

# International Solar Alliance Expert Training Course

## New Business Models: Part 2

*In partnership with the Clean Energy Solutions Center*

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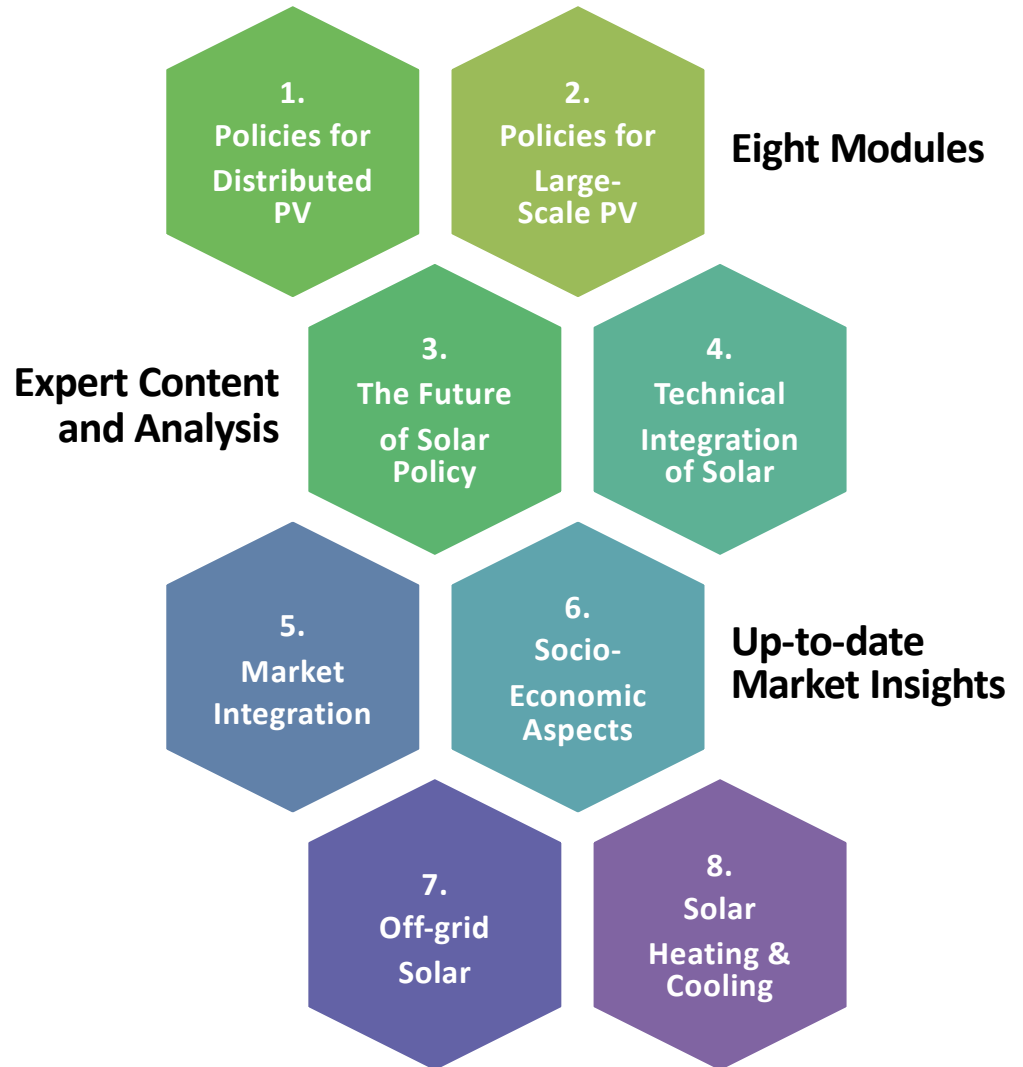
# Supporters of this Expert Training Series



ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY

# Overview of Training Course Modules

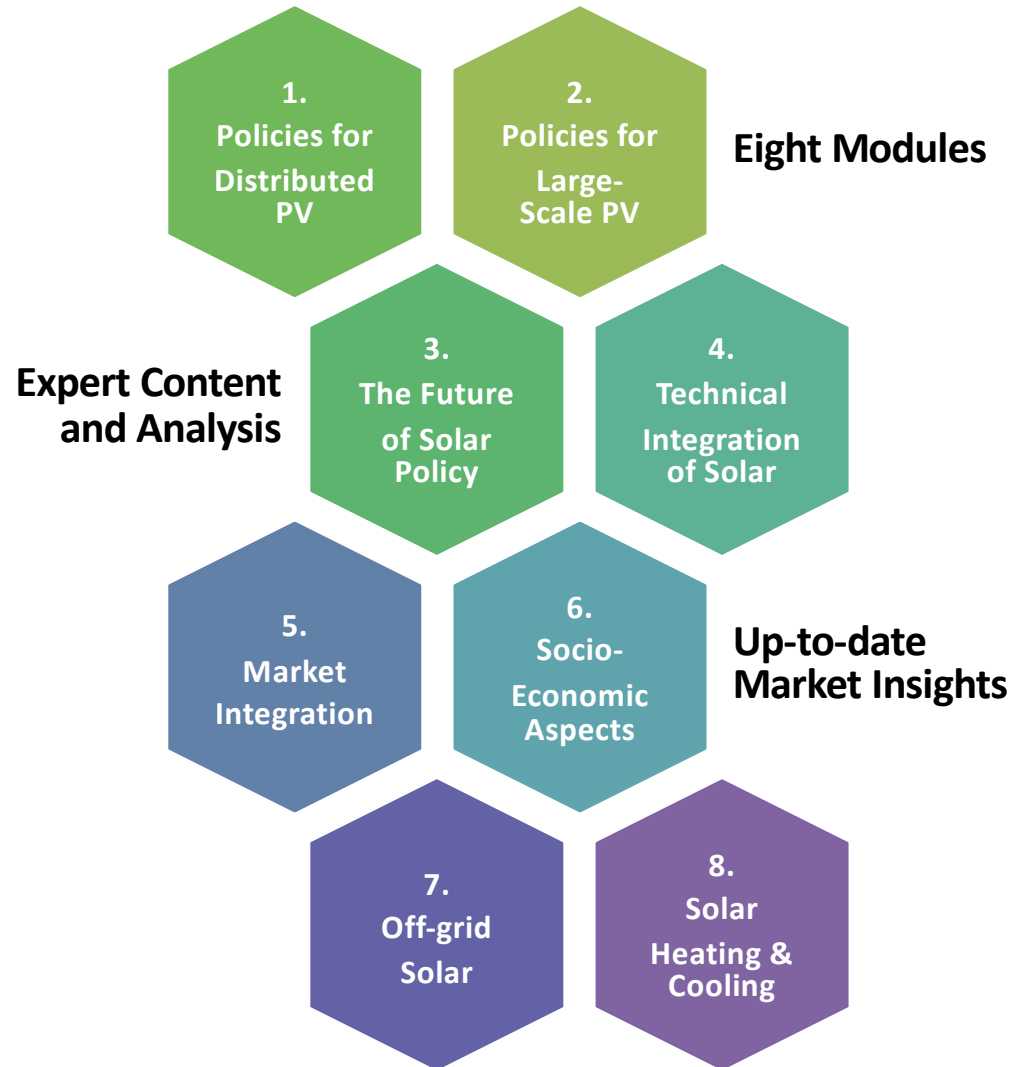
This Training is part of Module 1, and focuses on the issue of **New Business Models in the Solar PV Sector**



