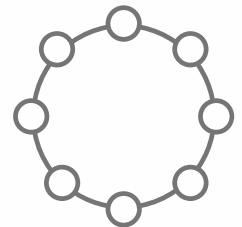


The Role of Flexibility and Virtual Power Plants in Modern Power Markets

Nicolas Sommer

Joint Meeting Hertie Energy and Environment Network (HEEN) and
Strommarkttreffen
01. July 2016



Outline

NEXT Kraftwerke, Trading, and Flexibility

- > **NEXT Kraftwerke**
 - Who we are and what we do
- > **Trading electricity on short-term markets**
 - Which markets are we talking about?
 - Our activities
- > **Flexibility**
 - Reactive and Proactive

WHAT IS A DIGITAL UTILITY?



- > A VPP operates and markets power plants, without owning them!
- > It's a platform where independent producers & consumers are connected to grid operators & markets through M2M communication

Being flexible: Prepared for what comes next

Earning opportunities in our business modell



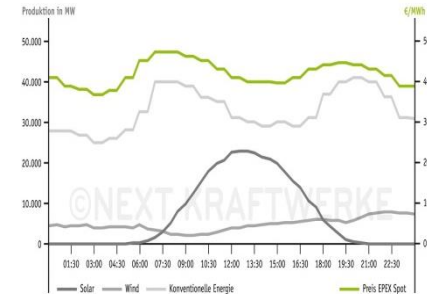
Reactive Flexibility

Stabilizing the grid and keeping the grid frequency at 50 Hertz.



Services

Optimal trade with remote-controlled units within the Market Premium Model.

