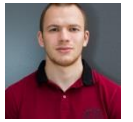

T. Difonzo


A. Adamov


I. Kalinin


A. Saprykina


L. Spindel


D. Altomonte

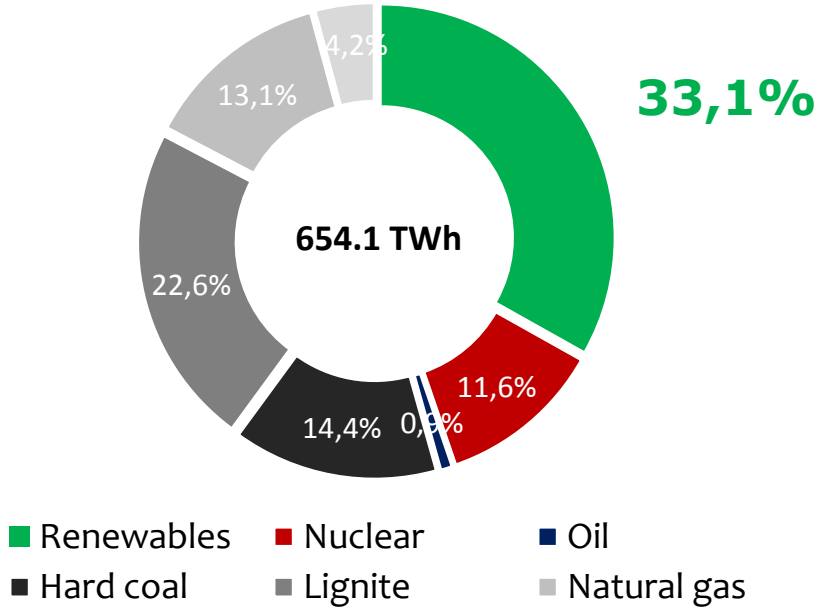
Project challenge:

DIGITALIZATION OF ELECTRICAL INFRASTRUCTURE

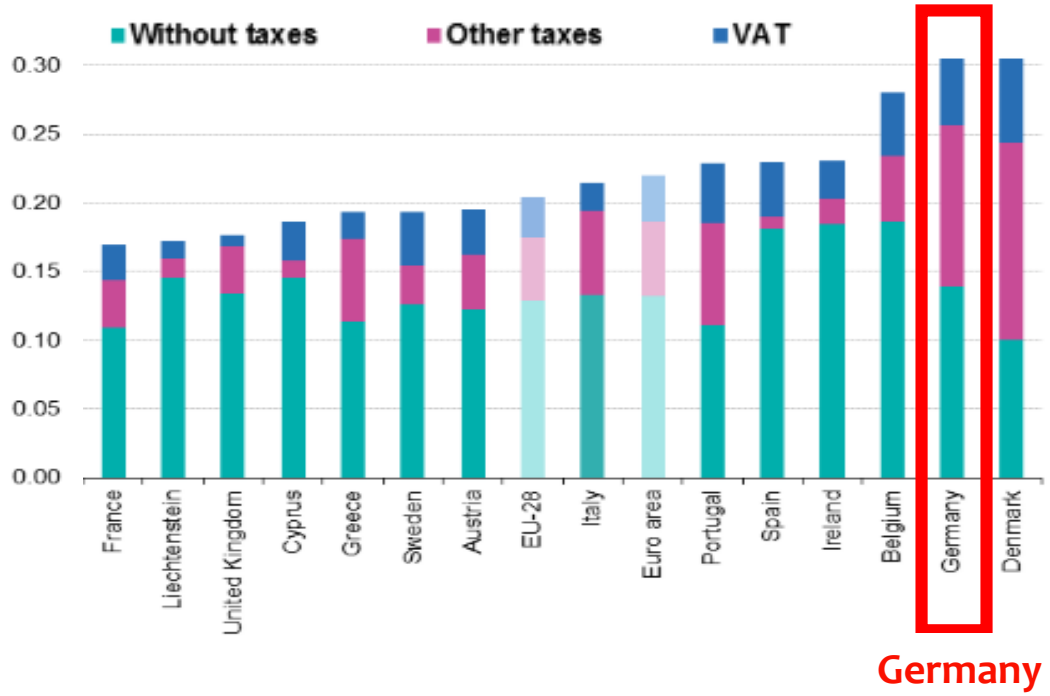
Country challenge-provider: Germany

The main challenge of the German elect. market

Gross power generation mix (2017)[1]



