

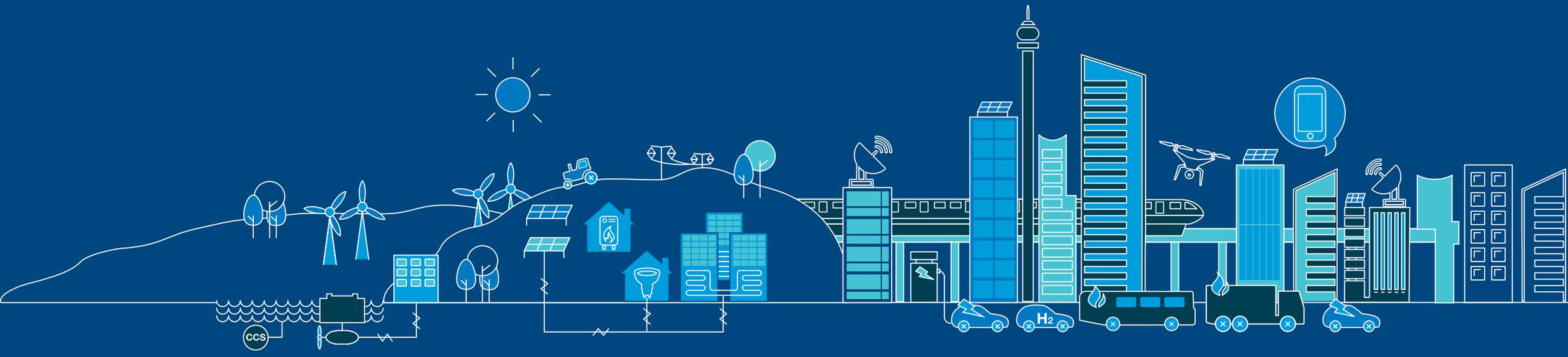


# Future Energy Scenarios 2017

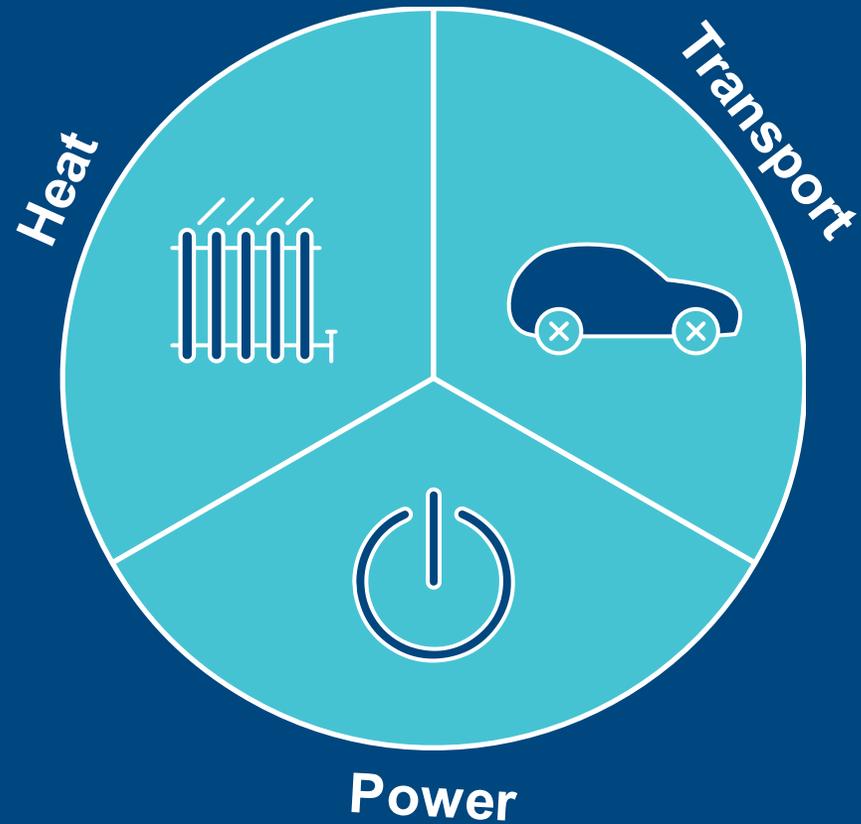
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## Jan Mather

