



Energy performance towards 2030 in the Nordic/Baltic region

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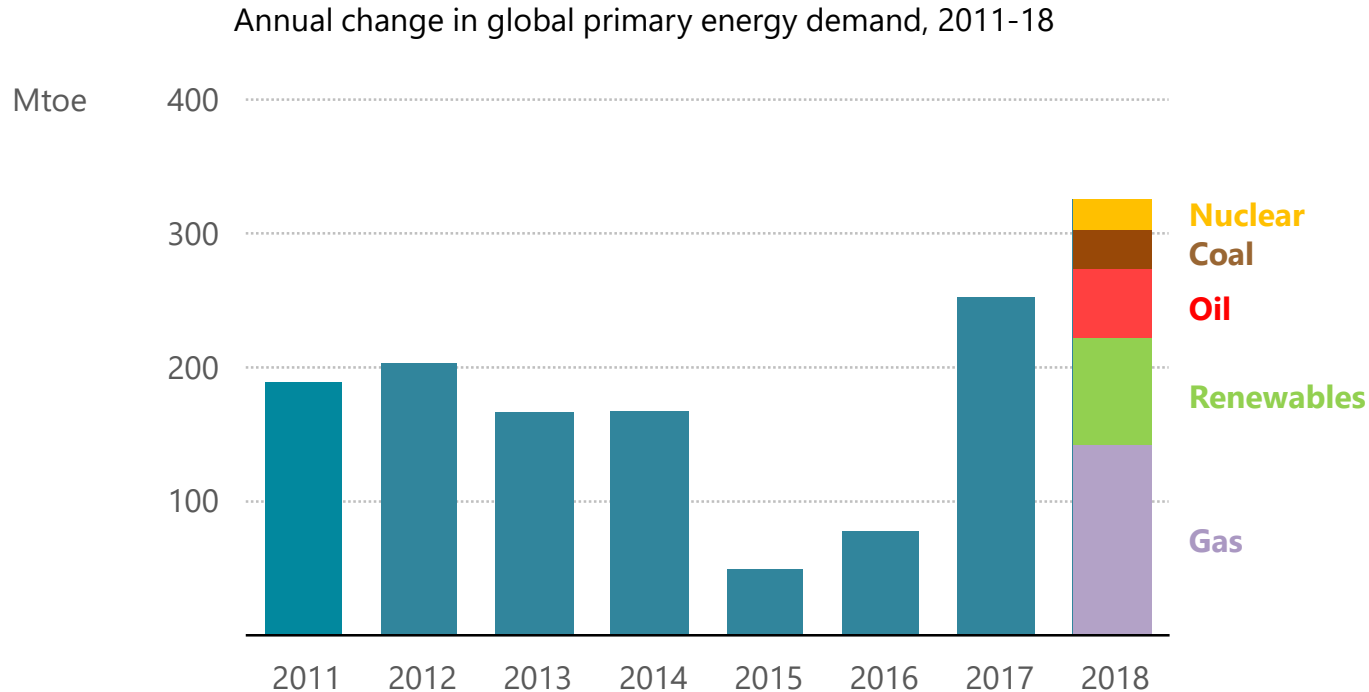
Nordic-Baltic Energy Conference 2019, 24 October 2019

The “eagle view” on Nordic and Baltic energy performance

- How are the Nordics and Baltics performing in:
 - Renewables
 - Energy efficiency
 - Innovative technologies
- Current picture and outlook to 2030
- Policy implications and recommendations
- International context, from an IEA perspective

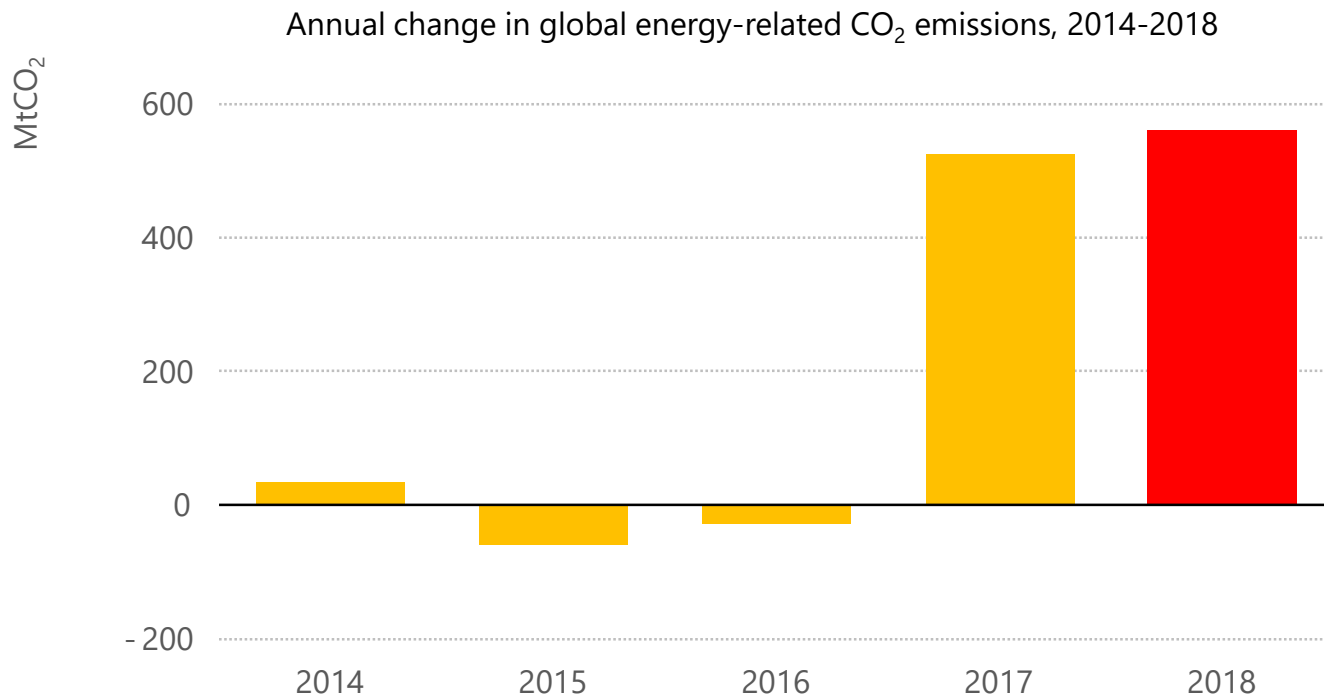


2018 – a remarkable year in energy



Global energy demand grew by 2.3% in 2018, the fastest pace this decade, driven by a robust global economy, unseasonal weather, and moderate energy prices