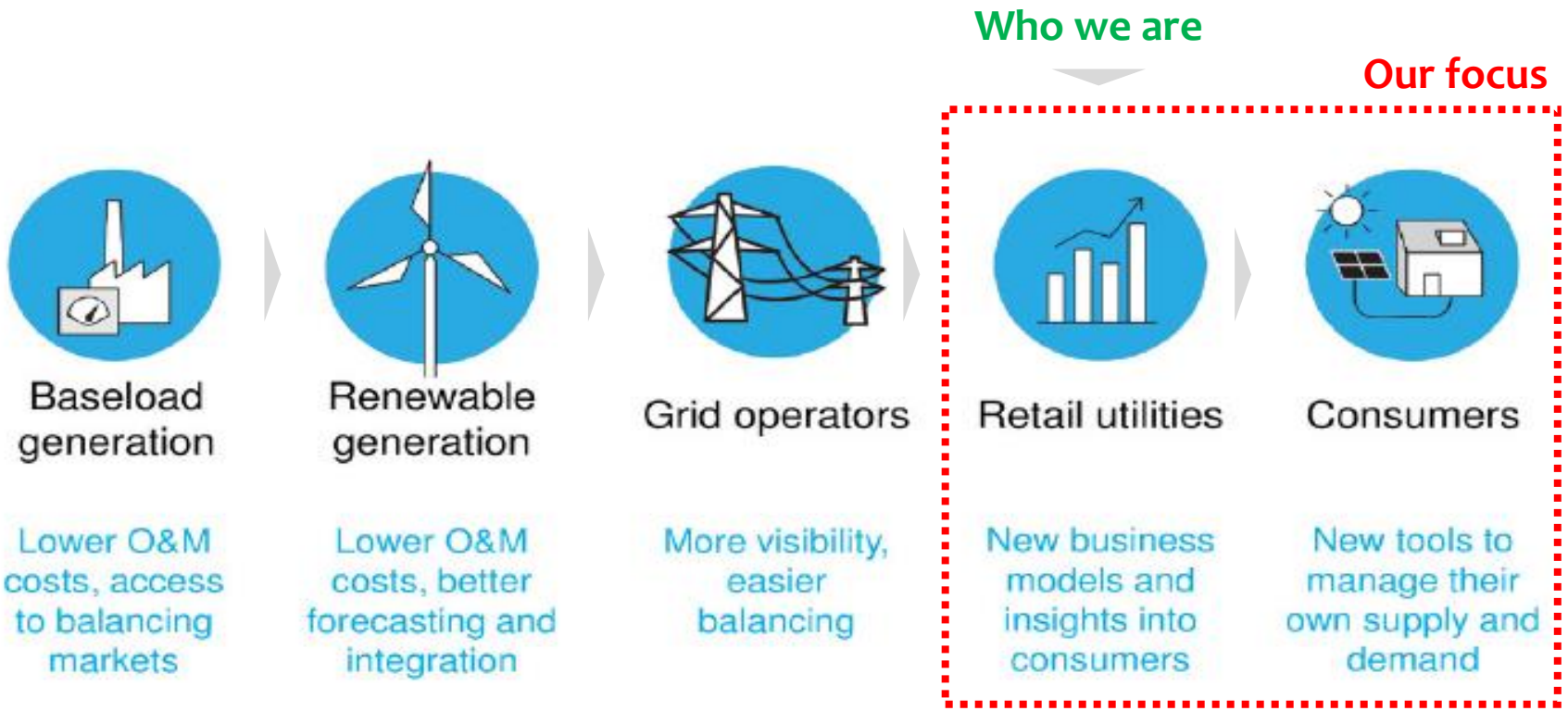
Households electricity prices, 1H2017 (€/kWh)[2]



Germany's green shift to renewables has led to high electricity prices

1. AGEB, 2. Eurostat

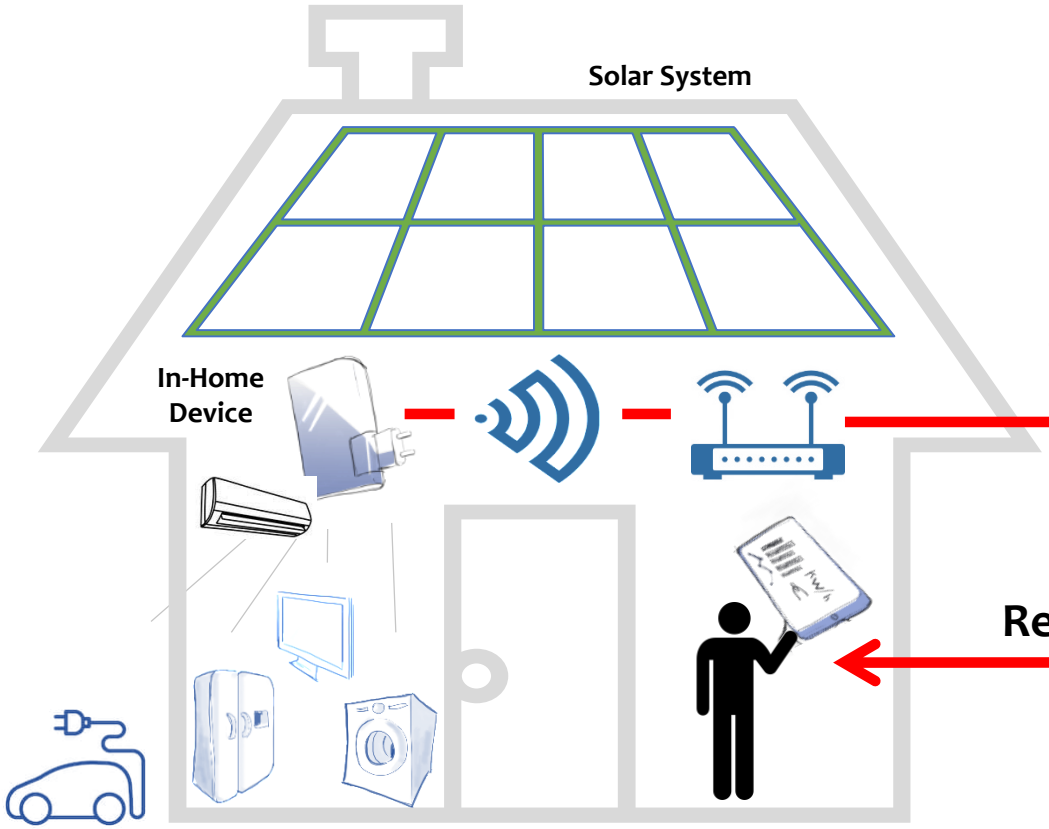
Digital consumers:
positive spill-over effect on the entire value chain



