



Support for solar photovoltaic in France

A shift towards capacity market mechanism

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Outline

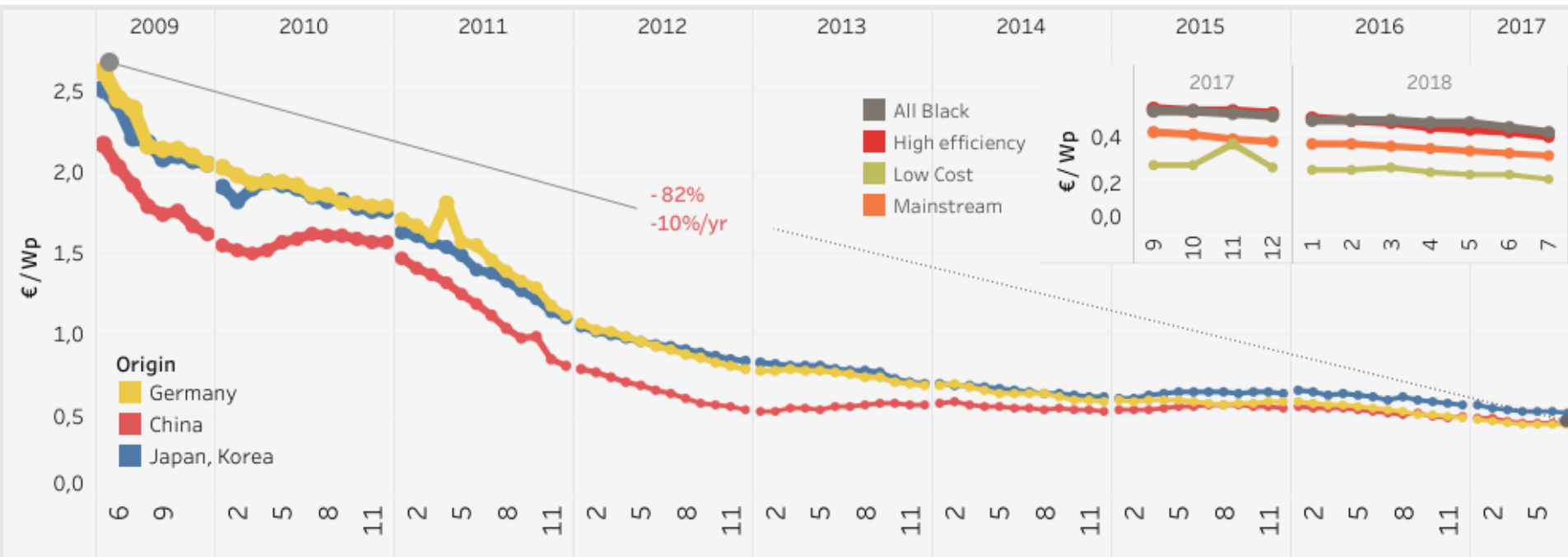
- Why solar PV?
- Trend of solar PV costs in France
- Support framework for renewables in France
- Renewable electricity in France
- PV role in electricity generation in France
- Evolution of support framework
 - Regular FIT
 - Capacity Market
- Effectiveness of support for PV in France
- Key takeaways

Why solar PV?

Now the cheapest source of electricity

Crystalline **module index price dropped by 82%** over 2009-2017, to 0.45 €/kW;

The **weighted average LCOE** of utility-scale solar PV **fell 73%** over 2010 - 2017, to USD 0.10/kWh



