



Energy Efficiency: A strategic Agenda For Government and Industry

The Grand Hyatt
9th of November 2009



Fact about Jordan:

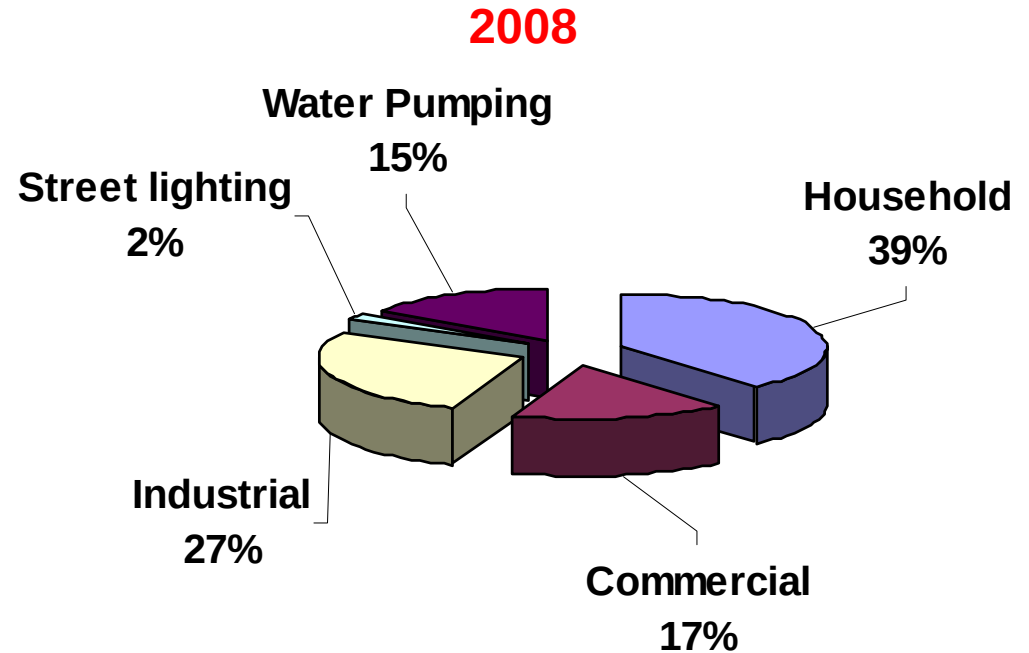
- ✓ Population 5.7 million
- ✓ Approximately 80 % urbanized
- ✓ Pre capita GDP 3000 USD
- ✓ Low agriculture resources
- ✓ No oil resources
- ✓ Annual Per capita Water consumption dropped from 3600m³ in 1946 to less than 160m³ in 2008
- ✓ National water deficit of 500mcm



- Jordan is ranked among the poorest 4 countries in water availability
- Water availability is expected to drop to about 90m³ per capita per year by 2025
- Jordan emits 20.14 million tons of CO₂ equivalent per year.
- Green house gasses = 0.1 % of global emissions

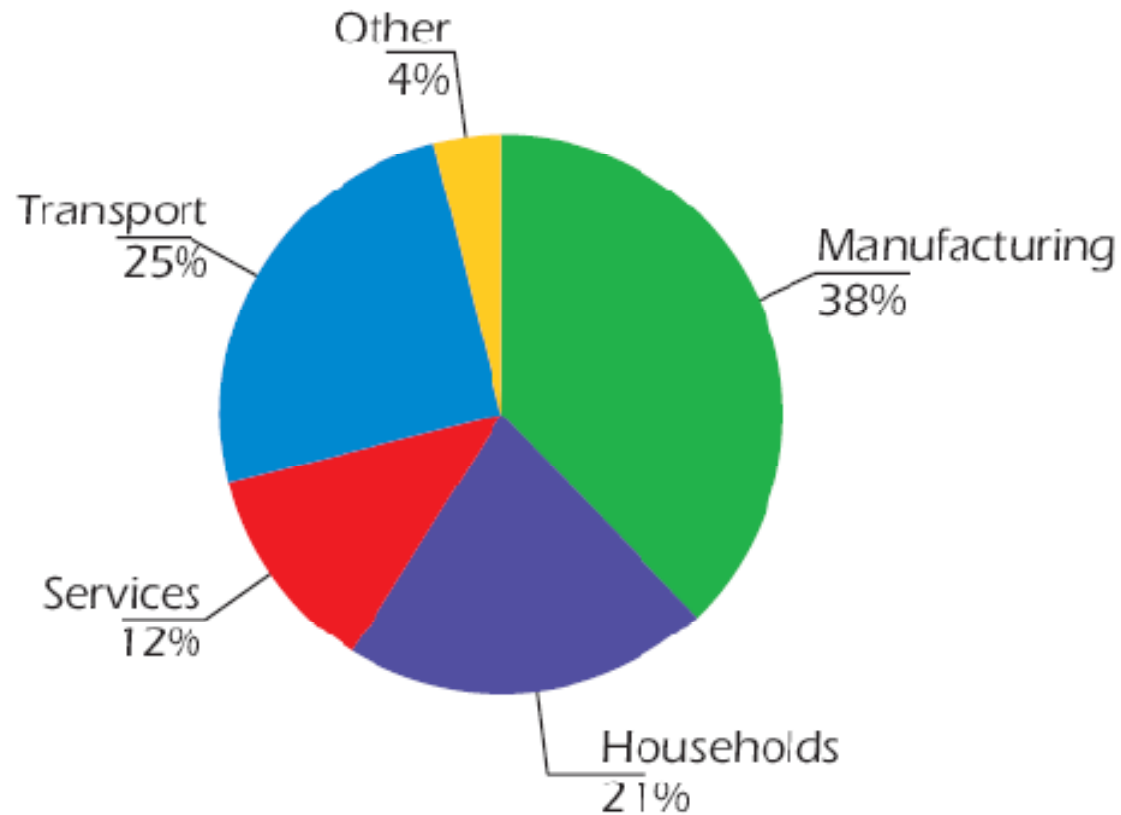
Electrical Energy Consumption per sector

