REGEN

Consultation response

Transitional Regional Energy Strategic Plan

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About Regen

Regen provides independent, evidence-led insight and advice in support of our mission to transform the UK's energy system for a net zero future. We focus on analysing the systemic challenges of decarbonising power, heat and transport. We know that a transformation of this scale will require engaging the whole of society in a just transition.

Regen is a membership organisation with over 200 members who share our mission, including clean energy developers, businesses, local authorities, community energy groups and research organisations across the energy sector. We manage the Electricity Storage Network (ESN) – the industry group and voice of the grid-scale electricity storage industry in GB.

Summary and recommendations

Regen welcomes the ambition behind the transitional Regional Energy Strategic Plan (tRESP) and its role within a wider whole-system planning framework. Regional planning, alongside national strategy, is essential to deliver timely investment and enable local ambitions to shape our energy system. Having long advocated for regional energy planning, and worked extensively with distribution network operators to deliver Distribution Future Energy Scenarios (DFES), and well over 50 local authorities on local area energy planning under the Net Zero Living programme, we support the development of the RESP.

Our experience producing Distribution Future Energy Scenarios (DFES) and Local Area Energy Plans (LAEPs) has shown the importance of consistent data, assumptions and engagement. The tRESP represents progress towards a more joined-up approach. At present, the interaction between distribution network operators, their DFES, and local authorities and their LAEPs is not

seamless. There are programmatic differences that common assumptions and building blocks from the RESP could help to address. We also recognise that LAEPs are, in principle, a snapshot in time, and reflecting local development and priorities needs to be adaptive to policy and market changes. The feasibility of near-term ambitions needs to be pragmatically considered alongside disruptive policies (e.g. connections reform, CP30 and hydrogen allocation round results). The RESP may not fully capture shifts in policy and market changes, but reconciliation processes between tRESP/RESP and DFES-style analysis could identify the need for justifiable variances.

However, the significant effort invested in both LAEPs and RESPs must complement rather than duplicate work, and not create tension between these processes. The interaction between the tRESP and DFES is critical and will rely on strong, ongoing communication between NESO and DNOs – particularly on how strategic investment information flows into the RESP and aligns with DNO plans. To be effective, the tRESP must ensure clarity and transparency in how strategic investment data is communicated, so that projects are effectively reflected in NESO pathways and in DNO business planning. The Nations and Regions Context reports provide a good basis for this, which will help non-technical stakeholders interpret the data, and we welcome the initiative to produce them.

The 3-year cycle of production of RESP pathways can naturally complement ongoing, within-year DNO updates and processes, reflecting project and policy changes, new data sources and local ambitions. The scope of the RESP is intentionally designed to focus on key sources of future load that will trigger the need for investment. Additional analysis of other technologies and sources of load (that may not be included in the scope of the RESP) will need to be considered by regional network companies. It is sensible that a national strategic direction-setting process such as the RESP does not consider a broad scope of future energy/load requirements.

Regional plans will only succeed if they reflect national strategic priorities while empowering places to deliver their own goals. Making RESP outputs clear, accessible and sufficiently granular to be usable at a local authority level is an important first step, and ongoing and iterative engagement is essential to ensure that RESP data are genuinely useful and usable.

Ultimately, the value of the RESP will rest on its ability to drive investment, which must be supported by evolving and iterative feedback loops. Many local authorities responded to NESO's Request for Information on Strategic Investment Needs, and this type of contribution should form part of enduring governance processes, becoming business as usual.

There also remains an important question about how local authorities can best engage with, advocate for and communicate with key industries and growth sectors. Ensuring that major industries and drivers of local growth are actively involved in the RESP process is vital, though the precise role of LAs in facilitating this has yet to be clearly defined. Further guidance is needed to help local authorities engage most effectively, particularly given the capacity and resource constraints many LAs face.

The adoption of consumer-led flexibility (CLF) remains in its early stages and will inform the development of the Consistent Planning Assumptions. Our understanding of consumer behaviour in a more flexible system will evolve, for example with more variable pricing and technologies such as vehicle-to-grid, which could significantly reduce peak demand. Given uncertainty around how CLF will evolve, this too must be treated as an iterative process and regularly updated as new evidence emerges.

The key recommendations from our response are below, with further detail written against specific questions below.

General recommendations

- **Recommendation:** Strong, ongoing coordination is needed between NESO, DNOs and local authorities to ensure the tRESP, DFES and LAEPs complement one another, avoiding duplication or tension between processes. An adaptive process is needed to align the RESP's three-yearly cycle with within-year data updates by individual network companies.
- **Recommendation:** NESO and DNOs will need to work together in the coming months to ensure strategic investment data is reflected in both the tRESP and in DNO business planning.
- **Recommendation:** The RESP should include enduring governance and feedback loops to enable continual learning and regular local authority input.
- **Recommendation:** RESP outputs must be clear, accessible and sufficiently granular so that local authorities can use them effectively.
- **Recommendation:** Further guidance is needed for local authorities to help them engage effectively with key industries and growth sectors.
- **Recommendation:** The Consistent Planning Assumptions must remain iterative and be regularly updated as understanding of consumer-led flexibility and new technologies evolves.

