



Why is Intelligent Efficiency Important?

R. Neal Elliott, Ph.D.; Ethan A. Rogers, Paul Hamilton

December 4th, 2012

The American Council for an Energy-Efficient Economy (ACEEE)

- ACEEE is a nonprofit 501(c)(3) that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments & behaviors.
- Nearly 50 staff based in Washington, D.C.
- Focus on end-use efficiency in industry, buildings, utilities & transportation
- Other research in economic analysis; behavior; national, state & local policy.
- Funding:
 - Foundation Grants (52%)
 - Contract Work & Gov. Grants (20%)
 - Conferences and Publications (20%)
 - Contributions and Other (8%)



www.aceee.org

Schneider Electric – the global specialist in energy management

Balanced geographies – FY 2011 sales

22.4 billion € sales

(last twelve months)

39% of sales in new economies

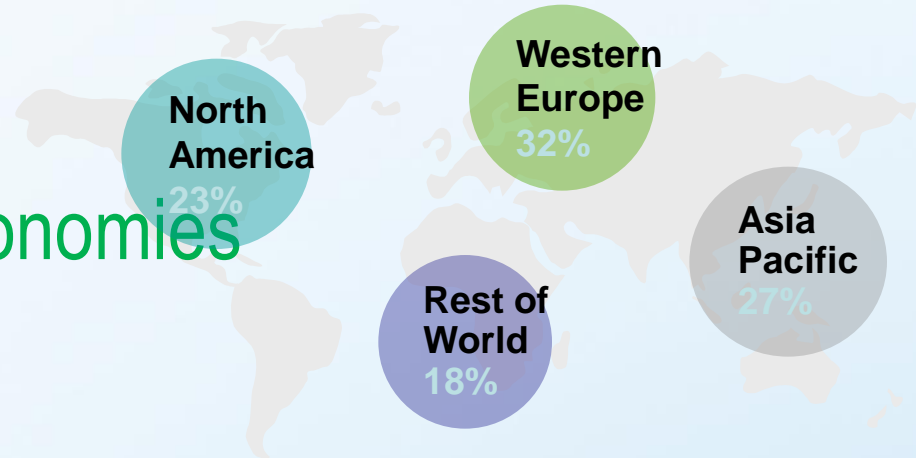
(last twelve months)

137,000+ people

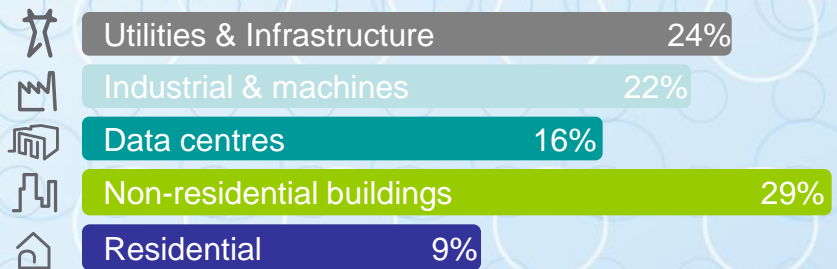
in 100+ countries

4-5% of sales

devoted to R&D



Diversified end markets – FY 2011 sales



Agenda

- Why is Intelligent Efficiency Important?
 - Ethan A. Rogers
- Market barriers and policy opportunities
 - R. Neal Elliott
- Importance to the business sector
 - Paul Hamilton

ACEEE Intelligent Efficiency Project

Assembled group of industry experts to:

- Define *Intelligent Efficiency*
- Understand opportunities & barriers
- Begin developing a policy agenda to realize the promise of *Intelligent Efficiency*

What is Intelligent Efficiency & Why is it important?