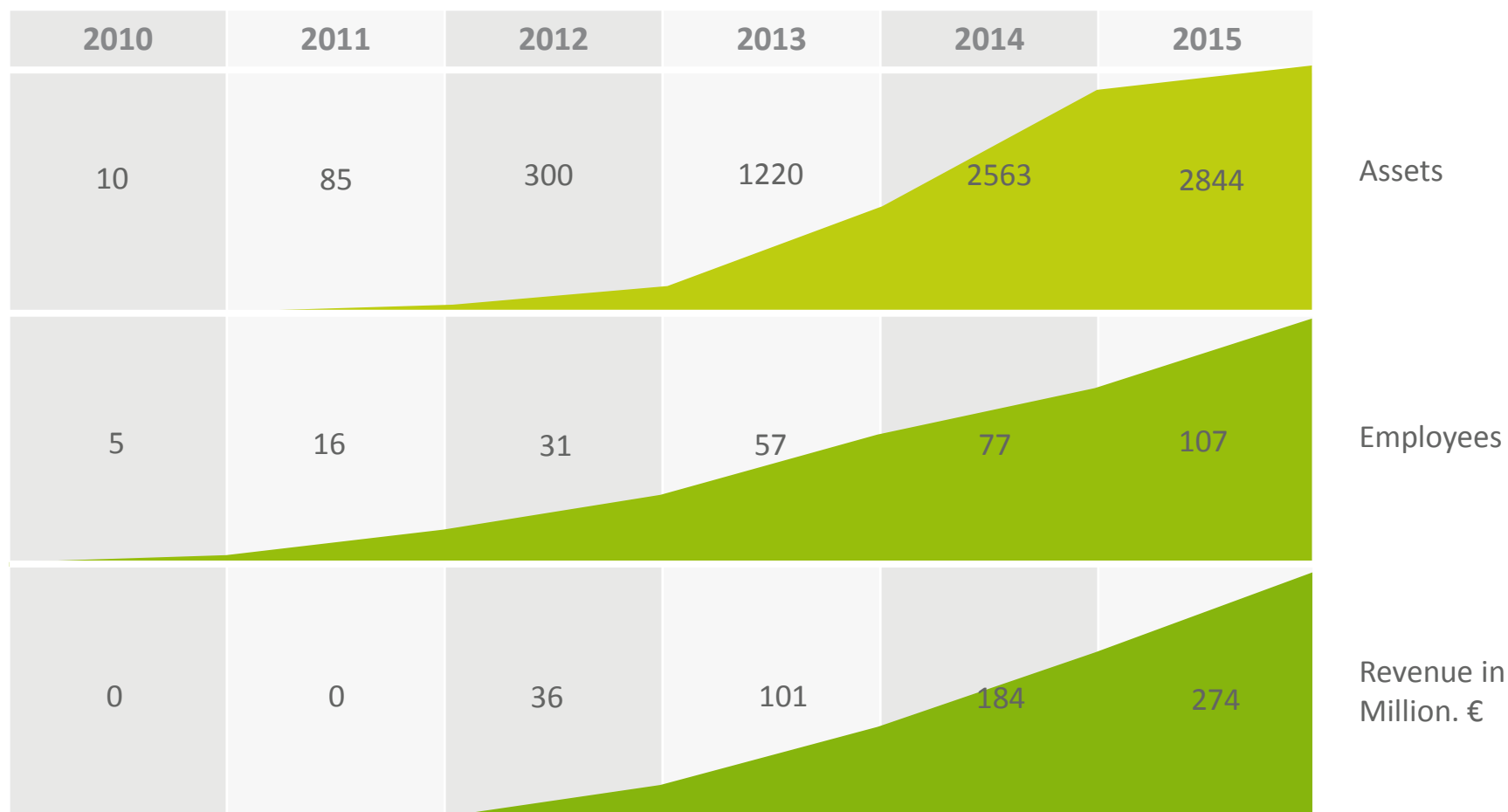


Proactive Flexibility

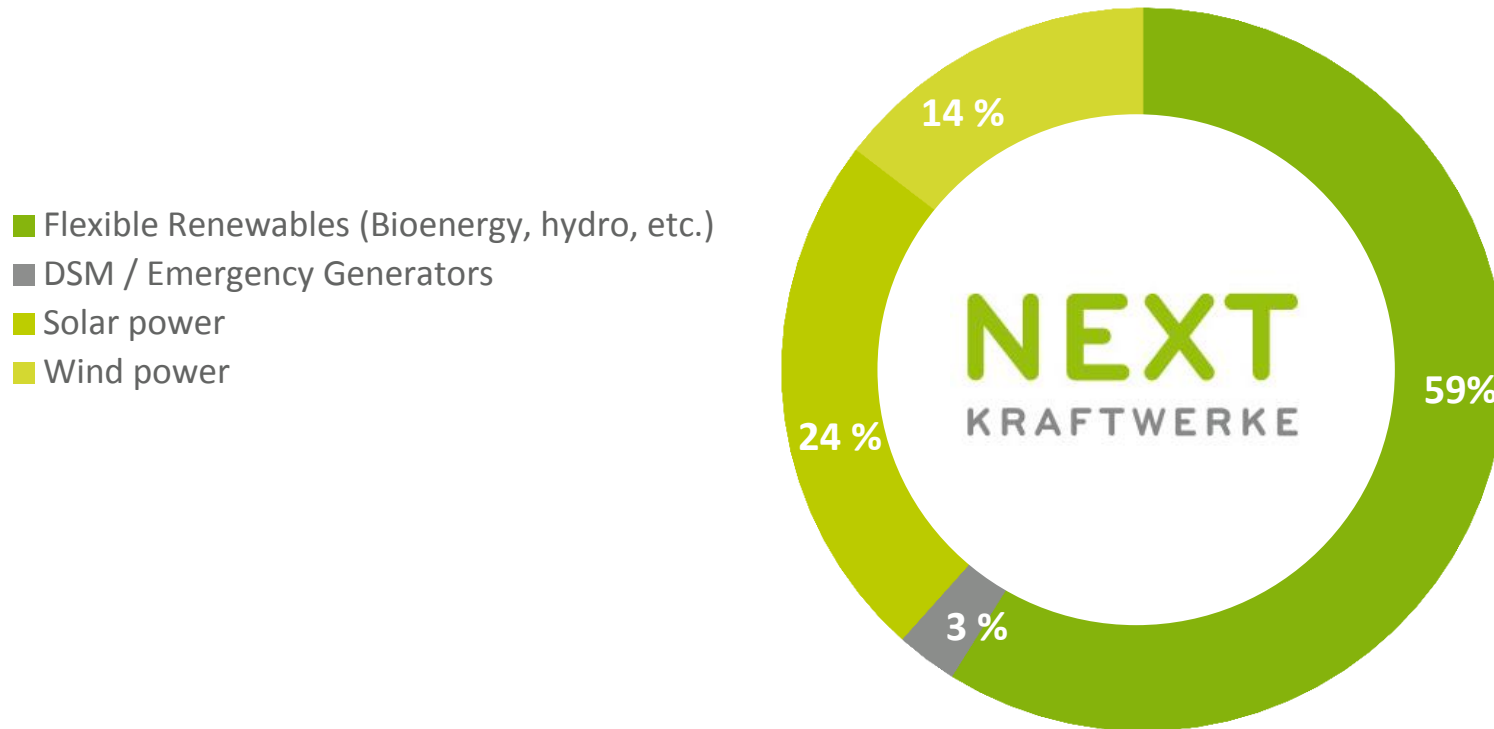
(Short term) trading of power to use the units flexibility profitably.

