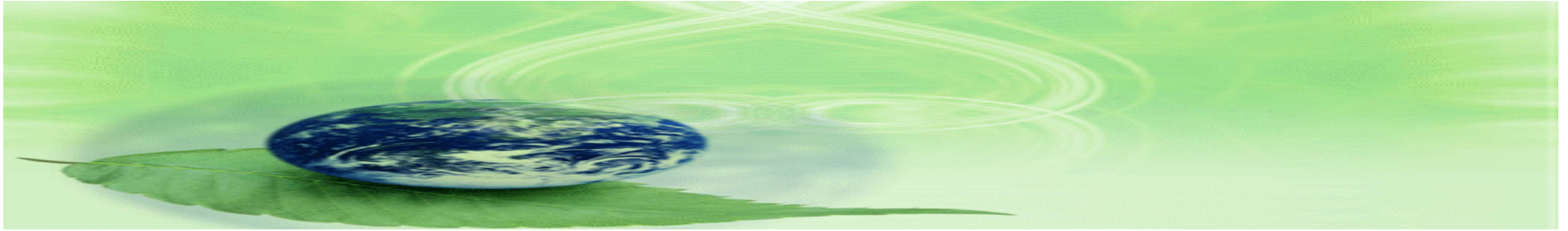




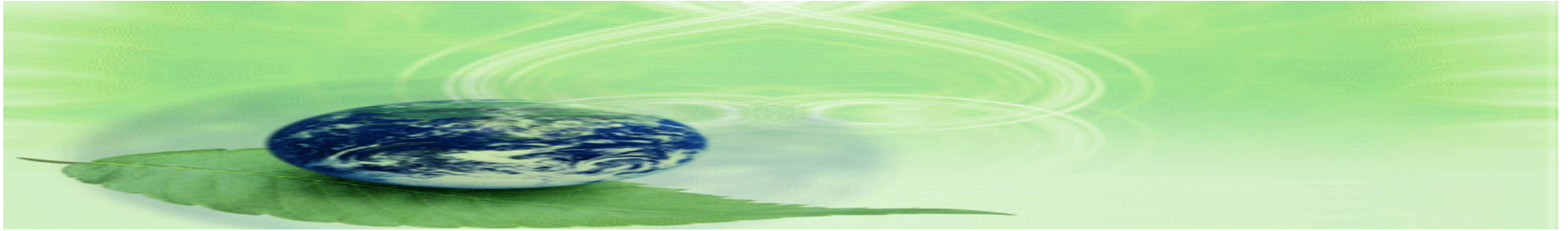
SKILLS FOR GREEN JOBS

By Carmela I. Torres
ILO Decent Work Team (DWT) Bangkok
ILO Staff Training
Green Jobs: Linking environment, climate change & the
world of work



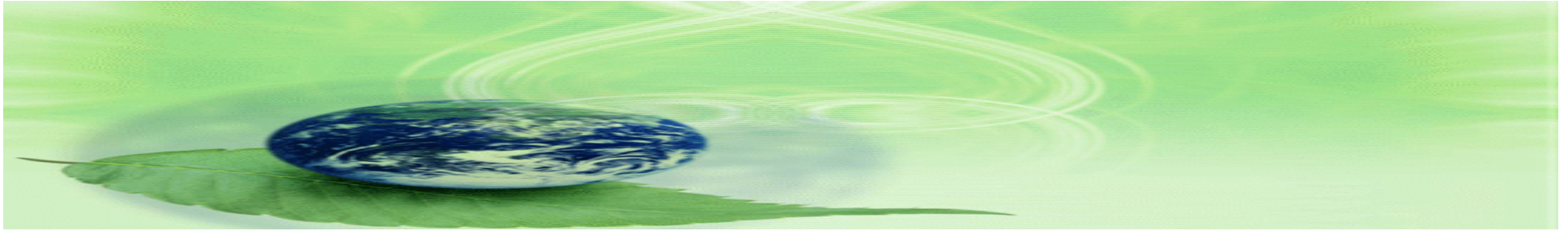
OUTLINE

- **DEFINITIONS**
- **NEED FOR SKILLS DEVELOPMENT IN THE CONTEXT OF A GREENER ECONOMY**
- **ENVIROMENTAL STRATEGIES AND SKILLS STRATEGIES**
- **CHANGING SKILLS NEEDS**
- **SKILLS RESPONSES & ANTICIPATING SKILLS NEEDS**
- **SOME COUNTRY EXAMPLES**
- **EMPLOYMENT SERVICES**



SKILL OR COMPETENCY?





ANSWER

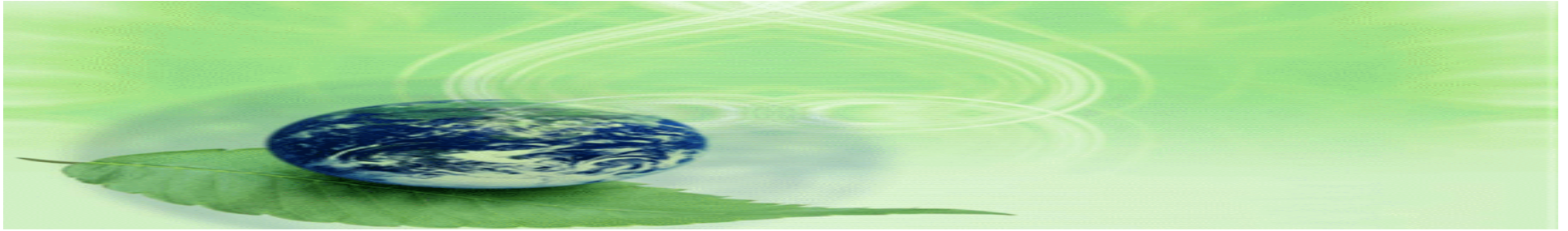
Picture A:

Skill: Woodworking

Competencies:

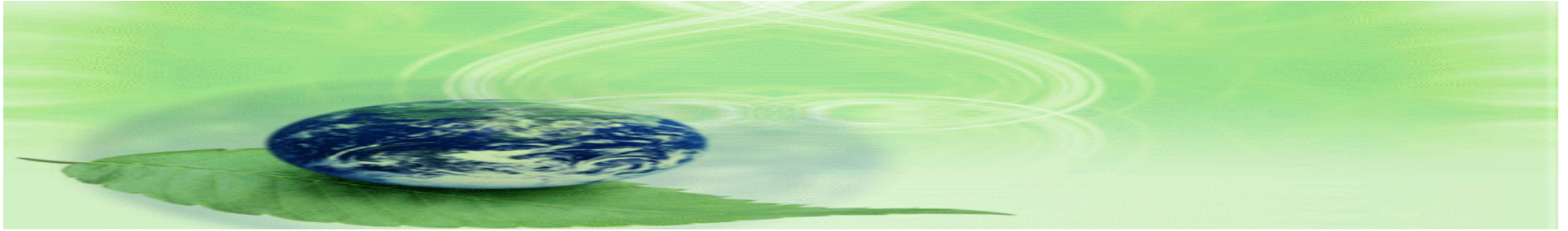
- **Sawing wood with a specific dimension**
- **Use of wood working tools**
- **Wood carving**
- **Framing**





SKILL OR COMPETENCY?





ANSWER

SKILL: MASONRY

COMPETENCIES:

- Use of tools
- Identification of Stones & finishings
- Fitting solar panels

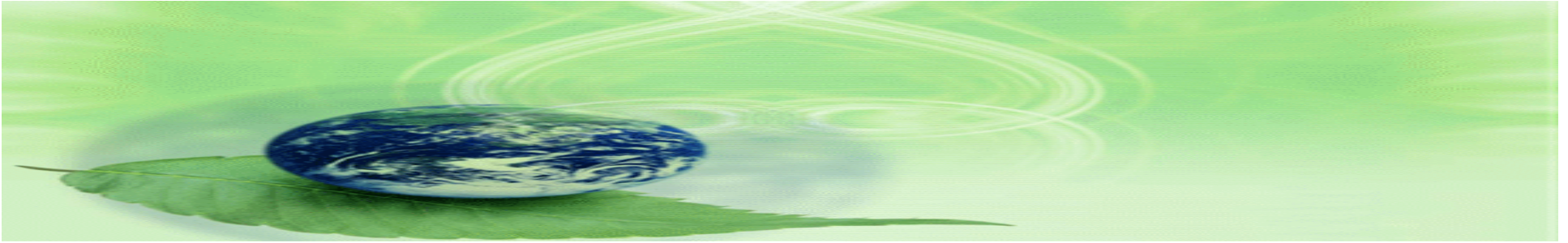




DEFINITIONS

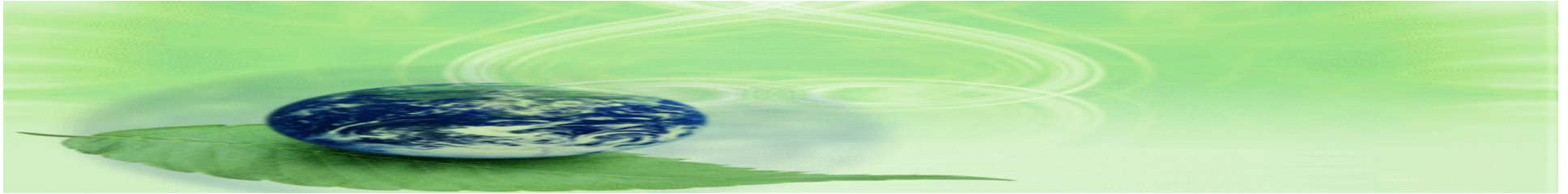
SKILLS

- Incorporates knowledge, qualifications, competencies, abilities. Sometimes understood as ‘the ability to perform tasks and solve problems
- Skills have become increasingly important in determining an individual’s ability to secure a job and retain employment and move flexibly in the labour market.



