Status and Trends of Global Solar Photovoltaic Industry Development

中華新能源

China New Energy Chamber of Commerce

全国工商联新能源商会

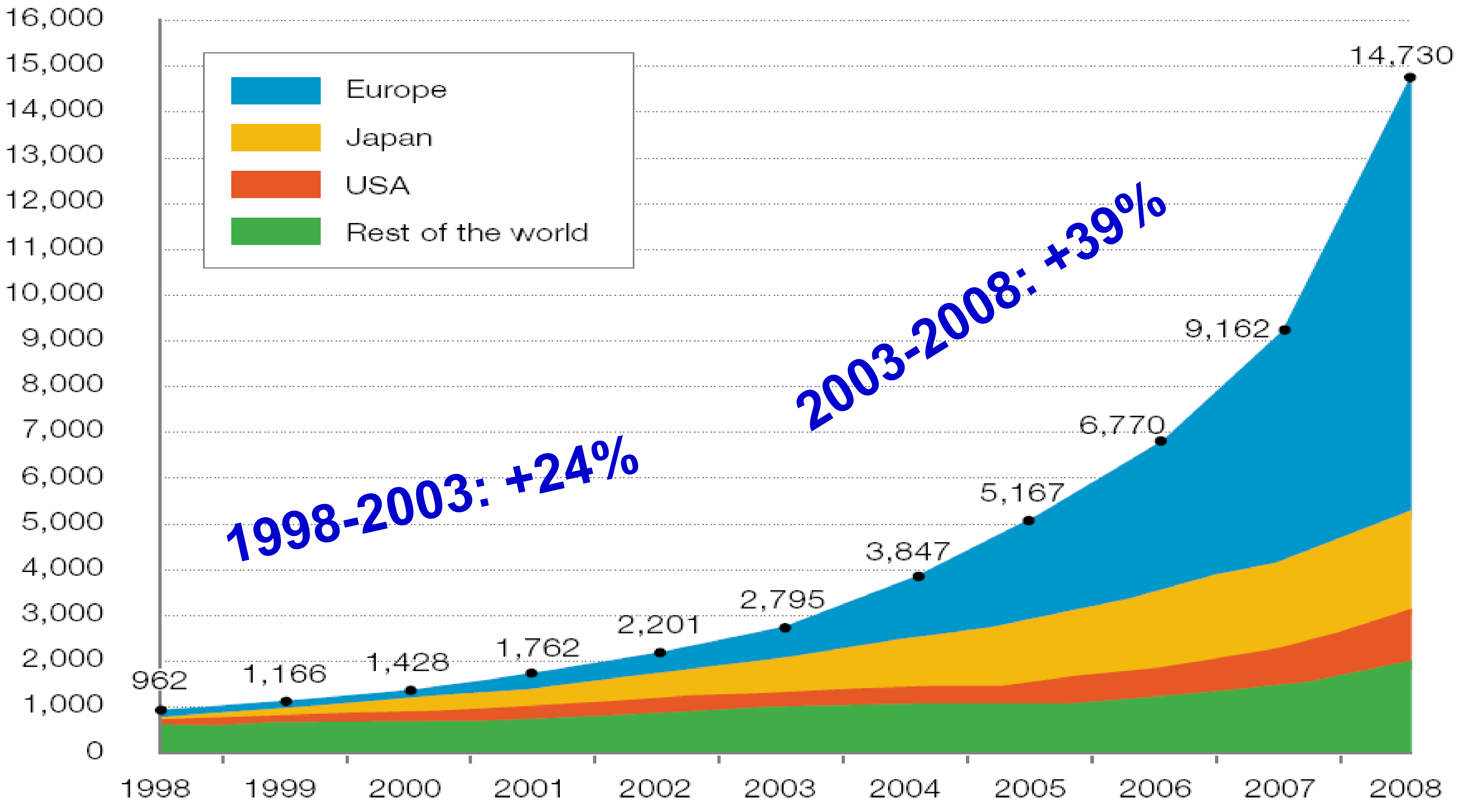
“第四届中国新能源国际高峰论坛”

中国（北京）**2010**年**1**月**20**日

Frank Haugwitz (韩飞**)**

Global Cumulative MWp PV Installations per Region 1998-2008

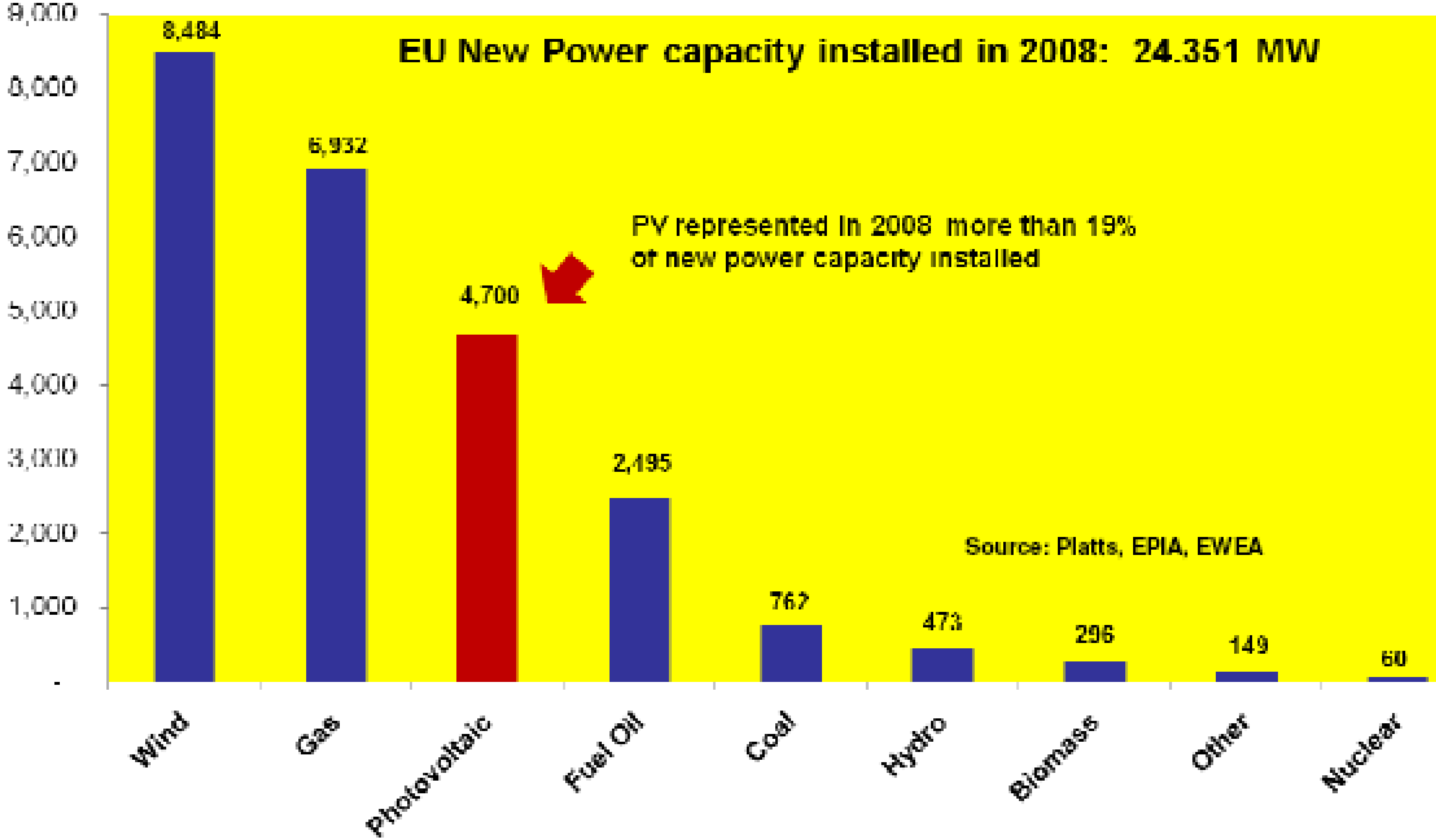
分地区的全球光伏累计安装量



Source: EPIA Global Market Outlook March 2009

PV represented 19% of new EU power capacity installed in 2008

2008年欧盟的新装发电能力中光伏占19%



Overview Natl. Support Scheme of EU Member States

欧盟成员国国家激励机制概览

Country	Main support scheme	Ground mounted	BIPV	BAPV	Duration	Cap	Cumulative PV Power installed (end 2008)
France	FiT	0.32 - 0.43	0.60	0.32 - 0.43	20	-	87 MW
Germany	FiT	0.32	0.33 – 0.43		20	-	5,308 MW
Italy	FiT	0.35 – 0.39	0.43 – 0.48	0.39 - 0.43	20	1200 MW	430 MW
Switzerland	FiT	0.30 - 0.40	0.38 - 0.56	0.37 - 0.46	25	16 Mio CHF	46 MW
Austria	FiT	0.30 - 0.46			10+1+1	3.3 MW/year	30 MW
Belgium	GC	Brussels: 0.15 - 0.65 Wallonia: 0.15 - 0.63 Flanders: 0.45			Brussels 10 Wallonia 15 Flanders : 20	-	71 MW
Bulgaria	FiT	0.38 - 0.42			25	-	1.4 MW
Czeck Republic	FiT	0.48 - 0.49			20	-	54 MW
Greece	FiT	0.40 - 0.50			20	-	20 MW
Luxembourg	FiT	0.36 - 0.39			15	5MW	24 MW
Netherlands	FiT	0.29			15	15 MW (2009)	59 MW
Portugal	FiT	0.62			5+10	12 MW	68 MW
Romania	GC	0.11 – 0.22			10		0.45 MW
Slovenia	FiT	0.33 - 0.37			5+5+10	-	2.1 MW
Spain	FiT	0.32 – 0.34			25	500 MW (2009)	3,137 MW
UK	GC	0.03-0.06			lifetime		24.1 MW

