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# ENERGY EFFICIENCY & RENEWABLE ENERGY (EE/RE) APPLICATIONS IN PALESTINE

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# Palestinian Energy & Environment Research Center

A national R&D



Energy  
Efficiency

1993

Renewable  
Energy

## MISSION:

To foster the development of renewable energy, rational use of energy and energy conservation in Palestine



# Palestinian Energy & Environment Research Center

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- ✓ *Feasibility studies, technological researches*
  - ✓ *Awareness, training and promotion of clean and efficient technologies*
  - ✓ *Case studies & demonstration projects*

PEC was appointed as the focal point for all actions related to renewable energy and energy efficiency.

# Problems in Energy Sector

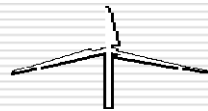


- Energy resources either dwindling or non exist

- High energy prices



- Renewable energy not reached a satisfactory level of utilization



- Environmental pollution potentially threatening



- Supply of conventional energy monopolised by Israel



## Development of Actions in RE/ EE

### ➤ Publication of Master Plan for RE & EE



Raise RE to 20% of TFC

Reduce energy imports by 2%

Cost  
**20 M\$**

Investments  
**166 M\$**

**SAVING**  
**24 M\$/yr**

# Development of Actions in EE

 RE/EE strategy/ Law ~ Under preparation

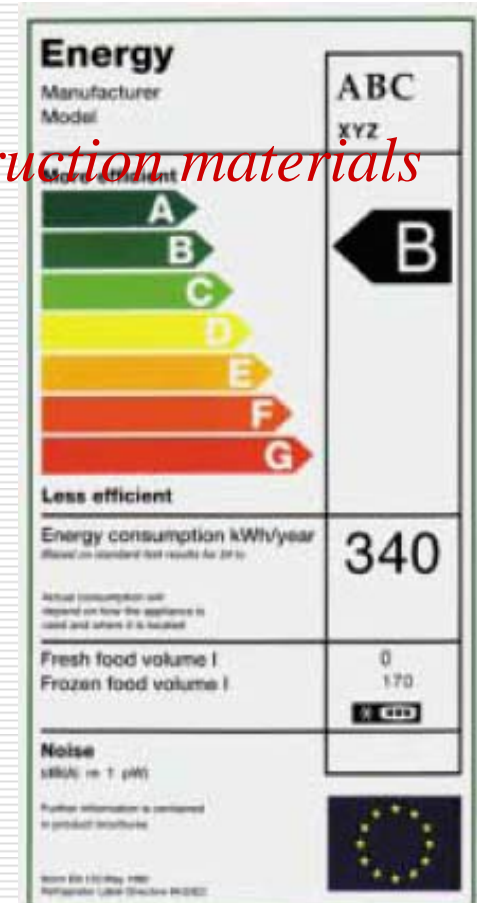
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## ➤ Energy Code for Buildings

- ✓ Approved by PHC in 2004
- ✓ Drafted Action plan of implementation
- ✓ Introduced Technical Guidelines

# Energy labeling/ specifications of appliances and construction materials

- *Energy labeling for domestic appliances*
- *Energy labeling and specifications for construction materials*



