



Energy for  
generations



# Switching on to the Energy Transition

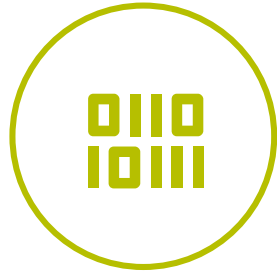


18<sup>th</sup> February 2020

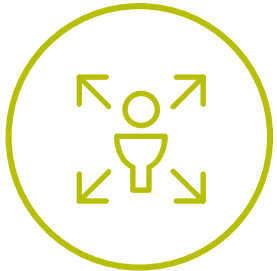
# The 4 Macro Trends informing our Strategy



**SHIFTING REGULATORY PRIORITIES** as a **CONSEQUENCE** of **CLIMATE CHANGE**



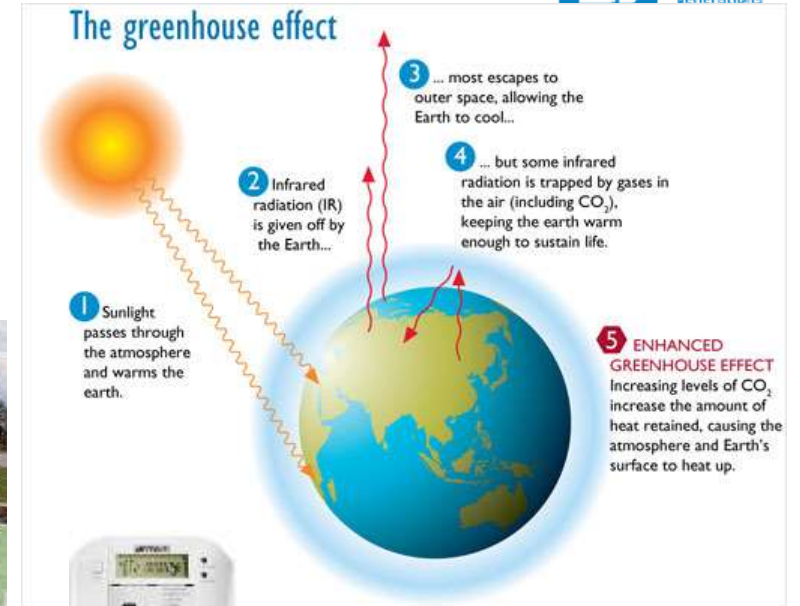
**RAPID ADVANCES IN TECHNOLOGY** both within the **VALUE CHAIN** and within **CUSTOMER** activity



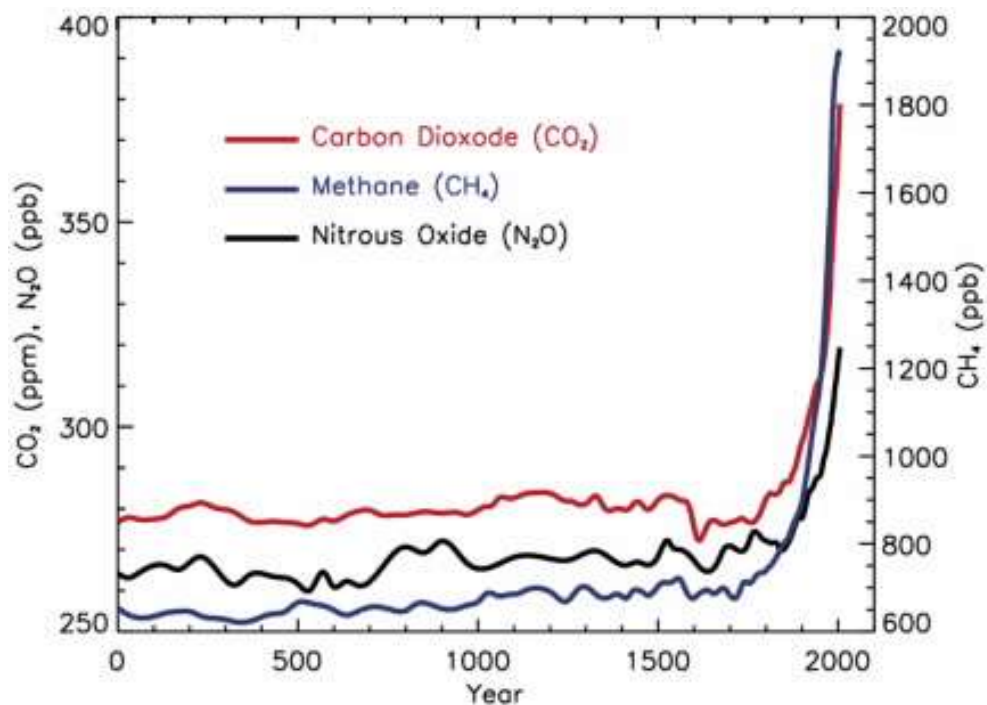
**CHANGING CUSTOMER PREFERENCES**



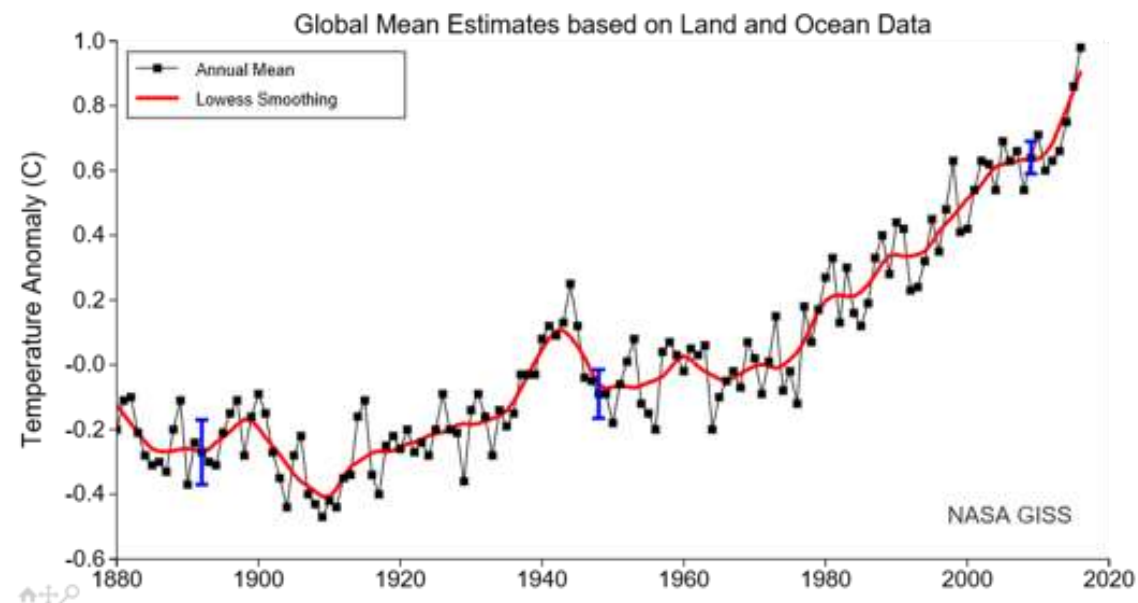
**RISE OF NEW BUSINESS MODELS** delivering **NEW FORMS OF COMPETITION**



