**Rossendale Valley Energy response to the ED3 consultation**

**Introduction: What Net Zero Terrace Streets Is and What We Want to Achieve**

**Net Zero Terrace Streets (NZTS)** is a place-based decarbonisation model designed to transition whole neighbourhoods—particularly dense, pre-1919 terrace housing—towards clean heat, affordable energy, and smart local flexibility. Rather than upgrading homes one at a time, NZTS works **street-by-street and block-by-block**, unlocking the economies of scale, community trust, and data granularity needed for a reliable and cost-efficient transition.

NZTS focuses on the most common housing archetype in the UK—terraced homes—which collectively represent one of the largest and most challenging segments of the net zero transition. These homes typically have:

- higher heat losses than modern buildings,
- low EPC ratings,
- limited garden or external space,
- mixed tenure arrangements, and
- existing vulnerabilities related to cold homes and energy affordability.

Traditional, individualised retrofit approaches cannot deliver net zero at the speed or scale required. NZTS introduces a new delivery architecture built around:

1. **Community-led engagement and mobilisation**, supported by Local Development Vehicles (LDVs).
2. **A standardised, high-confidence technical model** using Building Energy Models (BEM), Techno-Economic Models (TEM), and Financial Models (FM).
3. **A unified digital layer**, via the Fairer Warmth Platform, which collects property-level data, supports quality assurance, and manages ongoing performance.
4. **Clustered installation**, enabling high-quality, low-cost deployment and rapid learning.

The ambition is to create repeatable, investable local programmes that:

- reduce heat demand through whole-house retrofit,
- deploy low-carbon heat (particularly heat pumps) at scale,
- integrate rooftop solar and domestic flexibility assets,
- lower energy bills and improve health outcomes,
- protect vulnerable households, and
- build long-term community resilience.

**Why NZTS Has Direct Relevance to ED3 and the Future of DNOs**

The NZTS approach creates exactly the kind of **street-level visibility, data coordination, and local flexibility resource** that the ED3 Framework recognises as essential for the future distribution system. It produces:

- **high-resolution LV demand data**,
- **real-world LCT clustering patterns**,
- **verified flexibility availability**,

- **upgrade requirements on specific feeders**, and
- **predictable local energy behaviour**.

This visibility is crucial for DNOs because electrification stress and flexibility potential manifest **not regionally, but street by street, feeder by feeder, and home by home**. NZTS demonstrates that without **community-led, property-level data acquisition**, DNOs—and Ofgem—will continue to operate with blind spots at the level where the energy transition is actually occurring.

**What NZTS Ultimately Wants to Achieve**

The NZTS programme aims to:

**1. Create investable, data-driven neighbourhood decarbonisation**

By aggregating 150–300 homes into coherent clusters, NZTS reduces risk, increases certainty, and provides the data needed for infrastructure investment (e.g., ground loops, LV upgrades, district-scale heat pump optimisation).

**2. Build a unified smart local energy system (SLES) from the bottom up**

NZTS generates the digital and physical conditions required to operate a local smart energy system:

- verified heat loads
- detailed load curves
- appliance-level flexibility
- localised solar and storage forecasts
- community governance and delivery capability

This creates the basis of a **local flexibility market** long before national markets are capable of reflecting LV needs.

**3. Enable a unified LV data layer**

Through systematic local engagement, NZTS captures:

- per-home energy characteristics
- readiness for heat pumps, EVs, and solar
- consumer behaviour insights
- substantiated LCT adoption likelihood
- building-level constraints and opportunities

This forms the **street-level LV data layer** the ED3 framework urgently needs. NZTS effectively fills the "last mile intelligence gap" in distribution planning..

