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# CMP213 - Impact assessment
## (process & stage 2 results)



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# Introduction

- The TransmiT Decision Model (developed by RedPoint) has been previously used to undertake the TransmiT Significant Code Review (SCR) Impact Assessment for the years to 2030
- CMP213 modeling sub-group established to provide advice to the Technical Working Group
  - General principle: Accept model rationale as used for Project TransmiT SCR Impact Assessment (Q3 2011) and only review where there have been significant industry developments
  - Hence input previously provided by the SCR Technical Working Group (see WG meetings 7 and 8) was recognised

http://www.ofgem.gov.uk/Networks/Trans/PT/WF/Pages/WebForum.aspx

**Note: Reasonable visibility of generation and transmission projects exists up to 2020; beyond this, uncertainty increases when estimating future costs**

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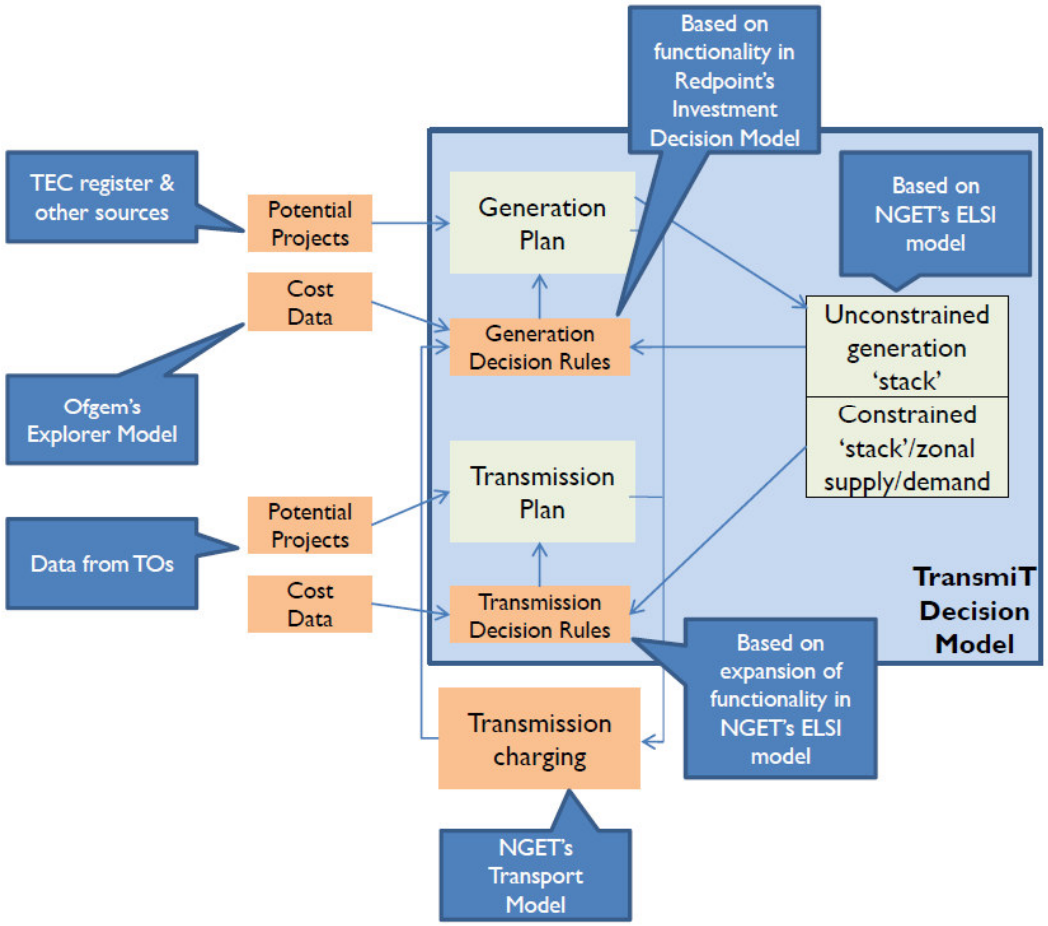
# Overview of modelling Framework*