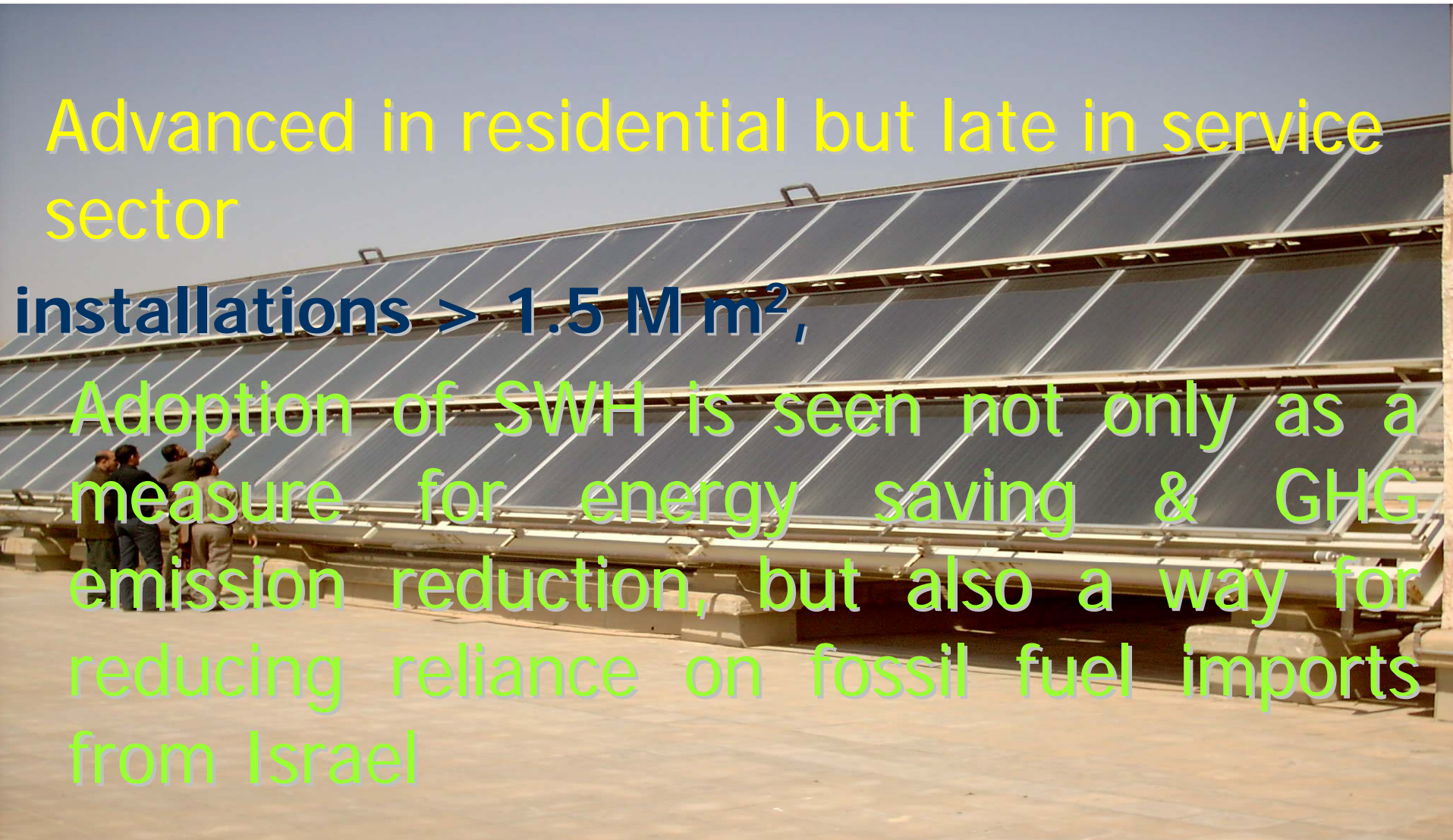
# Development of Actions in SWH



Advanced in residential but late in service sector

installations  $> 1.5 \text{ M m}^2$ ,

Adoption of SWH is seen not only as a measure for energy saving & GHG emission reduction, but also a way for reducing reliance on fossil fuel imports from Israel





