



**GRID PARITY**

**P R O J E C T**

# **Solar Economics Forum**

*Towards Grid Parity*

London 16-18 June 2009

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Chairman

Grid Parity Project Association

# Toward Grid Parity

*“Without Grid Parity all  
PV economy will be  
drastically reduced”*

# **Toward Grid Parity**

**A common word “Grid Parity” without a real definition.**

**A “road” not yet completed.**

# Grid Parity Project Association

An “independent” non profit organization  
established in Rome in march 2008.

A dedicated group of representatives of  
important companies members of the  
Executive Committee.

The only interdisciplinary group of experts  
working together to improve the knowledge  
of the conditions for PV competitiveness.

# Grid Parity Project - GPP

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# Grid Parity Project's Members



# Five main groups of interest in the GPP

- PV companies of different size and different activities.
- Financial Institutions and Banks.
- National Government and local Administrations
- International Organizations.
- Utilities

# “PV scepticism”

- PV is still considered the most expensive renewable energy technology.
- PV applications exist only for financial profit.
- PV is an unreliable source of energy.
- The complexity of the electricity costs evaluation is still a barrier against a rationale evaluation of PV electricity.
- Not really CO<sub>2</sub>/fuel-saving, due to energy-intensive production process of PV material

# The danger of “PV scepticism”

- *National Governements could cut incentives without real planning.*
- Financial Institution and Banks have difficulties to understand the long term implication of industrial PV financing.
- *Public opinion is badly informed by all sort of media.*
- “The road to Grid Parity is almost impossible”.

# Grid Parity Definition

GP is an economic “environment” where the internal and external conditions of the applications of the PV technology bring the cost (price) of PV electricity within the range of cost (price) of electricity generated by other and more conventional sources of energy for any specific “consumer”.

**Many GP conditions not a unique GP**

# Grid Parity cost evaluation

The basic problems for the evaluation the cost of PV kWh is to define the boundaries of the 'system' and the costs that are included in it:

*Technology factors*

*Market or “external” factors*

# Key Technology Factors

- Module cost
- BOS and installation cost
- Performance Ratio
- PV plant lifetime

# Key “Market” Factors

- Financing and cost of capital
- The cost and timing of autorizations
- The cost of peak electricity (gas peakers).
- Local electricity billing policy.
- Cost of land.
- Local solar radiation.
- Clarity and reliability of the regulatory framework

# PV kWh cost evaluation

Our model does not take into consideration:

- Any Government subsidies
- Any Tax rebate policy
- Any Environmental benefit

# PV kWh cost evaluation

Total CAPEX per MW :

