EU-CHINA

Development and Perspectives of Photovoltaic in Selected European Markets

SNEC 2nd (2008) International Solar and PV Conf. & (Shanghai) Exhibition
International Solar and PV Industry Summit
PV Industrial Technology Forum

Shanghai, May 9, 2008

EU-China Energy & Environment Programme
Frank Haugwitz (韩飞)

SPAIN – Legislative Framework

- Since 1999 the govt. follows a clear strategy to promote PV
- Royal Decree 436/2004 Feed-in-Tariff Scheme came into effect resulting in rapid market development and the investment climate is one of the best throughout Europe

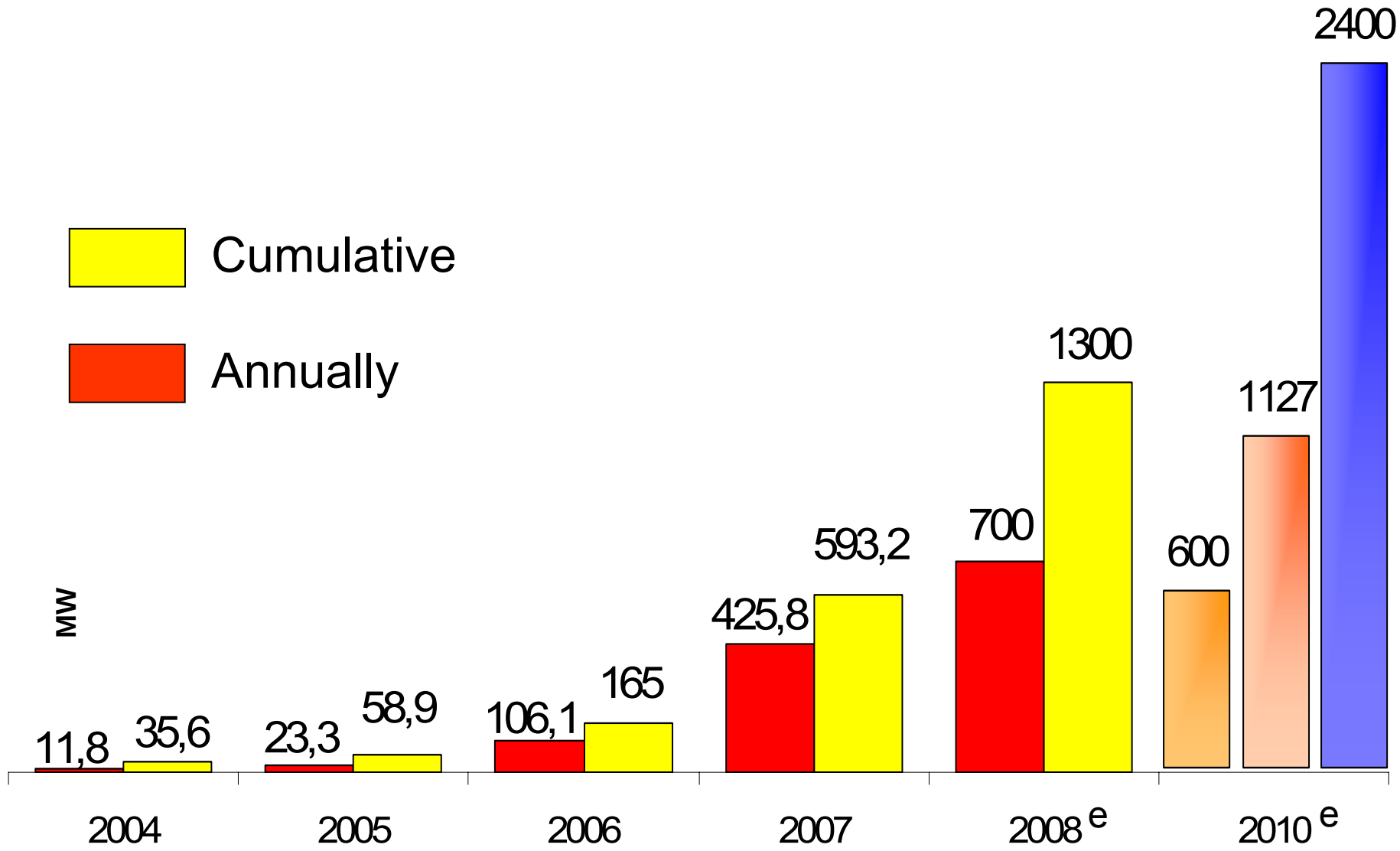
  < 100 kWp - 41 €c/kWh

  > 100 kWp - 22 €c/kWh
- Royal Decree 661/2007

  Tariff in 2008: 45 €c/kWh
- National Target of 1200 MW by 2010

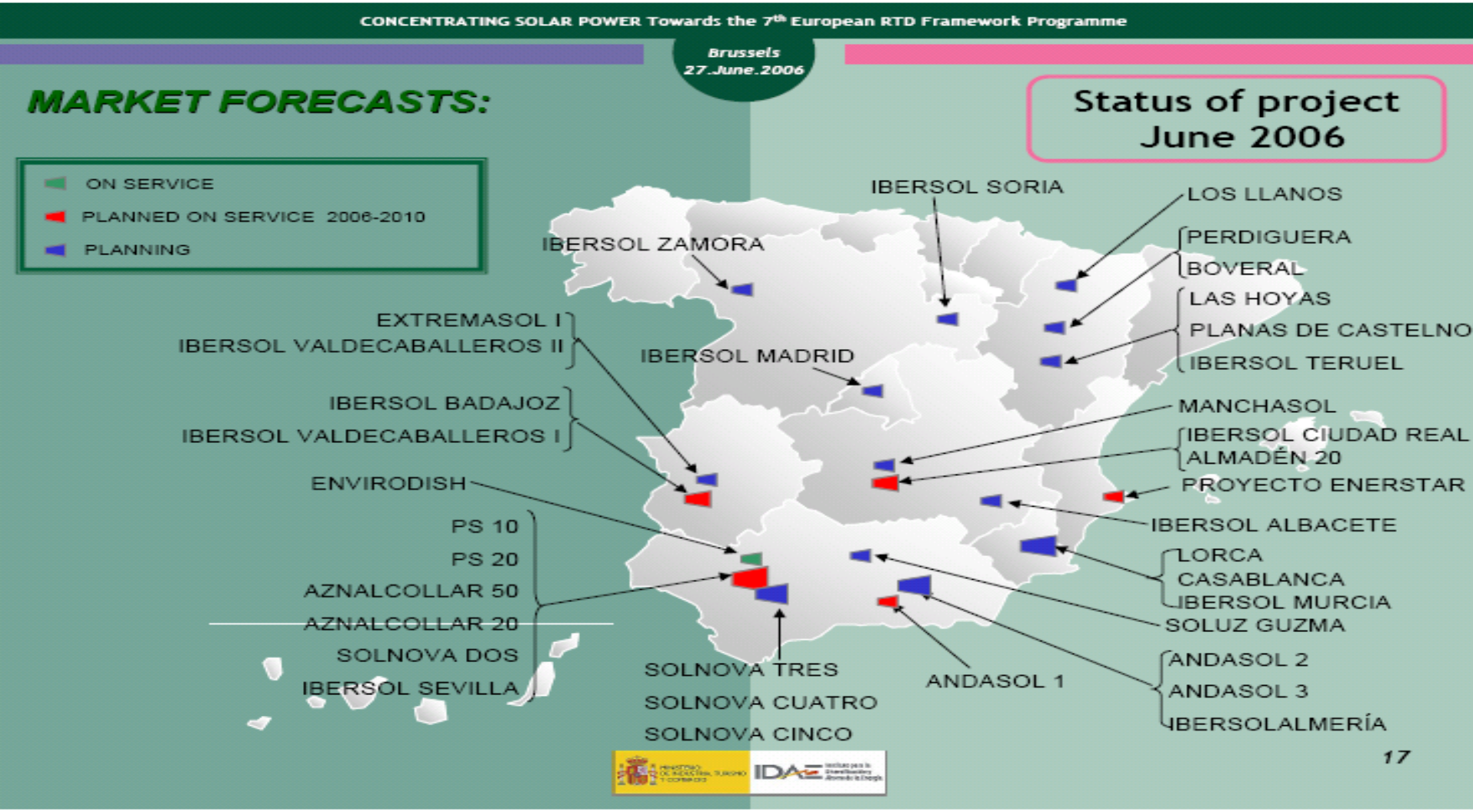
  (expected to be surpassed in September 2008)

SPAIN – Market Development & Perspectives (2004 - 2010)



Sources: Spanish PV Industry Association (ASIF), Est. for 2010 from EPIA, Sarasin, Photon Intl.

