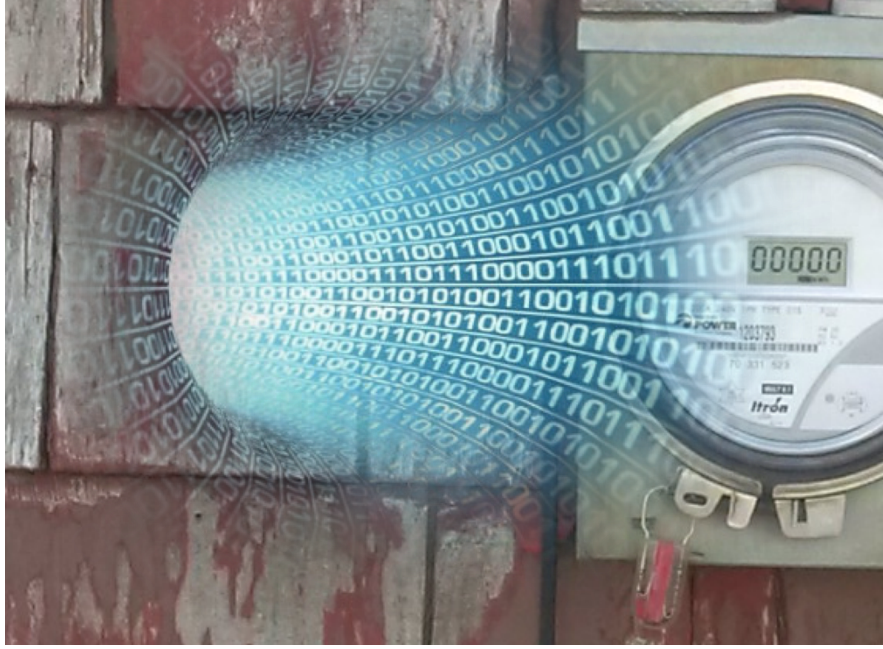
energy efficiency



New Task
Big Data for Energy Efficiency

Energy Metering based Data Analytics for Energy Efficiency

Matthias Stifter, AIT

IEA ExCo Meeting Brussels

October 14, 2015 (Version 1)

Big Data for Energy Efficiency

Use of **data analytic methods** and approaches to identify **energy efficiency potentials** in consumption and other areas of energy usage.

nitatives

Big Data Europe – Empowering Communities with Data Technology

https://www.big-data-europe.eu/

SEED Standard Energy Efficiency Data

(US Department of Energy / Lawrency Berkeley National Labs, NREL)

http://energy.gov/eere/buildings/standard-energy-efficiency-data-platform

http://seedinfo.lbl.gov/

IEEE Power & Energy Society –

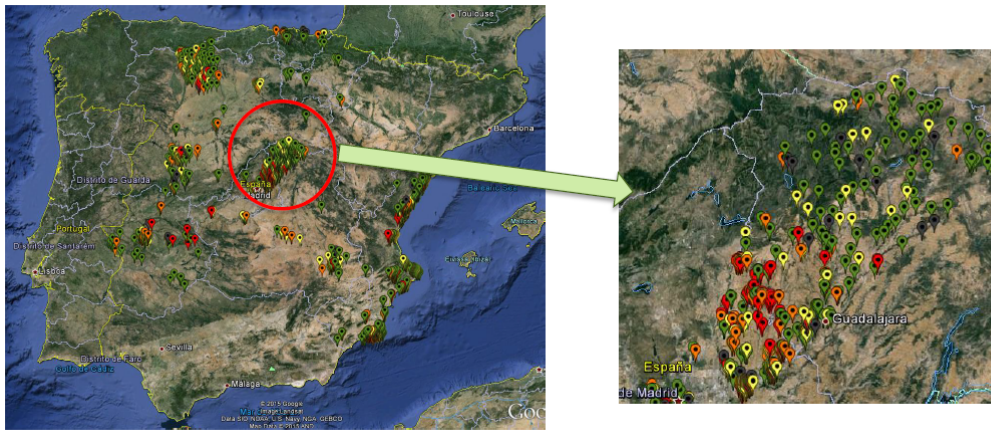
Subcommittee on Big Data & Analytics for Power Systems