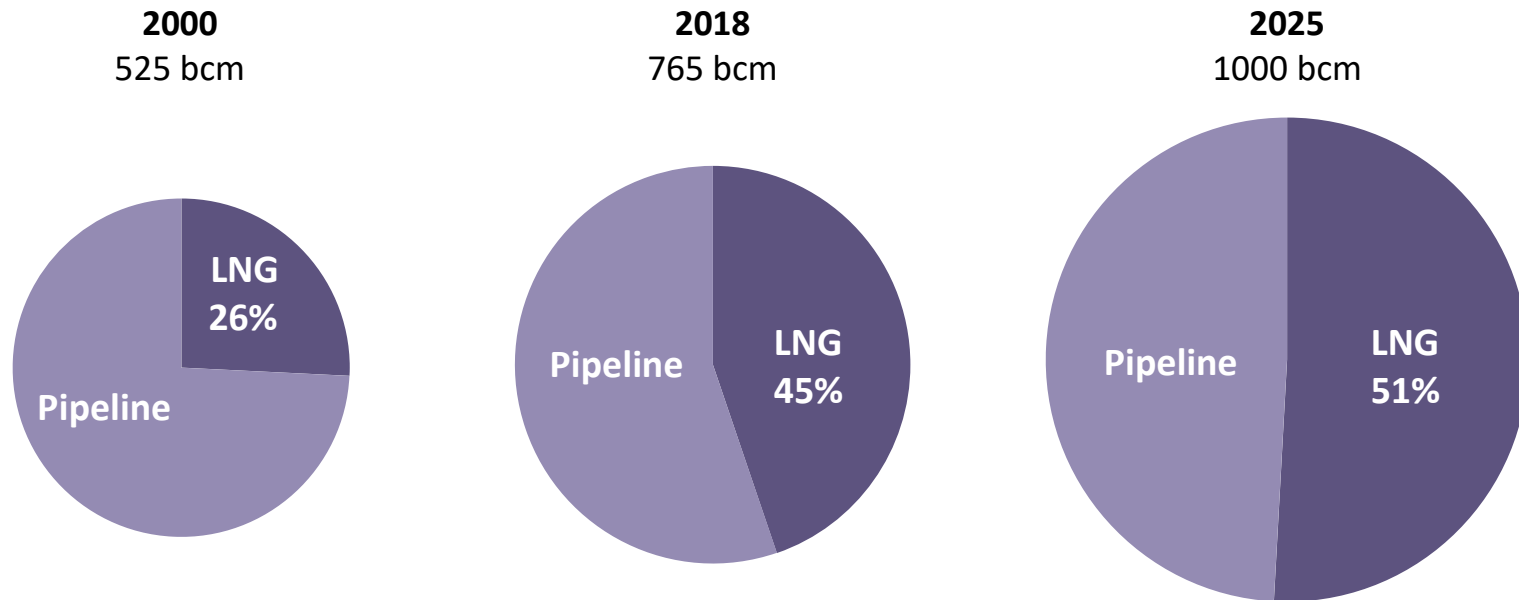
Energy-related CO₂ emissions hit a record high...



The need to accelerate clean energy transitions is underscored by recent data: CO₂ emissions rose for a second year in a row in 2018 to reach a record high.

The rise of LNG is bringing more security and diversity to markets

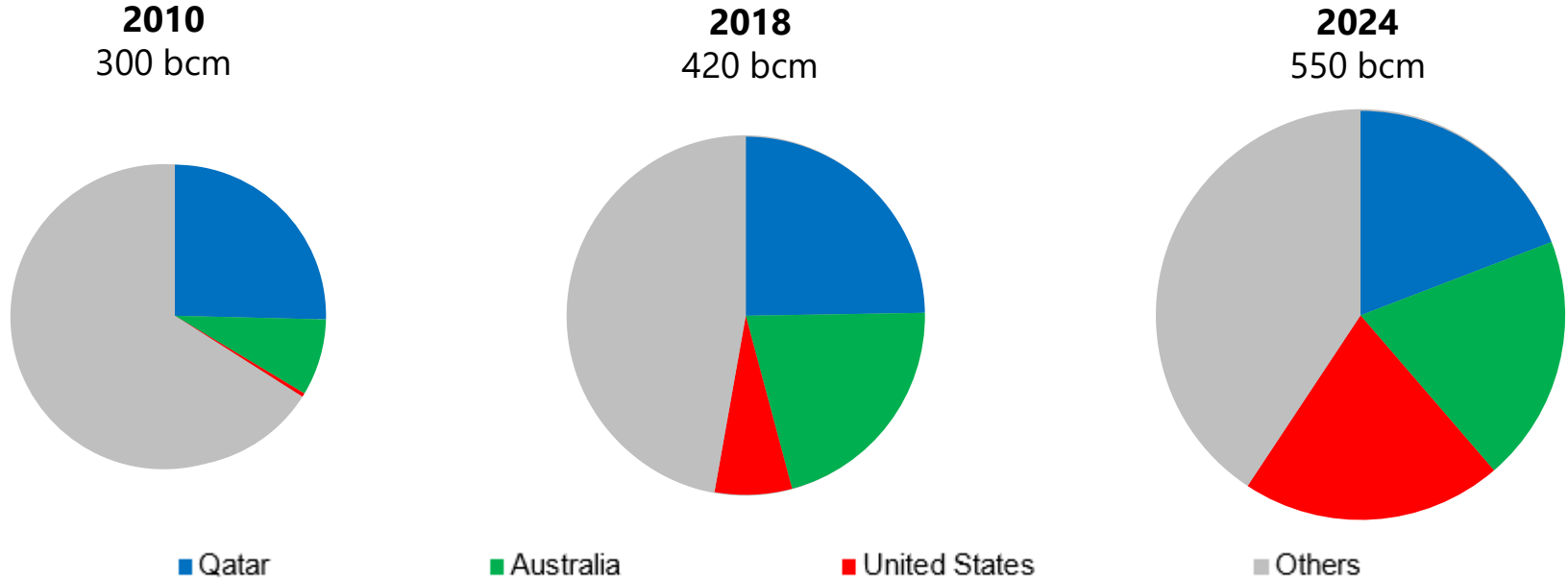
Share of LNG in global long-distance trade