- Total electrical consumption amounted to 11,509 GWh in 2008
- This represents an increase of more than 30% since 2005
- Demand forecasts expect a continued high growth rate ranging between 5 to 7% until 2020



➔ **Rising demand for electricity provides for an increase of GHG emissions and cost of electricity generation**

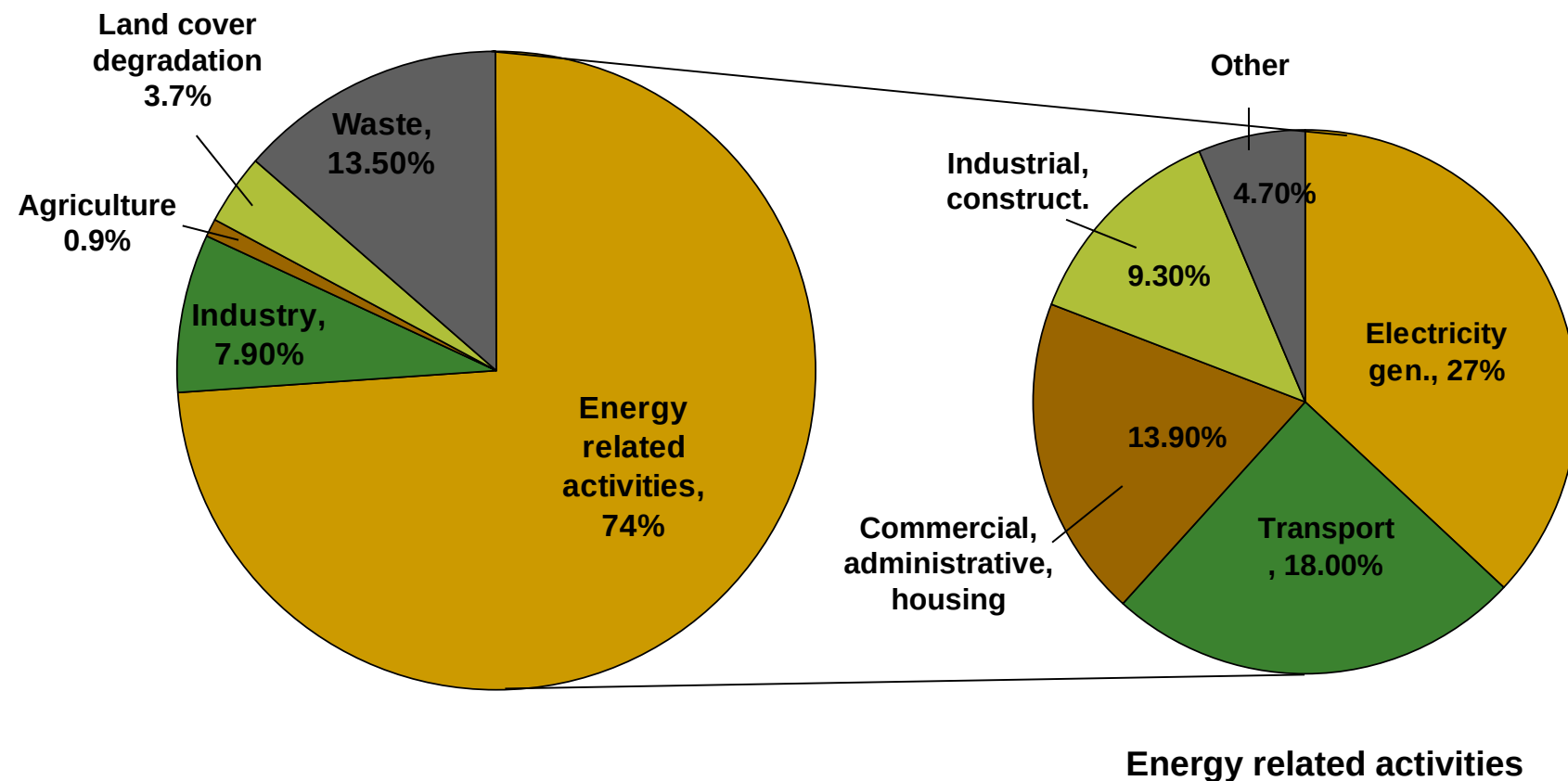
Total direct and indirect CO₂ emissions in 2005: 21 Gt CO₂:



Jordan Total Emission of Green House gases

- Energy related activities account for more than 74% of CO₂ Emissions.
 - 27 % from Energy generation
 - 18 % Transportation
 - 13.9 % Commercial, administrative and housing
 - 9.3 % industrial and construction
 - 4.7 % other
- Industrial activities generate 7.9%
- Agriculture 0.9%
- Land cover degradation 3.7%
- Waste 13.5 %

Total Emission of Green House gases

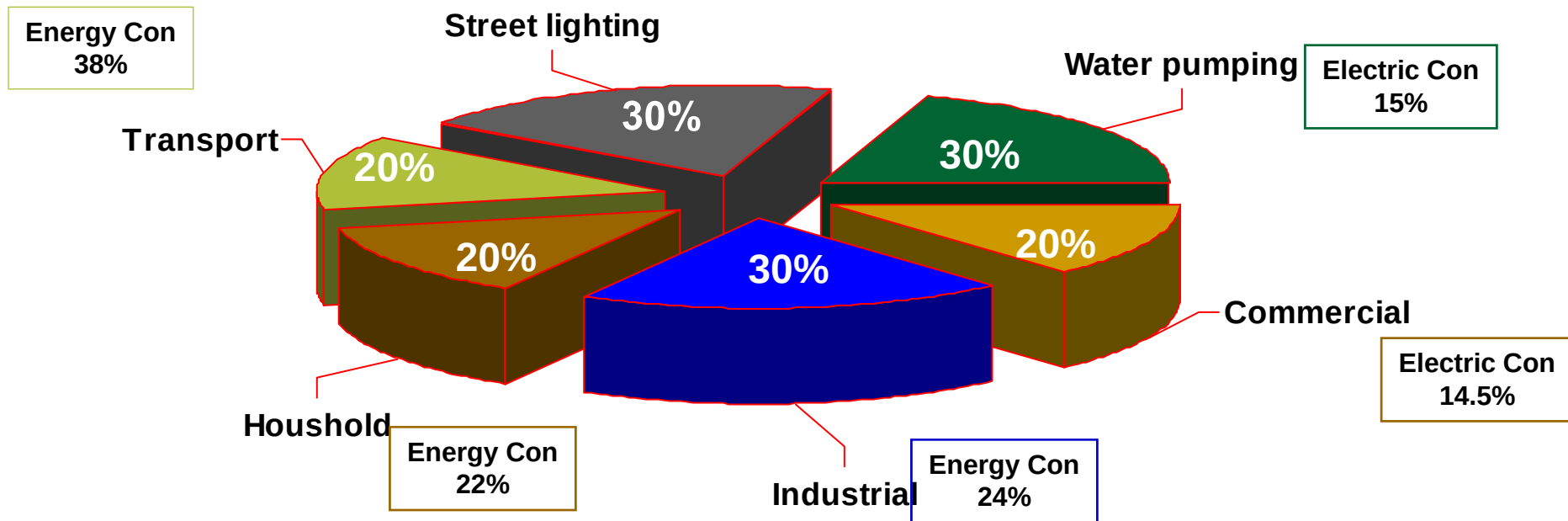


Main challenges for Jordan

- Rising energy demand
- Rising green house gas emissions
- Rising cost of energy consumption

➔ To avoid negative impacts on environment, health and economic situation then energy efficiency measures are an indispensable tool.

