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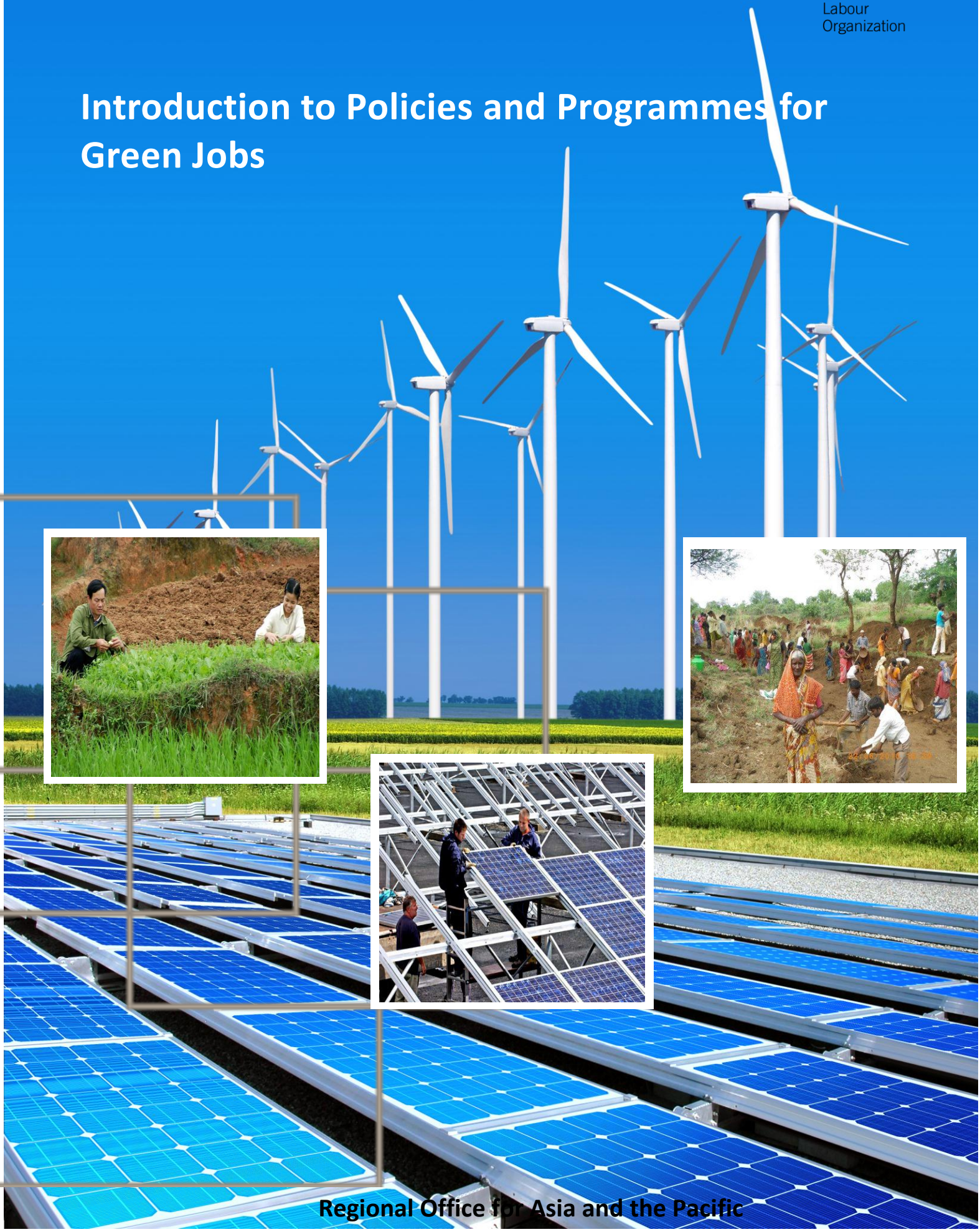
Introduction to Policies and Programmes for Green Jobs



Regional Office for Asia and the Pacific

Introduction to policies and programmes for green jobs
2012

Regional Office for Asia and the Pacific

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Foreword

This publication was developed by Ian Barnes under the guidance of Vincent Jugault, Senior Environment and Decent Work Specialist, Green Jobs Unit, ILO Regional Office for Asia & the Pacific in Bangkok to address some of the new and specific needs for information sharing and general understanding of the complex relationships between social, economic and environmental policies. The need for a development path that would be more respectful of the environment, economically viable and socially sustainable with decent work for all is largely discussed and accepted. However, to achieve a greener economic growth model that supports sustainable development and poverty eradication remains an uncertain challenge, particularly in countries with a large unemployed youth population, sub-standard living and working conditions and a large informal economy.

In the Asia and Pacific region great disparity exists between countries, economic sectors and the speed with which these structural shifts towards a greener economy and adjustment to climate change are taking place. What are particularly necessary are policies and measures that are adapted to each country's particular situation. In this context, green jobs are increasingly seen as a solution to not only environmental but also economic and social challenges and are moving to take a central space in the policy agenda. Specific policies and measures are needed for a green and just transition that can create more quality jobs and green jobs and help the actors of the world of work to adapt to the changing environment. This process has been initiated through different forms and by various stakeholders in both developed and developing countries around the world.

The publication examines the different facets of sustainable development policy that can generate quality jobs, including green jobs, in a somehow systematic and comparable manner. In no way should it be considered as providing a comprehensive overview but rather an introduction to this rapidly evolving field of policy making. The publication has also been designed to help the reader have direct access to the information and examples without being required to read the whole report. In-depth profiles of a limited list of more advanced countries are presented which aim to provide a clearer and more holistic view of the policy framework that is required across the environmental, economic and social fields to navigate the economy towards a low-carbon, climate resilient, environmentally sustainable path. Additional national profiles will be added as more countries come to terms with their green jobs arrangements in line with their own specificities and priorities.

In the second part of the publication, examples are given on programmes and sector-based approaches to green job creation that have been implemented in a variety of countries around the world, both in developed and low-income countries. The intent is to share experiences on very different issues and sectors from a wide range of stakeholders, including central and provincial authorities, employers, trade unions and non-governmental organizations.
Such concrete examples will help, it is hoped, the actors of the world of work engaged in such a transformation process to promote a strategy that will be integral towards a shift to a low-carbon environmentally sustainable economy, accelerate the jobs recovery, reduce social gaps, support development goals and realize decent work in the process.

Alcestis Abrera Mangahas
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Executive summary

Introduction

The transition to a greener economy will create green jobs and increase demands on the labour market for new green skill sets. Implementing polices that adapt to the impacts of climate change while pursuing a low carbon development path can improve the climate resilience of society while opening up new avenues for economic growth through the development of new green industries and climate smart technologies. The impacts of climate change, urbanization, natural resource scarcity, increasing energy prices, loss of biodiversity and ecosystem degradation have compelled governments around the world to implement legislation that will engender greater environmentally sustainable economic growth. It is also generating demand for increased eco-efficiency standards and economy wide reductions in energy and carbon intensity and cleaner production processes creating additional demand for workers with green skills. In this regard, the recent United Nations Framework Convention on Climate Change (UNFCCC) negotiations in Cancun[1] highlighted that addressing climate change requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued high growth and sustainable development, based on innovative technologies and more sustainable production and consumption and lifestyles, while ensuring a just transition of the workforce that creates decent work and quality jobs.

According to an estimation made by the International Labour Organisation (ILO) in 2008 green jobs have the potential to employ 100 million people worldwide over the coming years. For countries with abundant labour resources, green sectors offer an opportunity for employment in environment-related labour intensive activities and to address the possible Decent Work gaps that often characterize these sectors. Strong political leadership channelled through multi-stakeholder dialogues involving social partners and public consultations can garner political support for new policies and programmes that create an enabling environment for the greening of the economy and the development of new green growth sectors. Countries at risk from the impacts of climate change will require gender sensitive, job-centred policies to adapt to the changes, alleviate poverty and bring significant social and economic benefits at the local level. Well-developed integrated policies including social and employment policies have the potential to initiate a cycle of virtuous economic development and poverty eradication while contributing to social inclusion and environmental sustainability. Greater national and provincial government coordination on green jobs and green skills development can encourage the implementation of robust, coherent and stable policy frameworks needed to create new green businesses while supporting the wider environmental agenda. More environmentally friendly socio-employment agendas can strengthen the social pillar and may be linked with environmental agendas, national adaptation plans of action (NAPAs), nationally appropriate mitigation actions (NAMAs), climate change plans and national development plans. This would require greater inter-ministerial collaboration and dedicated national and provincial level task forces charged with integrating environmental, socio-employment and sustainable development policies.

[1] UNFCCC, Outcome of the work of the Ad Hoc Working Group on long-term Cooperative Action under the Convention - Article 10, Cancun, 2010, http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf

The ILO defines a green job as direct employment in economic sectors and activities, which reduce their negative environmental impacts, ultimately resulting in levels that are sustainable. This includes but is not limited to jobs that work towards protecting ecosystems and biodiversity, reducing energy, materials and water consumption, de-carbonizing the economy and minimising all forms of waste and pollution. Green jobs can be found in every sector that produces green goods and services but are predominantly focused in agriculture and forestry, green construction and retrofitting, renewable energy, public transport, energy efficiency, waste management, industries in transition (cleaner production), water resource management, green chemistry, sustainable tourism, adaptation to climate change and the regeneration of natural capital. There are also thousands of additional opportunities for green jobs in traditional pollution control activities such as monitoring air, waste and water quality and the rehabilitation of disused sites. Moreover, a job can only be classed as a green job if it is decent work and thus must offer safe working conditions, adequate wages, career prospects, and job security and worker rights. It is important for policy-makers to consider social protection policies and decent work principles while these new green jobs are being created.

Methodology

Without passing judgment on the effectiveness of such policies and programmes, this study examined relevant policy developments from around the world in regards to green jobs. The methodology sought to effectively map social, economic and environment-related policies which have been introduced in recent years and how their coordinated implementation has contributed to the development of green jobs. In-depth country profiles were used to analyse current environmental policy frameworks and specific employment and social policies targeting green jobs. The study seeks to provide policy-makers with a clearer, more holistic view of the policies and measures currently being undertaken towards the development of low carbon, climate resilient and green economies. The profiles are separated into six separate sections in an attempt to organise the information in a clear and coherent manner for the reader, they are; legislative framework on sustainable development; consultative & institutional mechanisms; investments and financial incentives; environmental standards & targets; social protection and education and vocational training.

The second part of the report focuses on sector specific policies and programmes for green jobs around the world which includes green sector based programmes; brown field redevelopment; restructuring and diversification strategies involving the renewable energy sector; employment guarantee schemes and investment in natural capital as well as provincial and municipal strategies on green jobs. The information presented in this report comes from official sources mainly and relates to innovative programmes and measures in the economic, social and environment fields.

Key findings and policy recommendations

Labour market demand for new green skills is set to increase worldwide as governments enact legislation to tackle climate change and unsustainable patterns of economic growth. Legislators need to establish a comprehensive policy framework to create an enabling environment for new green job creation. The following policy recommendations can work towards the development of green jobs:

- **Legislation on green jobs** can mobilize resources and key actors in the world of work to identify demand for new green jobs and spur employment in new green sectors. Legislation may set up policies and programmes to undertake research on the labour market, engage stakeholders to identify and track new green jobs and the skills needed to develop green industries, link research and development to job standards and training curricula and address green skill shortages in emerging industries. New institutions can be created or new functions given to existing institutions to address changing labour needs in particular at the local level or by sector of activity (e.g. observatories for green jobs).
- **National, provincial and municipal government coordination and consultations on green jobs**. Establish inter-ministerial working groups, multi-stakeholder dialogue mechanisms and public consultation workshops on green jobs, including government engagement with labour unions and employers' organizations, industry, institutes of higher learning and civil society when planning strategies for new green employment. Green job committees can be created to facilitate consultations between the labour, energy, education and industry departments as well as other relevant provincial organisations.
- **Greater economic, social and environmental policy integration** can result in innovative solutions to issues related to economic development and employment including youth employment, social development, climate change and natural resource scarcity. An effective sustainable development policy mix supported by national, provincial and municipal level legislation can foster the growth of new green industries, green employment opportunities and a just transition for enterprises and workers to adapt to new sustainable patterns of consumption and production. Therefore, there is a need for an overall umbrella policy framework for greening the economy as a whole, under which specific social and employment 'green' policies can be launched to develop green jobs.
- **Green skills development and up-skilling programmes** as well as education strategies are needed that address the emerging needs of industry and the public sector at both the national and local levels. Employment and skills needs forecasting ought to be integrated in to economic planning to anticipate developments in the labour market and implications for education and training. Green job programmes can be developed and administered by newly created observatories in their economic area of relevance (e.g. agriculture and forests, fisheries, cars, buildings, water management, waste and air, electric construction and networks, renewable energy, bio-fuels, green chemistry, tourism, transportation, biodiversity and ecologic services provided by nature, etc.). A factor for success in these plans is the participation of social partners (employers and workers representatives) who are able to anticipate skills needs early and also manage continuous trainings at the work place.
- **Social protection schemes.** Cohesive programmes may be developed that integrate training and social support services with a view to creating pathways out of poverty for people from disadvantaged communities. Such programmes may provide competitive grants to organisations to carry out green job trainings for individuals and families from low incomes areas. Such measures could include recruitment and referral services, basic skills and occupational green skills training and support services to overcome employment barriers. Also, partnerships or programmes can be launched that target specific groups such as the disabled, single mothers, unemployed, veterans, etc, assisting them to find green jobs in the labour force while providing training as well as social and health care services.
- **Establish eco-industrial parks, eco-clusters, eco-towns, green technology manufacturing hubs and sector-based programmes** to support the development of new green businesses and green jobs. Green Industry Complexes can be built which utilise the

concepts of resource-use efficiency, closed loop production, waste-to-feed and waste-to-energy while being wholly powered by renewable energy. The positioning both of large companies and SMEs in close proximity can spur inter-disciplinary cooperation in green technology development, improving fuel and energy efficiencies while reducing GHG emissions.

- **Promotion of entrepreneurship and SME development in green technologies and services.** Consistent policies for the creation and expansion of SMEs, through adequate fiscal and tax policies, including tax rebates for investments in country-specific green growth sectors must be developed. Technical and financial support can be granted to help entrepreneurs explore green business opportunities, create their own start ups and expand opportunities to learn about new technologies.

Key policies that generate green jobs

The report focused on mapping the major green job related policies in the economic, social and environmental fields which have been implemented in the following selected countries: France, Malaysia, Republic of Korea, Singapore and the U.S. These policies were analysed to see how they interact, create synergies and drive the development of green jobs across the economy and are presented in the form of country profiles.

France established the Environmental Grenelles in 2007 and 2008 (Environmental Round Table discussions) and Sea Grenelles in 2009 that brought together representatives from government, local authorities, labour and management, NGOs, workers and the private sector to discuss France's sustainable development policies. The multi stakeholder discussions resulted in two ground breaking pieces of legislation; the *Grenelle 1 Law on Implementation of the Environmental Round Table Commitments* and the *Grenelle 2 Law on the National Commitment to the Environment* intended to harmonise France's economic development with greater environmental sustainability. The subsequent Grenelle Environmental Plan confirmed France's commitment to quarter GHG emissions by 2050 relative to 1990 levels and established a regulatory and financial framework to encourage the use of low carbon and renewable energy technologies. The Grenelles have been estimated to have the potential to create 600,000 new green jobs and generate up to €450 billion worth of economic activity by 2020. France also announced a skills development strategy in 2009 known as the Mobilisation Plan for Green Jobs which included the establishment of 11 sectoral committees on green jobs to work with industry.

Malaysia escalated green technology to the mainstream cabinet portfolio in 2009 creating the Ministry of Energy, Green Technology and Water (KeTTHA). This ministry is now the primary ministry leading Malaysia's push towards green growth and green jobs. The 10th Malaysia Plan (2011-15) developed by the Economic Planning Unit under the PM outlined a programme of economic reforms expected to facilitate the growth of new industrial sectors, particularly in green technologies. The National Green Technology Policy of 2010 developed by the Cabinet Committee on Green Technology and KeTTHA promoted the development of new green technologies in four main sectors; energy, buildings, water and waste management. The policy established legal mechanisms to foster accelerated growth in green technologies and established the Malaysian Energy Centre, Malaysian Green Technology Corporation and Malaysian Green Technology Agency as well as the RM 1.5 billion Green Technology Soft Loan Scheme to encourage green businesses.

Republic of Korea passed national level legislation on green growth in early 2010. The *Framework Act on Low Carbon Green Growth* established a comprehensive legal framework to foster the development of new green technologies and industries, to create new green jobs, to respond to climate change, to control energy targets, to promote a green lifestyle for citizens and to promote sustainable development. This legislation created the Presidential Committee on Green Growth, local committees on Green Growth and a Green Growth Task Force to assist the work of relevant sub-committees. Korea's *Five-Year Plan for Green Growth* (2009-14) is the country's medium-term plan for implementing the *National Strategy for Green Growth*. The plan allocated US$ 94.7 billion over five years for investments in fifty projects covering twenty-seven core green technologies including; clean technology, resource & material efficiency, renewable energy, sustainable transport, green buildings, green IT and ecosystem restoration. The plan is expected to create between 1.18 - 1.47 million new green jobs over 5 years.

Singapore released the *Sustainable Singapore Blueprint* in April of 2009. Launched by the Inter-Ministerial Committee for Sustainable Development (IMCSD) it set out the national framework and strategy for Singapore's sustainable development over the next two decades until 2030. The *National Climate Change Strategy* (NCCS) was released in 2010 which outlined the agenda to develop the country into an environmental knowledge hub over the next 10 years while improving economic sustainability. The strategy was developed between six Ministries to better understand the country's vulnerabilities to climate change, to identify and assess adaptation measures and to mitigate greenhouse gas emissions in Singapore. The Clean Energy Programme Office (CEPO) will focus on cluster development and technology development including the Jalan Bahar Clean-tech Park for companies researching, test-bedding and prototyping clean technologies. Singapore is one of the few countries in the world to mandate green building standards, since 2008 all new buildings have to meet the Green Mark Certified rating, coupled with the Skyrise Greenery Programme it is expected to generate hundreds of green jobs in the engineering and construction sectors.

United States of America passed the *Green Jobs Act* in 2007 which authorized up to $125 million to fund national and state job training programmes in green industries, such as energy efficient buildings and construction, renewable energy, low carbon vehicles, and bio-fuels development**.** This was followed by the development of the *Green Jobs Framework for Action* by the U.S. Department of Labour (DoL) to coordinate policies and programmes for green job creation across the country. The *American Recovery and Reinvestment Act* of 2009 authorised $787 billion to stimulate the U.S. economy during the financial crisis. 12 per cent of the total was spent on green investments including renewable energy, carbon capture & storage (CC&S), energy efficiency, low carbon vehicles, high speed rail, smart grids, water and waste management as well as an additional $600 million to the DOL for training programmes for green collar workers.

Sectoral examples of policies

The following examples highlight some sector based policies and programmes that contribute to the development of green jobs around the world.

The **German Alliance for Work and the Environment** is a partnership between the German government, trade unions, environmental NGOs and employers' federations and has created around 600,000 new high skilled green jobs for German workers since its inception. In 1998 the Confederation of German Trade Unions (DGB) proposed a retrofit programme

that would enhance the energy efficiency of 300,000 existing buildings in Germany by improving building insulation (roofs, walls and windows), upgrading heating and ventilation systems and installing renewable energy equipment such as photovoltaic and solar thermal systems. The energy efficiency programme aimed to reduce CO_2 emissions, to reduce energy bills for tenants, to renovate at least 300,000 apartments a year, to reduce dependency on fossil fuel imports and to reduce unemployment costs while increasing income tax revenues. Retrofitting also produced a number of benefits to the local communities such as inner city revitalisation, reduced urban sprawl in the suburbs, a reduction in rush hour traffic and an overall improvement in the quality of life for the residents.

In 2007 the Brazilian government announced the **Growth Acceleration Programme**, a strategic investment programme of US$ 349 billion that combined management initiatives and public works programmes to stimulate the economy while improving the lives of the poor. In 2009 Phase two allocated US$ 152.5 billion for new green social housing (homes built using principles of green construction) and the urbanization of *favelas* (informal settlements). The idea was to use fiscal policy to stimulate the economy, create new jobs in green construction, to build environmentally sustainable housing and to create more liveable and sustainable communities for Brazil's urban poor. The majority of the housing construction process is completed offsite, so unskilled workers can be easily trained to assemble structures. Green social housing has the potential to generate substantial numbers of green jobs in developing countries while providing sustainable solutions to the environmental challenges caused by informal settlements.

The **National Green Jobs Corp** was established by the Australian government in 2010 to provide work experience, skills development and accredited training to young people to prepare them for employment in green sectors. The AUS$ 79.6 million initiative funded environmentally focused projects and aimed to equip 10,000 young people a year with green skills and training. The projects were developed in conjunction with local government, local communities, representatives of environment groups, and relevant training providers. Examples of the green job projects include; restoring degraded beaches, dunes, riverbanks, foreshores, flora and fauna; land surveys and audits; building and repairing board walks; regeneration and replanting of degraded lands; restoring national parks; wildlife and fish habitat protection; weed clearing; refurbishing public parks and improving public spaces; building or repairing bikeways, tracks and footpaths; landscaping gardens using native plants and work in recycling and waste management. The initiative also provided skills training and work experience on projects designed to tackle climate change such as improving the energy efficiency in buildings or installing renewable energy technologies.

In 2008 the **All China Federation for Trade Unions (ACFTU)** demonstrated its commitment to reducing GHG emissions and promoting green jobs by implementing a training programme to create 670,000 new energy efficiency inspectors. These inspectors now play an active role in ensuring that workplaces and enterprises are compliant with energy reduction regulations and are responsible for familiarizing workers with the relevant skills and knowledge needed to perform their duties properly while contributing to greater energy efficiency. The ACFTU has also raised public awareness about energy conservation issues by launching quiz competitions, speech contests and essay competitions as well as supporting the continued development of green education and training programmes. The ACFTU also plans to build 800 new demonstration points and 50 female worker training and demonstration schools to act as training bases for green skills and re-skilling programmes for laid-off and migrant workers.

The redevelopment and restructuring of brown field sites with renewable energy technologies has the potential to create green employment for workers laid off from traditional carbon intensive industries. **Lindø Shipyard** in Denmark was forced to lay off hundreds of workers from their shipbuilding business due to increased foreign competition. In response it was decided to restructure the shipyard construction facilities to build offshore renewable energy technologies. The Lindø Offshore Renewable Centre (LORC) was established in 2010 after consultations between national and local government, Danish energy companies and the Lindø Forum to facilitate the redevelopment. Offshore renewable energy was identified as one of the most promising alternative employment opportunities for the laid off workers. Skills competencies such as surface treatments, welding and outfitting can be easily transferred to wind turbine production if facilitated by effective upskilling programmes. The local municipal authority took the lead in identifying new green skills for the offshore renewable energy sector as part of their public employment services while LORC was tasked with providing an upskilling programme for offshore renewable energy needs with a view of adapting it to the public vocational training system once green jobs started to materialise.

Shipyards in the U.K. have also been forced to diversify into civil engineering and offshore renewable energy construction including wind turbines and tidal power plants. Using ship building skills such as design engineering, welding, ship repair and ship conversion, the workers now manufacture a range of renewable energy technologies such as wind turbines, towers, blades, wave and tidal power devices, as well as the decommissioning and recycling of ships at the end of their life cycles.

The National Rural Employment Guarantee Scheme is a public works programme developed by the Ministry of Rural Development of India. Established by the *Mahatma Gandhi National Rural Employment Guarantee Act* (NREGA) of 2005, the programme was designed to address the issue of rural development and guaranteed registered rural households a maximum of 100 days of paid unskilled manual employment a year. NREGA guaranteed wage employment to rural households for work to create durable community assets through ecological regeneration in rural areas; activities included water conservation, drought proofing, reforestation, flood protection, land development, minor irrigation, horticulture and rural connectivity. The programme has had a significant impact on raising incomes in rural areas. The average wage earned in rural areas has risen from Rs 65 per person day in 2006 to Rs 100 per day by 2011 impacting 54,954,225 households across the country (2010-11). The scheme has also had a positive effect on gender equality as women constituted 50.9 per cent of all persons working in the scheme from 2010 - 11, which dramatically exceeded the original target of 30 per cent. NREGA also had a positive impact on social protection as a component of the programme facilitated a social protection cash transfer umbrella programme. The scheme directed state governments to earmark a percentage of the workers' wages for a variety of voluntary social security schemes including, different types of insurance, survivor benefits and maternity benefits.

The **U.S. Forest Service's** *Strategic Framework for Responding to Climate Change* outlines efforts that are being made to enhance the capacity of carbon sinks in the U.S. to capture and store carbon dioxide. Extensive tree planting programmes are expected to significantly improve the assimilative capacity of carbon sinks, creating labour intensive green jobs in the process. Green jobs in the forestry sectors include adaptation of ecosystems to the effects of climate change, restoration of forests and grassland, efforts to reduce wildfires or pest outbreaks and forestry management. Carbon accounting, carbon trading and other activities related to the international carbon markets are also expected to generate significant numbers

of green jobs in the forestry and finance sectors. Employment related to climate change mitigation and adaptation in the forestry sector may also include forest management to increase carbon dioxide sequestration, using forest products to reduce and replace fossil fuel energy, research and development into climate change and actions which can reduce the environmental footprints of government operations.

Kitakyushu is an industrial city located in Fukuoka Prefecture on Kyushu; the southernmost Island of Japan. The municipality has introduced numerous policies and measures to reduce pollution and is now one of the most progressive cities in Japan regarding pollution control and recycling technology. The *Kitakyushu Eco-town Project* aims to develop a zero-emissions system where no waste would be produced in the city at all. It is supported by the *Kitakyushu Green Frontier Plan*, a regional policy that combines industry promotion and environmental conservation, in order to generate green jobs and establish a resource circulating society. The city has also established the *Basic Plan to Protect the Natural Environment in Kitakyushu*, the first of its kind in any Japanese city, as well as a designated council that consists of company representatives, academics, residents, and city officials to discuss issues regarding environmental management. The *Green Innovation Goals* direct Kitakyushu to create new markets worth 350 billion yen and 10,000 new green jobs for workers by 2020. Private sector companies have worked together with the municipal authorities to develop cleaner production processes, pollution prevention facilities and innovative technologies such as dust collection devices, desulfuration technologies and wastewater and sewage treatment facilities creating hundreds of green jobs in the process.

Conclusion

Labour market demand for green jobs is set to increase across the world as more initiatives are implemented by governments, industry, workers and the different actors of society to tackle climate change, energy security, environmental degradation and unsustainable patterns of economic growth. Addressing climate change and resource scarcity requires a paradigm shift towards building a low-carbon, environmentally sustainable society while ensuring a just transition for the workforce to adapt to the changing socio-economic environment and which creates decent work and quality jobs. In particular, by integrating low carbon development strategies with social protection and skills development programmes for green jobs, progress can be made towards harmonizing environmental and social considerations with further economic growth.

Drawing on the selected examples from the study it is clear there is a need for greater economic, environmental and social policy integration in development planning and that green jobs can be created through greater inter-ministerial consultations and cross cutting collaboration from different levels of government and economic sectors. During the transition to a greener economy it will be essential to ensure that the concerns of affected workers and employers are represented through multi-stakeholder dialogues. This can help identify any structural barriers to the creation of green jobs, provide innovative solutions to employment needs as well as garner political support, especially from the communities which will be most impacted. It is important that social policies are put in place to make sure that workers negatively affected by the transition to a greener economy are protected through income support, retraining opportunities and relocation assistance. It is equally important to optimize the employment and social gains that the shift towards a green economy could bring, through adequate skills development and entrepreneurship initiatives, and to support sustainable enterprise development.

Demand is rapidly growing for policy support for green jobs, particularly from developing countries in Asia and the Pacific. Governments are increasingly placing green jobs at the centre of the policy agenda; however there are still wide disparities in the speed with which changes are occurring between different countries and sectors that need to be investigated further. More research and experience sharing amongst countries is required to analyse the impacts of green policies both on the labour market and wider economy and their potential to generate large numbers of decent work while supporting further economic and social development agendas.

List of abbreviations

ACFTU	All China Federation for Trade Unions
ANFA	National Association for Training in the Automobile Sector, France
ANPs	Advanced Nano-Products
ARPA-E	Advanced Research Projects Agency –Energy
ARRA	American Recovery and Reinvestment Act
ARRI	Appalachian Regional Reforestation Initiative
AWI	Aging Worker Initiative
CAFE	Corporate Average Fuel Economy
CALSS	Chinese Academy of Labour and Social Security
CAT	Centre for Appropriate Technology Inc., Australia
CCS	Carbon Capture and Storage
CCX	Chicago Climate Exchange
CERC	China-US Clean Energy Research Center
CESE	Economic, Social and Environmental Council, France
CEQ	Council on Environmental Quality
CGDD	Department of the Commissioner-General for Sustainable Development, France
CGEDD	General Council of the Environment and Sustainable Development, France
CWSRF	Clean Water State Revolving Fund
DGB	Confederation of German Trade Unions
DPRK	Democratic People's Republic of Korea
DOL	Department of Labor
EPA	United States Environmental Protection Agency
ESCO	Energy Service Companies
EU ETS	European Union Greenhouse Gas Emission Trading System
FISO	Social Investment Fund
IEO	International Employers Organization
ILO	International Labour Organisation
IOE	International Organisation of Employers
ITUC	International Trade Union Confederation
JPoI	Johannesburg Plan of Implementation
KOICA	Korea International Cooperation Agency
LEED	Leadership in Energy and Environmental Design
LORC	Lindø, Offshore Renewable Centre
MBI	Market Based Instruments
MEA	Multilateral Environmental Agreements
MEEDDM	Ministry of Ecology, Energy, Sustainable Development and the Sea, France
MEPS	Minimum Energy Performance Standard
MOU	Memorandum of Understanding
NAFTA	North American Free Trade Agreement
NDRC	National Development and Reform Commission of China
NEC	National Economic Council
NREGAS	National Rural Employment Guarantee Scheme
NGO	Non-Governmental Organisations
NPC	National People's Congress
O*NET	Occupational Information Network
OIA	Office of Congressional and Intergovernmental Affairs
OECD	Organisation for Economic Cooperation and Development
PCGG	Presidential Committee on Green Growth

R&D	Research and Development
RGGI	Regional Greenhouse Gas Initiative
RSA	Revenue of Active Solidarity
SCHRD	Sector Councils for Human Resource Development
SCP	Sustainable Consumption and Production
SDRC	State Development Reform Committee of China
SEZ	Special Economic Zone
SME	Small and Medium Sized Enterprises
SNDD	National Sustainable Development Strategy, France
TARP	Troubled Asset Relief Programme
UNCBD	United Nations Convention on Biological Diversity
UNCDD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
VWIP	Veterans Workforce Investment Programme
VETRC	Vocational Education and Training Reform Centre

1. Introduction

1.1 Towards a low-carbon, climate resilient, environmentally sustainable development path

Climate change, natural resource scarcity and increasing environmental degradation have compelled governments around the world to step up the implementation of policies and measures that will engender greater environmentally sustainable economic growth. The recent economic crisis has created a window of opportunity for policy-makers to reassess current development paradigms and to initiate programmes that will decouple economic growth from environmental degradation and rising greenhouse gas emissions (GHGs). The term green growth has emerged to encompass modern day notions of environmental stewardship and inclusive sustainable development. Green growth is described as "a way to pursue economic growth and development, while preventing environmental degradation, biodiversity loss and unsustainable natural resource use (OECD, 2010). It builds on existing sustainable development initiatives in many countries and aims to identify cleaner sources of growth, including seizing the opportunities to develop new green industries, jobs and technologies, while also managing the structural changes associated with the transition to a greener economy." A green economy is thus an economy that values progress, that values the environment and that values her people. The goal of truly inclusive sustainable development can be achieved but only once the social and environmental costs of economic activity are internalised into the market price. From a government perspective, encouraging investments in human, social and natural capital as well as in industrial capital, while accounting for externalities in the price of production is a crucial public policy strategy to ensure sustained prosperity for all members of society.

A successful strategy to improve the environmental performance of the economy will encompass changes at all levels of society, therefore it is vital to consult people from across a wide spectrum to ascertain and discuss how they would envisage a greener future and healthier way of life. Only through multi-stakeholder dialogue can a truly inclusive path to green growth be achieved. This transition to a greener economy will create new employment opportunities and demands for new skill sets as well as spur the development of new green industries and technologies. Implementing polices to adapt to climate change and to pursue a low carbon development trajectory can increase climate resilience while creating new economic, environmental and social benefits to society. Strong political leadership and holistic strategies coupled with robust, coherent and stable policy frameworks will be needed to create an enabling environment for new green businesses, products and services to prosper while supporting the wider environmental agenda. New social policies will be required to ensure that this development is inclusive and sustainable while serving the good of the many and protecting the most vulnerable in society. New ways of thinking and of doing things will emerge to replace our antiquated patterns of industrial-era production and consumption.

The economy is likely to be affected in a myriad of ways by this drive towards greater sustainability. New jobs, industries and businesses will be created, some jobs will be substituted, some jobs will be lost, while many existing jobs will simply be transformed. There is no doubt that the green economy will create vast opportunities for entrepreneurs, scientists, engineers and decision makers willing to embrace the changes. However, there will also be losers, those entities that fail to adapt to the new realities of climate change, resource

scarcity and an increasingly carbon-constrained world will struggle to survive in an increasingly competitive global market. It will be the role of policy-makers to ensure that this transition will be one that creates win-win outcomes for all members of society and provides solutions to mankind's surmountable challenges of climate change, poverty alleviation and environmental degradation.

1.2 Background to green jobs

A green job, as defined by the International Labour Organisation (ILO), is direct employment in economic sectors and activities, which reduce their negative environmental impacts, ultimately resulting in levels that are sustainable. This includes but is not limited to jobs that work towards protecting ecosystems and biodiversity, reducing energy, materials and water consumption, de-carbonizing the economy, minimising all forms of waste and pollution and adapting to climate change. In addition, the ILO only considers a job to be a green job if it is decent work. Green jobs must offer safe working conditions, adequate wages, career prospects, job security and worker rights. That means there are thousands of new environment-related jobs being created around the world, however not all of them can be defined as green jobs. Even if a job is in an environment-related sector but is harmful, exploitive, pays below minimum wage, etc., it should not be described as green or decent. There are millions of green jobs around the world already in both developed and developing countries and this number is set to increase over the coming decades as more countries instigate low carbon, environmentally sustainable development strategies. According to an ILO estimate (2008), green jobs have the potential to employ 100 million people worldwide over the coming years. For countries with abundant labour resources, green sectors offer an opportunity for new employment in environment-related labour intensive activities. Green jobs can be found in almost every sector but are predominantly focused in agriculture and forestry, green construction and retrofitting, renewable energy, public transport, energy efficiency, waste management, industries in transition (cleaner production), water resource management, green chemistry, sustainable tourism, climate adaptation and the regeneration of natural resources sectors. There are thousands of additional opportunities for green jobs in traditional pollution control (air, waste, water) and monitoring activities.

It is important for policy-makers to consider social protection policies and decent work principles while these new green jobs are being created. Public social policy can work towards reducing the disparity between the winners and the losers arising from the green economy transition. Decent green jobs can thus effectively link Millennium Development Goal 1 (poverty reduction) and Millennium Development Goal 7 (protecting the environment) making them mutually supportive rather than conflicting.

In this regard, the ILO in partnership with United Nations Environment Programme (UNEP) and the International Trade Union Confederation (ITUC) launched the Green Jobs Initiative in 2007 and were subsequently joined by the International Organization of Employers (IOE) in 2008. The ILO Green Jobs Initiative was established to try and enhance the social and working conditions of those employed in these new environment-related sectors and to support countries in creating an enabling policy framework for new green job creation. This includes strengthening social protection polices and active labour polices, green job training for workers at risk of redundancy in carbon-intensive industries, participatory consultations and decision-making between government, social partners, labour unions, civil society and environmental groups, as well as public awareness raising about green jobs and green skills. By integrating climate change action plans and low carbon development strategies with social

protection and green skills development programmes, progress can be made towards harmonizing environmental and social considerations into economic development planning, strengthening the three pillars of sustainable development.

The green jobs initiative also calls for greater consultation and engagement with labour unions, social partners, industry and civil society when planning strategies for new green employment. In addition, green jobs programmes can be designed to target the most vulnerable members of society such as minority groups, disabled, single parents, old people, long-term unemployed, ex-convicts and young people, providing new employment and social protection opportunities. There is a pressing need to better integrate social and employment dimensions into the development decision-making process to create a more inclusive, greener and sustainable way of life for everyone.

1.3 Methodology

The methodology of the policy study seeks to present information on green jobs in a clear and holistic manner. It was decided that in-depth country profiles would be an effective means to both describing current environmental policy frameworks and specific employment and social policies targeting green jobs and analysing how they are likely to impact green job creation as part of the wider transition to a green economy. It offers the reader an opportunity to see how economic, social and environmental policies have been integrated at the national and provincial level to achieve greater environmental sustainability while creating decent green jobs.

France was chosen for the policy profile because of the success of the Environmental Round Table discussions known as the Grenelle de l'Environnement. Wide-spread consultations were undertaken by the government with social partners such as labour unions, non-governmental organisations and environmental groups to prepare a vision of how different actors in society could move forward together to benefit from green growth and the new green economy.

Malaysia has also made enormous strides towards greater environmental sustainability in recent years. The government demonstrated their commitment to greater energy security and climate change mitigation and adaptation by escalating green technology to the mainstream cabinet portfolio in 2009, creating the Ministry of Energy, Green Technology and Water (KeTTHA). This ministry is now the primary ministry leading Malaysia's push towards greater green growth and green jobs.

The Republic of Korea has made significant progress in the past few years by improving the environmental sustainability of their economic growth patterns while implementing measures to fight climate change. The *Framework Act on Low Carbon Green Growth* passed in 2010 as well as the Green New Deal and National Strategy for Green Growth makes the Republic of Korea an excellent case study on how to integrate green growth polices into the wider economic development agenda to create new green industries and green jobs.

Since Singapore's independence government policy-makers have been keenly aware of the need to pursue resource efficient growth strategies brought about by the absolute lack of natural resources found on the island. Water, energy and most of the food must be imported into the territory, so concepts of energy efficiency, resource-use efficiency, water

conservation and environmental protection have always been at the forefront of Singaporean development planning generating hundreds of interesting examples of policies for green jobs.

The United States was chosen for their comprehensive efforts on green job creation, especially in regards to assisting vulnerable groups. Green employment was supported by the passing of the *Green Jobs Act* in 2007. The *Recovery Act* of 2009 also earmarked billions of dollars for investments in renewable energy, sustainable infrastructure, research and development and green job training.

The profiles are separated into six separate sections in an attempt to organise the information in a clear and easily understandable manner. 1) *Legislative Framework on Sustainable Development* highlights the current multilateral environmental agreement (MEAs) commitments and examines current legislation on sustainable development and green jobs to provide a clearer picture of how the current legislative frameworks interact and work towards creating a more enabling environment for greater green job creation. 2) *Consultative & Institutional Mechanisms* examines what institutions are present in the country to promote sustainable development policy at the federal and state levels and what kind of multi-stakeholder consultations have been convened to discuss green growth and green job issues. 3) *Investments and Financial Incentives* will quantify and analyse the wide range of government polices currently underway to drive the transition to the green economy. This section is further divided into three sections, *Market Based Instruments* examines policies that affect the market and price signals, *Loans and Funds* examines how and where the money is being used to develop new green industries and green technologies and *Fiscal Policies and other Investments* covers recent economic stimulus packages, green public procurement, research and development (R&D) and other policies related to spending. 4) *Environmental Standards & Targets* examines what types of legislation (legally binding standards and voluntary targets) are on the books driving the development of and setting the environmental performance standards for procedures, technologies, products and services and consequently the need for new green jobs and skills. 5) *Social Protection* examines social polices relevant to green jobs, particularly those which target disadvantaged and vulnerable members of society. 6) *Education and Vocational Training* examines some of the recent training programmes for green jobs and green skills as well as other actions taken to educate people about sustainable development issues.

The second part of the publication provides some interesting examples of programmes and sector-based approaches to green job creation that have been implemented in a variety of countries around the world. Efforts were made to choose case studies which provided good examples of decent work in green sectors. It also examines programmes for redeveloping brown-field sites, restructuring in heavy industries and job creation in the protection of the environment.

Without judging on the effectiveness of such policies and measures, the report examines a range of information regarding the different facets of sustainable development policy in various countries around the world. It seeks to provide policy-makers with a clearer, more holistic view of such policies and measures currently being undertaken to engage the economy into a low-carbon, climate resilient, environmentally sustainable path that can generate jobs, including green jobs.

2. Country profile – France

2.1. Legislative framework on sustainable development

At the international level France has signed and become party to all of the major multilateral environmental agreements passed within the past decades including the Montreal Protocol banning the use of substances that deplete the ozone layer (ratified December 1988), the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal (ratified May 1992), the United Nations Convention on the Law of the Sea (entered into force November 1994), the United Nations Convention to Combat Desertification (signed December 1996), the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (ratified February 2004) and the Stockholm Convention on Persistent Organic Pollutants (POPs) (ratified May 2004).

France also signed the United Nations Framework Convention on Climate Change (UNFCCC) and the Biodiversity Convention (ratified December 1993) as well as formally adopting Agenda 2 1 while attending the United Nations Conference on Environment and Development (UNCED) in 1992 and subsequently ratified the Kyoto Protocol in May 2002 as an Annex I party. France also signed the Johannesburg Plan of Implementation (JPOI) in 2002 which reiterated their commitments towards sustainable development and which called for support to be given to regional and national initiatives to accelerate the shift towards sustainable consumption and production (SCP) patterns. France is now one of the leading advocates of the Marrakech Process and is working with international partners and UNEP to develop a 10-Year Framework of Programmes (10YFP) on SCP focusing particularly on polices that promote sustainable tourism.

In 1990 France established the National Environment Plan, which brought about the first sweeping environmental administration reforms in the country. This was followed by the creation of 26 Regional Environment Directorates (DIRENs) in 1991 and the *Sustainable Development Act* of 1999 and the *Environmental Code* adopted in 2000.

France implemented the country's first National Strategy for Sustainable Development in June 2003 which provided the legislative framework needed to ensure consistency between different actions and measures implemented by public authorities. The strategy endeavoured to reconcile a dynamic economy, a high level of education, health protection, social and territorial cohesion while protecting the environment and cultural diversity. France further demonstrated their commitment to environmental stewardship by amending the constitution in 2005 with the inclusion of the *Charter of the Environment*.

In May of 2007 the country convened a series of environmental round table discussions to examine a wide range of environmental and developmental issues. Known as the 'Grenelles', the project's goal was to engage actors from across the spectrum of French society (state and local governments, trade unions, environmental protection agencies and representatives from business and civil society) to work tighter to develop a shared vision and strategic plan to pave the way towards a new form of competitive green economy, where development and economic growth are pursued in tandem with reduced demand and use of energy, water and natural resources.

The result of these discussions was two pieces of ground-breaking legislation designed to transform the society, the *Grenelle 1 Law on Implementation of the Environmental Round Table Commitments* and the *Grenelle 2 Law on the National Commitment to the Environment* of 2010. The first Grenelle law was designed to transmit the conclusions and recommendations made from consultations with trade unions, business, civil society and environmental protection agencies to the Senate and National Assembly for formal debate. The Grenelles have been lauded as having the potential to create 600,000 new green jobs and generate up to €450 billion worth of economic activity by 2020.

The *Grenelle 1 Act* confirmed the major commitments made by the Environmental Round Tables including;

- **Fighting climate change**: Confirmed France's commitment to quarter the amount of GHG emissions by 2050 (factor 4) relative to 1990 levels by establishing a regulatory and financial framework to encourage the use of low carbon technologies and renewable energy. Hastening the rate of energy efficiency retrofits of buildings, harmonising guidelines and planning legislation for urban areas, developing new renewable energy technologies and sustainable transport systems.
- **Protecting biodiversity, ecosystems and the natural environment**: Established a system of green and blue corridors across the country to limit urban sprawl and to facilitate the circulation of natural species across the country. These green corridors will protect and enhance biodiversity preserving it for the future. Target to reduce pesticide use by 50 per cent within ten years provided alternatives are available.
- **Preventing environmental and health risks and reducing waste**: Introduced measures to improve the knowledge of nano materials and the health effects of electromagnetic waves, a ban on equipment for children that emits electromagnetic waves, a reduction in household waste and the promotion of recycling.
- **Developing an ecologically-responsible democracy**: Providing representatives from environmental organisations access to the same discussion bodies as trade unions whenever there are impacts on the environment.

The *Grenelle 2 Law on the National Commitment to the Environment* of 2010 provided all the legislative standards and measures needed to fully implement the commitments of the Round Tables. Measures included inter alia:

1. **Buildings and urban planning**: The mandatory renovation of public buildings and service sector buildings (commencing in 2012 and completed by 2020), issuance of soft loans for energy efficiency improvements, development of an energy efficiency certification system for buildings, urban planning restrictions withdrawn for use of energy systems, promoting vegetated rooftops and renewable materials, urban planning text must be revised to limit the use of land in new constructions to protect farmland and the countryside and finally a limit on advertising billboards near infant and primary schools.
2. **Transportation**: Defines the powers of local authorities to improve the planning and management of all types of transport, promotes self-service cycle hire schemes, reserved lane public transport networks and the use of labels to promote car sharing schemes. New urban transportation plans must undergo a CO_2 emissions assessment before implementation, varying toll fees for trucks depending on their GHG emissions and finally the development and installation of a charging point infrastructure on the roads for electric and hybrid vehicles.

3. **Energy**: Introduces regional air quality, energy and climate plans to set guidelines to mitigate and adapt to climate change. Set policy to better manage energy demand, develop renewable energy sources and reduce air pollution, while companies in heavy GHG emitting industries and municipalities with more than 50,000 inhabitants must produce an audit of their emissions. Features provisions for renewable energy targets and the creation of wind farm zones.
4. **Biodiversity**: Provides a framework to control the trade in products made from protected plants, bans aerial spraying of pesticides, protection of drinking water catchment areas, introduction of a voluntary environmental certification scheme for farms, development of green and blue belt networks to facilitate the free movement of animal species. Water agencies will be given the powers to acquire wetlands up to a maximum of 20,000 hectares for conservation, while the right of pre-emption will be given to woodland owners to buy adjacent plots offered for sale by neighbours to reduce deforestation.
5. **Health risks and waste**: Defines measures to regulate artificial light pollution and indoor air quality; implements the EU directive on the assessment and management of flood risks; develops a framework for the certification of eco-materials; bans the use of mobile phones in primary and lower schools; a ban on radio terminal equipment manufactured for children under the age of six; requires regular monitoring of electromagnetic fields from electricity transmission lines; companies engaged in the business of nano materials and nano particulates must declare such substances and their use. In regards to waste, it stipulates the establishment of collection and processing channels for household waste and furnishing products, requires food stores over 500 m^2 to install points for recycling packaging waste, refund schemes for gas bottles, imposes capacity limits on the burial of household waste to encourage reuse and recycling, mandatory collection of organic waste by major producers and introduces plans to manage waste from public buildings.
6. **Governance**: Extends the requirement of companies with over 500 employees to present a social and environmental accountability report to management and investment firms, makes parent companies responsible for environmental damages caused by their subsidiaries, requires carbon footprints for consumer products and passenger and freight transport to be displayed. Finally it establishes regional economic, social and environmental councils to formulate and implement sustainable development policy at the regional level.