# Two-Part Training

*Part 1: Focused on understanding these new solar business models (previous)*

**Part 2: Focuses on understanding how these new business models are impacting the traditional utility sector**



# Overview of the Presentation

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- 1. Introduction: Learning Objective**
- 2. Historical Context of the Utility Sector**
- 3. Main body of presentation**
- 4. Further Reading**
- 5. Knowledge Check: Multiple-Choice Questions**

# 1. Introduction: Learning Objective

# Learning Objectives

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- ❖ **Understand the historical context for the opening up of the electricity market (i.e. liberalization)**
- ❖ **Understand the rise of new business models in the utility sector**
- ❖ **Understand how the new business models, combined with other trends, are impacting the power sector**
- ❖ **Understand the key issues and challenges for utilities**

## 2. Historical Context

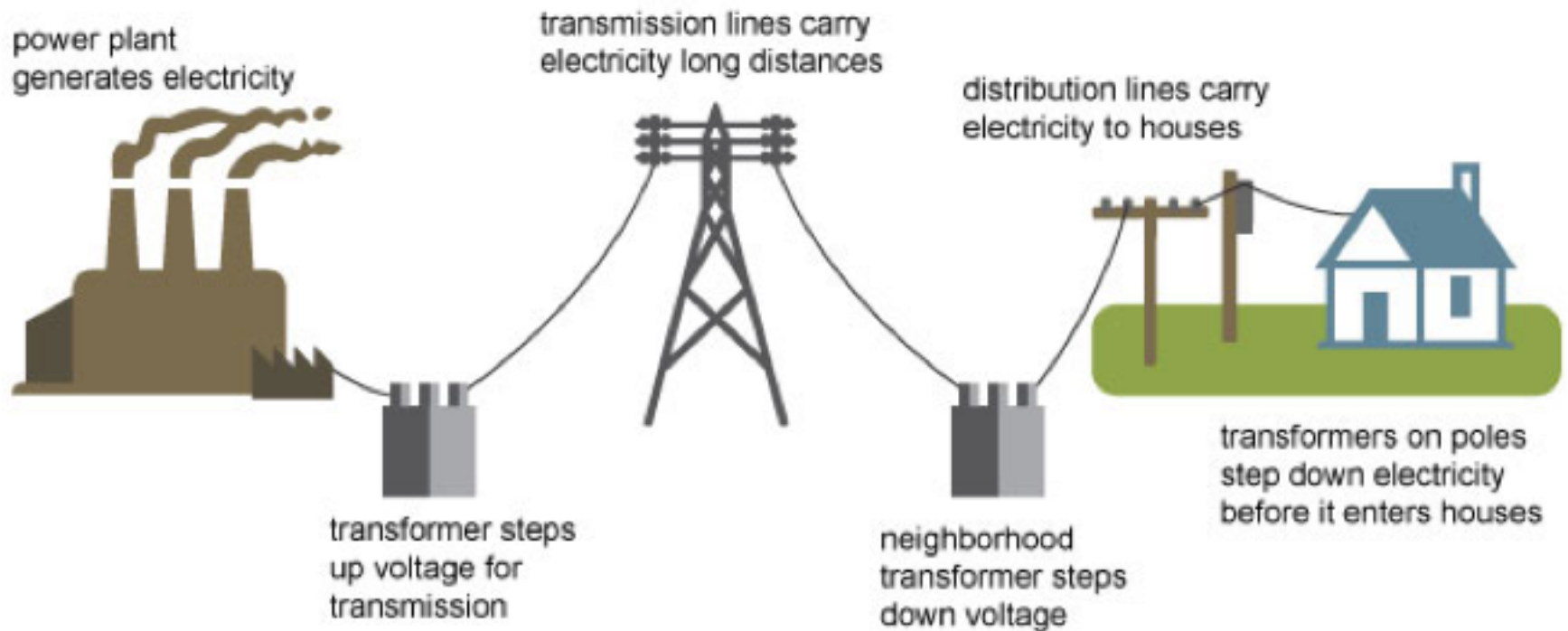


# Historical Context

- The traditional utility business model of selling electricity from large, centralized power plants has defined the second half of the 20<sup>th</sup> century
- Captive customers connected to one monopoly utility led to strong utility balance sheets
- Stable regulatory conditions in most markets guaranteed a certain target rate of return (typically between 7-12%) on new investments, making utilities a low-risk investment for retail investors, pension funds, and institutional investors

# Historical Context

## Electricity generation, transmission, and distribution



Source: Adapted from National Energy Education Development Project (public domain)

[https://www.eia.gov/energyexplained/index.php?page=electricity\\_delivery](https://www.eia.gov/energyexplained/index.php?page=electricity_delivery)

# Historical Context

- **Utilities' perception as a low-risk investment was key to their success:** they could access low-cost capital to finance their investments and operations
- **Monopoly conditions, combined with supportive regulation, effectively ensured stable returns to shareholders**

# Historical Context: the Perfect Storm

In the 1970s, the "**Utility Consensus**" started to shift, driven by a host of factors:

- **Rising fuel prices**, which drove rising electricity rates and fueled customer dissatisfaction
- The **rise of distributed energy technologies** (solar, wind, natural gas turbines, as well as energy efficiency)
- Changing **financial market conditions** (rising interest rates)
- **Utility mis-management**: e.g. major project cost overruns
- **Lower electricity demand growth**, driven by major improvements in energy efficiency etc.

