EPIA
European Photovoltaic Industry Association

ADEL EL GAMMAL
SECRETARY GENERAL

SET FOR 2020

SETTING THE PACE OF THE SOLAR AGE

European Photovoltaic Industry Association

The world's largest industry association devoted to the solar PV electricity market

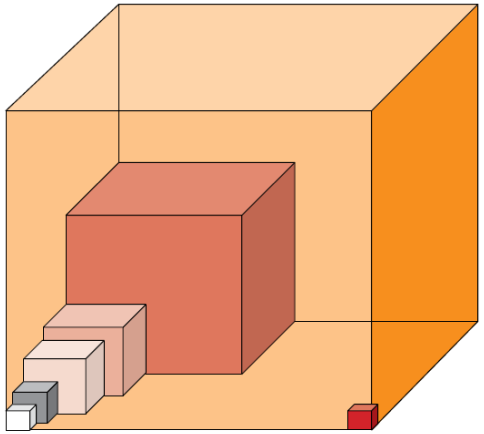
- + 200 members representing 90% of EU PV Industry
- National Associations: ASIF, AEF, APPA
- Sustainability as governing principle
- EU and global levels, Members States (RES)
- Reference information source: market, policy, technology & science
- EU SET Plan – Solar Europe Industry Initiative (SEII)
- PV MED Conference, Spain 2010

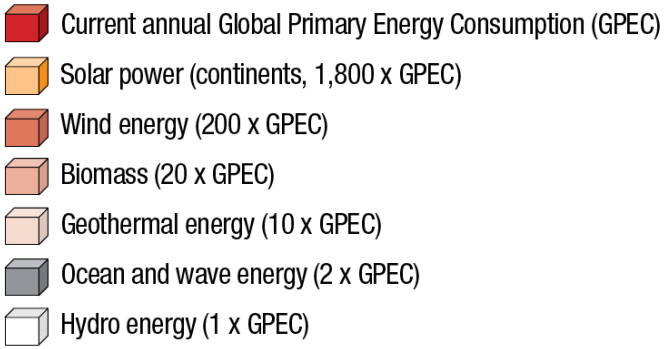
SET For 2020
Setting the Pace of The Solar Age

- Commissioned by EPIA to Strategy Firm A.T. Kearney
- Identify and demonstrate the true potential of PV
- Roadmap & recommendations for sustainable accelerated growth
- Most comprehensive study to date on the future of photovoltaic electricity generation in Europe
- Fully endorsed by the PV Industry
- Acknowledged by EC as reference high penetration PV scenario

