

The role of a rural region in the future energy system

Results from the Renewable Model Region Harz

Britta Zimmermann

Fraunhofer IWES

Oct 25, 2012



Ein Projekt gefördert durch das



Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit

Förderkennzeichen 0325090 I



Contents

- The Renewable Model Region Harz (RMH)
- Results
 - Transferability of results
 - Indicators
 - Classification of Landkreis Harz
- LK Harz's role in the future energy system
- Conclusions



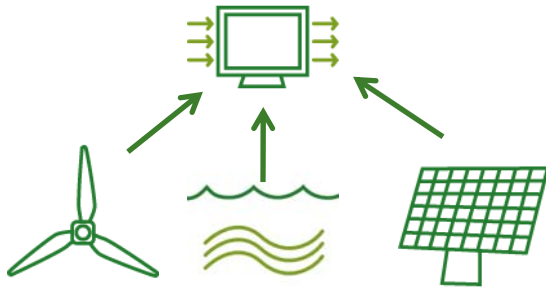
The Renewable Model Region Harz

- Support programme of BMWi and BMU
- 1 out of 6 E-Energy projects
- Duration: 2008 – 2012
- Budget: € 16 million, support funds: € 10 million

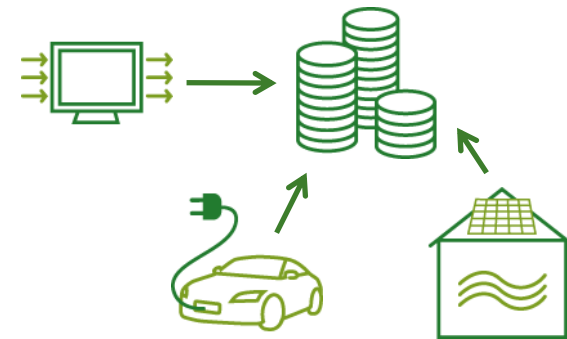


Key objectives

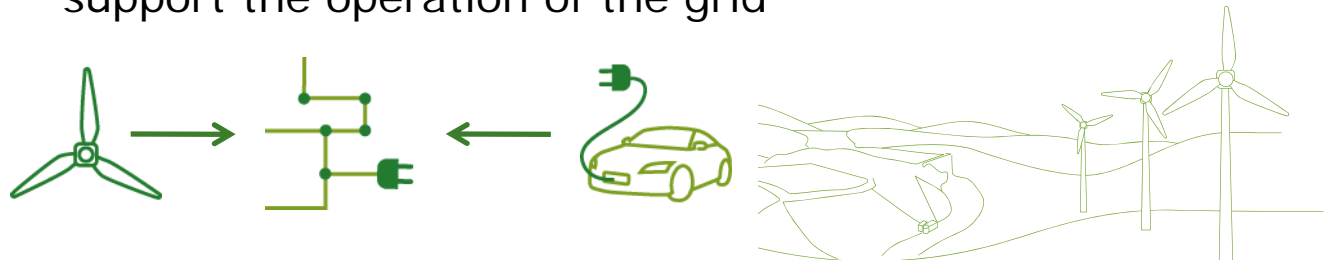
Development and implementation of a control unit for the virtual power plant (VPP) Harz



Marketing of the electricity produced by the VPP

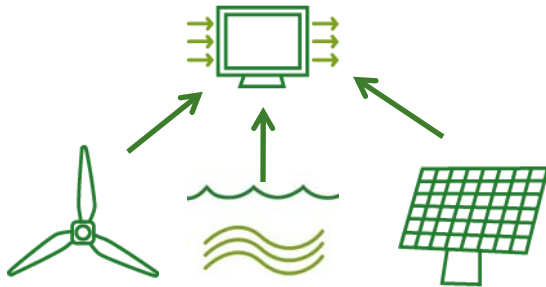


Monitoring of the grid and ancillary services to support the operation of the grid

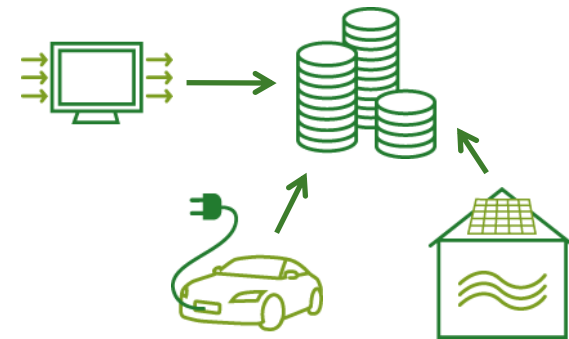


Key objectives

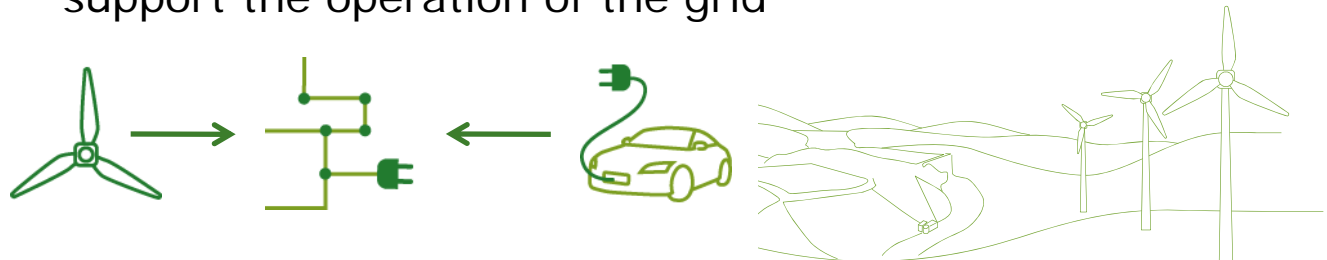
Development and implementation of a control unit for the virtual power plant (VPP) Harz



Marketing of the electricity produced by the VPP



Monitoring of the grid and ancillary services to support the operation of the grid



