BRITISH HYDROPOWER ASSOCIATION

<u>BHA Consultation Response to DNOs' future role in supporting the rollout of low carbon technologies</u>

Introduction

The British Hydropower Association (BHA) represents the UK hydropower sector, including conventional hydropower, pumped storage hydro and tidal range. These technologies provide proven, reliable and long-life renewable generation, alongside critical system services such as flexibility, dispatchability and storage. As the energy system transitions towards net zero, hydropower has an increasingly important role to play in supporting system stability, reducing reliance on unabated gas generation, and contributing to energy security.
However, the full value of hydropower, particularly smaller, distributed schemes, is not currently realised within the existing energy system architecture.

Local generation is often under valued through lack of visibility, and insufficient coordination between assets, networks and markets. This results in underutilisation of existing resources and missed opportunities to deliver cost-effective, low-carbon energy at a local level.

Smart Local Energy Systems (SLES) provide a critical pathway to unlocking this value. By enabling local visibility, coordination and control across generation, demand and storage, SLES can optimise the use of distributed assets such as hydropower within their local networks, while contributing to wider system needs. This requires a shift from passive network management to active, coordinated system operation, supported by improved data, interoperable digital infrastructure, and clear operational frameworks at the distribution level.

In this context, the BHA strongly supports the direction of travel towards enhanced coordination. However, as set out in this response, further development is required to ensure that reforms enable practical system operation, integrate local and national system needs, and unlock the full value of distributed renewable generation.

Q1. Should DNOs play a role in co-ordinating and supporting a cost-effective energy transition through improved planning and supporting/directing targeted delivery? How can they help make the transition more efficient and affordable for everyone, and do they have a role in supporting lower-income households?

Yes — but as enablers of local coordination rather than central controllers.

As electrification accelerates, millions of distributed assets (EVs, heat pumps, batteries) create new pressures:

- local network constraints
- connection delays
- peak demand and curtailment
- rising balancing costs

- limited visibility at low-voltage level

DNOs have a critical role in making the transition more efficient and affordable by:

- **providing granular network visibility** (LV constraints, feeder capacity, forward plans)
- **defining local operating envelopes** to ensure assets respond safely to system conditions
- **aligning network planning with place-based delivery** (e.g. Local Area Energy Plans)
- **enabling access to flexibility markets** for aggregated local resources

However, a key gap is the absence of a **low-voltage coordination layer** (“missing middle”) between national markets and household assets. That coordination must occur at **street and feeder level**, not through price signals alone. Without this, national optimisation can drive demand into already constrained local networks.

DNOs should therefore **enable and interface with local coordination mechanisms**, not replace them.
On affordability, DNOs have an important but indirect role. Low-income households are least able to engage with complex markets or respond to price signals. DNOs can support them by:

- prioritising investment and flexibility procurement in fuel-poor areas
- enabling trusted local intermediaries (e.g. community delivery models)
- supporting scalable, zero upfront cost approaches (e.g. standing charge models)

DNOs have a critical enabling role in addressing this gap, but this must be complemented by local delivery and system integration. In parallel, firm, dispatchable renewable generation such as hydropower, plays a vital role in maintaining system stability, managing peaks, and reducing reliance on gas at the margins. Together, coordinated local flexibility and strategic national assets provide a least-cost pathway to a resilient, affordable and secure energy system**.**

Q2. Do you agree with the overall rationale and scope of 'Enhanced Co-ordination'?

In part. The rationale is correct, but the current scope is not yet sufficient to deliver effective system operation at distribution level.
The direction of travel, towards greater coordination, improved data and more active system management, is necessary. However, the proposals remain too focused on high-level data visibility and market optimisation, and do not yet address the operational realities of a highly electrified, distribution-led system. For example, existing datasets provide useful information on network location and asset size, but do not consistently provide:

- **low-voltage constraints and substation operating margins**
- **forward visibility of network capacity under different demand scenarios**
- **real-time or near real-time coordination signals**

Similarly, the proposed Smart Optimisation Outputs do not yet go far enough to support:

- coordination of distributed flexibility at feeder or street level
- integration with home, building and community energy management systems
- alignment between wholesale price signals and local network limits
- recognition of Smart Local Energy Systems as a core coordination layer