PV has unique fundamentals

- Unlimited power **from the sun**

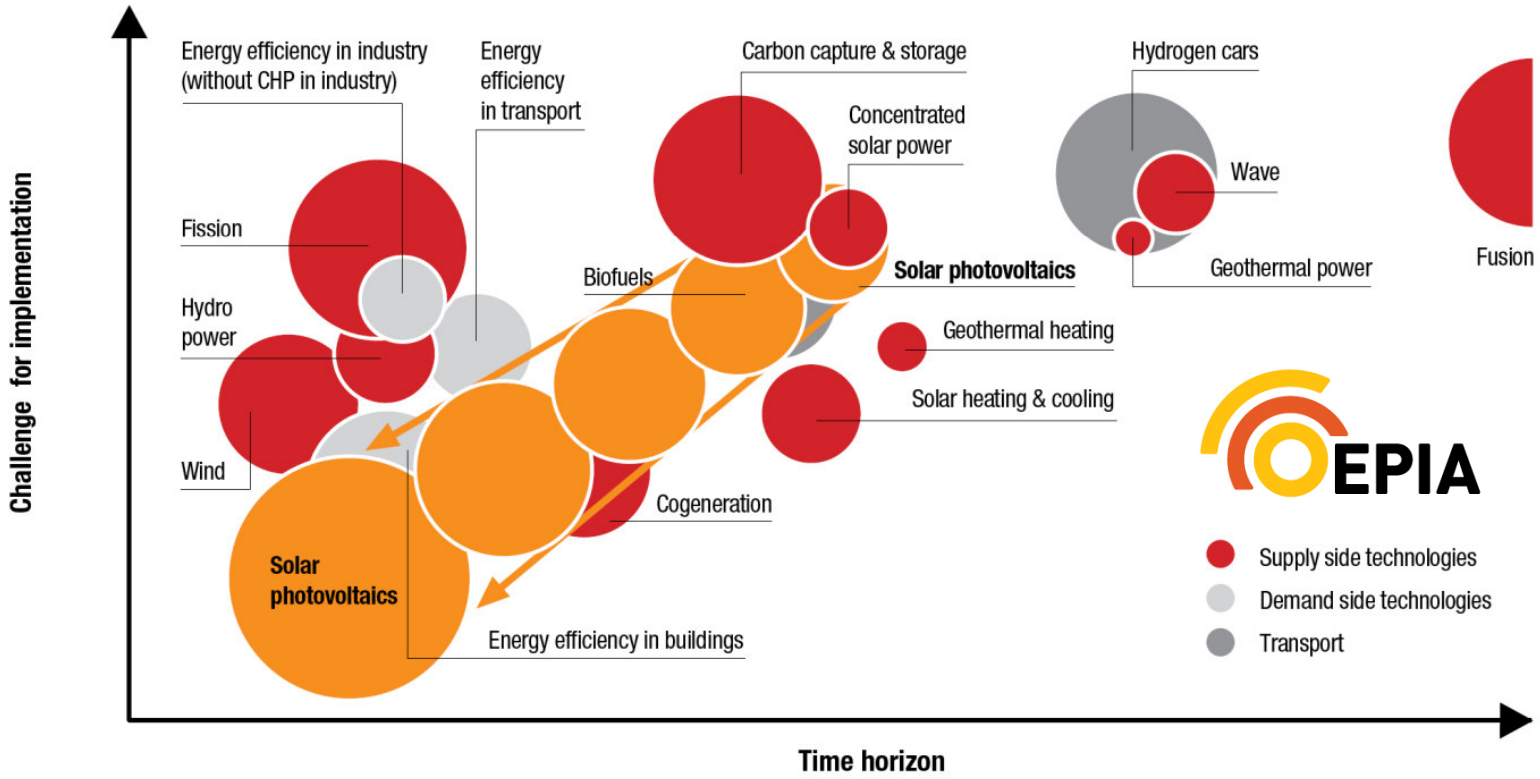




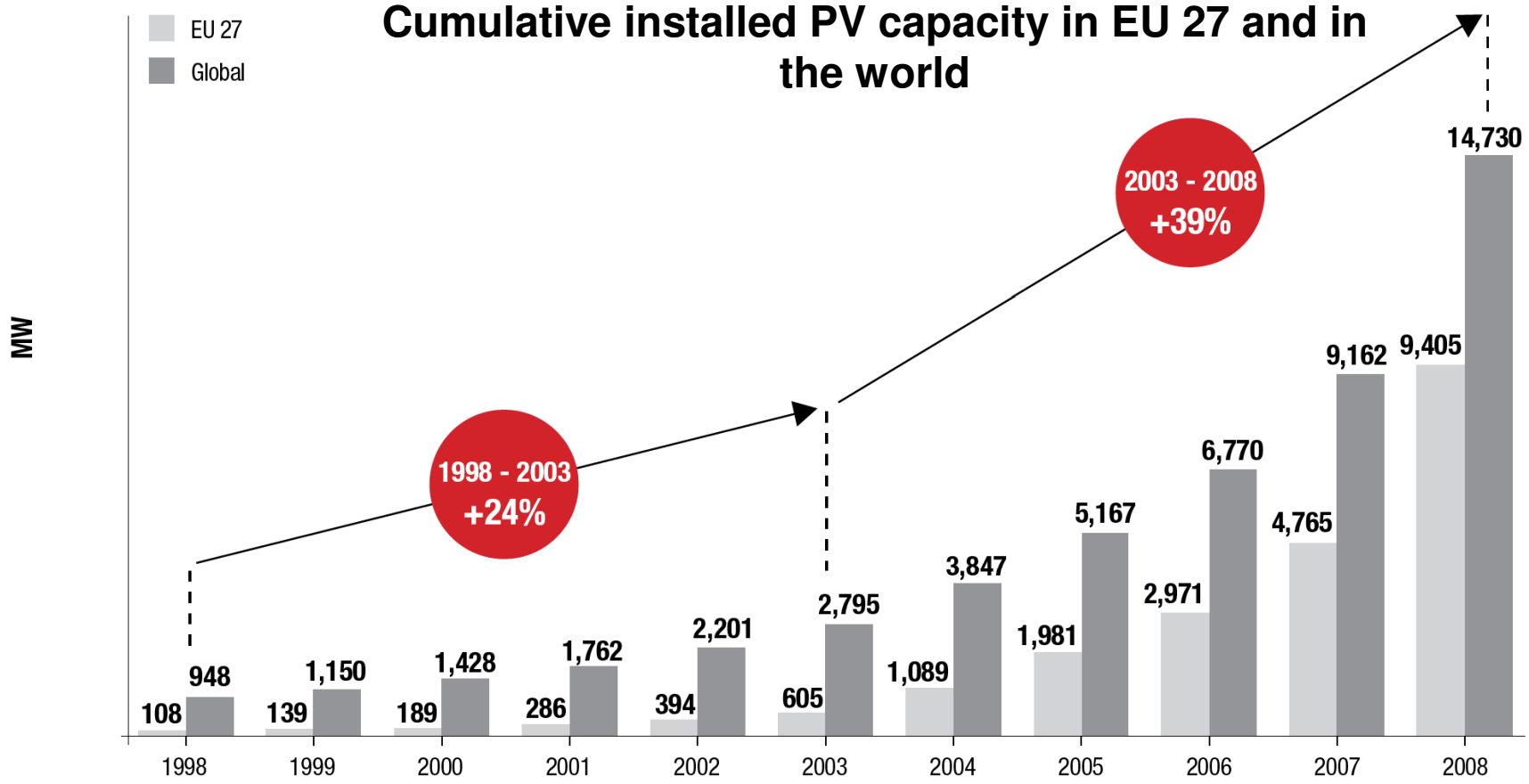
- No material, environmental or industrial limitations
- Excellent environmental Footprint
- Distributed power generation
- Seamless integration in highly dense urban environments
- Quick ramp up capability

.. and can make a larger contribution in the short and longer terms without major challenges