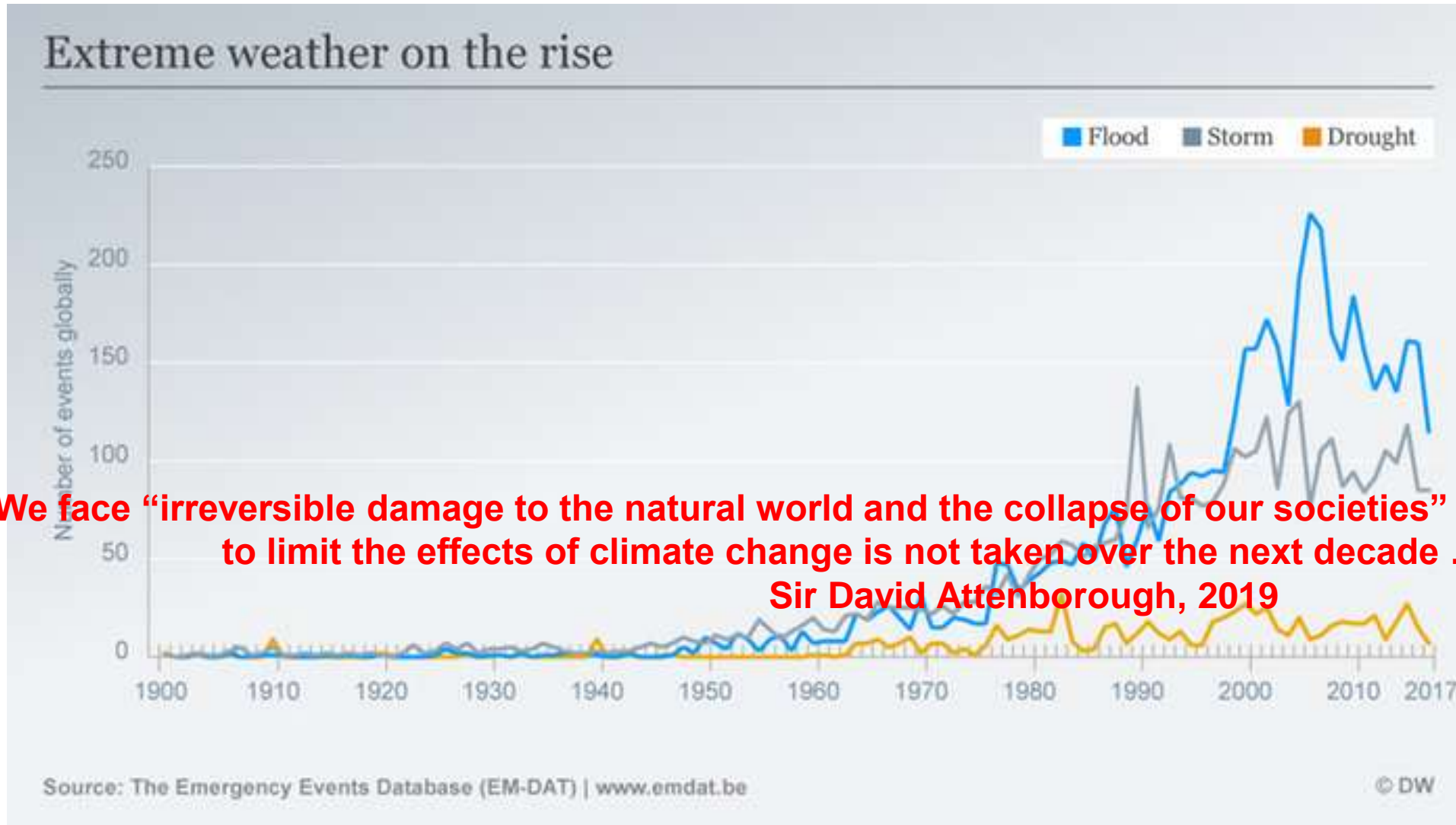
## Trend in CO2 Emissions



## Trend in Global Mean Temperature



# Increase in Extreme Weather Events



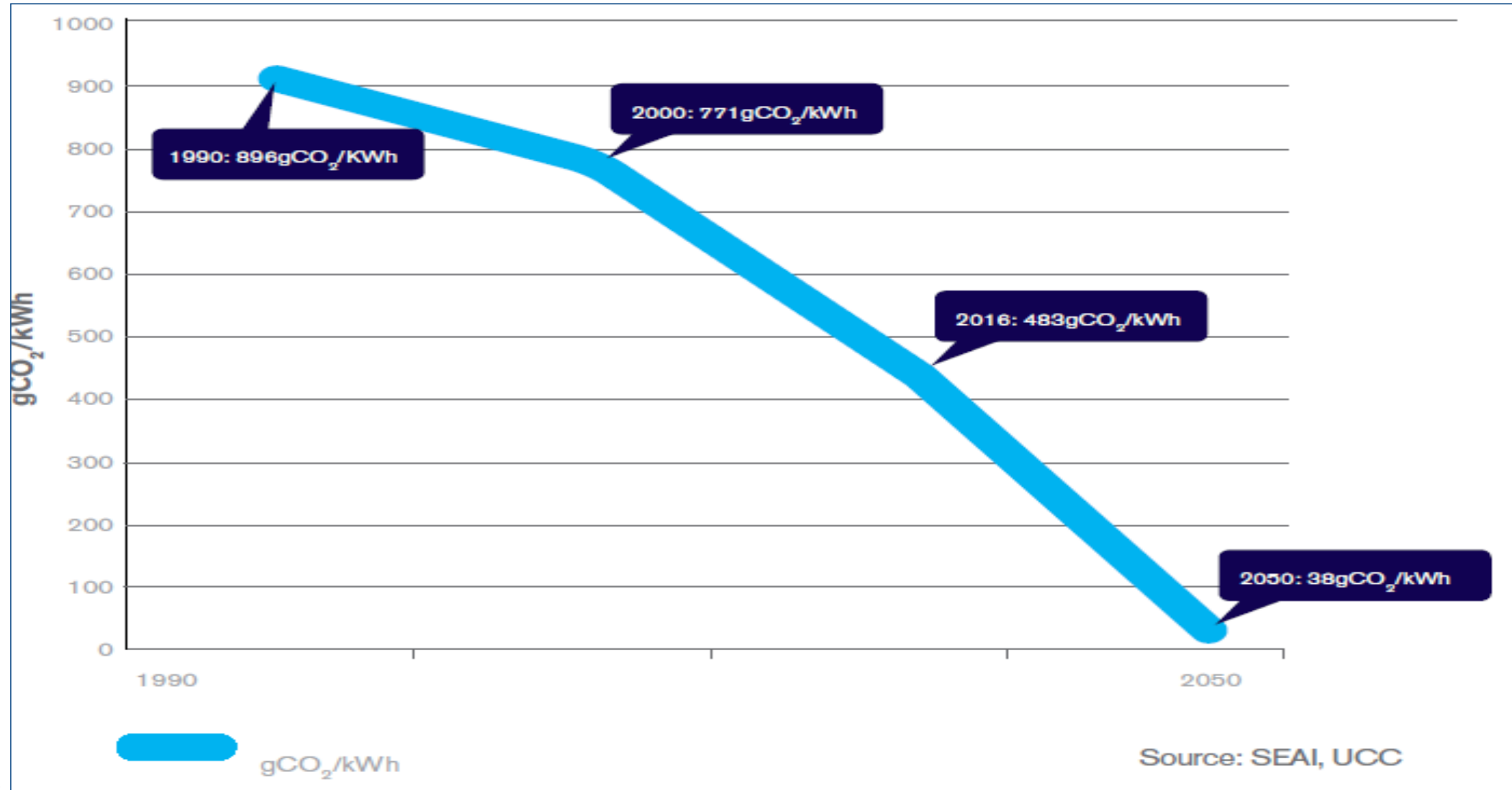
**We face “irreversible damage to the natural world and the collapse of our societies” if dramatic action to limit the effects of climate change is not taken over the next decade .....**