# Historical Context: the Perfect Storm

This “**perfect storm**” drove a shift in utility regulation, leading to rules favoring more competition, more actors, and a more open electricity market

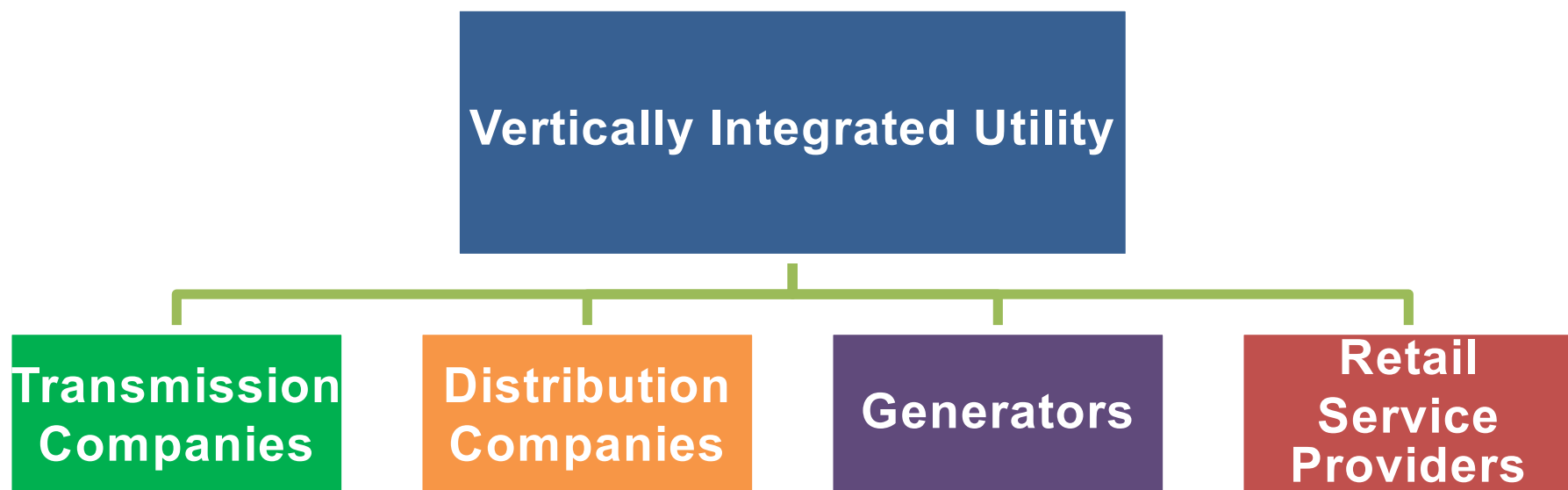
*“...advances in small-scale generating equipment caused people to question the assumption that utility companies constituted natural monopolies capable of producing power at the lowest cost.”*

- Richard Hirsh, [Power Loss](#) (2001)

# Key Regulatory Steps

- **Electricity markets were opened up to retail competition**, enabling customers to choose their supplier: first for industrial customers, then for commercial and residential
- **Regulators drove unbundling** of transmission, distribution, generation, and customer service
- **Independent producers** were allowed to invest in the generation business
- Also **opened the door to new business models** (e.g. solar leasing, peer-to-peer operators, pure retailer who buys on the wholesale market and owns no generation; pure transmission operator, etc.)

# Historical Context: Liberalization: 1980s-90s



# Historical Context

- Opening the market to new business models has triggered profound changes in electricity markets worldwide
- In the process, **many utilities have been (and remain!) uncertain which path to take**



Photo: <https://handihelp.wordpress.com/2016/01/03/new-year-new-opportunity-the-fork-in-the-road/>



# Historical Context

- The problem is, there are far more than two paths to follow:

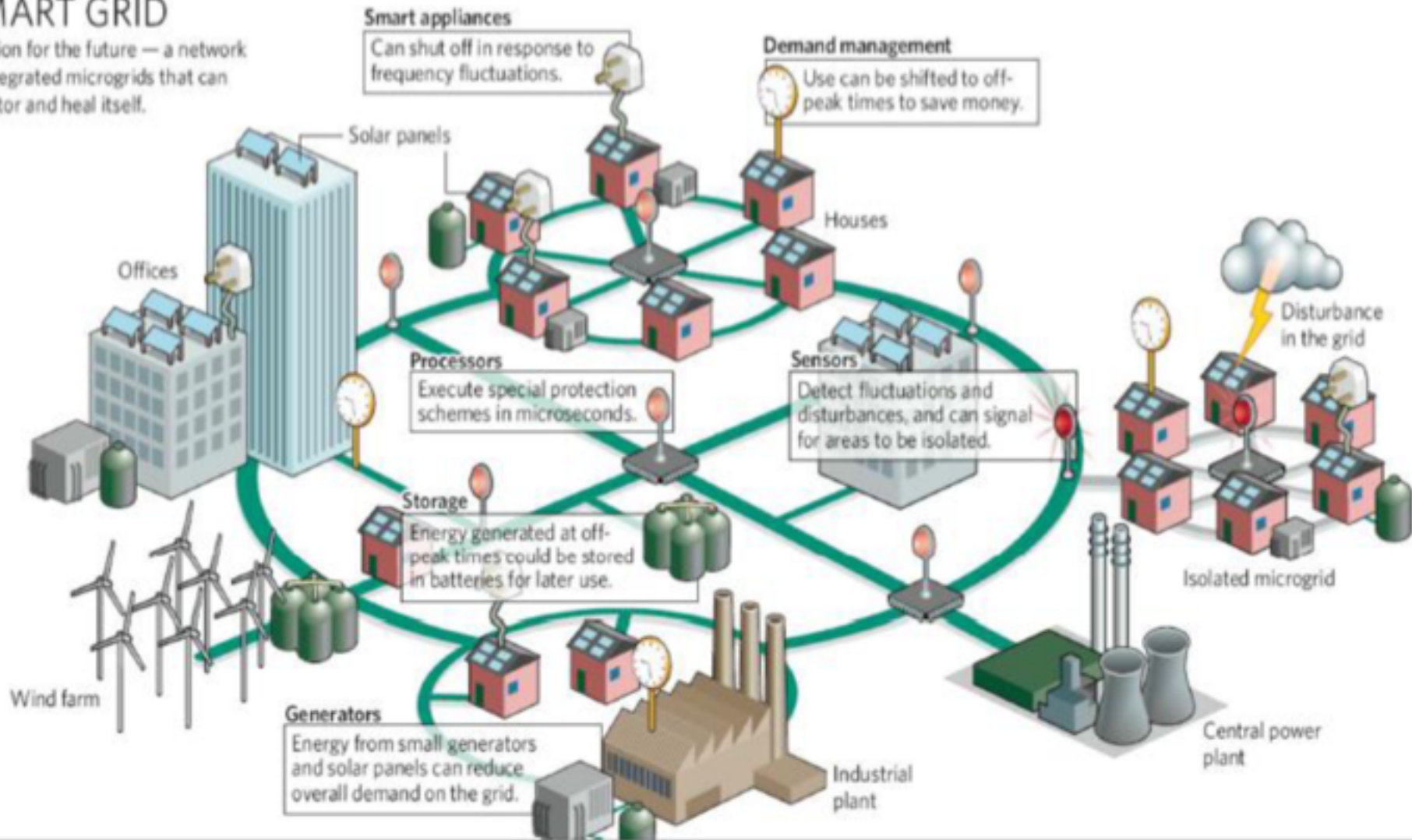


Photo: [https://www.huffpost.com/entry/10-useful-ways-to-choose-the-right-direction-in-life\\_b\\_9192982](https://www.huffpost.com/entry/10-useful-ways-to-choose-the-right-direction-in-life_b_9192982)

# 2010s – Beyond?

## SMART GRID

A vision for the future — a network of integrated microgrids that can monitor and heal itself.



## 3. New Utility Business Models

# Transition in Utility Business Models

## Old Utility Model



## Emerging Utility Models

- | Old Utility Model   | Emerging Utility Models   |
|---|---|
| <ul style="list-style-type: none"><li>- Customers are charged on a per-kWh basis</li><li>- Customer owns everything behind the meter (appliances, etc.)</li><li>- Appliances are controlled solely by the customer</li><li>- The customer has little cost visibility, and few choices (other than which appliances they buy)</li><li>- Utilities own T&amp;D infrastructure and ensure reliability</li><li>- Utilities own and operate generation sources</li></ul> | <ul style="list-style-type: none"><li>- Customers are charged on the basis of service level</li><li>- Utility owns or finances a portion of customers' equipment</li><li>- Some appliances can be remote controlled by the service provider (e.g. hot water heaters, freezers)</li><li>- Customers have more transparency over costs, and more choices</li><li>- Different ownership structures for T&amp;D (unbundling)</li><li>- Generation can be owned by a range of actors, and is more highly distributed</li></ul> |

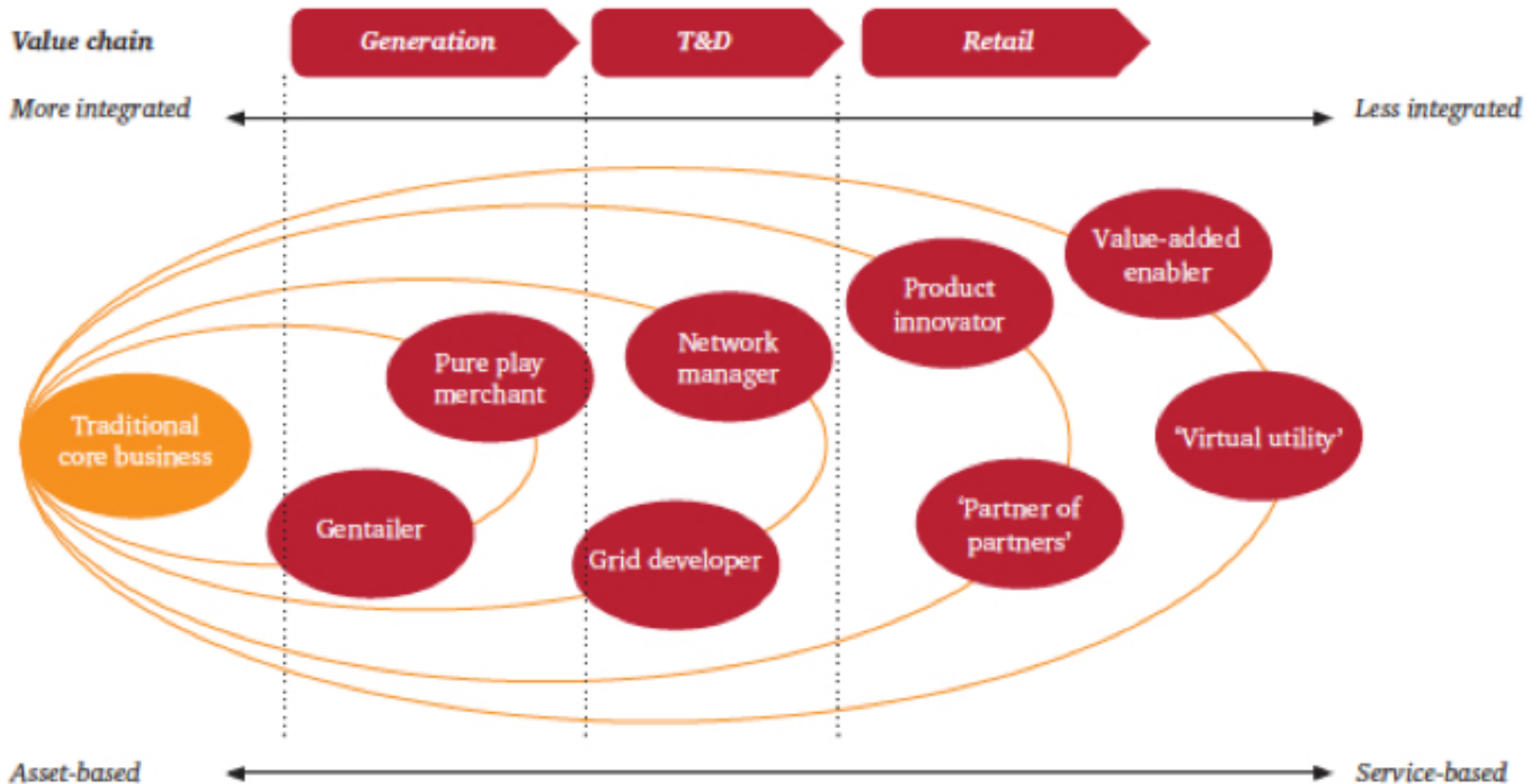
# New Business Models

In the utility sector as a whole, a wide taxonomy of utility business models is emerging:

- “Gentailer” Model
- Pure Play Merchant Model
- Grid Developer Model
- Network Manager Model
- Product Innovator Model
- “Partner of Partners” Model
- Value-added Enabler Model
- Virtual Utility Model

Source: <https://www.pwc.com/ox/en/utilities/publications/assets/pwc-future-utility-business-models.pdf>

# Unclear which one(s) will thrive, and which will fail



Source: <https://www.pwc.com/ox/en/utilities/publications/assets/pwc-future-utility-business-models.pdf>

# New Business Models

*"Conventional business models of larger power supply companies no longer work."*

- Head of EnBW, a large utility in southwestern Germany
- These various trends are pushing some utilities away from increasingly “low-margin” parts of the electricity sector (trading electricity), and toward higher margin areas (customer service, automation, energy optimisation, software, the Internet-of-Things, etc.)

<https://www.creentechmedia.com/articles/read/this-is-what-the-utility-death-spiral-looks-like>

# New Business Models

Broadly speaking, there is a “**barbell strategy**” emerging (Taleb 2017): movement is toward the poles

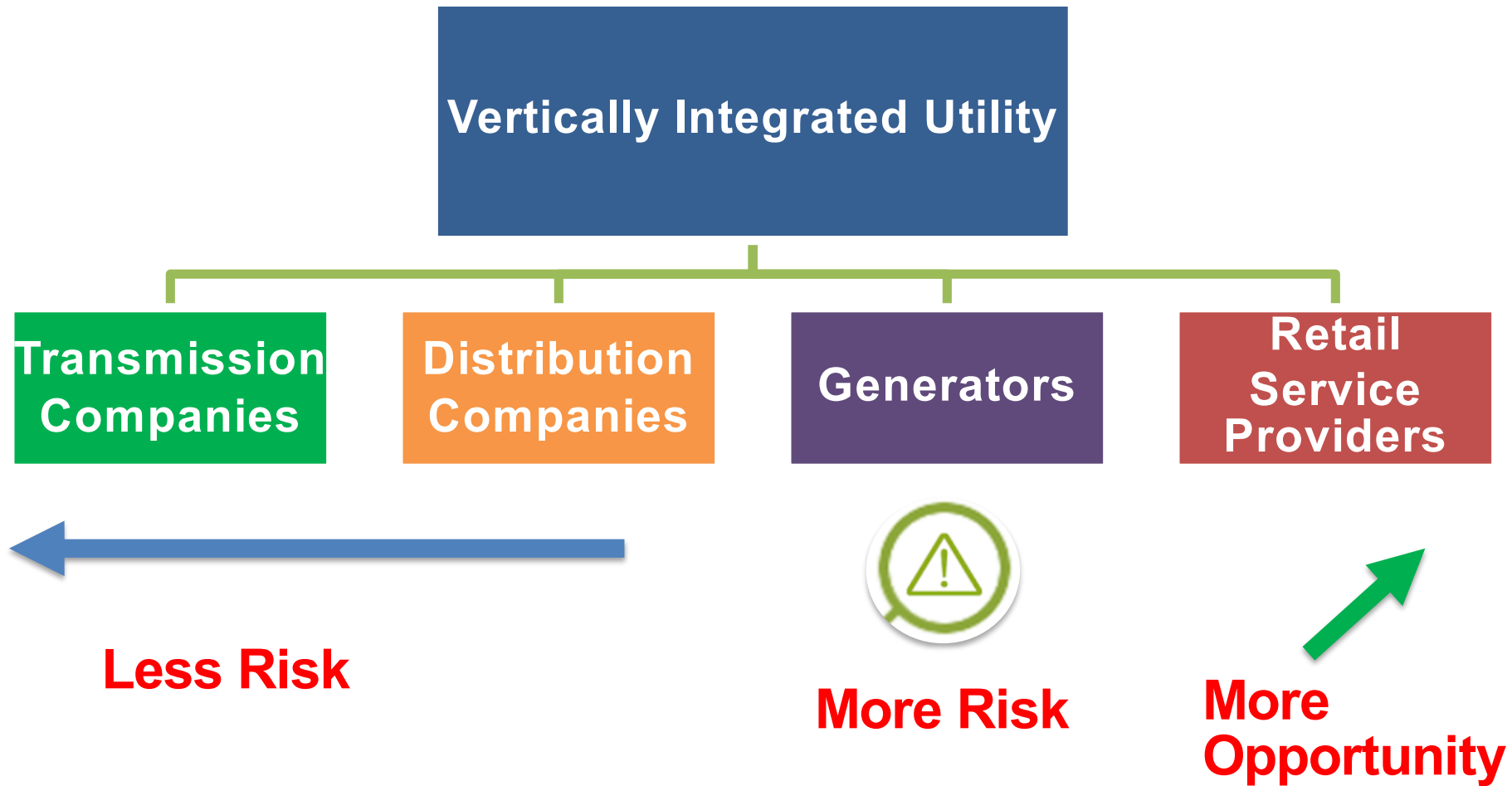
Some utilities are focusing more on the regulated end of the business (e.g. transmission) while other are focusing on the customer end of the business (e.g. retail services)