Status EU New Member States
新欧盟成员国的情况

	Feed-in tariff	Quota system	Green certificates	Tax incentives	Preferential loans	Net-metering
Bulgaria	✓				✓	
Cyprus	✓	✓				
Czech Republic	✓			✓		
Estonia	✓			✓		
Hungary	✓	✓			✓	✓
Latvia	✓					
Lithuania	✓			✓	✓	
Malta				✓	✓	✓
Poland		✓	✓	✓	✓	
Romania		✓	✓	✓	✓	✓
Slovakia	✓				✓	
Slovenia	✓			✓	✓	

Country	Feed-in tariff rate for PV (EUR/kWh)	Granting period (years)	Degression	Price of electricity (EUR)
Bulgaria	<5KW – 0,428 >5KW – 0,380	25	no	
Cyprus	0,383 for houses and non-profit entities 0,36 for companies 20,5–22,5 with subsidy	15 or 20	no	0.12-0.16
Czech Republic	0.4603-0.4634 or bonus	20	5%	
Estonia	0,073	12		
Hungary	0,093	investment payback	no	0,156€/kWh for households
Latvia	0,427 since 02.2009	10	no	0,106
Lithuania	to be set by National Control Commission for Prices and Energy		no	
Malta	No			
Poland	GC = 250 PLN (57 EUR)			0,09
Romania	CG = 4 x (27 – 55) EUR	15	no	0,144 – 0,256
Slovakia	0,280 0,45 since 2009	1	yes (from 2009) 10%	
Slovenia	0,399 or bonus	15	7%	

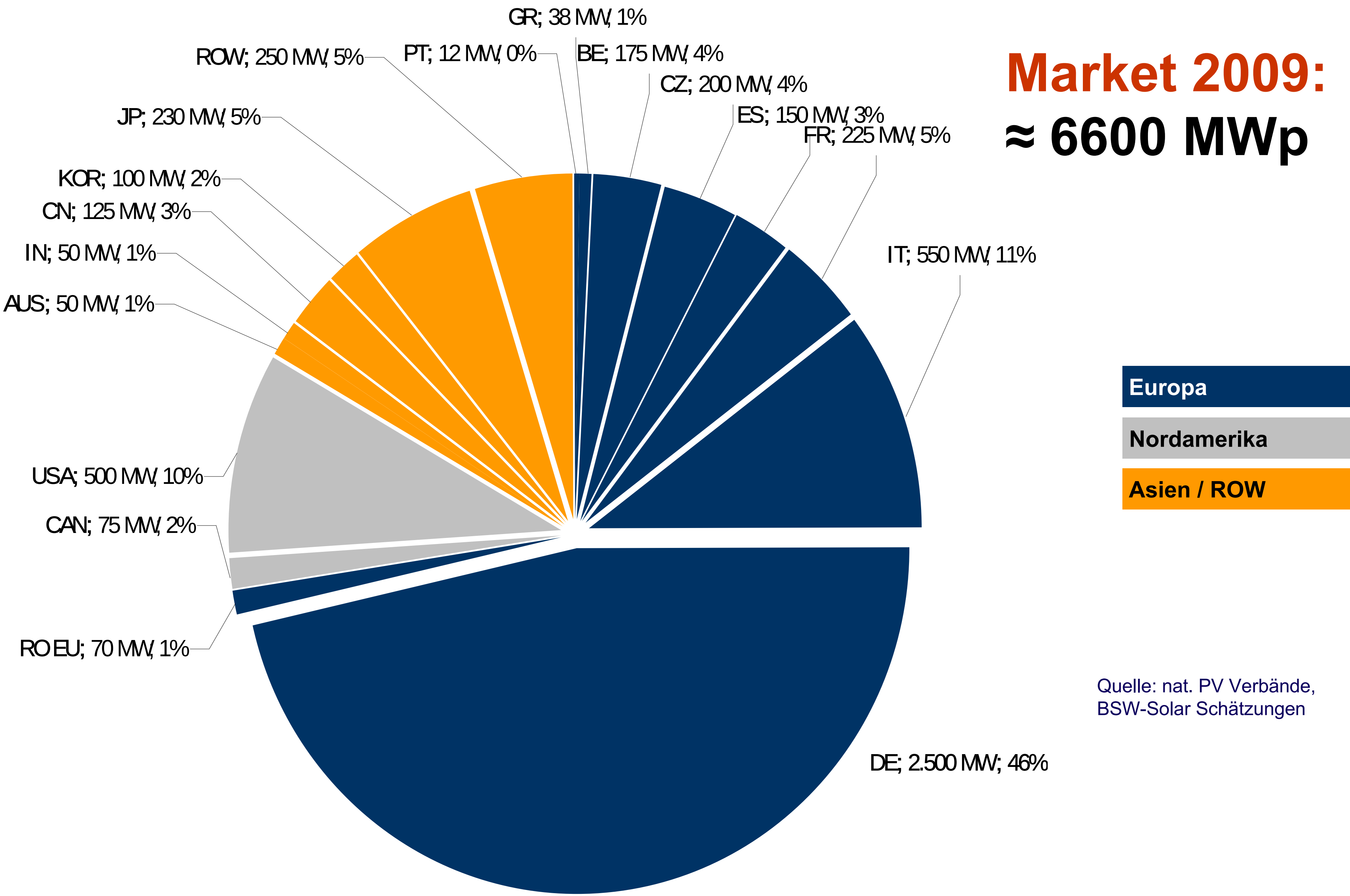
Market Development in EU New Member States 2003 – 2008

2003-2008新欧盟成员国的市场开发

Country NMS	2003	2004	2005	2006			2007			2008		
	Total	Total	Total	Off-grid	On-grid	Total	Off-grid	On-grid	Total	Off-grid	On-grid	Total
	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]
Czech Rep.	330	363	470	194	546	740	209	5252	5361	380	54 294	54 674
Slovenia	51	96	200	95	310	405	100	925	1025	100	2 046	2 146
Cyprus	254	340	518	450	578	1028	560	843	1403	600	1586	2186
Bulgaria	20	33	43	13	53	66	20	55	75	32	1 375	1 407
Poland	107	234	291	337	101	438	488	152	640	832	179	1011
Hungary	100	138	155	100	150	250	130	220	350	180	270	450
Romania	50	86	101	95	95	190	175	125	300	205	245	450
Malta	4	9	15	0	48	48	0	97	97	0	238	238
Lithuania	17	17	19	40	0	40	55	0	55	55	0	55
Slovakia	10	15	20	20	0	20	20	26	46	20	46	66
Estonia	2	2	2	5	0	5	12	0	12	12	0	12
Latvia	3	3	3	3	0	3	4	0	4	4	0	4
TOTAL	948	1336	1837	1352	1881	3233	1773	7695	9368	2 420	60279	62 699

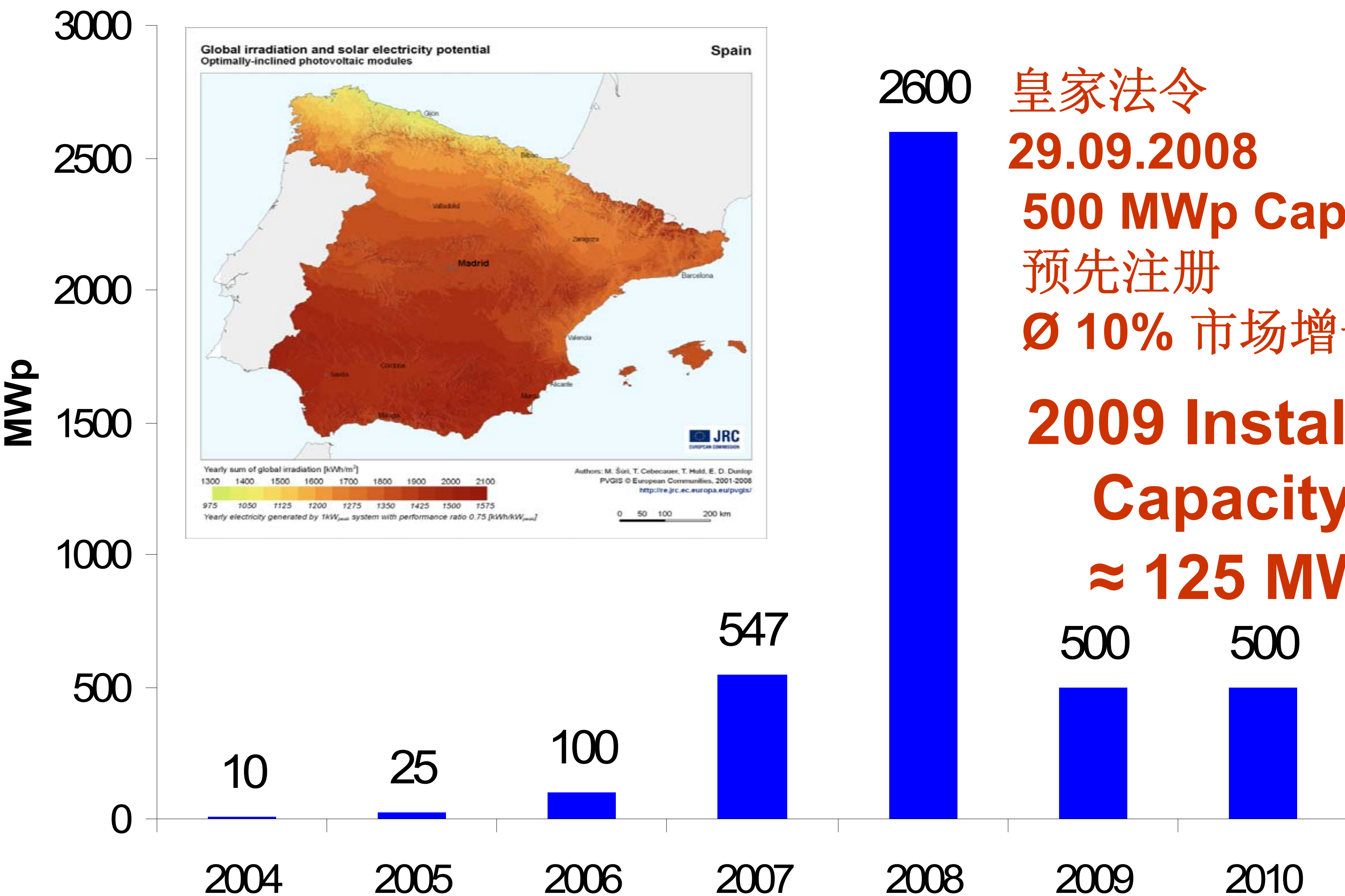
Global PV Markt 2009 (Estimation)