**Sir David Attenborough, 2019**

- **Air pollution has overtaken tobacco as the number one killer in Europe, with some 800,000 premature deaths now attributable to poor air quality. Of these deaths between 40-80 per cent were due to cardiovascular diseases, mainly heart attacks and strokes.**
- **Air pollution is the biggest environmental cause of heart and circulatory disease in the UK, linked with 40,000 premature deaths every year. That's around 20 times more people than die in car accidents.**
- **“The most recent statistics show that 1,150 premature deaths in Ireland were attributable to air pollution in 2015. Cardiovascular disease is the most common cause of deaths.**

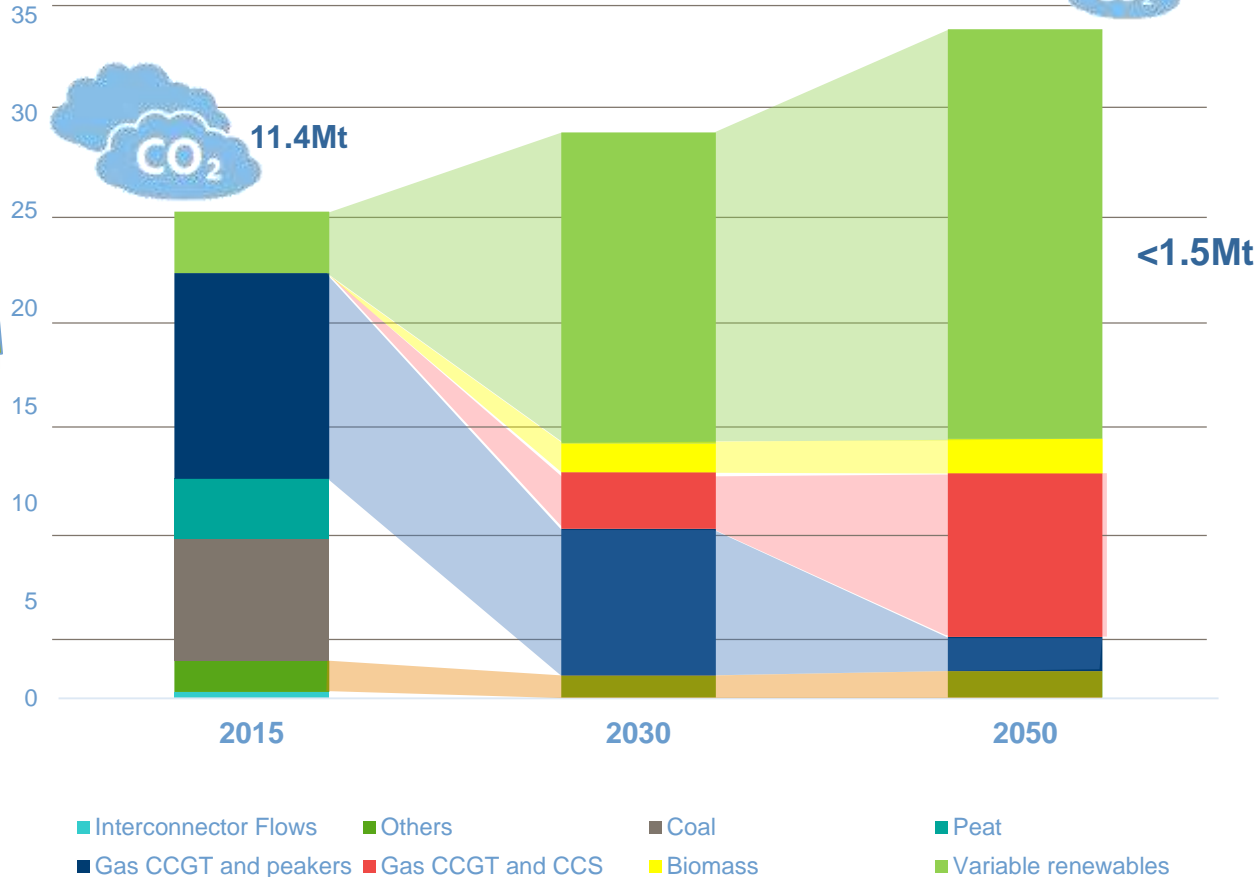
# Decarbonising Energy

# Electricity is on a clear path to decarbonisation



# Electricity is on a Low Carbon Path

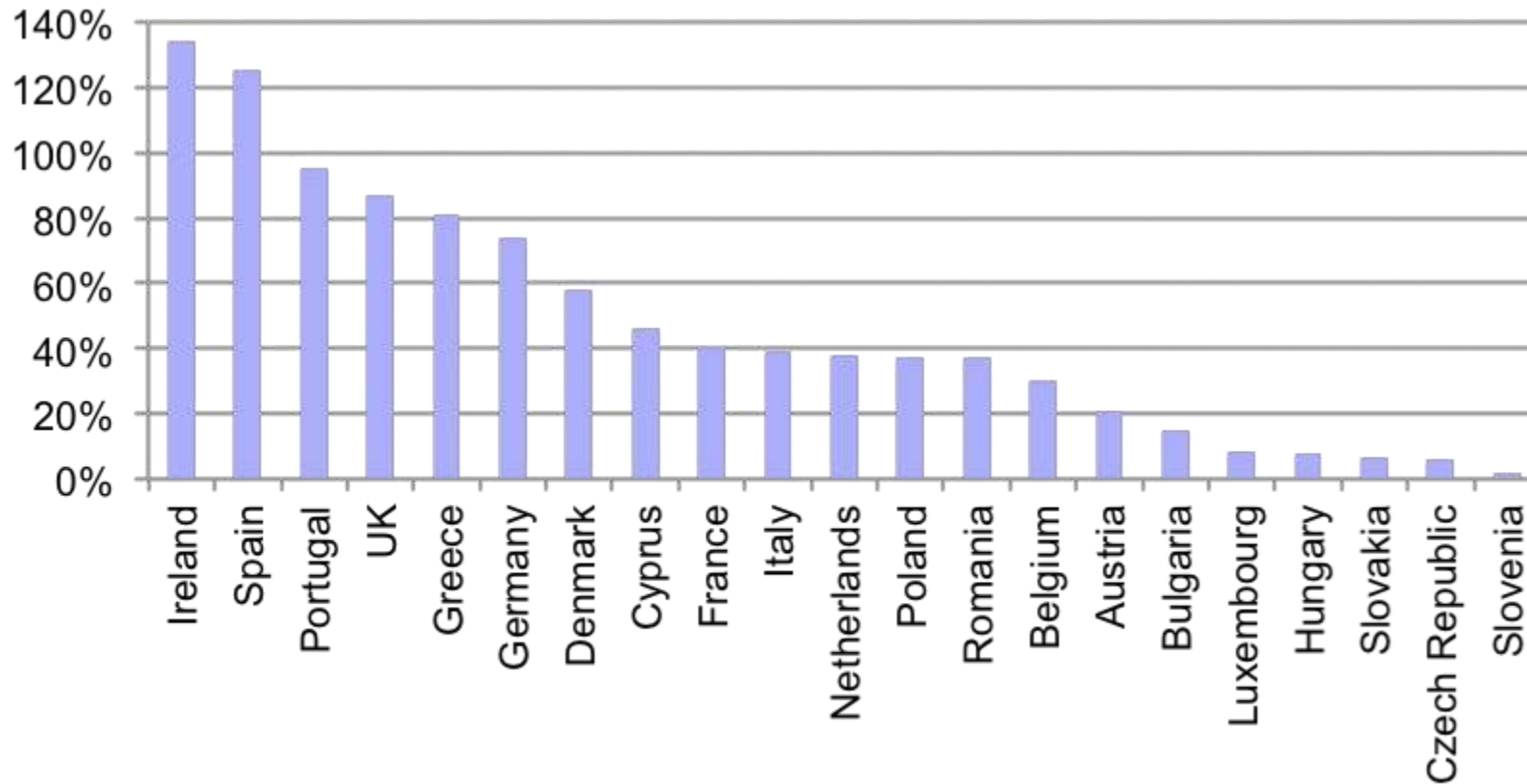
Electricity Transition - Generation (TWh)



- Technological solutions exist to decarbonise electricity...only question is what is optimal mix?
- We expect a range of solutions including increase RES, Gas with Carbon Capture (CCS), Biomass, supplemented with Gas Peakers