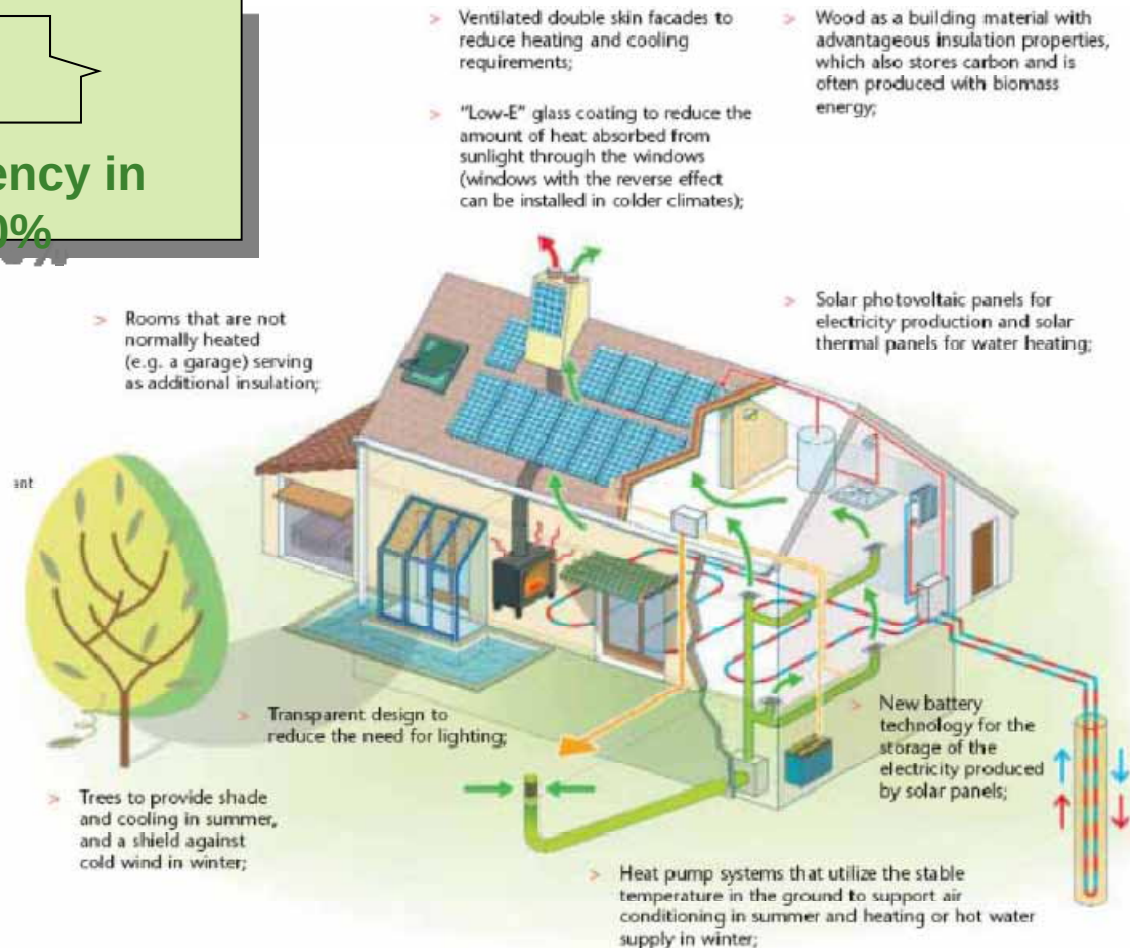
Energy saving per sector:



From all of the above EE, it is concluded that by implementing EE projects in the various sectors, the sum of savings that can be achieved is around 1,198,520 TOE, which is 21% of total energy consumption. NERC Renewable Energy and Energy Efficiency Current Situation