LNG from the United States, Australia, Qatar & elsewhere is expanding supply and thereby improving market flexibility & diversity

Three major exporters diversifying LNG supply

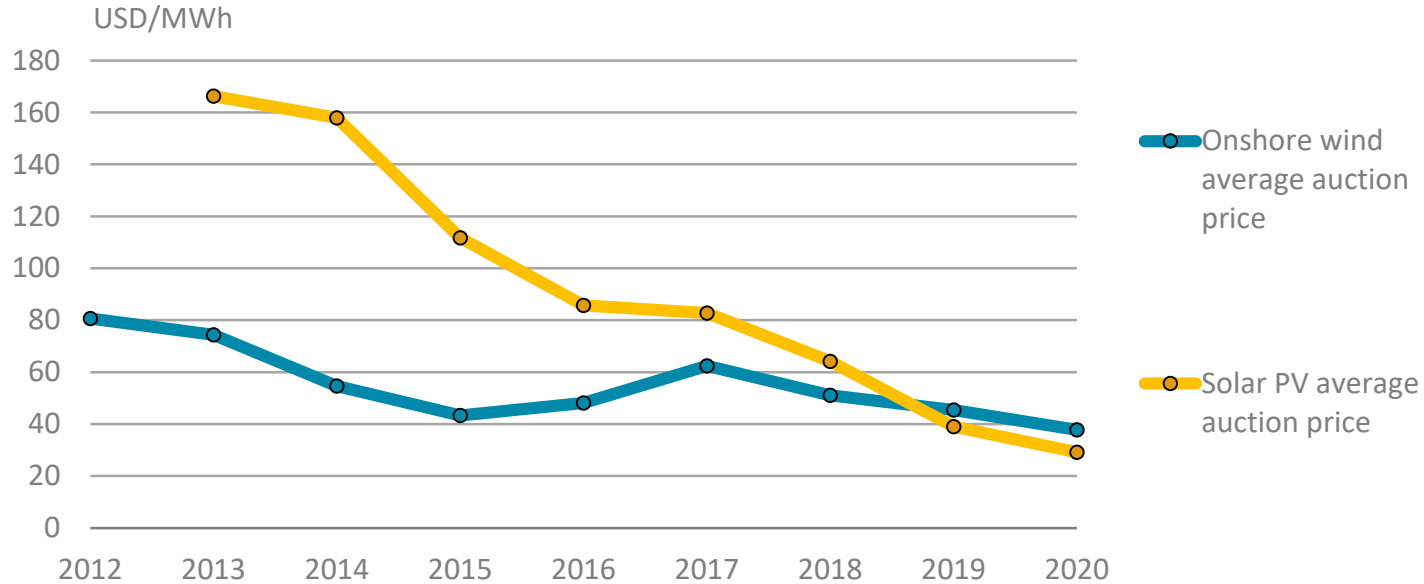
Evolution of LNG exports, 2010-24



Australia, Qatar and the United States will account for 60% of total LNG supply by 2024, with the United States contributing two-thirds of LNG export growth through the forecast.

Falling renewable technology costs create major opportunities

Announced wind and solar PV average auction prices by commissioning date



Technology progress and competition have driven down prices to record-low levels in countries with good renewable resources, transparent policies and well-designed auction schemes

The In-Depth Reviews of IEA member countries' energy policies

Recent IEA In-depth Reviews of the Nordic countries

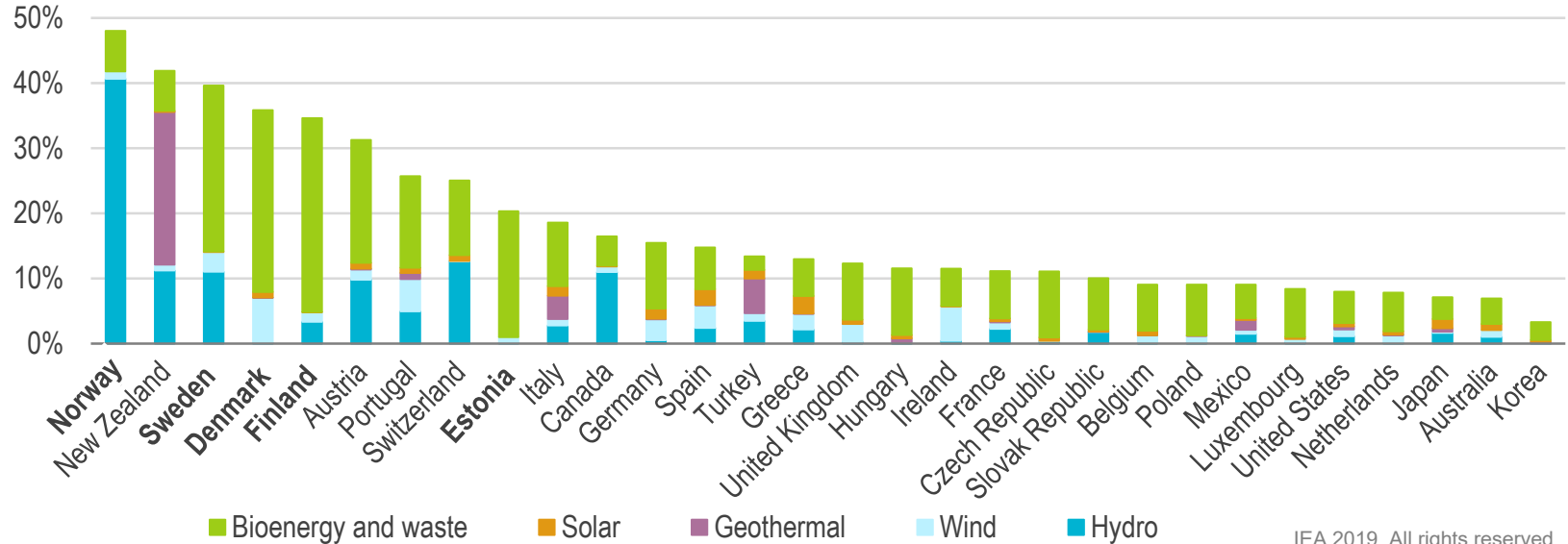


The IEA helps its member countries design effective energy policies through regular In-depth Reviews every five years. All Nordic countries and Estonia have been reviewed since 2017.