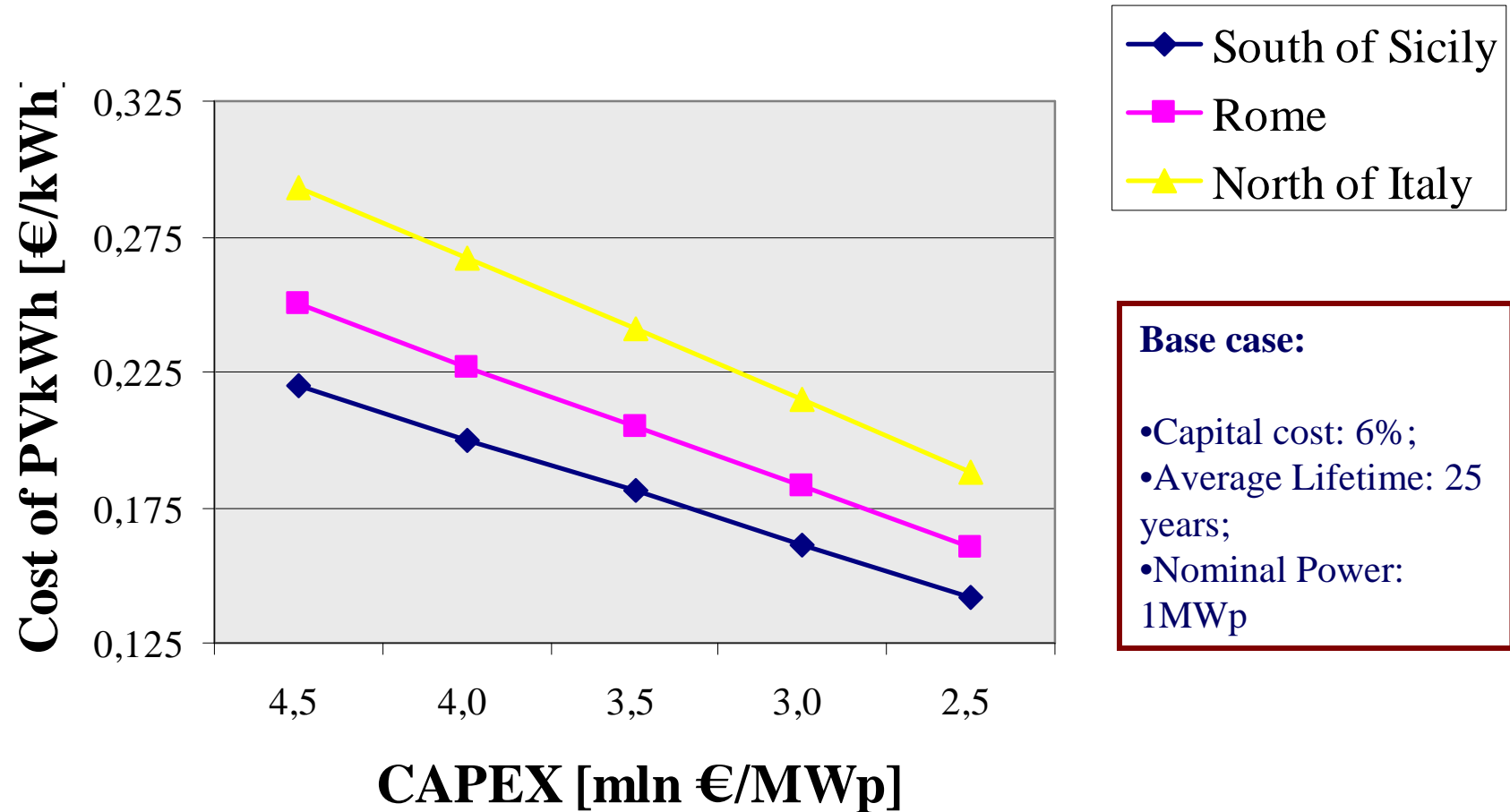
- BOS and installation cost
- Module cost
- Cost of land
- Financing and cost of capital