* A full description of the RedPoint model can be found at:
http://www.ofgem.gov.uk/Networks/Trans/PT/Documents1/Modelling%20the%20impact%20of%20transmission%20charging%20options.pdf

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# Input data – significant changes

| Updated Input Assumptions |
| --- |
| Commodity prices (inc. Carbon Price floor) |
| Exchange rates |
| Electricity Demand levels |
| Contracted generation new build (inc. conversions) |
| Known generation retirements (inc. nuclear lifetime extensions) |
| Costs of new generation (capital and operating cost, hurdle rates, etc.) |
| Network reinforcements (inc. options, timing, cost) |
| Transmission Owners Allow Revenue (from RIIO business plan final proposals) |
| Transport Model network topology (based on NG current view) |
| Transport Model Expansion factors |
| G:D split (27:73 throughout) |

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# Model alternatives developed

- The workgroup agreed to model the following scenarios which would allow the full range of CMP213 options to be considered:
  - Status Quo
  - Original
  - Original 50% HVDC Converters
  - Diversity 1
  - Diversity 2
  - Diversity 3

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# Modelling stages

Future changes to transmission charges might impact on:

- The ***rate*** at which low carbon generation is deployed
- The ***level of support*** that would be required to achieve a certain level of low carbon generation

In order to assess these, a 2 stage approach was adopted

**Stage 1:**

- Low carbon support levels (ie CfD Strike prices) adjusted to achieve renewable and low carbon targets (as below) under Status Quo and ***fixed at this value*** for other scenarios

**Stage 2:**

- As for Stage 1 but low carbon support levels adjusted to achieve renewable and low carbon targets (as below) for ***all*** scenarios

| Metric | 2020 Target | 2030 Target |
|---|---|---|
| EU renewable share | 30% of demand (+3) | |
| Carbon Intensity | | 100g/kWhr (+/-7%) |
| Nuclear capacity | | 14GW (+/-7%) |

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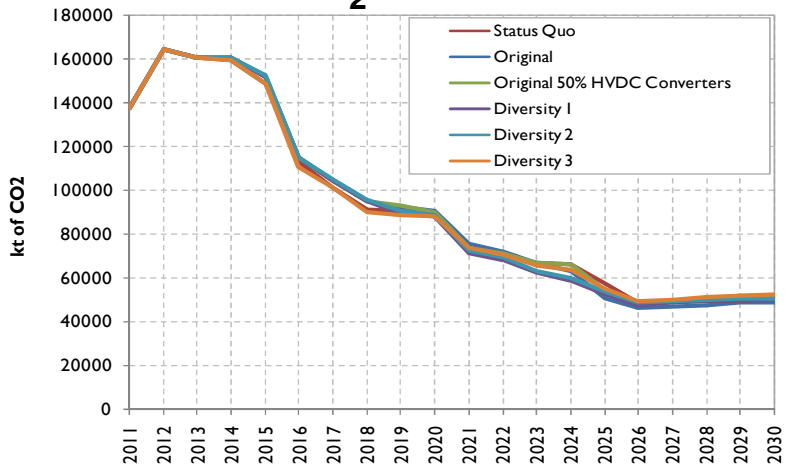
# Modelling results

- Stage 2 target
  - $CO_2$ Emissions
  - Carbon Intensity
  - Renewable generation
- Transmission Costs
  - Transmission Investment
  - Constraint cost
- Consumer Bill Impact
- TNUoS Generation tariffs
- TNUoS Demand tariffs

