



Germany as a Business Location

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- *Germany Trade & Invest* is the foreign trade and inward investment promotion agency of the Federal Republic of Germany.
 - The agency is promoted by the Federal Ministry of Economics and Technology and the Federal Government Commissioner for the New Federal States in accordance with a German Parliament resolution.
 - *Germany Trade & Invest...*
 - supports export-oriented companies based in Germany with comprehensive foreign market information.
 - promotes Germany as a high-performance business and technology location in order to attract investors who create/secure jobs in Germany.
 - Provides consultancy services to foreign investors in terms of their business settlement plans and the necessary project management support in Germany.
- An additional special focal point of activity lies in promoting the economic development of the new federal states including Berlin.

Areas of Activity

Companies in Germany (Exporters/Investors)

Foreign Country and Market Information

- Macroeconomic analyses and forecasts
- Country and industry analyses (over 125 countries)
- International projects and tenders
- Foreign economic and tax law
- Customs information and tariffs
- Practical business tips
- Business contacts and addresses

Companies Abroad (Foreign Investors)

Information about Germany/Consultancy

- Identification of attractive markets and companies
- Economic framework in Germany
- Site-specific information
- Industry-specific information
- Direct contact with potential investors abroad
- Investor consultancy services
- Project management support

Partners

- *Germany Trade & Invest* works in close cooperation with the 120 German Chambers of Commerce Abroad (AHKs) in 80 countries across the globe.
- *Germany Trade & Invest* cooperates with all foreign trade promotion partners in Germany - and in particular with trade associations and chambers of commerce.
- The economic development agencies of the federal states are *Germany Trade & Invest's* partners within the investor settlement process in Germany.

Main Objectives

Climate protection measures	2020	2050
CO2 cuts vs. 1990	-40%	-80%
Renewable share of...	2020	2050
Total energy consumption	18%	60%
Electricity consumption	35%	80%
Heat generation	14%	60%
Energy efficiency measures		
Increase in energy productiveness	2.1% p.a.	
Reduction of energy consumption	-50% (2050 vs. 2008)	
Reduction of electricity consumption	-25% (2050 vs. 2008)	
Renovation rate	2% p.a.	
Reduction of energy for transportation	-40% (2050 vs. 2005)	

Measures for implementing the new energy policy after the decision taken on the gradual phase-out of nuclear power by 2022

- Faster expansion of renewable energies
- Integration of renewable energies into the overall energy system, e.g. through a market premium
- Central component: wind energy
- Increase energy R&D levels - up to €0.5 bn will be made available
- Expansion of electricity and smart grids as well as increasing the level of energy storage capacity
- Restructuring the fossil power plant park towards more flexible power stations (e.g. gas plants as responsive power to intermittent renewable energies)
- Increase energy efficiency (particularly in buildings)
- Cost efficiency and efficient procurement
- European initiatives for energy efficiency

Source: http://www.bmu.de/energiewende/beschluesse_und_massnahmen/doc/47892.php

Expansion requirements for the transmission and distribution grid

Transmission grid

Grid expansion of **3,600km** is required by 2020.

→ Baseline scenario with overhead lines as most cost-effective option:

0.946 bn. €/a

Distribution grid

- For the **medium-voltage power** grid (500,000km), expansions of **11%** to **28%** are foreseen.
- For the **low-voltage power** grid (1.1m km), an expansion of **13%** to **22%** is anticipated.

Investment needs

→ **€ 10-27 bn**

The Federal Network Agency's competences

Based on the amendment of the **Federal Law on the Energy Industry** (EnWG) and the enacting of the **Network Expansion Acceleration Act** (NABEG), competences for the extension of the high-voltage grid have been transferred to the **Federal Network Agency**.

Four major steps were developed:

- Appraisal and determination of the conditions for the network extension
- Based on the Network Agency's scenarios, the Transmission System Operators (TSO) calculate the extension requirements
- Federal advisory planning for finding adequate route corridors
- Plan approval procedure for the exact route

Smart meter legal amendment and roll-out in Germany

In 2011, the German Federal Law on the Energy Industry (EnWG) was supplemented by specifications for metering elements e.g. *smart meters*, smart meter installations and requirements (§ 21b, § 21d, § 21e, § 21 f, § 21i)

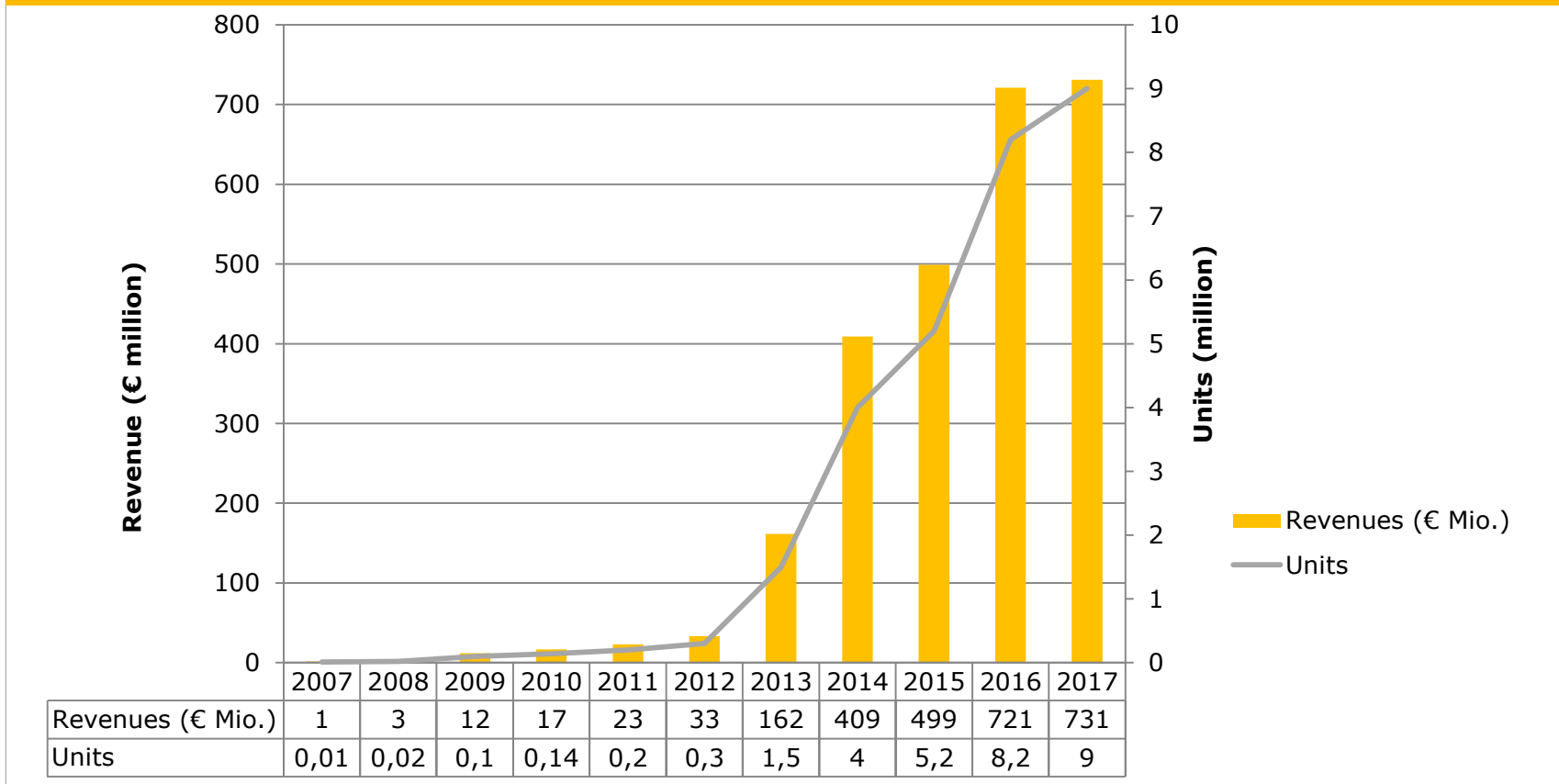
→ *Smart meters* are obligatory for: **new constructions** and **complete refurbishments**, consumer loads of over **6000 kWh/Year** and plant operators under the renewable energy act (EEG) and in accordance with the cogeneration act (KWKG) of over **7 KW** (§ 21c para. 1 and 2 EnWG)