Specific recommendations

Additional context for these recommendations is provided below, in response to questions from the consultation.

- **Recommendation:** Provide key messages from the Nations and Regions Context reports in an Executive Summary ahead of the context and granular data. Ideally, this summary should provide insights for senior decision makers in local government and industry, offering a more localised view than the RESP nation/region.
- **Recommendation:** Include detail in the Nations and Regions context on steps being taken by NESO to ensure the tRESP pathways incorporate just transition considerations.

- **Recommendation:** Include transport and heating insights, including relevance of demographic data and geospatial results in designated sections.
- **Recommendation:** Include the impact of data centres and details on the approach to managing trade-offs in the Nations and Regions context reports.
- **Recommendation:** Include project-specific data (mapped) for generation and storage projects (existing and pipeline) within the Nations and Regions context reports. This should include categorisation by technology and be compared directly with relevant regional CP30 targets.
- **Recommendation:** Ensure the messaging around LAEPs in the nations and regions context reports includes the nuances of different areas' approach – noting that the government's position, informed by NIC analysis, is that not all areas necessarily need to develop a LAEP (and may lack the resources or appetite to do so). These areas should not be disadvantaged in RESP engagements, as this would risk entrenching existing gaps in decarbonisation progress.
- **Recommendation:** Include an action-focused executive summary, aimed at senior-level local stakeholders, at the beginning of the nations and regions reports.
- **Recommendation:** Retain stated building blocks focus due to strong alignment with ENA building blocks, and the pragmatic focus on high materiality demand drivers.
- **Recommendation:** Consider ways in which regional nuance included in DNO modelling can be retained for baselining in tRESP.
- **Recommendation:** Provide clarity around rationale for EV charger utilisation assumptions (EV09).
- **Recommendation:** Consider updating methodology for domestic EV peak demand calculation to include direct dependency on EV charger counts, and a minimum level of diversified peak demand per charger.
- **Recommendation:** Consider heat pump assumptions (eg HP02) which result in low demands.
- **Recommendation:** Clarify NESO position on planning for average winters and managing "1-in-20" stress events.
- **Recommendation:** Consider additional modelling modifications to reflect potential behavioural and technology performance changes in cold weather.
- **Recommendation:** Publish data and methodology to high levels of granularity, with strong consideration given to the needs of local governments and planners.
- **Recommendation:** Engage directly with Local Planning Authorities to explore pathways and their potential implications.
- **Recommendation:** Explore the potential of joint scenario planning between RESP and Local Planning Authorities.
- **Recommendation:** Use tRESP and RESP as an opportunity to standardise data practices across local energy planning.

- **Recommendation:** Ensure NESO's local actor support and messaging around tRESP is cognisant of what is most important for local net zero planning – i.e. what will help build local buy-in from senior council stakeholders, what data would be most valuable for assessing deliverability and formulating a plan, etc.
- **Recommendation:** Target local actor support at spatial planning teams to help overcome common gaps between spatial and net zero planning.
- **Recommendation:** Develop methodologies to incorporate RESP data into the planning activities of local authorities in a standardised way.

Responses to questions

Question 1: Are the Nations and Regions Contexts accessible, clear and easy to interpret? What improvements would you like to see?

The Nations and Regions Context reports are clear and accessible, and will be an invaluable resource for local stakeholders seeking to interpret the data for their area. This will be especially valuable for local authorities, who are often resource-constrained and may not have the time or in-house expertise to comb through more technical elements of tRESP and RESP outputs.

Future iterations would benefit from a short "Key Messages" or "Executive Summary" section at the beginning. The draft versions contain useful context, but they fail to pull out top line messages before delving into demographic data.

While interacting with local authority representatives through our work, particularly on the Innovate UK Net Zero Living programme, Regen has heard repeatedly that senior stakeholders – from heads of services to elected officials and senior executives – will require a strong, tangible appreciation of the value of tRESP in order to prioritise it alongside their statutory obligations. These reports are one of the key levers to enable this, and therefore top-level messaging will be highly valuable.

Key messages and graphics for different sub-regions (e.g. unitary or strategic authority level) would enhance their value, given that the nations and regions chosen for RESP are very large compared to the catchment areas of most local government organisations. We recognise that this may not be possible in the timescales for the tRESP, but it would be a valuable addition.

Recommendation: Provide key messages from the Nations and Regions Context reports in an Executive Summary ahead of the context and granular data. Ideally, this summary should provide insights for senior decision makers in local government and industry, offering a more localised view than the RESP nation/region.

Question 2. How well do the Nations and Regions Contexts reflect your understanding of your nation or region?

Regen does not represent a specific nation or region.

Question 3. Do you agree with the elements and topics included in the Nations and Regions Context and is there anything missing that you would have expected to see?

See answer to Question 1.

Including more detail on key demand drivers (especially heat and transport) would be beneficial. Each having its own section may be useful.