http://www.ece.tamu.edu/~lxie/BigDataAndAnalyticsForPowerSystems/activities.html

Use Cases

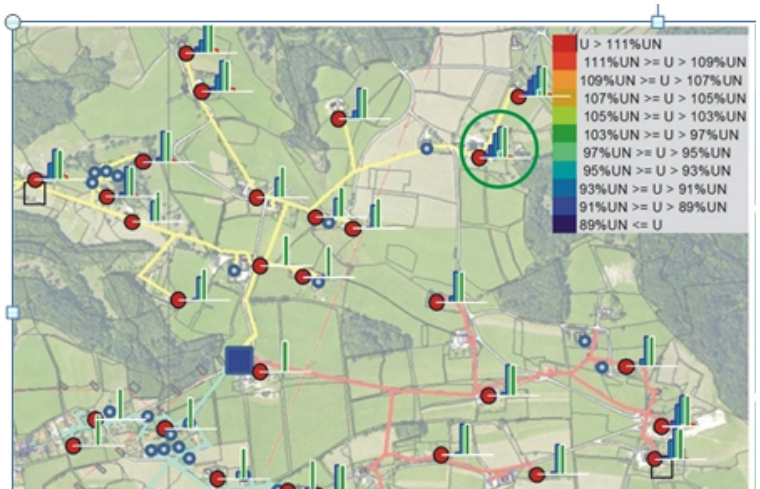
Power Systems

- Power System Network data from sensors and meters (e.g. smart meters) to identify losses and other inefficient network conditions.



- High losses (“non-technical”)