Example: Measures in the building sector

Energy efficiency in homes 20%

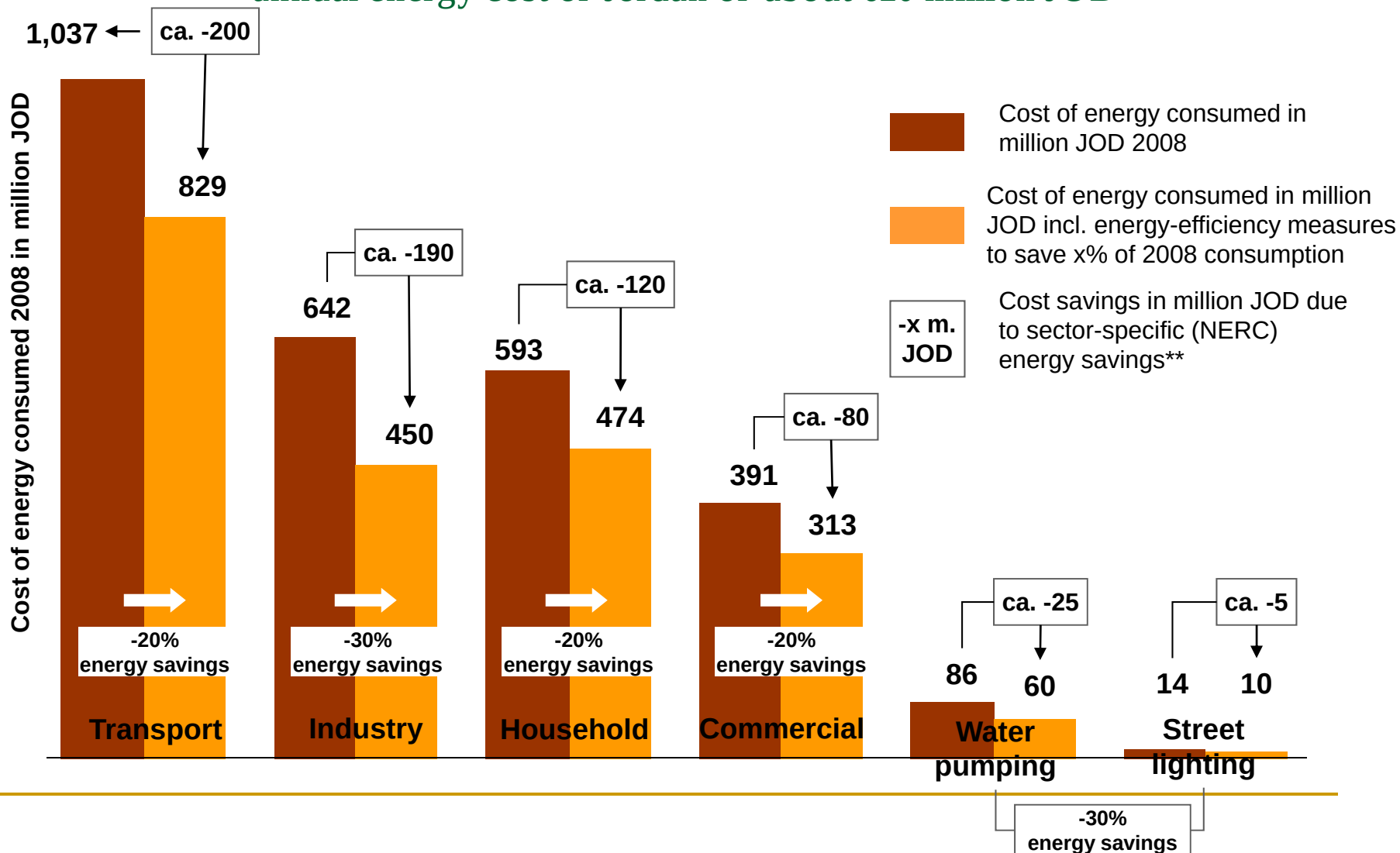


Example:

Energy Saving in water pumping

- Consumes around 15% of the country's total electric consumption
- Estimated reduction 5 % - 65 % of electricity consumption
- 21million Kwh = 935000mt/year savings
- Reduction of 15700 mt CO₂ emission

