



**TradeRES**

New Markets Design & Models for  
100% Renewable Power Systems

# Comparison of Support Schemes for Renewables - A German Case Study

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## *Research question*

*Are **RES remuneration schemes** needed and if so, how should they be designed?*

### **Approach**

- Simulate energy system dispatch
- Apply different remuneration schemes
- Compare market performance indicators



# *Simulate dispatch*

**AMIRIS: open Agent-based Market model for the Investigation of Renewable and Integrated energy Systems**

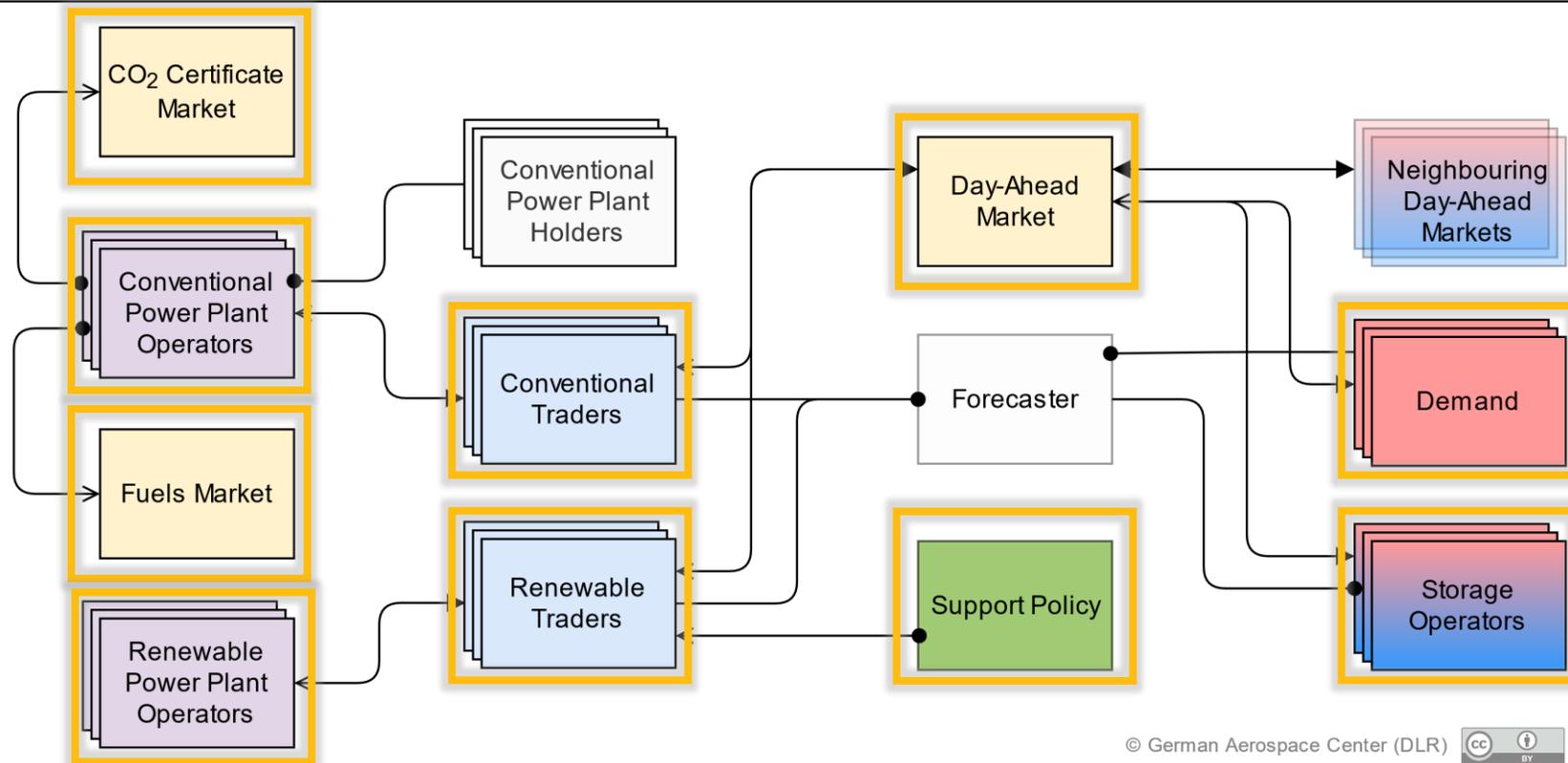
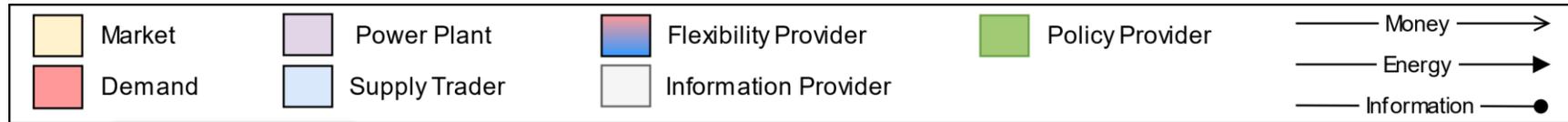
- is an **agent-based** model for the power market
- models **business-oriented** dispatch decision making
- considers different regulatory framework conditions
- is available **open source** at <https://gitlab.com/dlr-ve/esy/amiris>

