

# Hydrogen, fuel cells and storage technologies, Finland – and EU

Deputy Director General Timo Ritonummi

Energy Department  
Ministry of Economic Affairs and Employment

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Ministry of Economic Affairs  
and Employment of Finland

# Paris Agreement, carbon neutralites



- **The Paris Agreement (2015) finally gets "more wind into the sails" in Europe and globally**
- **Politicians are calling for Carbon Neutrality for 2050 (EU).... Even 2035 (Finland)**
- **Whether this goal is in 15-20 years or even 30 years, the slope down is deep**
- **Actions are needed in every sector - including process industry: wind power, PV and EV is not enough – even with soya / oat milk in coffee and strict recycling**
- **Technologies that has been known – but not used or favored - are now undergoing 2<sup>nd</sup> (or 3<sup>rd</sup> etc.) emerge: Hydrogen & Fuel Cells, PV, EV, CCUS, Nuclear (SMR) etc.**

# The role of hydrogen and new storage technologies...



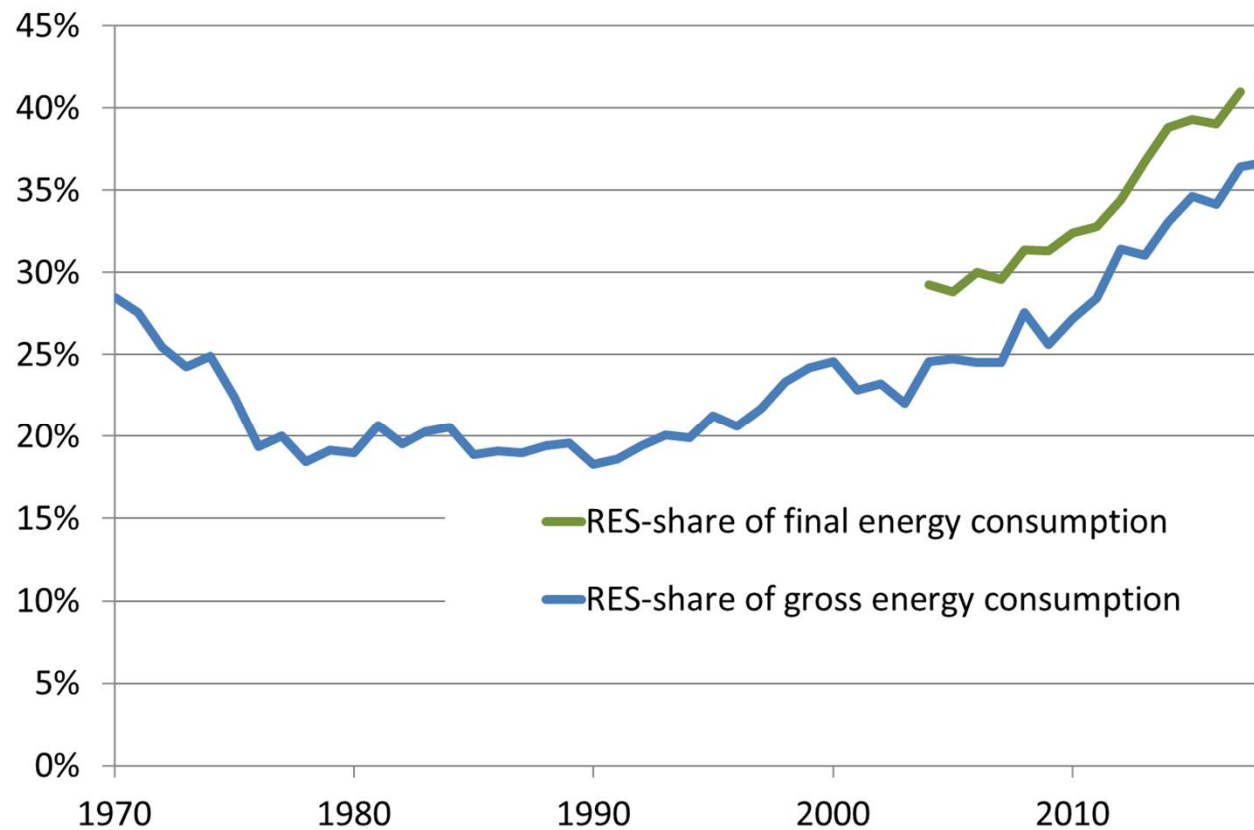
- **A lot of variable power production (PV, wind) is taken into use – even more coming**
- **All possible and economical ways of grid balance are needed: DR, storage etc.**
- **Sector coupling is a popular phrase, but also a must and reality in some cases**
  - District Heating and Cooling, power sector, transportation (hydrogen, electrofuels)
- **In transportation ”only one option for ICE” = EV has been too dominating**
  - Renewable Fuels (liquid and gaseous) and Hydrogen and Electrofuels will be part of solution
- **Hydrogen and new storage technologies: promising alternatives, but must battle against other clean solutions – not automatically the next truth**

