Large-scale RET for Sustainable Rural Development

I. Requirements for Sustainable Rural Development

II. Issues with Deployment of Large-scale RETs

III. Issues with Current Supply Energy Model

IV. Mandated Paradigm Shift in Rural Energy Supply Model

V. New Energy Model Mapping into Energy Statistics
I. Pursuit of Sustainable Rural Development in DCs

a. Rural energy supplies should be well scaled to meet the required sustainable development conditions & growth mandates (different options).

b. Proper Rural Planning for required Infrastructure in DCs!
II. Issues with Renewable Energy Technologies (RETs)

• Bad experiences with small scale RE systems for rural development!

• Economy of Scale is vital for cost reduction: Several RETs will become competitive in power plants of 40 – 50 MW installed capacity.

• Energy Used & CO₂ Produced during RE equipment manufacturing: Hydraulic and steam related power plant equipment (8g of CO₂/kWh; Wind Energy equip (9-25 g of CO₂/kWh; PV (60g of CO₂/kWh)
II. Issues with Renewable Energy Technologies (RETs)

- How much energy could be supplied before asking how much is optimally needed and at what scale and quality it could be optimally provided.

- Best Available RE resource is the un-captured “efficiency resource”: Increasing energy end-use efficiency is generally the largest, least expensive, most benign, most quickly deployable, least visible, least understood, and most neglected way to provide energy services.

- Manufacturing efficiency compact fluorescent lamps (CFLs) or Light Emitting Diodes (LEDs) in Sana’a or super-windows in Damascus will cost much less capital than expanding electricity generation to supply the same light and comfort via inefficient lamps and air-conditioners!

- Huge decrease in capital requirements could turn the power sector, which now uses about one-fourth of global development capital into a net exporter of capital to fund other development needs. This also calls for brawling and scrapping the existing global trade in every inefficient electricity-using device.
1. Analyses of energy use should, but seldom do, start with the desired services or changes in well-being, then work back upstream to primary supplies. (maximize the extra value of downstream efficiency gains and the capital-cost savings from smaller, simpler, cheaper upstream equipment).

2. To save primary energy and the most capital cost, efficiency efforts should start all the way downstream by investigating the following: How little flow can actually deliver the desired service? How small can the piping friction become? How small, well-matched to the flow regime, and efficient can the pump be made?
II. Issues with Renewable Energy Technologies (RETs)

- Regulatory RE/EE Framework: Feed-in Tariff law(s) & Power Purchase Agreements (PPAs) for Independent Power Producers (IPPs) are absent, i.e. no serious efforts done for investment attraction in the field;

- Highly Subsidized Energy prices;

- No current local production and/or large assemblies for different RE Systems;

- High Land Use.
III. Issues with Current Rural Supply Energy Model

- **Access:** 19 million (10%), mostly in rural areas, have no access to appropriate energy services esp. electricity; further more 30 million are severely undersupplied.

- Major consumers of gas and petroleum products:
  - Transport (43%), Residential (18%); Industry (17%)

- Major consumers of generated electricity:
  - Residential (56%); Industry (26%)

- The very form of Fossil Fuel supply to rural areas hinders growth and development (due to lack of infrastructure) making it unsustainable both in short & long terms for rural development in DCs!
III. Issues with Current Rural Supply Energy Model

• No clear plan as to how to expand energy accessibility to all consumers, as appropriate to specific communities and different economic groups, particularly the poor;

• Slow process to Integrate sustainable energy objectives, strategies, and plans within national development policies, strategies, and plans; (highest 20% of energy mix)

• No current clear response to the challenge of rapidly increasing energy demand due to population and economic growth;
IV. Mandated Paradigm Shift in Rural Energy Supply Model

Rural Energy Planning & Development approaches that are:

• Completely separate SRED from economies of fossil fuel, i.e. favourable of the use of 100% RE bulk electricity in rural cities and municipalities that are not planned for grid connection within the next 5-7 years;

• Address issues of legislation & standards (Feed-in tariff Laws), and set up a code of exemplary practice at municipality level and in full partnership with participating cities;

• Emphasis on market-led approaches in technology development & deployment through pricing & investment, and appropriate electricity purchasing policies;

• RE systems cost reduction thru market aggregation and Industry alliances;
IV. Mandated Paradigm Shift in Rural Energy Supply Model

**New Multi-criteria energy rural supply model(s):**

- Address concerns of all rural economic sectors including challenges of unsustainable land use practice, desertification, water pollution, deforestation, rural poverty, uncontrolled urbanization;
- Energy market issues (security/economics);
- Opportunities in improving infrastructure, built Fabric, land use, Industry base;
- Global environmental concerns; i.e. include Adaptation to Climate Change Measures through Sustainable City Development; Sustainable rural energy systems; and Sustainable Transport Systems in the Rural planning process;

These models should be:
- Comprehensive, affordable & replicable.
4. Mandated Paradigm Shift in Rural Energy Supply Model

1- A clean visible RE Bulk Power Market is to be defined at each city/municipality level connected by local grid, thru’ a Clean Energy Act embedded in national law;

2- Local production of components & equipment of RE systems: use currently available Industrial infrastructure (increased production volume) and move away from specifically-tailored components.

3- Use of place-based (city and/or municipality level) emissions allocation techniques & action as a new approach in compiling GHG emissions versus globally differed GHG levels carries & produce action plans accordingly.
IV. Mandated Paradigm Shift in Rural Energy Supply Model
At City/Municipality level, necessary capacity building programs for local statistics offices should take place to assist in:

- All current energy data (production, consumption, per capita, CO$_2$ produced, etc., collected at national should be collected and reported for each city/municipality;
- Data concerning Industry expansion in the rural areas according to RET manufacturing requirements and available natural resources;
- Current Rural land Use and possible land allocation for RET prospective projects;
- Distances between cities/municipalities versus energy demand and load for each location should be reported;
- Collect necessary demographic & socio-economic data for rural areas.
- Assessment of Energy Resources (Solar/Wind)
THANK YOU