Linking each section to the demographic and governance context outlined at the start may also improve understanding by stakeholders. For example, the implications of efficiency, affluence and fuel poverty for clean heat uptake should be reiterated in the heat section. Relevant local government powers to affect change around each demand driver would also be helpful.

For more recommendations around the topics and framing, see our answer to question 5.

Question 5. Do you have any feedback on the data selected for the specific topics included for the Nations and Regions Contexts?

Section 1 – Demographics

- The included data appear to be sensible, covering governance, population, energy efficiency and fuel poverty.
- Supporting analysis could do more to provide a narrative around how this data influences the insights developed by RESP.
- It would be particularly valuable to provide context around steps being taken by NESO to ensure a just transition via strategic planning, such that energy infrastructure buildout does not perpetuate or deepen existing inequalities.
- Regen has worked closely with SSEN to introduce vulnerability considerations into its network planning, alongside technical considerations around load growth from low carbon technologies.

Section 2 – Energy Infrastructure

- It is useful to explain the standard nomenclature and network topology, though it may be preferable to show the transmission network layout for the region/nation in question.
- Context from elsewhere in the report points to the fact that the tRESP is primarily concerned with distribution-connected assets. As such, it may be beneficial to provide more detailed maps of distribution network assets, rather than simple catchment areas.
- The London Nations and Regions Context report references grid constraints in West London – a geospatial representation of (for example) primary network

demand/generation headroom from DNO Network Development Plans may be useful to illustrate the point.

Section 3 – Transport and Heating

- Geospatial data on electric vehicle (EV) and heat uptake should be more prominent, at a higher resolution than included for EV chargers in these versions (e.g. LSOA).
- Future iterations should consider including projected totals compared with baselines. Our engagement with local authorities around local energy planning shows that one of the most valuable elements of LAEPs and other plans has been helping local stakeholders grasp the scale of uptake required to achieve net zero targets, and communication around the (t)RESP could aid with this.
- The map of existing and prospective heat network opportunities is valuable. Further categorisation (e.g. by technology types, existing versus future, new versus expansion of existing) may be helpful for local authorities to quickly interpret information. Similarly, including governance boundaries would be valuable.

Section 4 – Industry and Economy

- Mapping and detail are rudimentary in the example.
- Data on large sources of industrial emissions (e.g. from the National Atmospheric Emissions Inventory) would be valuable.
- Spatial data on industrial businesses by sector could also be included to provide a view of distribution of industrial demands.
- Qualitative information included on clusters is useful.
- Data centres (existing and proposed) may have an outweighed effect on the network. NESO has a key role in advising on these connections and considering trade-offs against other industries and wider demand opportunities. As such, more detail and spatial information on these projects would be of use – i.e. similar to the heat network map included.

Section 5 – Generation and Storage

- Generation and storage projects draw only on the Renewable Energy Planning Database. We would expect to see data from sources such as each DNO's Embedded Capacity Register and the Transmission Entry Capacity Register.
- Data should be provided at site granularity, rather than M/LSOA.
- Maps of existing and pipeline should differentiate between technology types – rather than total generation capacity.
- More information on CP30 targets for each technology could be included to draw out the context of connections reform – for example, showing the contracted pipeline against CP30 capacity targets.
- Regen's dashboard provides an example of this data.

Section 6 – Targets

- As above, this should be more clearly contextualised alongside the region/nation's generation and storage data.
- It would be beneficial to include specific targets adopted by each regional local government, to demonstrate that this is of crucial importance to NESO in developing the RESP.
- Description of LAEPs should expand to general local net zero planning, in recognition of the fact that not all areas have completed a LAEP but may still have detailed energy and climate strategies and plans.
- The National Infrastructure Commission's report 'Electricity Distribution Networks: creating capacity for the future' recognised the importance of local energy planning including LAEPs, but recommended that:

  > "The objective of building capacity and capability should not be that all English local authorities complete a Local Area Energy Plan. Creating these plans is resource intensive and would represent a significant burden for local authorities who are not already engaged with energy planning. The priority should be to ensure that they can engage with strategic energy planning over time and funding a one-off plan is unlikely to be the best way to do this."

  This is a position that Regen agrees with, and which is borne out by our engagement with local authorities and expert practitioners in local energy planning. Messaging in the tRESP and RESP should communicate this nuance to avoid alienating areas that are less engaged or unable to develop a LAEP.
- Furthermore, Regen considers that the tRESP and RESP can provide transformational opportunities for streamlining the approach local areas take to energy planning, saving time and money and enabling a wider focus on engaging with delivery. Regen will be publishing a report with Innovate UK on this topic soon (see also our response to Question 19).

Section 7 – Summary and Implications for tRESP

- This content should be included at the start of the report, and more narrative providing the "so what" should be included.
- Content should be focused on sub-regional levels – RESP regions in England do not typically adhere to common governance boundaries, so insights for specific local and combined authorities would increase impact.

Recommendations:

- Include detail in the Nations and Regions context on steps being taken by NESO to ensure the tRESP pathways incorporate just transition considerations.