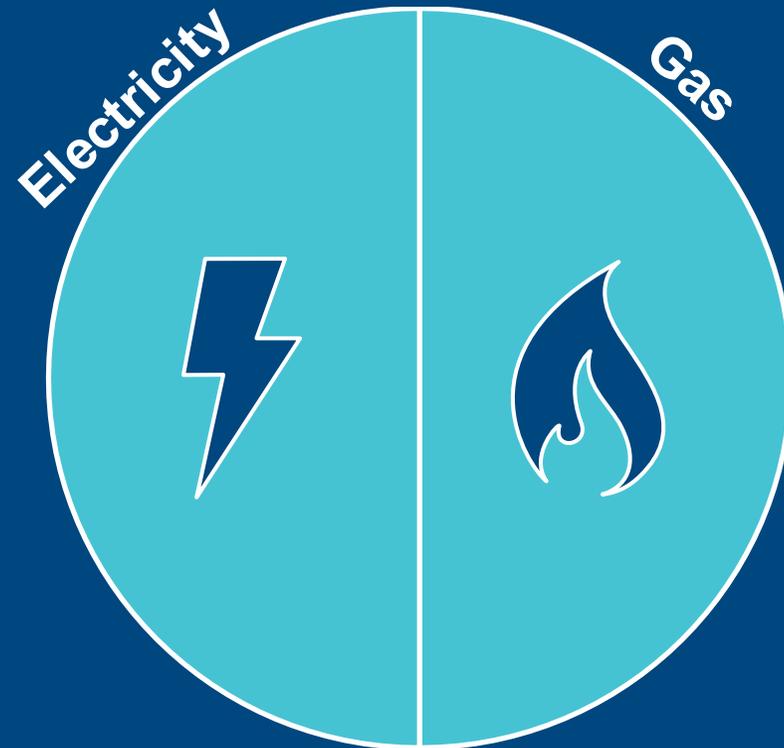
### Energy Supply and Demand Manager



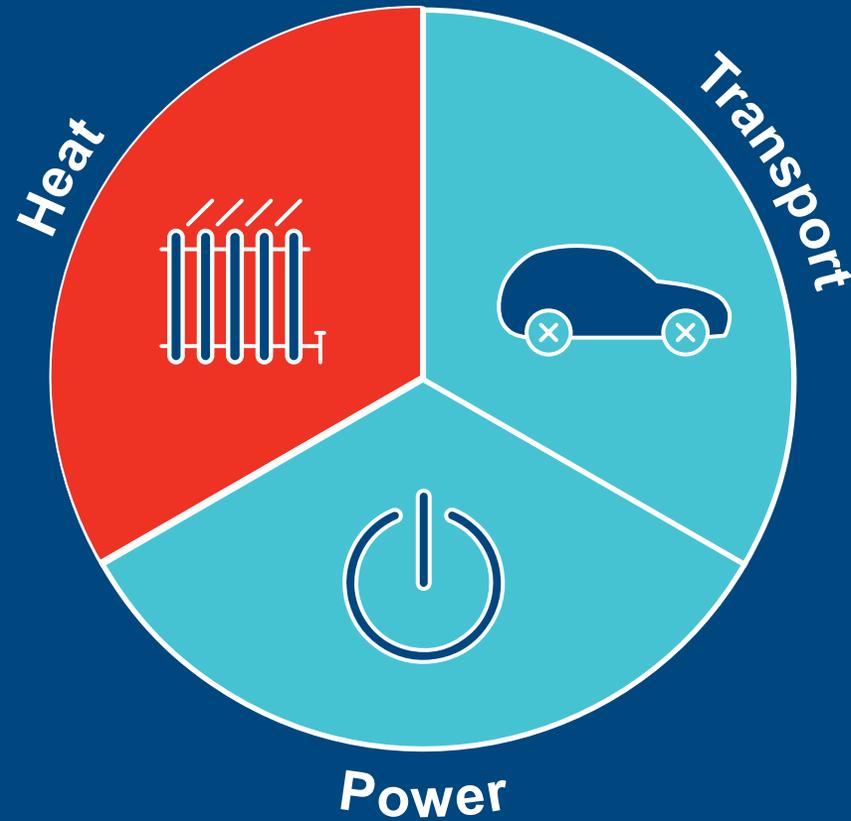
# Demand



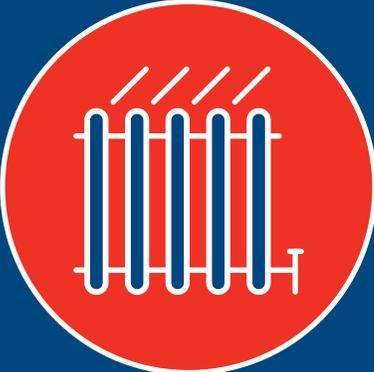
# Supply



# Demand



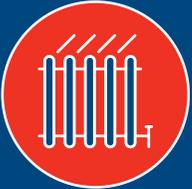
# Heat



Past

Present

Future

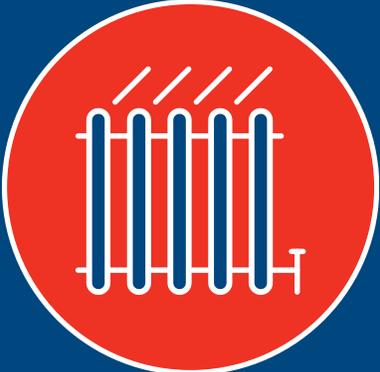


Heat



1968

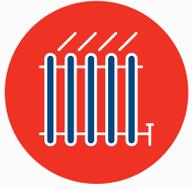
# Heat



Past

Present

Future



Heat

# Residential Heating



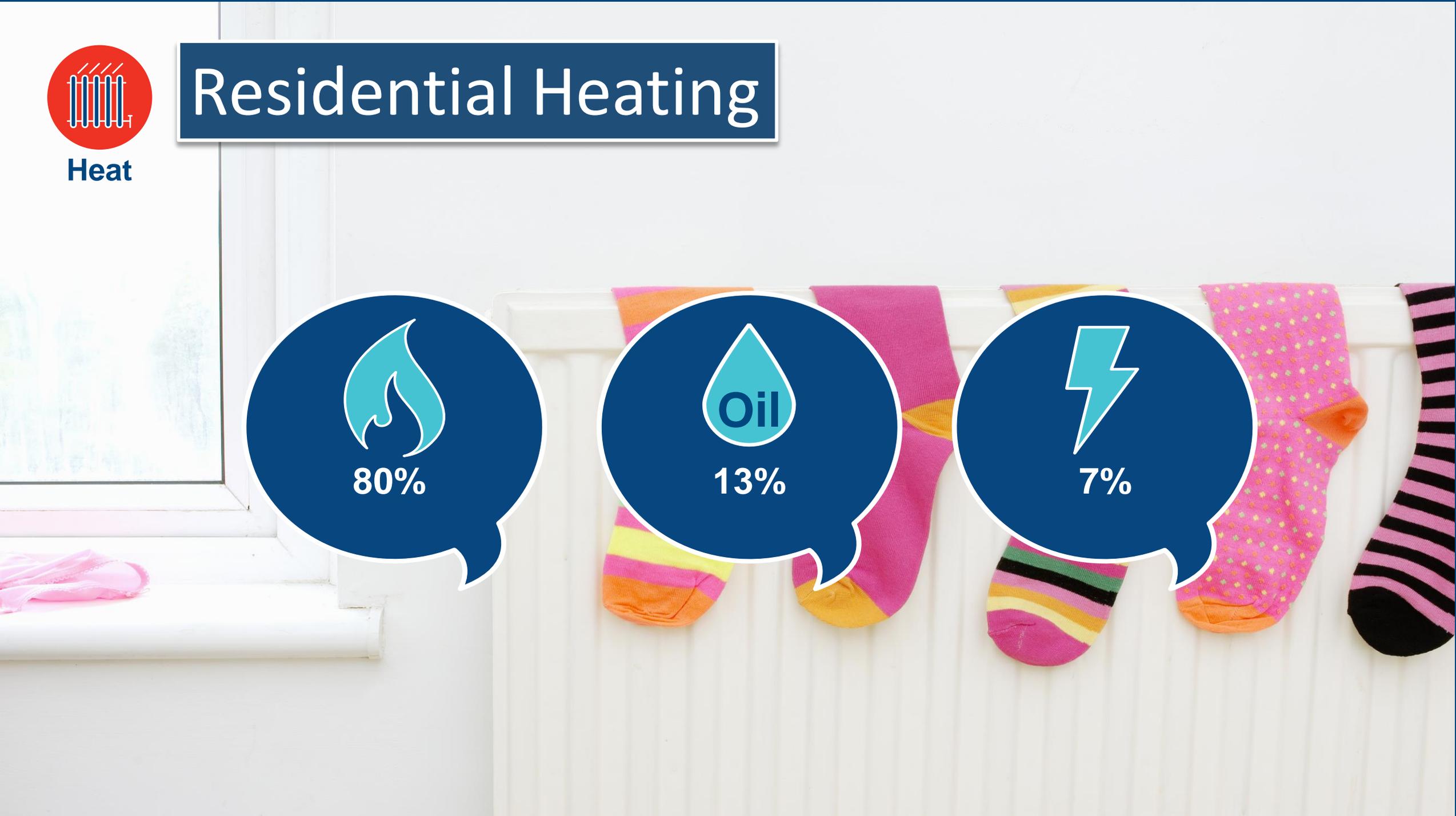
80%

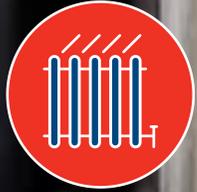


13%



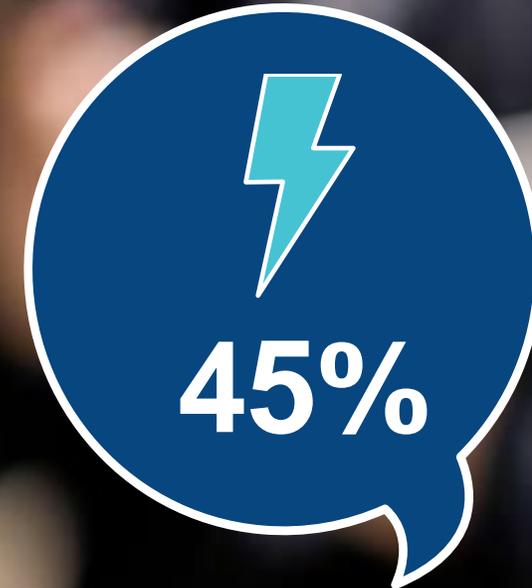
7%



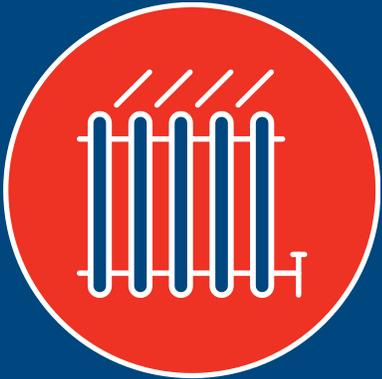


Heat