Virtual power plant

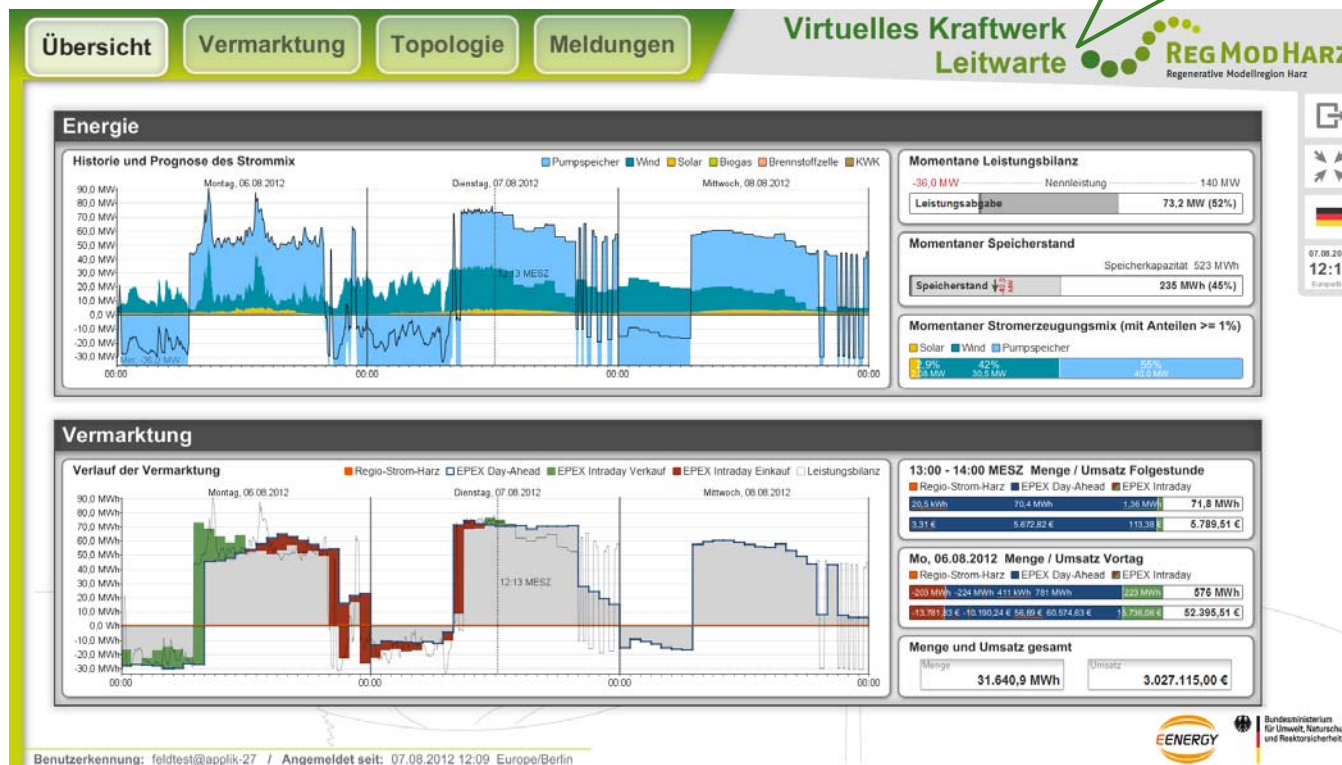
Overview

Marketing

Topology

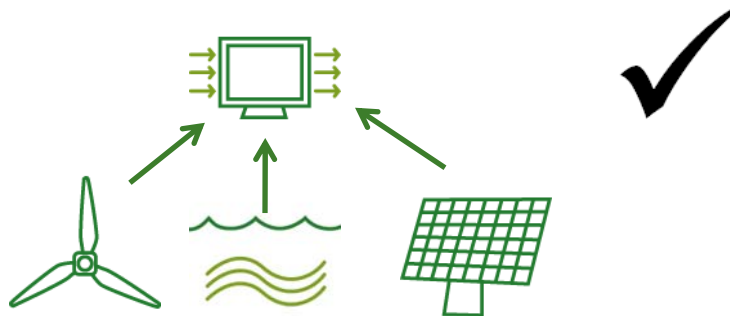
Messages

Control center

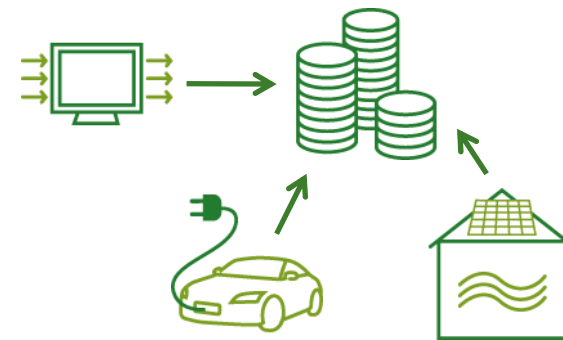


Key objectives

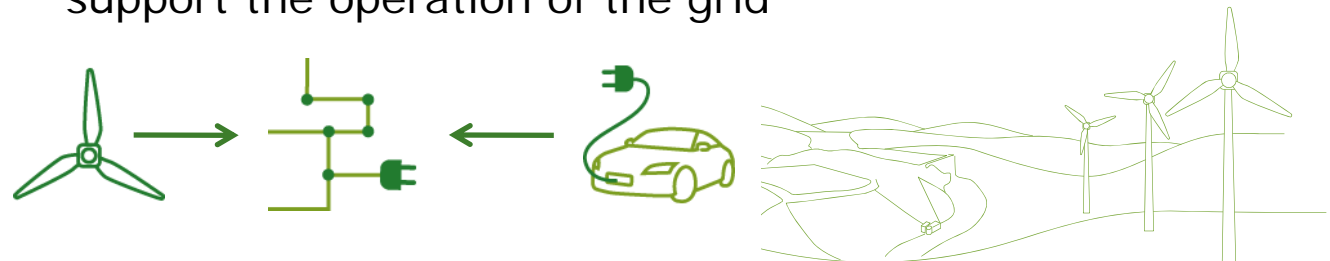
Development and implementation of a control unit for the virtual power plant (VPP) Harz



Marketing of the electricity produced by the VPP

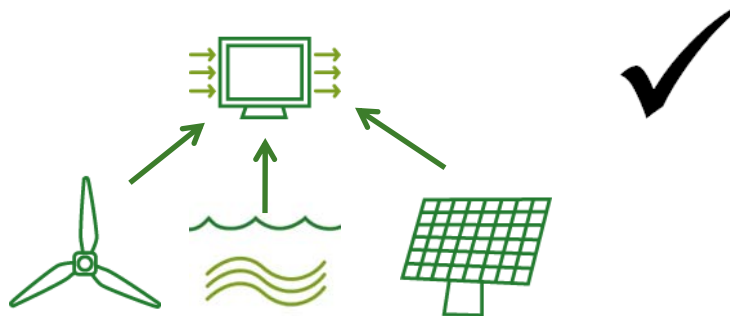


Monitoring of the grid and ancillary services to support the operation of the grid

