Availability and Accessibility of Personalised Energy Data in Smart Grid Research

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Focus of this talk

- Issues with respect to availability and accessibility of personalized data considering **primary** and **secondary use of data**

- Motivated by research in energy related projects, e.g.
  - MeRegio – Moving towards Minimum Emission Regions
  - MeRegioMobile – ICT for Electric Mobility
  - CROME  German-French Crossborder Mobility with E-Vehicles
  - Establishment of Large Scale Data Facilities
    - Large Scale Data Management and Analysis (LSDMA@SCC)
    - European Large Scale Energy Data Facility (EIT ICT Labs + KIC InnoEnergy → ESA²)
# Moving towards Minimum Emission Regions

## Research Question / Scenario

### Energy Technology
- Smart Metering
- Hybrid Generation
- Demand Side Management
- Distribution Grid Management

### Energy Markets
- Decentralized Trading
- Price incentives at the power plug
- Premium Services
- System Optimization

### ICT
- Real-time measurement
- Safety & Security
- System Control & Billing
- Non Repudiable Transactions

## Objectives

- Optimize power generation & usage from producers to end consumers
- Intelligent combination of new generator technology, DSM and ICT
  - Price and control signals for efficient energy allocation
  - Combined Heat and Power
- MeRegio-Certificate: Best practice in intelligent energy management

## Partners

- AIFB + ZAR
- EnBW
- ABB
- IBM
- SAP
- Systemplan Engineering

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Pilot Region with ~ 1000 Participants (Freiamt + Göppingen)

5 chairs at KIT:
- Energy Economics
- Informatics
- Telematics
- Management
- Law
MEREGIO system view

- Intelligent system platform
- Central element for integration in the model region.

“Intelligent system platform for future energy services”

- Energy market
- CO₂-Balance
- Energy supplier
- Distribution network provider

Intelligent Networks

- Intelligent meters

Intelligent Appliances

- Small & medium industry
- Household

Intelligent Storage

- Electric power storage
- Electric vehicles

Intelligent Dec. Generation

- CHP plant
- RE-provider
Research Question / Scenario

- Intelligent & efficient integration of electric vehicles into the grid
- Technology assessment & feasibility under real life conditions
- Seamless integration into MeRegio pilot region
- Center of competence at KIT (demo and research lab)

Methodology
- Computer Simulations
- Field trial with about 40 BEV
- Living Lab

Objectives

- Intelligent & efficient integration of electric vehicles into the grid
- Technology assessment & feasibility under real life conditions
- Seamless integration into MeRegio pilot region
- Center of competence at KIT (demo and research lab)

Partners

- KIT
- EnBW
- Bosch
- SAP
- Fraunhofer
- Daimler
- Opel
- AIFB + ZAR
Collecting data on various aspects

- Energy consumption and production in model region (1000 participants, private households and enterprises)
- Status of power grid
- Usage of various devices (appliances) in smart home
- Mobility data in fleet test (MeRegioMobile and CROME)
  - Routing information (origin, destination, route (GPS),...)
  - Personal usage of infrastructure (charge spots etc.) and services
  - Car-related driving data (energy consumption,..)
- Impact of EV usage on personal mobility profiles

Barriers to availability and accessibility of data:

- Privacy protection
- Confidentiality (intellectual property rights, OEMs)
  → not considered in this talk, but severe problem
Objectives and research questions for this talk

- Primary use of data
  - Simulation studies (on-line and off-line)
  - Energy system analysis
  - User acceptance studies

- Secondary use of data (“Open Access”)
  - Traceability of primary research results
  - Data repository for (subsequent) third party research
Conflicting fundamental rights

Informational Self-determination

„This fundamental right guarantees every individual the authority to decide if he/she wants his/her personal data to be used or to give them away. (BVerfGE 65, 1)

Freedom of Research

„Art, science, research, and teaching are independent.“ (Artikel 5 Absatz 3 Satz 1 GG)

Solution:
Dissolving the existing tension through legal specification of the principle of practical concordance.
Availability (primary use of data)

Basic principle within the data privacy law:
Everything is prohibited unless it is explicitly allowed.

- Permission through law or freely given consent
- Permission is required whenever personal (not anonymous) data are concerned.
- Informing the person concerned about the purpose of the data usage is inevitable.
- The use of data must be indispensable for the specific research purpose.
Research Privilege

Legal permission due to research privilege:

- For example, § 35 LDSG-BW allows the collection of data by public authorities whose task is independent scientific research (applies to university part of KIT only)

- Special laws and provisions, e.g. SGB X, LandesArchG, etc.

- § 40 BDSG (federal law as a procedural rule only) does not apply, since it does not grant any permission

However, the collection of data directly from the person concerned has precedence

→ necessity of consent, in particular, if person concerned is known ahead of time of data collection (unless this is contradicting the research objectives)
Consent

Prerequisites:

- Information about the purpose of research (which data, usage, number of recipients, justification of data proliferation, necessity, etc.)
- Freely given consent (independent of promised benefits)
- Written form

Problematic issues:

- **Revocation of consent** (only possible for the future; previous utilisation of the data is not prohibited)
  - Is a complete deletion of data possible?
- Consent regarding **unknown research purposes (secondary use)**?
Accessibility (secondary use of data)

- Obligation to anonymisation of data, see § 40 BDSG
  - Issue: traceability of the research findings?
  - Issue: longitudinal research design?

- Approach: § 35 (3) LDSG requires explicit consent to publication

- But: consent of the person concerned is often impractical; e.g. consent regarding undefined purposes? (→ open access)

- Potential Solution: data trustee?
  - Responsible for management and protection of data
  - Handling requests for secondary use of data

Thank you for listening!
Questions?