Strengthening Institutional Capacity to Support Energy Efficiency in Asian Countries: UN ESCAP Project

KK Philip Kang
Economic Affairs Officer
Energy Security Section
Environment and Development Division, ESCAP, Bangkok
The Asia-Pacific

- Population: 4.1 billion people or 2/3 of the global population
- 44 million added each year to region
- Land surface: 40% of global land area
- Account for 45-50% of world primary energy demand between 2007-2030
- 1.6 billion relying on traditional biomass
- 1 billion without access to electricity
- Ecological footprint 3-5 times higher than global per capita average
ESCAP at a glance

- Established in 1947 (already 66th Commission session)
- Regional arm of United Nations (5 total)
- Main areas: poverty reduction, environment, social development, statistics, transportation, trade, ICT & disaster risk reduction
- Environment & Development Division: Environment, Water Security Section & Energy Security Section
- MCED5 (Seoul, March 2005) adopted Green Growth as key regional strategy for achieving continued economic growth compatible with environmental sustainability
- MCED6 (Astana) 27 Sept-2 October 2010
Key messages:

- High dependency on fossil fuels aggravating AP’s vulnerability to energy prices.
- Share of fossil fuel consumption to remain 82% in 2030 under BAU scenario.
- Regional energy system baseline scenario would require US$9 trillion up to 2030.
- LDCs are most vulnerable to high oil price.
- Shift to “quality of growth” and sustainable energy paradigm.

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Oil Supply (Thousand bpd)</th>
<th>Import (Thousand bpd)</th>
<th>Dependency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>5421.49</td>
<td>2023.96</td>
<td>37.33</td>
</tr>
<tr>
<td>Japan</td>
<td>5160.04</td>
<td>5224.50</td>
<td>100.00</td>
</tr>
<tr>
<td>India</td>
<td>2485.00</td>
<td>1710.64</td>
<td>68.84</td>
</tr>
<tr>
<td>Thailand</td>
<td>815.48</td>
<td>598.43</td>
<td>73.38</td>
</tr>
<tr>
<td>Rep. of Korea</td>
<td>2032.33</td>
<td>2055.82</td>
<td>100.00</td>
</tr>
<tr>
<td>Philippines</td>
<td>316.04</td>
<td>318.82</td>
<td>100.00</td>
</tr>
<tr>
<td>New Zealand</td>
<td>136.55</td>
<td>110.44</td>
<td>80.88</td>
</tr>
</tbody>
</table>
Growth of energy supply in AP

- Asia and the Pacific accounts for almost 45% of the global total primary energy supply in 2007
- More than a 56% increase in the region’s energy supply in 1990

Source: Statistical Yearbook for Asia and the Pacific 2009, ESCAP
Projected primary energy demand

