

## CAN THIS WORK FOR PV?

### General Principle

Electricity will always have a value.

**A PV generator must find a buyer at a price that allows him amortizing his investment.**

$LCOE + \text{flex costs} + \text{transaction costs} + \text{margin} = \text{value}$   
over the life time of the investment.

Parameters:

- Contract duration (spot versus negotiated PPA): risk versus margin
- Aggregator price and size: transaction costs and risk
- Flexibility costs: local vs central resource, local vs central control
- Technology readiness and costs of DSM and storage



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### Necessary Characteristics (Market Access)

- Economic
  - economies of scale will require aggregation
  - allocation of costs & benefits in line with risk and size
- Regulatory
  - market access for aggregated PV for all markets and products
  - new products, oriented at the intrinsic characteristics of PV, wind, DSM, storage, e.g., with probabilistic price component
  - ancillary services from distributed generation and flexible resources
- Legally
  - unambiguous and stable legal framework for aggregation
- Technically
  - ICT for monitoring, forecasting and control
  - Distributed generation, consumption and electrical storage

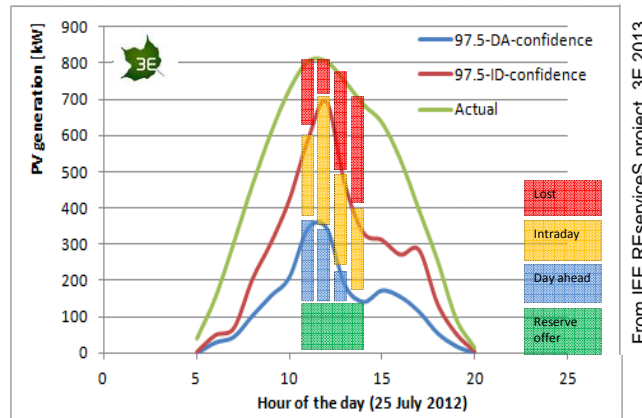


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Example: Probabilistic Bidding with a PV Portfolio



Ideally with a larger portfolio of complementary resources.



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## FOR DISCUSSION

Competitive PV on Power Markets

- In a renewables-dominated market, PV can be a sustainable investment
- This requires aggregation, regulatory changes, an adaptation of the legal framework and technical innovation
- A sustainable market for PV may be threatened if non-sustainable generation can offer at prices lower than the LCOE of renewables
- We don't know which pure flexibility options (DSM, power to gas, storage) will ever have a business case
- Transition needs to be smooth, careful and strategic



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