



IoTSec Status Meeting, 23Nov2016, Oslo

The Way Ahead

Christian Johansen
UiO/Ifi & UNIK
christi@ifi.uio.no

Josef Noll
UiO/UNIK
josef@unik.no

IoTSec - Identifying Opportunities

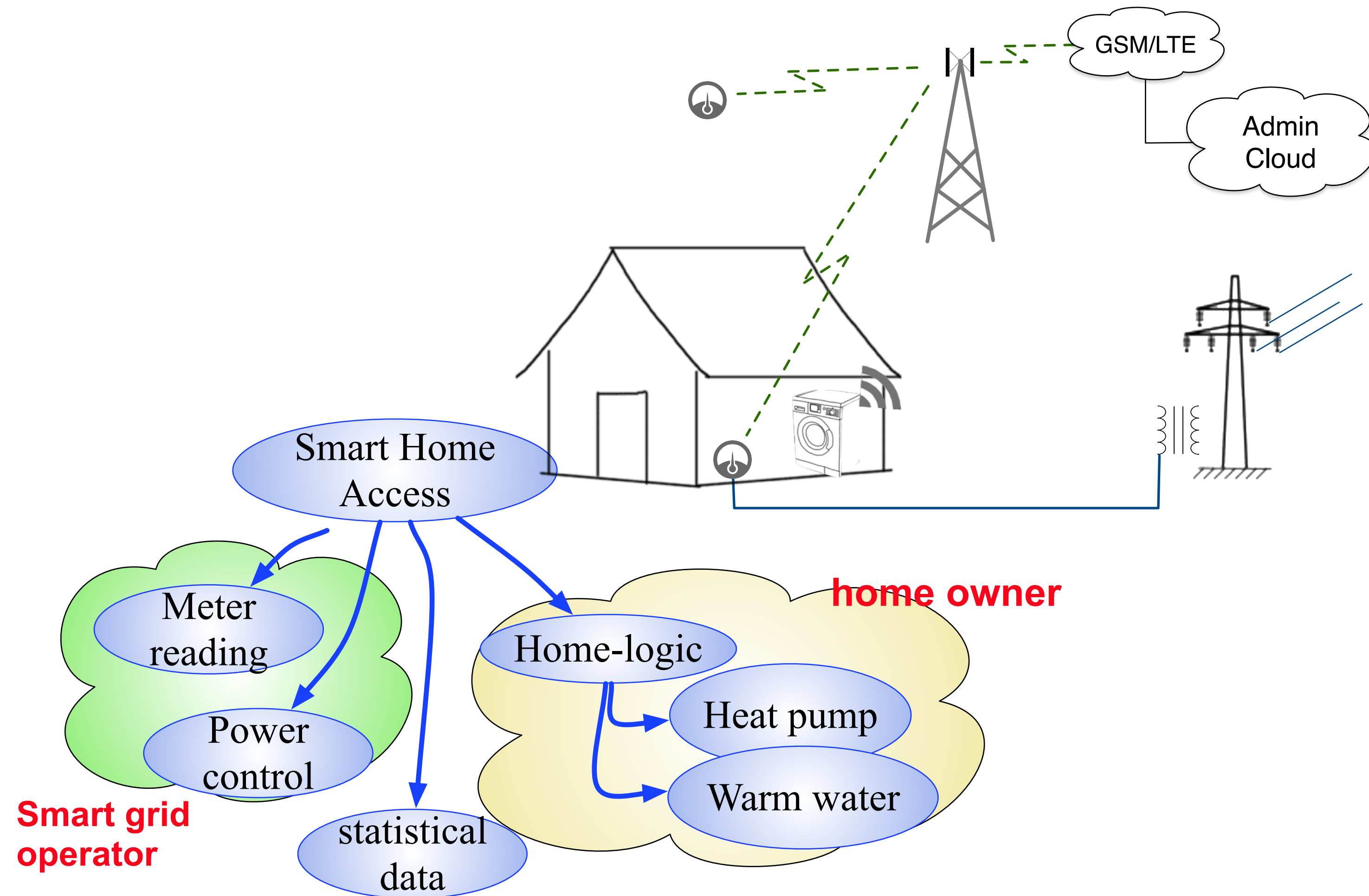


- Global network
 - ➔ value proposition for industry, authorities through **Smart Grid Security Centre**
 - ➔ academic **collaborations**, e.g. Energy Informatics
 - ➔ international collaborations and promoting “the Norwegian Model”
- Scientific work
 - ➔ Semantic framework,
 - Starting with Customer Information System (KIS)
 - Real Topology mapping of signalling and power flow
 - ➔ Models and modules
 - ongoing work: Abstract behaviour specification language (ABS), SeCreol (Security in Creol) Measurable Security Framework
 - ➔ Bringing Measurable Security to Applications
 - Application goals versus system capability
- Impact
 - ➔ Smart Grid Security Centre for 2017
 - ➔ Key concepts to the market:
 - “Measurable Security” adopted in SCOTT (54 partners from 14 countries)
 - “Privacy labelling” suggested in collaboration with Consumer Services
 - ➔ International visibility: project (INVADE, SCOTT)/proposal work

