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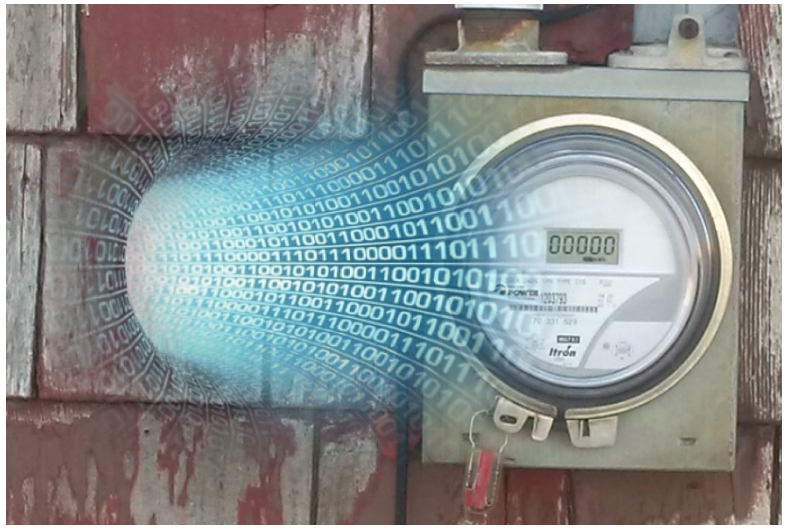

New Task
Big Data for Energy Efficiency

Energy Metering based Data Analytics for Energy Efficiency

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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.

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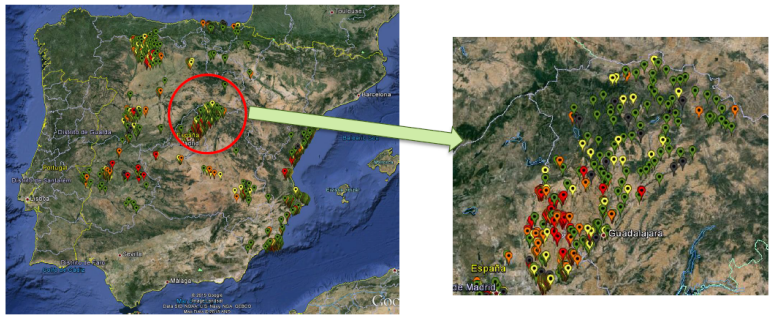
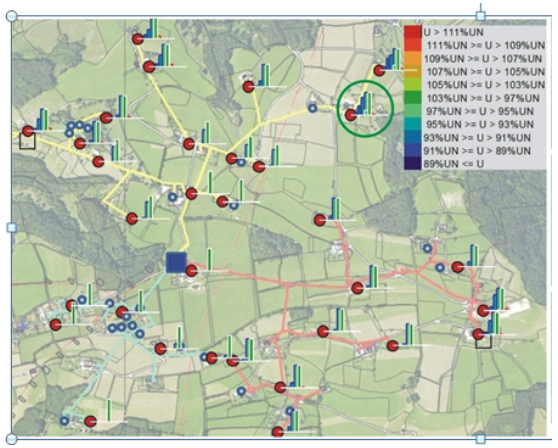
Use Cases