- Flexible production of bioenergy, hydro, etc.
- Demand Side Management

COMPANY DEVELOPMENT

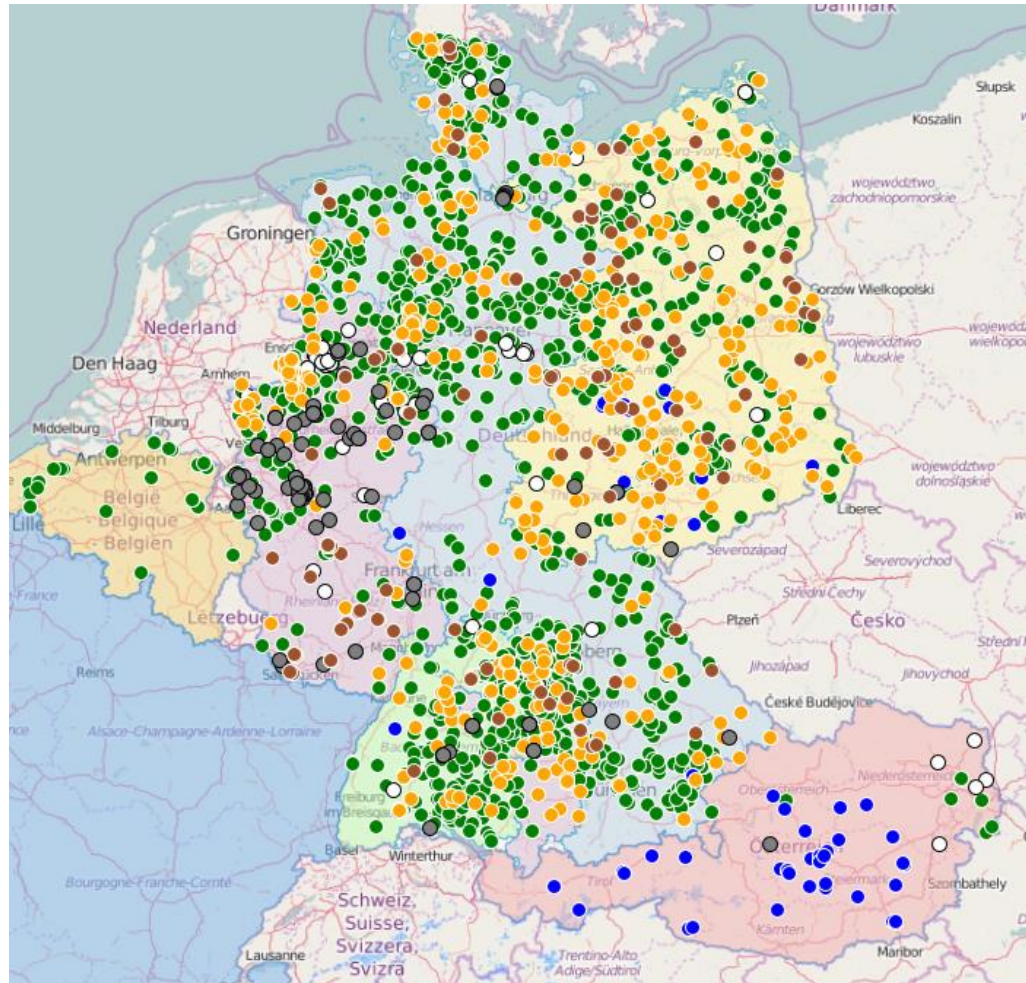


PORTFOLIO



* The Next Kraftwerke portfolio comprises of renewable energy producers and large-scale power consumers in all control areas in Germany, Belgium & Austria

PORTFOLIO

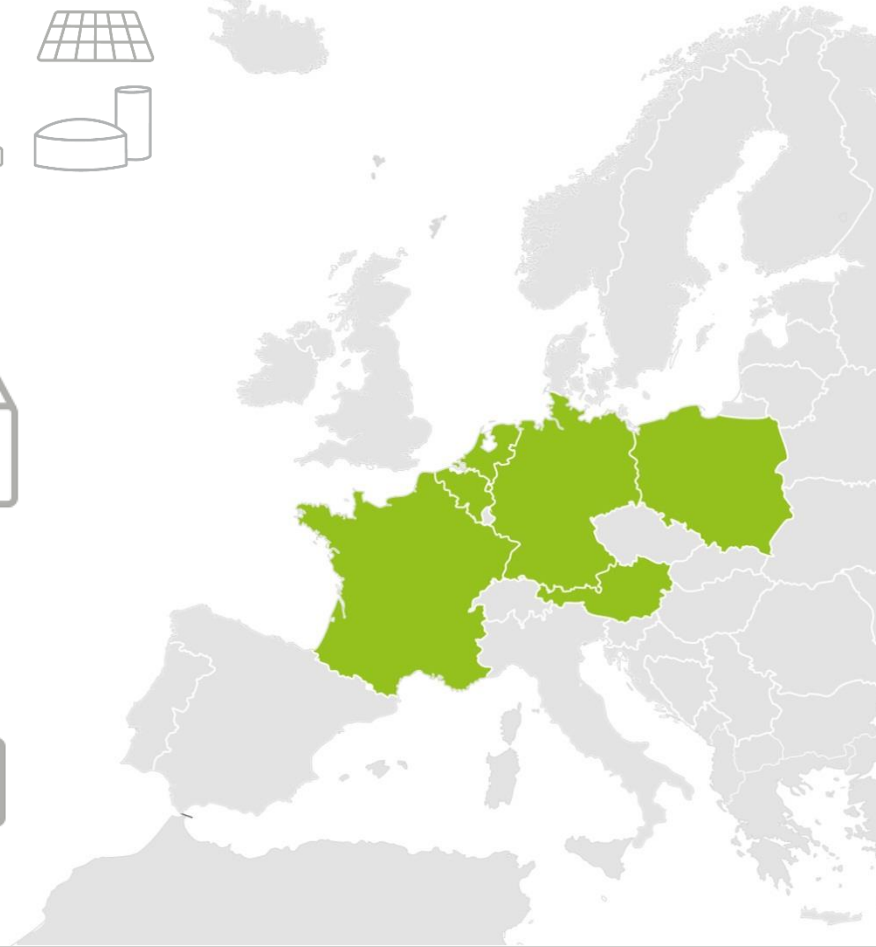
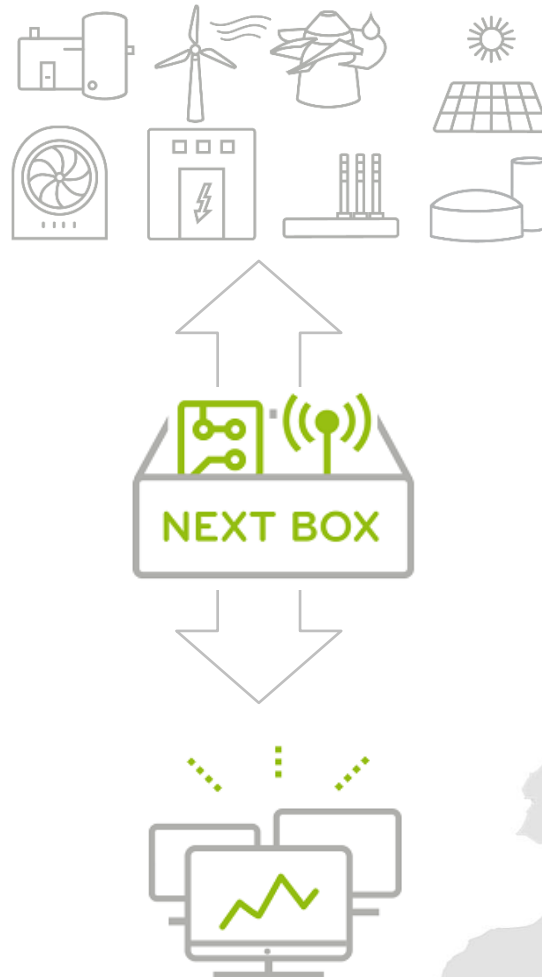