Trend of solar PV costs in France

Utility-scale solar PV installed cost 2010-2017

77% decrease

Average total installed costs of residential solar PV systems, Q2 2007-Q1 2017

66% decrease

Utility-scale solar PV: electricity costs 2010-2017

71% decrease

LCOE from residential PV systems, Q2 2007-Q1 2017

61% decrease

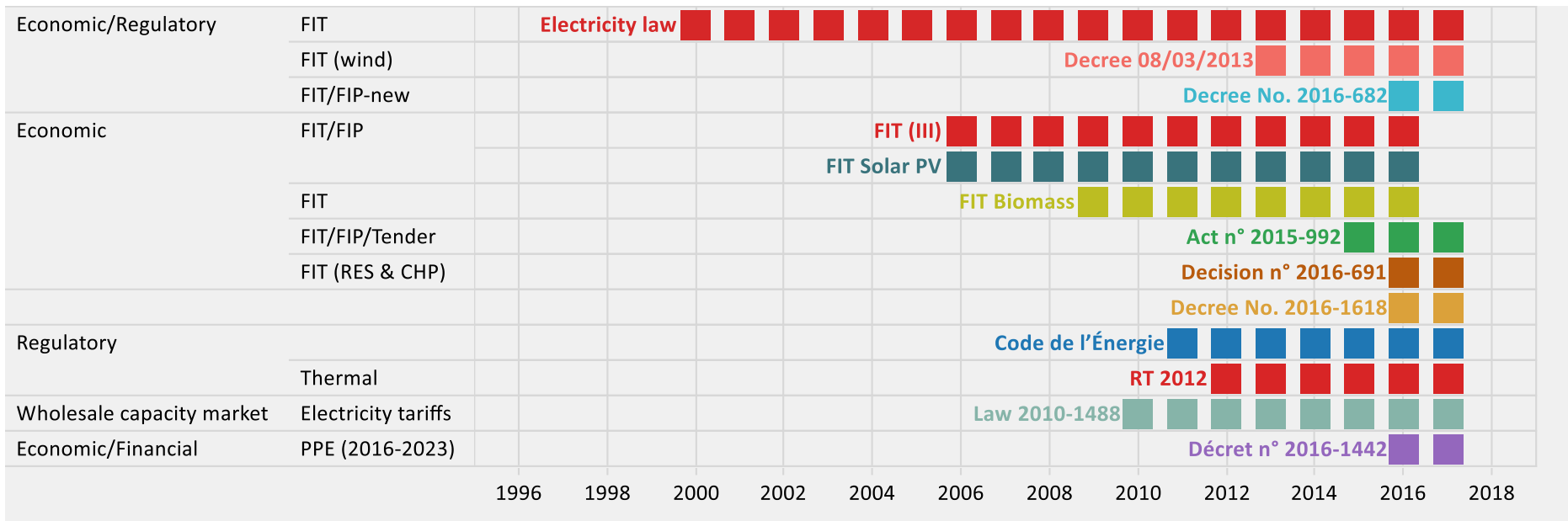
Support framework for RES in France

Electricity Law (2000) – Feed-in Tariff

Law 2010/1488 – wholesale capacity market

Energy Code (2011) – consolidates energy framework

Energy Transition Act (2015) – Feed-in Premium and
“complement de renumeration”



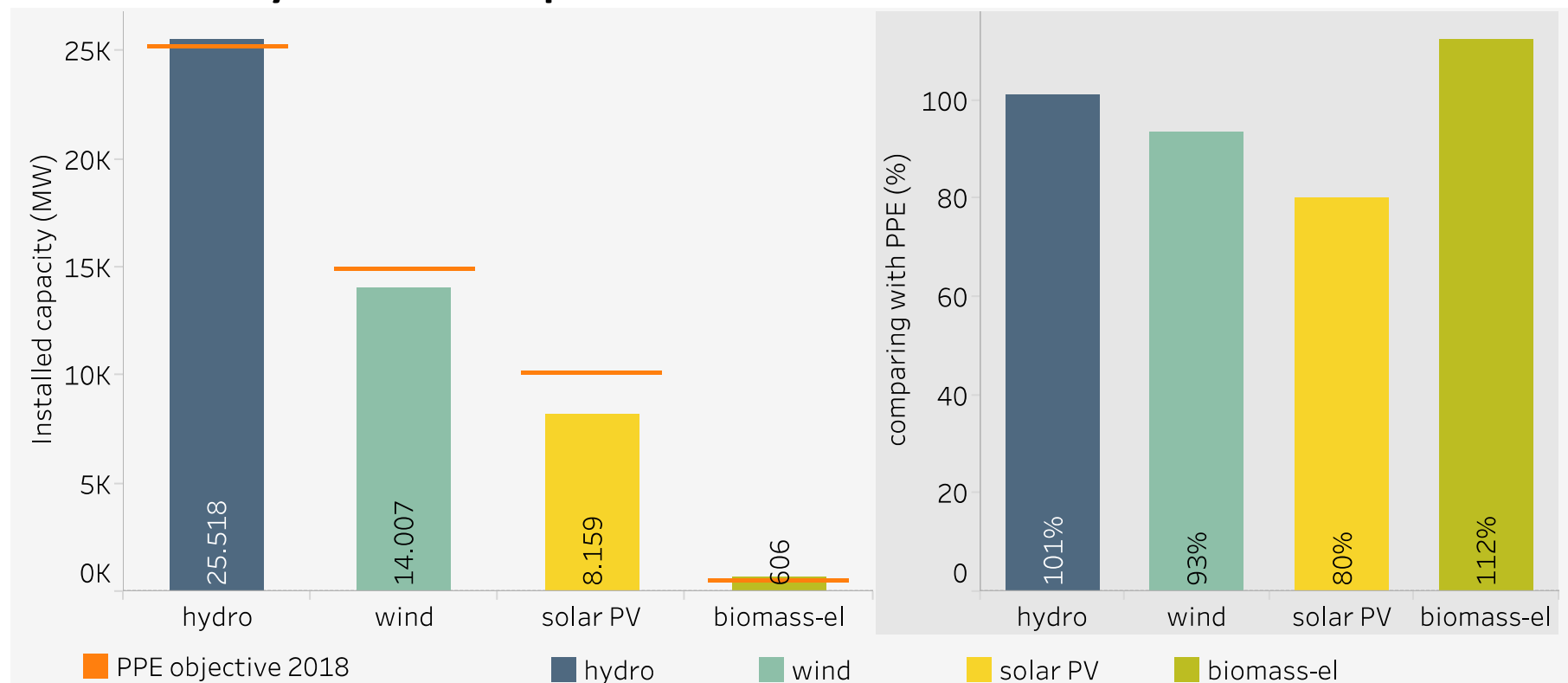
Renewable electricity in France



Share of renewable electricity – **22%** in 2017

Renewable electricity generation **+1.5** time fold in last decade

Hydropower still plays the main role - **12.7%** of gross electricity consumption