# Development of Actions in CSP



## Solar Energy is a core in Palestine's Master Plan of Renewable Energy

### Signing of a contract for CSP in Jericho

- Demonstration: 0.5 MW
- Phase I: 3 MW ~ 17 M\$
- End phase: 100 MW ~ 300 M\$



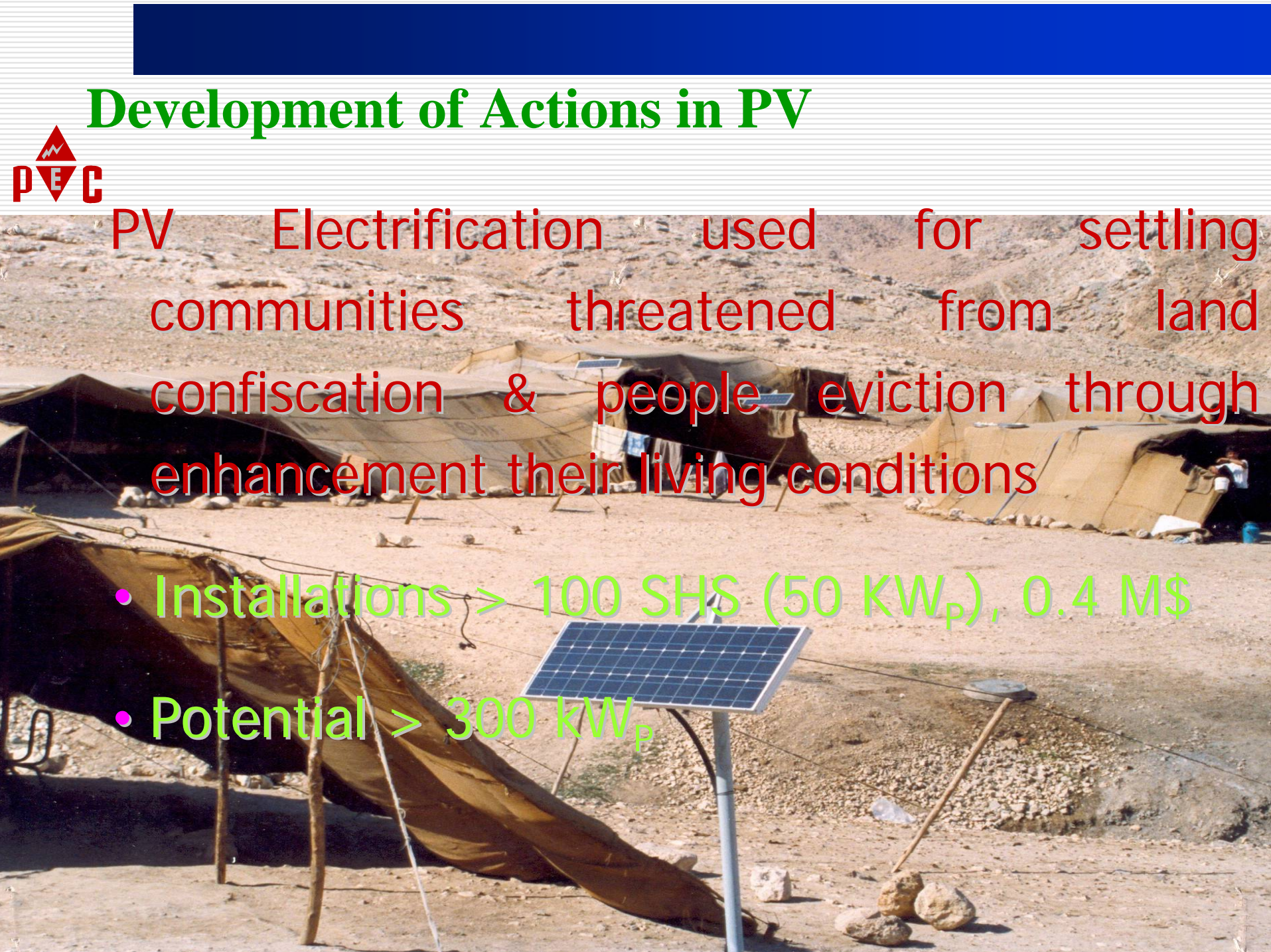


# Development of Actions in PV



PV Electrification used for settling communities threatened from land confiscation & people eviction through enhancement their living conditions

- Installations > 100 SHS (50 KW<sub>p</sub>), 0.4 M\$
- Potential > 300 KW<sub>p</sub>



# Development of Actions in Wind



~ 5 m/s

- Still a subject of research & investigation
- Could be feasible for grid-off electricity production & water pumping





# Development of Actions in Biogas




- Under investigation
- ~~Potential ~ 33 M m<sup>3</sup>~~
- Pilot project demonstration



# Development of Actions in Geothermal

## Etihad subdivision in Ramallah – Al –Bireh

 Area = 390 m<sup>2</sup>

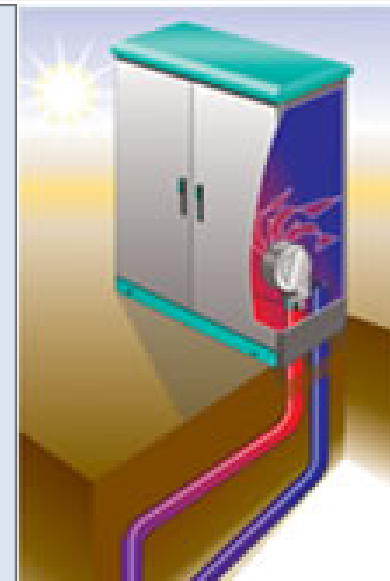
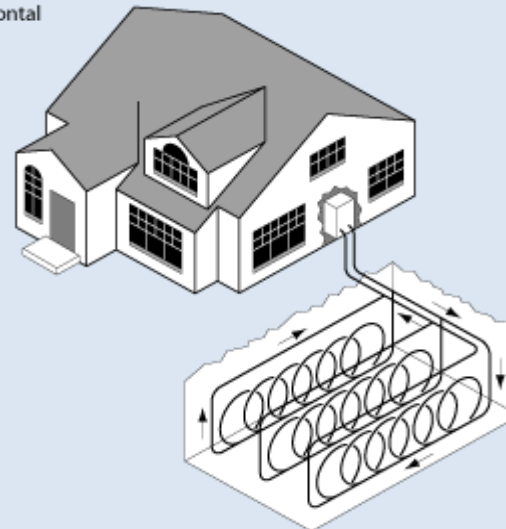
- U value walls = 0.87 w/K.m<sup>2</sup>
- U value windows = 2.87 w/K.m<sup>2</sup>
- 25 kW cooling and 23 kW heating loads
- Two Geo. Heat pumps 14 kW water-to-Air
- Vertical loop 70 m
- Pilot project demonstration ~ Med-Enec

### Expected Results

- 4000 liters of diesel reduction/y
- 33,000 kWh of electricity annually
- 70% savings on operating cost
- Payback period 3.5 years



Closed Loop Systems  
Horizontal





***THANK YOU***