SPAIN – CSP Projects



More than 1000 MW of CSP under construction / development

SPAIN – Assessment of Framework Conditions

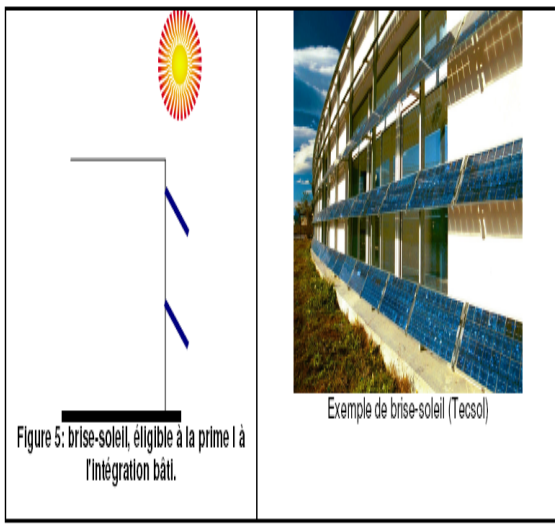
Strengths	Weaknesses	Lessons Learned
Excellent solar yields + feed-in-tariff + loans up to 80% are extremely attractive	Limited budget led to suspension of support program in 2004	Subsidies abolished and Feed-in-Tariff introduced
Very consistent policy and PV strategy, e.g. support schemes, full commitment on natl. and regional level, natl. targets	Most investors focused only on subsidies and public funds, just a few commercial lending / bank credits	Simplification of administrative procedure in order to facilitate the market development
Good market monitoring and policy performance measurement	Bureaucratic application procedures for grants on esp. on regional level	

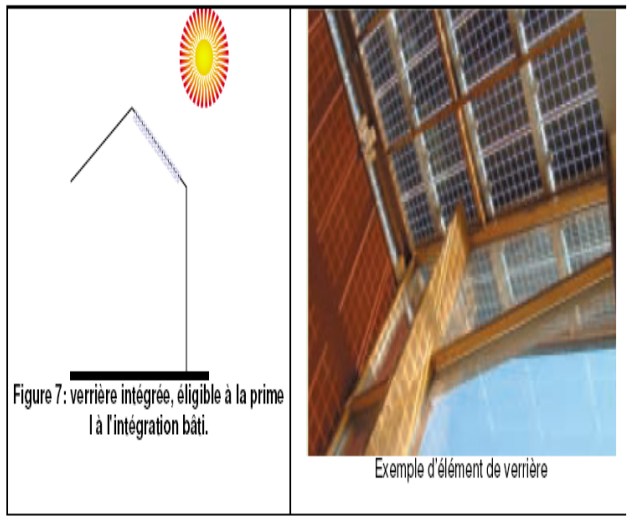
Source: PV Policy Group Assessment of 12 Natl. PV Policy Frameworks, May 2006

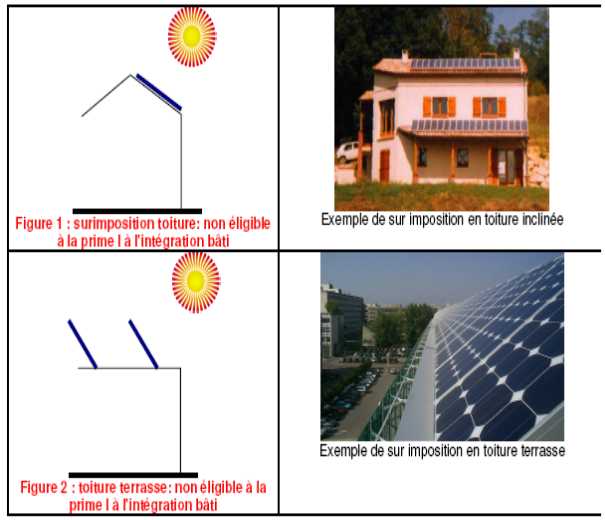
FRANCE – Focus on BIPV

Focus on Building Integrated PV (BIPV)

- PV is an integrated part of the construction of the buildings which generates electricity
- BIPV will become cheaper than PV + Building components
- Added-Value of BIPV is higher than PV alone