BEING DIGITAL: THINKING IN BITS AND WATTS

3,000 UNITS IN SIX
COUNTRIES, 2,000
MEGAWATTS

LINKED VIA THE REMOTE
CONTROL UNIT NEXT BOX

PROCESSED & ORCHESTRATED
BY THE CENTRAL CONTROL
SYSTEM



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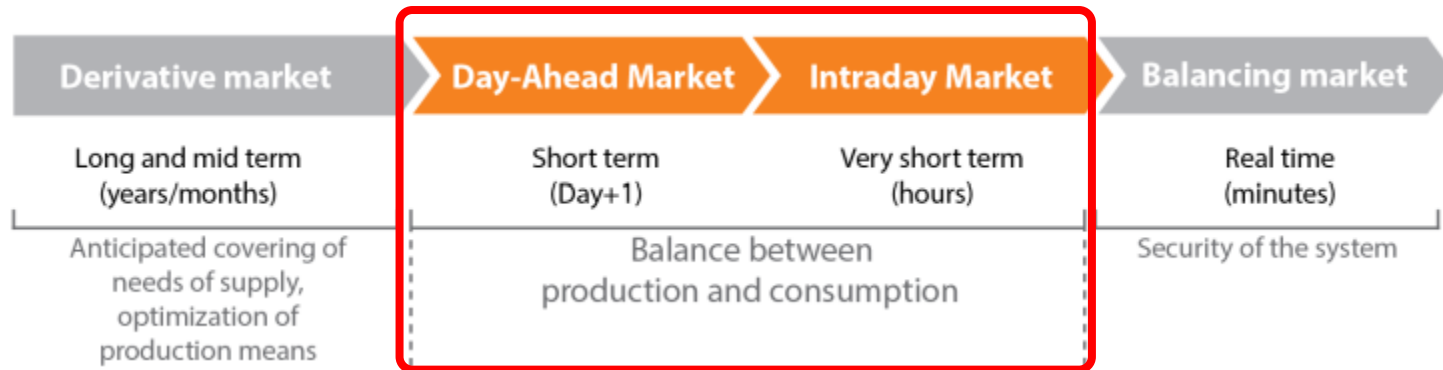
- Which markets are we talking about?
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German Wholesale Electricity Market

Timeline and Setup



DAY-AHEAD MARKET

- > Energy with physical delivery on the next day
- > Hourly auction at 12pm
Quarter-hourly auction at 3pm
- > Sell your renewable forecast

INTRADAY MARKET

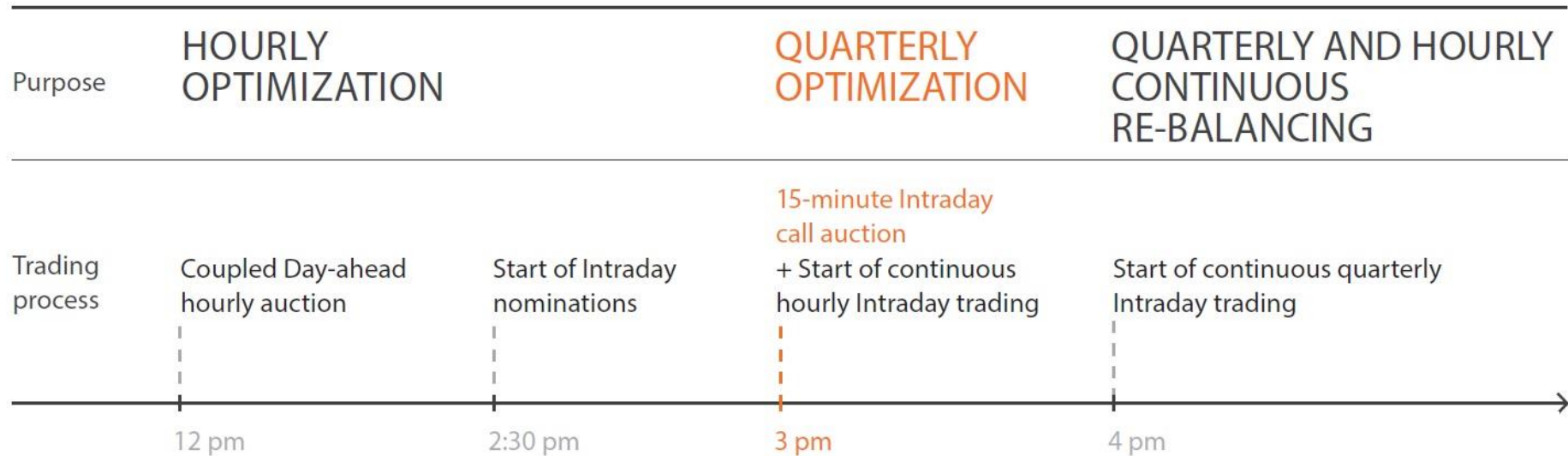
- > Continuous trading with products close to real-time
- > Sell / Buy forecast residuals

BALANCING MARKET

- > Daily / Weekly Tender of reserve power products by the Transmission System Operator (TSO)