Expected *smart meter* roll-put in Germany:

2015 – 10% of grid accesses with *smart meters*

2020 – already 60%

Smart meter market: unit and revenue forecast Germany



→ The market is expected to grow substantially with overall CAGR of 71.7% from 2010-2017

Source: Own draft according to Frost & Sullivan 2011

Direct marketing of power from renewable energy create new business opportunities in Germany

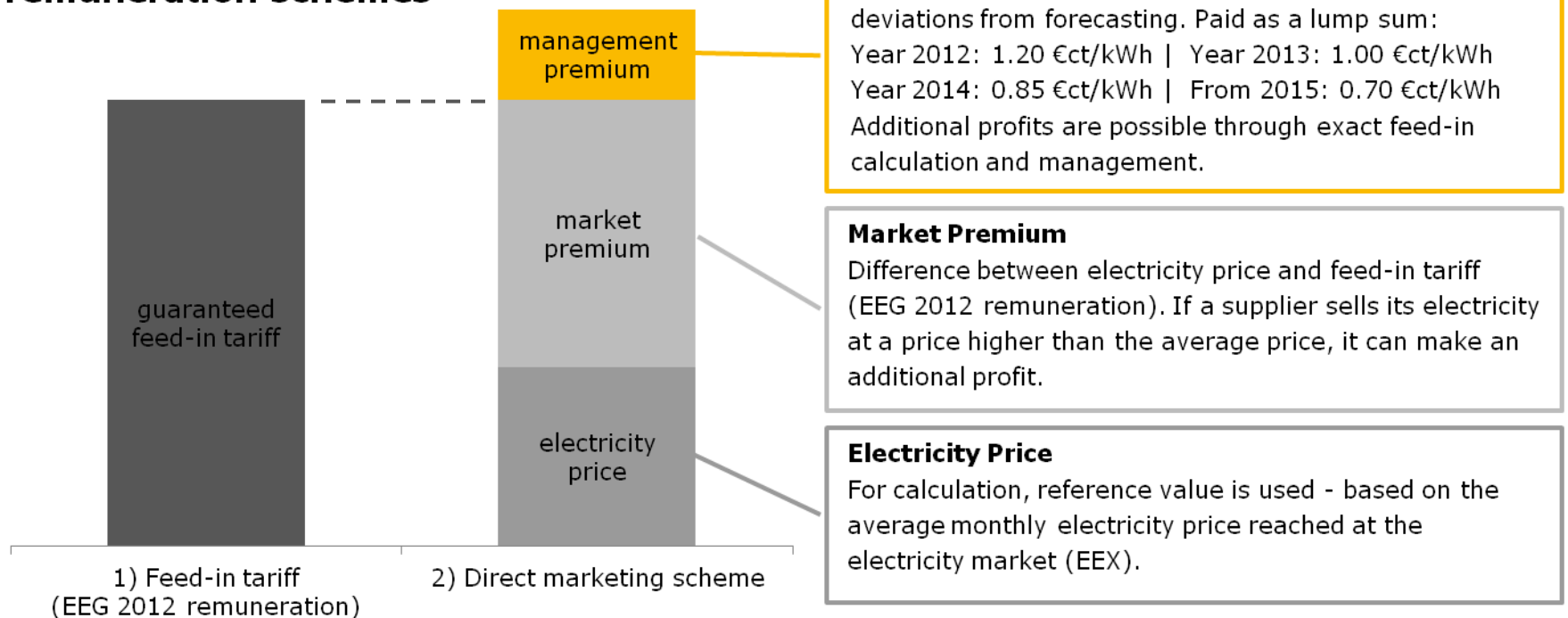
Incentives Scheme	<p>Sellers of renewable energy electricity can decide on a monthly basis to either feed the electricity into the grid and receive the feed-in tariff remuneration or participate in direct selling in the electricity market and receive an amount equal to the difference between a reference value based on the average electricity price and the feed-in tariff. An additional management premium is paid to cover cost of forecasting and feed-in management.</p>
Requirements*	<p>Requirements for direct marketing:</p> <ul style="list-style-type: none"> ▪ Access to the electricity market ▪ Recognized trading participant in the European Energy Exchange ▪ Next day feed-in volume forecast and real-time load measurement of RE-installation
Opportunities	<p>Challenges and opportunities exist in Technologies and services to forecast feed-in volume and feed-in management Energy storage options and smart grids Virtual linking different power plant technologies New business models for electricity trading services and utilities</p>

Note: *not exhaustive; Source: Renewable Energies Sources Act (EEG) 2012; Federal Ministry for the Environment, Nature Conservation and Nuclear Safety 2011; Sonne Wind & Wärme 17/2011

To improve market and system integration, incentives for direct selling of power from renewable energy have been established.

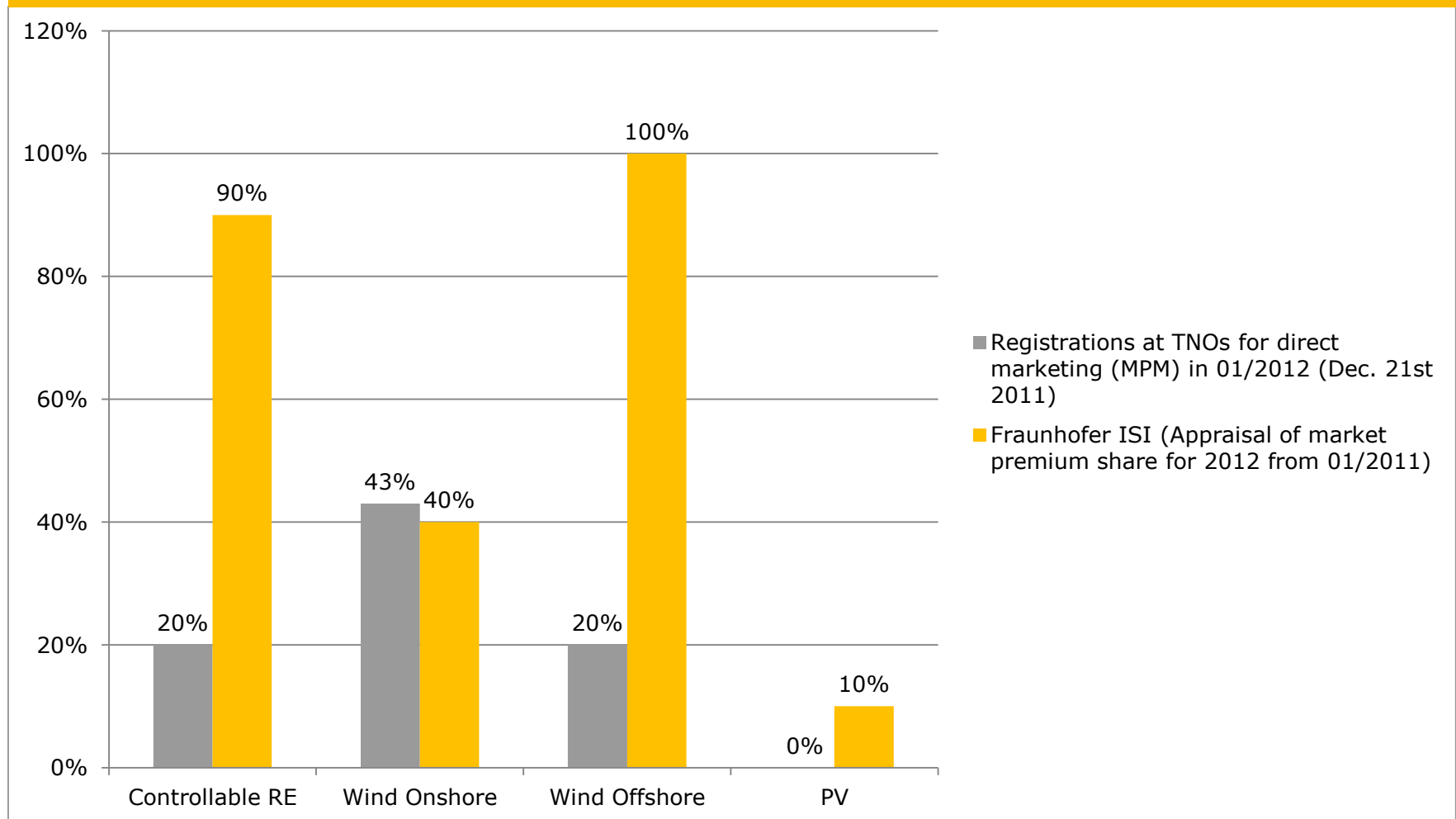
**Operators of renewable energy facilities have two options for remuneration:
1) Feed-in tariff remuneration or 2) Direct sale under the direct marketing scheme**

