



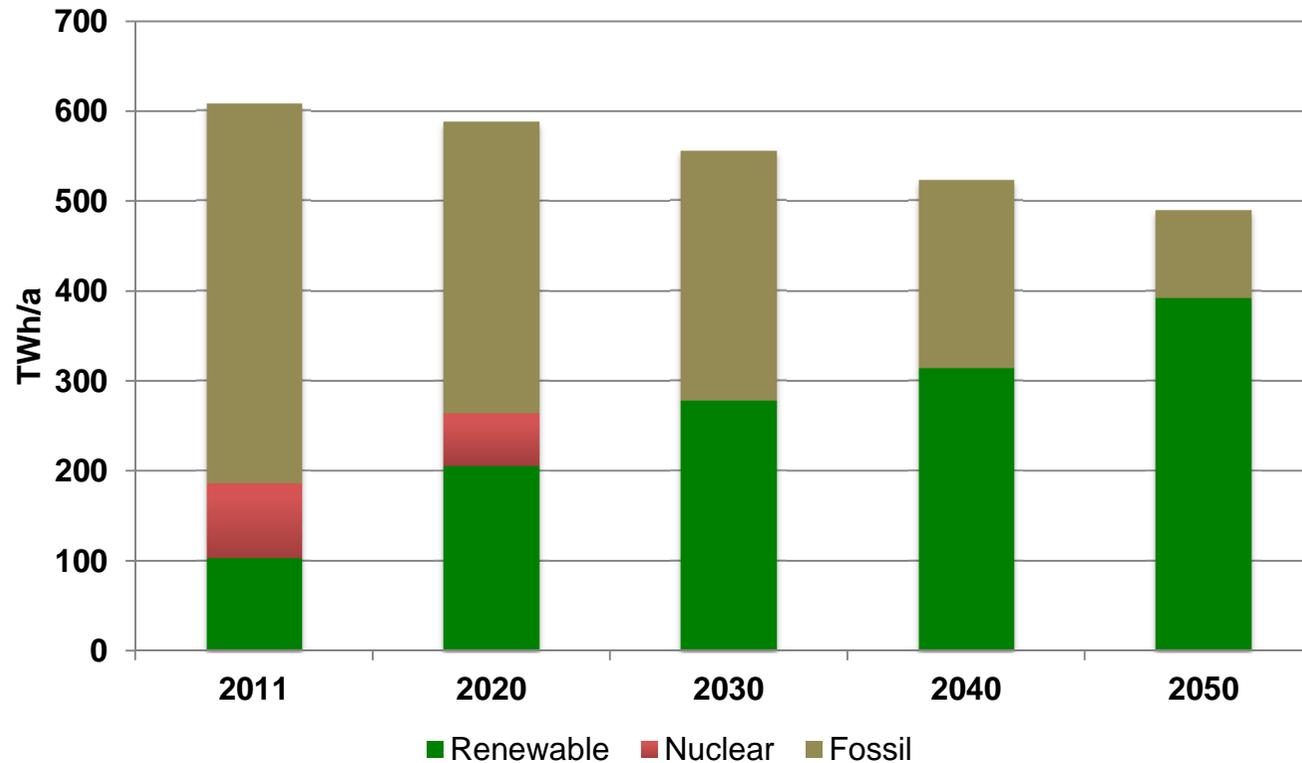
Industrial / Commercial Demand Response as a Business Model **A practical view**

EnInnov2012 at Technical University Graz, 16 Feb 2012

Dirk Idstein, Head of Business Development, Entelios AG
dirk.idstein@entelios.com | www.entelios.com

Germany's "energy turnaround": betting on energy efficiency and renewables while phasing out nuclear power.