The tax-related provisions relating to 19 of the Grenelle commitments were debated separately and later passed under the *Budget Amendment Act* of 2008 and the *Budget Act* of 2009. Collectively referred to as Grenelle 3, the budget legislations set the framework to facilitate fiscal reforms that would promote green growth and green jobs in the economy.

The Grenelle Round Table discussions also resulted in the creation of a comprehensive employment development strategy called the *Mobilisation Plan for Green Jobs*. It has been estimated that at present there are around 400,000-450,000 environment-related jobs in France and the government hopes to significantly increase that number by 2020. In September 2009, the Ministry of Ecology, Energy, Sustainable Development and the Sea (MEEDDM) announced the intention to mobilise relevant sectors and regions to support occupations for green growth by creating 11 sectoral committees in areas considered most promising in terms of green job creation.

The 11 committees are overseen by a steering committee modelled on the same Grenelle approach to governance, including representatives from social partners, private sector, NGOs, government (relevant ministries i.e. MEEDDM, labour, education and research) and other representatives concerned with employment and training. The committees identified what new green skills and training programmes were needed by relevant sectors and how existing training programmes and qualifications could be adapted to fill the gaps. The plan builds upon the existing employment structures established in 2004 by the *National Training Agreement Law* which required every sector to create regional training and employment observatories (including representatives from ministries, regional councils, statistics departments, education departments and industrial partners) to forecast new training needs and provide training programmes. These branch observatories can give central government a clearer indication of the emerging skill needs at the sectoral and local level.

The *Mobilisation Plan for Green Jobs* outlines four main areas for action:

1) The establishment of a new national-level green job observatory to identify new green professions and quantify them.
2) The development of a reference system featuring new occupations and definitions for green jobs as well as setting up new training programmes and qualifications.
3) Helping jobseekers apply for green jobs and retraining them in green skills.
4) Promotion and public awareness campaigns about emerging green professions.

The mobilisation plan was considered necessary as many sectors of the economy had already identified substantial skill gaps emerging from the production and use of new green technologies. The steering committee identified a lack of educators as a barrier to widespread dissemination of these new green skills and recommended the immediate establishment of 'training of trainers' programmes to start retraining and re-skilling the workforce.

2.2. Consultative & institutional mechanisms

In 2007, the French Government decided to amalgamate four existing ministries (public works and transport, energy, ecology and the sea) into the Ministry of Ecology, Energy, Sustainable Development and the Sea (MEEDDM) to improve efficiencies, policy coherence and coordination on cross-cutting issues. The MEEDDM is now the main government ministry in France responsible for overseeing and implementing policies for green technologies, climate negotiations and the commitments under what is known as the Grenelle de l'Environnement Round Table.

The Inter-ministerial Committee on Sustainable Development (CIDD) is a high-level body established in 2003 to coordinate French policy implementation in the field of sustainable development. Chaired by the Prime Minister, the CIDD ensures cross-ministerial policy consistency of actions adopted under the National Strategy for Sustainable Development as well as monitoring French positions and undertakings at the European and international level.

This institutional mechanism was further developed by Environmental Round Table (Grenelle de l'environnement) discussions which sought to streamline environmental considerations into the existing sustainable development framework. The Environmental Round Table commitments are now overseen and coordinated by the Department of the Commissioner-General for Sustainable Development (CGDD).

The Grenelle discussions aimed to formulate a consensus among actors on how to achieve a transformation of the entire economic and social system towards greater environmental sustainability. However, the government realised that such a drastic paradigm shift in attitudes and behaviour would be almost impossible to achieve using traditional top-down management. That is why the Grenelle discussions sought to include a wide range of views and suggestions from across a wide spectrum of French society. Initial discussions centred on the five-panel governance model designed to represent different stakeholder views on environmental issues. These included state and local authorities, private sector, trade unions, civil society and for the first time representatives from environmental associations. This was the first time a sustainable development framework had been used to approach issues related to the environment and economy, which proved to be very successful and is now an international reference in this regard. The discussions covered a broad spectrum of topics, structured around six working groups; fighting climate change and managing energy demand; protecting biodiversity and natural resources; adopting sustainable consumption and production practices; developing a healthy environment; promoting ecologically-responsible development methods that enhance competitiveness and create jobs and constructing an ecologically responsible democracy. The working groups were not allowed to prepare any documents prior to starting the discussions to ensure that any proposed ideas came from the panels. By the end of the dialogue several hundred proposals were drafted, followed by an even larger scale consultation consisting of 19 regional meetings, two internet discussion forums, two parliamentary debates and 31 advisory body referrals resulting in 268 commitments endorsed by the President.

The overall framework of the discussions was monitored by the Environment Round Table Monitoring Committee which met every two months, chaired by the Minister of State and including representatives from the five main panels. The committee played a central role in ensuring that all panel members were kept up to date with developments and enabled them to contribute to the drafting of the new National Sustainable Development Strategy (SNDD) for 2009-12. The *Grenelle 1 Act* made the committee permanent replacing the existing National Council for Sustainable Development and extended its remit to monitoring the implementation of the environmental commitments, the SNDD and the national biodiversity strategy. This new committee also included legal representatives from civil society active in other areas of sustainable development (social integration and welfare, consumer rights, cooperation and youth work).

During the summer of 2009 a further consultative process was established called the *Sea Grenelles*, to supplement the commitments specific to the seas and coastlines. The *Sea Grenelles* identified medium and long-term objectives and actions and drafted a maritime policy that formalised government actions in regards to maritime affairs. During October of 2009 the Secretary of State launched a number of projects to implement the *Sea Grenelles* commitments which included: the creation of ship dismantling activities; the processing of dredging sludge, ships and ports of the future; blue energy (tidal, wave power) plans; protection of the coastline, innovation, research and development in the maritime field; development of protected marine areas; pollution reduction; development of a compensation scheme for oil slicks; awareness raising tools; communication tools; skills training; improving social conditions and the creation of a new macro-waste fund.

2.3. Investments and financial incentives

2.3.1. Market-based instruments (MBIs)

France has been a member of the European Union Greenhouse Gas Emissions Trading System (EU ETS) since 2004 since the adoption of the EU Directive *Establishing a Scheme for Greenhouse Gas Emission Allowance Trading.* Although the EU ETS mechanisms were initially set up apart from the UNFCCC, once the Kyoto Protocol came into force in 2005, the EU agreed to allow Kyoto flexible mechanism certificates from the Clean Development Mechanism (CDM) and Joint Implementation (JI) credits to be traded on the ETS as compliance tools. Under the system large GHG emitters in France must monitor the amount of CO_2 they release and return an equivalent amount in carbon credits back to the central authority. Discussions are still underway in France regarding the introduction of a carbon tax, however, the draft Budget for 2010 did contain text for a carbon tax on energy from fossil fuels but was not passed. It had envisioned a starting price of €17 per tonne of CO_2 aligned to the average value of carbon on the French emission quota market and then progressively increasing every year until it reached a price of €100 per tonne of CO_2 by 2030.

France has also provided substantial sums to subsidise the development of renewable energy in the country. Under the Renewable Energy and Green Chemistry Demonstration Programme of 2010 €450 million was earmarked for subsidies and were granted for projects such as solar energy, marine energy and geothermal energy, as well as carbon capture and storage projects and advanced biofuel (algae) developments. The government also provides sustainable development tax credits to encourage energy efficient improvements in buildings. Households can deduct part of the cost of energy improvements from their income tax bill (e.g. 50 per cent for solar PV, 40 per cent for wood-burning stoves). In addition, the tax cuts granted under the *Budget Law* of 2005 guaranteed VAT reductions on home improvements for energy efficiency equal to 50 per cent of the purchase value. Interest payments can also be extended from 5 to 7 years for people buying a low-energy consumption property. Low consumption housing tax credits increased credit by 40 per cent throughout the period.

The Ecological bonus-malus tax system is a combined bonus and penalty system designed to encourage the purchase of low carbon vehicles. Since 2009, consumers have been required to pay a penalty if they buy a vehicle that emits high levels of CO_2, (penalty will increase over time) while low emission vehicles would be subsidised (bonus) and able to be bought at a much cheaper price. The scheme also provides a €300 bonus for scrapping a vehicle over 15 years old. In addition, the new hybrid and electric vehicle plan provides a bonus of €5,000 to consumers who purchase these low carbon vehicles spurring the market for low carbon vehicles. The General Tax on Polluting Activities also operates on the polluter-pays principle and applies to entities releasing polluting substances into the atmosphere as well as lubricants.

The French renewable energy feed-in tariffs are reviewed every year and are provided to producers who generate energy produced by biomass, (between €1.25 and €1.75/kWh, 2009) and solar PV (€0.44/kWh, 2010). France has one of the highest adder costs for solar PV in the EU and has witnessed tremendous growth in renewable energy markets over the past few years.

2.3.2 Loans and funds

Under the *Finance Law* of 2009 the French government provided interest-free eco- loans for the energy efficient renovations of private properties as well as social housing eco-loans to

improve the energy performance of social housing. By July of 2009 15,000 eco-loans had been issued by the government. There were €250 million of subsidized loans available from the government for manufacturers of hybrid and electric vehicles in 2010. There is also a Renewable Heat Fund available for energy producers to support the development of renewable sources for heat production. The fund provides €1 billion over three years of financial aid to benefit cooperative housing, communities and companies who install geothermal and other renewable energy supplies. The Renewable Energy and Green Chemistry Demonstration Programme of 2010 provides €1.35 billion over next four years to a renewable energy fund to support the development of cutting-edge clean energy technologies, including €900 million of low-interest soft loans for advanced technology projects. Projects funded by the programme include: solar energy; marine energy; geothermal energy; carbon capture and storage and advanced bio-fuels for sustainable transport initiatives, as well as a €250 million smart grid demonstration programme.

2.3.3. Fiscal policies and other investments

In December 2008 the government announced an economic stimulus package totalling €26 billion (1.3 per cent of GDP) commonly referred to as the *Exceptional Public Investment Programme* under the *Budget Amendment Act* of 2009. It allocated €11 billion to help kick start the economy through the reimbursement of taxes to improve business cash flow, €11 billion for direct state investment and €4 billion for public companies to improve the postal service, high-speed rail infrastructure and energy services. Out of the total, 21 per cent of the funds were designated for policies and measures to promote the green economy and fight climate change, the highest proportion among EU countries. This investment demonstrated France's commitment to developing new green sectors that would spur new green businesses and enhance green job creation while reducing economic disparity among different regions of the country.

In addition, €1.1 billion was allocated for hastening the implementation of the Grenelle Round Table commitments including €470 million for sustainable transport, €200 million for retrofitting public buildings for energy efficiency, €220 million for instituting a scraping premium, €100 million for subsidising the National Agency for Housing Renovations (ANAH), €50 million for overseas investment and €20 million for decontaminating industrial brownfield sites. The stimulus package also included €4.96 billion for investment in sectors covered by the MEEDDM and approximately €1 billion over the next three years for the development of eco-clusters dedicated to research, development and production of green technologies. The *Grenelle 1 Act* of 2009 included further funding of €1 billion for carbon capture and storage projects, recycling captured carbon projects and improving fossil fuel energy performance. For the period 2009-20 the French government is also developing plans for a further €440 billion to be invested in major green growth projects, which have been estimated to have the potential to generate an extra €15 billion a year (0.8 per cent of GDP) and create nearly 500,000 green jobs (in renewable energy, construction and transport) such as a €53 billion investment in 2,000 km of new high-speed railway lines.

France also has a number of advanced research and development programmes in green technologies and green industries which will generate thousands of new green jobs over the coming years. In 2006 a €96 million public-private research partnership was established known as the Green Chemistry Initiative which aims to develop cost-effective methods for replacing petrochemicals with agricultural products. PREDIT 4 is a €400 million nationwide sustainable transport plan that will run from 2009-12 and will finance projects that reduce

CO_2 emissions, improve data on pollution and its effects, and coordinate research into energy-efficient, low or zero-carbon emitting vehicles. In addition, the OSEO Innovation Programme will provide between €460 and €500 million from 2007 to 2013 for a combination of grants and zero-interest advances to small and medium sized (SMEs) and larger enterprises for research, development, innovation and deployment activities related to green technologies.

The French green public procurement (GPP) national action plan was developed by the Ministry of Finance and MEEDD to increase the amount of green products and services purchased by the government from 2007-09. The *Public Procurement Contracts Code* of 2006 and the *Grenelle 1 Act* of 2009 established the legal framework for more environmentally friendly purchases to be made by state administrations, selected ministries and local authorities. The GPP action plan is expected to increase the demand for green products and services and employment in cleaner production activities, while increasing the sustainability of government operations.

2.4. Environmental standards & targets

2.4.1. Standards (legally binding)

French standards related to the creation of green jobs include new provisions under the *Grenelle 1 Act* of 2009 which mandates a 40 per cent reduction in energy consumption from public buildings within eight years, increasing the demand for green jobs in retrofitting and green building construction. From 2012 onwards two new high energy efficiency performance standards for public buildings and housing will be introduced. The low consumption standard (enforced 2010) and the positive energy building standard (enforced by 2020). Planned to commence in 2015, new heat standards will also be used to promote low energy consumption in buildings.

Voluntary standards include the Energy Performance Certificate Programme of 2005 which monitors the energy performance of buildings and the Aviation Industry Greenhouse Gas Emissions Agreement of 2008 which the French government signed with the aviation industry which called for airlines, airplane manufacturers and airport operators to reduce their GHG emissions over the 2008 to 2012 period. Also, the Retailer Sustainable Commerce Agreement of 2008 commits the retail sector to establish packaging waste and GHG emission reduction goals as well as an eco-labelling programme regarding reducing the carbon footprint of goods and services.

2.4.2. Targets

France's commitment to reduce GHG emissions by 20 per cent by 2020 was outlined in the *Copenhagen Accord* of 2009 where France signed as part of the EU contingent. This GHG target was further increased to a Factor 4 reduction in GHG emissions by 2050. The EU renewable energy Directive instructs France to generate 23 per cent of final energy consumption from renewable sources by 2020 and in addition France also intends to increase the amount of heat produced from renewable sources by 50 per cent by 2015.

In regards to energy efficiency targets the National Energy Efficiency Action Plan adopted as a result of the European Parliament and Council Directive 2006/32/EC outlined a minimum of 9 per cent of energy to be saved over the period 2008-16. While the *Grenelle 1 Act* of 2009

sets targets to improve the energy efficiency of all public and private entities (over 50 people) by 20-30 per cent as well as directing 30 per cent of farms to be energy self-sufficient by 2013. The National Energy Efficiency Policy of the Agency for the Environment and Energy Management proposed to reduce national energy intensity by 2 per cent every year until 2015 and then 2.5 per cent every year until 2030.

In regards to the transport sector, the renewable fuel standards set by the *POPE Act* of 2005 increased the use of bio-fuels in total fuel consumption by 2 per cent in 2006 and increasing to 5.75 per cent in 2020, while the fuel economy targets set by the *Grenelle 1 Act* of 2009 promote the reduction of private vehicle GHG emissions from 176g of CO_2/km to 120CO_2/km by 2020.

In regards to the waste sector *the Grenelle Act* of 2009 sets the target of a 15 per cent reduction in the quantity of incinerated or buried waste that needs to be discarded, a 70 per cent reduction in construction waste, a 75 per cent increase in the household packaging recycling rate by 2012 as well as a 5 kg reduction in quantity of waste per inhabitant per annum. The *Grenelle 1 Act* of 2009 also sets targets for organic farming at 20 per cent of production by 2012.

2.5. Social protection

The growing social exclusion of certain disadvantaged groups in French society has been of concern for the government since the 1990s. Policies which promote inclusive development and help excluded members of society find work are known as insertion. This issue was again highlighted during the Grenelle Round Table discussions and resulted in the Grenelle de l'Insertion, a multi-stakeholder debate on reforming the national policy of insertion. The meeting consisted of representatives of government, industry, labour, professional associations and NGOs attending six months of negotiations. It resulted in a number of reforms designed to create incentives for people to return to work including the Revenue of Active Solidarity (RSA) of 2009. The policy works to offset the loss of certain social benefits when resuming employment and provides additional income to low-income workers. The amount paid to unemployed beneficiaries will be at the same level as the minimum subsistence income, with an increase for single people with children. It is hoped the RSA will work towards improving the lives of the working poor in France, helping them to find new jobs and reducing disparity across regions of the country.

In 2009 French social partners lobbied the government to use the opportunities brought about by the financial crisis to implement new training measures for the most vulnerable members of society. This idea resulted in the establishment of the €500 million Social Investment Fund (FISO) to coordinate temporary and short term anti-crisis measures such as retraining programmes to increase employability in the workforce. These retraining programmes contained provisions for green skills and green jobs. The idea was to pool government resources with those from social partners and to coordinate efforts to adapt to the challenges created by the financial crisis. It aims to engender greater professional mobility and increased matching in the labour market by preparing people with the new green skills needed for the green economy.

The economic stimulus package of 2008 also contained social provisions to support low income households during the financial crisis known as the Active Solidarity Bonus. The

programme provided €200 per month per family and was targeted at 3.8 million low-income households across the country intended to help stimulate local economies and job creation.

One of the benefits of the multi-stakeholder approach adopted by the Grenelle Round Tables was the inclusion of social partners and environmental organisations in decision making. This ensured that discussions covered a wide range of socially relevant issues associated with environmental and social protection. In particular, many conversations with social partners centred on the idea of protecting the public's health from a variety of environmental pollution sources. It was agreed to beef up the role of health and safety committees working in the health and environment-related sectors by developing a population bio-monitoring programme for people at most risk. This integrated programme addresses both social and environmental concerns as well as generating new green jobs in monitoring. It will monitor at-risk populations in the workplace and their employment and health histories as well as training more specialised doctors to identify and treat the toxic effects of environmental pollution. This will be supported by the establishment of new research hubs to study the links between the environment and its effects on human health, toxicology and eco-toxicology, spurring cross disciplinary research and development.

Recognising that preserving the environment would not only protect human health but also encourage innovations and creativity by industry in reducing harmful effects, a number of health-environmental programmes were initiated. This included structuring measures for regulations to restrict the marketing of carcinogenic, mutagenic, toxic and bio-accumulable substances and to ban their sale for domestic use and in public places. In addition, the Grenelles set clear objectives to reduce the production and waste of substances known to be extremely harmful to human health such as benzene, mercury, percloroethylene, trichloroethylene and certain chromium compounds and to establish a partner-driven substitution and innovation policy to support industry to find alternatives. This would be complemented by the bio-surveillance programme to monitor the human health effects of these and other toxic substances. The issue of lead poisoning and its effects on children's developmental psychology was highlighted as a priority objective of the programme. Working in collaboration with the building renovation and retrofitting programme, green jobs will be generated in construction as the government seeks the total elimination of lead from the built environment over the next few years. The sale and use of nano particles and nano materials will also be heavily monitored and companies using these substances will be required to declare their use to public authorities. The plan also aims to reduce pesticide use by 50 per cent within ten years provided alternatives are available and a ban on the aerial spraying of pesticides.

Measures would also be introduced to reduce the amount of noise pollution by reviewing the existing inventory on noise black spots and mandating the elimination of those most damaging to human health within 5 to 7 years. The Grenelles allocated €150 – €450 million to support noise reduction measures targeted at road, motorway and rail infrastructure, as well as ordering a reassessment of the airline noise pollution tax. These noise reduction measures would be supported by the establishment of a number of noise observatories located in major cities across the country which would facilitate the collection and dissemination of data and convene consultations with relevant stakeholders.

In regards to air pollution and its effects on human health, a particulate plan was developed to reduce air borne pollutants by 30 per cent. Using WHO guidelines, the programme will target primary and secondary particulates emanating from combustion facilities, boilers, transport

and wood-fuelled heating. It will also set up a measurement and information system to monitor inside air and acoustic quality in establishments open to large numbers of people or vulnerable groups (children, elderly, etc.) such as schools, train stations, airports, etc. Funding will be allocated for further research on the effects of radio and microwave frequencies on human health, particularly in respect to mobile phones, with a view to setting limits on the maximum amount of use. Mobile phones will be banned in all primary and lower schools, radio terminal equipment manufactured for children under the age of 6 will be banned as well as mandating regular monitoring of electromagnetic fields from electricity transmission lines and a limit on advertising billboards near infant and primary schools.

2.6. Education and vocational training

France has established a comprehensive set of forecasting tools to assist in decision-making while employment and skills needs forecasting are integrated in economic planning to anticipate developments in the labour market and implications to education and training. As a result of the *Mobilisation Plan for Green Jobs* of 2009, a full-fledged skills development strategy was launched following from the *Grenelle* Round Tables. A study commissioned to look at the effects of the measures undertaken at *Grenelle* revealed the potential creation of 600,000 jobs and these had education and skills implications. Existing training programmes and qualifications were adapted and new ones were created. The plan was developed along four themes: (1) identification of relevant occupations including setting-up a national observatory to define and understand these new green fields; (2) definition of training needs and setting up training and qualification pathways to allow professional skills to be recognized; (3) recruitment for green jobs to actively assist jobseekers meet requirements; and (4) promotion and development of professions for green employment through a national event on green professions promoted by the President. A €369 million comprehensive green skills development programme was also funded by the government to implement further action.

The Mobilisation Plan was an excellent illustration of effective collaborative among stakeholders at every level of decision making. One of the key factors in the plan's success is the participation of French social partners (employers and employees representatives) in the decision-making process who are able to anticipate skills needs early and manage continuous trainings. The green job programme will be administered by 11 sectoral observatories (see Annex 2) (agriculture and forests, cars, buildings, water, wastewater, waste and air, electric construction and network, renewable, refining, bio-fuels and green chemistry, tourism, transportation, professions of the sea and the seaside and biodiversity and ecologic services provided by nature) and will include the following actions:

1. Initiating national and regional level public awareness campaigns for each sector.
2. Raising the awareness of job and training advisers.
3. Creating labels to guarantee the training quality of initial and continuing education.
4. Defining an adaptation programme of employees' skills to support green growth in each sector.
5. Supporting employee qualifications and reconversions in relevant sectors when business activities are affected.
6. Encouraging the recruitment of young people through alternance contracts and contracts supported by the state.

7. Creating a convention between all stakeholders (government, regions, professional sectors, social partners, professional sectors and training organisations) to coordinate national and regional activities.

The sectoral committees' mandates will also be regularly renewed to elaborate on action plans made specifically for each sector. Cross-skill training programmes will be developed to allow workers to transfer from one industry to another more easily while the committees will also evaluate the gross evolutions in skills and job numbers and find ways to work closely with the private sector to better manage the transition to a green economy.

The *Grenelle 1 Act* of 2009 also established provisions for green job training such as the *Energy Efficiency of Agricultural Exploitations Plan* implemented to provide education programmes to farmers to assist in reaching the target of 30 per cent of farms having low energy consumption rates by 2013 and to increase the amount of organic food produced. And finally the National Association for Training in the Automobile Sector (ANFA) collects and distributes a levy for apprenticeship development, qualifications and continuous employee adaptation to support technological advances in the automobile industry.

3. Country profile – Malaysia

3.1. Legislative framework on sustainable development

Principles of sustainable development have been enshrined into Malaysia's five-year development plans since the adoption and implementation of Agenda 21 at the Rio Earth Summit in June 1992. Malaysia has been an active participant in international environmental discussions since the 1970s and was recognised as a key negotiating player on behalf of developing countries during recent climate change negotiations. Malaysia's international commitment to action on climate change began with the signing of the United Nations Framework Convention on Climate Change (UNFCCC) (entered into force 11 October 1994) and the Kyoto Protocols (entered into force 16th Feb 2005). Malaysia has also signed the Basel Convention on the trans-boundary movement of hazardous waste (ratified 8th October 1993), the Rotterdam Convention on the trade in hazardous chemicals and pesticides (ratified 4 Sep 2002), as well as the Montreal Protocol (ratified 29th August 1989). Other multilateral environmental agreements which effect Malaysia's national level legislation on sustainable development include the United Nations Convention on the Law of the Sea (UNCLOS) (ratified 14th October 1996) and the United Nations Convention to Combat Desertification (UNCDD) (entered into force 26th December 1996). Efforts to preserve and protect the country's 60 per cent of land area presently covered by forests were augmented by Malaysia's signing of Convention on International Trade in Endangered Species of Wild Flora and Fauna (Entered into force 18th January 1978), the United Nations Convention on Biological Diversity (CBD) (ratified 24th June 1994) and the RAMSAR Convention (entered into force 10th March 1995) which designated the country's largest freshwater ecosystem, Tasek Bera as a protected wetland site.

The Malaysian New Economic Model (NEM) was unveiled on 30 March, 2010 by Prime Minister Najib Tun Razak following a series of meetings convened by the National Economic Advisory Council (NEAC) in 2009 on high income, inclusiveness and sustainability. The NEAC held consultations with stakeholders from the government, labour unions, business sector, academia and others. This updated version of the NEP defined a number of Strategic Reform Initiatives (SRIs) to propel the country forward towards Vision 2020 goals and recommended that the government set a green economy policy platform for development in-line with the commitments made at Cop 15 in 2009. Malaysian policy-makers are faced with the challenge of moving the economy away from competing on costs and natural resources to an economy that is driven by productivity, innovation and that can attract and retain capital, sustainable companies and the best human resource talent. It implies a shift from affirmative action being ethnically-based to being need-based, becoming more competitive, market orientated and investor friendly.

To achieve these strategic shifts the 10th Malaysia Plan (2011-15) with a budget of RM 230 billion was developed by the Economic Planning Unit under the Prime Minister's Office and launched in 2010. It sets out a programme of economic reforms which are expected to facilitate the growth of new industrial sectors, particularly in green technologies. This includes; creating a private sector-led economy; supporting innovation-led growth; rationalising the role of government in business; developing green SMEs, constructing world-class sustainable infrastructure; supporting Malaysian firms to better compete globally and by focusing on key growth engines by building agglomerations, promoting economic corridors around business clusters and developing National Key Economic Areas (NKEAs). NKEAs have already established 12 Entry Point Projects (EPPs) that would help spur economic

growth. Clusters include Ampar Tenang Green Experimental cluster and the Kinabalu Gold Coast Enclave that incorporates the creative industry cluster, as well as other sustainable businesses generating green jobs such as wellness and healthcare, floriculture, natural products, marine sports, sustainable resorts and holiday homes. The Brunei Bay Development corridor is an integrated zone for companies specialising in multi-modal logistics, tourism, waterfront real estate, livestock and food crops, fisheries, aquaculture farming and halal products. The country will also be promoted as a premier destination for tourists particularly for eco and heritage tourism capitalising on Malaysia's 60 per cent forest cover and wide range of biodiversity. Focused tourism clusters will generate green jobs leveraging the success of existing tourism icons such as, inter allia, the Langkawi (Geopark and Pulau Payer Marine Park), the Carey Island eco-tourism cluster, Sarawak (Sarawak cultural village and Gunung Mulu National Park) and Pulau Pinang (George Town, Penang).

The 10th Malaysia Plan also includes RM 16.5 billion for substantial rail projects to facilitate greater quantities of freight to be moved by rail from Johor Bahru in the south to Padang Besar Perlis in the north reducing GHG emissions from the transport sector. A mass rapid transit system covering a 20km radius from Kuala Lumpur City centre will be built and is expected to carry 2 million passenger trips a day once completed. Plans are also underway to develop an electric vehicle master plan as well as the infrastructure roadmap needed for charging electric vehicles in Putrajaya and Cyberjaya, with a view to developing low carbon communities in Malaysia.

Very relevant to the green job agenda is the National Policy on Climate Change of 2009, developed under the auspices of the Inter-ministerial Committee for National Climate Change Policy and the Ministry of Natural Resources and Environment (approved by the Malaysian Cabinet in 2009). The new climate change policy is in line with comments made by the Prime Minister in Copenhagen in 2009 where he announced his vision of a Green Malaysia. The objective of the new policy is to mainstream and improve the management of natural resources, integrate responses to the impacts of climate change into national policies, plans and programmes and to strengthen institutional capabilities to deal effectively with the challenges. Climate change considerations will be integrated into planning strategies by utilising a number of tools including Sustainable Development Indicators, Strategic Environmental Assessments and the Economic Evaluation of Ecological Services. The policy will promote community-based climate change responses and programmes at the local level such as the promotion of renewable energy generation by small and independent developers to create new green businesses and employment in local communities. To ensure the sustainable use of forests and their natural resources two major government led initiatives have been launched as well as the UN led Reducing Emissions from Deforestation and Degradation Plus (REDD-plus) Programme. The Forest Spine project covers 4.3 million hectares of the Malay Peninsula and the Heart of Borneo project covers 6 million hectares in Sabah and Sarawak. The government will also provide RM 5 billion for climate change adaptations measures such as flood mitigation programmes using an integrated flood management approach to better forecast, warn against and manage flood risks. The government will also develop disaster preparedness and community awareness programmes creating many new green jobs in adaptation in rural areas.

The other major national policy expected to generate green jobs is the National Green Technology Policy being developed by the Ministry of Energy, Green Technology and Water (KeTTHA). The Green Technology and Climate Change Council will be the main driver of the policy intended to accelerate national economic development and promote sustainable

development. The council is a high level coordinating body that consists of representatives from ministries, government agencies, and the private sector and looks at policy level coordination and decision making. The National Green Technology Policy of 2009 was developed with the cooperation of relevant stakeholders in the country and endeavours to strengthen institutional frameworks and policy coherence on green technology development in Malaysia.

The Green Technology Policy is based around four main pillars;

- *Energy* – seek to attain energy independence and promote efficient utilization.
- *Environment* – conserve and minimize impacts on the environment.
- *Economy* – enhance national economic development through the use of technology.
- *Society* - improve the quality of life for all.

KeTTHA Malaysia defines green technology "as products, equipment or systems which minimise environmental degradation, have low or zero GHG emissions, are safe to use for all forms of life, minimise the use of energy and resources and promote the use of renewable sources for energy". The objectives of the Green-tech policy are; to minimise growth of energy consumption while enhancing economic development, to facilitate the growth of the green technology industries and enhance its contribution to the national economy; to increase national capability and capacity for innovation in green technology development and enhance Malaysia's competitiveness in green technology in the global arena; to ensure sustainable development and conserve the environment for future generations and to enhance public education and awareness of green technology and encourage its widespread use.

The Green Technology Policy will promote significant progress and develop new green technologies in four main sectors; energy, buildings, water and waste management generating thousands of new green jobs in the process. It mandates strategic green technology hubs to be built across the country under the direction of the Malaysian Green Technology Corporation. The policy also calls for the design and enhancement of green skills training and education programmes including the expansion of local research institutes and institutions of higher learning to expand research, development and innovation activities on green technology towards commercialization, as well as wide-spread public awareness campaigns to increase the awareness of green technology by the public. KeTTHA is also currently developing a Green Jobs Framework for Action to provide policy coherence and guide programmes for green jobs. In addition, KeTTHA and Ministry of Human Resources facilitate inter-ministerial coordination through the joint secretariat of the Working Group on Green Jobs.

have conducted an occupational analysis (OA) to develop; an Occupational Analysis for Green Jobs; National Competency Standards (NCS); and National Occupational Skills Standards (NOSS) to support further green job creation in the country.

The success of the green technology policy will be measured by key performance indicators (KPIs) providing a feedback mechanism for the government and the opportunity to improve or refine keys parts of the policy if needed. KeTTHA has also initiated the initial stages of discussion into a Low Carbon Green Growth Act for Malaysia as well as developing a green technology base line study and roadmap.

The New Energy Policy (2011-15) will focus on five main strategic areas to improve Malaysian energy security and economic efficiency while taking stock of environmental and

social considerations. The policy includes initiatives to secure and manage a reliable energy supply, measures to encourage energy efficiency, adoption of market-based pricing, stronger governance and managing change. Energy supply security will be improved by developing alternative resources, predominantly hydro but also liquefied natural gas (by 2015) and super critical coal technology will be explored to further reduce GHG emissions. The Renewable Energy Act (RE Act) has been tabled in Parliament and is expected to be passed by mid 2011. Meanwhile, the government has established the Sustainable Energy Development Authority (SEDA) to oversee the development of the sustainable energy industry in Malaysia and in particular the Feed-in Tariff (FiT) mechanism.

The Malaysian National Policy on Biological Diversity of 1998 set forth the policy framework for the preservation, sustainable management and utilisation of biological diversity as part of the country's national commitments under the United Nations Convention on Biological Diversity. The policy was formulated by the Biodiversity Council (established in 2001) after extensive consultations and cooperation with eminent scientists, the business community and the public. It also lead to the amalgamation of a number of environment-related government agencies into the Ministry of Natural Resources and Environment (NRE) in 2004 to strengthen the institutional framework for the protection of biodiversity in Malaysia. The Biodiversity Council also spearheaded the *Biosafety Act* which was passed by parliament in July of 2007. The National Policy on Biological Diversity outlines 15 strategies and 85 action plans to help protect Malaysia's forests and wildlife including plans for creating national parks, improving conservation practices, expanding the scientific knowledge base and addressing bio-safety concerns. These protected areas act as biodiversity reservoirs and watershed areas and are classified as Environmentally Sensitive Areas (ESA) where limited or no development is permitted. Many projects are under way to generate revenue and employment from biodiversity protection through eco-tourism activities. To protect these vital natural assets the government adopted the Common Vision on Biodiversity Outreach Strategy. It consisted of strengthening the protected areas system, managing landscapes and seascapes for biodiversity conservation and mainstreaming biodiversity protection with national development plans. The National Policy on Biological Diversity is expected to create green jobs in areas such as research, conservation, sustainable forest management and sustainable tourism. The policy has already promoted a number of activities generating green employment such as the National Mangrove Replant Programme, the National Biodiversity Inventory Project, the establishment of the Rainforest Tropical Centre under the Forest Research Institute of Malaysia (FRIM), the National Action Plan on the Coral Triangle Initiative to conserve marine resources and the expansion of the Natural History Museum.

These planning strategies have demonstrated a commitment by Malaysia to safeguard the forests, seas, endangered species, wetlands and biodiversity while dealing with the challenges created by urbanization, industrialisation, pollution and environmental degradation. These efforts have been further supported by Malaysia's adoption of Agenda 21 and the subsequent establishment of Local Agenda 21 initiatives across the country to improve sustainability in rural areas.

3.2. Consultative and institutional mechanisms

Sustainable development policy design and implementation is within the prevue of the Economic Planning Unit under the Office of the Prime Minister. The Unit is responsible for preparing the medium-term and long-term plans for national development in Malaysia and

produced the National Development Policy of 1991-2000 and the National Vision Policy 2001-10 while facilitating overall major economic policy coherence for the National Mission until 2020. The Prime Minister demonstrated his commitment to climate change mitigation and energy security by escalating green technology to the mainstream cabinet portfolio in 2009, creating the Ministry of Energy, Green Technology and Water (KeTTHA). This ministry is now the primary ministry leading Malaysia's push towards greater green growth and green jobs.

The Inter-ministerial Committee for National Climate Change Policy was established in 2009 to drive, coordinate and facilitate the implementation of adaptation and mitigation measures across the country. The committee was charged with developing a roadmap for climate resilient growth and to facilitate the implementation of climate-friendly measures and technologies by strengthening; laws and regulations and enforcement; human resource development; finance and incentives; research and development; technology transfer and communication with relevant stakeholders. The committee is supported by the National Green Technology and Climate Change Council which is responsible for the implementation of the National Policy on Climate Change. Under the Green Technology and Climate Change Council there are 7 subordinate working groups (industry, promotion and awareness, green neighbourhoods, transport, human capital, R&D and innovation, adaptation response and technology) working in a variety of areas to draft and implement sector specific low carbon action plans. The Committee has also called for the development of a 40 per cent carbon intensity reduction roadmap for 2011.

The Cabinet Committee on Green Technology was also established in 2009 to oversee efforts for nurturing the adoption and growth of green technologies across the economy. The Committee is chaired by the Prime Minister to coordinate high-level activities across ministries and to establish legal mechanisms to foster accelerated growth in green technologies.

The committee's work is supported by the Green Technology Council, a high level coordination body which consists of representatives of government ministries, agencies, the private sector and other stakeholders, and which coordinates the green technology agenda across multiple ministries, agencies and key stakeholders to accelerate the development of green technology in the country. In conjunction with KeTTHA, the Green Technology Council formulates strategies and policies for the implementation of green technology in Malaysia including the restructuring of the Malaysia Energy Centre to become the Malaysia Green Technology Corporation (GreenTech Malaysia). The work of the Council is further supported by the Malaysian Green Technology Corporation (Green Tech Malaysia) which aids in the coordination and implementation of green technology initiatives and programmes across the economy as well as the establishment of strategic Green Technology Hubs throughout Malaysia.

The policy consists of five strategic thrusts:

1.) Strengthen the institutional frameworks.
2.) Provide an enabling environment for green technology development.
3.) Intensify green technology research and innovation.
4.) Intensify human capital development in green technology.
5.) Promotion and public awareness.

Policies for human capital development under strategic thrust 4 that will support green jobs in Malaysia include the design and enhancement of training and education programmes; the provision of financial and fiscal incentives for students to pursue green technology disciplines at under graduate level and post graduate level; retraining schemes for semi-skilled labour; the formulation of grading and certificate mechanisms and the exploitation of brain gain programme to strengthen the local expertise in green technologies.

Other government agencies responsible for influencing vocational education and training for green jobs and eliminating distortionary labour market practices include the Technical Education Department under the Ministry of Education, the Manpower Department under the Ministry of Human Resources, the Department of Skills Development (established by *National Skills Development Act* of 2006), the Ministry of Entrepreneurship and the Ministry of Youth and Sports.

3.3. Investments and financial incentives

3.3.1. Market-based instruments

The Malaysian government uses a wide variety of market based instruments to encourage the development and uptake of new green technologies as well as to promote new green businesses and employment. Using price signals to communicate government intentions to the market can help develop opportunities for the sale of new environmentally sustainable goods and services. In this regard the government intends to introduce market-based pricing for energy resources to help attract new providers and to improve energy security.

The Green Technology Financing Scheme (GTFS) provides RM 1.5 Billion for credit guarantees of up to 60 per cent of investments for Malaysian owned companies to produce or use green technologies. There is a maximum amount of RM 50 million for users of green technology and the government will absorb 2 per cent of the interest rate. There is also Pioneer Status (PS) under the *Promotion of Investments Act* of 1986 which provides full income tax exemption for 10 years on statutory income to companies that generate renewable energy or undertake energy efficiency initiatives. While the Investment Tax Allowances (ITA) under the *Promotion of Investments Act* offer a tax allowance of 100 per cent of qualifying capital expenditure incurred within 5 years of the first expenditure which can be offset against statutory income in the year of assessment. The ITAs include import duty and sales tax exemptions for one year on imported machinery, equipment, materials, spare parts and consumables used for renewable energy and are available both for importers and third party distributors. Import tax exemptions under the Budget of 2009 allow exemptions to third party distributors of solar systems and import duty exemption for 1 year on any imported machinery used to generate renewable energy. In addition, there is a Sales tax exemption on locally produced items used for renewable energy generation and energy efficiency initiatives.

The 10th Malaysian Plan outlines the intention to gradually rationalize subsidies and price controls to remove market distortions from the sale of fossil fuels. Subsidies will be converted to productivity-based incentives, for example fishing industry incentives will be based on volume of fish landing not input subsidies. Initial subsidy reforms initiated under first Malaysian Economic Stimulus Package of 2008 saved RM 7 billion from fuel subsidies and channelled those funds to housing development and promotion.

Feed-in-tariffs introduced in 2011 created an enabling environment for new investments in renewable energy technologies and green business start-ups. A tariff of 1 per cent is to be incorporated into the electricity tariffs of consumers to support the development of renewable energy ventures through the establishment of a renewable energy fund. There is also the 1-InnoCERT Programme which assesses the innovation-level of new enterprises and applies funding incentives, such as the access to preferential rate loans, credit guarantees and grants to support new green business development.

In addition, the National Water Resources Policy of 2010 outlined how the Government would implement an integrated tariff for both water and sewerage services moving away from flat rate tariffs. These tariffs were designed to link sewerage charges to water consumption and thus encourage more water conservation initiatives amongst industries and households.

3.3.2. Loans and funds

The government has empowered the Securities Commission (SC) to update and expand the role of Malaysian capital markets to develop new financing alternatives for green technologies. The SC has devised the Capital Market Master Plan 2 which will run from 2011 to 2020 and is expected to help expand financial industry employment in green sectors such as carbon trading, green fund management, green finance and carbon consulting services. The plan will enhance secondary market liquidity and create better avenues for managing risk to encourage the exploration of investments in new growth and innovative areas and facilitate the growth of capital market firms such as fund management, venture capital and private equity. The plan aims to develop the banking capacity to assess credit approvals for new green businesses using non-collateral-based criteria, support venture capital firms and to liberalise the entry of foreign experts specialising in financial analysis of green technology projects. In addition, the government will provide a large pool of funds on a *Mudharabah* (risk sharing) basis for venture capital investments, especially through co-investment with private sector funds. The Government intends to increase R&D expenditure during the 10th Malaysia Plan using a combination of greater public R&D funds combined with facilitation support for private sector R&D.

The Renewable Energy Policy and Action Plan as stipulated under the *Energy Commission Act* of 2001 allocated RM 19 billion of loan values and 80 per cent debt financing for renewable energy projects and is estimated by KeTTHA to have the potential to create 50,000 new green jobs in constructing, operating and maintaining renewable energy power plants. The Renewable Energy Bill of 2011 included guaranteed access to the electricity grid for private renewable energy producers, competitive feed-in tariff rates and a fixed tenure for those rates in order to provide certainty to investors. In addition, a bill known as the Sustainable Energy Development Authority (SEDA) Bill, has also been tabled for consideration that would initiate the establishment of SEDA Malaysia under KeTTHA, to administer a renewable energy fund and oversee the development of the renewable energy industry. It has been estimated that the renewable energy sector could provide at least RM 70 billion worth of business revenue for the private sector, and at least RM 1.76 billion in tax revenue for the Government by 2020.

The RM 1.5 billion Green Technology Soft Loan Scheme (GTFS) initiated by KeTTHA and administered by Green Tech Malaysia provides soft loans to companies that supply and utilise green technologies and has the potential to dramatically increase the uptake rate of

new energy efficiency and renewable energy technologies. The Government bears 2 per cent of the interest and guarantees up to 60 per cent of the financing amount through the Credit Guarantee Corporation Malaysia Berhad (CGC), while the remaining 40 per cent of the financing risk will be borne by participating financial institutions. The Industry Restructuring Guarantee Fund Scheme (IRGFS) initiated under the Second Malaysian Economic Stimulus Package of 2009 provides RM 5 billion worth of loans to companies to increase industrial productivity and value added activities. A significant proportion of this fund is expected to be invested in new energy, material and resource-use efficiency technologies and cleaner production activities.

In addition, microcredit programmes totalling RM 300 million are available to assist farmers and agro-based small businesses. This provides the potential opportunity to thousands of farmers to be trained in sustainable agriculture and social entrepreneurship skills spurring the creation of green jobs in rural areas.

3.3.3. Fiscal policies and other investments

Under the 10th Malaysian Plan privatisation and public private partnerships (PPPs) in key government sectors will be intensified with 52 projects with an estimated value of RM 62.7 billion already under consideration. Over the next five years government focus will shift away from building infrastructure and operating services towards more buying of those services from the private sector. Changes in legislation to enable a more competitive free market for businesses, including new green businesses have been announced including promoting investments in renewable energy by providing long-term contracts for new renewable energy companies. Smart Partnerships will be established between government agencies, industries and research institutions to encourage more research and development in green technologies and help bring them to market.

To better manage growth in urban areas and to reduce encroachment into the countryside the government will facilitate the use of growth management mechanism such as zoning, urban growth boundaries, growth control regulations and other development incentives. The goal is the construction of high-density, mixed-use developments integrated within a well functioning public transport system particularly positioned around major high capacity railway stations to be known as transit corridors. Four bus expressway transit routes and a high-speed limited stop service were launched in KL in January 2010 and have significantly reduced travel times by over 50 per cent on selected commuter routes. To encourage the better utilisation of land within city boundaries, urban renewal and brown-field redevelopment projects are being initiated. To support the redevelopment of these unused, dilapidated or abandoned brown-field sites incentives such as the implementation of mechanisms to facilitate the sale of collectively-owned developments or en-bloc same mechanisms that require only 80 per cent or 90 per cent of owners to agree to sale will be employed, as well as more PPPs for redevelopment efforts.

The restoration of rivers and waterfronts in all Malaysian cities is a priority such as the Melaka River Rehabilitation and Beautification project. River restoration projects are inherently long-term in nature creating large numbers of green jobs. These projects require a large scale co-ordinated effort to clean the rivers, revive the ecosystem, improve infrastructure and protect the river both upstream and when it flows through a city. In addition, the 10th Malaysia plans also calls for the expansion and development of the 101ha Lake Gardens in KL into a Botanical Garden, featuring a wide variety of unique trees and

flowers indigenous to Malaysia, themed mini gardens and nature trails to provide greater opportunity for residents to interact and experience the country's rich biodiversity. Within the gardens activity centres such as cafes, an open plaza and an amphitheatre will host a range of cultural performances will be introduced and connected to the city centre by pedestrian walkways and improved public transport.

High-end Research Centres will be established under SRI thrust 2 of the New Economic Model of 2010 to nurture and retain local and global talent for positions in new industries including new green occupations in green industries. The Government will also form a Talent Corporation, to actively identify and recruit promising young candidates from among the Malaysian Diaspora for top positions within industry and the government. Establishing more links with Malaysians abroad would provide additional human resources for advisory roles, international business networks and assistance for Malaysian companies entering overseas markets.

The plan will also promote the development of concentrated industrial clusters and supporting infrastructure ecosystems towards enabling greater specialisation and economies of scale in emerging green industries. Investment promotion will be more targeted towards investment quality (rather than just quantity) to support value added activities and technological upgrading including incentives provided to multinational companies to establish research centres in Malaysia. Strategic green technology hubs will also be established throughout Malaysia to encourage greater synergies and efficiency gains for green technology industries.

The Malaysian Energy Centre was established by KeTTHA to conduct R&D in energy efficiency and renewable energy technologies and aimed to cut solar-electricity production costs in Malaysia by a fifth by 2010. Malaysia has also strengthened the national capabilities for bio-prospecting to facilitate wealth generation from the country's rich biodiversity resources, such as medicines, bio-fuels, organic beauty products, etc.

Malaysia has organised a national workshop and seminar on green procurement as well as having established a number of working groups on green procurement as part of the National Green Technology Policy. The Ministry of Finance is co-operating with KeTTHA, the Malaysian Green Technology Corporation and SIRIM Berhad to devise a national plan for green public procurement by the government. The National Green Technology Policy also sets the ground work to include green products and services produced by Malaysian firms to become the preferred choice for public procurement.

3.4. Environmental standards and targets

3.4.1. Standards

National Standards for environmental protection were first introduced in Malaysia under the *Environmental Quality Act* of 1974, and subsequently amended a number of times to set different environment related sector standards. The act first introduced Environmental Impact Assessments and worked to prevent pollution and natural resource exploitation in Malaysia.

