

Energy Management Solutions for Campuses

Petr Stluka

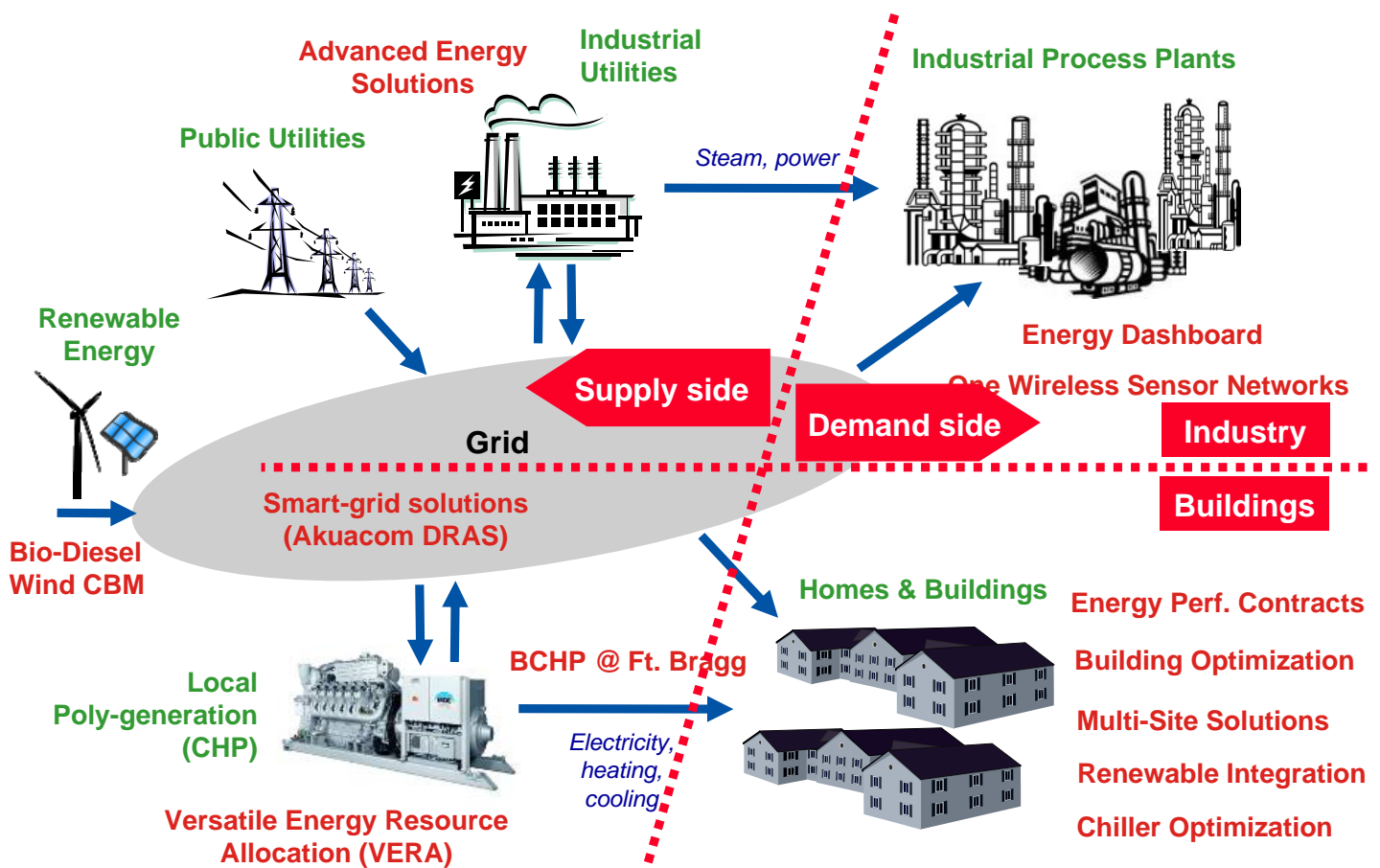
Honeywell, Engineering Fellow

Lisbon, November 11, 2010

Honeywell

Honeywell Energy Efficiency Technologies

Honeywell



- **Energy Management Solutions for Campuses**

- **Remote energy management service**