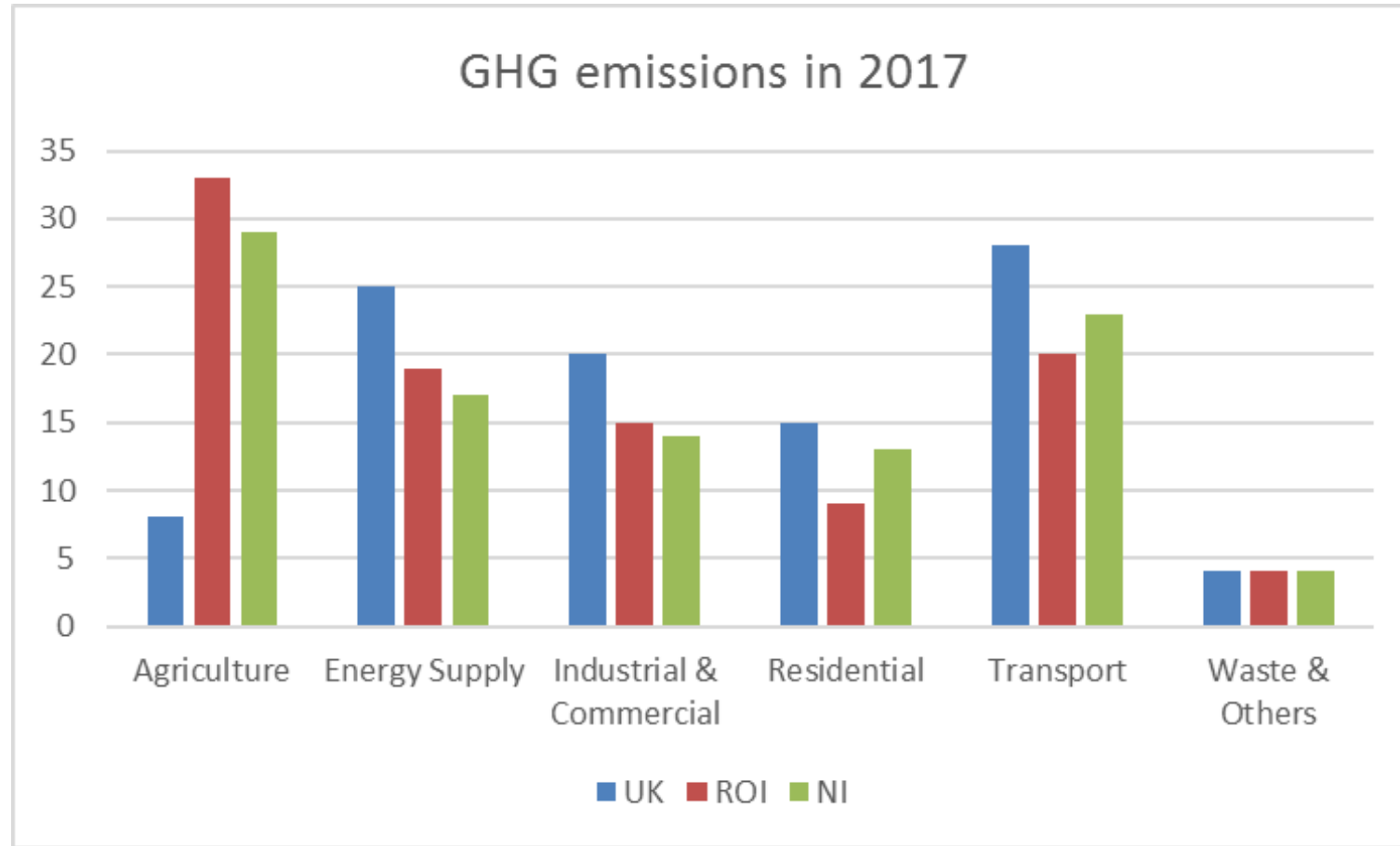


# Wind capacity versus national load



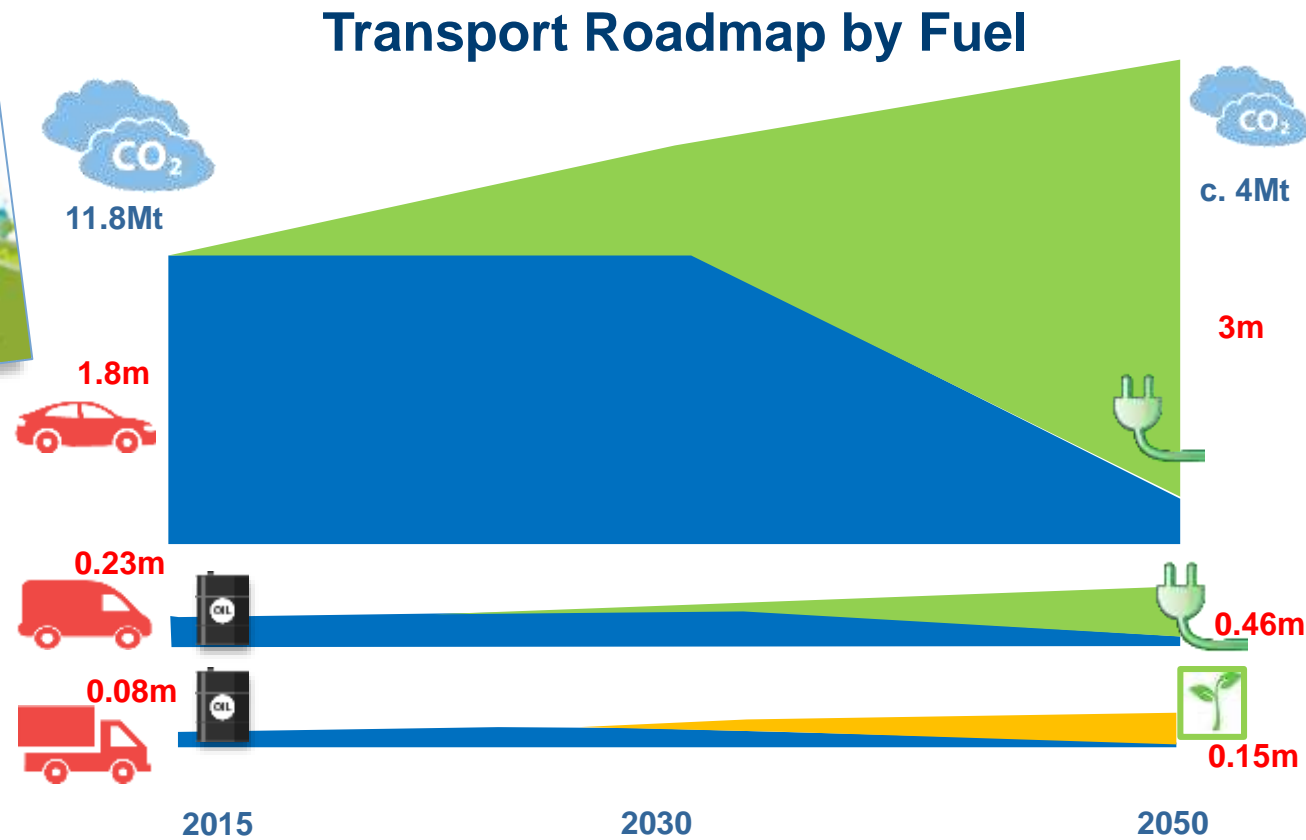
17 Wind capacity as a proportion of minimum demand in summer 2020

# GHG emissions by sector more closely aligned to ROI than UK as a whole



# Decarbonising Transport



# Decarbonise Transport – move away from oil



- Electric Vehicles to progressively replace diesel and petrol cars and light commercial vehicles
- Potential for bio-fuels or electricity (direct or indirect) for larger vehicles – In development

# Existing all island EV Charging Network

## Public EV charging infrastructure

-  ● 50kW Fast Chargers – x 92
-  ● 22kW Standard Chargers – >1,000