Energy efficiency standards are still under development at the Green Technology Council and intend to develop and implement nationwide regulations on energy efficiency standards for new buildings. Under the new Energy Efficiency Master Plan of 2010 Minimum Energy

Performance Standards (MEPS) for appliances and new green technologies are being developed.

In regards to water management, national water quality standards were first introduced under the *Environmental Quality Act* of 1974. Water standards are regularly monitored by the government and modified where appropriate. After consultation with experts from the Environmental Quality Council the Minister sets down regulations for prescribing ambient water quality standards which are then applied to surface waters and marine waters. The National Water Resources Policy of 2011 reassessed how Malaysia manages its water across the entire water cycle. It established a system for ensuring the security of the water supply in an era of rapid industrialisation, urban sprawl and population growth. The policy focused on three core areas; developing a long-term strategy for water resource management; to continue efforts to restructure the water services industry and to protect the river from pollution. By streamlining polices and legislation it allows for the more efficient and equitable distribution of water resources contributing to an overall higher standard of living for all in society while generating thousands of new green jobs in the water management, conservation, monitoring, purification, distribution and sewage sectors.

3.4.2. Targets

During the run up to the climate change negotiations held in Copenhagen in 2009 the Malaysian Prime Minister Najib Tun Razak pledged a 40 per cent reduction in Malaysia's GHG emissions intensity by 2020. A large proportion of Malaysia's present GHG emissions come from buildings therefore the government has focused a number of initiatives on reducing emissions from both new and existing buildings. The 10th Malaysian Plan mandates the wider adoption of the Green Building Index (GBI) by green star accredited professionals to benchmark energy consumption in new buildings. Under the National Green Technology Policy the government has set the target of 10 per cent savings in energy and water consumption in all Putrajaya Government Buildings. Guidelines on Green Townships in Putrajaya and Cyberjaya and carbon footprint baselines for rating scales are also being developed under the National Energy Efficiency Master Plan of 2010. KeTTHA is working with the Ministry of Transport and the Ministry of International Trade and Industry to develop the infrastructure roadmap for electric vehicles in Malaysia as well as a Hybrid vehicle initiative developed with Proton.

The Code of Practice on Energy Efficiency and use of Renewable Energy for Non Residential Buildings (MS 1525:2001) provides minimum standards for the design of new and existing buildings while the Uniform Building By-laws have been amended to incorporate new standards for energy efficiency and renewable energy in non-residential buildings. Energy efficiency targets were included under the National Energy Efficiency Master Plan of 2010 as well as the implementation roadmap to improve energy efficiency across all sectors. It sets a target to achieve cumulative energy savings of 4,000 kilo tonnes of oil equivalent (ktoe) by 2015. The plan also prescribes increasing energy performance labelling from four to ten electrical appliances and the phasing out of incandescent light bulbs by 2014 which is estimated to reduce 732,000 of CO_2 emissions per year.

Renewable energy targets under the Renewable Energy Policy and Action Plan of 2010 set a target of 985 MW to be generated from renewable sources by 2015 which is about 5 per cent of total electricity generation and to raise to 9 per cent from renewable sources by 2020. This will be supported by a feed-in-tariff of 1 per cent incorporated into the electricity price of

consumers for contribution to a renewable energy fund to begin the construction of green energy plants creating green jobs in the renewable energy sector.

Targets in regards to transport are outlined under the 10th Malaysian Plan with a goal to increase the public transport modal share in Kuala Lumpur (KL) from 12 per cent in 2009 to 30 per cent in 2015. This will be achieved by the development and implementation of a 20-year National Land Public Transport Master Plan under the Commission for Land Public Transport (SPAD). The plan will feature region specific master plans to evaluate macro-level policies, regulatory changes and major infrastructure investments and will be funded by the Land Transport Fund created under the *Land Public Transport Act* of 2010. In KL the capacity of the light-rail Transit (LRT) lines will be increased by the construction of 34 km of new track, while new carriages will increase the capacity of the Kelana Jaya LRT line from 24,000 to 98,000 passengers per hour. The Bus Rapid Transit System will be expanded by 49 km consisting of three major corridors through the city, expanding employment in public transport.

Under the *Solid Waste and Public Cleansing Management Act* of 2007 responsibility for waste management was moved from the jurisdiction of local authorities to the jurisdiction of the Federal Government. Integrated waste management was then integrated into a holistic national strategic plan which included a recycling target of 25 per cent by 2020. The government intends to close and rehabilitate the existing 112 unsanitary landfills across the country and will develop the infrastructure needed to support the waste management industry creating green jobs in transfer stations, integrated material recovery facilities, thermal treatment plants, disposal and treatment facilities and recycling banks. Activities under the strategic waste plan included a Reduce, Reuse and Recycle Programme, a deposit refund scheme and a take back system to help consumers get money refunded when they return items to be recycled. Separate domestic waste collections will be arranged for garden waste, recyclables and bulky waste from the rest of the household solid waste to encourage greater recovery and recycling.

3.5. Social protection

Since the development of the initial New Economic Policy in the 1970s Malaysia has worked to enshrine social concerns in to all development planning to promote a progressive and inclusive society. The New Economic Model and 10th Malaysia Plan provide policy support to minority and disadvantaged groups in Malaysia and work towards creating a more equitable and inclusive society.

The Second Malaysian Economic Stimulus Package of 2009 featured a number of social protection provisions to help vulnerable and disadvantaged groups in Malaysia. The government replaced market distorting energy and food subsidies with credible assistance packages to support the poorest members of society during the transition to an advanced green economy. The package also provided RM 2 billion for efforts to reduce unemployment and to increase employment opportunities and RM 10 billion to ease the burden of the Rakyat vulnerable groups. The package also provided RM 2 million for the Fishermen's Welfare Fund to protect fisherman from the effects of the economic downturn.

In efforts to protect human health and the quality of air in urban areas the government will intensify the implementation of the Clean Air Action Plan under the 10th Malaysia Plan. Greater efforts will be made to reduce emissions from motor vehicles through the stricter

enforcement of emission standards in line with global standards to reduce incidents of asthma among children and other respiratory diseases caused by air pollution. The government will work to reduce deforestation particularly from man-made forest fires to reduce haze pollution and the release of GHGs. Peat land fires will also be reduced by strengthening sustainable peat land management efforts and greater trans-boundary collaboration. Air pollution from industrial activities will be also reduced to protect human health with new emission standards for specific industries while businesses will be encouraged to monitor and reduce pollution by using environmental audits and monitoring systems.

In rural areas the government will address the challenges faced by estate workers of Indian descent working on rubber or palm oil estates. Many are often poorly educated, on low incomes and endure poor living conditions with lack of access to public amenities. In order to improve their conditions and raise living standards RM 109 million was allocated under the 10th Malaysian Plan to rural work programmes to supply clean treated water to 182 estates less than 1000 acres in size. Efforts will also be made to work with estate owners to build basic access roads and amenities such as housing and schools for the children. Existing training and re-skilling programmes will be extended to aid displaced estate workers. Specific targeted programmes will also be developed to address rural poverty and other challenges faced by disadvantaged community groups in Malaysia including the Bumiputera in Sabah and Sarawak, residents of Chinese new villages and the Orang Asli communities in Peninsular Malaysia.

In addition, the government will step up partnerships with the private sector and NGOs to increase the incidence of tree planting activities across the country to increase the assimilative capacity of Malaysia's carbon sinks, creating hundreds of green jobs in the process.

3.6. Education and vocational training

Human capital development is one of the top priority areas for the Malaysian government and lies at the heart of a transformation from a middle-income to a high income country as set out in the Vision 2020 plan. There are various programmes underway for workers which focus on re-skilling and skills development for green skills in new green sectors, including practical on-the-job training, soft-skill training and job placement initiatives in green businesses and SMEs.

The *Skills Development Fund Act* of 2004 was passed to promote up-skilling and retraining of the workforce. Under the 10th Malaysian Plan RM 500 million was allocated for loans to workers and RM 500 million for school leavers to promote workforce up-skilling and training. The National Skills Development Act of 2006 established the Department of Skills Development under the Ministry of Human Resources for the design and enhancement of training and education programmes to improve human resource capacity for a range of sectors including green technologies.

The government will promote entrepreneurship to young Malaysians by sponsoring business plan competitions at schools and universities. There is also a grading and certification mechanism for people competent in green technology and National skills certification and competency standards are being developed by the government under an occupational framework for green technologies, including green occupations in the energy, building, water and waste management and transport. To support SMEs with their human capital

development and management the government has initiated collaborations with the trade and industry associations to develop medium-term training maps and to undertake industry-related training. The Skills Upgrade Programme provided by SME Corp enhances the green skills of workers of SMEs at technical, supervisory and managerial levels and will provide 80 per cent of the training costs while the Retraining Programme and Apprenticeship Scheme is designed to retrain and enhance competency of semi-skilled labour to meet the demands of the green technology industry.

The Malaysian Energy Professionals Association (MEPA) was established in 2002 as part of the Industrial Energy Efficiency Improvement Project (MIEEIP) under the Malaysia Green Technology Corporation. It is aimed at creating a pool of dedicated professionals in energy conservation and energy efficiency and currently has 150 members ranging from professional engineers, lawyers and architects, etc. MEPA has developed a number of training programmes to teach and certify new green skills for green occupations.

In regards to education, Malaysia has invested heavily over the past few decades and has made human capital development a top priority. The Integrated Human Capital and Talent Development Framework under the 10th Malaysian Plan was developed to nurture and develop Malaysians across their entire lifetimes. Indeed, since the two economic stimulus packages were passed RM 300 million has been spent on initial training programmes to prepare unemployed graduates for green jobs. So far 76,940 unemployed graduates, school leavers and displaced workers have been trained in new skills including green skills. Lifetime learning has been enhanced by the expansion of distance learning, e-learning and retraining and up-skilling programmes.

Under the Green Technology Policy, financial and fiscal incentives are provided for students to pursue green technology disciplines at undergraduate and post graduate level. The Knowledge Transfer Partnership Programme of 2011 will facilitate collaboration between industry and relevant universities, particularly in new emerging technologies such as bio-fuels, renewable energy and bio-plastics.

To develop the capacity of government officials a World-class Civil Service Collage was commissioned under 10th Malaysian Plan to provide more choice, greater flexibility and content of training programmes for civil servants and will be better aligned with on-the-job needs. The curriculum will be tailored to the changing needs of government while brain gain programmes will be employed to strengthen the expertise of local government in green technology. In addition, a Green Growth Capacity Development Programme was hosted in 2010 by KeTTHA in collaboration with UNDP and UNESCAP for policy-makers from a wide range of ministries, academia, civil society and private sector, all working on aspects of the new green economy. The capacity development programme included a workshop and web-based learning platform to educate participants about the green growth policy tools available for low carbon development.

4. Country profile – Republic of Korea

4.1 Legislative framework on sustainable development

The Republic of Korea began the transition towards a sustainable economy in 1992 at the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro where they formally adopted the Agenda 21 blueprint of action as well as signing both the United Nations Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC) (entered into force 21 March 1994). These efforts were further built upon by the signing of the Kyoto Protocols of the UNFCCC as a Non-Annex I party in 1997 and which subsequently entered into force in February of 2005. Korea's sustainable development agenda was further endorsed by signing the Johannesburg Plan of Implementation in September 2002 at the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa which built on earlier declarations made at the UNCED. As of May 2010, Republic of Korea had submitted their national report on the progress of Agenda 21 implementation to the United Nations Committee on Sustainable Development (CSD) 18/19.

Other relevant Multilateral Environmental Agreements (MEAs) related to Korea's international environmental commitments include the Montreal Protocol that phased out the use of substances that deplete the ozone layer (ratified February 1992), the Basel Convention regarding the trans-boundary movement of hazardous waste and the Rotterdam Convention regarding the trade in hazardous chemicals and pesticides that were both ratified February 1994, while the Stockholm Convention that restricts the use of persistent organic pollutants (POPs) was ratified February 2004. The United Nations Convention on the Law of the Sea (UNCLOS) was ratified by Republic of Korea in 1994 which among other things established guidelines for businesses, the environment, and the management of marine natural resources, while the United Nations Convention to Combat Desertification (UNCDD) entered into force in December 1996.

Other relevant acts which have contributed to the evolution of Korea's legislation on environmental governance include the *Basic Environmental Policy Act* of 1990 which mandated producer responsibility for environmental pollution and clean up costs and the *Rational Energy Use Act* of 1995 which featured provisions for securing energy supplies and stabilizing energy demands for sustainable development.

These above mentioned MEAs working to support Korea's national level legislation on sustainable development created an enabling institutional framework for greater environmental sustainability and set the stage for future growth in green jobs and skills. Although Korea has yet to pass specific legislation on green jobs, much of their existing policies and programmes are working towards developing new green industries and green technologies spurring the demand for new green skills and occupations.

On 15 August, 2008 President Lee Myung-bak announced the Republic of Korea's vision for Low Carbon Green Growth as a new paradigm for economic development during his congratulatory address delivered at the 60th anniversary of the founding of the Republic. This was followed by the Presidential Committee on Green Growth (PCGG) that was established in February of 2009 and tasked with facilitating inter-agency cooperation towards developing a national strategy for green growth. In order to strengthen the existing foundations of sustainable development efforts in Korea the *Framework Act on Low Carbon Green Growth*

was adopted by the National Assembly in early 2010 and established a comprehensive legal framework to foster the development of green technologies and industries, to create new green jobs, to respond to climate change, to control energy targets, to promote a green lifestyle for citizens and to promote sustainable development.

The Act entered into force in April 2010 and put into practice policies and measures that addressed climate change and energy security issues while promoting sustainable development. This was further confirmed by the *Presidential Decree on the establishment and operation of the Presidential Committee on Green Growth* also issued in early 2010. This legislation established and enforced the National Strategy for Green Growth which stipulated the country's targets and policy prescriptions needed to achieve a paradigm shift towards greater environmentally sustainable economic growth.

4.2 Consultative & institutional mechanisms

As a result of the Republic of Korea's participation and commitments made at UNCED the first Presidential Committee on Sustainable Development was established in 1992. The Committee consisted of representatives from government, academia, civil society and the private sector and was Korea's first attempt to promote multi-stakeholder involvement in the formulation of sustainable development polices. More recently, the Presidential Committee on Green Growth, established in 2010 by a *Presidential Decree on the Establishment and Operation of the Presidential Committee on Green Growth* replaced the existing Committee, although it is organised in a similar manner. The establishment of the Presidential Committee on Green Growth highlights the President's firm commitment to place green growth at the top of the national development agenda. It consists of approximately fifty members including government ministers and experts from the private sector, academia and civil society specialised in a variety of green growth related fields.

The task of the Presidential Committee is to coordinate actions on green growth implementation that support the Five-Year Plan on Green Growth that was funded by US$ 83.6 billion (2 per cent GDP) in 2009. The plan is designed to operationalize Korea's green growth strategy into concrete policy initiatives that will spur the shift towards low carbon green growth and the early indications are that this has already significantly contributed to streamlining government actions. Previous green growth initiates that had been operating independently under different ministries are now able to draw on cross-ministerial experience as well as enhancing the focus of policy implementation. Provisions of financial and fiscal support are being utilised in a more efficient and effective manner, for example in 2008 there were 267 green growth related projects submitted by 20 ministries. As a result of this new streamlined planning process under the Presidential Committee they were able to identify synergies and thus repackaged them into nine core projects and 27 related industrial programmes which became the firm basis for the new Five-Year Plan for Green Growth.

The Preliminary indicators from the private sector indicate that businesses are also supportive of these new green growth initiatives. A survey conducted by the Federation of Korean Industries of 300 businesses in 2010 indicated 70 per cent of them expected green growth would improve the economy while 41.4 per cent expressed their intention to invest in green growth related projects.

The National Employment Strategy Council of Korea includes members of the government, Financial Services Authority (FSA), Bank of Korea, financial institutions, heads of research centres and social policy experts. In January 2010 they announced The 1st National Employment Strategy of 2010 which recognized that stabilizing employment was crucial to consolidating the country's economic recovery and that the government would prioritize job creation as one of the primary national tasks. The Council recognized that this would need a multi-dimensional approach incorporating measures across the major economic, industrial, environmental and labour sectors. The plan would be regularly monitored and updated by three task force teams consisting of representatives from the employment, social security, education and training sectors. An additional task force would be established known as the Real Economy Taskforce to facilitate reforms of the service sector and to encourage investment. The Council committed to provide 580,000 publicly funded jobs including the recruitment of 100,000 people to the public workforce programme for the revival of the 'four major rivers project'. Over the medium to long term the National Employment Strategy vowed to increase the overall capacity to create jobs by making revisions to the law and by resolving structural issues in the national economy such as improved labour flexibility and improving vocational training to meet the emerging needs of new green industries.

In 2009 the Korean International Labour Foundation (KILF) organised a National Emergency Conference held at the plenary meeting of the Economic and Social Development Commission (ESDC), consisting of participants from the government, labour, management and civil society groups. Known as the Grand Social Consensus of 2009 the conference concluded with commitments from all four major parties regarding; i) joint efforts by labour and management for job retention and sharing, and their support by the government, ii) the role of the civil society groups in the course of overcoming the economic crisis, iii) measures for job creation and employment promotion, iv) expansion of the social safety net for the unemployed and underprivileged people, v) action plans for the implementation of the agreement.

At the local level the National Strategy for Green Growth stipulates the formation of sub-committees on Green Growth to be established at the provincial and municipal levels under the control of the Governor or Mayor. These sub-committees will also develop their own Five-Year Plans for Green Growth which will help translate the national plans into local implementation. These local committees are able to tailor projects more consistently to the needs and aspirations of their local constituents. In an effort to encourage the participation of local stakeholders a series of presentations and public hearings were held to introduce concepts of green growth to the public and to adapt plans accordingly to their feedback.

4.3 Investments and financial incentives

The Government of the Republic of Korea uses a variety of investments and financial incentives to galvanise economic development towards a low carbon green growth trajectory and has committed substantial funds to create an enabling environment for new green businesses and industries, new green technologies and new green jobs. The government has initiated a significant increase in both public and private investment to accelerate the growth in new environmentally sustainable sectors such as low carbon technologies, renewable energy, green IT, sustainable agriculture, green construction, broadcasting technologies, sustainable cities and transport, green chemistry and ecological infrastructure that will position Korean industries and businesses among the world's top green economies over the coming decades.

4.3.1 Market-based instruments

Korea uses a mix of market-based instruments (MBIs) to alter market conditions to support the transition to low carbon green growth and to create an enabling environment for green jobs. Under provisions of the *Restriction of Special Taxation Act & the Local Tax Act* the State or local governments may support new green technology by exempting their operations from income tax, corporation tax, acquisition tax, property tax, registration or any other tax deemed appropriate that will contribute to their growth and strengthen their competitiveness. There are also credit guarantees for various green projects with plans to increase the budget to US$ 5.4 billion by 2013. Under article 46 of the recently passed *Framework Act on Low Carbon Green Growth* of 2010 it stipulates that the government may operate a system for trading emissions of GHGs by utilizing market functions in order to accomplish the State's target of reducing GHGs. Additionally, the *Enactment of the Emission Trading System Act* was submitted to the National Assembly on 31 July 2010 to set the groundwork for the introduction of carbon trading in Korea. Moreover, there are plans to establish a national carbon monitoring and management system to enhance carbon visibility and to encourage carbon-3R activities across the economy. This is expected to create an innovative business climate for both domestic and international industries stimulating alternative ways of conducting business. The carbon market will also generate green jobs in a variety of sectors including trading and consultancy, monitoring and management, project design, renewable energy, carbon sequestration and ecosystem services as well as contribute to the greening of a variety of existing occupations across sectors.

In 2008 the Government initiated energy tax reforms in an attempt to correct counter-productive market distortions in energy markets including an increase in the transportation tax rate, to raise the price of light oil to 85 per cent to that of gas prices within the next three years, coupled with a decrease in the individual consumption tax rate in order to keep LPG butane prices at 50 per cent of gas prices. Under the economic stimulus package of 2009 the government introduced a number of tax cuts in an effort to kick start the economy including a 2 per cent reduction in income tax, corporation tax was reduced by 3 per cent to 22 per cent in 2009, and 20 per cent in 2010 for large companies and from 13 per cent to 11 per cent in 2009 and 10 per cent in 2010 for small and medium sized enterprises (SMEs). Moreover, there have also been discussions which are still under review for a broad based energy tax to better reflect the full costs of externalities into the price of energy. These measures are part of a wider initiative to decrease Korea's existing heavy reliance on imported fossil fuel energy. In fact Korea derives 97 per cent of their total energy demand from imported fossil fuels, so are extremely vulnerable to any future oil price hikes or disruptions in supply. Developing alternative fuels such as bio-ethanol and bio-diesel has the potential to save millions of dollars a year in foreign exchange reserves.

There are also plans to reduce consumption tax on green technologies and low carbon goods and services to cultivate new green markets and businesses. In regards to subsidy reform there is still no national level legislation or programme that seeks to evaluate and reform the system of market distorting incentives. However, the G-20 Toronto Summit Declaration endorsed by Korea in 2010, does outline a commitment to phase out inefficient fossil fuel subsidies but falls short of stating a timeframe for these reforms.

In an attempt to support the sale of more fuel efficient cars the government has provided various tax incentives to expand the distribution of fuel efficient automobiles such as minis and hybrids. The buyer is exempted from unit consumption tax, registration tax, acquisition

tax, as well as a 50 per cent discount on highway toll fees and a 50 per cent discount on car parking fees. The tax exemptions for hybrid cars were implemented on a temporary basis and will operate from 1 July 2009 to 31 December 2012. Feed-in-tariffs for renewable energy (US$0.32 - 0.36/kWh) are used in Korea to encourage businesses that invest in renewable technologies to sell excess electricity back to the grid. These feed-in-tariff polices are expected to spur the development of private renewable energy companies, home installations and energy service companies (ESCOs) creating new green markets and jobs in renewable electricity across society. Feed-in-tariffs and other incentives which can encourage the growth in renewable energy technologies are part of the country's drive towards greater energy independence and reducing GHGs.

4.3.2 Loans and funds

Some low interest loans have been used in Korea since 2004 to encourage companies to use alternative energy. The *Korea Technology Guarantee Fund Act* and the *Korea Credit Guarantee Fund Act* of 2009 make funds more easily available for new green businesses by establishing a technology credit guarantee system for the development of new green technologies. Credit guarantees in the field of green technology will be increased from US$1.9 billion in 2009 to US$5.4 billion in 2013. In addition, low interest loans are also offered for ESCOs at a floating rate of 2.75 per cent. There are also a number of funds available to support green business development including the Green Fund and the Green Private Equity Fund both established in 2009 to facilitate access to credit for SMEs. The Start-up Investment Fund of 2009 provides 500 billion won to support the setting up of SME venture capital firms for emerging green technologies and markets. In addition, there are also plans to issue long-term and low interest green bonds to investors. Individual investors will be exempted from paying capital gains tax on any income generated from green bonds and other green financial products to be issued by banks. The government will also seek to mobilize funds from pension schemes to invest in new green sectors.

Internationally Korea has established the East Asia Climate Partnership, a US$ 200 million climate change assistance package (2008-12) administered by the Korea International Cooperation Agency (KOICA) for developing countries in Asia and the Pacific. The fund will support low carbon green growth projects in Asia and Pacific which will contribute to the development of new green jobs in developing countries.

4.3.3 Fiscal policies and other investments

Korea's Five-Year Plan for Green Growth (2009-13) is the country's medium-term plan for implementing the National Strategy for Green Growth which sets specific budget earmarks and assignments to each ministry and local governments. The plan allocates US$94.7 billion over the next five years for investments in projects covering core green technologies as shown in table 1 in sectors including; Climate Change, Energy Source Technologies, Efficiency Enhancement Technologies, End-of-pipe Technologies and R&D in Virtual Reality.

Table 1 Korea's 27 onvestments in core green technologies under five-year plan for green growth

No	Sector	Core technologies
1.	Climate change	Climate change modelling and monitoring
2.		Climate change assessment and adaptation
3.	Energy source technologies	Silicon-based solar cells
4.		Non silicon-based solar cells
5.		Bio-energy
6.		Light water reactors
7.		Next generation fast reactors
8.		Nuclear fusion energy
9.		Hydrogen energy
10.		High efficiency fuel cells
11.	Efficiency enhancement technologies	Promotion of plant growth technologies
12.		Integrated gasification combined cycles
13.		Green cars
14.		Intelligent infrastructure for transport & logistics
15.		Green cities and urban renaissance
16.		Green buildings
17.		Green process technologies
18.		High efficiency L.E.D.s and green IT
19.		IT-combined electric machines
20.		Secondary batteries
21.	End-of-pipe technologies	Carbon capture, storage and reprocessing
22.		Non-carbon processing
23.		Water quality assessment and management
24.		Alternative water resources
25.		Waste recycling
26.		Monitoring and processing hazardous substances
27.	R&D in virtual reality	Virtual reality computing

The government has estimated that the Five-Year Plan will stimulate between US$141.1 billion to US$160.4 billion worth of new production during the period 2009-13 and is expected to create between 1.18 million and 1.47 million new green jobs in green industries over five years by harnessing the country's highly educated workforce. Based on two different scenarios prepared by the Presidential Committee on Green Growth the value-added inducement calculated over the five years will be US$ 58.4 billion or US$ 73.9 billion and the production inducement will be US$ 141.1 billion or US$ 160.4 billion.

The US$ 19.7 billion allocated for green cities and the development of railways as well as other modes of public transport will stimulate thousands of new green jobs in the sustainable transport sector. In regards to renewable energy production, the plan intends to build upon Korea's existing capacity for energy generation from waste, which currently accounts for 76 per cent of all renewable energy generated in the country. The plan funds the construction of forty eight environmental energy facilities as well as twenty five new landfill gas recollecting facilities, generating thousands of new green jobs in the process. The expansion of tidal power plants will also add to the country's renewable energy mix, with plans for new plants in Ganghwa Bay, Incheon and Garorim Bay.

The government intends to establish a number of green industry complexes and eco-industrial park upgrades by 2013 which will utilise concepts of industrial symbiosis such as resource-use efficiency, waste-to-feed and renewable energy. It is hoped positioning both large companies and SMEs in close proximity will spur inter disciplinary cooperation in green technology development, improving fuel, water and energy efficiencies while reducing GHG emissions.

The plan also outlines the development of a nationwide Smart Grid to manage power production and distribution that will be installed by 2030 at a cost of US$ 23 billion. The government estimates that a nationwide smart grid could reduce power consumption by 3 per cent, reduce GHG emissions by 150 million tonnes CO_2, and generate US$ 65 billion worth of demand for new green products both domestically and abroad, while generating 50,000 new green jobs. The Smart Grid Programme has gained further momentum since the Korean Smart Grid Institute and the Korean Smart Grid Association were established in 2009 to facilitate collaboration between the government and industry. The first demonstration pilot project will be completed by 2013 on Jeju Island, off the south west coast connecting 6,000 households to the nation's first smart grid. Overall the development of green technologies in Korea is estimated to generate 481,000 new green jobs by 2012 and 1.18 million by 2020 while reducing 130 million tonnes CO_2 by 2020.

The Five-Year Plan for Green Growth also makes provisions for carbon sinks to offset CO_2 emissions. The capacity of national forests to act as carbon sinks will be increased from 862 million cubic metres to 953 million cubic metres by a wide-scale tree replanting programme. The plan also provides provisions to finance reforestation projects in the Democratic People's Republic of Korea (DPRK), consequently generating jobs for people in the north as well.

On 6 January 2009 Korea demonstrated their commitment to low carbon green growth by passing a US$ 38.1 billion economic stimulus package (4 per cent of GDP) known as the Green New Deal. Consisting of a mix of financial, fiscal and taxation policies it was the most ambitious green stimulus package initiated among OECD members. The Korean government recognised that the financial crisis had presented an opportune moment to use fiscal policy to redirect the country's development path towards greater environmental sustainability while creating new business opportunities and jobs in key green growth areas. Under the Green New Deal US$ 30.7 billion (80 per cent of total) was allocated to green growth sectors such as water and waste management (US$ 13.89 billion), sustainable transport (US$ 7.01 billion), energy efficient buildings (US$ 6.19 billion) renewable energy (US$1.8 billion) and low carbon vehicles (US$ 1.8 billion) (see figure 1.).

One major cornerstone of the Green New Deal is the US$ 20 billion Four Rivers Restoration Programme (Rivers Han, Nakdong, Geum and Yeongsan) which will undertake measures to secure water resources, create systems of flood control, improve water quality, restore ecosystems and create opportunities for rural development. It will also fund the construction of 42 new medium sized hydroelectric plants at a cost of US$ 163 million which are expected to generate 278,471 MWh of electricity per year. This substantial investment in the country's natural capital will create numerous new green jobs both in the restoration phase of the rivers as well as in water resource management, energy production and eco-tourism once it is completed.

Under Article 9 (18) of the *Investment Services and Capital Markets Act* of 2010 the Green Industries Investment Company was established to develop clusters, networks and complexes

for research and development in new green technologies. The company will oversee a substantial increase in the amount of investment for green technology research and development from US$ 1.2 billion in 2008 to US$ 2.4 billion in 2013. The company will focus research and spending in key growth areas such as advanced LEDs, carbon capture and storage (CCS), low carbon vehicles, high-end solar cells, fuel cells, telecommunications, smart grids and green IT.

Korea also passed the *Promotion of the Purchase of Environment-friendly Products Act* of 2007 to increase the government's public procurement of green goods and services by central and local agencies. By promoting green consumption activities the government can support new green markets for environmentally sustainable products. Industries with government contracts will be encouraged to pursue the whole systems approach by utilising cleaner production processes, improving resource-use efficiency and energy efficiency as well as designing new green products and services. This support for new green markets is encouraged by incentivizing consumers to also make environmentally conscious purchasing decisions. A carbon cash-back system was established for consumers to encourage the private consumption of green purchases. Consumers were granted 'carbon points' when they purchased low carbon products and then these could be exchanged later on for allowances at public facilities.

4.4 Environmental standards & targets

4.4.1 Standards

The *Framework Act on National Standards* was passed in February 1999 and laid the foundations for the standardisation of green technologies and industries, including certification of conformity in Korea. The Energy Efficiency Standards & Labelling Programme (1992, 2001, 2002) was established by the *Energy Use Rationalization Act* that established national energy efficiency standards (grades 1-5) and a labelling scheme indicating the level of energy efficiency of products to encourage consumers to purchase high efficiency products. The Minimum Energy Performance Standard (MEPS) Programme of 1999 limited the distribution of low efficiency products and promoted the technical development of manufacturing processes of products such as refrigerators, air-conditioners and domestic gas boilers.

Design standards for energy efficient buildings were introduced in 2001 with additional standards implemented for buildings with high energy consumption rates, such as large office buildings, hospitals, etc. These standards necessitate that the buildings expand their use of energy efficient equipment and improve design standards in order to qualify for approval. In July 2009 the Seoul Metropolitan government announced plans to upgrade the city into one of the greenest in the world by spending US$ 35 billion on retrofitting buildings greater than 2000 m^2 with energy efficiency measures creating thousands of new green jobs.

Fuel efficiency standards were specified under the *Framework Act for Low Carbon Green Growth* of 2010 at 17km per litre or a reduction in GHGs emissions below 140g per km between 2012 and 2015. The Average Energy Consumption Efficiency Policy requires manufacturers to calculate the average fuel-efficiency of all automobiles sold and to ensure certain annual fuel-efficiency goals are either met or exceeded. This policy encourages manufacturers to continuously improve the fuel-efficiency of their automobiles and to

develop technologies that contribute to reducing CO_2 emissions. Manufacturers who fail to meet the average efficiency standard goal can be penalised.

National skills certification standards have been implemented under the Five-Year Plan for Green Growth to meet the emerging demands of green industries for new green skills. The Green Building Certification Programme of 2001 aimed to improve the environmental performance of new buildings and reduce their GHG emissions. It introduced voluntary standards directing construction companies and builders to evaluate and gain certification of the life-cycle impacts of the building construction process (production of material, design, construction, maintenance and dismantling of buildings).

4.4.2 Targets

The *Enforcement Decree of the Framework Act on Low Carbon Green Growth* 2010 set out national GHG reduction targets at 30 per cent below the business-as-usual projection by 2020 (Article 25) and laid out a framework to manage targets for each entity or sector that emits GHGs as part of Korea's commitments to the Copenhagen Accord of 2009. In addition, Korea introduced targets for the building sector of a 31 per cent reduction of GHG by 2020. In addition, to the founding of the Presidential Committee, the Presidential Decree also included the implementation of a system of mandatory reporting of GHG emissions by all carbon and energy intensive industries.

In 2004 the government developed the General Energy Conservation and Efficiency Improvement Plan to improve energy efficiency and to reduce energy intensity (total energy consumption per unit of GDP) from 0.359 tonnes of oil equivalent per million constant year 2000 international dollars (TOE / US$ 000) in 2004 to 0.328 in 2007 to 0.294 by 2012. The *Framework Act on Low Carbon Green Growth* of 2010 expanded these energy intensity targets to 0.290 TOE/US$ 000 by 2013 and to 0.233 TOE/US$ 000 by 2020. The Act also details targets for the supply of renewable energy from 2.7 per cent of total supply in 2009 to 3.78 per cent by 2013 and 6.08 per cent by 2030.

Under the Five-Year Plan for Green Growth renewable fuel standards will be adopted in 2012 making it mandatory for fuel suppliers to provide bio-diesel, bio-ethanol and biogas for automobiles as well as setting fuel economy targets at 15.1km/litre by 2016. Sustainable agriculture targets are set at 4.5 per cent of agriculture in 2009 to increase to 18 per cent by 2020 and in addition targets are set to build fourteen eco-towns across the country by 2020. Local Green Growth Committees are charged with setting waste recycling, re-use, recovery and final disposal targets.

4.5 Social protection

The Korean economic stimulus package of 2009 included a number of provisions for extended social security protection. The Emergency Welfare Programme of 2009 provided financial assistance to 130,000 people experiencing difficulties due to business shutdowns and job losses as a result of the financial crisis. The Temporary Livelihood Relief Programme of 2009 extended social security provisions to those unable to work at 460,000 households with incomes below the minimum cost of living. Employment retention subsidies were provided to 147,000 beneficiaries to help companies' efforts to retain jobs (365.3. billion won) during the economic downturn. While job seeking and unemployment benefits were

increased targeting 1,586,000 beneficiaries while simultaneously expanding vocational training for the unemployed.

The Hope Work Project is a temporary project aimed to provide low income families with livelihood support and jobs to boost their spending in an attempt to stimulate the local economy. It targeted 400,000 people with family incomes 120 per cent below the minimum cost of living and has a budget of 1.328 trillion won. Financial assistance was 830,000 won per month with 50 per cent of that paid by means of a traditional market coupon which can be used in local shops to purchase food and other consumer goods. Types of employment for people under the Hope Work Project included demolishing school fences, repairing and maintaining public facilities and creating eco-experience zones to educate people about the environment. An eco-experience zone provides an opportunity for visitors to interact with nature while living in the cities. By re-wilding the urban landscape with indigenous plants and trees people have the opportunity to learn more about biodiversity and the environment. The zone creates green jobs in the construction phase and in the sustainable tourism sector once the eco-experience zone opens to the public.

4.6. Education and vocational training

Korea has implemented a number of new employment skills development programmes to foster growth in green jobs and to train workers in new green skills. The *Framework Act for Low Carbon Green Growth* of 2010 outlined the need for re-skilling programmes to facilitate the efficient mobility and conversion of manpower in each relevant industrial sector as well as a need to expand opportunities for citizens to learn about new technologies and financial and technical support for SMEs. It also made provisions for the training, supply and overseas expansion of professional human resources for green technologies and industries. The specialized vocational training programme for construction workers targeted 100,000 beneficiaries to supply the green skills needed for eco-efficient construction, green buildings and retrofitting.

At the local level, Sector Councils for Human Resource Development (SCHRDs) have been established with financial support from the Ministry of Education and Human Resource Development and the Ministry of Industry and Resources for green job training. These SCHRDs closely monitor the current trends in human resource supply and analyse where the skills shortages are occurring. These new councils are mostly run by business associations to provide short training courses in areas such as renewable energy, green finance, global healthcare, low carbon automobiles and ubiquitous sensors. In 2009 the Ministry of Labour established the Vocational Education and Training Reform Centre (VETRC) based on the analysis of skills shortages by the SCHRDs to develop new green skill trainings. The automobile SCHRD, for example, provides skills training for green automobiles and low carbon vehicles in partnership with two distinguished engineering colleges which certifies skills for future generation automobile skills. Currently, the national skills qualification system in Korea is making constant improvements to embrace green skills and green jobs.

Education programmes related to green jobs include Stay-in-school programmes to enhance the employability of unemployed college graduates by allowing them to gain new green skills. Undergraduate and graduate universities as well as Polytechnic Colleges will continually update existing curriculums to develop new skills for the green economy in areas such as solar photovoltaic, wind power and fuel cells. For example, the Korea Institute of Construction Technology and Education will develop courses for sustainable building

technologies while work experience placements in these new green fields for the Internship Programme will be expanded from 25,000 to 37,000 beneficiaries. The programme stipulates the government will pay for 70 per cent of an intern's wages to encourage SMEs to take on more student interns and to develop the human capital of the country.

5. Country profile – Singapore

5.1. Legislative framework on sustainable development

Singapore has been an active party in international discussions on environmental protection and sustainable development since independence from the British in 1965. In fact, UNFCCC deliberations held during the Rio Earth Summit in 1992 were chaired by a Singaporean, Professor Tommy Koh. Since Singapore's independence government policy-makers have been keenly aware of the need to pursue environmentally sustainable economic growth strategies brought about by the absolute lack of natural resources found on the island. Water, energy and most of the food must be imported into the territory, so concepts of energy efficiency, resource-use efficiency, water conservation and environmental protection have always been at the forefront of Singaporean development planning. By embracing notions of environmentally sustainable economic growth, Singaporean development can be characterised by long-term vision, holistic urban planning, sound environmental policies and high regulatory standards. The government has established policies and programmes which optimise the use of available environmental resources such as clean air, land, water and energy which create green jobs in the process. Singapore has developed an action-oriented approach to environmental sustainability that recognises all environmental resources as finite and valuable. The National Climate Change Strategy of 2010 sets out the agenda to develop Singapore into an environmental knowledge hub over the next 10 years.

Singapore has been pursuing a sustainable development agenda since the late 1960s which was complimented by the adoption of the Agenda 21 principles on 14 June 1992. Principles of sustainable development are now habitually incorporated into Singapore's national development plans as well as in the local/regional Agenda 21 plans. In regards to environmental stewardship the government of Singapore has also signed the Convention on Biological Diversity (CBD) (ratified 21 December 1995) and the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (acceded 30 November 1986).

Singapore signed the UNFCCC during the Rio Earth Summit in 1992 which entered into force on 27 August 1997 followed by accession to the Kyoto Protocol in 2006 as a non-annex 1 country. Singapore sent their most recent national communication to the UNFCCC secretariat in November 2010 outlining current policies and measures being implemented to combat climate change.

In regards to other multilateral environment agreements Singapore has been a committed and active participation in all relevant MEA negotiations including the Montreal Protocol, (acceded 5 January 1989) the UNCLOS, (acceded 17 November 1994), the Basel Convention, (acceded 2 January 1996), the Convention to Combat Desertification, (Entered into force December 1996) the Rotterdam Convention (acceded 24 May 2005) and the Stockholm Convention (acceded 22 August 2005).

These MEAs were complimented at the national level by the *Environmental Protection and Management Act* of 1999 (last amended 1 April 2009) and the *National Environment Agency Act* of 2002 which created the legislative framework for regulations governing environmental stewardship as well as the establishment of the National Environment Agency (NEA).

Recognising that greater economic development and population growth would exert pressures on the limited land, natural resources and environmental quality of Singapore over the coming years, the government initiated the development of the Singapore Green Plan 2012 (SGP2012) by the NEA. Initially launched in 2002 the plan set out environmental targets and stated commitments in six key focus areas; Clean air and climate change; Water; Waste management; Public health; Conserving nature and International environmental relations. The green plan was subject to three-yearly reviews to ensure that the SGP2012 remained relevant and up-to-date. The 2006 edition was published after consultation with more than 17,000 people from the public, private and people sectors. Building on the work of the Green Plan, the Sustainable Singapore Blueprint was launched by the Inter-Ministerial Committee for Sustainable Development (IMCSD) in April of 2009 and set out the national framework and strategy for Singapore's sustainable development over the next two decades until 2030. The IMCSD's vision is; "…to make Singapore a liveable and lively City State, one that Singaporeans love and are proud to call home".

Additional national level legislation which is likely to contribute to further green job creation includes the National Climate Change Strategy (NCCS) of 2008 prepared by the National Climate Change Committee. It sets out Singapore's targets and commitments in regards to reducing GHG emissions and reiterates support for the APEC-wide regional aspirational goal of a reduction in energy intensity of at least 25 per cent by 2030 from 2005 levels. This will be achieved by more use of renewable energy sources and energy efficiency programmes such as a national energy efficiency plan known as Energy Efficient Singapore (E^2 Singapore) under the. Energy Efficiency Singapore Programme Office (E^2PO) which is chaired by representatives from the NEA. The NCCS also outlines how Singapore is beginning to develop solar energy and water technologies and fund R&D to help the world meet the challenges posed by climate change.

The 2010 Budget allocates S$ 5.5 billion over the next 5 years to fund the Continuing Education and Training (CET) Master Plan designed to prepare the Singaporean workforce for the future and to maintain a competitive advantage in existing and emerging industries. The plan will form the fundamentals of a lifelong learning system to help equip Singaporeans with the skills for job opportunities in new growth industries, whether they are preparing for new jobs, switching careers or acquiring new skills. This will include the Specialist Manpower Programme to train specialist manpower and research talent for the clean energy and water technology sectors and the clean energy diploma programme to provide green skills and accreditation for work in green sectors. The CET Master Plan sets targets of 80 per cent of the resident workforce to have at least a diploma qualification by 2020, compared to 36 per cent in 2007.

Other related legislation nurturing the growth of green jobs include the National Biodiversity Strategy and Action Plan (NBSAP) overseen by the National Parks Board. The National Biodiversity Centre (NBC) was established to provide both policy frameworks and specific measures to ensure better planning and co-ordination in the sustainable use, management and conservation of biodiversity. To increase the level of knowledge regarding biodiversity in Singapore the National Parks Boards can facilitate research by issuing permits under the authority of the *National Parks Board Act* and the *Parks and Trees Act* of 2005 and the *Parks and Trees Regulation* of 2005. The NBSAP also fulfils Singapore's regional and international commitments regarding the Convention on Biological Diversity (CBD).

5.2 Consultative and institutional mechanisms

The Inter-Ministerial Committee on Sustainable Development (IMCSD) was established in January 2008 to develop a national sustainable development framework based around 4 key strategies;

a.) Boosting resource efficiency, including a 35 per cent improvement in energy efficiency from 2005 levels to 2030, a recycling rate of 70 per cent by 2030 and to reduce domestic water consumption to 140L per person per day by 2030;
b.) Enhancing the urban environment, including enhancing green spaces, 70 per cent of all journeys made via public transport and an improvement in overall air quality;
c.) Building capabilities such as test bedding new technologies to overcome resource limitations;
d.) Fostering community action by encouraging community ownership and participation in building a clean, green and resource-efficient Singapore and to make environmental responsibility part of the culture, in the way people live, work, play and commute.

The IMCSD published the Sustainable Singapore Blueprint in 2009 which outlined plans to invest S$1 billion over the next 5 years to improve the environmental sustainability of the City State. The first public forum held by the IMCSD in 2008 was entitled *Building a Sustainable Community* and featured discussions on sustainability with members of the public, NGOs, business, academia, media editors and Mayors. The IMCSD received over 1,300 suggestions from members of the public via the Sustainable Singapore website. The second public forum entitled *Enhancing the Built Environment* engaged over 700 people in focus group discussions, public forums and dialogue sessions on a wide range of issues related to improving the urban environment. Additional local consultations included the Energy SAVE Programme under the Housing and Development Board (HDB) that facilitated discussions with town councils to promote energy efficiency in public common areas.

The Inter-Ministerial Committee on Climate Change (IMCCC) was established in 2007 consisting of six ministries under the Prime Minister's Office (PMO) and was followed by the establishment of the National Climate Change Secretariat in 2009 to enable the government to engage the public on climate change issues. Through consultations with the public the National Climate Change Strategy (NCCS) for Singapore was devised to help stakeholders and policy-makers better understand how to address climate change, by better understanding the country's vulnerabilities, identifying and assessing adaptation measures, and how to mitigate GHGs.

The IMCCC was renamed the National Climate Change Committee in 2010 and is still under the PMO. The Ministry of the Environment and Water Resources also chairs a National Climate Change Committee (N3C) with representatives from various government agencies, industry representatives (e.g. from the Singapore Manufacturers' Federation and the Real Estate Developers Association of Singapore), academia, and non-governmental organisations (e.g. the Singapore Environment Council) with several subcommittees and workgroups. There was an e-platform for policymakers to engage with the 1300 members of the public who participated on climate change issues and policies, to gather feedback and provide the mechanism for key stakeholders to debate and share ideas on climate change issues. The Committee also coordinated an inter-agency taskforce in collaboration with the Ministry of National Development that reviewed existing infrastructural adaptation measures, as part of the overall government approach to address climate change in Singapore.

The establishment of the Economic Strategies Committee (ESC) was announced by Prime Minister Lee Hsien Loong in May of 2009. The ESC is chaired by the Minister of Finance and comprises of members from the government, the labour movement, the private sector and academia to provide recommendations for the Budget of 2010. The ESC works towards 'developing strategies for Singapore to build capabilities and maximise opportunities as a global city in a new world environment', to achieve sustainable and inclusive growth.

The National Productivity and Continuing Education Council was established in 2010 and chaired by the Deputy Prime Minister. It included members of the government, business and the labour movement working to boost skills and enterprise productivity, and to develop a comprehensive system for continuing education and training for the people of Singapore. The Council coordinates among different Government agencies and promotes closer collaboration amongst the business sector, workers, unions and the public sector in regards to sustainability issues.

The Standards, Productivity and Innovation Board of Singapore (SPRING Singapore) is the key government agency that promotes a pro-business environment by leading enterprise growth and development, particularly for SMEs. SPRING Singapore has invested S$3.9 billion in strategies for increased productivity, applied technology, workforce development and industry quality improvement. It also has developed partnerships with three local universities for economic educational programmes and manpower training.

The Economic Development Board (EDB) under the Ministry of Trade and Industry is tasked with developing the clean energy industry in Singapore. The EDB has established the inter agency Clean Energy Programme Office (CEPO) with a budget of S$ 50 million to focus efforts under the Clean Energy Research Programme on cluster development, technology development and internalisation with an emphasis on solar power. New developments include the new generation of green housing districts known as 'green living by the waters', the Eco-precinct project Tree lodge at Pungol Waterway and the Biopolis Centre that groups research institutions alongside many international medical companies in the same cluster.

The Singapore Workforce Development Agency was formed to lead and drive workforce development in Singapore by partnering with industries and education and training providers to offer relevant and quality programmes that meet sectoral needs. The Agency also developed the national Continuing Education and Training (CET) infrastructure to facilitate programmes contributing to improving green skills including water and waste management, town planning and intelligent transport systems, green building solutions and clean energy. The agency recognises that green skills, new innovation and greater productivity will be the key drivers of sustainable economic growth over the next decades.