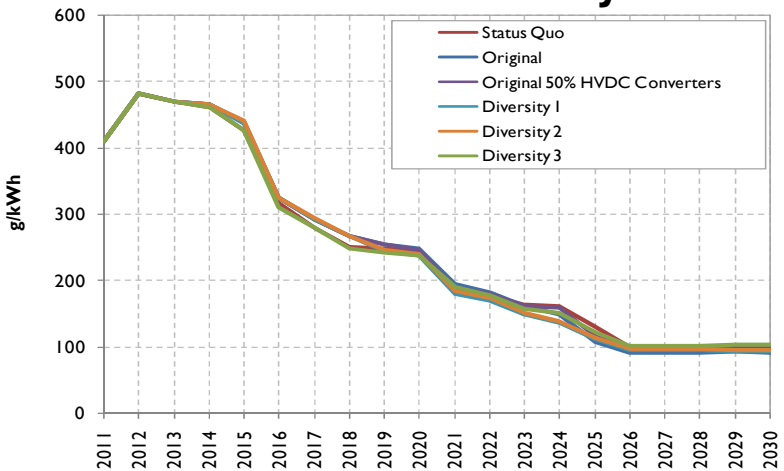
**Note: results are illustrative of future trends rather than forecasts of outcomes**

# Stage 2 targets

## $CO_2$ Emissions

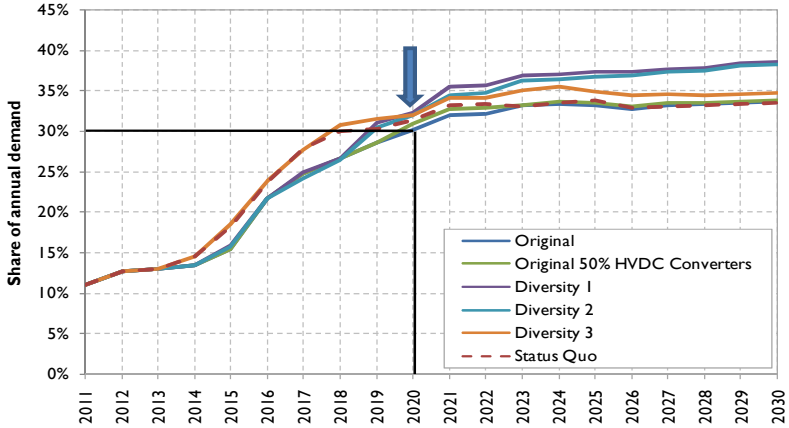



## Carbon intensity



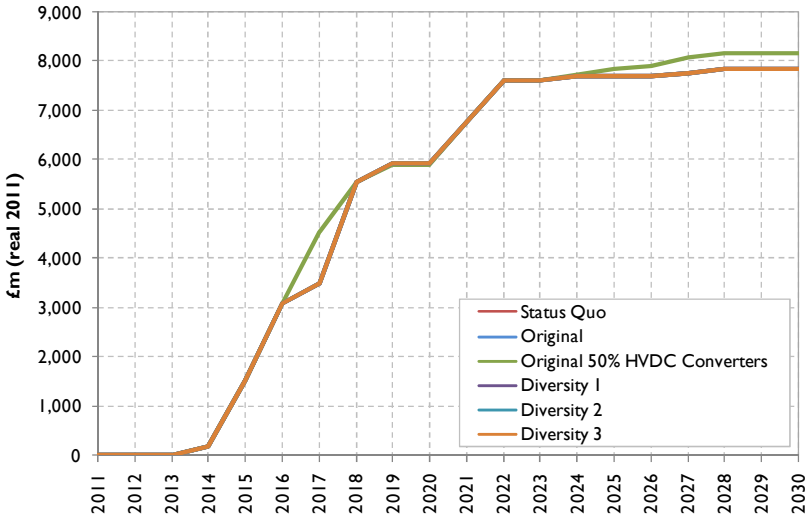

- As CfDs adjusted to meet targets; outputs will be similar
- Consideration of environmental impact will have an effect on consumer bills