E-customers can foster renewables integration and reduce costs by:

- Responding to market signals, modifying their consumption and habits
- Producing renewable electricity to satisfy their own consumption needs

THE SOLUTION: AdELE
Adaptive Electric Loads for E-customer



Home residential consumers

Real time consumption / production

Recommendations

dELE

- Cloud Based
- Big Data Analytics
- Machine Learning

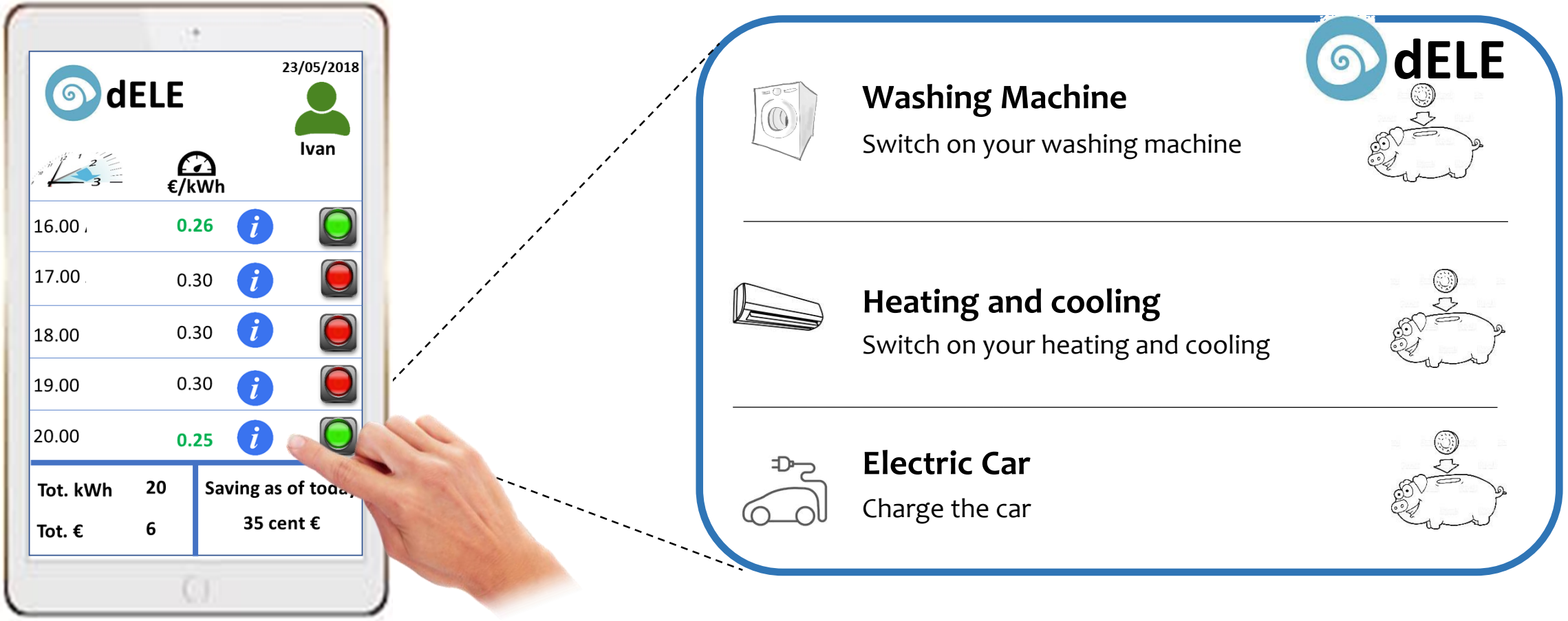
Central System

Other inputs

- Day Ahead market
- Forecast
- Historical Consumption

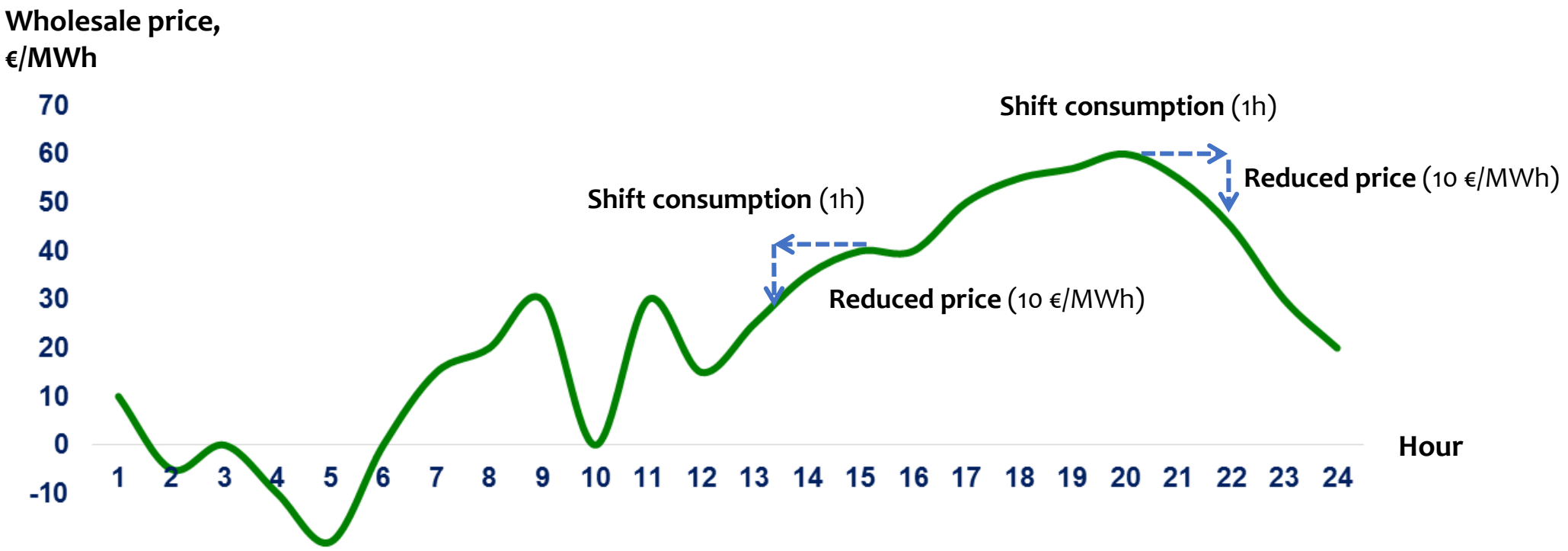
AdELE tells you when energy is cheaper

AdELE App interface



AdELE gives recommendations and works on every mobile device with user-friendly interface

The benefits of AdELE



AdELE gives advice to E-customer to shift consumption → E-customer follows AdELE → E-customer spend less on electricity

→ Retailer gets economic advantage in the wholesale market

1. EpexSpot

AdELE's business model