5.3. Investments and financial incentives

5.3.1. Market-based instruments

The Singaporean economy is one of the most open in the world and as such it relies a great deal on market based instruments to create an enabling environment for greater free trade and innovation. By using MBIs to send price signals to the markets the government can better communicate its intentions to pursue environmentally sustainable economic growth strategies.

Presently, there is still no national level carbon tax in Singapore or a corresponding limit on carbon emissions such as a cap-and-trade permit system. However, the Government is currently calculating a shadow price for carbon in its cost benefit analysis so that policies and decision-making can be better informed and adapted if a globally binding agreement on climate change is signed. Singapore does not subsidise the price of energy, providing a market incentive for energy consumers to be more energy efficient. In fact, past efforts to improve energy efficiency have improved energy intensity by 15 per cent between 1990 and 2005.

To encourage water conservation the Public Utilities Bureau (PUB) sets water tariffs at 30 per cent for domestic use and set at S$1.17/m3 for consumption below 40m^3 per month and connection, and at S$1.40/$m^3$ for higher consumption. It also sets a Sanitary Appliance Fee and Waterborne Fee that are statutory charges payable to the PUB under the Sewerage and Drainage regulations to offset the cost of treating used water and for the operation and maintenance of the public sewerage system.

The Green Vehicle Rebate Programme was implemented to encourage Singaporean consumers to buy low carbon and fuel efficient cars. The programme provides a rebate of 40 per cent of the vehicle's open market value (OMV) for electric, hybrid and CNG passenger cars, 5 per cent of the vehicle's OMV for electric, hybrid and CNG buses and commercial vehicles, and 10 per cent of the vehicle's OMV for electric motorcycles. The rebate can also be used to offset the Additional Registration Fee (ARF) payable at registration.

Singapore uses a number of MBIs to manage and reduce the amount of traffic through the electronic road pricing (ERP) scheme that requires motorists to pay each time they drive into a congestion prone area. The ERP is supported by the vehicle quota system which controls the number of cars on the streets, an annual road tax, the Area Licensing Scheme (ALS) and the Green Link Determining System (GLIDE) that increases traffic throughput by real time monitoring of traffic flows and expressway systems. These types of sustainable transport solutions are very labour intensive and can create thousands of new green jobs when introduced in a city.

The government also provides a number of incentive schemes to encourage greater sustainability and green jobs. The Energy Efficiency Prototype Building Incentive is a S$ 5 million scheme to encourage developers to collaborate with experts worldwide to develop buildings that will achieve at least a 50 per cent improvement in energy efficiency. The One-Year ADAS Scheme (Accelerated Depreciation Allowance for Energy Efficient Equipment and Technology) authorised under the *Income Tax Act* of 1984 (amended 2008) and administered by the NEA was devised to encourage companies to replace old, energy-consuming equipment with more energy efficient versions and to encourage investments in energy-saving equipment. The ADAS allows capital expenditure on energy efficient or energy-saving equipment to be written off in one year instead of three. All costs directly related to the project, including the equipment, supplies and installation costs, are also eligible for accelerated tax allowances.

5.3.2. Loans and funds

There has been a lot of interest from within the Singaporean financial system about so-called green finance such as green bonds and carbon credit trading. International Enterprise Singapore (formally known as the Singapore Trade Development Board) under the Ministry

of Trade and Industry is responsible the development of Singapore's external economy and has designated carbon credits as a qualifying product under the Global Trader Programme (GTP), allowing eligible companies to receive tax concessions on qualifying income from emissions trading and to encourage more firms to locate their emission trading activities in Singapore with a view of promoting Singapore as a carbon trading hub in Asia.

The Green Programme Office (GPO) was established in March 2010 by International Enterprise Singapore to assist Singapore-based companies with the greening of their business activities and to develop green goods and services. The GPO's goals are; to act as a repository and brain trust for knowledge related to the green economy; brand Singapore as a provider of sustainable solutions within the new green economies and industrial sectors of the future and to drive new initiatives to help Singapore-based companies to develop exportable green solutions, including the development of new incentive schemes.

The Renewable Energy Exchange Capital Asia (ReEx Capital Asia) was established in 2006 in Singapore to help bring together investors looking for projects in renewable energy and project developers seeking funding. The Renewable Energy and Energy Efficiency Partnership and the German Government have committed to provide funding support for the initial establishment and operation of the exchange. The exchange was also supported by the NEA and IE Singapore by organising meetings, seminars and workshops with industries that have an interest in CDM projects.

The NEA is the Designated National Authority on CDM in Singapore and as such ensures that CDM projects are in line with existing sustainable development plans. There is interest from the private sector in different parts of the carbon value chain to start operations in Singapore to support the development of CDM projects in other parts of the region. The NEA also provides incentives to encourage companies to develop CDM projects in Singapore such as Clean Development Mechanism documentation grants to fund 50 per cent of the qualifying cost of employing a carbon consultant to develop a new methodology and Project Design Document (PDD) and 30 per cent of the cost to develop a PDD that uses an existing approved methodology. Potential CDM projects in Singapore include waste-to-energy and energy efficiency projects. There is also a S$ 5 million Market Development Fund administered by the Energy Market Authority to facilitate test bedding of non-traditional generation technologies useful to the electricity market while the Design for Efficiency Scheme (DfE) provides funding assistance to investors in new facilities in Singapore to integrate energy and resource efficiency improvements at the initial design stage.

Grants for Energy Efficient Technologies (GREET) were approved in November 2008 to encourage owners and operators of industrial facilities to invest in energy efficient equipment or technologies by offsetting up to 50 per cent of the qualifying costs for investments in energy efficient equipment (capped at $2 million per project). The Energy Efficiency Improvement Assistance Scheme (EASe) will co-fund the cost of energy audits by up to 50 per cent.

The Innovation for Environmental Sustainability (IES) Fund under the NEA provides S$ 20 million as a seeding fund to encourage and assist Singapore-registered companies to undertake environmental protection and public health related projects that contribute to the long-term environmental sustainability. The IES fund is targeted at projects at the applied research and test-bedding/demonstration stages of technology developments. The 3P Partnership Fund also under NEA provides S$ 1.5 million to assist organisations from across

the public and private sectors with limited resources to realise successful projects on environmental sustainability while the Environment Technology Research Programme (ETRP) is a S$ 15 million funding programme to expand technological competencies and to support a growing ecosystem of companies and researchers undertaking Clean Environment R&D in waste management.

The 3R Fund (reduce, reuse and recycle) also under the NEA provides S$ 8 million over 2 years to co-fund projects that promote the reduction, reuse and recycling of waste. Projects include the provision of waste recycling infrastructure, redesign of processes to reduce waste and provision of innovative sorting or recycling systems.

The Water Efficiency Fund under the PUB was set up to help industries to pay part of the capital costs of investing in water recycling systems. This is supported by the Water Efficient Buildings Programme which encourages the use of water-efficient fittings and the monitoring of water consumption by building owners.

5.3.3. Fiscal policies and other investments

The Singapore Stimulus Package of 2009 allocated S$ 20.5 billion from the financial reserves to help stimulate the economy during the financial crisis. The package included lower corporate taxes (cut by 1 per cent from 18 per cent to 17 per cent), subsidized wages, guaranteed bank loans and S$ 4.4 billion in sustainable infrastructure projects to create new green jobs such as the subway system extensions, green public housing projects and developing parks facilities. S$ 350 million was earmarked for initiatives in clean energy, with the aim of increasing the share of Singapore's GDP from the Clean Energy sector to S$ 1.7 billion and to generate 7000 green jobs by 2015[2]. Subsidies and tax rebates were provided for low income earners and households amounting to $1.7 billion in form of tax rebates and cash handouts. The stimulus package also subsidized 12 per cent of the first S$ 2,500 of each employee's monthly wages, increased the number of training programmes and increased public sector hiring.

The Singapore Budget of 2009 (also known as the Resilience Package) allocated S$ 4.8 billion from the reserves to be spent on infrastructure, health and education improvements. Funding was also provided to the Jobs Credit SPUR Programme and Special Risk-Sharing Initiative.

The Singapore Budget of 2010 contained provisions for a sustained national initiative to assist enterprises and workers to raise productivity (increase 2 per cent to 3 per cent productivity growth per year for a whole decade) by deepening skills and expertise in new growth areas including green technologies. It allocated S$ 5.5 billion over the next five years to support inclusive growth by supporting low-wage workers to upgrade and up-skill themselves, and more help for families with children and for older Singaporeans. The Budget 2010 also provided funding to develop the infrastructure of institutes of higher learning, research institutes and companies to conduct basic and applied research and to demonstrate

[2] Singapore's Budget, Ministry of Finance, 2011, http://app.singaporebudget.gov.sg

innovative solutions such as green technologies. The Budget also funded the development of a new 'sustainable schools' to showcase resource-use efficiency savings and to provide a healthy learning environment for students.

The Clean Energy and Water Technology Sectors Investment Programme was allocated S$ 680 million under Budget 2010 and estimated that these sectors could generate an additional S$ 3.4 billion by 2015 and create 18,000 green jobs. The Energy Market Authority and SingPower have begun the development of an intelligent power grid pilot project involving 4,500 customers from residential, commercial and industrial areas to evaluate how new applications and technologies can contribute to the national smart grid. The customers will be able to select their own electricity retailers and packages while monitoring and managing their own electricity usage at home with smart meters and other automated devices.

The Sustainable Singapore blueprint of 2009 will be executed by the Singapore Economic Development Board (EDB) which coordinates research and development efforts in Singapore to support the development of new business opportunities in regards to clean technologies and urban solutions. The EDB is guided by three main objectives:

1. Create a vibrant research ecosystem;

2. Facilitate test-bedding; and

3. Expand and develop industrial clusters and eco-parks for clean technologies.

Activities related to the renewable energy sector include the EDB's S$ 17 million Clean Energy Research & Test-bedding Programme designed to encourage greater synergies amongst R&D organisations when conducting test-bedding activities. Technology providers provide the clean energy equipment and technologies to support research activities. The programme will create the opportunity for the private and public sectors to work together to develop and test-bed cutting-edge clean energy solutions and systems using government facilities as a field laboratory.

The Centre for Liveable Cities (CLC) under the Ministry of National Development, in partnership with Ministry of the Environment and Water Resources is a policy orientated think tank with expertise in green sectors such as sustainable urban development, urban planning, resource management, living environment technologies, affordable green housing and sustainable transport. The Built Environment Research Fund under Ministry of National Development provides S$ 50 million for the test bedding of green building technologies and zero energy buildings that reduce GHG emissions.

The Energy Technology R&D Programme under the Solar Energy Research Institute of Singapore (SERIS) was established in 2008 by the Agency for Science, Technology and Research (A*STAR). The preliminary budget was S$ 130 million over the first 5 years for the coordination, integration and expansion of efforts and capabilities in innovative green technologies including solar energy research and related manpower development, fuel cells, bio-fuels and hydrogen technologies. While the Temasek Polytechnic plans to invest S$ 5 million over the next few years to establish a Fuel Cell Application Centre to engage start-ups in collaborative R&D.

The S$200 million Energy Research Institute at Nanyang Technological University conducts research and development in a number of key green growth sectors including energy storage, wind and marine renewable energy technologies, green and smart buildings, and hydrogen fuel cells. The S$ 30 million Incubator Development Programme (IDP) established by the Singapore Enterprise Development Agency (SPRING) helps the growth of new ventures including clean energy and water technology start up companies creating hundreds of new green jobs (e.g. tri-generation facilities, waste-to-energy, water purification). The programme provides support to incubators and venture accelerators that help nurture, grow and promote new ideas. Capability development programmes are provided for innovative start-ups by providing up to 70 per cent grants as well as business mentoring and other financial support.

There are also extensive plans to develop the 55ha Jalan Bahar Clean-tech Park over the next 20 years to host companies researching, test-bedding, prototyping and light manufacturing of clean technologies. Jalan Bahar Clean-tech Park will be designed to achieve low carbon emissions and integrate surrounding ecological features within the green buildings and infrastructure.

5.4. Environmental standards and targets

5.4.1. Standards

Minimum Energy Performance Standards (MEPS) are included in the Sustainable Singapore Blueprint of 2009 for key electrical appliances such as air-conditioners and refrigerators as well as key benchmarks for industrial processes and recommends the adoption of green data centre standards to reduce the power consumption of IT systems (green IT). Energy efficiency improvements made at a data centre can be a green job.

The Singapore Standard 530 on Energy Efficiency for Building Services and Equipment of 2007 sets minimum energy efficiency standards for building equipment such as water heaters, air-conditioners, electric motors and high efficiency lighting. Energy Management Practices in Singapore mandate large energy users to employ specific energy management practices such as the appointment of trained energy managers and the implementation of an energy management system within companies to integrate energy efficiency into management practices.

At present the building sector contributes approximately 16 per cent of Singapore's greenhouse gas emissions. About half of the electricity used by buildings in Singapore is for air-conditioning (40-50 per cent), 20 per cent for mechanical ventilation and 20 per cent for lighting (20 per cent). Singapore is now one of the few countries in the world to mandate green building standards, since 2008 all new buildings have to meet the Green Mark Certified rating thus transforming most of the jobs in the design, engineering and construction sectors into green jobs. The Singapore Green Building Council (SGBC)’s Green Building Product Certification Scheme was launched in September of 2010 to support the building industry drive towards an environmentally friendly built environment. The Certification is the first dedicated green building product certification scheme to support the BCA Green Mark Scheme. In addition, under the Green Building Master Plan of 2009 S$ 100 million was allocated to the Green Mark (GFA) Incentive Scheme to encourage all buildings to undergo retrofit programmes to improve their energy efficiency and environmental sustainability creating green jobs in retrofitting. It is widely recognised in Singapore that green buildings

are more competitive than regular buildings and can command a rental premium in the marketplace.

In regards to fuel efficiency, new diesel vehicles are required to meet European IV standards which results in less harmful emissions. The government has stipulated that all taxis and buses must conform to these standards by 2014. Air emission standards, first set under the *Clean Air Act* of 1978 mandate a reduction in particulate matter to 12/ug/m^3 by 2020 and cap SO_2 levels at 15 ug/m^3 by 2020. These standards are regularly reviewed for industrial and transport sectors. In addition, the government will study how the use of diesel particulate filters and alternative hybrid technologies can be employed to further reduce harmful emissions. Stringent measures were thus put in place, overseen by the Anti-Pollution Unit that reported directly to the Prime Minister. Finally, minimum water efficiency standards were introduced in July of 2009 for water appliances in new developments and existing premises undergoing renovation.

5.4.2. Targets

Singapore attended the climate change negotiations held in Copenhagen in December of 2009 as a non-annex 1 country and took note of the Copenhagen Accord. During the 15th conference of the parties (COP 15) the government of Singapore had offered a voluntary reduction of 16 per cent of emissions below 2020 BAU levels if a global binding agreement had been set. Even in light of the failure to reach a binding agreement on emissions the government of Singapore is still committed to reducing its GHG emissions and improving environmental sustainability. To achieve this reduction target the government has set an ambitious carbon intensity target of 0.35 kgCO2/2000 US$ which is well below the world average for carbon per unit of GDP produced. About 80 per cent of the electricity currently generated in Singapore is from natural gas using highly efficient combined-cycle technology which had replaced previous oil and coal based systems. The gross efficiency of power generation in Singapore thus increased from 39 per cent in 2001 to 44 per cent in 2006 and significantly reduced GHG emissions. The use of cogeneration (combined heat and power) and tri-generation refers to capturing both the heat and electricity produced from fuel combustion and can further increase the energy efficiency of power generation from about 50 per cent to more than 75 per cent. This has been done at a number of locations across the island.

Energy efficiency targets have been set as part of the National Energy Efficiency E^2 Plan under the Energy Efficiency Programme Office (E^2PO) an inter-agency committee lead by the NEA. To help support the implementation of the E^2 Singapore plan a Sustainable Energy Fund (SEF) of S$ 50 million over 5 years was established and administered by the E^2PO. It has set a target of a 35 per cent improvement in energy efficiency from 2005 by 2030, to reduce energy consumption in common areas of existing housing estates by 30 per cent and new estates by 20 per cent.

Energy intensity targets were also set under the National Energy Efficiency E^2 Plan to reduce energy intensity (per $ of GDP) by 20 per cent from 2005 levels by 2020 and by 35 per cent from 2005 levels by 2030. Singapore also supports the APEC-wide regional goal of a reduction in energy intensity of at least 25 per cent by 2030 from 2005 levels. To reach these targets a number of programmes have been established such as the Design for Efficiency Scheme under the NEA which aims to encourage investors in new facilities in Singapore to integrate energy and resource efficiency improvements into manufacturing capital at the

begging of the design stage to ensure a whole systems approach is taken in regards to production. The government will fund 80 per cent of the qualifying costs or S$ 600,000, whichever is lower. The Energy Smart Building Labelling Programme under the NEA promotes energy efficiency and conservation in the buildings sector by according recognition to energy efficient buildings.

The Fuel Labelling Scheme of April of 2009 introduced mandatory labelling for passenger cars and light goods vehicles and by 2010 more than 20 per cent of the vehicles in the market were participating in the scheme. In addition, Neste Oil has started production at the largest biodiesel plant in the world in Singapore with an annual production capacity of 800,000 tons a year. The biodiesel from the plant can be either blended with the conventional diesel or used directly and is manufactured by using either vegetable oil or a mixture of oils and residual animal fats from the food industry.

In regards to targets for public transportation use the Land Transport Authority (LTA) has earmarked S$ 40 billion to improve Singapore's public transportation systems and plans to double the length of the rail network from 142 km to 278 km by 2020. The target is to achieve 70 per cent of morning rush hour journeys to be made by public transport. The LTA also intends to improve the off-peak car scheme and the Park and Ride Scheme as well as test bedding new technologies such as diesel-hybrid buses and developing a green framework for rail systems generating hundreds of new jobs in the sustainable transport industries.

Under the National Recycling Programme a target was set to increase the recycling rate to 65 per cent by 2020 and 70 per cent by 2030. Singapore is one of the few countries in the world that incinerates almost all the waste to generate electricity in an attempt to minimise the amount of waste dumped into the landfills. Singapore's five waste-to-energy plants contribute approximately 3 per cent of Singapore's total energy supply.

In regards to water conservation targets the Sustainable Singapore Blueprint of 2009 aimed to reduce domestic water consumption to 140l per person per day by 2030 and to increase the use of NEWater (desalinated sea water) to 30 per cent of City's needs. The blueprint also set targets to increase the size of reservoirs by 900 ha and to create an extra 100 km of waterways for recreation. The water agency under the PUB has created a secure and sustainable supply of water through the implementation of the 'Four National Taps' strategy. All Singaporeans participate in the first 'Tap' through conserving water and by maintaining clean catchment areas and waterways. The other three 'taps' include importing water through pipes from Johor Bahru in Malaysia, using recycled water through the use of membrane-based technology (NEWater), and using reverse-osmosis technology to provide drinking water through desalination of seawater. Water conservation and purification now employ hundreds of people in green jobs in Singapore.

Singapore's identity as a 'garden city' is due to the presence of primary rainforests in four nature reserves and eighteen nature areas, which currently cover 23 per cent of Singapore's landmass. In addition, the government will increase the amount of green spaces in the city to 0.8ha of green space for every 1000 persons and expand the amount of parkland over the next 10 years to 900ha. Greenery targets set under the Singapore blueprint also target an increase in the amount of skyrise greenery in tall buildings to 30 ha by 2020 and 50ha by 2030.

5.5. Social protection

Policies that engender greater social protection for members of the public have always been pursued by the Singaporean government. Under the stimulus package of 2009 the Workfare Income Supplement (WIS) was provided to supplement the wages of low income earners with an increase of 50 per cent designed to encourage older low-wage workers to continue to stay in the workforce. A further S$ 1.7 billion was provided to low income families in the form of tax rebates and other direct cash handouts.

The Workfare Training Support (WTS) Scheme under the Ministry of Manpower was developed to encourage low wage workers to conduct further trainings to improve their chances of social mobility. This is achieved by providing higher funding subsidies to companies to incentivise them to send their low wage workers for extra training and by providing a cash reward to workers for attaining a certain level of expertise. Training programmes include courses on renewable energy, energy efficiency and water conservation. The Youth Environment Envoy (YEE) Programme provides training courses to disadvantaged young people to encourage them to conceptualise and implement environment related projects. By 2010, over 200 young people had been trained as YEEs supplying much needed environmental awareness and green skills.

To safeguard human health the government has outlined a number of initiatives to be taken under the Sustainable Singapore Blueprint including strengthening disease surveillance systems, improving response times to disease outbreaks and continuing the professional development of public health officers. At present air quality monitoring takes place at a number of stations around the city as part of the existing avian flu surveillance programme. As part of the surveillance system, NEA will respond to calls on the presence of dead birds equipped with personal protection equipment such as gloves and masks, and are trained to follow safety procedures before sending samples for virus testing in laboratories.

This bio surveillance system is to be expanded to enhance capabilities to recognise a wider variety of viruses and pathogens to protect against threats to human health from the environment. The government will also update the inter-agency action plan to respond to disease outbreak incidents. To protect human health and to ensure that Singapore has clean and safe air to breathe the NEA monitors vehicle emissions to make sure they remain at acceptable levels. To control the emissions generated by motor vehicles, the NEA regulates the type and quality of fuel that can be used in Singapore as well as setting minimum exhaust emission standards for all vehicles.

5.6. Education and vocational training

Under the Sustainable Singapore Blueprint of 2009, human capital targets have been introduced to increase productivity growth from about 1 per cent per annum over the past decade to between 2-3 per cent per year over the next ten years, supported by the *National Productivity Fund Act* of 2010. The *Singapore Workforce Development Agency Act* was passed in 2003 and established the Singapore Workforce Development Agency to enhance the employability and competitiveness of Singaporean workers, from workers to professionals, managers and executives. The agency established a network of Industry Skills and Development Councils to support the development of manpower in each economic sector of the economy.

This productivity growth was facilitated by the Singaporean Budget of 2010 by implementing a comprehensive legislative framework for human capital development, training and education known as the Continuing Education and Training (CET) Master Plan under the Ministry of Manpower at a cost of S$ 5.5 billion over 5 years. An Integral component of the plan is the Singapore Workforce Skills Qualifications (WSQ) S$ 2.5 billion in continuing education and training (CET) over the next 5 years enabling training to be delivered through the CET centres and a network of associated training providers. It provides different levels of certifiable training in employability and vocational skills through a comprehensive continuing education and training CET infrastructure, with a network of about 50 CET centres providing comprehensive training and career services to people, including services for green skills and green jobs.

The agency holds regular discussions with a range of partners including employers, industry leaders, the unions, other governmental agencies and training organisations to develop programmes and initiatives creating skilled workers to meet industry needs such as the Specialist Manpower Programme in clean energy and the Clean Energy Diploma Programme (S$25 million). The plan aims to enhance worker skills quality and productivity by helping them acquire industry-relevant skills for the future to maintain a competitive edge. The plan will form the fundamental framework for a lifelong learning system to help equip Singaporeans with the skills for new growth industries. The plans set a target of 80 per cent of the resident workforce to have at least a diploma qualification by 2020, compared to 36 per cent in 2007.

In regards to training for green jobs the Manpower Development Programme was developed to train specialist manpower and research talent for the clean energy and water technology sectors. The Skills Upgrading and Resilience (SPUR) Programme promoted by the government pays 90 per cent of retraining fees, as well as an hourly lost productivity rebate, to keep employment while new job training takes place. The Singapore Certified Energy Manager (SCEM) Programme under the National University of Singapore (NUS) is a formal training and certification system in the area of energy management. The S$ 25 million scheme is targeted at engineers who manage manufacturing facilities and buildings, provide energy services or engineering consulting services. NEW provides a training grant that offsets a portion of the training fees for the curriculum. It also provides clean energy scholarships to students, visiting professor programmes and manpower training centres of excellence. The cost is S$ 963 for 144-hours of professional tuition on a course consisting of 4 core and 2 elective modules. The Water Efficiency Management Course under PUB is designed to equip operation managers with water audit skills to identify gaps and develop their own water conservation strategies developing green skills for workers in the areas of water management, purification and conservation. The Solar Capability Scheme (SCS) is a S$ 20 million programme to enhance the capabilities of designers, architects and system integrators working in solar energy companies. It encourages innovative design and integration of solar panels into new green buildings and the use of green design concepts during construction. This was developed in conjunction with the S$ 31 million Solar Programme that test-beds new solar technologies across 30 public housing precincts in Singapore. Large scale solar test beds enable Singaporean workers to be trained in new green skills such as installing and maintaining solar systems while getting qualified. There is also a training and certification scheme for public and private sector data centre operators to promote R&D in energy efficiency data centres and green IT.

The Programme for Environmental Experiential Learning (PEEL) was developed by the NEA and Singapore Environment Institute (SEI) to provide courses on environmental management in Singapore. The course is classroom based but does include a series of six site tours to environmental facilities around Singapore as well as the relevant training courses to enhance capabilities in carbon consultancy services through accreditation schemes and courses at partner institutes. This will help to ensure a continued expansion of skills in carbon markets and CDM development projects.

Singapore has earmarked a substantial proportion of the budget for investments in education and notions such as resource efficiency, recycling, climate change and environmental protection as common place in schools and higher learning institutes. The Clean and Green Singapore Programme under the Community Development Councils (CDCs) was developed in partnership with the NEA to inspire all Singaporeans to care about and help, protect the environment.

Environmental education has become part of the national school curriculum under the Ministry of Education of Singapore. Environmental education is also one of the criteria in the Schools Excellence Model which is used to appraise the overall performance of schools in Singapore, incorporating topics such as recycling, energy and water conservation. There is also a network of environmental education advisors in all schools to facilitate contacts between the NEA and teachers. The Students Embracing Litter-Free (SELF) Programme was launched by the NEA in 2010 to encourage students to make a personal commitment to maintain a clean and green environment. Under the SELF Programme students are encouraged to organise litter-free activities outside the school premises such as conducting clean-up activities or adopting the community spaces around the school. Students can learn how their actions can have an impact on the living environment and that the programme is not only about having a litter-free school but embracing a litter-free community as well.

The NEA's Singapore Environmental Institute regularly conducts capacity development programmes for new green skills. Capacity building training programmes on environmental protection and natural resource management for international participants are provided under the Singapore Cooperation Programme which helps to train foreign government officials on the various aspects of water, waste management as well as public health.

6. Country profile – United States of America

6.1. Legislative framework on sustainable development

The United States of America (U.S.) attended the United Nations Conference on Environment and Development (UNCED) in 1992 and signed the United Nations Framework Convention on Climate Change (UNFCCC) as an Annex 1 country and the Biodiversity Convention as well as adopting Agenda 21. This set the initial policy framework to develop and implement a National Strategy for Sustainability that would expand and harmonize the existing economic, social and environmental policies and plans of the country. On the basis of the Vienna Convention of 1985, the U.S. signed and finalized the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987 which called on all parties to phase out the use of ozone depleting substances. The United Nations Convention to Combat Desertification was signed and entered into force December 1996. The U.S. has yet to become a party to the Basel Convention, the Rotterdam Convention and the Stockholm convention. More recently the United States has agreed to participate in the development of a Ten-Year Framework of Plans on Sustainable Production and Consumption as part of their contribution to the Marrakech Process.

The U.S. is a member of the Commission for Environmental Cooperation that was established by the North American Free Trade Agreement (NAFTA) parties to implement NAFTA's environmental side agreements and to facilitate cross border collaboration on a range of environment related issues. The *National Environmental Policy Act* of 1969 established the President's Council on Environmental Quality (CEQ) and was the first piece of legislation in the U.S. to mandate federal agencies to conduct environmental impact assessments before taking any major decisions. Federal environmental stewardship was further endorsed by Executive Order 13148 that directed the head of each Federal Agency to integrate environmental accountability into the agency's day-to-day decision making and long-term planning processes, consequently, environmental management considerations must be a fundamental and integral component of all Federal level policies, operations, planning, and management.

The Green Jobs Act of 2007 incorporated into the *Energy Independence and Security Act* of 2007 is widely recognised as one of the leading examples of legislation on green jobs. The legislation aimed to decrease the country's reliance on foreign oil imports by encouraging alternative sources of energy and by improving energy efficiency and authorized up to $125 million to support on-the-ground apprenticeships and the establishment of an energy efficiency and renewable energy worker training programme, administered by the U.S. Department of Labor. The *Green Jobs Act* helped identify and track new green jobs and skills needed to develop the renewable energy and energy efficiency industries as well as link research and development in green industries to job standards and training curricula. The training programmes are aimed at addressing green skill shortages in key emerging green industries, such as energy efficient buildings and construction, renewable energy, energy efficient vehicles and bio-fuels.

The *Green Jobs Act* was intended to spur up to 3 million new jobs by helping companies retrain workers in new green skills and to produce renewable energy and energy efficient components. Under the green job programme, National Energy Training Partnerships grants were provided on a competitive basis to entities that helped individuals achieve economic self-sufficiency and that collected data on the labor market. Other initiatives set up by the Act

include the State Labor Market Research Programme, Information and Labor Exchange Research Programme, the State Energy Training Partnership Programme and the Pathways Out of Poverty Demonstration Programme. Many of these programmes targeted specific groups such as the disabled, African-Americans, older people, veterans and women assisting them to find green jobs in the labour force.

In addition, the *American Recovery and Reinvestment Act* of 2009 further advanced the green jobs agenda by directing the Office of the Employment and Training Administration at the DOL to draft a Green Jobs Framework for Action (see annex 2) and awarded US$ 490 million for green jobs training as well as US$ 227 million in health care and high growth grants. The framework is designed to promote the development of new and existing green jobs, and to encourage employment in new green sectors by organising regional discussion forums and providing education grants for green careers. The *Recovery Act* also funded specific projects to help women, veterans, the disabled, the long term unemployed, older people, ex-convicts, African-Americans and Latinos as well as many others from disadvantaged groups find green jobs in new green industries.

At the regional level, the State of New York also passed legislation on green jobs in 2009 to coordinate the State's efforts to develop and train a workforce for the green economy. It established the Green Jobs Subcommittee to facilitate consultations between the Department of Labour, the New York State Energy Research and Development Authority, the Department of Education, the Public Service Subcommittee as well as numerous other relevant organisations on green jobs. The subcommittee is responsible for collecting and analysing data on the regional labour market and identifying which new and existing business sectors have a growing demand for green skills. It will also develop strategies and training programmes in the following areas; energy efficient buildings and retrofitting; energy efficiency assessment industries; renewable electric power; biofuels; deconstruction and material recycling industries; brown-field remediation; manufacturers that produce green products and renewable energy components; public transport and industries in transition (ones adopting cleaner production processes). The legislation also called for the creation of local Green Jobs Corps in municipalities throughout New York State to work with local communities and other established green job programmes to help young people develop green career paths and learn green skills.

6.2. Consultative & institutional mechanisms

The President's Council on Sustainable Development was established in 1993 by President Clinton and was tasked with developing a series of reports and recommendations for making the U.S. more sustainable. The Council operated for six years but was disbanded in 1999. At the time of writing the U.S, does not have a Federal institutional mechanism to coordinate sustainable development policy across all sections of government.

Within the Executive Branch the Office of Policy Development is responsible for convening the National Economic Council (NEC) which works to coordinate and implement the President's economic policy objectives throughout government. Members are drawn from a wide spectrum of disciplines and backgrounds pertaining to employment, therefore policies for green jobs are usually the responsibility of the NEC. The Office of Congressional and Intergovernmental Affairs (OCIA) is the coordination mechanism for cooperation between Agency offices, the Congress, States, and local governments on a wide range of issues including labour. The OCIA promotes the "Good Jobs for Everyone" principles to

policymakers both in Washington and at the state level and works to educate policy-makers about federal labour issues. In December 2009 President Obama convened the White House Forum on Jobs and Economic Growth and invited leaders from government, labour, academia, non-profits and business to discuss a variety of important employment related issues, including a session entitled Innovation and Green Jobs of the Future.

The White House Council on Environmental Quality (CEQ) is a division of the Executive Office of the President that coordinates federal efforts regarding environmental and energy policies. Working through interagency working groups the CEQ encourages government-wide coordination by bringing federal agencies, state and local governments, and other stakeholders together on matters relating to the environment, natural resources and energy. In 2009 the first Special Advisor for Green Jobs, Enterprise and Innovation was appointed to the CEQ to ensure policy coherence in regards to green job creation.

The United States Senate Committee on Health, Education, Labor, and Pensions is the consultative body responsible for deliberating matters relating to health, education, labor, and pensions and oversees three subcommittees including the Subcommittee on Employment and Workplace Safety. The Committee on Education and Labor of the U.S. House of Representatives and its five subcommittees oversee education and workforce programmes and meet regularly to deliberate on a wide range of issues including early learning, secondary education, job training and retirement. The Committee makes sure effective programmes are implemented at both the federal and state levels to help workers find job training and to receive retirement security once they reach old age.

The U.S. Department of Labor (DOL) is a Cabinet-level department responsible for occupational safety, wage and hour standards, unemployment insurance benefits, re-employment services, and issues related to green jobs. The DOL works in conjunction with the United States Environmental Protection Agency (EPA) as well as a number of NGOs on a range of environment-related programmes which create green jobs.

Finally, the *Good Jobs, Green Jobs* National Conference held in May of 2010, in Washington, D.C., convened representatives from the private sector to discuss issues related to building a new, green economy that creates good jobs, reduces global warming and preserves America's economic and environmental security.

6.3. Investments and financial incentives

6.3.1. Market-based instruments (MBIs)

Discussions about the use of market based instruments in the U.S. to combat climate change and improve the environmental sustainability of economic growth are still ongoing. At present there are still no federal level carbon taxes or a long term price for carbon which would provide a level of certainty conducive for investors to begin heavily investing in renewable energy projects and other green growth-related sectors. However, there are many policies and programmes currently operating in the U.S. which are contributing to greater environmental sustainability.

At present there is no cap-and-trade system at the Federal level in the United States. The Waxman-Markey bill also known as the *American Clean Energy and Security Act* had intended to create an emissions trading scheme similar to the EU emission trading system and

was passed by the House of Representatives in 2009 but failed to pass the Senate. However, a number of north-eastern States are participating in the first regional mandatory, market-based effort in the United States to reduce GHG emissions known as the *Regional Greenhouse Gas Initiative* (RGGI). The ten states (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont) have started emission permit auctioning and will start to reduce emissions in the power sector by 10 per cent by 2018. The other regional trading scheme is the Western Climate Initiative involving both the U.S and Canada (California, Montana, New Mexico, Oregon, Utah, and Washington, and the Canadian provinces of British Columbia, Manitoba, Ontario and Quebec).

The *Energy Policy Act* of 2005 introduced targeted subsidies for wind and other alternative energy producers as well as tax deductions for energy efficient commercial buildings. The Act also created credit guarantees for innovative new technologies that avoid GHGs such as the clean coal and renewable energy sectors. A tax credit known as Section 1603 offers cash grants to help spur developments of wind power while the *10 million solar roofs Bill* (introduced to the Senate 2010) proposed incentives and tax rebates aimed at getting 10 million solar roofs and 200,000 solar heaters installed across the country over next 10 years. The incentives would pay for half of the cost of new solar systems and would complement the existing tax credits and rebates already available at the federal, state, and local levels. Under the *Energy Independence and Security Act* of 2007, the State Energy Programme provided grants to states to design and implement programmes that encouraged renewable energy and energy efficiency through communications and outreach activities, technology deployment, and accessing new partnerships and resources.

6.3.2 Loans and funds

U.S. development finance and export credit agencies committed US$ 700 million in 2010 and nearly US$ 900 million in 2011 for climate-related export credits and development financing that will help American companies and investors deploy clean energy technologies in developing countries. This huge overseas expansion of markets for American made renewable energy technologies and other green products and services will create many green jobs in manufacturing by domestically and abroad.

Qualified Green Building and Sustainable Design Project Bonds otherwise known as *green bonds* were introduced under an amendment to the *America Jobs Creation Act* of 2004 which authorised the U.S. Treasury to finance environmentally sustainable development through the issuance of US$ 2 billion worth of AAA rated bonds. These so called *green bonds* are to encourage the redevelopment of contaminated industrial and commercial brown-field sites and to encourage the use of renewable energy sources and energy conservation. In addition, the *Energy Improvement and Extension Act* of 2008 authorised the issuance of US$ 800 million of Clean Renewable Energy Bonds to finance projects utilising alternative energy sources.

During the White House Forum on Jobs and Economic Growth in 2009 discussions also centred around the possibility of establishing a new national Infrastructure Bank which would be able to issue bonds for large sustainable infrastructure projects. In September 2010 President Obama announced the new US$ 50 billion Infrastructure Bank which would be operated by the government (with private sector contributions) and provide funding for major

infrastructure projects such as energy efficiency retrofits, renewable energy and high-speed rail projects creating thousands of new green jobs in the construction, sustainable transport and energy efficiency sectors.

There are also other funds in the U.S. intended to promote the development of new green industries, green products and green jobs. The U.S. Department of Energy (DOE) has provided US$ 14.3 million to the Technology Commercialization Fund that was established in 2008 to support the development, demonstration, and deployment of new prototypes of renewable energy technologies.

The Advanced Technology Vehicles Manufacturing (ATVM) Loan Programme of 2008 was a US$ 25 billion congressionally funded direct loan programme that provided debt capital to the U.S. automotive industry to fund projects that help vehicles manufactured in the U.S. meet higher millage requirements and lessen U.S. dependence on foreign oil. The Clean Water State Revolving Fund (CWSRF) is the largest water quality financing fund in the country. Since 1987 the CWSRF has funded over US$ 68 billion to improve water resources and management and has provided over 22,700 low-interest loans to date. In addition, these programmes have provided more than US$ 5 billion annually to fund water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management.

6.3.3. Fiscal policies and other investments

The *Economic Stimulus Act* of 2008 was a US$ 152 billion piece of legislation that provided tax incentives to stimulate business, tax rebates to low income families, and an increase in the limits imposed on mortgages eligible for purchase by government-sponsored enterprises. This was followed later on in the year by the *Emergency Economic Stabilization Act* of 2008 the US$ 700 billion bailout package passed by the U.S. Congress in the midst of the financial crisis. The Act created the Troubled Asset Relief Programme (TARP) designed to purchase 'illiquid' mortgage backed securities from troubled financial institutions.

The *American Recovery and Reinvestment Act* (ARRA) was a $787 billion economic stimulus package passed by the U.S. Congress in 2009 designed to stimulate new jobs, spur investment and encourage economic growth during the financial crisis. Out of the total, 12 per cent was spent on green investments such as carbon capture and storage, low-carbon vehicles, high speed rail, smart grids, and water and waste management. US$ 23 billion was allocated to increasing the capacity for energy generation from renewable energy sources such as wind, solar, and geothermal and for expanding the manufacturing capacity for renewable energy technologies while US$ 346 million was earmarked to expand the development, deployment, and use of energy efficient technologies in residential and commercial buildings. As of June 2010 the *Recovery Act* had created 749,597 new jobs across the economy[3]. The Act included federal tax cuts; expansion of unemployment benefits, social welfare provisions as well as $3.45 billion earmarked for job training and provided a US$

[3] The American Recovery and Reinvestment Act, 2010, http://www.recovery.gov/Pages/home.aspx

600 million package specifically for a new green job programme to be administered by the DOL.

The U.S. also supports new markets for green products and services through a variety of green public procurement directives and programmes. The Environmentally Preferable Purchasing Programme launched by the EPA in 1993 encouraged federal agencies to buy or lease environmentally preferable products and services, (defined as those products or services that have a reduced effect on human health and the environment when compared with similar products or services). The *Resource Conservation and Recovery Act* of 1976 and the *Farm Security and Rural Investment Ac*t (known as the Farm bill) of 2002 required federal agencies to purchase EPA designated products partially manufactured with recycled materials. Executive Order 13101 *Greening the Government through Waste Prevention, Recycling and Federal Acquisition* of 1998 required all federal procurement officials to assess and give preference to those products and services that are rated as environmentally preferable, while Executive Order 13123 *Greening the Government through Efficient Energy Management* of 1999 specified that agencies shall select, where life-cycle cost effective, ENERGY STAR® and other energy efficient products during purchasing.

In regards to R&D the U.S. has a number of promising programmes intended to develop new low carbon and green technologies and is likely to create whole new industries and markets over the coming years creating thousands of high paying green jobs in the process. The Department of Energy's Clean Coal Programme was allocated $21.3 million over three years to examine the key challenges regarding the wide-scale deployment of carbon capture and storage (CCS) technologies. The research will cover the entire carbon sequestration life cycle of capture, separation, transportation, and storage, as well as conduct experiments to capture methane (CH4) and nitrous oxides (N2O). The Fossil Energy's Innovations for Existing Plants (IEP) Programme allocates US$ 36 million for R&D into CO_2 capture technologies that can be retrofitted to existing coal-fired power plants. The programme's goal is to capture at least 90 per cent of the CO_2 emitted at no more than a 35 per cent increase in the cost of electricity. The Advanced Research Projects Agency – Energy (ARPA-E) has allocated US$ 349 million for R&D into new green technologies such as energy efficiency technologies, electro-fuels, low-carbon vehicles, smart grids, air conditioners and new types of batteries while the U.S. China Clean Energy Research Centre (CERC) will receive US$ 25 million over five years from the U.S. Department of Energy to collaborate on carbon capture and storage research and an energy efficient building programme.

6.4. Environmental standards & targets

6.4.1. Standards

At present the United States does not have a Federal renewable energy standard or a federal energy efficiency standard. These two important standards would be required to provide a more stable investment environment for renewable energy investors in the U.S. as well as spur more R&D and subsequent deployment of energy efficiency technologies. *The National Energy Conservation Policy Act* of 1978 gave Federal Minimum Energy Performance Standards (MEPS) pre-emption over existing State standards while *the National Appliance Energy Conservation Act* of 1987 and amendments of 1988, applied MEPS for twelve additional categories of appliances. It also required the Department of Energy to monitor technological improvements and to update MEPS accordingly. In 2009, the President announced tougher new efficiency standards on fluorescent and incandescent lighting to

reduce GHGs, to create new green jobs in energy efficiency and is expected to save consumers up to $4 billion a year in energy bills over the next thirty years.

Provisions under the *Energy Independence and Security Act* of 2007 set Corporate Average Fuel Economy (CAFE) standards that required automakers to boost fleet-wide gas mileage to 35 mpg (14.8 km/l) by 2020 and set a standard of 27.5 miles per gallon for domestic passenger vehicles. These standards were further improved by the establishment of the National Fuel Efficiency Policy in 2009 which sought to reduce CO_2 emissions from all new cars and trucks sold in the U.S. The new policy was designed to provide a predictable regulatory framework for the automotive industry ultimately requiring an average fuel economy standard of 35.5 mpg in 2016 that is projected to reduce oil consumption by 1.8 billion barrels over the life of the programme with a fuel economy gain averaging 5 per cent per year while reducing GHG emissions by 900 million tonnes per year.

To promote the construction of new green buildings a voluntary standard was developed by the U.S. Green Building Council in 1998. Known as Leadership in Energy and Environmental Design (LEED) it is a green building certification system that provides third-party verification that a building or community was designed and built using sustainable design and construction concepts such as energy efficiency, water efficiency, CO_2 emission reductions, improved indoor environmental quality, and stewardship of resources.

6.4.2. Targets

The U.S. signed the *Copenhagen Accord* in December 2009 and committed to reduce GHGs by 17 per cent below 2005 levels by 2020, 42 per cent by 2030 and 83 per cent by 2050. On the domestic front *Executive Order 13514* of 2009 named *Federal Leadership in Environmental, Energy, and Economic Performance* set sustainability goals for all Federal agencies and promoted continual environmental, energy and economic performance improvements. *Executive Order 13514* also directed Federal agencies to set a 2020 GHG emission reduction target within 90 days, to increase energy efficiency, to reduce fleet petroleum consumption, to conserve water (26 per cent improvement in water efficiency by 2020 and efficiencies that will net a 2 per cent annual reduction of consumption through 2020), to reduce waste (50 per cent recycling and waste diversion by 2015), to support sustainable communities and to leverage Federal purchasing power to promote environmentally responsible products and technologies. By 2030 it specifies an implementation of the 2030 net-zero-energy building requirement.

Renewable Fuel Standards (RFS) were laid down under the *Energy Independence and Security Act* of 2007 to promote the sale of flex-fuel vehicles and to increase bio-fuel production. While renewable portfolio standards (RPS) are reportedly on hold until 2012.

The Energy Star Programme of 1992 uses energy efficiency targets, labelling and tax credits to conserve energy and to reduce waste by promoting the use of energy efficient products and practices among consumers. It also aims to reduce GHG emissions from public, commercial and industrial buildings. The programme promotes energy efficient products under more than sixty categories by offering training, information, management strategies, targets and rating systems.

In regards to waste targets, the EPA has established an action plan to achieve a national recycling rate of 35 per cent for municipal solid waste including household and office waste.

The action plan laid out a framework of programmes to target particular waste streams such as the Recycle on the Go Programme that promotes recycling opportunities in public locations (e.g. parks, convention centres, sports stadiums, and shopping centres) and the Community Pay-As-You-Throw Programme (also known as unit pricing or variable-rate pricing), where residents are charged for the collection of household waste based on the amount they throw away creating an economic incentive to recycle and to generate less waste.

6.5. Social protection

The creation of new green jobs offers a great opportunity for policy-makers to design legislation and programmes that work towards enhancing the inclusivity of disadvantaged groups into the workforce. The *Green Job Act* of 2007 and subsequent funding by the *Recovery Act* of 2009 made a number of provisions targeting vulnerable communities for green job training programmes. Grants are more likely to be approved if green skills training programmes are targeted at unemployed, disabled or other disadvantaged members of society. For example, the Clean Energy Workforce Training Programme (CEWTP) in California provided US$ 75 Million to create the country's largest state-sponsored green jobs training programme. It targeted unemployed workers, particularly from the construction sector, existing workers requiring re-skilling to prepare for clean energy industry, low-wage workers and young people preparing to enter the workforce.

The Pathways Out of Poverty Programme provides US$ 147 million to develop green skills and integrates training and supportive services into one cohesive programme. It targets people from disadvantaged communities including low-income workers, the homeless, high school dropouts, ex-convicts, the disabled, older people and immigrants with limited English language ability to help them find green jobs in the workforce. It provides competitive grants to organisations (i.e. national non-profits and local public organisations) to carry out green job trainings for individuals and families with low incomes in areas where poverty rates are 15 per cent or higher, to equip them with the skills required to work in the energy efficiency and renewable energy industries. The programme provides a range of services to disadvantaged communities, including recruitment and referral services, basic skills and occupational green skills training and support services to overcome employment barriers. Participants who complete the programme receive certification and work experience leading to employment.

The *Green Jobs Act* in conjunction with 38 U.S.C. 4215 also established the Veterans Workforce Investment Programme (VWIP) to train and place combat veterans returning home from overseas in green jobs and green industries. The programme assists eligible veterans by providing employment, training, support services, credentialing and networking information in renewable and sustainable energy industries. The programme provides support for employment and green skills training services through grants and contracts to entities that assist veterans with reintegration into the workforce. The programme targets veterans with disabilities, veterans who served on active duty in the armed forces during a war and those who have significant barriers to employment. In many VWIP funded programmes, minorities, females, economically disadvantaged individuals, homeless veterans, and disabled veterans are particularly targeted to receive specialized employment, training, and educational resources. The programme works closely with veteran support services to identify and assist any veterans who develop stress-related disorders or have trouble adapting to civilian life. The DOL awards funding to projects that will prepare veterans for careers in any of the seven

energy efficiency and renewable energy industry categories as defined by the *Workforce Investment Act*, which include; energy-efficient building, construction and retrofit industries; renewable electric power industry, energy efficient and advanced drive train vehicle industry; bio-fuels industry; deconstruction and materials use industries; energy efficiency assessment industries serving the residential, commercial or industrial sectors and manufacturers that produce sustainable products using environmentally sustainable processes and materials.

