Sectoral Approaches on Green Jobs: Developing "Skills for Green Jobs" in the Building Sector

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Outline of Discussion

Developing Skills for Green Jobs in the Building Sector (Developing Skills for Green Building)

1 Relevance of Green Building

1.1 Drivers and Barriers

2 Potential for Job Creation

2.1 Policy Levers

3 Occupations and Skills

Developing Skills for Green Jobs in the Building Sector

1 Relevance of Green Building

1.1 Drivers and Barriers

The Building Sector

Domestic Buildings	Non-Domestic Buildings
Detached houses	Wholesale trade
Attached dwellings	Retail
Buildings containing two or more sole occupancy units	Accommodation, cafes and restraints
	Communication services
	Finance and insurance
	Property and business services Government administration and defence
	Education
	Health and community services
	Cultural and recreational services
	Personal and other services

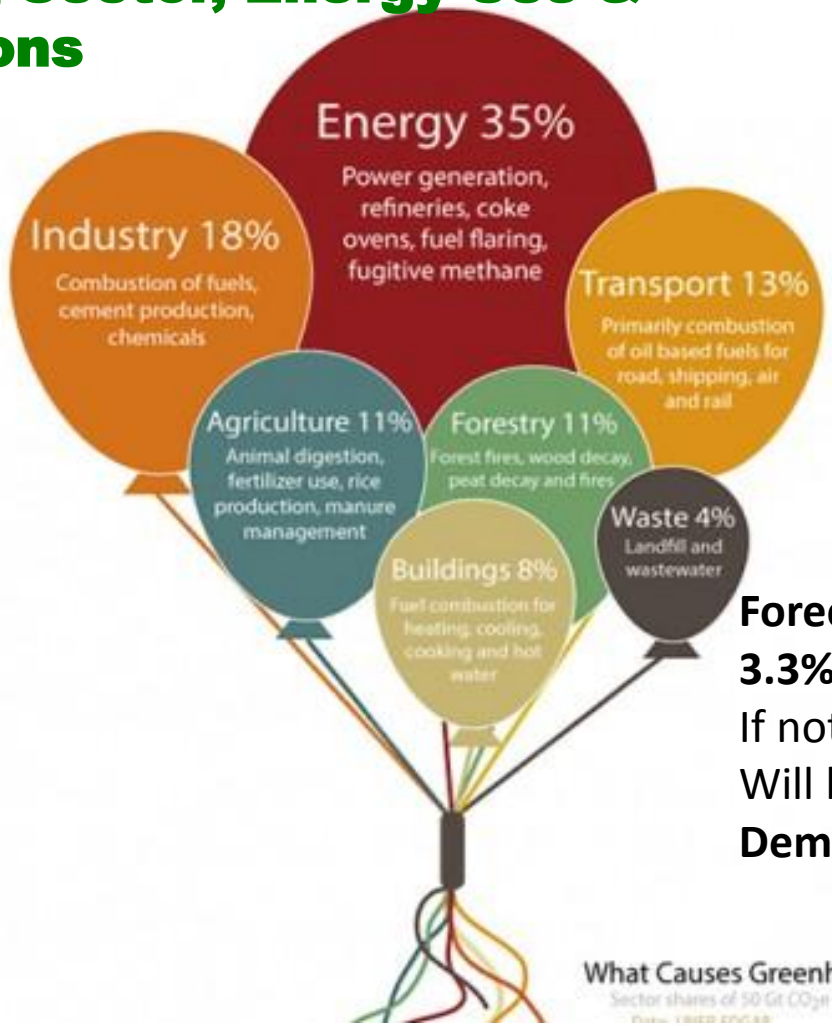
Data source: CIE 2007

The Building Sector, Energy Use & GHG Emissions

2010
50 gigatons of GHGs emitted

↑ In anthropogenic GHGs-> Energy, Industry, Transport (population & economic growth main drivers)