Source: <https://thedeependish.org/advanced-investing-barbell-strategy/>



# Spectrum



# New Business Models

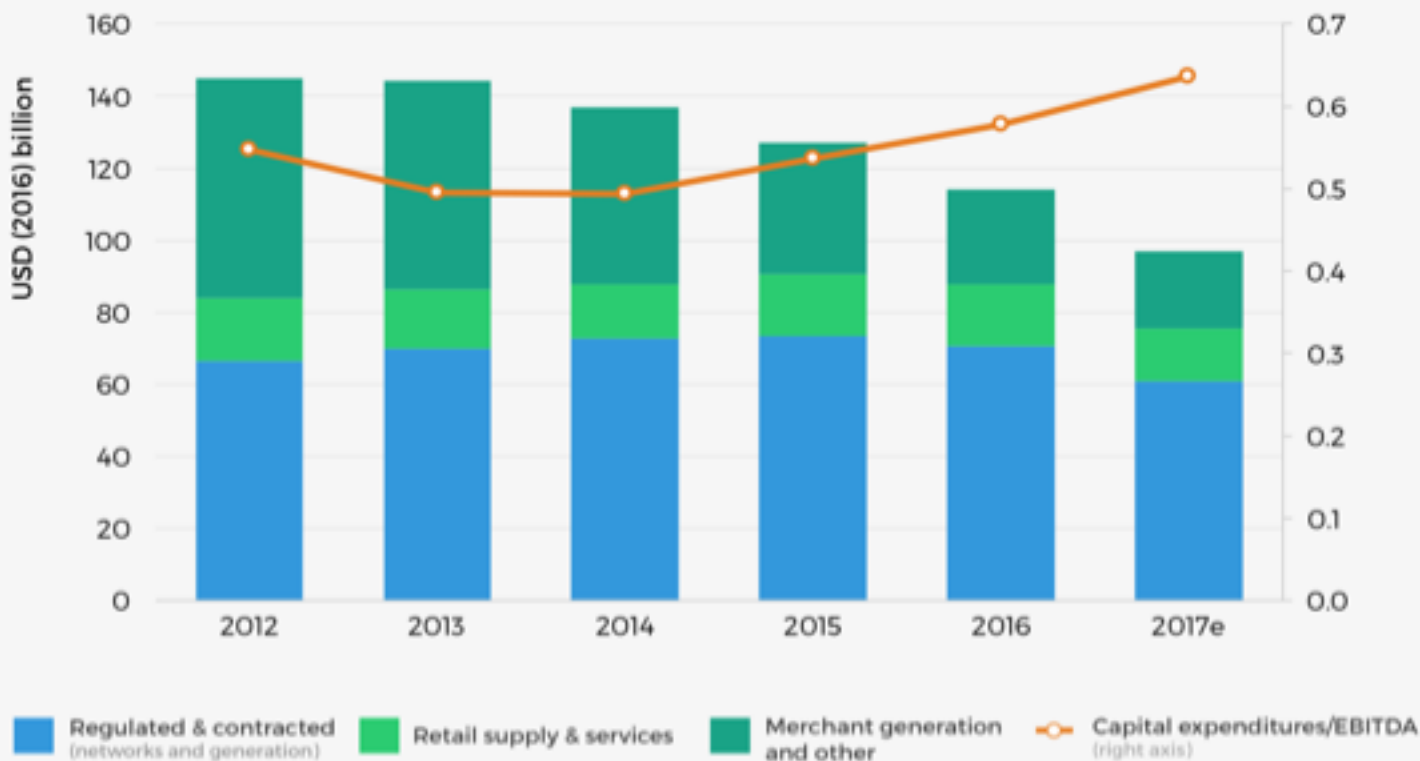
“However brilliant the strategy, you should occasionally look at the results.”

- Sir Winston Churchill



# New Business Models

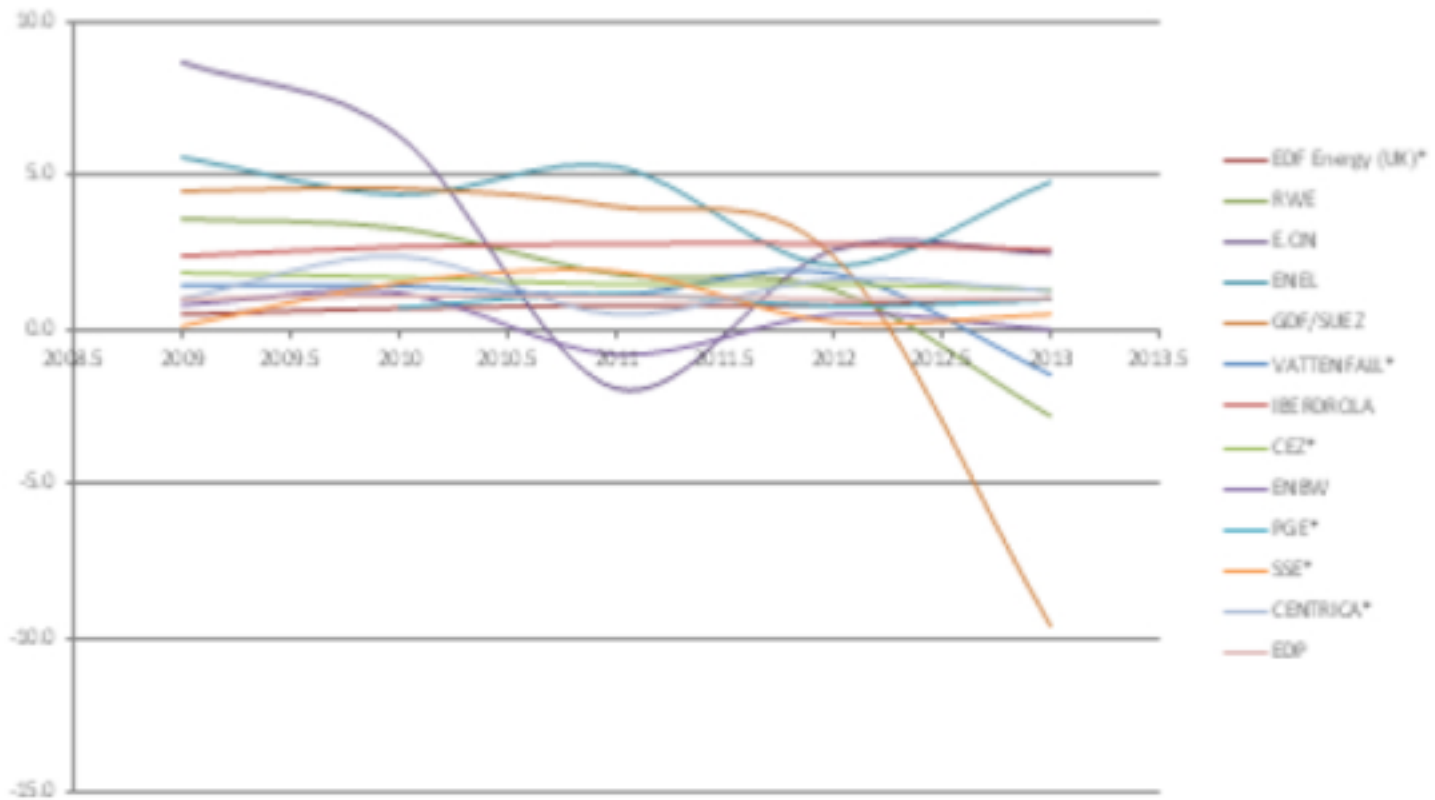
Aggregate earnings of the top 20 European utilities by business segment  
IEA Analysis