Market 2009:
≈ 6600 MWp



Quelle: nat. PV Verbände,
BSW-Solar Schätzungen

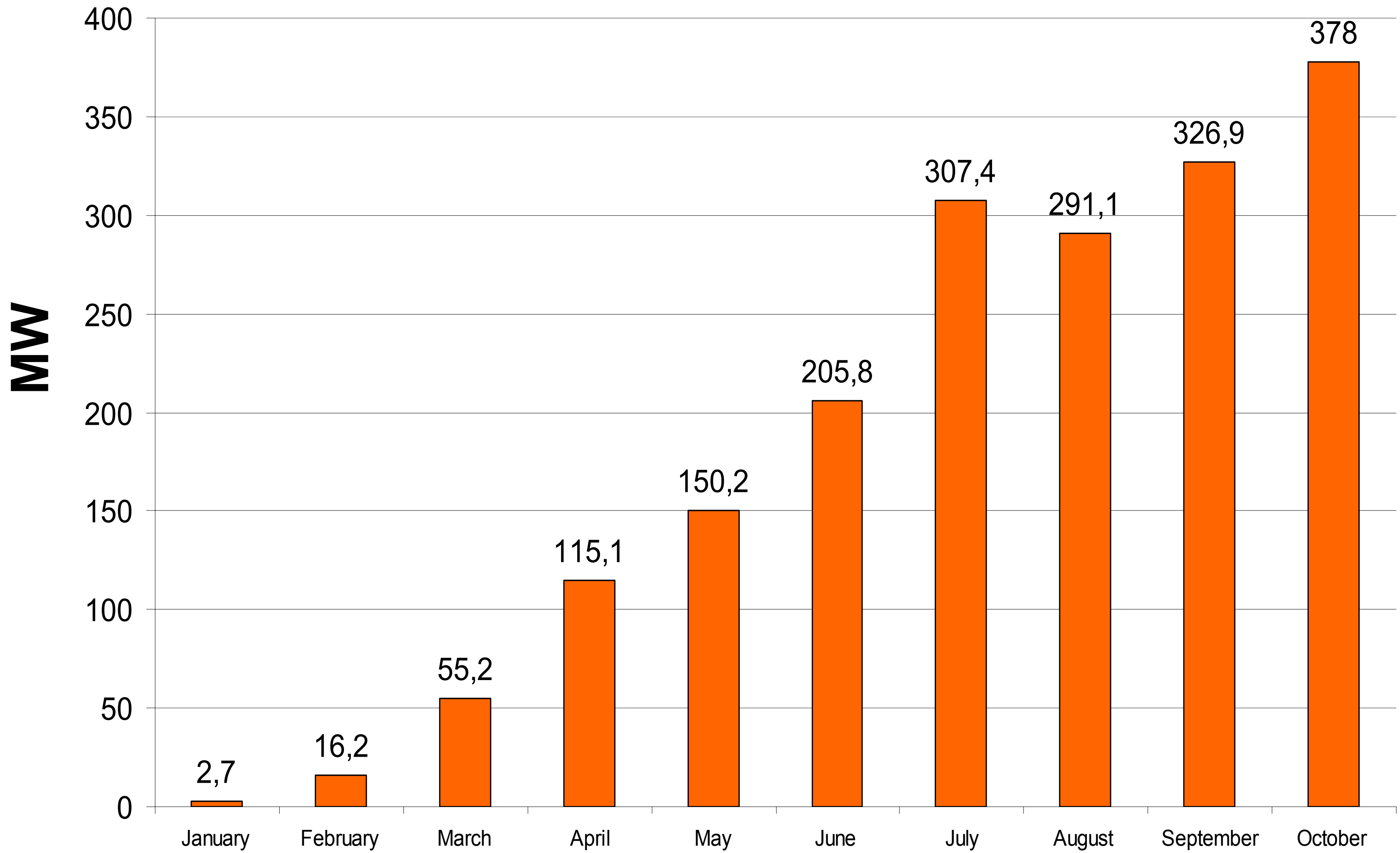
西班牙光伏市场的发展



皇家法令
29.09.2008
500 MWp Cap / a
预先注册
Ø 10% 市场增长率

2009 Installed Capacity:
≈ 125 MW

德国并网光伏市场到2009年10月



Source: German Federal Network Agency Dec. 2009

德国光伏市场发展状况

2008年光伏市场数据:

新增光伏发电容量	**1500 MWp**
总装机容量	**5300 MWp**
安装系统总数	**500 000**
2008年营业总额	**6 Bln. €**
就业岗位	**53 000**

重要里程碑

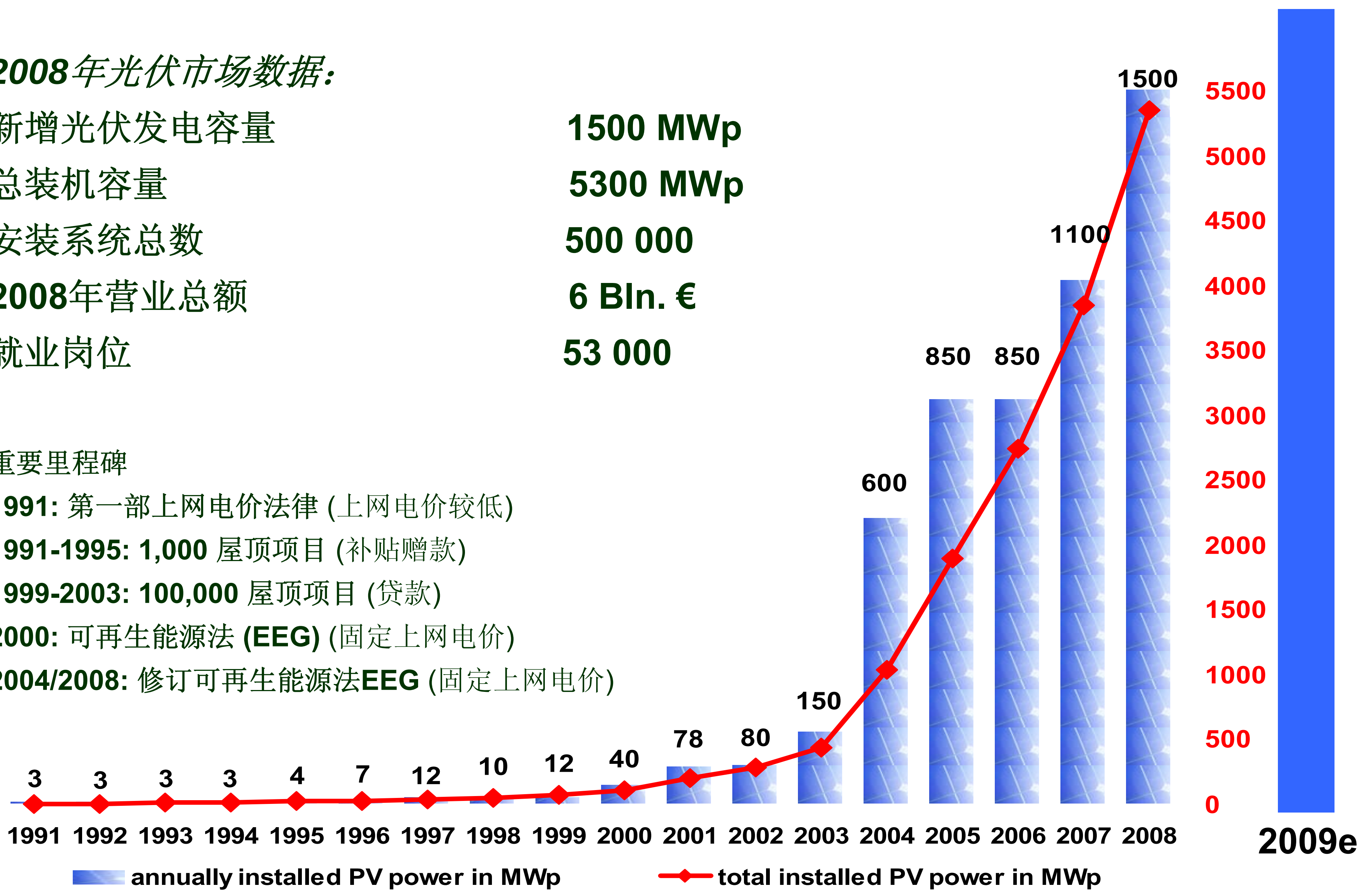
1991: 第一部上网电价法律 (上网电价较低)