The Trading Workflow: A Closer Look

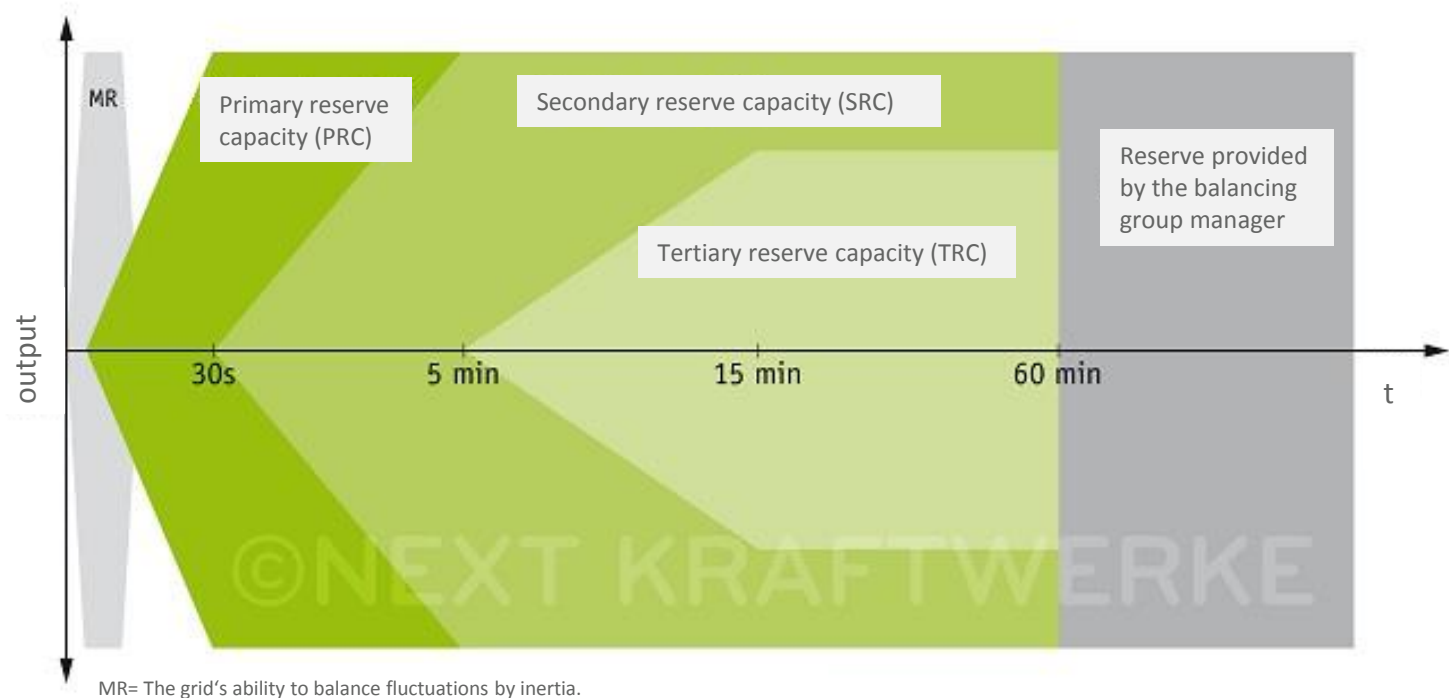
Markets and Deadlines



- Day-Ahead auction for hourly products
- Actual forecast → schedules → TSO grid planning
- Intraday auction for quarter-hourly products (→ PV)
- Continuous intraday for hourly and quarter-hourly products
- Periodic update of forecasts