Power generation in Germany by year, by energy source

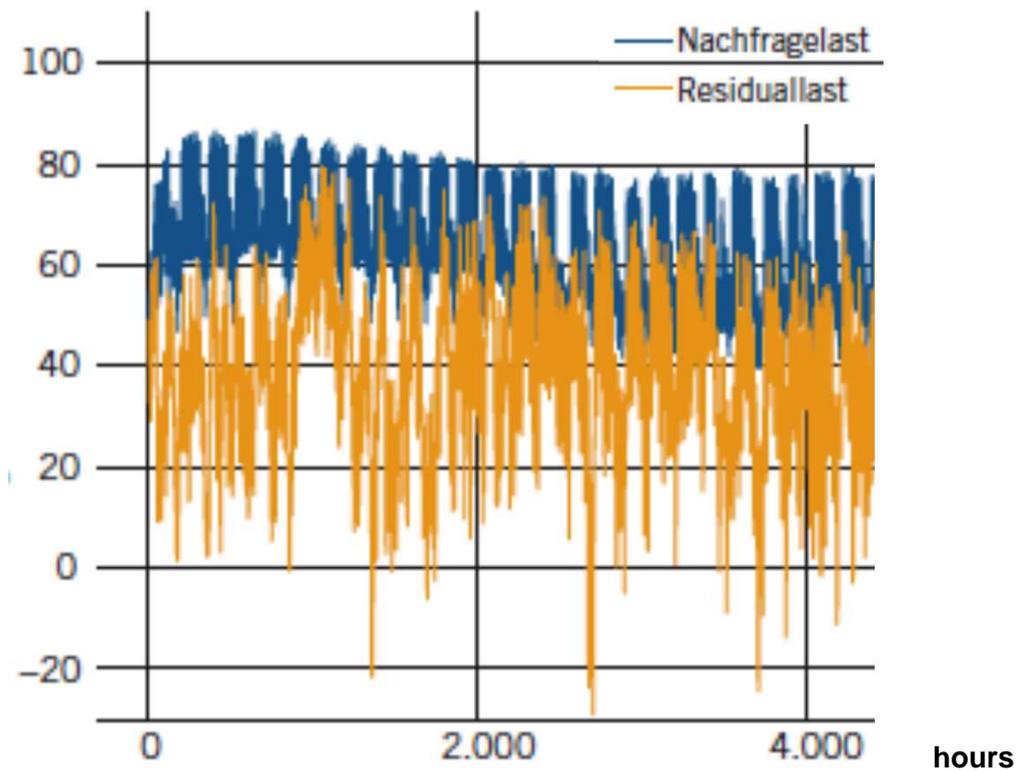


Source: Entelios analysis, Energiekonzept der Bundesregierung, BMU, BMWi

Renewable energy sources are making it more difficult for conventional power plants to cover the residual load...

Residual Load = Demand not covered by renewables

Demand and residual load at 40% RE (in GW)



Source: IER Universität Stuttgart

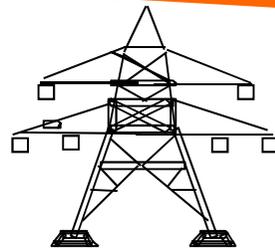
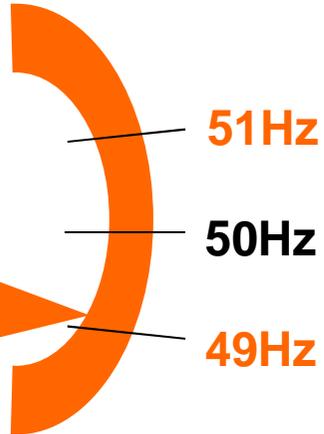
... because every minute, power generation and consumption must be perfectly balanced.