This matters because theoretical market efficiency is not the same as practical system performance. A pricing model may appear efficient in wholesale simulations but fail under real-world conditions, for example:

- clustered EV charging on residential feeders all on octopus agile and following national price signals – this synchronicity will lead to transformer damage (invisible to the DSO)
- simultaneous electrified heating demand during cold weather
- lack of automated response at asset level

In addition, enhanced coordination should recognise the role of firm, dispatchable renewable generation in supporting system operability alongside distributed flexibility. Hydropower provides critical system services including peak management, inertia, and long-duration storage, enabling the system to respond to variability and demand spikes that cannot be managed through local flexibility alone. A coordinated approach is therefore required that links local, distribution-level optimisation with national system assets. Without this whole-system perspective, there is a risk that local coordination improves efficiency at the margins but does not address wider system balancing challenges or reduce reliance on unabated gas generation.

Enhanced Coordination should therefore move beyond data publication and market signals, and focus on enabling operational coordination at low-voltage level, supported by interoperable systems and clearly defined local control frameworks.
Without this, there is a risk that reforms optimise financial signals while leaving underlying system constraints unresolved.

Q3. What are your views of the effectiveness of the existing Collaboration Plan requirements? Do you think the enhanced Community Collaboration Plans we have described would be helpful to stakeholders and, if so, how best should they be monitored?

In part. The direction is positive, but current proposals risk remaining too high-level and insufficiently grounded in real system operation.
The existing Collaboration Plan requirements recognise the need for greater engagement and coordination. However, they do not yet ensure that reforms are tested against real distribution-level operability scenarios, which are now the critical constraint. Enhanced Community Collaboration Plans would be valuable if they move beyond stakeholder engagement and are used to support **practical, place-based system testing**, including:

- EV clustering on residential feeders
- simultaneous electrified heating demand during cold weather
- local renewable generation with constrained export capacity
- coordination between local flexibility and national balancing signals

This is important because market design and data-sharing alone are insufficient. Without testing how systems behave under real conditions, there is a risk that policy is based on abstract modelling rather than operational evidence.

To be effective, Collaboration Plans should therefore be monitored against:

- their ability to enable whole-system demonstrators at feeder or substation level
- integration of network constraints, flexibility, and automated asset response
- evidence of improved local operability and reduced need for reinforcement
- participation of multiple actors, including local authorities and community delivery organisations

A further risk is that a purely "community-led" approach could unintentionally reinforce geographic inequality. Areas with less established community capacity, often those with higher levels of fuel poverty, may be least able to engage.

To address this, DNOs should ensure that Collaboration Plans:

- prioritise support in low-income areas
- work through trusted local intermediaries, not just established organisations
- align with place-based delivery models that can operate at scale

In addition, these demonstrators should explicitly consider the interaction between distributed, local energy systems and wider system assets, including hydropower. While Smart Local Energy Systems can optimise demand and flexibility at a local level, firm, dispatchable generation and long-duration storage are essential to maintain system stability and manage prolonged peaks or system stress events. Collaboration Plans should therefore support testing of how local coordination interacts with national balancing resources, ensuring that distributed flexibility and large-scale assets operate in a complementary, rather than disconnected, way.

Q4. How useful is the data currently published by DNOs, and is it presented adequately?

In part. The data is useful but not yet sufficient for operational decision-making in a highly electrified system.

Current DNO data provides helpful information on network location and asset capacity, but it is largely static and retrospective, and does not clearly indicate how additional low-carbon technologies will impact network performance in practice.

In particular, there is limited visibility of:

- low-voltage constraints and substation operating margins
- forward-looking capacity under different demand scenarios
- real-time or near real-time network conditions

This limits the ability of local actors, including community energy management systems, to plan and operate effectively. As the system evolves from a traditional DNO model to a more active DSO model, data needs to support a shift from passive network management to active coordination. This includes enabling:

- flexibility procurement to defer or avoid reinforcement
- participation of distributed assets and aggregated community systems
- alignment between local network conditions and system-wide signals

In addition, improved data provision should support better coordination between distribution networks and wider system assets, including hydropower. As the system becomes more dependent on variable generation and electrified demand, understanding how local constraints and flexibility interact with national balancing resources becomes increasingly important. Data frameworks should therefore enable visibility not only of local network conditions, but also how these conditions align with system-wide requirements for dispatchable generation. Without this, there is a risk that local optimisation is pursued in isolation, limiting the ability to deliver efficient whole-system outcomes.