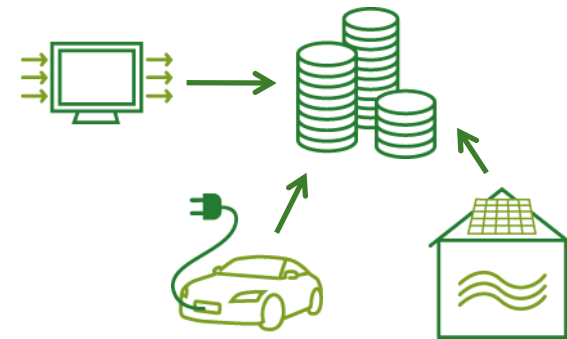


Key objectives

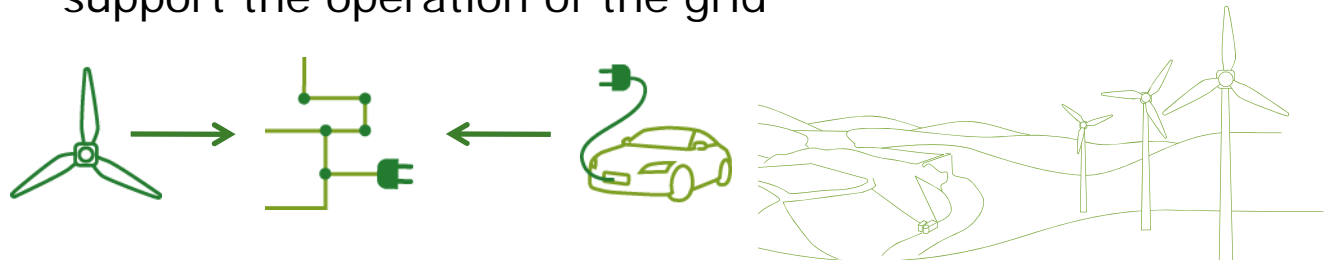
Development and implementation of a control unit for the virtual power plant (VPP) Harz



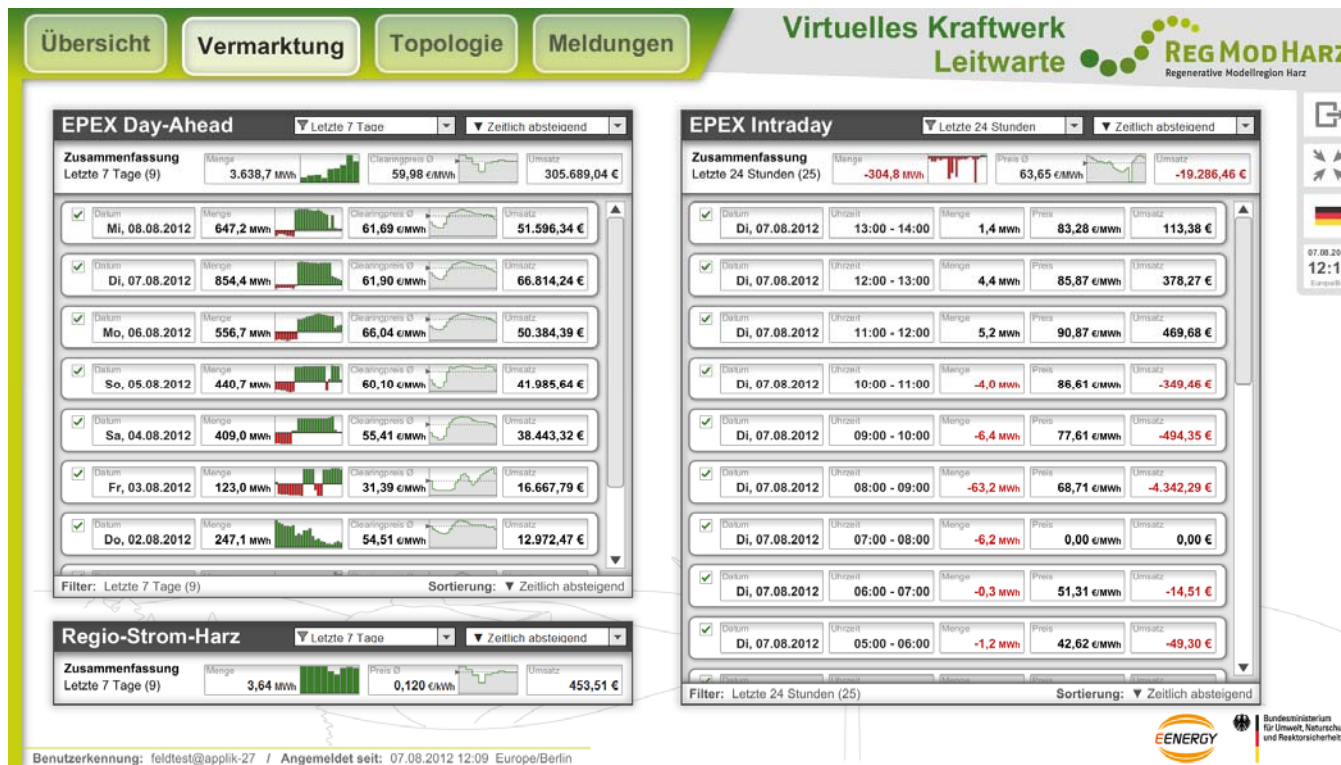
Marketing of the electricity produced by the VPP



Monitoring of the grid and ancillary services to support the operation of the grid

