



RENEVOL

renewable evolution

1 INNOVATION WEEK ON R.E.S.

ENTREPRENEURSHIP CHALLENGES & PERSPECTIVES FOR DEVELOPMENT & EMPLOYMENT



...ENERGY TO BE INDEPENDENT



DIRECTIONS

- **Reducing the use of energy resources**
(Energy Saving)
- **Increasing energy efficiency**
(Improving the Efficiency of Energy Conversion)
- **«Decarbonisation» of power**
(Promotion of Renewable Energy Sources)





MAIN TARGETS

The main strategic energy objective of the EU is to reduce their greenhouse gas emissions by 20% by 2020 compared with 1990 levels.

To achieve the main strategic goal, the European Commission proposes parallel to achieve three related goals for 2020

- improving energy efficiency by 20%
- increase the rate of penetration of renewables in the energy mix to 20% level
- and increasing the share of biofuels in transport to 10%



NATIONAL TARGETS

According to EC Directive 77/2001 the participation of RES in total electricity consumed in the EU 2010 should be around 12%. For Greece the figure was 20.1%.

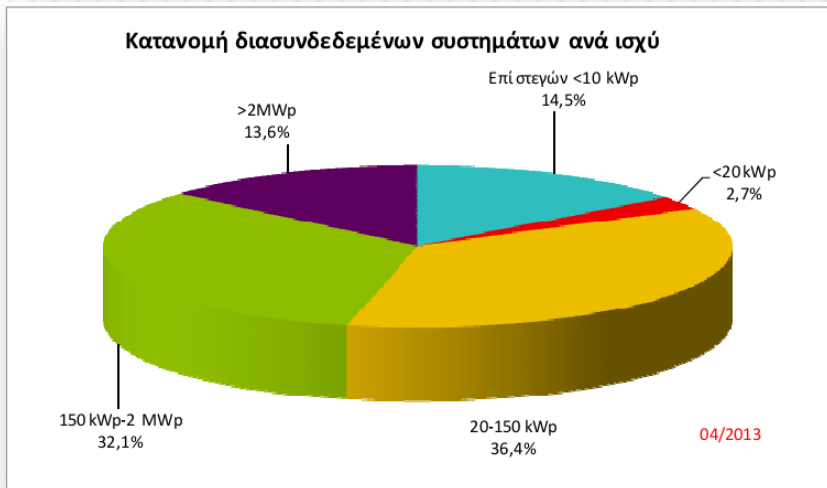
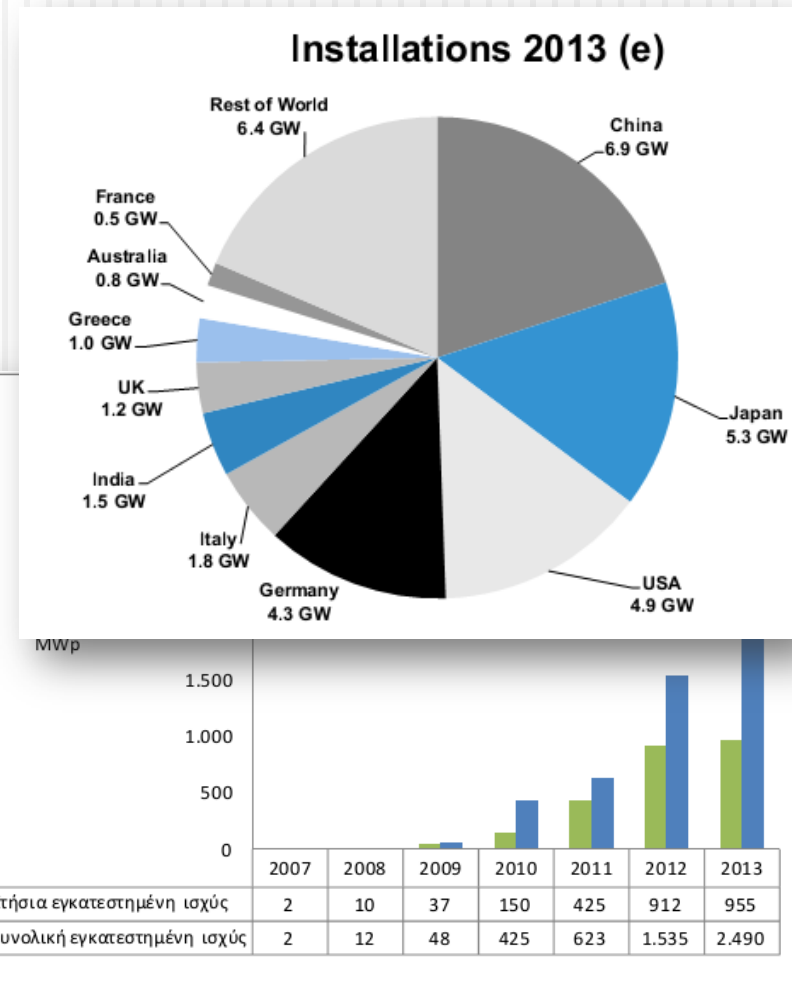
Greek government issued an Intended proportion of installed power and distribution in time between various RES