- ◆ Honeywell / Novar multi-site solutions

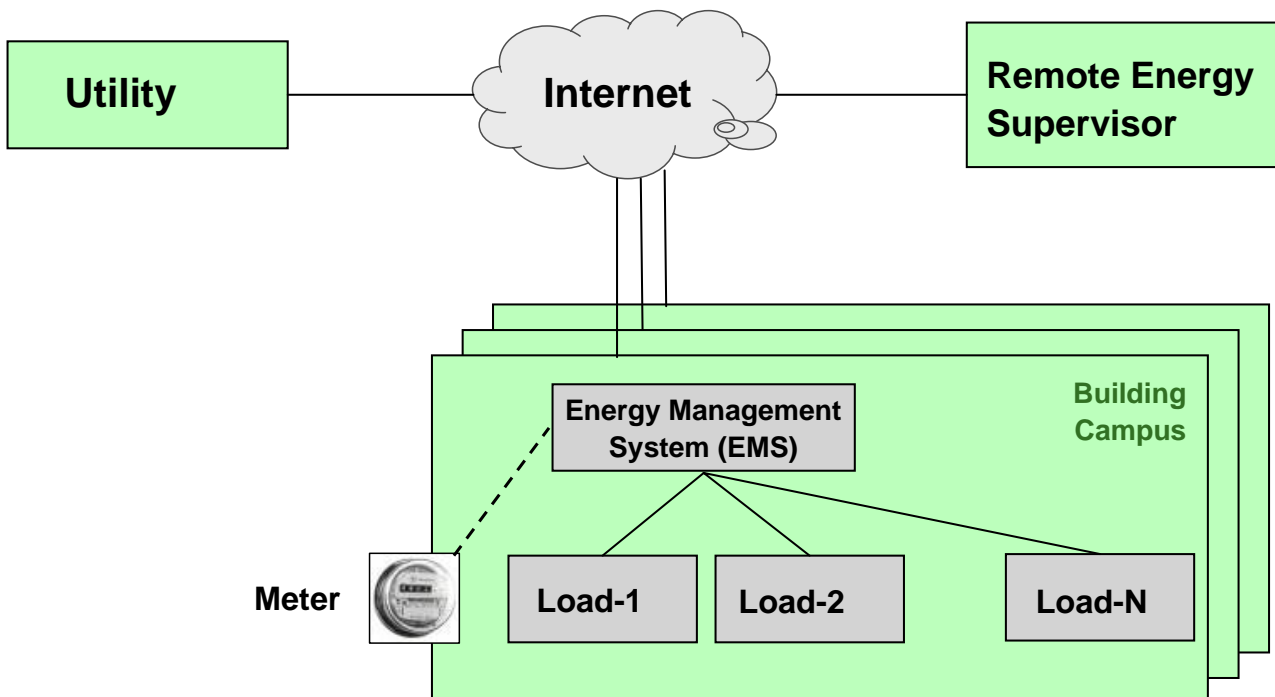
- **Demand Response**

- ◆ Smart grid driven opportunities for energy savings
- ◆ Honeywell / Akuacom commercial Demand Response

- **Microgrid energy management**

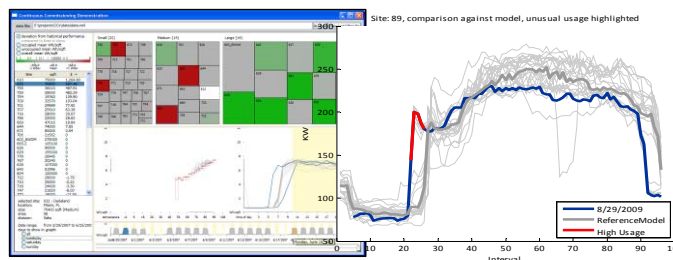
- ◆ Honeywell / VERA
- ◆ Hospital in Heerlen, The Netherlands

