Policies & Regulation and Innovation in Sustainable Energy
Impact in the value chain and in the supply chain

The view from an innovation engine: InnoEnergy

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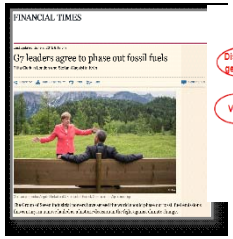
CEO InnoEnergy
26th January 2017

InnoEnergy´s view on the Energy Transition

A multidimensional challenge

Not only about technology & regulation, MORE dimensions interwoven



Societal & Individual

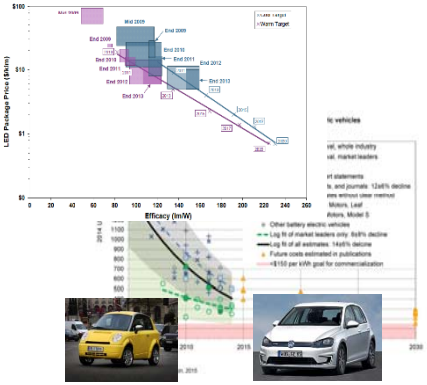
Supply Chain

Technology

Value Chain/Market/Biz Model

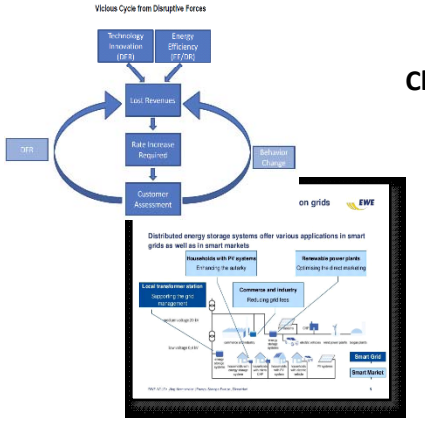
Human Capital

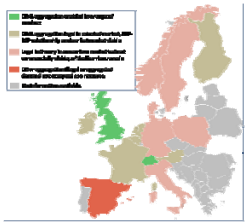
Regulation



Think City 2009
Platser: 2
Längd: 314 cm
MaxHast:113 km/h
0-100km/h: 16 s.
Räckvidd: 161 km
Effekt: 34kW (46hk)
Utrustning: Ej AC, Ej servo, direkt elvärme, ingen aktiv säkerhet...

VW eGolf 2014
Platser: 5
Längd:425 cm
Max Hast: 1
0-100km/h:
Räckvidd:19
Effekt: 85 kW
Utrustning:
aktiv säkerh