Buildings
~1/3 of all energy-related CO2 emissions

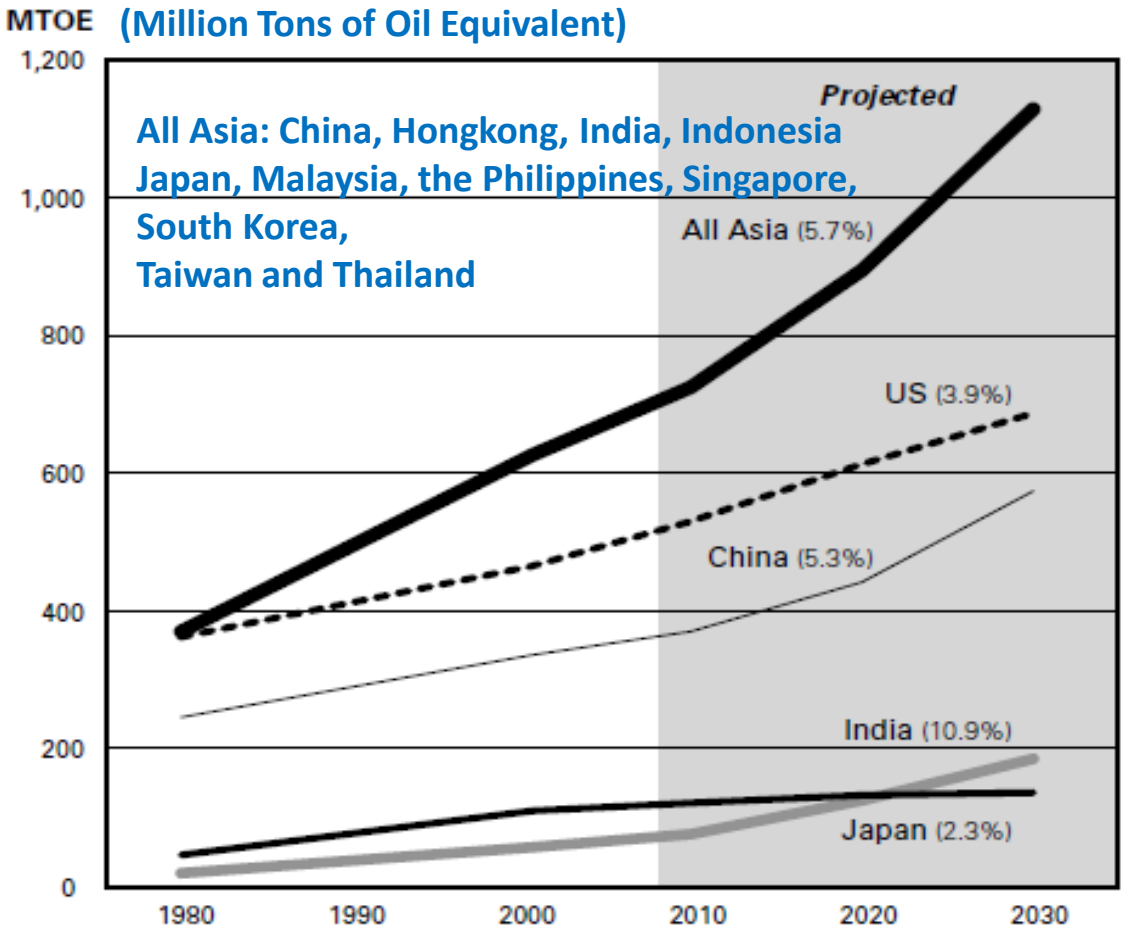


2007
Buildings=
1/4 Asia total energy consumption

↑ 1971-2004
260% total energy consumption in buildings

Forecasted annual growth 3.3% until 2030
If not stopped
Will be **30% of Total Energy Final Demand** (Asia) by **2020**

Projected Final Energy Consumption of Buildings: 1980-2030



Energy Use:

Residential:
-Approx 2/3 for heating or cooling
Inc. water heating
(¼ in commercial bldgs)

Commercial:
More varied use/ little hard info
-Heating and cooling
-¼ Lighting
(only 4-6% in residential)

Reducing GHG Emissions

30-35% by 2050 on an economic basis

GHG Emissions reduction in domestic buildings:

- substitution towards energy efficient lighting
- Substitution towards more efficient refrigeration
- Adoption of appliances with a low standby energy use
- Introduction of more efficient heating & cooling

GHG Emissions reduction in non-domestic buildings:

- Improving air conditioning systems
- Use of more efficient office appliances
- Better insulation and improved heating and ventilation
- The use of efficient light fixtures;
- Upgrading to more efficient water heating systems

For each ton of CO2 e-abated:

US$133 saved
Domestic/Residential building

US$144 saved
Non-domestic/Commercial buildings

Drivers of Green Building ...in addition to the need to lower CO2 emissions from buildings:

- -energy prices and energy security
- -environmental awareness among individuals
- -broader issues of sustainability including the need to conserve water and overall environmental impact
- -ecological sanitation
- -population growth, urbanization and improving living standards
- -comfort
- -quality of existing stock of buildings
- -employment creation in the economic crisis

The Skills for Green Jobs in Building Sector (Skills for Green Building)

While much of literature focus on skills to reduce energy use (dependent on climate and current equipment) , green building covers activities

1. reducing energy and water needs in use of domestic and non-domestic (commercial buildings)
2. reducing environmental impact of sourcing and manufacture of materials and components from which buildings are built as well as the negative impacts of the processes of construction including demolition and its potential for reuse and recycling of materials
3. improving health and comfort of the occupants once the building is built.

The Building Sector

Every year >50% of new buildings are built in Asia!

China: 40 Billion sq.m. floor area (2005)
+2 Billion sq.m./year = ½ of global trend

India: grown 2x from 2000 to 2005

COMMERCIAL BUILDINGS
Wholesale trade
Retail
Accommodation, cafes and restraints
Communication services
Finance and insurance
Property and business services Government administration and defence
Education
Health and community services
Cultural and recreational services
Personal and other services

Mostly modern design features:
Glass Facades
Centralized Heating/Cooling

Some Use of Energy Efficient Components
Intelligent Lighting

In general, yet few take
design & technology options for energy & material efficiency

Barriers to uptake of Green Building (Energy efficiency Uptake)

Category	Definition	Barriers
Financial & Cost Benefit	Ratio of investment cost to value of energy savings	• Upfront equipment cost • Deficient financing opportunities • Energy Subsidies • Marginal Costs (environment/health not internalized in price
Hidden cost-benefit/transaction cost	(Real/Perceived) Costs or risks associated to change not captured in standard CBA	• Possible cost/risks associated with incompatibility, performance and other transaction costs • Obsolescence- cost/risk of not changing • Change in consumption pattern • New legislation

Barriers
…continued

Category	Definition	Barriers
Market Imperfection	Market structures and constraints which prevent the consistent trade-off between energy-efficient investment and the societal energy-savings benefits	• Principal agent dilemma • Fragmented market structure • Regulatory failures • Imperfect information
Behaviour	Behavioural characteristics of individuals and organizations	• Business as usual behaviour/lifestyle • Lack of awareness • Corruption

Source: Carbon Trust 2005 and Levine, Urge-Vorsatz et al (2007)