Remote Energy Management



Novar Remote Energy Management Service

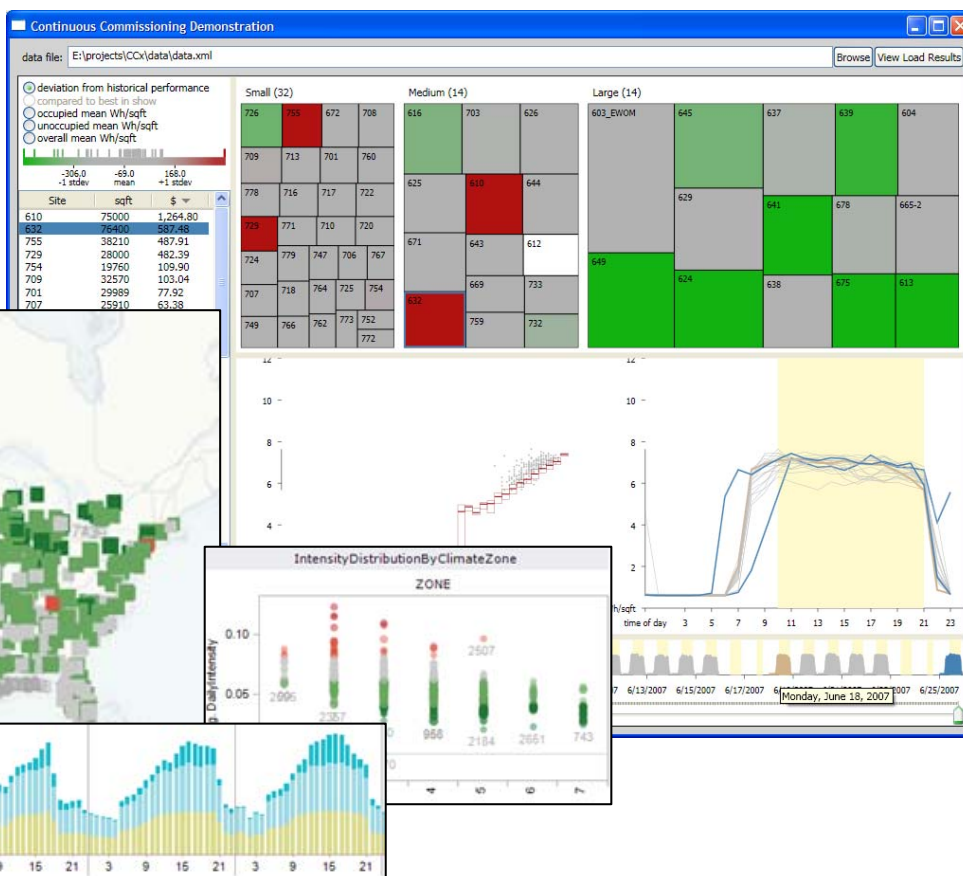
- Honeywell's Novar (www.novar.com) keeps energy consumption and costs low for multi-site businesses and reduces peak loads for utilities
 - Novar currently manages 6 gigawatts of load
- Top Novar multi-site customers
 - Walmart, Office Depot, Home Depot, Lowes
- Typical results
 - 20-25% energy efficiency
 - 10-20% peak load reduction
- Analysis & Feedback
 - Comparison between buildings
 - Comparison to baseline and model
 - Root cause analysis
 - Specific suggestions
 - Results in behavior change



Secure remote energy management using existing communications infrastructure

Energy Dashboards: Monitoring & Analysis

- Dashboards
 - Powerful tools for highlighting energy performance issues
 - Can be used to visualize performance of multiple buildings



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Smart Grid Driven Opportunities for Savings

Automation

Complete, consistent & persistent (~25-30%)



ZigBee
Native AMI radio
IP Addressable

Behavior Feedback

Real-time consumption (~5-7% energy savings)
Comparison between facilities (~2-3%)
Targeted feedback to improve EE (~10-15%)