Community energy systems are well placed to provide local flexibility, but require operationally useful, interoperable data to do so.
To support this transition, DNO data should move beyond static publication towards:

- granular, low-voltage visibility (feeder/substation level)
- forward-looking and scenario-based data
- standardised, machine-readable formats and APIs
- clear linkage between network constraints and flexibility opportunities

In summary, while current data is a good foundation, it is not yet adequate for enabling the transition to an actively managed, distribution-led energy system.

Q5. What are your views on strengthening the System Visualisation Interface requirement, and would it be valuable for DNOs to collate and publish additional non network datasets, if so, which datasets would be most beneficial?

Strengthening system visualisation is necessary, but not sufficient. A traditional interface alone will not meet the needs of a Smart Local Energy System (SLES).
SLES is a distributed, constraint-bound physical system comprising millions of assets (heat pumps, EVs, solar, batteries). This system cannot be effectively coordinated through static dashboards, spreadsheets, or siloed platforms. What is required is a stack-level operating model ("Energy Integrated operating system EIOS") that enables real-time coordination across devices, networks, markets and users.
This requires development across five layers:

- **Physical layer:** interoperable, secure-by-default devices
- **Connectivity layer:** resilient, CNI-grade communications
- **Data & identity layer:** trusted data sharing with consumer control and consent
- **Market & operational layer:** standardised APIs for flexibility dispatch, settlement and constraint management
- **Consumer layer:** simple, automated propositions that enable participation without complexity

Within this context, system visualisation should evolve from passive data display to operational visibility, supporting decision-making and coordination at low-voltage level.

Additional datasets would be valuable where they support this transition, including:

- low-voltage constraints and substation operating margins
- forward-looking network capacity and planned reinforcement
- locational flexibility needs and procurement signals
- standardised, machine-readable data accessible via APIs

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However, data provision alone is insufficient. The key challenge is interoperability and system integration. The Energy IOS stack cannot be delivered through voluntary collaboration alone. The UK requires a Central Independent Digital Delivery Body to:

- define and mandate common standards and interfaces
- establish architectural guardrails across the system
- enable secure, real-time coordination at scale
- ensure consumer protection, trust and accessibility

Q6. What are your views on the Working with Local Authorities and others proposals we have set out above? What if any, would be the key elements of this? Are you aware of particular entities who would benefit from such advice?

We strongly support greater coordination with Local Authorities (LAs) and local actors. However, this must move beyond advisory engagement to enabling structured, place-based delivery models.

Local Authorities are critical because net zero delivery is inherently **place-based**, requiring alignment across housing, infrastructure, planning, and social outcomes (including fuel poverty and health). However, LAs typically lack the capacity, capital, or technical capability to deliver complex energy systems alone.

To make this effective, the key elements of working with LAs should include:

- alignment with Local Area Energy Plans and housing strategies
- clear roles across DNOs, LAs, and delivery entities
- standardised governance and commercial frameworks
- support for local delivery intermediaries (e.g. community organisations, Local Delivery Vehicles)
- integration of data, planning, and investment models

Particular entities that would benefit include:

- Local Authorities and combined authorities
- community energy organisations and anchor institutions
- housing providers and regeneration partnerships

In summary, working with LAs is essential, but success depends on enabling replicable, investable delivery models with strong local governance, rather than relying on any single institutional model alone.