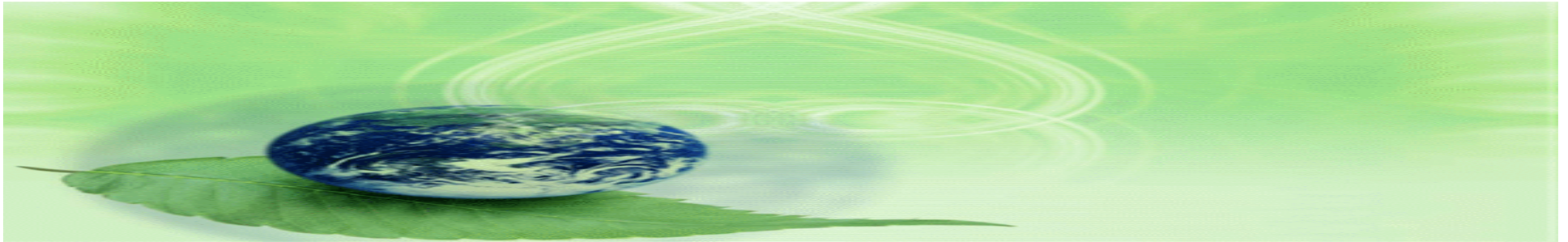
DEFINITIONS

COMPETENCY - ability to **apply** learning outcomes adequately in a defined context like in the *workplace*; doing the required things to the *required standard*



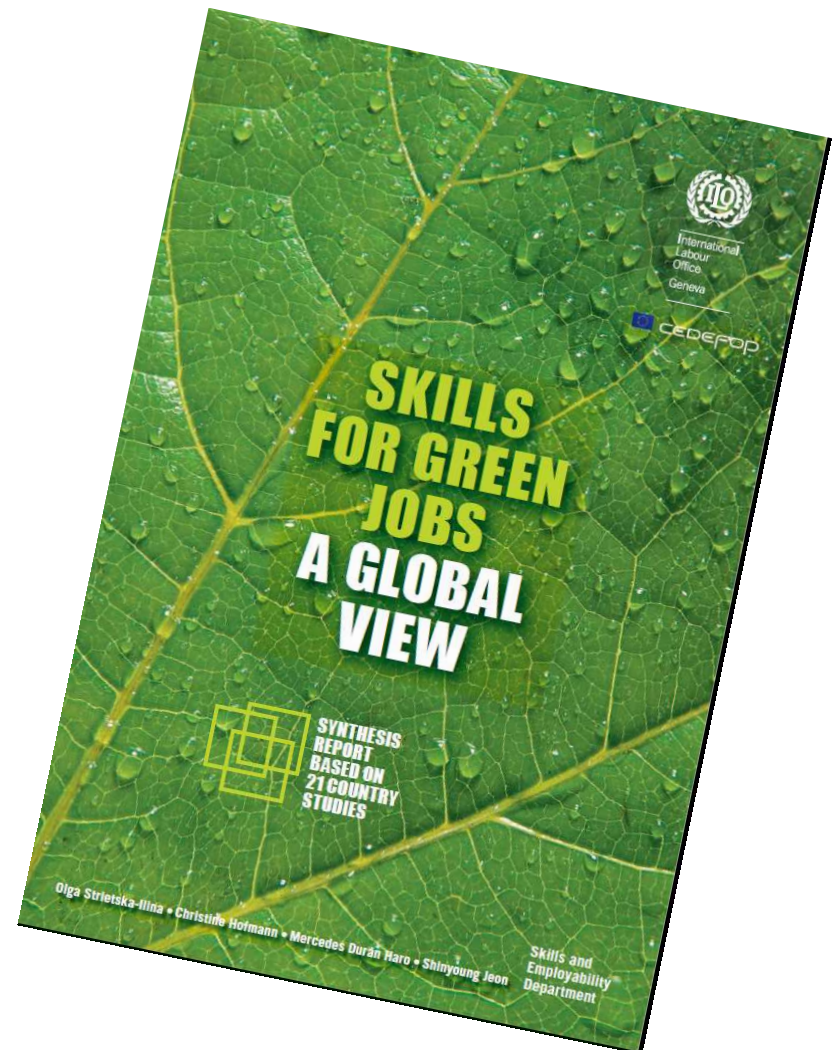
NEED for SKILLS DEVELOPMENT in the CONTEXT of a GREENER ECONOMY

- **Right skills allow for a better transition to a greener economy**
- **Skills shortages hamper transition**
- **Promote just transition ensuring DW**
- **Skills need to be relevant to labour market needs**
- **Policy coherence & institutional coordination for effective governance**



ILO-Cedefop study: Skills for Green Jobs

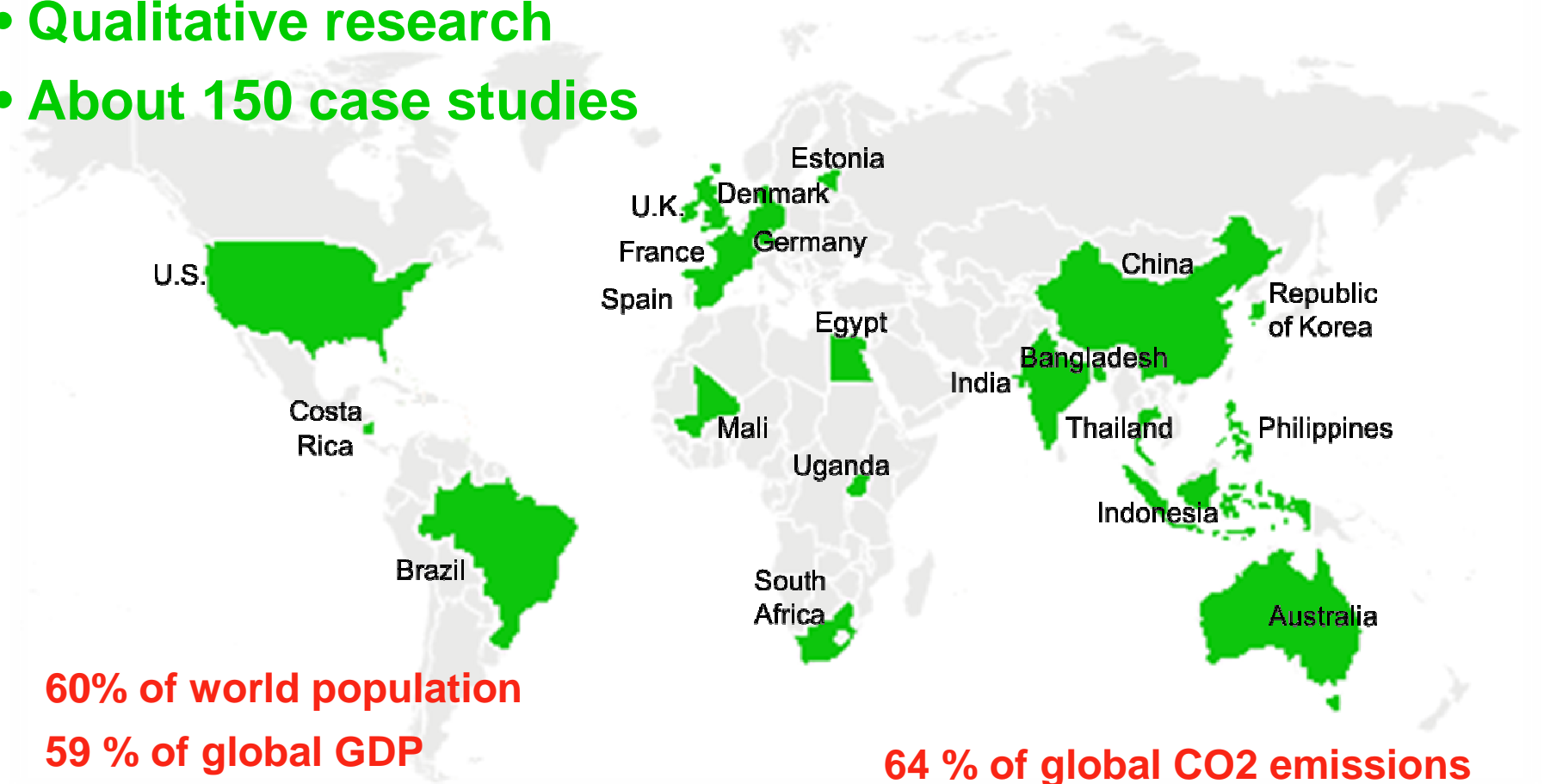
21 country studies
ASIA: China, Bangladesh
India, Indonesia, Korea
Philippines, Thailand

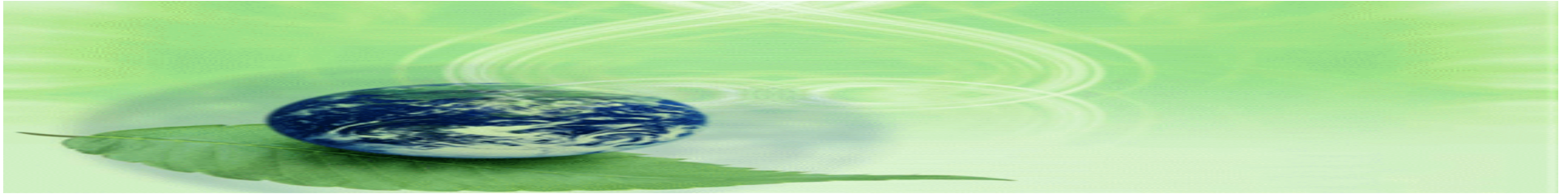


COUNTRY STUDIES

- Partnership with Cedefop
- 21 country studies
- Qualitative research
- About 150 case studies