In addition to these industries, the VWIP also funds projects that focus on employment and training opportunities in emerging green industries that clean and enhance the environment such as brown-field remediation. The Energy Efficiency and Renewable Energy Worker Training Programme established under the *Energy Independence and Security Act* of 2007 also provides green skills training to veterans and other disadvantaged groups such as unemployed and displaced workers impacted by energy and environmental policies.

In December of 2009 the Office of Disability Employment Policy organised a meeting in conjunction with the National Technical Assistance and Research Leadership Center, entitled "Strategies for Including People with Disabilities in the Green Jobs Talent Pipeline." The discussions evolved around drafting a list of recommendations to ensure that people with disabilities are included in the emerging energy efficiency and renewable energy workforce and helped to identify promising Federal and local opportunities for people with disabilities to get green jobs.

The Self Employment Assistance Programme offers dislocated workers the opportunity for early re-employment. The programme is designed to encourage unemployed workers to create their own jobs by starting their own small businesses such as retrofitting buildings for energy efficiency and installing renewable energy systems. Under the programmes, States can pay a self-employed allowance, instead of regular unemployment insurance benefits, to help unemployed workers while they establish businesses and become self-employed.

The Women's Bureau (WB) collaborates closely with the DOL as well as employers, unions, education and training providers, green industry organizations, and other government agencies to raise awareness, expand training options, and promote the recruitment and retention of women in green occupations. The WB in cooperation with Public Policy Associates and Wider Opportunities for Women developed the "Women's Guide to Green Jobs," publication to increase knowledge and access to women regarding emerging occupations in green sectors. The guide provided female workers and workforce professionals with information about hiring needs and challenges, training and entrepreneurship opportunities, and emerging jobs in green industries. The WB also organised a series of seven tele-conferences for workforce practitioners, designed to offer information and to discuss ways to better connect women with green jobs training and green employment. Additionally, in 2009 the WB convened more than 30 roundtable discussions across the country to discuss green jobs and developed nine green jobs training programmes for women. For example the Vermont Works for Women in Burlington, Vermont developed an on-the-job training programme for women in sectors such as green construction, renewable energy, and energy efficiency. The project will provide unemployed women new green skills related to the installation of solar tracking systems, weatherization, window and door replacement, equipment operation, and energy auditing to improve the energy efficiency of social housing units in Burlington.

The Aging Worker Initiative (AWI) provides training and related services for individuals aged 55 and older which result in employment and advancement opportunities in high-growth sectors such as green industries. The ultimate goal of the AWI is to prepare for an ageing population by providing better and more expansive services to older Americans for the foreseeable future. Ten grants have been made so far to projects that target older individuals who have been laid off and are seeking re-employment, those who need to stay in the workforce beyond the traditional retirement age and identifying transferable skills which can expand older workers' career opportunities. Grants are usually awarded to entities engaged in strategic regional partnerships with the Department of Labour and fund projects such as, limited English proficiency "bridge" training in green jobs, training and certification in green skills for high-growth, high-demand industries (e.g. green construction and sustainable transport).

6.6. Education and vocational training

Funding for National and State job training programmes was provided by the *Green Job Act* of 2007 and included US$ 125 million worth of National Energy Training Partnership Grants to 25 projects ranging from approximately US$ 1.4 to US$ 5 million each to encourage strategic partnerships requiring labor and business groups to work together. These grants are to address job shortages in green industries such as green buildings and construction, renewable electricity, electric vehicles and bio-fuels.

The High Growth Job Training Initiative identified 14 key sectors where existing or emerging businesses are being transformed by technology and innovation. The initiative provides training in new skills sets for workers in industries such as renewable energy, green construction and transport by expanding postsecondary training alternatives including apprenticeships and community colleges' workforce development programmes.

The *American Recovery and Reinvestment Act* of 2009 earmarked US$ 600 million (0.6 per cent of total) to the Department of Labor's Employment and Training Administration (ETA) for green skills training programmes and to set up green communities of practice for workforce professionals. The Recovery funds also supported the Occupational Information Network (O*NET) that conducts labour market research and monitors new green skills and green occupations and categorizes descriptions on a standard basis for online career guidance and human resource development.

The new Green Workforce Programme of the DOL provides a variety of grants targeted at:

- Improving strategic planning processes at the government level;
- Training and placement services for workers;
- Green skills training for disadvantaged groups; and
- Improved labour market information and data related to energy efficiency and renewable energy.

The funds are divided among the fifty State Workforce Investment Boards to help align employment strategies with state energy policies. The programme also provides specific grants to support green job training programmes targeted at students, dislocated workers, veterans, women, disabled, African-Americans and Latinos, helping them to find new jobs in expanding green industries and related occupations. Approximately US$ 28 million will be provided to support projects in communities impacted by auto industry restructuring. In

addition, the Office of Apprenticeship at the DOL is updating existing registered apprenticeship programmes for young people to keep up to date with new green employment opportunities.

The U.S. DOL is working with communities, labour and industry partners to train the workforce in new and high-growth fields that would build a greener environment. In creating new jobs and in greening old jobs, they want to make sure that these are well paying decent jobs. Their Policy Office is leading a department-wide programme alongside the ETA to assist agencies in coordinating their efforts to ensure safe access to green jobs for workers. At the same time, it has coordinated with the Departments of Education and Energy to closely link workforce jobs to education and training opportunities.

Building on *Recovery Act* funds for construction, rehabilitation, acquisition and operations, many Job Corps centres have implemented green student training programmes for students and have commenced green construction projects at more than 65 centres across the country. Courses include, knowledge of sustainable building products, solar panel installation and weatherization techniques. Job Corps also organised an Earth Day Every Day campaign in April 2010 to raise the awareness of environmental issues among students and staff. The Youth Build Programme aims to train young people in new green construction techniques, green trade apprenticeships and the use of sustainable building materials. Community-based Job Training Grants are also available to increase the capacity of community colleges to provide training in local high growth, high demand industries such as renewable energy or green construction with the aim of employing and increasing the retention and earnings of trained workers, while meeting the skill needs of businesses within targeted industries. The grants assist in the development of training curricula in collaboration with local businesses and arranging work experience placements with industry.

7. Examples of programmes and sector-based approaches

7.1. Green sector-based programmes

7.1.1. Retrofitting and energy efficiency

Name: The German Alliance for Work and the Environment
Actors: Trade Unions, Government, Civil Society, Employers Federation
Sector: Energy efficiency
Country: Germany
Estimated Green Jobs: 600,000

The German Alliance for Work and the Environment is a partnership between the German government, trade unions, environmental NGOs and employers' federations. In 1998 the Confederation of German Trade Unions (DGB) proposed a retrofit programme that would enhance the energy efficiency of 300,000 existing buildings in Germany by improving building insulation (roofs, walls and windows), by upgrading heating and ventilation systems and by installing renewable energy equipment such as photovoltaic and solar thermal systems. Even though the programme was proposed by the trade unions, the government immediately recognized how it could complement the existing Integrated Energy and Climate Programme and thus allocated substantial funds to support its implementation. Consultations were subsequently held between the government, unions and other stakeholders about how to coordinate the programme across the country.

The energy efficiency programme had a number of objectives namely; to reduce CO_2 emissions (German commitment to reduce 40 per cent of GHG emissions by 2020), to reduce energy bills for tenants, to renovate at least 300,000 apartments a year, to reduce dependency on fossil fuel imports, to reduce unemployment costs while increasing income tax revenues and to create at least 200,000 new high skilled green jobs for German workers. Retrofitting also produced a number of benefits to the local communities such as inner city revitalisation, reduced urban sprawl in the suburbs, a reduction in rush hour traffic and an overall improvement in the quality of life for the residents. The programme aimed to create green jobs in skilled crafts such as construction, heating insulation, renewable energy installation as well as thousands of indirect green jobs such as architects, engineers, auditors and environmental consultants. However, at this time a tripartite dialogue structure on green issues does not exist at the Federal level in Germany and there are no joint strategies and actions by the DGB and the employers' associations on the issue of green jobs. [4].

By 2008 the programme had renovated 280,000 apartments, employed 221,000 people and reduced 767,000 tonnes of CO_2 emissions. The initiative also supported the growth of new markets for green products such as hydrogen fuel cells, photovoltaic and solar thermal systems, cross flow heat exchangers (saves 85 per cent of heat), triple-glassed windows and thermal insulation materials.

[4]Eironline, European Industrial Relations Observatory, Germany – Greening the European Economy: responses and initiatives by Member States and social partners, 2010, http://www.eurofound.europa.eu/eiro/studies/tn0908019s/de0908019q.htm (5 June 2012).

Between 2001 and 2008 the German government provided a total of US$ 26 billion to finance energy efficiency retrofitting schemes across the country. The programme was further expanded by the German Economic Stimulus Package 1 (*Konjunkturpaket 1*) of 2008 which allocated US$ 4 billion to support investments in energy efficient buildings through low interest credits as well as the German Economic Stimulus Package 2 (*Konjunkturpaket 2*) of 2009 which included an additional US$ 8 billion to support energy efficiency retrofit programmes for all federal States and local authorities for public buildings such as kindergartens, schools, universities and institutes of further training. As a result of the stimulus package investments, the DGB estimated that approximately 600,000 green jobs were created by the end of 2010. In addition, in 2007 the DGB made a recommendation to the German EU Presidency to upscale the programme across all EU member states. Consequently, the initiative was adopted into the European Energy Efficiency Action Plan helping to create thousands more new green jobs across the Eurozone.

Sources

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7.1.2. ACFTU: The role of trade unions in promoting energy efficiency

Name: ACFTU Energy Efficiency Inspectors Training
Actors: Government, Trade Unions
Sector: Energy efficiency
Country: China
Estimated Green Jobs: 670,000

China's drive towards greater environmental sustainability requires workers in a number of occupations and sectors to develop new green skills and abilities, principally within energy-intensive industries. The Ministry of Human Resources and Social Security (MoHRSS) of China has mandated that future development strategies and training programmes must be adjusted to meet this new demand for green skills.

Chinese trade unions, particularly the national-level All China Federation for Trade Unions (ACFTU) have been taking important and practical steps in reducing emissions in the workplace and in advocating awareness and innovation about energy efficiency among workers. The ACFTU is the sole national trade union federation of the People's Republic of China and with 134 million members in 1,713,000 primary trade union organizations it is the largest trade union in the world. Actions taken by the ACFTU demonstrate how China is taking a multi-stakeholder dialogue approach towards developing an inclusive path to green growth.

A recent MoHRSS study on green employment in China noted that the majority of employment in green industries and enterprises are expected to be carried out by workers without university education. Therefore, vocational training will be critical in developing these new green skills including training programmes to meet immediate business needs as well as providing sustainable pathways to higher level qualifications for workers.

In 2008 the ACFTU demonstrated its commitment to reducing GHG emissions and promoting green jobs by implementing a training programme to create 670,000 new energy efficiency inspectors. These inspectors now play an active role in ensuring that workplaces and enterprises are compliant with energy reduction regulations and are responsible for familiarizing workers with the relevant skills and knowledge needed to perform their duties

properly while contributing to greater energy efficiency. For example in 11 cities in Hebei Province there is an energy efficiency inspector for every 200 employees while the Shanghai Federation of Trade Unions has hired energy efficiency inspectors across 45 districts and counties. Researchers at the Institute of Labor Studies (ILS) and the MoHRSS have supported these actions as the training of green collar workers in China will benefit the mid and long term needs of the vocational training and education system by building greater connections between policy development, technological innovation and investment.

The training programme also compliments the recommendations set out in March 2010 by the Chinese Academy of Labour and Social Security (CALSS) and the MoHRSS in a report entitled *Skills for Green Jobs in China* which recommended that China facilitate further trainings through consultations with industry, employers, and trade unions to develop a green curriculum that meets the needs of industry. The report also noted that the teachers and trainers should predominantly be recruited from within industry itself. This initiative to improve energy efficiency is all the more important since China overtook the United States as the world's largest energy consumer in 2010.

The ACFTU promotes the mobilization of workers in energy saving activities through four key initiatives; rewards for innovative energy efficiency ideas; quiz and speech competitions; monthly energy reductions themed events and specific training programmes for energy efficiency inspectors. The ACFTU has also raised public awareness about energy conservation issues by launching quiz competitions, speech contests and essay competitions with inclusive titles such as *environmental conservation is everyone's responsibility, harmonious development benefits everyone, I can reduce energy consumption* and *You and I can save energy*. It has also distributed 1.2 million copies of posters and other promotional materials on methods to conserve energy at work. One thousand workers have been commended nationally for their recommendations on energy savings in the workplace while a contest based on the knowledge of energy saving and environmental protection was completed by 11 million workers from across 29 provinces. There are also monthly events organised about energy savings which have been attended by 50 million workers, from approximately 250,000 enterprises from all 31 provinces in China. While in 2010 the National Federation of Trade Unions and the Ministry of Industry and Information Technology launched the *I offer a strategy for energy savings* activity which generated an enthusiastic response from workers.

In order to encourage workers to contribute their innovative ideas about reducing energy consumption, the ACFTU provides financial rewards and prizes to workers who actively participate in energy conservation activities.

The ACFTU objectives for 2011 include further improvement of the technical qualities and innovation abilities of workers and the continued development of green education and training programmes. In addition, the ACFTU also plans to build 800 new demonstration points and 50 female worker training and demonstration schools which will act as training bases for green skill and re-skilling programmes for laid-off and migrant workers.

Sources

ACFTU official website, 2011. http://www.acftu.org (5 June 2012).
ACFTU, Work Objectives for the Year 2011. January 2011.
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Zhang Xinmin, Li Mingfu, Tian Feng, Shu Qin. *Skills for Green Jobs in China*. China Academy of Labour and Social Security, Ministry of Human Resources and Social Security. March 2010.

7.1.3. Training and education

Name: National Green Jobs Corp
Actors: Government, Environment Groups, Youth Groups
Sector: Education and training
Country: Australia
Estimated Green Jobs: 10,000

The National Green Jobs Corp is a AUS$ 79.6 million initiative established in January 2010 by the Department of Education, Employment and Workplace Relations of the government of Australia to provide work experience, skill development and accredited training to young people (aged 17-24 years old) to prepare them for employment in emerging green sectors.

The Green Jobs Corp offers a wide range of environmentally focused projects and aims to equip 10,000 young people a year with green skills and training. The projects are developed in conjunction with local government, local communities, representatives of environment groups, and relevant training providers. The Green Jobs Corp provides 26-week programmes and has generated green jobs across the country in projects focused on the conservation, protection and rejuvenation of Australia's natural environment and cultural heritage.

Examples of the green job projects include; restoring degraded beaches, dunes, riverbanks, foreshores; land surveys and audits; building and repairing board walks; regeneration and replanting of degraded lands; restoring national parks; wildlife and fish habitat protection; weed clearing; refurbishing public parks and improving public spaces; building or repairing bikeways, tracks and footpaths; landscaping gardens using native plants and work in recycling and waste management. The initiative also provides skills training and work experience on projects designed to fight climate change such as improving the energy efficiency in buildings or installing renewable energy technologies.

Green Job Corp recruits receive regular payments for their work and are also covered by a variety of social protection policies. The National Green Jobs Corps Supplement totalling AUS$ 41.60 per fortnight (in addition to the regular payments) is available to support the participation of youngsters from disadvantaged groups. Disability Support Pension recipients willing to work 15 hours per week or more as well as participants receiving income support payments such as the Newstart Allowance, Youth Allowance and Parenting Payments are also eligible to join the Green Job Corp. It is hoped by providing work experience and training in green skills the State can help reduce welfare payments, unemployment and provide new opportunities to disadvantaged members of society.

The Queensland Government is investing AUS$ 57 million over three years to create 3,000 jobs in Queensland's Green Army. There will be 2,300 green work placements and 700 green traineeships available throughout the State. An additional 700 Green traineeship positions of 12 months paid work and training in partner organisations are also being offered. Green traineeships are primarily for young persons aged 15-24 years old without post-school qualifications that need a nationally accredited qualification to get their first start in the workforce and are usually in occupations related to conservation and land management, horticulture, water conservation and waste management.

Sources
Department of Education, Employment and Workplace Relations, Government of Australia http://www.deewr.gov.au/Employment/JobsandTraining/Pages/newgreenjobs.aspx (5 June 2012).
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Conservation Volunteers Australia, http://www.conservationvolunteers.com.au/NationalGreenJobsCorps.html (5 June 2012).

7.1.4. Sustainable tourism

Name: Suncheon Wetland Restoration Programme
Actors: Government, Local Government, Civil Society
Sector: Sustainable tourism
Country: Republic of Korea
Estimated Green Jobs: 6,400

The Suncheon Wetland Restoration Programme was initiated by Suncheon City, Republic of Korea to redevelop its tidal ecosystems in an effort to promote eco-tourism and to enhance the areas adaptive capacity to climate change. Suncheon Bay is amongst the world's five largest coastal wetlands and is home to a wide variety of wildlife and plant species including 158 types of birds and 6 endangered species.

In July 2000 the Korean South-Sea Tourism Belt Development Project was established after consultations between representatives of the government, city officials, businesses and local residents. In an effort to protect the wetlands and to increase the cities flood defences the local government decided to establish the Suncheon Ecological Park covering 22km^2 of mudflats and 4km^2 of reed beds. The park has become an important bird sanctuary attracting species from as far away as China and has helped revitalise the local economy. Suncheon City recently declared itself the Ecological Capital of South Korea and has received many awards for environmental stewardship.

The designers of the eco-park chose to incorporate the wavy features of the coastline into the design of the park infrastructure and facilities. Elevated meandering pathways allow tourists to experience the wetlands and outdoor exhibits without harming or disrupting the wildlife.

In an effort to promote rural development the government has established a foundation to provide opportunities for sustainable tourism such as bus tours of the area and visits to local farms (agro-tourism). Special training was provided to local people to teach them about the importance of environmental stewardship and sustainable tourism. As a result, the exchanges between urban and rural areas have increased, resulting in revitalisation and an increase of incomes in rural areas. The wetlands now attract 2.3 million visitors a year and have created 6,400 new green jobs while generating over US$ 100 million in extra revenue for the city. In addition, the government has decided to host the International Garden Expo of 2013 around the Suncheon Bay area as a showcase of the achievements.

Sources
Korea Tourism Organisation, http://english.visitkorea.or.kr/enu/index.kto (5 June 2012).
Official website of Suncheon City, http://www.suncheon.go.kr/home/english/ (5 June 2012).

Name: Fiji Ecotourism Association
Actors: Government, Indigenous Groups, Private Sector
Sector: Sustainable tourism

Country: Fiji
Estimated Green Jobs: unknown

The National Ecotourism Programme overseen by the Fiji Ecotourism Association is an initiative launched by the Ministry of Tourism of the Fijian government to consolidate all the country's ecotourism practitioners into one organization. The initiative seeks to manage and coordinate the large number of ecological, historical, cultural, nature based, and adventure-based tourism activities in Fiji. Pacific islands such as Fiji are heavily reliant on the tourism industry for their economy so recent efforts to promote sustainable tourism practices have been widely promoted by the government.

The National Ecotourism Programme promotes a variety of sustainable tourism activities to travellers, including eco-tours, eco-lodge stays, conservation programmes and village stays. The tours directly benefit rural villagers by providing a proportion of the tour fees directly to help maintain the villages and to preserve the rainforests while providing opportunities for villagers to sell handmade arts and crafts thus preserving the artistic traditions of Fiji.

The Association was active in drafting and adopting the *Fiji Ecotourism and Village-based Policy*, which defined ecotourism as, "a form of nature-based tourism which involves responsible travel to relatively undeveloped areas to foster an appreciation of nature and local cultures, while conserving the physical and social environment, respecting the aspirations and traditions of those who are visited, and improving the welfare of the local people". Officials from the association make frequent trips to tribal areas to discuss the eco-tours and to deal with any issues that may arise from the tourists. Village heads are always consulted before any major policy decisions are made.

The Association also maintains a Code of Ethics among all the ecotourism operators to ensure the continued protection of the environment and indigenous way of life of the indigenous communities. An accreditation system is maintained that recognizes legitimate ecotourism operators and communicates policy and guidelines to visitors while ensuring the sustainable use of natural resources. It also encourages and assists locals to become more involved in ecotourism related activities, creating green employment opportunities in rural and mountainous areas. Tours are not allowed on Sundays to allow indigenous peoples time for religious ceremonies.

Sources
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Official website of the Government of Fiji, http://www.sidsnet.org/eco-tourism/fea.html (5 June 2012).

7.1.5. Renewable energy

Name: Bushlight
Actors: Government, Research Institutions, Indigenous Groups
Sector: Renewable Energy
Country: Australia
Estimated Green Jobs: unknown

Bushlight is an Australian Government funded project under the Centre for Appropriate Technology (CAT) based in Alice Springs, Australia. The project's goal is to further the development of the Australian renewable energy industry and research sector. The project was established in 2002 to improve livelihood opportunities in remote indigenous

communities across Australia through the application of sustainable renewable energy services. The communities are isolated by hundreds of kilometres of dirt roads, are often cut off by floods and have no access to running water or electricity. Since it was founded, Bushlight has installed 120 renewable energy systems providing 24 hour reliable power to over 2,000 people living in remote outback communities in Australia. Prior to the Bushlight system being installed many communities would operate diesel generators for up to 8 hours a day with an annual cost of approximately AUS$ 4,700 for diesel fuel. Switching to renewable sources of energy has saved communities thousands of dollars a year in energy bills.

Bushlight provides information resources, training and education services to increase the technical capacity of indigenous people to design, use and repair renewable energy power systems themselves. The project also contributes to reducing GHG emissions by reducing the communities' reliance on diesel and kerosene oil for lighting, heating and cooking. The communities are now able to use refrigerators to preserve food and medicines, can power televisions and radios and have light at night.

Bushlight's innovative Community Energy Planning Model has a strong focus on community engagement which seeks to inform, train and empower communities to better utilise their energy services. This consultative approach operates through a dynamic partnership with local councils, resource agencies, community members and technical contractors. During the design and planning stages local people are taught about solar power and how to install the systems. The initial focus is on community education and empowerment to ensure the continuation of the energy services once Bushlight's technical staff have left. Local people are trained in the new green skills needed to ensure the continued operation of the energy services and are recruited as members of the project's large technical support network to go out and help other communities.

A training guide for user training was also developed by the Department of the Environment and Water Resource' s Greenhouse Gas Office that featured simple pictures and diagrams as well as a generic solar renewable energy system user guide. There are no official figures yet of the number of jobs created by the initiative, often the communities served are often home to no more than 20-30 people. However, the programme does show how empowering rural indigenous communities with green skills can help reduce poverty and support sustainable livelihoods in remote rural areas.

Sources
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7.1.6. Green schools

Name: Green Schools Initiative
Actors: Trade unions
Sector: Education
Country: India
Estimated Green Jobs: 30

Building and Wood Workers International (BWI) is a Global Union Federation of democratic and free trade unions representing 350 member unions from 135 different countries in the building, construction, wood & forestry sectors. BWI currently has a membership base of around 12 million workers with a mission to promote the development of trade unions

throughout the world and to promote and enforce workers rights in the context of sustainable development. In partnership with selected national unions, the BWI implemented a Child Labour Programme to provide education to former child labourers through its network of 22 schools in India (Bihar, Uttar Pradesh, Orissa and Punjab) and Nepal aimed at ensuring decent education for children and works toward the co-operative management of schools with the government, community and trade unions.

The BWI is committed to helping its members reduce their ecological footprints and to increase public awareness about environmental issues. In this regard it has adopted environmentally friendly practices in their Child Labour Schools in an effort to create a healthy learning environment for the children. The partner unions have expressed their interest to promote the concept of Green Schools, defined as "schools that utilize resources sustainably, minimize waste and pollution, create greener spaces, engage children in greening their schools and contribute to creating more green jobs". Projects which have been initiated so far include the installation of solar lighting, rainwater harvesting and tree planting.

These green school efforts were exemplified on World Environment Day in 2010 when children and teachers at selected BWI union run schools planted trees and sang slogans to pledge their commitment to preserving the environment around them. The children in three states; Bihar, Punjab and Uttar Pradesh planted about 1,500 trees to mark the occasion. Also, at selected locations the children carried out rallies, cultural programmes and participated in theme based painting competitions. These events were all covered by the local media.

In addition, to reduce the effects of intermittent electricity supplies one of the Child Labour Schools in the state of Bihar was equipped with solar power as an alternative source of energy. The solar lighting equipment is cost effective, low maintenance and helps to address the challenges of limited rural electrification, remoteness (where most of the Child Labour Schools are located) and promoting environmentally friendly practices under the programme. Efforts are underway to equip other child labour schools with solar lighting.

The National government of India also provides subsidies for training programmes for solar panel installation and how to develop facilities for rain water harvesting, etc. By adopting such practices, the unions and the schools not only promote national environmental agendas but also are themselves seen in a positive light. The BWI Green Schools initiative pledges to continue working to inculcate environmentally friendly practices among the children and the surrounding communities in an effort to create a better and more sustainable world.

Source
The Building and Wood Workers' International, 2011. http://www.bwint.org (5 June 2012).

7.1.7 Green buildings

Name: Eco-towns Programme
Actors: Government, Local Government, Private Sector
Sector: Green buildings
Country: United Kingdom
Estimated Green Jobs: 2,000

In November of 2008 the British Parliament passed the *Climate Change Act* which set legally binding targets on the U.K. to reduce GHG emissions by 80 per cent on 1990 levels by 2050.

As part of the country's Climate Action Plan, the Department for Communities and Local Government (DCLG) announced Britain's largest ever green home-building programme.

The programme outlines the intention to design, plan and build 10,000 new green homes in four new eco-towns across the country by 2016 employing green design principles, modern systems for saving water, energy efficiency, recycling and composting waste. The government will contribute £60 million to assist developers with infrastructure development as well as providing £5 million to local councils to assist with planning proposal preparations. The plan also stipulates that between 30-40 per cent of the new green homes should be affordable green social housing to reduce the waiting lists for new homes.

Town planners are required to adhere to strict development criteria set down by the Town and Country Planning Association (TCPA) regarding what classifies as an eco-town. The TCPA established the Zero Carbon Development Taskforce Team to monitor construction and has published guidelines on topics such as sustainable transport, community development, waste management, green infrastructure and water cycle management to inform stakeholders how to design the eco-towns. The plan also specifies that at least one job opportunity per house should be accessible by public transport, walking or cycling to minimise emissions from the transport sector as well as the establishment of a dedicated delivery organisation to manage the town and its development and to provide support for people, businesses and community services. The green building programme is expected to create approximately 2,000 local jobs in green construction, including apprenticeships and spur the development of new green building techniques. It is hoped these government funded eco-town projects will spur further private sector investments in eco-developments over the coming years and create the demand for more green buildings and housing by consumers.

The government initially shortlisted 17 potential sites and conducted environmental impact assessments to ascertain an area's suitability. Once the studies were completed the government announced a Planning Policy Statement (PPS) designating four sites as suitable locations for eco-town status. The eco-towns will be new settlements, rather than urban extensions, in the vicinity of Whitehill-Bordon in Hampshire, St Austell in Cornwall, Rackheath in Norfolk and North West Bicester in Oxfordshire and will be built to strict environmental and sustainability standards based on the Code for Sustainable Homes to ensure minimal impacts on the environment. The low-energy, carbon-neutral developments will be built from recycled materials featuring modern aspects of green building design and architecture to minimise the use of energy and water, while reducing waste. Each household will also have access to their own allotments so they can grow their own fruit and vegetables. The eco-towns are planned to be carbon neutral by offsetting any GHGs they emit with local renewable energy production such as wind or solar and capturing any energy which could otherwise be wasted in combined heat and power plants.

The homes will include a number of key features such as; equipment to generate power from natural sources (solar, wind, or geothermal), smart meters to manage and track energy use, charging points for electric cars and high efficient insulation to reduce heat loss. The plans also state that at least 40 per cent of the eco-towns should consist of green spaces, half of which must be open to the public. All schools, shops, businesses, health centres, parks and community facilities should be within walking distance or at least accessible a short ride away by public transport. There should be real-time public transport information in every home and a public transport link within ten minutes walk of every household.

Germany, Brazil, Sweden, Malaysia and the Netherlands are also developing plans for new green settlements while the Republic of Korea recently announced the intention to build 14 eco-towns in eight areas (known as environment energy towns) across the country as part of their Five-Year Strategy for Green Growth as well as 600 low-carbon green villages in rural communities.

Sources
Eco-towns Prospectus, Department of Communities and Local Government, 2010, http://www.communities.gov.uk/publications/housing/ecotownsprospectus (5 June 2012).
The official UK government website for citizens, 2011, http://www.direct.gov.uk/ (5 June 2012).
U.K. Department of Communities and Local Government, 2011, http://www.communities.gov.uk (5 June 2012).
Town and Country Planning Association, 2010, http://www.tcpa.org.uk/ (5 June 2012).

7.1.8. Green social housing

Name: Green social housing
Actors: Government, Local Government, Private Sector
Sector: Green buildings
Country: Brazil
Estimated Green Jobs: 50,000

In 2007 the Government of Brazil announced their economic stimulus programme known as the Growth Acceleration Programme (PAC 1), a strategic investment programme of R$ 638 billion (US$ 349 billion) that combined management initiatives and public works programmes aimed at kick starting the economy while improving the lives of the poor. Part of this investment was allocated to upgrading the informal settlements (*favelas*) of Brazil with green social housing, defined as affordable homes built using principles of green construction. The idea is to use fiscal policy to stimulate the economy, to create new green jobs in construction, to build environmentally sustainable housing and to create more liveable sustainable communities for Brazil's urban poor.

The PAC 1 was followed in 2009 by phase two (PAC 2) with estimated investments of R$ 958.9 billion (US$ 526 billion) for the period 2011 to 2014 in areas related to energy and social development, organized under six major initiatives: better cities (urban infrastructure); bringing citizenship to the community (safety and social inclusion); my house my life (housing); water and light for all (sanitation and access to electricity); energy (renewable energy, oil and gas); and transportation (highways, railways, airports). Of that total R$ 278.2 billion (US$ 152.5 billion) was allocated for new green social housing and the urbanization of informal settlements. The plan calls for the construction of two million homes, which in addition to the one million homes promised by PAC 1, will help reduce the country's housing deficit by half.

The green social housing programme will be developed in partnership with the British firm Ultra Green who specialises in holistic green construction. The firm has been asked by the government to build an initial 80,000 homes generating hundreds of green jobs for local people. By using a whole house approach, environmentally-conscious engineers can design buildings made of cheap locally available materials that use waste-to-clean energy technologies, waste water treatment and energy efficient building techniques. The houses are quick to build (just 14 hours) and people can move in as soon as work is completed. The houses will be built to high environmental standards based on the U.K.'s Sustainable Code Level 6 (also known as Brazil's PAC Code) that uses a whole-house approach to building design and construction**.** This system of standards will measure energy efficiency, CO_2, water

efficiency, surface water management, site waste management, household waste management, use of materials, and life-time homes. This will enable communities to work together to achieve zero waste targets and reduce waste sent to landfills. Green social housing has the potential to generate a lot of green jobs in developing countries while providing sustainable solutions to the environmental challenges caused by informal settlements

Sources
The Secretariat for Social Communication (SECOM) of the Presidency of Brazil, Government of Brazil, 2011, http://www.brasil.gov.br (5 June 2012).
Growth Acceleration Programme, 2009, http://portal2.tcu.gov.br/portal/page/portal/TCU/english (5 June 2012).
Ultra Green Group, 2011, http://www.ultragreengroup.com/ (5 June 2012).

7.1.9 Green townships

Name: Green Townships
Actors: Government, Research Institutions
Sector: Low carbon cities
Country: Malaysia
Estimated Green Jobs: unknown

Under the 10th Malaysian Plan (2011-15) the government of Malaysia intends to build a number of so-called Green Townships or environmentally sustainable neighbourhoods to initiate the national drive towards sustainable cities. These new low carbon towns will generate hundreds of new green jobs and become showcases of new concepts of environmentally friendly living in Malaysia, incorporating a variety of sustainability concepts such as the use of material-use efficiency, renewable energy and water conservation, low carbon transport and recycling, etc.

These green townships will be built to provide a clean and healthy environment for people to live, work and raise their families creating more inclusive human-friendly sustainable habitats. There will be a focus on creating landscaped public community spaces such as parks and playgrounds for families and neighbours to encourage greater integration of people from local communities.

The green township programme will begin with the greening of Malaysia's administrative capital Putrajaya and nearby city of Cyberjaya. The Ministry of Energy, Green Technology and Water (KeTTHA) in partnership with the Malaysia Institute of Planners (MIP) is developing Green Township guidelines as well as a green rating system to support the transition towards more sustainable cities. The green township guidelines will provide policy prescriptions and recommendations to builders and city planners to ensure the new communities are both liveable and socially inclusive, engendering a sense of community and belonging while also being well connected, environmentally friendly, resource-use efficient and built in line with green buildings standards. KeTTHA is also developing a Low Carbon Cities Framework and Rating System for Malaysia in line with commitments made at COP 15 to reduce GHG emission intensity by 40 per cent. The government will also install the necessary infrastructure to recharge electric cars with a view of making all vehicles within the green townships low carbon and has pioneered an electric and hybrid vehicle initiative with the Malaysian car manufacturer Proton.

The green rating system will be developed and overseen by the Ministry of Natural Resources and Environment (MNRE) in partnership with the Institut Sultan Iskandar UTM (ISI-UTM) and will be based on the Common Carbon Metric (CCM) Protocol which was developed by

UNEP for the Sustainable Building and Construction Initiative (UNEP-SBCI**)**. The system is to be used for calculating green house gas emissions from development and operation activities in the Townships and to develop programmes to reduce their carbon footprints. By using a carbon footprint baseline methodology to identify where GHGs are being emitted it is hoped the lessons learned will then be able to be used to develop further green townships and sustainable cities across the country.

In addition, the government will introduce tax breaks for green buildings and sustainable design elements such as solar water heaters, rain water harvesting and water conservation facilities. The goal is to initially reduce energy and water consumption by 10 per cent in Putrajaya government buildings by establishing a Taskforce Committee lead by Jabatan Kerja Raya Putrajaya (JKR) and supported by KeTTHA, Jabatan Perdana Menteri (JPM) and other agencies and building users who will provide technical assistance and basic training to building managers while monitoring programme implementation. They will organize seminars for public officials and awareness campaigns to educate people on how they can reduce their use of energy and water.

Sources
10th Malaysian Plan (2011-15), Economic Planning Unit, Government of Malaysia, 2011, http://www.epu.gov.my/html/themes/epu/html/RMKE10/rmke10_english.html (5 June 2012).
Ministry of Energy, Green Technology and Water (KeTTHA), Government of Malaysia, 2011**,** http://www.kettha.gov.my (5 June 2012).

7.1.10 Sustainable aquaculture

Name: Aquaponics
Actors: Government, Private Sector, Farmers, Academia, Individuals
Sector: Sustainable aquaculture
Country: New Zealand
Estimated Green Jobs: 3,000

Aquaponics has emerged in recent years from the evolution and synergistic combination of aquaculture and hydroponic methods and can provide a working model to farmers for sustainable organic food production without the use of chemicals or petroleum based fertilizers. Aquaculture is the general term given to the farming of any fresh or salt water plant or animal. Aquaponics is defined as a combination of breeding fish in tanks (aquaculture) and growing plants with special lighting (hydroponics). Using a bio-integrated system a farmer is able to link the recirculated water from the fish aquaculture with hydroponic vegetable, flower or herb production. Indeed, the synergies created by growing fish and vegetables together have greater environmental and economic benefits than the individual activities conducted alone.

There is minimum effluent runoff from this type of farming and plants and bacteria in the growing beds use nutrients from the fish effluent. In return plants purify the water which benefits the fish. Fertilizers normally required for hydroponics production are not needed in this type of system. The plants clean the water of excess nutrients while nitrifying bacteria convert the fish waste into nutrients that can be used by the plants. The plants then use these nutrients as their main nutrient supply. The fish also benefit from this process, as the water is being constantly filtered by the plants, providing clean oxygenated water for the fish to live in.

In 2005 new aquaculture legislation was enacted in New Zealand to clarify local and central government roles in managing aquaculture in regards to the other competing uses for the coastal marine areas and to promote further sustainable aquaculture development. The legislation provided the aquaculture industry with more secure long-term future fish farming rights for both land based aquaculture and marine aquaculture.

In 2006, an industry initiative resulted in the drafting of a business strategy aimed at achieving a NZ$ 1 billion sustainable annual business of aquaculture by 2025. The government of New Zealand responded to this industry initiative by offering more support to the growing industry by releasing an aquaculture development strategy and pursuing environmentally sustainable aquaculture development. The Aquaculture Vision for 2020 sets the goal of increasing sustainable aquaculture production export revenues to US$ 782 million per year by the year 2020. The *Aquaculture Legislation Amendment Bill* (No 3) was introduced to the New Zealand Parliament in November 2010 to provide an efficient legislative and regulatory framework to enable the sustainable development of aquaculture within the coastal marine area. The Bill was part of a wider programme of reforms that included non-regulatory measures to provide for a more active role for government in the development and management of aquaculture and aquaponics.

Some of the benefits derived from using aquaponic systems are:

- Water is conserved by constant reuse and recycling.
- Plants are organically fertilized with natural fish emulsion without the use of chemicals.
- A reduction in the amount of cropland needed to grow crops.
- The elimination of solid waste disposal from intensive aquaculture.
- An overall reduction in the environmental footprint of crop production.
- Adaptation to climate change. Building small efficient commercial installations near markets reduces food miles and GHG emissions from supply chains.

During conventional farming, irrigation water is pumped out onto the land, only to be lost through evaporation, percolation or surface runoff. Large scale commercial aquaponic farms have the potential to significantly reduce the amount of GHG emissions generated by the agriculture sector by reducing the amount of soil needed to be ploughed, reducing the use of nitrogen based fertilizers and minimising methane emissions from waste.

The integration or polyculture of plants and fish is practiced on a commercial scale in Christchurch, New Zealand and other coastal towns in the region. Many larger scale farms that practice aquaponics also use similar environmental, lighting and temperature control systems as those commonly found in hydroponics grow systems. Commercial aquaponic farms have the potential to be established at many different types of locations including city warehouses, commercial greenhouse operations, rural farms as well as on the green roofs of public housing estates and buildings, schools, shopping centres, balconies, and other urban settings. It also offers the opportunity for vertical farming, using multiple floors of a building to grow fish and food that can be sold locally, reducing GHG emissions from the supply chain. Simple less complex aquaponics systems that are designed to feed a family or a small group can be successfully installed in a shed, garage or greenhouse. A well designed efficient system will use about one tenth of the water required for normal vegetable growing and can reduce the water needed for single usage fish farming by 95 per cent or more.

Fish which have been successfully bred in aquaponic systems include Tilapia, Silver & Jade Perch, Cod, Barramundi, Bass, Carp, Brim, Goldfish and Koi. A number of commercial operators have also been experimenting with raising Trout, Char and Salmon which require a higher level of technology for environmental control. Vegetables such as lettuce, chives, tomatoes, cucumbers, and a variety of peppers have also been successfully grown using aquaponics. In addition, a number of commercial growers and researchers have also had success growing flowers including lilies and roses.

The research centres in NZ work in collaboration with local governments, farmers, NGOs and private enterprises to conduct R&D into sustainable aquaculture and aquaponic methods. Promising research includes the Integrated Waste Reclamation and Animal-plant Production Systems Project which was developed to research new vermiponic (using worms and hydroponics) and vaquaponic (worms and aquaculture) methods that can generate chemical-free hydroponically grown plants and vegetables.

The Seafood Industry Training Organization (SITO) have developed tailored aquaculture training programmes based on their prior experience with industry-based training for wild fisheries. They now offer nationally recognized training programmes based on the needs of companies involved in aquaculture while the Auckland University of Technology offers an undergraduate degree course in aquaculture.

Sources

FAO, Fisheries and aquaculture Department, National Aquaculture Sector Overview New Zealand. 2009, http://www.fao.org/fishery/countrysector/FI-CP_NZ/en (5 June 2012).
National Institute of Water and Atmospheric Research (NIWA), New Zealand, 2011. http://www.niwa.co.nz (5 June 2012).
Ministry of Fisheries of New Zealand, 2011, http://www.fish.govt.nz/en-nz/Commercial/Aquaculture/default.htm (5 June 2012).

7.2. Brown-field redevelopment

Name: The Brown-fields Programme
Actors: Government, EPA, State and Municipalities, Industry
Sector: Brown-field Redevelopment
Country: U.S.A.
Estimated Green Jobs: 3,250

The Brown-fields Programme is an initiative developed by the U.S. Environmental Protection Agency (EPA) which provides grants and technical assistance to communities, states, tribes, and other stakeholders to create alternative uses for disused industrial properties. Brown-field is a generic term used to describe abandoned or underused industrial and commercial facilities that have the potential for redevelopment. In an increasingly carbon-constrained world the closure of heavy GHG emitting industries is likely to increase, so programmes which can aid the redevelopment of these sites and to contribute to the green economy are vital. The EPA estimates that there are approximately 490,000 brown-fields in the U.S. and almost 15 million acres of potentially contaminated properties, many of which have the potential presence of hazardous substances, pollutants, or contaminants. The *Small Business Liability Relief and Brown-fields Revitalization Act* of 2002 promoted the cleanup and sustainable reuse of brown-field sites by providing financial assistance to redevelopment projects. The EPA manages a number of different programmes that use green remediation principles and encourages the sustainable reuse of these disused areas. The programme seeks

to identify the renewable energy potential of these sites and provides useful resources to developers, industry, state and local governments to support their redevelopment potential.

The EPA also established the Brown-fields Job Training Programme to provide training grant funds to non-profit organizations and technical assistance for environmental cleanup and health and safety training to residents of brown-fields impacted communities. The programme is predominantly targeted at low-income, minority, unemployed residents from local communities near the brown-fields. These local residents are taught new green skills to help them find secure full-time sustainable employment in jobs in environment-related sectors.

New green skills taught include green remediation techniques, recycling of demolition materials, installation of solar panels and other renewable energy systems as well as Leadership in Energy and Environmental Design (LEED) certification of new developments. So far the EPA has provided 144 brown-fields job training grants to partner organisations totalling over US$ 25 million. Of the 5,000 brown-field training graduates who have completed the course, more than 3,250 have obtained employment in the environmental field, earning an average starting wage of US$ 13.81 per hour.

The abandoned 30 acre Bethlehem steel mill site in Lackawanna, New York was redeveloped under the brown-field programme by installing 18 wind turbines on top of an old slag pile. In May of 2002, the EPA awarded the City of Lackawanna a US$ 200,000 Brown-field Assessment Grant to investigate contamination at various properties in the city, including at the old steel mill. The site was chosen as the best location for wind energy redevelopment because much of the construction occurred without a need to excavate the contaminated soil. The windmill foundations, service roads and green spaces were built to cover the contaminated earth instead. The electricity from the windmills is now sold in the form of renewable energy certificates to Constellation New Energy, to meet its renewable energy obligations under New York's renewable portfolio standard. The site now produces 45 MW of renewable energy a year, enough electricity to power 9,000 homes and created 5 permanent green jobs and 40 green construction jobs in an area plighted by high unemployment.

The old Philadelphia Navy Yard located on the waterfront in southern Philadelphia is home to a 7 acre brown-field site formally used as a disposal facility for municipal and industrial waste, and which had polluted the environment with incinerator ash leaving behind a multitude of hazardous wastes including toxic heavy metals. Now with the support of the EPA's Brown-field Programme and in partnership with the Philadelphia Department of Commerce, the City of Philadelphia Redevelopment Authority and Conergy Projects, Inc. the site has been redeveloped into a 1.5 megawatt solar energy facility, making it the largest photovoltaic facility situated in a major U.S. city. The solar plant is now contributing to Pennsylvania's renewable portfolio standard requirement that solar power make up 0.5 per cent of the state's energy consumption by 2020. The cost for the solar project was US$ 10 million and created approximately 50 construction and 10 permanent jobs. Redevelopment projects across the whole Navy Yard site have encouraged the establishment of 80 new businesses with more than 7,500 employees. In addition the U.S. Department of Energy will invest US$ 122 million for a new Energy-Efficient Building Systems Design Hub to be located at the Navy Yard, from a partnership between United Technologies and Pennsylvania State University, spurring more green jobs in the R&D sector. The Navy Yard was selected as an ideal location because it includes more than 200 buildings that are currently powered by

an independent electric micro-grid. The Yard will become a real-life testing ground for new energy saving technologies and greenhouse gas reduction technologies designed for building systems.

Sources
Bethlehem Steel Winds Project, New York,
http://www.epa.gov/renewableenergyland/docs/success_steelwinds_ny.pdf (5 June 2012).
Improving Land and Lives: Improving Land and Lives: 10 Years of Investment in EPA's Brownfields Job Training Programme, U.S. EPA, 2010 http://www.epa.gov/brownfields/grant_info/jt/jtreport0408.pdf (5 June 2012).
U.S. Environmental Protection Agency http://www.epa.gov/renewableenergyland/ (5 June 2012).

Name: City of Newton
Actors: Government, Local Government, Private Sector
Sector: Redevelopment for renewable energy
Country: U.S.A.
Estimated Green Jobs: 640

The City of Newton in Iowa is a small town that has redeveloped itself as a wind energy manufacturing hub. For almost a century, the Maytag Corporation was the largest employer in the town. The company used to manufacture home appliances such as washing machines, ovens, dish washers and refrigerators. However, in 2006 the company was bought out by a competitor who quickly moved to close the manufacturing plants and made 1,800 workers redundant. The closure left over 1.9 million sq. feet of manufacturing space, warehouses and other buildings disused on the 175-acre property. The new owners had agreed with the U.S. EPA to help clean up the site which included removing and treating contaminated groundwater that had been polluted with chromium and other chemical solvents as well as monitoring the groundwater and operating a groundwater extraction well.

The City of Newton authorities acted quickly and identified renewable energy production as a viable employment alternative for the laid off workers. The existing infrastructure and railways connecting the town to the Great Plains region where new wind turbines were being located and the issuance of tax incentives and grants by the city authorities made it an attractive location for renewable energy manufactures to locate their facilities.

In partnership with TPI Composites, a wind turbine blade manufacturer, the city authorities completed the construction of a new US$ 56 million, 316,000-square-foot facility in 2008. The new plant now manufactures fibre glass blades for companies that install wind turbines across the State of Idaho and employs 500 people in green jobs. In 2009 another renewable energy manufacturer, Trinity Structural Towers of Texas, proposed to invest a further US$ 21 million to retrofit 300,000 square feet of the Maytag plant for the production of steel and concrete wind turbine towers creating an additional 140 new green jobs to the town.

Sources
United States Environmental Protection Agency,
http://www.epa.gov/renewableenergyland/docs/success_maytag_ia.pdf (5 June 2012).