Source: EPIA Workshop Brussels, ADEME Fabrice Juquois, February 2007

FRANCE – Legislative Framework

Tax Incentives

- Tax credit for income tax payers : 50 % reimbursement of the equipment cost
- Specific tax incentives on investment in overseas departments (French Territories)

Feed-In-Tariffs

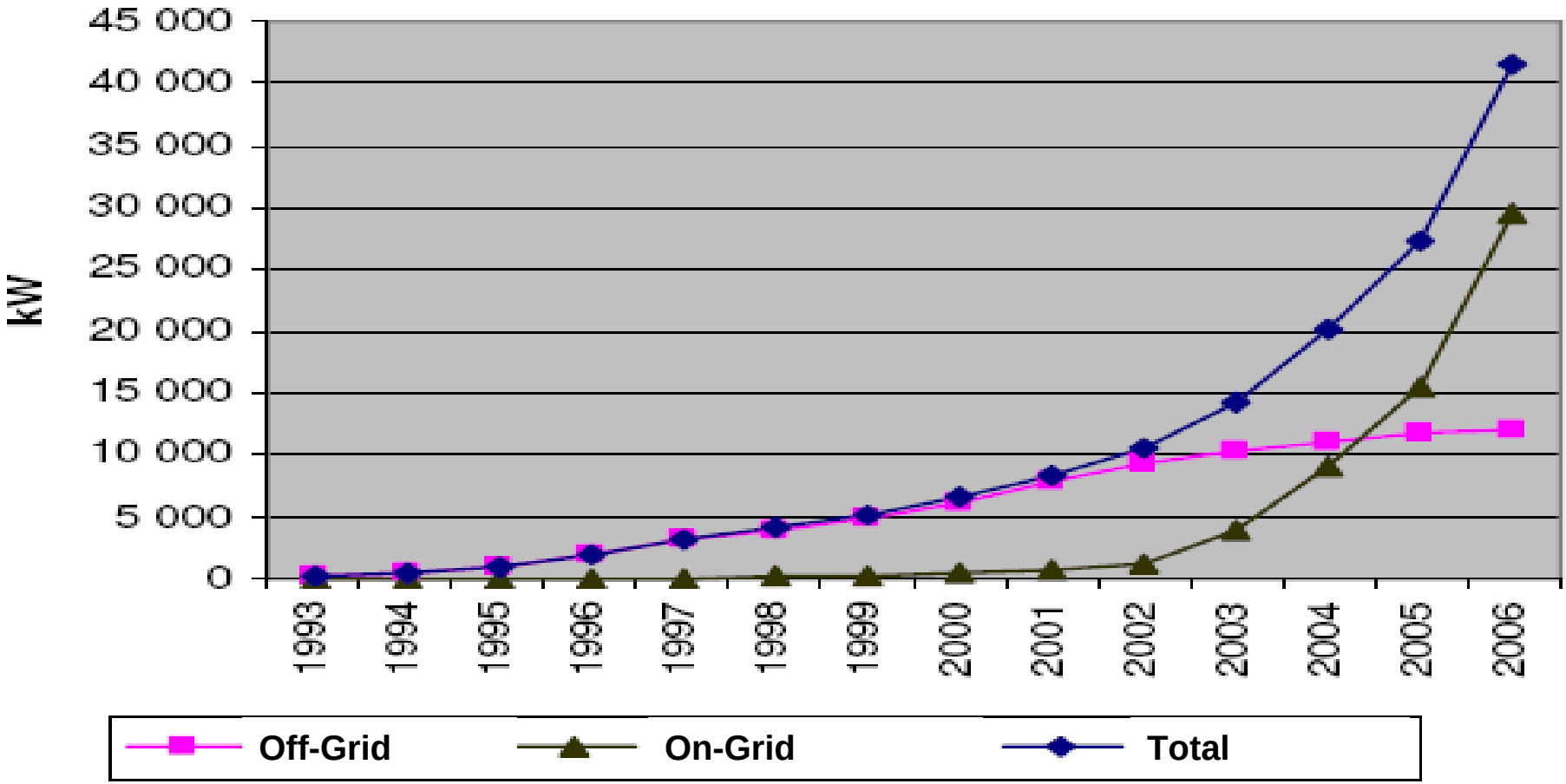
- Continental France : 31,19 €c/kWh + 26 €c/kWh, if BIPV
- Overseas Dept. : 41,19 €c/kWh + 0,16 €c/kWh, if BIPV
- Duration 20 years