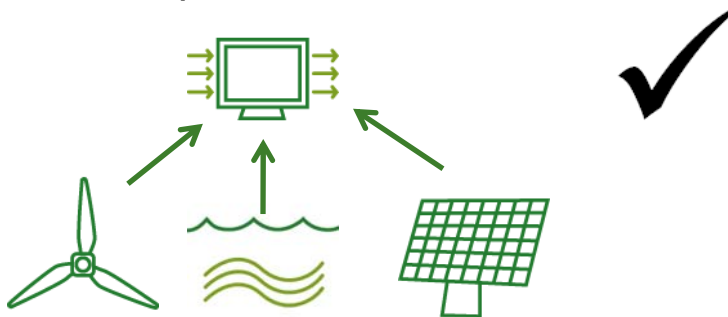


VPP - Marketing

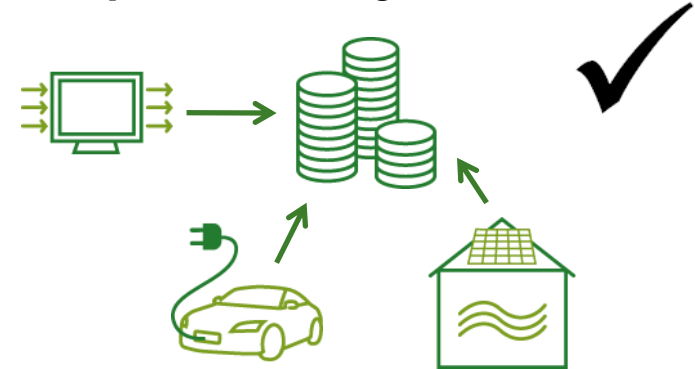


Key objectives

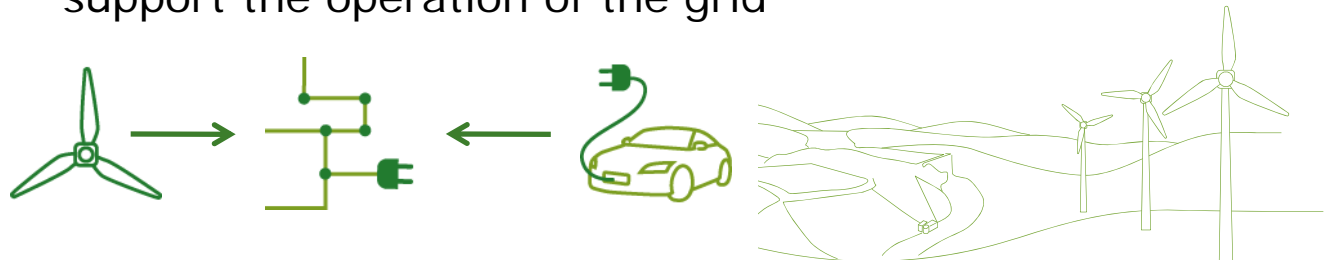
Development and implementation of a control unit for the virtual power plant (VPP) Harz



Marketing of the electricity produced by the VPP

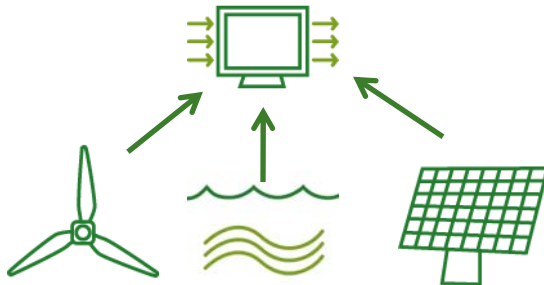


Monitoring of the grid and ancillary services to support the operation of the grid

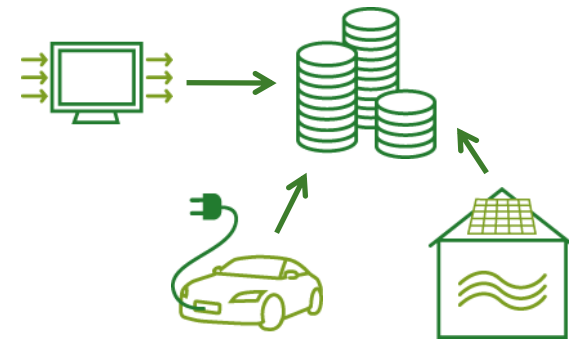


Key objectives

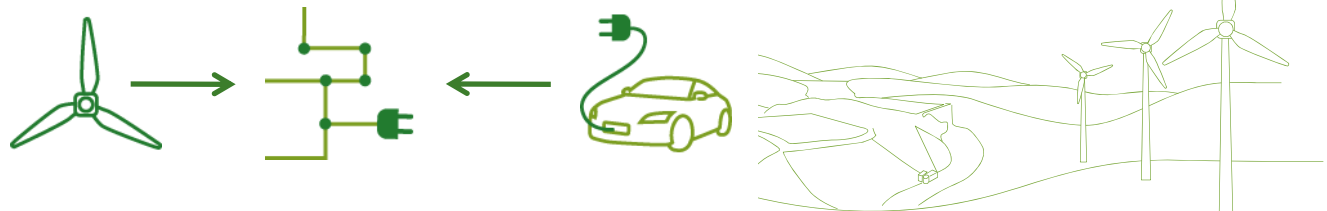
Development and implementation of a control unit for the virtual power plant (VPP) Harz



Marketing of the electricity produced by the VPP

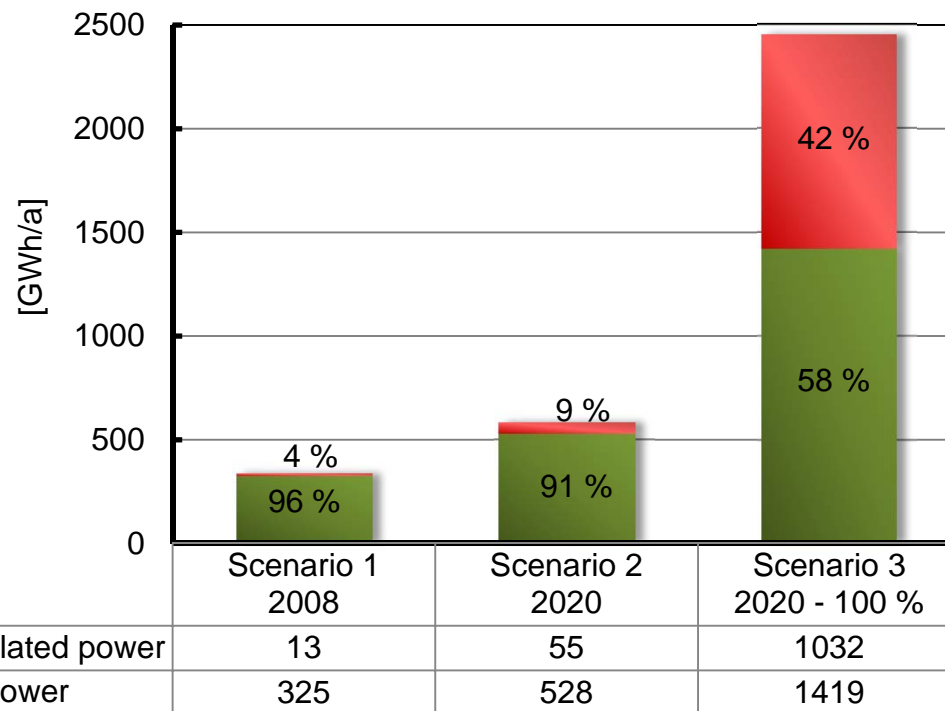


Monitoring of the grid and ancillary services to support the operation of the grid



Grid simulations

Theoretical annual power



3 Szenarios:

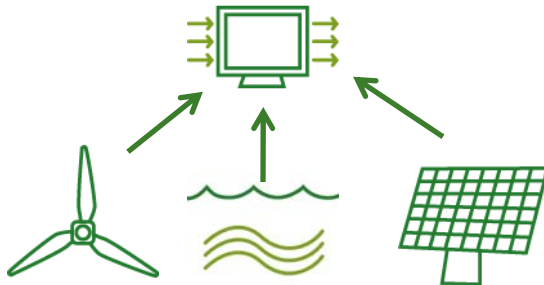
- 1) 2008
- 2) 2020
- 3) 2020 - 100%

- Increasing down-regulation of power expected
- Only 58% of 100% RE supply feasible
→ Grid extension would be necessary