Value proposition — *Obtain costs savings for our Company as energy retailer developing a cloud-based system which will guide end-customers behavior through an App*

Savings

Reducing the cost of buying electricity on the wholesale market

Number of households

✖

Consumption per household

✖

Economy on buying price

✖

Probability of following advise

=

Savings (retailer)

35 Mln EUR per year

Costs

Creating and maintaining cloud infrastructure of AdELE

Installation of devices

+

Development of AdELE

33 Mln EUR
in 1st year

Discount to E-customer

+

Marketing

+

Maintenance

19 Mln EUR
per year

Payback period (retailer)
4 years

Average profit (retailer)
9.5 Mln EUR

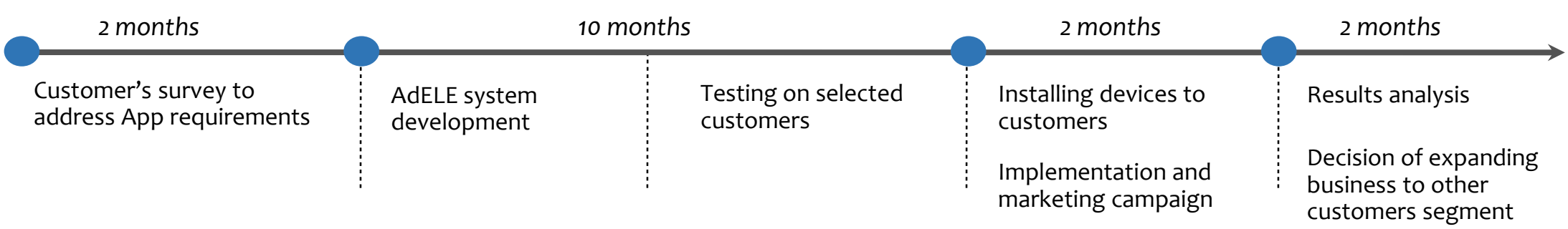
Savings (per household/year)
70 EUR

*https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC

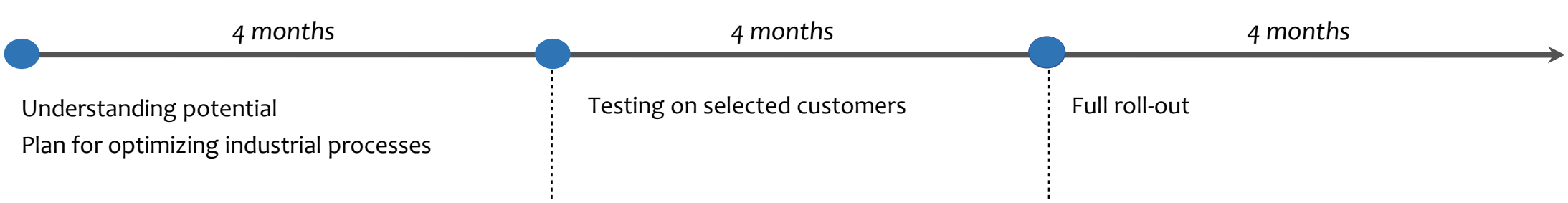
Implementation plan

28 months will take to make AdELE working on both phases

PHASE 1: Households customers



PHASE 2: Industrial / Commercial customers



Conclusions: AdELE is a powerful tool to reduce electricity bills and enhance transparency…