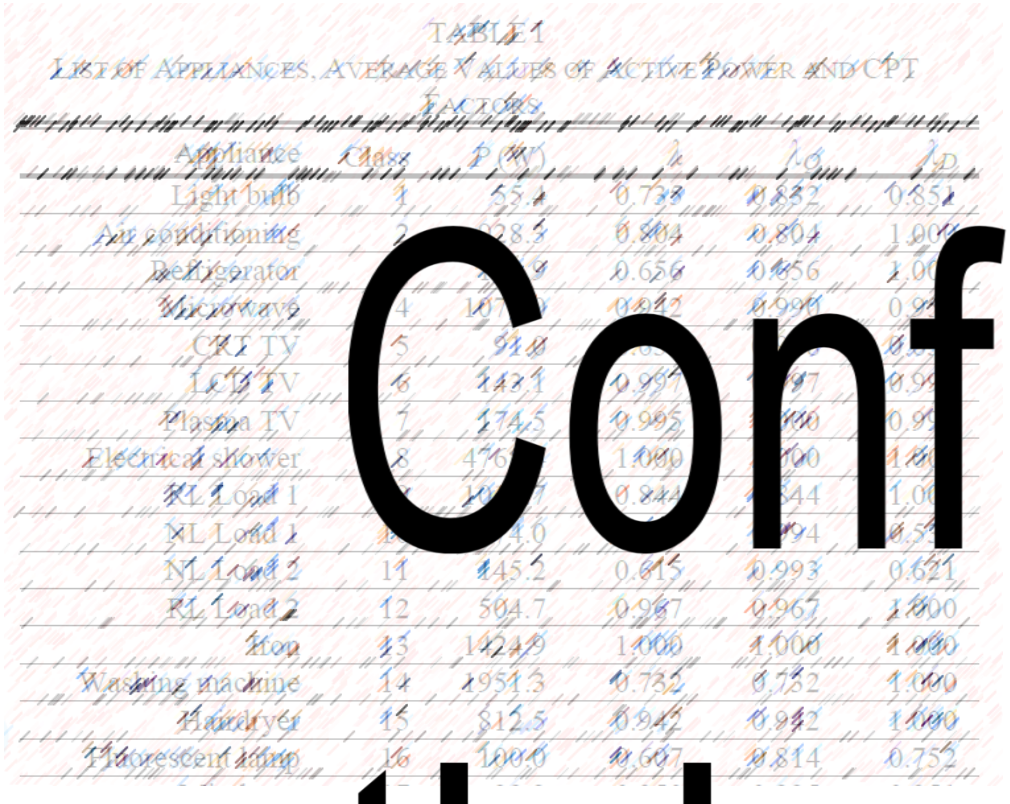
- Renewables impact

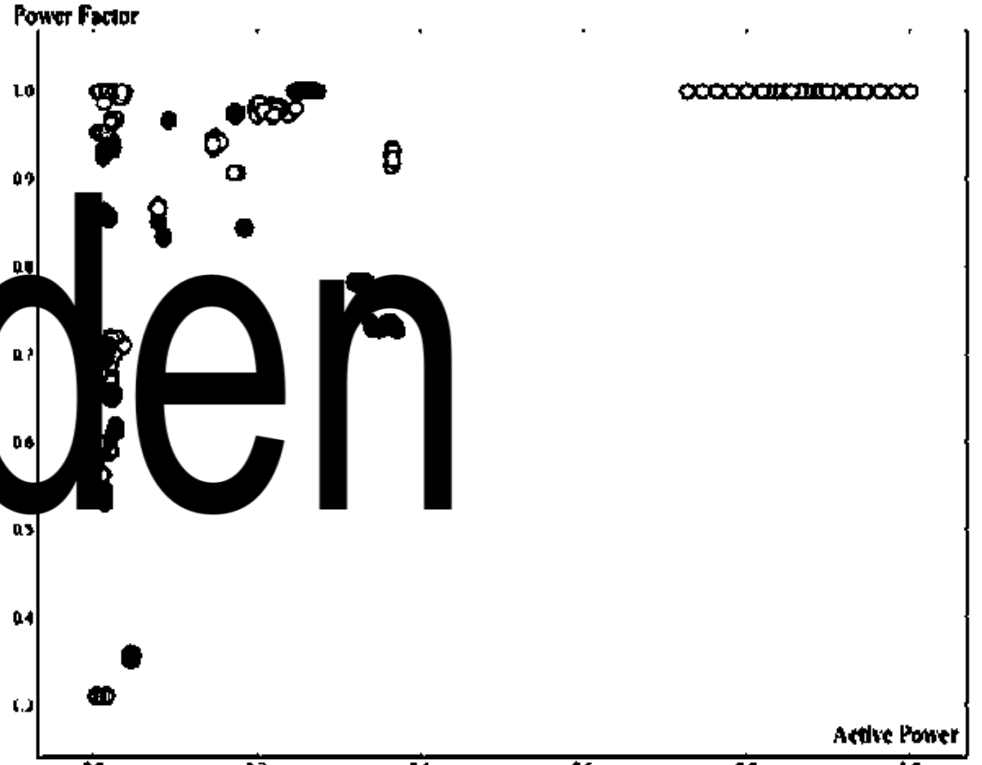


Use Cases

Consumer devices

- Consumption of electronic devices: use meter data and data discovery to identify the energy consumption of gadgets.



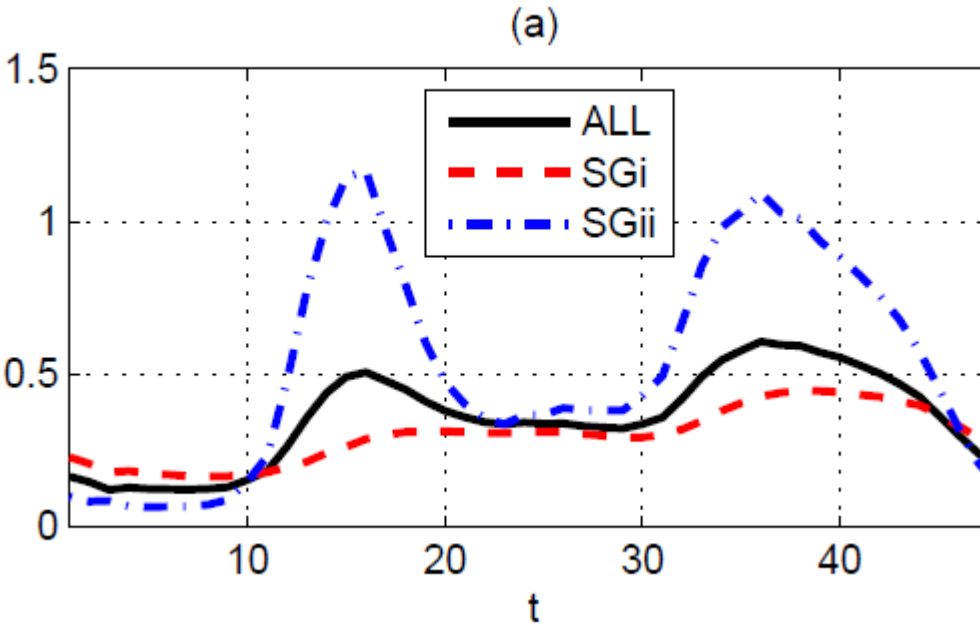


Use Cases

Consumer behavior and segmentation

- Identification of energy intensive user behavior (segmentation, etc.), using demographic data for more detailed information.