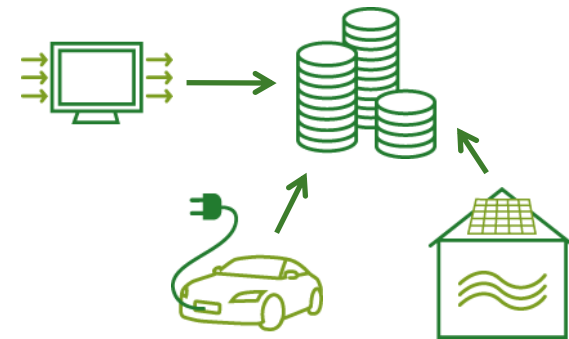


Key objectives

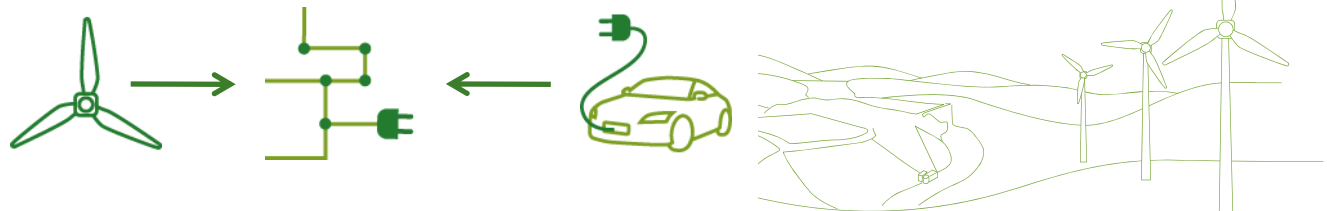
Development and implementation of a control unit for the virtual power plant (VPP) Harz



Marketing of the electricity produced by the VPP



Monitoring of the grid and ancillary services to support the operation of the grid



Further outcomes

Electricity grid
Extension RE

Business models
Dynamic tariffs, direct marketing

Storages
Electric vehicles

Field tests
VPP, BEMI, PMU

Scenarios
2008, 2020, 100% RE

Framework conditions

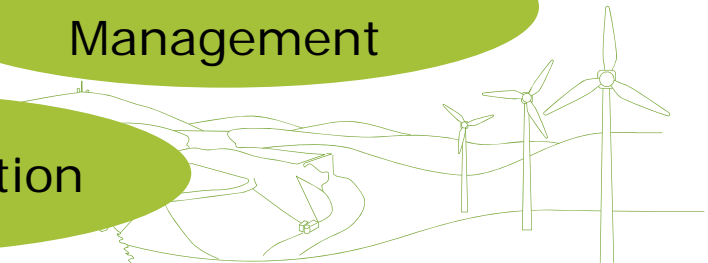
Transferability
Categorization of regions

