Research-2-Practice, PAUWES Tlemcen, April 16st 2018

How Incumbents React to the Changing Business Environment of the Energy Sector

Case of the German Energy-transformation

Florian Weiß and Timon Zimmermann
Berlin University of Technology, Workgroup for Economic and Infrastructure Policy (WIP)

Agenda

1) Introduction

2) The Disruptive Change

3) Structural Reactions

4) The Challenge of Decommissioning and Nuclear Waste Disposal

5) Conclusion

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The German Energy Sector

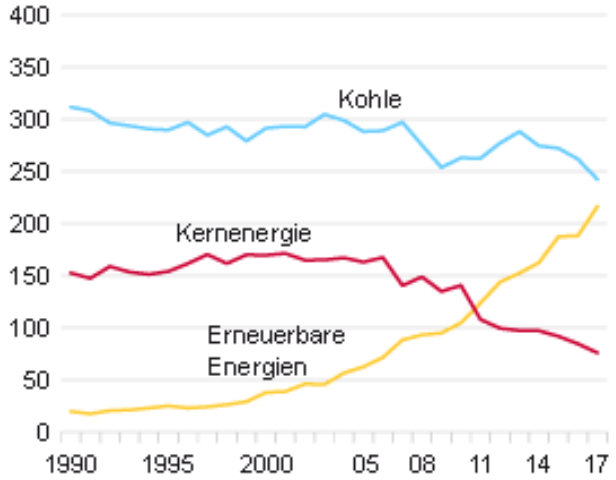

Figure 1: Brutto power generation in Mrd. kWh

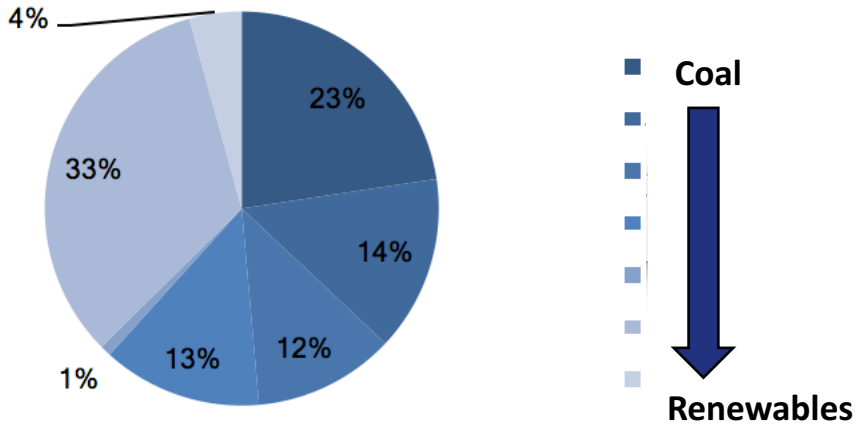

Figure 2: Shares of power generation in 2017

Market structure

- Since 2000 rather monopolistic and vertically integrated
- Four “former” big players
- Prices are decreasing

Changing conditions of regulation

- Due to catastrophes like the one of Fukushima in 2011
- Updated priority setting → sustainable energy generation
  - ”Shut-down” of the last NPP in 2022
  - Coal exit in the end of the next decade
  - Etc.