Evolution of energy efficiency

- Efficient components
- Simple control systems
- Reactive control systems
- Programmable control systems
- Predictive control systems

Technology-Behavior Continuum

People-Centered Efficiency

Providing real-time information and management tools that enable users to lower energy consumption in response to changing information

Technology-Centered Efficiency

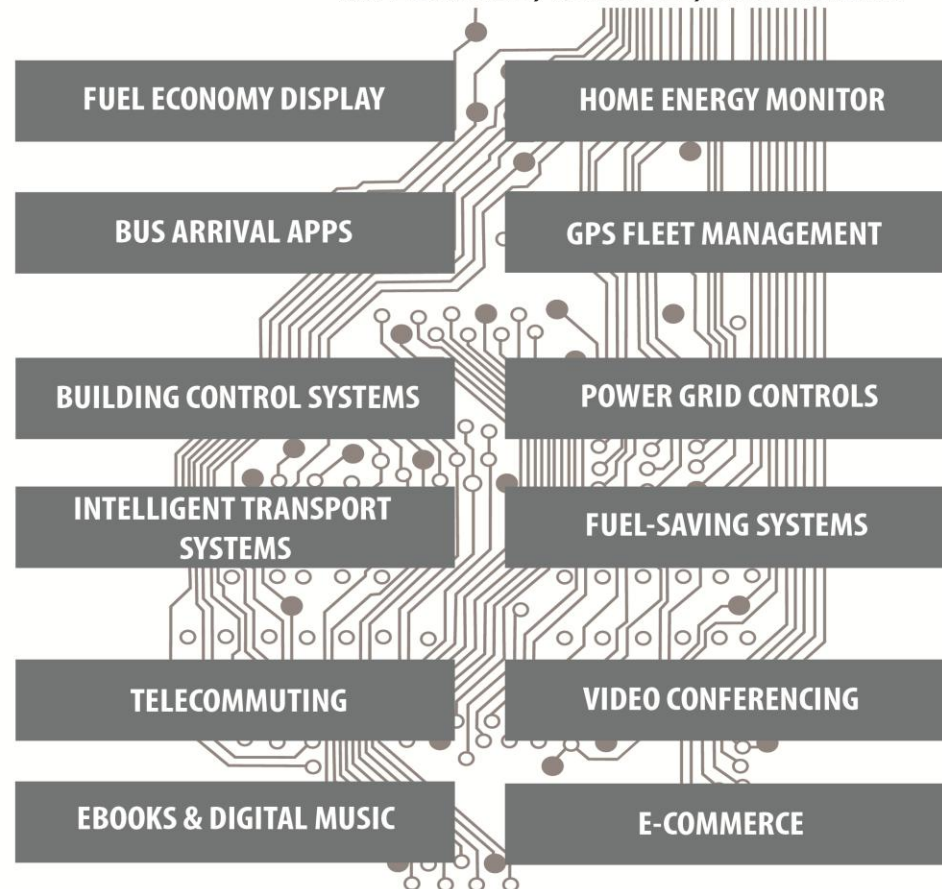
Using sensors, controls, and software to automate and optimize energy use

Service-Oriented Efficiency

Shifting behavior and organizational structures to reduce energy-intensive activities

Intelligent Efficiency

INTEGRATED, RELIABLE, and SMART.



Enabling Intelligent Efficiency

Elements supporting *Intelligent Efficiency* technologies & practices:

- Switch to systems based thinking
- Information and communication technologies (ICT)
- Affordable sensors & controls
- The internet & *Big Data*

Market Barriers & Policy Opportunities

Barriers to greater adoption

- Societal
- Regulatory
- Financial
- Structural



What are market barriers

Societal:

- Awareness
- Fear
- Complexity
- Risk aversion
- Values

Regulatory:

- Business model
- Valuation of benefits

Financial:

- Upfront costs
- Split incentives

Structural:

- Workforce
- Information tools
- Lack of data
- Ownership of data & privacy

Policy responses

- Awareness
- Recognition
- Leadership
- Information infrastructure investment
- Alternative regulatory business models



Targeting Policy Responses

Federal:

- Lead by example
- Facilitate markets

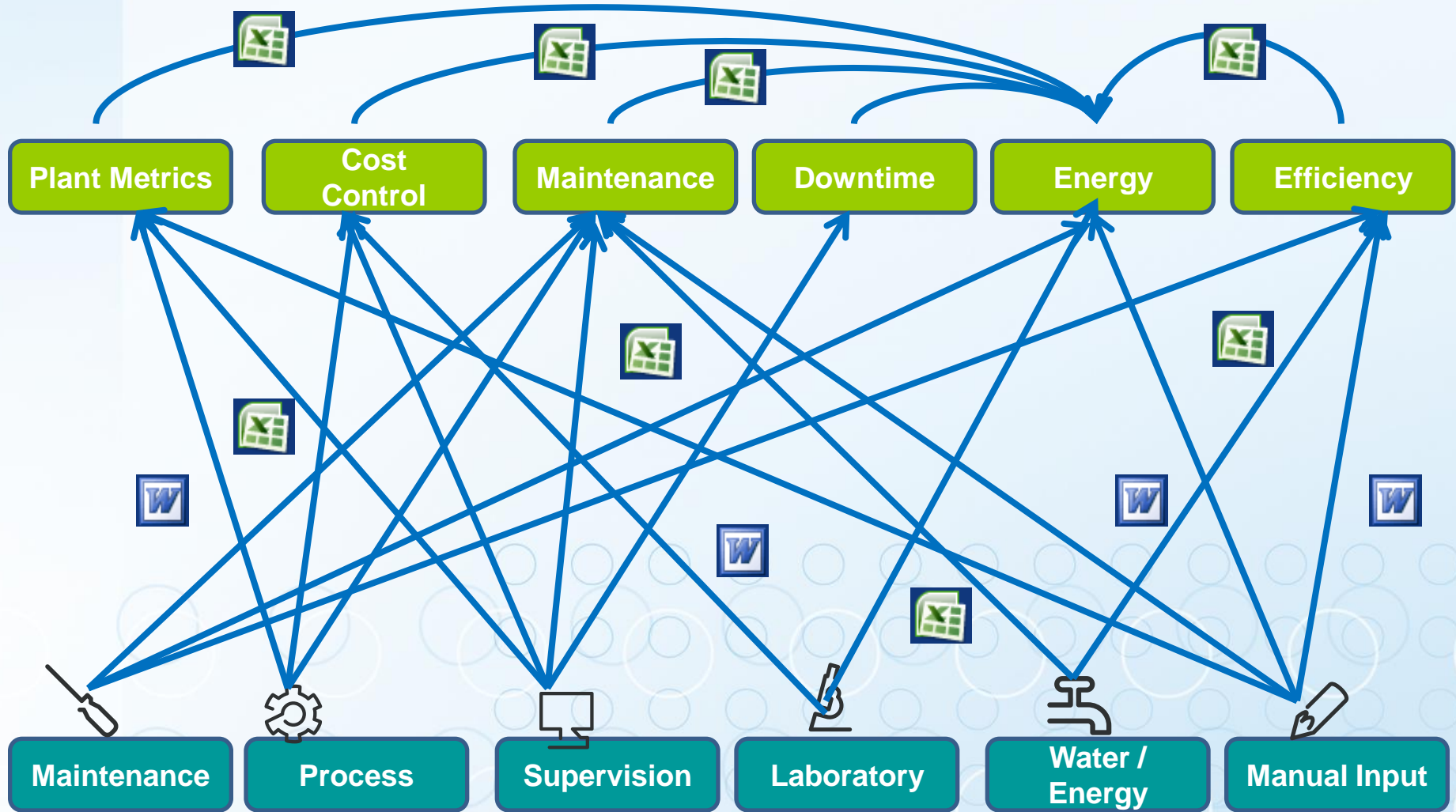
State:

- Utility regulations
- Lead by example

Local:

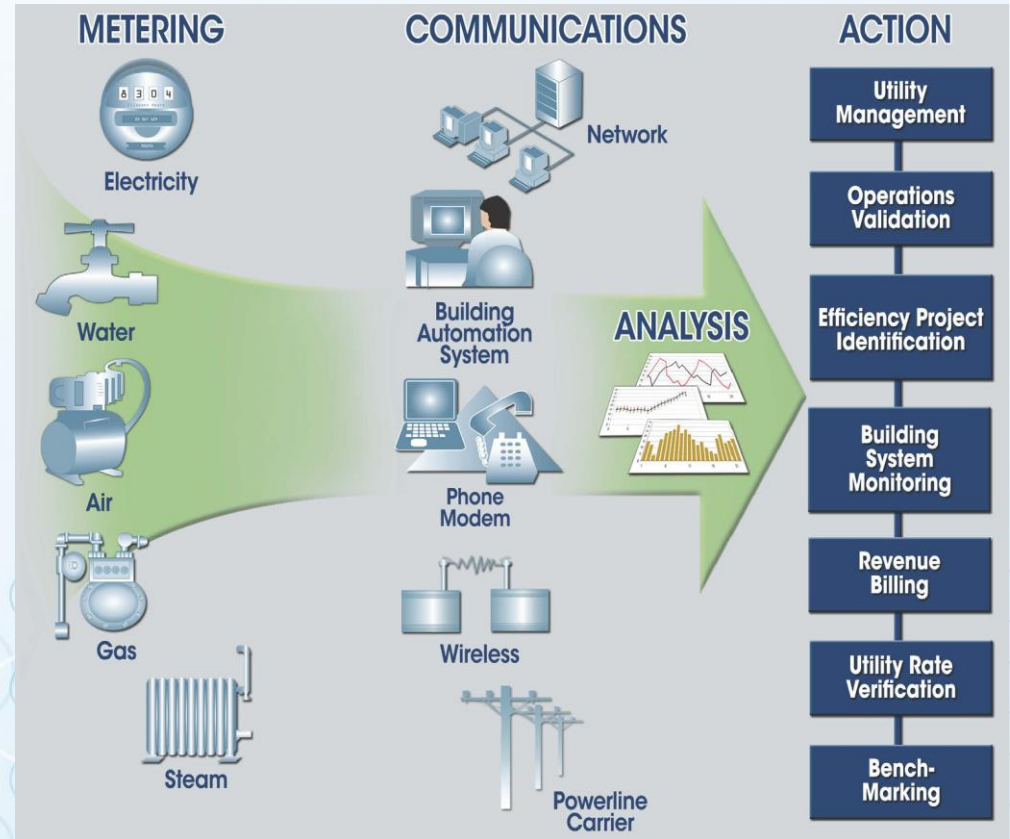
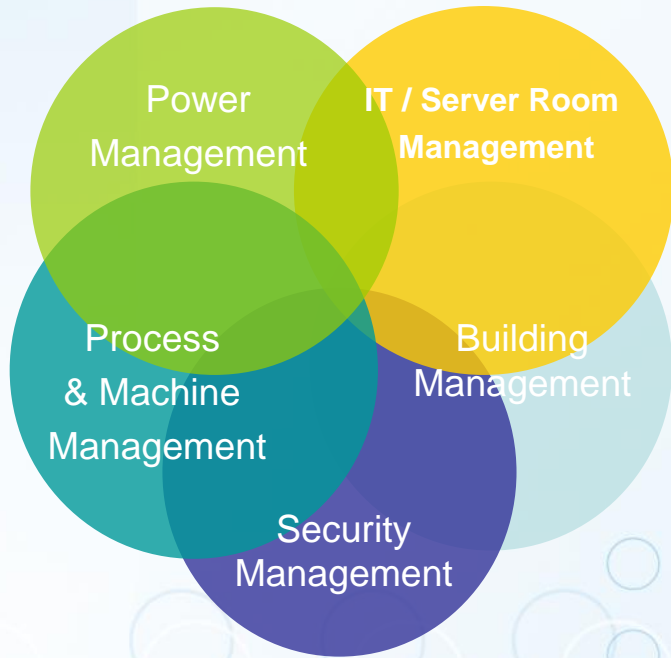
- Buildings & standards

Energy in Context challenges



Manual inputs, data duplication, dissimilar systems, integration....