Potentials

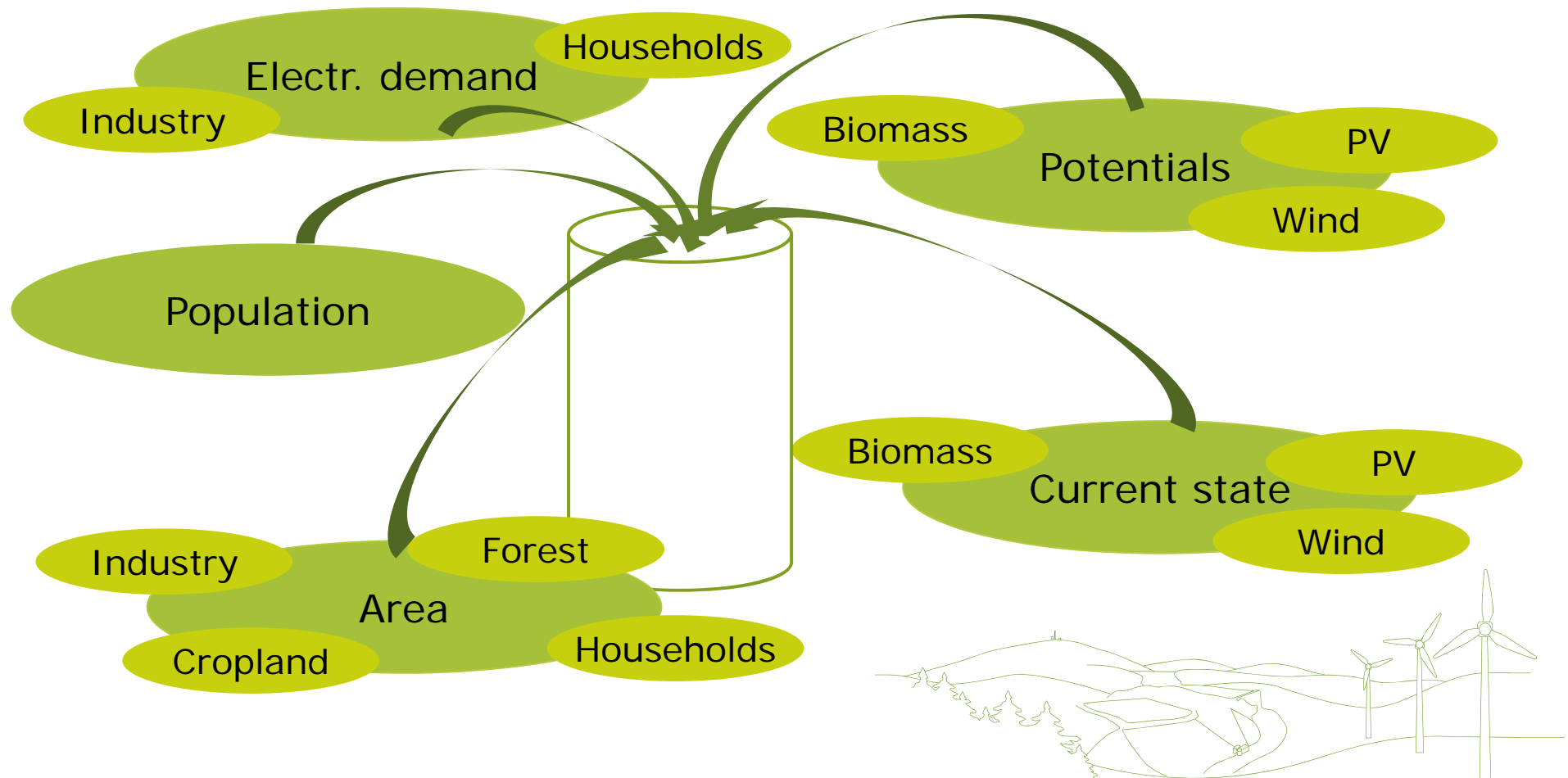
Demand Side Management

Forecasting systems
RE, demand, heat, prices

Civic participation



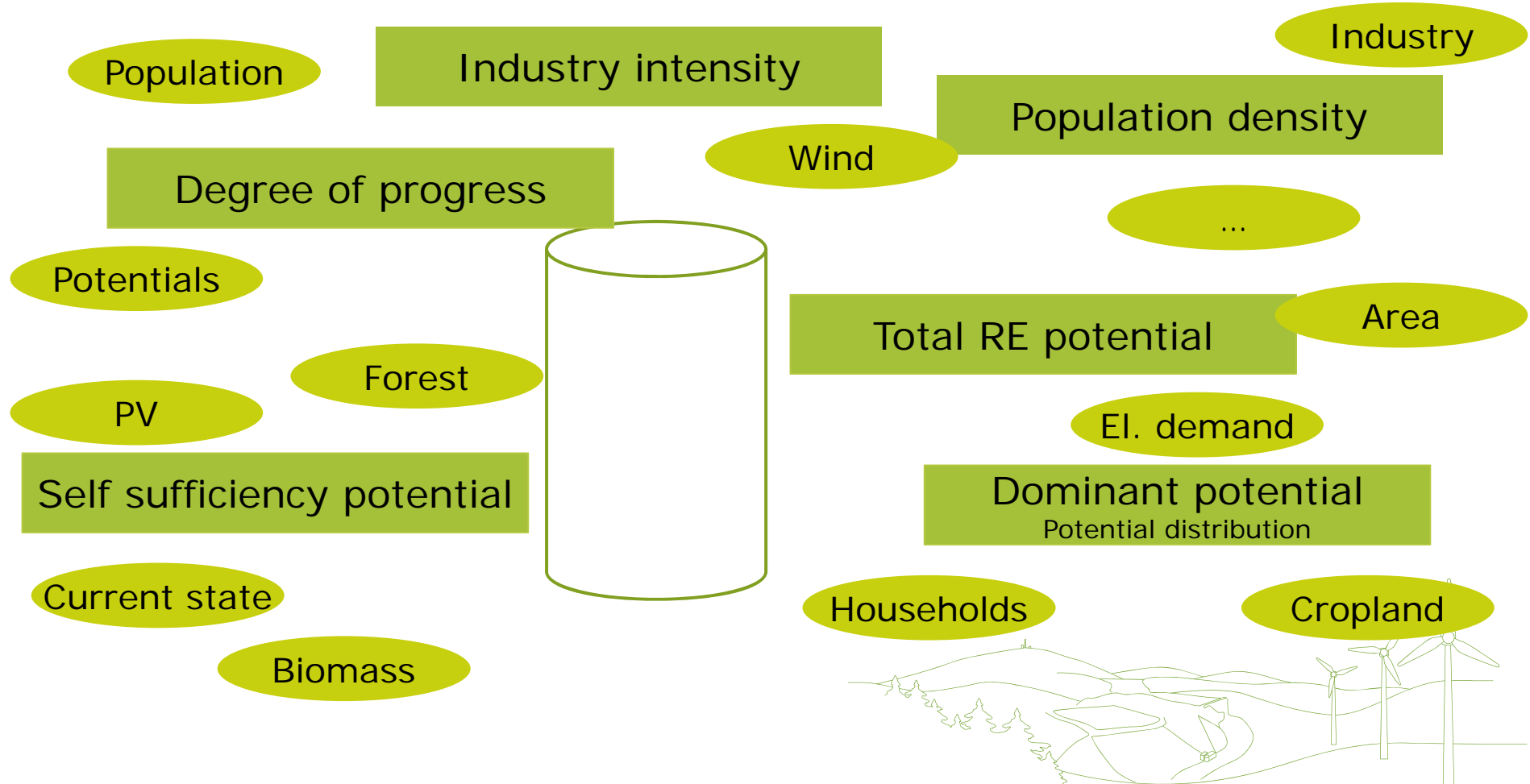
Characterization of a region



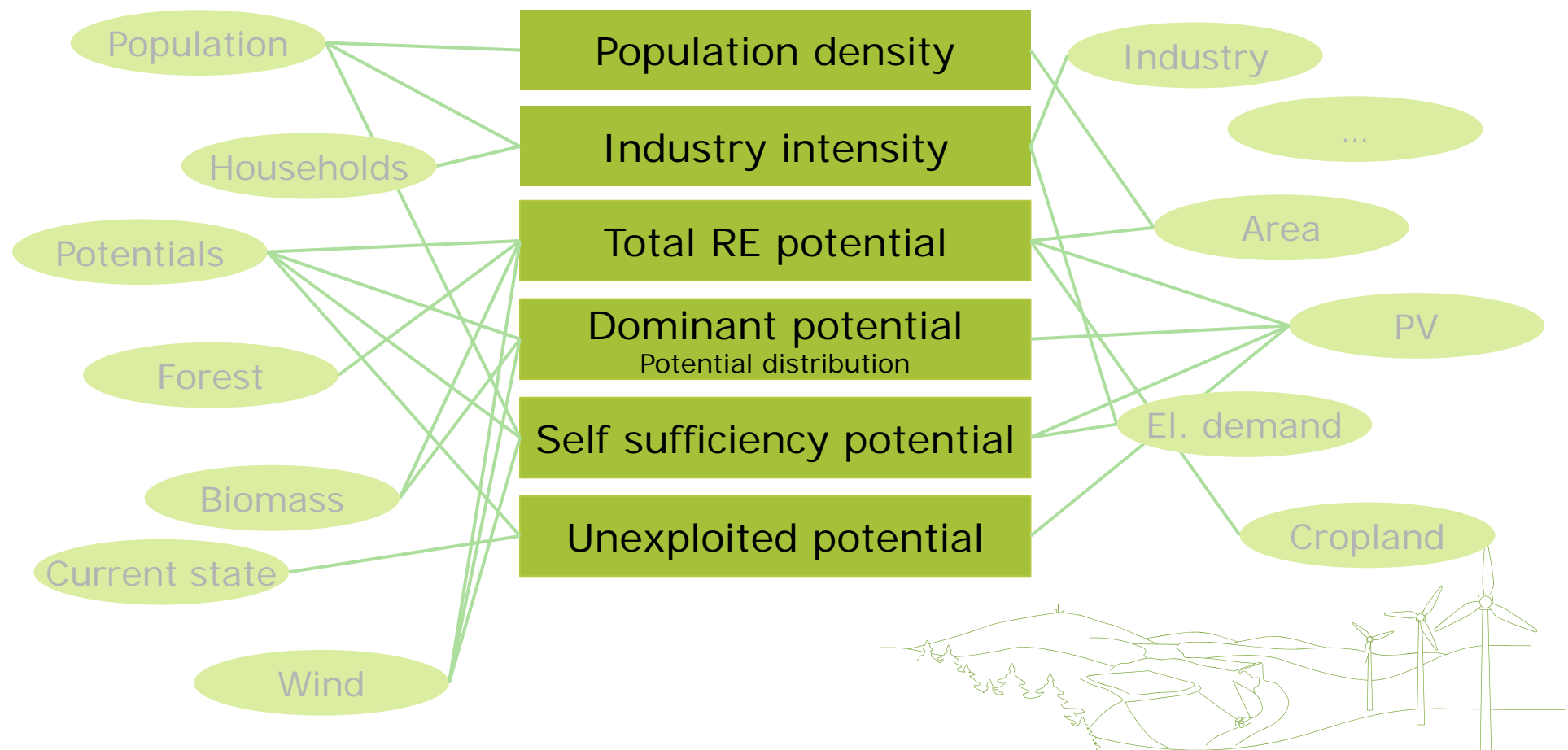
Characterization of a region



Characterization of a region



Indicators



Definition 'Landkreis'