Started in
early 2009



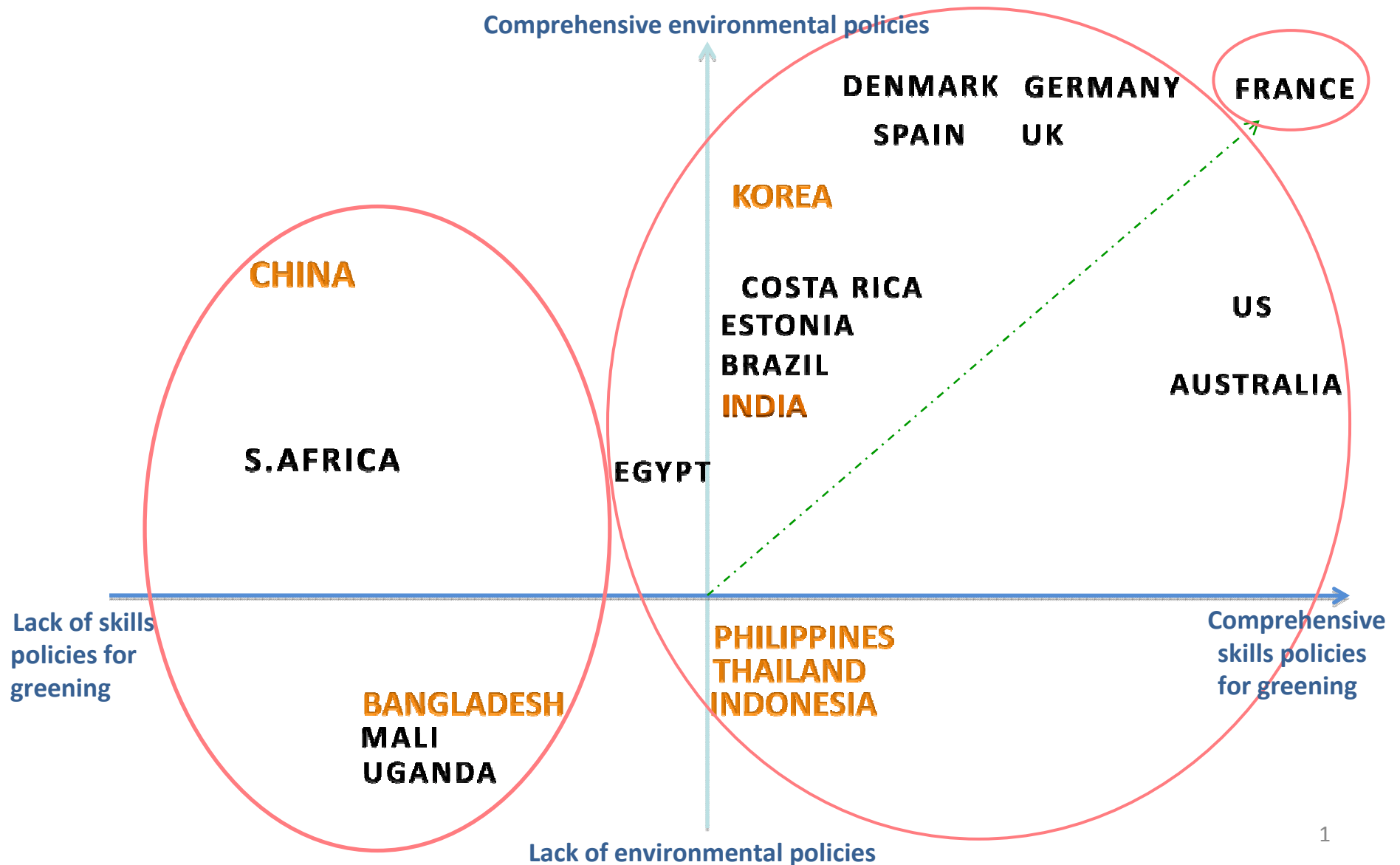


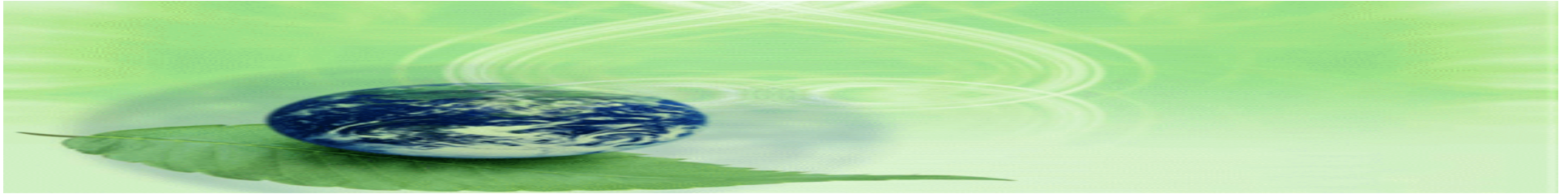
DRIVERS OF CHANGE

- **Changing natural or built environments**
- **Policy & regulation: environmental policies & other policies affecting country's ecological footprint**
- **Technology & innovation**
- **Markets for green industries & consumer habits**



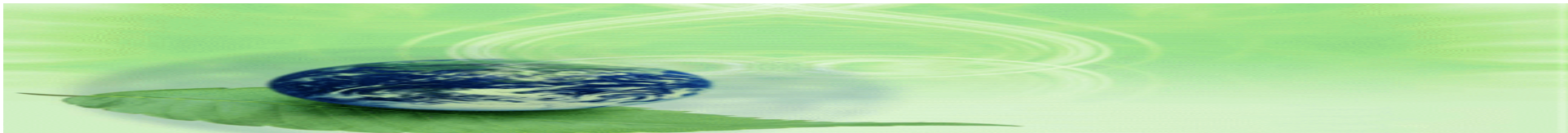
POLICY COHERENCE: Environmental and skills policies





Environmental & skills policies

- Need to integrate skill dev policies & strategies with environmental policies
- National : varied
 - Coordinated policies: comprehensive environmental + comprehensive skills (FRANCE)
 - Comprehensive environmental & fragmented skills policy (UK, DENMARK, KOREA, GERMANY, SPAIN)
 - Fragmented environmental & comprehensive skills (AUSTRALIA, USA)
 - Fragmented environmental & fragmented skills (INDIA, EGYPT, THAILAND, PHILIPPINES)
 - Policies under development: no environment or skill policy (CHINA, INDONESIA, BANGLADESH, SOUTH AFRICA)



GREEN STIMULUS PACKAGE

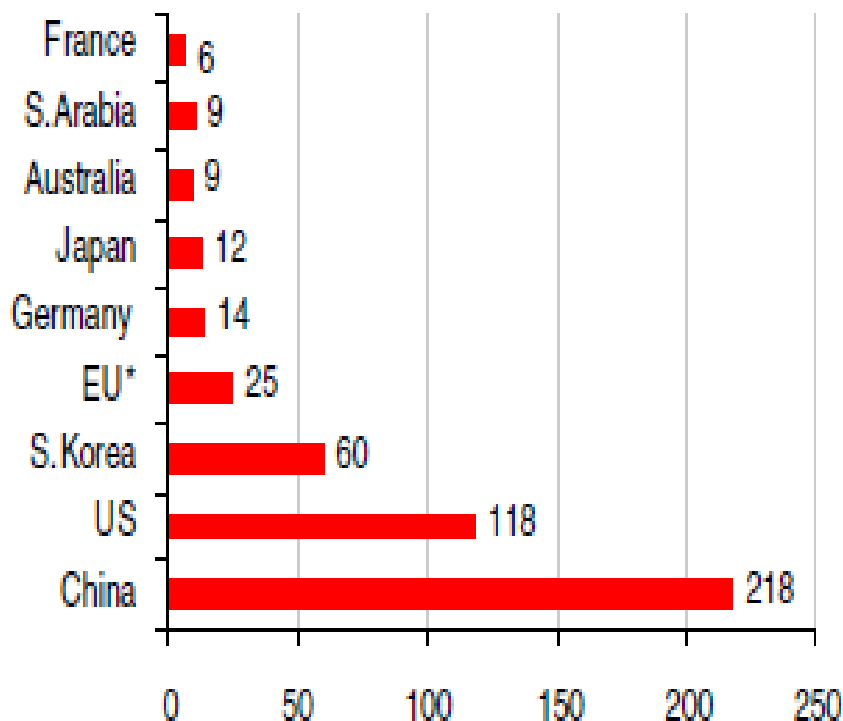
USA: skills measures constitute 0.6%

Switzerland: estimate is 4.6%

USA & CHINA: dominate stimulus package

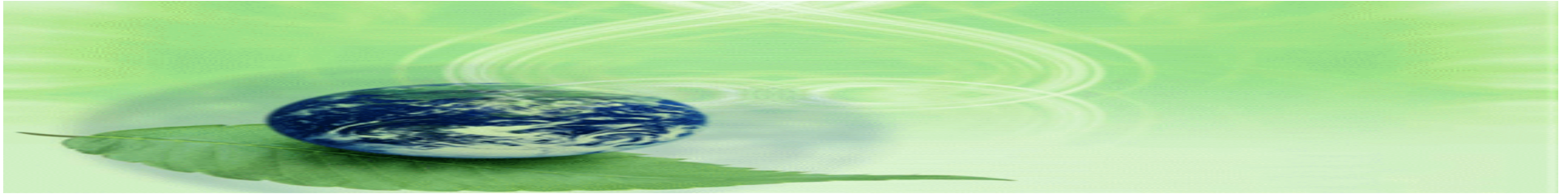
ASIA forefront in spending

Green stimulus ranking (USDbn)