The balancing act

Generation



Demand



Grid

- Practically no buffer / storage
- Reserve / balancing power is expensive

German “energy turnaround” rests on 5 pillars

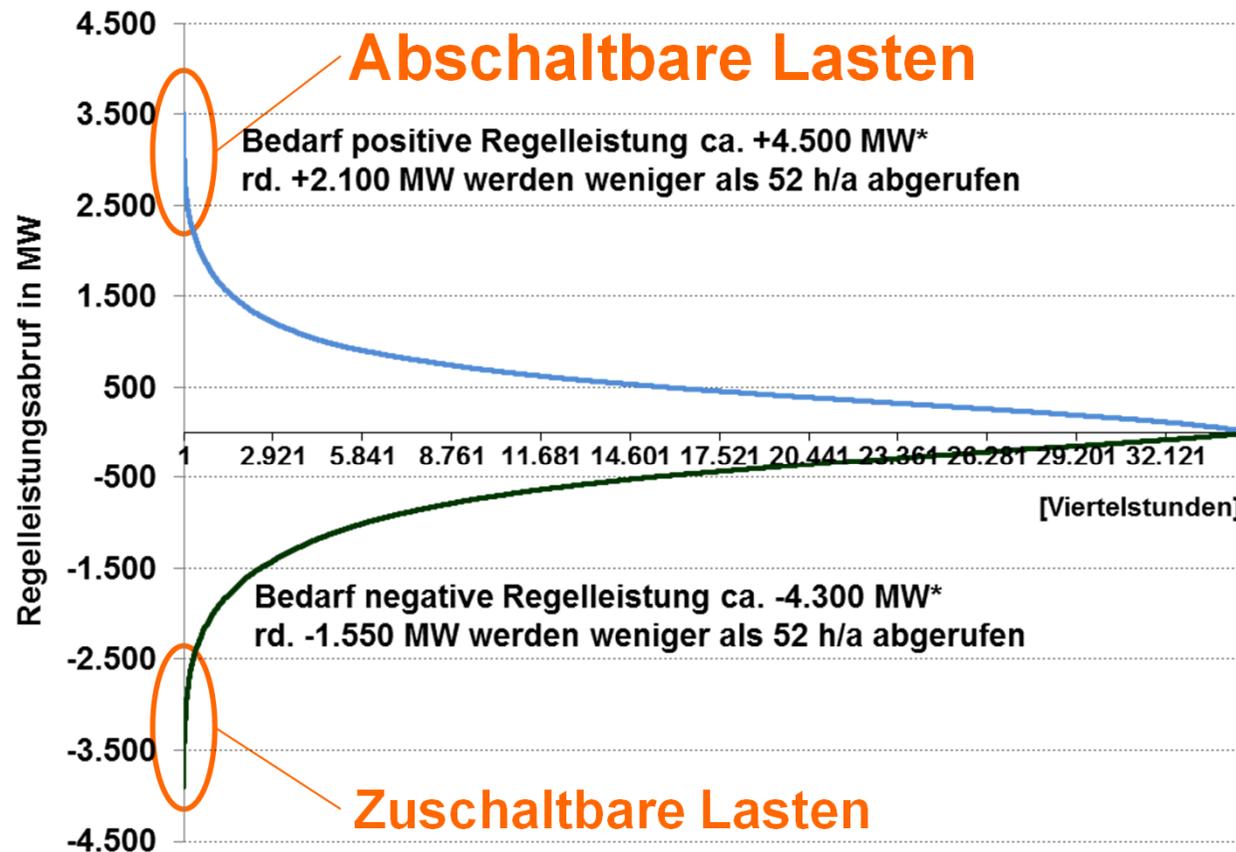
Converging on a consensus in government and industry

	Costs	Time	Green
Energy Efficiency	€€		
Flexible Generation	€€€		
Build out Transmission and Distribution Grids	€€		
Energy Storage	€€€		
Demand Side Management / Demand Response*	€		

* A process to manage customer consumption (demand) of electricity in response to supply conditions.

A low call frequency for reserve power is an ideal precondition for industry & commerce to engage in intelligent Demand Response.

SRL/MRL Calls (2010)