1991-1995: 1,000 屋顶项目 (补贴赠款)

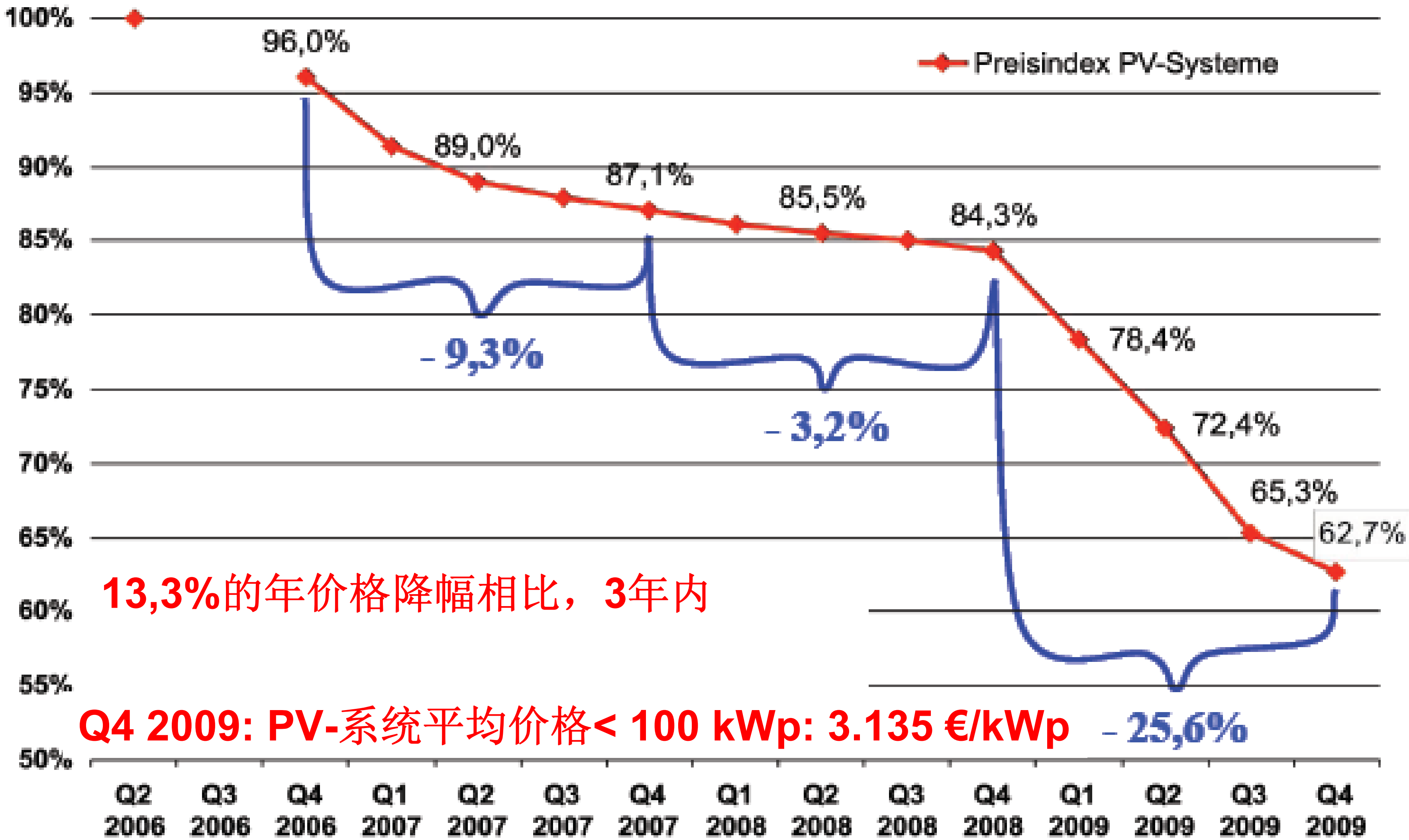
1999-2003: 100,000 屋顶项目 (贷款)

2000: 可再生能源法 **(EEG)** (固定上网电价)

2004/2008: 修订可再生能源法**EEG** (固定上网电价)

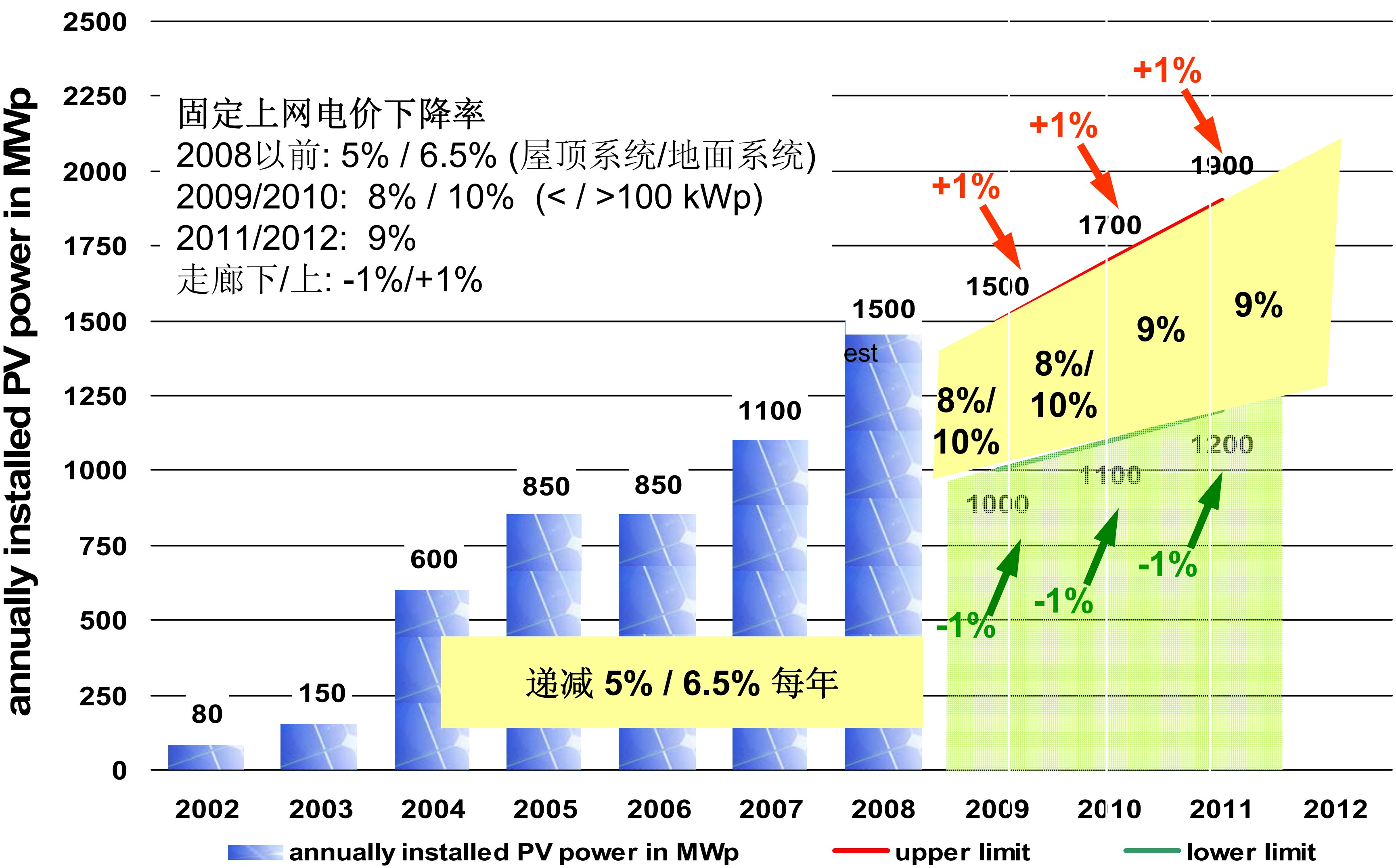


德国光伏系统价格指数



Source: Representative independent poll of 100 installers by EuPD-Research on behalf of BSW-Solar
PV-System Price means final customer price

德国固定上网电价- 06/2008修订



德国的政策和优惠措施情况

德国固定上网电价 2010年 (-月初)

	< 30 kWp	> 30 kWp	> kWp 100	> 1000 kWp
Roof-Top	€ 43.01ct - 9% = **€ 39.14ct**	€ 40.91ct - 9% = **€ 37.23ct**	€ 39.58ct - 11% = **€ 35.23ct**	€ 33.00ct - 11% = **€ 29.37ct**
Own Consumption	**€ 25.01ct**			
Ground-Mounted	€ 31.94ct - 11% = **€ 28,43ct**			