## Renewable generation

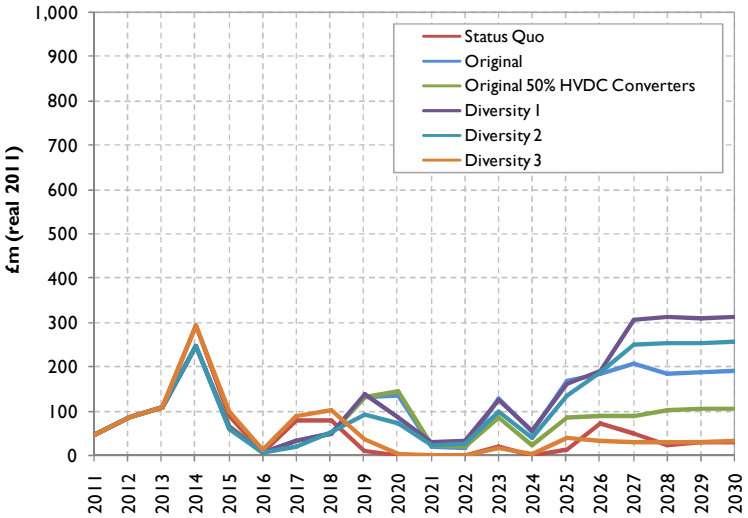


# Transmission Costs

## Transmission Investment



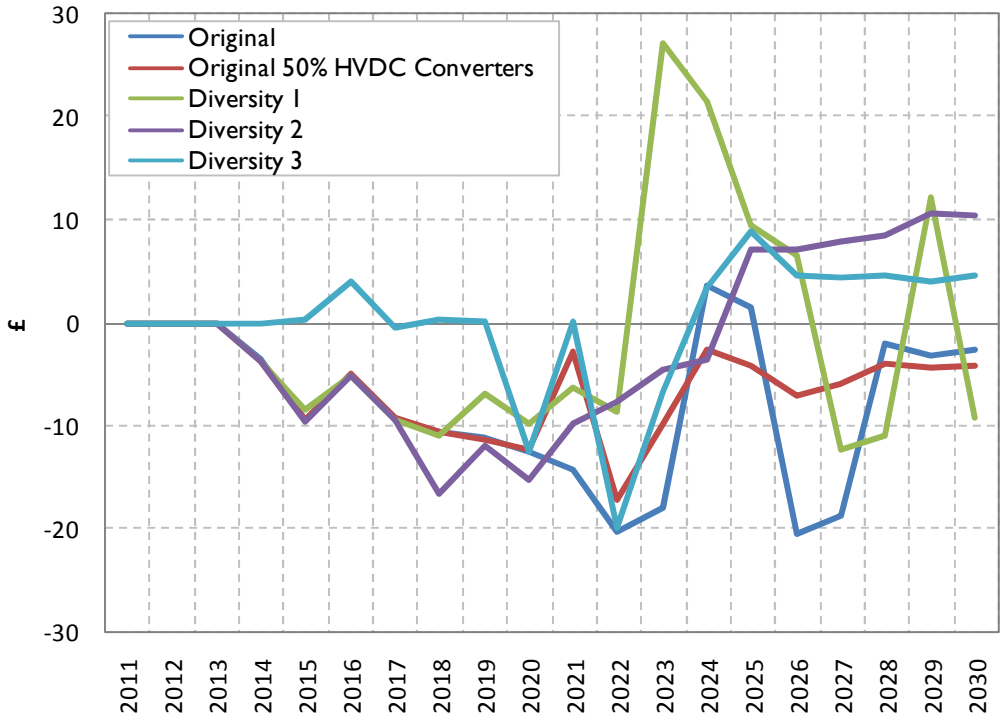

## Constraint Costs




- Transmission investment profile broadly similar for all options
  - Slightly earlier build under HVDC @ 50%
- Differences between options can be better observed from constraint costs
  - Status Quo and Diversity 3 lead to lowest constraint costs
  - HVDC @ 50% also reduced constraint costs (however higher investment in later years)