Solar PV in France energy sector

National Targets for PV

Number 4 in EU

Largest PV system in EU

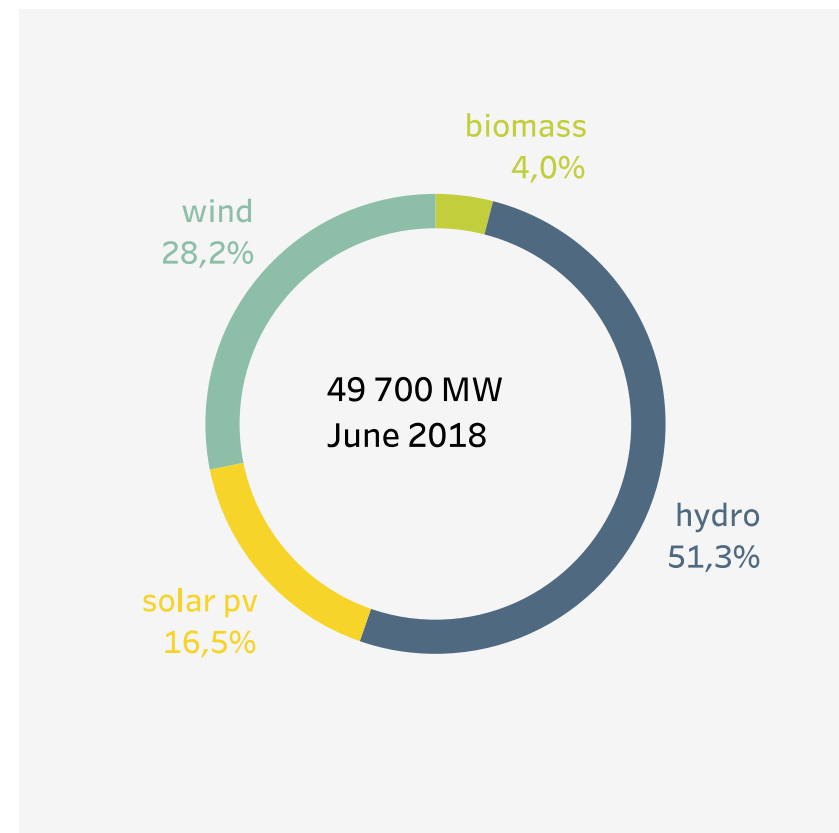
8.2 GW capacity installed

9.4 TWh electricity generation

8.9% of renewable electricity

1.9% of gross electricity consumption

16.5% of renewable capacity



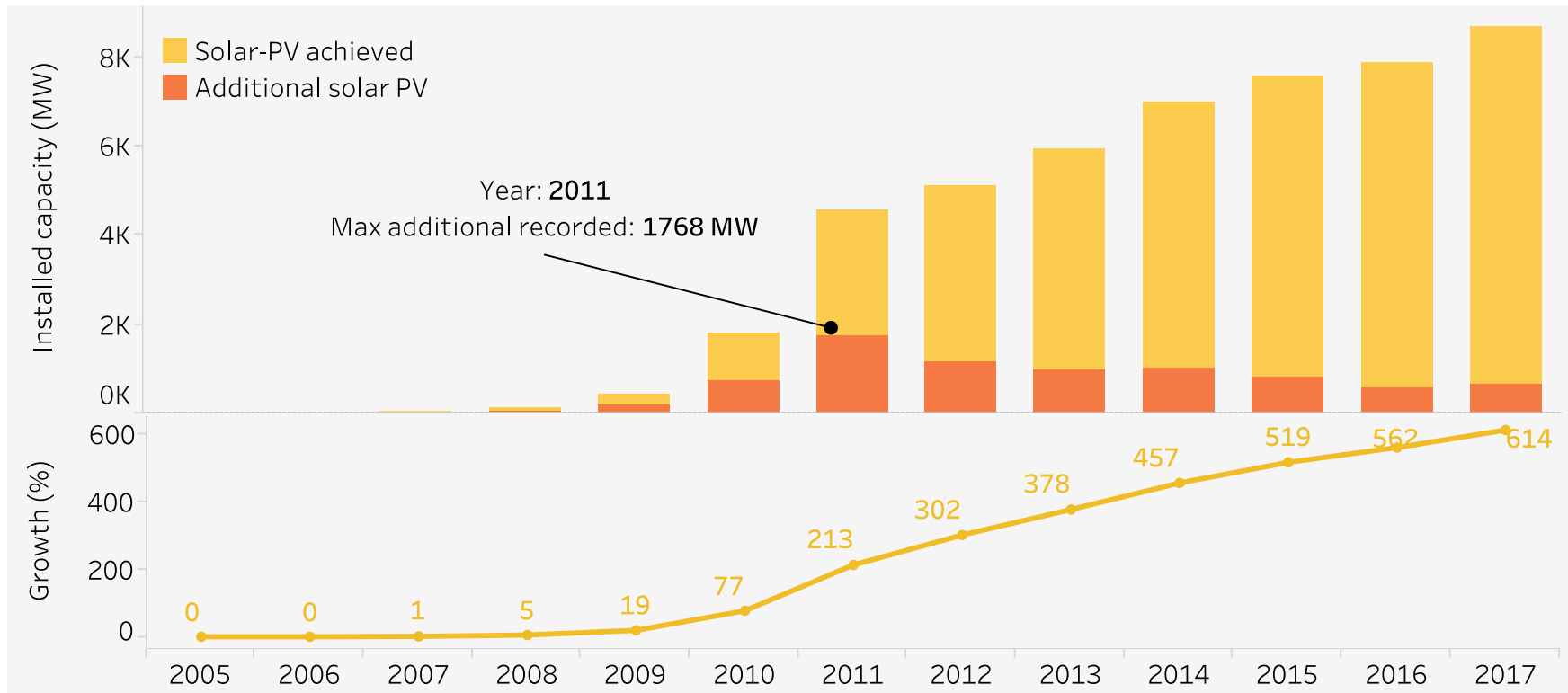
Solar PV deployment in France

Last decade **+30%** yearly; **+614%** since 2005