Elements of available remuneration schemes



Source: Renewable Energies Sources Act (EEG) 2012; Federal Ministry for the Environment, Nature Conservation and Nuclear Safety 2011

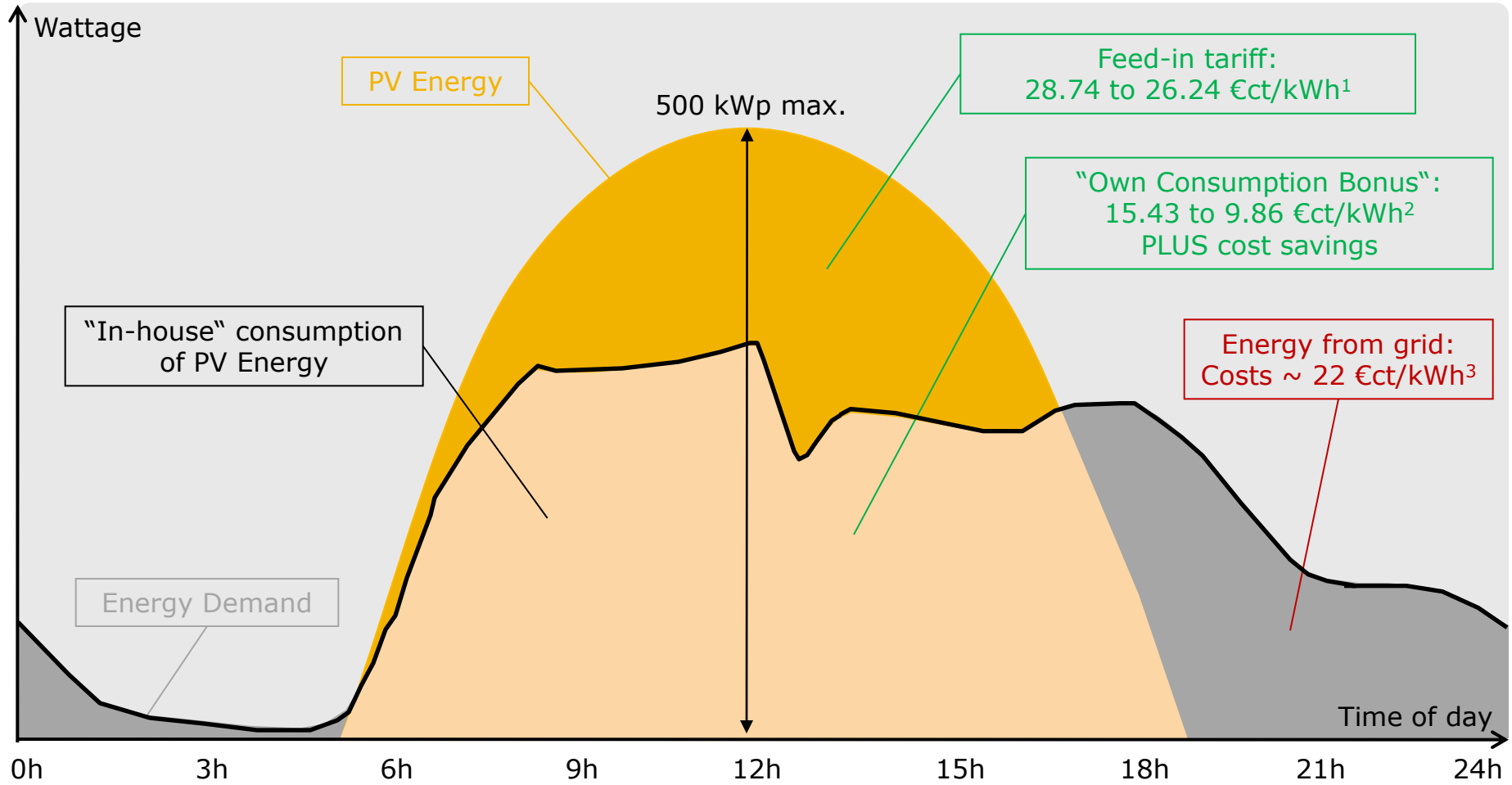
Forecast and actual direct marketing (MPM)



Source: Own draft according to BDEW 2012

The "Own-Consumption Bonus" Principle

Funding through feed-in tariff system AND cost savings on grid energy:
Rooftop systems $\leq 500\text{kWp}$ may generate income of $> 37 \text{ €ct/kWh}$ in 2011



Notes: 1) Subject to size of system according to feed-in tariff classification | 2) Applicable only for rooftop systems $\leq 500\text{kWp}$ installed between July 2010 and December 2011

3) Subject to electricity retail price of respective utility company

Source: German parliament resolution from July 2010

Ambitious growth targets for RE: what does this mean for energy storage?

	RE-share	Required compensation capacity (GW)	TWh of energy required
Today	17%	16-17	22
2015	n.a. (30%)	ca. 22	30
2020	35%	ca. 26	37
2025	>35%	ca. 28	39

- But: Almost no possibility of developing new pumped storage capacity!
- Use of new storage technologies combined with smart grid solutions will be a necessity