Semantic attribute based access control (S-ABAC)



- Access to information
 - ➔ who (sensor, person, service)
 - ➔ what kind of information
 - ➔ from where
- Attribute-based access
 - ➔ role (in organisation, home)
 - ➔ device, network
 - ➔ security tokens
- Rules inferring access rights



Attributes: roles, access, device, reputation, behaviour, ...

Privacy Labelling

<http://PrivacyLabel.IoTSec.no>



- “Measure, what you can measure
- Make measurable, what you can't measure” - Galileo
- Privacy today
 - ➔ based on lawyer terminology
 - ➔ 250.000 words on app terms and conditions
- Privacy tomorrow
 - ➔ A++: sharing with no others
 - ➔ A: ...
 - ➔ C: sharing with
- The Privacy label for apps and devices

In collaboration with Consumer Services (Forbrukerrådet)
- Paul Chaffey (Statssekretær) support
- Finn Myrstad (Forbrukerrådet) -> EU



Appfail Report - Threats to Consumers in Mobile Apps

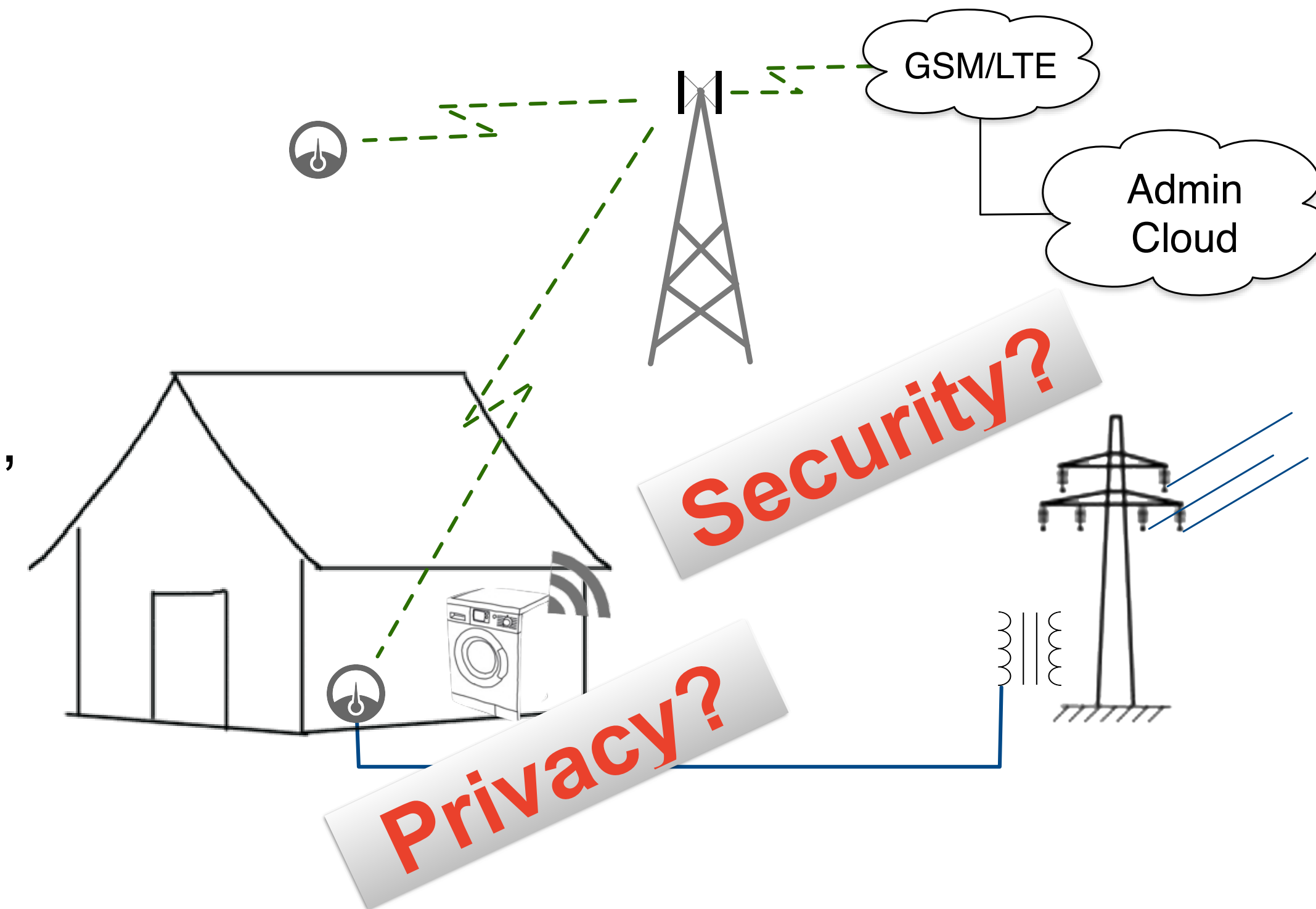
The Norwegian Consumer Council analysed the terms of 20 mobile apps. The purpose is to uncover potential threats to consumer protection hidden in the end-user terms and privacy policies of apps.

