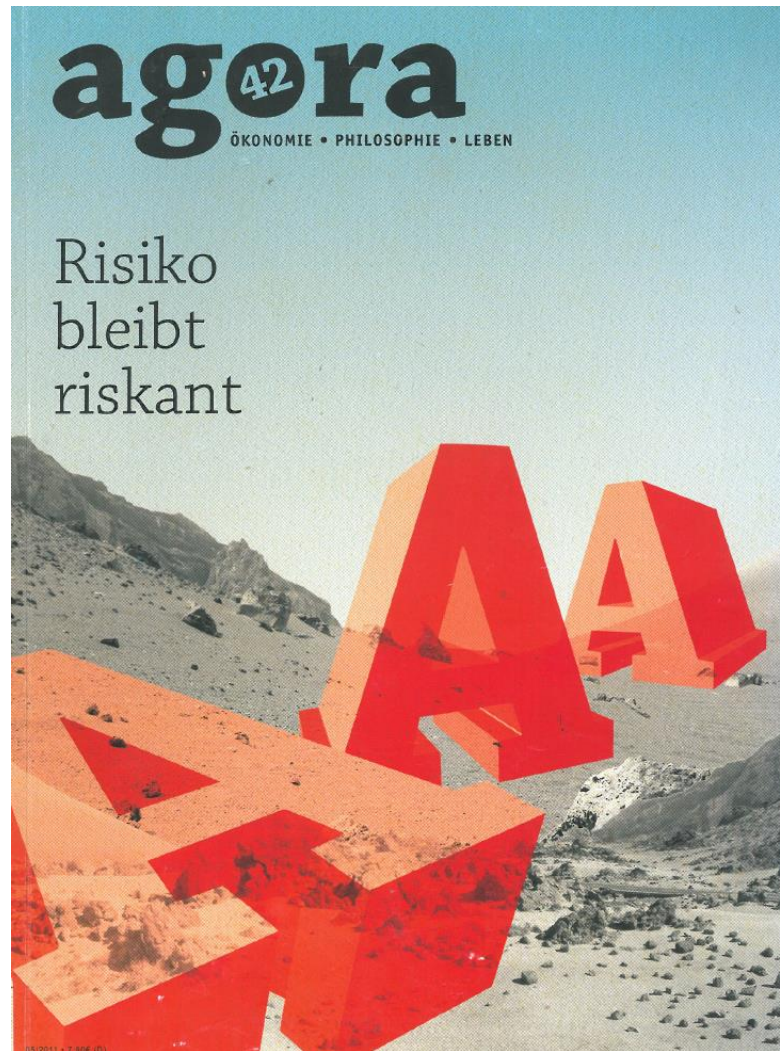


A risk perspective on market integration and the reform of support of renewables in Germany

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Market integration & risk transfer