KIC InnoEnergy

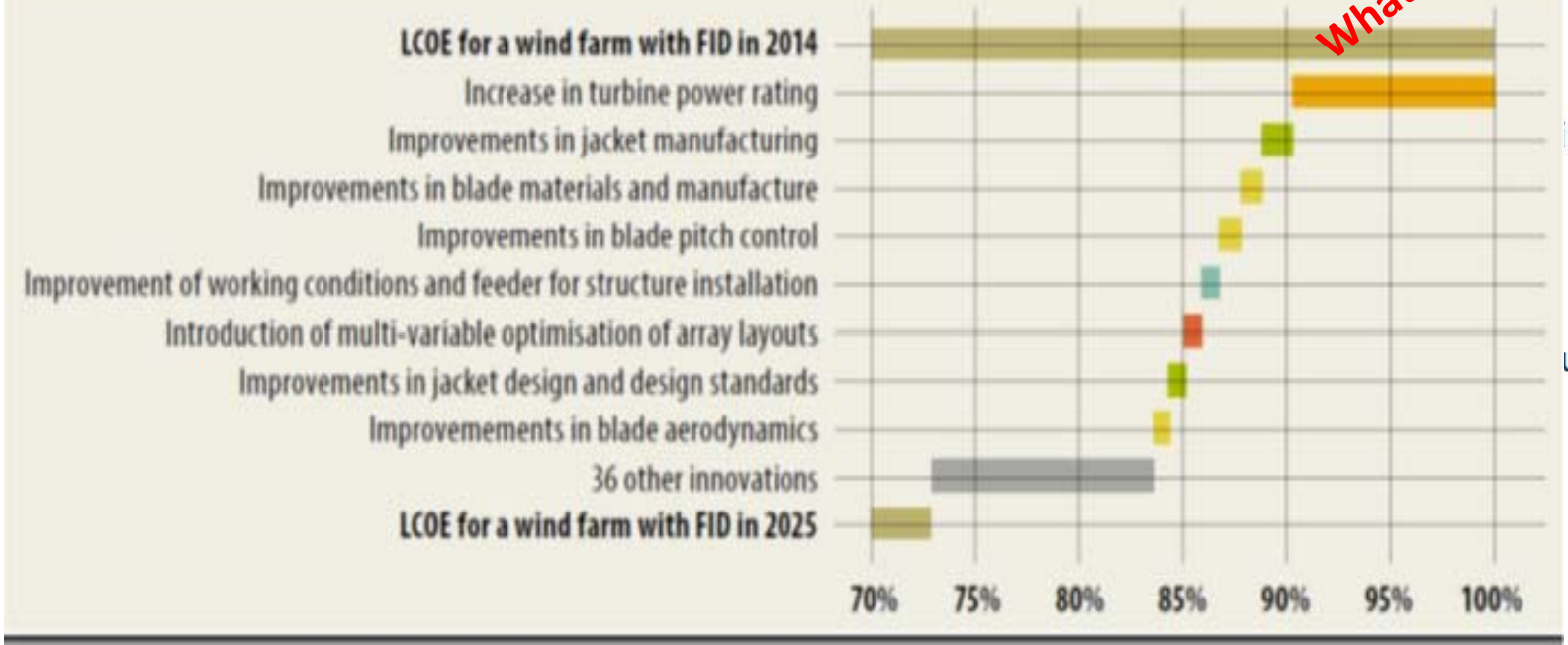
And systemic and multidisciplinary

Regulation enabling innovation, creating long term impact (1/2)

A success case (cost of on-shore and off-shore wind)

What InnoEnergy does

Figure 0.2 **Anticipated impact of technology innovations for a wind farm using 8MW-Size Turbines with FID in 2025, compared with a wind farm with 4MW-Size Turbines with FID in 2014.**[2]



nd*

used

Flak will be EUR 1.1 – 1.3 billion, pending

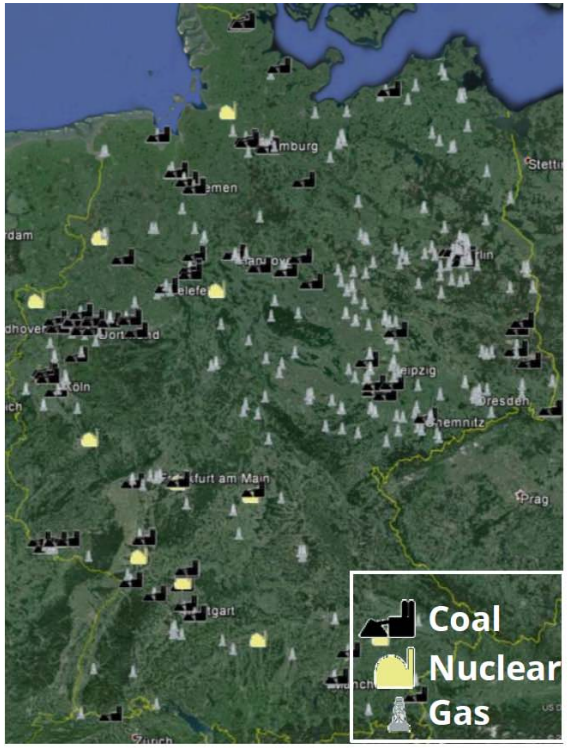
"This is exciting news. I'm very proud of our people in the Wind organisation who once again delivered a winning bid. Vattenfall has won the three latest offshore wind tenders in Denmark; Horns Rev 3, Danish Near Shore and Kriegers Flak, equivalent to the energy consumption of 55 percent of the Danish households", says Gunnar Groebler, Head of Vattenfall Wind.