- The cost and timing of local Authorization

# Sensitivity analysis

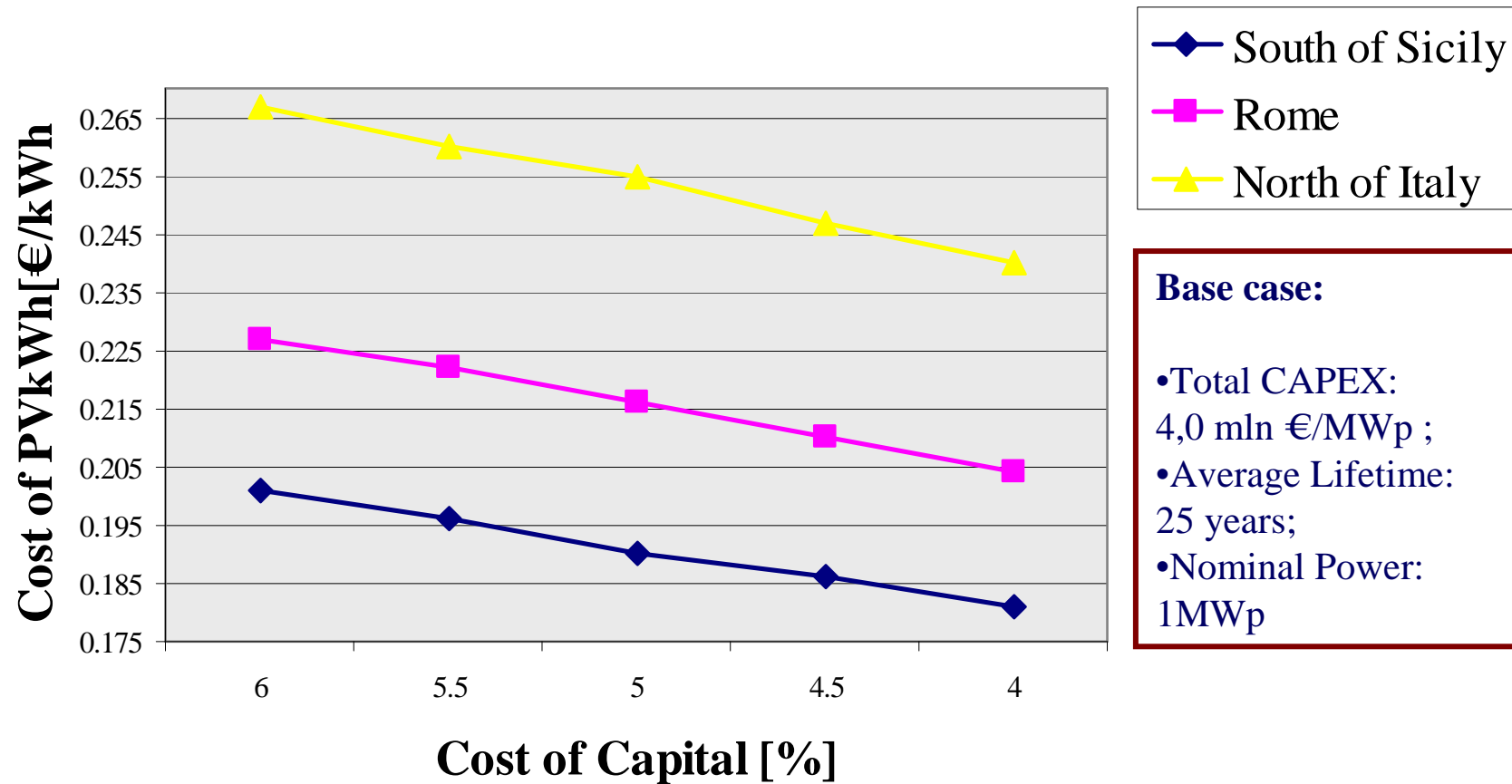
## Base Case :

