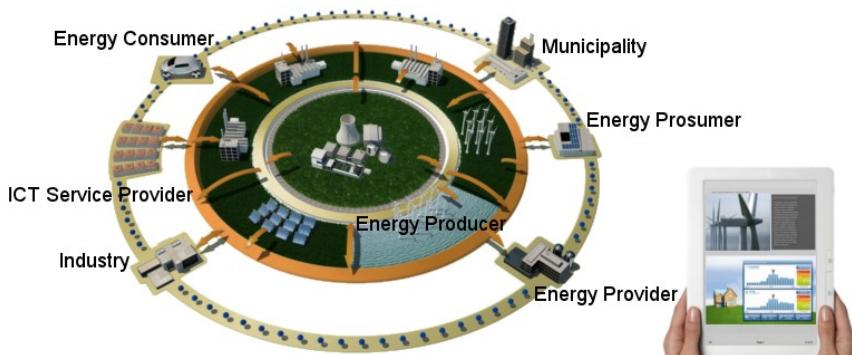


# Towards New Business Models in the Energy Sector based on Software-as-a-Service-Utilities and Value-added Services

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## Demographic dynamics



- **Population growth**  
7.5 bill. in 2020 (+1.1 bill.)
- **Megacities**  
27 megacities (>10 mill. people) by 2025

Source: UNO

**Increase of society's electrification equals to rising energy consumption**

## Scarce resources



- **Geopolitics**  
70% of global oil and gas reserves are located in just a few countries
- **Price volatility**

**Shortage of fossil energy resources** results in:

1. Demand for energy efficiency
2. Substitution with **alternate energy resources**

## Climate change



- **Global endeavors**  
Political programs aimed at long-term reduction in CO<sub>2</sub> emissions

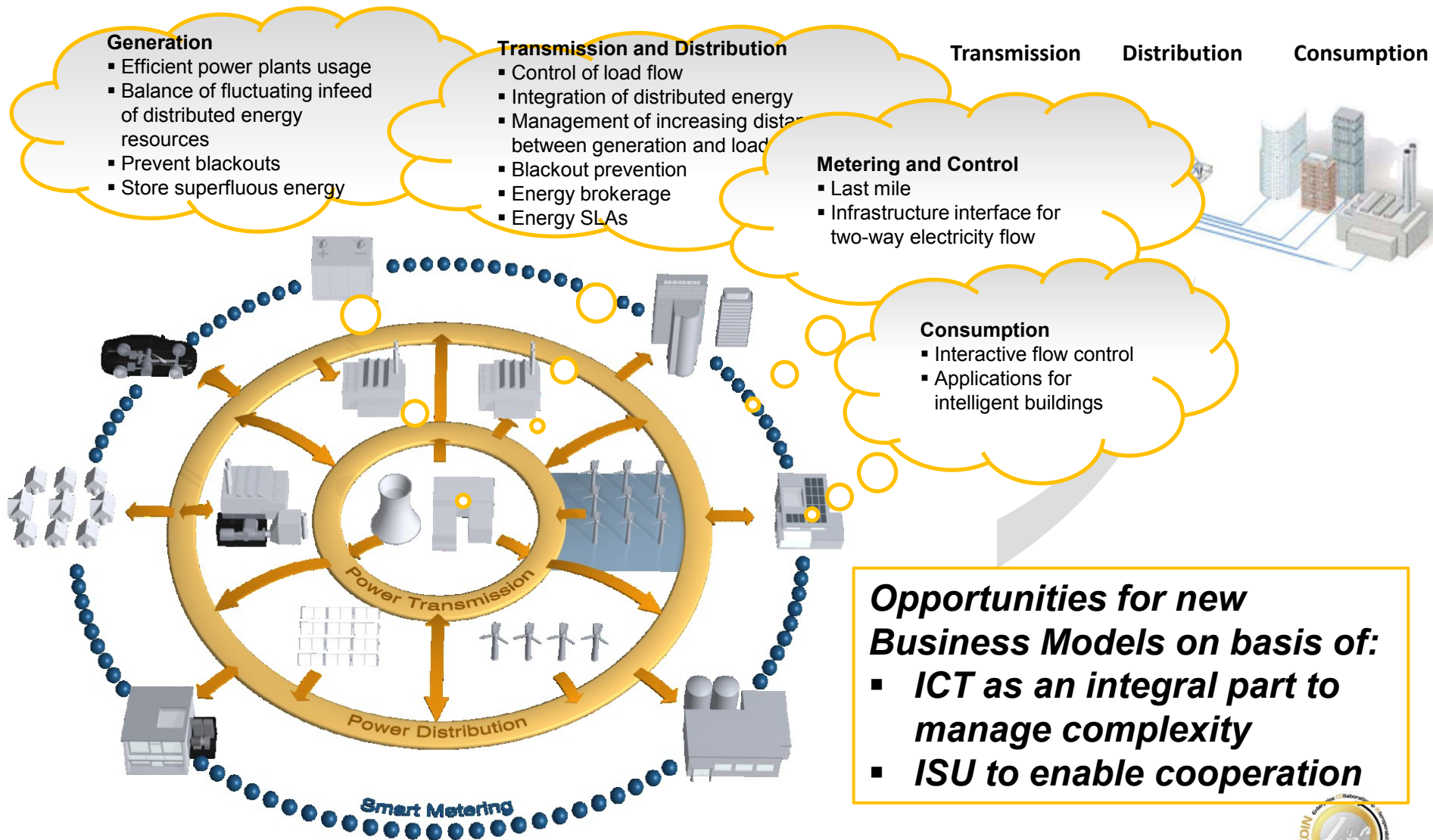
**Environmental awareness** triggers demand for "clean" and renewable energy solutions