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The Disruptive Change

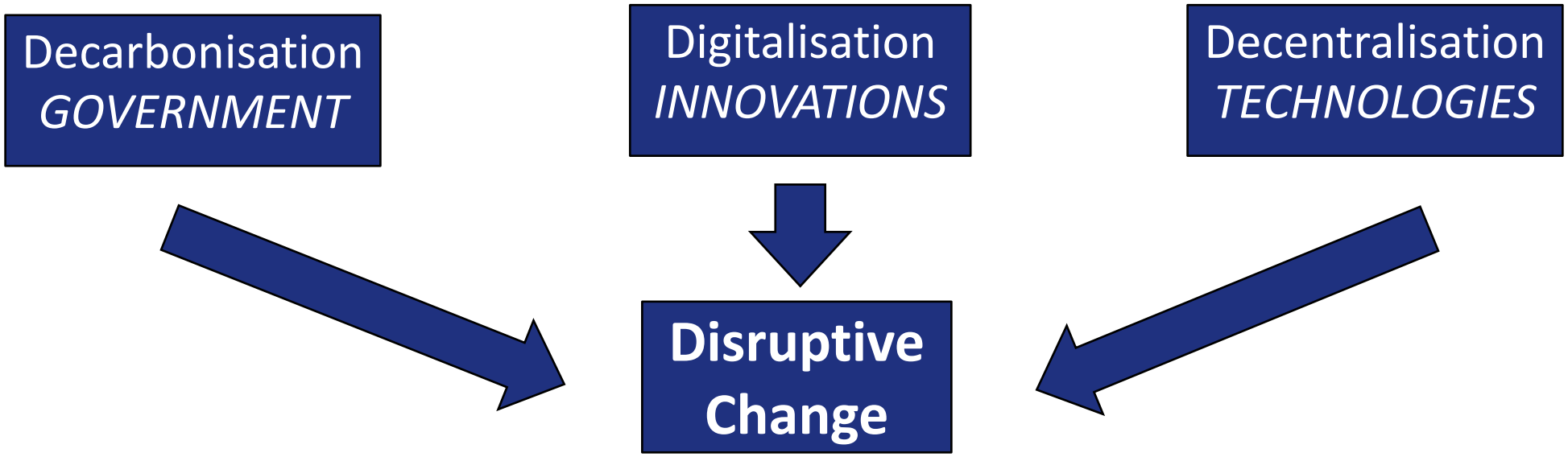

Figure 3: Origins of the DC

The 3-D driven DC

Crucial Developments of the s. c. three Ds – triggered the DC:

1. Decarbonisation, consisting mainly of updated conditions of regulation.
2. Digitalisation, empowered through technological innovations.
3. Decentralisation, as a necessity for the decentral energy generation using especially Solar- and Wind energy.

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Some Direct Effects

Diversity and reconstruction

- Volume of investments increased significantly
- Amount of employees suggests a shift of focus
  - Disintegration of emission intense power generation.
  - Foundation of new companies, like Innogy or Uniper.