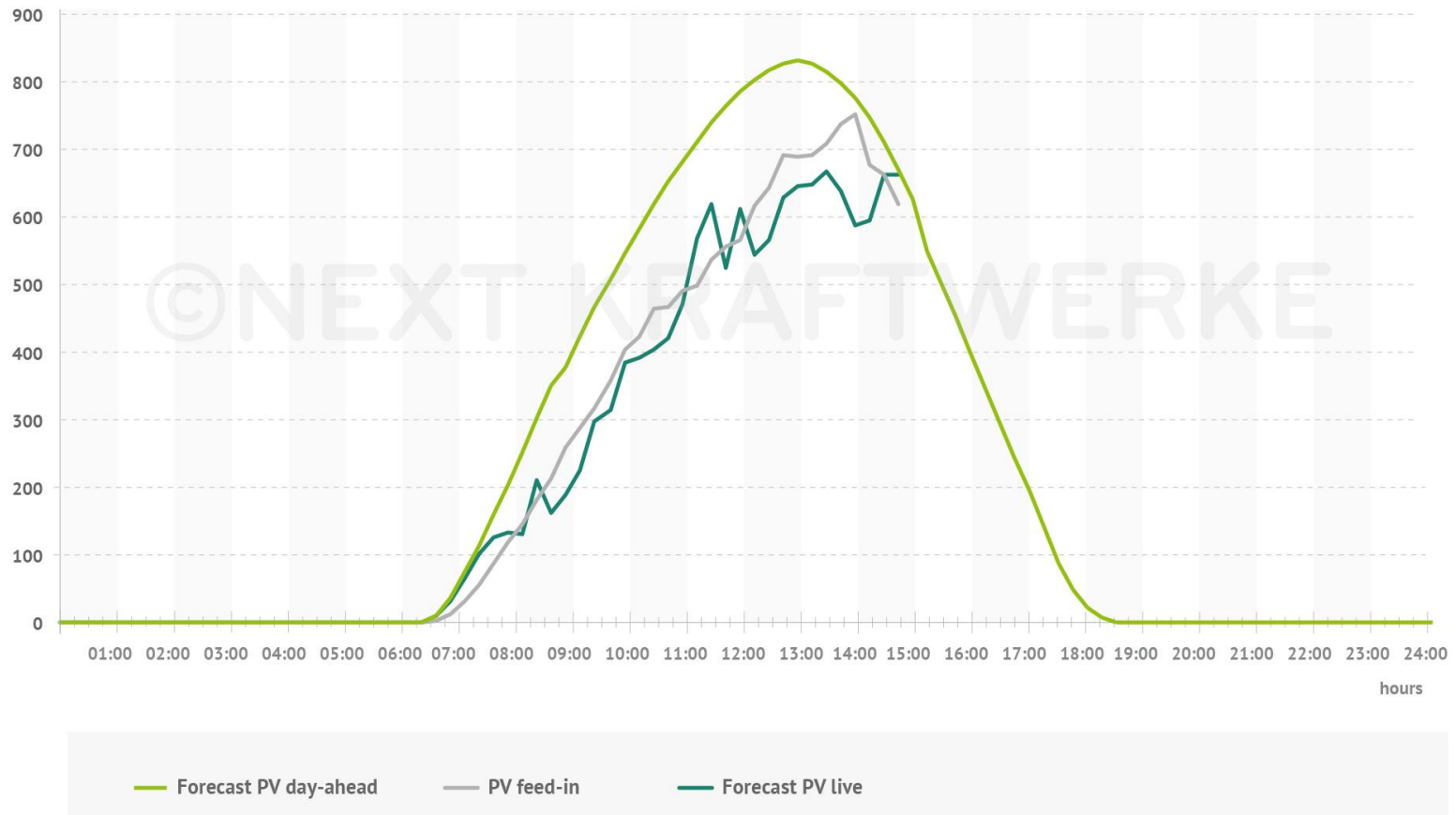
Control Reserve

Stabilizing the grid and keeping the grid frequency at 50 Hertz



PV forecast

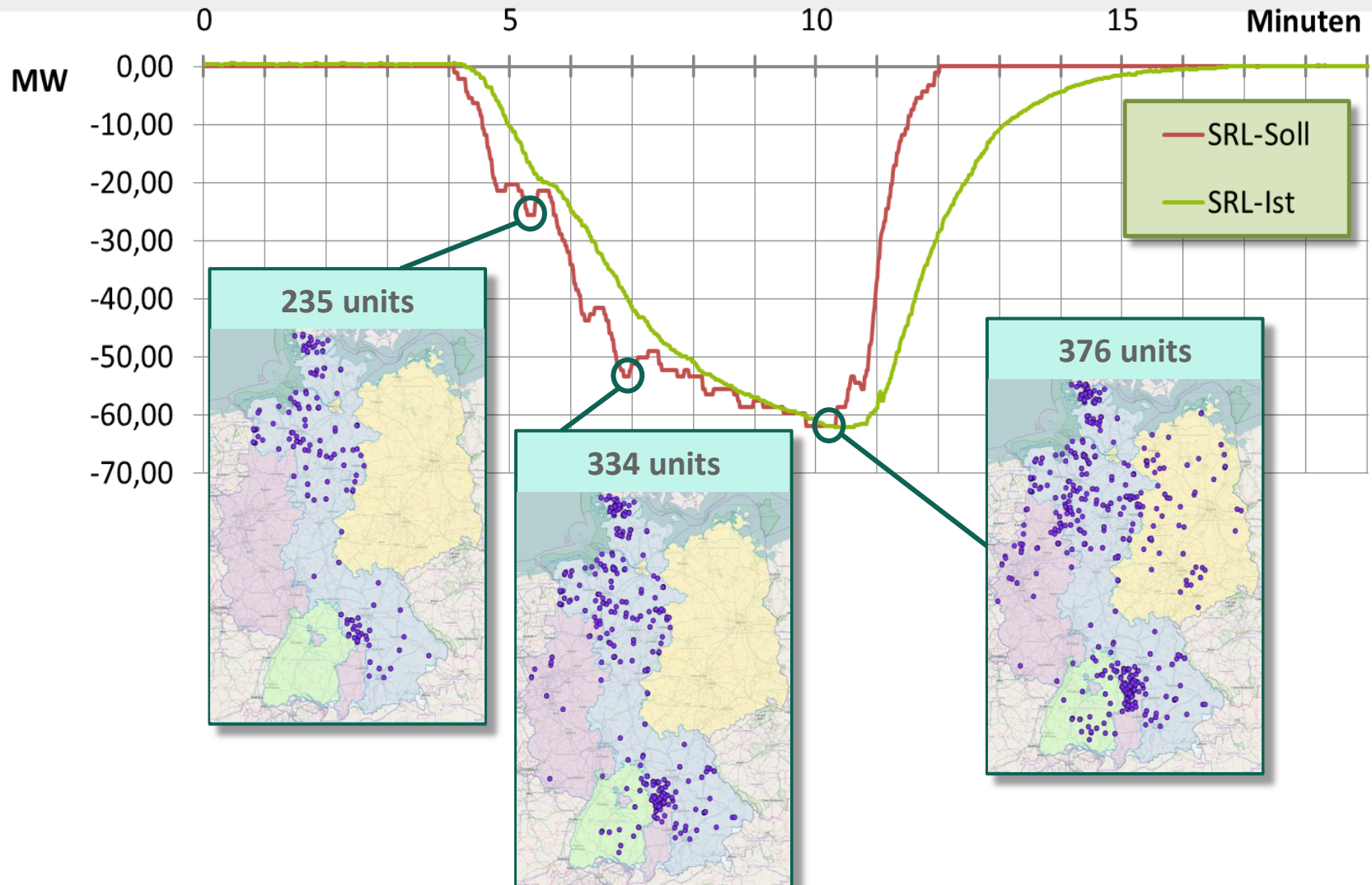
The Need for Management of your Portfolio in the Very-Short Term



- > Forecast errors need balancing → Expensive!
- > Live-data is essential for high-quality forecasts

Balancing services – Flexibility by VPPs

How does it work?