Europe leading ☺

Regulation enabling innovation, creating long term impact (2/2)

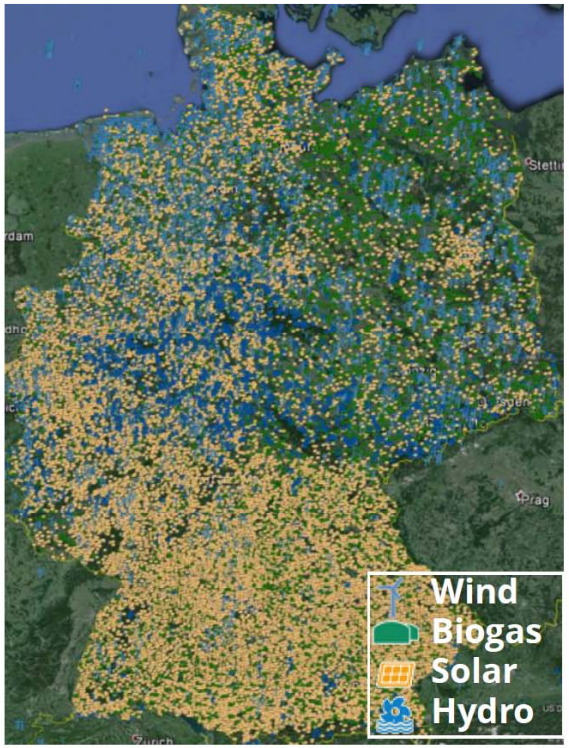
A success case (renewables/distributed generation/aggregators)

2000

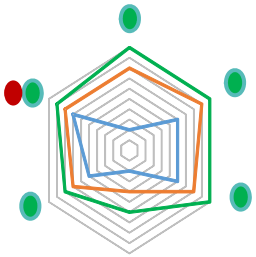


200

today



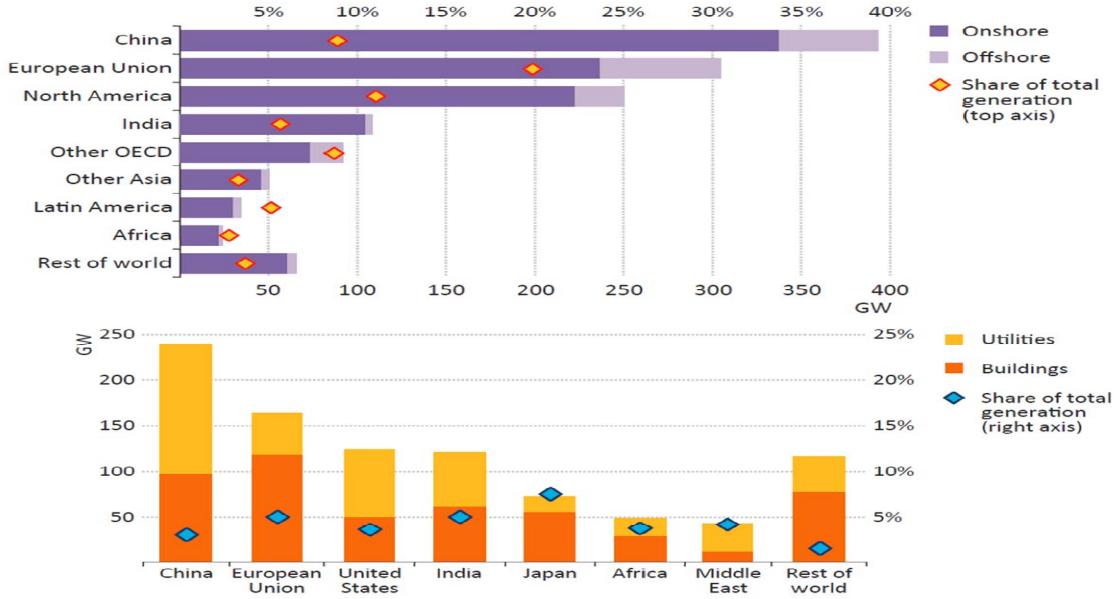
>1.6 Mio.