Maximum of additional capacity in 2011 – **1768 MW**

16% increase of additional capacity 2016-2017

Solar PV plants – small scale <1 MW – **98%** of total



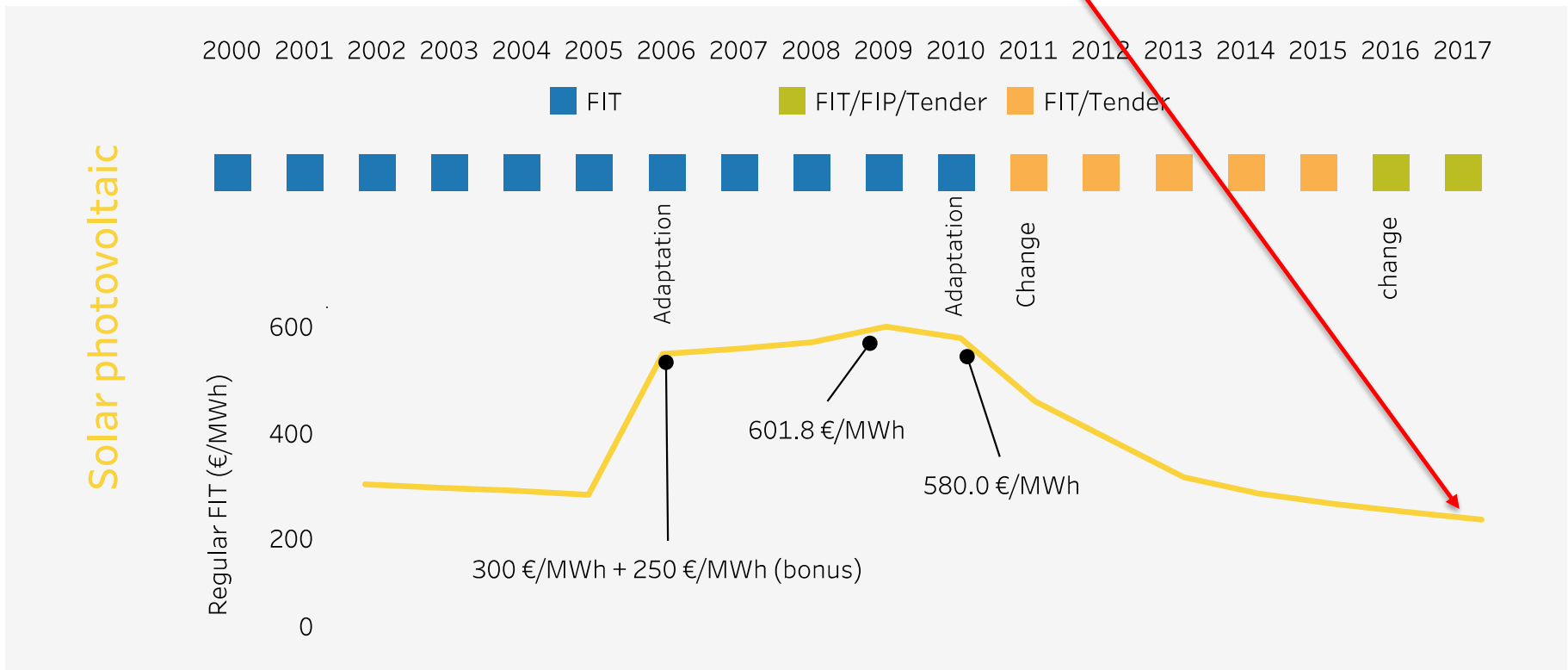
Regular FIT support scheme for PV

Adaptation 2006 & 2010 - above **600 €/MWh**

Buyback obligation suspended December 2010 – March 2011

Change 2011 & 2016 – maximum **250 €/MWh**

decrease by a factor of 2.5