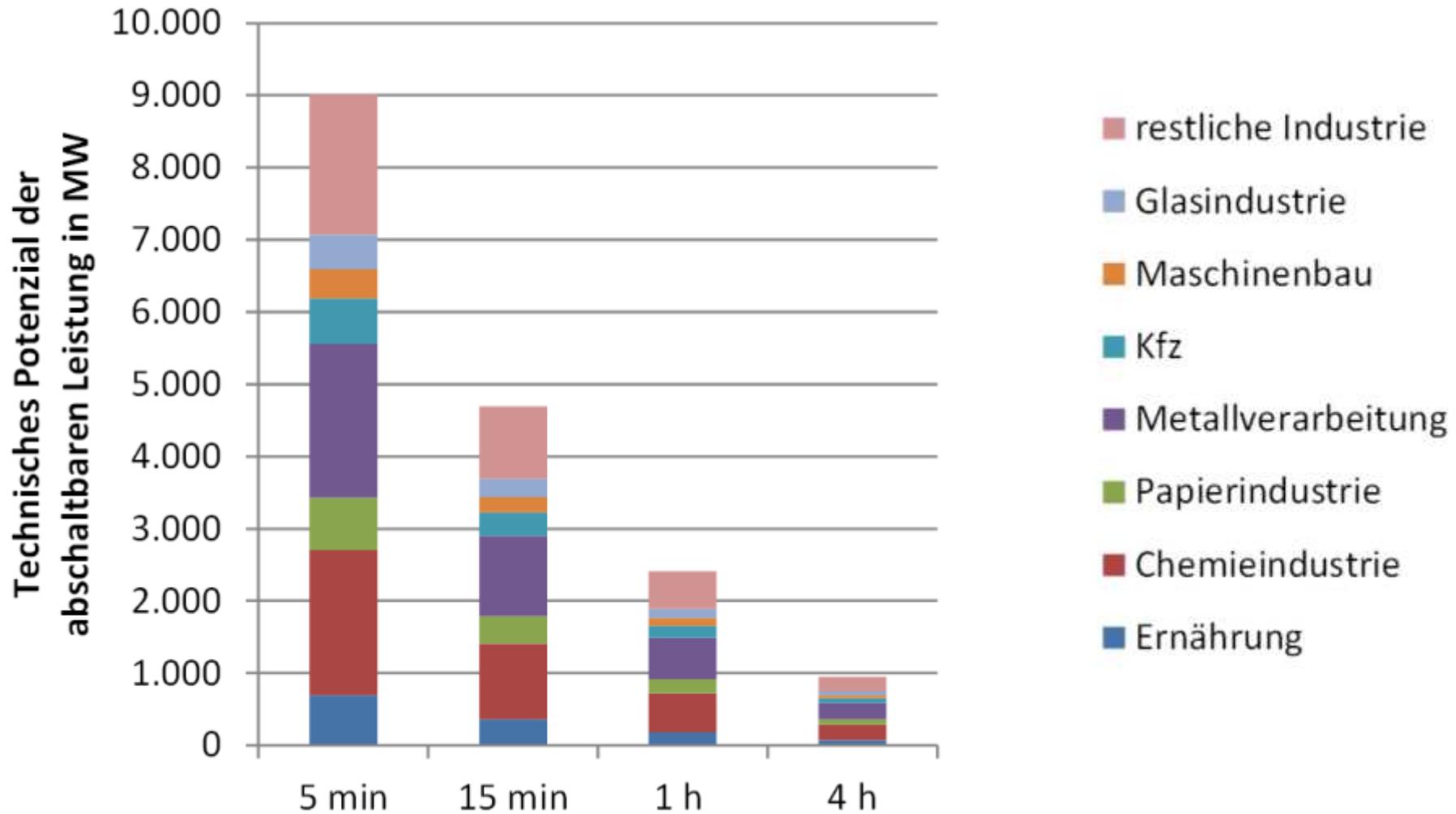


* Dezember 2010

Quelle: Neubarth, J.: Integration erneuerbarer Energien in das Stromversorgungssystem;
In: Energie für Deutschland 2011, Weltenergieinstitut-Deutschland, Berlin (2011)

Demand side potential from industry and commerce in Germany estimated around 9 GW.