TECHNOLOGY	TIME PERIOD	
	2014	2020
HYDRO	3700	4650
Small (0-15MWp)	300	350
Large (>15MWp)	3400	4300
PHOTOVOLTAICS	1500	2200
Special class for farmers	500	750
Other Installations	1000	1450
WIND SYSTEMS	4000	7500
BIOMASS	200	350
SOLAR THERMAL	120	250



GREEK PV GROWTH

- ✓ Greece became one of the Top10 (8th place) countries in the World in PV installations for 2013
- ✓ The target of 2500 MWp installations was reached on 2013 instead of 2020 that was planned





WHAT CAUSED THE OVERHEAT OF PV GROWTH

- ✓ Delay in reducing the Feed-In-Tariff accordingly with the decrease of PV systems cost
- ✓ Change of Feed-In-Tariff 3 times in less than a year
- ✓ Anti-dumping law in the Chinese PV modules
- ✓ Reached the target of 2500 MWp in 2013 instead of 2020
- ✓ Change of European Energy Targets from RES to cheap energy
- ✓ Lack of political will and support





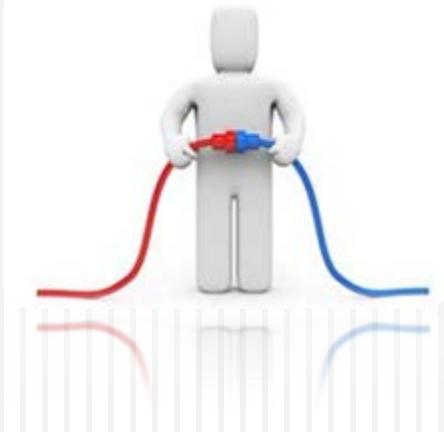
WHAT'S NEXT FOR PV?

- ✓ Sustainable growth without Government support
- ✓ Increasing of retail electricity prices can make again PV systems competitive
- ✓ Further decline of solar module price
- ✓ Technology gains will continue to boost productivity
- ✓ Balance of system costs will continue to decline
- ✓ New regulatory and institutional framework