- Include transport and heating insights, including relevance of demographic data and geospatial results in designated sections.
- Include the impact of data centres and details on the approach to managing trade-offs in the Nations and Regions context reports.
- Include project-specific data (mapped) for generation and storage projects (existing and pipeline) within the Nations and Regions context reports. This should include categorisation by technology and be compared directly with relevant regional CP30 targets.
- Ensure the messaging around LAEPs in the nations and regions context reports includes the nuances of different areas' approach – noting that the government's position, informed by NIC analysis, is that not all areas necessarily need to develop a LAEP (and may lack the resources or appetite to do so). These areas should not be disadvantaged in RESP engagements, as this would risk entrenching existing gaps in decarbonisation progress.
- Include an action-focused executive summary, aimed at senior-level local stakeholders, at the beginning of the nations and regions reports.

Question 6. Do you have any feedback on how the data was presented visually?

See response to Question 5.

Question 7. What additional data do you think we should be considering either for tRESP or full RESP?

See response to Question 5.

Question 8. The purpose of the tRESP Pathways is to drive consistency across DNO forecasting, as part of their business plans for 2028-2033 (ED3). Are the steps we are taking to drive consistency, via the baselining and alignment, clear and proportionate? Are the set of tRESP building blocks and the approach to creating Pathways fit for purpose?

Regen engaged directly with NESO (through DNO contacts) regarding the technology building blocks that should be used in the tRESP. We believe that strong alignment to the existing ENA building blocks is a sensible basis for reconciliation and consistency. There will inevitably be

some regional nuances to sub-technologies, but the ability to aggregate/disaggregate the pathways to core technology sectors will enable consistent reconciliation.

There are obviously technology sectors that are not included in the scope of the tRESP. Whilst we would support a focus on the key and disruptive sources of demand and generation load growth, it is recognised that individual networks will need to continue with their own analysis for other sources of electricity load that could be impactful in their licence areas.

Below is a summary of Regen's thinking on the four options assessed by NESO for the development of GSP-level baseline figures. Option 3 has been selected. It is Regen's view that the development of multiple, potentially conflicting datasets of GSP-level Low Carbon Technology (LCT) uptake (i.e. via FES and tRESP) may drive confusion. Furthermore, we believe there is significant value in the localised approaches developed by DNOs through DFES, which often go beyond disaggregating totals using nationally available datasets.

Option Considered	Pros	Cons
1. Use FES 2025 GSP numbers	• Consistency with other NESO publications provides simplicity of messaging	• DFES GSP totals often misalign with FES numbers, suggesting FES methods are not reflective of local DNO expectations.
2. Use DFES data to guide GSP disaggregation	• Utilises the significant and robust work carried out by all 6 DNOs • Builds on over a decade of detailed modelling approaches for each building block considered in tRESP and more • Utilises and embeds ongoing work regarding LAEP (etc.) reconciliation • Utilises DNO stakeholder engagement	• Underlying methodological discrepancies between regions • Regional data will not necessarily sum to FES totals, leading to inconsistency.

Option Considered	Pros	Cons
	• Aligns with ongoing DNO processes, and allows for continuity	
3. Independent GSP baselining by NESO (using national FES numbers as input)	• Methodological consistency. • While GSP totals may differ, aggregated data will match with FES.	• Inconsistent messaging with other NESO publications (e.g. FES) introduces confusion and inconsistency • Bypasses work of DNOs through DFES, including local insight and relationships.
4. Contract modelling to a consultant experienced with DFES and LAEP	• Utilises mature models, avoiding potential pitfalls and inefficiencies of first-principles methodology development • Utilises existing frameworks, stakeholder input etc.	• Potential lack of transparency.

Recommendations:

- Retain stated building blocks focus due to strong alignment with ENA building blocks, and the pragmatic focus on high materiality demand drivers.
- Consider ways in which regional nuance included in DNO modelling can be retained for baselining in tRESP.

Question 9: Will your organisation use the Pathways? If yes, which of the building blocks and for what purpose?

Regen regularly engages in detailed network and energy system modelling, including via DFES. tRESP and RESP data outputs will be of significant interest to us and our partners, and we will

likely utilise them in various modelling contexts for local authority and DNO partners, internal modelling and research, and more.

Regen will be working with the network planning teams in NGED and SSEN to undertake a direct side-by-side reconciliation of the tRESP outputs for all pathways in scope, against the DFES 2025 projections we have provided. This will include the baselines, pipeline build-outs and long-term scenario projections that we produce, down to 11kV and LV substation level, aggregated up to GSP / licence area level.

Question 10. Pathways will be published for each building block, down to Grid Supply Point feeding area, and for each RESP nation/region. What is your preferred format to receive the Pathways?

For Regen's purposes, standard data formats will be of most use. This could include Excel files, .csv files, shapefiles, geopackages, .json etc.

Other stakeholders – particularly local actors – will likely value online visualisation as well as data downloads to help with accessibility and quick interpretation.

Question 12. Are the definitions of the CPAs clear, as described in the tRESP methodology and detailed design document and the tRESP CPA value workbook?

Definitions included for CPAs are clear, and the summary table and list are particularly useful reference sources. The level of transparency shown with the CPAs is excellent and makes understanding the proposed methodology easier.