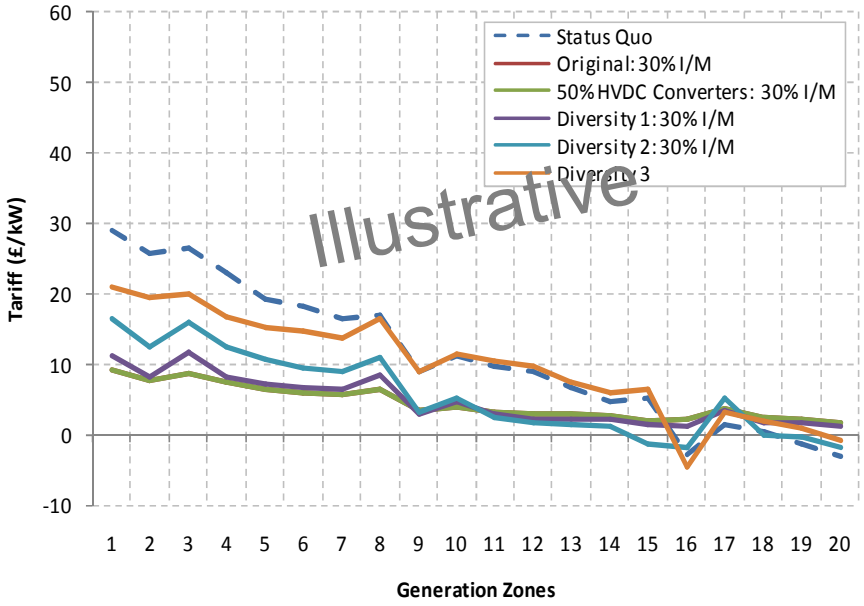
# Consumer Bill Impact

- Figures show change in bill for average domestic consumer relative to Status Quo
- For Stage 2 results can be used to show overall greenhouse gas emissions impact
- Original and 50% HVDC show greatest overall benefit

