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

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

*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

(Million Tons of Oil Equivalent)

All Asia: China, Hongkong, India, Indonesia, Japan, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand

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

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)

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

...continued

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

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)

<table>
<thead>
<tr>
<th>Key Sector</th>
<th>Potential CO₂-Eq (Gt CO₂-eq/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Supply</td>
<td>(potential at &lt;US$100/tCO₂-eq: 2.4 - 4.7)</td>
</tr>
<tr>
<td>Transport</td>
<td>(potential at &lt;US$100/tCO₂-eq: 1.6 - 2.5)</td>
</tr>
<tr>
<td>Buildings</td>
<td>(potential at &lt;US$100/tCO₂-eq: 5.3 - 6.7)</td>
</tr>
<tr>
<td>Industry</td>
<td>(potential at &lt;US$100/tCO₂-eq: 2.5 - 5.5)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>(potential at &lt;US$100/tCO₂-eq: 2.3 - 6.4)</td>
</tr>
<tr>
<td>Forestry</td>
<td>(potential at &lt;US$100/tCO₂-eq: 1.3 - 4.2)</td>
</tr>
<tr>
<td>Waste</td>
<td>(potential at &lt;US$100/tCO₂-eq: 0.4 - 1.0)</td>
</tr>
</tbody>
</table>

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

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

Entry Points for Manufacturing
Entry Points for Services
Entry Points for Entrepreneurship
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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Job intensity</th>
<th>Long-Term cost reduction</th>
<th>CO₂ reduction</th>
<th>Security of supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Refurbishment</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Switch to Cleaner Cars</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Wind/Solar Energy</td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Battery Development</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Clean Energy R&amp;D</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Carbon Capture &amp; Storage (CCS)</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

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


• 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

- 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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Green Jobs Programme (Asia-Pacific):