Perception of PV



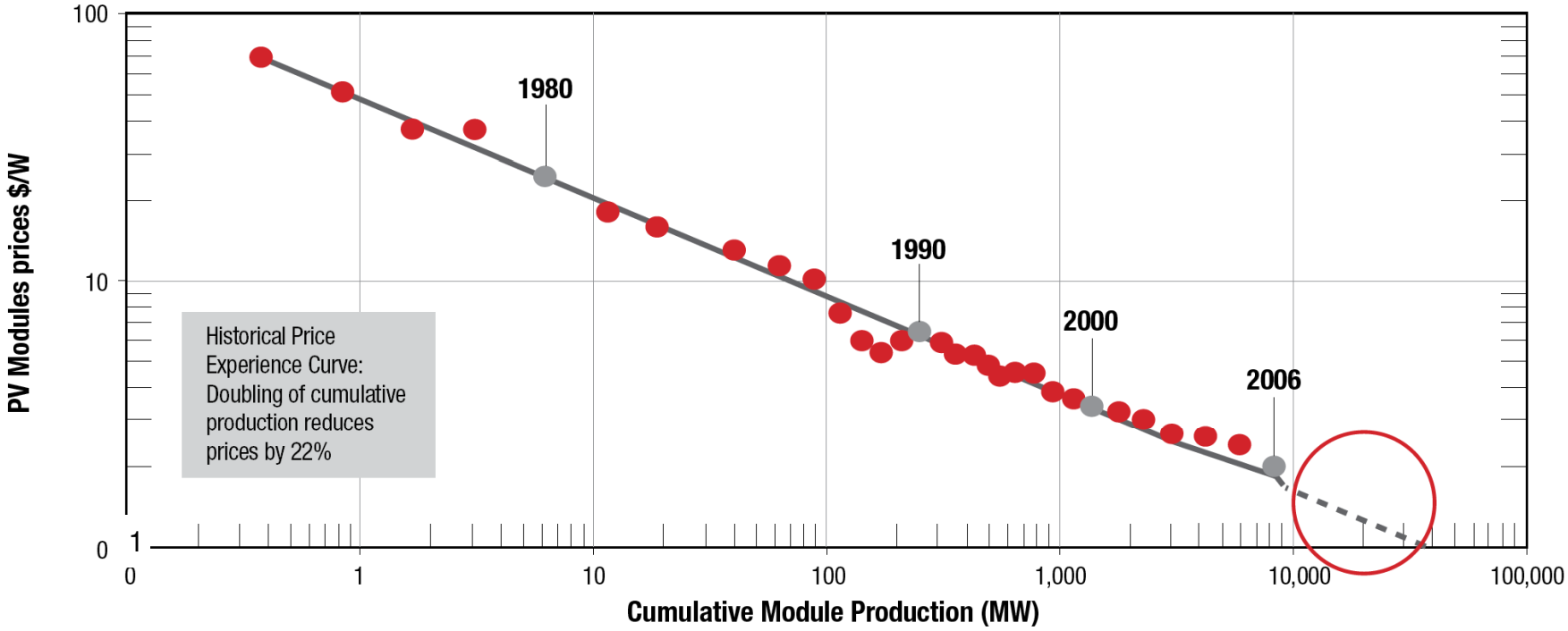
PV has demonstrated impressive growth



Sources: EPIA « Global Market Outlook for Photovoltaics until 2013 », 2009 - A.T. Kearney analysis.

… and consistent price decrease, with huge further potential

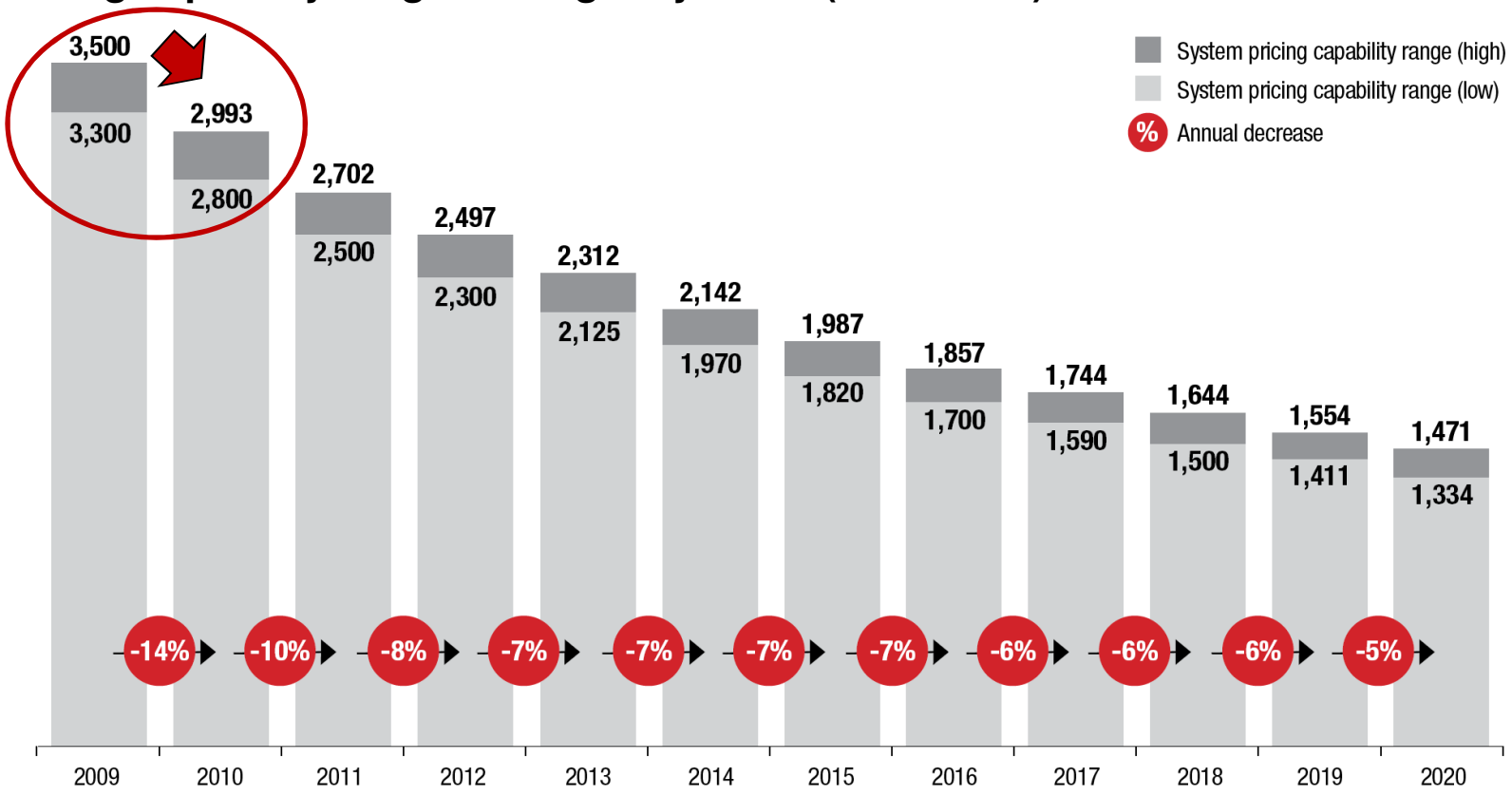
Solar Experience Curve: Module Price/Watt