- RoI and NI networks allow cross-island travel and provides public EV charging in most communities with >1,500 population



# Infrastructure - The Trend in Tech

- Faster Charging - Higher Power
- 50kW >150kW >350kW chargers
- Quicker charging
- Greater range from each charge
- Multiple chargers at each location



# Decreasing battery price

## US MEDIUM BEV PRICE BREAKDOWN, ICE PRICE & SHARE OF BATTERY COSTS

\$2016 (thousand) and %



- Battery prices decreasing significantly
- This will see the manufacturing price of an electric vehicle drop
- The reduced battery prices should see EVs become cheaper than conventional vehicles after 2024

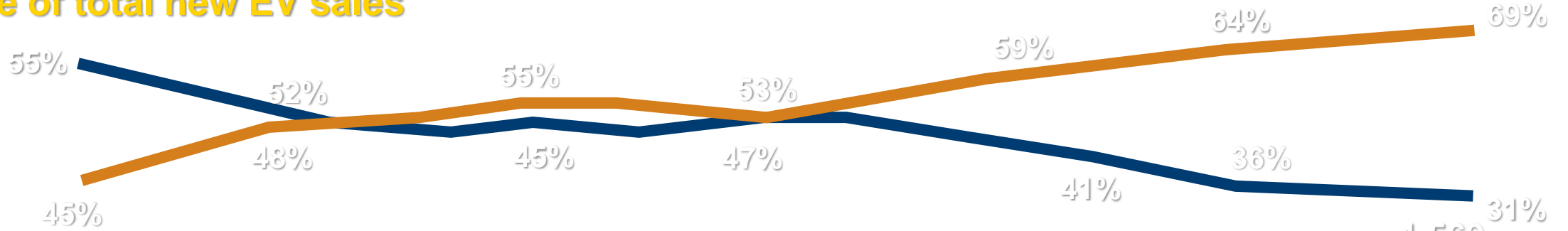
Source: Bloomberg NEF, EPA, ICCT, FEV, ONRL, IDL.