Flexibility Potential



Source: FfE, München

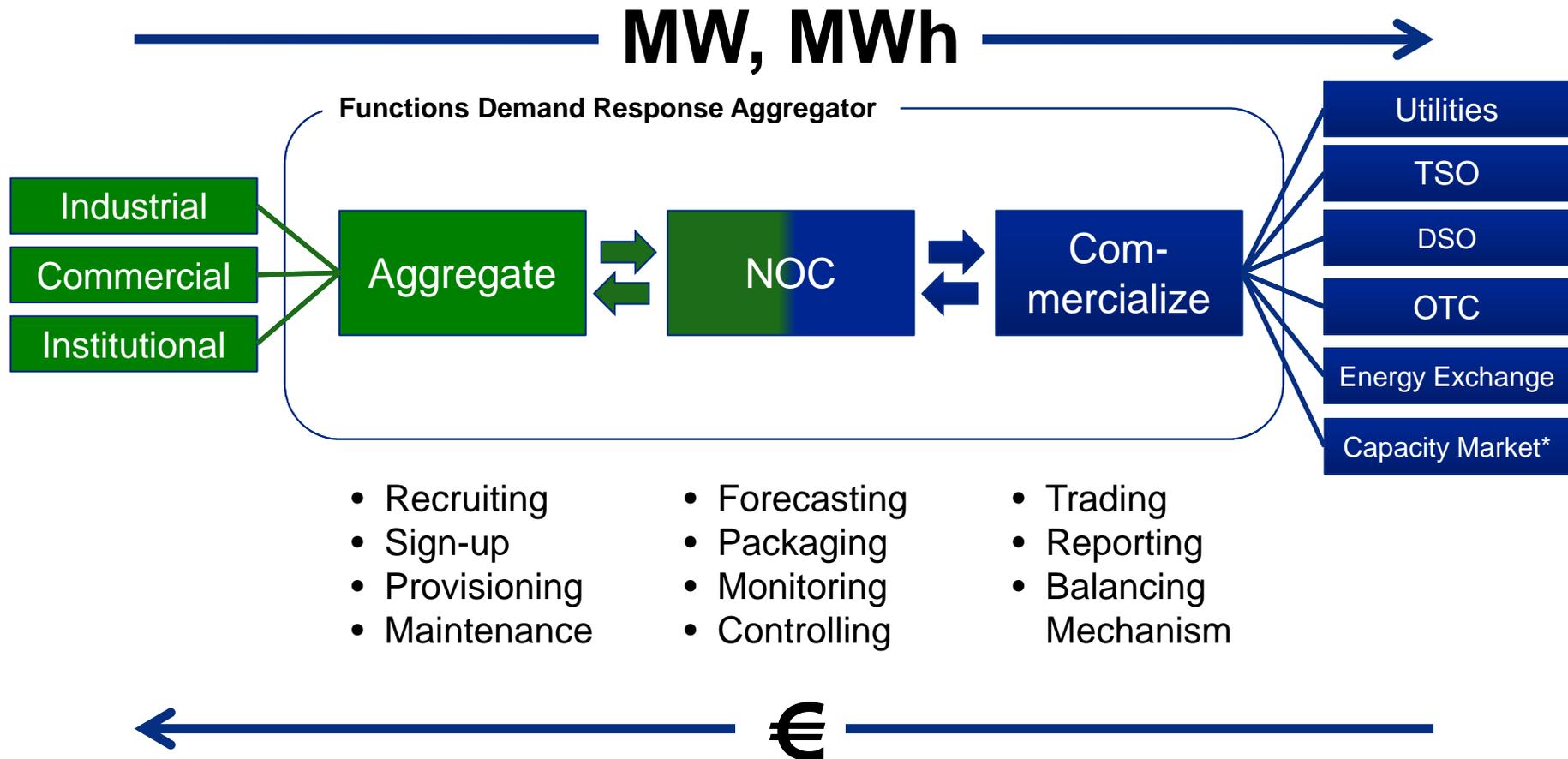
Entelios is Germany's first Demand Response Aggregator and has taken a market leading role in Europe.

Facts

- **Founded 2010**
- **Services:**
 - Demand Response **Aggregation**
 - Demand Response **as-a-Service** to utilities and TSOs
 - Intelligent Energy **Efficiency Services**
- **Focus:**
Industrial, Commercial & Institutional load control & management
- **Offices:**
Germany – Berlin and Munich.
Development team in India.



Entelios is the smart connection between the supply side and the demand side of the energy equation.



Notes:
 NOC: Network Operations Center
 TSO: Transmission System Operator

DSO: Distribution System Operator
 OTC: Over the counter
 * In discussion for specific European markets, e.g. France.

Compelling benefits for participating in a Demand Response program.

Benefits for participating customers ...

- **Attractive financial benefits** from commercialization of load adjustments
- **Positive image:** innovation & active contribution to grid stability and efficiency
- **Transparency on own energy consumption:** first step towards possible reduction and decision for further value-adding services

.. without any additional costs or risks.

- No investments
- No discomfort
- Always in control
- Simple to use
- Ability to add later further potential of switchable load (production and /or auxiliary processes)

Ready to participate within 4 weeks from first meeting

Entelios as of today is capable switching quite a number of loads including distributed generation.