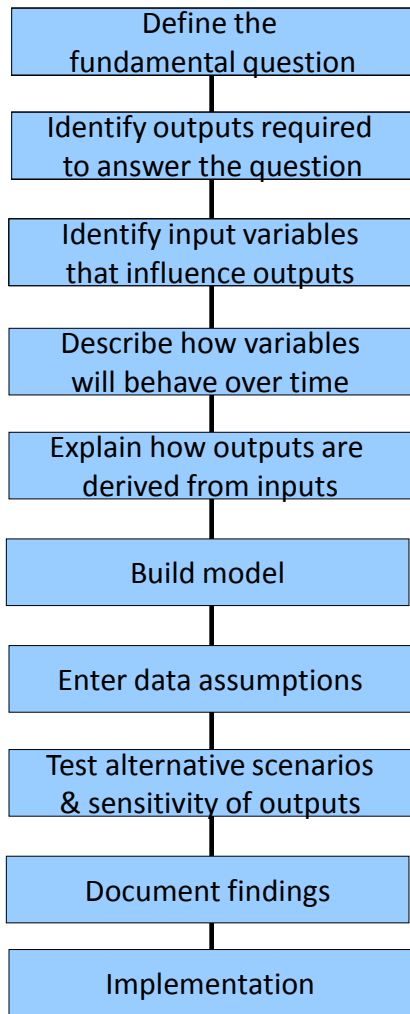




Video available at  
<http://www.energy.siemens.com/hq/en/energy-topics/smart-grid/smart-grid-information>







Source: IC Focus

**The European, 01.06.2020**

**Electricity supply by individuals tops supply of traditional energy sector**

Sun, water, wind, biomass and geothermics allow privateers to produce nearly 35 percent of the world's energy market.

The trend of steadily rising energy consumption has been stopped due to the possibility to save excess energy in ecologically sustainable and affordable storage devices, as well as the stern commitment to optimize energy supply and demand with information and communication technologies.

The ICT infrastructure, platforms and services are based on COIN and enable everyone to participate in the energy market having equal rights in exchanging information and trading electricity.

The market has turned into a customer market exceeding all environmental expectations of the various summits from the beginning of this millennium.

**Critical events leading to the story**

<b>2010</b>	<ul style="list-style-type: none"> <li>▶ Devastating oil pollution in the Gulf of Mexico</li> <li>▶ EU regulates CO<sub>2</sub> emission</li> </ul>
<b>2013</b>	<ul style="list-style-type: none"> <li>▶ BRIC states biggest energy consumer in the world</li> <li>▶ Rocketing oil price stimulates R&amp;D programs for energy optimization</li> <li>▶ Introduction of COIN to the market</li> </ul>
<b>2015</b>	<ul style="list-style-type: none"> <li>▶ Broadband internet, smart meters as well as energy storage available and affordable for everyone</li> <li>▶ Energy sector relevant ICT standards established</li> <li>▶ First supply and demand service for electricity available</li> </ul>
<b>2017</b>	<ul style="list-style-type: none"> <li>▶ Electric fuel station network all over Europe</li> </ul>
<b>2020</b>	<ul style="list-style-type: none"> <li>▶ Market turns into customer market</li> <li>▶ Start of energy production in world's deserts</li> </ul>

**Ideal electricity market 2020**  
Highly competitive marketplace, where individuals can trade electricity based on just-in-time info over standardized ICT