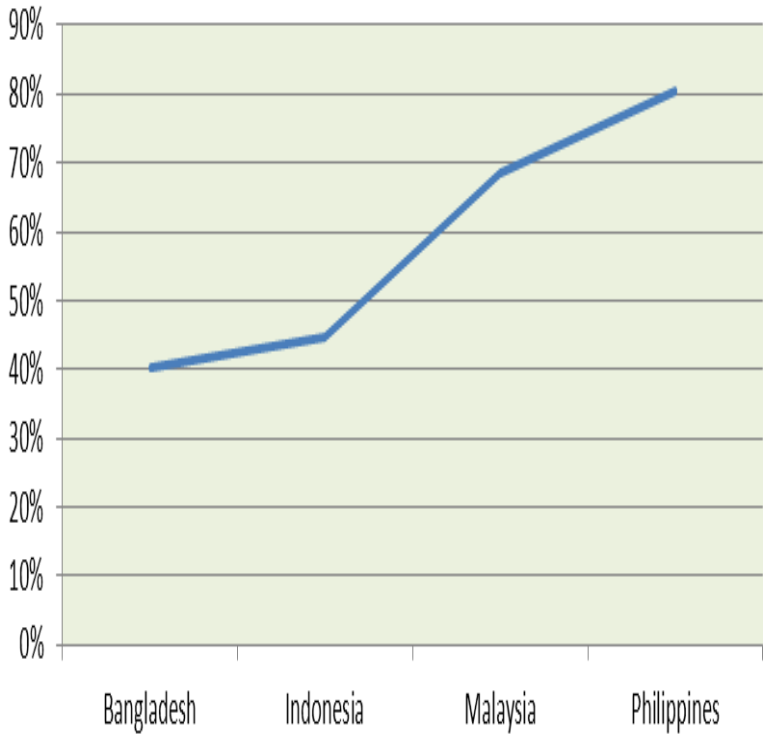
Developing Skills for Green Jobs in the Building Sector