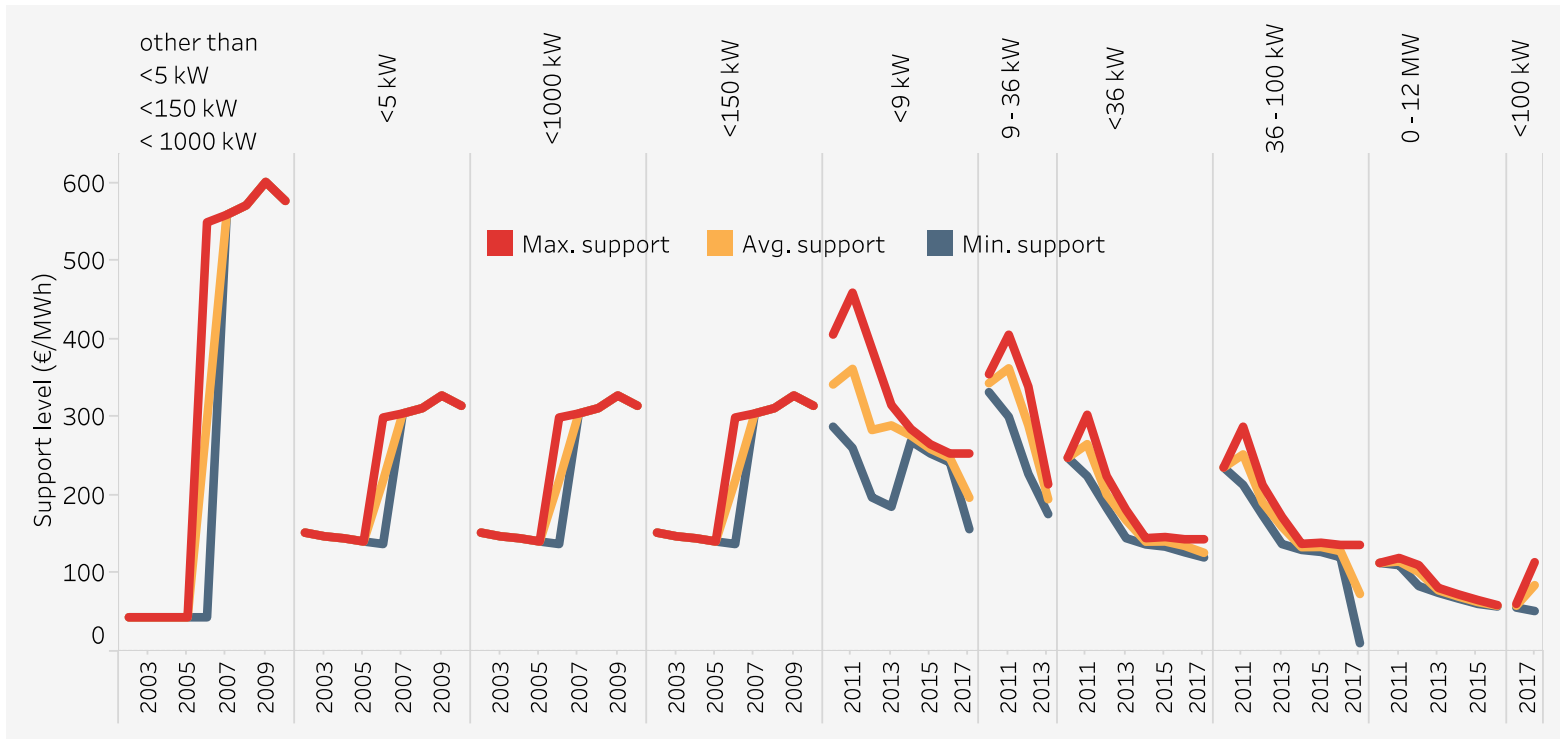
Regular FIT support scheme for PV

Supports mainly **small-scale projects (<250 kW)**, **20 yr**

Until 2010 - building integrated PV systems (BIPV)

After 2010 – BIPV the largest decrease in support

2013-2014 the support 2-folded for simplified PV



Capacity market scheme for PV

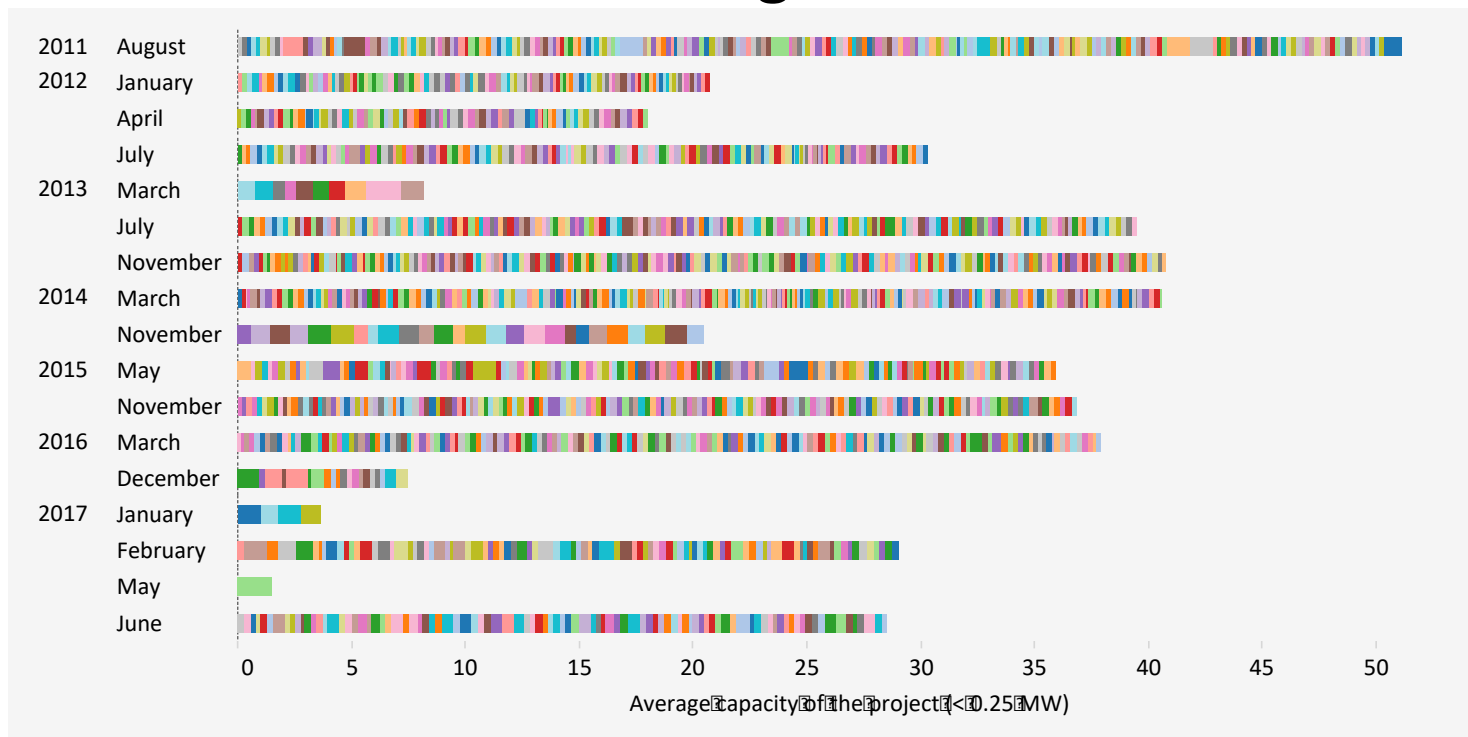
Small-scale projects dominate;