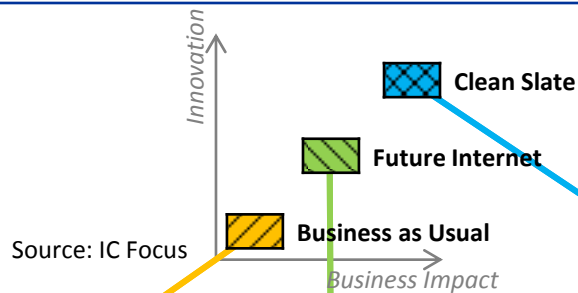
  

**The Business Model Canvas** Designed for \_\_\_\_\_ Designed by \_\_\_\_\_

<p><b>Key Partners</b></p> <p>Who are our key partners? Who are the suppliers? Who are the distributors? Who are the channels and resellers? Who are the complementors?</p>	<p><b>Key Activities</b></p> <p>What key activities must we perform to make our business model work? What key activities are essential? What key activities are most difficult to imitate?</p>	<p><b>Value Propositions</b></p> <p>What value are we offering to the customer? What problem are we solving for the customer? What need are we satisfying? What are our unique selling propositions?</p>	<p><b>Customer Relationships</b></p> <p>What type of relationship do we offer our customers? How do we acquire our customer segments? How do we retain our customer segments? How do we expand our customer segments? How do we create additional value for our customer segments? How do we create additional value for our customer segments?</p>	<p><b>Customer Segments</b></p> <p>Who are our customer segments? What are our customer segments? What are our customer segments? What are our customer segments?</p>
<p><b>Key Resources</b></p> <p>What key resources do we need to make our business model work? What key resources are essential? What key resources are most difficult to imitate?</p>		<p><b>Channels</b></p> <p>Through which channels do our customer segments want to be reached? How do we reach our customer segments? How do we reach our customer segments? How do we reach our customer segments? How do we reach our customer segments?</p>		
<p><b>Cost Structure</b></p> <p>What are the most important costs incurred in our business model? What are the most important costs incurred in our business model? What are the most important costs incurred in our business model?</p>			<p><b>Revenue Streams</b></p> <p>For what value are our customer segments willing to pay? How do we capture value? How do we capture value? How do we capture value? How do we capture value?</p>	

www.businessmodelgeneration.com

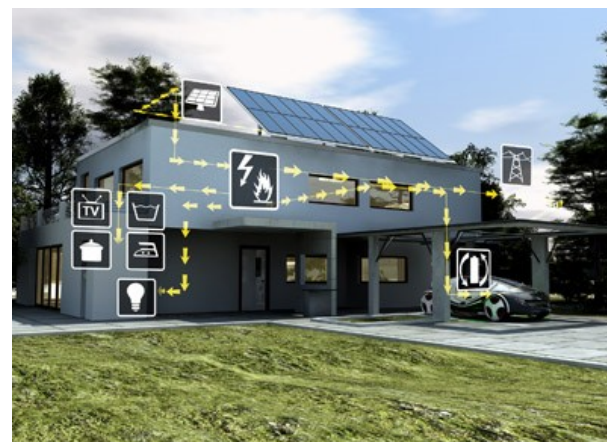




Input Parameters		Value 1	Value 2	Value 3	Value 4
Business-Economics	Number of private members in the Electric Ecosystem	1 Mio	25 Mio	50 Mio	100 Mio
	Rate of private energy production	1%	3%	5%	10%
	Rate of energy management of the market over COIN	< 1%	5%	15%	25%
	Energy consumption trend	Decreasing	Stable	Increasing	
	Energy pricing	Stable	Dynamic		
Technology	Rate of alternate electricity production	20%	25%	30%	40%
	Development of energy infrastructure	No	Small	Medium	Overall
	New grid services (e.g. smart metering, storage, trading)	Hype	Sustainable		
	Rate of mobile internet access	20%	40%	60%	90%
Policy	Standards for energy exchange	Open	Implemented	Sustainable	
	Legislative regulations	Low	Strict	Harder	
	Subsidies of alternative energy	None Existing	Existing Low	Existing High	



- Analysis of daily load distribution per customer (prerequisite: smart meters)
- Forecast of energy prices
- Forecast of energy consumption for a customer (e.g. heating depending on season, weather) based on regression data analysis
- Recommendations for a customer how to distribute energy consumption over the day
- For energy “prosumers”: forecast of ideal time slots for energy production (e.g. wind turbine, solar collector) based on meteorological forecast
- For energy “prosumers”: show energy demand of customers in your proximity
- For municipalities: comparison of energy supply and demand within the municipality (energy planning support)



# What will the future look like?

Large centralized power plants still supply the majority of power demand

CO2 emissions are constantly on display

Renewables supply 30% of power demand

Micro generation as part of smart buildings

Car-parking for plug-in vehicles, buy or sell electricity shaving peak loads

Very large and very small generation plants need to be managed in parallel

Wireless sensors and smart metering coupled to load management and market driven energy supply software