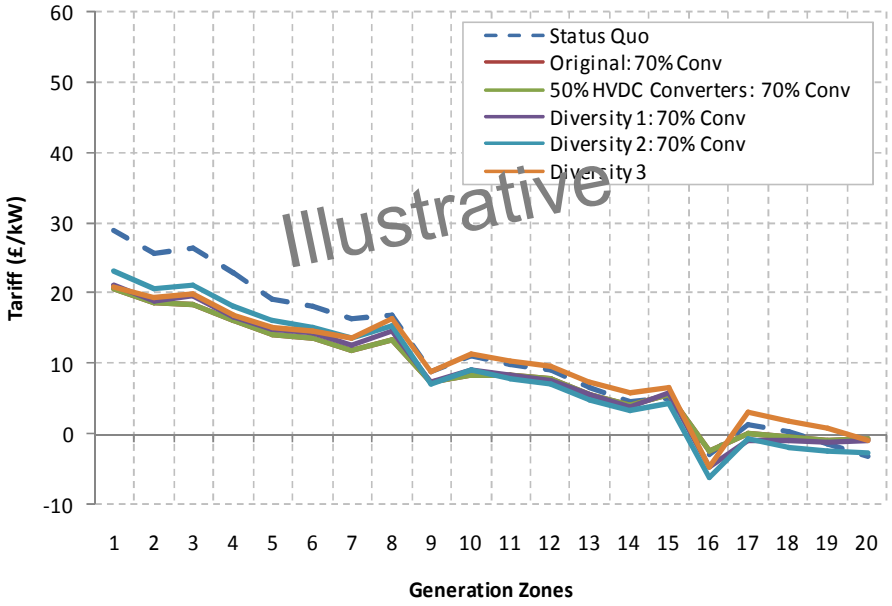


# Illustrative wider TNUoS tariffs, 2014

## Intermittent Generation
(30% Annual Load Factor)




## Conventional Generation
(70% Annual Load Factor)



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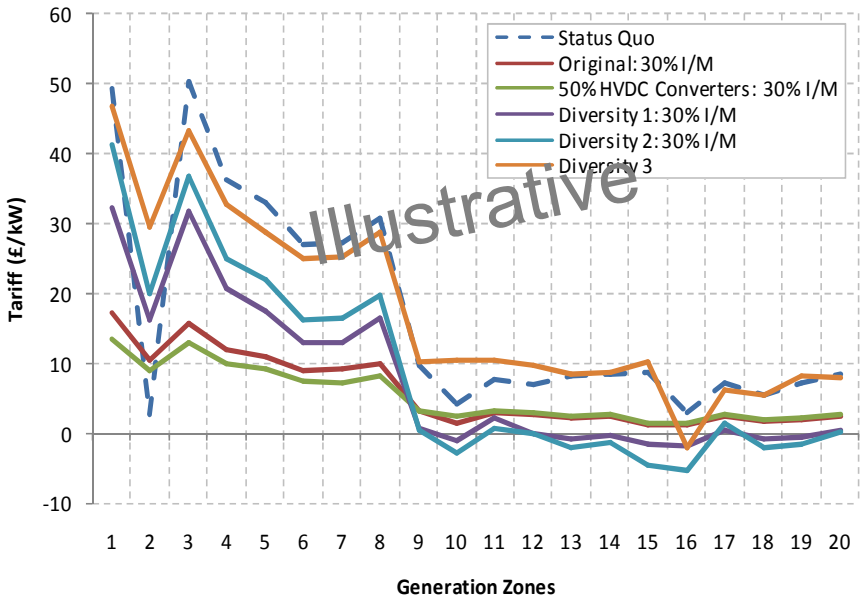
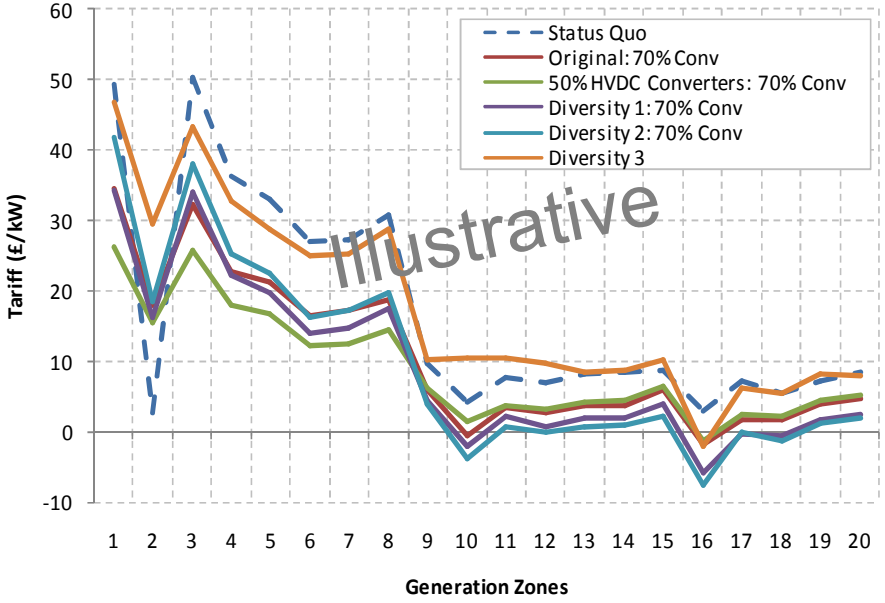
# Illustrative wider TNUoS tariffs, 2021

## Intermittent Generation
(30% Annual Load Factor)




## Conventional Generation
(70% Annual Load Factor)



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# Illustrative wider TNUoS tariffs, 2030