<https://www.iea.org/newsroom/news/2017/december/commentary-changing-utility-business-models-and-electricity-investment.html>

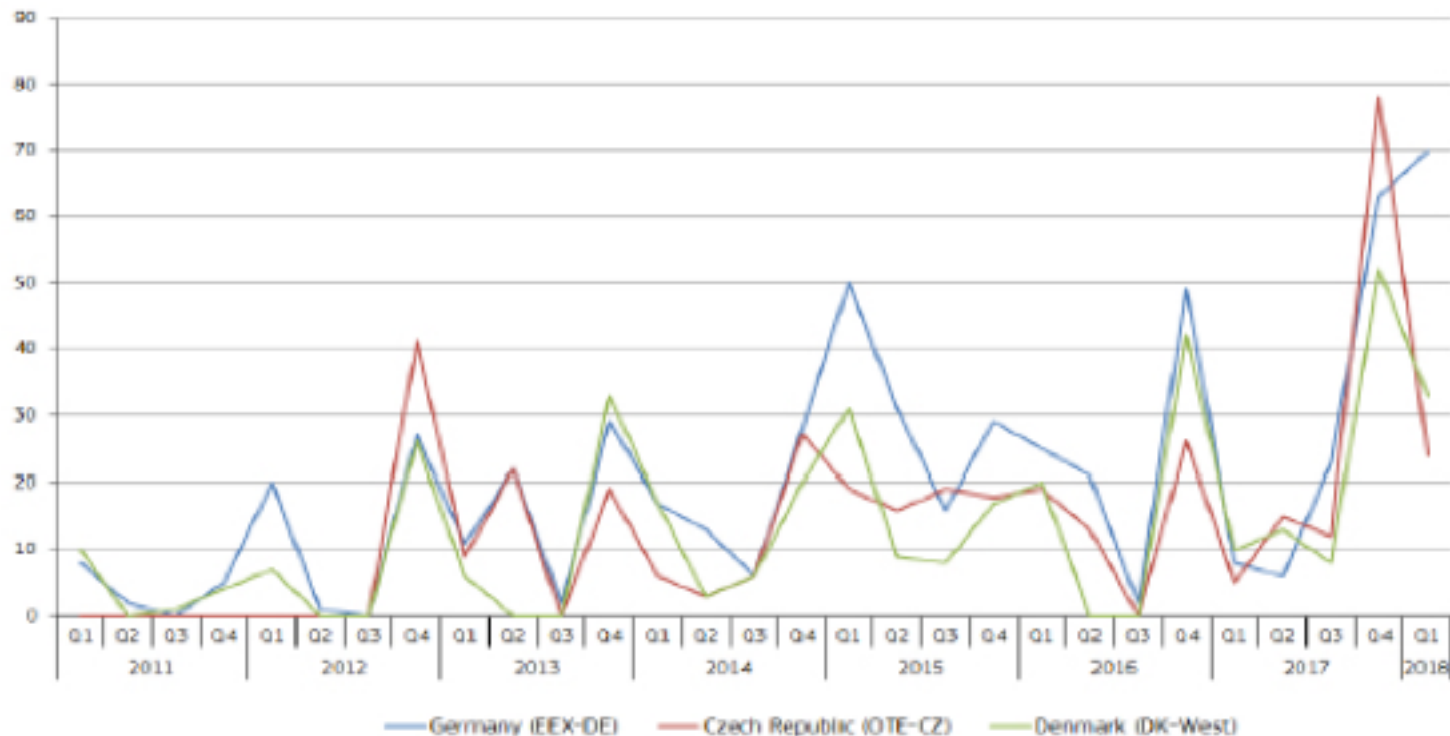
# Utility Revenues Declining

## Net Income (€ billion)



Source: Annual Reports

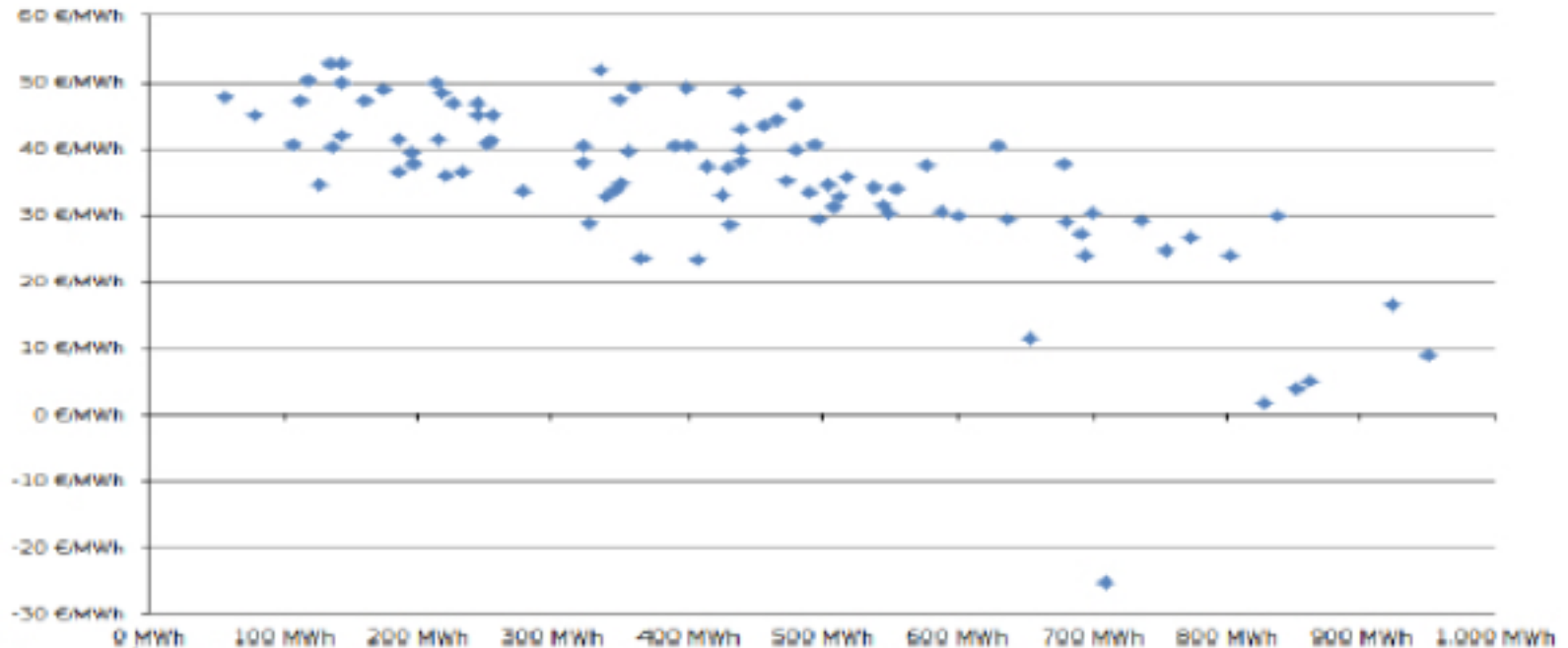
# Number of Hours w/ Negative Prices



[https://ec.europa.eu/energy/sites/ener/files/documents/quarterly\\_report\\_on\\_european\\_electricity\\_markets\\_q1\\_2018.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_electricity_markets_q1_2018.pdf)

# Impact of RE Supply on Wholesale Prices

**Figure 22 – The impact of the variation of the amount of daily combined wind and solar generation on daily average wholesale electricity prices in Germany, in the first quarter of 2018**



Source: Platts, ENTSO-E

[https://ec.europa.eu/energy/sites/ener/files/documents/quarterly\\_report\\_on\\_european\\_electricity\\_markets\\_q1\\_2018.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_electricity_markets_q1_2018.pdf)

# New Business Models

- **New business models are competing** for many different parts of the traditional utility business
- **Competition is driving innovation** across the sector, but particularly on the customer end of the business
- **Equipment providers (OEMs)** are also starting to engage
- **New actors** (peer-to-peer energy sharing, blockchain technologies, aggregators, virtual utilities, etc.) are becoming more widespread

# New Business Models

- Customers are increasingly tapping into **new ways of managing their power demand**, supported by better analytics (esp. Commercial and Industrial customers)
- **Many large companies are starting to procure their own power supply**, signing long-term renewable energy contracts (Apple, Google, etc.), and becoming more self-sufficient in their electricity supply (Adobe, etc.)
- **The rise of self-consumption** across the sector is putting further downward pressure on utility electricity sales



# New Business Models

**The result is that utilities are losing traditional sources of revenues.**

**This is forcing utilities to devise new ways of generating value for customers (and for shareholders!)**



Photo: <http://www.ennavadicanta.com/detail/news/20832>

# Utility Revenues Declining

- Analysis of 50 major utilities from Asia, Europe, and North America revealed cumulative returns to shareholders of about **1 percent** from July 2007 to July 2017, compared with 55 percent for the MSCI World Index
- “Centrica of the UK has seen its share price fall 50 per cent over the past four years. **France’s EDF has lost 65 per cent of its value since the 2005 initial public offering. Despite some recent recovery, the German utility RWE is worth little more than a fifth of its peak value 10 years ago.**”
  - Nick Butler, FT, June 18 2018

<https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/how-utilities-can-keep-the-lights-on>

# Driven by a wide range of factors

- Weakened price signals for investment from energy-only markets