未来德国固定上网电价的变化

2010: January 1, 2010 Reduction of 9-11 %

April 1, 2010 Reduction of ≈ 16-17%

2011: January 1, 2011 Reduction of 10%

} – 38% in 2 yrs

Principal Drivers: 2006-2009 Cost Reduction of Systems ≈ 35%, FIT reduce by 17%, but Revenues plus 10%/a

If in future, > 3000 MW/a ⇉ FIT + 2.5%

> 3500 MW/a ⇉ FIT + 5%

Focus on Roof-Top Installations vs Ground-Mounted Systems (CSU Proposal) higher reduction of FIT proposed

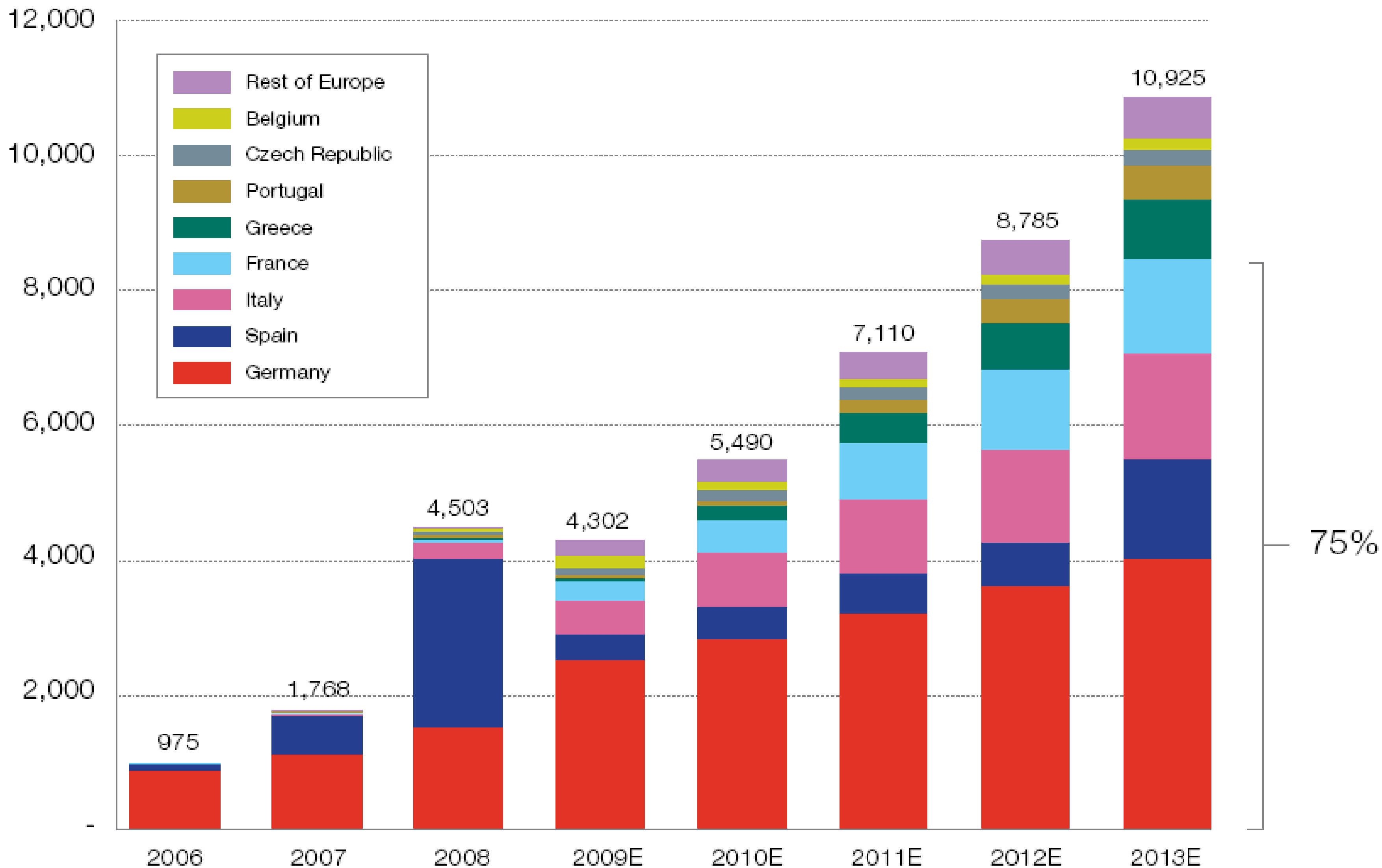
European PV Markets – Perspectives欧洲光伏市场的展望

Italy 意大利	FIT, Natl. Target of 1200 MW by 2010/11, New FIT 2011 although tight control expected sound market development envisaged, admin barriers on regional level, market demand for 2010 est. 650-900 MWp/a 上网电价法，2010/2011年国家目标为1200MW，2011年新上网电价后会有更大发展，2010年市场需求约为650-900MW/年
France 法国	FIT, good market development, favorable conditions for BIPV, further improvements of framework conditions expected, 2010 est. 600 MWp/a 上网电价法，市场发展良好，对BIPV优惠，将进一步改进网络环境，2010年市场需求约为600MW/年
Greece 希腊	Jan 15, 2009 new FIT incl. degression from 08/2010 onwards, new Roof-Top Prog. to be initiated, former cap abolished, due to admin procedures applications for 3.7 GW are waiting to be approved 2009年1月15日新的上网电价法包括了自2010年8月开始的递减，将发起新的屋顶项目，废除了以前的封顶政策，由于管理程序，3.7GW的应用等待批准

Promising Future European PV Markets其他欧洲市场 2009:

Belgium (150 MWp), Czech Republic (200 MWp), Portugal (12 MWp), Slovenia, UK, Turkey, …

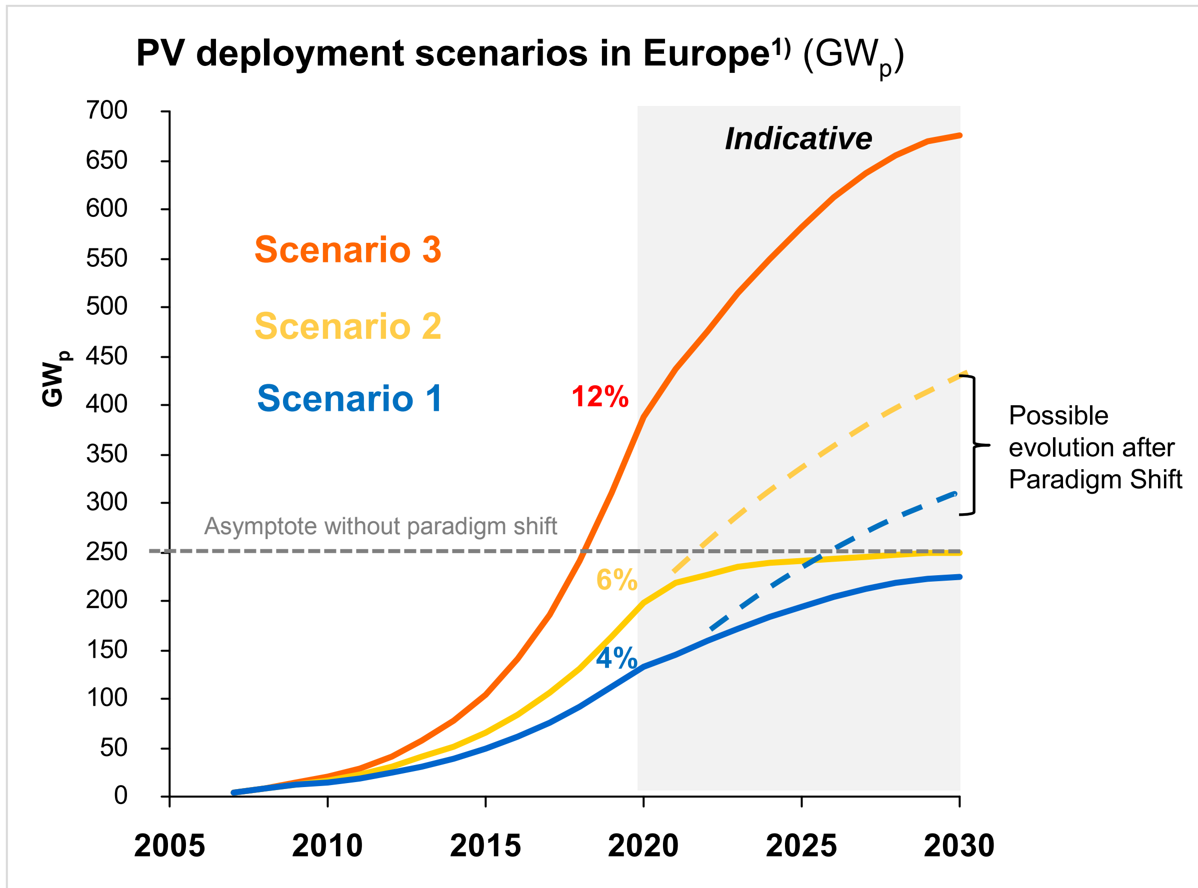
2013年前欧盟年度市场发展



Source: EPIA Global Market Outlook March 2009

3 PV deployment scenarios in Europe[1]
3种欧洲光伏发展预想

The Paradigm Shift requires significant changes in the existing electricity system and at market and regulatory level, together with a strong collaboration with other players in the energy sector
光伏的发展需要现有电力系统、市场和调度环节的显著改变，还需要电力系统其它参与者的密切合作