Outline

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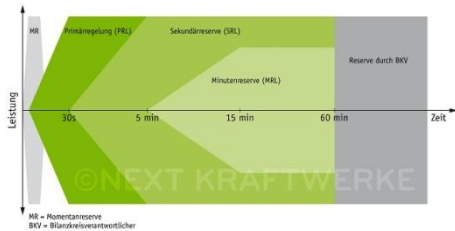
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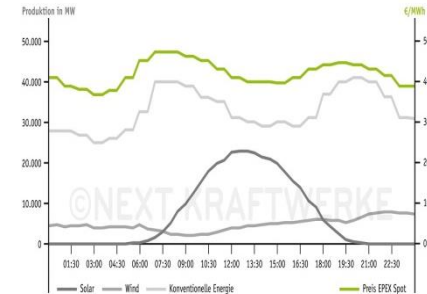
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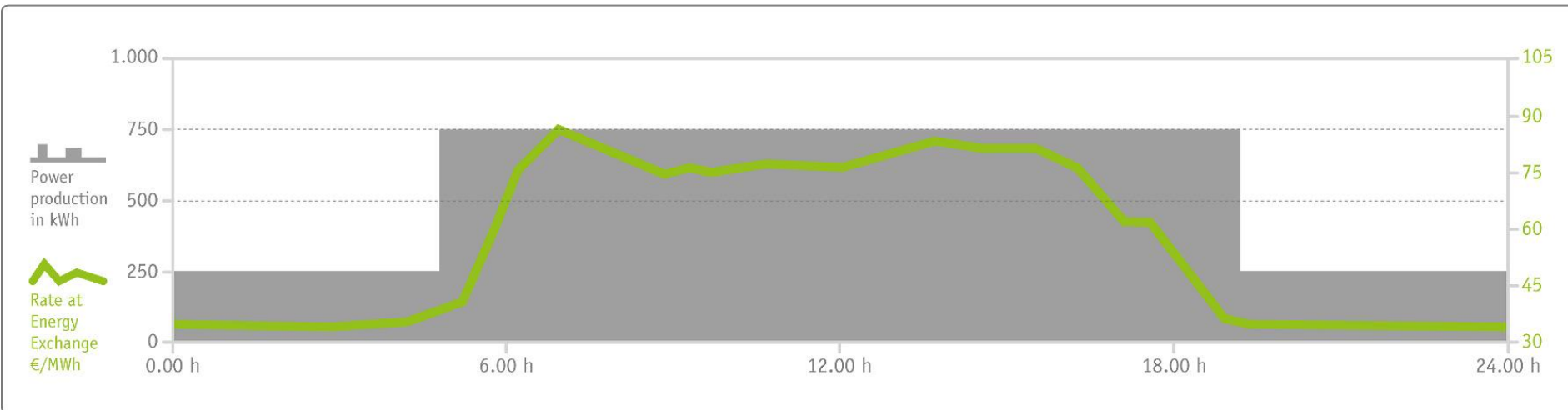
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Proactive Flexibility – Adjustment of Production (Day-Ahead)