Expected: Investment of € 25-30 billion in storage capacity until 2030

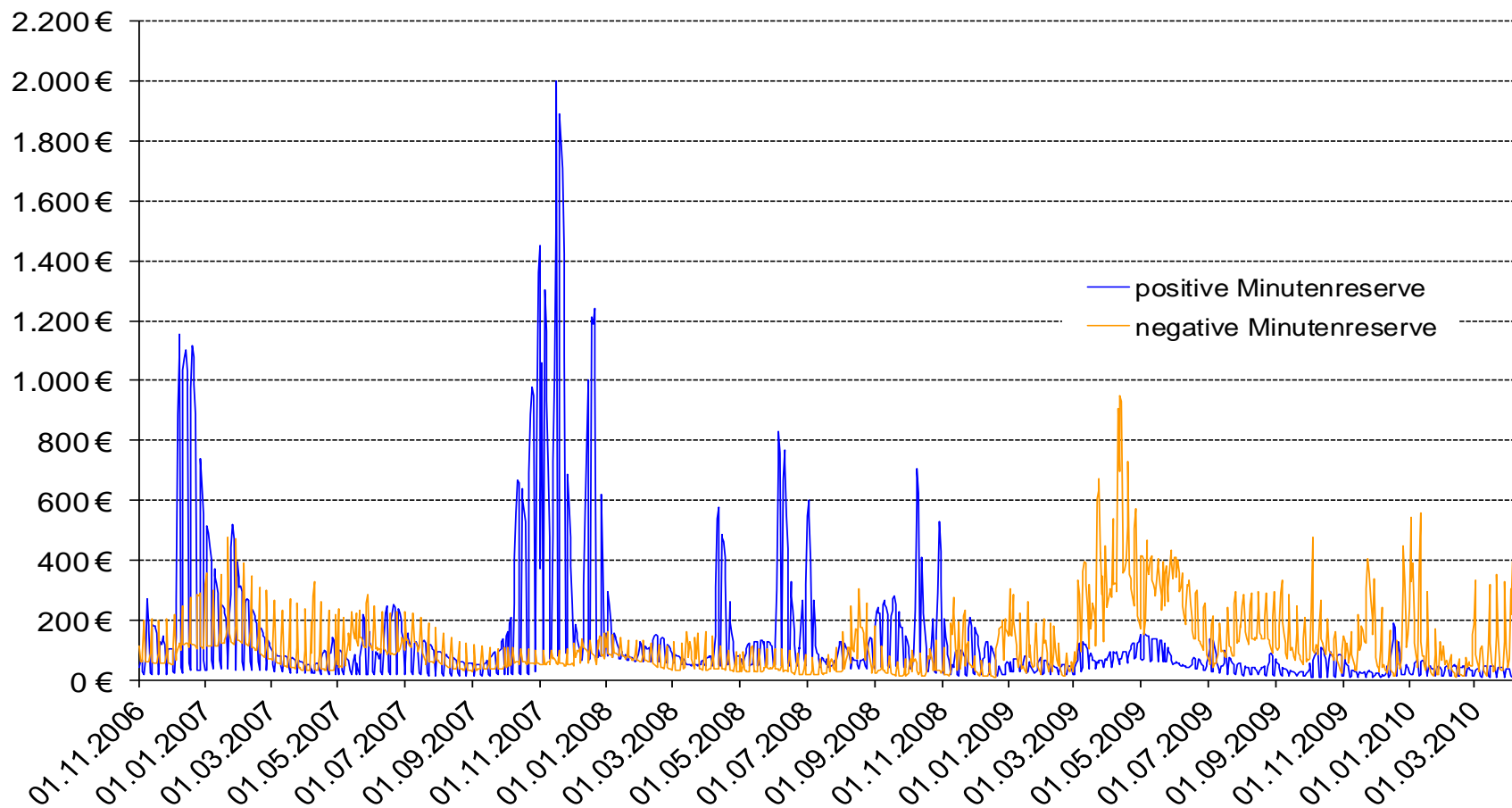
Easy market entry for smaller players in the balancing power sector

	Primary control reserve (PCR)	Secondary control reserve (SCR)	Tertiary control reserve (TCR)
Time for activation	30 s	5 min	15 min
Availability	Up to 15 min	15 min to 1hr	Minimum of 15 min
Required min. bids by regulator ¹⁾	5 MW	10 MW	15 MW
Required min. bids by regulator since April 13	1 MW	5 MW	5 MW (10 MW)
Tendering period	monthly		daily
Tendering period since April 13	weekly		
Focus on new technologies	<i>Flexible/controllable</i> plants, battery storage systems, renewable energy systems at direct marketing		

Source: BMU 2011

- ➔ Today for energy storage and balancing power only hydro-pump and gas power Plants attending at the balancing power market in Germany.
- ➔ Legislative framework has been changed to open the market for innovative storage technologies.
- ➔ IRR subject to the technology used and the control reserve segment targeted*

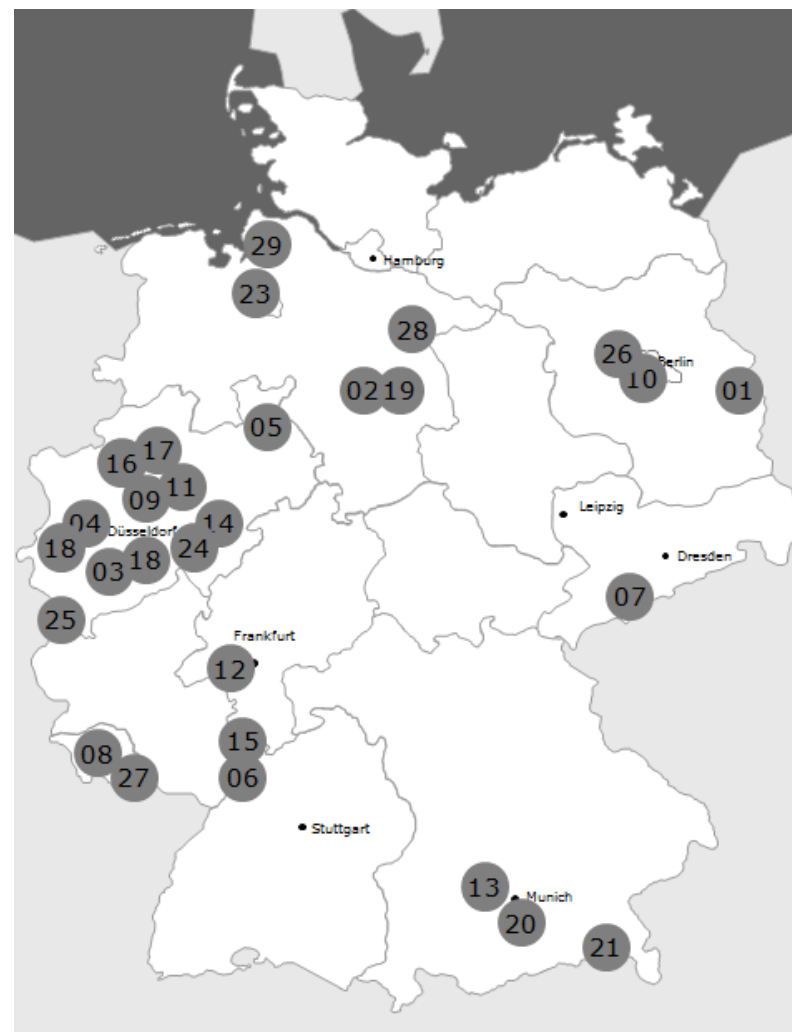
Price development of TCR 2006 – 2010 in € / MW / d



Source: 50 Hertz

Prequalified providers of different kind of balancing power

	Provider	Location	Primary Capacity Reserve (PCR)	Secondary Capacity Reserve (SCR)	Tertiary Capacity Reserve (TCR)
1	ArcelorMittal Eisenhüttenstadt GmbH	Eisenhüttenstadt			x
2	BalancePower GmbH	Hannover			x
3	CURRENTA GmbH & Co. OHG	Leverkusen			x
4	E.ON Energy Trading SE	Düsseldorf	x	x	x
5	E.ON Westfalen Weser Energie-Service GmbH	Herford		x	x
6	EnBW Kraftwerke AG	Karlsruhe	x	x	x
7	envia Mitteldeutsche Energie AG	Chemnitz			x
8	Evonik Power Saar GmbH	Saarbrücken	x	x	
9	Evonik Steag GmbH	Essen			x
10	GDF SUEZ Energie Deutschland AG	Berlin	x		x
11	Infracor GmbH	Marl			x
12	Kraftwerke Mainz Wiesbaden AG	Mainz			x
13	Lechwerke AG	Augsburg			x
14	Mark-E AG	Hagen			x
15	MVV Energie AG	Mannheim			x
16	RWE Innogy GmbH	Essen			x
17	RWE Supply & Trading GmbH	Essen	x	x	x
18	Stadtwerke Düsseldorf AG	Düsseldorf			x
19	Stadtwerke Hannover AG	Hannover			x
20	Stadtwerke München GmbH	München	x	x	x
21	Stadtwerke Rosenheim GmbH & Co. KG	Rosenheim			x
22	Statkraft Markets GmbH	Düsseldorf	x	x	x
23	swb Erzeugung GmbH & Co. KG	Bremen			x
24	ThyssenKrupp Steel AG	Duisburg			x
25	Trianel GmbH	Aachen		x	x
26	Vattenfall Europe Generation AG	Berlin	x	x	x
27	VSE AG	Saarbrücken			x
28	VW Kraftwerk GmbH	Wolfsburg			x
29	Xstrata Zink GmbH	Nordenham		x	



Source: regelenergieleistung.net, 2011

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Funding Initiative Energy Storage – growing awareness for stationary storage technologies.