Regulation delaying innovation(1/3)

A pending case (storage in the grid)

The need



2040 IEA

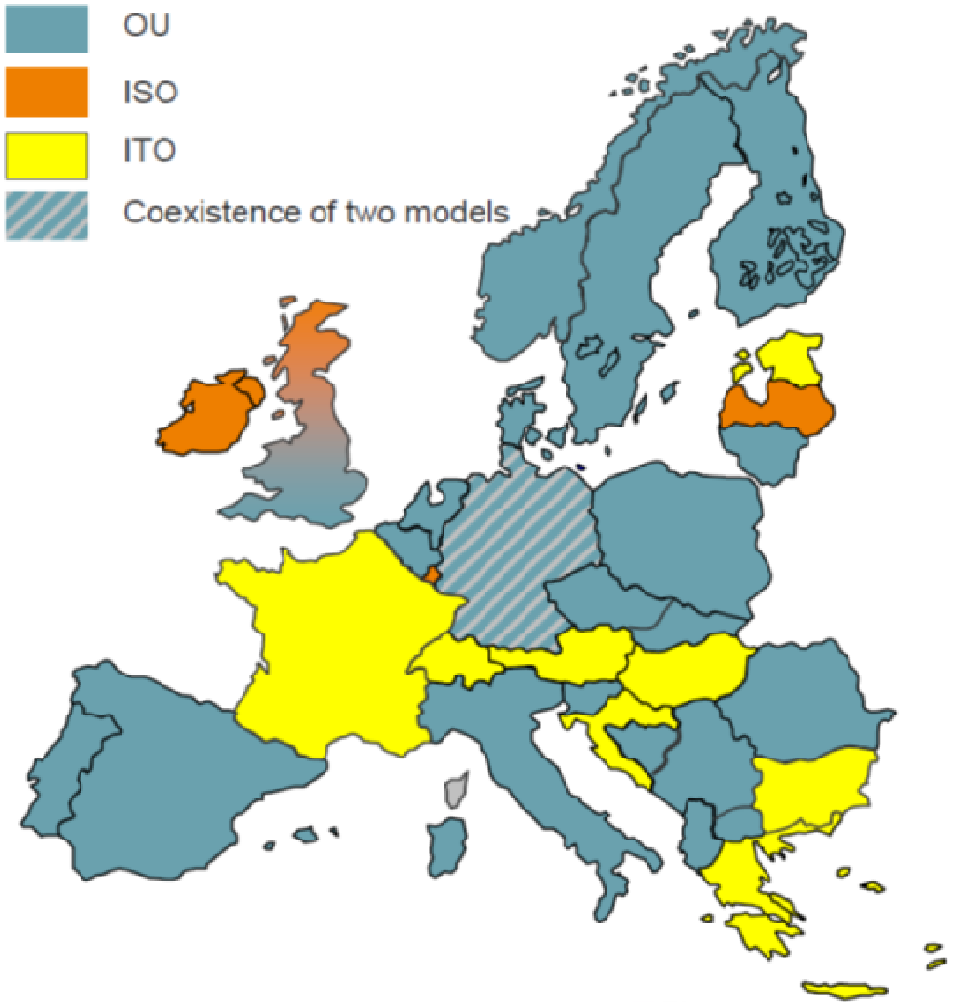
Services required => value => Business case drivers

Category	Service	
Arbitrage	Arbitrage, energy transfers valorization	○
	Production shaping	●
Capacity guarantee	Capacity guarantee, consumption peaks management	○
Ancillary services	Frequency regulation	○
	Adjustment mechanism, tertiary reserve	○
	Voltage regulation	○
	Black start	○
Grid support	Congestion relief	●
Consumer services	Voltage quality control	○
	Reliability, supply continuity	●

Caption			
●	Service accessible and main business case driver	●	Service not easily accessible
○	Service technically accessible	●	Non-accessible service