Digitalization of the electric infrastructure is necessary, but not enough

Active participation of citizens will create an efficient and sustainable energy ecosystem

Policies and regulations have a key role to play in enabling new business models, technologies and innovation


dELE

ANNEX

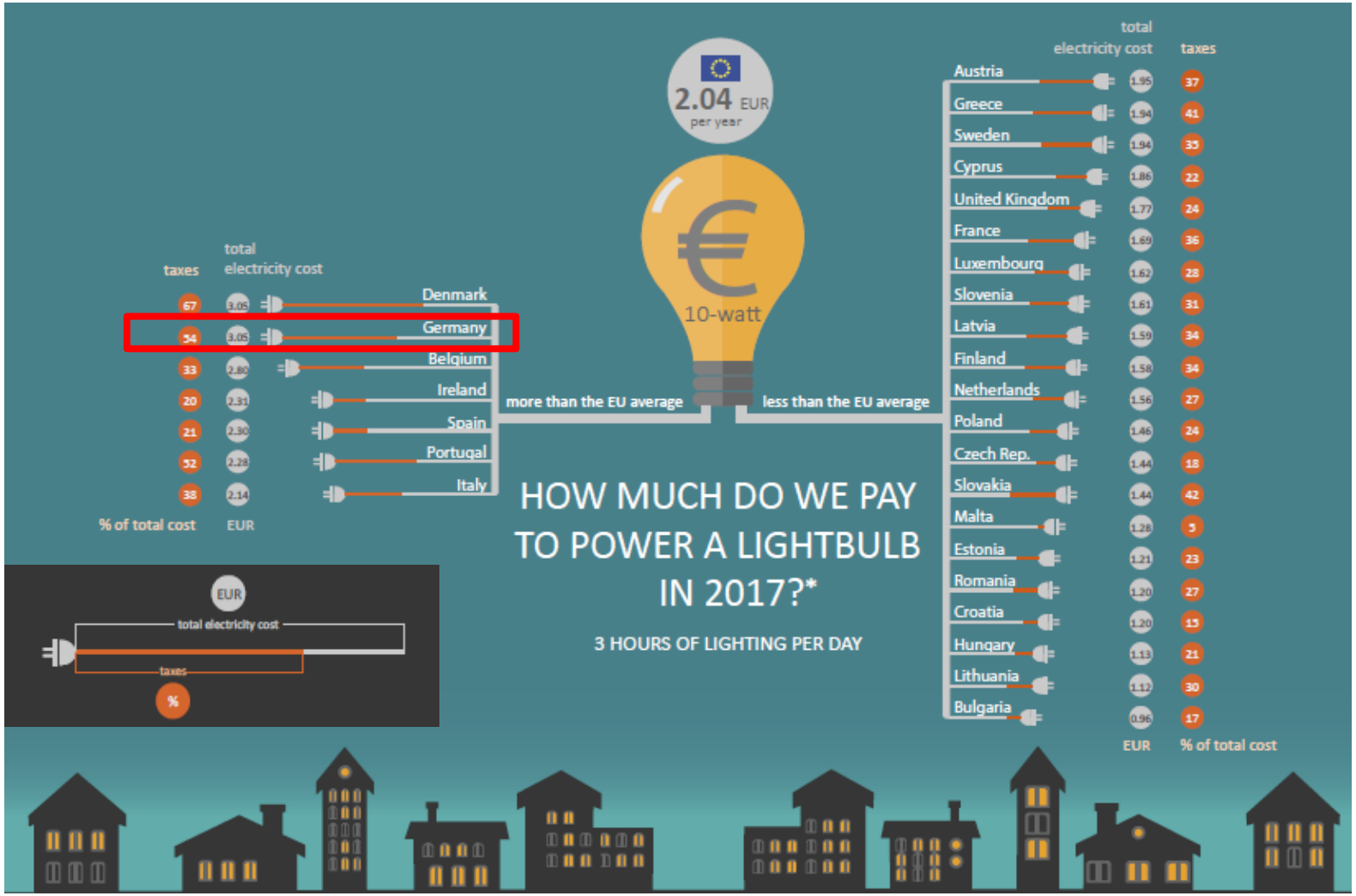
EU ELECTRICITY MARKET LIBERALIZATION

- In Germany the retail market is continuing to develop very positively as more than 4.6 million household customers switched supplier in 2016. This is the highest figure since the start of liberalization process
- In addition, almost 2.4 million household customers switched tariffs with the same supplier