Automation

Behavioral Change

Dynamic Pricing
Net Metering
Demand Response
Energy Efficiency

Integrated Software Solutions



UtilityPRO DR Thermostat



Smart Appliances



Building Controls



In Home Display

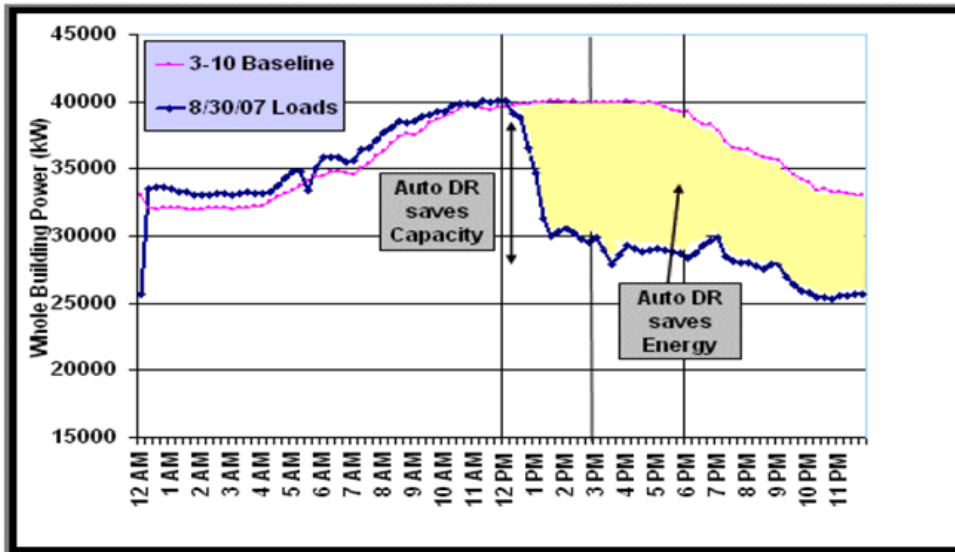


UtilityPRO with Integrated IHD