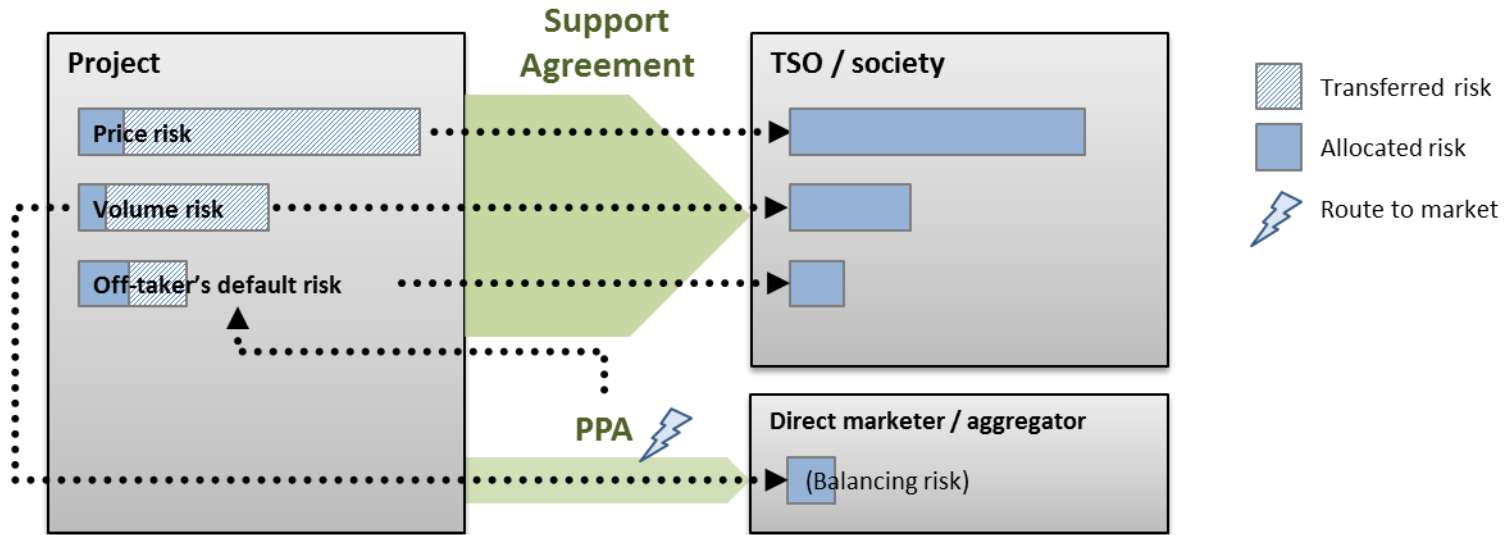
Market integration & risk transfer

- Government pursues **market integration** of renewables (RES) in the long-run to contain costs
 - Requires RES to carry **market risks**, which create incentives for efficient investment behavior
- But under current finance structures high risks threaten **bankability** of new projects (*credit rationing*)
 - Insufficient finance implies not meeting deployments targets
- **Our approach:** Give RES some “**tough love**” (Bell 2012) by gradually transferring risks to RES
- **Advantages:** Markets can adapt over time, foreseeable **non-disruptive investment environment**

