



Ways to trigger Demand Side Flexibility – A case example for dynamic pricing

Peter Stratmann
Bundesnetzagentur

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- Increasing shares of intermittent RES in the energy mix intensifies the flexibility requirements for the energy system, progressively creating a level playing field between DSF and generation resources.
 - Missing financial incentives leave existing DSF potential largely unexplored today.
 - Dynamic pricing is one option to induce stronger market signals, which will mainly activate the flexibility potential of large electricity consumers.
 - Various possibilities for introducing dynamic pricing: dynamic retail price or dynamic elements in the retail price such as dynamic network charges, dynamic taxes or surcharges.
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The single pricing elements of the retail electricity price for industrial customers are linked to different incentives, which are cancelling each other out.

Wholesale market price
(40% of retail price)

- **Incentive to reduce consumption in times where electricity generation is low**, demand and prices are high.

Only wholesale prices send scarcity signals to market players

Network charge
(20% of retail price)

- **Large industrial customers:** incentive of reducing maximum capacity (kW) needed throughout the year & ensuring a regular consumption pattern over the year.
- **Small industrial customers:** incentive of reducing electricity consumption independently from the time of use (kWh/y).

Taxes, levies, etc.
(> 40% of retail price)

- **Incentive of reducing electricity consumption independently from the time of use** (costs are proportional per kwh consumed).



Structural characteristics of the system weaken the wholesale market price signal:

- **Low price elasticity** of renewables generation.
- **Subsidies and other financial benefits** reduce the signal of negative wholesale prices.
- **Other structural benefits such as financial advantages** for generation behind the meter, avoided network charges, “must run” characteristics of generation capacities, etc.

Spot market signal is often too weak to trigger DSF on a larger scale for large electricity consumers



Static RES surcharge

- RES expansion financed by a static surcharge (6,24 ct/kWh in 2014) paid by every consumer per kWh of electricity consumed.
- Raises any slightly negative price on the spot market above zero. Incentive to save remains (positive total price) instead of “consuming as much as possible” (= signal of negative prices).
- RES surcharge does not provide any incentive to shift consumption to times where the market is long and where prices would be lower.

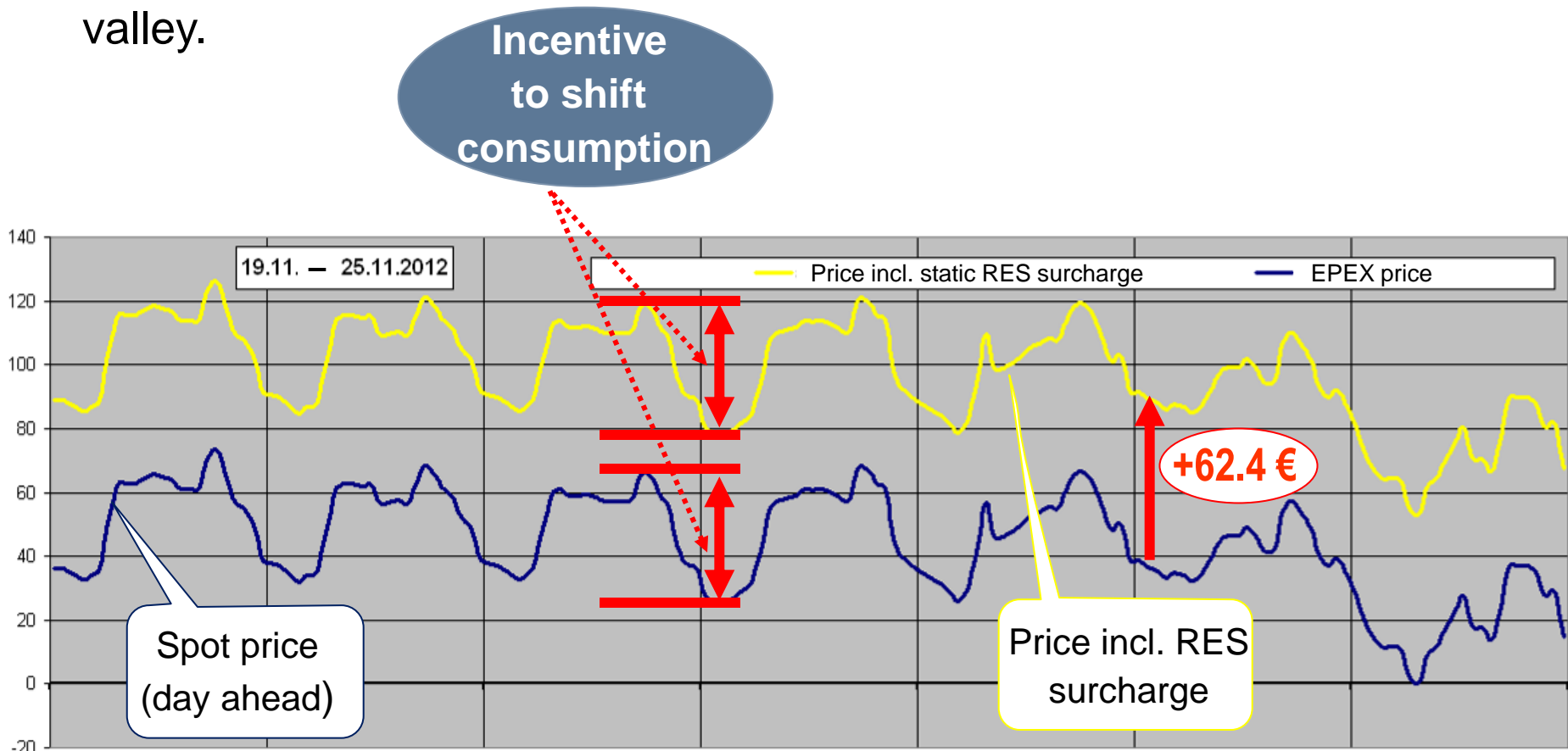
VS.

