

Smart meter security: a survey by Ross Anderson

Specialization Course in Distributed Systems

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Agenda

Introduction

- Prepayment

Security Economics

- Smart Meter Fraud

- Privacy

- Strategic Vulnerabilities

- Overregulation

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- Conflict of Interest

Architecture

- Differences in Europe

Introduction



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- ▶ Like the **AAU Sidebar** theme, the theme is not really useful to people not affiliated with AAU due to the tight integration between the theme and the round AAU logo. However, everyone is of course encouraged to download and modify the theme according to their own needs.

Prepayment

South African Example



- ▶ Why prepayment?
 - ▶ Poor households
 - ▶ Informal accommodation
- ▶ Parties
 - ▶ Eskom - state owned
 - ▶ Local electricity distributors
 - ▶ Token vending agents
 - ▶ Customers vendors
 - ▶ Equipment vendors
- ▶ Issues
 - ▶ Brownout
 - ▶ Token vending machines

Security Economics

South African Example



- ▶ Going from credit to prepayment resulted in 10% reduced energy usage
- ▶ Same in Northern Ireland, Russia and Brazil
- ▶ People care more about their usage because they have to go to the vending station and use their ATM card or cash
- ▶ Easy debt management - no court order, no replacement of meter

Smart Meter Fraud

General



- ▶ Vulnerabilities will get industrialised
- ▶ The South African example shows this
- ▶ Fixing a bug is very expensive
- ▶ Replacing 100 million meters in Europe would take 5 years and cost \$20bn

Smart Meter Data

The problem



- ▶ Smart meter data in Europe is recorded in fine granularity
- ▶ Extract personal information by analysing the meter data
 - ▶ How many live in the house?
 - ▶ When are they asleep?
 - ▶ Are they home at the moment?
- ▶ Home appliance vendors, burglars etc.
- ▶ Customer vs energy company owned data

Smart Meter Data

Who owns it?



- ▶ Most countries move toward customer owned data
- ▶ The tussle is the granularity one should share
- ▶ Energy company: 48 readings per 24h
- ▶ Customer: Only enough for billing
- ▶ European Convention on Human Rights: European citizens have the right to respect for the privacy of their family life.



Centralised Metering System

- ▶ Avoid rolling out a truck to the customer
- ▶ When countries are in conflict - energy is a target
- ▶ Remote computer exploits, vulnerabilities:
 - ▶ Software upgrade
 - ▶ Tariff setting
 - ▶ Billing
 - ▶ API attacks
 - ▶ Applets
- ▶ General problem: Replacing hardware is expensive

Overregulation



- ▶ Concerns about over regulating the smart meter security

Company vs Government



- ▶ Companies buy energy which varies by time of day
- ▶ Ikke interessant??!?!?



Questions



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