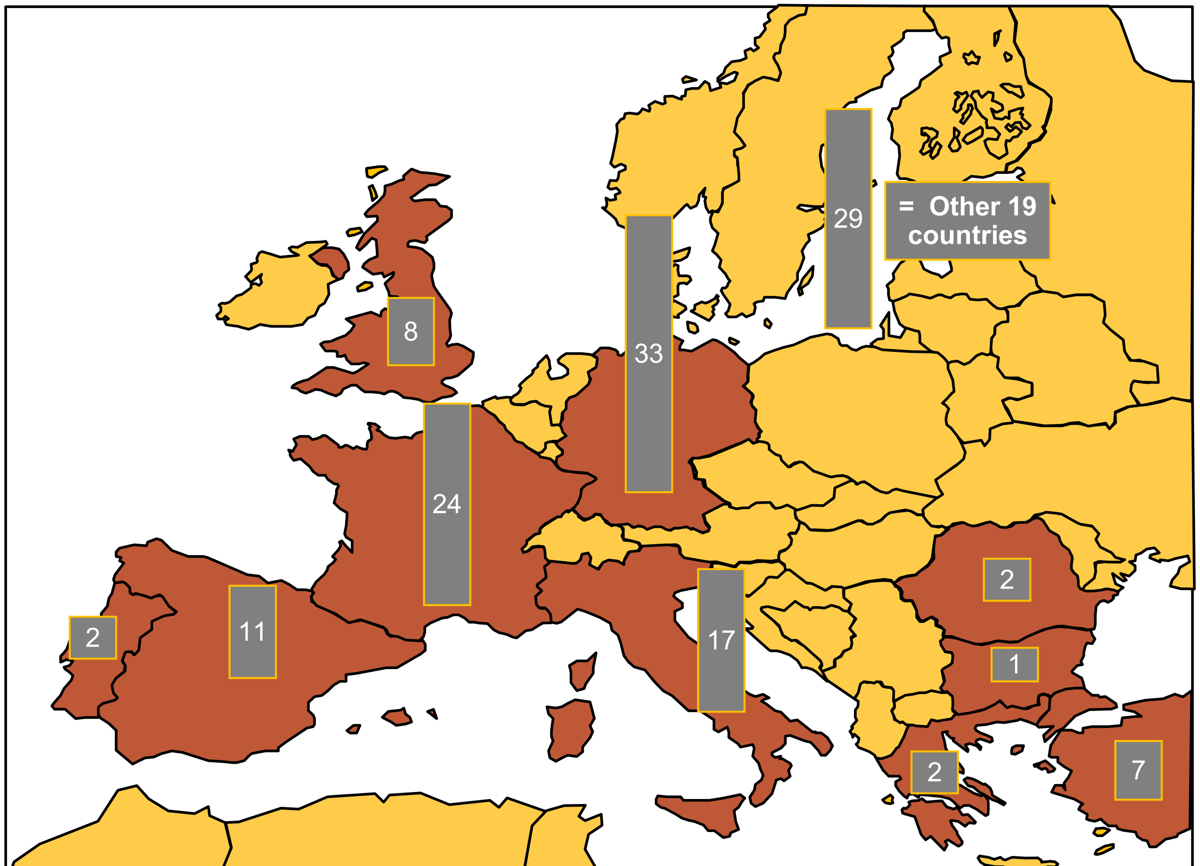
1) Europe 27, Croatia, Norway and Turkey
Sources: EPIA, EU DG TREN "European Energy and Transport: trends to 2030, update 2007", Eurostat Data Portal, EU JRC Photovoltaic Geographical Information System, A.T. Kearney analysis

The geographical deployment scenario is based on the key drivers of PV penetration

地理上的发展预想基于一些领先国家

Example – Baseline scenario cumulative installation by 2020 (GW_p)

例：到2020年基线预想的总安装量GW



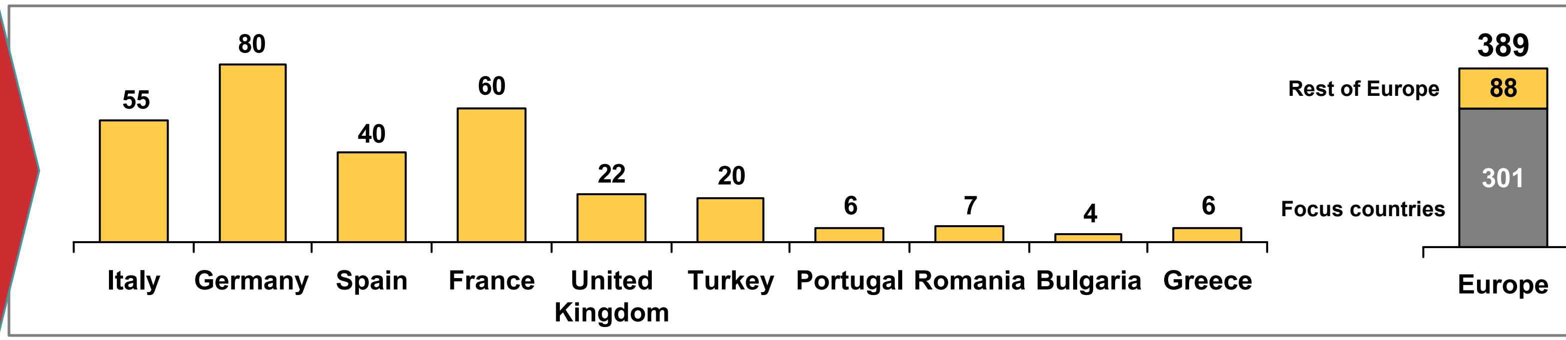
- **The deployment takes into account all the drivers identified to drive PV penetration:**
  - Evolution of electricity prices by country and customer segment
  - Irradiation data
  - Size and pattern of electricity consumption
  - Support schemes available
  - The likely results of the implementations of the recommendations for the SET plan

In the Paradigm Shift scenario, total PV installation in the 10 countries will reach ~300 GW_p