7.3. Restructuring and diversification strategies involving the renewable energy sector

Name: Lindø Shipyard
Actors: Government, Local Government, Private sector, Confederation of Danish Industry
Sector: Restructuring for renewable energy
Country: Denmark

The Lindø Shipyard in Denmark is one of the largest and most advanced ship construction facilities in the world. Home to three large docks as well as a 95m high gantry-crane the facilities have built some of the world's largest container ships, oil tankers and bulk carriers. However, over recent years the demand for huge vessels has plummeted as production moved to Asia and the yard has become unprofitable to operate. As a result the owners have decided to close the yard by February 2012. The Confederation of Danish Industry fears that up to 8000 direct and indirect jobs will be lost as a result of the closure.

The surrounding dock area has now been redeveloped into Lindø Industrial Park, home to the Lindø Offshore Renewable Centre (LORC), established in 2010 after consultations between national and local officials, Danish energy companies and the Lindø Forum aiming to make LORC Europe's number one centre for research and testing new offshore renewable energy technologies. This will support Denmark's ambitious green economy plan to generate 35 per cent of its energy from renewable sources by 2020 and 100 per cent by 2050.

From a job creation perspective offshore renewable energy was identified as one of the most promising alternative employment opportunities for the laid off workers. Skills competencies such as surface treatments, welding and outfitting can be easily transferred to wind turbine production if facilitated by suitable retraining programmes. The local municipal authority took the lead in identifying new green skills for the offshore renewable energy sector as part of their public employment services but realised current vocational training programmes did not focus on employment in the offshore industries. Therefore LORC was tasked with providing a training programme for offshore renewable energy needs with a view of adapting it to the public vocational training system. Sources

Source
The Lindø Forum 2010, http://www.lindoeforum.dk/ (5 June 2012).
The Lindø Shipyard 2010, http://www.lindø.dk (5 June 2012).

Name: Belfast Shipyards
Actors: Government, Trade Unions and Private sector
Sector: Restructuring for renewable energy
Country: United Kingdom

At the turn of the Millennium, Harland and Wolff Heavy Industries based in Belfast, Northern Ireland, U.K. was faced with increasing foreign competition in the ship building business. The company was forced to restructure and diversify their business model from shipbuilding to civil engineering and was forced to lay off 2,400 members of staff. The shipyards have built some of the world's largest *Olympic*-class ocean liners of the White Star Line including the Titanic, the Olympic and the Britannic as well as many ships for the British Royal Navy. More recently, the company has diversified into bridge building and offshore renewable energy construction including wind turbines and tidal power plants. Using ship building skills such as design engineering, ship repair and conversion, the facilities now manufacture a range of renewable energy technologies such as wind turbines, towers and blades, wave and tidal power devices as well as the decommissioning and recycling of ships at the end of their life cycles.

As part of their strategy to mitigate GHG emissions and to reduce reliance on fossil fuels, the government plans to construct 7,500 new offshore wind turbines in the U.K. between 2008 and 2020, creating a huge demand for this green technology and associated heavy-assembly work. This was further supported by the U.K. Budget of 2010 which earmarked £60 million

for the development of UK port sites to entice offshore wind turbine manufacturers looking to locate new facilities in the UK. Unfortunately, the diversification strategy away from ship building has created redundancies in the workforce because renewable energy construction projects require significantly less man hours than ship building. Therefore re-skilling and up-skilling programmes were introduced by the company to teach low skilled and mechanical fitters how to use the new equipment. The company-wide training programmes, based on DNV classifications also taught the engineers new design concepts and knowledge needed to design offshore wind turbines. The company works hand in hand with the trade union to ensure that any temporary workers are already certified in the new green skills needed for renewable energy technology construction.

Sources
Millennium Harland and Wolff Heavy Industries, http://www.harland-wolff.com/home.asp (5 June 2012).
ILO, Skills for Green Jobs: Global Synthesis Report, Geneva, 2010

7.4. Employment guarantee schemes and investments in natural capital

Name: National Rural Employment Guarantee Scheme
Actors: National and State Government
Sector: Rural development
Country: India
Estimated Green Jobs: Employment for 54,954,225 rural households

The National Rural Employment Guarantee Act (NREGA) is a public works programme developed by the Ministry of Rural Development of the Government of India to guarantee wage employment to rural households. The programme is monitored by a national task force set up to deal with employment issues related to the enhancement of productive assets in rural areas that can also contribute to ecological regeneration. NREGA was devised as a public work programme to pursue a rights-based approach to development; to provide income security to rural households through guaranteed wage employment; to reduce distress migration from the rural to urban areas and to create durable community assets (in the rural areas) to trigger an overall development of about 600,000 Indian villages. The categories of works permissible under NREGA include water conservation, drought proofing (including plantation and afforestation), flood Protection, land development, minor irrigation, horticulture, land development and rural connectivity.

Established by the *Mahatma Gandhi National Rural Employment Guarantee Act* of 2005, the programme was designed to address the issue of rural development and guaranteed registered rural households a maximum of 100 days of paid unskilled manual employment a year. The Act enabled state governments to use fiscal and legal instruments to tackle poverty alleviation and unemployment concurrently by creating various public works schemes costing the central government approximately US$ 2.5bn (0.3 per cent of GDP) from 2006-07 and US$ 5.6 billion from 2008-09 while expenditure for the programme was around US$ 8.1 billion for 2009-10. The costs for wages are covered by the central government as well as 75 per cent of material costs and some percentage of the administrative costs. Conversely, the State governments must cover the costs of unemployment benefits (not less than 25 per cent of the minimum wage for the first 30 days and not less than 50 per cent the minimum wage thereafter) thus it created an incentive for States to organise the work schemes to reduce costs.

The initial coverage was for 200 of the most poverty affected districts and later extended to a further 130 the following year. The scheme eventually covered all 593 districts in India by

2008. The scheme has helped invigorate civil and community life by using the Panchayati Raj Institutions (village level democratic bodies) to monitor and implement the work programmes, to provide income security to rural households, to reduce rural migration to the cities, to empower women by giving them the opportunity to earn money (one half of the workforce is women), and to promote inclusive development by creating durable assets (e.g. flood barriers, irrigation channels, etc) in the village which would have a multiplier effect on the wider economy. Workers who wished to register for the scheme were issued a job card and asked to complete a demand-for-work application. In this sense the programme is different from existing works programmes because it is demand driven by the workers themselves. From 2010-11 NREGA generated work for 54,954,225 rural households across the country. Women constituted 50.9 per cent of all persons working in the scheme from 2010 - 2011, which exceeded the original target of 30 per cent.

The scheme also directed state governments to earmark a percentage of the workers' wages for a variety of voluntary social security schemes including different types of insurance, survivor benefits and maternity benefits. The workers were asked if they would like to sign up for the schemes when they registered to participate in the work projects. There is also a formal public grievance redress system in place to record and process complaints made by the workers in regards to working conditions and wages. Guidelines are issued to site managers which stipulate minimum standards for working conditions such as providing a place with shade for workers, provision of drinking water and someone to deliver it around and the presence of a first aid kit in case of any accidents. If five or more children are found to be on site then a crèche facility must be provided. A recent ILO study based on limited empirical evidence has demonstrated the potential for creation of green jobs, should improvements be made in ensuring decent work. The Government has acknowledged the challenges and opportunities attached to the further implementation of the scheme, including those of turning this employment scheme into a true policy instruments for sustainable development targeting the poor in particular in rural areas.

Sources
Mahatma Gandhi National Rural Employment Guarantee Scheme, 2010, http://nrega.nic.in/netnrega/home (5 June 2012).

Name: The Abandoned Mine Lands Programme
Actors: Federal Government, State agencies, Tribes, Private Sector
Sector: Mining
Country: U.S.A.
Estimated Green Jobs: Unknown

The Abandoned Mine Lands Programme (AML) under the U.S. Department of the Interior's Bureau of Land Management (BLM) is making efforts to reclaim land seriously degraded and subsequently abandoned as a result of open top coal mining. The programme targets hard-rock mines and public lands administered by the BLM at which the exploration, development, mining, reclamation, maintenance, and inspection of facilities and equipment has stopped. The Abandoned Mine Lands (AML) Programme works in partnerships with the U.S. EPA, state agencies, tribes, private parties, and other groups to accelerate the rate of cleanup of areas affected by abandoned mining activities.

The restoration programme aims for the full restoration of lands affected by mining activities while addressing any remaining environmental concerns such as widespread mercury contamination, acid mine drainage issues, vertical mine openings and unstable slopes. Based

on the AML Programme's Strategic Plan, the BLM will invest approximately US$ 130 million to address nearly 3,500 sites scheduled for cleanup by 2012. The strategic plan includes a variety of cleanup solutions including constructing signs and fences, closure or removal of physical safety hazards, bat gating, restoration of streambeds and redirecting stream flow to avoid mine wastes and tailings, plugging adits to reduce or control the flow of heavy metal-laden water, removing toxic soils and removal of hazardous materials to repositories.

Green jobs which would contribute to helping restore environmental quality include helping to post signs and markers, monitoring site closures to ensure markers, fences and bat gates are functional (site stewards), helping to clean up debris on public lands and streams, taking water samples as well as administrative support roles. At present no data is available to quantify the number of green jobs created by the environmental cleanup programmes, however the sector is expected to be a growth area as countries around the world start to improve environmental stewardship and begin to reinvest in natural capital as part of their policy directives towards greater environmental sustainability.

Source
Abandoned Mine Lands Programme, U.S. Department of the Interior's Bureau of Land Management, http://www.blm.gov/wo/st/en/prog/more/Abandoned_Mine_Lands.html (5 June 2012).

Name: Forest Service's Strategic Framework for Responding to Climate Change
Actors: Government, NGOs
Sector: Forestry
Country: U.S.A.
Estimated Green Jobs: 30,000

The National Forest System in the U.S. is composed of 155 national forests and 20 national grasslands managed by the U.S. Department of Agriculture's Forest Service. The Forest Service currently employs 34,250 employees in a wide range of green jobs including scientists, rangers and tree planters. As part of the Forest Service's *Strategic Framework for Responding to Climate Change* considerable efforts are being made to enhance the capacity of carbon sinks in the U.S. to capture and store carbon dioxide. It has been estimated that the net carbon uptake by terrestrial ecosystems in the United States, already offsets about 12 per cent of the country's CO_2 emissions. Extensive tree planting programmes are expected to significantly improve the assimilative capacity of carbon sinks in the country.

Job descriptions related to climate change mitigation and adaptation in the forest sector include, managing forests to increase the carbon dioxide they capture and store, using forest products to reduce and replace fossil fuel energy, research and development into climate change and actions which can reduce the environmental footprint of government operations. The wildfires of 2007 and 2008 burned more than 250,000 acres of forestland in California and continue to pose a risk due to climate change. In responses the forest service began replanting 8,000 acres of trees in 2008, increasing to 22,000 acres in 2009, and 38,000 acres in 2010. With the help of non-profit organisations such as the National Arbor Day Foundation, American Forests and the National Forest Foundation (NFF), more than 10 million trees had been planted by 2010. In addition, the NFF's Carbon Capital Fund Initiative works in conjunction with the Forest service to provide an opportunity for individuals and organizations to invest in reforestation projects that sequester additional carbon and create green jobs. The key to increasing the amount of sequestered carbon will be to transform biomass into solid wood products, biofuels or other fossil fuel substitutes as well as

sequestering carbon into the soil. The Restoration Policy Framework provided guidelines for managers and owners of private lands about how to improve the sequestration rate and quality of existing forests.

Green jobs in the U.S. Forest Service include; adaptation of ecosystems to the effects of climate change; restoration of forests and grasslands; efforts to reduce wildfires or pest outbreaks (such as thinning overstocked stands, thinning to alter species composition, and prescribed fire) and forestry management. Carbon accounting, carbon trading and other activities related to the international carbon markets are also expected to generate significant numbers of new green jobs in the forestry sector. There are also hundreds of opportunities for green volunteers, allowing them to develop their green skills either working outdoors or in the office. Green jobs provided by the Forest Service also entail a number of social benefits including life insurance, subsidised transport, tuition reimbursement, liability insurance and pensions. These reforestation efforts are to compliment the Forestry Service's Open Space Conservation Strategy of 2007 which set out plans to develop an interconnected network of open space across the country to conserve forests, grasslands, farms, ranches, and urban green spaces that provide vital ecosystem services to society. This includes actions to plant trees and enhance natural biodiversity reducing the effects of land use change and deforestation. As outlined under the *Cooperative Forestry Assistance Act* and the *National Forest Management Act.*

A good example of a reforestation programme is the Appalachian Regional Reforestation Initiative (ARRI) a coalition established after consultations between the government, the coal industry and citizens dedicated to restoring forests on coal mined lands in West Virginia. Using a technique known as the Forestry Reclamation Approach, high-value hardwood trees are planted on reclaimed coal mined lands generating highly productive forestland. Much of the reclaimed land from coal mining is often rough, rocky, and on steep terrain, therefore planting hardwood tree seedlings is best undertaken by hand and can create many green jobs in the process.

Sources

The U.S. Forest Service, U.S. Government, 2010, http://www.fs.fed.us
Forest Service Strategic Framework For Responding to Climate Change, U.S. Forest Service, 2010, http://www.fs.fed.us/climatechange/documents/strategic-framework-climate-change-1-0.pdf (5 June 2012).

8. Provincial strategies on green jobs

8.1. Ulsan eco-industrial park, Republic of Korea

Name: Ulsan eco-industrial park
Actors: Government, local government, private sector, academia
Sector: Cleaner Production
Country: Republic of Korea.
Estimated Green and greener jobs: 1,000

In 2005, the Korean National Cleaner Production Center (KNCPC) with the support from the Ministry of Knowledge Economy (MKE) of Korea began a 15-year, 3-phase programme known as the Korean EIP Initiative to pioneer eco-industrial park development and to establish cleaner production infrastructure in Korea. The ultimate goal of the initiative was to encourage all 504 Korean industrial parks to commence a transition towards becoming eco-industrial parks (EIPs) improving the environmental, social, and economic performance of Korean industry as called for by the *Korean Five-year Strategy on Green Growth* in 2009.

The KNCPC chose 5 demonstration sites to either upgrade existing industrial parks or build new eco-industrial parks including the renovation of the Mipo and Onsan industrial complexes in Ulsan City. Ulsan is the largest industrial city in Korea located 389.5 km southeast of Seoul and is home to a number of industrial complexes at both the national and regional levels, including 2 national industrial parks and 4 agricultural industrial complexes and 5 regional industrial complexes. During the 1970s and 1980s Ulsan was known as the most polluted city in Korea until it was designated a special air pollution control region in 1986.

An eco-industrial park (EIP) is a community of businesses that cooperate with each other and with the local community to efficiently share resources (information, materials, water, energy, infrastructure and natural habitats), leading to economic gains, gains in environmental quality, less waste, and equitable enhancement of human resources for the business and local community (UNESCAP 2010). EIPs can provide a basis for industrial recruitment, bringing new green jobs and income opportunities to local communities. An EIP can reduce the environmental impact of industrial activities by providing collective solutions to companies' challenges and obligations, providing cost-effective options for energy supply, waste-water treatment and waste management services including minimization, collection, transport, re-use, recycling and recovery. The application of water cascading techniques can reduce pollutant discharges into the water supply while reducing the use of fresh water. The collocation of EIP companies can reduce the demand on natural resources and reduce costs, spur new green business start-ups and mitigate the environmental impact of new firms.

The Master plan of Eco-Polis Ulsan was established in 2004 and set the framework for the Eco-Polis Ulsan programme and subsequent implementation of the Ulsan EIP Transition Initiative. The Eco-Polis Ulsan programme includes initiatives related to cleaner production (at the company level), industrial symbiosis, EIPs (at the industrial cluster lever), and the regional eco-industrial network (at the regional level). Both the Eco-Polis Ulsan programme and the Ulsan EIP Transition Initiative pursue an integrated approach to regional development by researching and applying principles of industrial ecology at the municipal level. The economic, social and environmental goals for Ulsan EIP were developed through a participatory process involving consultations with all community stakeholders such as the national and local government, industry, communities and academia. Before the park could

begin effective operations the environmental regulatory systems had to be updated, to allow for greater flexibility amongst park participants to trade their waste products facilitating the most cost-effective way to enhance the efficiency of the park.

The Ulsan EIP Transition Initiative will encourage the renovation of existing traditional industrial parks through the greater use of renewable energy and cleaner production technologies. It will also introduce concepts of industrial symbiotic networking to large-scale industries simultaneously with other SMEs thus improving their competitiveness and preventing future factory closures and the accompanying job losses. Companies are attracted to the EIP because of the significant cost savings that can be achieved from industrial symbiosis as well as simultaneously contributing to a cleaner and greener environment. Since phase 1 began in 2005, Ulsan EIP has raised US$ 6 million for research and around US$ 50 million for infrastructure developments. The projected total cost savings from all currently identified symbiosis projects at Ulsan EIP is approximately US$ 287 million and a reduction of over 75 million ton of CO^2. Ulsan EIP also features a cluster of resource recovery companies that utilise and recycle the industrial by-products not absorbed through company exchanges.

The Ulsan EIP transition initiative will be completed over three phases;

- **Phase 1** (2005-09): Establishment of demonstration pilot projects to spur the shift towards EIP renovations at existing industrial complexes. Implement energy flow analysis and study input, output and waste flows and raw material use. Initiate symbiosis identification and implement network expansion strategy.
- **Phase 2** (2010-14): Provide conceptual ideas and disseminate the EIP design concepts to 20 other industrial complexes across the country.
- **Phase 3** (2015-19): Evaluate the flaws and constraints discovered in first and second phases and work to reinvent the existing systems of practice for greater efficiencies. Performance indicators will be studied to redesign any missing components and infrastructure.

One of the major achievements of the Ulsan EIP Transition Initiative was the establishment of the Ulsan Eco-center under the Korea Industrial Complex Corporation (KICOX) in 2007. The Eco-center is staffed by industry experts, academics and representatives from the University of Ulsan and will help coordinate and implement the renovations throughout the EIP. The Eco-center will cooperate and help other municipalities by providing regulatory, technical, and financial assistance information regarding the establishment of EIPs. The eco-center is also responsible for improving inter-company collaboration within the industrial complex and within supply chains to enable environmental protection synergies, community benefits, and competitive bidding. The center also provides affordable access to cleaner production training and consultation which is strategically important for SMEs filling skill gaps for green jobs. Jointly managed emergency prevention, preparedness, and response systems reduce the risks and costs of major incidents and increase the investment security in the complex as well as contributing to more competitive insurance premiums.

An example of the kind of cost savings achieved at Ulsan EIP is the partnership between Sung-am Corporation and Hyosung Corporation who have saved US$ 7.1 million by integrating their steam networks to maximise the amount of energy recovered from the incinerators, saving 55,000 tons of GHG emissions during the process. These savings enabled the establishment of a new factory creating 140 new jobs. Another example is the Yoosung

Corporation that captures waste heat generated during the production process and in partnership with Hankuk paper mill utilizes the heat to generate steam to make electricity. This has led to cost savings of US$ 2.32 million per year and reduced GHG emissions by 15,000 tons per year. In addition, the steady supply of excess steam from other plants enabled Korea Zinc to save US$ 6.6 million per year and reduce GHG emissions by nearly 65,000 tons per year.

Sources
UNESCAP, Guidelines on Developing Eco-efficient and Sustainable Urban Infrastructure in Asia and Latin America, Bangkok, Thailand, 2011
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8.2. Masdar City, United Arab Emirates

Name: Masdar City
Actors: Government, academia, private sector
Sector: Sustainable cities
Country: United Arab Emirates
Estimated Green Jobs: 70,000

Masdar City is a clean technology cluster located in a special economic zone 17 km from downtown Abu Dhabi which was opened in February 2008 by the Emirate of Abu Dhabi of the United Arab Emirates (UAE). The City was designed to be the world's first zero-carbon, zero-waste, car-free and 100 per cent renewable-energy-powered city. Once completed Masdar City will cover 6 million m^2 and intends to provide a blueprint for other cities regarding sustainable urban development. Masdar City was built to provide research and development (R&D) facilities for international companies and organisations focused on the development, commercialisation and deployment of renewable energy and other clean technologies and will be home to the new International Renewable Energy Agency (IRINA). The development is estimated to save the equivalent of more than US$ 2 billion in oil over the next 25 years, create more than 70,000 green jobs and will add more than two percent to Abu Dhabi's annual GDP. The first buildings were scheduled to open in 2015 while construction work over the entire site is expected to be finished between 2020 and 2025.

Masdar means *source* in Arabic and is part of the Emirate of Abu Dhabi's 2030 Development Plan, which includes a long-term strategic commitment to a resource diversification policy to accelerate the development of alternate energy solutions and to achieve a national renewable energy target of 7 per cent. The Masdar Initiative is driven by the Abu Dhabi Future Energy Company (ADFEC), a wholly owned company of the Emirate of Abu Dhabi through the Mubadala Development Company. The total budget for the new eco-city is between US$ 18.7 and US$ 19.8 billion including a US$ 4 billion contribution by the government for sustainable infrastructure developments. The remaining finance is to be raised by direct investments and the creation of various financial instruments. An essential driver for the development of the city is carbon financing. Carbon emissions reduced by Masdar City will be monetized under the Kyoto Protocol's Clean Development Mechanism and sold as carbon offset credits to Annex 1 countries.

R&D facilities will focus on emerging green sectors such as sustainable transportation, waste management, water and wastewater conservation, green buildings and industrial materials, recycling, biodiversity, climate change, renewable energy, industrial ecology, carbon capture and storage (CCS), carbon markets and green finance. Pilot projects already underway at the site involve geothermal energy and solar thermal cooling technologies.

Electricity for the city will be powered 100 per cent from renewable sources such as the sun and wind, including the development of a 100 MW concentrated solar power (CSP) plant in the Western Region of Abu Dhabi called SHAMS 1, the largest in the Middle East. Wind farms generating 20 MW will be built on Masdar's outskirts while plans are underway to build the world's largest hydrogen power plant. Once construction is finished the city power demands will reach approximately 200 MW, a reduction of 75 per cent from the 800 MW required for a similar sized city built along conventional designs. A solar powered desalination plant will also produce clean drinking water for the city and through the use of water conservation techniques almost 80 per cent of the grey water will be captured, recycled and reused helping to irrigate the surrounding desert creating local jobs in sustainable agriculture. The city will require around 8,000 m^3 per day of desalinated water versus more than 20,000 m^3 per day for similar sized cities. In fact all of the public services will be delivered in a sustainable way effectively making the majority of the public sector jobs in Masdar City green jobs. Organic waste from the city will be used to make fertilizers, all plastics and metals will be recycled while the remaining waste can be incinerated to create electricity.

The city was also designed to be completely car-free and pedestrian-friendly so people will be able to walk around the city, ride an elevated light railway line or sit in a series of automated transport pods known as a Personal Rapid Transit (PRT) or podcar through an extensive network of underground electric tracks. The system presently serves 5 stations connected by 1.2 kilometres of track and is expected to be expanded in the future. Unlike subway trains, the small PRT podcars are meant for single occupants or small groups (3-6 people), providing privacy during public transportation. The PRT is expected to generate green jobs both in construction and operation and is also being piloted in Suncheon, Republic of Korea and Heathrow Airport in London, U.K.

All of the building units at Masdar will be built in accordance with green building standards and will be closely aligned to produce more shaded areas outside, while boundary walls will be built to stop the sand from blowing in from the desert. Buildings will be designed with solar glass to reduce the heat burden and high efficiency cooling towers to regulate inside temperatures as well as other energy conservation technologies. The Masdar Headquarters complex is located in the world's first positive energy mixed-use building that can produce more energy than it consumes. The Masdar HQ complex utilizes sustainable materials and includes integrated wind turbines, outdoor air quality monitors, a solar thermal driven cooling and dehumidification system and one of the world's largest building-integrated solar energy arrays.

Fountains and trees will be utilised in the streets as additional cooling devices while giant moveable sunshades towering over the roads and footpaths, designed based on the principles of sunflowers, will provide moveable shade during the day, store heat and then release the heat at night.

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Masdar, 2011, http://www.masdar.ae/en/home/index.aspx (5 June 2012).
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8.3. Skyrise greenery programme, Singapore

Name: Skyrise greenery programme
Actors: Government, private sector, NGOs

Sector: Urban landscape
Country: Singapore
Estimated Green Jobs: 500-1,000

Singapore is a small island with a growing population of almost 5 million people. The inevitable population growth and associated urbanization is projected to place great stress on the environment therefore policy-makers have introduced a series of policies and programmes to invest in the natural capital of Singapore to preserve biodiversity, to raise the quality of life for the residents and to develop a beautiful city of gardens and water.

Under the Sustainable Singapore Blueprint of 2009 the government set out greening targets and goals for various parts of the city. The blueprint aimed to increase the amount of green park space by 900ha by 2020, provide 0.8ha of park land per 1,000 persons by 2030 and to improve the accessibility of the parks by tripling the length of park connectors to 360km by 2020 to help butterflies and birds fly from park to park. This increase in surface greenery will generate green jobs during the construction phase and in maintenance.

City planners in Singapore also want to green the urban landscape and that includes encouraging skyrise greenery such as green roofs and living green walls. *The Green Roof Incentive Programme* supervised by National Parks (NParks) Singapore has introduced the Green Roof Incentive Scheme across the city to encourage owners of existing buildings to green their rooftops. Such skyrise greenery reduces the amount of heat transferred through the roof, reducing the need for air conditioners and thus saving energy and reducing GHG emissions. Skyrise greenery also reduces ambient urban temperatures and glare, improves building sound insulation and can increase city-wide biodiversity such as butterflies and birdlife.

The Centre for Urban Greenery and Ecology (CUGE) was established by the National Parks Board and the Singapore Workforce Development Agency as a regional centre for advancing and sharing knowledge and expertise in regards to urban greenery and ecology designed to enhance the urban living environment. The CUGE works in partnership with industry and government to train workers in the green skills needed to enhance the competitiveness and growth of the urban landscape industry.

The Centre provides professional skills training programmes for all levels of professionals in Landscape Workforce Skills Qualifications (WSQ) and is the lead training provider for all levels of the landscape industry workforce. Using the WSQ system the centre trains and certifies skills training and facilitates career development in the landscape industry. It provides professional certification for specialisation in areas such as arboriculture (tree care), horticulture, landscaping, nursery management, turf and irrigation management as well as short skills courses for continuous training and professional development. CUGE serves as a regional hub for best practices and facilitates cooperation to advance urban and green living environments.

The government has set targets to increase the amount of skyrise greenery by 30ha by 2020 and 50ha by 2030, including 9ha of green roofs on multi-storey car parks in public housing estates over the next 3 years. NParks Singapore will pilot a grant scheme to provide co-funding for 50 per cent of the installation costs for green roofs in all existing buildings in the Central Business District and Downtown core (Orchard Road, Rochor, Museum, Singapore

River and Outram) planning areas to incentivise the development of and to boost the level of skyrise greenery.

The Urban Redevelopment Authority (URA) of Singapore will grant existing buildings bonus gross floor area (GFA) for rooftop outdoor refreshment spots if developers provide rooftop landscaping, generating new green jobs in landscaping and horticultural design of the urban environment. In the Downtown core (including Marina Bay), Jurong Gateway and Kallang Riverside a landscape replacement policy has been established for new developments. It stipulated that all new developments in the Downtown core must provide landscaped areas equivalent to the overall land space of the site. This can be in the form of green walls, green roofs or ground level public landscaped areas. The 'Gardens by the Bay' development at Marina Bay consists of three different waterfront gardens which once completed will become Singapore's main urban outdoor recreation space. The Gardens at Marina South opened in 2011 and were built using energy and water conservation measures and technologies that showcase the best of tropical horticulture and garden artistry featuring a variety of coloured foliage and tropical flowers. The gardens also have a cooled conservatory complex monitored by energy efficiency technologies. It will provide a sheltered 'edu-tainment' space in the centre of the garden featuring a 0.9ha 'cool moist biome' and a 1.2ha 'cool dry biome' displaying flora and fauna from around the world. These new investments in Singapore's urban natural capital will create green jobs in a variety of sectors including landscaping, horticulture, water conservation and renewable energy.

Sources
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Sustainable Singapore Blueprint, Inter-Ministerial Committee on Sustainable Development, Government of Singapore, 2009, http://app.mewr.gov.sg/web/Contents/ContentsSSS.aspx?ContId=1034 (5 June 2012).
Centre for Urban Greenery and Ecology (CUGE), Singapore, 2011, http://www.cuge.com.sg (5 June 2012).

8.4. Waste management, Hong Kong

Name: The Tuen Mun eco-park project
Actors: Local Government, Private Sector
Sector: Waste management
Country: Hong Kong (Special Administrative Region, China)
Estimated Green Jobs: 120

For years the municipal waste generated by Hong Kong has been sent to the Chinese mainland for recycling or simply dumped into landfills. Very little of the waste materials were recovered and reused in the city itself. According to Hong Kong's Environment Protection Department (EDP) 5.7 million tons of waste was produced in Hong Kong in 2004, of which 40 per cent was recovered and 60 per cent was disposed of in landfills. The EDP has now set a waste recovery target of 50 per cent for the city by 2014. In line with the policy framework, the Hong Kong administration began developing the 200,000 meter square Tuen Mun eco-park in the Western New Territories, a specialised recovery park dedicated to waste recycling and environmental engineering. By encouraging and promoting the reuse, recovery and recycling of waste resources and returning them to the consumption loop, the eco-park can encourage the adoption of a circular economy and the development of the recycling industry. Local trade associations and recyclers were consulted during the planning stages to generate stakeholder support for the development of the eco-park. It was agreed that by providing long-term land at an affordable cost and the supporting infrastructure, that the eco-park would spur recycling technology developments in the area and improve waste recovery rates across Hong Kong.

At present, 99 per cent of recovered recyclable materials are exported to mainland China for re-processing while less than 1 per cent are processed locally and remanufactured into useful goods. With the development of the Tuen Mun Eco-Park, the recovery of recyclable materials will now be processed in Hong Kong, generating new associated green businesses in the process. The eco-park admission criteria give priority to processes involving value-added technologies and target materials of the proposed producer responsibility schemes. This will spur the creation of green jobs and green start-ups and will help stimulate the local economy of Tuen Mun District. For example, in early 2010 an eco-park job fair was organised in the area offering more than 120 new green jobs in the recycling industry to job seekers.

The first phase of the eco-park was successfully completed in May of 2009 and encompassed an area of 80,000 square meters, including allocated lots dedicated to the recycling of waste wood, used cooking oil, chemical waste, clinical waste, used computer equipment, metals and batteries. The second phase of the EcoPark is also complete. Two lots have been allocated to non-government organizations for the recycling of plastics and waste electrical appliances (e-waste). There is also a visitor centre to promote community environmental awareness through campaigns, publicity, education and action programmes and the Hong Kong Second-hand Exchange, a web based platform where people can post any unwanted but reusable items for donation or for sale at a nominal charge.

Sources
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Hong Kong Eco-park, 2011, http://www.epd.gov.hk/epd/ecopark (5 June 2012).

8.5. Kitakyushu eco-town project, Japan

Name: Kitakyushu eco-town project
Actors: Local Government, Private Sector, Academia, Civil Society
Sector: Low carbon cities
Country: Japan
Estimated Green Jobs: 100,000

Kitakyushu is an industrial city located in Fukuoka Prefecture on Kyushu; the southernmost Island of Japan. During the 1960s residents demonstrated against the local authorities due to the dangerous levels of smog and pollution resulting from heavy industrialisation in the city. Since that time the municipality has introduced numerous policies and measures to reduce pollution and is now one of the most progressive cities in Japan in regards to pollution control and recycling technology.
The *Pollution Prevention Ordinance* was established in 1972 to reinforce the city-wide implementation of pollution controls and to set regulations for small-sized facilities that were previously outside of the national law's jurisdiction. It allowed improvement orders to be issued to pollution violators as well as sanctions on those who failed to comply with environmental regulation standards.

The city promotes the Kitakyushu Eco-town project that aims to develop a zero-emissions system where no waste would be produced at all. It is supported by the Kitakyushu Green Frontier Plan, a unique regional policy that combines industry promotion and environmental conservation, in order to generate green jobs and establish a resource circulating society. The city has also established the *Basic Plan to Protect the Natural Environment in Kitakyushu*, the first of its kind in any Japanese city, as well as a designated council that consists of company representatives, academics, residents, and city officials in order to discuss issues

regarding environmental management. In line with their Green Innovation Goal, Kitakyushu must create new markets valued at 350 billion yen and 10,000 new green jobs for workers by 2020.

The local government can monitor pollution throughout the city using automatic measuring devices equipped with a telemeter system which sends data back to a central monitoring centre allowing for real time enforcement. Private sector companies have worked with the authorities to develop cleaner production processes, pollution prevention facilities and innovative technologies such as dust collection devices, desulfuration and denitration devices and wastewater and sewage treatment facilities to reduce pollution creating hundreds of green jobs in the process. This has helped harmonise pollution control with energy saving and resource conservation in the city and has spurred economic development. The Japanese government awarded the city the Model Environment City Award in 2008 and Kitakyushu now acts a leading example and repository of best practices in various areas of urban environmental management for stakeholders from across Japan and the Asia-Pacific region.

The Kitakyushu Smart Community project plans to build a low carbon society in an industrial city and to reduce GHG emissions while still achieving economic growth and an improved quality of life for citizens. The project will oversee the development of a smart grid to conserve energy, using a new information communication system and will be a $150 million investment in green jobs and an estimated 50 per cent reduction of CO_2 emissions. Towards this end the municipality has set city wide emission reduction targets to reduce GHGs 30 per cent by 2030 (10,900,000 tons of CO_2) and 50 per cent by 2050 (7,600,000 tons of CO_2). It also aimed to reduce household waste generation by 20 per cent and to increase recycling ratios by 25 per cent. This was achieved by promoting more compact urban developments that minimise the use of energy; industrial clustering to create an energy production base from all factories in the city; promoting low carbon living to every citizen through awareness campaigns; emphasising greater product quality and long-term use by manufacturers and by promoting low carbon societies in other Asian cities through the dissemination of information as well as sending experts to other Asian cities to share knowledge and technology. By 2009, the municipality had purchased 860 low-emission public vehicles to reduce GHG emissions from the transport sector as well as making investments in public transport. The Kitakyushu Hydrogen Town project used the hydrogen by-product gas generated from factories to power fuel cell vehicles.

To improve waste management the authorities set up a system employing hundreds of people to collect and separate municipal solid waste at locations such as at the Hibiki Recycling Area. The waste is sent for processing at three incineration plants in the city to generate electric power and have a combined capacity to process 2,130 tons of waste a day. The *Kitakyushu Basic Plan for Municipal Solid Waste Management* was developed to legislate a comprehensive resource-circulating concept incorporating the 3Rs (reduce, reuse, and recycle) and to increase the demand for recycled products (green purchasing) as well as Japan's first recycling plant for fluorescent tubes.

During the 1980s the Kitakyushu International Techno-cooperative Association (KITA) and Japan International Cooperation Agency Kyushu International Centre (JICA/KIC) were established to train local government officers from developing countries in policies and strategies for environmental management. It offered environmental training courses commissioned in partnership with JICA to develop human resource capacity in green sectors, such as how to develop a resource circulating society as well as providing opportunities for

Japanese experts to travel and work overseas enhancing international cooperation. KITA uses a Training Implementation Framework and employs retired engineers and specialists with expertise in green technologies to implement the training course curricula. The programmes introduce trainees to administrative policies (integration of appropriate waste disposal and recycling policies with, the inducement and development of environmental industries), and modern green technologies (waste treatment, recycling technologies, and environmental management) using Kitakyushu as the example and training ground.

These training institutions were further complimented in 2010 by the establishment of the Kitakyushu Asian Center for a Low Carbon Society. The new centre was tasked with facilitating greater technology transfer to developing countries by providing economic incentives and financial assistance to green companies wanting to expand into Asian markets and by organising green technology trade fairs to encourage business networking. The centre also supports the development of new green technologies and business models in areas such as energy conservation; reduce, reuse, and recycle (the 3Rs); waste separation and recycling; carbon separation and capture; and renewable energy technologies. The centre has since provided human resource training to city officers from developing countries (434 in 2008 and over 400 in 2009) to enhance their capacity in environmental stewardship. In addition the Kitakyushu Interdependent Business Consortium for Sustainable Development (KICS) was established to enhance international business opportunities for green businesses. In 2005, KICS signed a friendship agreement with the Dalian Environmental Protection Industrial Association to promote environment-related green businesses in China. Green jobs have also been generated in research and development and the environmental technical field at the Institute for Global Environmental Strategies' (IGES) Kitakyushu Office, Eco Life Plaza and the Kitakyushu Science and Research Park which clusters together national, public and private universities engaged in research into environmentally sustainable technologies.

In September 2000 the city hosted the Fourth Ministerial Conference on Environment and Development in Asia and Pacific (MCED 4) in partnership with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) which inspired the establishment of the Kitakyushu Initiative for a Clean Environment (KI) to draw on the experiences and lessons learned from the city and to compile them into a menu of effective actions for environmental protection which could be drawn upon by other cities in Asia. By 2010 the KI included participation from 173 cities from 19 countries from across the Asia and Pacific region. The KI's main objective was to improve the urban environment and human health by promoting environmental actions at the local level. The scope of the KI programme included thematic areas such as urban environmental management, water management, sanitation, solid waste management, air quality, transportation, city planning and landscaping, and cross-cutting issues such as public participation, resource mobilisation and capacity building. The KI programme was specifically designed to focus on building the capacity of local government officers in the area of urban environmental management. This was achieved through the facilitation of information exchanges and the dissemination of good practices among network member cities, workshops, seminars, and newsletters. The KI also set up a database of good environmental practices, assisted in the implementation of demonstration projects and supported the actual replication of good practices promoting green jobs across the region.

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8.6. Curitiba City, Brazil
Name: Curitiba City
Actors: Local Government, Private Sector, Academia,
Sector: Sustainable cities
Country: Brazil
Estimated Green Jobs: 50,000

Curitiba is the capital of the state of Paraná in southern Brazil, approximately 400 km from Sao Paulo. The city has been lauded for its efforts to reduce poverty, for improving the environment and for raising the standard of living of its citizens. In 2010 Curitiba was awarded the Globe Sustainable City Award in recognition of cities which excel in sustainable urban development.

The Curitiba Master Plan was first developed in 1968 by Mayor Jaime Lerner and the Institute for Research and Urban Planning in Curitiba (IPPUC). The plan proposed strict controls on urban sprawl while reconfiguring a development pattern based on linear growth through the use of zoning regulations. These new developments were designed around an affordable and convenient public transit system. The plan helped form a vision and strategic principles that have guided developments in the city up to the present day.

During the 1980s, the Rede Integrada de Transporte (RIT) or Integrated Transport Network was developed which allowed passengers to transit between any points in the city by paying just one fare. The system took an integrated approach to economic development and recognised the linkages between improved public transport and environmental protection. The system has been continuously updated and improved over the years and now consists of approximately 1,100 bi-articulated buses making 15,000 high frequency trips per day and is used by 85 per cent of Curitiba's population. This has resulted in Curitiba consuming 30 per cent less fuel per capita than similar sized cities and now has one of the lowest rates of ambient air pollution in Brazil.

There are different sized buses for different routes while roadside stations are designed as elevated tubes providing shelter and security for passengers while being easily accessible for the disabled. The total cost of building both the elevated tube stations and the direct bus lanes was $200,000 per km, which is far cheaper than the estimated $20 million per km which was proposed for a light rail system. Each station employs an attendant to collect the fares from passengers before they disembark, as well as hundreds of bus drivers. Thus the RIT is very labour intensive and creates many green jobs in sustainable transport and has inspired the development of similar BRT systems in Bogotá, Columbia and Jakarta, Indonesia. In addition there are over 100 km of bike paths spanning the city to encourage people to leave their car at home.

Curitiba has also transformed the informal waste sector into a prosperous programme for employment and poverty alleviation. In fact 90 per cent of the city's residents now recycle two thirds of their waste. The *Garbage that is not Garbage Initiative* involves the roadside collection and disposal of recyclable materials that have been sorted by households such as organic waste, paper, cardboard, metal, plastic and glass. The *Green Exchange Employment Programme* focuses on social inclusion and environmental protection and was the impetus for

green job generation in the waste sector. Low-income families living in informal settlements unreachable by road can take their waste to neighbourhood centers, where they can exchange materials for bus tickets, parcels of surplus food and children's school notebooks. The food they get comes from local farmers, so that money spent by the municipal government stays within Curitiba. The collected waste is then sent to a processing plant (built of recycled materials) that employs people from disadvantaged groups such as handicapped, recent immigrants and recovering alcoholics to separate bottles, cans and plastics. The recycling programme costs no more than sending the waste to landfill and results in less city litter, less communicable diseases, less waste dumped in sensitive areas such as rivers and woodlands and creates a means of sustainable livelihood for the poor. The *All Clean Initiative* temporarily hires retired and unemployed people to clean up specific areas of the city where litter and waste have accumulated. There is also a related programme for the children who can exchange recyclable waste for school supplies, chocolates, toys and tickets for shows.

Curitiba also promotes urban greenery projects to enhance the quality of life of its citizens and is often referred to as the ecological capital of Brazil due to the network of 28 parks and wooded areas. In 1970, there was less than 1 m^2 of green space per person but by 2007 there was 52 m^2 for each person in the city. These continuous urban greening projects are supported by public policy as builders and construction companies can receive tax breaks on new developments if they include green spaces, creating opportunities for urban agriculture, gardening and landscaping.

Sources

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8.7. The national low carbon province and low carbon city experimental project, China

Name: The national low carbon province and low carbon city experimental project
Actors: Government, Local Government, Private Sector
Sector: Low carbon cities
Country: China
Estimated Green Jobs: unknown

Cities play a crucial role in reducing GHG emissions, promoting sustainability and developing new avenues for green job creation. In China provincial governments play an important role in determining how national policies and directives are successfully implemented at the local level. The National Low Carbon Province and Low Carbon City Experimental Project was launched in August 2010 by the National Development and Reform Commission (NDRC) of China and targeted 5 provinces and 8 cities for low carbon development. The project has provided these provinces and cities an impetus to act on national energy intensity reduction targets to reduce 2005 energy intensity levels by 40 per cent by 2020. It is hoped that this drive towards greater environmental sustainability will generate a demand for new green jobs and green skills.

These low carbon provinces and cities are driven by economic considerations promoted by the national government and are based upon the development of investment, education and innovative communities with supporting financial mechanisms. The experimental provinces and cities are encouraged to explore effective government guidance and economic incentive policies such as soft loans, subsidies, land grants, and special empowerment zones legislation to actively promote the introduction, absorption and re-innovation of green technologies or to

conduct joint research and development in new green technologies with overseas companies. This will be supported by new vocational training programmes for green skills developed in tandem with local industries.

These pilot regions are currently designing their own low carbon development plans and supporting policies while developing low carbon industrial systems that promote sustainable consumption patterns and the production of low carbon products with small environmental footprints. Carefully planned regional green industrial development coupled with consultations between government officials, national and local experts will ensure that the green jobs created will be appropriate for local conditions.

The National Low Carbon Province and Low Carbon City Experimental Project is administered by the State Development Reform Committee (SDRC) of China and focuses on five pilot provinces; Guangdong, Hubei, Liaoning, Shaanxi and Yunnan. The eight target cities are Baoding, Chongqing, Guiyang, Hangzhou, Nanchang, Shenzhen, Tianjin and Xiamen. Together these cities and provinces produce 36 per cent of China's national gross domestic product (GDP), consume 31 per cent of its energy, emit 27 per cent of its energy-related carbon emissions, and are home to 27 per cent of the nation's population. The NDRC stipulates that the initiative will cover greenhouse gas accounting, low carbon development planning, green industrial and economic policy, government official capacity development, communications and international cooperation. The lessons learned from the pilot programme will then be applied to other regions and cities throughout China.

This initiative also hopes to emulate the success of the Chinese Special Economic Zone (SEZ) policy authorised by the National People's Congress (NPC) in 1980. The SEZs benefited from special tax incentives for foreign investments and greater independence for international trade activities. The success of the first five SEZs in the early 1980s led to many more such zones being designated throughout China. The projected economic and environmental benefits resulting from the existing low carbon cities pilot projects are anticipated to act as a catalyst for other provinces and cities to develop low carbon strategies in the future.

Regional or local low carbon models provide a logical progression toward international low carbon accounting and regulatory schemes. Cities are well placed to deliver low carbon programmes at scale such as recycling schemes, the generation of energy from waste, broadband network connections, plug-in car points, integrated public transport systems, smart buildings, smart grids and congestion pricing contributing to a reduction in GHG emissions and greater environmental sustainability.

Low carbon provinces and cities represent a special advantage for the production of clean energy technologies, as urban regions or mega-regions can gather a critical mass of people with highly specialized and advanced skills that have the ability to engage in particular productive activities. This aggregation allows provinces or urban areas to become both very productive and particularly innovative in developing and marketing new products and new production processes that combine knowledge from previously unrelated disciplines in the creation of new industries. Additional green jobs are expected to be developed by the interconnections that will develop between existing sectors. It is expected that green buildings, renewable energy technologies, efficient land planning, sustainable transportation systems and environmentally and socially sensitive urban design coupled with new vocational skill training programmes will spur further developments and innovation.

Sources

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9. Green jobs policies and programmes

Over the coming years the demand for new skills by industry will increase. Legislators need to establish a comprehensive policy framework to create an enabling environment for new green job creation. Multi-stakeholder dialogue can identify challenges to green jobs and offer solutions to overcome issues related to climate change, natural resource scarcity and environmental degradation. An effective policy mix supported by federal, regional and municipal level legislation can foster the growth of new environmentally sustainable industries, green employment opportunities and a just transition for enterprises and workers to adapt to new patterns of consumption and production.

As countries develop their own arrangements for green jobs, no one-for-all solution or recipe will apply. What may work in one country may not be applicable in others. Some policies and measures are given below as examples of the actions that are aimed to promote the instruments of a just transition for a job-centred shift towards a low carbon, environmentally sustainable, climate resilient economy. These recommendations have been taken from real cases in countries from around the world.

A. Strengthening the legal framework for green jobs

National framework legislation on green jobs.
Legislation on green jobs can mobilize the actors of the world of work and beyond to promote the development of new and existing green jobs and spur employment in new sectors. Such legislation may set up programmes to undertake research on the labour market, engage stakeholders to identify and track new green jobs and the skills needed to develop the environmentally sustainable industries, link research and development to job standards and training curricula, and address green skill shortages in key emerging industries.

Also, partnerships and demonstration programmes can be launched that target specific groups such as the disabled, unemployed and women assisting them to find green jobs in the labour force, providing training or health care services. Consultation and dialogue mechanisms can be organized in the context of the law between government and all spectrums of society at the federal and local levels. New institutions can be created to address changing needs or new functions given to existing institutions (e.g. observatories for green jobs). In addition, green investments and green stimulus packages linked to job creation targets can facilitate the growth of green jobs in emerging green sectors.

Regional/Provincial legislation and regulations for green jobs.
Where appropriate, regional/provincial level legislation and regulations can help coordinate efforts to develop and train the workforce that is required to sustain the emergence of a more environmentally sustainable economy. Green Jobs committees can be created to facilitate consultations between the Labour, Energy, Education, Public Service Departments as well as other relevant provincial organisations. Such committees can be tasked with the collection and analysis of data on the labour market at the local level as well as identifying which new and existing business sectors have a growing demand for new green jobs and greener jobs.