# I&C Heating



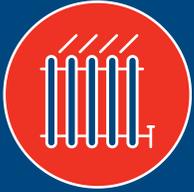
# Heat



Past

Present

Future



Heat

# Framework

Consumer Power - Total

Results for  
2030

Total - Two Degrees

Results for  
2030

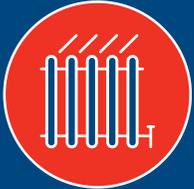
Today's  
Figures

Results for  
2030

Steady State - Total

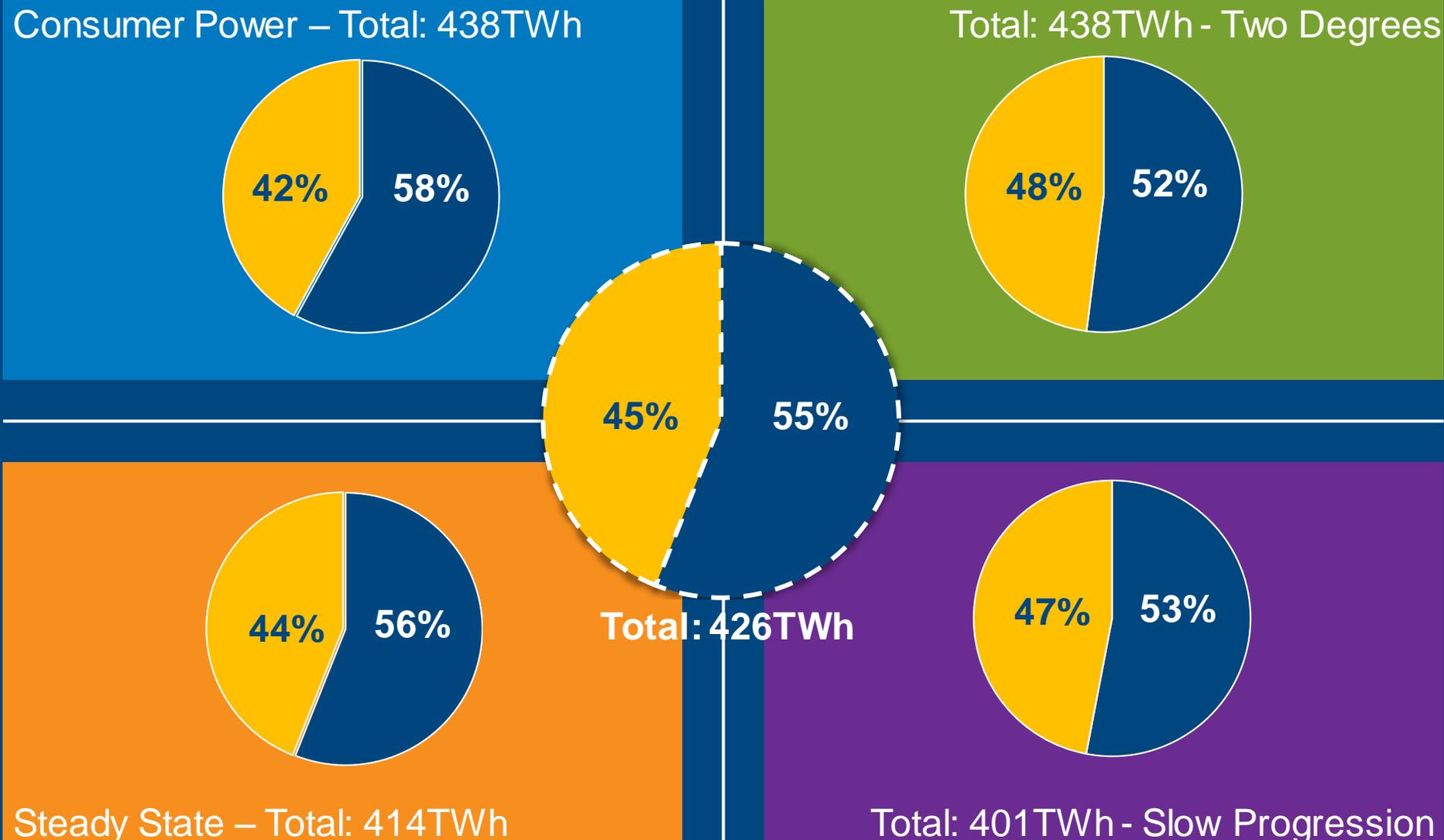
Results for  
2030

Total - Slow Progression

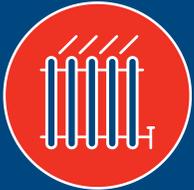


Heat

# I&C demand - 2030

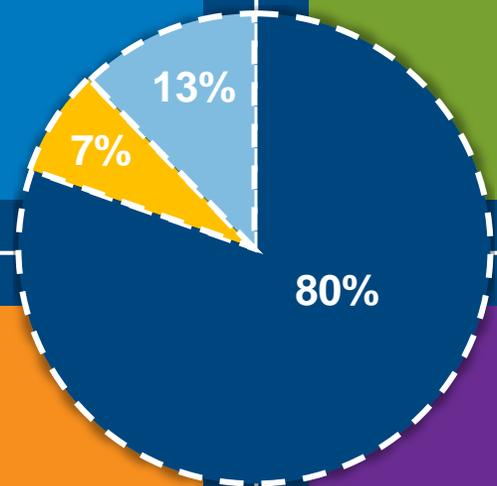
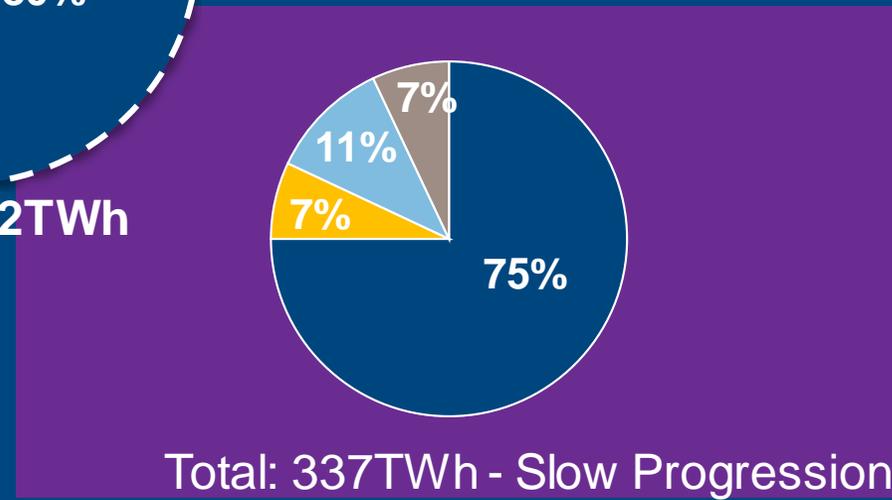
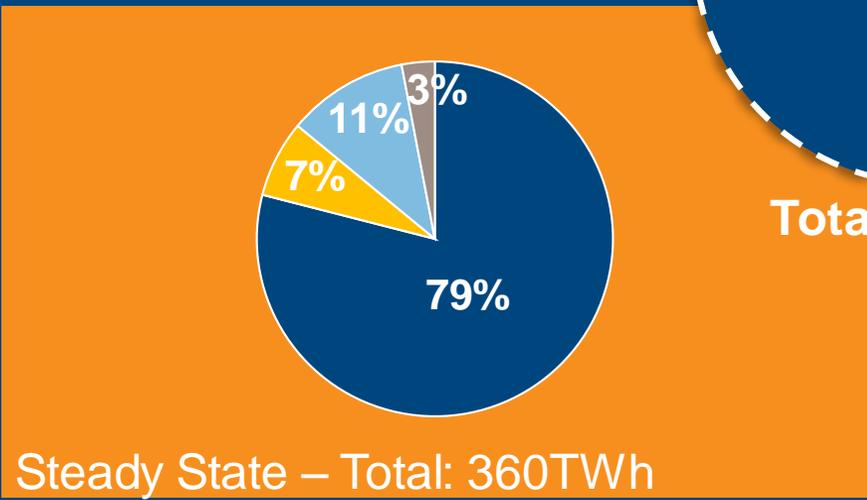
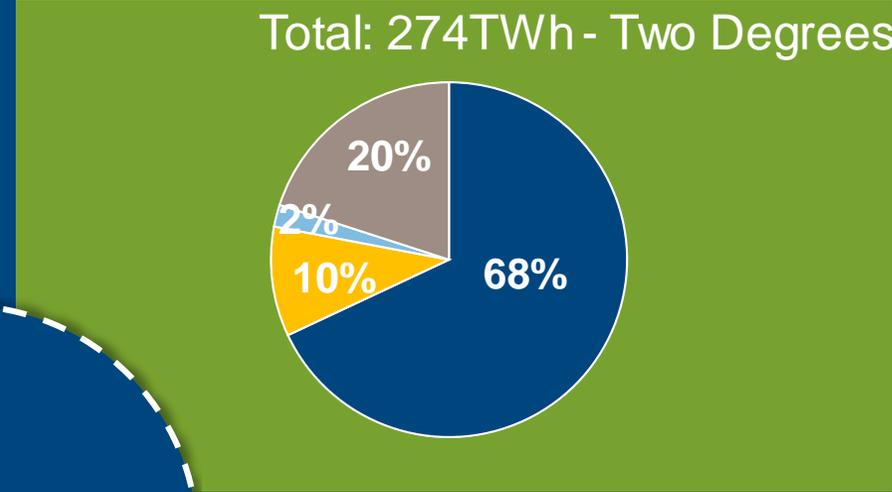
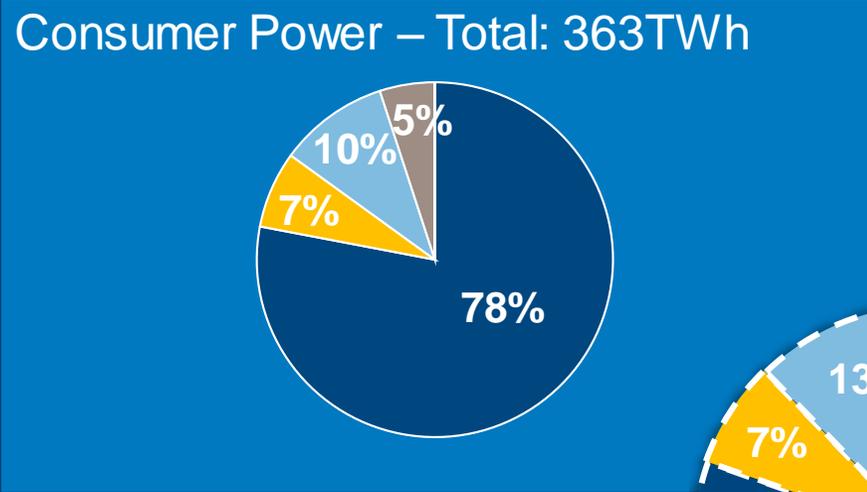