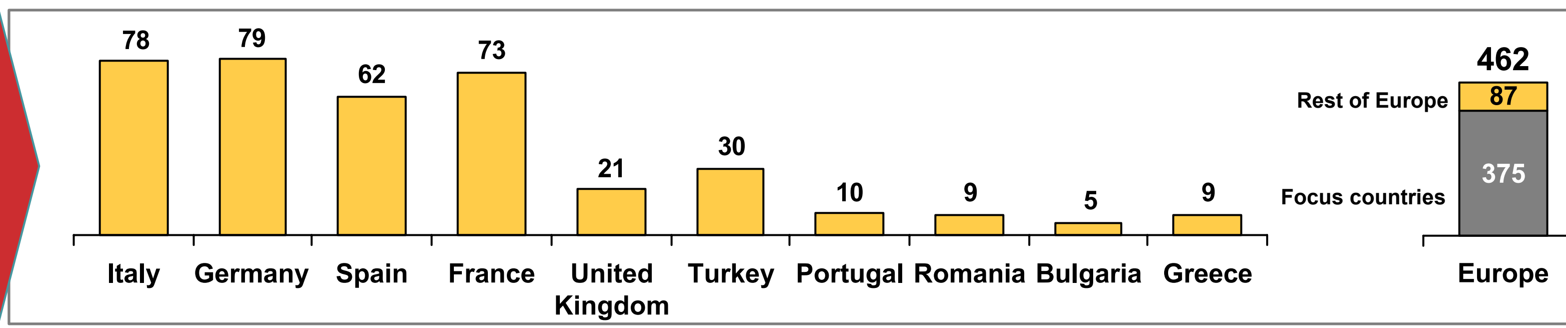
范例预想,10个领先国家光伏总安装量达到300GW

PV paradigm shift scenario 范例预想

2020 PV Installed Capacity GW_p 2020年光伏安装容量GW_p



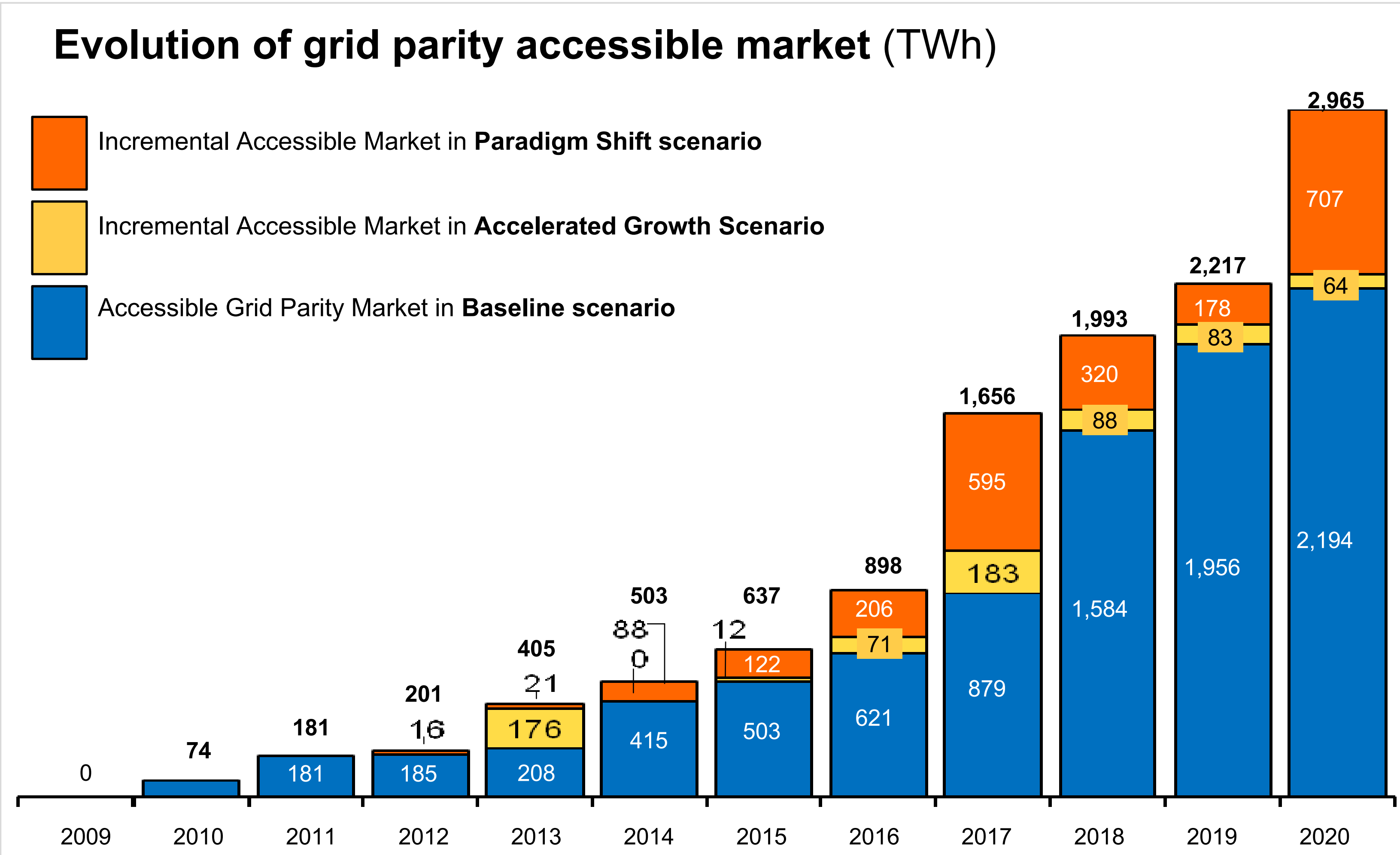
2020 PV Electricity Production TWh 2020年光伏发电产量TWh



PV Penetration on total electricity consumption in 2020 2020年光伏发电占总电力消耗比例

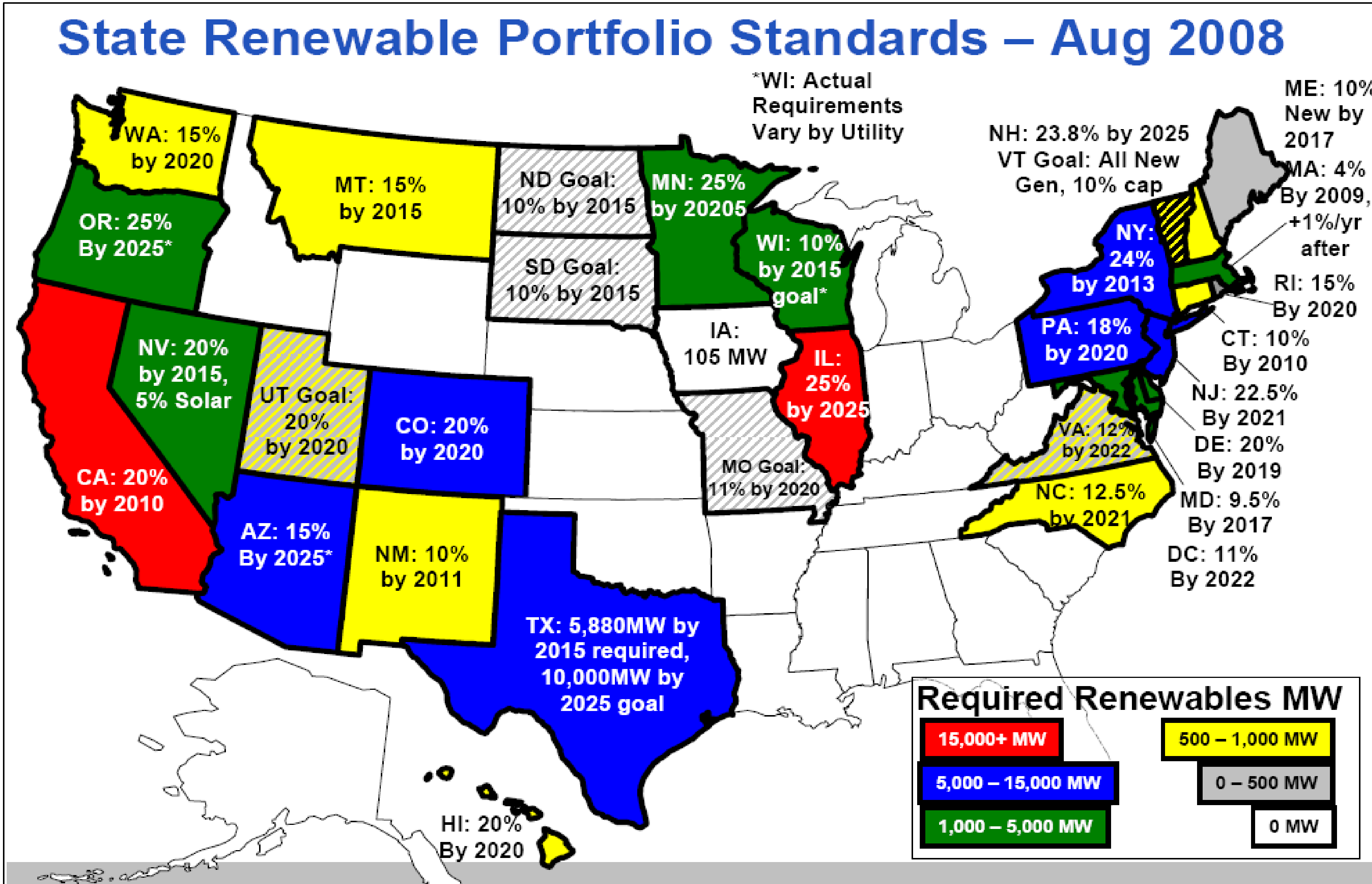
18%	13%	18%	14%	5%	16%	14%	13%	13%	13%	12.0%

... leads to large grid parity markets



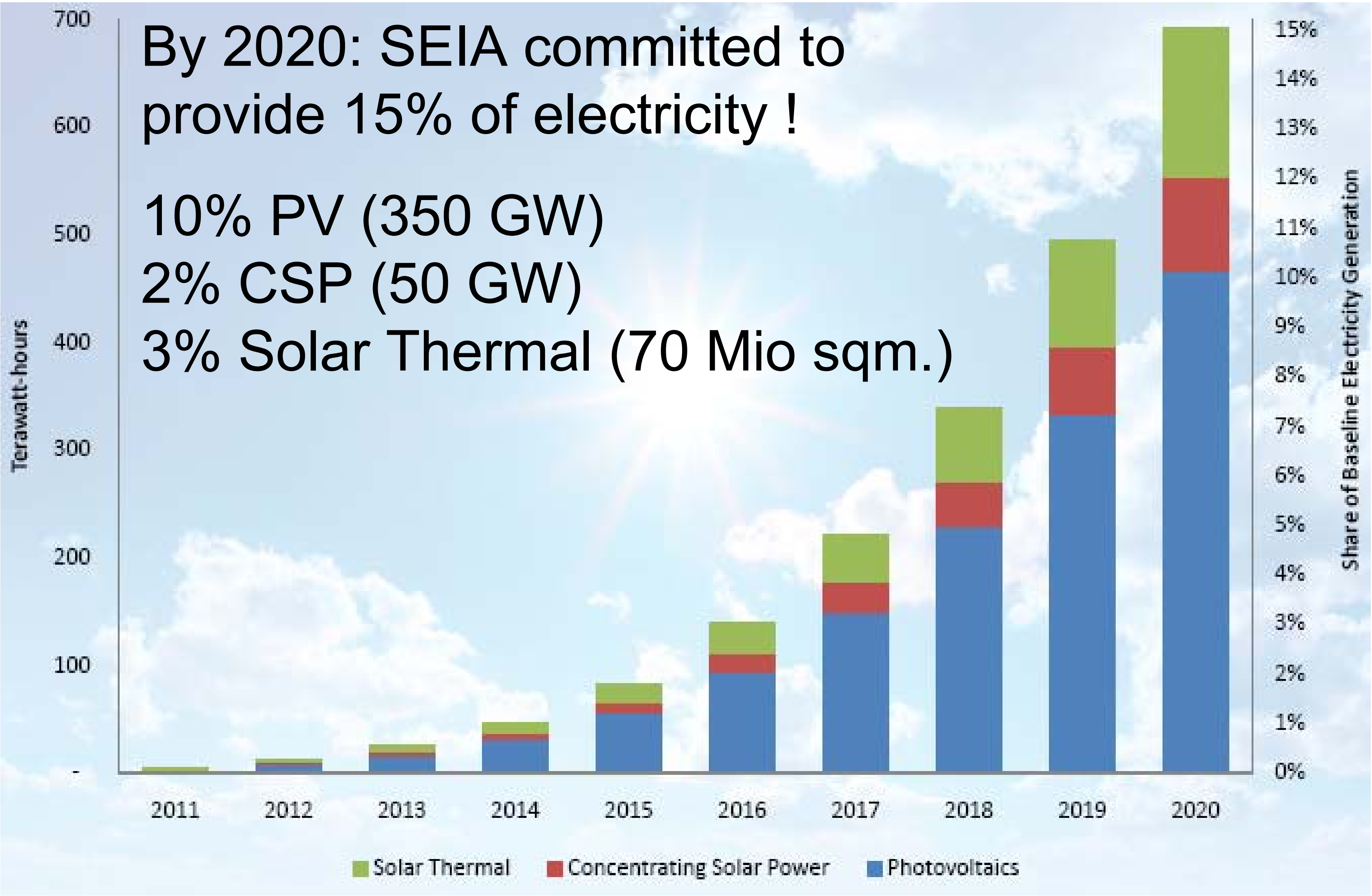
Sources: EPIA, Eurostat Data Portal, EU JRC Photovoltaic Geographical Information System