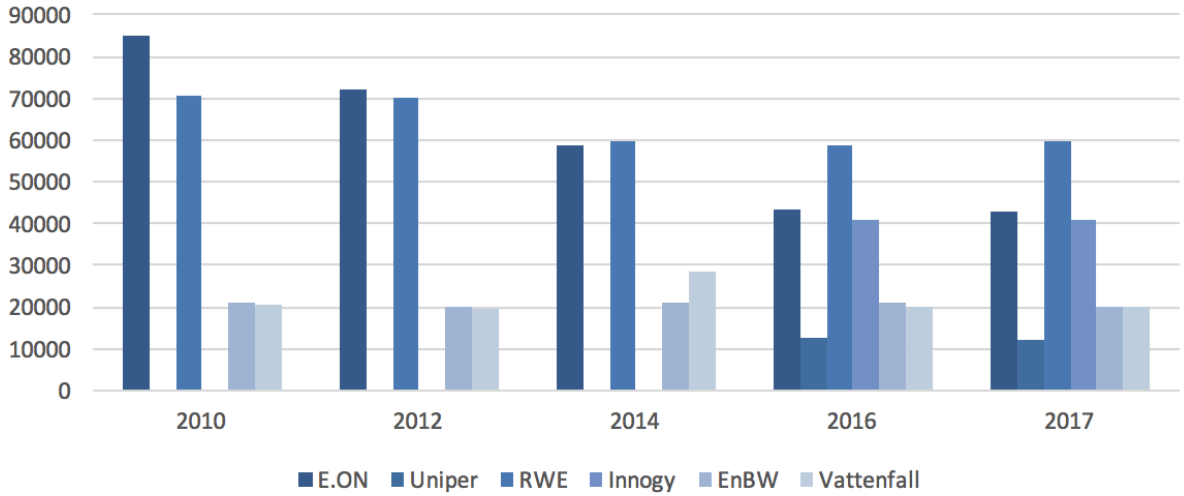

Figure 4: Number of Employees

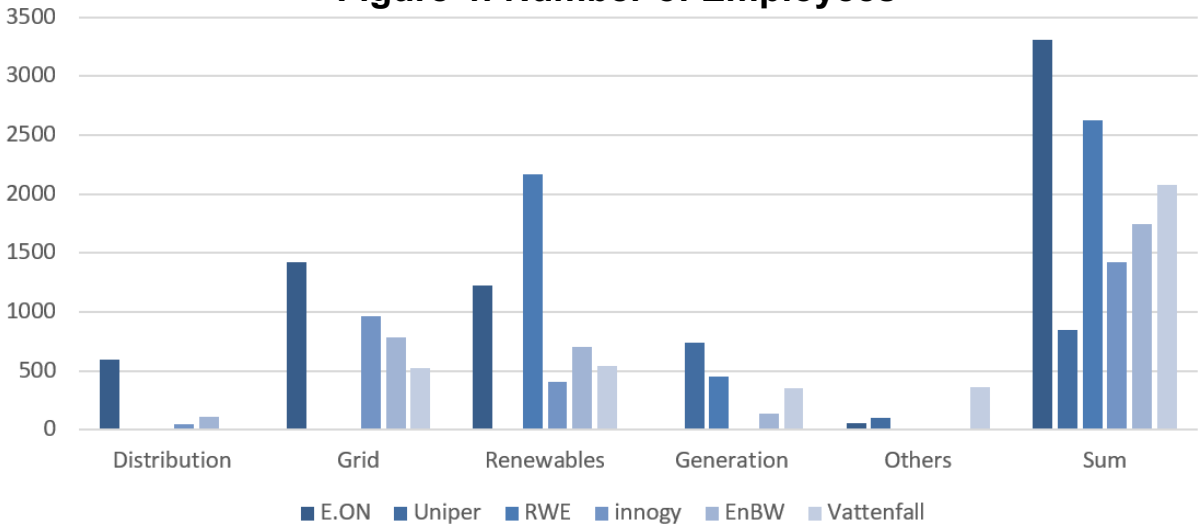

Figure 5: Volume of Investments in Mio. Euro

Visualising the Wave of Disintegration

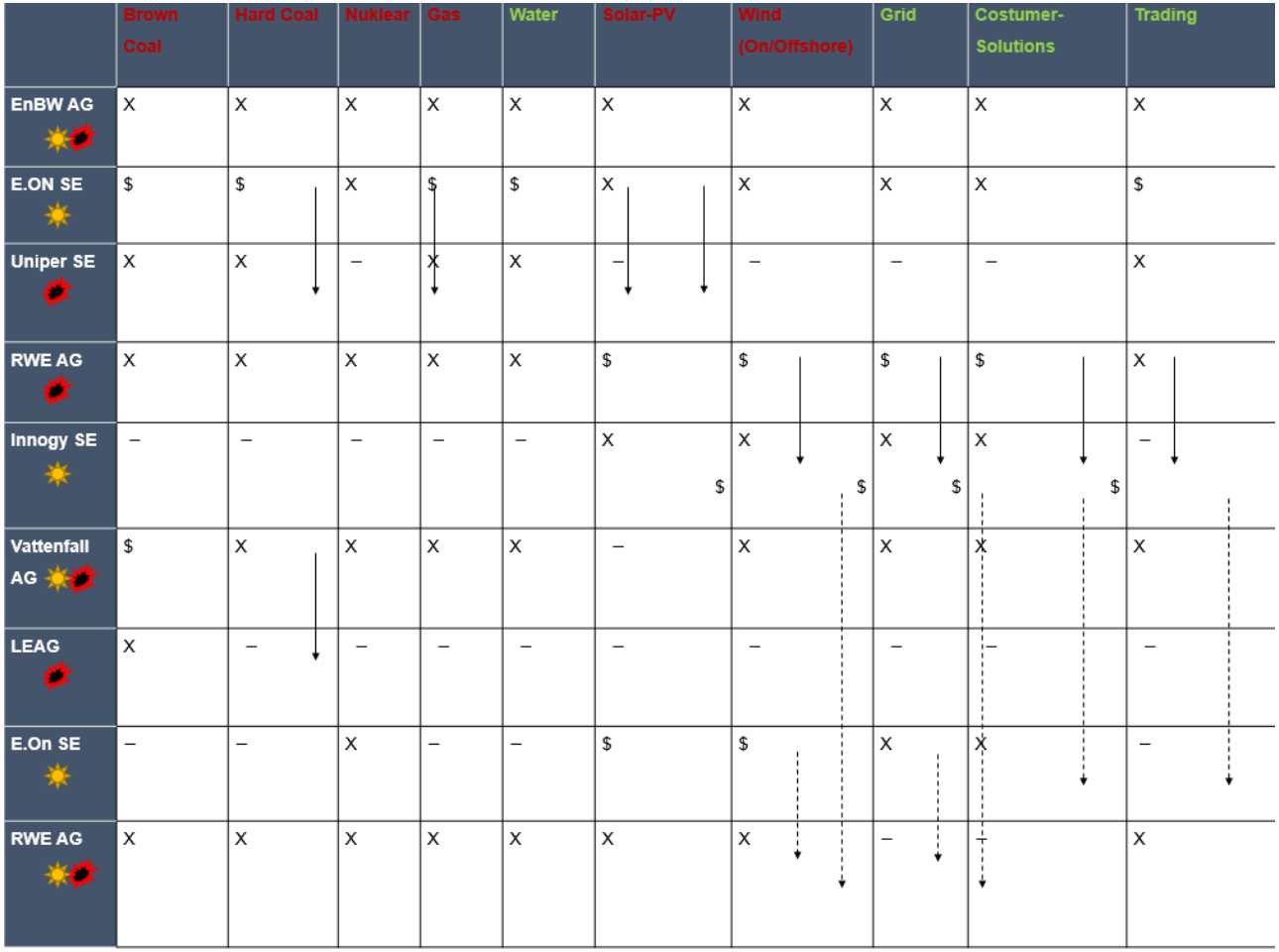

Table 1: Structural Consequences of the DC

SWOT Analysis of the Major Energy Suppliers

	E.ON SE	Uniper SE	RWE AG	Innogy SE	EnBW AG	Vattenfall AB
International Orientation	+	+	-	+	-	+
Diversity of Portfolio	+	-	-	+	+	-
Decommissioning Costs	-	+	-	+	-	-
Share of Renewables	+	-	-	+	+	-
Dependency on conventional PG	+	-	-	-	+	+
Costumer Solutions a. o.	+	-	-	+	+	-
Level of vertical Integration	*	*	-	*	*	*
Legend: + = Strength, - = Weakness, * = Irrelevant						

Table 2: SWOT Analysis

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The Challenge of Decommissioning and Nuclear Waste Disposals

Disposal

- NPP-Exit until 2022
- High risk of bankruptcy for energy-providers
- State-Fund for financing the construction of a final waste disposal since 2016

✓ Planned to be commissioned until end of this century.