## Intermittent Generation
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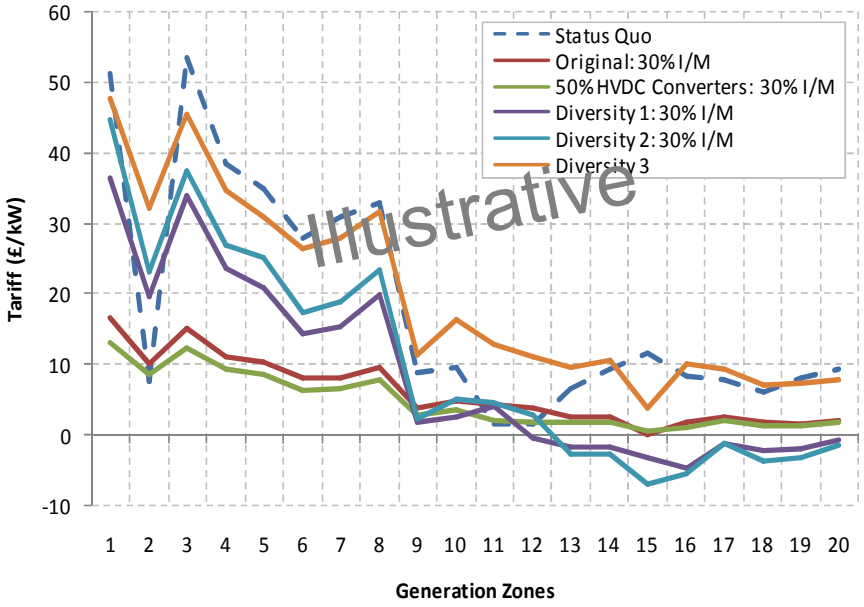
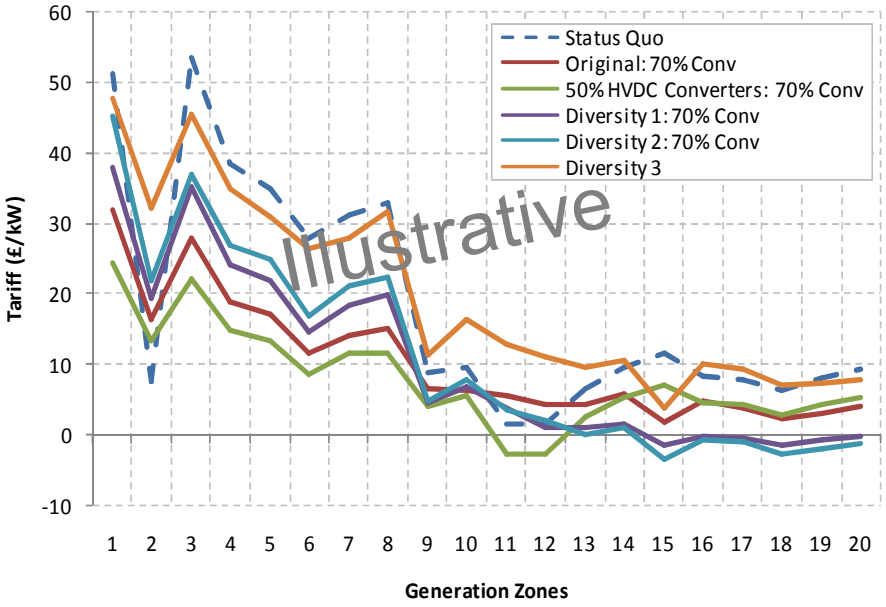