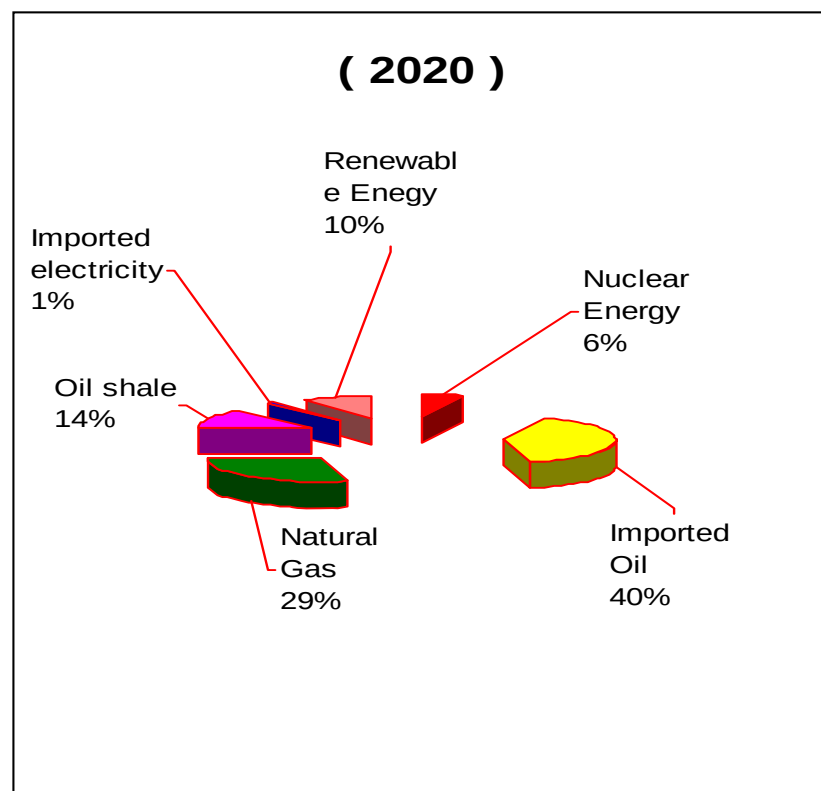
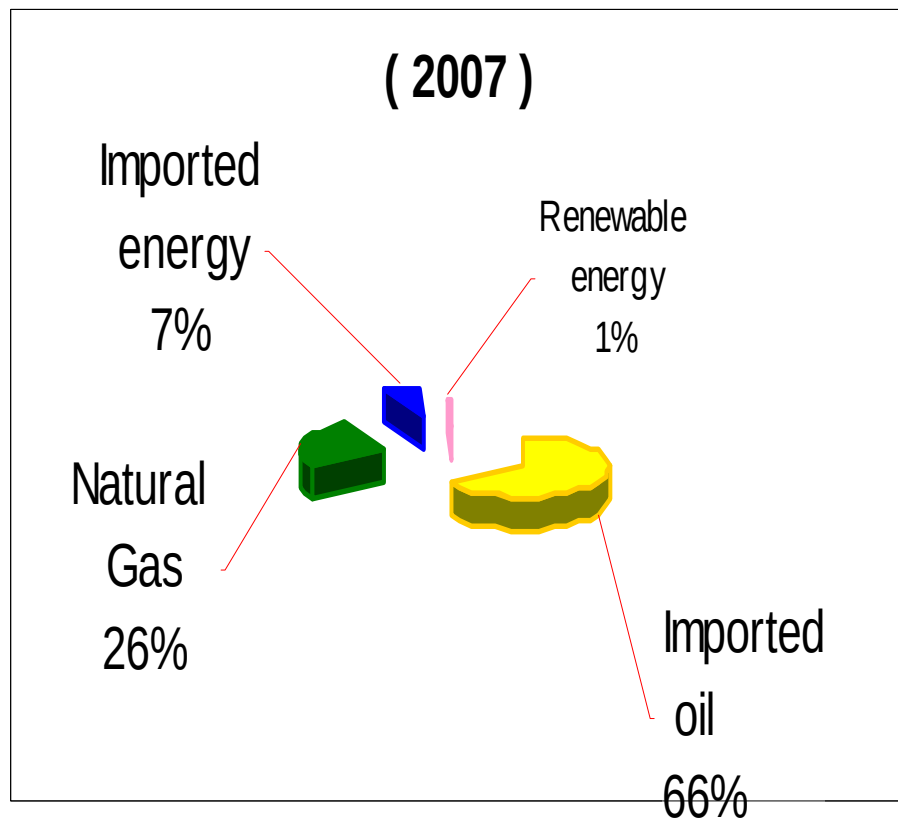
Savings of 20 - 30% of final energy consumption per sector represents a reduction in annual energy cost of Jordan of about 620 million JOD*



* Internal estimations (Ministry of Environment/ CIM)

