



ADEL EL GAMMAL
SECRETARY GENERAL

SET FOR 2020

SETTING THE PACE OF THE SOLAR AGE





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

- + 200 members representing 90% of EU PV Industry
- National Associations
- 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

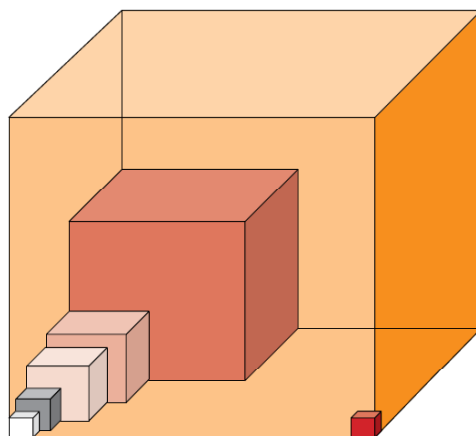


- ▶ Commissioned by EPIA to Strategy Firm A.T. Kearney
- ▶ Most comprehensive study to date on the future of photovoltaic electricity generation in Europe
- ▶ Fully endorsed by the PV Industry
- ▶ Acknowledged by EC as reference high penetration PV scenario

PV has unique fundamentals



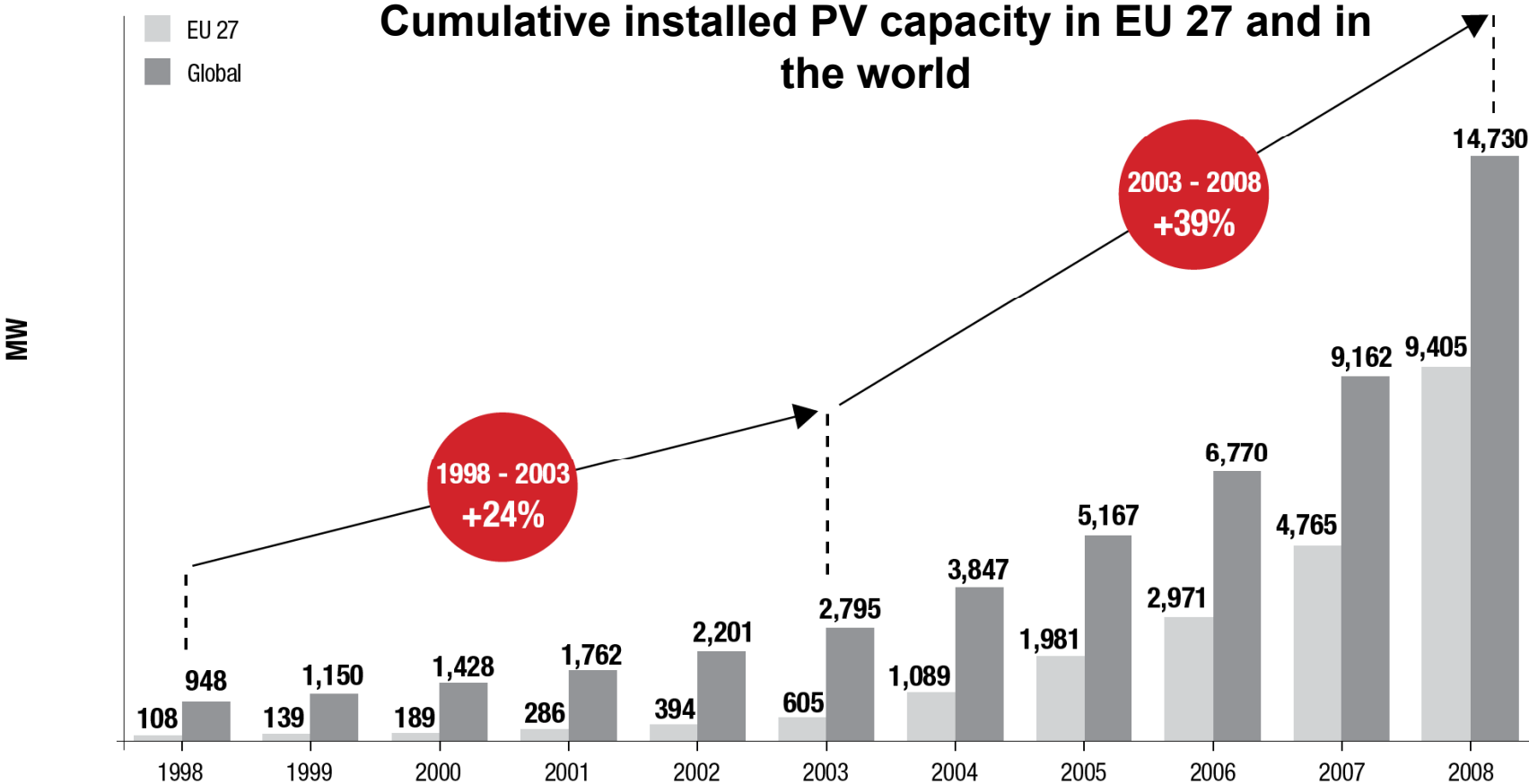
▶ Unlimited power from the sun



- ▶ Current annual Global Primary Energy Consumption (GPEC)
- ▶ Solar power (continents, 1,800 x GPEC)
- ▶ Wind energy (200 x GPEC)
- ▶ Biomass (20 x GPEC)
- ▶ Geothermal energy (10 x GPEC)
- ▶ Ocean and wave energy (2 x GPEC)
- ▶ Hydro energy (1 x GPEC)