- Total CAPEX: 4,0 mln (€ /MWp)
- Capital cost: 6%
- Average lifetime: 25 years
- Nominal Power: 1 MW

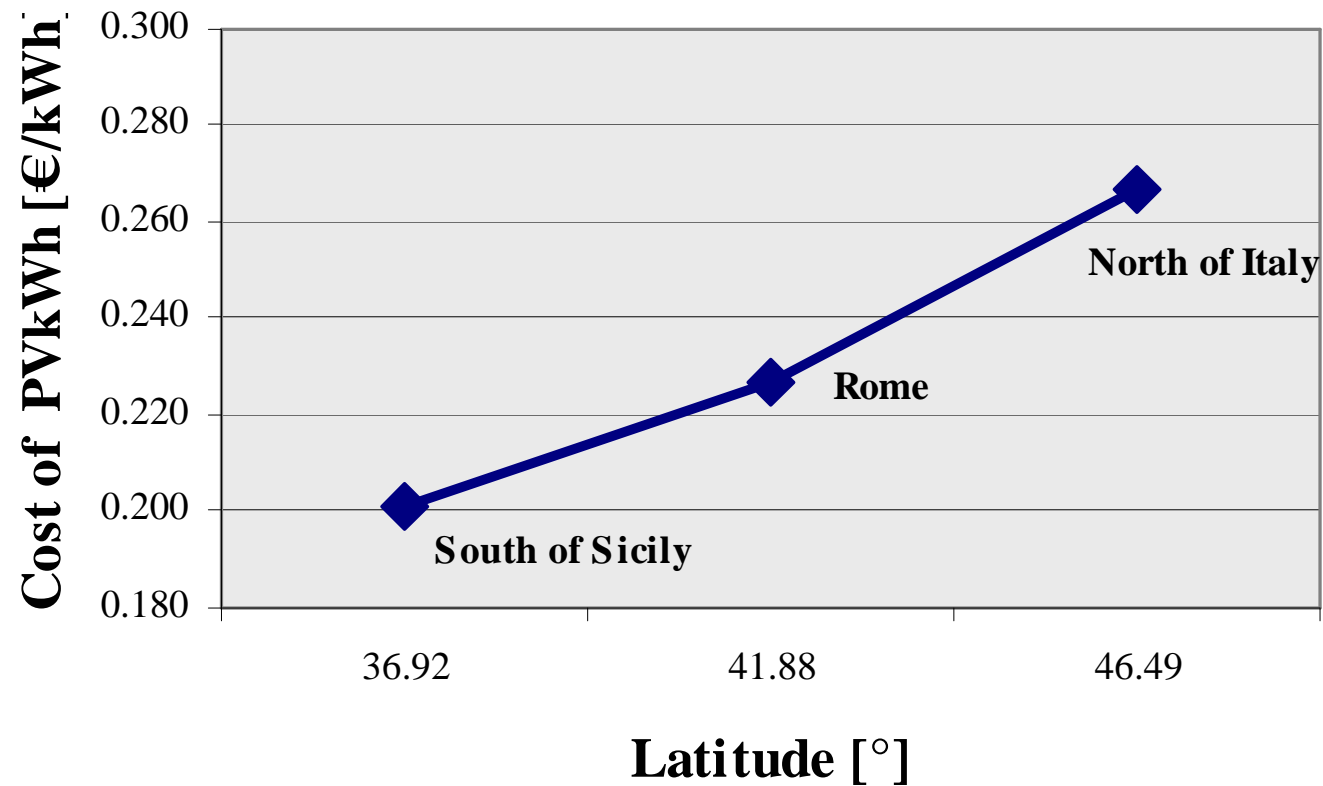
# PV kWh cost evaluation