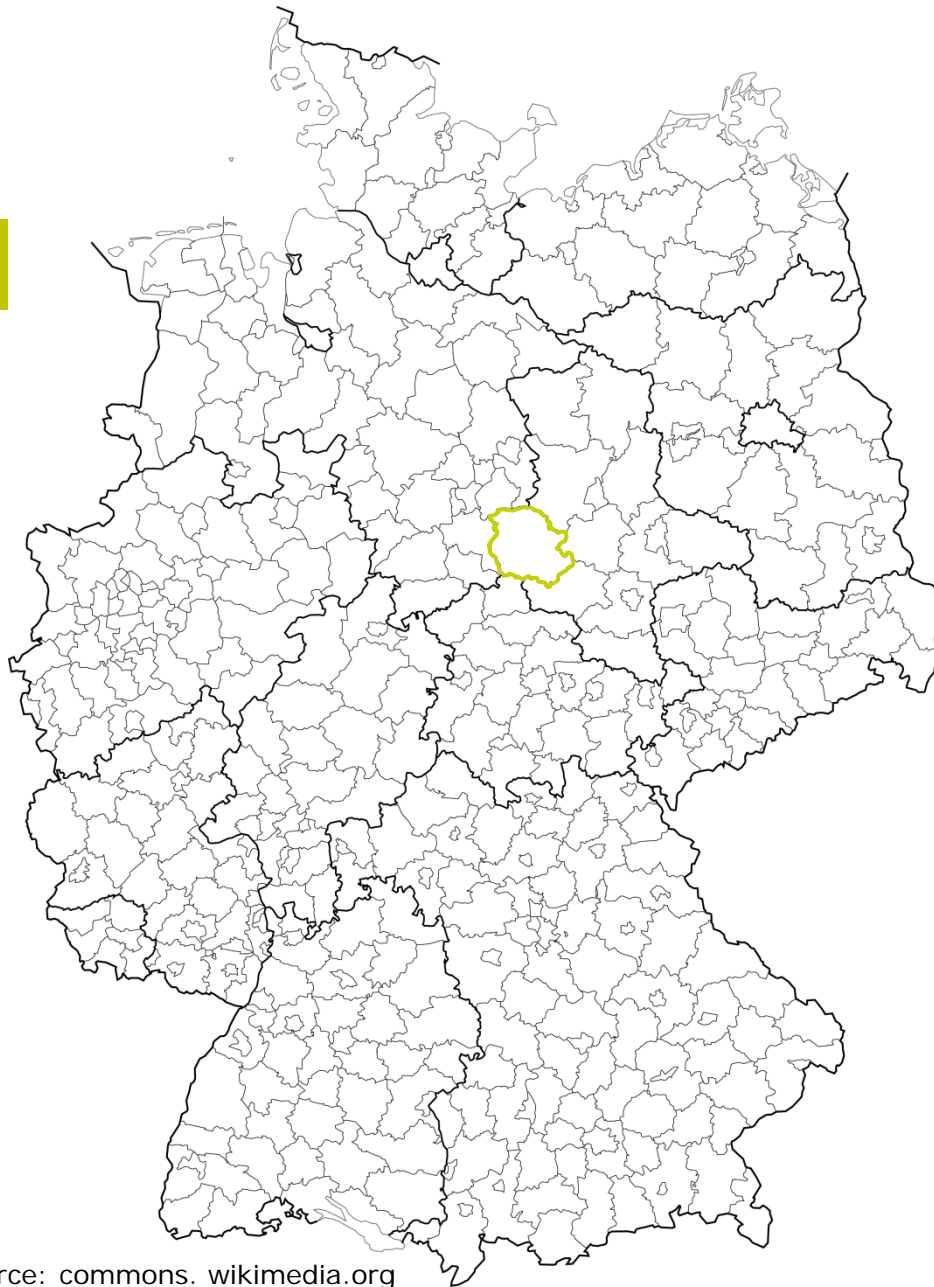
Germany



16 Bundesländer



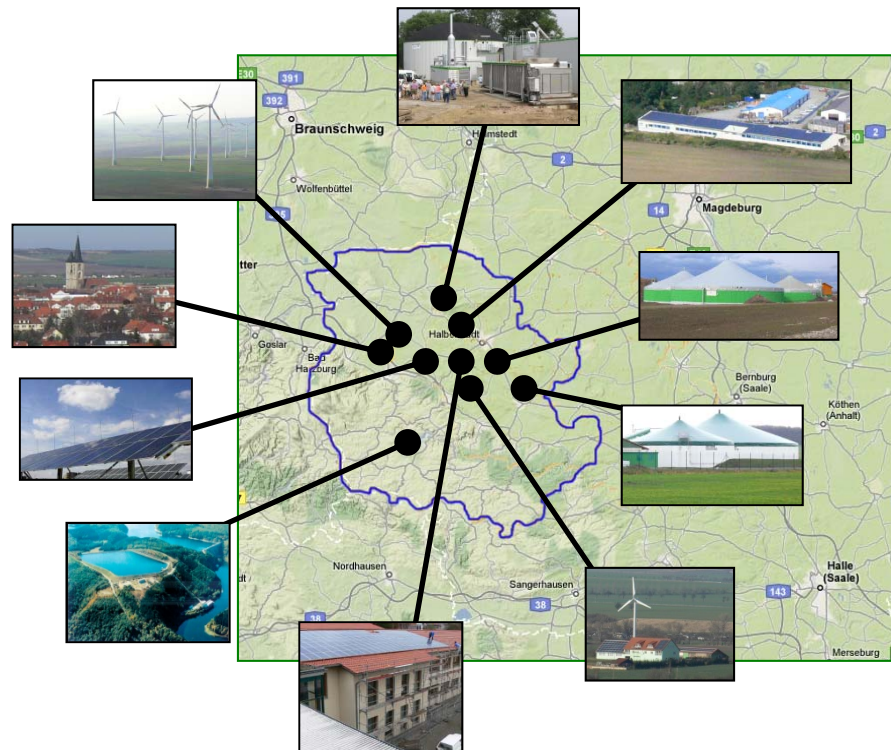
~400 Landkreise/kreisfreie Städte



Source: commons. wikipedia.org



Landkreis Harz



Bundesland: Sachsen-Anhalt

Inhabitants: 229176*

b2

Area: 2104 km²

RE/el. generation: 19%*

* Year 2012



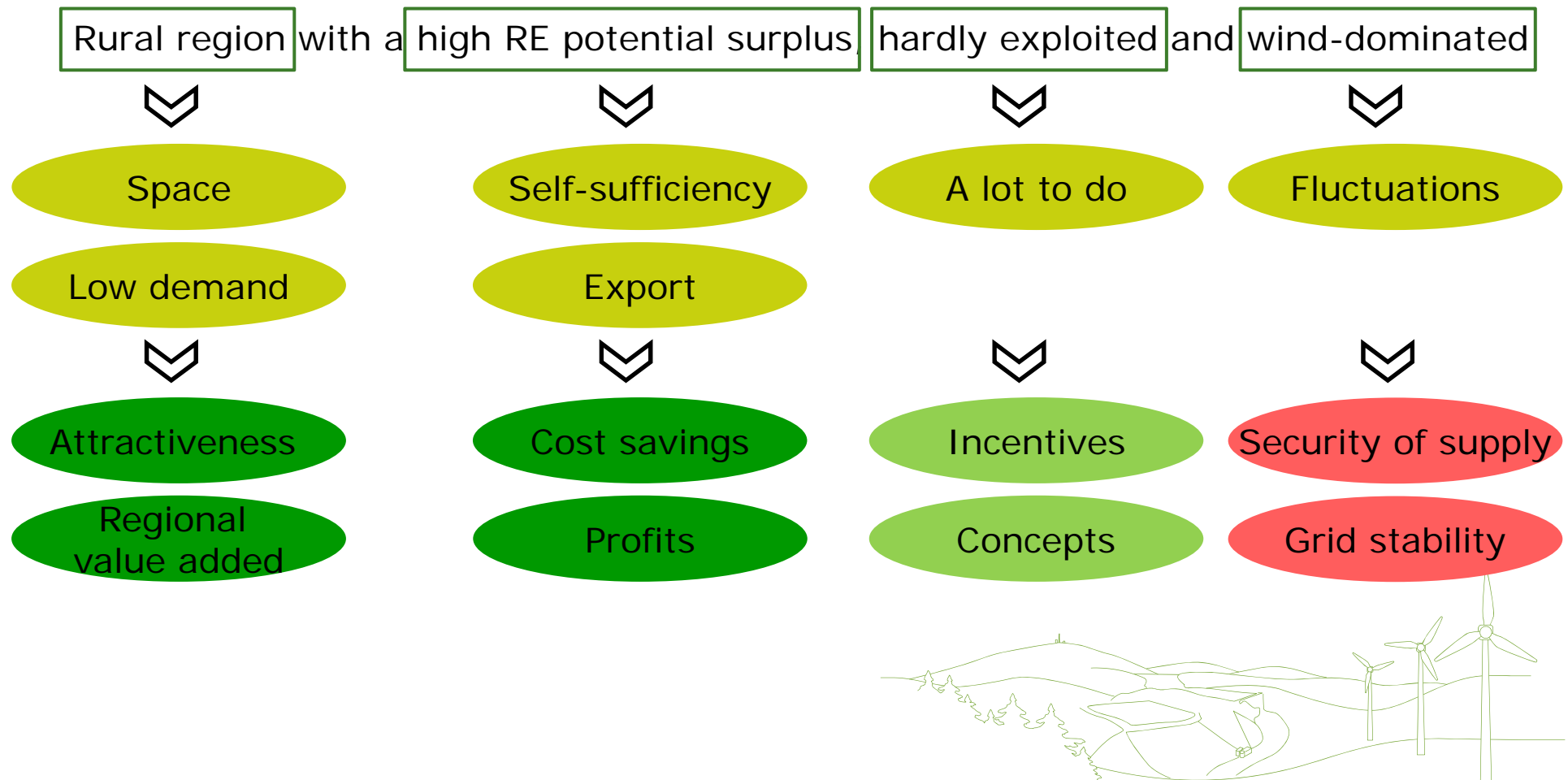
Indicators of LK Harz

Indicator	LK Harz	Interpretation	Rank *
Population density [capita/m ²]	109	Rural region	315
Industry intensity	1,7	Above average	51
Total RE potential [GWh/a]	7551	High average	117
Self sufficiency [GWh/a]	+5285	Potential surplus	134
Dominant potential	83% Wind	Wind-dominated	---
Unexploited potential	96%	Below average	250

* out of 345...427

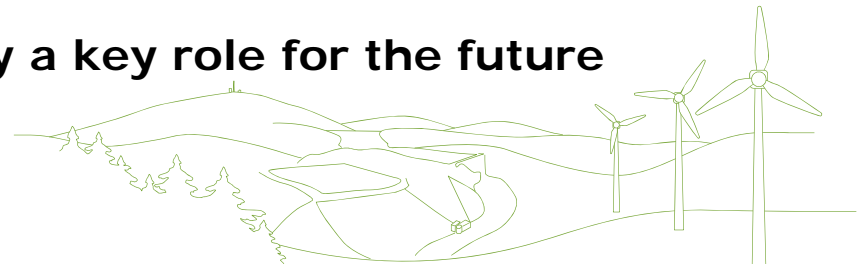


LK Harz - Classification



Conclusions

- Potentially, Germany can reach a 100% RE self-supply in the future
- The „Energiewende“ takes place in the regions
- Regional progress affects the whole system (grids, markets, storages, etc.)
- Interactions need to be assessed
- A regional energy self-supply and possible electricity exports offer plenty of advantages (e.g. regional value added)
- Potential deficit regions need to cooperate with potential surplus regions
- **Rural areas, such as LK Harz, play a key role for the future energy supply!**
- **Rural regions, take that chance!**



Thank you!

For further information check

www.regmodharz.de

Contact:

Dipl.-Ing.

Britta Zimmermann

Fraunhofer IWES Kassel

Phone: +49-561-7294-203

Email: britta.zimmermann@iwes.fraunhofer.de