EcoStruxure™: An ecosystem integrating of Infrastructure and IT

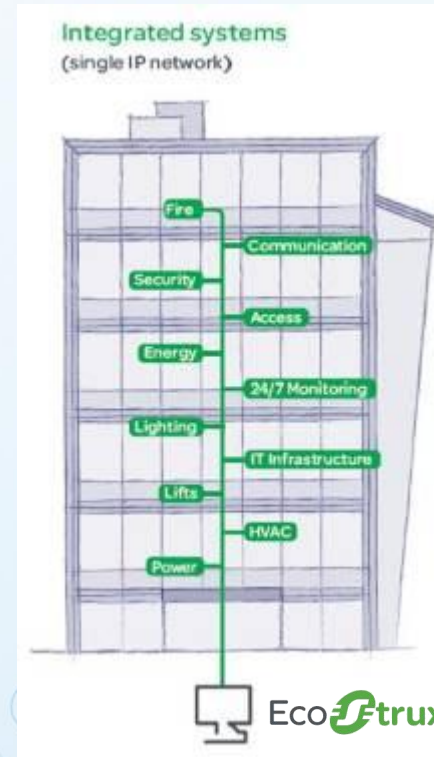
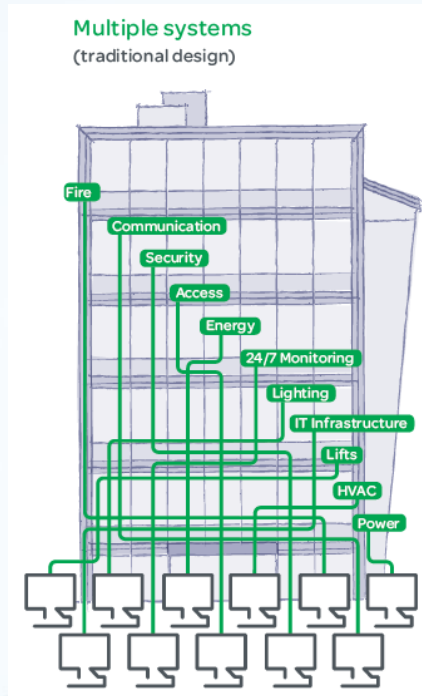