Large number of periods within 1 tender;

Erratic timing & 12 months between call and organization;

Tenders of 2012-2014: 3000 candidates - half only in 2014

1300 bids given – half of bids 2011-2017

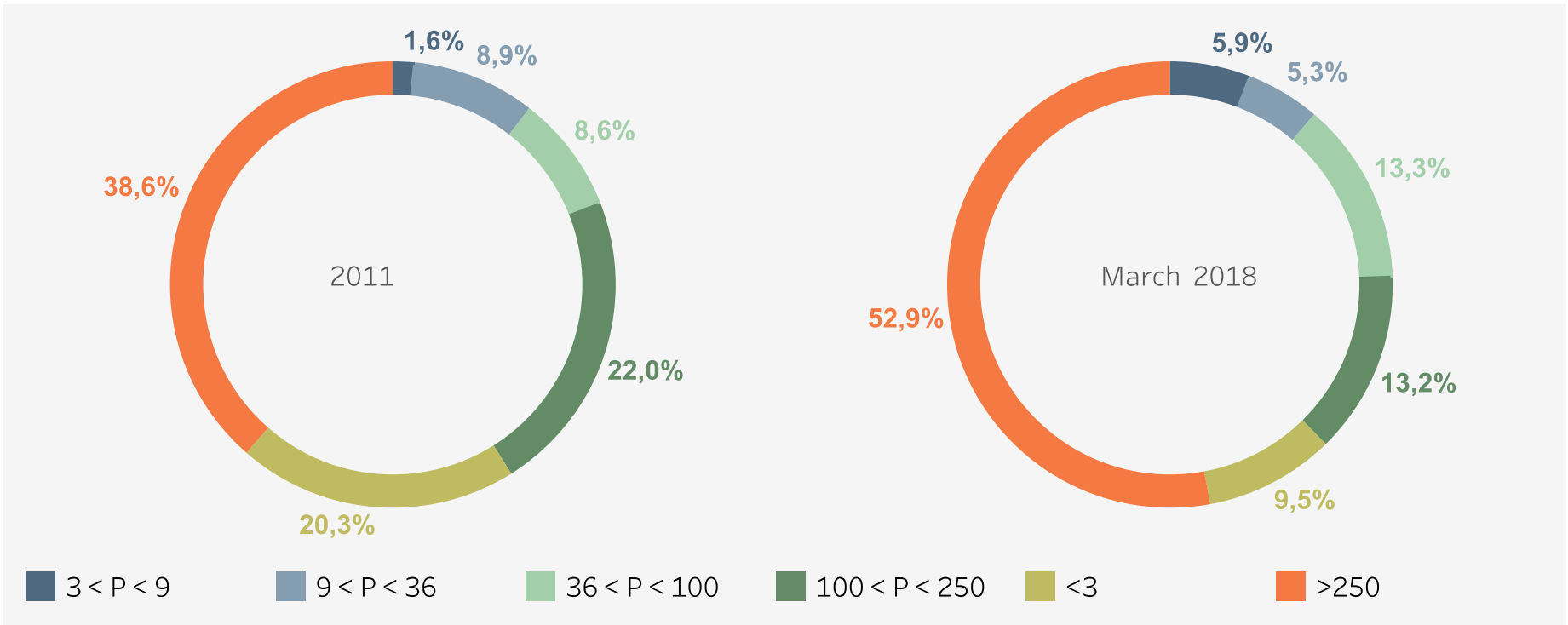


Capacity market scheme for PV

Large-scale projects > 250 kW – 53% in March 2018

Capacities <3 kW and 100-250 kW decreased their share