- Low to flat electricity demand growth
- Low to negative profitability of existing generation assets dependent on wholesale market revenues
- New technologies combined with digitalization are facilitating new business models, such as virtual power plants (VPPs), providing increased roles for consumers, peer-to-peer platforms, and third parties in providing energy, capacity and flexibility services
- **These factors are collectively re-shaping the sector.**

<https://www.iea.org/newsroom/news/2017/december/commentary-changing-utility-business-models-and-electricity-investment.html>

# New Business Models

- The recent fall of major incumbents is a reminder that nothing is forever, and that no businesses are immune
- All businesses are vulnerable to rapidly changing technology and market trends



# Investment Needs Remain High

- This underscores the **thin margins** on which many traditional utilities are currently operating
- And yet, **the total investment needs in the coming decades in the power sector are tremendous**
- The IEA estimates that globally we will need to invest approximately USD \$3 Trillion for the transmission and distribution sectors alone between 2016 and 2025 (IEA WEO)
- How utilities (and other businesses) will respond to this massive investment need remains unclear

<https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/how-utilities-can-keep-the-lights-on>

## 4. Concluding Remarks

# Concluding Remarks

- Key priorities for the electricity sector remain **security of supply, low prices, and the transition to a cleaner generation mix**
- As utilities try to balance these priorities while remaining profitable, **making sound investment decisions is becoming more challenging**
- Likely to see the emergence of more **direct consumer-to-utility relationships: e.g.** real-time mobile and digital services, energy audits, more energy management solutions, two-way-power-flows, and real-time billing

# Concluding Remarks

- **One aspect remains clear: business-as-usual is not an option**



Photo: [https://www.huffpost.com/entry/10-useful-ways-to-choose-the-right-direction-in-life\\_b\\_9192982](https://www.huffpost.com/entry/10-useful-ways-to-choose-the-right-direction-in-life_b_9192982)



## 5. Further Reading

# Further Reading

IEA 2018:

<https://www.iea.org/newsroom/news/2017/december/commentary-changing-utility-business-models-and-electricity-investment.html>

PwC 2014: <https://www.pwc.com/gx/en/utilities/publications/assets/pwc-future-utility-business-models.pdf>

RMI 2014: <https://rmi.org/insight/bridges-new-solar-business-models/>

Future of Utilities - Utilities of the Future (2016). Ed. Fereidoon Sioshansi, Elsevier. <https://www.elsevier.com/books/future-of-utilities-utilities-of-the-future/sioshansi/978-0-12-804249-6>

# Thank you for your time!



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## 6. Knowledge Checkpoint: Multiple Choice Questions