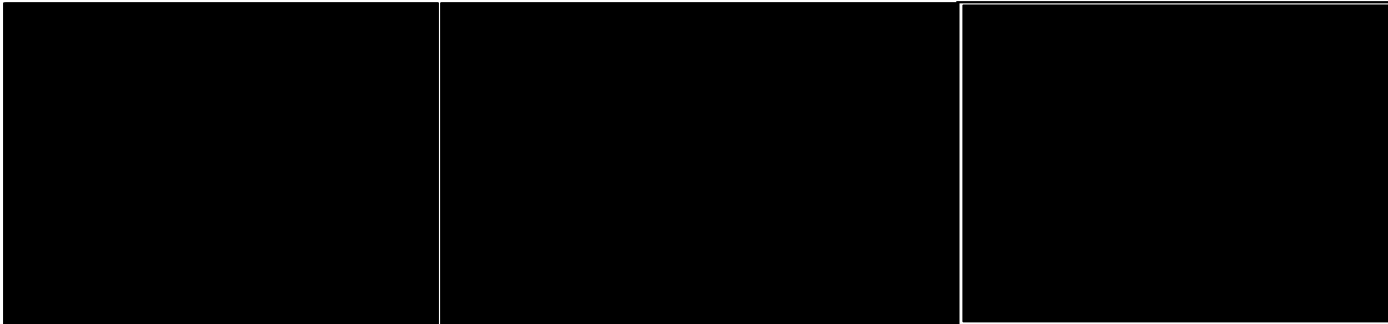


Second UFZ EnergyDays
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Special Session on 'Market and System Integration of Renewable Power Supply:
The Role of Future Power Market and RES Support Design in Germany'

System and markets adaption to high shares of renewable power supply



Albert Hoffrichter

Berlin University of Technology, Workgroup for Economic and Infrastructure Policy (TU Berlin – WIP)
Team Infrastructure Economics and Management / Section Power Generation

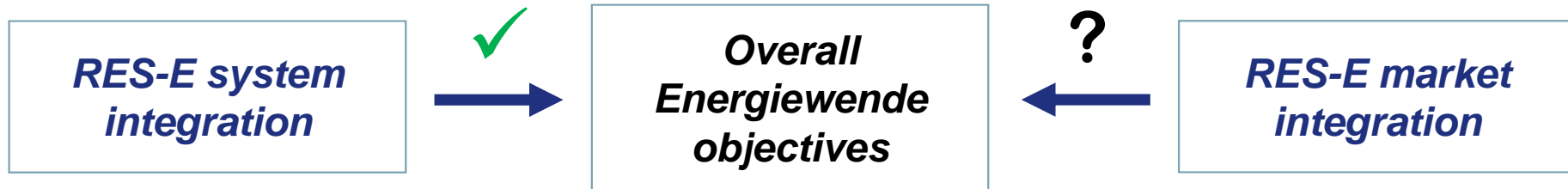
Contents are based on joint research with Prof. Dr. Thorsten Beckers (FÖV-Speyer / TU Berlin – WIP).

Motivation: Questions to be answered

Some central questions of this session (condensed)

- How to adapt the **electricity sector governance framework** to effectively achieve the ‚Energiewende‘ objectives?
- Who should make **investment and operational decisions**? Or: By which rules should they be influenced?
- Particularly: Which contributions can RES-E **system** and **market integration** make?

How are RES-E system and market integration related to the Energiewende objectives?



Broad agreement on the following points:

- RES-E **investment and operational decisions** should **accommodate system requirements**
- The electricity **system has to adapt** as well (institutionally and technically)

Creating a **sustainable, secure production system** to the **lowest costs** possible (long-term consumer perspective)

What is meant by that?

- Clearly *'Integration into existing markets as they are'* ✘
contradicts *'Institutional system has to adapt'*
- *'Maximizing the degree to which the actions of RES-E investors and operators are influenced by market signals'* ?

NIE: Appropriate coordination mechanism depends on the transaction's/task's characteristics

Characteristics of electricity supply

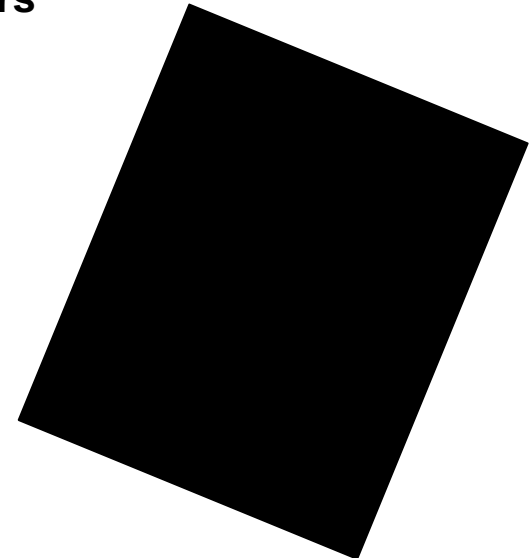
*Service of
general interest*

- The **regulator**¹ is **responsible for its provision** (i.e. for the task electricity supply)
- The regulator has certain **objectives regarding its provision** (in Germany mainly: Energiewende objectives)