Capacities 9-36 kW and 36-100 kW increased their share



Regular FIT vs Capacity market

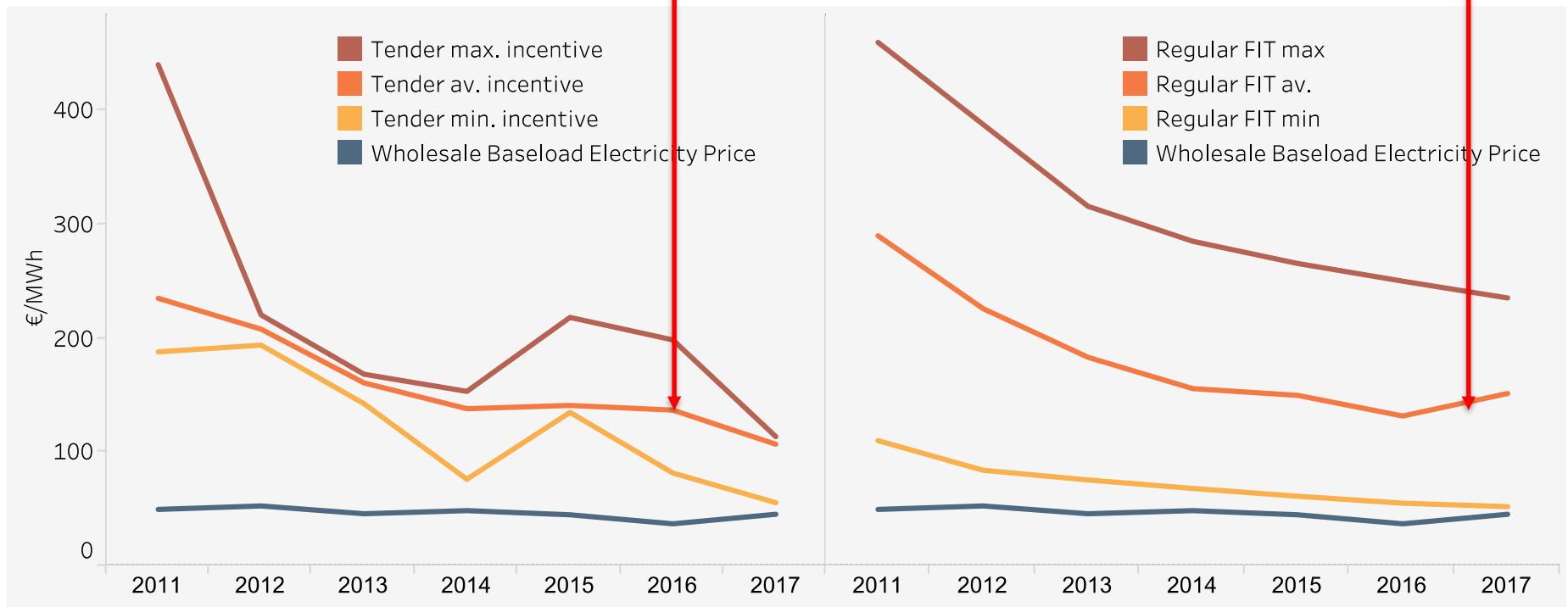
The unitary support decreased – approaching to wholesale baseline electricity price

Largest decrease

-50%

Highest FIT

-28%



Regular FIT vs Capacity market

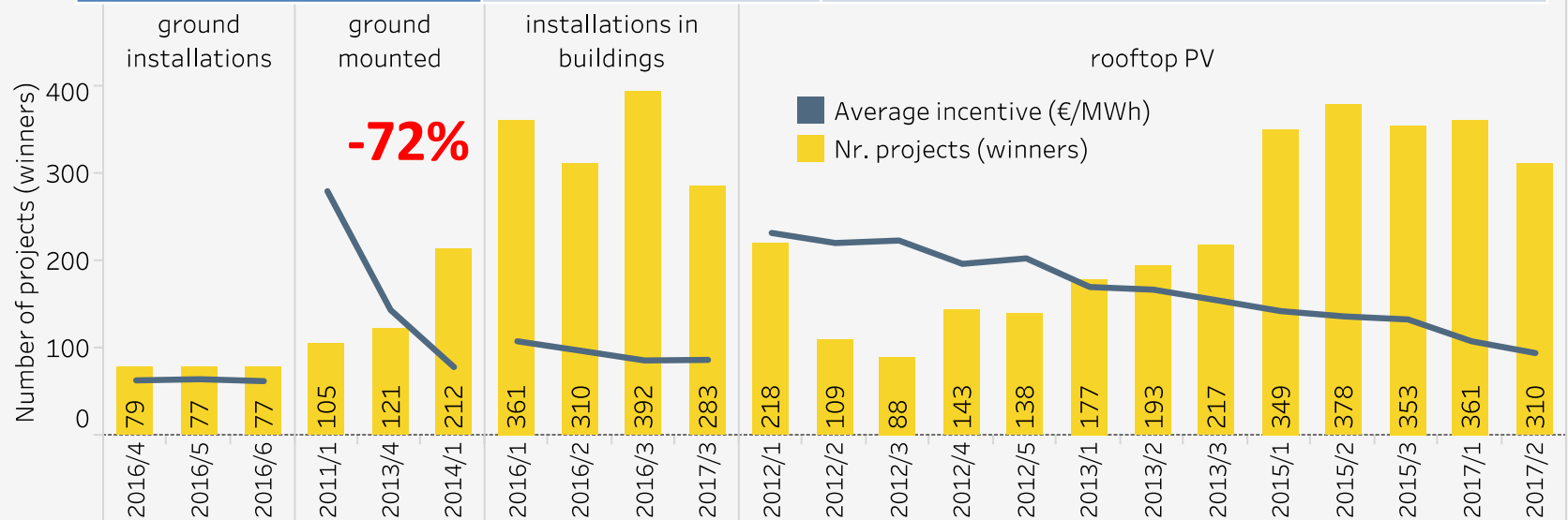
FIT - Simplified BIPV price the largest decrease