Electricity Gas



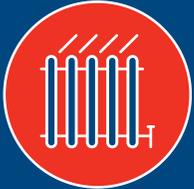
Heat

# Residential demand - 2030



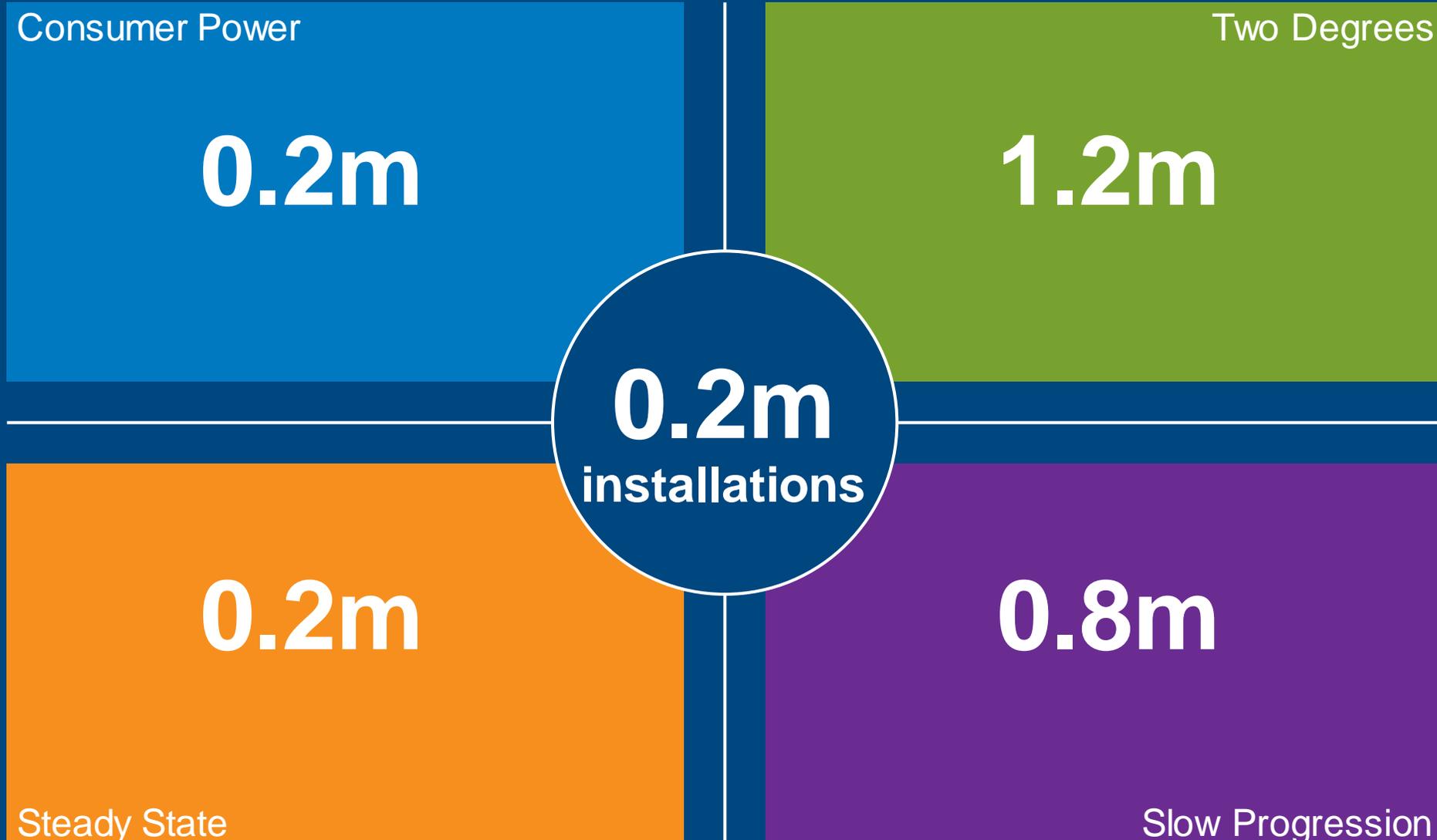
Total: 362TWh

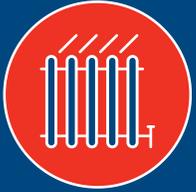
Gas
  Electricity
  Oil
  Heat pumps



Heat

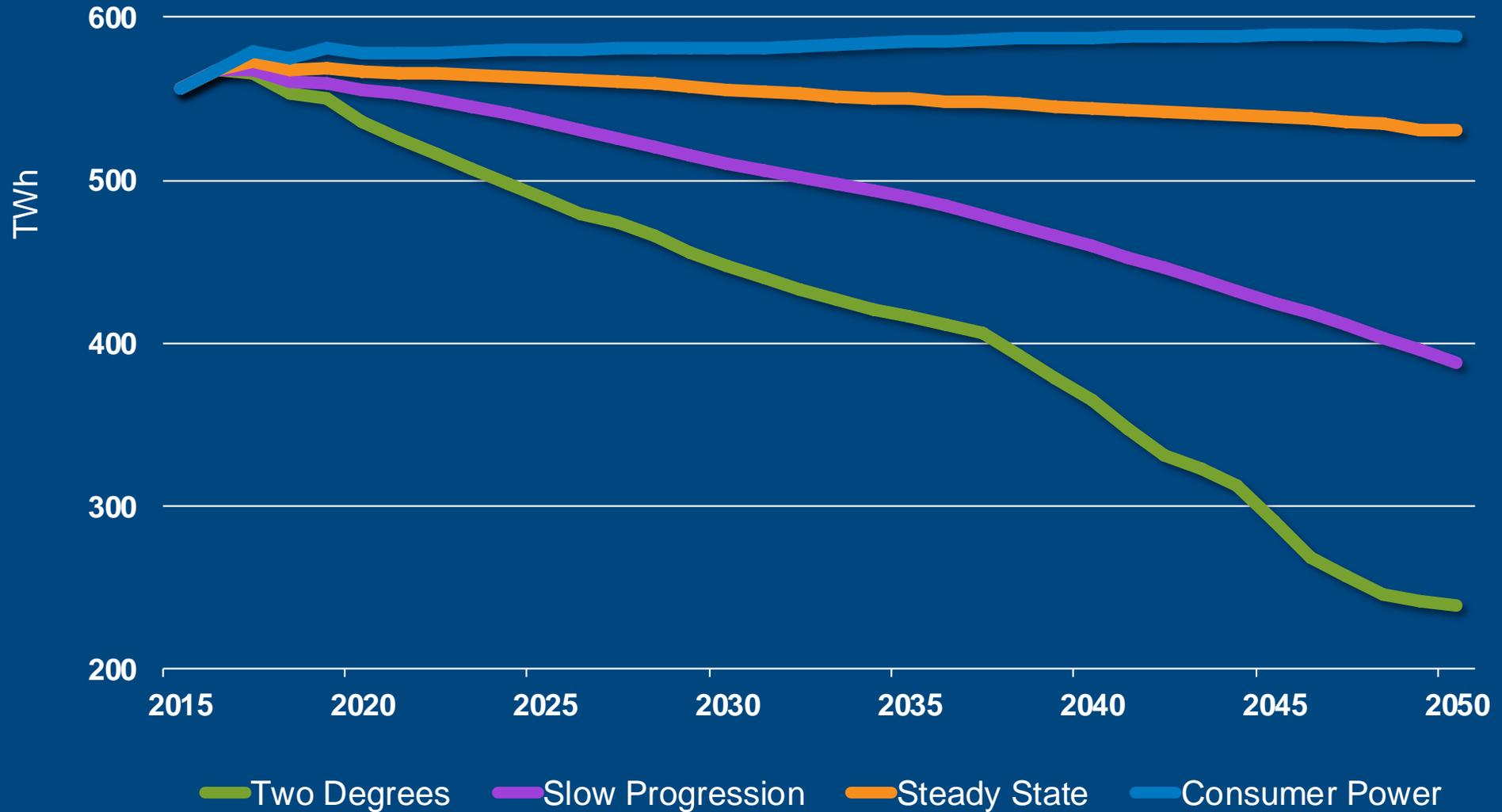
# District heat - 2030



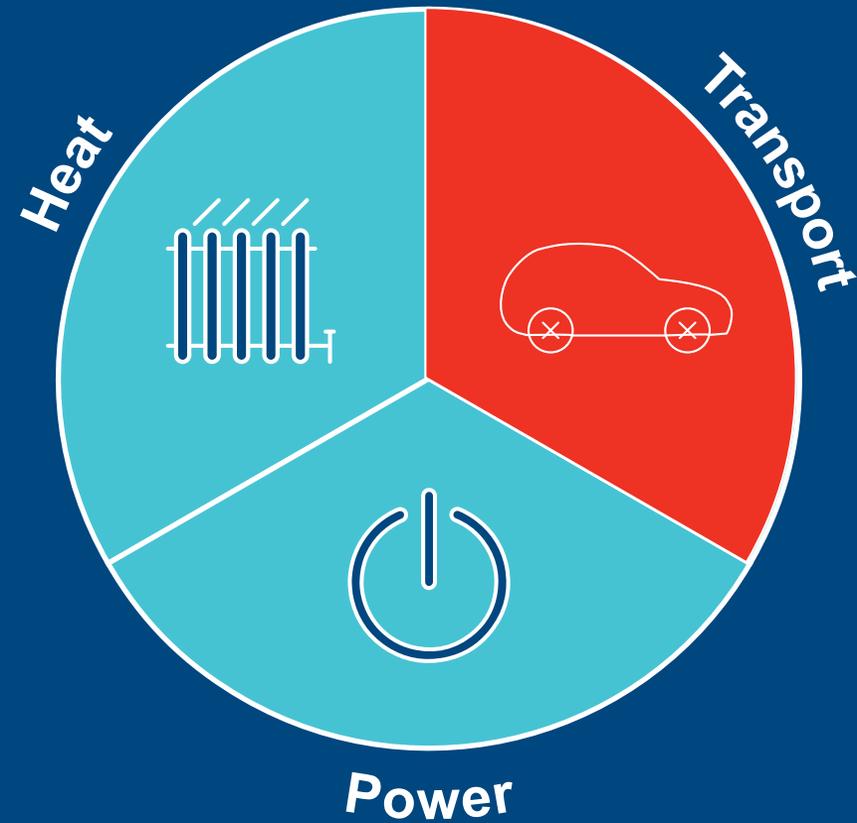


Heat

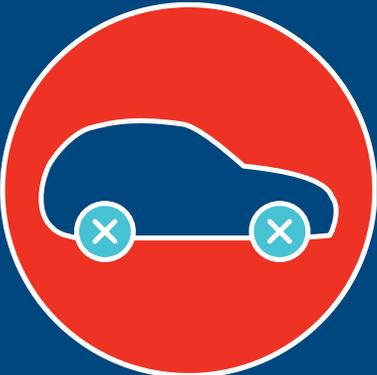
# Total gas demand for heat



# Demand



# Transport



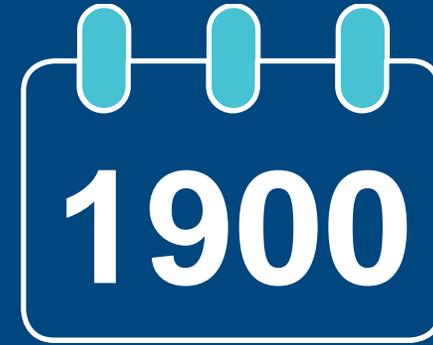
Past

Present

Future



Transport



# Transport



Past

Present

Future



Transport

# Car ownership



**60%**  
Ownership



Transport



1m  
2015

2m  
2016



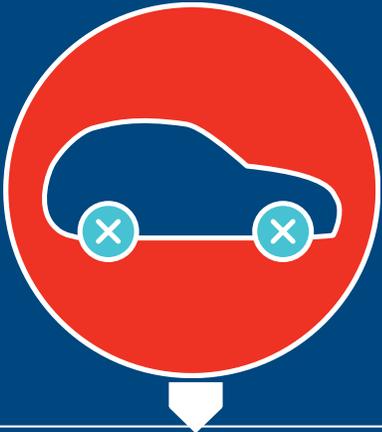
Transport

# Gas vehicles

nationalgrid



# Transport



Past

Present

Future

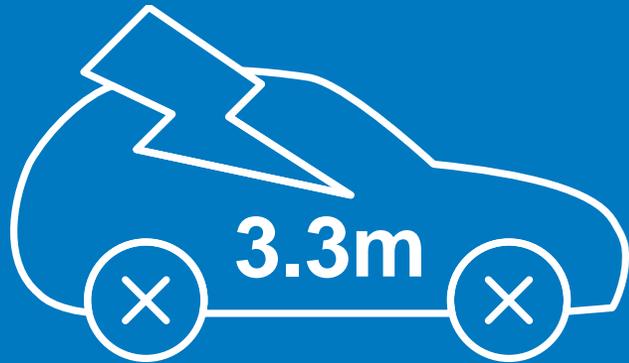


Transport

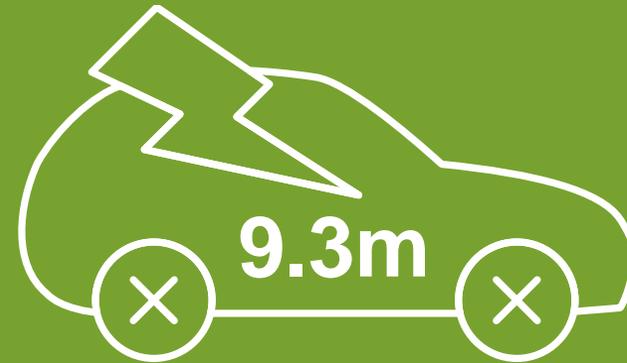
nationalgrid

# Number of EVs - 2030

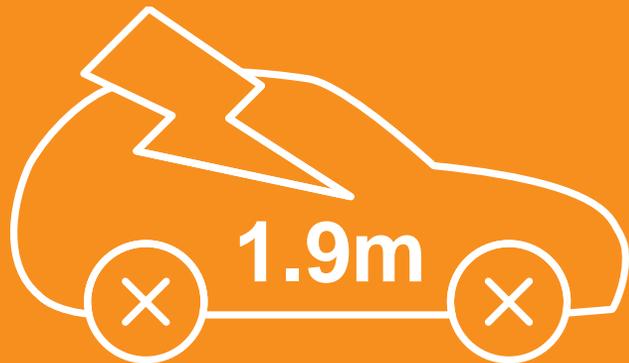
Consumer Power



Two Degrees



100K



Steady State



Slow Progression



Transport