- Primary energy demand, along with energy related CO\textsubscript{2} emissions are projected to grow by 40% in 2030 from 2007 levels.
- A large proportion of this growth will come from developing Asia as economies support their development needs.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong SAR, China</td>
<td>15.40</td>
<td>Hong Kong SAR, China</td>
<td>15.15</td>
<td>Hong Kong SAR, China</td>
<td>18.54</td>
<td>Hong Kong SAR, China</td>
<td>20.13</td>
</tr>
<tr>
<td>Turkey</td>
<td>8.30</td>
<td>Turkey</td>
<td>8.19</td>
<td>Turkey</td>
<td>9.26</td>
<td>Turkey</td>
<td>8.74</td>
</tr>
<tr>
<td>Japan</td>
<td>7.32</td>
<td>Singapore</td>
<td>7.81</td>
<td>Sri Lanka</td>
<td>7.75</td>
<td>Sri Lanka</td>
<td>8.64</td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>7.21</td>
<td>Japan</td>
<td>7.01</td>
<td>Japan</td>
<td>7.46</td>
<td>Singapore</td>
<td>8.15</td>
</tr>
<tr>
<td>Singapore</td>
<td>6.34</td>
<td>Sri Lanka</td>
<td>6.89</td>
<td>Brunei Darussalam</td>
<td>6.92</td>
<td>Japan</td>
<td>7.88</td>
</tr>
<tr>
<td>Turkey</td>
<td>6.26</td>
<td>Bangladesh</td>
<td>6.76</td>
<td>Bangladesh</td>
<td>6.85</td>
<td>Bangladesh</td>
<td>7.21</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>6.18</td>
<td>Brunei Darussalam</td>
<td>6.46</td>
<td>Singapore</td>
<td>6.74</td>
<td>Singapore</td>
<td>7.06</td>
</tr>
<tr>
<td>Philippines</td>
<td>5.41</td>
<td>Australia</td>
<td>5.42</td>
<td>Philippines</td>
<td>6.31</td>
<td>Philippines</td>
<td>6.67</td>
</tr>
<tr>
<td>Thailand</td>
<td>5.34</td>
<td>New Zealand</td>
<td>5.05</td>
<td>New Zealand</td>
<td>6.27</td>
<td>New Zealand</td>
<td>6.44</td>
</tr>
<tr>
<td>Malaysia</td>
<td>5.31</td>
<td>Philippines</td>
<td>4.91</td>
<td>Australia</td>
<td>5.77</td>
<td>Australia</td>
<td>6.02</td>
</tr>
<tr>
<td>Korea, Rep.</td>
<td>5.24</td>
<td>Malaysia</td>
<td>4.81</td>
<td>Korea, Rep.</td>
<td>5.21</td>
<td>Armenia</td>
<td>5.68</td>
</tr>
<tr>
<td>Iran, Islamic Rep.</td>
<td>4.98</td>
<td>Thailand</td>
<td>4.81</td>
<td>Armenia</td>
<td>5.01</td>
<td>Korea, Rep.</td>
<td>5.46</td>
</tr>
<tr>
<td>Australia</td>
<td>4.82</td>
<td>Korea, Rep.</td>
<td>4.66</td>
<td>Malaysia</td>
<td>4.62</td>
<td>Azerbaijan</td>
<td>5.33</td>
</tr>
<tr>
<td>New Zealand</td>
<td>4.80</td>
<td>Pakistan</td>
<td>4.22</td>
<td>India</td>
<td>4.58</td>
<td>India</td>
<td>4.92</td>
</tr>
<tr>
<td>Pakistan</td>
<td>4.22</td>
<td>Iran, Islamic Rep.</td>
<td>4.16</td>
<td>Thailand</td>
<td>4.58</td>
<td>Cambodia</td>
<td>4.79</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3.61</td>
<td>India</td>
<td>3.82</td>
<td>Pakistan</td>
<td>4.51</td>
<td>Thailand</td>
<td>4.72</td>
</tr>
<tr>
<td>India</td>
<td>3.22</td>
<td>Indonesia</td>
<td>3.71</td>
<td>Cambodia</td>
<td>4.21</td>
<td>Malaysia</td>
<td>4.67</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>2.92</td>
<td>Armenia</td>
<td>3.52</td>
<td>Pakistan</td>
<td>4.59</td>
<td>Pakistan</td>
<td>4.59</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2.46</td>
<td>Vietnam</td>
<td>3.35</td>
<td>Indonesia</td>
<td>4.02</td>
<td>Indonesia</td>
<td>4.15</td>
</tr>
<tr>
<td>Nepal</td>
<td>2.35</td>
<td>Cambodia</td>
<td>3.24</td>
<td>Vietnam</td>
<td>3.49</td>
<td>Iran, Islamic Rep.</td>
<td>3.97</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>2.15</td>
<td>Kyrgyz Republic</td>
<td>3.08</td>
<td>Kyrgyz Republic</td>
<td>3.19</td>
<td>Vietnam</td>
<td>3.75</td>
</tr>
<tr>
<td>Kyrgyz Republic</td>
<td>1.59</td>
<td>China</td>
<td>3.08</td>
<td>China</td>
<td>3.15</td>
<td>China</td>
<td>3.43</td>
</tr>
<tr>
<td>Nepal</td>
<td>1.46</td>
<td>Kyrgyz Republic</td>
<td>3.08</td>
<td>Kyrgyz Republic</td>
<td>3.41</td>
<td>Kyrgyz Republic</td>
<td>3.41</td>
</tr>
<tr>
<td>China</td>
<td>1.45</td>
<td>Tajikistan</td>
<td>2.73</td>
<td>Nepal</td>
<td>2.85</td>
<td>Russian Federation</td>
<td>2.94</td>
</tr>
<tr>
<td>Mongolia</td>
<td>1.44</td>
<td>Tajikistan</td>
<td>2.17</td>
<td>Azerbaijan</td>
<td>2.83</td>
<td>Nepal</td>
<td>2.92</td>
</tr>
<tr>
<td>Mongolia</td>
<td>1.35</td>
<td>Russian Federation</td>
<td>2.07</td>
<td>Azerbaijan</td>
<td>2.87</td>
<td>Tajikistan</td>
<td>2.86</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>1.32</td>
<td>Mongolia</td>
<td>2.06</td>
<td>Mongolia</td>
<td>2.57</td>
<td>Mongolia</td>
<td>2.58</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>0.70</td>
<td>Kazakhstan</td>
<td>2.00</td>
<td>Kazakhstan</td>
<td>2.35</td>
<td>Kazakhstan</td>
<td>2.39</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>no data</td>
<td>Turkmenistan</td>
<td>0.72</td>
<td>Turkmenistan</td>
<td>1.37</td>
<td>Turkmenistan</td>
<td>1.56</td>
</tr>
</tbody>
</table>

