

# “Business Opportunities for Energy Efficiency and Renewable Energies in Buildings”

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This presentation is to focus on the possibilities of making use of sustainable energy in Palestine through a demonstration of energy sector in Palestine especially electricity, fuel and renewable energy considering the available sources and consumption of the various categories in addition to the general policy of energy.

- Palestine is located on the western coast of the Mediterranean Sea, west of Jordan .
- The Palestinian territories consist of two geographically separated areas ( Gaza strip ,west Bank ).
- Elevation ranges from 350 m below sea level in the Jordan Valley to sea level along Gaza Strip seashore, exceeding 1000m above sea level in some locations in the West Bank .
- Geographic Coordinates:
- Between 34 20` - 35 30` E and 31 10` - 32 30` N.
- West Bank Area: ~ 5665 km sq.
- Gaza Strip Area: ~ 365 km sq.

- Climate conditions vary widely
- The coastal climate in Gaza Strip is humid and hot during summer and mild during winter, relative humidity ( 67% - 75% )
- Hilly areas of west Bank , cold winter and mild summer with relative humidity (51% - 83% )
- In Jordan Valley and Jericho hot summer and warm winter

- West Bank: 2,600,000
- Gaza Strip: 1,500,000
- Total : 4,100,000
- These numbers conclude Palestinians in Palestinian territories only .
- The whole Palestinians in the world are more than 10 m concentrated in Israel, Jordan, Syria , Gulf Countries , exe....

- Main indicators (World Bank expectations 2007):**

Gross Domestic Production (GDP)	2835 m \$
Real Rate Growth	-4.3%
Gross Domestic Product Per Capita	754 \$
Real Rate Growth	-7.4%
Gross Disposable Income Per Capita	1089 \$
Real Rate growth	-10%
Unemployment Rate	44%
Poverty Rate	72%

- **Generation:**
  - In 1999, the Palestinian Electric Corporation was established, 33% of its assets belong to public sector, 67% to private sector shareholders. The total capacity is 140 MW (Now 60 MW).
  - Local councils, not connected to IEC or Palestinian grid use small generation units.
  - Industrial needs like stone cutters ....

### Importation:

- The only source until 2006 was Israel (IEC), more than 90% of the Palestinian needs is imported from IEC nearly 700MW.
- At the end of 2006, two agreements were done, one with the Egypt to supply Rafah (south of Gaza) by 33KV O.H line – 17MW (connected), and the other agreement is with Jordan to supply Jericho in the West Bank by 33KV O.H line – 20MW (under construction).

- Palestinian per capita consumption is considered the lowest in the region.
- Remarkable decline in electricity consumption since Sept/2000 (2<sup>nd</sup> Intifada) as a result of negative growth rate of the domestic product and the high level of poverty.

<b>Consumption Per capita KWH/ year 2006</b>	675	5200	1145	2100	1050
<b>Country</b>	Palestine	Israel	Jordan	Lebanon	Egypt
<b>Average of Arab countries: 1445 KWH/capita/year</b>					

Palestinian petroleum General Institution was established in 1994.

- Independent body responsible for oil, petroleum and petrochemical products.
- In 1997, the law for institution was issued.
- The PA imports the petroleum products from Israel and distribute them locally.

The core duties of the Institution are:

1. Meeting the local demand.
2. Meeting the strategic reserve of the products.
3. Establishing a distribution system that covers all the territories.
4. Studying the possibility of establishing a refinery.
5. Monitoring the specifications and measures.
6. Developing the local source.

The main renewable energy sources considered to have potential in Palestine are solar energy, wind energy and biomass.

### Solar energy

- 3000 sunshine hours per year.
- Average solar energy is between 2.63KWH/m<sup>2</sup> -day in December to 8.5 KWH/m<sup>2</sup>-day in June.
- Annual average is 5.4KWH/m<sup>2</sup>-day.
- As area of Palestine is relatively small, solar radiation does not vary widely.

### Wind energy:

- Palestine can be considered as a country of moderate wind speed.
- Coastal region (Gaza) has very low wind speed (2.5-3.5)m/s.
- Hilly regions have annual average (4-6)m/s.
- Jordan valley (Jericho) has very low wind speed (2-3)m/s.
- Recently, five modern meteorological stations were installed in West Bank.
- Collected data shows that some areas could have considerable wind energy potential.

### Wind energy:

Two issues to be resolved:

- 1) Determining the exact potential of wind energy by installing more modern computerized stations in all Palestine.
- 2) Considering the market penetration barriers:
  - Financing the project.
  - Processing or hiring the land for installation of turbines.
  - Availability of electrical networks in the project area.
  - Lack of experience in the wind energy field.

# Sources of Biomass

- Palestine is an agricultural country.
- The reject of olive oil pressers is remarkable material to be taken (not assessed yet).
- Animal dung is important energy material (not assessed yet) It is being used as fertilizer.
- More, data collection is needed.

# Solid waste

- More than 1.0 million tons/year of solid waste disposed of unprotected landfill.
- Protected landfill and a (waste to energy) plants are under consideration.
- Environmental standards must be first priority.
- Following advantages are reasonable (protection of land, water resources, recycling and reduction in the overall waste volume).
- It is recommended to divide Palestinian Territories into four geographical areas;  
West Bank (north, middle, south), Gaza strip.

## Solar water heaters - Efficiency

- The efficiency of installed system drop sharply by time because of:
  1. Poor quality of the systems.
  2. High percentage of calcium contents of water causes accumulation of calcium in the tanks and pipes.
  3. Broken glasses of the plates.
- Maintenance plays important factor to improve efficiency.
- Developing the system will encourage the industrial sector and public use (hospitals ..) to use.

### A – Solar Energy

Base on encouraging data for solar energy, strategic plan to reflect this fact is priority for Palestinians and directing reasonable budget towards the project in the two fields:

1. Heating applications
  - Developing the existing system, by the help of research centers. This will raise the efficiency of the units.
  - Extending the use of solar energy to industrial and public service sectors.
2. Photo Voltaic applications such as for:
  - Far small communities.
  - Street lighting.
  - Health centers, communication services, schools and water pumps.

### Methodology to be taken in the sector:

- Transparency.
- Centralizing the regulations and auditing processes.
- Parallel way work.
- Measurable goals in applicable plans.
- Protecting the social interests.
- Consideration of environment needs.

Under this difficult and complicated status in Palestine, we have to work hardly to get sustainable energy supplying, to support national *sustainable development* by:

- Completion of developing the relative *laws and bylaws*.
- *Integration* between sustainable energy plans and the policy of national sustainable development.
- Raising the *economic efficiency* to the energy sector (technology, tariff, public and private investment).
- Insurance of supplying energy to the *whole consumption categories*.

- Meeting the increase of *energy demand*.
- Improving the *energy efficiency*, especially at the end use side .
- Extend the use of more *clean technology* and fuel.
- Encourage *Investment* in the renewable energy applications.
- Focus on the global and *regional cooperation* and the exchange of information.
- *Capacity building* (renewable energy, sustainable energy implementations).