Overview of revenue risks

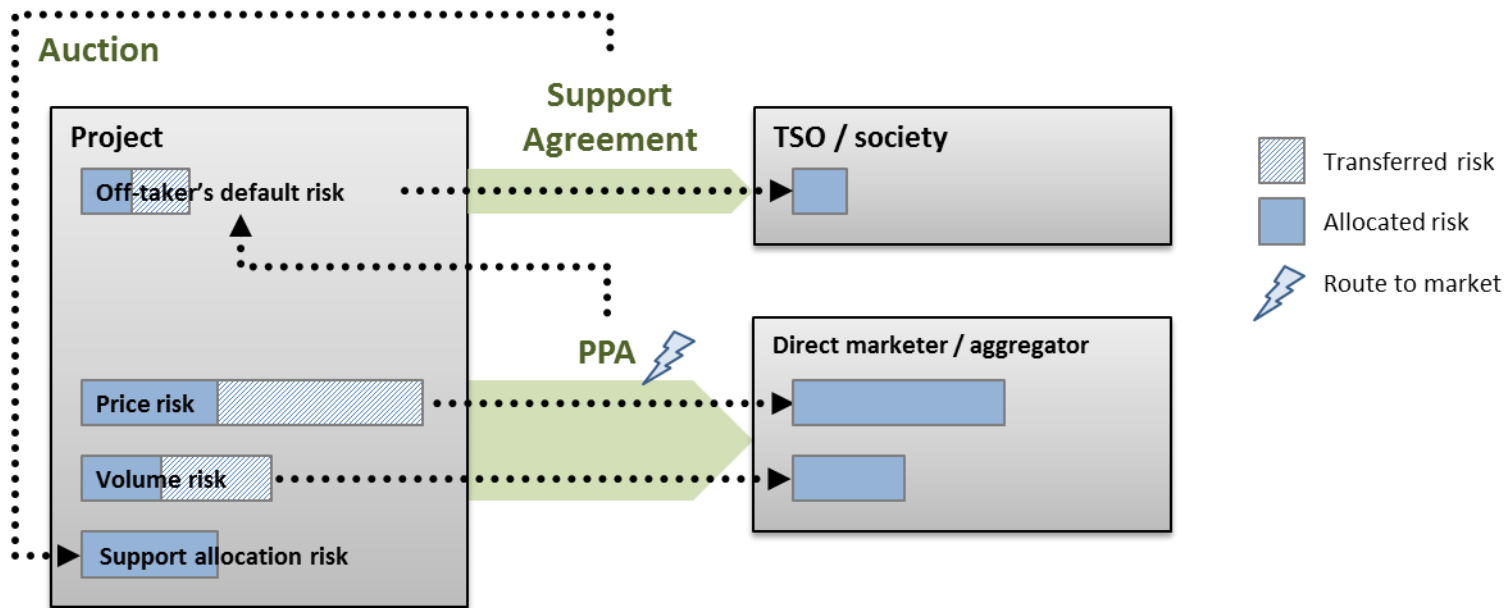
Risk	Relevant uncertainty	Risk description
Electricity price risk	Future development of electricity market prices and market price volatility	Risk of lower income due to unexpected negative price developments (downside risk)
Volume risk	Generation relative to long-term PPA contract; Generation relative to short-term market bid (balancing risk); Availability of network access (grid access risk)	Risk of actual generation deviating from contracted (sold) generation
Support allocation risk	Number of other applicants and their costs structures (auction)	Risk of not receiving a support contract for an at least partially developed project
Off-taker's default risk	Solvency/persistence of contractor	Risk of unexpected termination of power purchase contract

Contracts & risks in current sliding premium (EEG 2.0)



- Risks largely transferred to society (over TSOs)
- Typical PPAs of direct marketer do not cover full time period of EEG support (lower price certainty)
- Default provisions according to §38 (“Ausfallvermarktung”)

A hypothetical EEG 4.0 (fixed market premium)



- Additional allocation risk from auctioning (EEG 3.0)
- Considerable price risk, low/average volume risk
- Risks must be transferred to direct marketer via PPA in order for the project to be bankable

Challenge for the way forward

Case	1.0	1.1	2.0	3.0	4.0
Price Risk	No risk	Marginal risk	Marginal risk	Marginal risk	Considerable risk
Volume Risk	No risk	No risk	Marginal risk	Marginal risk	Low risk
Support allocation risk	No risk	No risk	No risk	Low risk	Low risk
Off-taker's default risk	No risk	Marginal risk	Low risk	Low risk	Low risk

Legend: No risk (light grey), Marginal risk (light green), Low risk (light orange), Considerable risk (light red)

- Main challenge: How to achieve risk transfer of “**considerable price risk**” given that currently price risks are marginal?

Diversified contracts needed

- Increasing price risks requires new contracts:
 - **Support:** More risk transfer from society to RES project
 - **PPA:** More risk transfer from RES project to direct marketer
- **Design provisions** for risk sharing (*sharecropping*)