National Targets

- 160 MW by 2010
- 450 MW by 2015

Source: EPIA Workshop Frankfurt, February 2008

FRANCE – Installed Capacities



In 2007: approx. 45 MW installed / Total installed capacity: approx. 80 MW

Source: EPIA Workshop Brussels, ADEME Fabrice Juquois, February 2007; EPIA Workshop Frankfurt, February 2008

FRANCE – Outlook

Market Development Estimations for 2008/2009

- 60% market share in continental France; 40% in overseas dept.
- Lead by private (< 3kW) BIPV systems
- Ground-mounted sys. mainly in overseas dept. and S-France
- France favors BIPV, consequently the development depends on strategies related to building sector.

Year	Annually Installed Capacity	Total Installed Capacity
2013	0,5 GW	1,6 GW
2018/19	1 GW	7-8 GW (in 2020)

Source: EPIA Workshop Frankfurt, February 2008

FRANCE – Assessment of Framework Conditions

Strengths	Weaknesses	Lessons Learned
Feed-in-Tariff has generated growth and hopes	Complex administrative procedure – Permission procedure for < 5 kW Ø 4-12 months > 5 kW Ø 12-24 months	Natl. Support scheme from ADEME proved effective
Tax Credit System is less bureaucratic than subsidies	Lack of political commitment and stability	Feed-in-Tariff proved as both effective and efficient support mechanism
Fairly efficient monitoring system	Support schemes always depends on budgets, which creates insecurity	

Source: PV Policy Group Assessment of 12 Natl. PV Policy Frameworks, May 2006

GREECE – Legislative Framework

The Law: 3468 / 2006

- Effective since June 27, 2006
- To promote wind and solar potential
- Natl. Targets of RES contribution to total electricity production: 20,1% by 2010 and 29% by 2020
- No cap, but reference is made that by 2020 a minimum of 500 MW / mainland and 200 MW / islands will be installed

Feed-in-Tariff kWh	On-Grid	Off-Grid
Sys. ≤ 100 kW	€c 45	€c 50
Sys. > 100 kW	€c 40	€c 45