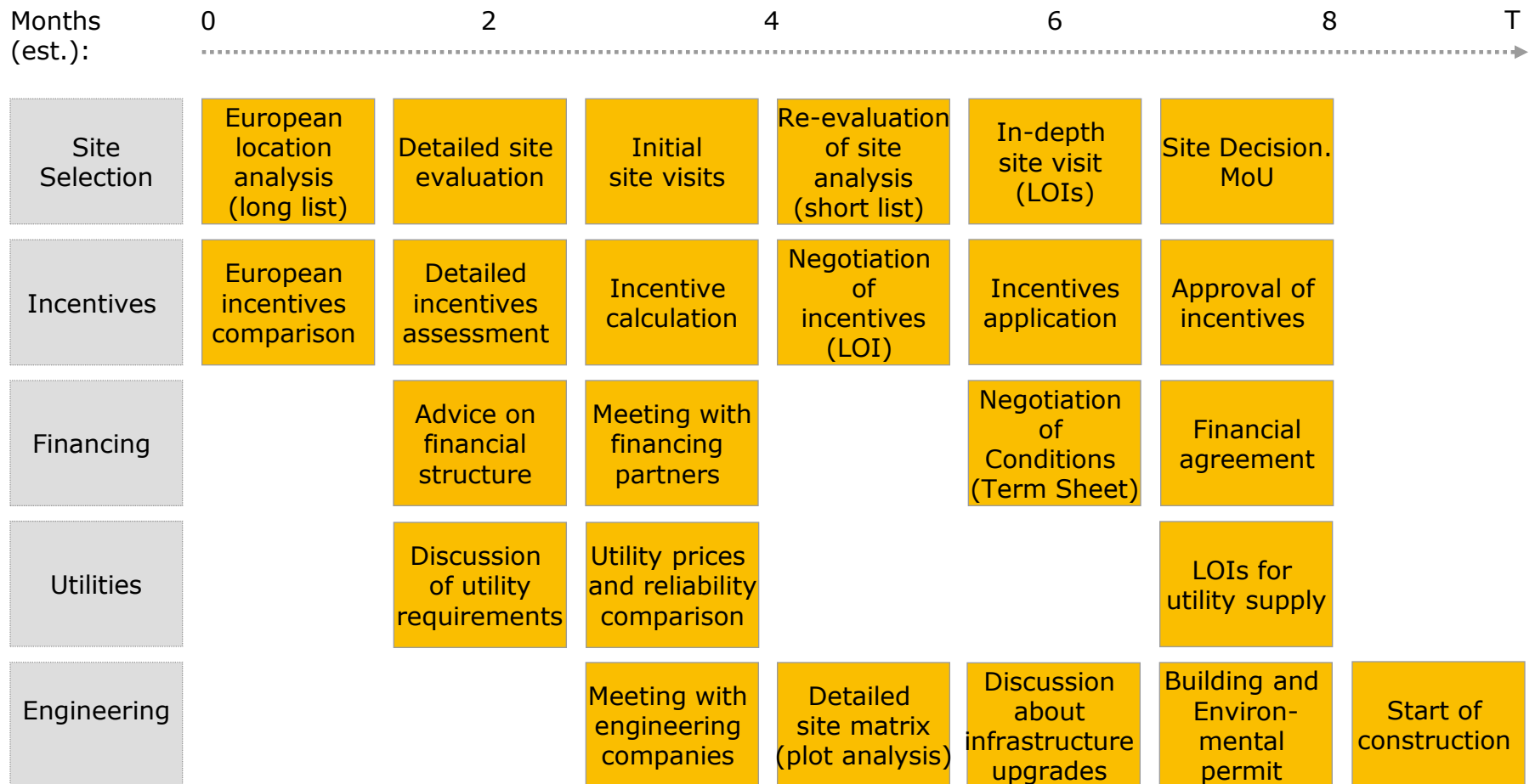
The *Initiative Energy Storage* supports collaborative R&D projects with funding of EUR 200 million for the period 2011-2014. The program is focused on the development of storage technologies for electricity, heat and other energy sources.

Type of funding	<ul style="list-style-type: none">▪ Non-repayable cash grants▪ Eligible projects can be funded by up to 50% subject to applicability
Grant recipient	<ul style="list-style-type: none">▪ Industrial companies in collaboration with research institutions and universities
Supported technologies and systems	<ul style="list-style-type: none">▪ Electric, material, thermal storage technologies▪ superordinated systems for management, communication, IT
Requirements	<ul style="list-style-type: none">▪ A registered business domicile in Germany▪ The utilization of the research results must be in Germany
Application procedure	<ul style="list-style-type: none">▪ First stage application until July 8, 2011 [project proposal]▪ Second application round probably in 2012

Subsequent to the objective of increasing renewable energy supply and building up smart grids in Germany, the necessity of balancing power receives more attention.

Germany Trade & Invest closely supports the project team throughout the investment decision-making process

Example: Milestones of a manufacturing project



Two headquarters in Germany - 46 locations worldwide



Contact

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The EU's new geographic center is in Germany: providing rapid & easy access to all European markets.

- State-of-the-art transportation infrastructure and logistics capabilities to serve all European markets.
- From Germany, most of Europe can be reached by air in just 3 hours and by road in 24 hours (flight, truck, and rail distances from Berlin in hours).

2009	EU-27	Germany
Population (millions)	500	82
GDP (in EUR bn)	11.806	2.407
GDP Growth (YoY)	-4.2%	-5.0%
Inflation	1.0%	0.2%
Unemployment	8.9%	7.5%