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

PV has demonstrated impressive growth

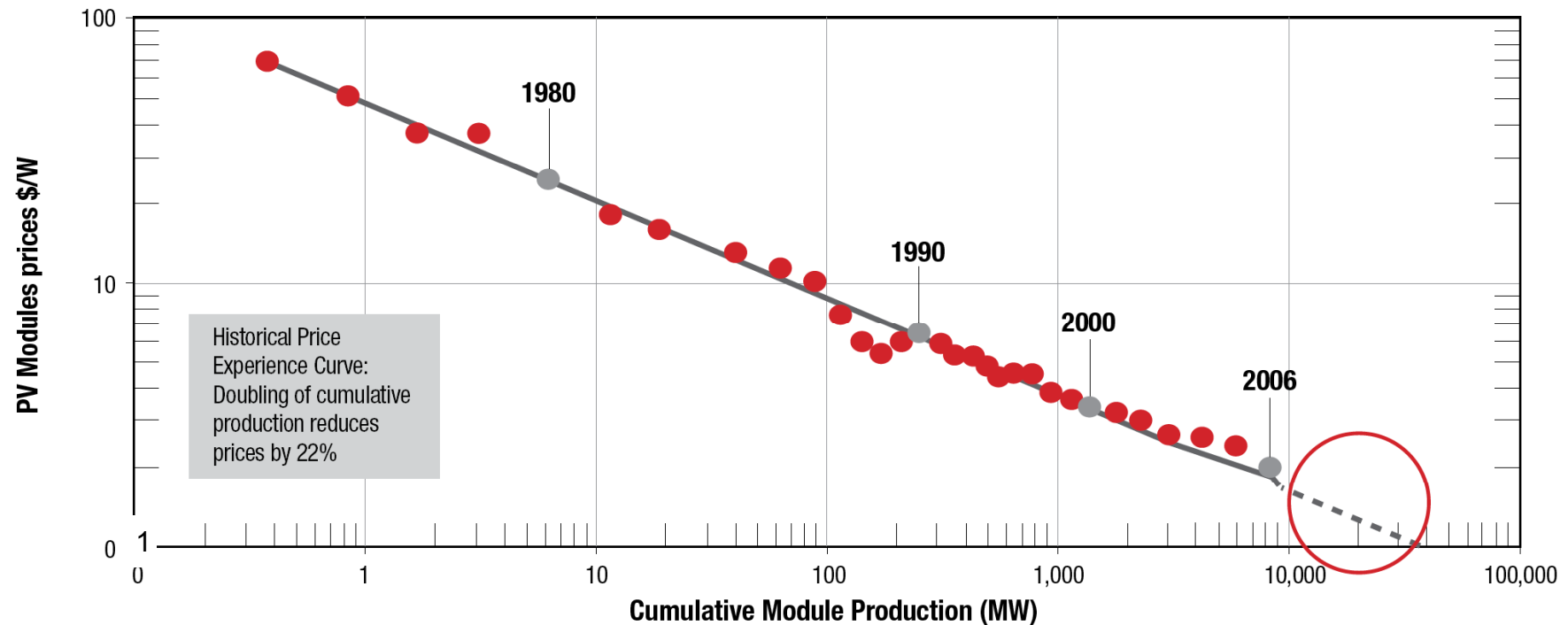


Sources: EPIA « Global Market Outlook for Photovoltaics until 2013 », 2009 - A.T. Kearney analysis.