**Italy is phasing our (June 2019); Spain reformed tariff in 2014 as to totally reflect spot prices*

Source: ACER Market Monitoring Report 2016

EU HOUSEHOLDS ELECTRICITY PRICES

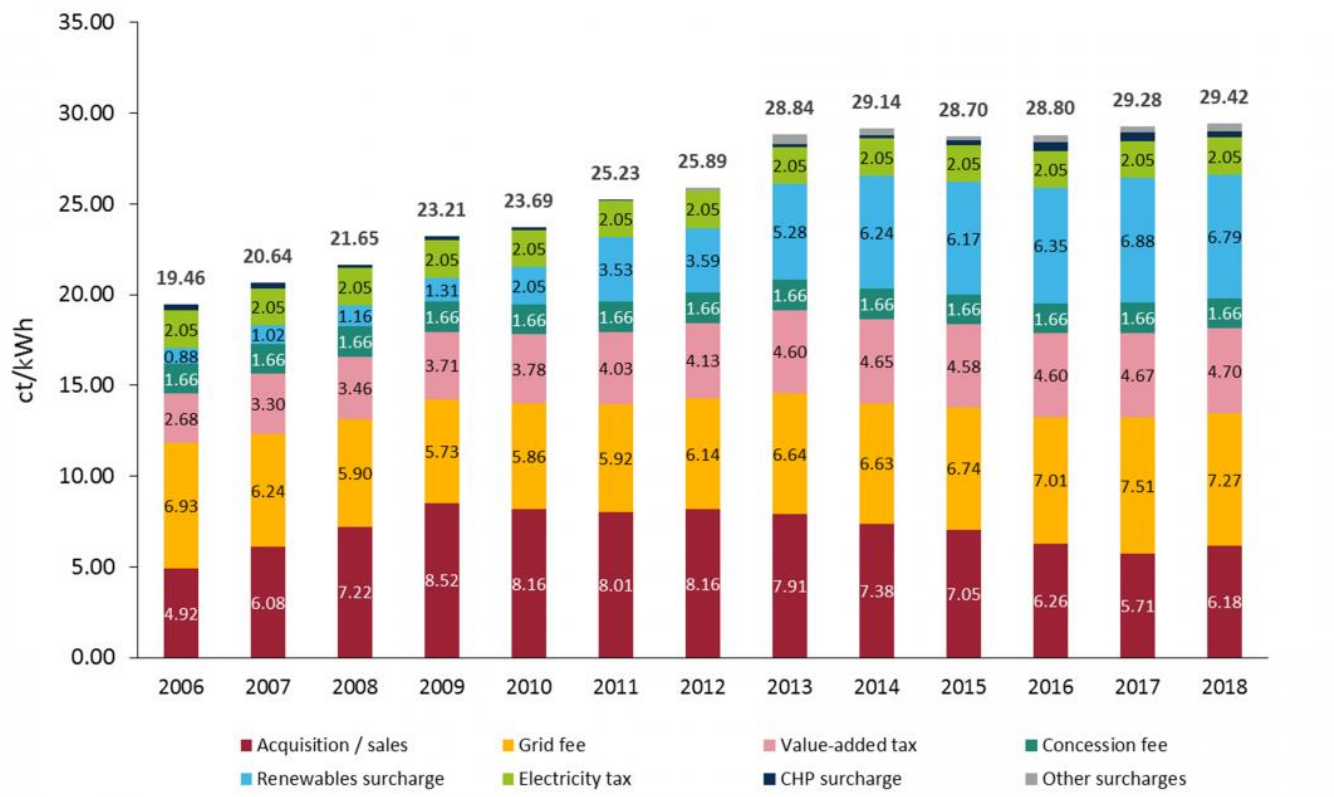


Germany has the second highest residential electricity prices in the EU-28 - *Electricity prices for household consumers ranged from 9.6 €/100 kWh in Bulgaria to 30.5 €/100 kWh in Denmark and Germany in 2017*

Source: Eurostat

GERMAN HOUSEHOLDS ELECTRICITY PRICES

Composition of average electricity price in ct/kWh using 3,500 kWh/year, 2016-2018



In 2017:

- *Surcharges, taxes and levies account for over 54% of the average electricity price for household customers*
- *The net network charge including billing, metering and meter operations accounts for a share of around 24.6%*
- *The share of the electricity price that the supplier can control (energy and supply costs and the margin) thus accounts for around 21.5%*