Green stimulus ranking as % of total stimulus





FRANCE: A COMPREHENSIVE POLICY FRAMEWORK

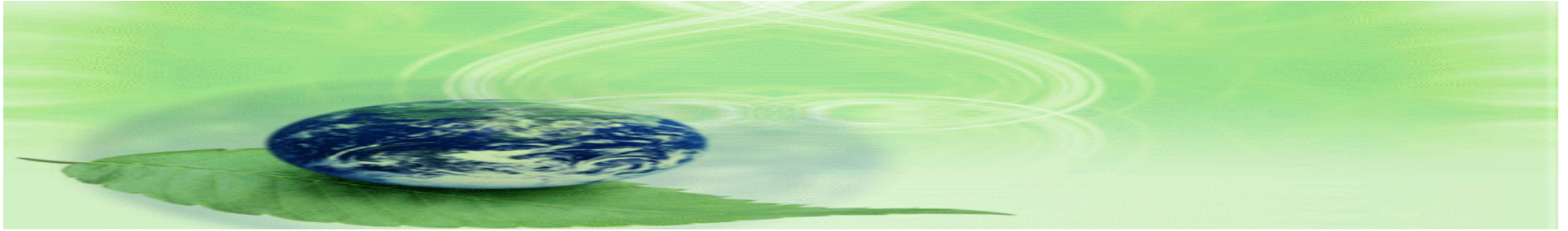
Grenelle de l'Environnement: government, unions, employers, NGOs
& local authorities

Important outcomes:

--National Strategy for Sustainable Development 2009-12 where
training is included

--**Mobilization Plan for Green Jobs—skills dev strategy**

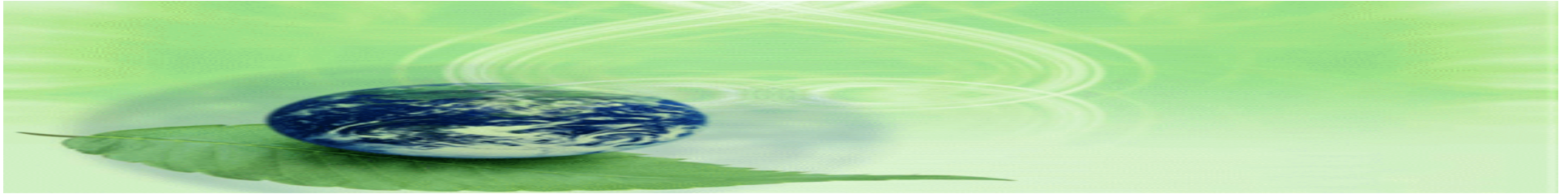
- Collaborative work between stakeholders at all levels
- Objective: Update/create training & qualifications
- Eleven Sectoral Committees: quantitative & qualitative analysis of each sector's skills & training needs
- Next step—adopting necessary measures to ensure that education & training system adequately cover the needs defined



POLICY COHERENCE: ENVIRONMENT & SKILLS POLICIES

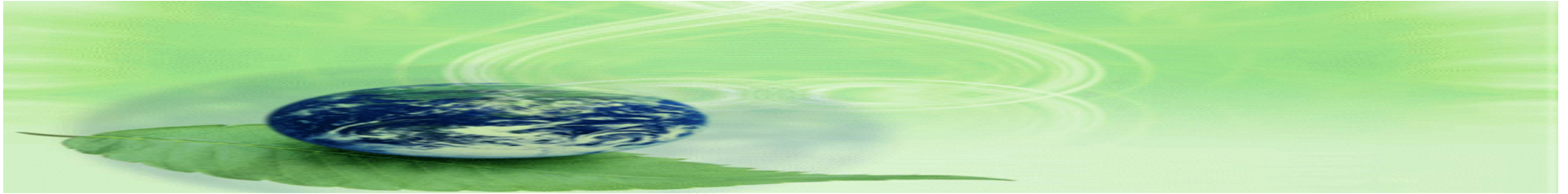
- Lack of enforcement of environmental regulations reduces need for new skills & slows down transitions
- Limited awareness and capacity of policy-makers to integrate skills dimension into policy responses jeopardizes capacity to manage environmental risks
- Weak coordination between and among ministries & other governmental agencies strains effectiveness of policy & implementation

GENERAL: policies to include skills response for greening remain limited to isolated initiatives



POLICY UNDER DEVELOPMENT

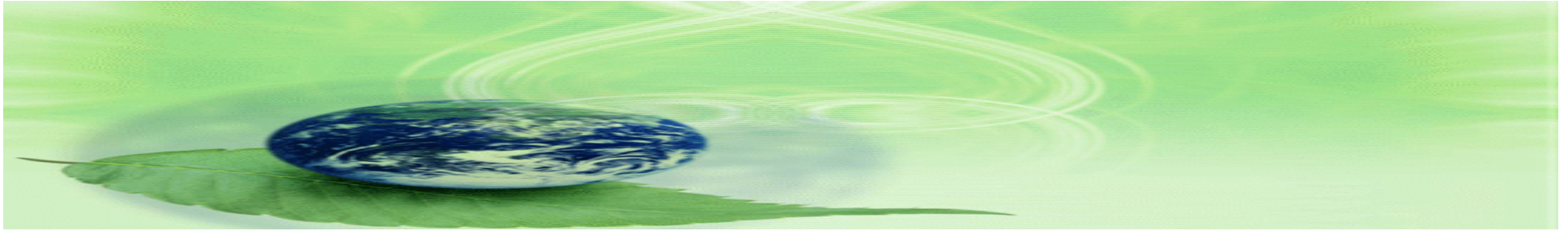
- **Countries benefitted from important initiatives in the field of environment at STRATEGY level**
- **Lacks implementation mechanisms & skills response implementation**
- **Sustainable development : a national strategy**
- **First developing country to issue an Action Plan on Climate Change**
- **Lacks a national skills development strategy for greening the economy**



ASIA GREEN JOBS INDEX

- **Shows conditions needed to create green jobs in 13 Asian countries including availability of skilled labour**
- **Asian Business Council: confirm country groupings**
- **China possesses most favorable conditions overall for green jobs creation---No skills devt strategy for greening was reported**





ASIA GREEN JOBS INDEX

13 countries:

China

Philippines

Japan

Taiwan

India

Malaysia

Korea

Indonesia

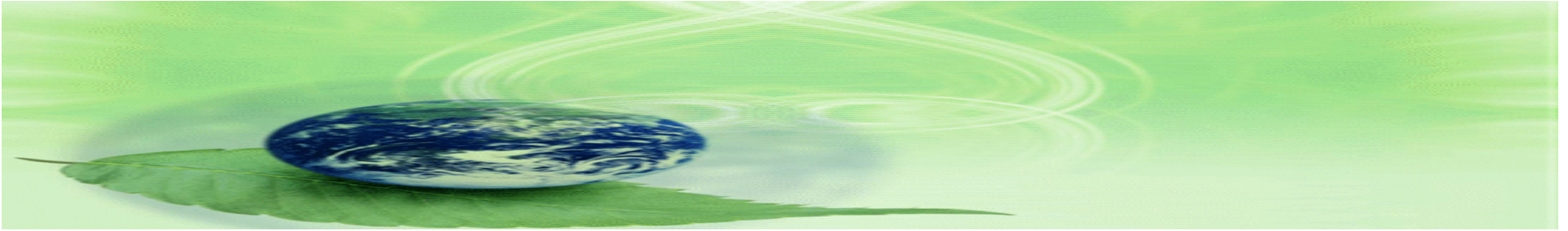
Singapore

Thailand

Hongkong

Viet Nam

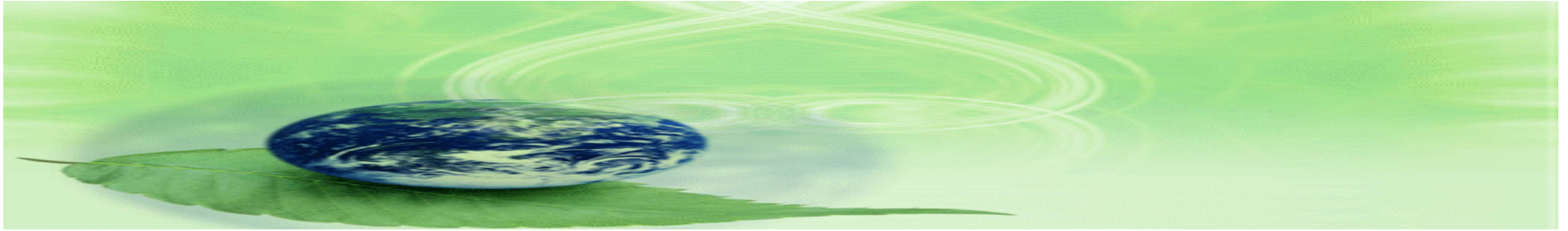
and Saudi Arabia



CHANGING SKILLS NEEDS



- **Green structural changes: affect jobs/job profiles**
- **Quantitative & Qualitative changes in occupations**
- **Degree of skills change determines if occupational change or merge**
- **Skills change in existing occupations by far outnumber new ones**