美国的政策和优惠措施情况



Source: California Power Utility Commission

US Solar Energy Industry Association (SEIA)



Source: Rhone Resch, SEIA

2010年前美国市场前景

2009: 装机容量为 ≈ 550 MW !

	2009		2010	
	确保	乐观估计	确保	乐观估计
民用	150	150	250	250
商用	300	350	500	600
屋顶上网	75	150	125	200
公共建筑	175	350	700	1400
大型上网系统	25	50	350	400
总计 MW	**725**	**1050**	**1925**	**2850**

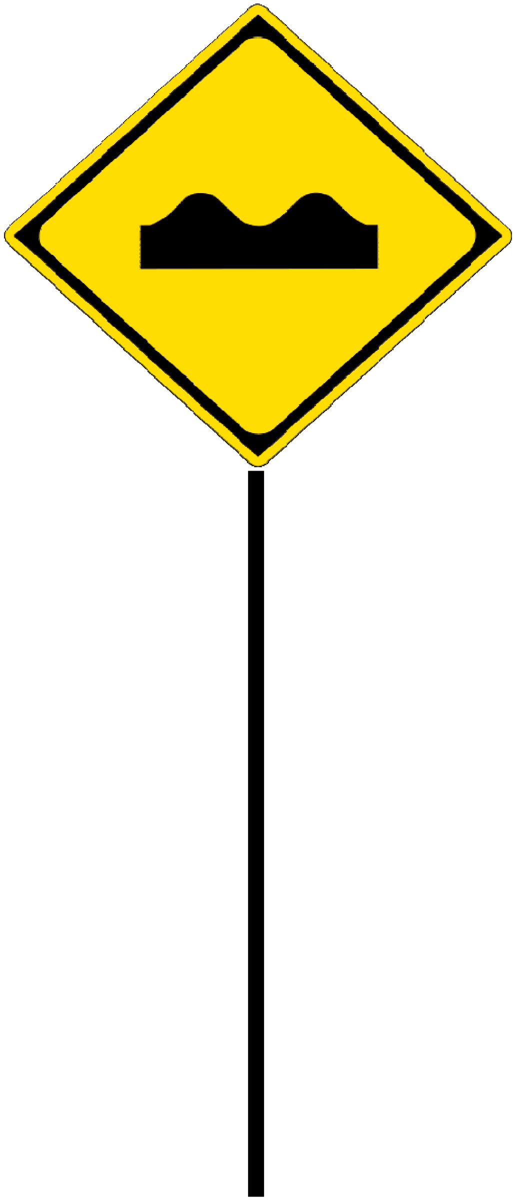
RPS Market Driver: Local Power Utilities: approx: 2,2 GW in the pipeline – Ground-Mounted Systems preferred type of installation.

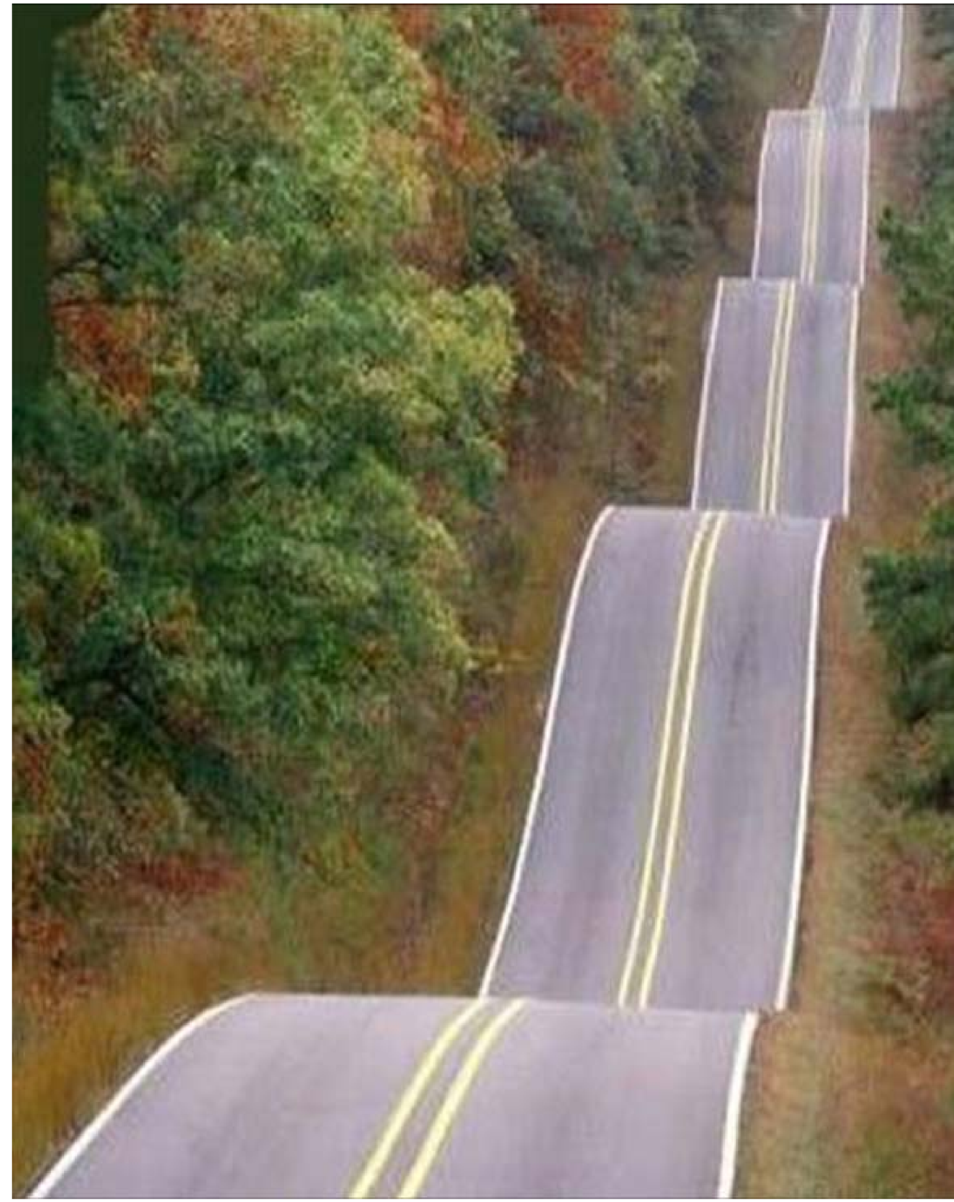
2/2009: Florida Feed-in-Tariff \$0.32/kWh/20 years. Among other States California followed with up to 750 MW!

California Market Share in US = 40%: Chinese companies in total 46% while Yingli has 27% and Suntech 10%.

Source: Credit Suisse, Sol,arbuzz, GTM, NYT

Future Development a Bumpy Road ?





Forecast until 2012

2009: Oversupply of Modules, Declining Prices, Project Finance Constraint

<u>Strategies:</u> Reduce cost, increase marketing/branding, for premium prices, less prod.-cap. expansion, enter higher priced niches, downstream projects, etc.

<u>Impact on Thin-Film:</u> Cost advantage shrinks, Bad timing because large-scale production just begins, number of players reduced by 50% today ≈ 70 companies still left

<u>Solar Venture Capital</u> ≈ US$ 1.4 bln. out of total ≈ US$ 4.5 bln.

- 2012: In 2010 a market of 8.5 GW estimated (40% growth yoy)

Module Ø price reductions of 10%, EU € 1.35 // Chinese € 1.20

Global Growth Forecast: Until 2012 – Ø 45-50%

Ø growth of 98% in USA, India, China expected

Europe Ø growth over 20%, focus will be Greece, Italy, France

Assumed that 10 new markets with each 500 MW/a will develop

Source: Sarasin Bank, Nov 2009

联系人信息

Frank Haugwitz

Email: Frank.Haugwitz@gmail.com

Fon: 0086-13901133214

China Renewable Energy Information

URL: www.frankhaugwitz.info

Email: fh@frankhaugwitz.info