# Tipping points for EVs

Consumer Power



Two Degrees



Steady State



Slow Progression

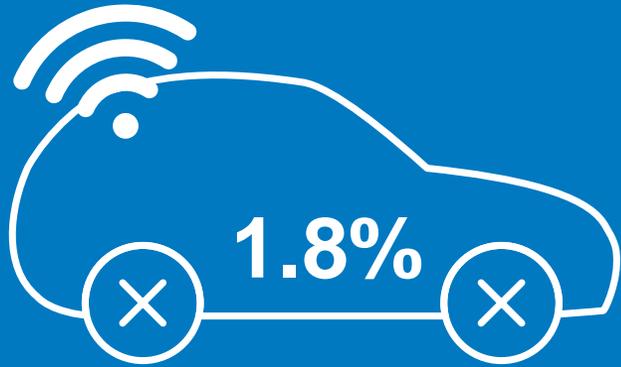


Transport

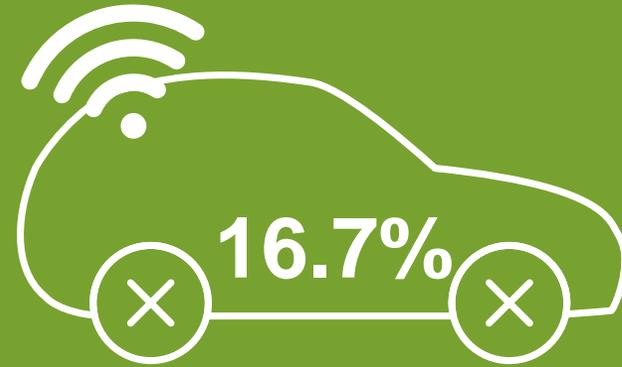
nationalgrid

# Shared Autonomy - 2030

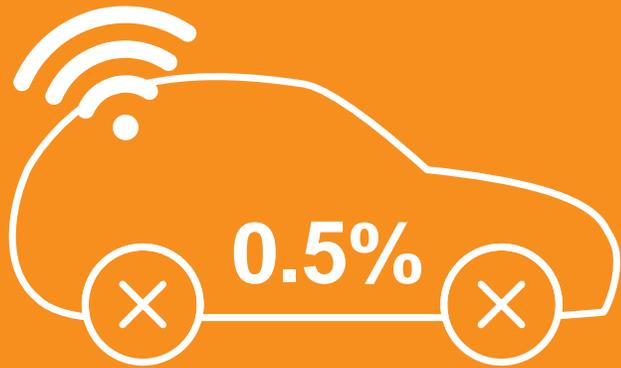
Consumer Power



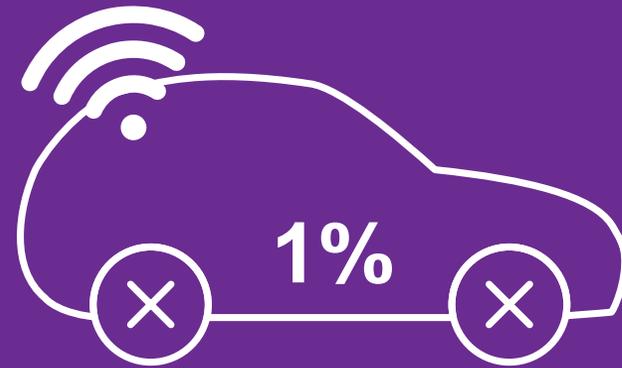
Two Degrees



0



Steady State



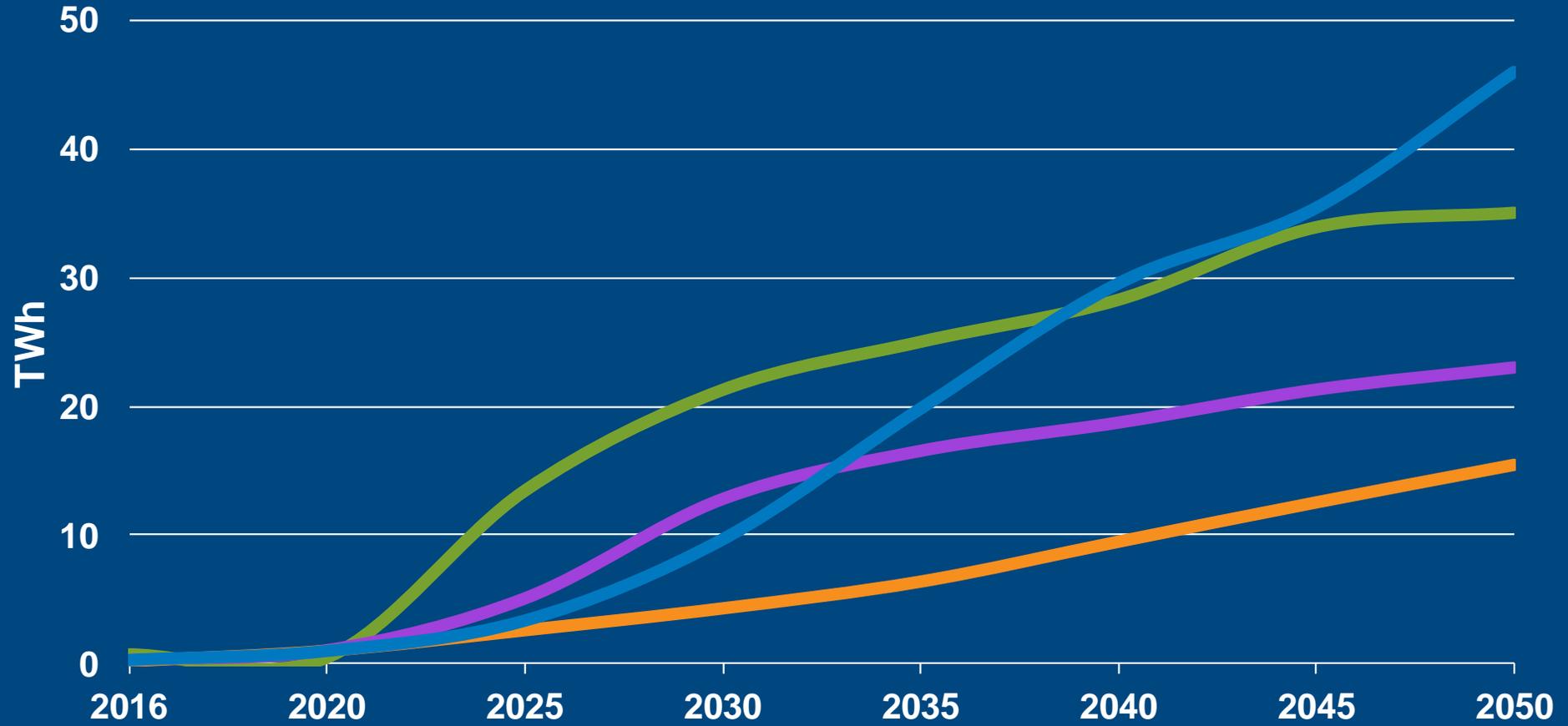
Slow Progression



Transport

nationalgrid

# Total electricity demand for EVs



Two Degrees

Slow Progression

Steady State

Consumer Power

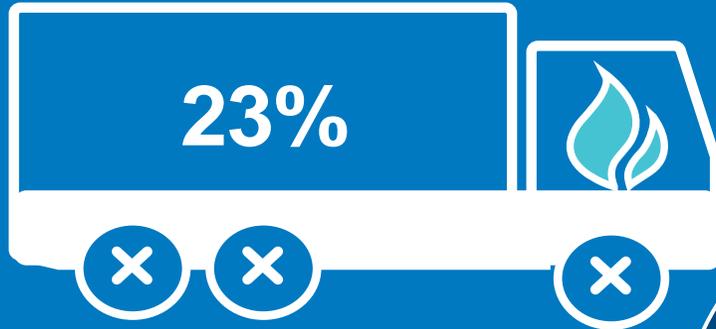


Transport

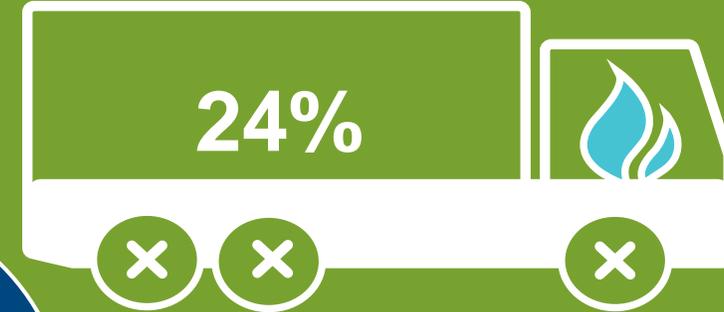
nationalgrid

# Gas Powered Vehicles - 2030

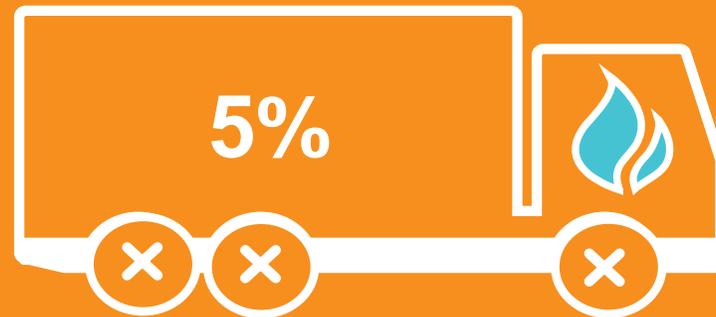
Consumer Power



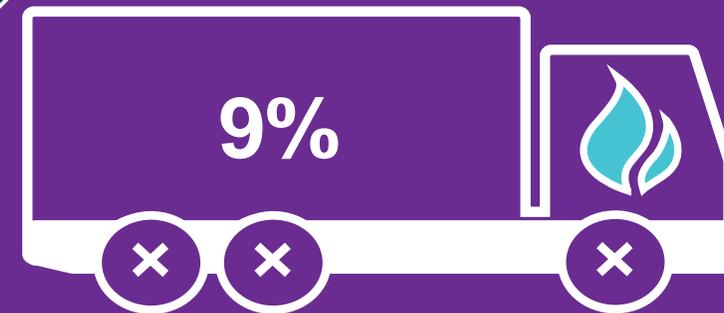
Two Degrees



<0.1%



Steady State



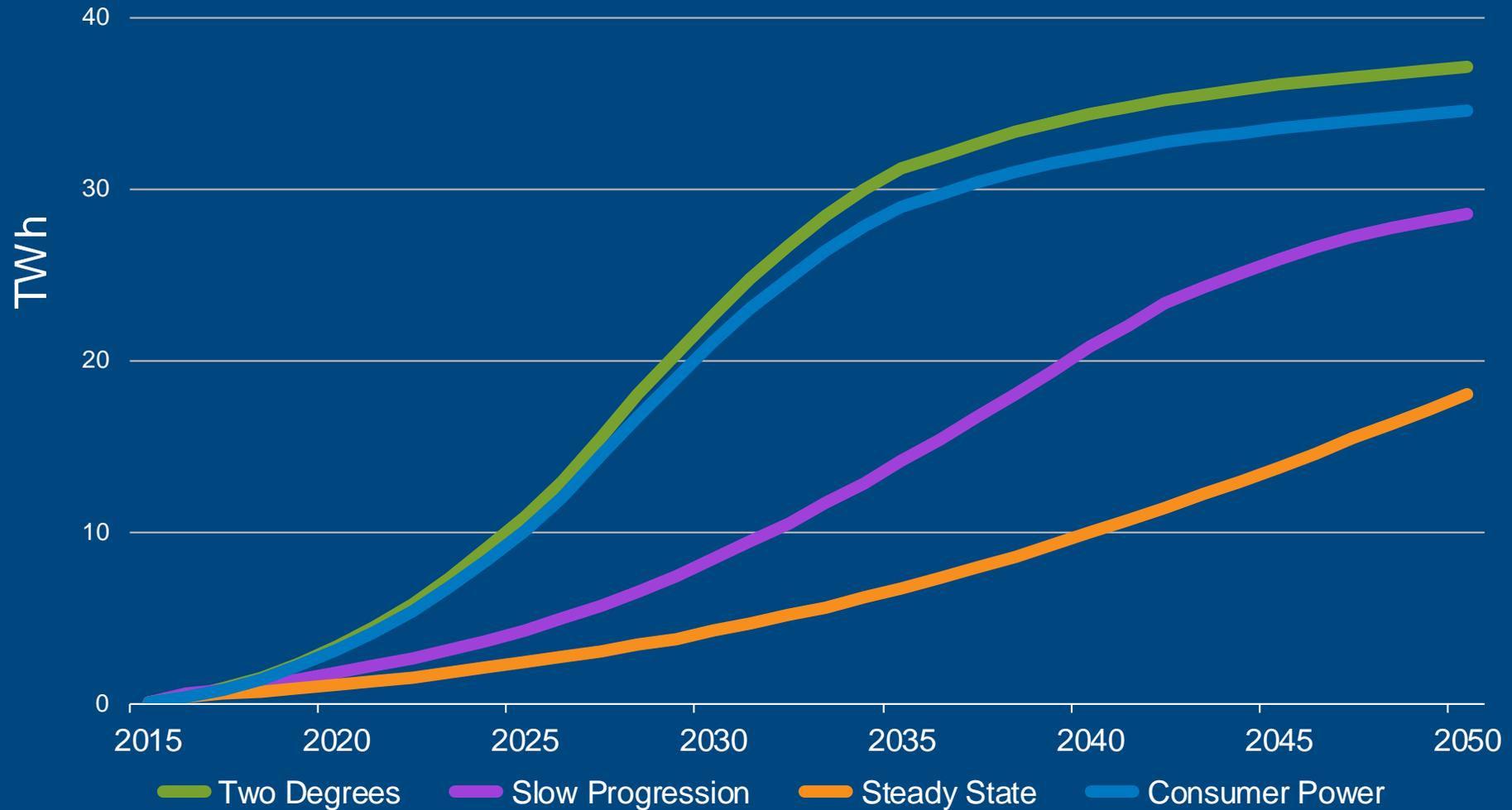
Slow Progression



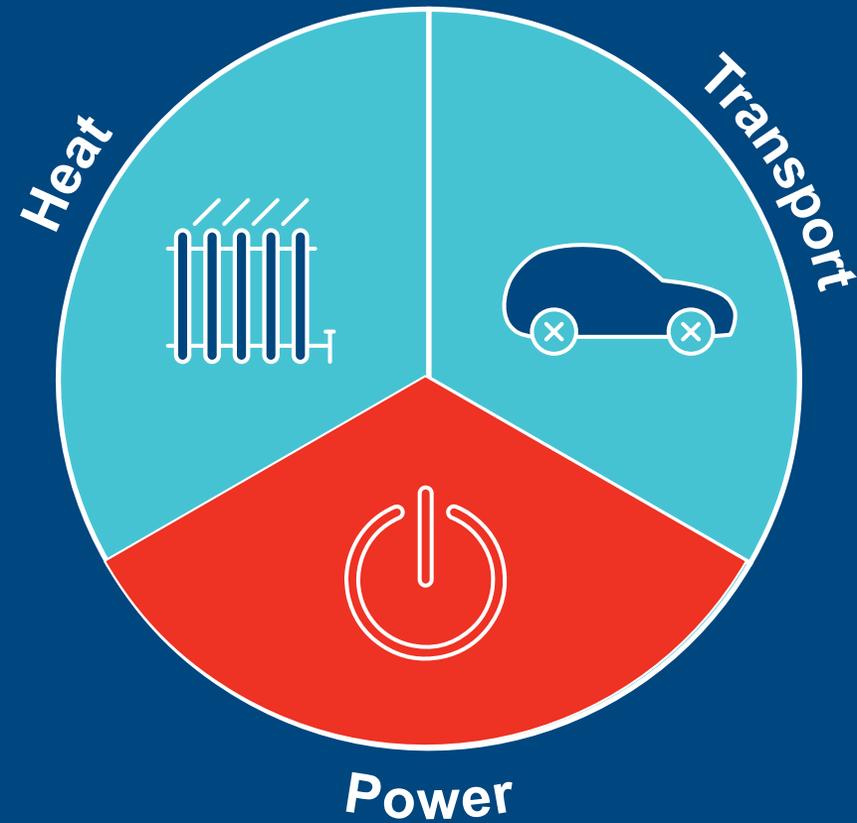
Transport

# Total gas demand for NGVs

nationalgrid



# Demand

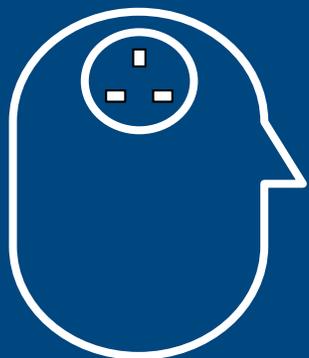




Power

nationalgrid