They can develop strategies and training programmes in specific sectors that are directly relevant to the local socio-economic context, such as energy efficient buildings and retrofitting, renewable energy, bio-fuels, manufacturing of green products and services, public transport, sustainable resource management, including fisheries and forestry,

sustainable tourism, etc. Legislation can also facilitate the creation of Green Jobs Corps at the local/municipal level to work with local communities and other established green job programmes to help young people and minority groups develop green career paths and learn green skills.

B. Enhancing dialogue and tripartite involvement

Consultation and dialogue mechanisms between government and all spectrums of society at the federal and local levels.
On the basis that the paradigm shift in attitudes and behaviour that is demanded would be almost impossible without involving all actors of the economy, opportunities may be given to engage a wide array of stakeholders in discussions, consultations and policy making. Thus, in addition to existing institutional mechanisms to ensure policy inclusiveness on sustainable development such as through the creation of specific inter-ministerial committees, consultation processes can be facilitated that provide the opportunity to receive views and suggestions from a large array of stakeholders including state and local authorities, trade unions, employers and industry, civil society, environmental organisations and other social groups.

Dialogues and round tables can be promoted with actors from the real economy and the world of work in a way that can complement the traditional top-down management approach and that aim to formulate a consensus on how to achieve a transformation of the entire economic and the social system towards greater environmental sustainability. Given the wide spectrum of sectors and subjects to be addressed, specific thematic working groups can be constituted to help identify bottlenecks and conflicting issues with the understanding that some working groups may reach consensus while others may not.

C. Enhancing coordination between employment policies, environmental policies and industrial policies.

Establishment of eco-industrial parks, eco-clusters, eco-towns, green technology manufacturing hubs and sector-based programmes to support the development of new green businesses and green jobs.
Examples include the setting up of 'Green Industry Complexes' which utilise the concepts of resource-use efficiency, waste-to-feed and waste-to-energy while being wholly powered by renewable energy. The positioning both of large companies and SMEs in close proximity can spur inter disciplinary cooperation in green technology development, improving fuel and energy efficiencies while reducing GHG emissions.

Other examples include the building of eco-towns in compliance with strict development criteria. Eco-towns promote the use of local systems for saving water, energy efficiency, recycling and composting of waste. New eco-friendly homes can provide affordable social housing to reduce the waiting lists for new homes. These government funded eco-town projects are expected to spur further private sector investments in eco-developments and create the demand for green buildings and housing by consumers.

Countries which are heavily reliant on the tourism industry for their economy may also promote sector-based programmes such as sustainable tourism practices which involve local communities in the management and coordination of nature based activities in the country.

National ecotourism programmes based on a code of ethics may be put in place with a variety of activities for travellers, including eco-tours, eco-lodge stays, conservation programmes and village stays that can directly benefit rural villagers by providing a proportion of the tour fees directly to help maintain the villages, providing livelihood opportunities for locals and protecting the environment, including coral reefs, humid areas and rain-forests.

D. Human resource development including green skills development, job transfer training and self-employment training.

Skills development and education strategies that address the needs of industry and the public sector at the national/local level.
Employment and skills needs forecasting ought to be integrated in to economic planning to anticipate developments in the labour market and implications to education and training. In order to do so, comprehensive sets of forecasting tools may be developed and implemented by the government to assist in decision-making.

Full-fledged skills development strategies may be launched that aim to adapt existing training programmes and qualifications and create new ones and address in priority such areas as
a) the identification of relevant occupations including setting-up a national observatory to define and understand these new fields;
b) the definition of new training needs and setting up training and qualification pathways to allow professional skills to be recognized;
c) the recruitment for sustainable development jobs to actively assist jobseekers meet requirements; and
d) the promotion and development of professions for green growth through national and provincial events and campaigns.

Skills development strategies by economic sector.
Green job programmes can be developed and administered by newly created observatories in their economic area of relevance (e.g. agriculture and forests, fisheries, cars, buildings, water management, waste and air, electric construction and networks, renewables, bio-fuels and green chemistry, tourism, transportation, biodiversity and ecologic services provided by nature, etc.). A factor of success in these plans is the participation of the social partners (employers and employees representatives) who are able to anticipate skills needs early and manage continuous trainings. These sectoral green jobs programmes aim to undertake such actions as :
a) promoting national and regional level public awareness campaigns for each sector;
b) raising the awareness of job and training advisers;
c) creating labels to guarantee the training quality of initial and continuing education;
d) defining adaptation programmes of employees' skills to support green growth in each sector;
e) supporting employee qualification and reconversion in relevant sectors when business activities are affected by green growth changes;
f) promoting the recruitment of young people; and
g) creating conventions and partnerships between all stakeholders (government, regions, professional sectors, social partners, professional sectors and training organisations) to coordinate national and regional activities.

E. A framework for the creation of jobs related to green technologies and green industries.

Coherent policies *to promote entrepreneurship and SME development in green technologies and services.*
These measures encompass the creation of an enabling environment conducive to the creation of new green businesses while maintaining the pursuit of long-term competitiveness, decent work and sustainable enterprises. In this regard, coherent policies for the creation and expansion of small medium size enterprises (SMEs), through adequate fiscal and tax policies, including tax rebates for investments in country-specific "poles" of green growth can be developed. Technical and financial support can be granted to help entrepreneurs explore green business opportunities, create their own start ups and expand opportunities to learn about new technologies and create jobs that are related to environmentally sustainable technology development and green businesses.

Specific measures can be taken to provide preferential support for joint projects between large enterprises and new SMEs to facilitate access to and transfer of environmentally sustainable technology and facilitate access to public facilities for the development of technology and the training of, supply and expansion of professional human resources.

F. Promoting policies and measures that target vulnerable workers and social groups such as extended social protection, including in disaster prone areas.

Green Jobs programmes targeted at specific groups.
Cohesive programmes may be developed that integrate training and supportive services with a view to creating pathways out of poverty for people from disadvantaged communities who are low-income, homeless, high school dropouts, ex-convicts, disabled, older people and/or migrants. Such programmes may provide competitive grants to organisations (i.e. national non-profits and local public organisations) to carry out green job trainings for individuals and families with low incomes in areas where poverty rates are high to equip them with the skills required such as in energy efficiency and renewable energy industries. Such measures include a range of services to disadvantaged communities, including recruitment and referral services, basic skills and occupational green skills training and support services to overcome employment barriers. Participants who complete the programme would receive certification and work experience leading to employment.

Public employment programmes for the poor that provide decent work and contribute to environmental outcomes.
Public work schemes may be legally established that provide income security to rural households through guaranteed wage employment, to reduce poverty and distress migration from the rural to urban areas, empower women by giving them the opportunity to earn money, enhance productive assets in the rural areas as well contribute to investments in ecological regeneration. Rights-based labour intensive works schemes can help local people to contribute directly to works that enhance environmental sustainability and climate resilience.

These schemes have the potential to facilitate access to limited social protection schemes and skills development programmes for illiterate people as well as generating low-skill green

jobs, should strict rules be followed in ensuring decent work and contributions to environmental outcomes in line with local and national policy objectives. These challenges and opportunities may be the subject of consultations involving all stakeholders with a view to turning the employment scheme into true policy instruments for sustainable development particularly targeting the poor in rural areas.

Contingency funding to fight against starvation and for disaster relief.
National Contingency Funds and programmes may be put in place to provide short-term assistance to the poor in disaster prone areas resulting from the effects of climate change and adverse weather conditions. Assistance can take the form of food aid or cash to buy food including during the pre-harvest season. Such schemes should be maintained to guarantee the availability of funds when disasters take place, as experience demonstrates shortcomings such as diversion of funds to other uses when no disasters occur. However, such funds constitute the only form of social assistance accessible to many poor households in many countries in the region, although only a portion of claimants actually receive help.

Annex 1.

Policy table – France

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
Legislative framework on sustainable development	Multilateral Environmental Agreements (MEAs)	UNFCCC	Signed 1992	France is an annex I member
		Kyoto protocol	Ratified 31 May 2002	
		Chemicals and waste conventions (Basel, Rotterdam, Stockholm, Montreal)	Basel ratified (May 1992), Rotterdam ratified (February 2004),Stockholm ratified(May 2004), Montreal Protocol ratified (December 1988)	
		UNCLOS	Entered into force November 1994	
		Biodiversity convention	Ratified (December 1993)	
		Convention to combat desertification	Party (December 1996)	
	Legislation on sustainable development	Agenda 21	Adopted June 1992. First National Strategy for Sustainable Development June 2003 & the New Strategy for Sustainable Development 2009-12	Providing a framework and ensuring consistency between different actions and measures implemented in France. Organised along 9 key challenges following the European strategy for sustainable development, involving institutional partners, NGOs and civil society. Seeks to reconcile a dynamic economy, high level of education, health protection, social and territorial cohesion while protecting the environment and cultural diversity

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Green growth and other types	*Multi-annual Estimates Act* 2008	Principles and objectives of France's sustainable development policy
			*The Grenelle I Law on implementation of the Environment Road Table commitment*s 2009	The Grenelle Environmental Plan confirmed France's commitment to quarter GHG emissions by 2050 relative to 1990 levels. Established regulatory and financial framework encouraging use of low carbon and renewable energy technologies. Main focus was the Built Environment
			The *Grenelle 2 Bill on the national commitment to the environment*	Makes renovation of public buildings obligatory. New obligation to supply a certificate of energy efficiency upon application of a building permit. Extends requirement to present a social and environmental accountability report to management and investment firms and companies with over 500 employees. Local Agenda 21 and regional SD programmes are harmonised under the national reference framework
			POPE Act 2005	Set out a new framework for energy policy
			The Charter of the environment 2005	Introduced in to the Constitution in 2005
			National Adaptation Strategy to Climate Change 2007 (ONERC)	Published by National Observatory dedicated to effects of climate change after it was adopted by the inter-ministerial committees for sustainable development in November 2006

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
	Legislation on green jobs	Green jobs	Mobilisation Plan for Green Jobs 2009	Skills development strategy launched after Council of Ministers Meeting September 2009. Creates 11 sectoral committees on green jobs. Drafted mandate for mobilisation plan presented during National Conference on Green Jobs, January 2010
			National Training Agreement Law 2004	Every sector required to create an Observatory for employment and training forecasts
Consultative & institutional mechanisms	Federal	Institutional mechanisms	The Inter-ministerial Committee on Sustainable Development (CIDD)	Chaired by Prime Minister and responsible for coordinating and implementing government policies on SD and ensuring cross ministerial policy consistency of actions adopted under the National Sustainable Development Strategy. Monitors French positions and undertakings at European and international level
			The General Council of the Environment and Sustainable Development (CGEDD)	Carries out expert reports, studies, audits, inspections and assessments and international cooperation missions commissioned by Prime Minster and ministries in areas of the environment, climate change, transport & infrastructure, town and country planning, sea, sustainable territorial planning and development, housing, construction and urban policy
			The General Planning Commission	Carries out studies to gauge developments in trade areas and qualifications. Deals with short

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				and medium-term changes in labour resources
		Policy consultations	The Economic, Social and Environmental Council 2010	Includes Government, environmental associations, civil society, local authorities to discuss and draw up SD policies. Replaces the French Committee for the World Summit on Sustainable Development
		Public consultations	The Environmental Grenelles 2007 & 2008 (Environmental Round Tables) & Sea Grenelles 2009	Brought together Government, NGOs, local authorities, labour and management, workers and business world to discuss France's environmental policy. Six working groups addressed climate change, biodiversity and natural resources, health and the environment, production and consumption, democracy and governance, and competitiveness and employment.
				Grenelles potential for 600,000 new green jobs and generate €450 billion of economic activity by 2020
	State		Regional training and employment observatories	Included Regional Council, Ministerial departments in charge of education, employment and training, institute of statistics and industrial partners
Investments and financial incentives	Market based instruments (MBIs)	Carbon tax/fossil fuel tax	'Bonus Malus' tax system (combined bonus and penalty system)	Bonus to encourage the purchase of low- CO2 emissions vehicles. Penalty if buy vehicle that emits high CO2. €300 bonus for scrapping a vehicle over 15 years old
		Cap and trade	Member of European Union Greenhouse Gas	Under the EU ETS Member States agree on

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
			Emission Trading System (EU ETS)	national emission caps, approved by the EU commission. Allowances allocated to industrial operators, and actual emissions tracked in accordance with the relevant assigned amount.
		Targeted subsidies	Renewable energy and green chemistry demonstration programme 2010	€450 million in subsidies for renewable such as solar, marine and geothermal energy, as well as carbon capture and storage projects and advanced biofuel development.
		Tax exemptions		
		Tax cuts/credits	Sustainable development tax credits	Households can deduct part of the cost of energy improvements from income tax bill. (50 per cent for solar pv, 40 per cent for wood-burning stoves)
			Tax cuts under *Budget Law* 2005	Tax credits equal to 50 per cent of value of purchases of energy efficient equipment. Partial cancelation of domestic taxation on bio fuels, VAT reductions on home improvements.
			Low consumption housing tax credits	Interest payments extended from 5 to 7 years for people buying low consumption property, credit boosted to 40 per cent throughout period
			Exceptional public investment programme 2008	€11 Billion reimbursement of taxes to boost business cash flow
		Subsidy reform	G-20 Toronto Summit Declaration 2010	Commitment to phase out inefficient fossil fuel subsidies

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Feed-in-tariff	Renewable Energy Feed-In Tariff: Solar PV 2010, Biomass 2009	Reviewed every year. Base tariff €0.44/kWh and €0.60 for building integrated installations. Between 12.5 and 17.5/kWh for biomass
		Broad based energy tax	General tax on activities that pollute	
	Loans and funds	Green bonds		
		Climate related funds	Under *Environmental Grenelle I Law* 2009	Setting up CO2 loans at a reduced rate for retrofitting private buildings
			Renewable heat fund	To develop renewable sources for heat production, €1 Billion over 3 years of financial aid to benefit cooperative housing, communities and all companies.
		Soft loans	Renewable Energy and Green Chemistry Demonstration Programme 2010	€1.35 billion over next 4 years for a renewable energy fund to support the development of cutting-edge clean energy technologies, includes €900 million in low-interest loans for cutting-edge technology projects
			Interest-free eco loans under *Finance Law* 2009	0 per cent loan for energy-efficient renovation of private properties, 15,000 0 per cent eco-loans by July 2009
			Subsidized loans 2010	€250 million for manufacturers of hybrid and electric vehicles
			Social-housing eco-loans	To improve energy performance of social housing
	Green public procurement		Under The Public Procurement Contracts Code (2006)	To reach quantified targets in specific areas

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
			Under *Environmental Grenelle I Law* 2009	To increase GPP, especially in the State administration
	Fiscal policies and other investments	Fiscal policies	Economic Revival Plan 2008 under *Budget Amendment Act No.2009-122*	€26 Billion over 2 years (1.3 per cent of GDP)
			Public investments for speeding up Grenelle Measures in 2009 and 2010	€1.1 billion in 2009 and 2010
		Stimulus package	Green new deal – economic recovery package (known as exceptional public investment programme)	21 per cent of funds to promote green growth. €1 Billion over next 3 years for development of eco-clusters dedicated to eco-technologies.
		Public-private partnerships (PPP)	Public-private research partnerships 2006	€96 million project for a green chemistry initiative to develop cost-effective methods for replacing petrochemicals with agricultural products
		Research and development	Renewable energy and green chemistry demonstration programme 2010 (Demonstrateurs energies renouvelables et chimie verte)	Supporting projects in solar energy, marine energy, geothermal energy, carbon capture and storage, and advanced biofuel. programmes for green transport (€1 billion programme) and smart grid demonstrations (€250 million programme).
			Under *Environmental Grenelle I Law* 2009	Additional €1 billion by 2012. Funding for CO2 carbon capture & storage projects, recycling captured carbon and improving fossil fuel energy performance
			CNRS Energy Programme	National Initiative on new energy technologies

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
			PREDIT 4 – Sustainable transport plan	€400 million will run from 2009-12. To finance projects that reduce CO2 emissions, improve data on pollution and its effects, and coordinate research into very energy-efficient, low- or zero-carbon dioxide emitting vehicles,
			OSEO Innovation 2005	Between €460 and €500 million from 2007 to 2013 for a combination of grants and zero-interest advances to SMEs and larger enterprises for research, development, innovation and deployment activities.
Environmental standards & targets	Standards (Legally binding)	Energy conservation standards	Under *Environmental Grenelle I Law* 2009	40 per cent reduction in energy consumption of public buildings within 8 years
		Energy conservation Standards	Low consumption standard (end of 2010) and positive energy building standard enforced end of 2020	For new public buildings and 2012 for new housing, consumption below 50kWh/m2/year
		Heat standards		
		National skills certification standards	Low energy consumption Heating Regulation (planned 2015)	Specifying high energy efficiency performance
		Energy efficiency standards		
		Energy intensity standards	Under *POPE Act* 2005	Reduction by 2 per cent per year until 2015, then 2.5 per cent a year until 2030
		Green building codes	The Energy Performance Certificate (EPC) 2005	Monitoring the energy performance of buildings, introduced after European Performance of Buildings Directive 2002/91

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
	Standards (Voluntary)	GHG emissions	Aviation Industry Greenhouse Gas Emissions Agreement 2008	France signed an environmental agreement with the aviation industry calling for airlines, airplane manufacturers and airport operators to reduce their GHG emissions over the 2008 to 2012 period.
		GHG emissions Copenhagen Accord (GHG reduction target)	Retailer Sustainable Commerce Agreement 2008	The agreement commits the retail sector to establish packaging waste and GHG emission reduction goals. And eco-labelling programmes
			France signed under EU commitment. Under *Grenelle draft Law*	20 per cent reduction of GHG emissions by 2020 Factor 4 reduction in GHG emissions by 2050
	Targets	Renewable Fuel Standards (RFS)	Under *POPE Act* 2005	Increase use of biofuels by 2 per cent in 2006 and 5.75 per cent in 2020
		Renewable Fuel Standards (RFS)	National Energy Policy (ADEME) under EU Renewable Energy Directive	Biofuels should account for 5.75 per cent of road fuels in EU countries
		Renewable energy Targets/renewable portfolio standards (RPS)	Under EU Renewable Energy Directive	23 per cent of final energy consumption from renewables by 2020
		Energy efficiency targets	Under *Environmental Grenelle I Law* 2009	Target to improve the energy efficiency of all public or private entities (over 50 people) by 20-30 per cent and 30 per cent of farms to be energy self sufficient by 2013
		Energy efficiency targets	National energy efficiency action plan	Minimum of 9 per cent energy savings over

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Fuel economy targets	(NEEAP) under Article 14(2) of the Directive 2006/32/EC of the European Parliament and of the Council	the period 2008-16. Decrease energy intensity by 2 per cent per year by 2015 and by 2.5 per cent per year by 2030
		Carbon intensity targets	Under *Environmental Grenelle I Law* 2009	Reduction of private vehicle emissions from 176g of CO2/km to 120CO2/km by 2020
		Waste recycling, re-use, recovery, final disposal targets	Under *Environmental Grenelle I Law* 2009	15 per cent reduction in quantity of incinerated or buried waste that needs to be discarded. 5kg reduction in quantity of waste per inhabitant per annum. Increase household packaging recycling rate 75 per cent by 2012.Cut 70 per cent of construction waste.
		Resource efficiency targets		
		Prevention of deforestation target		
		Organic farming target	Under *Environmental Grenelle I Law* 2009	Targets 20 per cent of farming to be organic by 2012 and 20 per cent of food used in public canteens to be organic by 2012
		Technology transfer to developing countries target		
		Under recovery [lan, active Solidarity Bonus (Prime de solidarite active)	For 3.8 million low income households, representing 200 Euros per family.	
Social protection		Extended social security protection	Social Investment Fund (FISO) 2009	To coordinate training measures to increase employability in workforce. Funded by the Satte, European Social Fund (€1.5 billion) and social partners (€400-500 million)
			State pensions managed by ARRCO and AGIRC	Pay-as-you-go schemes and supplemental schemes compulsory for all employees affiliated to the general and agricultural schemes

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Pensions	Unemployment insurance scheme New employment contract under Emergency Employment Plan 2005	Covering all wage earners and managed by representatives of employers and employees Aimed at creating jobs by bringing flexibility to small companies and business
		Unemployment insurance	Forward employment and skills management scheme (GPEC) under *Social Cohesion Law* 2005	Mandatory for all companies with more than 300 people to provide forecasts for future skills needs and to provide training
Education and vocational training		Re-skilling programmes	National Association for Training in the Automobile Sector (ANFA)	Collects and distributes a branch levy tax for apprenticeship development, qualifications and continuous employee adaptation to technological advances
		Employment skills development programmes	Vocational training entitlement for all employees under fixed-term contracts.	
		Education programmes	Under Grenelles 2009 Energy efficiency of agricultural exploitations plan	Education programmes to support objective of having 30 per cent of agricultural exploitations be low-energy consumption by 2013.

Policy table – Republic of Korea

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
Legislative framework on sustainable development	Multilateral Environmental Agreements (MEAs)	UNFCCC	Ratified (entered into force March 21, 1994)	
		Kyoto protocol	Ratified 8 November 2002	Korea is an non Annex 1 country
		Chemicals and waste conventions (Basel, Rotterdam, Stockholm, Montreal)	Basel Feb 1994; Rotterdam Feb 1994, Stockholm Feb 2004, Montreal Protocol Feb 1992	
		UNCLOS	Ratified 1994 agreement on implementation	
		Biodiversity convention	Signed 1992	
		Convention to combat desertification	Entered into force in December 1996	
	Legislation on sustainable development	Agenda 21	Adopted in 1992 & Johannesburg plan of implementation in 2002.	Has submitted National Reports for CSD-18/19 as of May 2010
			National strategy on sustainable development 2006	Presidential Commission on Sustainable Development was established in September 2000
		Green growth and other types	*Framework Act and Presidential Decree on Low Carbon Green Growth* 2010	
			Rational Energy Use Act 1995	Provisions for securing energy supplies and stabilizing energy demands for sustainable

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				development. 3,857 billion won of investment in 2004.
			Basic Environmental Policy Act 1990	Producer responsibility for environmental pollution and clean up costs
	Legislation on green jobs	Green jobs		
Consultative & institutional mechanisms	Federal	Presidential committees National employment centre board	Presidential committee on Green Growth & Green Growth task force to assist sub-committees	Includes 50 members; Ministers, experts on GG areas from private sector, academia and civil society
		Korea international labour foundation	The Grand Social Consensus Feb 2009	Consensus between labor circle, management, civic groups, and Government. The Government shall actively expand the social safety net for poor self-employed, temporary and daily workers, etc. The labor circle will implement a wage freeze or return for job sharing. The management will refrain from layoffs in a view to maintain the current level of employment.
		National employment strategy council	The 1st national employment strategy Jan 2010	Members include; The Government. Ministries, FSA, Bank of Korea, NEAB, heads of research centres and social policy experts
		State	Local committees on Green Growth	State or local government under the control of the Mayor/Governor

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
Investments and financial incentives	Market Based Instruments (MBIs)	Carbon tax/fossil fuel tax		
		Cap and trade	Plans to introduce domestic cap and trade system under discussion (article 46 of *Framework Act on Low Carbon Green Growth*)	
		Targeted subsidies	Yes	Subsidise projects for new green tech clusters/complexes
		Tax exemptions	*Restriction of Special Taxation Act & Local Tax Act*	State or local government may support green tech/industries by exempting them from income tax, corporate tax, acquisition tax, property tax, registration or other tax
		Tax cuts	Under Green New Deal 2009	Income tax cut by 2 per cent in 2009, corporate tax reduced by 5 per cent in 2010 and 3 per cent for SMEs by 2010
		Subsidy reform	The G-20 Toronto Summit Declaration 2010	Commitment to Phase out inefficient fossil fuel subsidies
		Feed-in-tariff	Tariffs for renewable energy	Tariffs range from US$0.32 – 0.36/kWh
		Broad based energy tax	Under review	To reform energy prices to reflect full costs
		Credit guarantees	Guarantees for green projects	Will increase to US$5.4 billion in 2013
	Loans and funds	Green bonds	Long-term & low interest Green Bonds under	Individual investors will be given tax

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
			development	exemptions on interest income from Green Bonds
		Climate related funds	East Asia Climate Partnership 2008-12	Climate change assistance package (US$ 200 million) for developing countries in East Asia and beyond.
		Esco funds	The Green Fund	To facilitate access to credit for SMEs
		Soft loans	Low interest loans 2004	For companies to encourage alternative energy use.
		Other funds	*Korea Technology Guarantee Fund Act* & *Korea Credit Guarantee Fund Act*	
			Green Private Equity Fund	
			Start-up Investment Fund 2009	500 billion won to support SME start-ups & venture capital firms
	Green public procurement		*Promotion of the Purchase of Environment-friendly Products Act 2007*	To increase the consumption of environmentally friendly products by central and local governments
		Fiscal policies	Five-Year Plan on Green Growth 2009	US$ 83.6 billion (2 per cent of GDP) to implement the National Strategy on Green Growth 2009-13 for investment in 27 areas including; green tech, resource & material efficiency, renewable energy, sustainable transport, green buildings, ecosystem restoration. Expects to create 1.18-1.47 new
	Fiscal Policies			

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
	and other investments			green jobs over 5 years, $3.3. billion on IT by 2013
		Stimulus package Public-private partnerships (PPP)	Green New Deal 2009	US$38.1 billion 6 Jan 2009, a mix of financial, fiscal and taxation policies
		Research and development	The Green Industries Investment Company Under Article 9 (18) of *the Investment Services and Capital Markets Act*, 2010	For R&D in new green technologies & develop clusters, networks and complexes for R&D in green tech
			The 21st Century Frontier R&D Programme 1999	To develop scientific and technological competitiveness in newly emerging areas. The government plans to invest a total of US$3.5 billion over a period of ten years in this programme that would comprise twenty-three projects in new frontier areas, such as bioscience, nanotechnology, space technology, and so on
Environmental standards & targets	Standards (Legally binding)	National standards	*Framework Act on National Standards* 1999	Foundation for standardisation of green tech/industries, including certification of conformity
		Minimum Energy Performance Standards (MEPS)	Minimum energy performance standard programme 1999	Restricts the distribution of low efficiency products and promotes the technical development & improvement of manufacturers, refrigerators, air-conditioners and domestic gas boilers

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Fuel efficiency standards	Under *Framework Act for Low Carbon Green Growth* 2010	Drive 17km per litre or cut GHGs below 140g per km between 2012 and 2015
		Energy conservation standards	Under *Framework Act for Low Carbon Green Growth* 2010	
		National skills certification standards	Under Five-Year Plan on Green Growth	to meet demands of green industry
		Energy efficiency standards	Energy efficiency standards & labelling programme (1992, 2001, 2002)	efficiency standards (grades 1 ~ 5) and labels indicating the level of energy efficiency to encourage consumers to purchase high efficiency products
			Design standards for energy efficient buildings (2001)	Separate building standards were implemented for buildings with particularly high energy consumption (large office buildings, hospitals, etc.). These standards require that these buildings expand their use of high energy efficient equipment and design standards in order to qualify for approval.
	Standards (Voluntary)	Green building codes	Green building certification programme (2001)	Evaluates and certifies the life cycle of the building construction process (production of material, design, construction, maintenance and dismantling of buildings) aiming to improve the environmental performance of the buildings and reduce GHGs
	Targets	Copenhagen Accord (GHG	Enforcement Decree of the *Framework Act*	30 per cent below the business-as-usual

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		reduction target)	*on Low Carbon Green Growth* 2010	projection by 2020 (Article 25) & manage targets for each entity that emits GHGs
		Renewable fuel standards	To be adopted in 2012	Mandatory for fuel suppliers to provide biodiesel, bioethanol and biogas for autos
		Renewable energy Targets/renewable portfolio standards	Under *Framework Act on Low Carbon Green Growth* 2010	Targets for the supply of renewable energy from 2.7 per cent in 2009 to 3.78 per cent in 2013 and 6.08 per cent in 2030
		Energy efficiency targets	Under *Framework Act on Low Carbon Green Growth* 2010	enhance EE to 0.290 TOE/US$ 000 in 2013 to 0.233 TOE/US$ 000 in 2020
		Fuel economy targets		15.1km/litre by 2016
		Carbon intensity targets		
		Waste recycling, re-use, recovery, final disposal targets		Set by the Green Growth Committee
		Resource efficiency targets		
		Prevention of deforestation target		
		Sustainable agriculture target	Under 5-year plan	4.5 per cent/2009 → 18 per cent/2020
		Environment energy towns targets	Under *Framework Act on Low Carbon Green Growth* 2010	Build 14 Environment Energy Towns by 2020

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
Social protection		Extended social security protection	Emergency welfare programme 2009 under Green New Deal 2009	Financial assistance for 130,000 people experiencing difficulties due to business shutdowns or redundancies
			Green stimulus package-assets backed loans (3 per cent interest rate) 2009	For 200,000 households with income below minimum cost of living and some property
		Pensions	Green stimulus package-temporary livelihood relief 2009	For 460,000 households with income below minimum cost of living and unable to work
			Hope Work Project 2009	Temporary project to provide low income families with livelihood support & jobs, boosting their spending and stimulating local economy. Paid by a traditional market coupon for use local stores. Jobs include creating eco-experience zones and repairing public facilities. Targets 250,000 households with incomes below 120 per cent below minimum cost of living
			Employment retention subsidy	To support companies' efforts to retain jobs (365.3. billion won) target 147,000 beneficiaries
		Unemployment insurance	Job seeking & unemployment benefits increased 2009	For those who lost jobs during economic downturn. Targets 1,586,000 beneficiaries
			Subsistence allowance	Target 209,000 beneficiaries
Education and vocational		Re-skilling programmes	Under *Framework Act on Low Carbon Green Growth* 2010	To facilitate the efficient mobilisation and conversion of manpower in each industrial

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
training				sector for new green jobs & expand opportunities for citizens to learn new technologies
		Employment skills development programmes	Under *Framework Act on Low Carbon Green Growth* 2010	Training, supply and overseas expansion of professional human resources for green tech/industries, SMEs & financial/technical support for new jobs for greentech industries
			Vocational training expanded for unemployed	
			Specialized vocational training programme for construction workers	100,000 beneficiaries
			Job sharing Scheme	
			Sector Councils for Human Resource Development	New councils set up to provide short training courses in RE and green finance
		Education programmes	Stay-in-school programmes	94,000 beneficiaries. To develop the employability of unemployed college graduates
			Internship programme	Targets 25,000-37,000 beneficiaries. 70 per cent of intern wages paid by Government to support SMEs
			Curriculum updated	Korean Polytechnic Colleges will update curriculums to develop technicians with new skills for green economy (20 per cent of

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				existing course curricula will be revised) undergraduate, graduate universities as well will update existing curriculums
		Capacity development programmes		
Other intervention strategies		Renewable energy programmes	Alternative Energy Act 1987 (revised 2002)	The initial framework for the development of new and renewable energy technologies. It encouraged the installation of waste-incineration plants to generate heat and power, promoted residential solar heaters, small hydropower plants and facilities to use methane gas.
			Smart grids under Green New Deal 2009	Introduce a national smart grid by 2030 to manage power production and distribution
			Energy Use Rationalization Act	

Policy Table - Malaysia

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
Legislative framework on sustainable development	Multilateral Environmental Agreements (MEAs)	UNFCCC	Ratified 13th July 1994 and entered into force 11th October 1994	
		Kyoto protocol	Entered into force 16th Feb 2005	Malaysia is a non-annex 1 party
		Chemicals and waste conventions (Basel, Rotterdam, Stockholm, Montreal)	Basel: ratified 8th October 1993, Rotterdam: ratified 4 Sep 2002, Stockholm: signed 16th May 2002 (not ratified) Montreal: ratified 29th August 1989	
		UNCLOS	Ratified 14th October 1996	
		Biodiversity convention	Is a party ratified 24th June 1994	Objectives incorporated into the National Policy on Biological Diversity
		Convention to combat desertification	Signed and entered into force 26th December 1996	
		Convention on international trade in endangered species of wild flora and fauna	Entered into force 18th January 1978	
	Legislation on sustainable development	Agenda 21	Adopted 14th June 1992 at Rio Summit	Sustainable development objectives are incorporated into Malaysia's Five-year plans
		Green growth and other types	National Green Technology Policy 2010	
			National Policy on Climate Change 2010	Objectives:

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				1. Mainstreaming climate change through wise management of resources and enhanced environmental conservation resulting in strengthened economic competitiveness and improved quality of life 2.Integration of responses into national policies, plans and programmes to strengthen the resilience of development from arising and potential impacts of climate change 3. Strengthening of institutional and implementation capacity to better harness opportunities to reduce negative impacts of climate change 4. Integrate climate change considerations at the planning level by applying tools that includes the following: • Integrated Environmentally Sensitive Areas; • Strategic Environmental Assessment; • Economic Evaluation of Ecological Services; • Sustainable Development Indicators. 5. Promote community-based climate change responses and programmes e.g. The promotion of RE generation by small and independent developers including local communities.

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
			New Energy Policy (2011-15)	
			New Economic Model developed by the National Economic Advisory Council	Developed overall framework to transform Malaysia from a middle income country to an advanced nation by 2020. Defines Strategic Reform Initiatives (SRIs) to propel the country forward towards Vision 2020 goals. Recommends that the government must set a green economy platform policy for development in-line with commitments made at Copenhagen 2009.
	Legislation on green jobs	Green jobs		
Consultative & institutional mechanisms	Federal	Committees	Inter-ministerial Committee for National Climate Change Policy	To drive, coordinate and facilitate implementation of adaptation and mitigation measures. Develop a roadmap for climate resilient growth. Incorporate and facilitate implementation of climate-friendly measures and technologies by strengthening the following: • Laws and regulations and Enforcement; • Human resource development; • Finance and incentives; • Research and development; • Transfer of technology; and

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				• Outreach to relevant stakeholders.
			Cabinet Committee on Green Technology	Chaired by PM and Deputy PM. Review and establish legal mechanisms to foster accelerated growth in green technologies. Established Malaysian Energy Centre to research EE, RE , R&D, etc. Malaysian Green Technology Corporation. Malaysian Green Technology Agency under Ministry of Energy, Green Technology and Water
		Green technology council	National Green Technology Policy	A high level coordination body consists of ministries, agencies, private sector and other stakeholders, chaired by Prime Minister and Deputy PM, coordinates the green technology agenda across multiple Ministries, agencies and key stakeholders for effective implementation of green technology policy. Establishment of strategic Green Technology hubs throughout Malaysia
		Climate change council	National Policy on Climate Change (approved by the Malaysian Cabinet in 2009)	Under the council are 7 working groups each developing their own plan for green growth. - Industry - Promotion and awareness - Green neighbourhoods - Transport - Human capital

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				- R&D and innovation - Adaptation response and technology Also developing 40 per cent carbon intensity reduction roadmap for 2011
		Ecosystem for environmental sustainability	AFFIRM framework (Awareness, Faculty, Finance, Infrastructure, Research, and Marketing)	A cross cutting framework of policies to set the agenda for environmental protection and conservation
		Economic planning unit and national development planning council	Under the Prime Minister's department	Responsibility of preparing the medium term and long term plans for national development. Produced National Development Policy (1991-2000) and National Vision Policy (2001-10) and facilitates overall major economic policies for the National Mission (until 2020)
		Roundtable on sustainable palm oil	RSPO Principles and Criteria for Sustainable Palm Oil Production (RSPO P & C) of 2003	The Roundtable on Sustainable Palm Oil (RSPO) is a global, multi-stakeholder initiative on sustainable palm oil. multi-stakeholder representation is mirrored in the governance structure of RSPO such that seats in the Executive Board and project level Working Groups are fairly allocated to each sector, include environmental NGOs, banks and investors, growers, processors, manufacturers and retailers of palm oil products and social NGOs. Produced global guidelines for producing palm oil sustainably. transparency and traceability is assured through RSPO

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				Supply Chain Certification
		State		
Investments and financial incentives	Market Based Instruments (MBIs)	Carbon tax/fossil fuel tax		
		Cap and trade		
		Targeted subsidies		
		Tax exemptions	Under 10th Malaysia Plan	Allowing tax deductions for R&D and providing matching grants to promote private sector funding of R&D and commercialisation. Also tax breaks for green buildings incorporating solar panels, rain water harvesting and water conservation facilities.
			Import tax exemptions under budget 2009 to grant exemptions to third party distributors of solar systems	Import duty exemption for 1 year on imported machinery used to generate RE. Sales tax exemption on locally made items. Also for EE initiatives.
			Pioneer Status (PS) under the Promotion of Investments Act of 1986	Full income tax exemption for 10 years on statutory income to companies that propose to generate RE or undertake EE initiatives.
			Investment Tax Allowance (ITA) under the Promotion of Investments Act of 1986.	A tax allowance of 100 per cent of qualifying capital expenditure incurred within 5 years. Can offset against statutory income in the year of assessment.

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Subsidy reform	Under first Malaysian economic stimulus package	RM 7 billion was saved from fuel subsidies and channelled to housing development and promotion.
			Under 10th Malaysian Plan	Subsidies and price controls will be gradually rationalized to remove market distortions. Subsidies will be converted to productivity-based incentives. E.g. fishing industry incentives will be based on volume of fish landing not input subsidies.
		Feed-in-tariff	Under 10th Malaysian Plan	Feed-in-tariff of 1 per cent to be incorporated into the electricity tariffs of consumers to support development of renewable. Establish RE fund.
		Broad based energy tax		
		Credit guarantees	Green Technology Financing Scheme (GTFS) RM 1.5 Billion	To promote green technology. Credit guarantees of 60 per cent for companies developing or using green technologies. Maximum of RM 50 million per company, up to 15 years, must be Malaysian owned companies (+51 per cent).
			1-InnoCERT programme	Assesses the innovation level of enterprises and applies funding incentives such as access to preferential rate loans, credit guarantees and grants.

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Tariffs	Water tariff under National Water Resources Policy 2010	Government will implement an integrated tariff for both water and sewerage services to link sewerage charges to water consumption, moving away from flat rate tariffs.
		Environmental related tax		
	Loans and funds	Green finance	Capital Market Master Plan 2	To update and expand the role of capital markets to develop new financing alternatives for green-technologies. Expand financial industry employment in green sectors e.g. carbon trading, green fiancé, consultancy, etc. Develop banking capacity to assess credit approvals for green businesses using non-collateral-based criteria. Support venture capital firms and liberalise entry of foreign experts specialising in financial analysis of green technology projects.
			RM 19 billion of loan values for RE projects under RE Policy and Action Plan as stipulated under Energy Commission Act 2001	Estimated to create 50,000 green jobs to construct, operate and maintain RE energy power plants. 80 per cent debt financing for RE projects.
		Funds	Business Growth Fund RM 150 million	Supports companies commercialising public sector research results and will provide hybrid grant-equity funding

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
			Facilitation Fund RM 20 Billion under 10th Malaysian Plan	To promote private sector investment in priority areas including sustainable infrastructure, health, education, etc. i.e. Senai Hi-tech Park in Iskandar Malaysia.
			Renewable Energy Fund	To support the development of RE. To be managed by a special agency, The Sustainable Development Energy Authority under the Ministry of Green Tech, Energy and Water
			Microcredit programmes RM 300m.	To assist farmers and agro-based small businesses in rural areas
			Industry Restructuring Guarantee Fund Scheme under Second Malaysian Economic Stimulus Package	For loans to increase productivity and value added activities, as well as the application of Green Technology (RM5 b).
			Green Technology Soft Loan Scheme RM 1.5 billion	To provide soft loans to companies that supply and utilise green technology. Government bears 2 per cent of the interest and guarantees 60 per cent of the financing amount. Interest subsidy of 2 per cent per year,
	Green public procurement	Establishment of working groups on Green Procurement	Under National Green Technology Plan	Development of an action plan on green procurement organised national workshop and seminar. Cooperation between Ministry of Finance, Ministry of Energy, Green Technology and Water, Malaysian Green

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				Technology Corporation and SIRIM Berhad.
	Other investments	Fiscal policies	Malaysian Economic Stimulus Package of Nov 2008 RM 7 billion	Included housing benefits, entrepreneurial credit facilities, and reduction in compulsory deposit options and human capital development
			Second Malaysia Economic Stimulus Package RM 60 billion	Thrust 1 - Reducing Unemployment and Increasing Employment Opportunities (RM 2 billion) Thrust 2 - Easing the burden of the Rakyat, in particular, the vulnerable groups (RM 10 billion) Thrust 3 - Assisting the private sector in facing the crisis (RM 29 billion) Thrust 4 - Building Capacity for the Future (RM 19 billion)
		Public-private partnerships (PPP)	Under 10th Malaysian Plan privatisation and PPP of key government sectors will be encouraged	Promoting investments in renewable energy by providing long-term contracts for new RE companies. Government will shift away from building infrastructure and operating services towards buying those services from the private sector. Change of legislation to enable a more competitive free market for businesses, including new green businesses.
			Smart Partnerships	Between government, industries and research

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				institutions to encourage green technology development.
		Research and development	Promotion of bio-prospecting	To facilitate wealth generation from the country's rich biodiversity resource, such as medicines, organic beauty products, etc
			Promotion of FDI for Green Technology	Establishment of an effective coordinating agency for RDI and Centre of Excellence or new research institute for Green Technology development;
			Establish High End Research Centres under SRI thrust 2 of NEM	To nurture and retain local and global talent.
			Under 10th Malaysia Plan	Incentives provided to multinational companies to establish research centres in Malaysia, Establishment of strategic green technology hubs throughout Malaysia
Environmental standards & targets	Standards (Legally binding)	National standards	Environmental Quality Act 1974	Introduces Environmental Impact Assessments and worked to prevent pollution and natural resource exploitation
		Minimum Energy Performance Standards (MEPS)	Under the Energy Efficiency Master Plan 2010	For appliances and development of green technologies
		Fuel economy standards		3 out of 6 fuels are Euro II compliant 5 out of 6 of the diesel fuel here complies with Euro II's sulphur ppm rating of a maximum of

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				500ppm
		Energy conservation standards		
		Water conservation standards	Water Services Industry Act 2006	An Act to provide for and regulate water supply services and sewerage services.
				Interim National Water Quality Standards
			National Water Quality Standards under Environmental Quality Act 1974	Minister after consultation with the Environmental Quality Council elaborates regulations for prescribing ambient water quality standards which are applied to surface waters and marine waters
		National skills certification standards	National Skills Development Act 2006	Human Capital Development
		Energy efficiency standards	Under development	Green Technology Council to develop and implement regulations on energy efficiency standards for new buildings.
	Standards (Voluntary)	Green building codes	Under 10th Malaysian Plan	Wider adoption of Green Building Index (GBI) to benchmark energy consumption in new buildings.
			Guidelines on Green Townships and rating scales based on carbon footprints under National Energy Efficiency Master Plan 2010	Green Townships in Putrajaya and Cyberjaya.
				MS 1525:2001 Code of Practice on Energy Efficiency and use of Renewable Energy for Non Residential Buildings provides minimum standards for the design of new, existing

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				buildings
			Uniform Building By-laws	Updated to incorporate Malaysian standards for EE and RE in non residential buildings.
	Targets	Copenhagen Accord (GHG reduction target)	Malaysian Prime Minster pledged 40 per cent reduction in GHG emissions intensity by 2020	
		Renewable Fuel Standard (RFS)	Under the New Energy Policy	Mandatory blending of all bio-fuel beginning 2011
		Renewable energy targets/renewable portfolio standards (RPS)	Renewable Energy Policy and Action Plan under 10th Malaysia Plan	RE target of 985 MW by 2015 – 5 per cent of electricity generation and 9 per cent by 2020.
		Energy efficiency targets	Under National Energy Efficiency Master Plan 2010	An implantation roadmap to improve EE across sectors. Target of 4,000kilo tonnes of oil equivalent (ktoe) by 2015
			Under National Green Technology Policy	10 per cent savings in energy and water consumption in Putrajaya Government Buildings. And a carbon footprint baseline for those green townships.
		Air quality targets	Under Clean Air Action Plan	Reducing emissions from vehicles, industries, public awareness campaigns, etc.
		Public-transport use targets	Under 10th Malaysian Plan	Increase public transport modal share in KL from 12 per cent in 2009 to 30 per cent in 2015

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Waste recycling, re-use, recovery, final disposal targets	Solid Waste and Public Cleansing Management Bill of 2007	Integrated waste management into national strategic plan. Recycling target of 25 per cent by 2020.
			Reduce, Reuse Recycle Programme	A deposit refund scheme and take back system will be implanted for consumers to get back money when they return products to be recycled.
		Water conservation targets	Suruhanjaya Perkhidmatan Air Negara Act 2006	To provide for the establishment of the SPAN Commission with powers to supervise and regulate water supply services and sewerage services and to enforce water laws.
			Under the National Water Resources Policy 2010	Streamlining polices and legislation to allow more equitable distribution of water, including RM 5 billion for the flood mitigation programme
		Prevention of deforestation target	REDD + under Copenhagen Accord 2009	Malaysia will start trading REDD credits.
			Under National Policy on Climate Change	Conserve and enrich carbon pools in natural ecosystems including plantations and promote Rehabilitation of sensitive and degraded ecosystems through sound management practices and land use planning.
Social protection		Extended social security protection	Fishermen's Welfare Fund RM 2 million under Second Malaysian Economic Stimulus Package	

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
			Social Assistance Programmes	Need to be better targeted at vulnerable groups.
			Energy and food subsidies	To be replaced with credible assistance to the poorest during the transition to an advanced green economy.
		Pensions	Employment Provident Fund	Only covers half the workforce, leaving many low-income workers out of the formal pension system.
		Unemployment insurance		
		Climate index-based insurance		
		Weather risk management facility		
		Life-line tariffs		
Education and vocational training		Re-skilling programmes	Skills Upgrade Programme	Provided by SME Corp. Enhancing skills of workers of SMEs at technical, supervisory and managerial level including green skills. Will provide 80 per cent of training costs.
			Retraining Programme and Apprenticeship Scheme	To retrain and enhance competency of semi skilled labour to meet the demands of the green technology industry.
			Skills Development Fund Act 2004	To promote up-skilling and retraining of the workforce. RM 500 Million allocated for loans

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				to workers and RM 500 million for school leavers
			Human Resource Development Fund RM 50 Million	A pool of funds where employers contribute levies for retraining and re-skilling of their workers.
		Employment skills development programmes	National Skills Development Act 2006	Established the Department of Skills Development. Design and enhancement of training and education programmes to improve human resource capacity for green technologies. integration of green modules into the curriculum of skills training institutes which will enable the creation of green jobs
			National Dual Training System (NDTS) 2005	
			Industrial skills enhancement programme	A training programme for to enhance the employability of graduates.
		Education programmes	Human capital development programme under First Economic Stimulus Package RM 200 million	76,940 unemployed graduates, school leavers and displaced workers were trained so far.
			Student incentives under Green Tech Policy	Provision of financial and fiscal incentives for students to pursue green technology disciplines at undergraduate and post graduate level.
			Integrated Human Capital and Talent Development Framework under 10th Malaysian Plan	Government adopted the framework to nurture and develop Malaysians across their lifetimes. Introduction of green topics into the