Renewables

The region is a leader in renewable energy supply...

Share of renewable energy (and waste) in TPES for IEA member countries, 2018

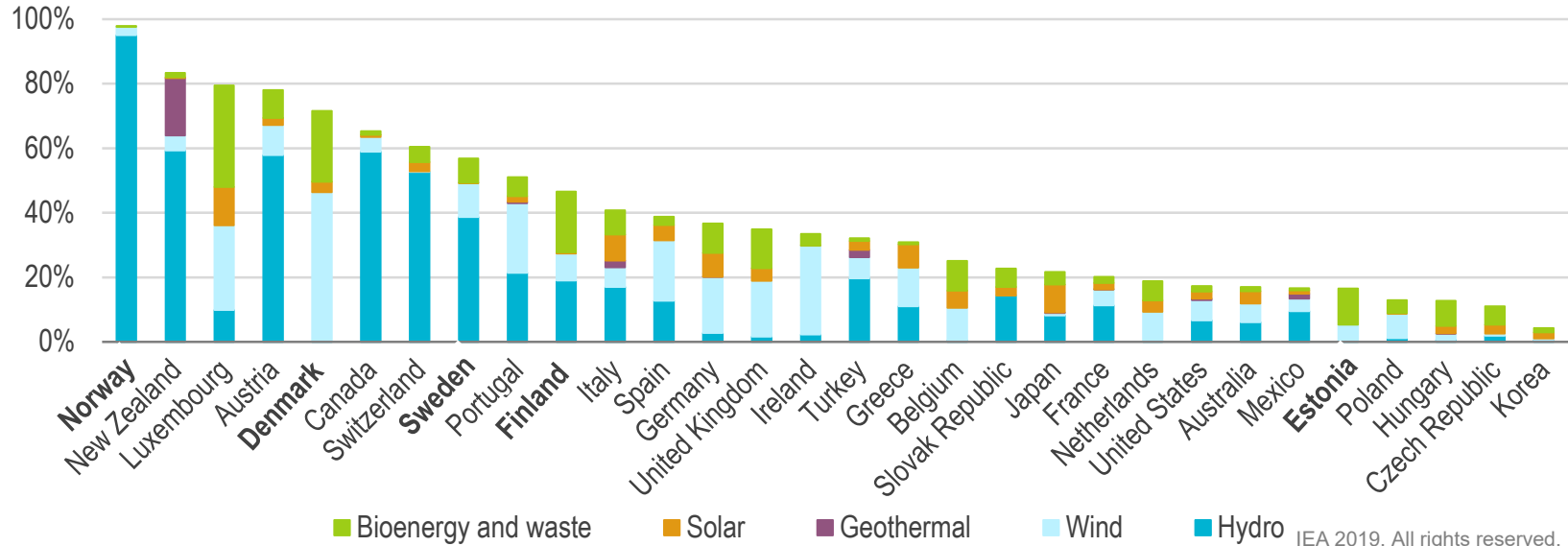


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Large bioenergy consumption in industry and district heating generation, and electricity from hydro and wind power puts the Nordic countries in the top for renewable energy supply in the IEA.

...and ranks mostly high also in renewable electricity

Share of renewable energy (and waste) in electricity generation for IEA member countries, 2018

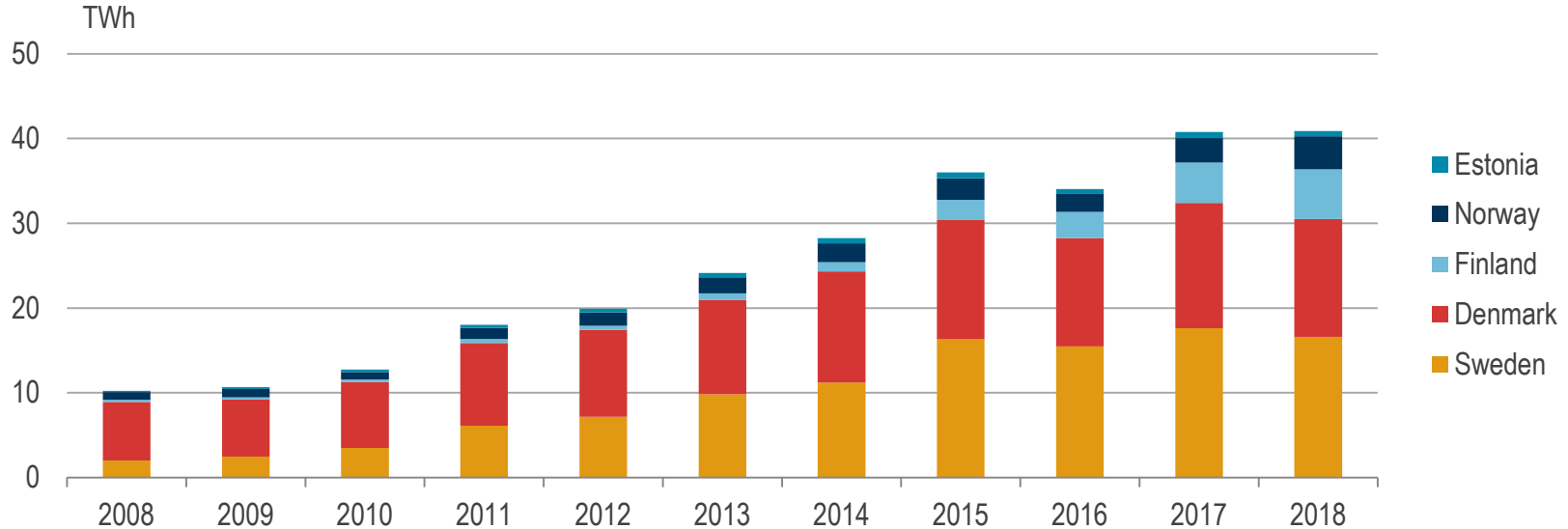


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High shares of hydropower dominates in Norway and Sweden, and wind power in Denmark. All Nordic countries ranks in top 10 among IEA members, while Estonia are further down.