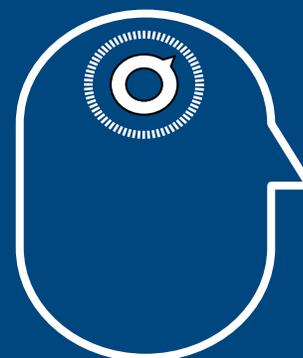
# Consumer Engagement



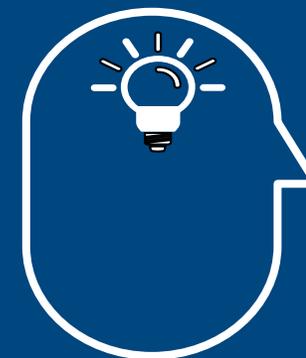
Unplugged



On Standby

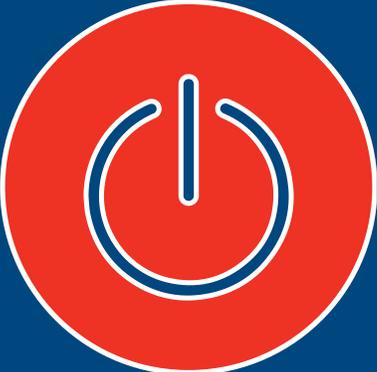


Tuned In



Switched On

# Power



Past

Present

Future



Power

nationalgrid



**60W**  
**1970**

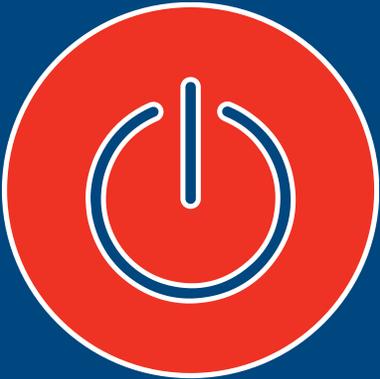


**10W**



**5W**

# Power



Past

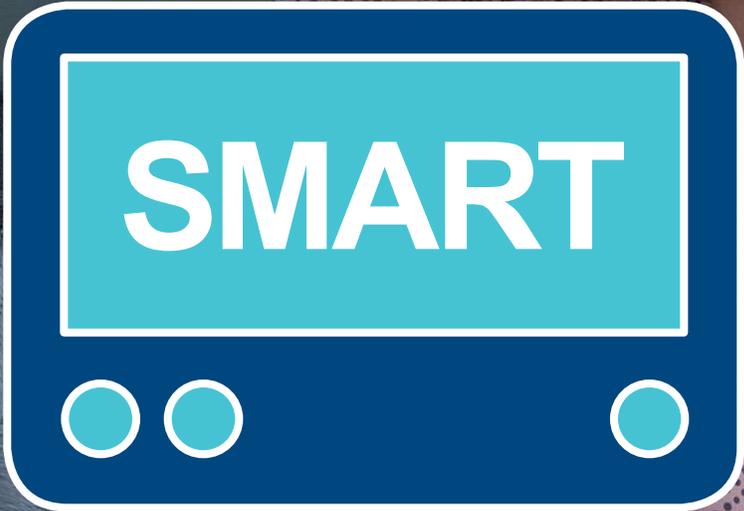
Present

Future



Power

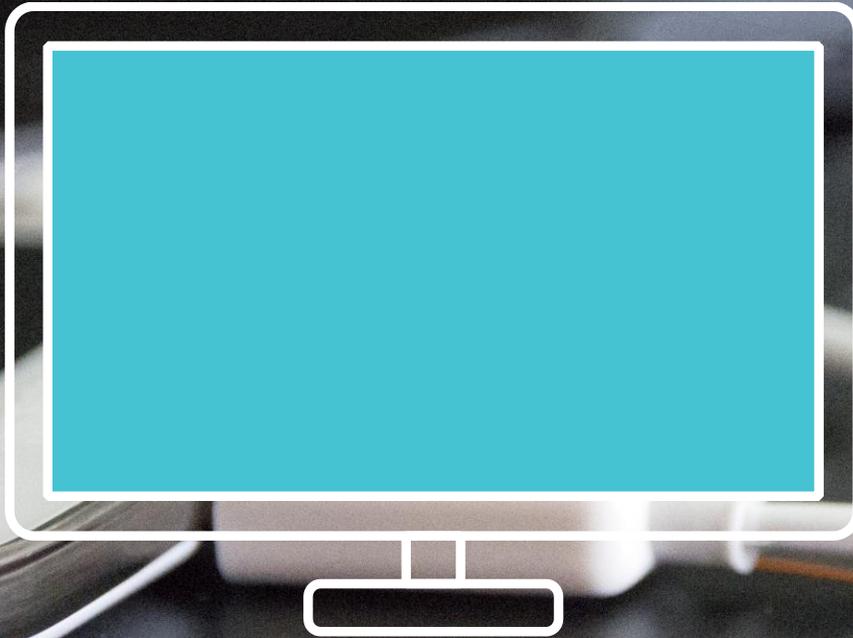
SMART usage





Power

# Appliances per household

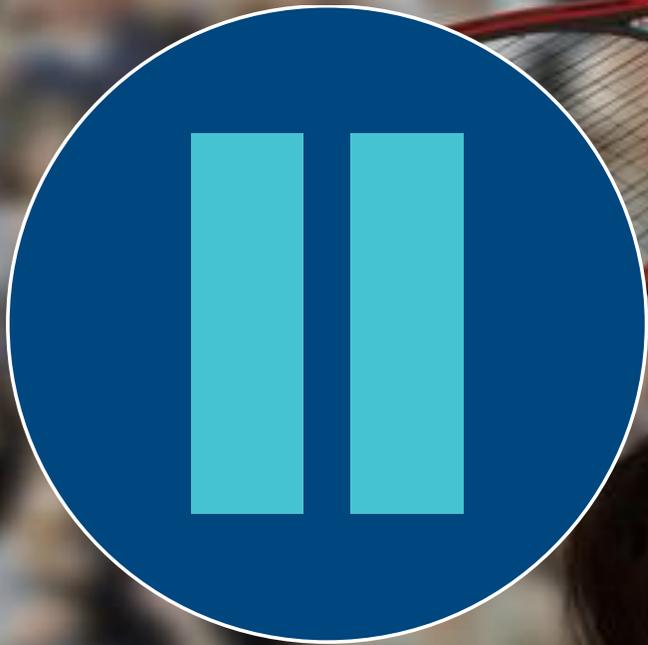


50



Power

# TV Pickups above 500MW



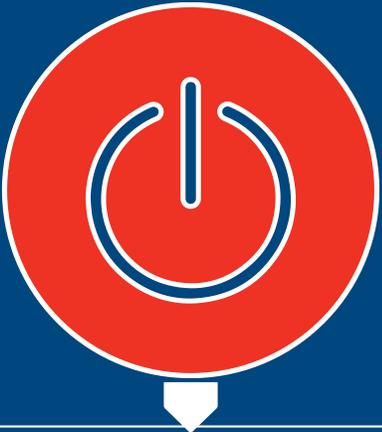
2006

523

2016

63

# Power



Past

Present

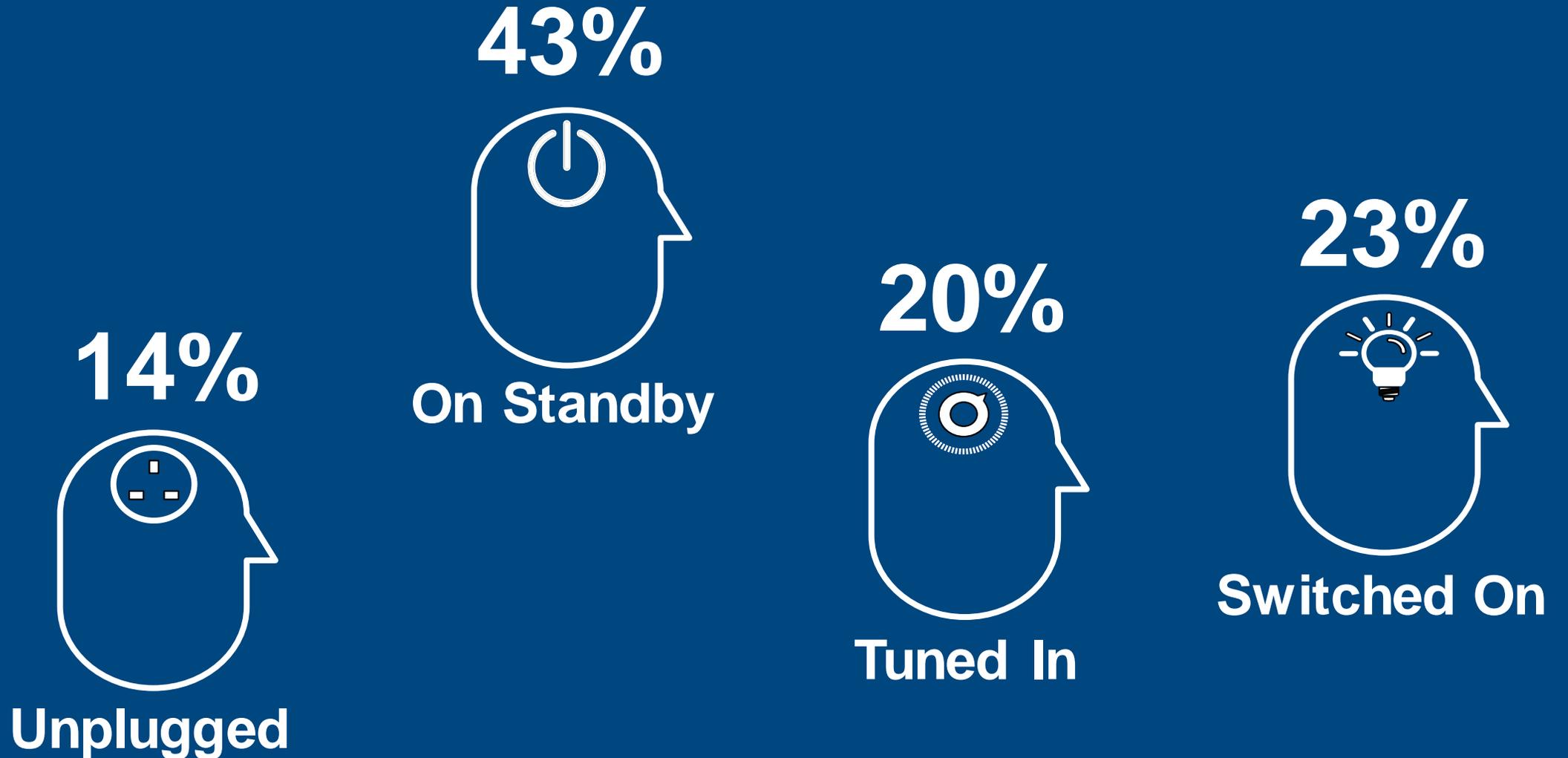
Future



Power

nationalgrid

# Consumer engagement results



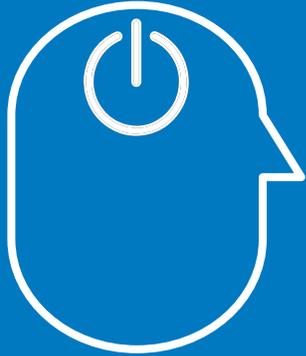


Power

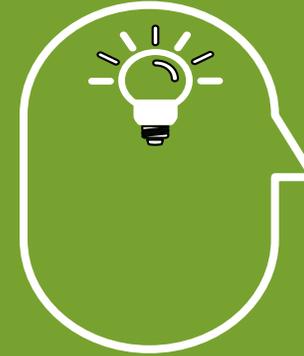
nationalgrid

# Consumer engagement mapping

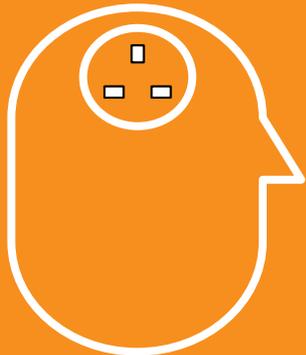
On Standby



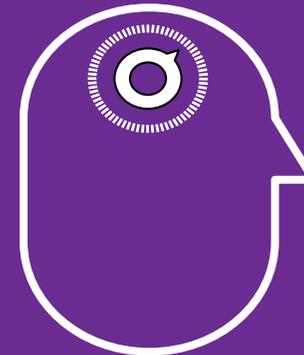
Switched On



Unplugged