Source: World Bank, Accessed April 2010 (constant 2005 ppp dollars per kg of oil equivalent)
UN: Priority area for sustainable energy

Emission Reduction by Technology Area ACT Map Scenario

- Industry 10%
  - Energy & feedstock eff. 6%
  - Materials & products eff. 1%
  - Process innovation 1%
  - Cogen. & steam 2%

- Buildings 18%
  - Space heating 3%
  - Air conditioning 3%
  - Lighting, misc 3.5%
  - Water heat, cooking 1%
  - Appliances 7.5%

- Transport 17%
  - Fuel economy in transport 17%

- End-use efficiency 45%
- Power Gen. 34%

- CCS in fuel transformation 3%
- CCS in Industry 5%
- Fuel mix in building 5% and Industry 2%
- Biofuels in transport 6%
- Coal to gas 5%
- Nuclear 6%
- Fossil fuel gen. eff. 1%
- CCS 12%
- Hydro 2%
- Biomass 2%
- Other renew. 6%

Project specifications

- **Goal:** Accelerated and sustained implementation of energy efficiency measures in the region
- **Countries:** Selected countries from Central, South and South-East (23 countries)
- **Target:** Energy efficiency policymakers and researchers
- **Duration:** April 2009 – March 2011 (2 years)
- **Donor:** Korea Energy Management Corporation (KEMCO)
Management modality

Lead Implementation:
Energy Security Section, Environment and Development Division, ESCAP

Subregional Partners:
• ASEAN Centre for Energy (ACE)
  MOU signed 2 January 2002
• Eurasian Economic Community (EurAsEC)
  MOU signed 23 May 2007
• South Asian Association for Regional Cooperation Energy Centre
  MOU signed 4 February 1994

Other Participating Partners:
Asian Development Bank, International Energy Agency (IEA), World Bank, & USAID ECO-Asia
Situational assessment & findings

EE promotion in Asia

- Asian economies paying greater attention to improving EE: benefits to lower energy cost, enhanced energy security and reduced environmental impact
- Developing & transition economies are growing rapidly thus lowering GDP energy intensity
- EE institutional frameworks established in most Asian countries
- Policy of “stick and carrot” is widely applied in industry (i.e. reduce income tax, income tax exemption, low interest loans, financial penalties)
- Building sector have voluntary certification for residential and commercial buildings
- EE standards & labeling for appliances & equipment in some countries
- Informational & educational measures to support EE policies
Situational assessment & findings

Emergence of EE institutions in Asia

• Most typical are **government agencies** devoted to EE
• **Not stand alone, but cooperation** with government bodies with ministries, energy companies, ESCOs, producers, utilities, research institutes & financial organizations
• For international & regional cooperation, **intergovernmental organizations** serve as conduit of knowledge sharing and technical assistance – ADB, APEC, ASEAN, EurAsEC, SAARC, etc.
Situational assessment & findings

Typical scheme of institutional structure of EE in Asia

Figure 1: Typical scheme of institutional structure of EE policy in Asian economies

- Government
  - Key ministry responsible for energy, industrial or economic policy
    - Relevant ministries dealing with: Construction, Transportation, Agriculture, Residential and Commercial Sector
    - State inspections responsible for control over efficient utilization of fuel and energy resources
    - Energy companies
      - Producers of energy efficient equipment
    - Scientific and research organizations
    - International organizations, banks of development
Situational assessment & findings