cio-demographic riables	Description	Number of categories	Example(s)
P group	Grid Supply Point Group in UK, which are regional electricity distribution networks	Total 14 3 in dataset*	Southern; South Wales; North Scotland
e	Age of head of household	6	Age 26-35
cision Maker Type	Type of person deciding household matters	13	Young Couple
mily Lifestage	The combined stage of life and family status including children	14	Young family with children
usehold Composition	People living together and their relationships to one another	13	Male homesharers
usehold Income Band	Total household income per year	10	£30,000 to £39,999
ins gas flag	Whether a household is connected to the Main gas network; if Yes, it's assumed that the household uses gas	2	connected to gas; not connected to gas
saic Public Sector Group	Classification on citizen's location, demographics, lifestyles and behaviors	15	Young, well-educated city dwellers; Wealthy people living in the most sought after neighborhoods
saic Public Sector Type	Subcategories of Mosaic Public Sector Group	69	Young professional families settling in better quality older terraces
mber of Bedrooms	Number of Bedrooms of the property	5	5 + bedrooms
perty Age	When the property was built	6	1871-1919
perty Type 2011	Type of property in 2011	5	Purpose built flats; Farm
perty Value Fine	Estimated property value	25	£500,001 to £600,000
nure 2011	Property ownership in 2011	3	Privately rented



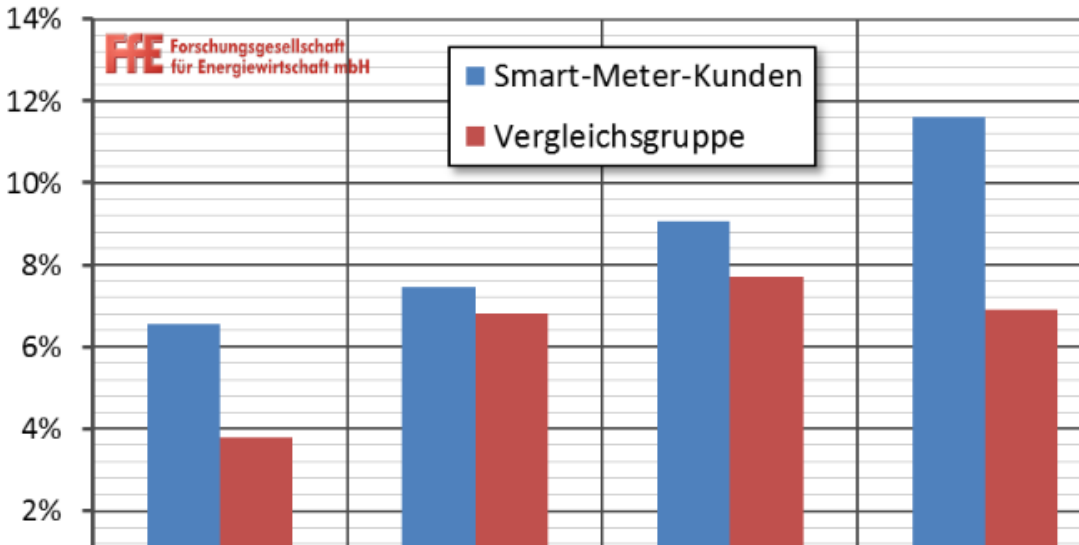
Use Case: Enduring long term energy saving potential by smart meter

Smart meter roll-out does **NOT** automatically result in energy savings

Long term energy saving potential is only possible by accompanying energy consulting in households