Grid Storage – Market Fragmentation

Regulatory frameworks - Situation in Europe

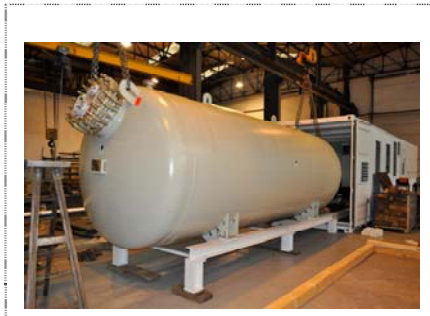


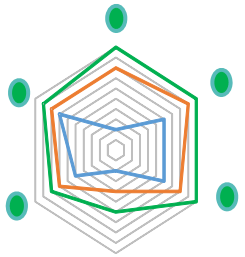
Let´s converge QUICKLY towards a NON fragmented market so we create volume demand

Regulation delaying innovation, delaying impact (3/3)

A pending case (storage in the grid)

What InnoEnergy does





Delayed positive impact

Aspect	Drivers	Status in 2015	Anticipated evolution
Political	▪ Sustained political commitments to develop renewable energies	●	●
Economic & Technological	▪ New network investments due to RES integration ▪ Limited direct competitiveness of storage with network upgrades ▪ Uncertainty around the valuation of network reliability and market services of storage ▪ Limited influence of congestion valuation through nodal and zonal pricing ▪ Long term competition of storage with demand management	●	●
Social & environmental	▪ Stronger environmental and social opposition to new infrastructures and new technologies	●	●
Legal	▪ Uncertain legal access to storage assets ownership and operation by System Operators	◐	●

Caption - Status definition			
Driver with positive impact	●	Driver with important negative impact	●
Driver with neutral or slightly negative impact	●		

Direct 350M€ /year

Indirect 2250M € /year

Lack of policies hampering impact (1/3)

Societal appropriation

Prosumer

VPPs .....

Smart .....

Demand - response

Distributed generation

Shave your load curve by installing batteries

Price signals ...