Question 13. Based on the methodology, do you agree with the values established as tRESP CPAs in the value workbook? If not, are there any additional or alternative data sources which are more appropriate? Answers should refer to specific CPA numbers e.g. EV01

Regen carried out a detailed review of DNO load forecasting assumptions on behalf of the National Infrastructure Commission, as part of the study "Electricity Distribution Networks: Creating Capacity for Net Zero". This included a detailed comparison of load profiles and underlying assumptions, and we met with representatives of the RESP team in relation to the CPAs to share learnings from the project earlier in 2025.

Our review in response to this question builds partially on the work for the NIC and has focused on the results presented in the indicative end-to-end examples provided for heat pumps and EVs in the CPA workbook. We recognise that these are the result of combining all relevant CPAs and have referenced individual assumptions where appropriate.

EVs

Using NESO's CPA workbook, an indicative calculation of small EV demand for the 2030 peak winter demand day in the West Midlands, with 53 BEVs (Lct_BB001) and 46 PHEVs (Lct_BB002) shows a diversified peak demand across charger types of 0.46-0.58 kW/EV. Looking only at domestic charge points, the "default" peak value per EV is 0.48 kW/EV. The calculation estimates that 25 domestic EV chargers will be required to meet the demand, giving an implied diversified peak per EV charger of 1.9kW.

Evidence reviewed in the NIC project shows comparable peak demand per charger (see Figure 1 below).

However, we would appreciate clarity on the methodology adopted for calculating the peak demand and its relation (or lack of relation) to the number of charge points. In the example calculation discussed above, the methodology results in 25 domestic charge points serving 99 BEVs and PHEVs. This is low and likely does not reflect the reality of domestic charge point installation – ZapMap's EV Charging Survey suggests 80% of EV drivers currently have a home charger. Examining the numbers more closely:

- The annual energy delivered by the chargers sums to 148 MWh (1.5 MWh per vehicle).
- Assuming 7 kW chargers deliver this over the year (implicitly one per EV), gives a load factor of approximately 2.5%.
- Meanwhile, the utilisation assumed for domestic chargers (EV09) is 10%, four times higher.
- This results in the number of chargers being four times lower than the number of cars.
- The peak demand is a function only of the annual energy demand.
- The utilisation rate is used to calculate number of charge points as an output but does not affect peak.
- This means the peak per charge point is not a constraint on the modelled peak load – theoretically allowing peaks much lower than the ADMDs used by DNOs for charge points shown in Figure 1.

We would appreciate clarity on the origin and rationale for values assumed for EV09. Specifically:

- What is the basis for the assumed domestic utilisation rate of 10%? (The CPA summary table cites NESO modelling.)
- We feel adopting "energy based" utilisation rates for public and HGV chargers would be benefical, as it would provide a more conservative estimate of charger numbers.

We think that the current approach to peak demand calculation (i.e. charger-count-independent profiles in units of kW/kWh$_{annual}$) is appropriate for non-domestic (i.e. public and workplace) charge points, because it is likely that a similar utilisation- and demand-based calculation would be used to define the number of charge points installed.

However, we would question the use of a method for calculating domestic EV peak demand which is independent of the number of charge points. This is because the driver for domestic off-street charge point installation is more likely to be convenience – a homeowner with an EV and a driveway is likely to install a charger, irrespective of the system-optimal deployment. As well as potentially resulting in systematic network underbuild, we are concerned that this discrepancy on EVs per domestic charge point may cause confusion among stakeholders.

As such, we recommend that a different logic flow is needed for domestic charge points specifically, which makes an explicit link to charger counts and utilises diversified profiles in units of kW/charger. For example:

- Domestic charger demand calculated in same manner as currently implemented.
- Number of 7 kW chargers needed calculated using:
    - Regional scale factor (RSF), if possible, accounting for:
        - availability of off-street parking
        - number of cars per home.
    - Demand (MWh) = No.chargers x RSF x UF x 7kW x 24 x 365
- Diversified profile (kW/charger) applied to calculated number of chargers.
- "Un-diversification" factor applied based on group size.

Note that the current implementation could be updated to incorporate a lower utilisation factor (EV09) – but, as noted above, because the peak is currently not a function of charger utilisation, the peak itself would not change. This means the peak per charger would drop to far lower levels than suggested by the data from various DNOs (Figure 1).

Finally, the proportion of customers adopting flexible charging (EV05) was noted as high, especially in the near-medium term. We note NESO has made use of FES Holistic Transition assumptions around smart-charging adoption. We understand many DNOs typically adopt more conservative assumptions around flexibility adoption, due to the significant aggregate impact this may have on capacity requirements. Likewise, the NIC analysis described earlier used 80% as a reasonable upper bound for flexible EV charging in the "high flexibility" scenario (noting that this included some bi-directional charging). The more conservative "low flexibility" scenario assumed smart charging driven by time-of-use tariffs was limited to 60%. We think a lower flexibility case would be prudent to include to ensure the materiality of smart charging is well understood and uniformly tested when making network investment decisions.