# Hydrogen and Finland



- **Political decisions: Carbon neutrality by 2035, transport 50 % renewables 2030 etc.**
- **They will develop into laws (like phase-out of coal by spring 2029) and RD&I fundings in accelerating phase – seems / hopes so**
- **Hydrogen, storage, CCU, electrofuels**
  - So far much more talk and theory than doing – now strong messages from industry
  - Some pilot-plans (LUT, St1 & Q-Power etc.)
- **Fuel Cell technology, long and strong RD&I (VTT and spin-offs)**
- **Wind power and PV not in that dominating role in RES in FI: now or in (near) future**
- **In industry BIG potential: SSAB Raahe steel factory (SSAB in Sweden and Finland)**

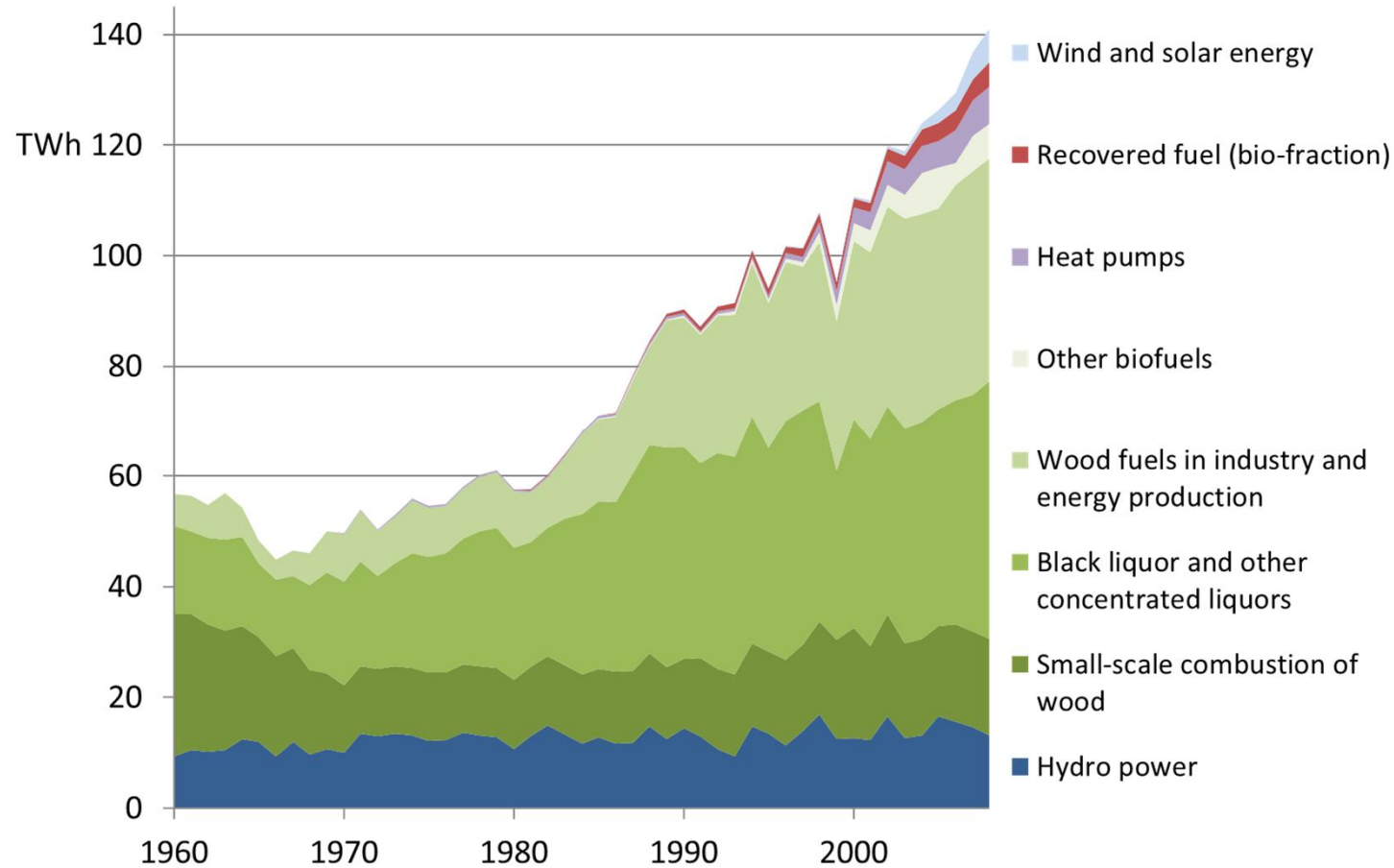
# Renewable energy share of final and of total energy consumption (1970-2017/2018)



Source: Statistics Finland, Eurostat



# Renewable energy in Finland, 1960 – 2018, TWh



Source: Statistics Finland



**Thank you!**

**Kiitos!**