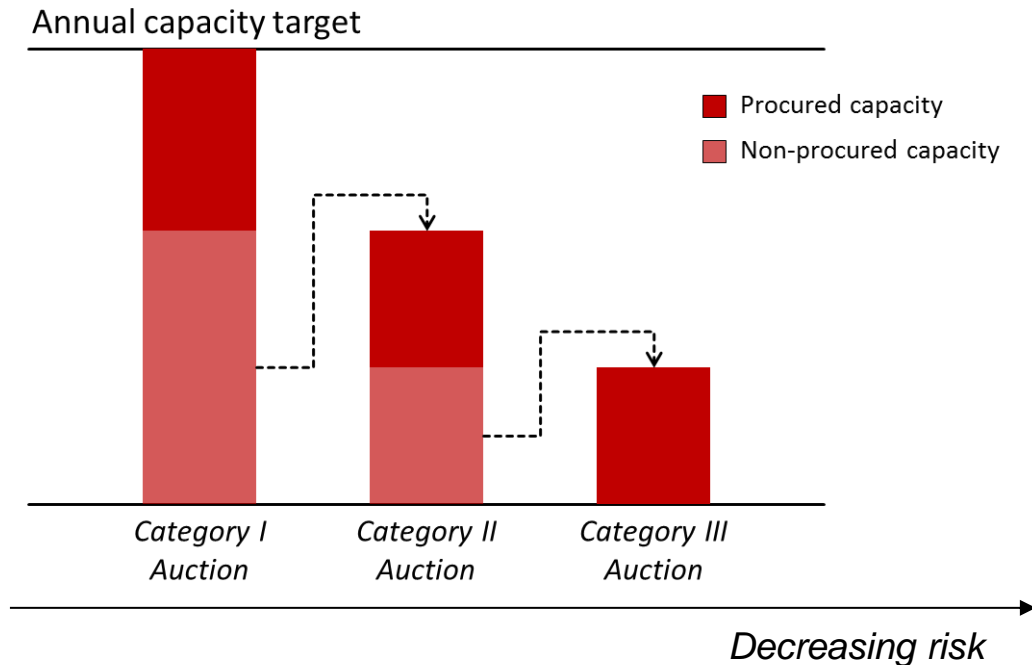
Feature	Description
Term	The duration of the contract may vary from long-term contracts of 20 years or more to short-term contracts of just a few years.
Power quantity and quality	The contract may set a fixed annual quantity of electricity delivered per year (e.g. in MWh) or may take off all electricity produced by the generator. Also, the quality in terms of delivery at specific times (e.g. during peak-demand) may be defined.
Price Mechanism	The purchase price may be paid per kWh or capacity based. Price mechanisms may range from fixed prices per kWh to price bands, variable prices or various price elements.
Liability clauses	Rules and sanctions e.g. in case of not meeting minimum delivery quantities.
Modes of termination	Relevant in case of delayed project completion, permanent non-delivery or permanent non-payment for delivered electricity.
Mode of electricity delivery	Use of public grid or not.
Solvency terms for Off-taker	Especially relevant for long-term contracts with third parties

Menu of support contracts with different risk

Category	I	II	III
PPA / Support agreement	“More risky”	Sliding premium (EEG 2.0 / status quo)	Sliding premium (EEG 2.0 / status quo)
Auction type	Competitive in price	Competitive in price	Non-Competitive first-come-first-served / Competitive in score
Overall risk transfer to project	High	Medium	Low
Typical investors	Utilities, large municipalities, large investors	Energy Cooperatives, small municipalities, utilities, medium-sized investors	Small private investors “Privatpersonen”, Energy Cooperatives

- Differentiate contracts for **different risk-readiness** of investors to achieve **efficient risk allocation**
- “More risky” contract should be **standardized** in the sense of allowing financiers to evaluate project risks

Auctioning framework for allocating contracts



- Sequence of auctions in which **risk “cascades”**
- Incentive to take risks due to “leftover risk” for category III
- Open questions regarding auction design, in particular how to set **reserve price**

Conclusion

- Market integration requires RES project to carry price risk to an increasing extent (also requirement towards first best)
- Risk should be transferred gradually in order to avoid disruptive investment environment
- This could be done using:
 - ...more “risky” contracts (support, PPA)
 - ...a risk allocation mechanism that creates incentives to take risks (cascading risk auction) and learning effects
- General approach spelled out here, more work needed regarding auction and contract design.
- Learning from other markets like California, SA.
- Risk transfer (esp. price risk) also framed by broader electricity market design discussion!