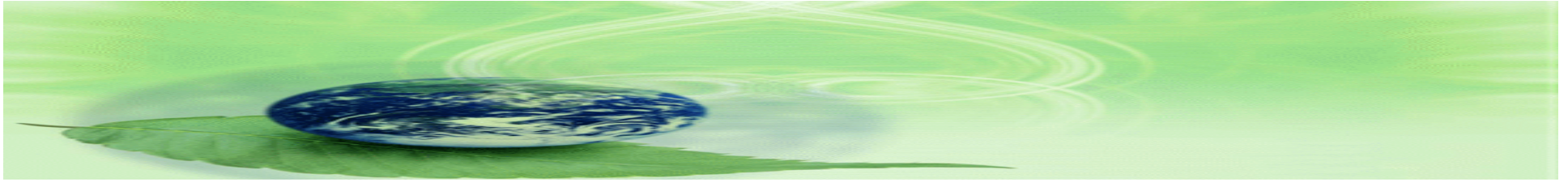


GREEN STRUCTURAL CHANGE

- Additional jobs will be created
- Some employment will be substituted
- Certain jobs may be eliminated without direct replacement
- New jobs created will offset those lost
- Existing jobs will be redefined
- Those who will get green jobs are not necessarily those who lost their jobs
- For socially responsible restructuring temporary or permanent job losses have to be recognized

**Retraining
matters**





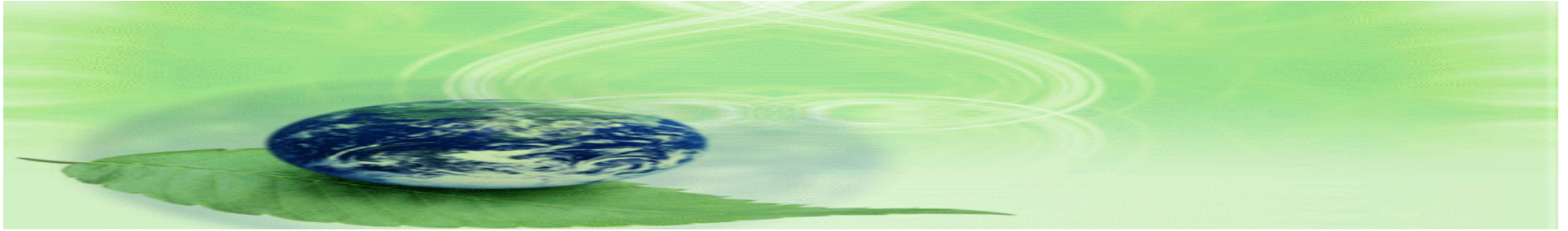
Sectors affected & retraining needs



Agriculture, forestry and fisheries

- Refocused on organic foods
- Production of bio-fuels
- Shifts across sub-sectors food/wood processing

(BANGLADESH, CHINA, INDIA, INDONESIA, KOREA)

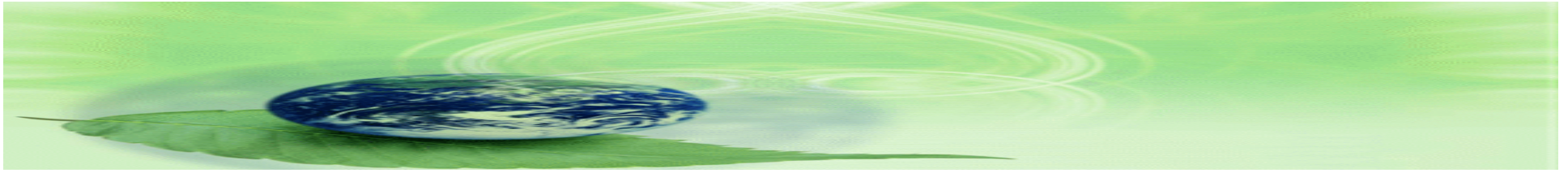


Sectors affected & retraining needs



Extracting industries and fossil-fuel energy generation

- Transition to energy & resource efficiency
- New green technologies
- Clean coal
- Carbon capture & storage (CHINA, INDONESIA, KOREA, PHILIPPINES. THAILAND)

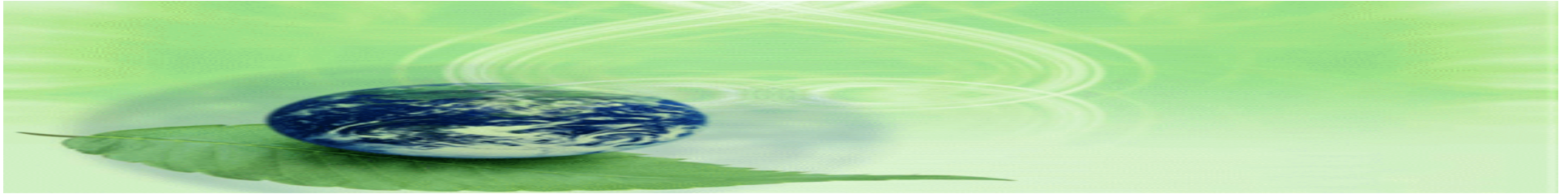


Sectors affected & retraining needs

**Emissions intensive manufacturing,
in particular:**

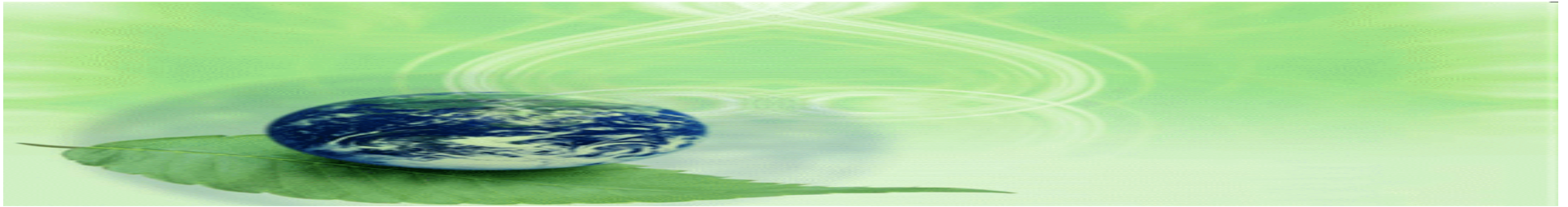
- Automotive sector and related supply chain: eco-friendly vehicles like hybrid, electric, hydrogen
- Ship-building and related marine engineering activities: re-focus on off-shore renewable energy including construction of offshore/onshore wind turbines, tidal wave & tidal energy (CHINA, INDONESIA, PHILIPPINES)





SKILLS SHORTAGES

- Skills shortages **already pose a major barrier to transitions to green economies and green job creation**
 - In certain sectors and occupations
 - Particular core skills
 - Multiskilling requirements
- **Why are there shortages?**
 - Underestimated growth of some sectors, such as for green technologies
 - General lack of scientists and engineers
 - National skill structure which does not meet skills demand
 - Low reputation of sectors – failure to attract trainees



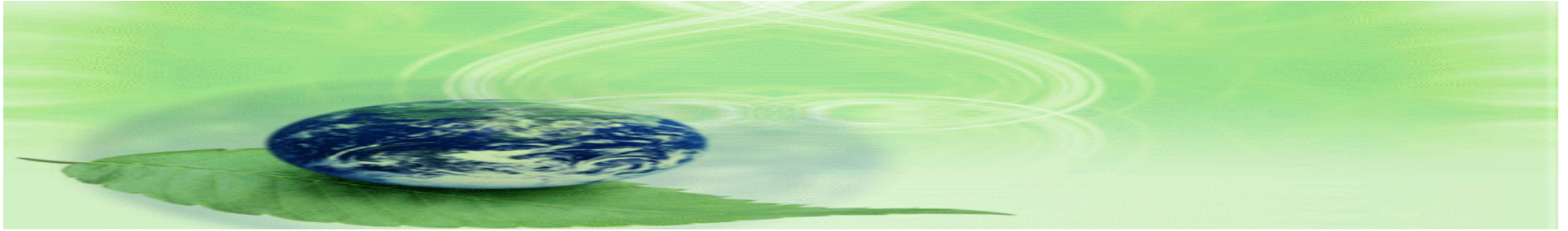
Changing and emerging occupations

Degree of skill change	Occupational change	Typical skills response	Examples
None	None or only quantitative	None or increased training in existing occupation	Bus driver in CNG driven buses; forester
Low	Changing occupation	On-the-job learning or short training courses	Welder in wind turbine production; Organic farmer
Medium	Changing or emerging occupation	Short courses or longer continuous training	Energy consultant in building; car mechanic for electric cars or CNG cars
High	Emerging occupation	Initial training, university degree or longer continuous training	Solar energy technician; eco-designer; biofuels technician