In Business Display

Electric load profile for PG&E participants on 8/30/2007



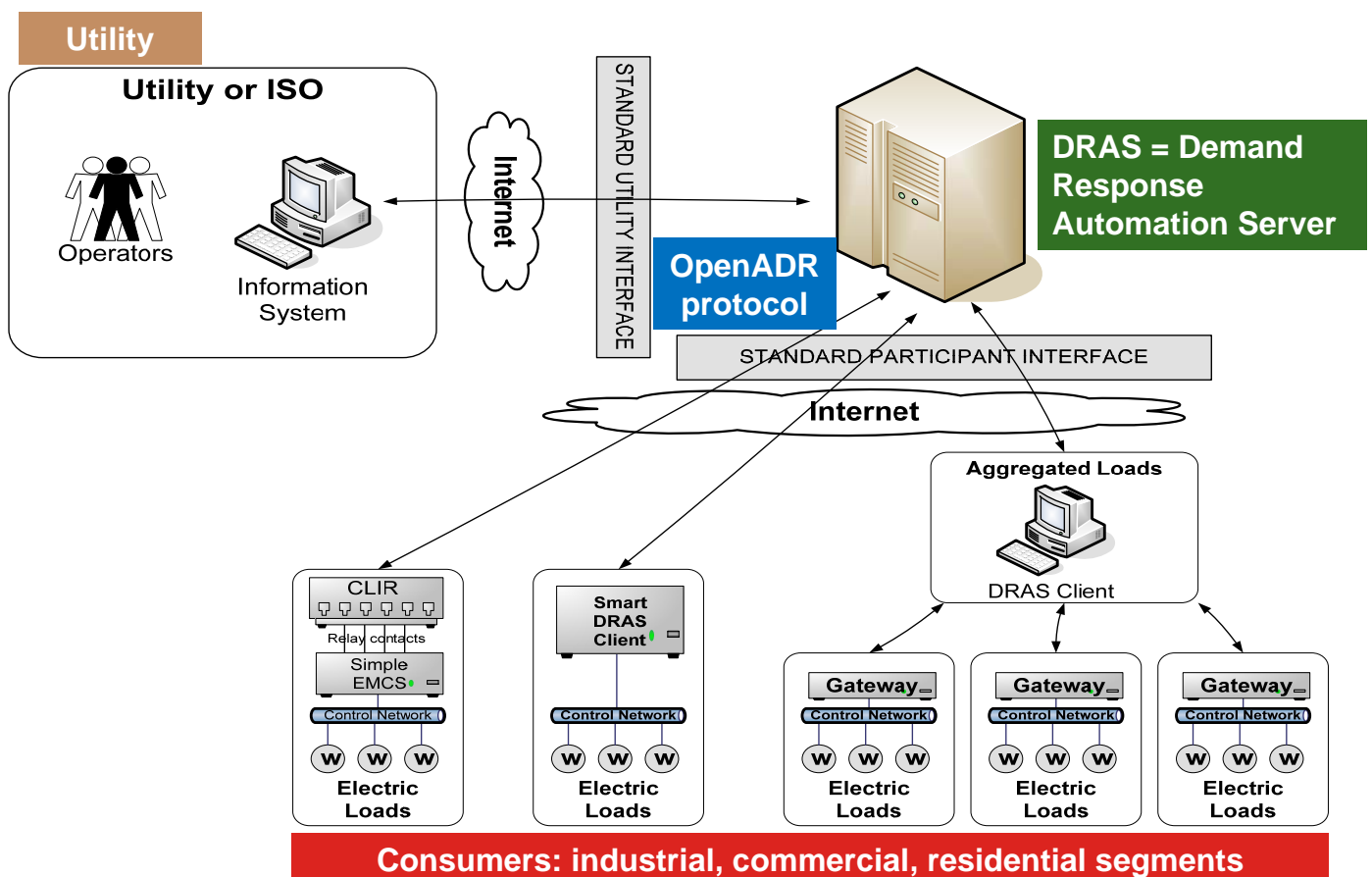
• Benefits for Utilities

- Network security & reliability
- Reduced load during peaks
 - New supply is expensive!
- Load order optimization