2 Potential for Job Creation

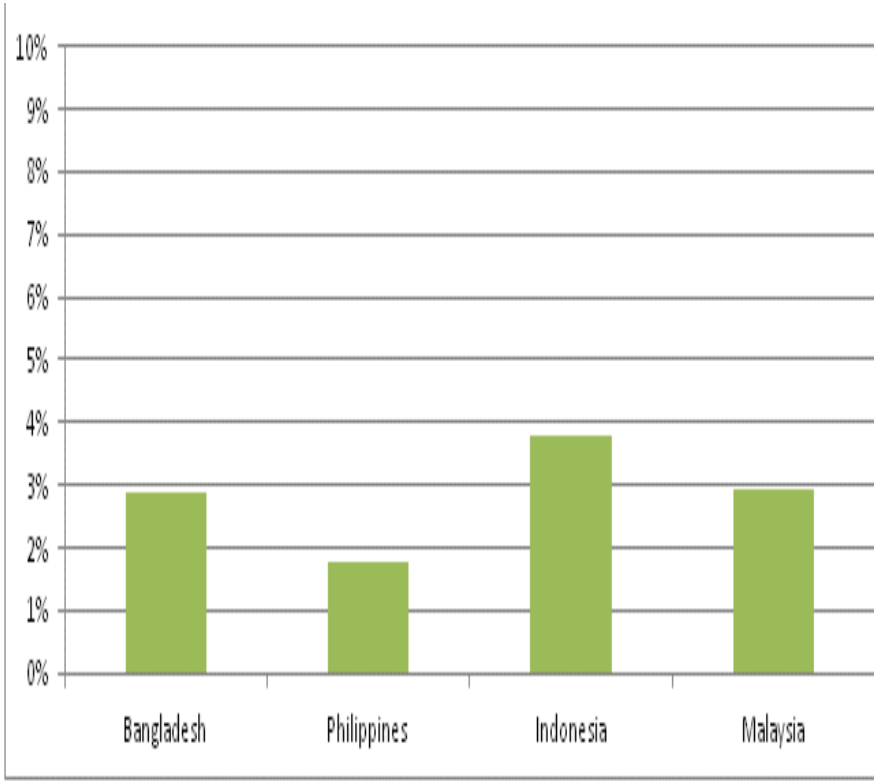
2.1 Policy Levers

Green Jobs already exist at varying % per country

Share of Green Jobs of the total Core Environment-related Workforce



Share of direct Green Jobs in the total Labour Force

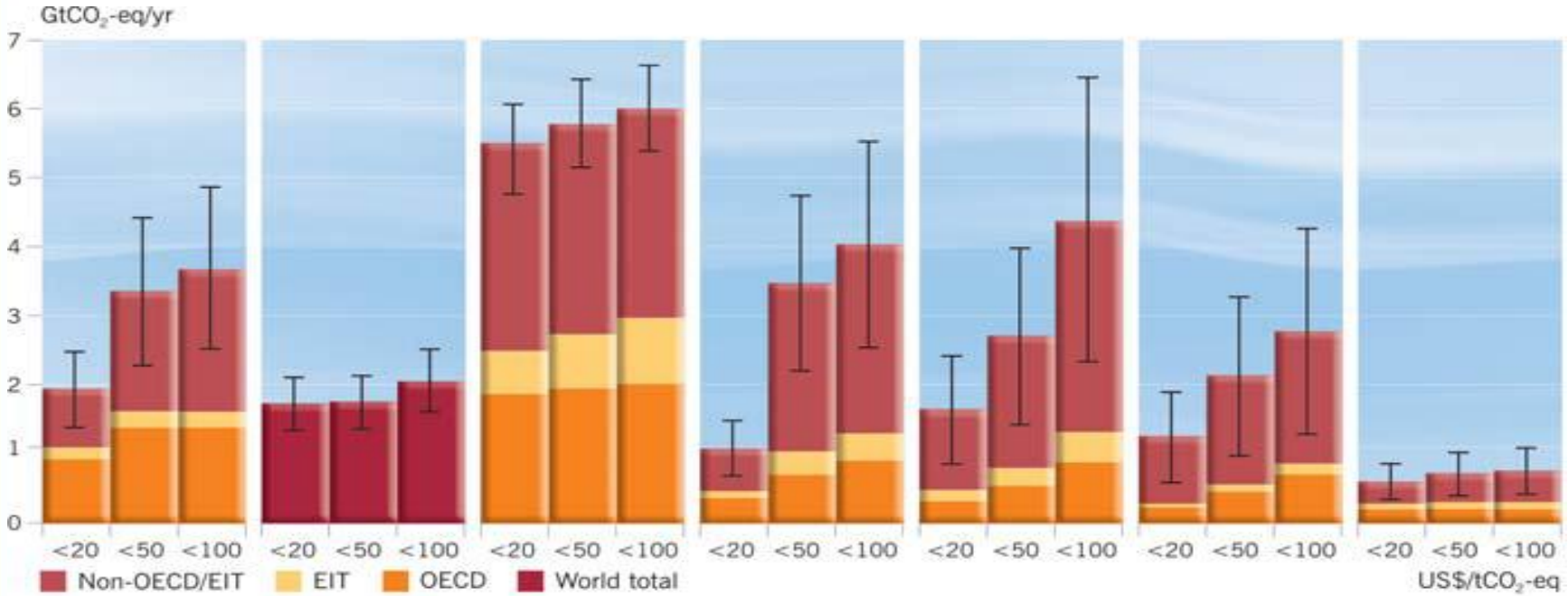


Source: ILO-ROAP Scoping studies 2010-2012

Key sectors for Green Jobs creation in Asia & the Pacific

- Agriculture, Fisheries, Forestry
- Transport
- **Buildings/Construction**
- Recycling, Waste Management
- Water Management
- Tourism,
- Finance and Enabling activities [Education Enforcement]

Key sectors are Country-Specific
-need for proper identification (research & piloting)



ENERGY SUPPLY	TRANSPORT	BUILDINGS	INDUSTRY	AGRICULTURE	FORESTRY	WASTE
(potential at <US$100/ tCO_2-eq: 2.4 - 4.7 Gt Co_2-eq/yr)	(potential at <US$100/ tCO_2-eq: 1.6 - 2.5 Gt Co_2-eq/yr)	(potential at <US$100/ tCO_2-eq: 5.3 - 6.7 Gt Co_2-eq/yr)	(potential at <US$100/ tCO_2-eq: 2.5 - 5.5 Gt Co_2-eq/yr)	(potential at <US$100/ tCO_2-eq: 2.3 - 6.4 Gt Co_2-eq/yr)	(potential at <US$100/ tCO_2-eq: 1.3 - 4.2 Gt Co_2-eq/yr)	(potential at <US$100/ tCO_2-eq: 0.4 - 1 Gt Co_2-eq/yr)

Source: IPCC

Green Jobs in Building Sector
Jobs in Green Building

Direct & Indirect

(within & beyond construction and maintenance)