Dynamic RES surcharge

- RES surcharge operating dynamically & reflecting price of electricity:
 - low electricity price → low RES surcharge
 - high electricity price → high RES surcharge
- Set yearly for “metered consumers” (industry) on a percentage basis. Level will be established for every hour by multiplying the EPEX SPOT day-ahead price by a specified factor (eg 1.2).



- **Parallel shift of the EPEX price:** Static RES surcharge currently induces a price shift of 62.4 €/MWh.
- **Incentive to shift consumption remains unchanged with or without RES surcharge.** In the chart: 40 € between evening peak and the night valley.

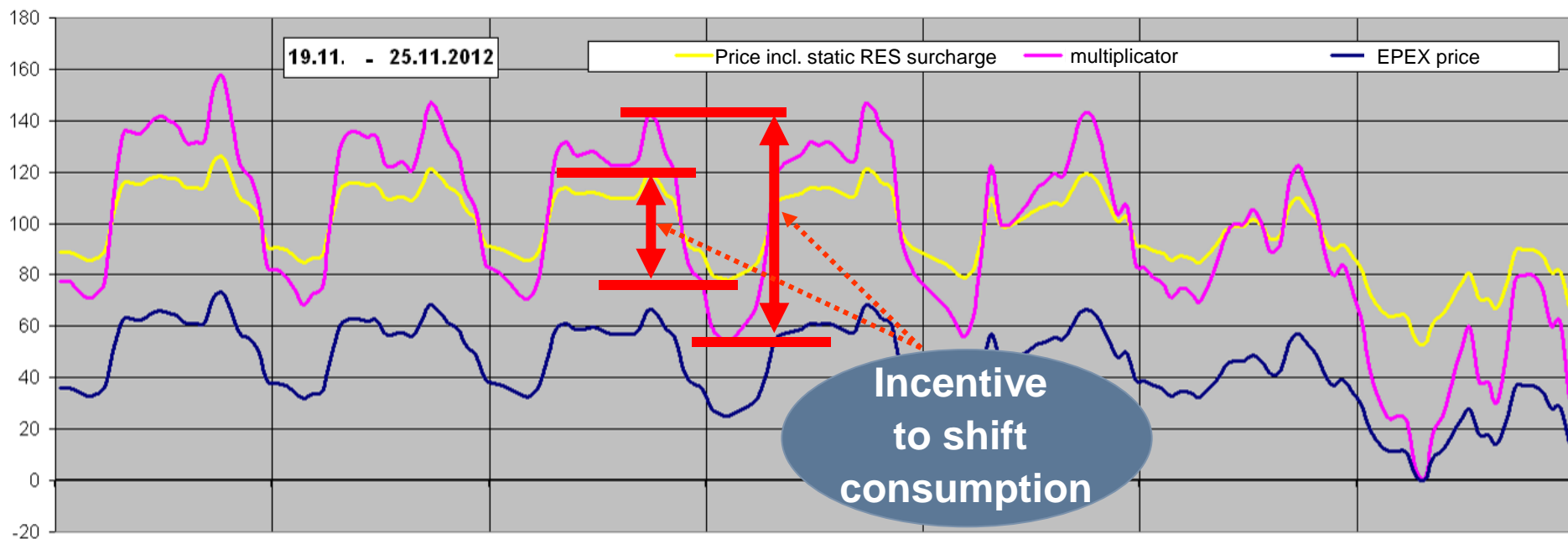




NEW CONCEPT: INTRODUCE A MULTIPLICATOR

Coupling the RES surcharge to the day-ahead spot price for electricity:

- Multiplicative approach replacing additive surcharge
- Hourly RES surcharge = spot price * 1.16. Multiplicative factor is defined on a yearly basis such as to cover the yearly costs of the RES support scheme
- Reaction time for consumers: more than 12 hours
- Shifting incentive **increases by a factor of 2.16 from 40 to 90 €/MWh**





Greater leveraged incentives for consumers

- Incentives to **be particularly economical** with electricity **when prices are high.**
- **Catch up** with consumption from expensive hours **when prices are low.**

Activation of internal shifting potential

- Businesses will rely on their **internal potential** for shifting consumption, which they can often do at no cost.
- With internal shifts, **control stays in the hands of the business.**
- **Internal potential** for shifting consumption is **much greater than external potential** (which is mostly looked at in current discussions about DSF).



Impetus for competition

- A **dynamic RES surcharge** will provide an **incentive to compare hourly prices**:
 - Competition for industrial customers will gain new momentum.
 - Suppliers will have more risks but also more opportunities.