Sources: EU Joint Research Centre - EIA - National Renewable Energy Laboratory - A.T. Kearney analysis.

PV is expected to allow ~ 60% price reduction at a system level by 2020 continuing through 2030 and later

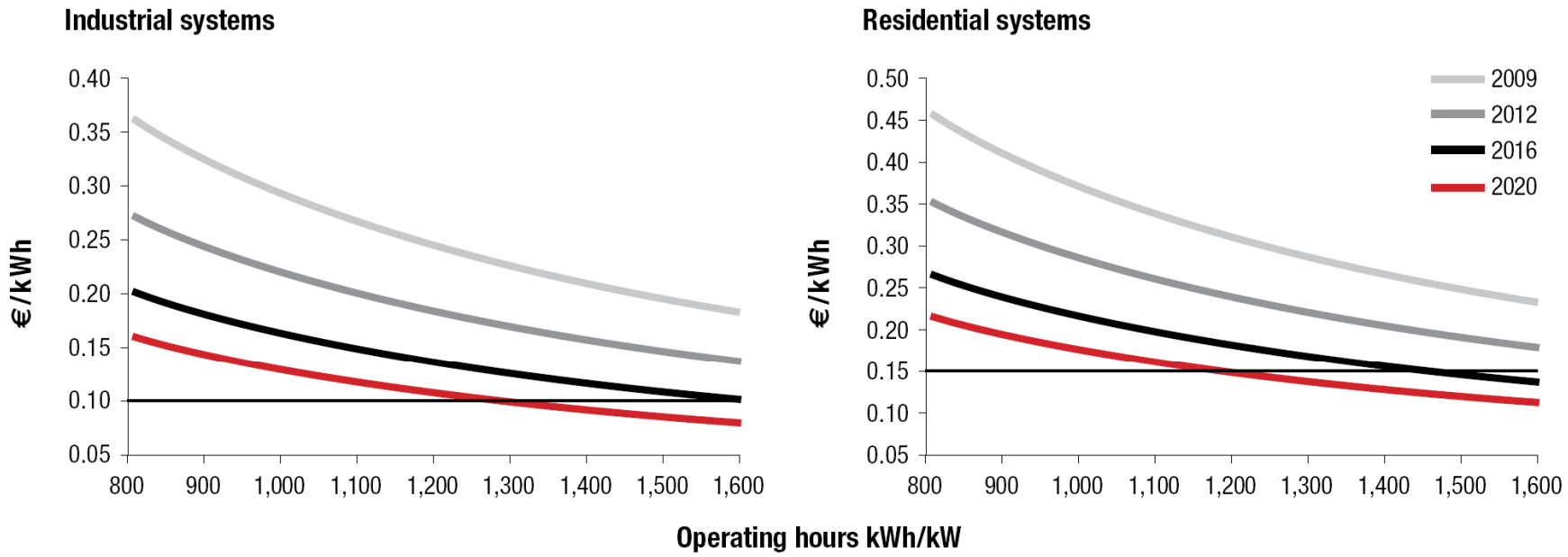
Pricing capability range for larger systems (2008 €/kW)



Sources: National Renewable Energy Laboratory - A.T.Kearney analysis.

