Smart meter security: a survey by Ross Anderson

Specialization Course in Distributed Systems

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Agenda

Introduction

Prepayment
    Prepayment

Security Economics
    Smart Meter Fraud
    Privacy
    Strategic Vulnerabilities
    Overregulation

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    Conflict of Interest

Architecture
    Differences in Europe

Introduction

- ▶ Overview

- ▶ Context

- ▶ Examples

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

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- ▶ 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??!?!

- ▶ Germany - a customer can choose an energy company
  - ▶ Company sets up smart meter
  - ▶ Disliked because fewer smart meters were sold
- ▶ United Kingdom - centralised system by a Data Communication Company
  - ▶ Same smart meter

Questions