... and consistent price decrease, with huge further potential



Solar Experience Curve: Module Price/Watt

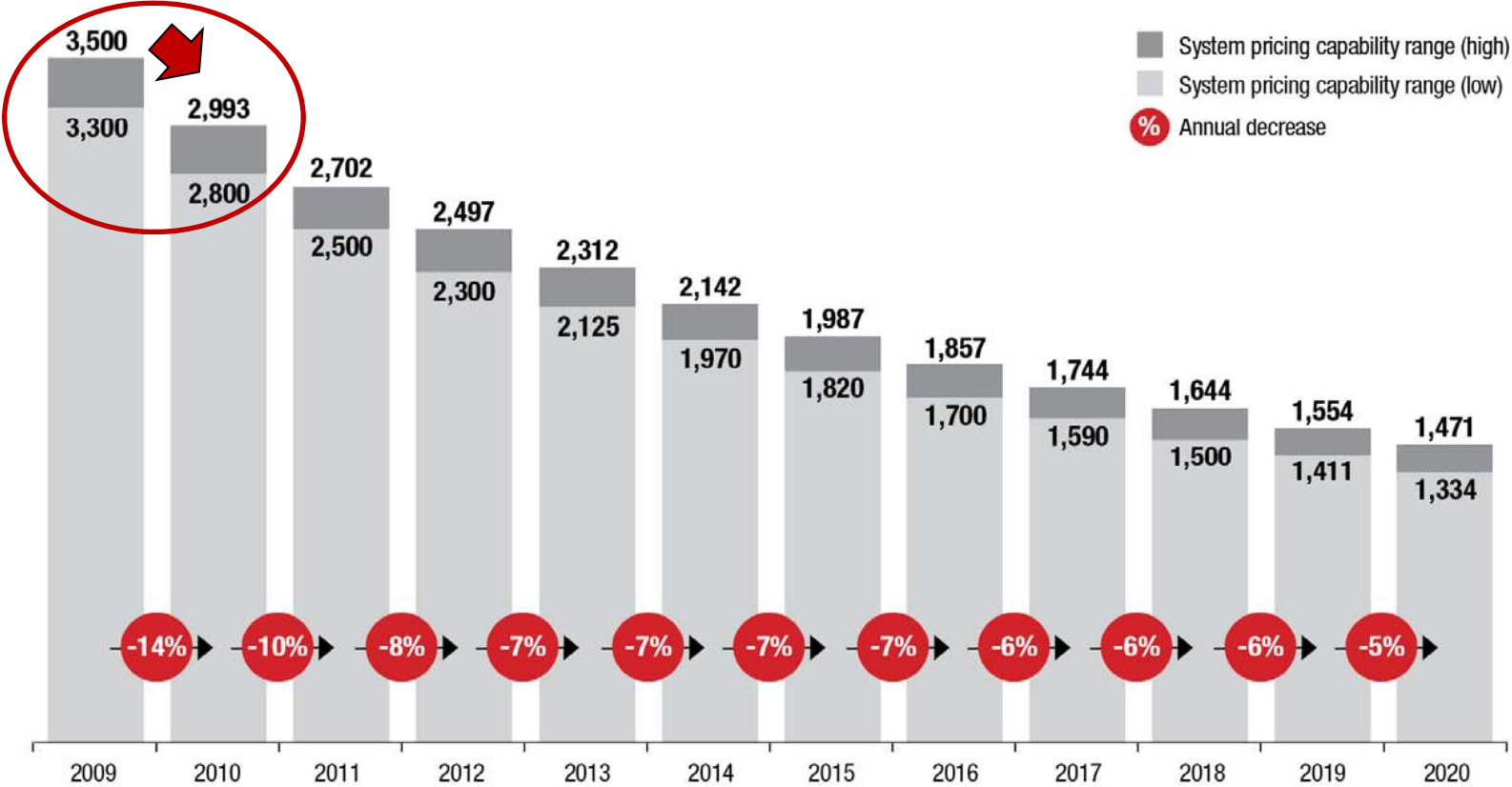


Sources: EU Joint Research Centre - EIA - National Renewable