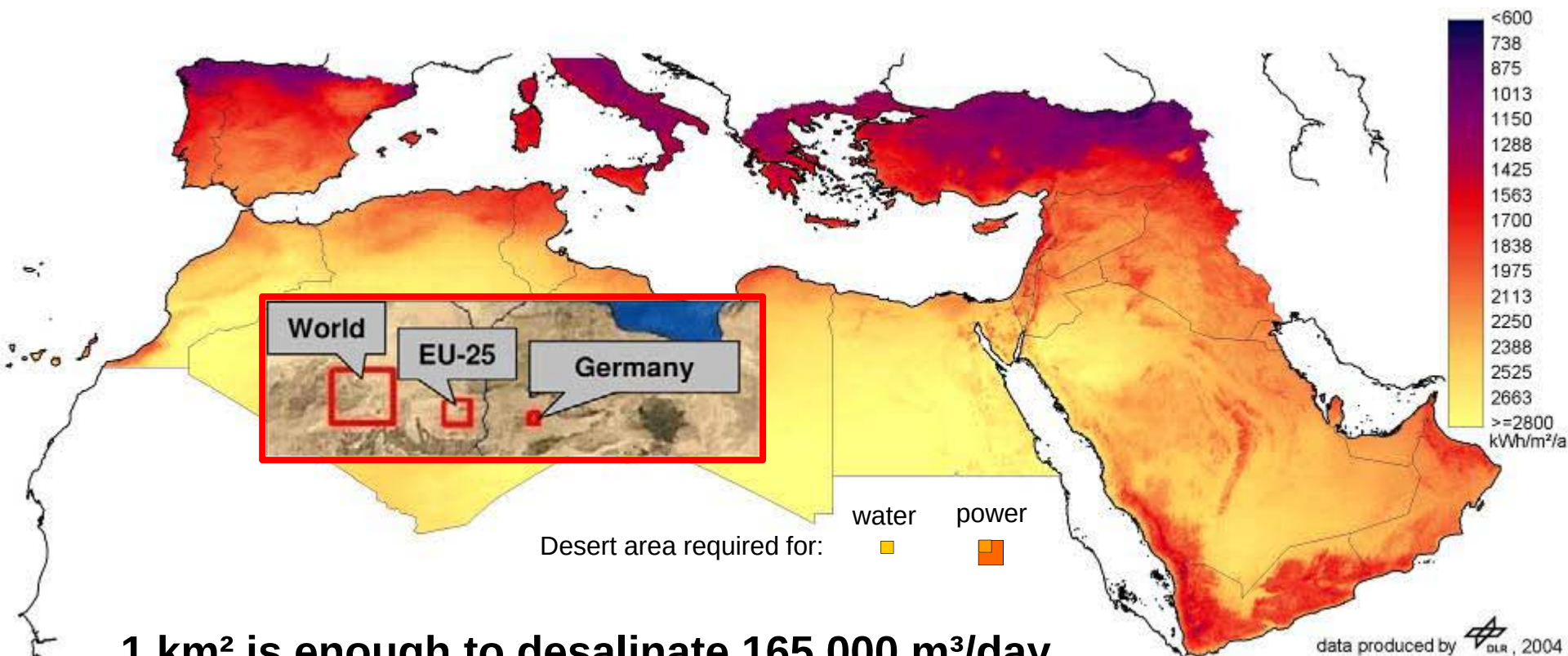
** Calculated by applying the sectors' share in final energy consumption to the total cost of consumed energy (2008=2,763 Million JOD; MEMR-Facts & Figures)

Jordan Energy mix



- ➔ increase of renewable energies' share by the National Energy Strategy as a further step to reduce GHG emissions and provide for more sustainable energy consumption
- ➔ Energy efficiency measures as complementing policy instruments

Direct Solar Irradiance in EUMENA in kWh/m²/y



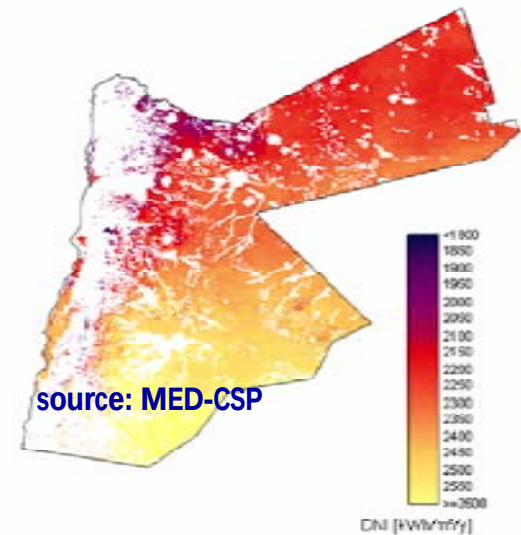
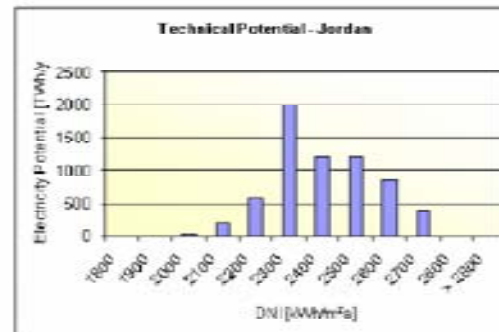
1 km² is enough to desalinate 165,000 m³/day.

50 km x 50 km are needed to avoid the MENA water deficit in 2050.

Solar irradiance 2400 kWh/m²/year x 10 % CSP efficiency / 4 kWh/m³ RO power consumption / 365 days/year = 0.165 m³/m²/day

Annual Sum of Direct Normal Irradiation in 2002 in Jordan.

Solar Thermal Electricity Generating Potentials in Jordan



Technical Potential: 5434 TWh/y (DNI > 1800 kWh/m²/y)
Economic Potential: 6429 TWh/y (DNI > 2000 kWh/m²/y)
Power Demand 2000: 7 TWh/y
Power Demand 2050: 50 TWh/y (Scenario CG/IE)
Feasible CSP 2050: 40 TWh/y (Scenario CG/IE)
Coastal Potential: 0 TWh/y (< 20 m a.s.l.)
Water Demand 2050: 3.5 TWh/y (Power for Desalination)

Jordan has the capacity of generating approximately 1.5×10^8 GWhr/yr which equals approximately 25cm of Crude Oil covering the surface of Jordan every year.