Wind power is steadily growing in the region

Wind power generation in the Nordic region, 2008-18



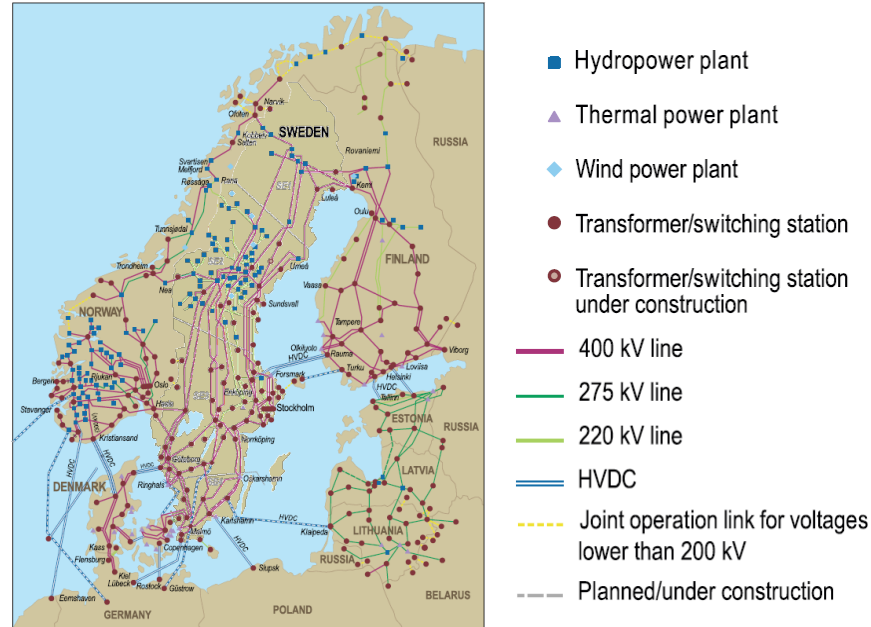
Wind power generation in the Nordic region has quadrupled in a decade, and the growth is likely to continue, and add to the challenge of system integration of variable renewable energy.

Support for renewable energy

- Targets for renewables
 - Denmark: at least 50% renewable energy in the energy demand by 2030
 - Estonia: 42% in gross final consumption by 2030
 - Finland: at least 50% renewable energy in final energy consumption by 2030
 - Sweden: 100% renewable electricity generation by 2040
- Renewable electricity support
 - Auction for tenders with feed-in premiums in Denmark, Estonia and Finland
 - Green electricity certificate system in Norway until 2020 and Sweden until 2030

Integrated power system benefits renewable growth the region

Electricity infrastructure in the Nordic/Baltic market area

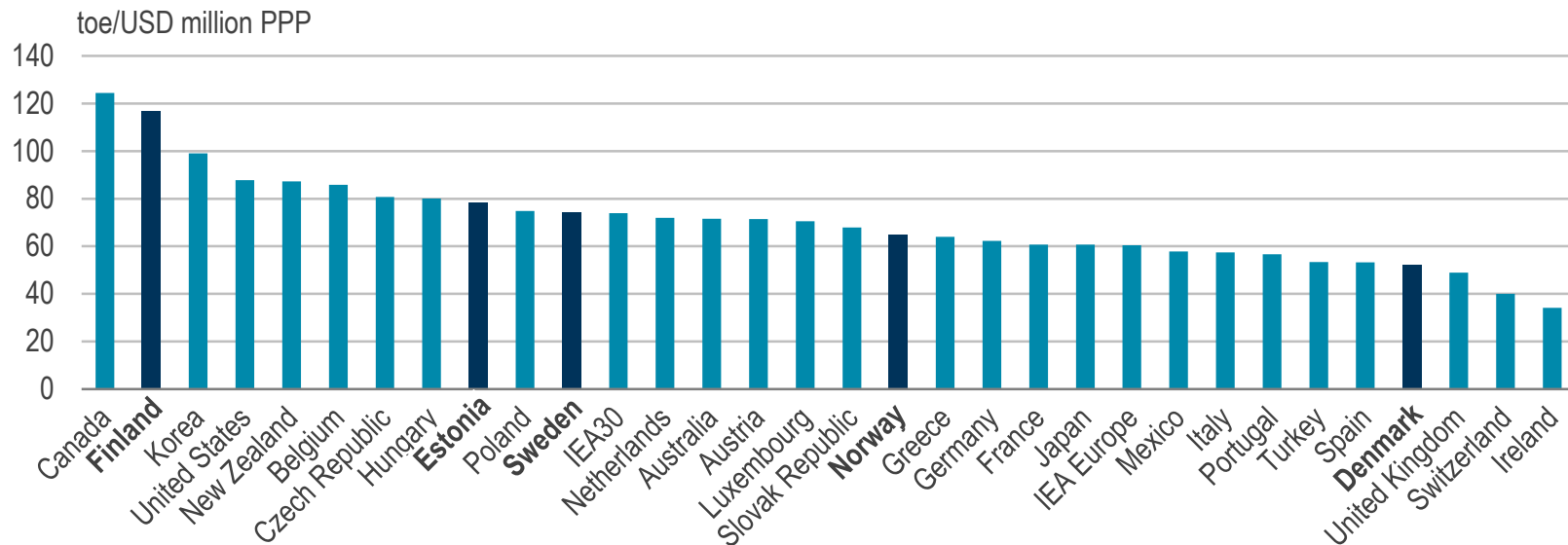


Interconnections allow for efficient use of available hydropower to help balance the growing share of wind power in the region. Nordic balancing market is under development.