Energy Laboratory - A.T. Kearney analysis.

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)

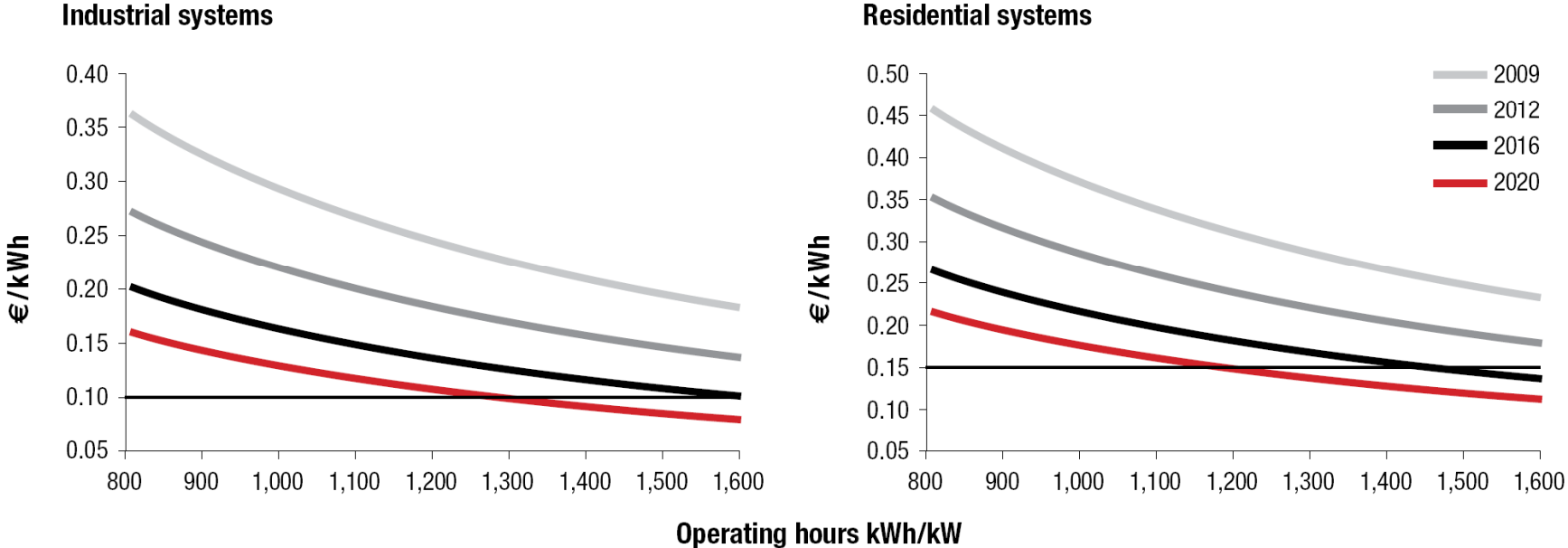


Sources: National Renewable Energy Laboratory - A.T.Kearney analysis.