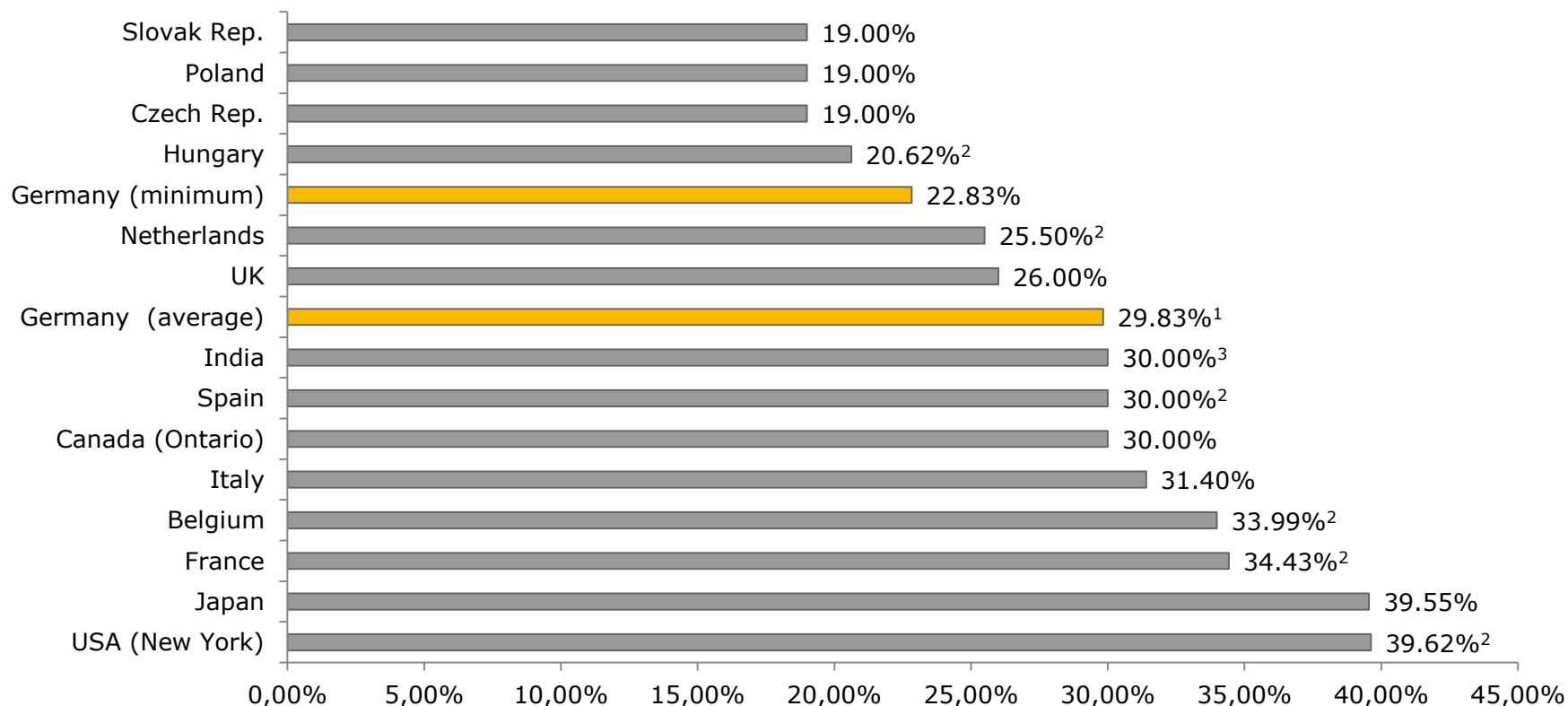
Source: Eurostat 2010

Note: EU-27's center: 42 km east of Frankfurt/Main in Meerholz, Hessen, *Estimates

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Germany offers one of the most competitive tax systems among the big industrialized countries.

Average Corporate Tax Burden (2012, in %)



¹National German average. Lower overall tax rates in certain areas are possible, e.g. only 22.83% in certain municipalities.

²Top corporate income taxation rate incl. local taxes; lower starting rates or other special tax rates available. Example USA: progressive rate for the federal corporate income tax from 15 % to 35 %.

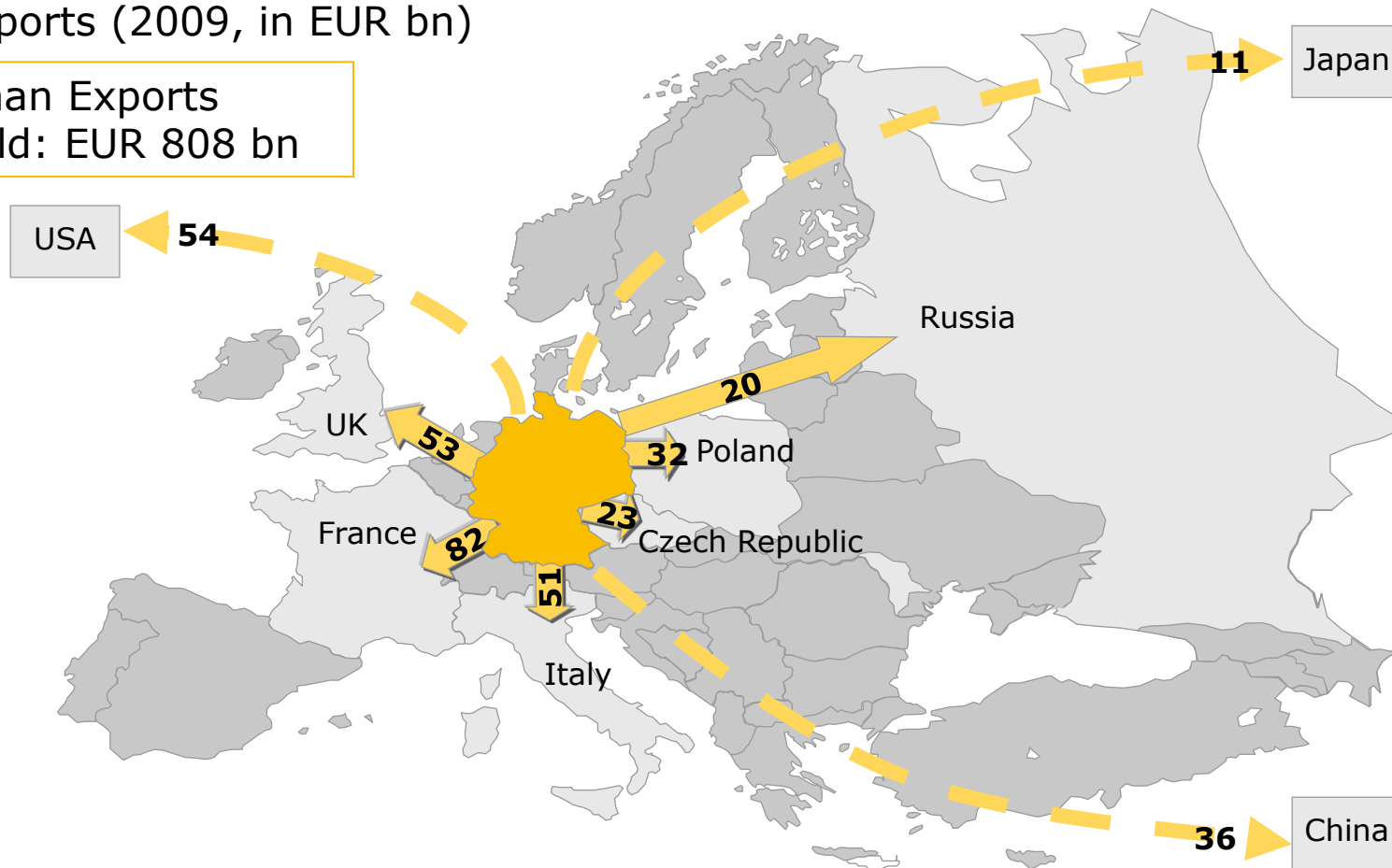
³A surcharge of 5% is levied on taxable income exceeds INR 1 mio.

Source: Federal Ministry of Finance (BMF), GTAI

Germany is *the* focal point for goods and services in Europe.

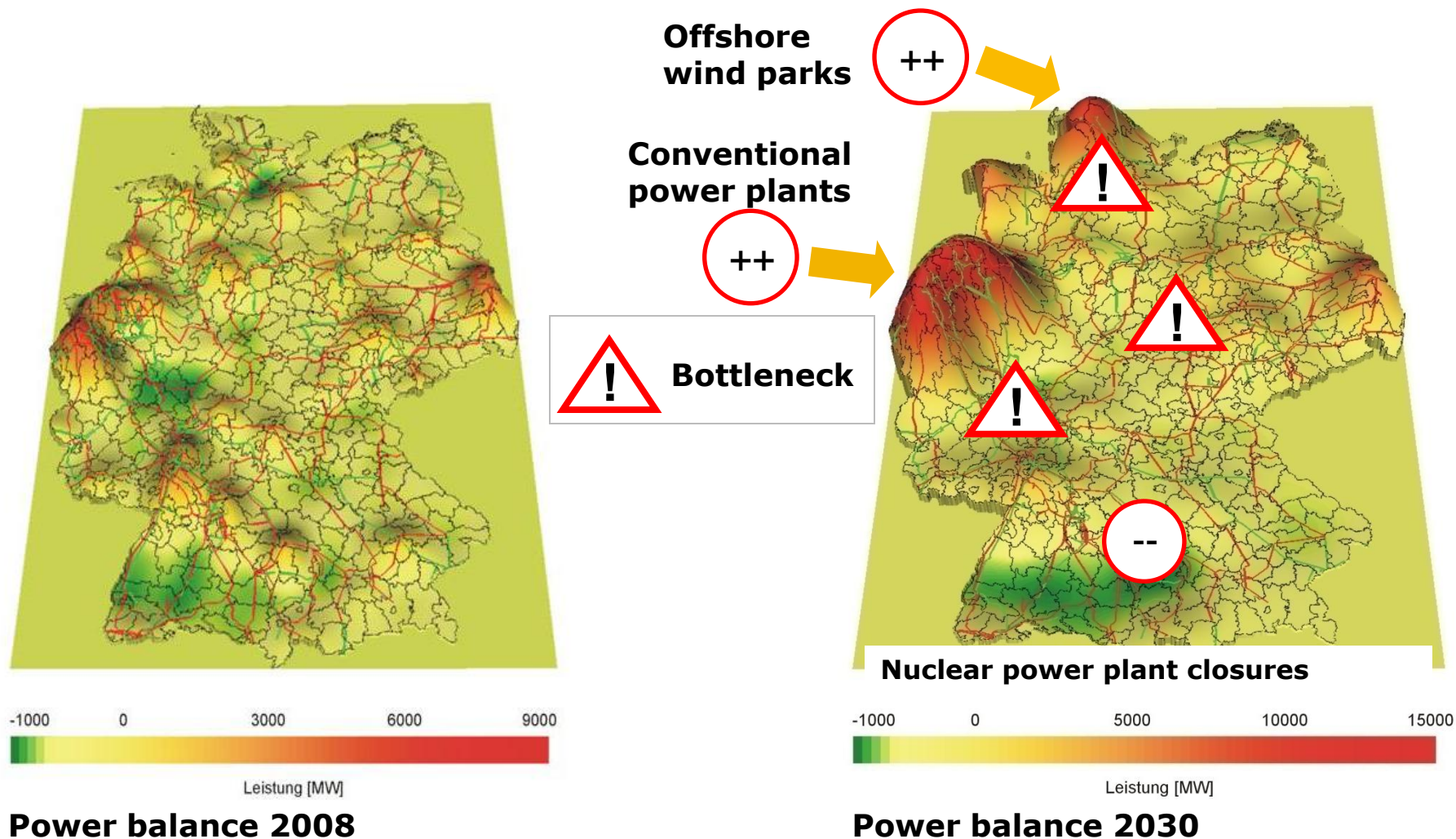
German Exports (2009, in EUR bn)