Note: Estimated pre-tax retail prices

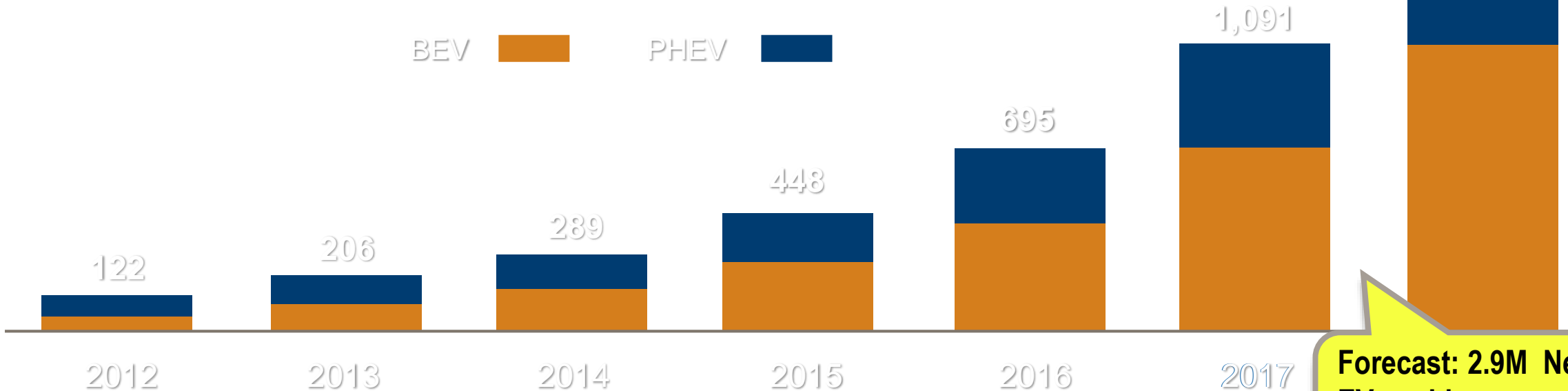
# Global EV sales by type



## Share of total new EV sales



## Thousand units



**Forecast: 2.9M New EVs sold per annum by 2020 - Bloomberg**

Source: Bloomberg New Energy Finance



# AN ELECTROMOBILITY VISION

- **No Range or Queuing Anxiety**
- **Seamless Fuelling**
- **Visibility & Control**
- **Reliability as a non-issue**

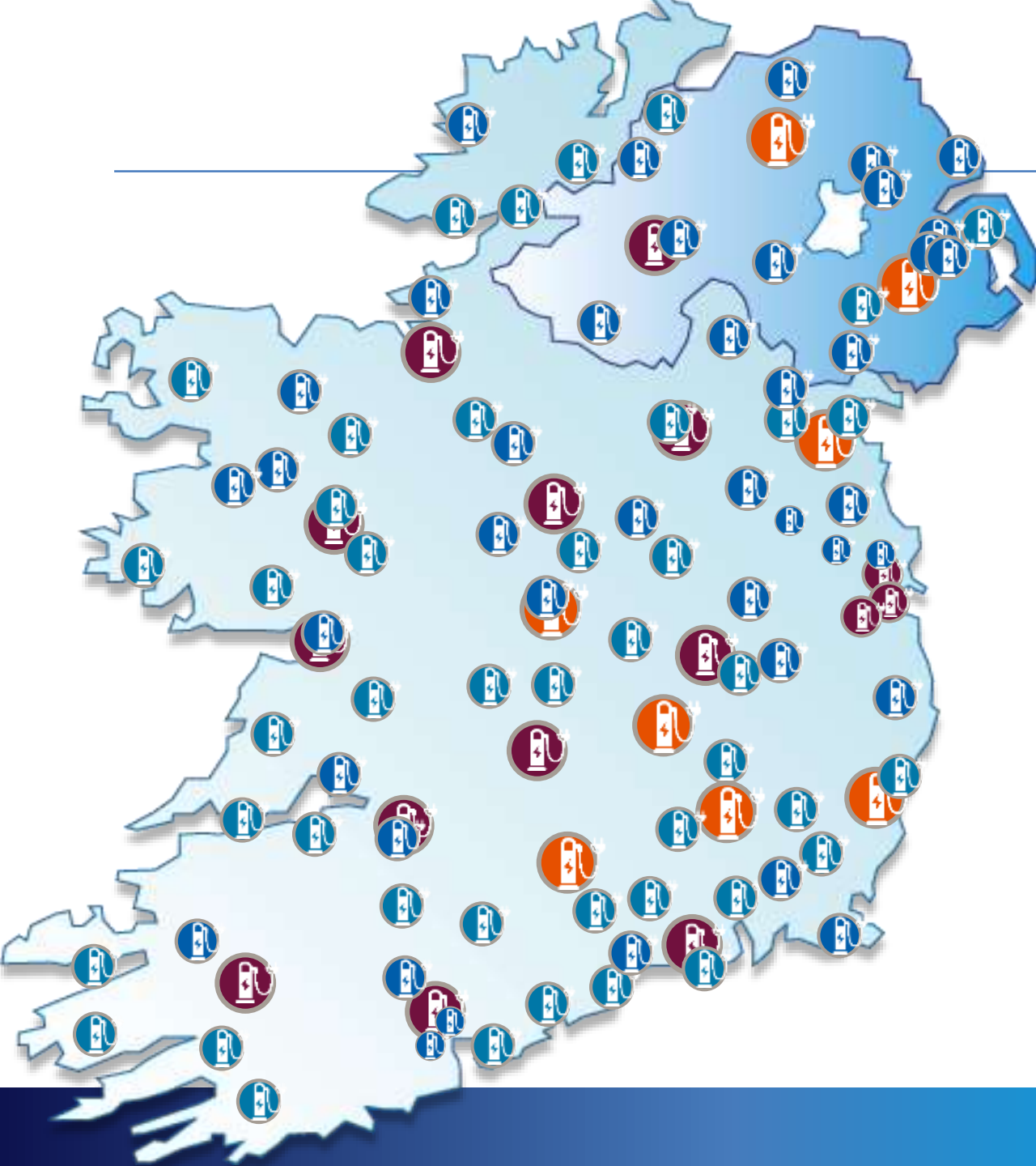







- **Cleaner Air**
- **Decarbonised Transport**
- **Fuel Imports**
- **Innovation & Jobs**