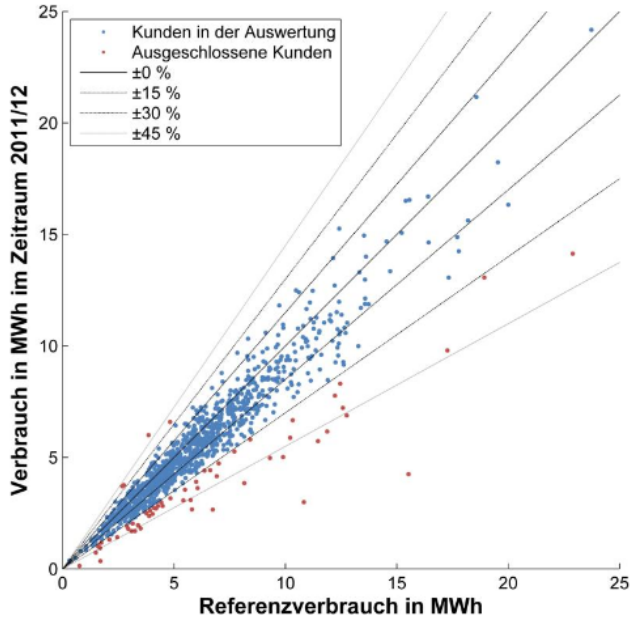
- Demand visualisation (second resolution)
- Webplatform
- Monthly bill
- Monthly energy report
- Individual personal energy consultancy

Jahr	S1	S2	S3
Darstellung des sekundengenauen Verbrauchs für den Kunden	X	X	X
Webplattform zur Überwachung des Verbrauchs	X	X	X
Monatliche Stromrechnung	X	X	X
Monatlicher Energiebericht		X	X
Individuelle persönliche Energieberatung			X



Use Case: Enduring long term energy saving potential by smart meter

Evaluation method (exclude extremes)