Total German Exports
to the World: EUR 808 bn



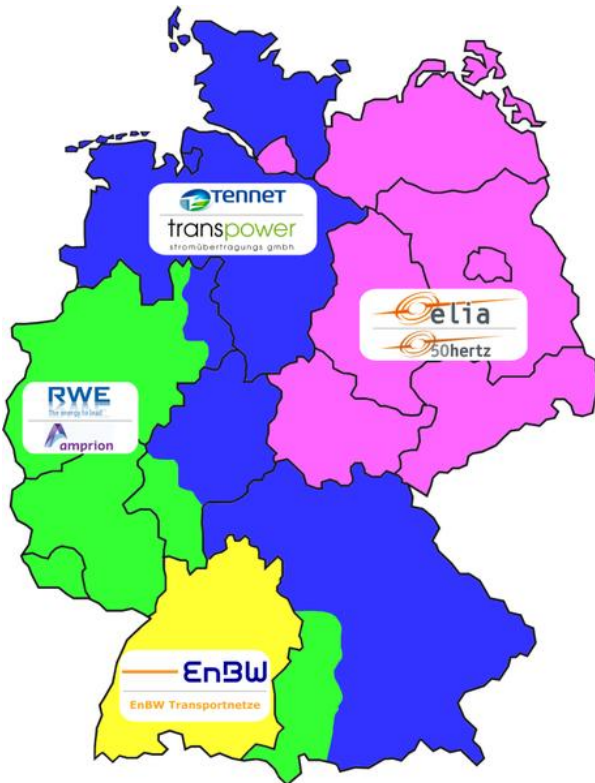
Source: Federal Statistical Office Germany 2010

New power structure in 2030 will lead to bottlenecks in Germany



More than 1,000 market participants are active in the fully liberalized German electricity market.

German Transmission Grid (2010)



4 Interconnected Companies

- Companies operate transmission grids (and grids in the lower voltage level)
- Mainly owners of power plants with capacity of more than 100 MW



866 Operators of Distribution Grids

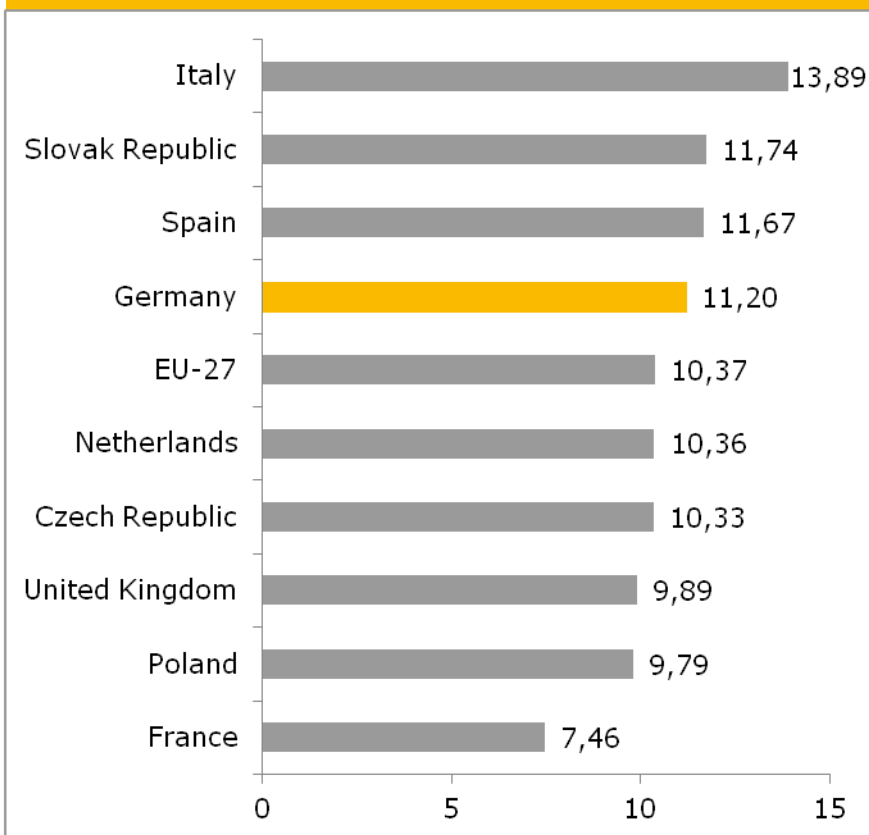
- Total: 1,000 market participants
- Mainly municipal utilities (*Stadtwerke*)
- App. 100 small private companies
- 150 new market participants

German Distribution Grid (2010)

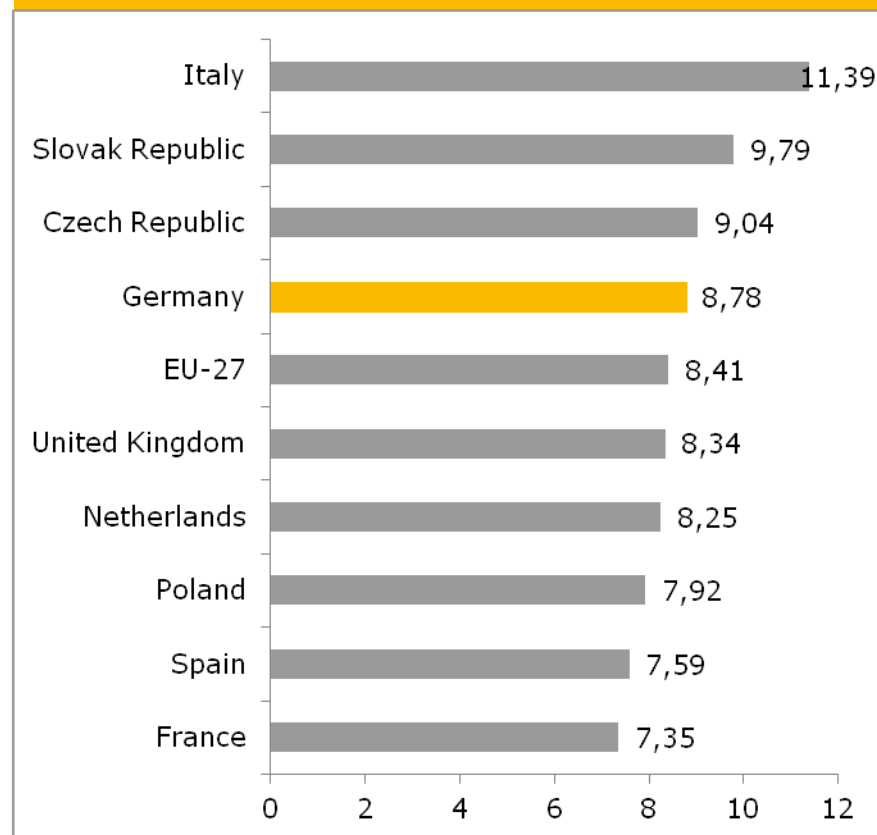


German industry electricity prices are slightly above the European average.