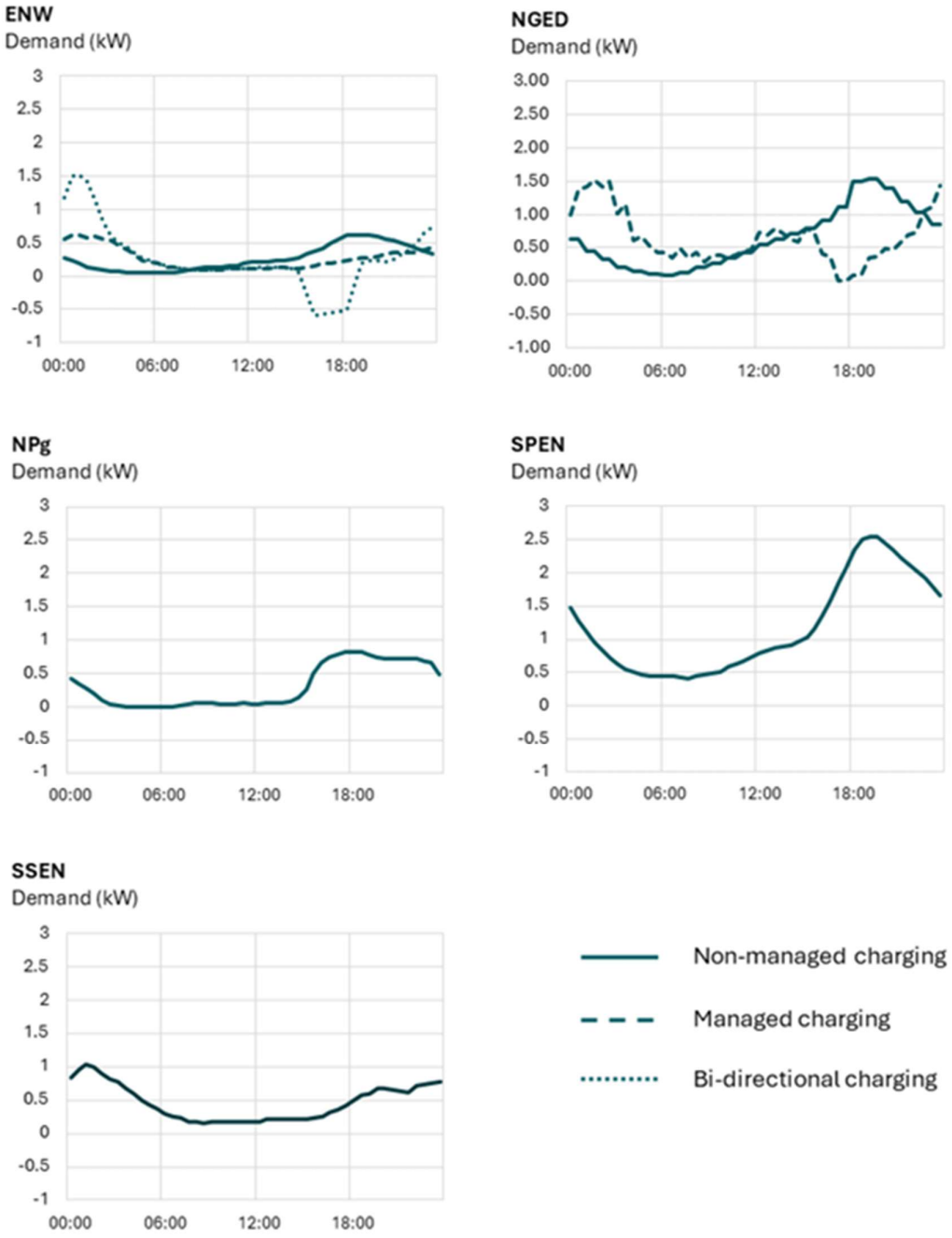


Figure 1: Comparison of load profiles for domestic off-street chargepoints (rated to 7.36kW) provided by DNOs for winter peak demand conditions. UKPN data not included due to different data format.

Heat Pumps

The end-to-end example in the CPA workbook provides an average diversified winter peak demand of approximately 1.1 kW per heat pump. The profiles reviewed by Regen for the NIC project had a large range of values around this, due to differing assumptions around the extremity of winter peaks. The peak demand ultimately used for that assessment was approximately 1.5 kW per heat pump (see Figure 2).

It was noted in the NIC report that the approach adopted by several DNOs (and now NESO) of using profiles normalised by annual energy consumption allows for significant regional granularity based on differing distributions of housing archetypes. This was not suitable for the NIC analysis but is accepted as a strong approach. Regen also supports the use of empirical Electrification of Heat data for the derivation of load profiles (HP06).