→ `pip install amirispv`





# Simulate dispatch AMIRIS





# *Renewable Remuneration*

## **Five Market Designs**

- “None”: no remuneration
- “MPfix”: fixed market premia
- “MPvar”: variable market premia with monthly reference period
- “CfD”: contracts for differences with monthly reference period
- “CP”: capacity premia

## **Premia**

adjusted: each renewable energy technology refinances within a 1% tolerance

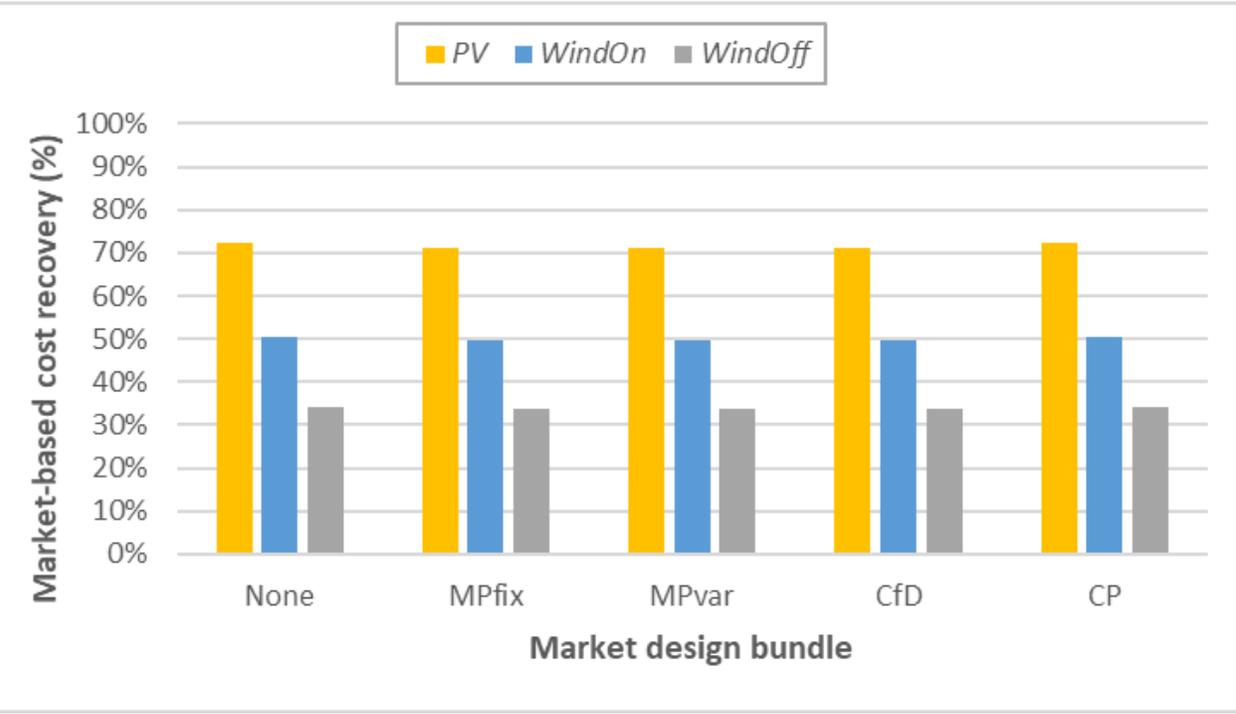
## **Renewable energy share**

~35%, ~85%