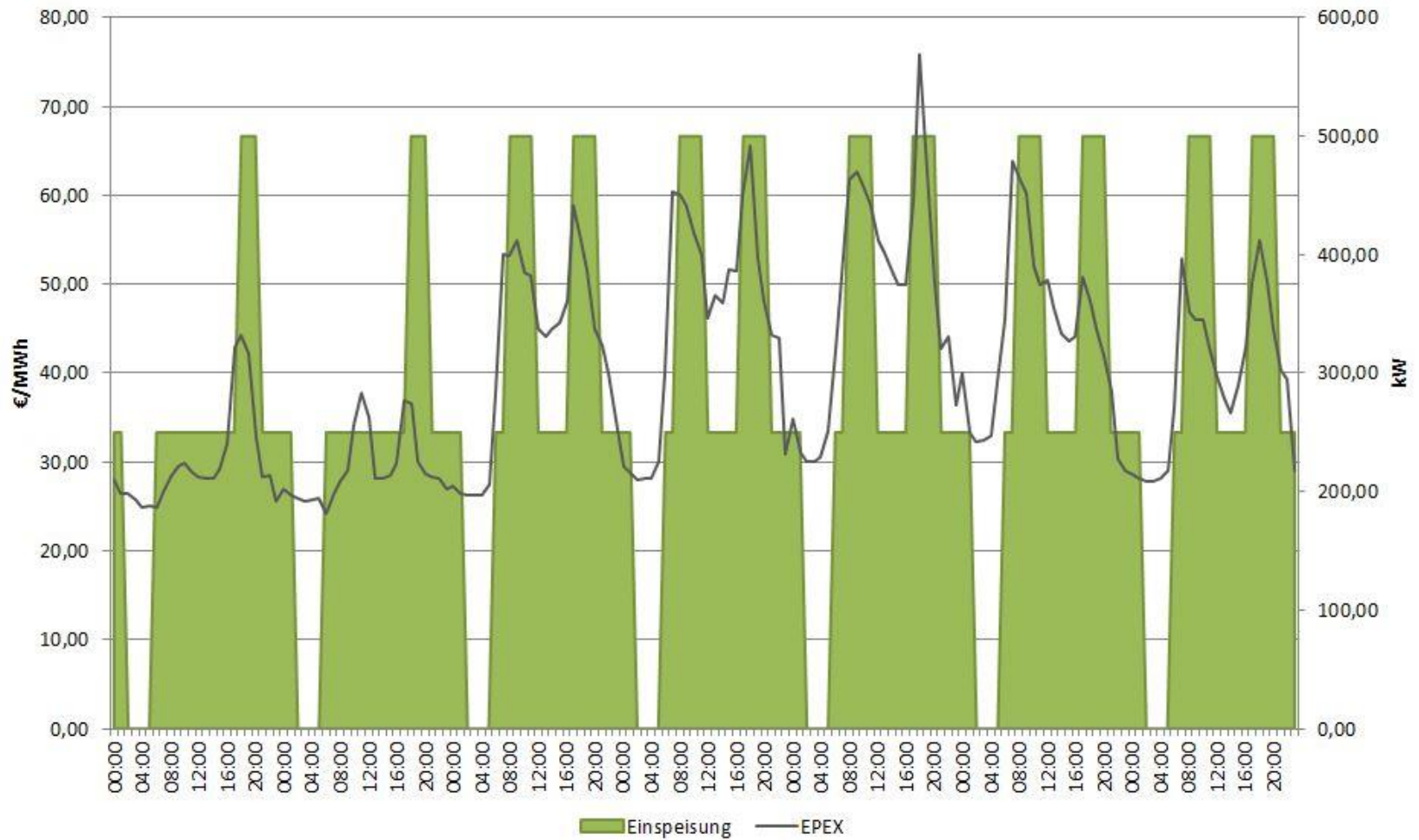
Peak Load Operation



- High prices (Day-Ahead) → Ramp up production (and vice versa)
- Very flexible plants: Production adjustment on the basis of intraday-prices

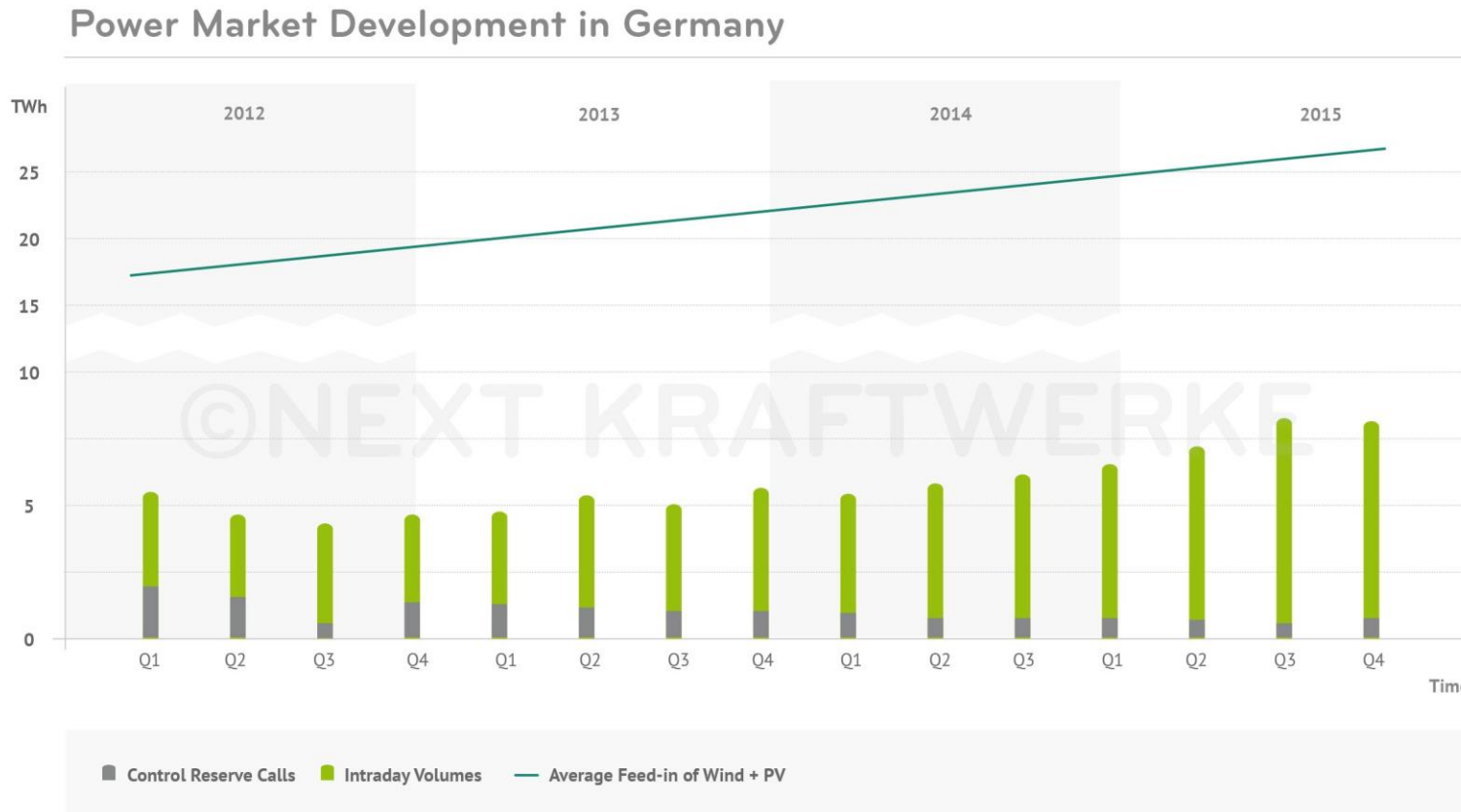
Proactive Flexibility

Weekly schedule of biogas plant: Sa, 31.1.2015 until Fr, 6.2.2015



Intraday (Proactiv) vs. Balancing (Reactiv)

Development of the last years



> Electricity markets deal very well with increasing RES

ABOUT

THE GOAL

Making 100% renewable energy possible

THE PATH

Digital, flexible, sustainable

THE STATUS

One of the largest Digital Utilities in Europe

THE TEAM

About 110 employees with a broad academic background

CONTACT

Nicolas Sommer

Portfolio, Schedule and Balancing Group Manager

sommer@next-kraftwerke.de



[@next_kraftwerke](https://twitter.com/next_kraftwerke)

NEXT
KRAFTWERKE