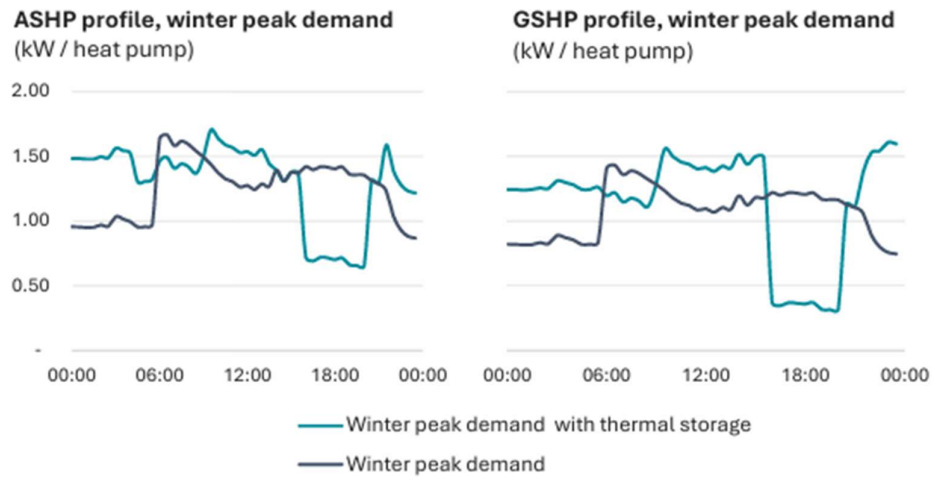
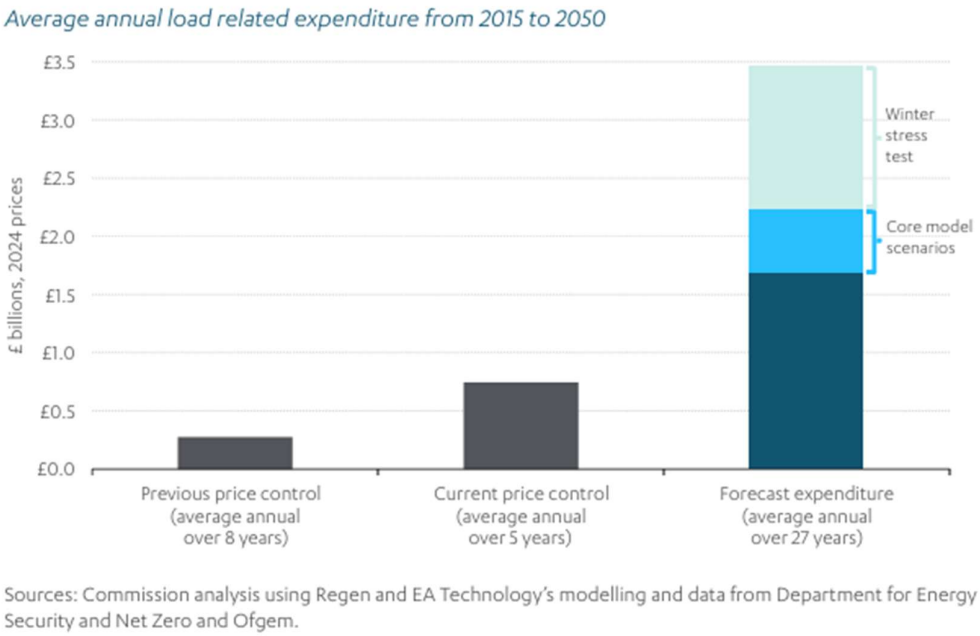


Figure 2: Winter peak heat pump profiles used in NIC analysis

However, Regen would note that adopting an approach which results in low average heat pump peaks risks underbuilding network and significantly increases the need for managing peak demands via flexibility. To this point, Regen advocates for a more conservative representation of home energy improvements, or a recommended approach to sensitivity testing – HP02 shows a thermal efficiency improvement of over 10% by 2035, which has a material impact on peaks due to the approach adopted. This does not account for stalled or unequal efficiency rollout, or rebound effects where thermal demand increases in more efficient homes.

In the NIC analysis, a "winter stress event" test case was used during which the most conservative available load profile was used uniformly, resulting in £25bn additional network investment by 2050 (driven especially by LV network investment) – see Figure 3.



Sources: Commission analysis using Regen and EA Technology's modelling and data from Department for Energy Security and Net Zero and Ofgem.

Figure 3: Forecast network expenditure under core modelling scenarios and winter stress event. NIC study

Though this was a non-probabilistic assessment and was not adopted as a core NIC scenario, it highlights the materiality of high peak demands in extreme weather events.

This also opens a wider question of network resilience standards. The adoption of heat pump profiles for tRESP with a diversified peak in the region of 1-1.5 kW/HP suggests that networks should plan infrastructure investment for average winters, while managing extreme conditions (i.e. "1-in-20") with procured flexibility. The specific approach endorsed by NESO would be a valuable addition to the CPAs.

Future additional considerations for extreme weather, which may mitigate (or exacerbate) some of the peak growth from heat during truly extreme cold weather, could include:

- Behaviour and performance changes for EVs (e.g. less travel, lowered efficiency) – we note that reduced performance for heat pumps is included via HP03.
- Loss/reduction of industrial and commercial demand.
- Diversity loss across technologies, but especially heat.