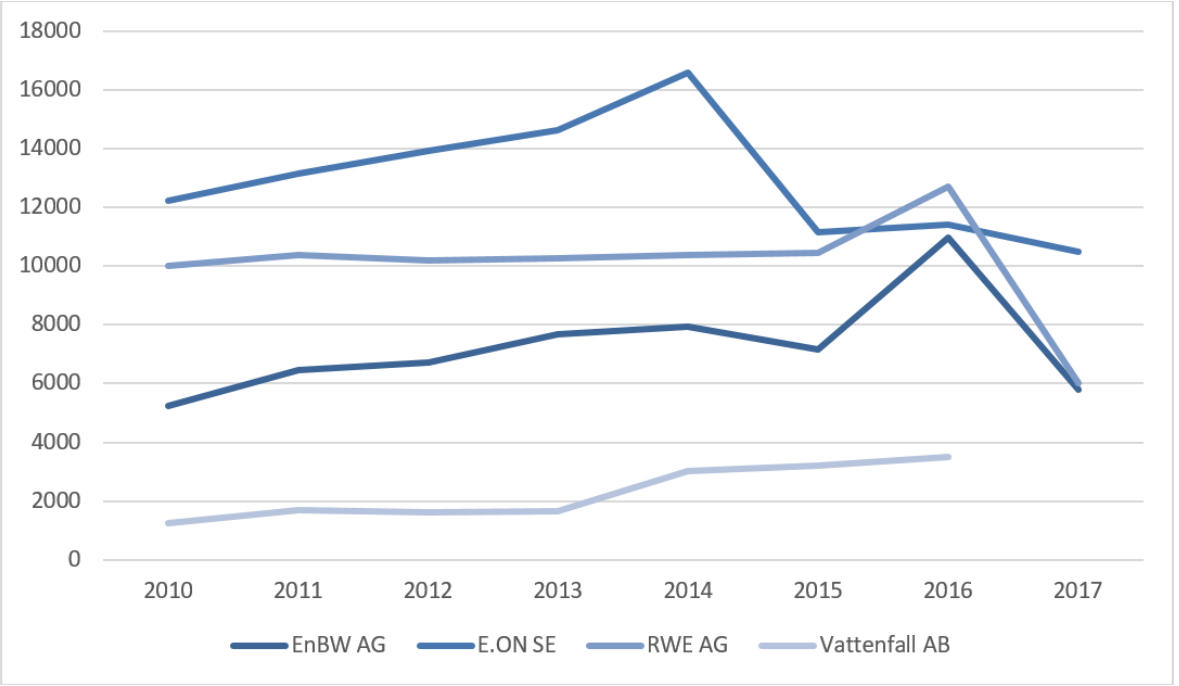

Figure 6: Accruals for Nuclear Power plant decommission

Decommissioning

- Nuclear Energy generating companies have to decommission according to the polluter principle.
- Average costs of decommission per block are about 1 Bn. Euro.

- Accruals per reactor block of the companies are between 0,75 Bn. Euro to 1,7 Bn. Euro.
- Synergies can possibly lower the decommissioning costs of bigger plants.

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Conclusion

Three Findings:

1. **The Disruptive Change is not over yet and is in action all over the world.**
2. **Sustainable Electricity generation using renewable technologies can contribute to a relevant level – today.**
3. **Algeria is next.**

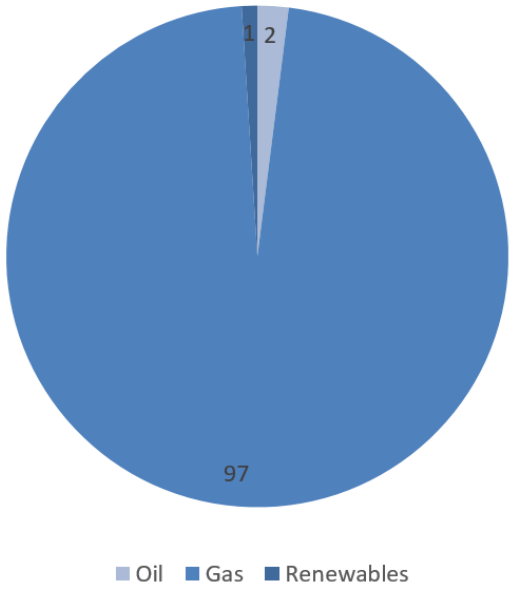

Figure 7: Electricity-Mix of Algeria[9]

Thank you for your Attention!

Contact

Florian Weiß
flw@wip.tu-berlin.de
+49 1525 561 67 44

Timon Zimmermann
tiz@wip.tu-berlin.de
+49 1573 55159 07

Source Directory

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Contents based on: Weiß, F. / Zimmermann, T. (2018): How Incumbents React to the Changing Business Environment of the Energy Sector – Case of the German energy transformation