Annual average windspeed :

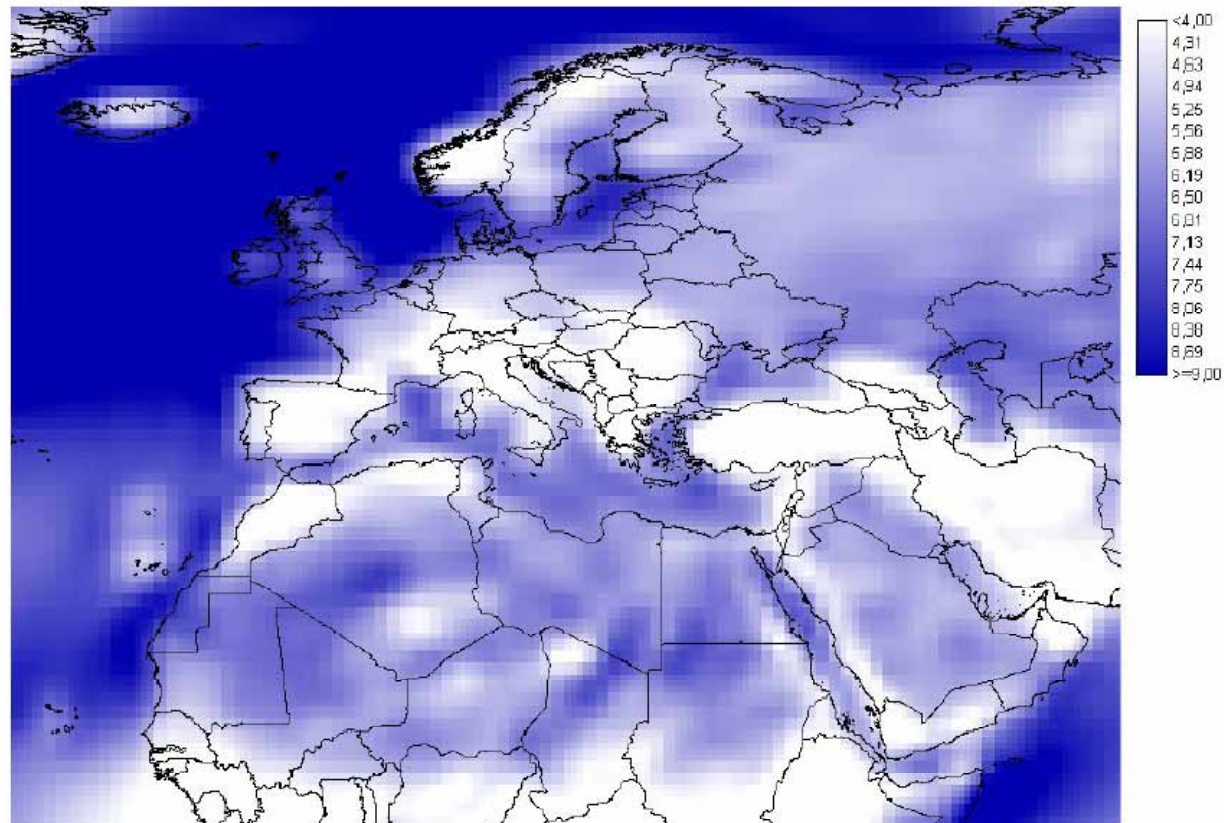


Figure 3-11: Annual average wind speed at 80 m above ground level in m/s. Source: Prepared by DLR with data from ECMWF, ISET for /WBGU 2003/



MINISTRY OF ENVIRONMENT

Action needed for incentivizing a Green Economy:

Market based incentives:

- Soft loans
- Rebates
- Private equity funds
- Private Equity and Venture Capital Funds
- Labeling

International trade agreements:

- Standards & certification
- CDM
- Credit Funds (AFD, GEF, IFC)

Government:

■ Fiscal incentives

- Tax exemptions
- Custom exemptions
- Subsidies
- Policies & Supporting regulatory frame work
- Loan Guaranties
- Green Funds
- Feed in Tariffs

National commitments:

- Media & awareness
- Education
- R&D
- Appropriate, suitable, affordable, Green Technology

➔ The Jordanian government should set an example for being a green government motivating the Jordanian economy and population to follow its example

Benefits from transforming in a Green Economy

■ Job Creation:

- For every 100 MW solar plants installed 400 full-time equivalent manufacturing jobs,
- For every 600 contracting and installation jobs, 30 annual jobs in Operations and Management

■ Leaders and followers:

The government spends annually a significant amount of its national budget on capital expenditures. To reduce the national deficit these assets and capital expenditures i.e. buildings, equipment, vehicles, stationary etc, must be purchased from energy efficient sources.



Thank you