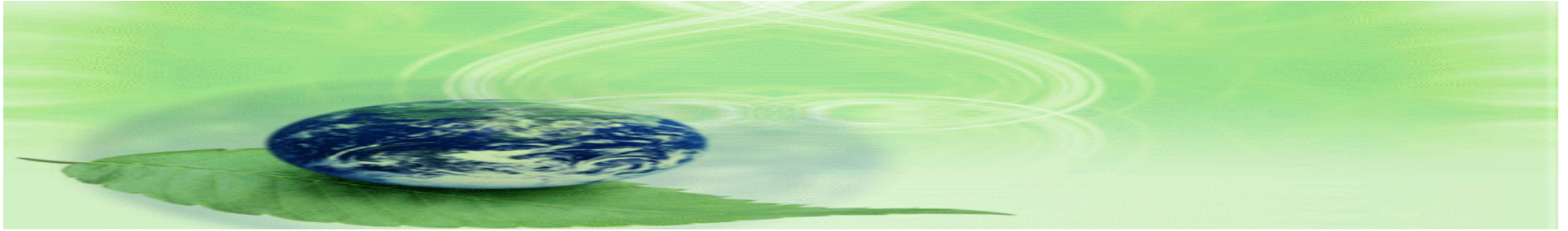
CHANGING SKILLS & OCCUPATIONS

Occupations	Core training	Upskilling	New occupation
Industry electrician/energy technologist	VET qualifications/tertiary engineering qualification	Knowledge of energy sources to integrate energy systems, proj mgt	Manager in Renewable Energy
Industrial operator/industry electrician	VET qualifications/upper secondary	Assembly, installation of parts, use of tools	Wind turbine operator
Plumber/electric & heating installer	Basic vocational training	Tech trng, knowledge of adm procedures, entre'l skills	Solar energy entrepreneur, installation proj designer
Engineer in energy sector	Tertiary eng'g qualifications	Installation & maintenane of low carbon tech	Smart energy expert



OCCUPATIONS & SKILLS CHANGES

- **Quantitative and qualitative changes**
- **Degree of skill change determines if occupations change or merge**
- **Skills change in established occupations by far outnumber new ones**
- **Emerging occupations more often require higher level qualifications**
- **Skill change happening across occupational groups & all levels of qualification**
- **Generic and core skills are equally important**
- **Gender dimension**

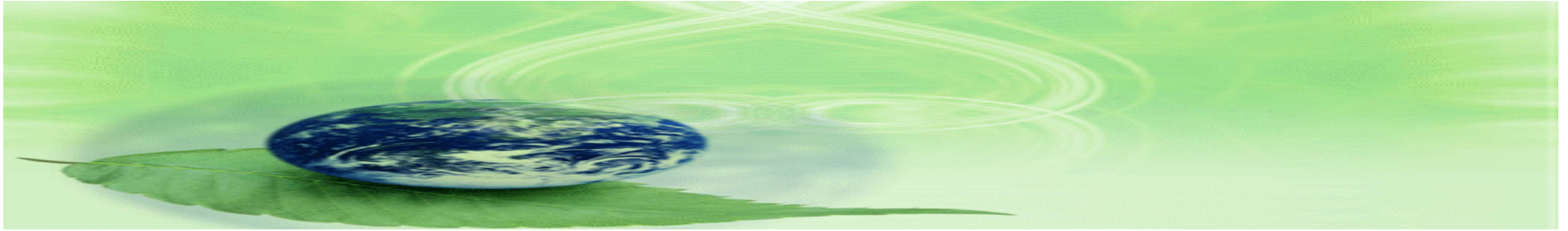


SKILLS RESPONSES & ANTICIPATING SKILLS NEEDS

**Six areas of green skills
investments: CHINA**

- **building retrofitting**
- **mass transit/freight rail**
- **smart grid**
- **wind power**
- **solar power**
- **advanced biofuels**

Representative
jobs
and
occupations



SKILLS RESPONSES & ANTICIPATING SKILLS NEEDS

**Six areas of green skills investments:
CHINA**

Building retrofitting

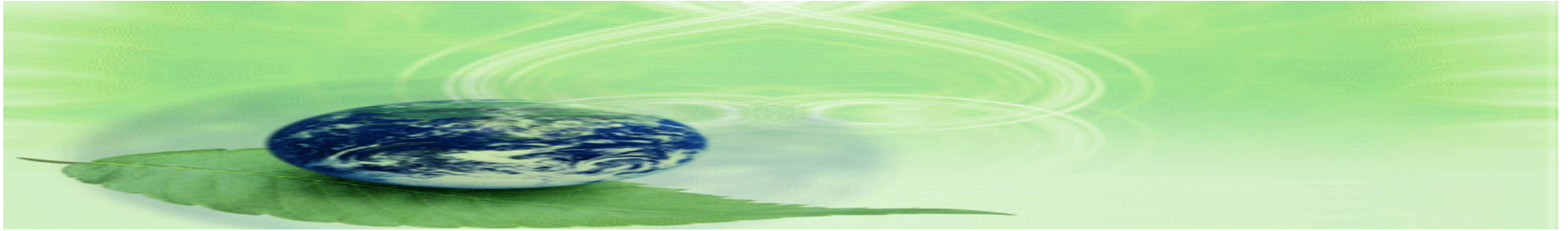
Electricians

Heating/Air conditioner installers

Carpenters

Equipment operators

Industrial truck drivers



SKILLS RESPONSES & ANTICIPATING SKILLS NEEDS

Six areas of green skills investments: CHINA

Mass transit/freight rail

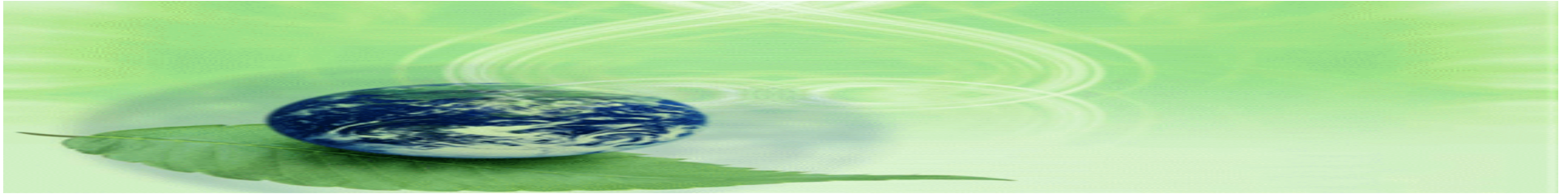
Civil engineers

Rail track layers

Welders

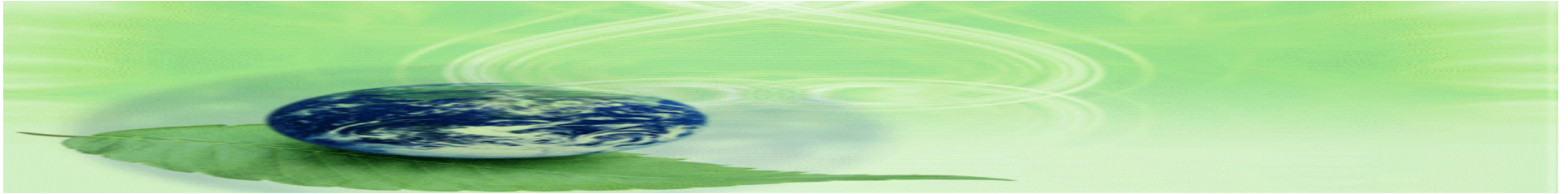
Metal fabricator

Railroad conductors



GENERIC and CORE SKILLS

- Strategic and leadership skills for policy-makers and business executives
- Adaptability and transferability skills,
- Environmental awareness and attitude and willingness to learn about sustainable development;
- Co-ordination, management and business skills;
- Systems and risk analysis skills;
- Entrepreneurial skills;
- Innovation skills;
- Communication and marketing skills;
- Consulting skills to advise consumers;
- Networking, IT and language skills.



NEW OR EMERGING GREEN OCCUPATION (BRAZIL)

Environmental Protection Professionals (public servants)

Responsible for regulation, control, inspection,
licensing, environmental auditing, management,
protection & environmental quality control

Forest & Environmental Engineers (90%), biologists & geographers

Training provided at National Centre of Devt &
Empowerment of HR linked to Brazilian Institute
of Environment & Renewable Natural Resources



New occupations in the green technology industry in the Republic of Korea

- Solar photovoltaic researcher & developer
- Marine bio-energy researcher
- Geothermal system development Engineer
- Wind Power researcher and developer
- Carbon Capture and Storage researcher
- Greenhouse Gas Auditor
- Seawater Desalination researcher
- Advanced water treatment researcher
- LED device engineer
- LED lighting system engineer
- LED Thermal Protection system engineer
- Hybrid Fuel Cell researcher and developer
- Hybrid Power System developer
- Maritime environmental regulation specialist
- Developer of Alternative fuels for ships
- Eco-friendly Ship designer
- U-city (Ubiquitous City) planner
- U-city Infrastructure Operator



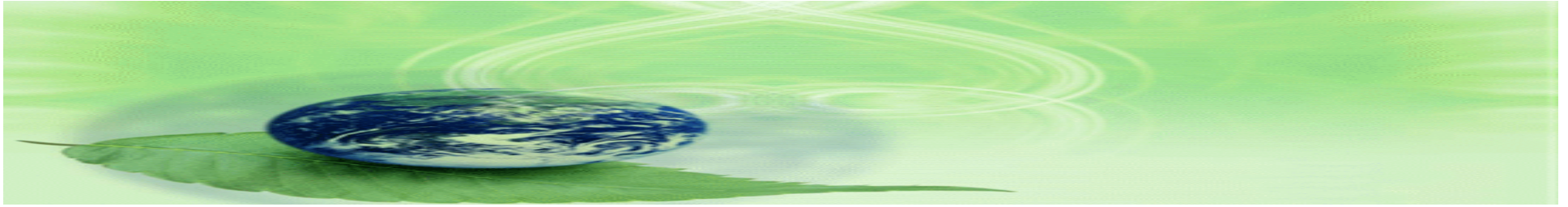
Greening Established Occupations: Indonesia

Climate Field School for farmers (Sekolah Lapang Iklim)

- **Ministry of Agriculture** initiated Climate Field Schools for Farmers (2002). Cooperates with the **Indonesian Meteorology Office**.(2009)
- SLIs use an existing network of field instructors & **pest monitoring officers** of the Ministry of Agriculture that operate through Field Schools for water saving & pest control.
- These **instructors train farmers** on the ground, and since 2002 also include climate related information in their courses.
- SLIs take place once a year before planting season

Course content:

Planting strategies for arid and for irrigated land, calculating water needs, estimate flood probability, understand flood and drought control, etc.