Measurable Security & Privacy

Application Scenarios for Smart Meters



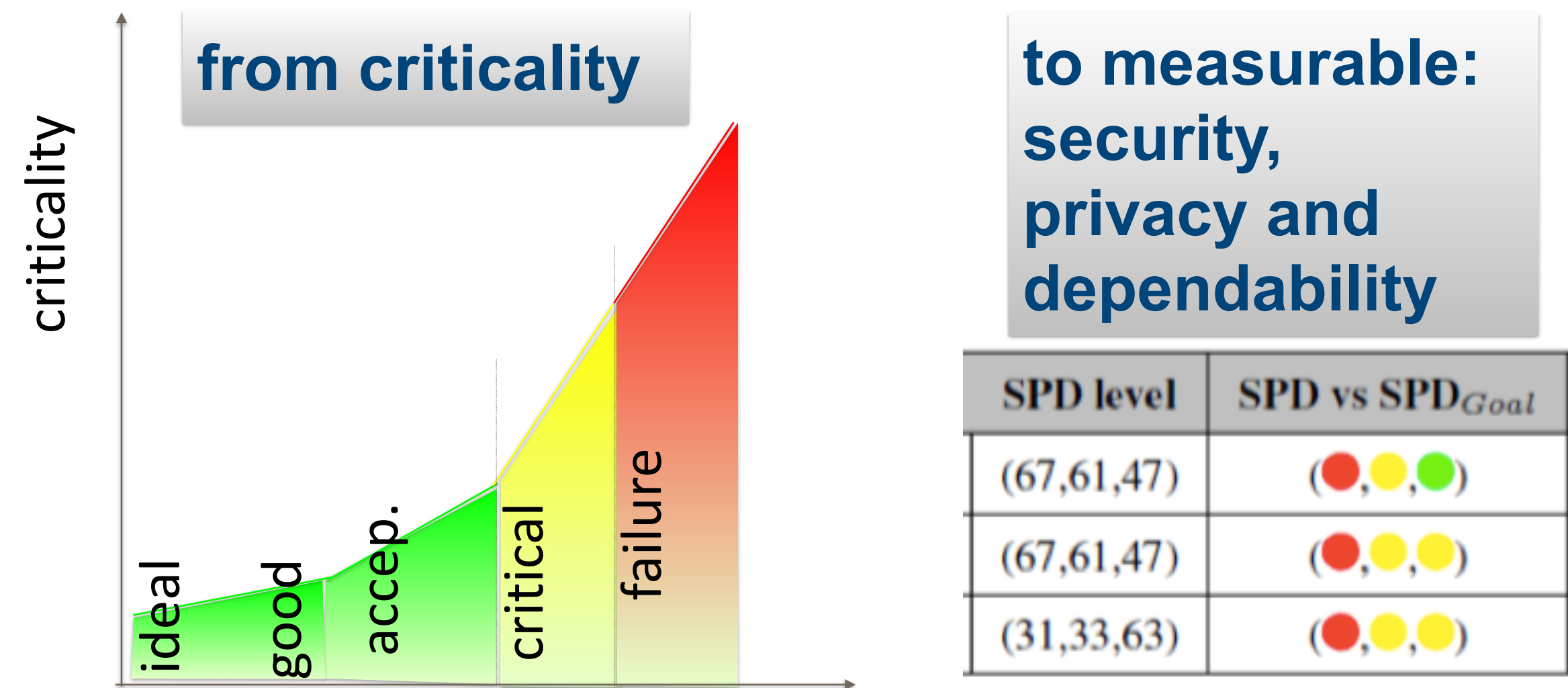
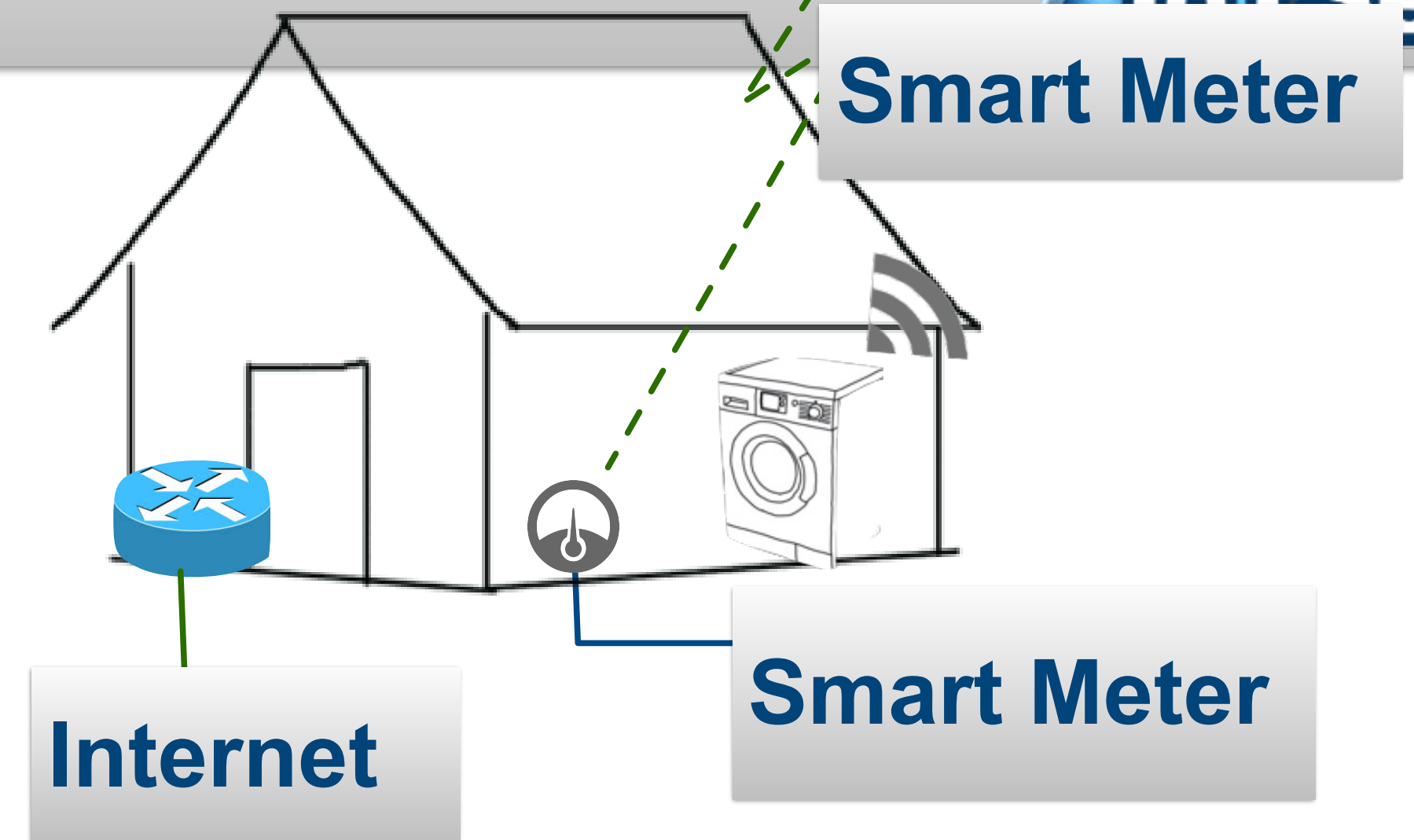
- Monitoring the grid to achieve a **grid stability** of at least 99,96%,
- **Alarm functionality**, addressing
 - ➔ failure of components in the grid,
 - ➔ alarms related to the Smart Home, e.g. burglary, fire, or water leakage,
- **Intrusion detection**, monitoring both hacking attempts to the home as well as the control center and any entity in between,
- **Billing functionality**, providing at least the total consumption every hour, or even providing information such as max usage,
- **Remote home control**, interacting with e.g. the heating system
- **Fault tolerance and failure recovery**, providing a quick recovery from a failure.
- Future services
 - ➔ Monitoring of activity at home, e.g. **“virtual fall sensor”**



