

IRENA INNOVATION WEEK <sup>2018</sup>

# Report from the Rapporteur

## Electrification

Ruud Kempener, European Commission

# Overview - Electrification

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- **Knowns**

- Electrification is central
- It is happening global
- Prices for both RE and enabling technologies are falling
- Better signals/incentives needed to reflect improved flexibility and efficiency
- Not 100%

- **Unknowns**

- Who owns the EV, storage, hydrogen, heat, infrastructure?
- How will the end-user respond/engage?
- How will the electricity market evolve?
- How will these new load profiles affect the operation of the system?
- Who manages the system, and how is it managed?
- Where is the money being made?
- “Too cheap to meter”

- **Opportunities**

# Electrification of heat

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**Multiple benefits**

**Unique characteristics and requirements**

**Innovation solutions proliferating, good deployment conditions less so**

**We know the policy solutions**

**Need to raise the profile**

# Electrification of transport

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**Massive and clear potential**

**Innovations on this front abound**

**First sector beyond the tipping point**

**Now focus on use/operation**

**The key questions and challenges remain in the coordination and efficiency of transition**

# Electricity storage

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**Abundant applications and benefits**

**Not just cost, but a value story**

**Storage projects developed by consumers, utilities, and energy suppliers – all with new business models**

**Remove artificial barriers to enable participation and level the playing field**

# Electrification of fuels: Hydrogen

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**Scale, scale, scale**

**One thing is to produce hydrogen from renewable power, and then.....**

**Social acceptance, awareness and education**

**Policy frameworks and markets are missing**

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**Thank you!**

# Overview - Electrification

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Reality is surpassing expectations consistently in terms of the energy transition – even in oil and gas discussions there is consensus that **the future is electric**

With power sector rapidly decarbonizing – see EU aim of carbon neutrality before mid-century – we look to leverage success for other sectors

However this is not a luxury - saw that any deep decarbonization strategy will likely need to rely on electrification as a central element, barring significant unexpected technological development – e.g. in the EU for 80-95% emissions reductions by 2050, see 38-60% direct electrification respectively – for 95% scenario see 63% in transport and buildings, 50% in industry; this is in line with IRENA's view of ca. 50% electrification by 2050

Certain contexts are, and need to be, at the vanguard of this transition – e.g. heard about what could call “test cases” for transition – Electrification of heat in OECD, transport in Costa Rica. If electrification cannot occur in these advantageous contexts then we are in trouble

Luckily technological innovations across the board in every sector, what were pilots at the last IW are now being commercialized, and what were theories are now being piloted - But strong policy to support this dynamic is not widespread

Across sectors, perhaps the defining benefits of electrification are greater overall system efficiency and flexibility – but signals to incentivise stakeholders and consumers based on both flexibility needs and efficiency benefits are typically underdeveloped

However certain markets at the forefront – have to learn as much as possible from e.g. Ireland, California, Costa Rica



# Electrification of fuels: Hydrogen

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## Scale, scale, scale

scale for hydrogen, scale for production, scale for supply chain, scale for renewables to meet demand. For MW to GW. Focus on the target and the timeline, which means that we have to start today. For example, mixing in 20% of hydrogen into the gas infrastructure is doable, but only reduces emissions by 6-7%. We need to go 100%.

Hydrogen allows for a further acceleration of the renewables deployment, but even then – hydrogen would be on one of the products. Before the session 11-20% in 2020, after the session 2-10%. Realised that renewables can go many other pathways.

## One thing is to produce hydrogen from renewable power, and then.....

In the session, a number of different end-use sectors were discussed with each multiple supply chain options. Heard about a range of ambitious projects at the forefront of the hydrogen scale up, which gave a clearer idea of use cases and benefits – e.g. visions of large scale transition seen in study of a 100% hydrogen gas grid in Leeds, which could future proof the current infrastructure and reduce risk of stranded assets, and in Fukushima, where innovation is tied with economic regeneration. **Before the session, it would be transport but in 20 yrs for solar and wind. After the session, the opinion has changed thinking that it is used for seasonal storage for wind and solar.**

## Social acceptance, awareness and education

Related to the scale. Social acceptance is associated the perception of safety. The other is consumer preference. Hydrogen can be used to create carbon free steel. But is the consumer then willing to pay 400euro more a bit more for your car to save Gt of carbons. Or is the consumer willing to pay for hydrogen trains? Toyota would like to see other brands to go hydrogen, there is plenty of opportunity to go and create consumer awareness.

## Policy frameworks and markets are missing

hydrogen is a link to put the power sector to different end-use sectors, which also means that policy frameworks and markets need to put different sectors together. Policy framework enables the market enables the scale. At the same time, we need to market to make policy makers aware. Trigger demand from consumers.