Target costs of PV generated electricity below 10 €c/kWh for industrial systems and below 15 €c /KWh for residential systems can be reached by 2020

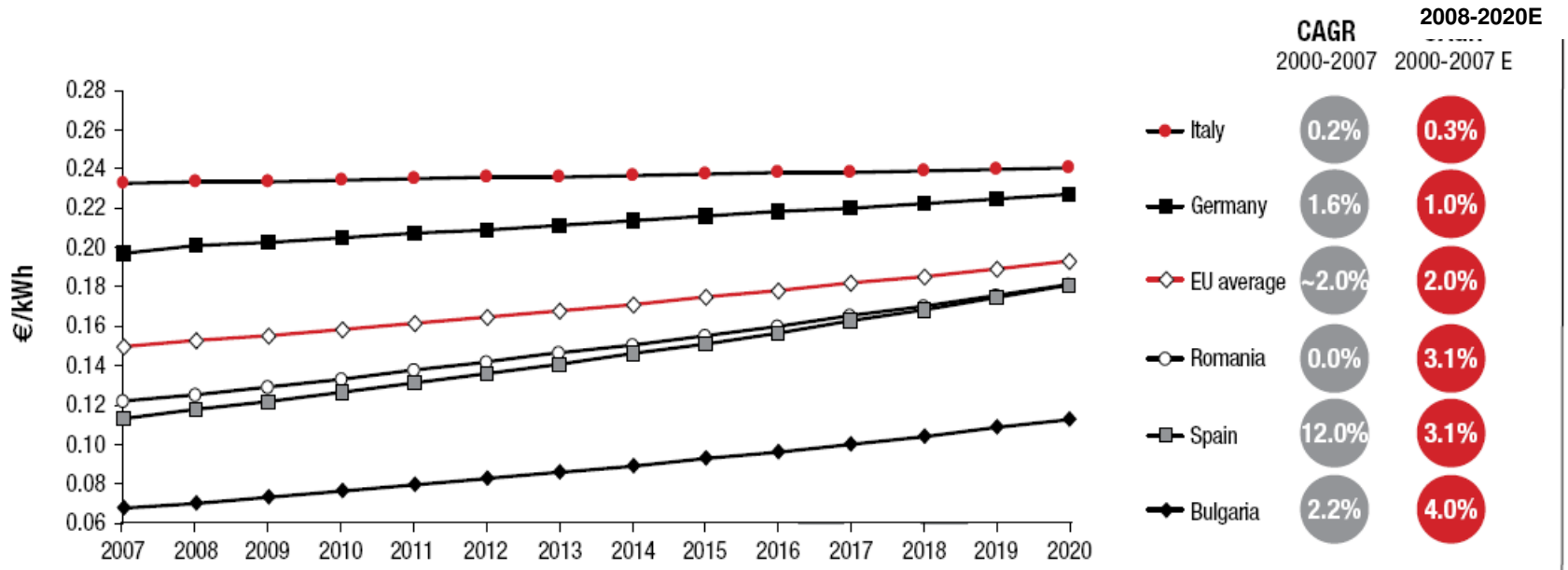
Evolution of PV levelised cost of electricity (depending on operating hours)



Sources: National Renewable Energy Laboratory; A.T. Kearney analysis.

… while electricity prices will continue to increase

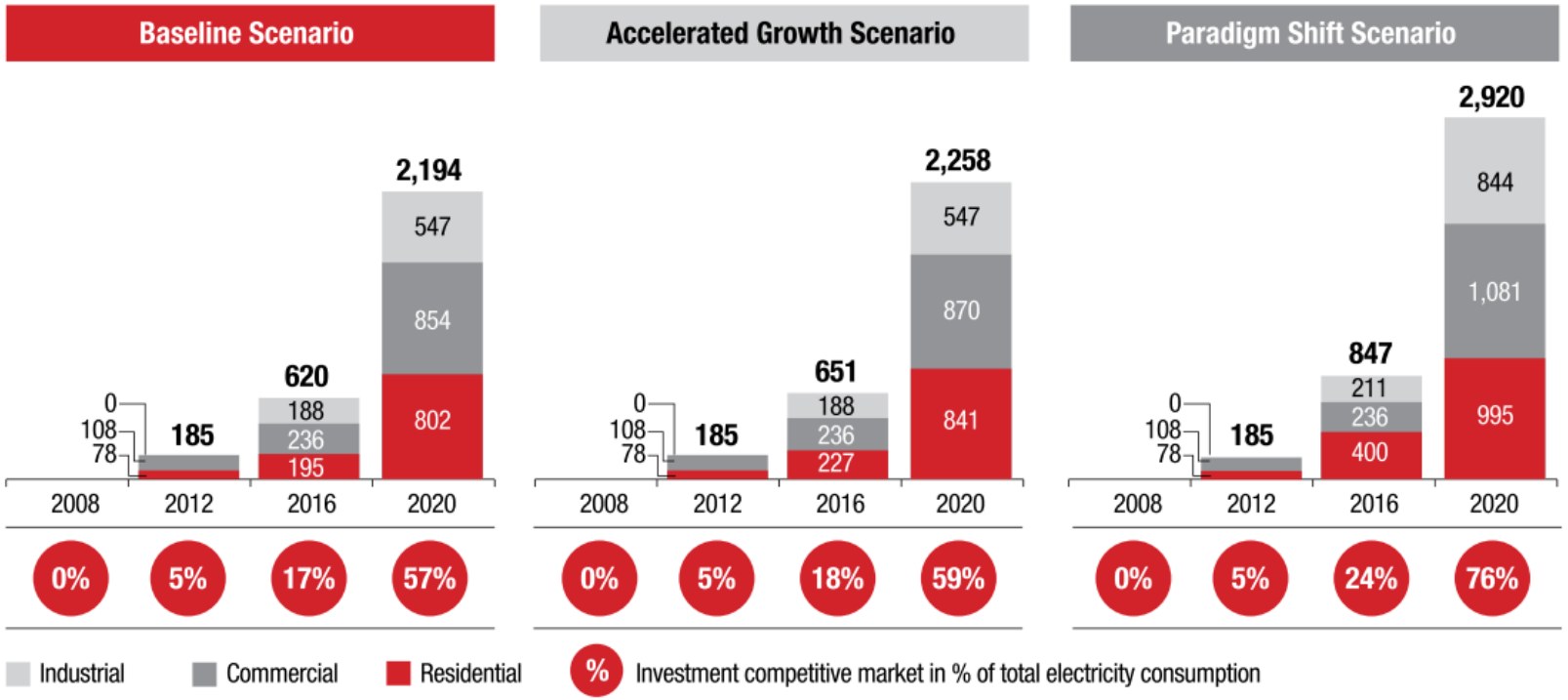
Figure 80: Forecast evolution of electricity prices in real terms



Sources: Eurostat Data Portal - IEA - A.T. Kearney analysis.