Tuned In





Power

nationalgrid

# Effects of Consumer Engagement

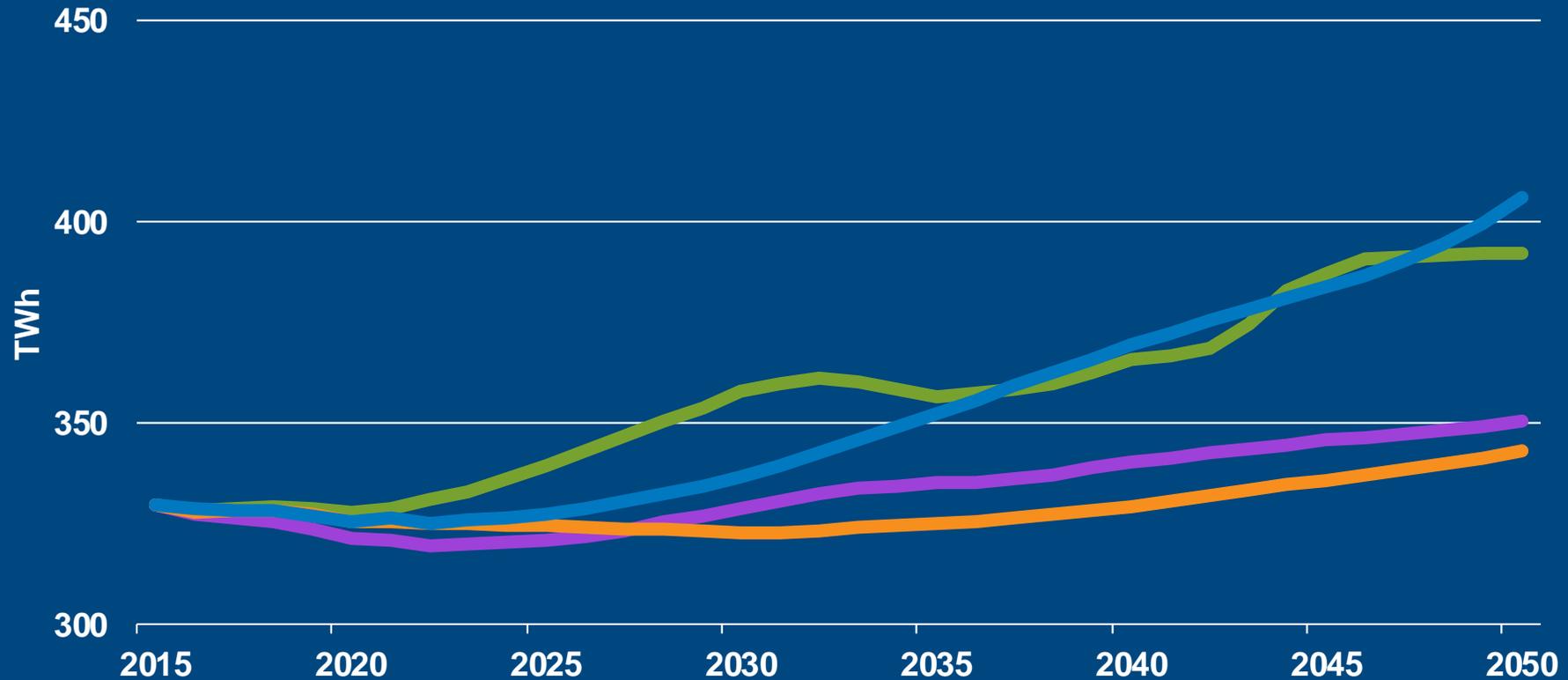




Electricity

nationalgrid

# Total Annual Electricity Demand



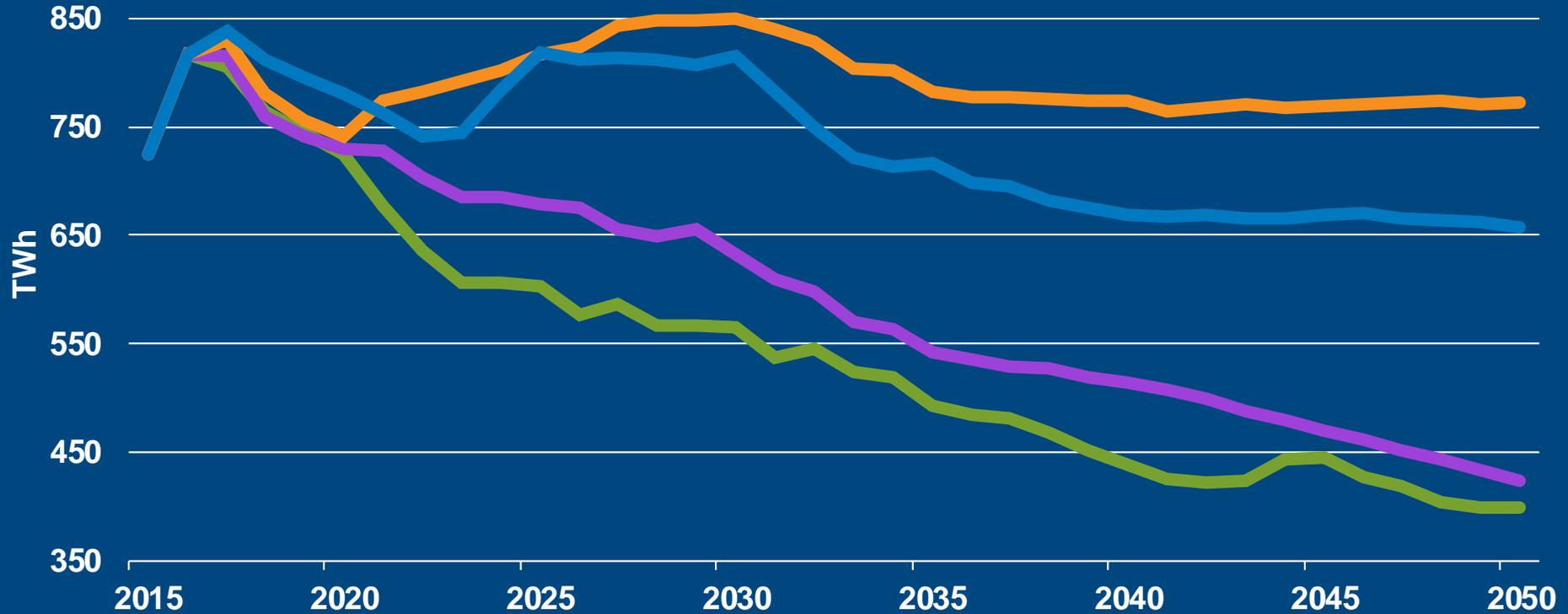
— Two Degrees — Slow Progression — Steady State — Consumer Power



Gas

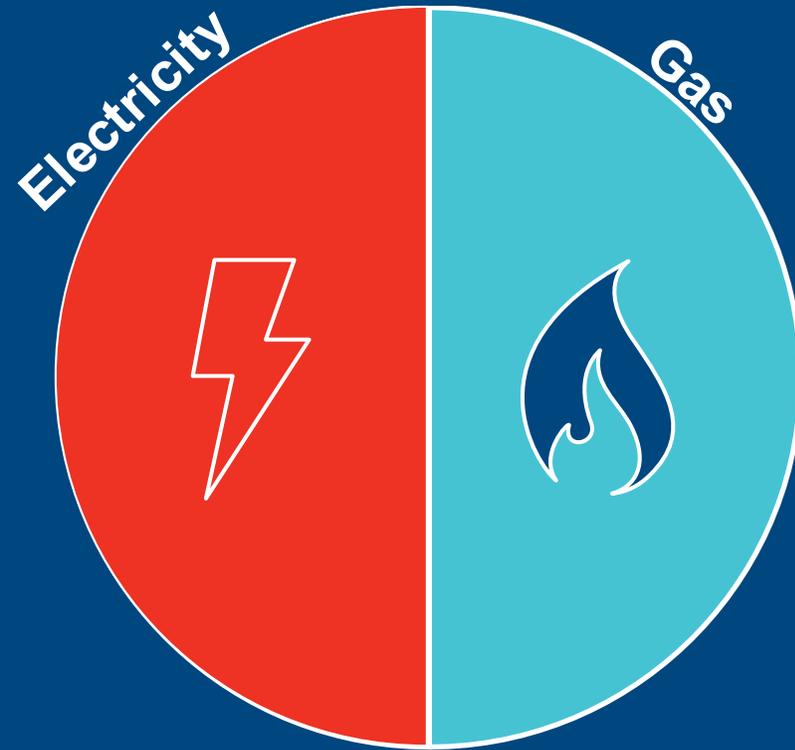
nationalgrid

# Total Annual Gas Demand (excl exports)

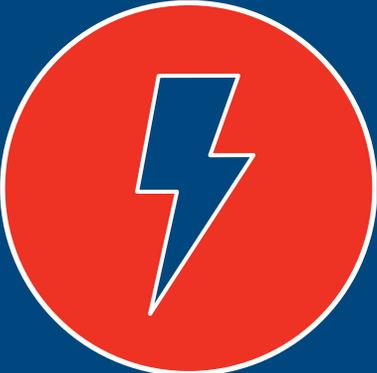


Two Degrees Slow Progression Steady State Consumer Power

# Supply



# Electricity



Past

Present

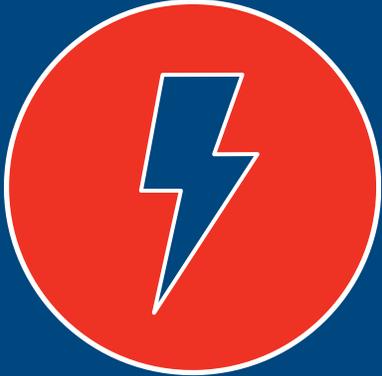
Future



Electricity

# 1880s

# Electricity



Past

Present

Future



Electricity



21 April 2017



Electricity



8.9GW

26 May 2017



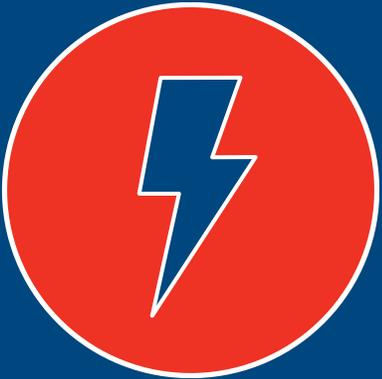
Electricity

A large blue speech bubble with a white outline, containing the text '10.8GW' in white. The background of the entire image is a photograph of an offshore wind farm with several white wind turbines on yellow and black foundations in the sea under a blue sky with light clouds.