Electricity Prices for Industry (2010, EUR ct/kWh, 500-2,000 MWh)



Electricity Prices for Industry (2010, EUR ct/kWh, 20,000-70,000 MWh)



Source: Eurostat 2011

Note: Prices incl. taxes, without VAT

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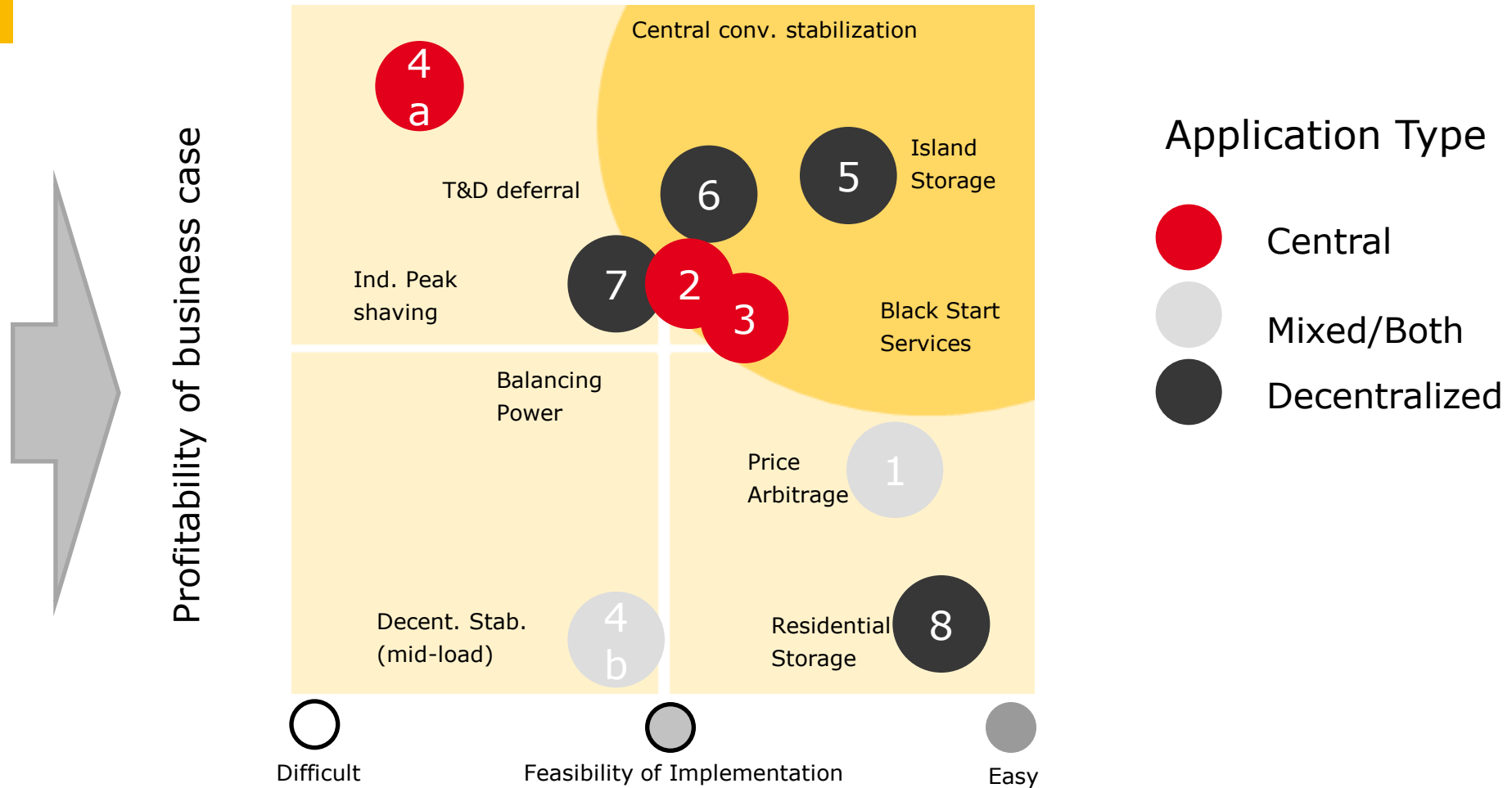
Storage in the LV and MV? Distributed PV?

The German network authority launches quality regulation for electricity distribution systems

The Federal Network Agency has now communicated the level of the so-called “quality” element (Q element) to the electricity distribution system operators participating in the regular incentive regulation procedure during the first regulatory period.

- The Q element level depends on the reliability of the relevant system.
- System operators whose network has had good quality levels relative to other system operators over the past few years will have an amount added to the revenue cap for the years 2012 and 2013.
- System operators whose networks have comparatively poor quality levels will, however, have amounts deducted.

Balancing power as early market

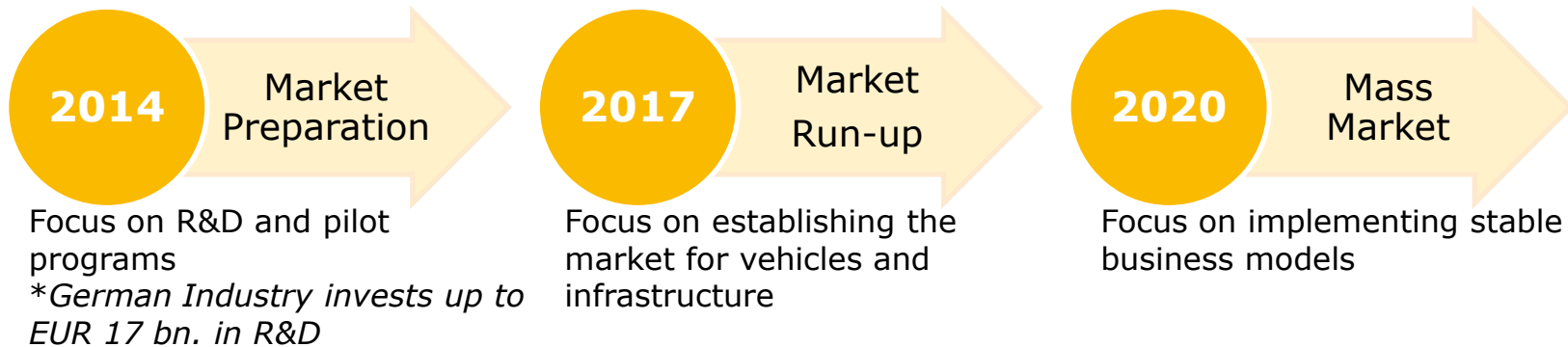


Calculations based on estimated storage prices 2015-2020 – further price decrease improve profitability of all cases

The German Government Program 2011: Germany to become e-mobility lead market and lead provider

Goal: 1 million EVs on German roads by 2020 and **6 million EVs by 2030**

Means: EUR 500 m R&D funds until 2011 - **additional EUR 1 bn until 2013**



Planned Incentives (extract)

- Special parking spots for EV's
- Admission to restricted streets and areas
- Use of bus and special lanes
- Diverse tax incentives

R&D Projects, Lighthouses, Showcases

- All aspects of e-mobility to be covered
- Introduction to broad public
- 8 model regions for e-mobility
- 6 model regions "e-energy" on smart grids
- 7 model regions "ICT for Electric Mobility"