NET METERING

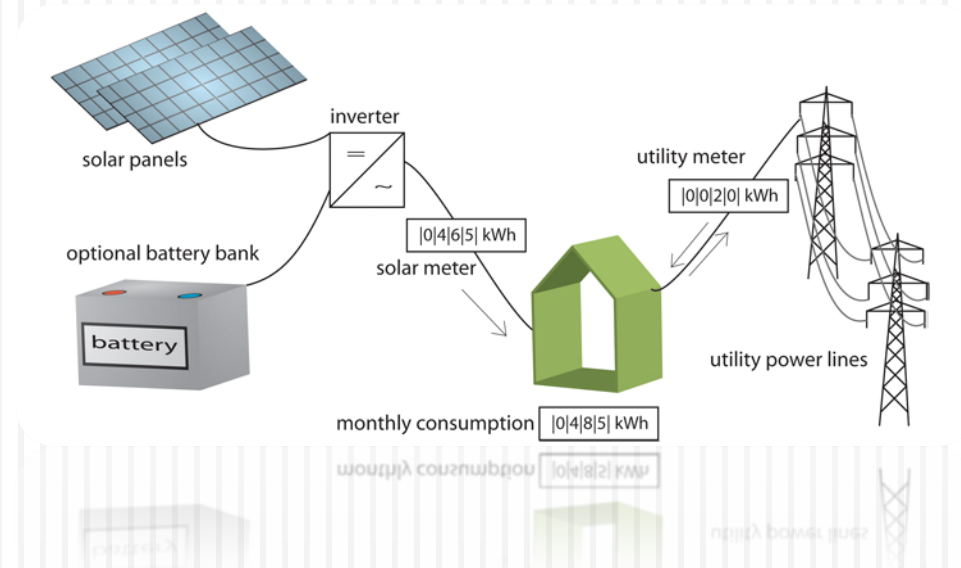
- ✓ Net metering is the energy offsetting of the energy produced to the energy consumed
- ✓ With net metering you only have to cover your energy needs
- ✓ The sectors that can benefit from net metering is
 - Residential buildings
 - Industrial buildings
 - Commercial buildings
- ✓ The energy is consumed in the same place that is produced
- ✓ New market for RES companies without creating more financial burden to LAGHE
- ✓ Keep the majority of the jobs





SINGLE HOUSE EXAMPLE

- ✓ Assume a family of 4
- ✓ In a house of 150 m²
- ✓ That consumes 4.500 kWh of electricity a year
- ✓ And pays 750€ per year



NET METERING SOLUTION WITH PV

- Using the net metering scheme it will need a PV system of $4.500 \text{ kWh} / 1450 \text{ kWh/kWp} = 3.1 \text{ kWp}$ to cover their energy needs
- The cost of a PV system of 3.1 kWp is 6.500€
- The payback of the system is 8^{1/2} years



SINGLE HOUSE EXAMPLE WITH CENTRAL HEATING

- ✓ Assume a family of 4
- ✓ In a house of 150 m²
- ✓ That consumes 4.500 kWh of electricity a year
- ✓ And pays 750€ per year
- ✓ Consumes also 2.000 lt of oil for central heating
- ✓ And pays 2.600€

CHANGE OIL BOILER WITH A HEAT PUMP

- ✓ To cover the same need in heating you need a 8 kWp heat pump
- ✓ Using a heat pump with COP of 2.5 instead of an oil boiler your addition in electricity is 8.640 kWh
- ✓ Thus the total consumption is 13.140 kWh of electricity a year
- ✓ And pay 2.760€ per year





NET METERING SOLUTION WITH PV + HEAT PUMP

- ✓ The new PV system you will need is $13.140 \text{ kWh} / 1450 \text{ kWh/kWp} = 9.0 \text{ kWp}$ to cover their energy needs
- ✓ The cost of a PV system of 9.0 kWp is 14.000€
- ✓ The cost of a heat pump is 7.500€
- ✓ The total cost is 21.500€ and with a cost saving of 3.350€
- ✓ The payback of the system is $6^{1/2}$ years





SINGLE HOUSE EXAMPLE WITH A CAR

- ✓ Assume a family of 4
- ✓ In a house of 150 m²
- ✓ That consumes 4.500 kWh of electricity a year
- ✓ And pays 750€ per year
- ✓ The family has a car that drives 20.000 km per year
- ✓ With an average consumption of 5lt/100km and the price of oil at 1,67€
- ✓ The yearly cost is 2.000€
- ✓ The total cost is 2.750€