Helping customers solve their Energy Equation

Making the energy Safe, Reliable, Efficient, Productive and Green

Solution offer vision

Multiple silo systems

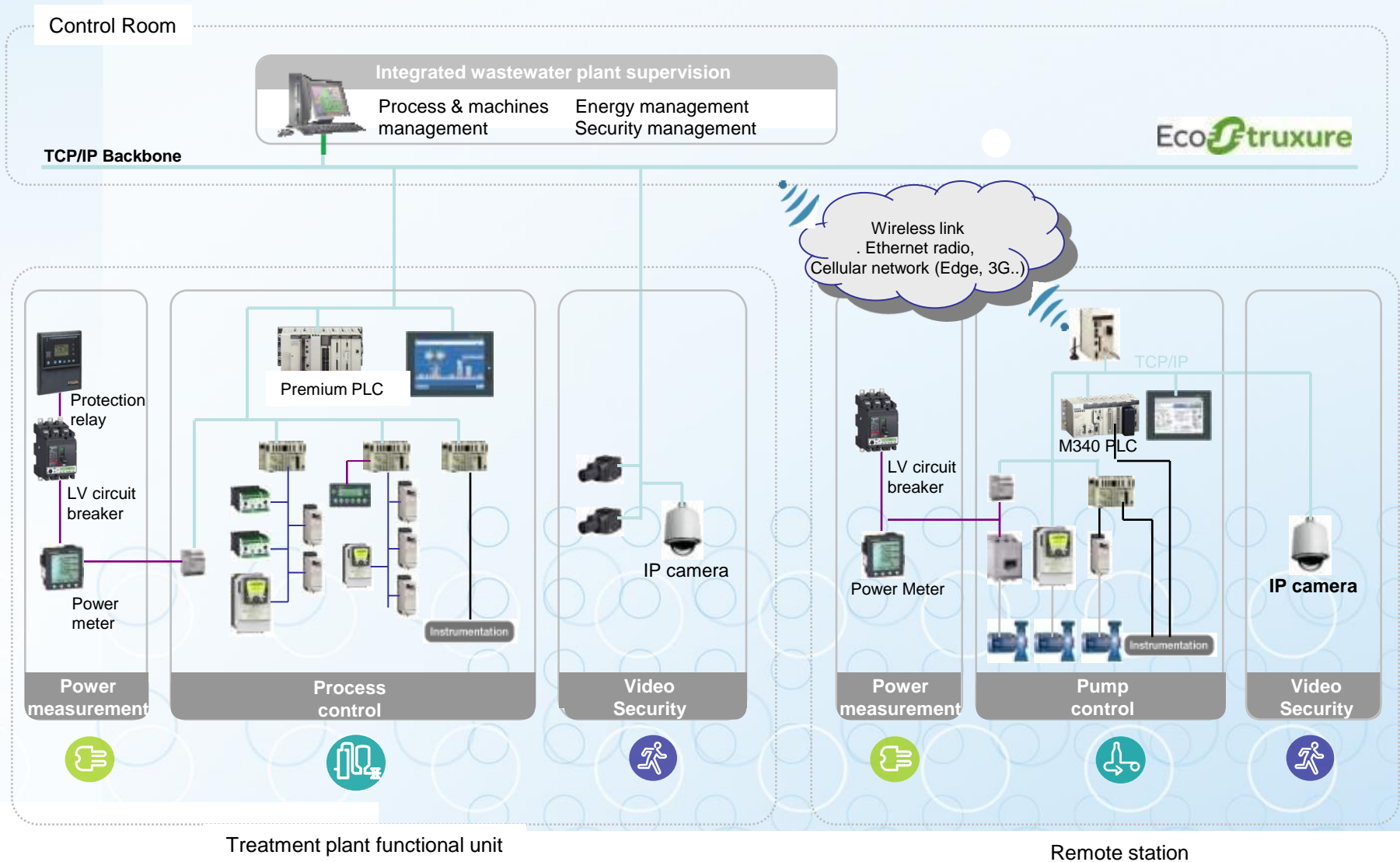


Integrated Solution

3
fundamental
principles

- Energy visibility everywhere
- Security integration everywhere
- Ethernet IP & Openness to 3rd party systems

Example: Water EcoStruxure architecture



Example of the Water Operating Center

Enterprise Performance



Waste water infrastructure overview



Enterprise Energy Dashboard



Plant energy performance



Process control with security integration



Power control



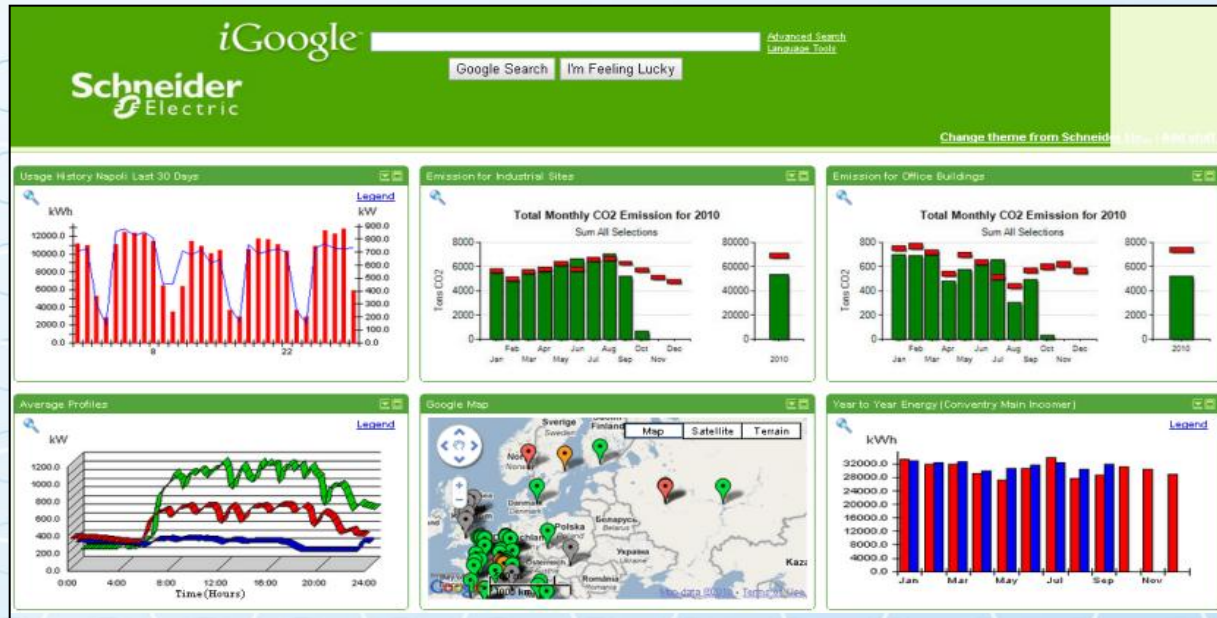
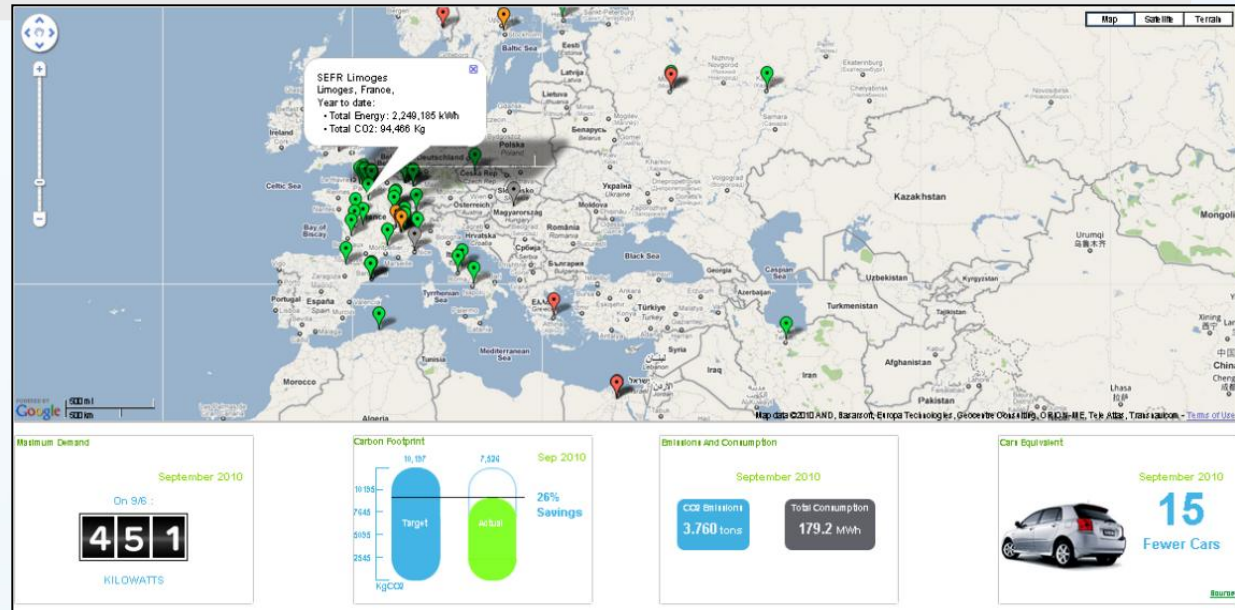
Process optimization