Steering

Involvement

Understanding

Awareness

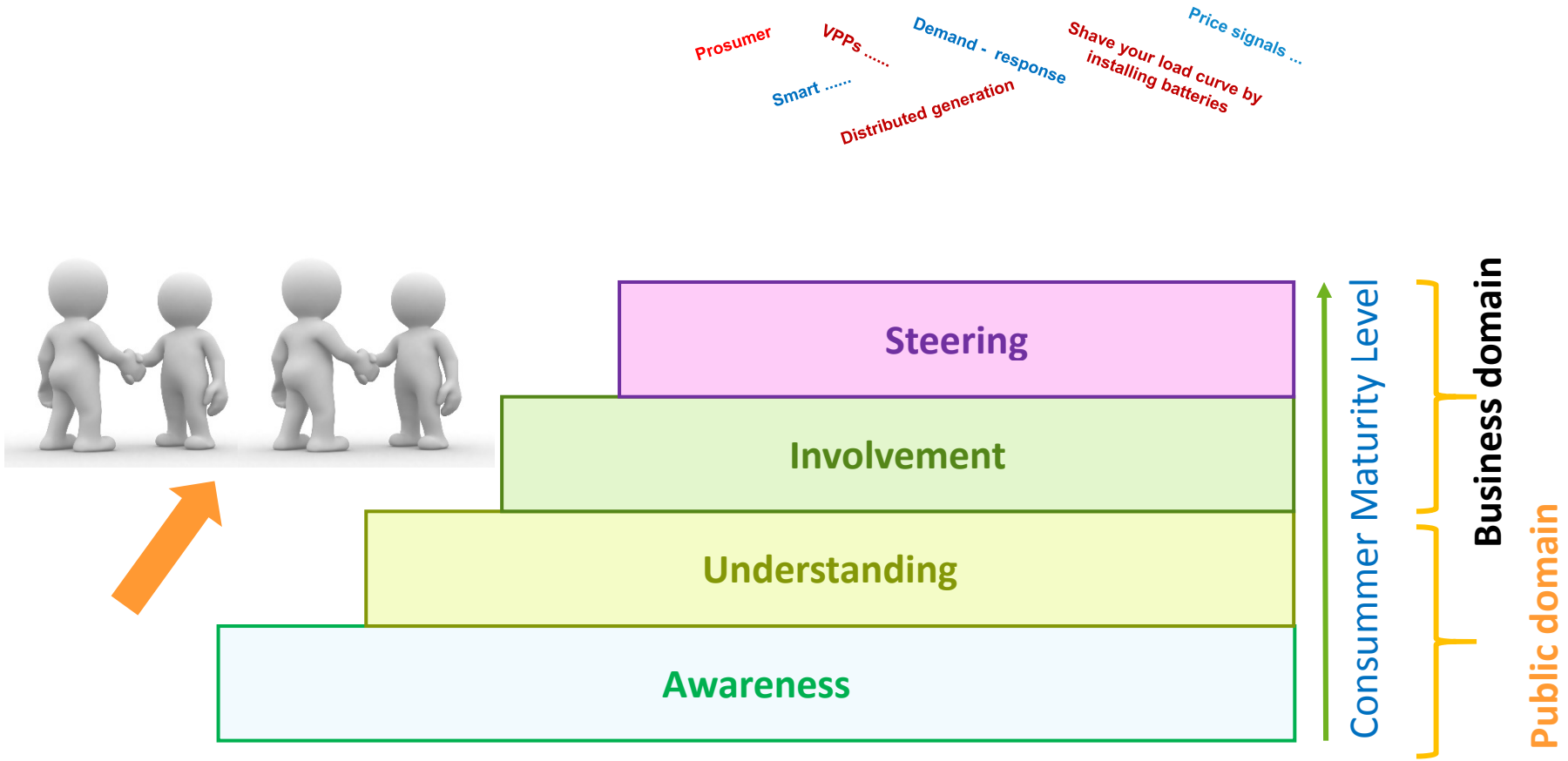
Consummer Maturity Level

Business domain

Public domain

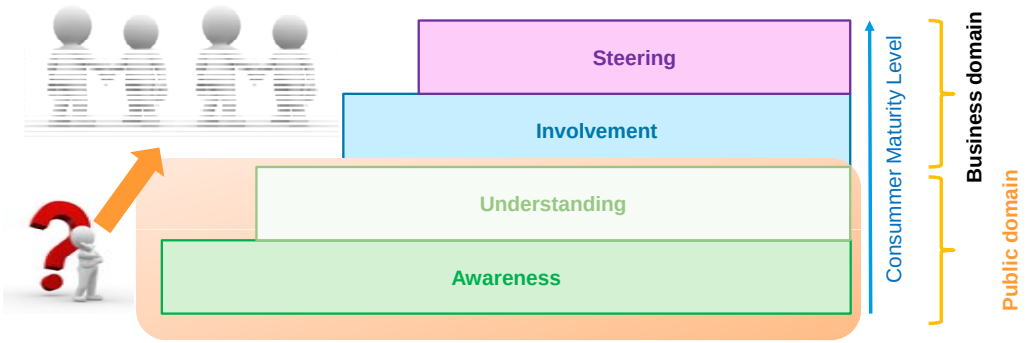
Lack of policies hampering impact (2/3)

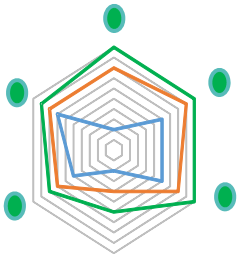
Societal appropriation



Lack of policies hampering impact (3/3)
Societal appropriation

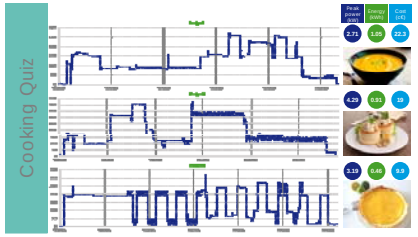
What innoEnergy does: From NIMBY to PIMBY ☺





A generational and societal change, to start .... yesterday?