Tender - Ground mounted price the largest decrease

FIT

Capacity range	Period	Average support change
0 to 9 kW	2011-2017	-42,4%
0 to 36 kW	2011-2017	-49,1%
9 to 36 kW	2011-2013	-43,2%
36 to 100 kW	2011-2017	-68,7%
0 to 12000 kW	2011-2016	-48,2%

TENDER



Effectiveness of support for PV

Overall support – **10 folded** over 2005-2016

2.5 €billion

In 2016 – PV sector turnover **0.7 €billion**

5800 jobs – 7% of total EU solar PV jobs

2005-2010:

+1 €/MWh in max regular FIT brought the rise
by **2 MWh** of renewable electricity from PV

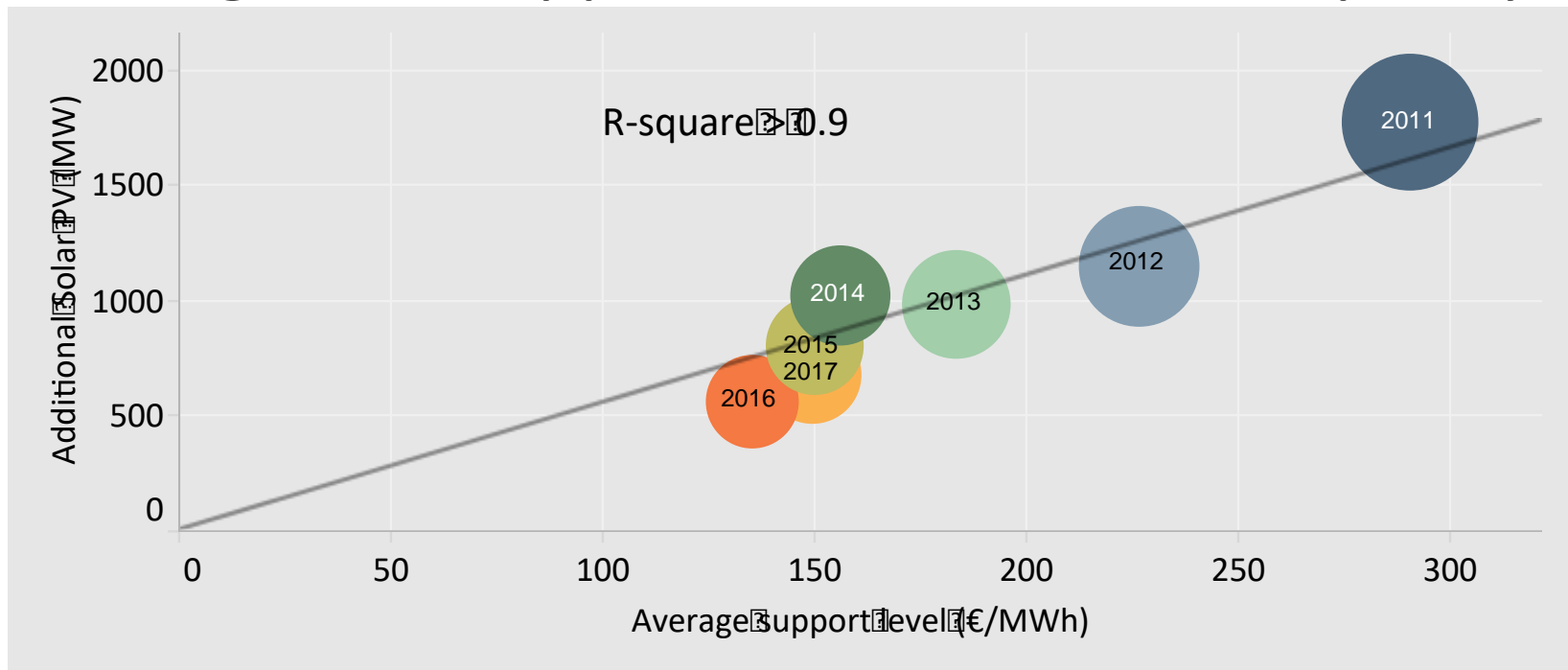
Comparing with 2018 PPE(10.2 GW)- **80%** in 2017

Effectiveness of support for PV

1% increase in overall support over 2005-2016
 brought to **0.6% increase** in PV capacity

Real relationship

‘average unit support – additional PV capacity’



Key takeaways

The overall support for solar PV in France has been effective in short and long terms

2008-2010 saw the highest FIT unitary support for PV

Until 2010 relatively high cost of support for PV
Building integrated PV systems (BIPV) mainly supported

The shifting towards the capacity market mechanism brought to the highest installed capacity of solar PV

Key takeaways

However after the shift the additional solar PV start decreasing

- Continues drop of unitary support through tendering
- Moving towards large-scale installations

FIT accompanied with quantitative specific targets for PV

- increased of cost-effectiveness
- provided more certainty to investments

Decrease of regular FIT and tender prices shows

- Favorable regulatory & institutional framework
- Low solar PV project development costs



Thank you for your attention!
QUESTIONS?