Recommendations:

- Provide clarity around rationale for EV charger utilisation assumptions (EV09).

- Consider updating methodology for domestic EV peak demand calculation to include direct dependency on EV charger counts, and a minimum level of diversified peak demand per charger.
- Consider heat pump assumptions (e.g. HP02) which result in low demands.
- Clarify NESO position on planning for average winters and managing "1-in-20" stress events.
- Consider additional modelling modifications to reflect potential behavioural and technology performance changes in cold weather.

Question 18. What level of geographic detail would be most useful in future versions? For example:

- Local authority boundaries
- Project-level details
- Place-based clusters or zones
- GSP (Grid Supply Point) boundaries
- Thematic areas (e.g. heat networks, industrial clusters)
- Lower layer super output area / data zone

We would support data that can be reconciled with existing network company outputs, specifically at the primary substation level (as proposed for the enduring RESP). It is equally important for the data to be viewable by local authority boundary, enabling comparison with LAEPs and other local planning information. For local authority purposes, LSOA granularity is common in LAEPs and other plans, and is typically more relevant than substation-specific geography.

Information on specific projects would be valuable to include. However, we recognise that due to commercial sensitivity and data protection considerations, it may not always be possible to publish pathways that directly relate to individual demand projects (or some generation & storage projects that may not currently be published in the Embedded Capacity Registers).

Question 19. Do you see a role for these outputs in supporting local planning, infrastructure alignment, investment proposals?

Spatial planning

Regen's report with the Royal Town Planning Institute, "Spatial Approaches to Local Energy Planning", highlighted some common planning pitfalls between energy system analysis (such as LAEPs) and implementation.

Several of the recommendations in the report recognise the need for data consistency and upskilling of planners around energy and net zero issues. Both are identified as key enablers for local areas to develop spatial policies that explicitly address energy planning and align with net zero goals. The tRESP and RESP processes provide a strong opportunity to support this.

Our report also called for active engagement between DNOs, the RESP process and local planning authorities, alongside a joint scenario-setting process involving energy system actors and spatial planners.

Though interaction with tRESP is not a statutory obligation, the implications of tRESP and RESP findings for infrastructure availability will ensure it is of significant interest to planners. As such, consideration should be given to how data outputs could best integrate with the needs, timescales and processes of (for example) Local Plan consultations.

Local energy and net zero planning

Regen's engagement with local authorities through Net Zero Living and our research such as *'Enable, Embed, Enact: maximising the value of net zero planning'* has shown that existing local energy planning approaches, such as LAEPs, often place a high analytical burden on councils without necessarily moving them closer to delivery.

In Regen's view, the tRESP and full RESP provide a major opportunity to shift local effort away from replicating technical analysis and towards understanding the delivery implications of different pathways, such as governance, finance, skills, capacity and partnerships. This would allow councils to focus resources where they have the most influence, while ensuring their insights continue to shape future pathway development.

Consistent RESP data could also support four key outcomes identified through our Net Zero Living work:

- **Aligning local plans with national infrastructure planning** – providing a common evidence base that explicitly links local ambition to network investment, helping overcome the inconsistent approaches taken to this currently, and grounding local decarbonisation planning in the realities of network availability.

- **Refocusing local authority effort on delivery** – by providing shared scenarios and assumptions, RESP outputs could enable councils to spend less on technical modelling and more on governance, finance and project design.
- **Overcoming siloed delivery** – NESO's institutional role, data standards and local-actor support could help embed and integrate planning across departments and organisations. As noted, this is especially pertinent for Local Planning Authorities. "Embedding" net zero in council delivery functions – especially those which are statutory – is fundamental for local delivery, and this requirement is not often met by existing local energy planning.
- **Using resources efficiently** – standardised data, open evidence and transparent methodologies from RESP would reduce duplication and cost, freeing capacity (which is often stretched) for implementation.

Local authorities will remain essential contributors, providing insight on place-specific opportunities, constraints and ambitions, ensuring RESP pathways are both deliverable and reflective of local realities.

We are clear, however, that RESP does not replace local analysis or delivery. Instead, it could provide a common baseline from which local authorities can assess delivery implications, develop projects and contribute insights back into future RESP iterations.

By building on the strengths of local net zero planning and addressing its structural challenges, RESP offers a pathway toward more coordinated, resource-efficient and delivery-focused decarbonisation across all levels of governance.

Recommendations:

- Publish data and methodology to high levels of granularity, with strong consideration given to the needs of local governments and planners.
- Engage directly with Local Planning Authorities to explore pathways and their potential implications.
- Explore the potential of joint scenario planning between RESP and Local Planning Authorities.
- Use tRESP and RESP as an opportunity to standardise data practices across local energy planning.
- Ensure NESO's local actor support and messaging around tRESP is cognisant of what is most important for local net zero planning – i.e. what will help build local buy-in from senior council stakeholders, what data would be most valuable for assessing deliverability and formulating a plan, etc.
- Target local actor support at spatial planning teams to help overcome common gaps between spatial and net zero planning.
- Develop methodologies to incorporate RESP data into the planning activities of local authorities in a standardised way.