NET METERING WITH A PV + E-MOBILE

- ✓ Changing the conventional car with an E-car
- ✓ The energy consumption of an average e-car is 30 kWh/160 km
- ✓ With 20.000 km per year we will need 3.750 kWh to cover transportation
- ✓ The total cost of electricity is 1.732€
- ✓ Using net metering we will need 5.7 kWp of PV
- ✓ The cost of the PV system with a charge station that can full charge the car in 6 hours is 14.000€
- ✓ The payback time is 8 years





NEW PV MARKETS

- ✓ BIPV + Zero Emission Buildings
- ✓ Hybrid PV/Thermal Modules
- ✓ PV Heating/Cooling
- ✓ Stand alone systems
- ✓ PV grid connected parks with storage ability for covering night load
- ✓ PV combined with Energy Management and Saving Systems
- ✓ Solar Lighting



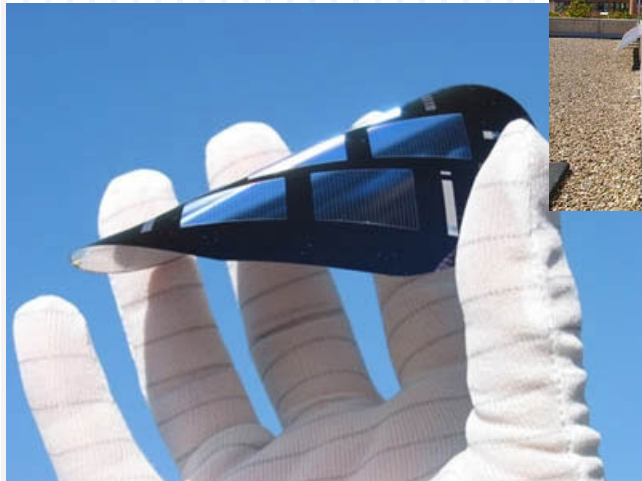
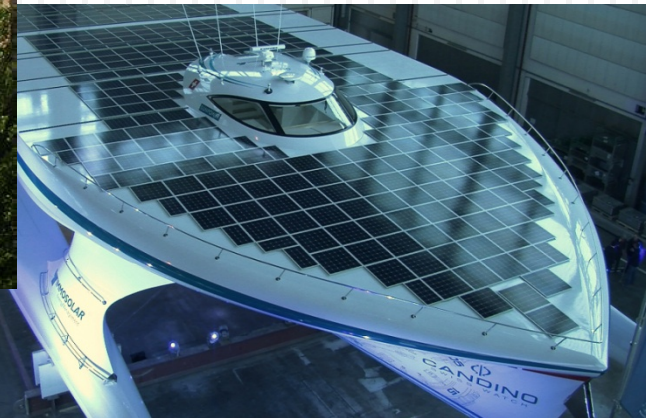


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PV & INNOVATION





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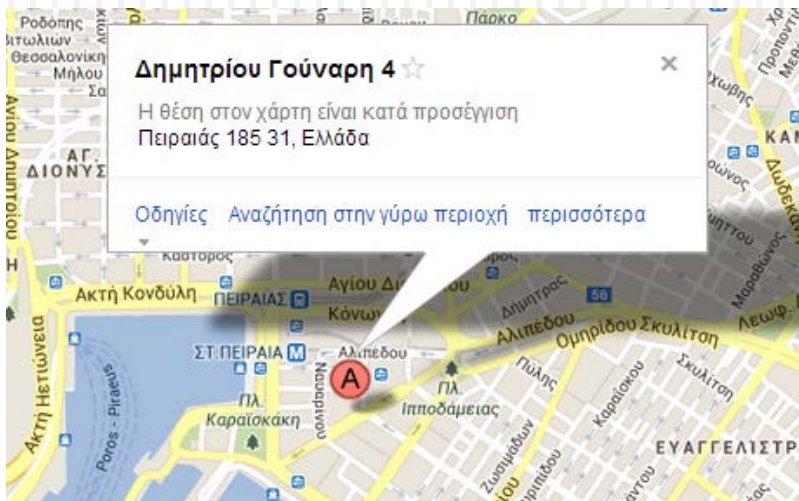
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THANK YOU FOR YOUR ATTENTION

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