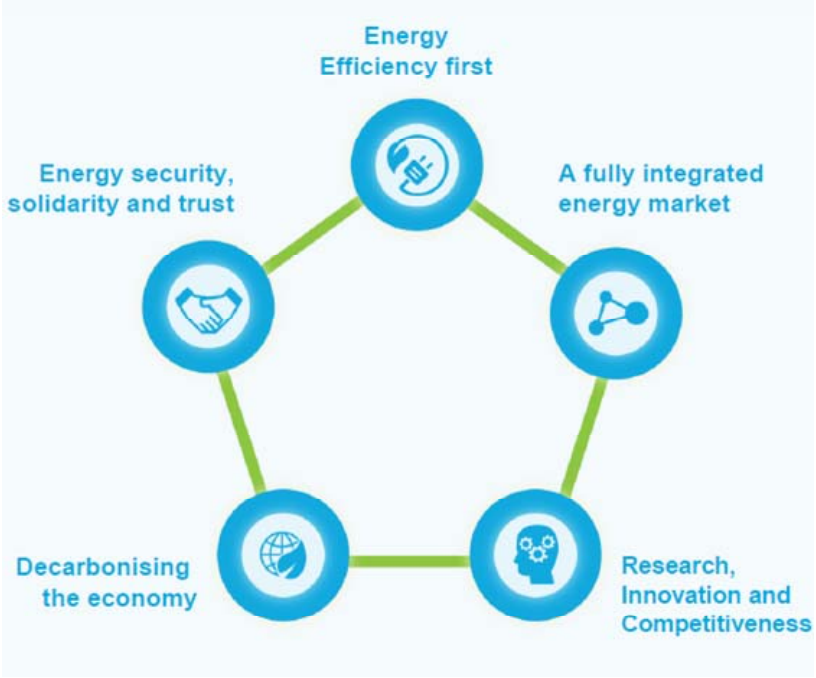
- Schools => gameification
- Mass Media => Role models
- Digital and non digital ”education”=>
- Contests
- Analogies
- .....



CLEAN ENERGY FOR ALL EUROPEANS

SMART AND CLEAN ENERGY FOR ALL – IMPLEMENTING THE ENERGY UNION STRATEGY

AN ENERGY UNION BASED ON 5 MUTUALLY SUPPORTIVE AND INTERLINKED DIMENSIONS



InnoEnergy is in, formally

European Commission

The Winter Package and the Energy Union: A BIG opportunity

Evolution of regulation requires Innovation as an enabler

CLEAN ENERGY FOR ALL EUROPEANS

WHAT CAN WE EXPECT IN TERMS OF RESULTS?

Massif impact expected

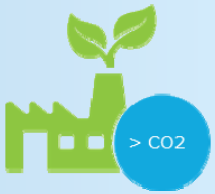
2016 2030

The package presents a **dual opportunity** to speed up **decarbonisation** and to speed up **growth and job creation**.

Investment:
- extra 177bn EUR euros per year of investment from 2021 to meet 2030 climate & energy targets
- Crucial role for EFSI

Economic growth*:
- 1% increase in GDP
- 190bn EUR into the economy
- 900,000 new jobs

*Upper end of estimates



Decarbonisation:
- Carbon intensity of the economy 57% lower in 2030 than in 2015
- **72%** share of non-fossil fuels in electricity generation in 2030

European Commission

Just a shortlist of key evolutions

New functions in the value chain

- Aggregators
- Local Energy Communities

Generation:

- Renewable loses priority (above 500kW)
- Coal above 550 ppm will not be remunerated for reserve capacity

Demand side:

- Full empowerment and easiness to become real actors

Grids:

- Possibility of TSO/DSO to serve flexibility services (Storage, Demand response, ..)
- Regional ”markets”, cooperation

A world of opportunities for innovators, incumbents and challengers

Conclusion

Policies/Regulation and Innovation: a dynamic healthy push-pull

1. It is not only about regulation and technology. It is much more comprehensive
2. Whatever triggers the evolution, it has to create impact in the energy KPIs *(decrease energy cost, increase operability of the system, decrease GHG emissions)*
3. Whatever triggers the evolution, it must create positive impact in the economy: value chain and supply chain *(increase competitiveness, increase growth => value, jobs)*
4. Let´s converge to market homogeneity (rules) in Europe
   Volume => Champions & Predictability
5. The winter package opens up a world of opportunities for the next 5-7 years

THANK YOU

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