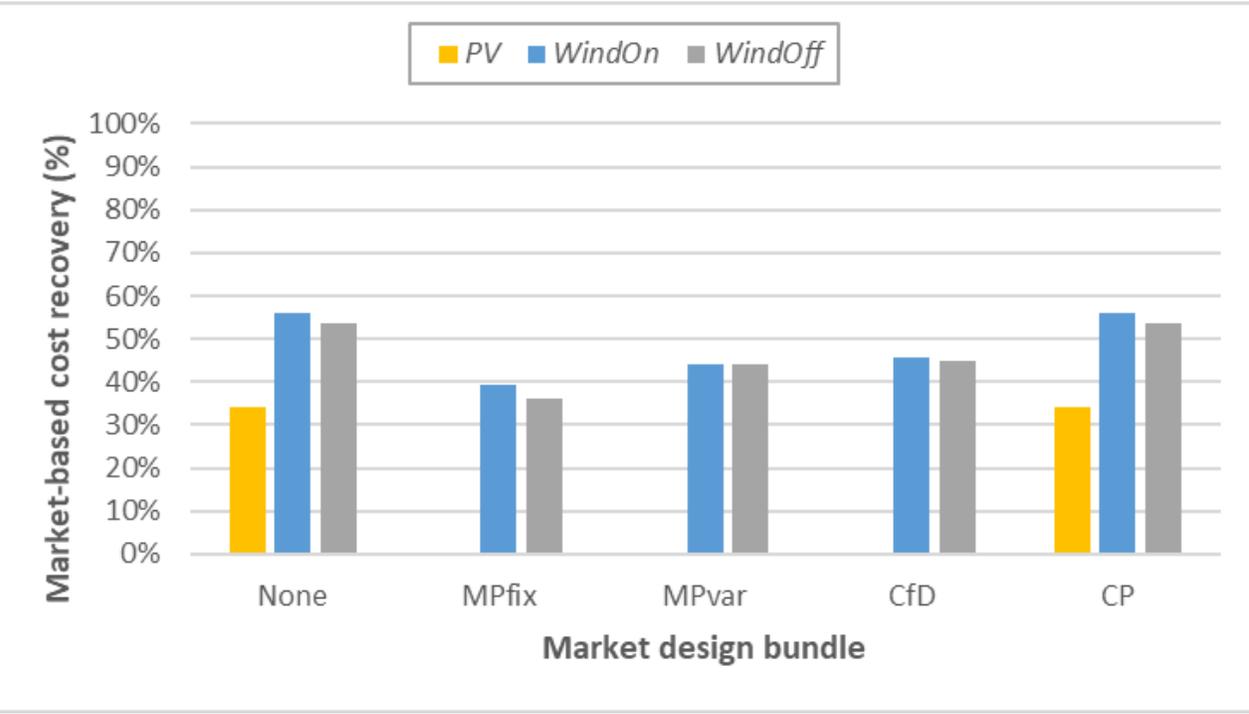
# Market Performance

## Market-based cost recovery

35% RES



85% RES



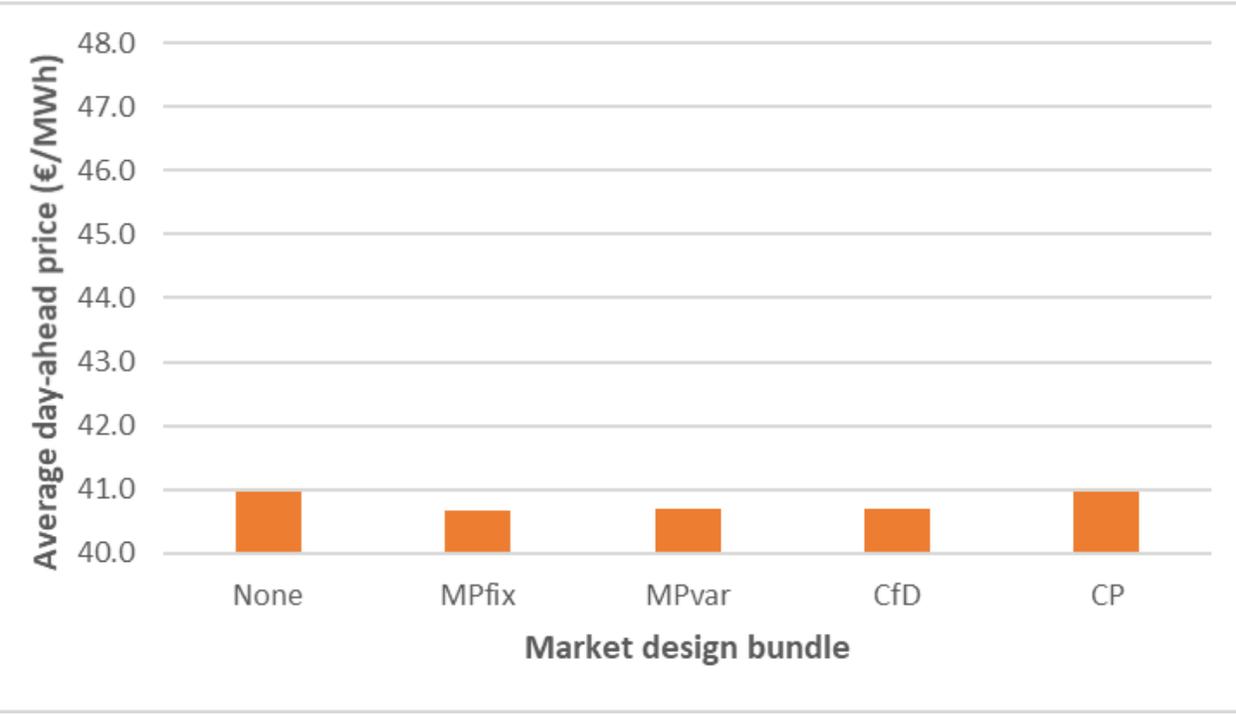
- No RES recovers cost at market, remuneration required
- Market premia may reduce cost coverage