Value Chain linkages

1. **reducing energy and water needs in use of domestic and non-domestic (commercial buildings)**
2. **reducing environmental impact of sourcing and manufacture of materials and components from which buildings are built as well as the negative impacts of the processes of construction including demolition and its potential for reuse and recycling of materials**
3. **improving health and comfort of the occupants once the building is built.**

Green Jobs in Building Sector
Jobs in Green Building

Value Chain linkages

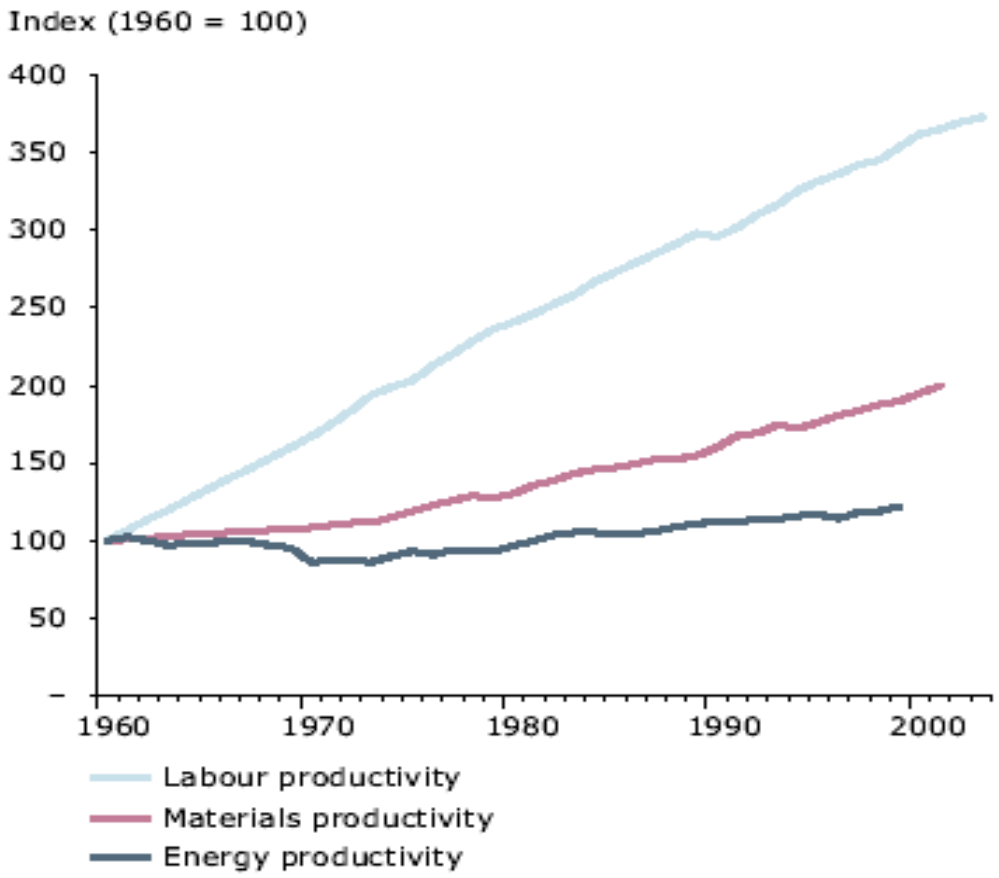
Entry Points for Manufacturing

Entry Points for Services

Entry Points for Entrepreneurship

- Policy Making
- Education and Research
- Green Building Controls
- Green Building Clients
- Conceiving & Planning Financing
- Construction, Installation & Maintenance
- Production & distribution of Product & Materials

Labour, Material, Energy Productivity 1960-2002



Labour productivity
>270 % over the past four Decades

In the same period:
Productivity of
raw materials (by 100%)
and energy (by 20%)
increased by
much less

However, in magnitude,
it is the greening of existing jobs and processes that will matter most

(Example from EU 15)