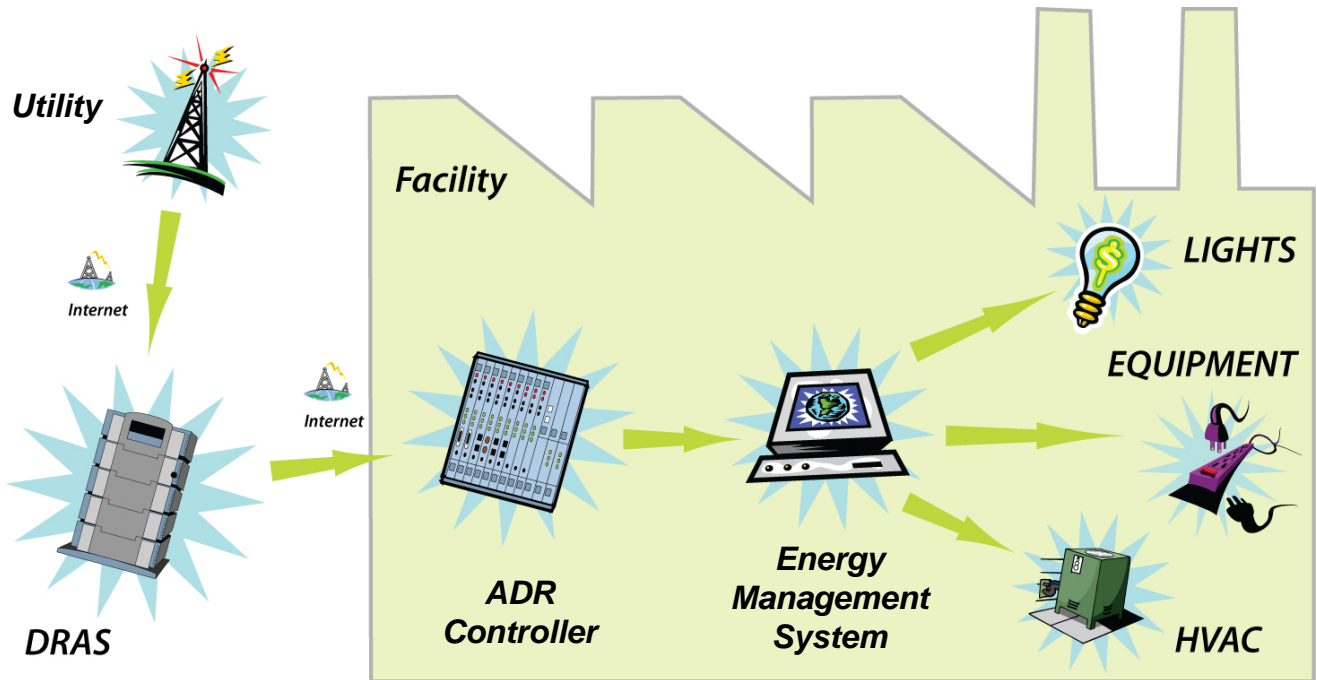
• Benefits for Consumers

- More control of consumption
- Economic benefits
- Reduced GHG

Automated DR: DRAS Concept



Automated Demand Response



- Types of Demand Response

- Scheduled Demand Response (day-ahead)
- Real-Time Demand Response (hour-ahead)
- Frequency Regulation (immediate response)

Example of a Typical DR Event

GRID STRESS → Notification → Client Actions



Turn off 1 of 4 elevators



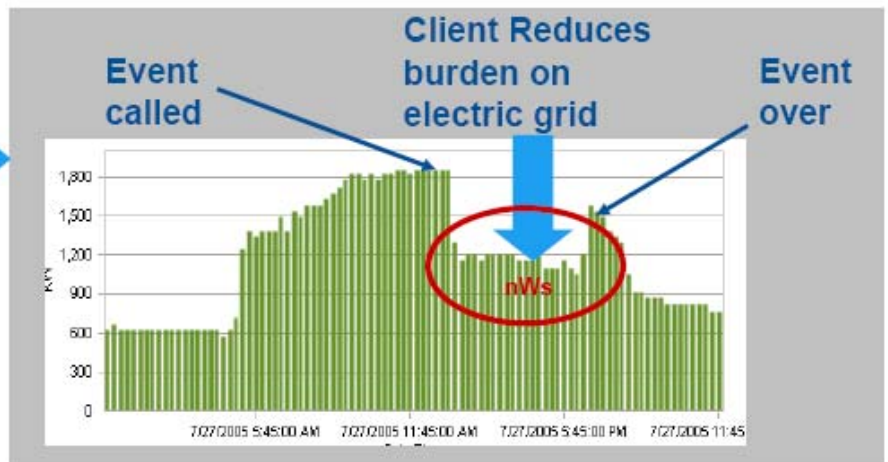
Pre-cool building in early morning hours



Turn on emergency generator (can use as monthly generator test)