Ventilation



Cooling



Fork Trucks



Pressure



Air Conditioning



Pumps

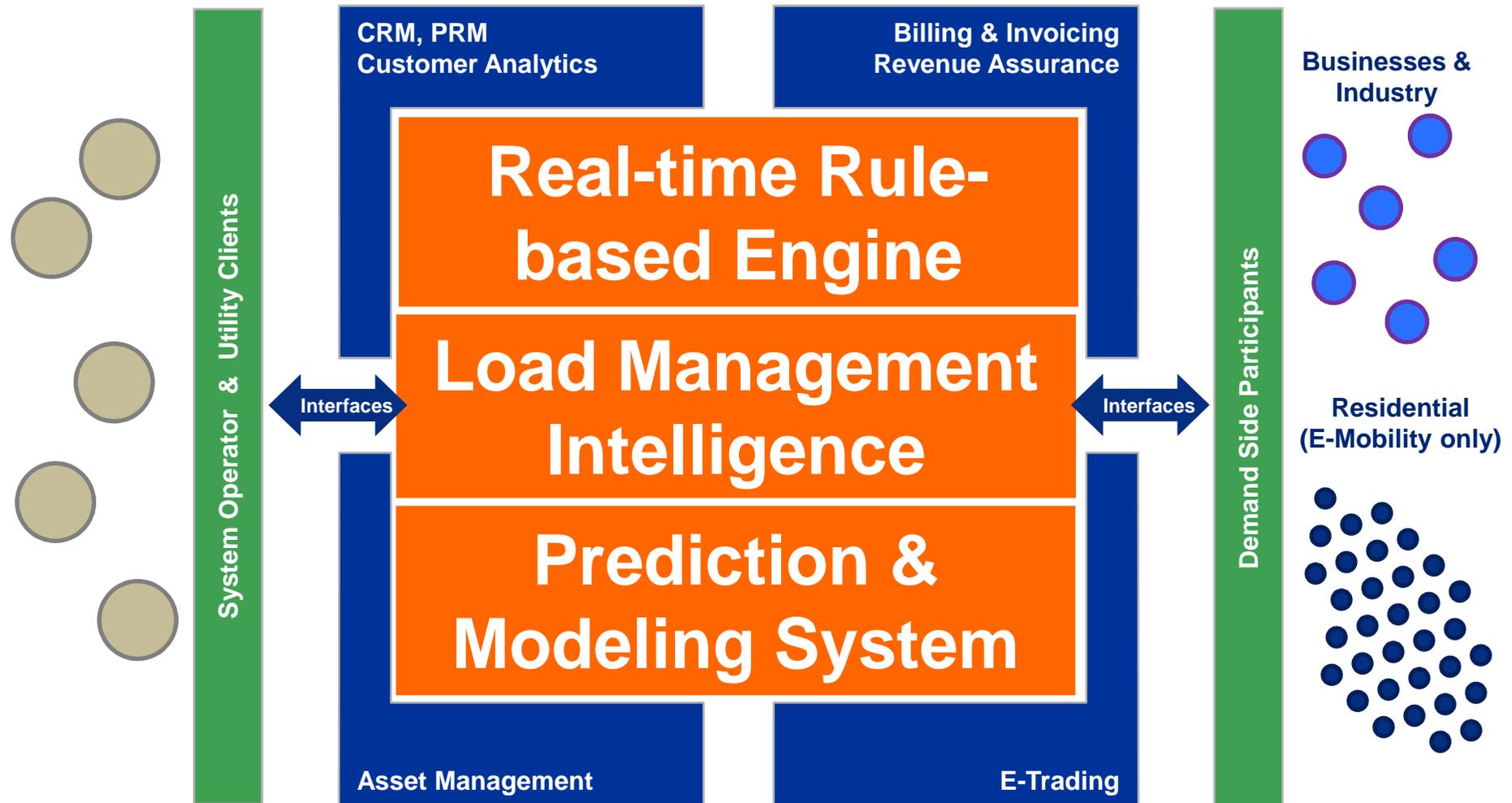


Lighting



Heating

The Entelios NOC combines in-depth industry know-how with scalable processes and state of the art ICT.



Important measures to overcome current slow market adoption of Demand Response.



Demand Response is:

- **faster**
- **greener**
- **and more capital efficient**

Demand Response is a critical resource!

Thank You!



Dirk Idstein
Business Development
Entelios AG

Mobile +49 171 2240931
eMail dirk.idstein@entelios.com

www.entelios.com