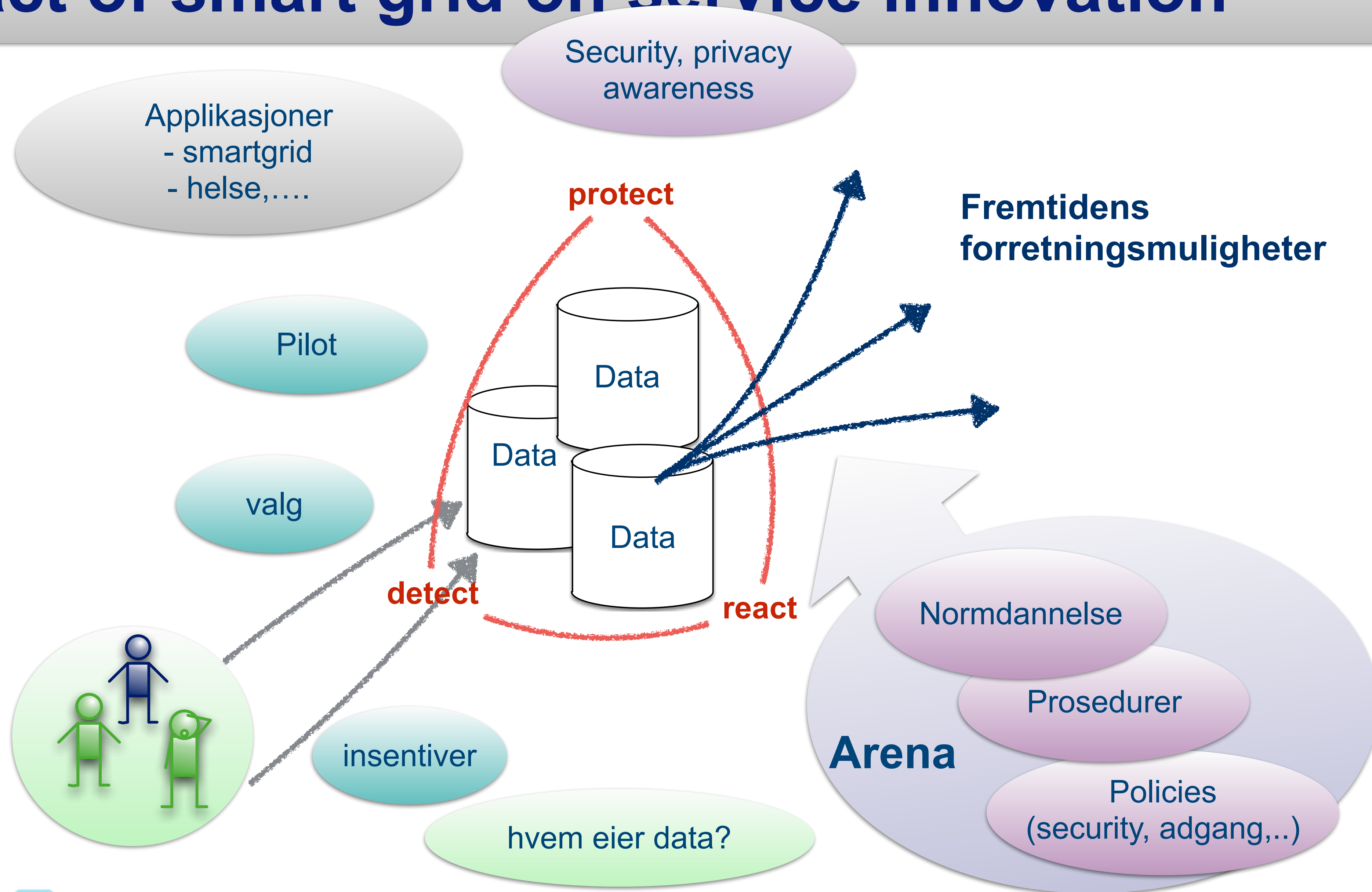
Security and Privacy challenges



- Smart Meter
 - ➔ read and control
 - soft switch, remote switch off
 - ➔ logic?
- Smart Home
 - ➔ intelligent devices
 - ➔ on-demand regulation
- Challenges
 - ➔ Logic: Centralised ↔ Fog
 - ➔ Smart Meter: Information ↔ Control
 - ➔ Smart Grid Information ↔ Internet Info



Service-driven innovation: Impact of smart grid on service innovation



Future Smart Grid operation, § 4-2 functional requirements

“Forskrift om måling, avregning, fakturering av netjtjenester og elektrisk energi, nettselskapets nøytralitet mv.”



1. Store measured values, registration frequency max 60 min, can configure to min 15 min.
2. **Standardised interface (API) for communication with external equipment using open standards**
3. Can connect to and communicate with other type of measurement units
4. Ensures that stored data are not lost in case of power failure
5. **Can stop and reduce power consumption in every measurement point (exception transformer)**
6. Can send and receive information on electricity prices and tariffs. Can transmit steering information and ground faults
7. Can provide security against miss-use of data and non-wished access to control-functions
8. Register flow of active and re-active power flow in both directions

§ 4-2. Funksjonskrav

AMS skal:

- a) lagre måleverdier med en registreringsfrekvens på maksimalt 60 minutter, og kunne stilles om til en registreringsfrekvens på minimum 15 minutter,