Source: EPIA Workshop Frankfurt, Solar Hellas Group, February 2008

GREECE – Legislative Framework

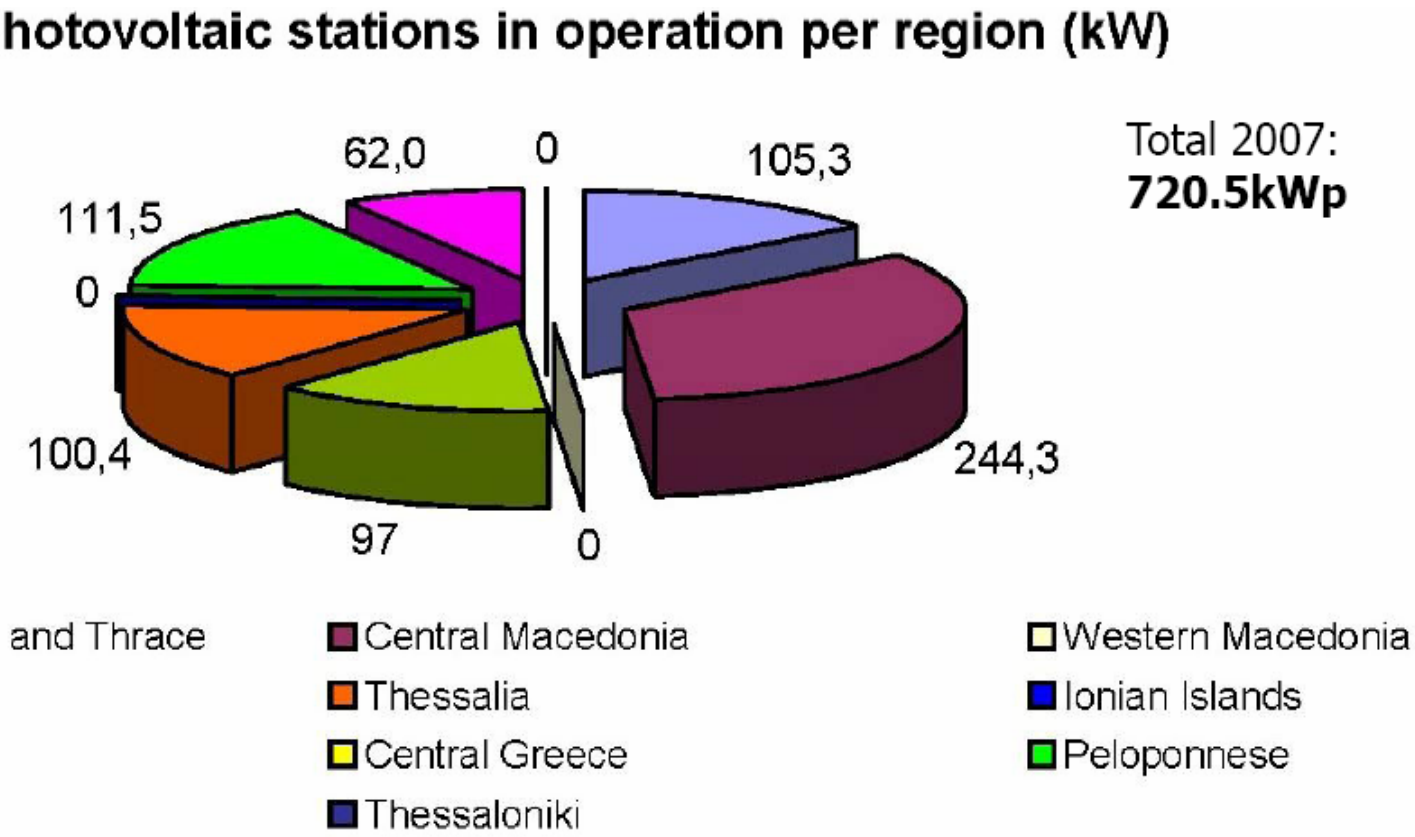
Timetable of Licenses/Permits Required

Description of Activity	Days Required	Total Days
Issuing of **PEAE**	55	55
Issuing of **ETA**	85	140
RAE opinion to MoD on the **EPL**	90	230
Decision of the minister of MoD on the **EPL**	15	245
Issue of the **Installation permit** from the Prefecture General Secretary	15	260
Issue of the **Installation permit** from the minister of MoD (if failure above)	30	290
Issue of the **Operation permit** (same authority as Installation permit)	15	**305**

- Days indicated are working days; 305wd correspond to **~14 months**
- Table above is indicative for large PV systems of capacity >150kWp; for smaller systems, time required for permits is less.

Source: EPIA Workshop Brussels, February 2007

GREECE – PV Installations in 2007



End of 2007: 6,5 – 7 MW installed capacity.

Next 3-5 years, medium and large size systems expected.

Source: EPIA Workshop Frankfurt, Solar Hellas Group, February 2008

GREECE – Assessment of Framework Conditions

Strengths	Weaknesses	Lessons learned
High Subsidy on the capital cost	Lack of a long-term political vision and strategy	Very effective investment support in solar thermal sector could serve as a reference for PV
Utility is obliged to connect to the grid	Extremely bureaucratic regulatory framework	
Very high public acceptance		

Source: PV Policy Group Assessment of 12 Natl. PV Policy Frameworks, May 2006

ITALY – Legislative Framework

Ministerial Decree 19/02/2007

System Size in (kW)	Non-Integrated	Partially Integrated	Integrated Systems
1 < 3	40	44	49
3 < 20	38	42	46
> 20	36	40	44
Non-Integrated	Open space plants ground-mounted, on tracking systems or similar		
Partially Integrated (3 types)	Modules installed on roofs, covers, facades or railings, coplanar with support surface		
Architecturally Integrated (10 types)	Roofs, roofing or facades of buildings consisting of PV systems		