Competitiveness could be reached for as much as 76 % of the EU electricity market

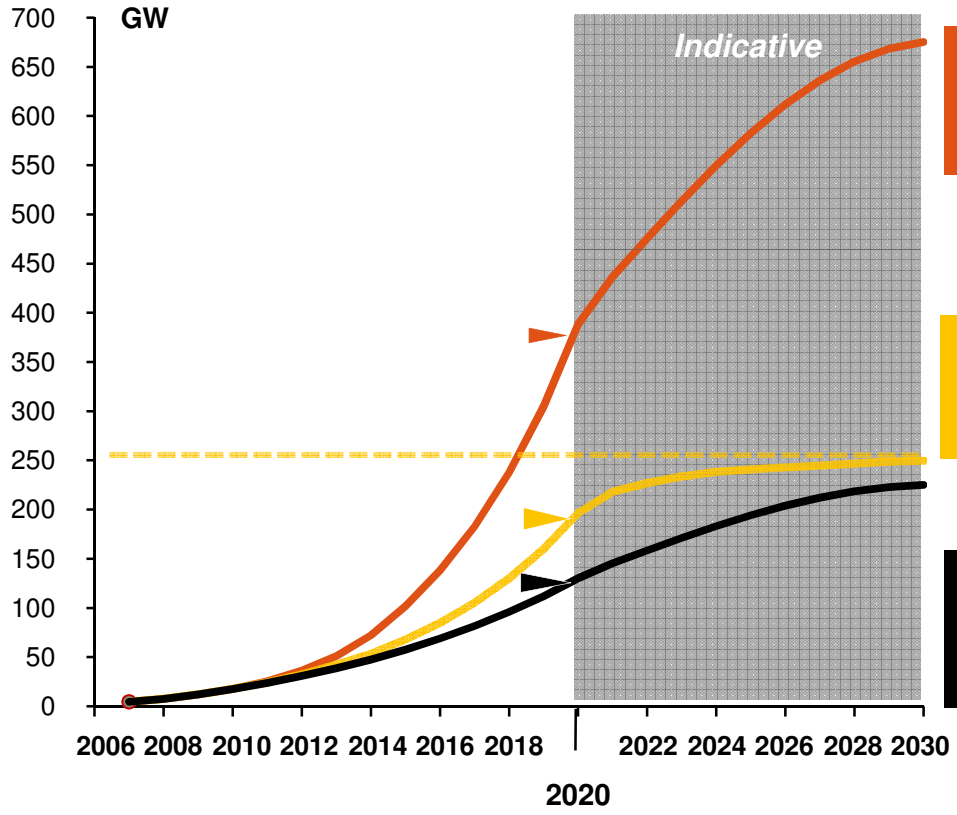
Size of the accessible end-user market for PV (TWh of final energy consumption in Europe)



Sources: EPIA "Solar Generation V", 2008 - A.T. Kearney analysis.

PV Penetration Scenarios in EU

Share of e-Demand by 2020



Paradigm Shift Scenario: 12%

Accelerated Scenario: 6%

Baseline Scenario: 4%

Conditions for Achieving 12% PV penetration by 2020

1

FLEXIBILITY POWER SYSTEM

- **Accomodate high penetrations of intermittent PV electricity**

2

SUSTAINABLE MARKET SUPPORT

- **Stable and sustainable policy support environment**

12% Target 2020

Condition 1: Flexibility of the Power System

- Flexibility in generation portfolio
- Smart grids, demand-side management
- Time-of-use billing, net metering
- Distributed storage
- E-mobility
- Virtual Power Plants