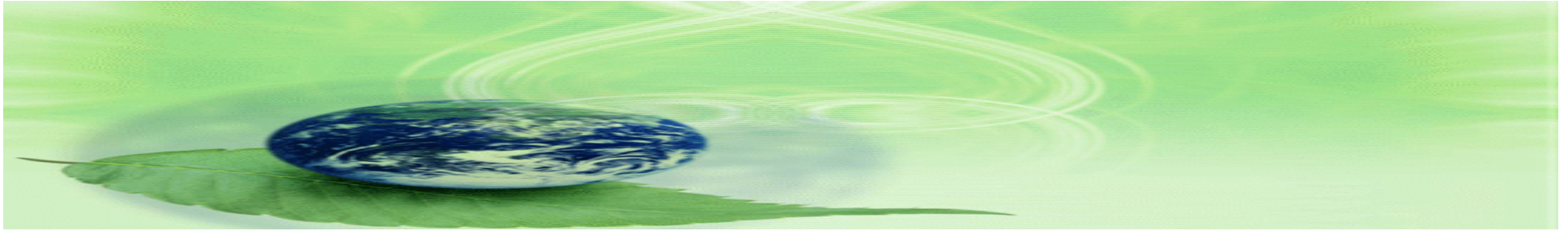


SKILLS RESPONSES FOR GREENER ECONOMIES

- **At different levels: enterprise, industry, government (national, regional, local) by universities, training providers, research institutes, NGOs, international**
- **Inside & outside existing education & training systems**

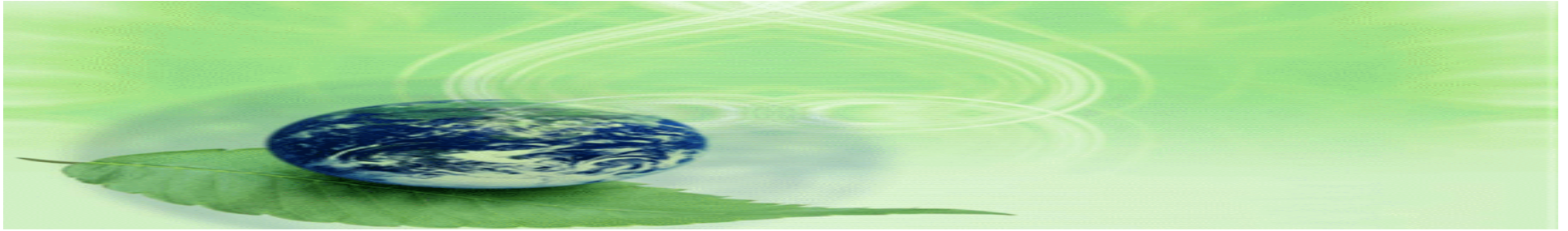
Effectiveness:

- **Targeting responses**
- **Industry level, PPPs, coherent & multi-level responses most effective**
- **Generally stronger compulsory & higher education & working on TVET**



ANTICIPATING SKILL CHANGE

- **On Measurement challenge**
- **Paucity of data on classification & incidence of green jobs**
- **Established LMI & skills identification system useful but not always used green jobs context**
- **Reliance on grass root level research in all countries**
- **Tripartism in identification of qualifications content and competencies is CRUCIAL**
- **More coordination is asked when it comes to skills for green jobs**



SKILLS RESPONSES & ANTICIPATING SKILLS NEEDS: CHINA

- **Construction of basic training system for skills of green jobs**
- **Entrepreneurship training**
- **Improvement of infrastructures for training**
- **Support systems by the government**



SKILLS RESPONSES: PUBLIC-PRIVATE PARTNERSHIPS

Recycling Training Centre in Dhaka - Bangladesh

- Waste Concern Group : **Social Business Enterprise** in waste management sector in Bangladesh. --established Recycling Training Centre at Dhaka with financial support from the **Ministry of Environment** and Forest and UNDP.
- Train local **governmental officials, NGOs & community-based organizations**.
- Courses: community-based **solid waste management & resource recovery**.
- **Trains trainers** to enable farmers to improve composting and utilise produced compost. --training provided through in-house or foreign experts.



SKILLS RESPONSES TO TRAIN SOLAR ENERGY TECHNICIANS

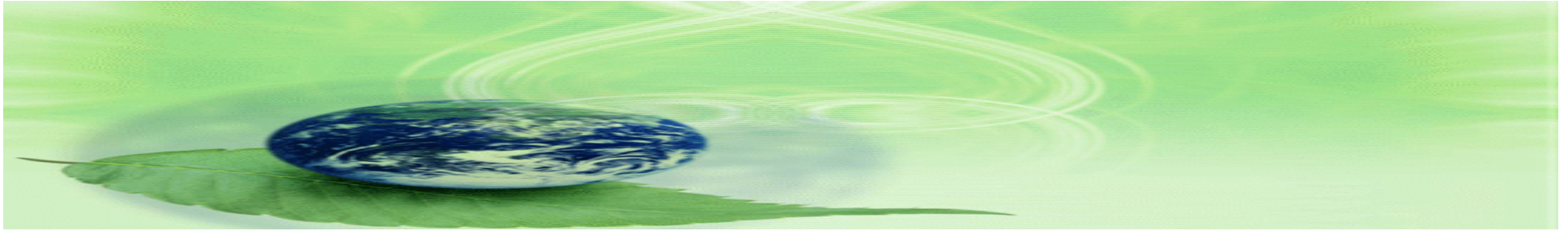
- **India:** Barefoot College provide training in solar technology by promoting the use of **solar equipments**. College has trained **illiterates** building on traditional knowledge and imparting modern skills, and also extended their services to international participants.
- **Bangladesh:** Grameen Shakti, has trained more than 1000 **women technicians** through 20 Grameen Technology Centers to install, maintain and assemble crucial components of the Solar Home Systems. The training provided by this NGO is delivered on the job.

Pilot project by the ILO in Bangladesh aiming to link the training provided by Grameen Shakti to **formal training** centres run by the Bureau of Manpower, Employment and Training. *



SKILLS RESPONSES IN THAILAND

- **Ministry of Agriculture:** provides training for agriculturists on use of **bio fertilizers** to replace chemical fertilizers that emit greenhouse gases.
- **Ministry of Energy:** trains technicians at industry & village level jointly with training instructors in energy management, technology, & end-use systems in companies, buildings and the production process; also constructed an eco-efficient house for training purposes and technology transfer.
- **Ministry of Tourism and Sports** organizes training courses on **eco-tourism** in selected villages; Villagers receive skills to work as tour guide, tour operator, environmentalist, wildlife and environment conservationist, and hotel manager.