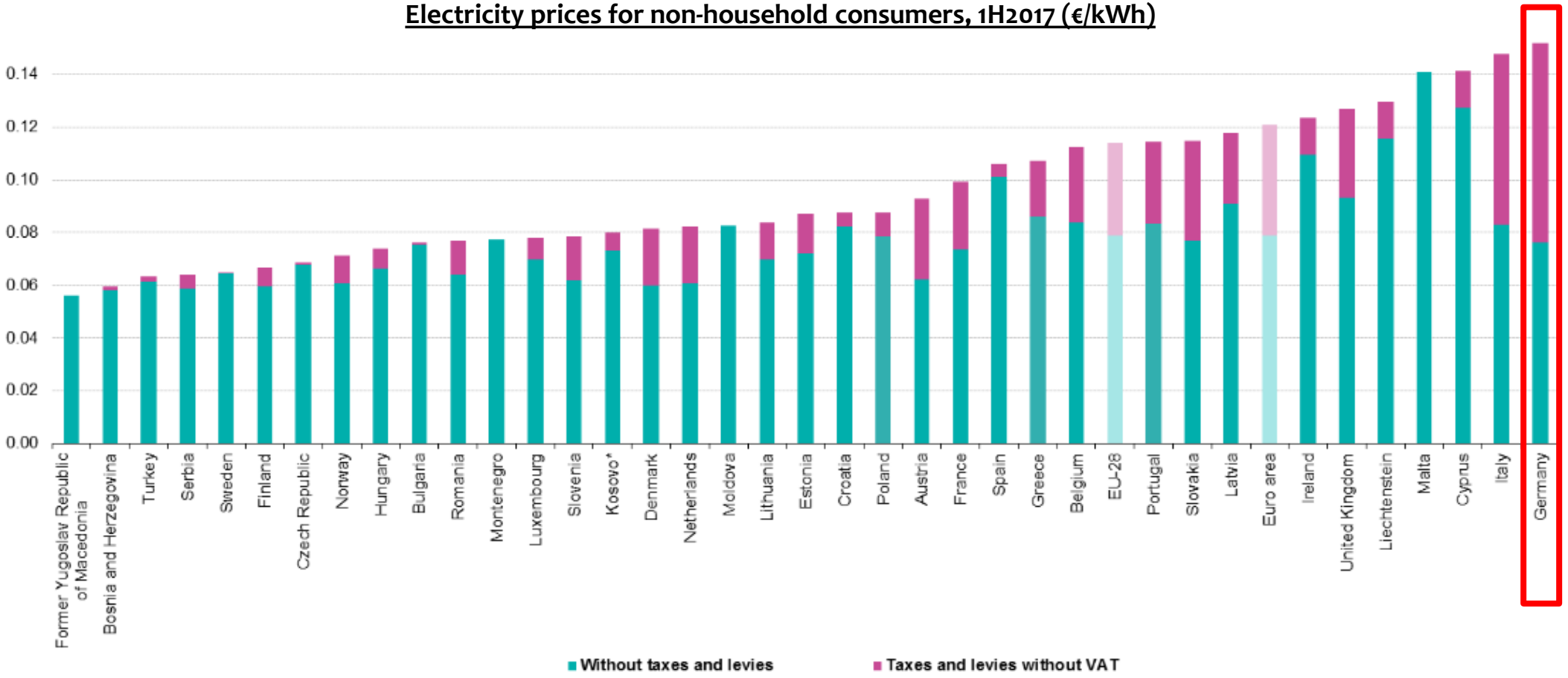
While generation and distribution costs remained relatively flat, the main driver of the significant overall cost increase over the past years is mainly linked to taxes and surcharges, which include support to renewable development (i.e. EEG surcharge).

The price component for energy remained more or less stable while since 2014 there has been a decrease in the price component controlled by the supplier. This decrease could be related in particular to the continuing low wholesale prices in 2016.

https://www.cleanenergywire.org/factsheets/what-german-households-pay-power

GERMAN NON-HOUSEHOLDS ELECTRICITY PRICES

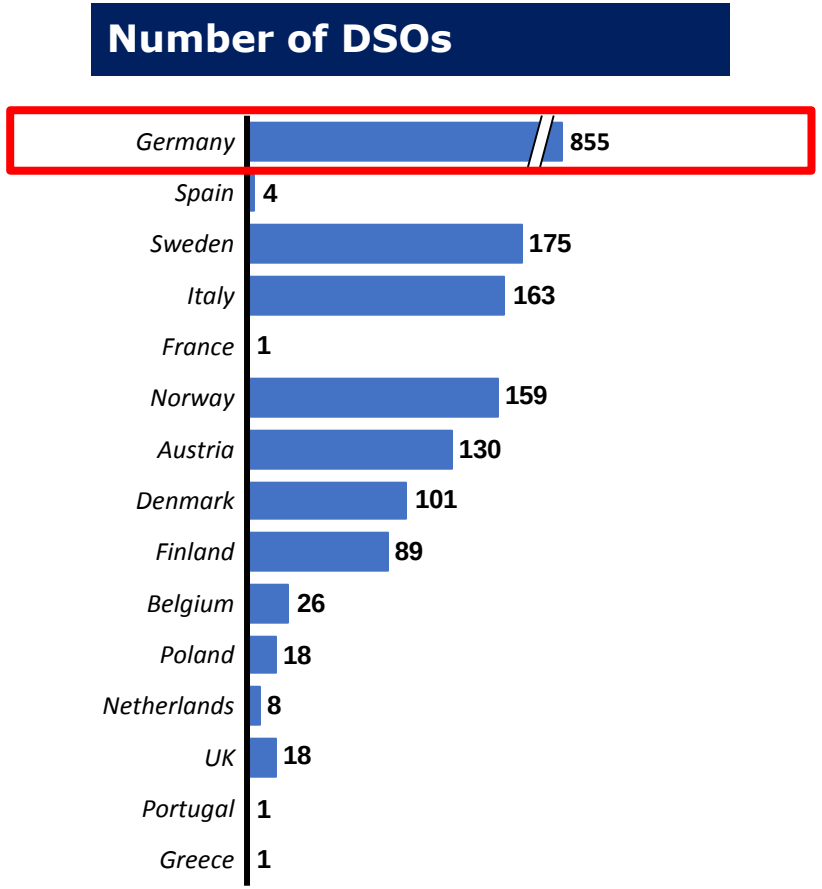
Germany has the first highest non-residential electricity prices in the EU-28