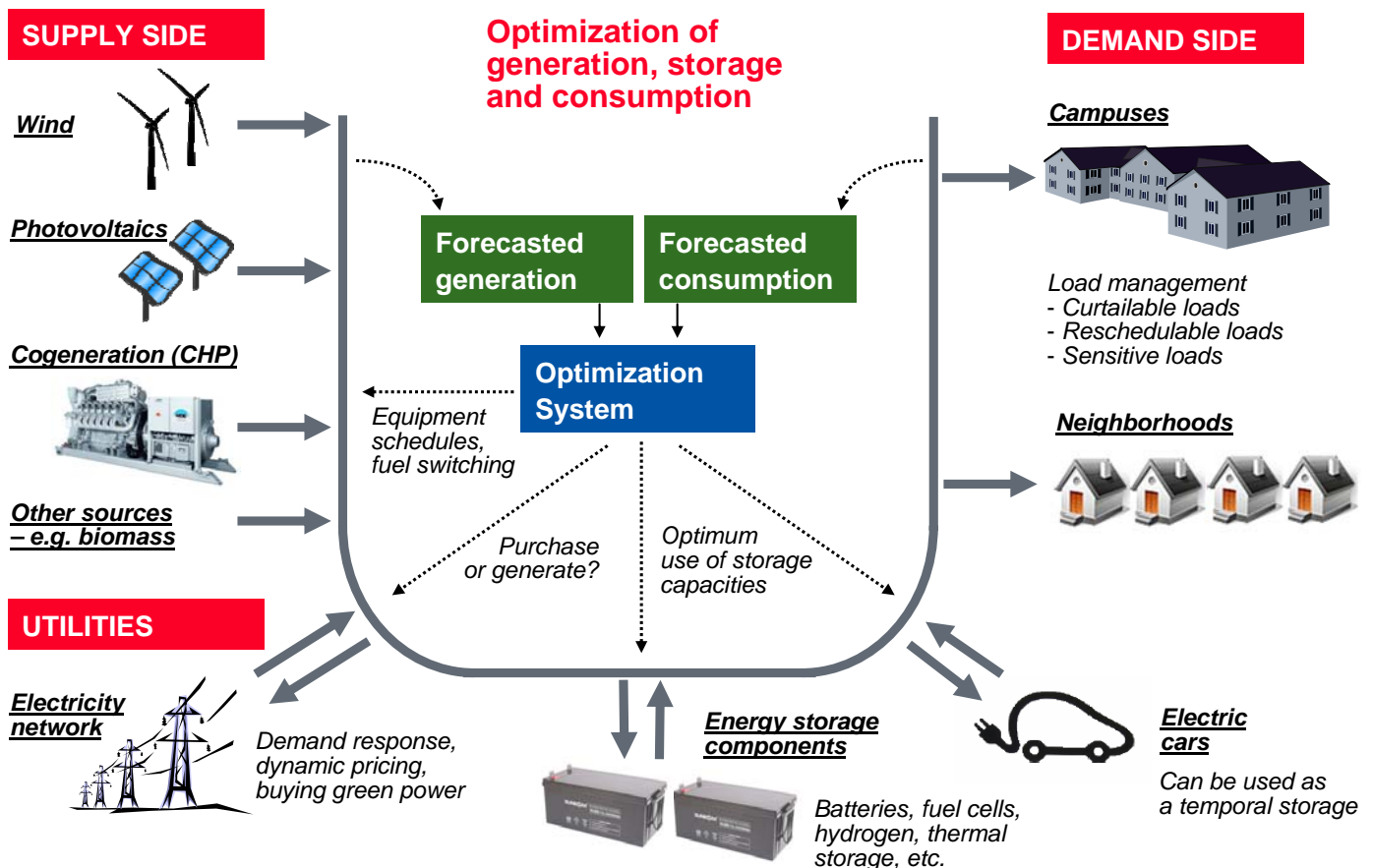
Turn off non-essential lighting



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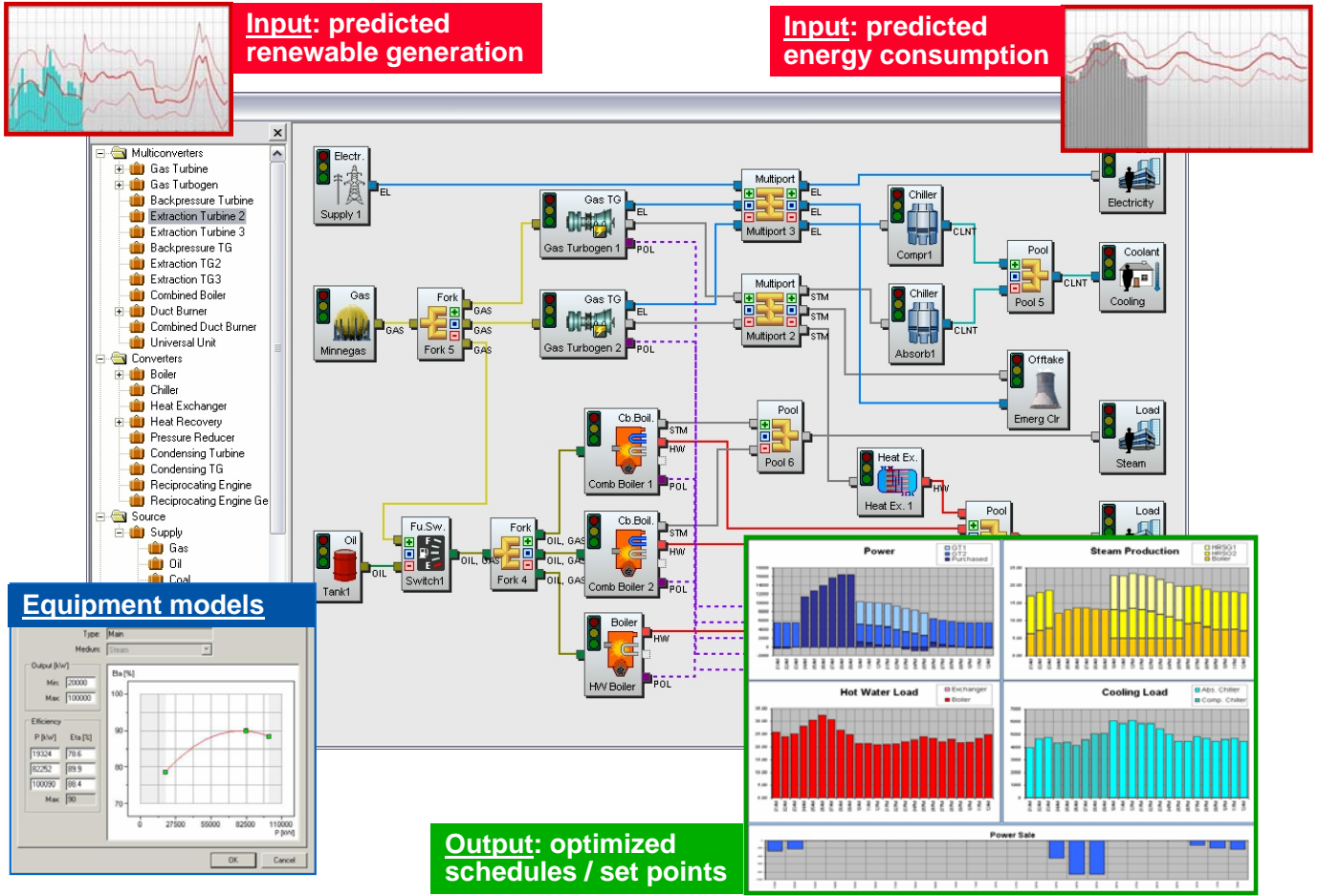
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- Demand Response
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Microgrid Energy Management



VERA = Microgrid Optimization System

Honeywell



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Typical Application

Honeywell

Atrium City Hospital, Heerlen, Netherlands