Storage plants buffer volatile generation



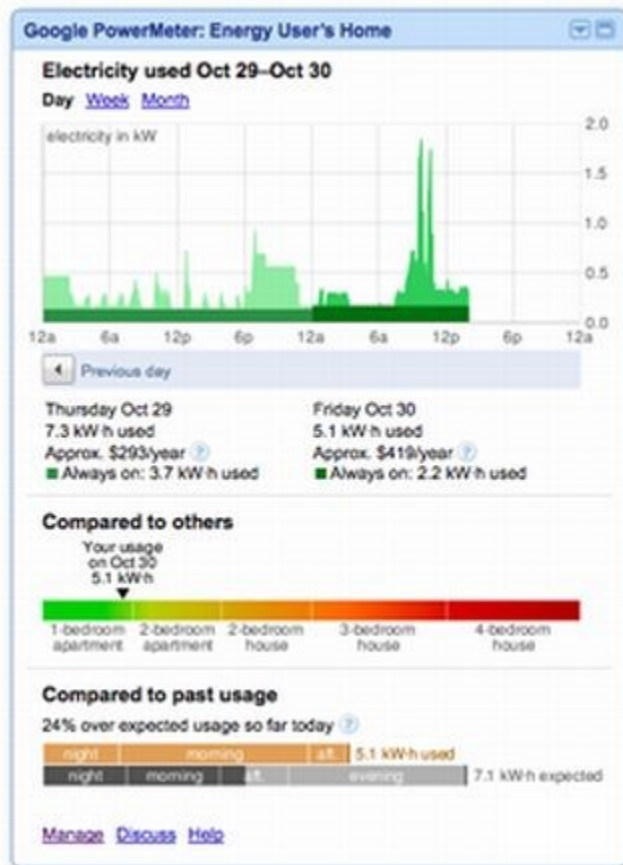
CO2 Footprint	
2:66	Sell 36:00
1:98	Buy 2:30



## Acknowledgement

This presentation and the preceding paper is based on work performed in the project COIN (EU FP7 Project 216256; <http://www.coin-ip.eu>) funded by the European Union within the ICT Work Programme of the Seventh Framework Programme and on research by Siemens. The presenter and the authors would like to thank all partners in the COIN consortium as well as their Siemens colleagues for their contribution.





“While smart meters enable automated reading and accurate collection of consumption data by utilities, as well as deliver of detailed consumption data to consumers ... communications can be interactive, empowering consumers to adjust their behaviors and energy usage according to data about rates, complementary services and other factors.”

„... energy usage awareness will also motivate consumers to obtain programmable devices and use any available dynamic pricing, and help drive down longer-term consumption trends.“

„... by creating a platform for information exchange, it is likely that – as with the Internet – there are numerous other applications, devices and services that have not yet been conceived and that will spring from the energy information exchange enabled by intelligent devices.“

„Enabling ... this two-way flow helps stimulate competition for services and promotes greater consumer choice.“

„... these opportunities will require ... a smarter energy infrastructure“

Source: Comments of Google Inc.  
 GN Dkts. 09-51, 09-47, and 09-137



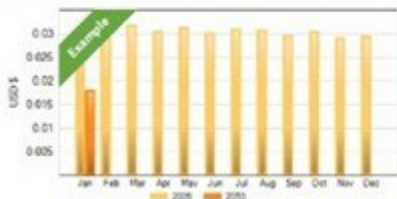
## Energy Cost Breakdown in Your Area\*



Heating	\$885
Lighting	\$109
Appliances	\$331
Water Heating	\$253
Other	\$361
<b>Total</b>	<b>\$1,938</b>

View your Energy Breakdown

## Monthly Energy Cost Comparison Example



## Top Ways to Save

This house could save up to

**\$1,938** per year



- \$367** **Slipping Through the Cracks**  
Hidden air leaks can add up to as much air loss as an open window! You could save 10 percent on energy bills by getting them sealed.
- \$297** **AFUE Good Men**  
New gas furnaces sport an AFUE number that rates their efficiency. Higher is better—look for an AFUE of at least 90 percent.
- \$139** **Duct Tales**  
Having your heating ducts sealed by a pro could make your home less stuffy and improve air quality. You could save significantly on heating and cooling, too.

“... consumers can ... start the process of predicting, monitoring and eventually managing energy use. Microsoft also plans to offer an API for third-party vendors to build devices and software.”

“... Hohm as the first step to working with smart devices and ultimately moving into the control layer for energy systems, either working with utilities to turn down appliances with smart plugs or developing smart charging software.”

„Hohm is free to consumers, but Microsoft plans to charge utilities for services eventually, likely when it moves more into the energy control systems. The energy industry is a strategic business area that Microsoft is moving into. “

Source:  
<http://gigaom.com/cleantech/chart-google-microsoft-energy-smackdown-powermeter-vs-hohm>