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



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

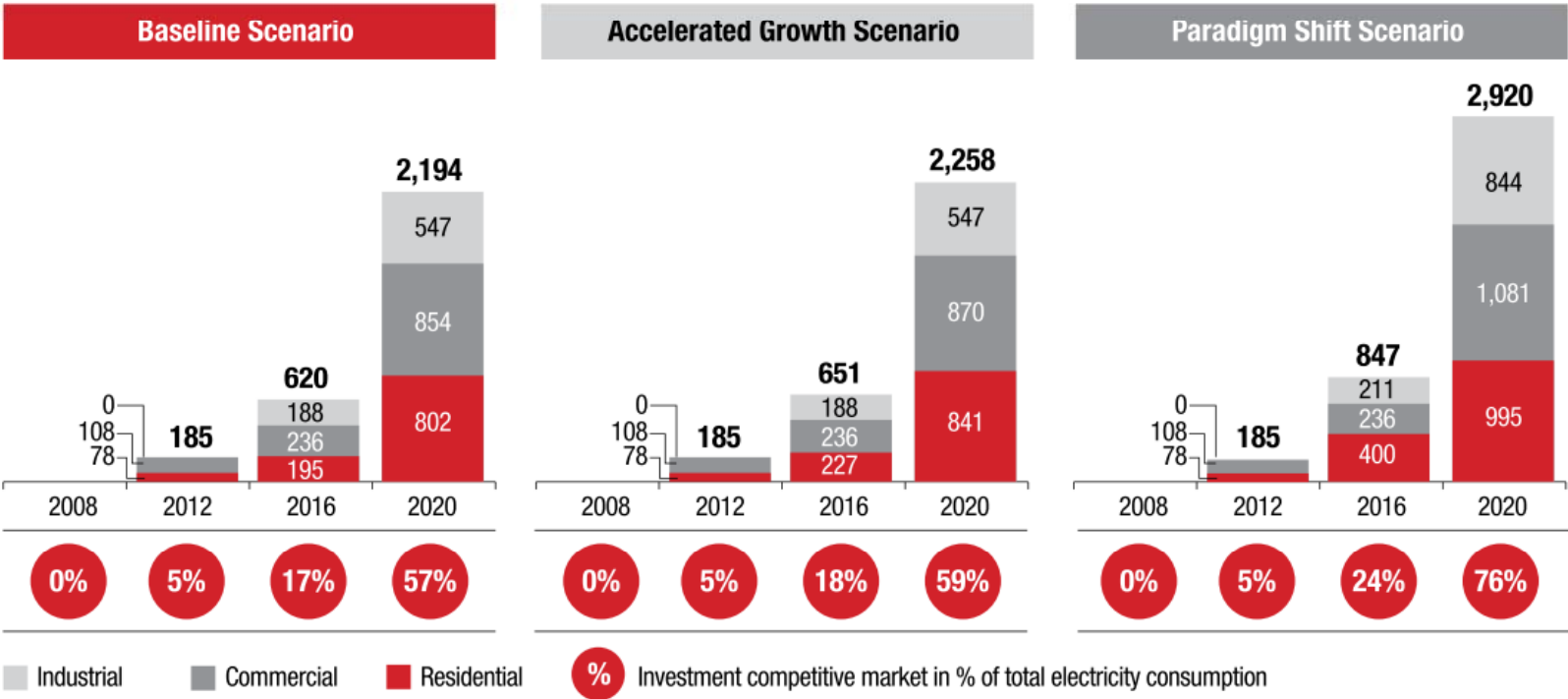


Sources: National Renewable Energy Laboratory; A.T. Kearney analysis.

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)

