

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 + flex costs + transaction costs + margin = 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 and flexible resources
- Legally
 - unambiguos and stable legal framework for aggregation
- Technically
 - ICT for monitoring, forecasting and control
 - Distributed generation, consumption and electrical storage

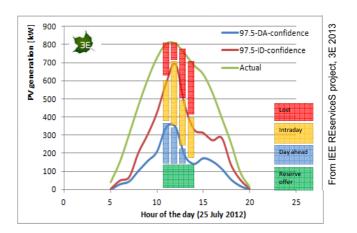


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Example: Probabilistic Bidding with a PV Portfolio



Ideally with a larger portfolio of complementary resources.

36

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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 nonsustainable 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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