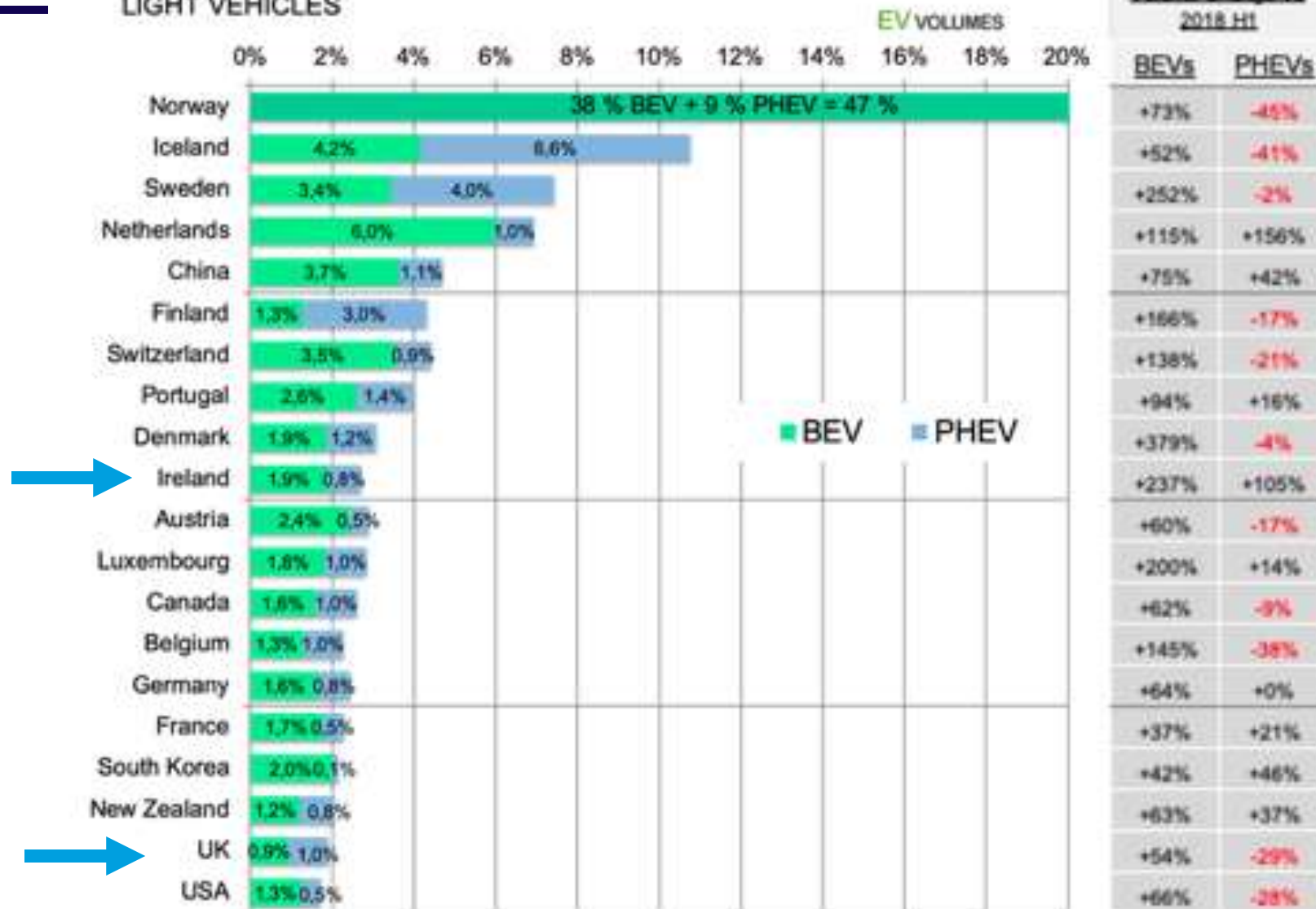
- 
- **Infrastructure as Enabler *NOT* a Barrier**

# National High Power EV Charging Network required to meet a high volume of EVs



-  **SUPER HUBS (Motorways)**  
4x150kW chargers  
(Capacity 8 vehicles)
-  **SUPER HUBS (National)**  
2x150kW chargers  
(Capacity 4 vehicles)
-  **Add to existing FAST HUBS**  
1x150kW / 1 x50kW charger  
(Capacity 4 vehicles)
-  **AC Upgrades (FAST 50kW)**  
1x50Kw DC charger at attractive AC sites  
(capacity 2 vehicle)
-  **Replacement of AC chargers**

## EV SHARES AND COMPOSITION 2019 H1 LIGHT VEHICLES

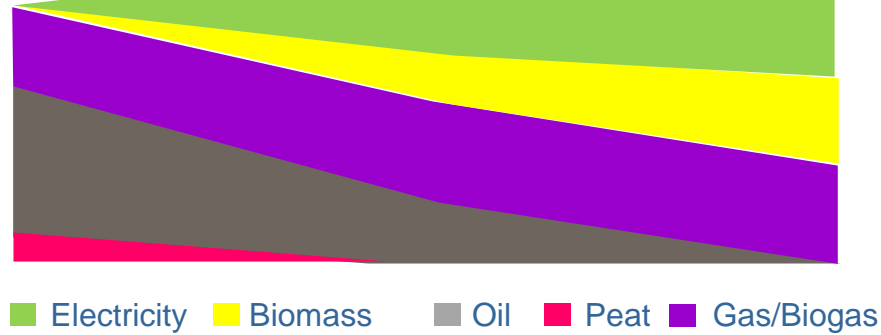


# Decarbonising Heat

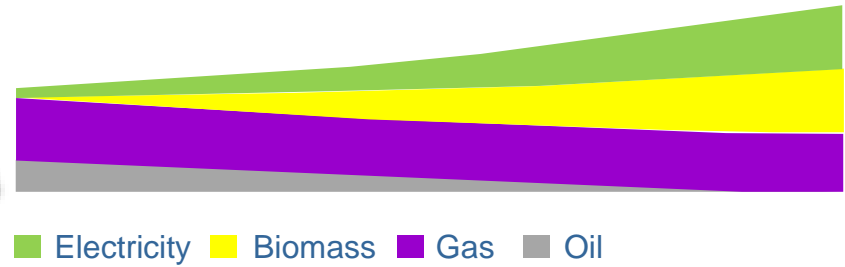
# Decarbonise Heat



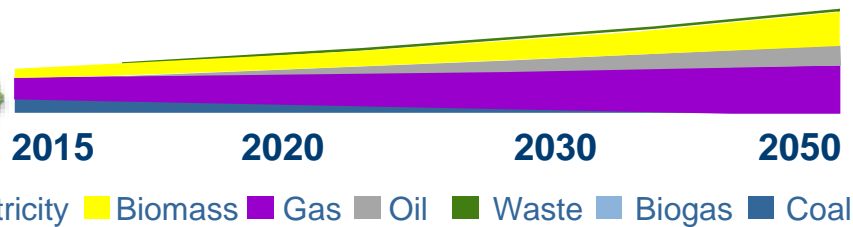
## Heat Roadmap by Fuel



### COMMERCIAL



### INDUSTRY



## New Build (Residential & Commercial) - Easy

- Avoid fossil fuel lock-in through
  - ❖ Integrated renewable low carbon technologies e.g. Heat Pumps offer benefits NOW
  - ❖ District Heating Schemes where viable

## Existing Building Stock (~1.6 million homes) - Harder

- Deep Retrofit with Heat Pumps [Upfront Capital Cost / Financing Challenge]
- District Heating Schemes where viable [significant barriers]
- Shallow/Deep Retrofit with Bio-Methane [studies indicate significant Bio-Methane volume limits]
- Shallow / Deep retrofit with biomass [volume limits and air quality concerns]