Site supervision

Energy Management Portal

Features:

- Load Profile
- Sustainability
- Set point
- Alarming
- Analysis
- Cost Savings
- Bill Estimation



Benefits are real!

Wastewater Treatment Plant, Csepel (HUNGARY)



The new Europe's largest wastewater treatment plant

Productive: ★★★★★

Efficient: ★★★★★

95% of wastewater treated instead of 54%. 15% design cost reduction



Global supervision

> Vijeo Citect SCADA



Power management

- Power quality mitigation
- Local LV/MV protection & control
- Intelligent power & motor control



Process and machines management

- Process automation
- Pump & fan control



Services

- Complete study and design of the architecture.
- Project management
 - Standardization and objects library creation
 - Full delivery and commissioning of motor control, process automation and energy efficiency from MV to LV.

The Orchard Ostrava (Czech Rep)



An eco-friendly commercial office and hotel center

Safe ★★ **Efficient** ★★★★★ **Reliable** ★★

Highly efficient **class A** office building

20% CapEx reduction vs. non-integrated solutions



Global supervision

> TAC Vista BMS



Power management

- Power measurement
- Power quality mitigation



IT Room management

- Uninterruptible power supply



Building management

- HVAC control
- Lighting control



Security management

- Video security
- Access control

Solaire Direct (FRANCE)



A turnkey contract for a complete system including conversion & distribution of photovoltaic electricity

Efficient: ★★★★★

The Vinon array will produce enough electricity to supply **2,000** homes, i.e. nearly **4,600** inhabitants. An array of this type can save **2,900 tons** of CO2 from being produced per year



Global supervision

> Kerwin Power SCADA



Power management

- Power measurement
- Local LV/MV protection & control
- Renewables energy conversion



Security management

- Video security
- Intrusion detection



Services

- Electrical network studies
- Installation and Commissioning
- 97,5% availability for 20 years with maintenance contract
- Remote monitoring

Thank you!

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