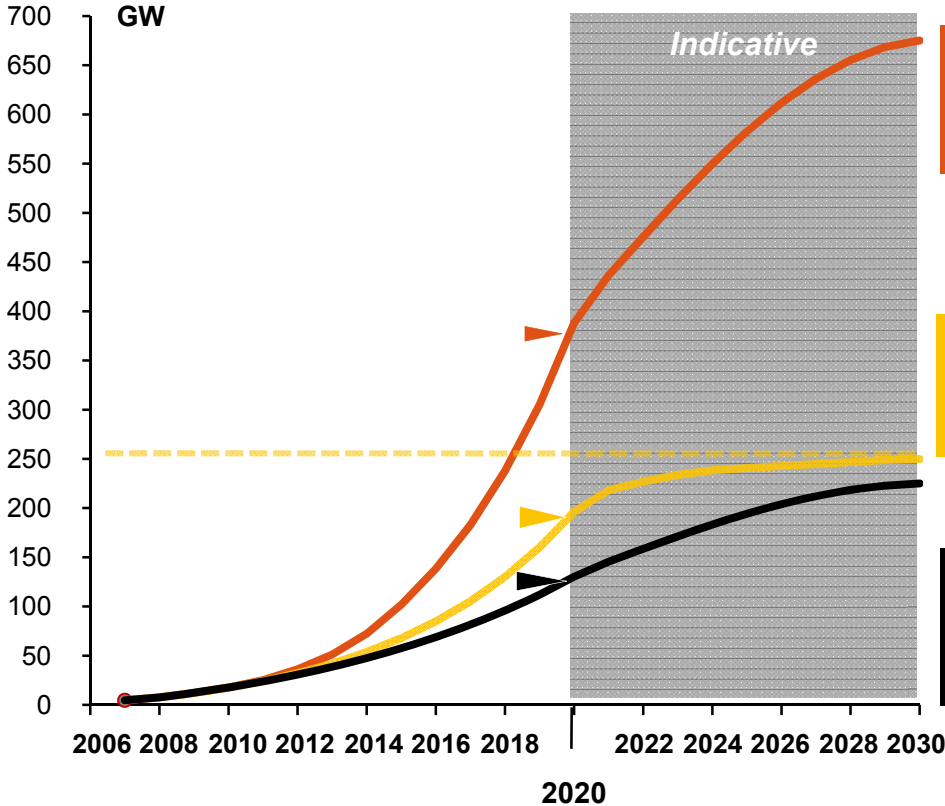


Sources: EPIA "Solar Generation V", 2008 - A.T. Kearney analysis.

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 (EU Member States)**
- 2. Sustainable Support Scheme**
- 3. Removal administrative barriers**