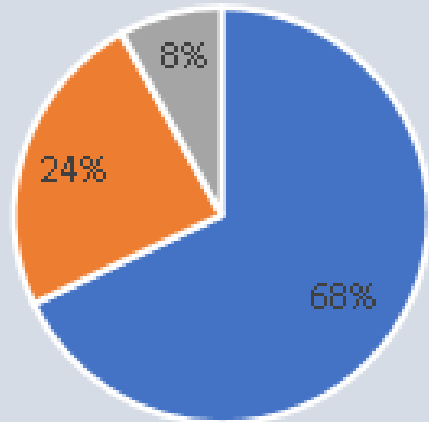
# Renewable Heating



60% less  
GHG  
Emissions

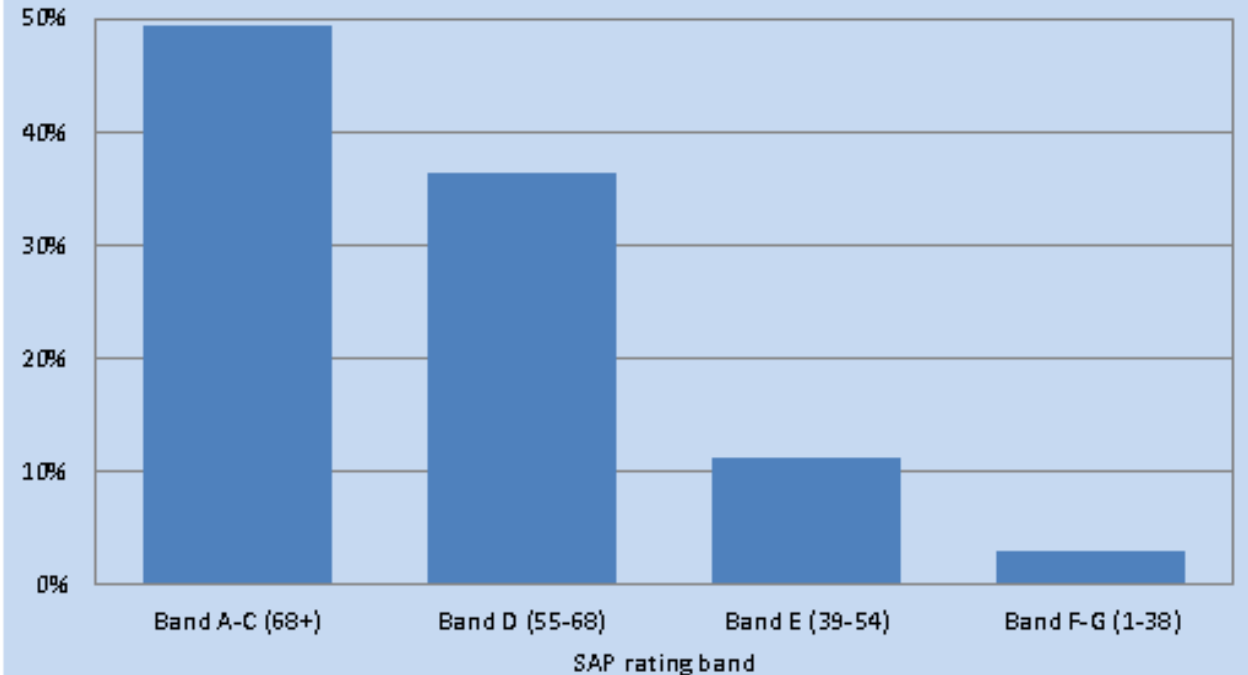
# Domestic Heating in Northern Ireland

## Domestic Heating (2016)



- Central heating oil
- Central heating gas
- Central heating solid fuel/electric/dual/other

## Percentage of dwellings within each SAP rating band, 2016



**780k Dwellings – could be up to 100k more by 2040**

## Compressed Natural Gas



15-25% less GHG Emissions  
and 35% Cheaper per km  
Driven compared to Petrol or  
Diesel

## Hydrogen Powered Vehicles



80% more to 10%+ less GHG  
Emissions and 70% more  
expensive per km Driven  
compared to Petrol or Diesel  
Car

## Battery Electric Vehicles



40%+ less GHG Emissions  
and 80% Cheaper per km  
Driven compared to Petrol or  
Diesel Car

## Air-source heat pump - electric

60%+ less GHG Emissions  
and 10%+ Cheaper per kWh  
of Heat delivered compared to  
Fossil Fuels






FOR A BRIGHTER FUTURE




# Smart Home and Industrial Smart Energy



## Electrification





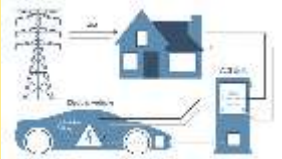
**Accelerated EV uptake**



**Promotion of eHeat solutions**

## Increased importance of services

**Microgen - PV**  
**Storage**  
**V2G**  
**Demand Response**

## Digital Personalisation



**Online Store/Sales**






**Self Service /Improved CX**



**Activation & Driving take-up**

## Openness to Data Sharing

**Analytics & Insights**

## Smart Solutions

### Smart Home



# Smart Metering Project



**Measurement**



**Communications**

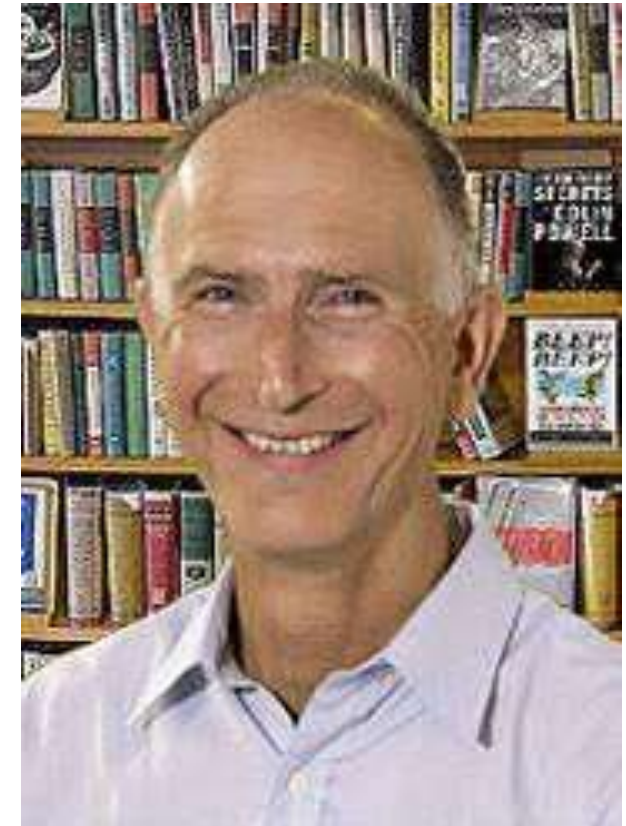


**Technical**



**Operations**

“Edison’s electric light did not come from the continuous improvement of candles” .....



Oren Harari

# Thank You