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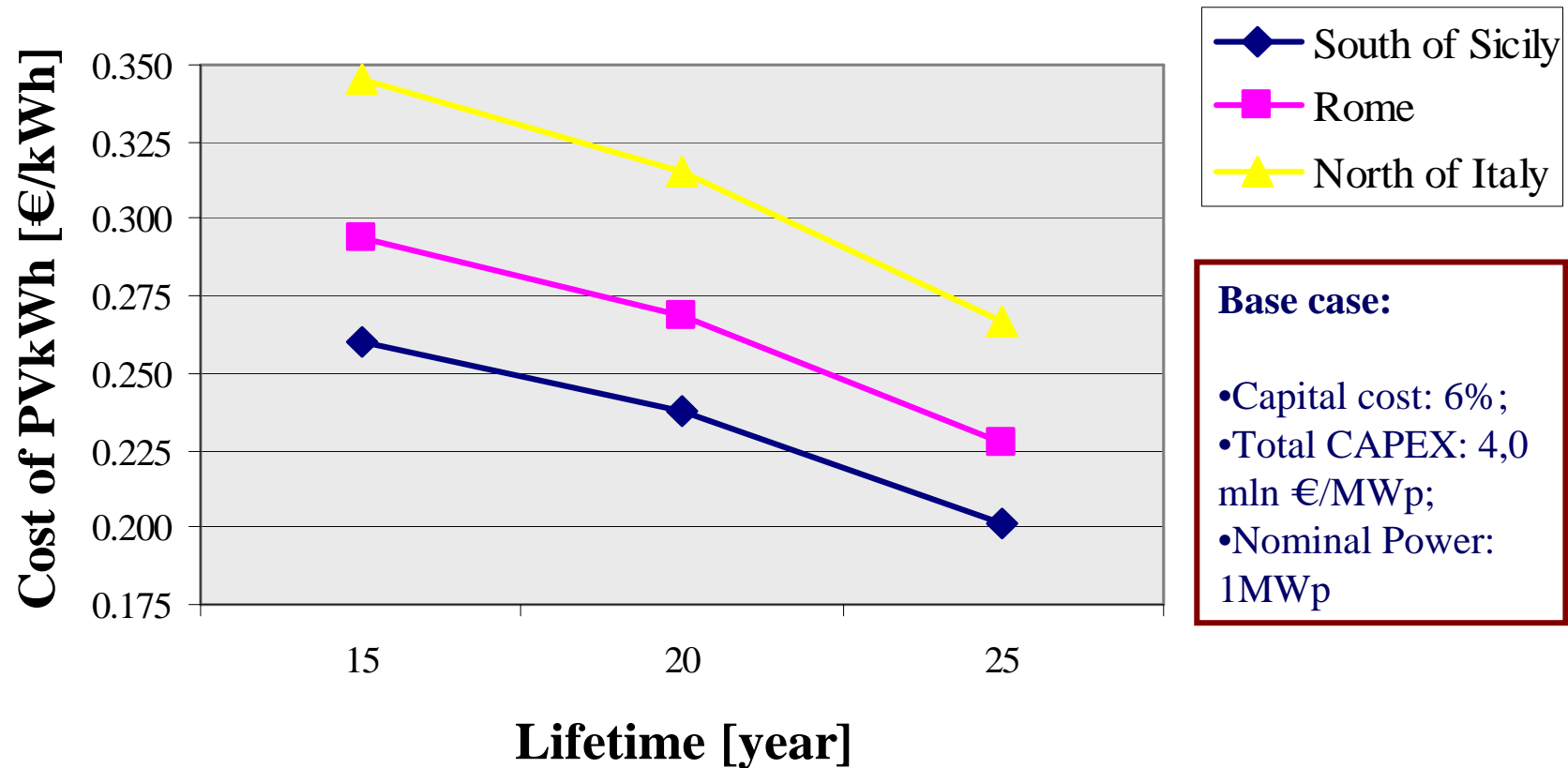
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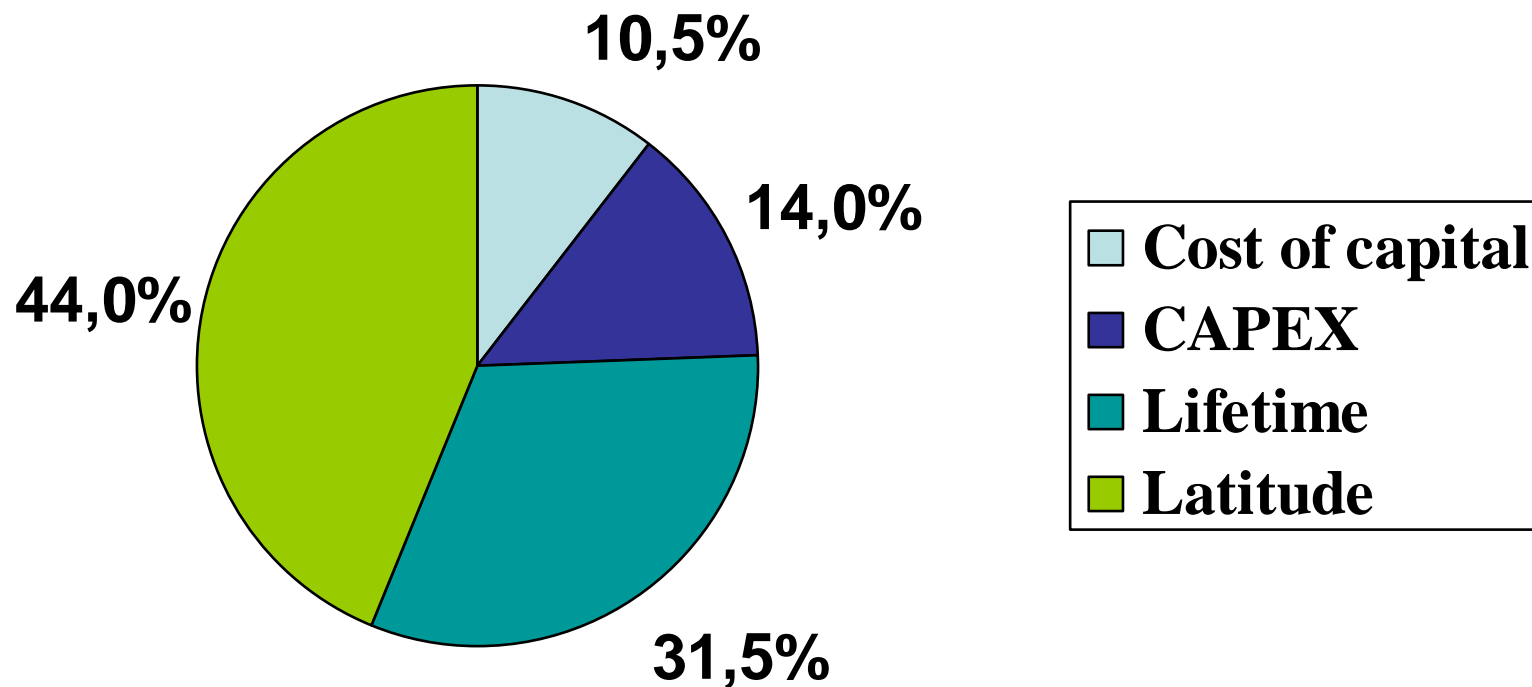
## Base case:

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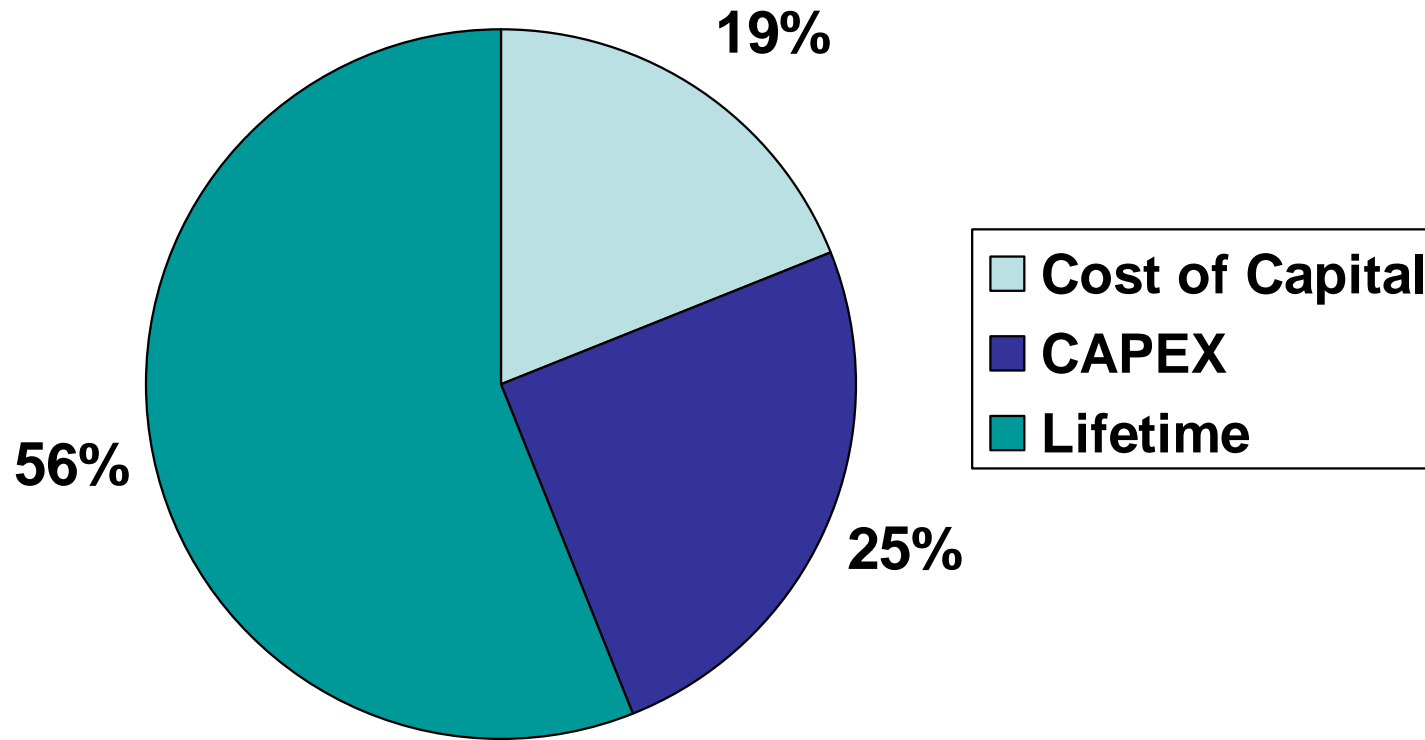
# PV kWh cost evaluation



# Key factors in PV kWh cost in Italy



# Key factors in PV kWh cost



At constant latitude

# Extreme Scenarios

Grid Parity **condition A**: cost of kWh at the point of **grid connection** for utility size PV plants.

Grid Parity **condition B**: cost of kWh for decentralized PV **domestic applications**.

Transition from Condition A to B may require years.

# **GPP first conclusion**

**The GPP conditions are very different for *Utility size* PV plant versus *Domestic* applications.**

# Main Limits for Grid Parity

- Availability of land or other areas
- Local electric grid “capacity”
- Power management
- Continuous capital investments

# Grid Parity Scenario

- Today large PV plant are ready for re-installation in the 25 years time.
- No other use of land will be more profitable than the production of PV electricity.

# **Grid Parity Scenario**

**Today PV investments must be considered as a long lasting investment.**

# **Grid Parity Project Development**

**In the near future:  
from an Italian Association to  
an International Association  
with several National entities  
open to all interested parties.**

**For expression of interest  
please contact:**

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