Challenges & barriers

**Institutional barriers**
- Legislative basis, national strategies and plans
- Organization and coordination of institutional structures
- Interactions and communications among government structures and other potential participants of EE policy (energy companies, producers of energy efficient equipment, financial institutions, R&D, final consumers)
- Capacity to develop and undertake EE policies, programmes and projects

**Fiscal barriers**
- Motivation, information and experience in project financing
- Financial support for EE programmes and activities
- Application of existing mechanisms (financial incentives, subsidies, etc.)
Situational assessment & findings

Recommendations

**Building relevant macro & micro institutions**
- Strong institutional support from the government is essential to coordinate various agencies
- Special state institute under ministerial control to take lead
- Sufficient financing and authority with clear mandate

**Strengthening subregional cooperation**
- Strengthen the existing subregional organizations
- Provide an enabling environment to promote EE as a culture
- Establishing a regional centre in Central Asia
Situational assessment & findings

Recommendations (cont’d)

Enabling policy and legislative measures
- Develop & adopt comprehensive legislation & policy regulation to support EE
- Develop & adopt practical (especially financial) mechanisms
- Develop & adopt EE product procurement programme
- Removal of current energy subsidies which distort energy prices

Enhancing capacities
- Benefits over the years from international agencies and bilateral donors with series of technical assistance & capacity building programmes
- Such assistance increased capacities in the areas of MEPS implementation, EE standards and labeling, CFLs, etc.
- Still huge potentials exist for regional collaboration on EE
Situational assessment & findings

Recommendations (cont’d)

Expert training and scaling-up of information dissemination campaigns
• Trained personnel needed to develop & implement EE programmes
• Lack of skills in EE technologies is one of the main barriers
• Training courses at various levels & target groups to raise their capacity and awareness
• Awareness raising leads to higher commitment

Innovative financing support
• Present channel for project financing is relatively limited
• Lack of efficient monitoring and evaluation of estimated project energy savings
• Need to raise investor confidence
• Market-based financing mechanism needed for increasing funding of EE programmes
Situational assessment & findings

Major premises for case studies

• To generate observations and ideas regarding the methodologies
• A complex, problem-solving process
• No single formula for success
• Descriptive in nature, rather than analytical
• Case studies as guides to policymakers and not prescriptive
BECon >> China Green Lights Project
ECCJ >> Top Runner Programme
KEMCO >> e-Standby Programme
EECA (NZ) >> ENERGYWISE
EST (UK) >> Local advice networks
EPA >> Energy Star
USGBC >> LEED Green Building Rating System
APEC-EGEE&C >> APEC ESIS
ELI >> Green Leaf logo
CLASP >> S&L brokerage
ACE >> ASEAN Best Practices Competition Awards
What lies ahead: next phase?

1. Development of guidelines tool
2. Conduct national gap analysis
3. Organize national workshops X 3
4. Organize subregional workshops X 3
5. Dissemination strategy and implementation
6. Promotion of EE institutional guidelines at various forums and partnership events (after project end)
Guidelines development plans

Focus on factors that contribute to energy intensity?

- To recognize the inherent constraints that impede the achievement of low energy intensity in a country
- Identify policy measures that have scope for success within the prevailing socio-political context
- Where possible, recommend techno-economic and behavioral changes for lowering the energy intensity
- Explore the scope to recommend action that could be pursued at the level of a specific subregion
- Look at the governance structure and arrangements
What are some contributing factors for energy efficiency?

**PHYSICAL**
- Fixed inheritance
- Geography
  - Size, Topology, climate
- Population & Demography

**TECHNO-ECONOMIC**
- Economic development
  - Level & structure of the economy,
- Infrastructure for energy production and consumption
- Industrial development
- Life style

**POLITICAL**
- Governance
  - Decision making, regulation, incentive structure
- Policies
  - Energy, Environment, Various sectors
- Consumer behavior
- Open/closed market
Any comments & suggestions?

• Is it necessary to have specialized institutions?
• What should be the scope of authority?
• How best to enforce the regulatory measures?
• What factors should be taken into account?
• Should we consider economic viability as the primary criteria for success?
• Should privatization or private-public partnership be the key to success?
• Should the tool be limited to information sharing?
Thank you

easia.unescap.org
http://www.unescap.org/esd/energy/