Energy efficiency

Energy intensity varies significantly among the Nordic countries

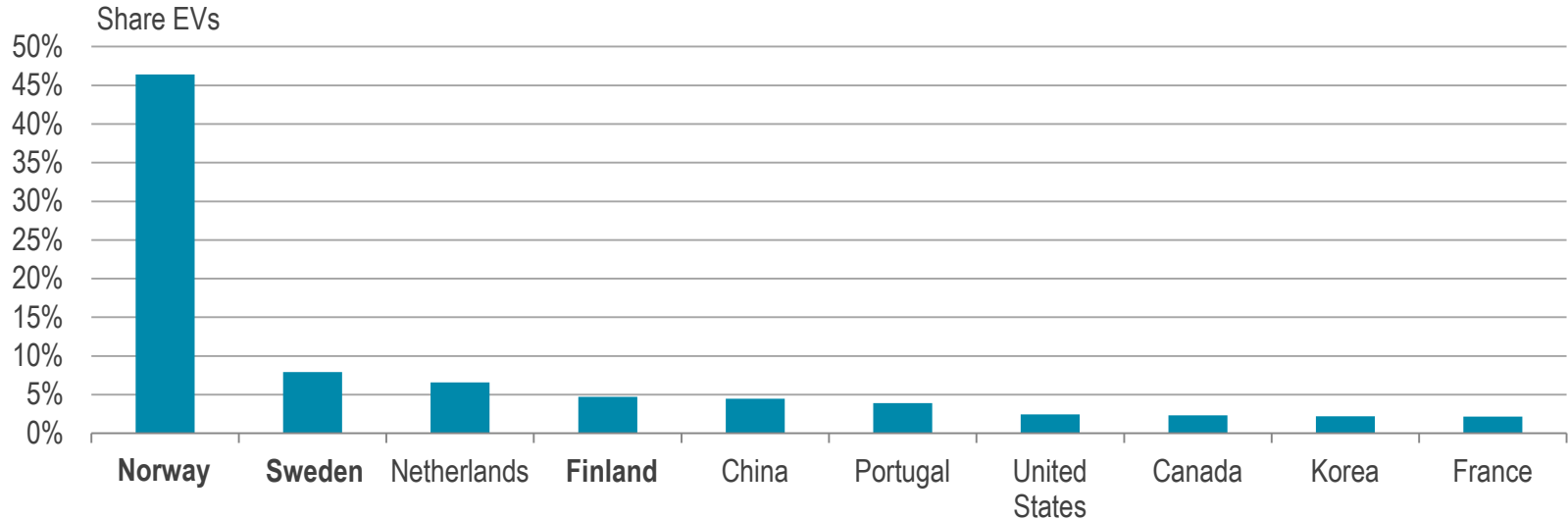
Total final consumption per GDP (PPP) in IEA member countries, 2017



Cold climate and energy intensive industries contributes to high energy demand in Finland, while Denmark ranks among the lowest in the comparison.

Nordic countries are leading in e-mobility

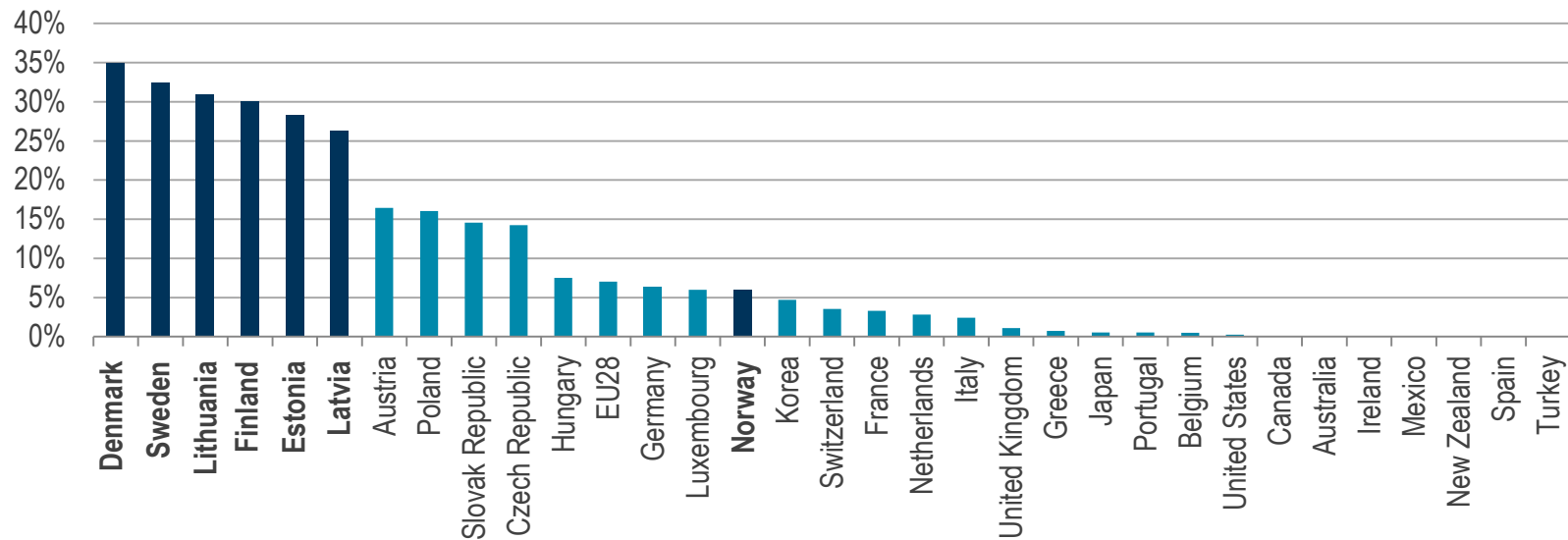
Electric cars (BEV and PHEV) market share development for the ten countries with highest shares in 2018



Norway is the most advanced EV market in the world, with nearly 50% of car sales being EVs in 2018, and other Nordic countries are advancing as well.