750 beds,

Approx. energy costs (2003): **€1,200,000 per year**

- System:**
- hot water boiler
 - 2 steam boiler
 - compressor and absorption chillers
 - 2 gas cogeneration units

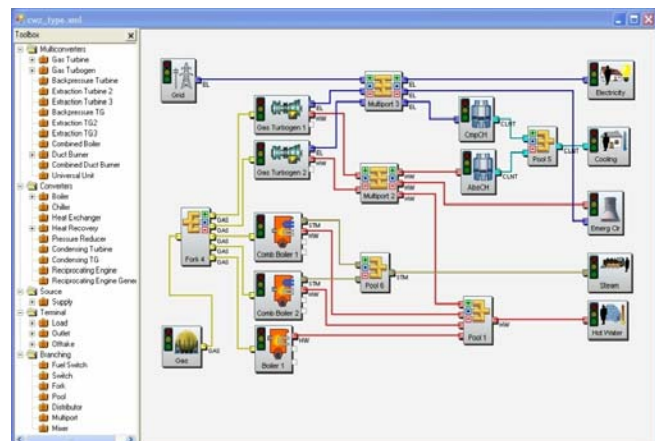


Honeywell Forecaster + VERA installed in 2002 ... now running 8 years

Cost savings:

2003	€ 75 000 (>6 %)
2004	€ 90 000
2005	€151 000
2006	€108 000
2007	€140 000

Solution ROI < 1 year



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