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				curriculum of schools and Higher Learning Institutions.
			Knowledge transfer partnership programme 2011	To facilitate collaboration between industry and relevant universities, particularly in new emerging technologies such as renewable energy, bio-plastics, etc
		Capacity development programmes	World-class Civil Service Collage to be established under 10th Malaysian Plan	To provide more choice, greater flexibility and content of training programmes. These to be aligned with on-the-job needs. Curriculum will be tailored to the changing needs of government. Exploitation of brain gain programmes to strengthen local government expertise in green technology.
			Green growth capacity development programme 2010 under KeTTHA	Training programme both classroom and web-based to teach government officials about green growth policy tools for low carbon development.
		Certification system		Formulation of grading and certification mechanism for people competent in green technology.
Other intervention strategies			Solid Waste and Public Cleansing Management Act of 2007	Responsibility for waste management is moved from jurisdiction of local authorities to the jurisdiction of the Federal Government

Policy Table - Singapore

Intervention category	Policies and measures	Policy instrument	Name and year	Description
Legislative framework on sustainable development	Multilateral Environmental Agreements (MEAs)	UNFCCC	Entered into 27th August 1997	National communication sent to UNFCCC November 2010
		Kyoto protocol	Acceded 12th April 2006	Singapore is a non-annex 1 country
		Chemicals and waste conventions (Basel, Rotterdam, Stockholm, Montreal)	Basel acceded 2 January 1996, Rotterdam acceded 24 May 2005, Stockholm acceded 22 August 2005, Montreal acceded 5 January 1989	
		UNCLOS	Acceded 17 November 1994	
		Biodiversity convention	Ratified 21 December 1995	
		Convention on international trade in endangered species of wild fauna and flora	Acceded 30 November 1986	
		Convention to combat desertification	Entered into force December 1996	
	Legislation on sustainable development	Agenda 21	Adopted 14t June 1992 at Rio Summit	SD principles incorporated into Singapore's development plans. Local/Regional Agenda(s) 21 plans
		Green growth and other types	National Climate Change Strategy (NCCS) Under National Climate Change Committee	

Intervention category	Policies and measures	Policy instrument	Name and year	Description
			2008 National Biodiversity Strategy and Action Plan (NBSAP)	
	Legislation on green jobs	Green jobs		
Consultative & institutional mechanisms	Federal	Committees	Inter-Ministerial Committee on Sustainable Development (IMCSD) 2008	Established January 2008 to develop a national framework and 4 key strategies. Published Sustainable Singapore Blueprint of 2009 S$1 billion invested over next 5 years. Green Plan 2002 – 2012
			Inter-Ministerial Committee on Climate Change established 2007	For the government to engage the private and people sectors on climate change issues. Developed between six Ministries the National Climate Change Strategy (NCCS), by better understanding vulnerabilities, identifying and assessing adaptation measures, and mitigating greenhouse gas emissions. National Greenhouse Gas Inventory.
			National Climate Change Committee 2010 under PMO	
			Economic Strategies Committee (ESC) May 2009	ESC is chaired by Minister of Finance and comprises of members from the government, labour movement, private sector and academia. Role is to "develop strategies for Singapore to build capabilities and maximise opportunities

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				as a global city in a new world environment, so as to achieve sustained and inclusive growth. Provided recommendations for Budget 2010.
			National Productivity and Continuing Education Council established 2010	Chaired by Deputy Prime Minister, includes members from the Government, business community and labour movement. To galvanise national efforts required to boost skills and enterprise productivity, and develop a comprehensive system for continuing education and training. The Council will oversee different Government agencies and promote close collaboration amongst the business sector, workers and unions, and the public sector.
			Economic Development Board (EDB) under Ministry of Trade and Industry	Tasked with developing the clean energy industry in Singapore. Set up the inter agency Clean Energy Programme Office (CEPO) to focus on cluster development, technology development and internalisation with an emphasis on solar. S$ 50 million Clean Energy Research Programme
			inter-agency Taskforce under The Ministry of National Development	Leads a task force to review existing infrastructural adaptation measures, as part of the overall government's approach to address climate change
		Institutional mechanism for	Sub-committee on Enhancing Human Capital	Working groups on human capital management, globalising talent and education

Intervention category	Policies and measures	Policy instrument	Name and year	Description
		green jobs	under Ministry of Trade and Industry	and training.
			Singapore Workforce Development Agency	Partners the respective industries' education and training providers to offer relevant and quality programmes that meet sectoral needs. Programmes such as such as water and waste management, town planning and intelligent transport systems, green building solutions and clean energy. Skills, innovation and productivity will be the key drivers of economic growth over the next decade
		Consultations	First Public Forum held by IMCSD entitled 'Building a Sustainable Community'	Discussions with members of the public, NGOs, business, academia, media editors and Mayors. Received 1,300 suggestions via the Sustainable Singapore website.
			Second Public Forum 'Enhancing the Built Environment'.	700 people participated in focus group discussions, public forums and dialogue sessions.
	Local	Consultations	Energy SAVE Programme under the Housing and Development Board (HDB)	Discussions with town councils to promote energy efficiency in common areas.
Investments and financial incentives	Market Based Instruments (MBIs)	Carbon tax/fossil fuel tax	No carbon tax yet	Government currently calculates a shadow price of carbon in its cost benefit analysis so that policies and decision-making can be better informed
		Cap and trade		

Intervention category	Policies and measures	Policy instrument	Name and year	Description
		Targeted subsidies		
		Tax exemptions	For CNG cars until 31 Dec 2011	For hybrid, electric and CNG buses and commercial vehicles: Road tax is pegged to that for petrol equivalents, which is 20 per cent lower than their diesel equivalents.
		Grants	Grant for Energy Efficient Technologies (GREET) November 2008	To encourage owners and operators of industrial facilities to invest in energy efficient equipment or technologies. Funding of up to 50 per cent of the qualifying costs, capped at $2 million per project. To offset part of their investment cost for energy efficient equipment.
		Rebates	Green Vehicle Rebate Programme	To encourage consumers to buy green and fuel efficient cars. Rebates of 40 per cent of the vehicle's Open Market Value (OMV) for electric, hybrid and CNG passenger cars, 5 per cent of the vehicle's OMV for electric, hybrid and CNG buses and commercial vehicles, and 10 per cent of the vehicle's OMV for electric motorcycles The rebate can also be used to offset the Additional Registration Fee (ARF) payable at registration.
		Subsidy reform		Singapore does not subsidise energy
		Feed-in-tariff		

Intervention category	Policies and measures	Policy instrument	Name and year	Description
		Incentive schemes	Energy Efficiency Prototype Building incentives S$ 5 million	To encourage developers to collaborate with experts worldwide to develop buildings that will achieve at least a 50 per cent improvement in EE.
			One-Year ADAS Scheme (Accelerated Depreciation Allowance for Energy Efficient Equipment and Technology) under Income Tax Act of1984 (amended 2008).	Administered by NEA to encourage companies to replace old, energy-consuming equipment with more energy efficient ones and to invest in energy-saving equipment. Capital expenditure on the qualifying energy efficient or energy-saving equipment can be written off in 1 year instead of three. All costs directly related to the project, including the equipment, supplies and installation costs, are eligible for accelerated tax allowances.
			Skyrise Greenery Incentive Scheme under Marina Bay renovation project.	To incentivise existing developments in the city centre to establish green roofs and ground level communal landscaped areas.
		Environment-related tax	Electronic Road Pricing (ERP) Scheme	Motorists pay each time they drive into a congestion prone area. Supported by Vehicle Quota System and Green Link Determining System (GLIDE) increases traffic throughput by real time monitoring of traffic flows and expressway systems.
	Loans and funds	Green bonds/finance	Global Trader Programme (GTP).	International Enterprise Singapore has designated carbon credits as a qualifying product under the GTP. This would allow

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				qualifying companies to enjoy a tax concession on qualifying income from emissions trading. This incentive aims to build up a critical mass of companies along the carbon value chain, anchoring their emissions trading in Singapore.
		Environment related funds	3R Fund (reduce, reuse and recycle) of S$ 8 million over 2 years under National Environment Agency (NEA)	To co-fund projects that promote the reduction, reuse and recycling of waste. Projects include the provision of waste recycling infrastructure, redesign of processes to reduce waste and provision of innovative sorting or recycling systems.
			Innovation for Environmental Sustainability (IES) Fund S$ 20 million under NEA	A seeding fund to encourage and assist Singapore-registered companies to undertake environmental protection and public health related projects that contribute to the long-term environmental sustainability The IES fund is targeted at projects at the applied research and test-bedding/demonstration stages of technology developments.
			Sustainable Energy Fund (SEF) S$ 50 million over 5 years	To support implementation of the E2 Singapore administered by the E2PO.
			Water Efficiency Fund under PUB	Help industries to defray part of the capital costs of water recycling systems. Water Efficient Buildings Programme encourages use of water-efficient fittings and assists building

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				owners to monitor water consumption.
		Other funds	3P Partnership Fund S$1.5 million under NEA	To assist organisations from across people, public and private sectors with limited resources to realise successful projects on environmental sustainability.
			Environment Technology Research Programme (ETRP) S$ 15 million under NEA	Funding programme to build up technological competencies and to support a growing ecosystem of companies and researchers undertaking Clean Environment R&D in waste management.
			Market Development Fund under Energy Market Authority S$ 5 million.	To facilitate test bedding of non traditional generation technologies useful to the electricity market.
			National Innovation Challenge under the Research, Innovation and Enterprise Council. S$ 1 billion over 5 years. Sept 2010	First round entitled "Energy Resilience for Sustainable Growth". Aims to develop cost-competitive energy solutions for deployment within 20 years to help Singapore improve energy efficiency reduce carbon emissions and increase energy options.
		Soft loans		
		Grants	Clean Development Mechanism (CDM) Documentation Grants under NEA	To encourage companies to develop CDM projects in Singapore. Funding consists of 50 per cent of the qualifying cost of engaging a carbon consultant to develop a new methodology and Project Design Document.

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				30 per cent of the qualifying cost of engaging a carbon consultant to develop a PDD that uses an existing approved methodology.
			Design for Efficiency Scheme (DfE)	Provides funding assistance to investors in new facilities in Singapore to integrate energy and resource efficiency improvements at the design stage.
			Energy Efficiency Improvement Assistance Scheme (EASe)	Co-fund the cost of energy audits by up to 50 per cent.
	Green public procurement		Green Labelling Scheme launched in 1992 under Ministry of Environment	
	Other investments	Fiscal policies	Singapore Budget 2009, (Resilience Package)	S$ 4.8 billion to be spent on infrastructure, health and education improvements. Being drawn from reserves to fund the Jobs Credit, SPUR Programme and Special Risk-Sharing Initiative. Companies will receive a 12 per cent cash credit against employee salaries, up to a salary of $2,500 which is the median income.
			Singapore Budget 2010	Sustained initiative to help enterprises and workers raise productivity (increase 2 per cent to 3 per cent productivity growth per year for a whole decade) by deepening skills and expertise, S$ 5.5 billion over the next five years. Support inclusive growth through support for low-wage workers to upgrade themselves, and more help for families with

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				children and for older Singaporeans. We will also restructure our property tax system to benefit the majority of home owners.
			Clean Energy and Water Technology Sectors Investment Programme S$ 680 million	It is estimated these sectors could generate up to S$ 3.4 billion by 2015 and create 18,000 green jobs. E.g. development of an intelligent power grid. The Energy Market Authority and SingPower have embarked on an intelligent energy system pilot project to evaluate new applications and technologies along the smart grid. Will involve 4,500 customers from residential, commercial and industrial settings. They can select their own electricity retailers and packages and monitor and manage their own electricity usage using smart meters and other automated devices.
			Provide infrastructure to institutes of higher learning, Research Institutes and companies	To conduct basic and applied research and to demonstrate innovative solutions such as green technologies.
			Fund the development of a 'sustainable school' to showcase resource use efficiency savings and a healthy learning environment.	
		Stimulus package	Singapore Stimulus Package of 2009 S$ 20.5 billion	Included lower corporate taxes (cut rate to 17 percent from 18 percent), subsidized wages, guaranteed bank loans and S$ 4.4 billion in sustainable infrastructure projects such as the subway system, roads, public housing and

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				parks facilities. Assume 80 per cent of the risk on private bank loans of up to S$ 5 million to help spark lending and investment.
		Public-private partnerships (PPP)		
		Research and development	Economic Development Board	To support new business opportunities in clean technologies and urban solutions. Three strategies 1.) Create a vibrant research ecosystem, 2.) Facilitate Test bedding and 3.) Expand and deepen the industry cluster in clean technologies.
			Built Environment Research Fund S$ 50 million under Ministry of National Development	Test bedding green building technologies. Zero Energy Buildings.
			Established Centre for Liveable Cities (CLC) under Ministry of National Development in partnership with Ministry of the Environment and Water Resources.	A policy orientated think tank with expertise in areas such as sustainable urban development, urban planning, resource management, living environment technologies, affordable green housing and sustainable transport.
			Incubator Programme	To nurture clean energy and water technology start ups through business mentoring and financial support. Tri-generation facilities, waste-to-energy.
			Develop the Jalan Bahar Clean-tech Park over next 20 years.	For companies researching clean technologies, test-bedding, prototyping and light

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				manufacturing. Achieve low carbon emissions and integrate surrounding ecological features with sustainable buildings and infrastructure.
			Solar Energy Research Institute of Singapore (SERIS) established 2008 S$ 130 million over first 5 years.	Innovative solar energy research and manpower development.
			Energy Technology R&D Programme	To coordinate, integrate and expand efforts and capabilities in clean energy, especially in the areas of fuel cells, alternative fuels such as biofuels and hydrogen, as well as solar PV technologies.
Environmental standards & targets	Standards (Legally binding)	National standards	Environmental Protection and Management Act of 1999 (last amended 1 April 2009) and National Environment Agency Act of 2002	Environmental management and protection regulations. Established National Environment Agency (NEA).
			Energy management practices	Mandated large energy users to use certain energy management practices such as the appointment of trained energy managers and implementation of an energy management system within companies to integrate energy efficiency into management practices.
		Minimum Energy Performance Standards (MEPS)	Under Sustainable Singapore Blueprint	For key electrical appliances i.e. air-conditioners and refrigerators. Key benchmarks for industrial processes
		Minimum water efficiency standards		For water appliances in new developments and existing premises undergoing renovation from

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				July 2009.
		Fuel efficiency standards	New diesel vehicles required to meet European IV standard.	Results in less harmful emissions. All taxis and buses to obtain standards by 2014.Study the use of diesel particulate filters and alternative hybrid technologies to further reduce harmful emissions.
		Air emission standards	Under Clean Air Act of 1978	Reduce particulate matter 2.5 levels to 12/ug/m^3 by 2020 and cap SO2 levels at 15 ug/m^3 by 2020.Regulary review standards for industry and transport
		Energy efficiency standards	Under Sustainable Singapore Blueprint, no country wide energy efficiency standards yet	Recommend adoption of green data centre standards to reduce the power consumption of IT systems (green IT)
		Green building standards	Green Mark Certified rating	Singapore is one of the few countries in the world to mandate green building standards. Since 2008 all new buildings have to meet the Green Mark Certified rating
	Standards (Voluntary)	Green building codes	Green Mark (GFA) Incentive Scheme of S$ 100 million under the Green Building Master plan	Administered by the Building and Construction Authority (BCA). 80 per cent of existing buildings to achieve at least a Green Mark Certification Rating by 2030. New green buildings are likely to command a rental premium in the marketplace
			Energy Smart Building Labelling Programme under NEA	To promote energy efficiency and conservation in the buildings sector by according

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				recognition to energy efficient buildings.
	Targets	Copenhagen Accord (GHG reduction target)	Took note of the Copenhagen Accord at COP 15 on 18 December 2009	Offered a voluntary reduction of 16 per cent of emissions below 2020 BAU levels if a global binding agreement had been set.
		Renewable Fuel Standard (RFS)		
		Water conservation targets	Under Sustainable Singapore Blueprint 2009	Reduce domestic water consumption to 140l per person per day by 2030. Increase use of NEWater to 30 per cent of City's needs
		Renewable Portfolio Standards (RPS)		
		Energy efficiency targets	National Energy Efficiency E^2 Plan of the Energy Efficiency Programme Office (E2PO)	E2PO) an inter-agency committee lead by NEA. 35 per cent improvement in EE from 2005 by 2030. Reduce energy consumption in common areas of old estates by 30 per cent and new estates by 20 per cent. To support implementation of the E2 Singapore, a Sustainable Energy Fund (SEF) of S$50 million over 5 years has been established, administered by the E2PO. Gross efficiency of power generation in Singapore increased from 39 per cent in 2001 to 44 per cent in 2006. Further efforts to help improve the energy efficiency of power generation in Singapore include the use of

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				cogeneration and trigeneration.
			Design for efficiency scheme under NEA	Aims to encourage investors in new facilities in Singapore to integrate energy and resource efficiency improvements into manufacturing development plans early in the design stage. Maximum amount of funding is 80 per cent of the qualifying costs or S$600,000, whichever is lower.
		Energy intensity targets	Under National Energy Efficiency E^2 Plan	Reduce EI (per $ of GDP) by 20 per cent from 2005 levels by 2020 and by 35 per cent from 2005 levels by 2030
		Carbon intensity targets		0.35 kgCO2/2000 US$ is below world average for carbon per unit of GDP produced.
		Fuel economy targets	Fuel Labelling Scheme April 2009 and establish a vehicle emission test lab.	Mandatory labelling for passenger cars and light goods vehicles. Test bedding new technologies such as diesel-hybrid buses and developing a green framework for rail systems. As of end 2007, less than 20 per cent of all vehicle models in the market were participating in FELS.
		Waste recycling, re-use, recovery, final disposal targets	Under National Recycling Programme launched 2001	65 per cent Recycling Rate by 2020 and 70 per cent by 2030. The Public Waste Collectors (PWCs) licensed by NEA, provide door-to-door collection of recyclable material in both HDB estates and landed properties.

Intervention category	Policies and measures	Policy instrument	Name and year	Description
		Resource efficiency targets		
		Prevention of deforestation target	National Biodiversity Strategy and Action Plan	
		Greenery targets	Under Sustainable Singapore Blueprint 2009	Increase to 0.8ha of green space for every 1000 persons and increase greenery in high rise buildings to 50ha by 2030. 900 ha of reservoirs, 100km of waterways for recreation. Create 30 ha of skyrise greenery by 2020 and 50ha by 2030. Expand parkland over next 10 years to 900ha.
		Public transport targets	Land Transport Authority (LTA) S$ 40 billion to improve public transport systems. Double rail network from 142km to 278 by 2020	70 per cent of morning rush hour journeys made by public transport. Improve off-peak car scheme and Park and Ride Scheme
		Environment energy towns targets	Develop new generation of green housing districts along Pungol Waterway.	Such as the Eco-precinct project Treelodge in Pungol. Known as 'green living by the waters'.
		Human capital targets	Under Sustainable Singapore Blueprint 2009	Increase productivity growth from about 1 per cent per annum over the past decade to between 2-3 per cent per year over the next ten years
Social protection		Extended social security protection	Workfare Income Supplement (WIS) under stimulus package of 2009	Supplements the wages of low income earners to be increased by 50 per cent. Encourage older low-wage workers to stay in the workforce

Intervention category	Policies and measures	Policy instrument	Name and year	Description
			Tax rebates and cash handouts under economic stimulus package of 2009	$1.7 billion in form of tax rebates and cash handouts for needy families
			Youth Environment Envoy programme	Train disadvantaged youth to conceptualise and implement environment related projects.200 youth trained as YEEs already in 2010
			Workfare Training Support (WTS) scheme under Ministry of Manpower	To encourage low wage workers to go for training. This is done by firstly providing higher funding subsidies to companies to incentivise them to send their low wage workers for training; and secondly by providing a cash award to reward these workers for attaining a certain level of training
		Pensions	Central Provident Fund	Administered by the Central Provident Fund Board, a statutory board under the Ministry of Manpower. A compulsory comprehensive social security savings plan. CPF encompass the following: Retirement Healthcare Home Ownership Family Protection Asset Enhancement
		Unemployment insurance		
		Health related policies	Environmental Public Health Act of 1987	

Intervention category	Policies and measures	Policy instrument	Name and year	Description
			Environmental Protection and Management (Air Impurities) Regulations	To ensure that emissions remain at acceptable levels to ensure that Singapore has clean and safe air. To control the emissions generated by motor vehicles, NEA regulates the type and quality of fuel that can be used in Singapore, and also sets minimum exhaust emission standards for all vehicles.
			Medisave introduced in April 1984, Medifund	A national medical savings account system. allows Singaporeans to put aside employees contributes 6-8 per cent (depending on age group) of their monthly salaries into a Medisave account to meet future personal or immediate family's hospitalization, day surgery and for certain outpatient expenses. Medifund Established in April 1993, Medifund is an endowment fund, which helps needy Singaporeans who are unable to pay for their medical expenses.
Education and vocational training		Re-skilling programmes	Skills Upgrading and Resilience (SPUR) Programme	Government will pay 90 per cent of retraining fees, as well as an hourly lost productivity rebate, to keep employment while new job training takes place.
			SCEM (Singapore Certified Energy Manager) Programme, a Training Grant, co-funding scheme under NEA	To develop local expertise and capability in professional energy management. The scheme is targeted at engineers who manage manufacturing facilities and buildings and provide energy services or engineering

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				consulting services. Substantially funds the SCEM training cost at the Professional Level. Qualifying candidates need only pay S$ 963 for the full 144-hour professional level SCEM Programme, which consists of 4 core and 2 elective modules.
			Solar Capability Scheme (SCS) S$ 20 million	To enhance the capabilities of designers, architects and system integrators in solar energy companies. Encourages innovative design and integration of solar panels into buildings.
		Employment skills development programmes	Singapore Workforce Development Agency Act of 2003	An Act to establish and incorporate the Singapore Workforce Development Agency, to provide for its functions and powers, and for matters connected therewith
			Skills Development Levy Act of 2008	
			Continuing Education and Training (CET) Master plan	A comprehensive plan to prepare the Singapore workforce for the future and maintain a competitive advantage. The plan will form the fundamentals of a lifelong learning system to help equip Singaporeans with the skills for job opportunities in new growth industries, whether they are preparing for new jobs, switching careers or acquiring new skills. 80 per cent of the resident workforce will have at least a diploma qualification by 2020, compared to 36 per cent

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				in 2007.
			Manpower development programme	To train specialist manpower and research talent for the clean energy and water technology sectors.
			Solar programme. Solar technology test-beds under HDB. S$ 31 million in 30 public housing precincts.	Large scale solar test beds enable Singaporeans to be trained in new green skills such as installing and maintaining solar systems.
			Programme for Environmental Experiential Learning (PEEL) under NEA	Organised by Singapore Environment Institute (SEI). Courses on environmental management in Singapore, consists of a series of six site tours to environmental facilities around Singapore.
			Training and certification scheme for public and private sector data centre operators.	To promote R&D in energy efficiency data centres.
			Water Efficiency Management Course under PUB	To equip operation managers with water audit skills to identify gaps and develop their own water conservation strategies.
		Education programmes	Singapore Certified Energy Manger Programme under National University of Singapore (NUS).	A formal training and certification system in the area of energy management. NEW provides a training grant that offsets a portion of the training fees for the curriculum.
			Provide clean energy scholarships, visiting professor programmes and manpower	Establish world class research ecosystem for clean technologies and urban solutions.

Intervention category	Policies and measures	Policy instrument	Name and year	Description
			training centres of excellence. S$25 million Clean Energy Scholarships	Features supplier base, testing and certification services, funds and incubator projects.
			Clean and Green Singapore Programme under Community Development Councils (CDCs) in partnership with National Environment Agency.	To inspire all Singaporeans to care about and help, protect the environment.
			Human Capital Leadership Institute	This Institute will conduct pan-Asian research on important human resource challenges, and offer global participants training and development programmes on leadership and management.
			Continuing Education and Training Framework. S$ 5.5 billion over 5 years under Budget 2010	E.g. Specialist Manpower Programme in clean energy and clean energy diploma programme S$25 million
			Workforce Skills Qualification (WSQ) system. S$ 2.5 billion in continuing education and training (CET) over the next 5 years	Provides different levels of certifiable training in employability and vocational skills. We have also built a strong continuing education and training CET infrastructure, with a network of about 50 CET centres providing comprehensive training and career services
			Education curriculum - environmental education part of the national school curriculum under Ministry of Education	Environmental education is also one of the criteria in the Schools Excellence Model which is used to appraise the overall performance of schools. Incorporates topics such as recycling, energy and water conservation. Network of environmental education advisors in schools to

Intervention category	Policies and measures	Policy instrument	Name and year	Description
				facilitate contact between NEA and teachers. With the nation-wide drive on energy efficiency and worldwide move to Reduce CO2 emissions, there will be a demand for energy management capabilities and services and carbon consultancy services. The establishment of the relevant training courses, accreditation schemes and institutes will help to ensure a continued build-up of such skills and expertise in Singapore in the future.
		Capacity development programmes	Under National Climate Change Strategy 2010	Develop Singapore into an environmental knowledge hub NEA's Singapore Environmental Institute regularly Conducts capacity building training on environmental protection and management for international participants. The Singapore Cooperation Programme also helps to train foreign officials on the various aspects of water, waste management as well as public health

Policy Table – The United States of America

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
Legislative framework on sustainable development	Multilateral Environmental Agreements (MEAs)	UNFCCC	Ratified and signed into Law 13 October 1992,	The U.S. is an Annex 1 country
		Kyoto protocol	Not party	
		Chemicals and waste conventions (Basel, Rotterdam, Stockholm, Montreal)	Basel (signed 1992) not ratified, Rotterdam (not party)Stockholm (not party) Montreal Protocol (signed 1987)	
		UNCLOS	Signed 1994 Agreement on Implementation, but not ratified	
		Biodiversity convention	Signed 5 June 1992 but not ratified	
		Convention to combat desertification	Signed. Entered into force December 1996	
	Legislation on sustainable development	Agenda 21	Adopted 1992 during United Nations Conference on Environment and Development	
	Legislation on green jobs	Green jobs	Green Jobs Act of 2007 incorporated into the Energy Independence and Security Act 2007	Authorized up to $125 million to establish national and state job training programmes, administered by the U.S. Department of Labor, to address job shortages in green industries, such as energy efficient buildings and construction, renewable electric power, energy
			Green Jobs Framework for Action 2007	

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				efficient vehicles, and biofuels development
Consultative & institutional mechanisms	Federal	U.S. Committee on Education and Labor	Current committee established on January 4, 2007	
		The National Economic Council (NEC)	Established in 1993	Resides within the Office of Policy Development, Executive Office of the President. The NEC Director works in conjunction with officials to coordinate and implement the President's economic policy objectives. Supported by a staff of policy specialists in various fields including: agriculture, commerce, energy, financial markets, fiscal policy, healthcare, labor, and Social Security.
		The Office of Congressional and Intergovernmental Affairs (OCIA)		Promotes the "Good Jobs for Everyone" principles to policymakers both in Washington and throughout state and local governments. OCIA coordinates with Departmental leadership to educate policymakers about the Department's programmes and federal labor issues.
	State	Carbon tax/fossil fuel tax		
Investments and financial incentives	Market Based Instruments (MBIs)	Cap and trade	Not at federal level. Regional Greenhouse Gas Initiative (RGGI)	
		Targeted subsidies	under Energy Policy Act 2005	Subsidies for wind and other alternative energy producers

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Subsidy reform	G-20 Toronto Summit Declaration 2010	Commitment to Phase out inefficient fossil fuel subsidies
		Feed-in-tariff	not at Federal level	
		Credit guarantees	under Energy Policy Act 2005	For innovative technologies that avoid greenhouse gases, including advanced nuclear reactor designs, pebble bed modular reactors (PBMRs) as well as clean coal and renewable energy technologies
		Reduced import tariffs		
		Environmental related tax		
	Loans and funds	Green bonds	Qualified Green Building and Sustainable Design Project Bonds (green bonds) under an amendment to the America Jobs Creation Act of 2004	$2 billion worth of AAA-rated bonds issued by the United States Treasury - to finance environmentally friendly development. The objective is to reclaim contaminated industrial and commercial land (brown fields), and encourage energy conservation and the use of renewable energy sources.
			Clean Renewable Energy Bonds under Energy Improvement and Extension Act 2008	$800 million issued
		Climate related funds	Contribute to Green Climate Fund under Copenhagen Accord 2009	Obama Administration pledged to provide short-term financing of up to $10 billion a year to developing countries in 2010, 2011, and 2012

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
		Direct loans	Advanced Technology Vehicles Manufacturing (ATVM) Loan Programme	A $25 billion direct loan programme funded by Congress in 2008 to provide debt capital to the U.S. automotive industry for the purpose of funding projects that help vehicles manufactured in the U.S. meet higher millage requirements and lessen U.S. dependence on foreign oil.
		ESCO funds	Energy performance contracting on a State by State basis	
		Other funds	The Technology Commercialization Fund 2008	$14.3 million from Department of Energy (DOE) 2007 – 2008 to promote early stage product development through prototype advancement including demonstration and deployment of renewables. The U.S. provided
	Green public procurement		Executive Order (EO) 13101, Greening the Government through Waste Prevention, Recycling and Federal Acquisition	All federal procurement officials are required by the Federal Acquisition Regulation (FAR) and EO to assess and give preference to those products and services that are environmentally preferable
			Resource Conservation and Recovery Act 1976 and the Farm Security and Rural Investment Act of 2002	Requires federal agencies to purchase EPA-designated products with recycled content
			Greening the Government through Efficient Energy Management	Specifies that Agencies shall select, where life-cycle cost-effective, ENERGY STAR® and other energy-efficient products

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
	Fiscal policies and other investments	Fiscal policies	Emergency Economic Stabilization Act 2008	$185 billion (10 per cent spent on green investment)
		Stimulus package	The American Recovery and Reinvestment Act of 2009	$787 billion (12 per cent spent on green investments) Renewables, CC&S, energy efficiency, low carbon vehicles, high speed rail, smart grids, water and waste
		Public-private partnerships (PPP)	National Action Plan for Energy Efficiency (NAPEE) 2006	A public-private initiative to create a sustainable national commitment to energy efficiency through the collaborative of gas and electric utilities, utility regulators, and other partner organizations. The goal is to achieve all cost-effective energy efficiency by the year 2025.
			Millennium Challenge Corporation (MCC) 2004	Created by the U.S. Congress in January 2004. Large-scale grants to fund country-led solutions for reducing poverty through sustainable economic growth. $7.4 billion in programmes worldwide for the pursuit of sustainable economic growth and a healthy environment
		Research and development	under Energy Policy Act 2005	$2.95 billion for R&D and the building of an advanced hydrogen cogeneration reactor at Idaho National Laboratory
			Clean Coal Programme (DOE)	$21.3 million over three years. Addressing the key challenges for wide-scale deployment of CCS technologies. Programme portfolio covers

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				the entire carbon sequestration "life cycle" of capture, separation, transportation, and storage or reuse, as well as research needs for the two other major energy related greenhouse gases of concern, methane (CH4) and nitrous oxides (N2O)
			ARPA-E Funds (Advanced Research Projects Agency -Energy)	$349 million for new green technologies including, energy efficiency technologies, new air conditioners, new batteries
			Energy Storage Technology Advancement Act of 2007	$50 million for basic research and $80 million for applied research authorised for each of the fiscal years 2009-14 for new energy storage technologies
			Fossil Energy's Innovations for Existing Plants (IEP) Programme	$36 million R&D in carbon capture technologies that can be retrofitted to existing pulverised coal-fired power plants. Goal is to achieve 90 per cent CO2 capture at no more than a 35 per cent increase in the cost of electricity.
Environmental standards & targets	Standards (Legally binding)	National standards		
		Minimum Energy Performance Standards (MEPS)	The National Energy Conservation Policy Act of 1978 (NECPA)	Gave Federal MEPS pre-emption over State standards
			The National Appliance Energy Conservation Act of 1987 and amendments of 1988	Established MEPS for twelve categories of appliances and instructed DOE to set MEPS for one additional product if technically feasible and economically justified. It also

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				required DOE to review and update the MEPS to keep pace with technological improvements, and strengthened the pre-emption of federal MEPS over state standards
		Fuel efficiency standards	CAFE (Corporate Average Fuel Economy) Under Energy Independence and Security Act of 2007	Automakers are required to boost fleet-wide gas mileage to 35 mpg (14.8 km/l) by 2020. Standard of 27.5 miles per gallon for domestic passenger vehicles
	Standards (Voluntary)	Green building codes	Leadership in Energy and Environmental Design (LEED)	Developed by US green building council. A green building certification system providing third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts
	Targets	Copenhagen Accord (GHG reduction target)	Signed 2009	17 per cent reduction GHG emissions by 2020
		GHG reduction target (Federal agencies)	Executive Order 13514 Federal Leadership in Environmental, Energy, and Economic Performance	Sets sustainability goals for Federal agencies and improvements in their environmental, energy and economic performance. Requires Federal agencies to set a 2020 greenhouse gas emissions reduction target within 90 days; increase energy efficiency; reduce fleet petroleum consumption; conserve water; reduce waste; support sustainable

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				communities; and leverage Federal purchasing power to promote environmentally-responsible products and technologies
		Renewable Fuel Standard (RFS)	Under Energy Independence and Security Act of 2007	To promote Flex-Fuel vehicles and E85 production.
		Renewable energy targets/renewable portfolio standards (RPS)	On hold until 2012	
		Energy efficiency targets	Energy Star Programme 1992	Programme to enhance energy efficiency and reduce greenhouse gas emissions in public, commercial and industrial buildings. It promotes energy efficient products and practices by offering training, information, management strategies, targets and rating systems
Social protection		Extended social security protection	Pathways Out of Poverty Demonstration Programme under Green Jobs Act 2007	Competitive grants to entities to carry out training leading to economic self sufficiency to individuals and families with income less than 200 per cent of sufficiency standard of the local area
			Recovery Rebates and Economic Stimulus for the American People Act 2008	Broad Tax Rebates for Individuals ($107 billion in 2008 & $117 billion over 10 years).Tax Cut for more than 130 million families, recovery rebates to 20 million additional seniors and 250,000 disabled veterans, provides $32 billion in tax relief for

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				35 million families who work but make too little to pay income taxes
		Pensions	Under Employee Retirement Income Security Act (ERISA) 1974	A defined benefit plan promises a specified monthly benefit at retirement and a defined contribution plan, the employee or the employer (or both) contribute to the employee's individual account under the plan, sometimes at a set rate, such as 5 percent of earnings annually. A 401(k) Plan is a defined contribution plan that is a cash or deferred arrangement
		Unemployment insurance	Federal-State Unemployment Insurance Programme	Unemployment benefits to eligible workers who are unemployed through no fault of their own (as determined under State law), and meet other eligibility requirements of State law
			Unemployment Compensation Extension Act of 2010	Extension to restore assistance to two and a half million people who lost their jobs in the recession.
			Disaster Relief and Emergency Assistance Act of 1974	Authorizes the President to provide benefit assistance to individuals unemployed as a direct result of a major disaster.
Education and vocational training		Re-skilling programmes	Energy Efficiency and Renewable Energy Worker Training Programme Under Energy Independence and Security Act of 2007	To provide training to veterans, unemployed individuals, and workers impacted by energy and environmental policies
		Employment skills development programmes	Green jobs training under The American Recovery and Reinvestment Act of 2009	$600 million for training for green collar workers by DoL and set up Green community

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				of practice for workforce professionals
			Funding for National & State job training programmes Green Job Act 2007	National Energy Training Partnership Grants of $125 million to address job shortages in green industries; green buildings & construction, renewable electricity, electric vehicles and biofuels
			Veterans Workforce Investment Programme (VWIP) 2009	To train and place veterans in green jobs and industries
			The Occupational Information Network (O*NET)	Monitors new green skills/jobs to identify on a standard basis and presents descriptions online for career guidance and human resource development
			YouthBuild Programme	Training young people in green construction techniques, green trade apprenticeships and the use of sustainable building materials
		Education programmes Capacity development programmes	Green student training programmes under Recovery Act 2009	
Other intervention strategies		Redeveloping Brownfield sites for RE	Brownfields Land Revitalization Programme	Established by EPA in 1990s
			Re-Powering America's Lands Programme	EPA is encouraging renewable energy development on current and formerly contaminated land and mining sites. This initiative identifies the renewable energy potential of these sites and provides other

Intervention category	Policies and measures	Policy instrument	Name and year	Brief description
				useful resources for communities, developers, industry, state and local governments or anyone interested in reusing these sites for renewable energy development
		Sustainable agriculture	The Food, Conservation, and Energy Act of 2008, H.R. 6124 (also commonly referred to as the "Farm Bill")	Outlines measures for improving water and energy efficiency in agriculture as well as establishes guidelines for land owners to measure the value of ecosystem services

Annex 2.

Figure 1. United States Green Jobs Framework for Action

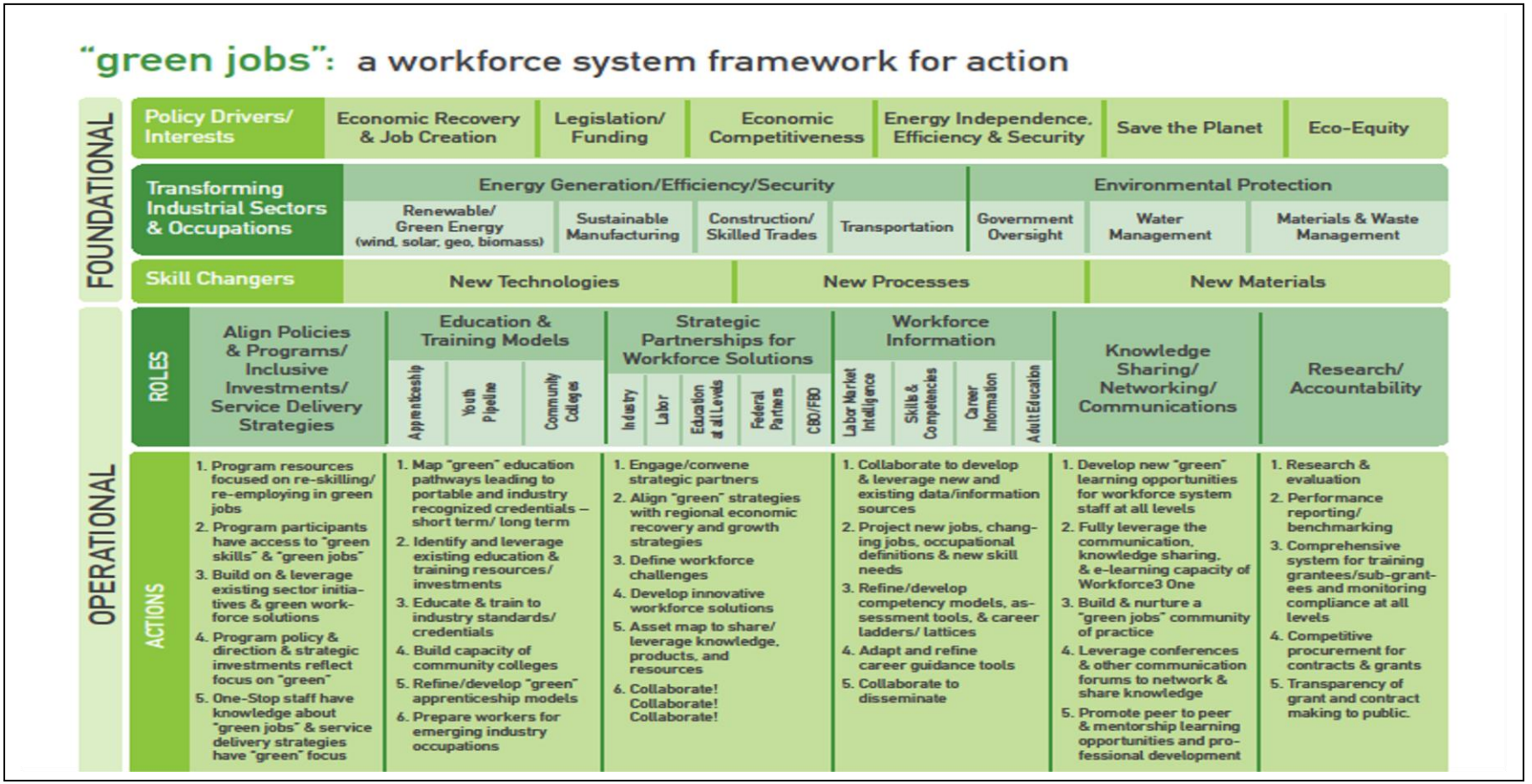
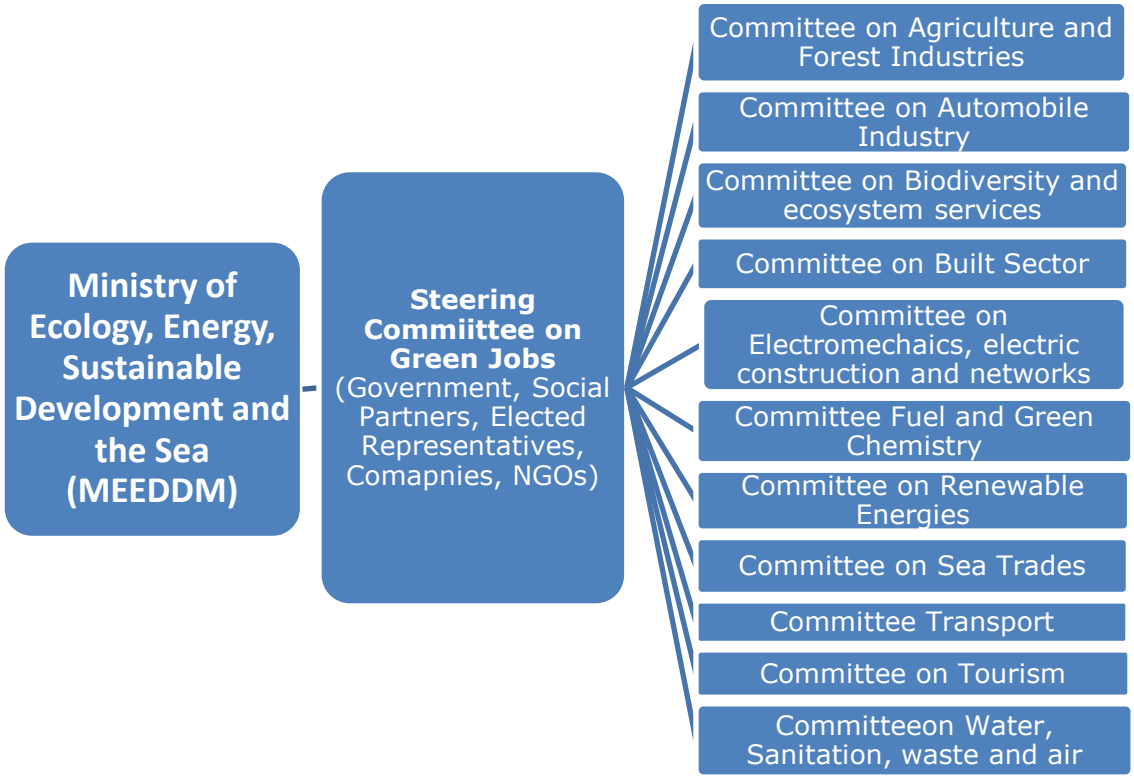
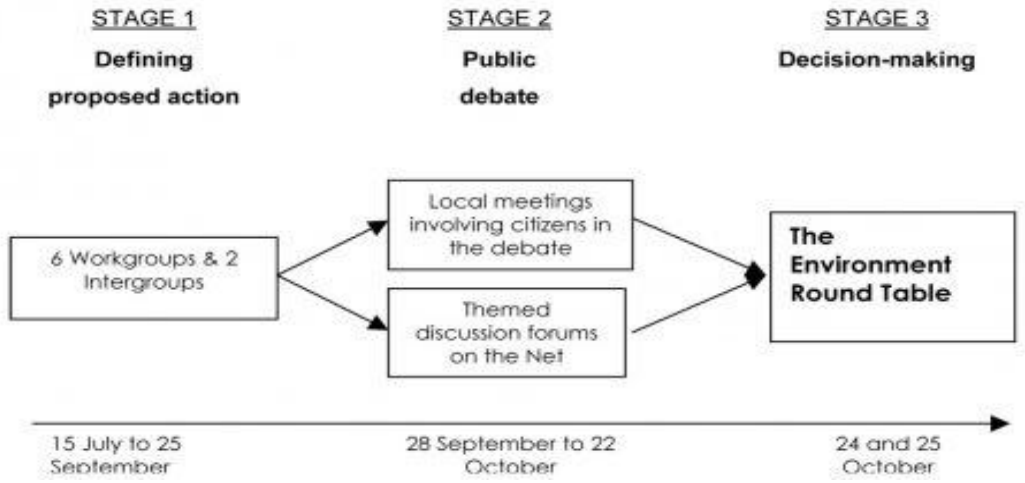


Figure 2. Consultative mechanism for mobilisation plan for green jobs



Source: Ministry of Ecology, Energy, Sustainable Development and the Sea, France, 2010

Figure 3. Implementing structure of France's environmental round table discussions



Source: Le Grenelle Environnement, http://www.legrenelle-environnement.fr/spip.php?rubrique112

Annex 3.

Short list of policy instruments

Country	Name of Policy Instrument	Year
Fiji	Fiji Ecotourism and Village-based Policy, http://www.sidsnet.org/eco-tourism/fea.html	1995
France	National Training Agreement Act, http://www.senat.fr/dossier-legislatif/pjl03-133.html	2004
France	Grenelle II Act on the National Commitment to the Environment, http://www.legrenelle-environnement.fr/	2010
Korea	Framework Act on Low Carbon Green Growth, http://www.moleg.go.kr/english/korLawEng?pstSeq=54792	2010
Korea	Promotion of the Purchase of Environment-friendly Products Act, http://www.newworld.moleg.go.kr/fl/.../14770/RU3OML8MGWGROFLQYMJD	2007
Korea	Korea Credit Guarantee Fund Act, http://www.kodit.co.kr/html/english/about_kodit/intro/object.jsp	2009
Malaysia	Green Technology Policy, http://www.kettha.gov.my/en	2009
U.S.A.	The Green Jobs Act, http://thomas.loc.gov/cgi-bin/bdquery/z?d110:H.R.2847:	2007
U.S.A.	Energy Independence and Security Act, http://thomas.loc.gov/cgi-bin/bdquery/z?d110:H.R.6:	2007
U.S.A.	Green Jobs New York Act, http://www.nysenate.gov/blogs/2009/sep/11/senate-passes-green-jobsgreen-ny-bill	2009
U.S.A.	American Recovery and Reinvestment Act, http://thomas.loc.gov/cgi-bin/bdquery/z?d111:H.R.1:	2009
U.S.A.	Small Business Liability Relief and Brown-fields Revitalization Act, http://www.fedcenter.gov/Bookmarks/index.cfm?id=3681	2002
U.S.A.	Energy Policy Act, http://thomas.loc.gov/cgi-bin/query/z?c102:H.R.776.ENR:	2005

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This guide to green jobs has been developed to address some of the new and specific needs for information sharing and general understanding of the complex relationships between social, economic and environmental policies. Without judging on the effectiveness of such policies and measures, it examines the different facets of sustainable development policy that can generate quality jobs, including green jobs, in a somehow systematic and comparable manner. In no way should it be considered as providing a comprehensive overview but rather an introduction to this rapidly evolving field of policy making. The publication has also been designed to help the reader have direct access to the information and examples without being required to read the whole report.

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