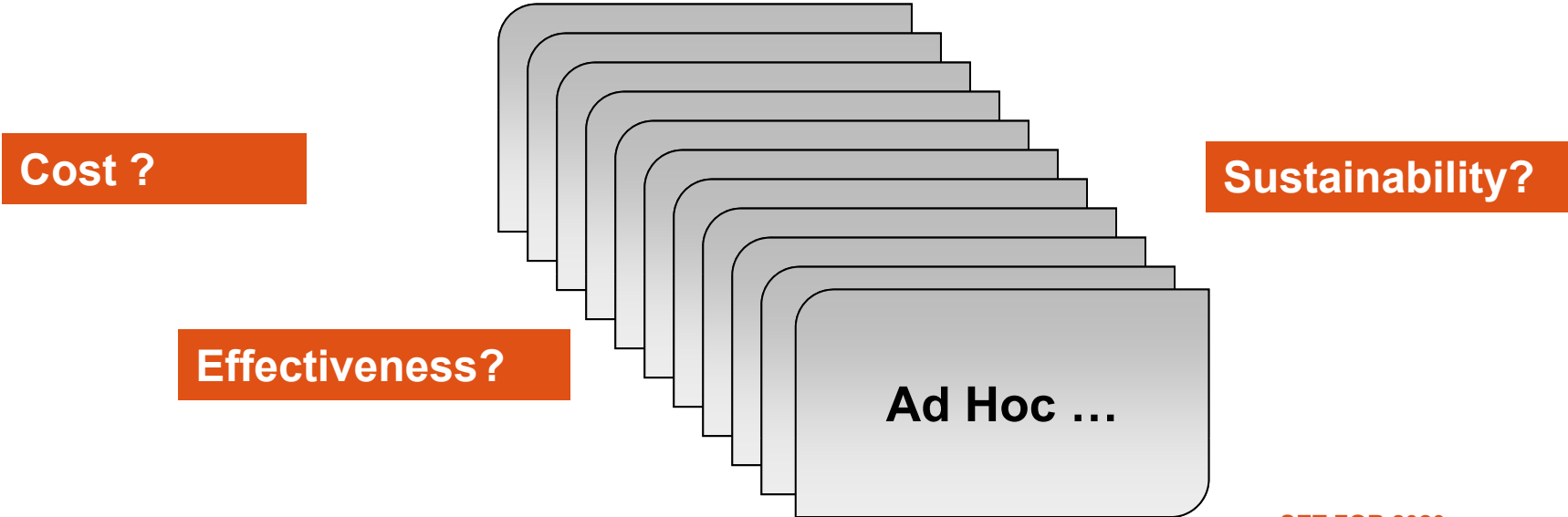
Sustainable Support Scheme



- ▶ **Win - Win - Win For Governments - Citizens - Industry**



- ▶ **Best Practices benchmarked across EU**



Sustainability condition #1

Financial attractiveness (IRR)

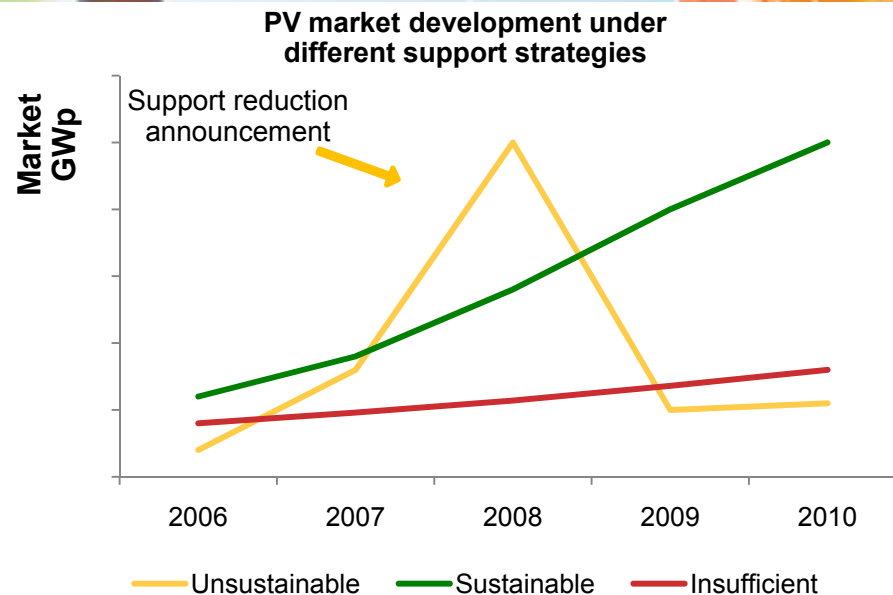


- ▶ **Internal Rate of Return (IRR) of PV investment**
 - ▶ FiT structure and level
 - ▶ Other incentives: Tax rebates, investment subsidies
 - ▶ PV system prices
 - ▶ Solar Irradiation

- ▶ **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**



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»



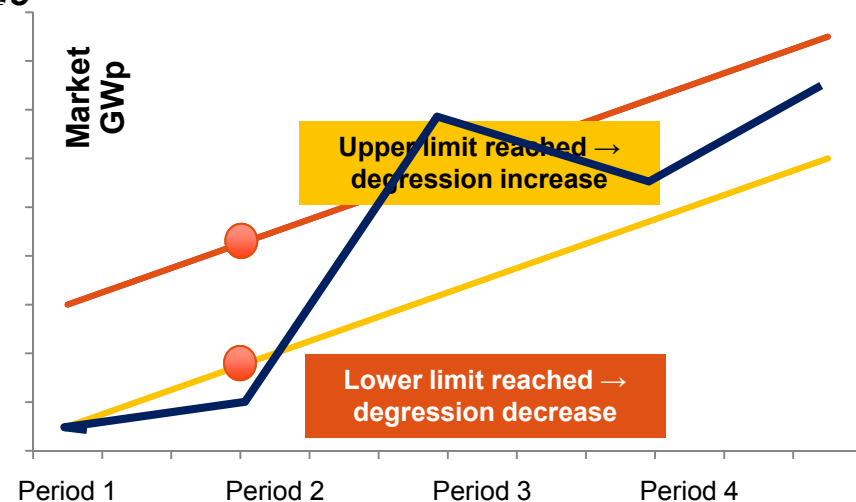
Support structure :