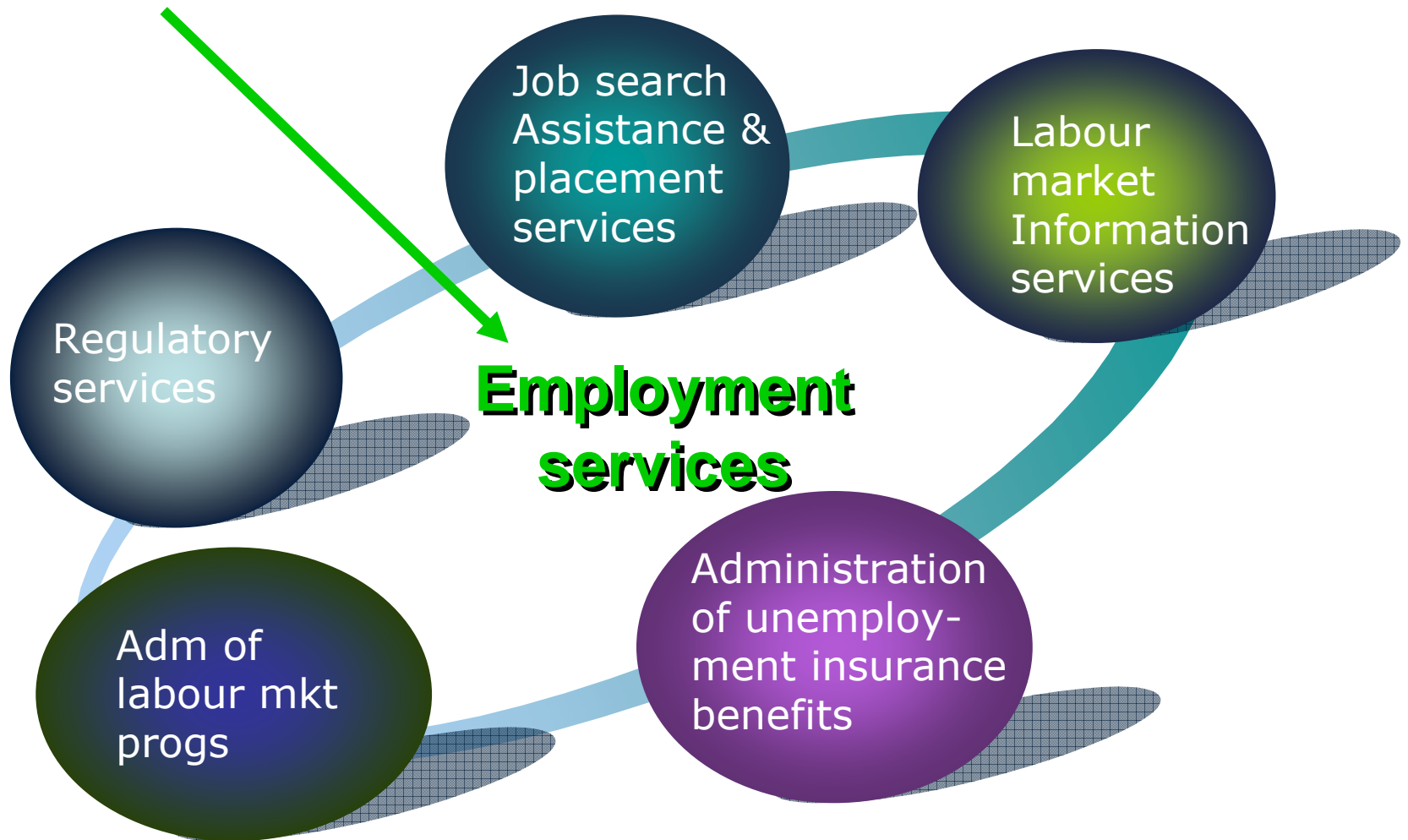


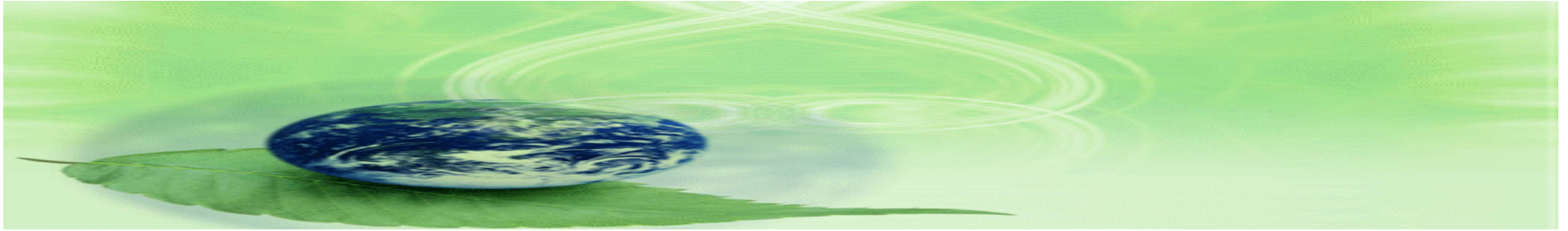
Some General Conclusions

- Green change is happening and skills requirements change too
- Rate depends on degree of effects of environmental degradation, policy, legislation and technology diffusion, as well as the role of market and consumer demand
- Success in response measures depends on policy coherence, targeted measures and coordination among various actors and levels



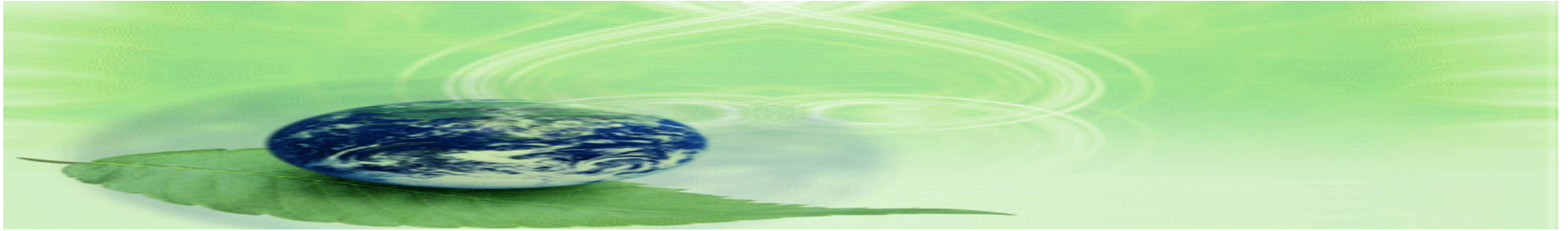
EMPLOYMENT SERVICES





EMPLOYMENT SERVICES RESPONSES

- **Integrated & timely response supported by active labour market measures**
- **Updated labour market information**
- **Active labour exchange mechanism**
- **Training/re-training of job seekers on skills for green jobs**
- **Career guidance & counselling**
- **Assisting enterprises in their restructuring**
- **Social dialogue: shared responsibilities by government, workers and employers**

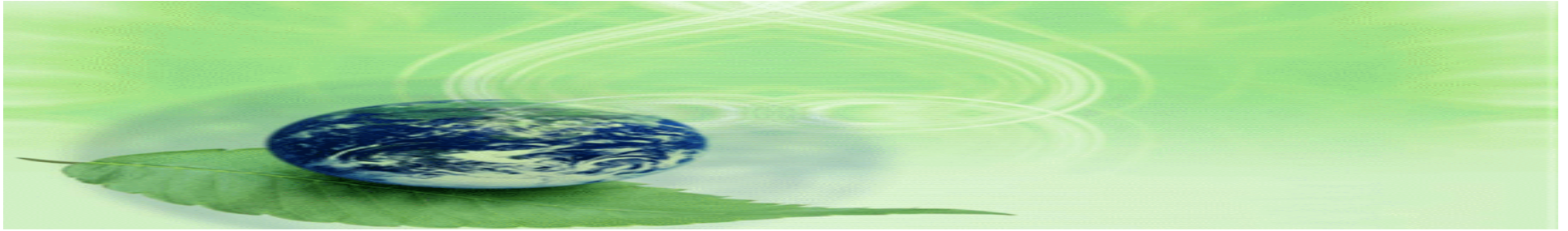


<http://www.ilo.org/skills>

What's new: Skills for Green Jobs

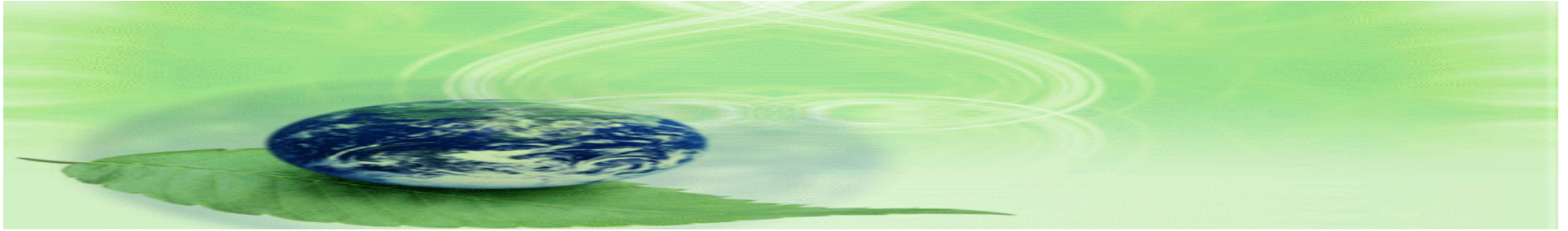


**THANK YOU FOR
YOUR ATTENTION!**



GROUP WORK

- **KEY ISSUES on SKILLS for Green jobs**
- **Areas to work on further**
- **Proposed action after training**



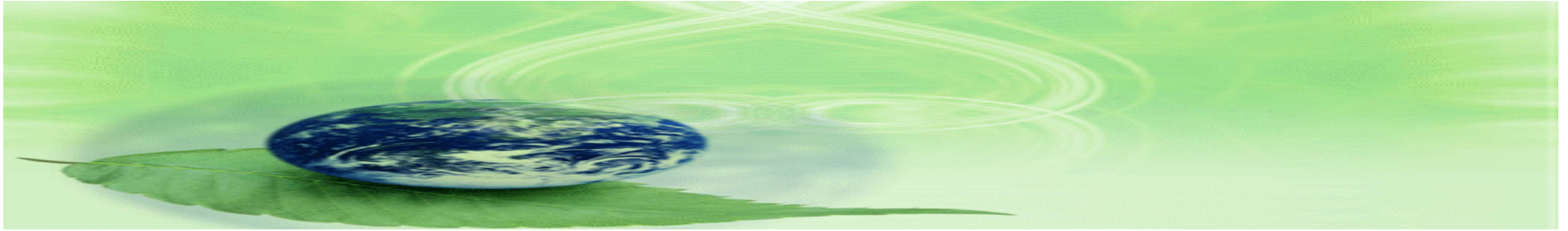
PROPOSED COMPETENCY STANDARDS

Construction

- **Retrofitting roof insulation**
- **Installation of solar energy panels**
- **Waste water system installation –**
- **Waste prevention & minimization**

Environmental awareness and monitoring

- **Environmental awareness – an introduction**
- **Water quality monitoring and testing**
- **Air quality pollution monitoring and testing**
- **Waste prevention & minimization - general**



PROPOSED COMPETENCY STANDARDS

Waste management

- **Waste management safety**
- **Vehicle transport of hazardous materials**
- **Disposal of hazardous materials**
- **Waste collection – sorting**
- **Managing land-fill**
- **Recycling of electrical goods**
- **Recycling of white products**
- **Waste management of motor vehicles**
- **Composting – small scale**
- **Large scale composting**
- **Managing worm farms**
- **Soil decontamination**