Condition 2: Sustainable Market Support

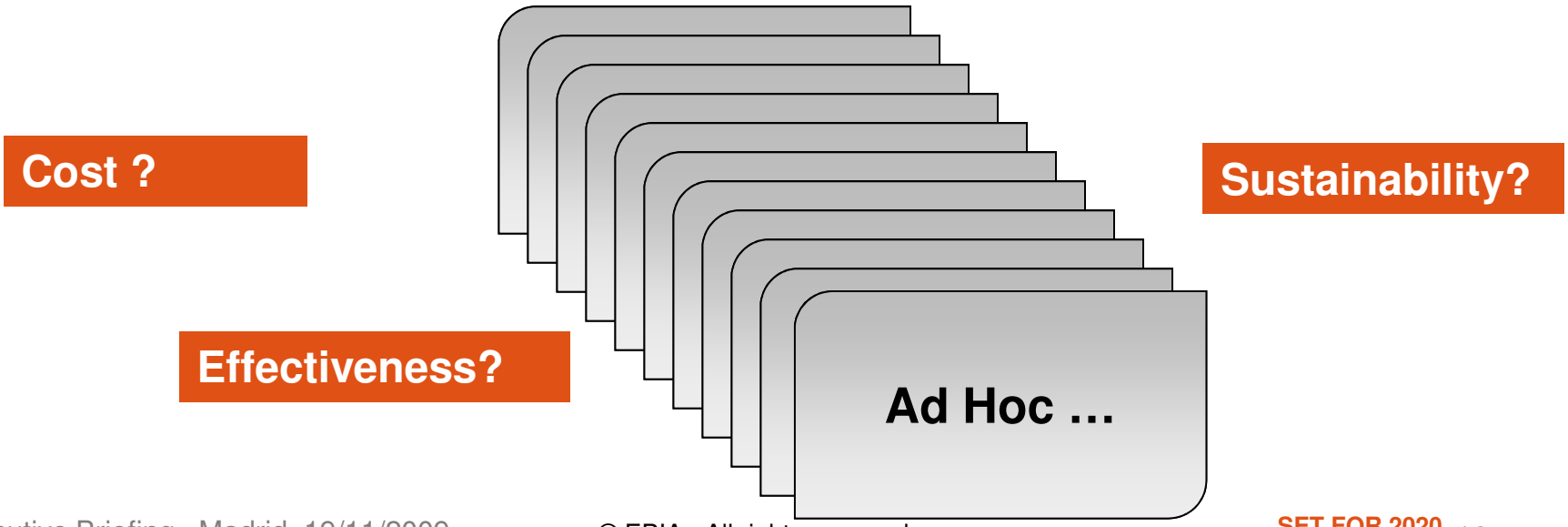
1. **Political Commitment : NREAP**
2. **Sustainable Support Scheme**
3. **Removal administrative barriers**

Sustainable Support Scheme

- Win - Win - Win For Goverments - Citizens - Industry

Sustainable Market Deployment ⟷ **Sustainable Industry Development**

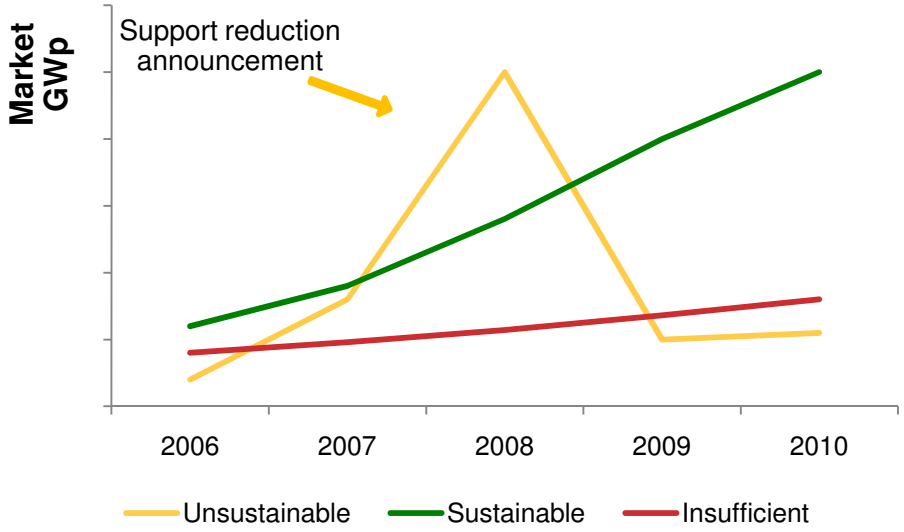
- Best Practices benchmarked across EU



Sustainability condition #1
Financial attractiveness (IRR)

- **Internal Rate of Return (IRR) of PV investment**
  - FiT structure and level
  - Other incentives: Tax rebates, investment subsidies
  - PV system prices
  - Solar Irradiation
- **IRR of PV investment should represent a reasonable incentive compared with IRR of investments with similar risk level**
- **Higher IRR may lead to unsustainable growth, lower to market stand still**
- **No unique solution; balanced combination of policy / financial instruments**

PV market development under different support strategies



Evaluation of IRR sustainability levels (example)

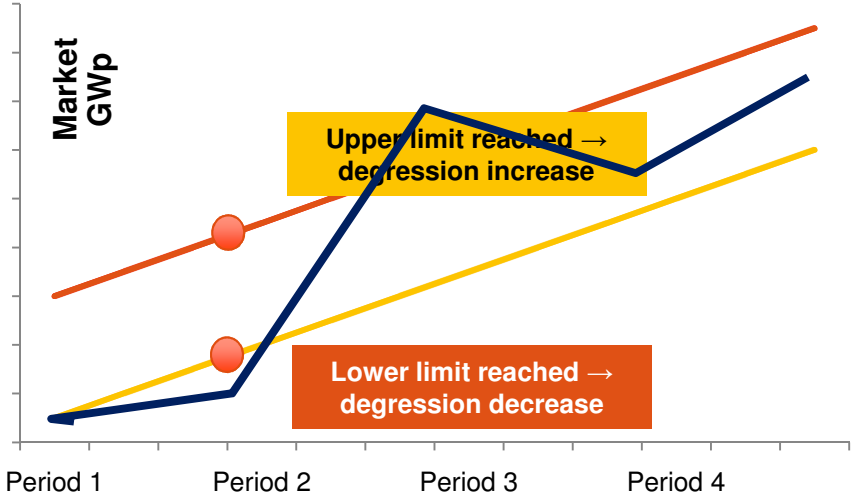
Evaluation Logic	Insufficient support	Sustainable Support	Unsustainable support
Private Investor	<6%	6-10%	>10%
Business Investor	<8%	8-12%	>12%