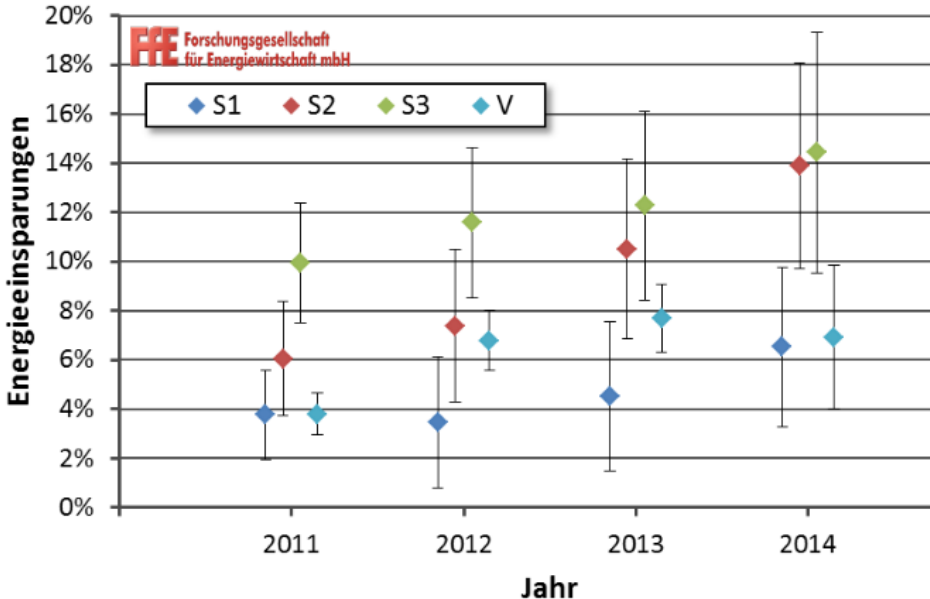


Increasing savings with S2+S3

→ sustainable effect of energy consulting

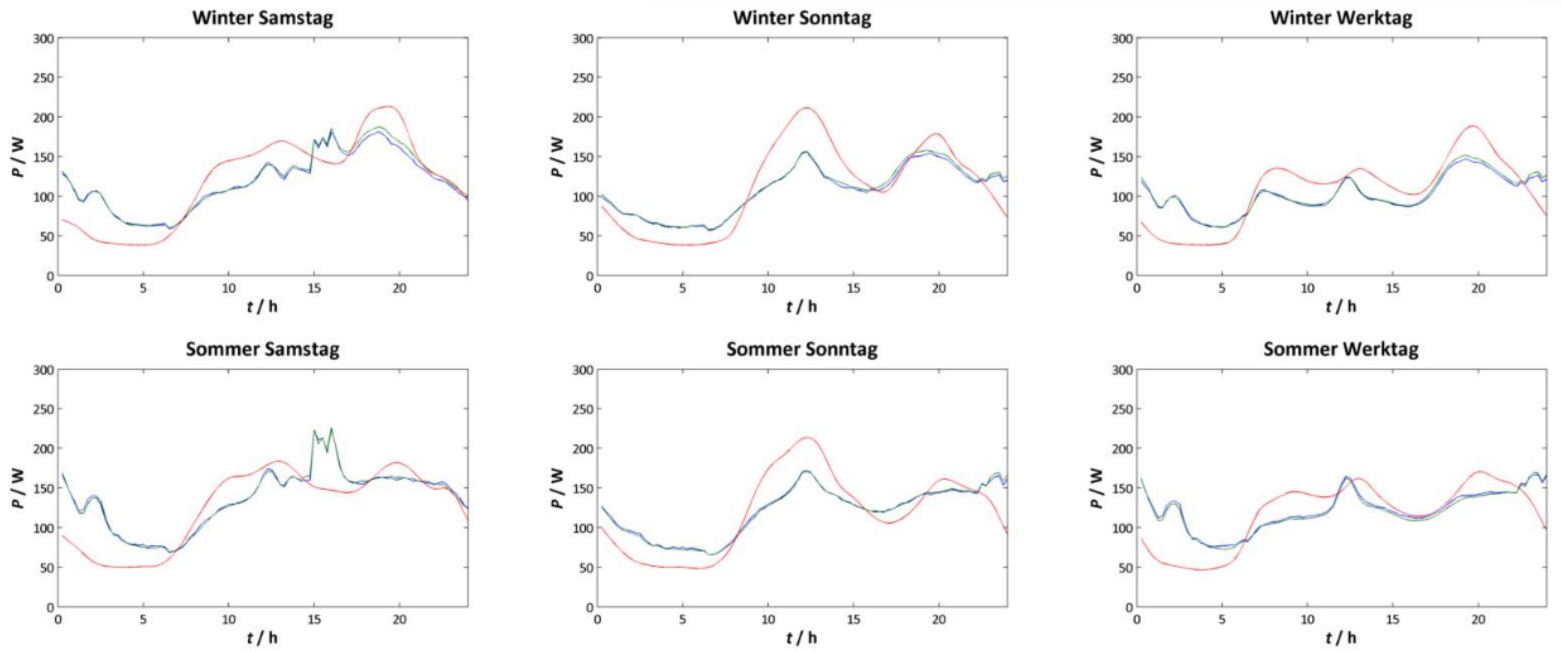
Non improving savings with S1

→ No effect without energy consulting



Use Case: Improve forecast by utilizing smart meter data

Improve deviations from forecast by improving the standard load profile



Jahr	S1	S2	S3	V
2011/12	3,8 %	6,0 %	9,9 %	3,8 %
2012/13	3,4 %	7,4 %	11,6 %	6,8 %
2013/14	4,5 %	10,5 %	12,2 %	7,7 %
2014/15	6,5 %	13,9 %	14,4 %	6,9 %

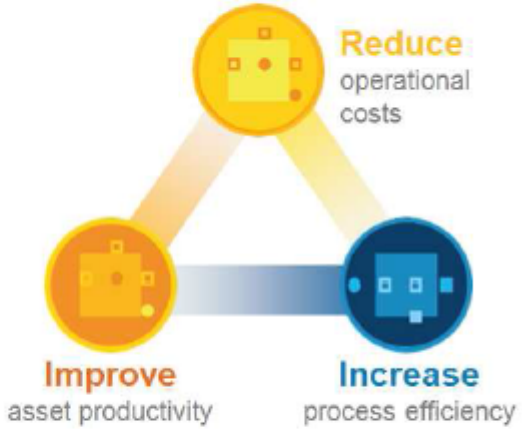
Use Cases

Energy Efficiency in Industry - Industry 4.0

- Predictive Maintenance and Quality
- Field Asset Monitoring

The Value of PMQ

1. Lowering Unit/Item Cost (Improving profit/margin)
2. Increasing Production "Yield"(Productivity)
3. Superior ROA and "Asset Optimization"
4. Higher Revenue due to Quality Improvement
5. Increased Competitiveness due to higher Quality
6. New Services for Health Monitoring of Assets
7. Lower Risks due to fewer or elimination of Asset Failures



Contact

AIT Austrian Institute of Technology

Matthias Stifter

Energy Department
Electric Energy Systems

Giefinggasse 2
1210 Vienna
Austria
T +43(0) 50550-6673
M +43(0) 664 81 57 944
F +43(0) 50550-6613
matthias.stifter@ait.ac.at http://
www.ait.ac.at