BANGKOK 21-23 JUNE 2016

Urbanization and Energy Nexus

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SDG 7 and 11

**7 AFFORDABLE AND CLEAN ENERGY**

Ensure access to affordable, reliable, sustainable and modern energy for all

**11 SUSTAINABLE CITIES AND COMMUNITIES**

Make cities inclusive, safe, resilient and sustainable
Presentation outline

• Background: state of urbanization, challenges and opportunities

• Case of Slums

• Road ahead: Habitat III – New Urban Agenda
Urbanization and Urban Energy Poverty

• 10% of the global population lived in cities in 1900;

• 50% of people lived in cities in 2007;

• 75% of the population will be living in cities in 2050.

• Out of the 3.5 billion people living in cities today, over one billion live in informal settlements and are mainly urban energy poor.
Rapid Urbanization is taking place in developing countries

<table>
<thead>
<tr>
<th>Region</th>
<th>2005</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>World</strong></td>
<td>48.7</td>
<td>59.9</td>
</tr>
<tr>
<td><strong>More developed regions</strong></td>
<td>74.1</td>
<td>80.8</td>
</tr>
<tr>
<td><strong>Less developed regions</strong></td>
<td>42.9</td>
<td>56.1</td>
</tr>
<tr>
<td><strong>Least developed countries</strong></td>
<td>26.7</td>
<td>40.9</td>
</tr>
<tr>
<td><strong>Sub-Saharan Africa</strong></td>
<td>35.2</td>
<td>48.3</td>
</tr>
<tr>
<td><strong>Asia</strong></td>
<td>39.8</td>
<td>54.1</td>
</tr>
<tr>
<td><strong>Latin America and the Caribbean</strong></td>
<td>77.4</td>
<td>84.3</td>
</tr>
</tbody>
</table>
Challenges
Increasing energy demand:

- As the population increased so is the demand for more energy.
- High dependency on energy imports (mainly fossil fuels: oil, coal, gas):
  - Vulnerability to price fluctuations (oil price rose from $14 in 1999 to $140 in 2008, and $30 in 2016)
  - “Imported” inflation and price instability for goods and services
  - High prices for modern energy services
- Power generation using (imported) fossil fuels:
  - High prices for electricity and for productive activities and the economy
Challenges

Inefficient use of energy:

- No consideration of energy efficiency:
  - Architecture and buildings that are not adapted to their respective climates,
  - Wastage of electricity and other modern energy sources through old and inefficient appliances,
  - Power transmission losses, (20 – 30 % )

- Absence of adequate urban planning:
  - Urban sprawl with low density development leading to high energy demand, need for private cars, increased air pollution.
  - Proliferation of unplanned settlements mainly in developing countries.
  - Outdated city master-plans
  - Traffic congestion and blockage
  - No roads and poor streets patterns.
Lack of Energy Access: (1.2 billion people without electricity: Y2013)

- Limited access to modern energy (electricity and gas) in developing countries:
  - **Per capita electricity consumption** remains very low in developing countries and LDCs.

- Extensive use of firewood and charcoal:
  - Respiratory diseases and deaths especially among women and children (4.3 million deaths per year globally)
  - Forrest depletion, soil erosion and desertification.

- Use of kerosene for cooking and lighting:
  - In-door air pollution: respiratory diseases and deaths
  - Low level of **productive activities after dark**.
Challenges: Human health care

• With increasing Urbanisation and Motorisation, **health problems** will increase

• Air pollution has emerged as a major **risk** to health in urban areas (WHO, 2012):
  - 3.7 million deaths/year from Ambient Air Pollution;

• Need for **clean Mass Rapid Transit** (e.g. Light Rail, e-trams, etc.)
Focus: Slums grow as cities grow

- There are more than one billion people living today in slums, and it is expected to reach 1.4 billion in 2020.

- The projected growth is 27 millions people a year (2005 - 2020).

- Slum growth represents 38% of the world’s urban growth.