Sustainability condition #2
Market Control: *«Variable vs Fixed market cap»*

Support structure :

- **Basic support : *Feed-in Tariffs weighted on the market development → « corridor »***

"Corridor" market cap rationale



Rationale and advantages:

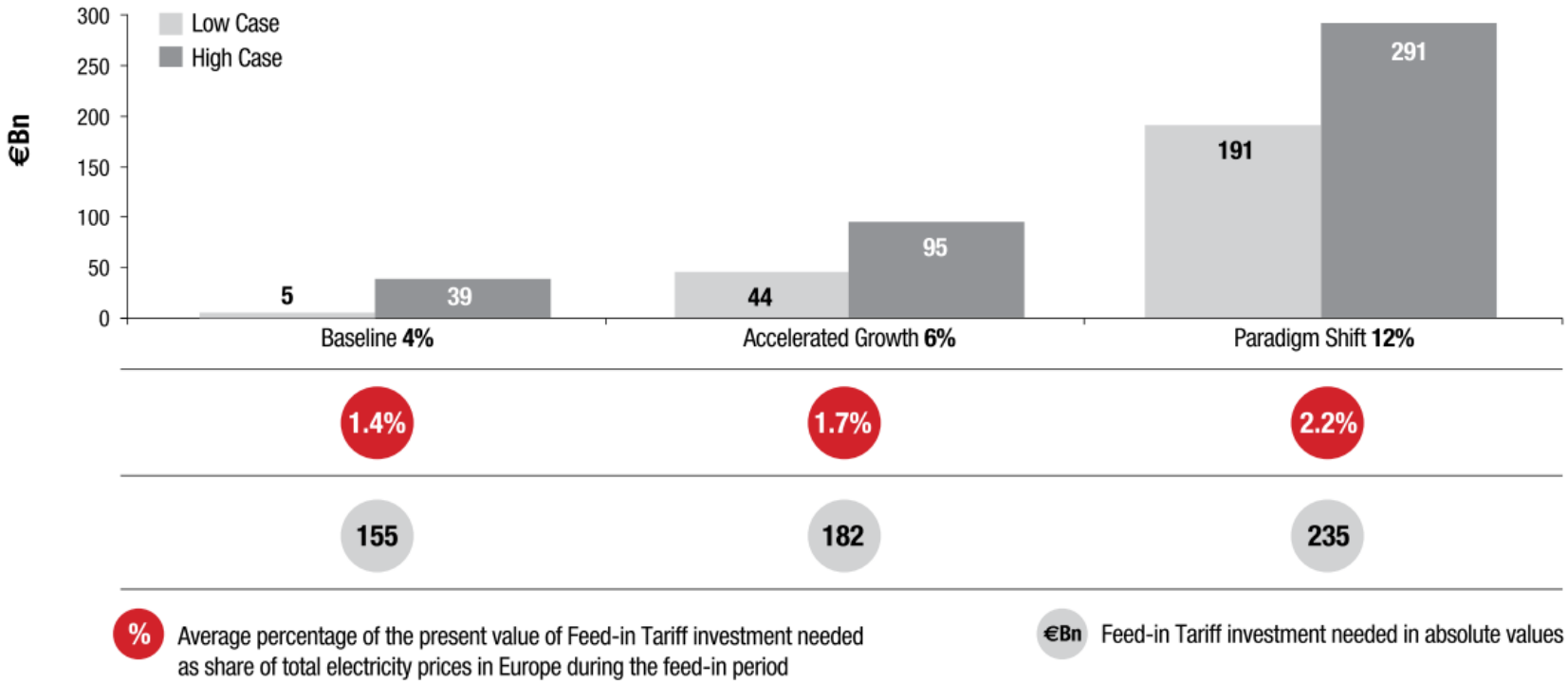
- **Market > upper limit, degression rate ↑**
- **Market < lower limit, degression rate ↓**
- **Transparent control and predictable market**
- **Ensures sustainable growth of market**
- **Importance of "Real Time" monitoring**

Benefits to Society

- Global Climate Change
- Energy Security of Supply
- EU Sustainability objectives
- Economic competitiveness
- Net positive economic return to EU Society

Supporting PV is an investment yielding huge economic benefits to society

Net present benefit from PV deployment



Sources: LBBW "PV Sector, Valuing the invaluable", 2008 - A.T. Kearney analysis.

Conclusions (1/2)
PV Credentials

- **PV providing 12% of EU e-demand** by 2020, is **highly desirable** and **achievable**
- Conditions to 12% PV penetration:
  - **Evolution** of the **electrical power system**
  - **Temporary** and **sustainable support environment**
- PV has a **strong societal value**
  - Environmental: Global climate Change
  - Economic: Energy Security of Supply; Economic competitiveness
  - Social : Massive job creation
- **Boosting PV is an Investment** - not a cost - **yielding huge macro-economical benefits**; The **more ambitious** the deployment, the **more profitable** the investment.

Conclusions (2/2)
Spain's unique assets

- **Spain has a privileged position**
  - Strong and successful industry
  - High solar irradiation
  - Opportunity to stimulate the building sector
  - Natural bridge to Mediterranean region

- **Leveraging PV benefits will require**
  - Political commitment : NREAP
  - Sustainable FITs (IRR, variable caps, market monitoring)
  - Administrative simplification

THANK YOU

The future is here, it is just not widely distributed yet …

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www.setfor2020.EU

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