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

Rationale and advantages:

- ▶ Market > upper limit, depression rate
- ▶ Market < lower limit, depression rate
- ▶ Transparent control and predictable market
- ▶ Ensures sustainable growth of market
- ▶ Importance of “Real Time” monitoring

“Corridor” market cap rationale



Benefits to Society

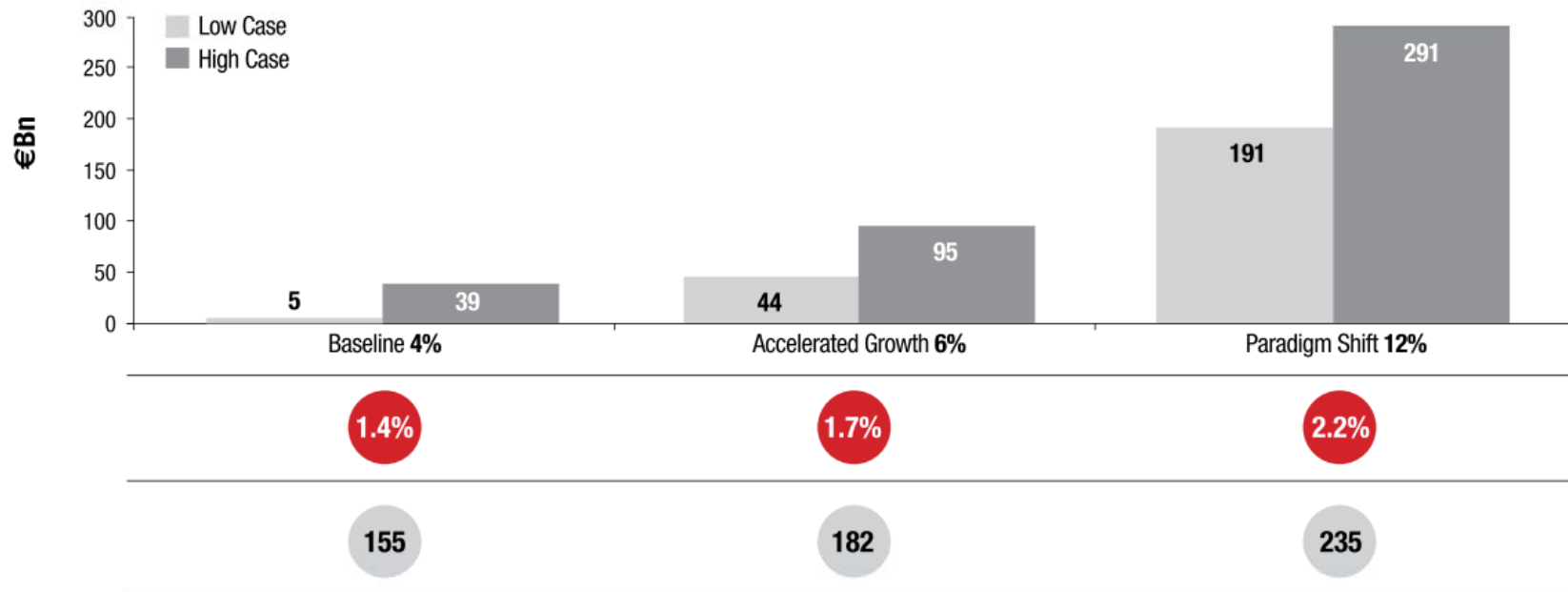


- ▶ **Global Climate Change**
- ▶ **Energy Security of Supply**
- ▶ **EU Sustainability objectives**
- ▶ **Economic competitiveness**
- ▶ **Net positive economic return to EU Society**

Supporting PV is an investment yielding huge economic benefits to society



Net present benefit from PV deployment



% Average percentage of the present value of Feed-in Tariff investment needed as share of total electricity prices in Europe during the feed-in period

€Bn Feed-in Tariff investment needed in absolute values

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

Conclusions



- ▶ **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.**



THANK YOU

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

www.epia.org

www.setfor2020.EU

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