<table>
<thead>
<tr>
<th>Region</th>
<th>Urban growth</th>
<th>Slum formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>4.6 %</td>
<td>4.5 %</td>
</tr>
<tr>
<td>Southern Asia</td>
<td>2.9 %</td>
<td>2.2 %</td>
</tr>
<tr>
<td>Western Asia</td>
<td>2.9 %</td>
<td>2.7 %</td>
</tr>
</tbody>
</table>
# Electricity Access

<table>
<thead>
<tr>
<th>Region</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>East/Southeast Asia</td>
<td>99 %</td>
<td>81 %</td>
</tr>
<tr>
<td>South Asia</td>
<td>68 %</td>
<td>30 %</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>51 %</td>
<td>7 %</td>
</tr>
<tr>
<td>Middle East/North Africa</td>
<td>99 %</td>
<td>77 %</td>
</tr>
<tr>
<td>Latin America</td>
<td>98 %</td>
<td>51 %</td>
</tr>
</tbody>
</table>

## Electricity Access by the slum dwellers

- Slum dwellers have no legal access to electricity;
- They are illegally connected;
- They pay high fee through illegal power vendors;
- They spend on average 10-15% of income on energy;
- Unsafe connections with fire hazards and electrocutions;
- Disconnection can happen any time.
Opportunities
Urban Energy Opportunities

- Increasing **access to modern, clean and reliable energy** services in urban areas with particular focus on pro-poor interventions

- Promotion of **renewable energy technologies**

- Mainstreaming **energy efficiency measures** into housing policies, building codes and building practices

- Capacity development in **energy planning** in urban areas
Opportunities: Renewables, technologies, policies

**Untapped Renewable Energy Resources:**
- Huge potentials of: **solar, wind, biomass, hydro, geothermal** etc.
- **Municipal solid and organic** waste to energy

**Decreasing cost** of renewable energy technologies and more **investment funds available:**
- The cost of solar and wind energy technologies has decreased on average by 75% in the last 5 years;
- There are increasing availability of innovative financing mechanisms for renewables.

**Technology innovation (R&D):**
- More efficient appliances are available,
- Efficient energy generation equipment developed.

**Enabling Policies** that support RETs: Global support SE4ALL. SDGs Goal 7, political will.
Opportunities: Rapid Urbanisation

- Transformation of rural areas into urban:
  - Opportunity for new urban planning
  - Opportunities for cities extension
  - Availability of space to promote social and economic mix
  - Planning for proper mobility and public transportation system
  - Opportunity for electric mobility

- Energy Demand Management:
  - Energy Efficiency in Buildings, Industry, Transport etc. (there is a potential of 50% energy savings)
  - The Green Economy
Case of Slums: Advantages of Slum Electrification

- Reaching more people with less investment given the high density of the population;
- New customers are willing to pay for a safe service through a more flexible payment system;
- Power utilities reduce their heavy losses from illegal connections.
- Government contributes with coherent legal framework for legitimize consumers and connections.
- Children can read more in the evening;
- Safety and security are enhanced;
Case Study: Slum Electrification in Ahmedabad, India

- Ahmedabah Electricity Company AEC and two local NGOs have implemented a pilot slum electrification project in an informal settlements.
- The program was financially support by USAID;
- The government provided a No – Objection Certificate (NOC) to slum dwellers;
- 5000 houses were connected with legal meters and CFL
- Connection cost were subsidized in part through cost sharing between: USAID, AEC and the households
- Only slums on state lands with upgrading program could benefit from the project.
Slum Electrification in India

- Access to electricity has dramatically increased the quality of life in slum communities.
- The utility company provided outside service and all connections;
- The NGOs were involved in awareness raising, distribution, bill collection, and financing;
- The No Objection Certificate provided by the Government was necessary to avoid the issue of land tenure barrier.
- As a result: more households have access to affordable power supply;
- Safety measures are put in place;
- Social and economic barriers were overcome through awareness, subsidy and legal framework.
  
Electricity theft was reduced.
Urbanization and Environment, Climate Change & Disasters

Rapid urban development and growth over recent decades has resulted in environmental degradation, exposure to pollution and disasters, and vulnerability to climate change.

Global political commitments in Sendai and Paris now need to be translated into concrete and immediate action at the local level.

Transforming the development trajectory to a low-carbon, resource-efficient and resilient future requires concrete and coordinated national and municipal policies and financing.
Thank you