- **Business models** allowing the **use of market-driven load flexibilities** which have failed so far on account of price differences that were either too weak or too infrequent **will become realistic**.

Other effects

- Market will be able to **integrate more electricity from RES**.
- **Conventional peak demand will be reduced**.
- **Networks** will be used slightly **more efficiently**.
- **Demand curve** will become **more elastic**. This will be very important in the long term for **the security of supply**.

BENEFICIARIES

Innovative suppliers

Industrial consumers

RES installation operators & direct marketers

- Anyone wishing to sell electricity in creative ways will find that the dynamic RES surcharge gives new options and opportunities.
- Industry will welcome the possibility of adopting an active role and being able to do something about paying high RES surcharges.
- Elasticity of demand will allow for higher revenues from RES on the electricity exchange, improving market return for RES electricity.



Setting an appropriate factor

- Annual determination of the new RES surcharge will be made by the TSOs, as in the past. However, for mathematical reasons the process of determining the factor will be considerably more error-prone than the process used to date.

Possible market distortions

- Dynamic RES surcharge will change (leverage) the price signal without impacting on existing inefficiencies, which cannot therefore be ruled out.
- Increase in revenues for base load power plants is expected.



Thank you for your attention.

Peter Stratmann

Bundesnetzagentur

Head of Unit

Unit for Renewable Energy Sources

Tulpenfeld 4

53113 Bonn

Tel: +49 (0)228 14-5842

Peter.stratmann@bnetza.de



In the day-to-day business, the shift of consumption is happening within a few hours, therefore only the upcoming 4 hours are considered:

Shifting incentive: $\text{MAX}(t:t+3) - \text{MIN}(t:t+3)$