Green Jobs in Renewable Energy and Energy Efficiency

	Job intensity	Long-Term cost reduction	CO_2 reduction	Security of supply
Building Refurbishment	**High**	Moderate	**High**	Moderate
Switch to Cleaner Cars	Moderate	Moderate	Moderate	**High**
Wind/Solar Energy	**High**	**High**	Moderate	Moderate
Battery Development	Moderate	**High**	**High**	**High**
Clean Energy R&D	Moderate	**High**	Moderate	Moderate
Carbon Capture & Storage (CCS)	Low	Moderate	**High**	Moderate

Source: IEA, 2009

The Policy Levers for Green Building

Promoting uptake of green building in addition to the drivers and responding to the critical barriers

1. **control and regulatory type of instruments**
2. **fiscal and financial incentives and instruments**
3. **market-based instruments**
4. **information and opportunity creation**

Policy Levers for Green Building

1 control and regulatory type of instruments

- **Building codes and building regulations [e.g** European Directive on Energy Performance of Buildings; India: Voluntary Energy Conservation Building Code 2007**]**
- **Mandatory building labelling/Certification [e.g** Australian Building Energy Efficiency Certificate; Singapore Water/AirCon Efficiency Labelling**]**
- **Appliance and other standards [water, waste, acoustics/noise;** Republic of Korea- strengthened Standards for Windows Insulation Efficiency by 2012**]**

Policy Levers for Green Building

2 Fiscal and financial incentives

- **Subsidies and Tax reductions [e.g for** insulation; for use of renewable energy, for materials when retrofitting buildings (Italy**)]**
- **Energy and Carbon Tax**
- **Financing [**preferential/soft loans; Japan's Eco-Point- gift certificate or prepaid card for EE appliance purchase**]**

Policy Levers for Green Building

3 Market-based instruments: EE Obligations & Certificate Trading Schemes

- White Certificates/Carbon Trading
- Kyoto Protocol Flexible Mechanisms

4 Information and Opportunity creation

- Increasing information and confidence
- Public procurement
- Research and development

Energy Advisory Services for building professionals

Independent Quality Assurance Services

Voluntary Labelling

Developing Skills for Green Jobs in the Building Sector

3 Occupations and Skills

Core Occupations in Green Building

- Conceiving, planning, designing and advising
- Construction, installations, maintenance
- Controlling
- Enabling
- Manufacturing and Distribution
- Green Building Clients

Core Occupations in Green Building

- **Conceiving, planning, designing and advising**

Examples:
Construction Company Managers
Architects/Structural & Environmental Engineers
Architectural Technicians
HVAC, Electrical/Mechanical Engineer
Surveyors
Consultants, Advisers

- **Construction, Installation, Maintenance**

Examples:
Bricklayers, Carpenters, Plasterers
Plumbers & Heating Installers
Electricians & Energy Systems Installers
Installers of wood pellets & other biomass heating systems
Heat pump installers
Installers/maintenance of solar photovoltaics

- **Controlling**

Examples: Energy Auditors, Inspectors, Certifiers

Core Occupations in Green Building

- **Enabling**

Examples:
Policy Makers
Urban Planners
Financing
Education and Information providers
Researchers

- **Green Building Clients**

Examples:
Developers
Energy Managers, Facilities/Building Managers
Procurement officers
Household (Managers)

- **Manufacturing & Distribution**

Examples: Manufacturers and distributors of green products & materials, IT Systems Technicians

Other Skills Development Needs

Specific Technical Skills

From research to manufacturing to management!

- **Green procurement**
- **Energy Management**
- **Assessment of works against planning requirements**
- **Assuring correct installation as per specific technology**
- **Waste Management and recycling**

Other Skills Development Needs

Core Skills for employability

- Capability to adapt to Change
- Environmental awareness
- Interdisciplinary skills
- Teamworking, coordination and leadership
- Interpersonal skills and negotiation
- Problem solving and critical thinking
- Business and marketing
- Foreign Languages

Skills Response for Occupations in Green Building

- University degree (higher education to specialized masters courses)
- Continuing professional development
- Training for policy makers, teachers, researchers
- Adaptation/New TVET courses
- In company training and apprenticeships
- Entry level training

Thank you!

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