**10.8GW**

**23 Dec 2016**

# Electricity



Past

Present

Future

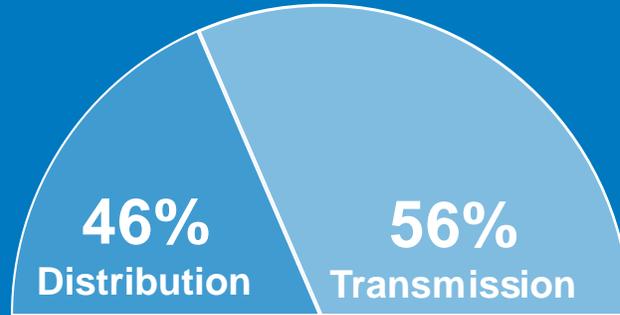


Electricity

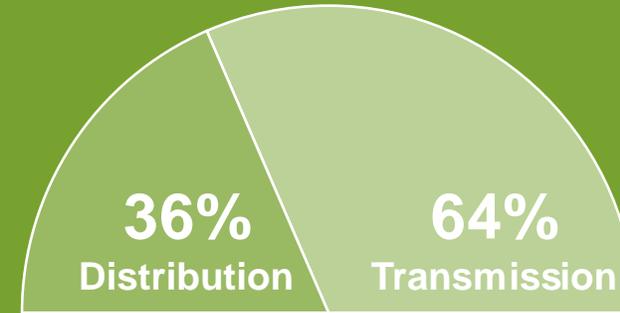
nationalgrid

# Installed capacities - 2030

Consumer Power – Total: 150GW

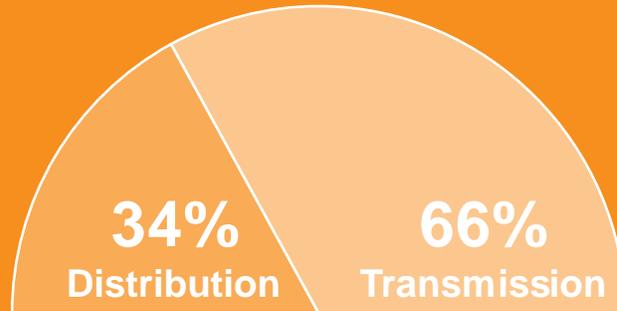


Total: 147GW - Two Degrees

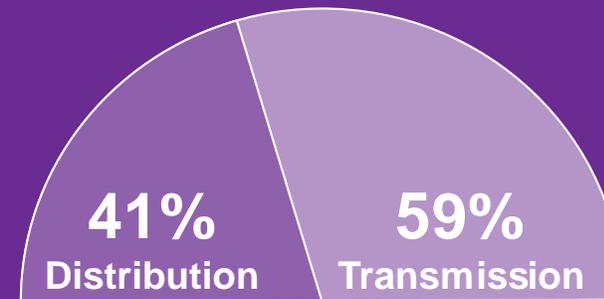


27% 73%  
Total: 100GW

Steady State – Total: 116GW



Total: 132GW - Slow Progression

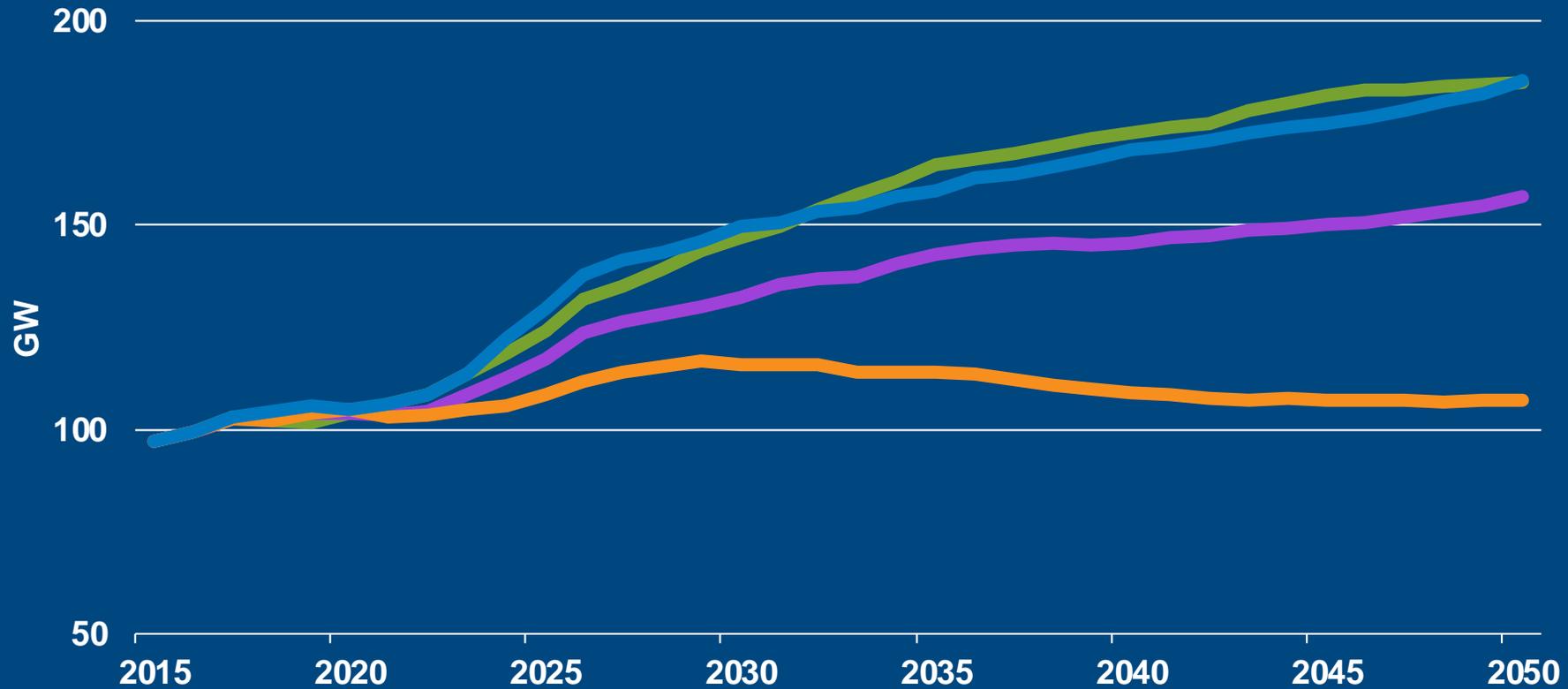




Electricity

nationalgrid

# Total Installed Capacity



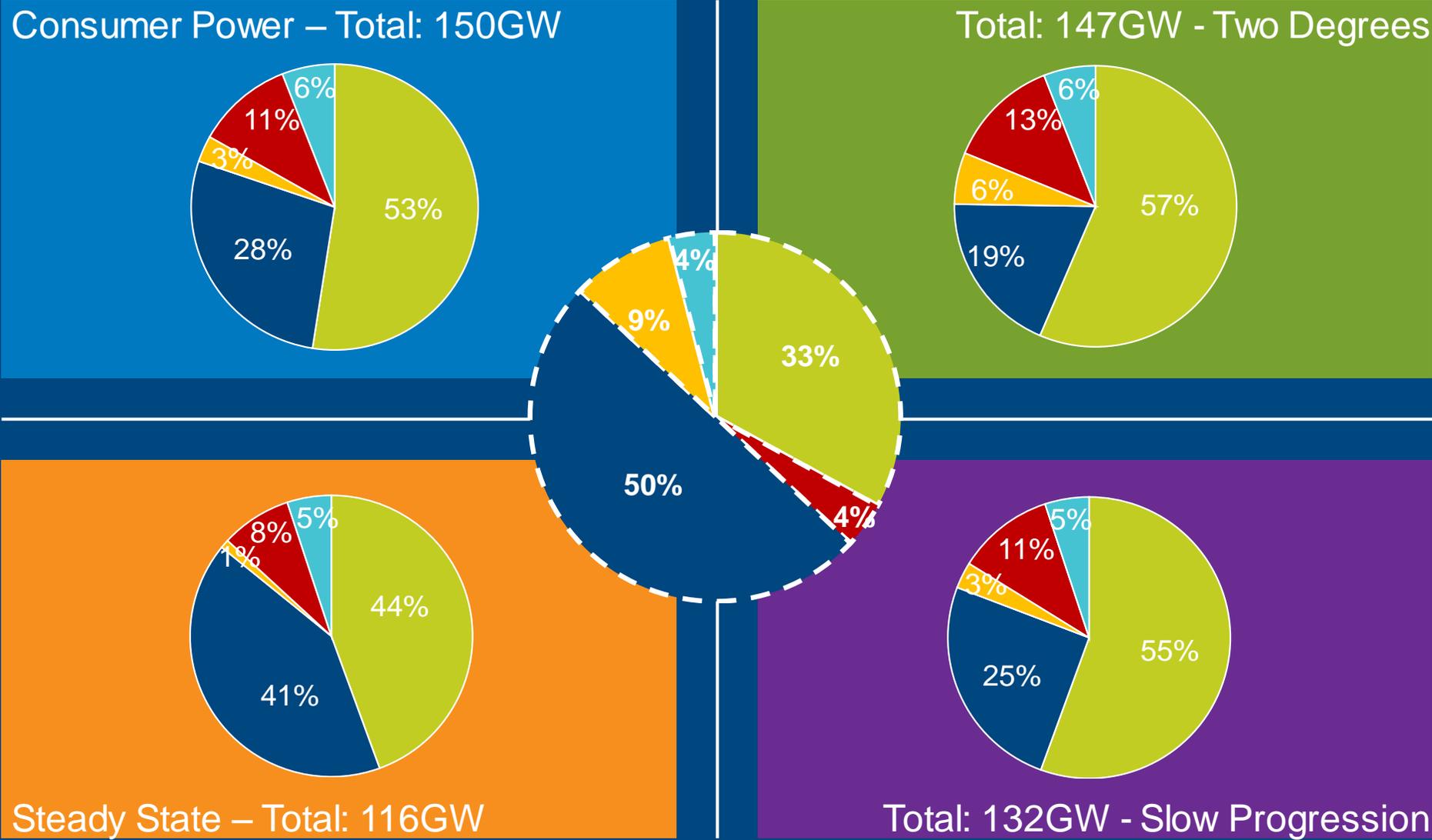
Two Degrees   Slow Progression   Steady State   Consumer Power



Electricity

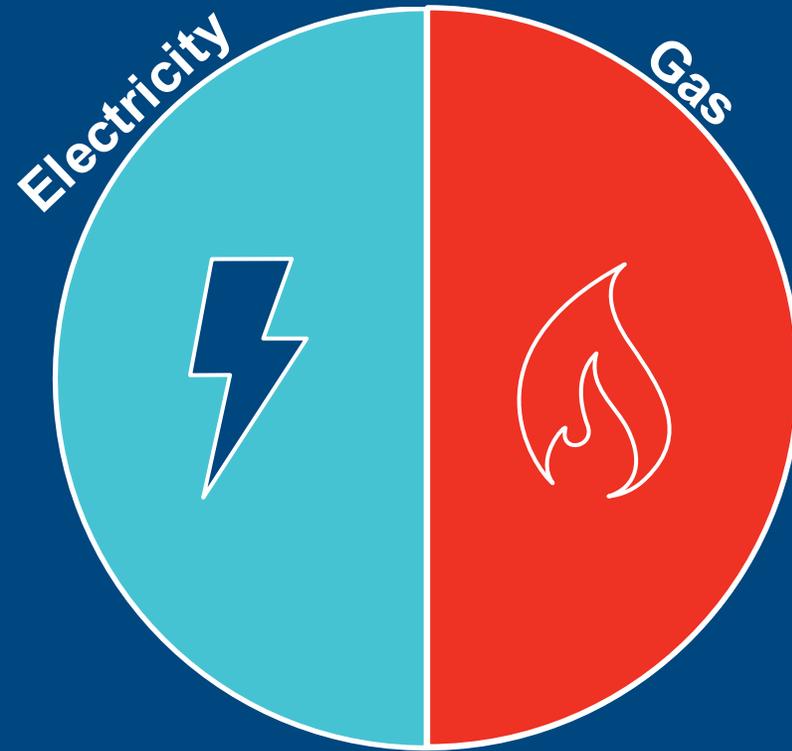
nationalgrid

# Installed capacities - 2030



Thermal
  Renewables
  Nuclear
  Interconnectors
  Storage

# Supply



**Gas**



**Past**

**Present**

**Future**



Gas

nationalgrid

1965



Leeds

Canvey Island  
LNG Import  
Terminal

Gas



Past

Present

Future



Gas

nationalgrid



465 mcm

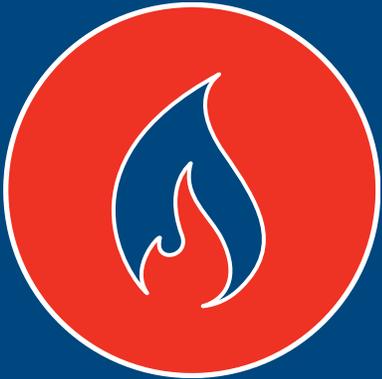
Jan 2010



114 mcm

Sep 2012

Gas



Past

Present

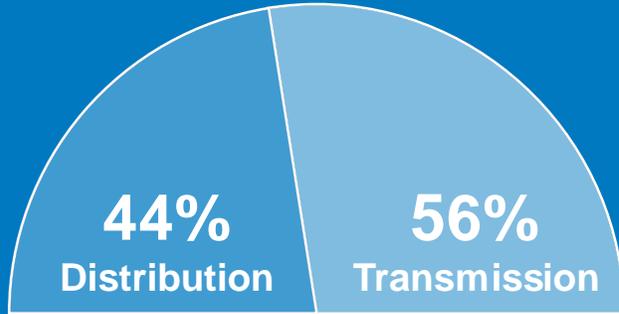
Future



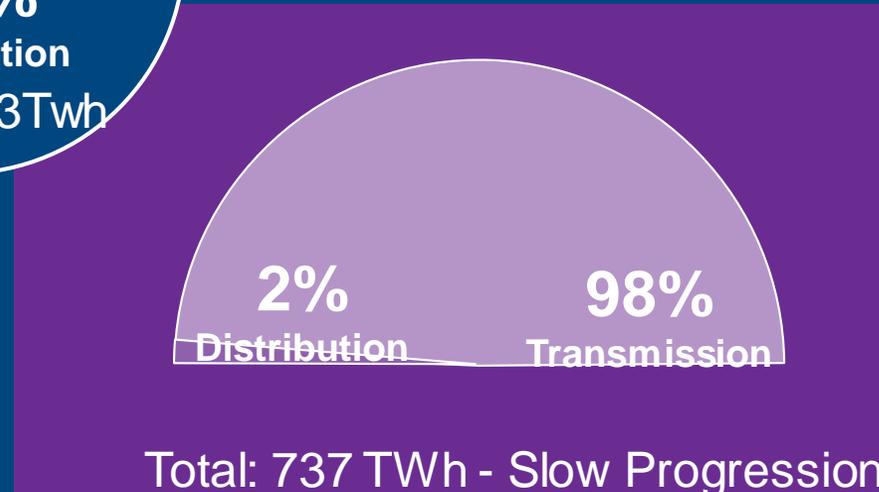
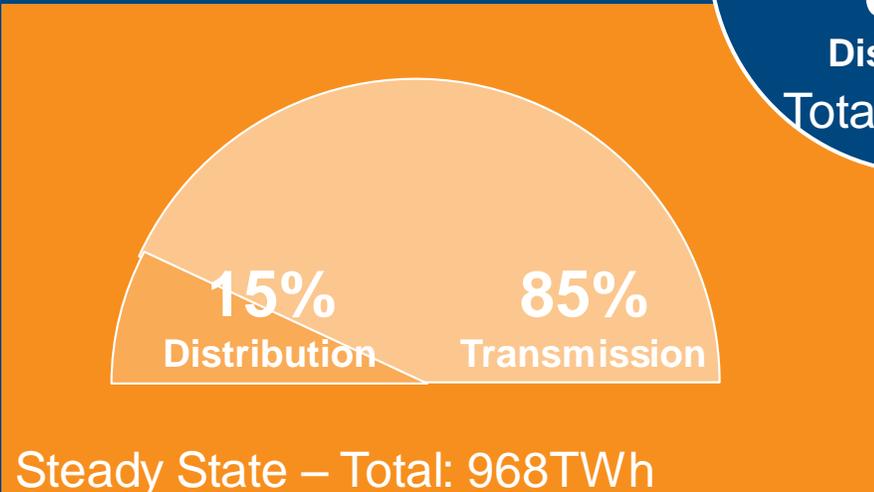
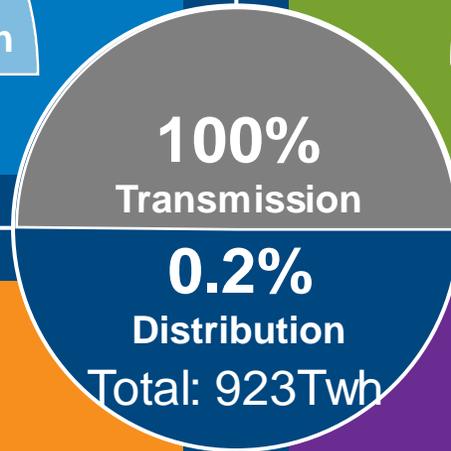
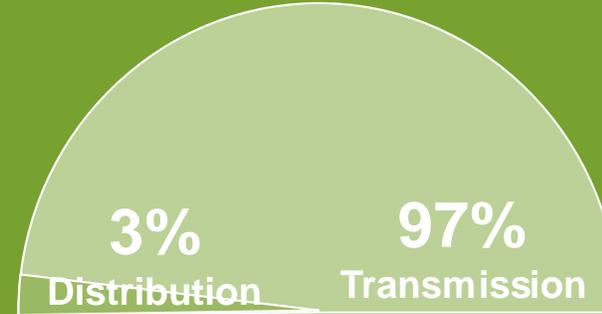
Gas

# Distributed gas potential - 2030

Consumer Power – Total: 968TWh



Total: 671 TWh - Two Degrees





Gas

2016



Imported gas

55%

Indigenous gas

45%



Gas

# Indigenous Supply - 2050

## Consumer Power



Imported gas  
**51%**

---

Indigenous gas  
**49%**

## Two Degrees



Imported gas  
**87%**

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Indigenous gas  
**13%**

55%



45%



Imported gas  
**79%**

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Indigenous gas  
**21%**

## Steady State



Imported gas  
**93%**

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Indigenous gas  
**7%**  
Slow Progression

**Summary**

**CHANGE**