*Complex task:
large variety
of sub-tasks
and decisions*

- The **regulator can...**
- **Carry out tasks / make decisions himself**
 - **Delegate** (or leave) **tasks to private actors**
 - **One** (→ monopoly)
 - **Multiple** (→ market/competition)

¹ in the broad economic sense (any public authority)

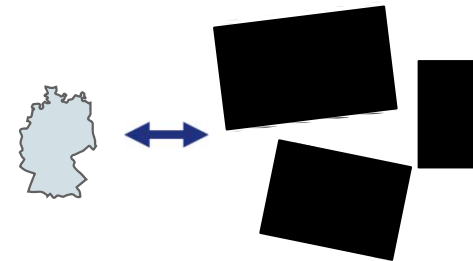


The merit of using markets and competition

Adequacy of 'market/competition' compared to 'decision/action by regulator'

Pros & Cons of market / competition solutions

- **Risk allocation** to decentral, private actors → ...
 - + Monetary incentives to bring in or develop knowledge/ideas on **efficient input** and **output choices**
 - Higher **costs of risk-bearing** (esp. relevant when high sunk costs)
 - Possibly unjustified **high producer rents**
- Decisions which are individually 'good' for market actors can be 'bad' from a social perspective
- + ...
- ...



Conditions that tend to make application of markets / competition favourable

- **Relevant knowledge** on efficient inputs or desired outputs is **dispersed** (and regulator does not have and cannot easily get it)
- **Decentral decisions** can be expected **not to run counter to social objectives**
- **Moderate specific, capital-intensive investments** (sunk costs)

Current power sector issues RES-E (1/1): Which governance options should be chosen?

| <u>Intermittent RES-E: What we (or the regulator) do know</u> | Statement on governance options |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| We want additional RES-E installations . Specifically, we want wind engines, and we want PV. | Low risk' remuneration mechanism (like in EEG) appropriate solution. |
| Certain RES-E projects should be realized with a different plant layout (to increase the generation's value to the system). | Direct requirements or bonus/premium schemes , although: difficult to design/implement. |
| Intermittent RES-E generation will have to be curtailed , when other generation and load units cannot react anymore. All plants: very similar marginal costs near zero . | No reason to allocate market risks to investors, could be governed by system operator (without financial implication for RES-E investors/operators). |
| An intelligent spatial distribution of capacities raises the generation's system value. | In the future probably reason for steering investment localization, ...but: challenging task (e.g. because of the federal system). |
| ... | ... |

Current power sector issues RES-E (1/2): Which governance options should be chosen?

| <u>Intermittent RES-E</u> : What we (or the regulator) do not know | Statement on governance options |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Which exact locations are most suitable (yield, externalities etc.)? | Decentral activity (competition) makes sense (like in EEG); although: potential to improve coordination of public actors and private investors (again: challenging task in the federal system). |
| Which future plant design improvements can further increase the system value? | Promotion of R&D competition; early adjustment of plant requirements (or incentive schemes) to create a demand. |
| ... | ... |

Current power sector issues back-up system (1/2): Which governance options should be chosen?

| <u>Back-up system:</u> What we (or the regulator) do know | Statement on governance options |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| We will not need additional back-up generation capacity in the near future. | No point in rushing into comprehensive capacity mechanism schemes. |
| We need (to maintain) generation capacity in special regions . | ResKV appropriate solution for now. |
| [<i>assumption</i>] We do not want additional carbon intensive generation capacity. | No reason to leave corresponding investment decisions to 'the market' ; various ways of interference. |
| ... | ... |

Current power sector issues back-up system (2/2): Which governance options should be chosen?

| <u>Back-up system:</u> What we (or the regulator) do not know | Statement on governance options |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| How are the current availability and costs (incl. opportunities) of the generation fleet? | Spot market is an excellent mechanism to gather the relevant information for dispatch. |
| Which flexibility options can complement an intermittent RES-E based system most cost-effectively ? | Develop knowledge ; more direct procurement (with lower, more secure remuneration) in the areas with advanced information, more output-orientated procurement (broad competition of solutions, higher rent potential) in areas with minor information. |
| ... | ... |

Thank you!

Contact

Albert Hoffrichter (mail: ah@wip.tu-berlin.de, phone: +49 (0)30-314 78773)