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| Network Innovation Competition 2021 Supplementary Answer form | | | | | |
| Project Name | EQUINOX | | | | |
| Question number | 14 | | Pro forma section | | 3 |
| Question date | 14/09/2021 | | Answer date | | 16/09/2021 |
| Question summary | Please explain how the flexibility of the heat pumps will manifest in kW savings? Your CBA is based on a 35-50% reduction in peak demand. Can you please provide details of this (the underlying Watt/VA values) including the pre-HP peak demand, the pre-HP diversified peak demand and the assumptions regarding the coincidence of the HP and non-HP demand. Can you also provide details of how this was applied to the network and what assumptions were applied concerning the growth of individual networks, i.e. was uniform scaling applied across the network, was it applied differently to different types of networks and what are the assumptions regarding the underlying headroom. | | | | |

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## Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)

Our model was based on a bottom up approach, which considered remaining site specific headroom based on existing diversity. This encompassed WPD’s entire primary system and also the selection of WPD’s HV/LV substations that were expected to exceed capacity in RIIO ED2 (meaning that the total benefit value to 2050 is likely underestimated).

Our CBA assumption of 35% reduction in peak demand is applied in the following way (**for each substation**):

* For each substation, the substation headroom (i.e., firm capacity minus peak load including heat pumps) is projected over the analysis period
* In the year that a substation’s headroom is projected to first turn negative, Equinox is assumed to be deployed
* It is assumed that Equinox reduces peak load demand at substation level by 35% (assumptions underpinning this can be found [here](https://www.tandfonline.com/doi/full/10.1080/09613218.2018.1442775))
* The substation’s headroom is then re-calculated, taking in account the effect of Equinox
* Headroom decreases over time as load grows (based on WPD’s site specific load growth forecasts for individual substations incl. heat pump load growth forecasts\*.)
* When headroom turns negative again, we assume that traditional reinforcement is eventually applied and Equinox is withdrawn

It should be noted that our CBA model calculates benefits at the substation level for each of the four WPD licence areas. Therefore, individual network growth projections are embedded in our analysis. For GB-level benefits, we scaled up by 14/4 (total number of licence areas ÷ WPD licence areas).

All load comparisons were made using MVA. Where necessary, we converted MW to MVA using existing power factors of individual substations.

\*Heat pump load growth is based on WPD’s [Distribution Future Energy Scenarios](https://www.westernpower.co.uk/distribution-future-energy-scenarios-application) (Leading the Way was used in our model) and the assumptions underpinning these. In DFES, all heat pumps are attached to specific substations within WPD licence areas.