- 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





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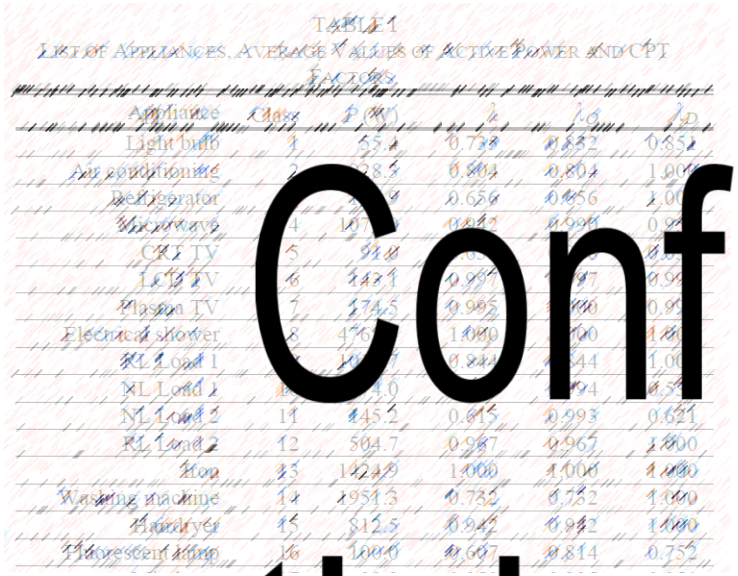
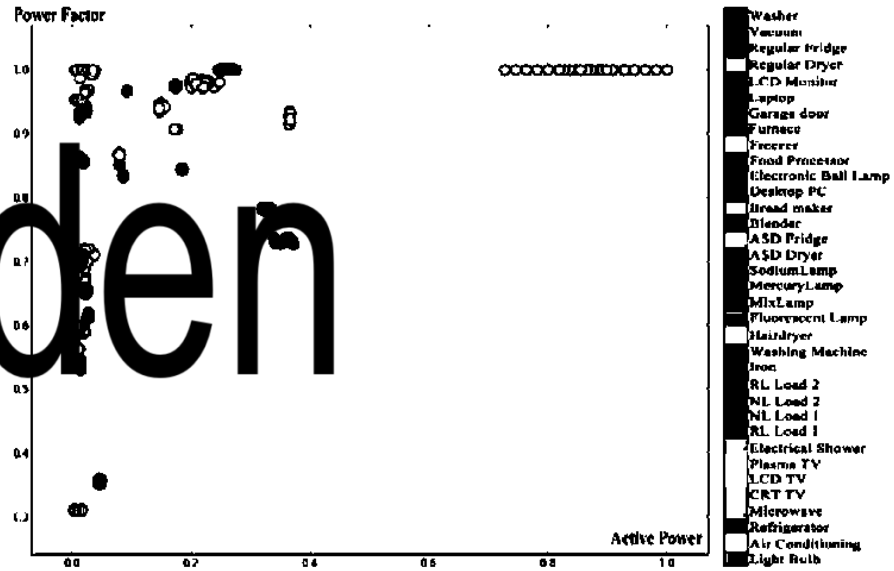
Use Cases

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





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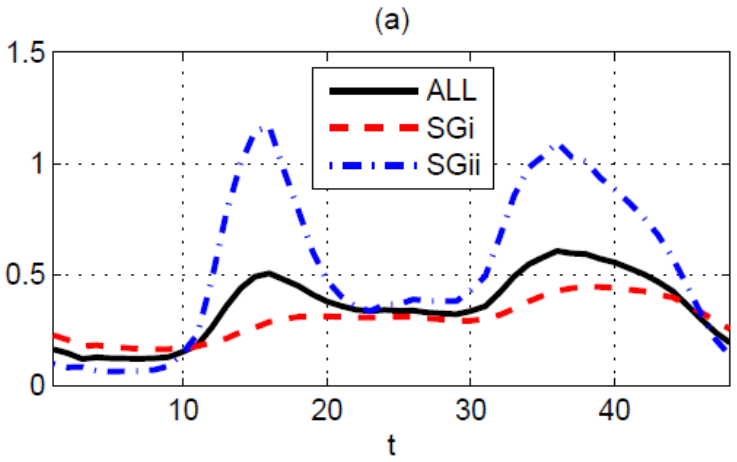
Use Cases

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

Socio-demographic variables	Description	Number of categories	Example(s)
GSP group	Grid Supply Point Group in UK, which are regional electricity distribution networks	Total 14 3 in dataset*	Southern; South Wales; North Scotland
Age	Age of head of household	6	Age 26-35
Decision Maker Type	Type of person deciding household matters	13	Young Couple
Family Lifestage	The combined stage of life and family status including children	14	Young family with children
Household Composition	People living together and their relationships to one another	13	Male homesharers
Household Income Band	Total household income per year	10	£30,000 to £39,999
Mains 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
Mosaic 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
Mosaic Public Sector Type	Subcategories of Mosaic Public Sector Group	69	Young professional families settling in better quality older terraces
Number of Bedrooms	Number of Bedrooms of the property	5	5 + bedrooms
Property Age	When the property was built	6	1871-1919
Property Type 2011	Type of property in 2011	5	Purpose built flats; Farm
Property Value Fine	Estimated property value	25	£500,001 to £600,000
Tenure 2011	Property ownership in 2011	3	Privately rented