District heating is an important energy carrier in the region

Share of district heating in residential and service sector energy consumption in IEA and Baltic countries, 2017

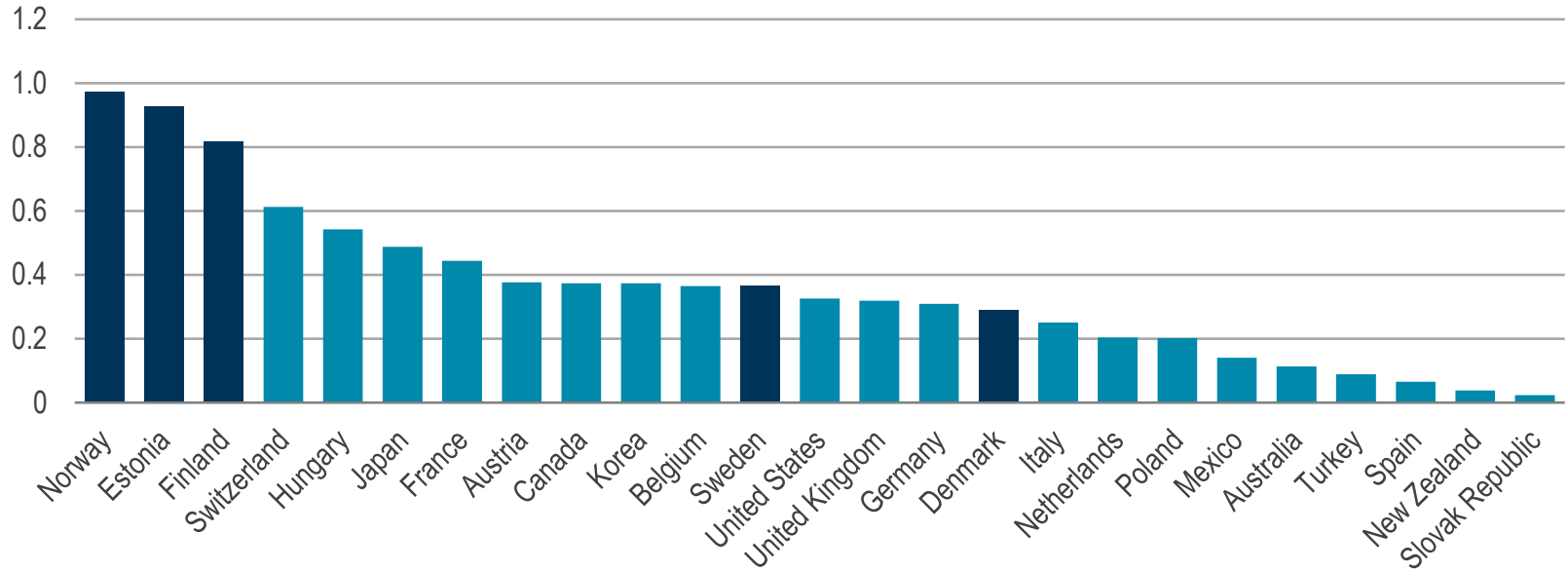


High demand for heat and good access to biofuels has enabled the use of district heating for decarbonising heat supply in several Nordic countries.

Research and innovation

The Nordic region do well in energy RD&D

Energy related public RD&D spending per thousand units of GDP, 2017

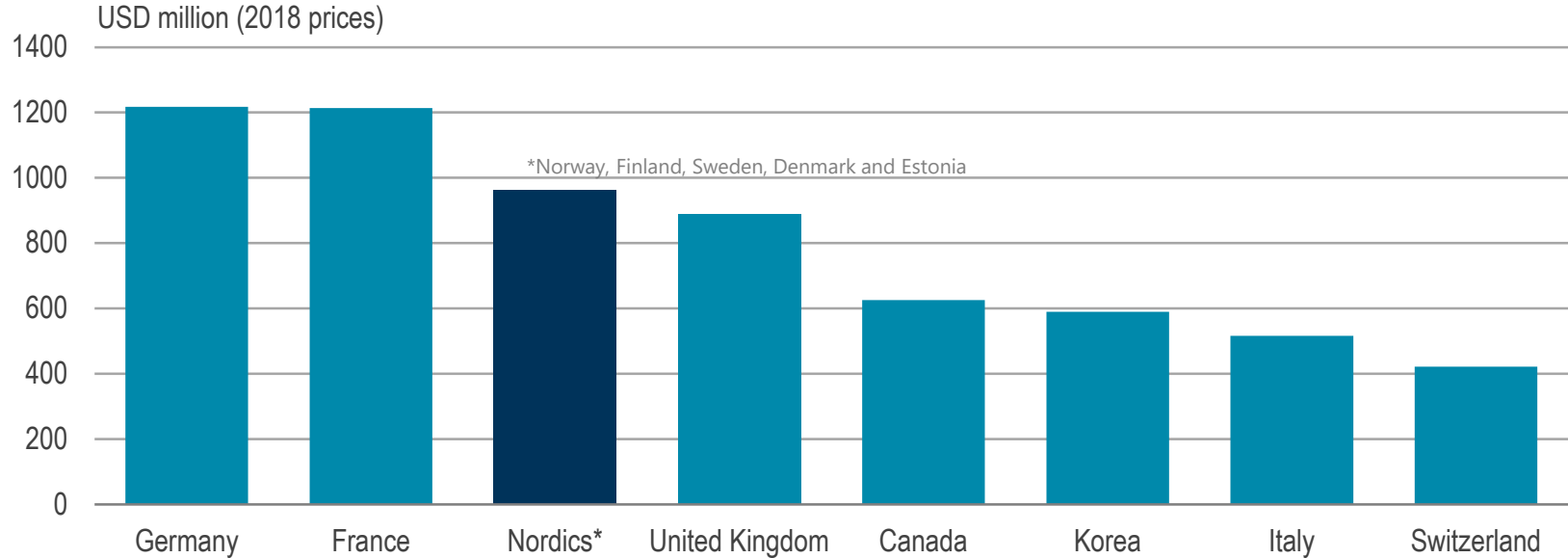


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Norway, Estonia and Finland are in the top in terms of public spending on energy RD&D per GDP in the IEA, and together the region becomes an important actor in energy innovations