Source: Eurostat

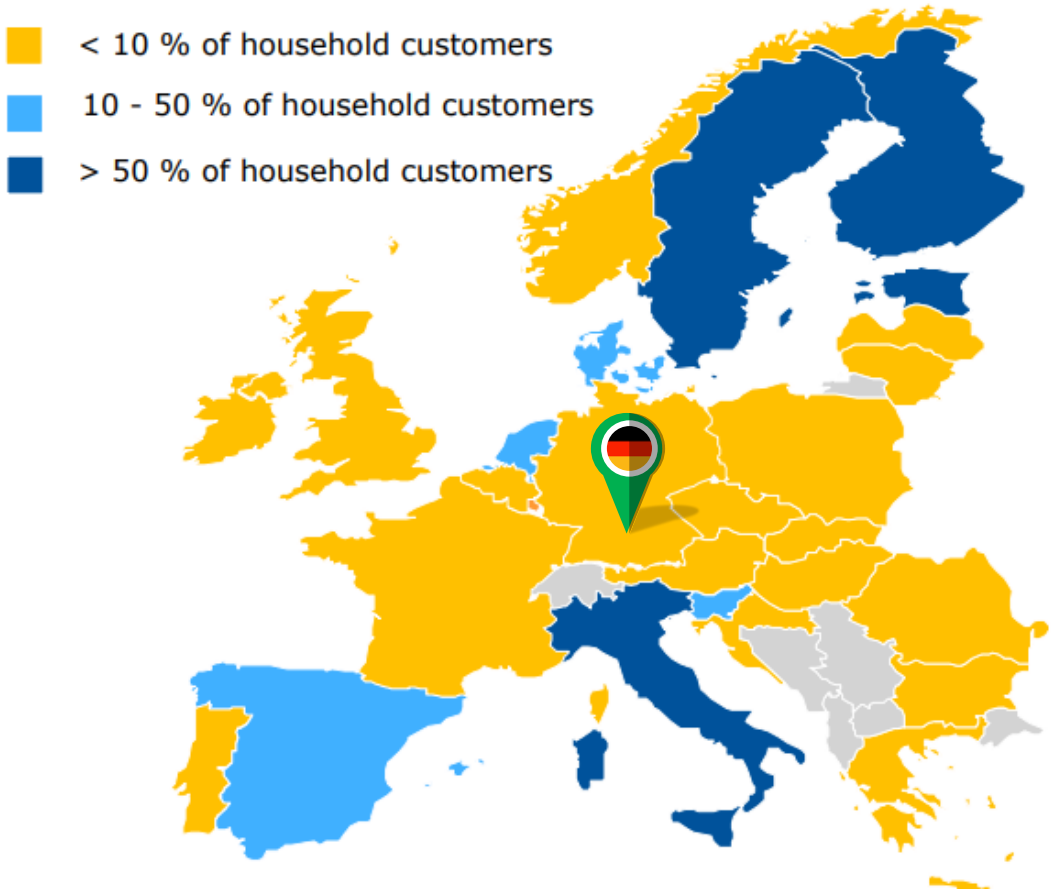
DISTRIBUTION SYSTEM OPERATORS (DSOs)

Tasks	Transport of electricity over the high-to-low voltage grid
Key activities	• Asset management • Network development • Operations and maintenance • Tariff-setting • Metering (sometimes)
Challenges	• Cost pressure • Decentralized generation • Unbundling • Demographical shift • Energy efficiency • Smart Grid / Metering
Players	• Regional or local distribution system operators (DSOs)



EU SMART METERS ROLL-OUT

Share of household customers equipped with smart meters for electricity (2014)



Source: CERRE, Monitoring Report

- According to Annex I of Directive 2009/72/EC, **Member States should roll-out electricity smart meters to 80% of consumers by 2020**, unless the result of a Cost Benefits Analysis (CBA) is negative, with full roll-out to be completed by 2022
- **The German CBA results suggested a staggered rollout, starting with larger generators and consumers**. The rollout is segmented by annual consumption (i.e. exceeding 10.000 kWh, from 2020 onwards exceeding 6,000 kWh), production and meter cost per customer per annum
- The **EU Clean Energy Package**, published on November 30, 2016 proposed that **local utilities or suppliers will have to offer smart meters to all consumers – where technically feasible**. This will supersede the previous Directive which allowed Member States to opt out (negative CBA). All legislative proposals included in the Clean Energy Package are currently undergoing the EU legislative process

Business plan

	Amount	Unit	Comment
households	1 000 000	N	4 people per client
device cost	30	eur	
development	3 000 000	eur	estimate
maintenance	500 000	eur/year	10 people * 4k eur per month
marketing	1 000 000	eur/year	estimate
economy on buying price	10	eur/mwh	if shift consumption by 1 hour
consumption	3,5	mwh/year	World Bank
probability	25%	%	estimate
economy from Adele	35 000 000	per year	
cost of discount	17 500 000	per year	
CAPEX	33 000 000	once	
OPEX of Adele	1 500 000	per year	
av. Profit (5 years)	9 400 000	per year	
economy for family	70	eur per year	if in all cases (4 people)