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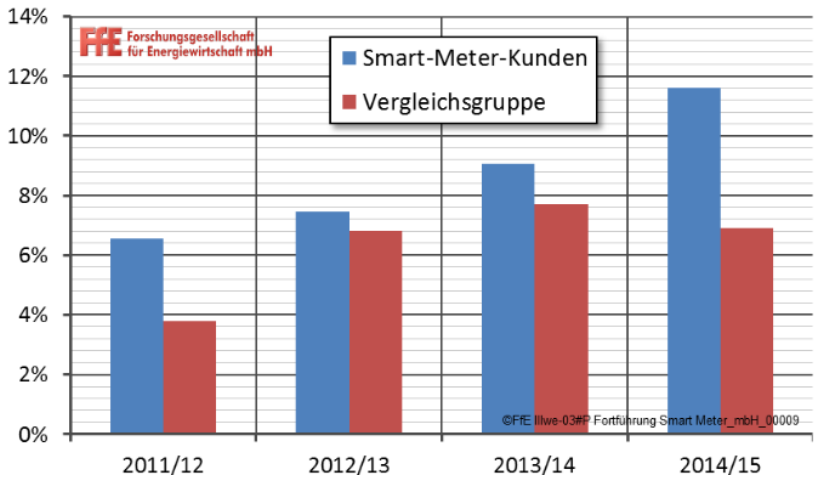
Use Case: Enduring long term energy saving potential by smart meter

- 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



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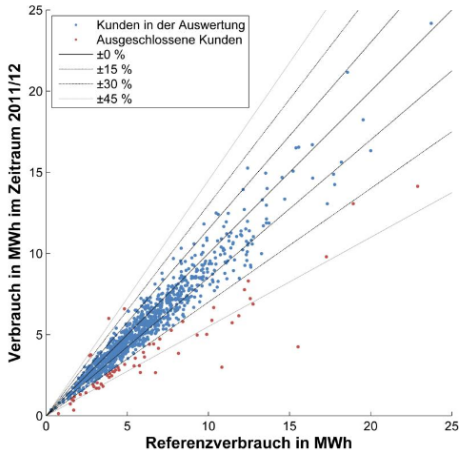
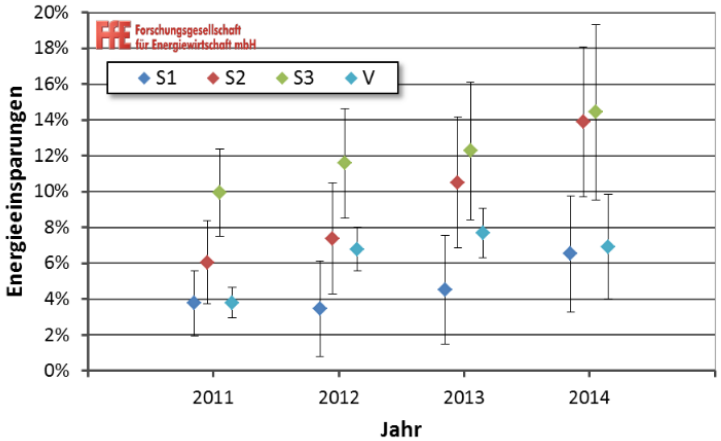
Use Case: Enduring long term energy saving potential by smart meter

- Evaluation method (exclude extremes)



- Increasing savings with S2+S3
  → sustainable effect of energy consulting
- Non improving savings with S1
  → No effect without energy consulting



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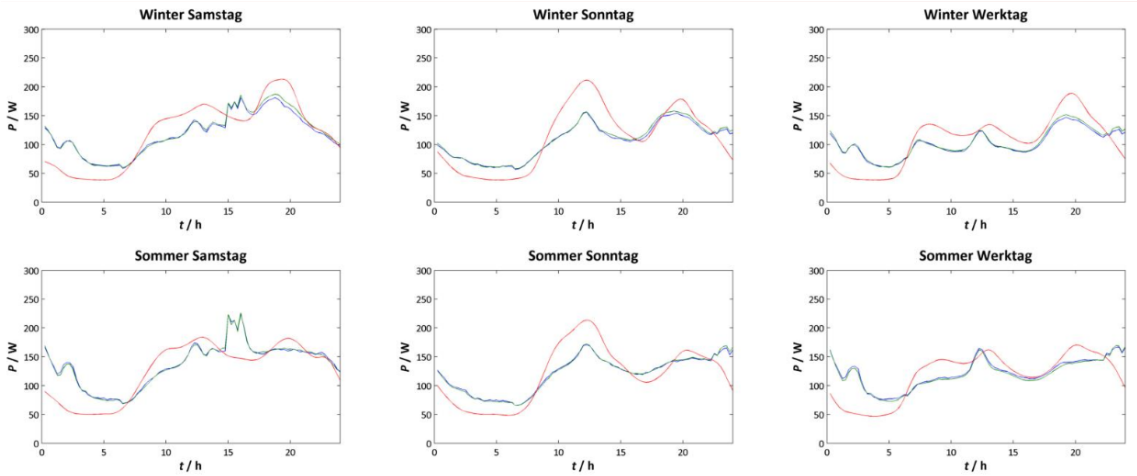
Use Case: Improve forecast by utilizing smart meter data

- 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 %

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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

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