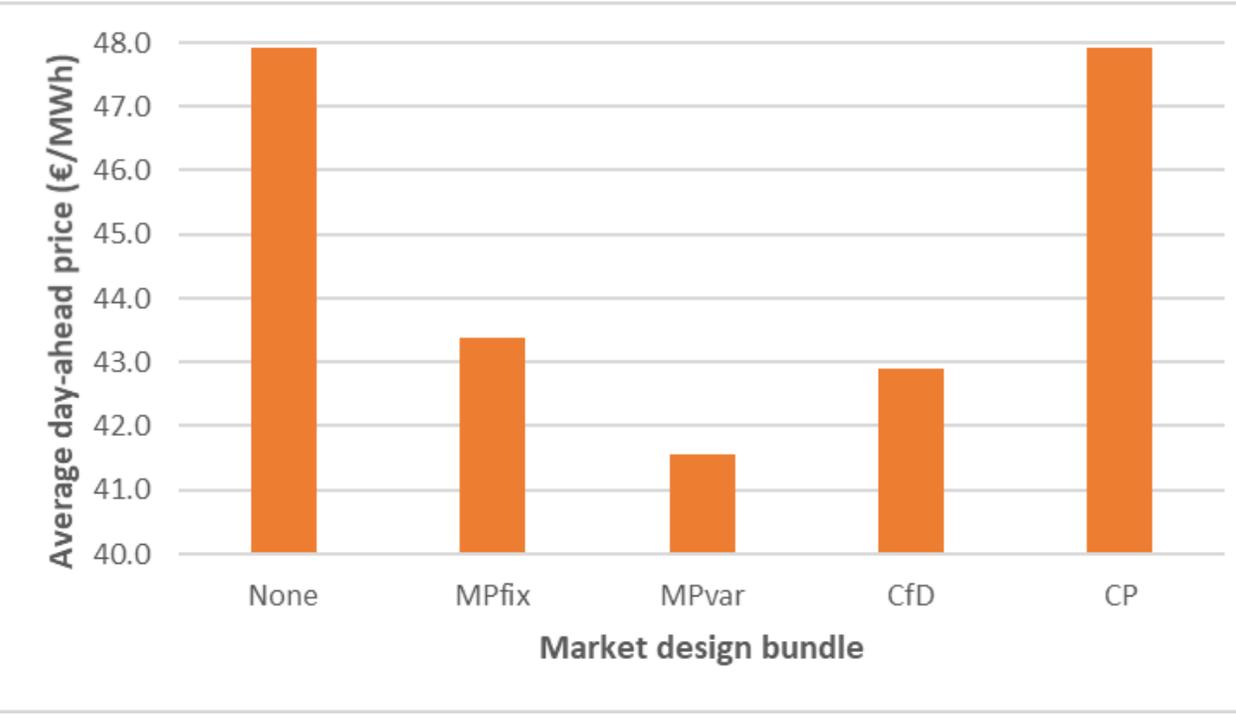
# Market Performance

## Average Electricity Price

35% RES



85% RES

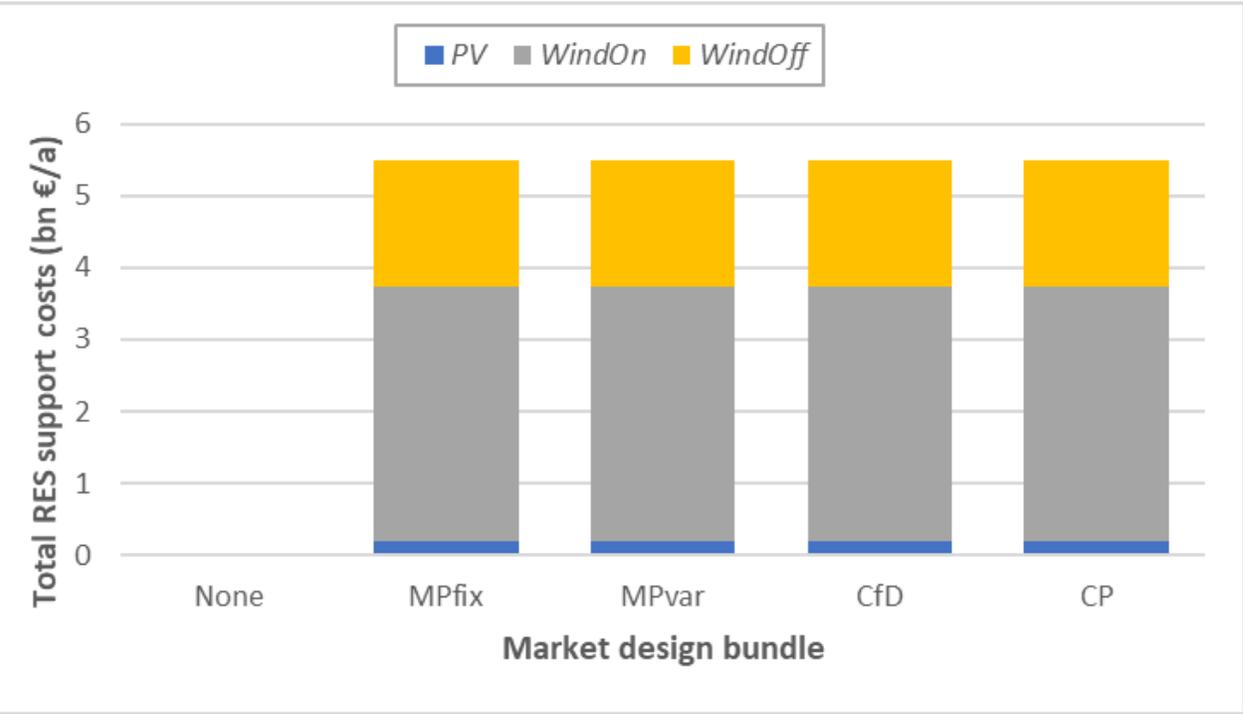


- Impact of market design on prices rises with RES share
- Market premia lower electricity prices

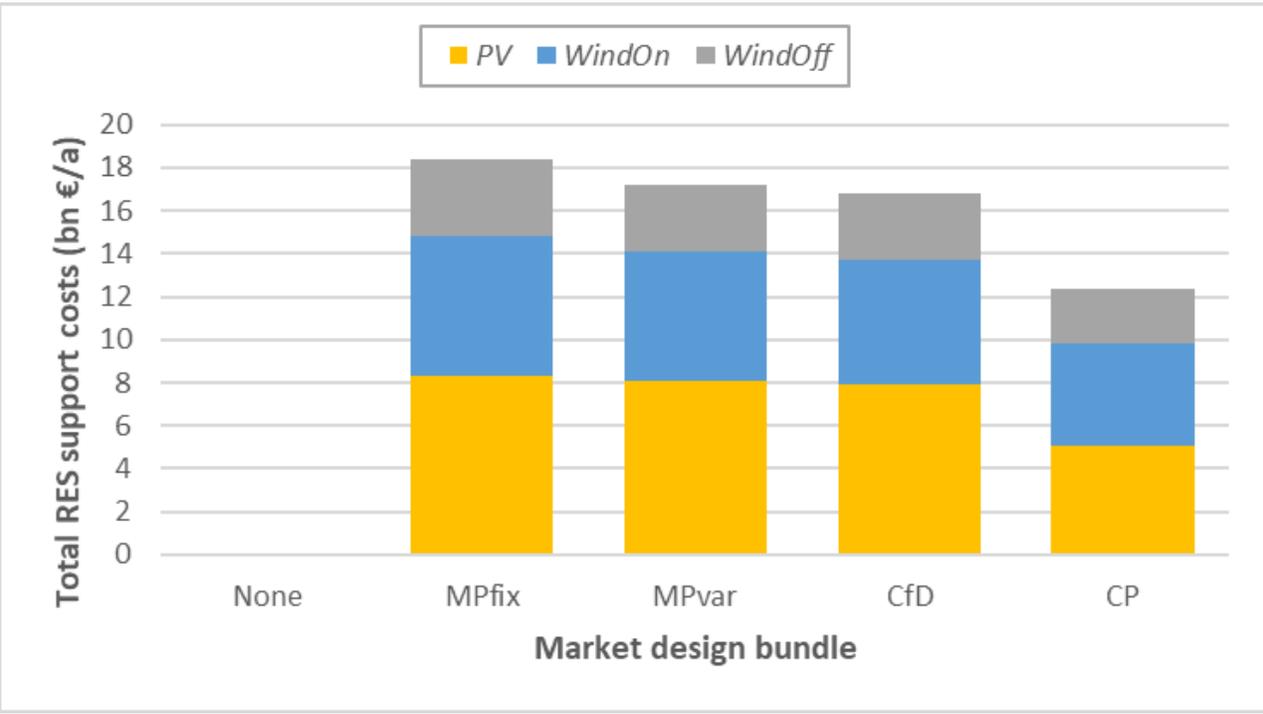
# Market Performance

## Total RES support cost

35% RES



85% RES



- Overall support cost similar for market premia
- Capacity premia may reduce support cost

**More market designs**

e.g., financial CfDs

**More scenarios**

also assess 4 different scenarios at ~95% RES share

**More indicators**

e.g., curtailment, system cost, loss of load, ...