Q7. How could iDNOs support the proposals in this portion of the consultation? How could either private wire connected properties or license-exempt networks feature in these proposals?

iDNOs, private wire networks and license-exempt networks should be fully integrated into Enhanced Co-ordination, rather than treated as peripheral or exempt parts of the system. As electrification accelerates, these networks will increasingly host significant volumes of low-carbon technologies (EVs, heat pumps, storage). If they are not included, they risk becoming blind spots in local system planning and coordination. iDNOs can support the proposals by:

- participating in common data-sharing frameworks, including visibility of constraints, capacity and planned connections
- adopting interoperable standards for flexibility, control signals and system coordination
- aligning with DNO and local authority planning processes, including Local Area Energy Plans
- enabling access to flexibility markets, ensuring assets connected via iDNO networks can contribute to local and national services

Private wire and license-exempt networks can play a valuable role as testbeds for coordinated local energy systems, particularly in defined geographies (e.g. developments, campuses, retrofit clusters). They can support:

- aggregation of distributed assets
- local optimisation within defined network constraints
- delivery of flexibility and demand response services

However, this requires that they:

- are visible within wider system planning and data environments
- adhere to common standards for interoperability and consumer protection
- do not create fragmented or closed systems that limit system-wide optimisation

Q8. We are keen to understand how these proposed Enhanced Co-ordination activities could best integrate with NESO's RESP processes in the near and long term, and how these proposals could complement, or be in tension with, RESP development?

Enhanced Co-ordination and RESP should be complementary, but operate at different layers of the system. RESP is focused on regional system planning and optimisation, whereas Enhanced Co-ordination must address local, distribution-level operability. The key requirement is a two-way integration, where:

- RESP provides strategic direction, market signals and national system needs
- Enhanced Co-ordination provides bottom-up visibility of local constraints, flexibility and delivery capability

At present, the UK flexibility market is not delivering at the required scale. While participation is growing, domestic and community-scale flexibility remains under-represented in national balancing markets. Community-based Smart Local Energy Systems (SLES) can address this by:

- aggregating at scale (e.g. 500 homes providing 2–5 MW of flexible capacity)
- stacking multiple revenue streams (local DSO services, national balancing, wholesale optimisation)
- unlocking the "last mile" of flexibility through trusted local engagement

Enhanced Co-ordination should therefore ensure that aggregated, community-scale flexibility can flow seamlessly between local and national markets, including alignment with RESP processes.
However, there is a potential tension if RESP relies primarily on top-down market signals without incorporating local network constraints. National price signals alone cannot manage feeder-level constraints and may unintentionally increase local system stress.

In summary, RESP should set the national framework, but Enhanced Co-ordination must provide the local intelligence and delivery mechanisms. Together, they can enable a scalable, whole-system approach to flexibility, provided local operability is embedded within national processes.

Q9. Do you think if DNOs adopted the type of Expanded Role described above this would add value and support the rollout of LCTs and EE? Could this model provide an effective and viable way to deliver network and system benefits? If so, could this be achieved while also prioritising support for low-income households?

An expanded DNO/DSO role in coordination, flexibility procurement and network planning can improve system efficiency by:

- reducing the need for costly reinforcement
- enabling faster connection of low-carbon technologies (LCTs)
- unlocking distributed flexibility at scale

This could provide a viable route to delivering both network and whole-system benefits, particularly where coordination occurs at low-voltage level.

Q10. What are your views on us considering these proposals using a network benefit and wider system benefits approach? Do you have relevant information on the likely network, system, consumer or efficiency benefits of such an approach?

A narrow focus on network cost alone risks under-valuing solutions that deliver significant whole-system and societal benefits, particularly in areas such as:

- fuel poverty reduction
- health and wellbeing improvements
- local economic development and jobs
- carbon reduction and energy security

Energy security can, and should, start at community level. Without incorporating wider societal outcomes, market mechanisms alone are unlikely to deliver net zero at the pace or scale required, particularly for harder-to-treat housing and low-income households.
From a system perspective, key benefits of this approach include:

- reduced network reinforcement costs through a "flexibility first" approach
- better utilisation of existing assets via coordinated local demand and generation
- improved system resilience through distributed, community-scale energy systems
- lower whole-system costs by aligning infrastructure, markets and consumer participation

To scale these benefits nationally, the UK requires a unified digital and operational architecture. This includes:

- a common digital foundation (e.g. the "EnergyIOS" stack) to coordinate distributed assets
- interoperable standards for data, flexibility and system control
- integration of local coordination with national system operation