- b) ha et standardisert grensesnitt som legger til rette for kommunikasjon med eksternt utstyr basert på åpne standarder,
- c) kunne tilknyttes og kommunisere med andre typer målere,
- d) sikre at lagrede data ikke går tapt ved spenningsavbrudd,
- e) kunne bryte og begrense effektuttaket i det enkelte målepunkt, unntatt trafomålte anlegg,
- f) kunne sende og motta informasjon om kraftpriser og tariffer samt kunne overføre styrings- og jordfeilsignal,
- g) gi sikkerhet mot misbruk av data og uønsket tilgang til styrefunksjoner og
- h) registrere flyt av aktiv og reaktiv effekt i begge retninger.

Norges vassdrags- og energidirektorat kan etter søknad i særlige tilfeller gi dispensasjon fra enkelte funksjonskrav.

- Ethical hacking course in collaboration with UiA
- Penetration testing of smart meters (Mnemonic, CPS@UiO lab)

<https://lovdata.no/dokument/SF/forskrift/1999-03-11-301>

The “sharing economy” for energy companies?



Ved å bygge internett for alle, og ved å skape relevante og uunnværlige digitale tjenester, kan vi bidra til en bedre verden, skriver Sigve Brekke.

FOTO: Heiko Junge, NTB scanpix

IKT er den nye oljen! | Sigve Brekke

[Source: aftenposten.no]

**Sharing Economy:
“Telenor will create a
digital ecosystem in
Pakistan”**



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Prosumer bidding and scheduling in electricity markets

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[Source: eSmartSystems.com]