The Nordic region makes a strong player in energy RD&D

Public energy related RD&D spending in selected countries, 2017

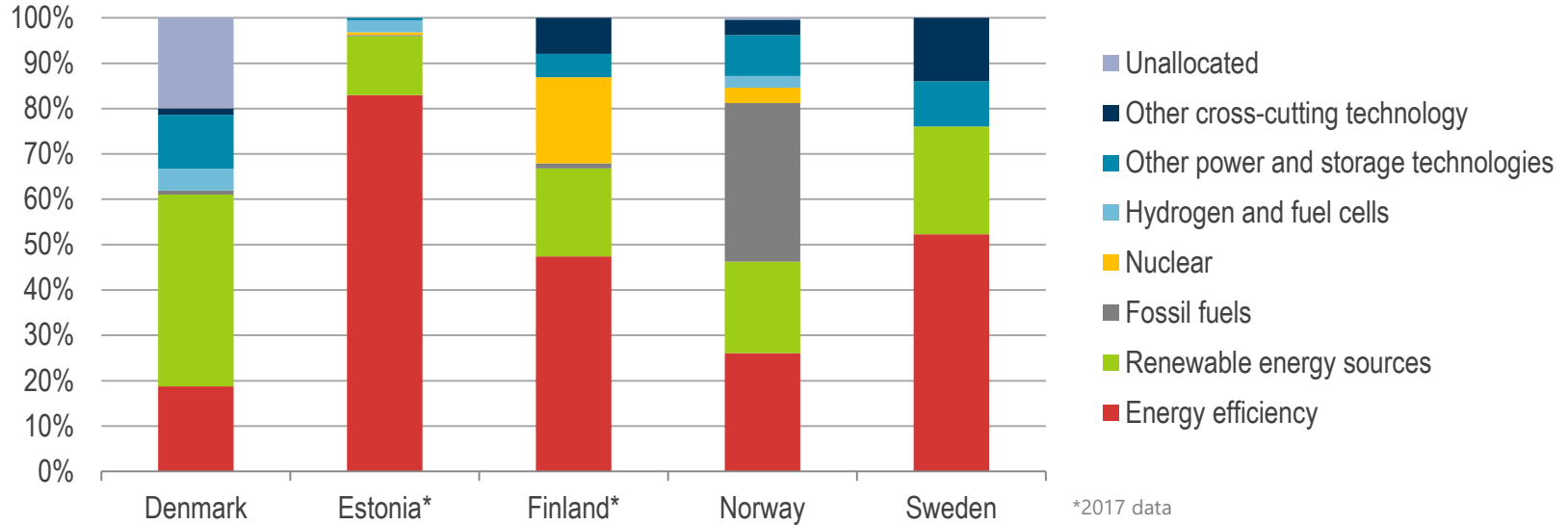


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On their own, most of the Nordic countries would not fit in the chart, but together, the public energy RD&D spending is of a similar size or even larger as in major European countries.

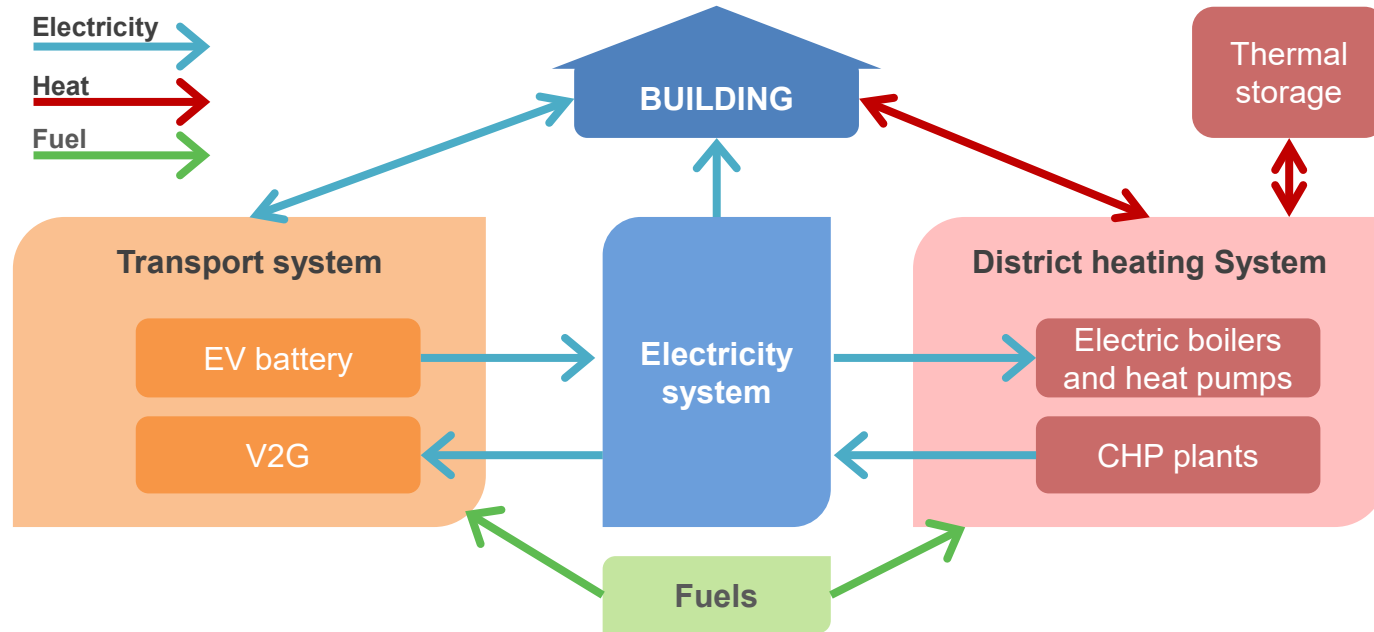
Where will the next technology breakthrough be?

Public energy RD&D funding by sector in the Nordic countries, 2018



Public RD&D money is focused towards energy efficiency and renewables

Sector coupling can benefit the whole energy system



With the large district heating sectors and rapid deployment of electric vehicles, sector coupling of transport, heat and power can improve system efficiency and benefit integration of variable renewables

The region should explore further collaboration

- The Nordic and Baltic region is doing well...
 - stands out in an international comparison, e.g. on wind power, EVs and District Heating
 - benefits from co-operation, notable on the electricity market
 - together forms a large investor in public energy RD&D
- ...but challenges remains ahead in integrating more renewables while maintaining energy security
 - Innovations needed to improve the “smartness” of the energy systems
 - Sector coupling can help integrate renewables and better utilise EVs and DH systems

Policy recommendations:

- *Continue developing the common electricity market*
- *Explore further policy coordination*
 - *Develop a regional climate and energy strategy?*
 - *Coordinate support for renewables, allocation of wind power, and buildout of EV infrastructure?*
 - *Coordinate more RD&D and develop a regional test hub for smart and integrated energy solutions?*

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