## Conventional Generation
(70% Annual Load Factor)



# Illustrative wider Half Hourly (HH) Demand tariffs

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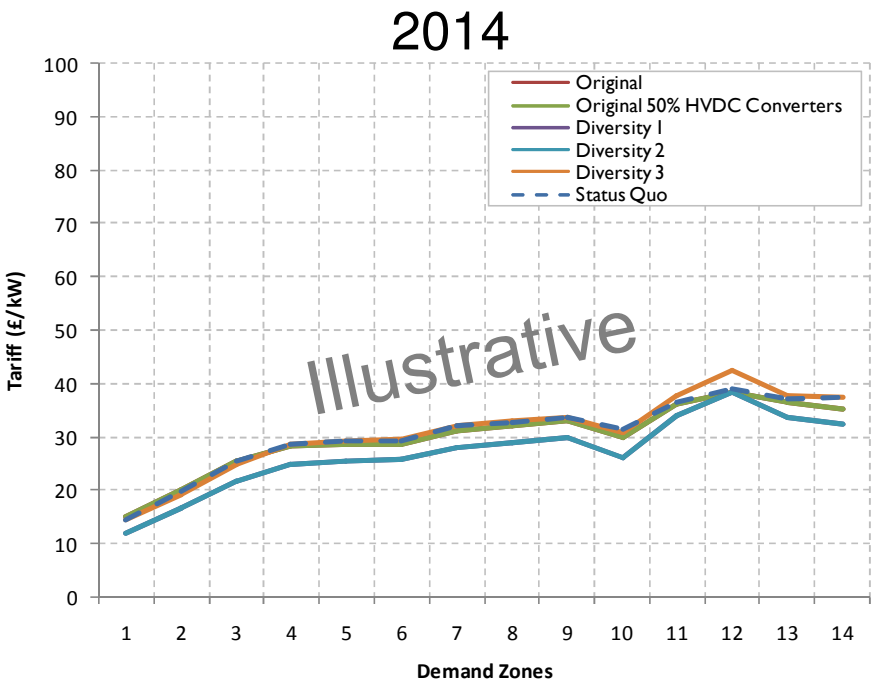


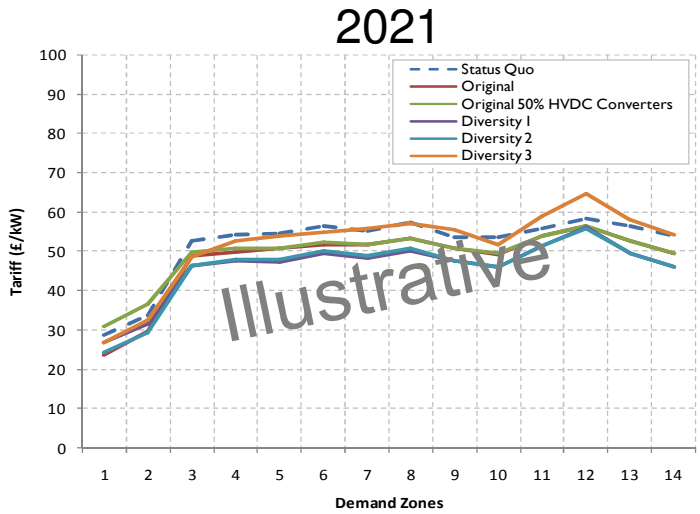


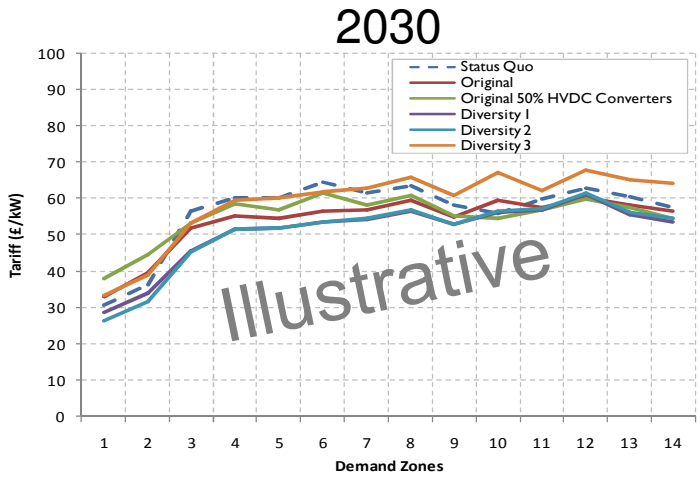

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# Next Steps

- National Grid is refining the impact assessment:
  - Improved capacity mechanism (EMR) modelling
  - Accounting for recent TEC changes
  - Presentational changes
- Intend to provide revised results as part of response to Code Administrator Consultation

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# Any questions?

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