High integration of RES to the market and policies – challenges for Japan

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REvision 2015 conference – 4 March 2015
EPIA’s mission

Shape the regulatory environment to promote the growing market opportunity for solar in Europe
Market development in Europe
Born in Europe, PV is becoming mainstream globally

TOP 3 MARKETS IN 2014:

- CHINA
- JAPAN
- USA

Evolution of global PV cumulative installed capacity 2000-2013

+42 GW
Solar covers the power needs of 30 million EU households
Market development until 2014 (preliminary)

Annual PV market in 2014: around 8 GW
Solar PV: a key player in the energy transition
1/3 of investments went to PV in the last 10 years

Renewable
Solar power is becoming a mainstream source of energy

Net power generation capacities added in the EU 28 between 2000-2013

Source: EPIA, ESTELA, EU-OEA, EWEA, Platts PowerVision, PV CYCLE.
PV will be a major clean power source by 2030
Solar PV in Japan: Key lessons learnt from European experience
KEY MESSAGE 1: Dynamic support mechanisms are key

Price of rooftop PV system in Germany

Overview of retroactive and retrospective changes in Europe

- Unplanned support reduction or cancellation of support
- Revoked measures
- Moratorium
- Retrospective measure
KEY MESSAGE 2: Ensure flexibility in the system

- Interconnection
- Storage
- Demand Side Management
- Flexible Generation mix
- Exploiting options PV can provide

Source: IEA PV Technology Roadmap 2014
PV is smart grid

THE SECOND MOST DEPLOYED “SMART GRID TECHNOLOGY” AFTER SMART METERS

CONSUMERS BECOMING A SOURCE OF FLEXIBILITY
Focus: PV capabilities to support system operation

State of the art capabilities:
- Q provision based on V at the PCC
- Remote P management (> \approx 30 kW)
- Limited frequency sensitive mode

Advanced capabilities:
- P management based on V at the PCC
- Remote P management for small systems
- Q provision based on set points
- Q provision at night

Capabilities under investigation:
- PV/others swarm management
- Negative sequence current provision (phase imbalances),
- Harmonic compensation and damping oscillations

Source: REserviceS 2014
KEY MESSAGE 3: reduce cost of capital via long-term signals

When cost of capital reaches 9%, it makes up 50% of the LCOE
KEY MESSAGE 4: pilot the energy transition

Development of gross power production 1990-2014 in TWh

Source: Agora Energiewende
KEY MESSAGE 5: adapt market design

Energy-only markets do not deliver

Ancillary service markets do not reflect variability

Challenges ahead: governance and new PV revenue streams

Marginal economic value and annual flat-block of power with increasing PV penetration

Source of graph: Ernest Orlando, Lawrence Berkeley National Laboratory
Bridging the vision, not patching the present

- **SOLAR UPTAKE IS A FACT**
- **NEW SOLUTIONS, NEW CHALLENGES**
- **OLD APPROACHES WILL NOT DELIVER**

**NEED FOR “SMART(er)” REGULATIONS TO:**

- **ENABLE PROSUMERS**
- **UNLOCK NEW BUSINESSES**