Q11. Do you have any views on the archetypes presented and their implications? Do you have any other approaches we should consider? Do you have any evidence on key components notably:

The archetypes are helpful, but they risk treating technologies too separately and focusing too much on DNO-led delivery rather than place-based, whole-system models.
The strongest outcomes come from integrated packages combining energy efficiency, heat pumps, hot water storage, solar PV and batteries, designed and operated as a local system. This improves both household outcomes and network performance. For example Net Zero Terrace Streets – which is a hybrid, place-based AssetCo model, where infrastructure investment is combined with public/community governance and local delivery. This offers a more realistic route to scale than either pure market delivery or full DNO ownership.
On identifying suitable properties and engaging consumers, DNOs are unlikely to be best placed to do this directly. DNOs hold important network data, but local authorities, community organisations and trusted local intermediaries are better placed to identify suitable areas, understand local needs and engage households. That is especially important in low-income communities.
On funding, fully socialising costs through DNO bills carries affordability and legitimacy risks. More viable models are likely to be blended finance approaches combining grants, private capital and long-term standing charge or service-based repayment structures, particularly where these create zero upfront cost access for households.
On installation, DNOs should not generally install measures directly. Better outcomes are likely where DNOs enable the system, while delivery is undertaken through qualified installers and local delivery bodies under strong QA and governance.
Finally, network and system benefits do not require full DNO ownership of assets. These benefits can also be achieved through interoperability standards, operating agreements, flexibility contracts and clear governance frameworks. What matters most is not ownership alone, but the ability to coordinate assets reliably, fairly and at scale.

Q12. Do you have views on whether pilots of these approaches would be valuable? And, if so, whether the pilots should potentially include a range options across archetypes, or whether the scope should be narrowed in advance? What should be the main focus of any pilots?

The UK has already undertaken extensive piloting of individual technologies and market mechanisms. The remaining challenge is not proof of concept, but how systems operate in practice at scale, particularly at low-voltage level.
Future activity should therefore focus on integrated demonstrators, rather than isolated pilots. These should:

- operate at feeder, substation or neighbourhood scale
- combine network constraints, market signals, and automated asset control
- include multiple technologies (heat pumps, EVs, storage, solar)

- test coordination between local flexibility and national balancing mechanisms
- demonstrate delivery in real communities, including low-income areas

The objective should be to understand operability, scalability and consumer outcomes, not just technical feasibility.
A wide range of archetypes may not be necessary at this stage. Instead, priority should be given to models that can scale quickly and deliver whole-system benefits, particularly:

- place-based, community-scale energy systems
- integrated heat and flexibility solutions
- delivery models that combine infrastructure investment with local governance

Critically, demonstrators should also test:

- affordability and accessibility, including zero upfront cost models
- consumer engagement and trust
- interoperability and digital coordination frameworks

In summary, the focus should shift from small-scale pilots to coordinated, system-level demonstrators that reflect real-world complexity and provide evidence for national rollout.

Q13. How could iDNOs support the proposals in this portion of the consultation?

iDNOs can play a constructive role in supporting an Expanded Role, provided they are fully integrated into common coordination, data and interoperability frameworks.
As more low-carbon technologies connect across both DNO and iDNO networks, it is essential that iDNO areas do not become gaps in visibility or coordination. To support these proposals, iDNOs should:

- participate in standardised data-sharing arrangements, including visibility of constraints, capacity and connections at low-voltage level
- adopt common technical and operational standards, enabling interoperability with DSOs, aggregators and national system processes
- facilitate access to flexibility markets, ensuring assets connected via iDNO networks can contribute to local and national services
- align with local and regional planning, including Local Area Energy Plans and place-based delivery initiatives

iDNO networks are often concentrated in new developments or defined geographies, also offer an opportunity to act as early deployment environments for coordinated energy systems, including integrated heat, EV and storage solutions.
However, this requires that they operate within shared governance and consumer protection frameworks, avoiding fragmentation or closed systems that limit wider system optimisation.
In summary, iDNOs should be treated as integral participants in the future system, operating within consistent standards and coordination mechanisms to support efficient, scalable and whole-system delivery.