Source: EPIA Workshop Frankfurt, Assosolare, February 2008

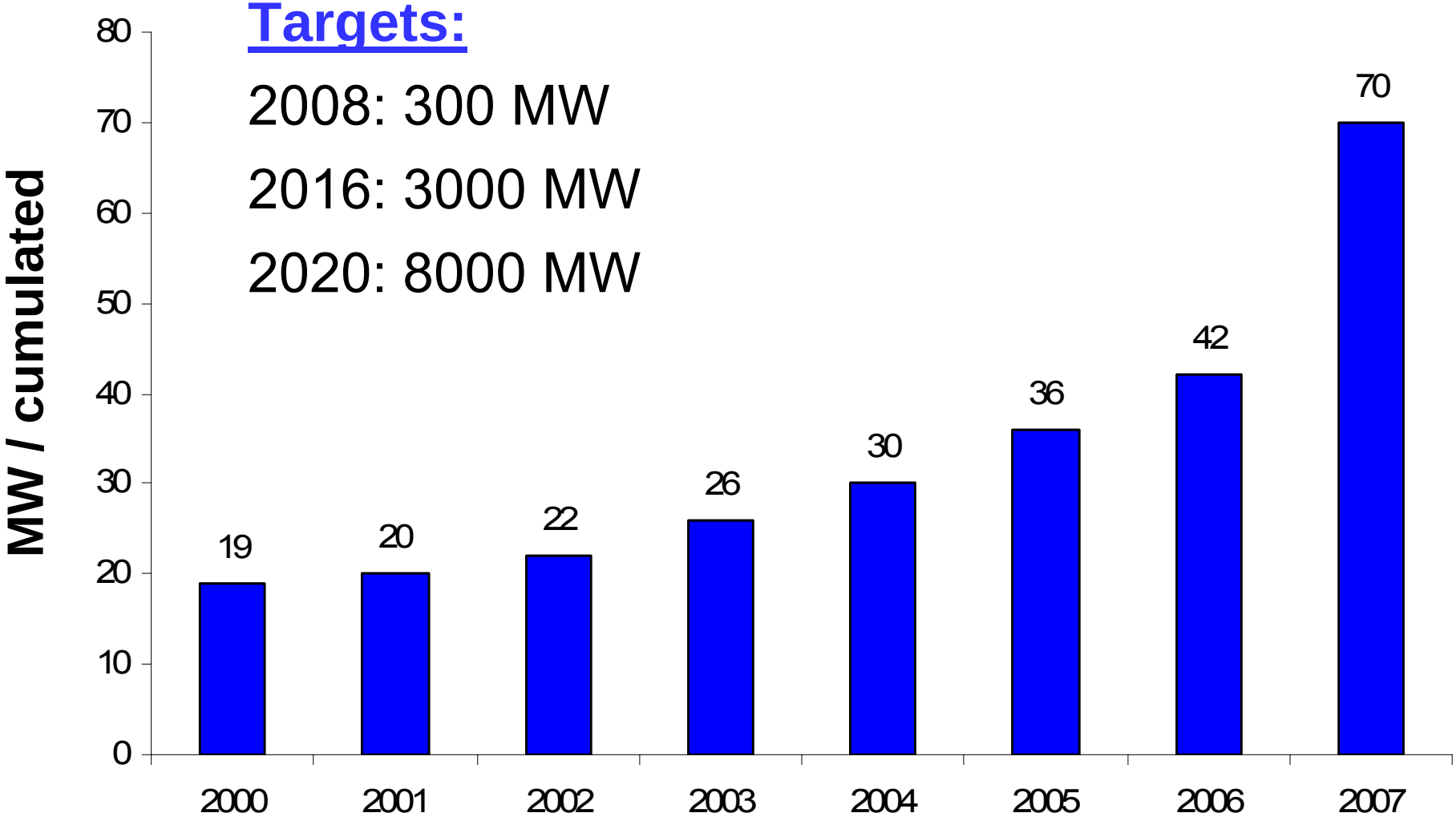
ITALY – PV Market Development

Targets:

2008: 300 MW

2016: 3000 MW

2020: 8000 MW

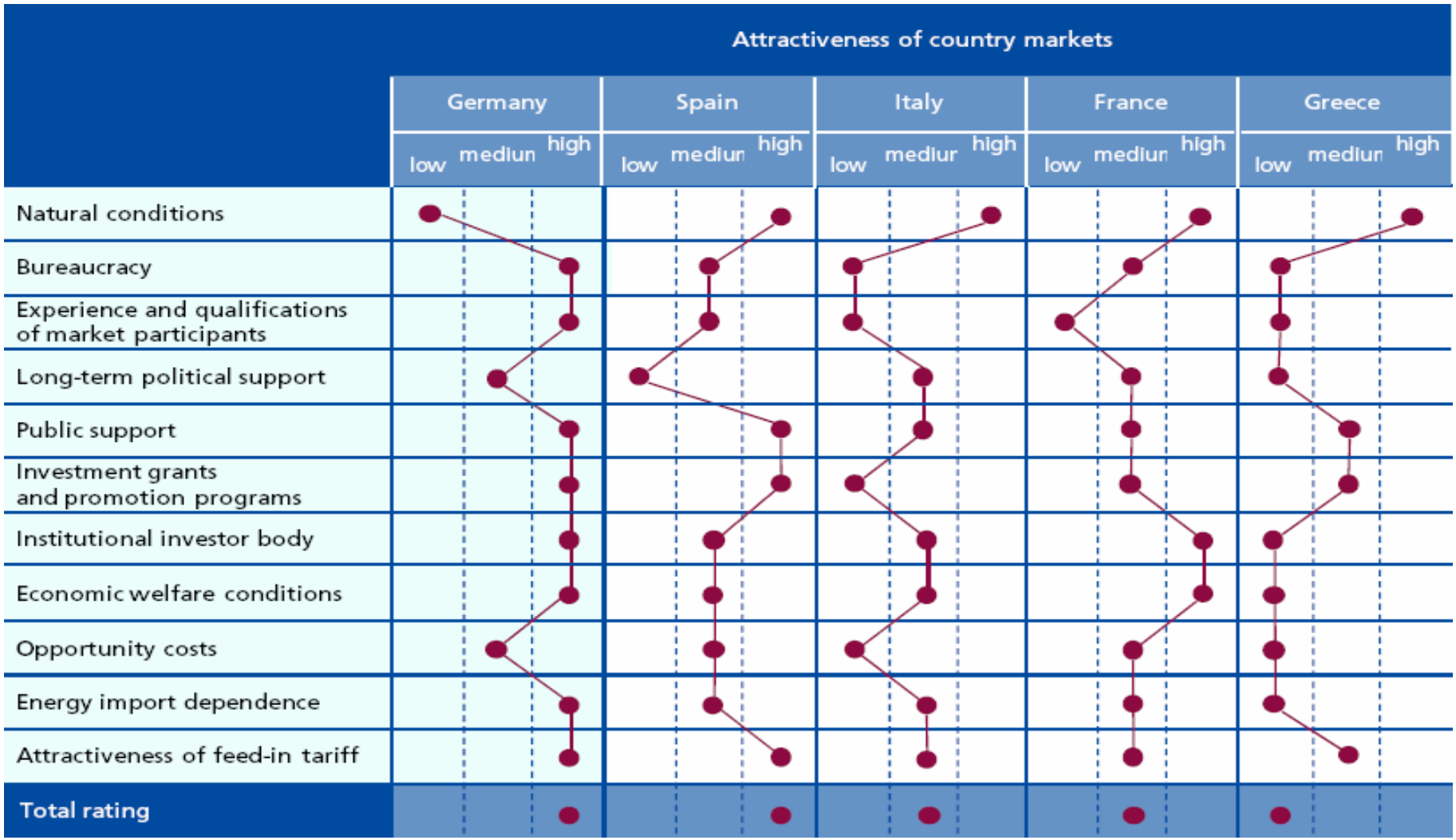


ITALY – Assessment of Framework Conditions

Strengths	Weaknesses	Lessons Learned
Introduction of Feed-in-Tariff – no Quotas	Centralized permission procedure – long time until installation realized	Too small systems had no impact on reducing system prices
Inclusion of open-land ground mounted sys.	No specific Feed-in-Tariff for BIPV until 2007	Operators made no profit, which could have been re-invested
Increased guaranteed Feed-in-Tarif time from 15 to 20 years and annual decrease of tariff of only 2% instead of 3%	Only small systems promoted, weak leverage effect in the public	Awareness & acceptance was not raised, no pull-effect
Possibility to combine Feed-in-Tariff with regio. investment subsidies	Poor market monitoring and policy performance measurement	Reduce bureaucratic procedures in order to reduce application time

Source: PV Policy Group Assessment of 12 Natl. PV Policy Frameworks, May 2006

Attractiveness of EU PV-Markets - Key Indicators



Source: EuPD Research, Feb. 2008, PV Policy Group Intelligent Energy Europe

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