**4. Unlock local flexibility and new markets**

NZTS creates predictable resources for:

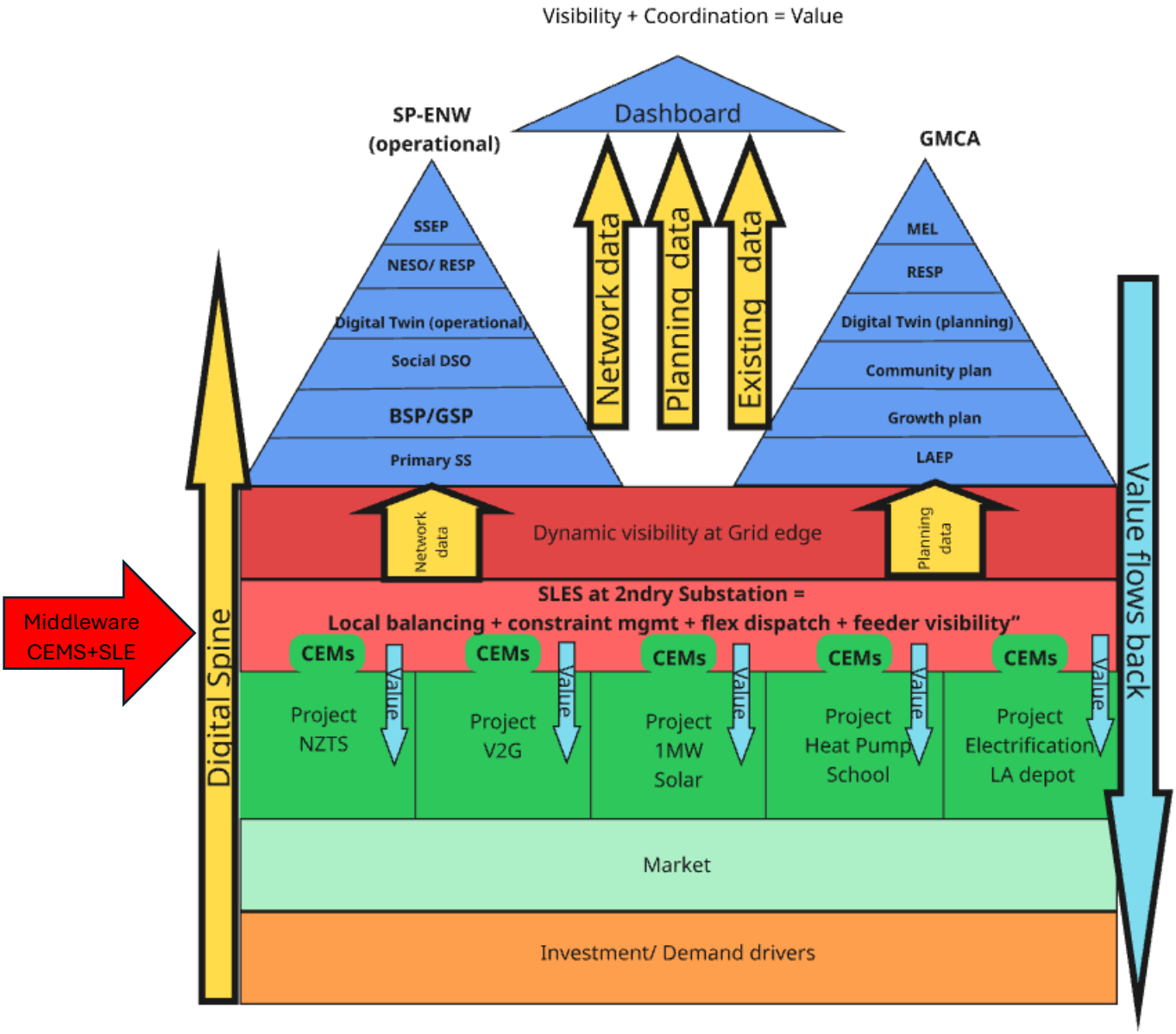
- peak shaving
- voltage management
- ramp-up / ramp-down services
- thermal storage optimisation
- grid-friendly heat pump operation
- EV managed charging

But these services can only be valued and coordinated if **new local markets** are created. NZTS is building the architecture to make these services:

- visible
- measurable
- locally priced
- locally coordinated
- investable

These new markets will be essential for deferring reinforcement, reducing consumer bills, and stabilising LV networks.

Below is the layered integration diagram that shows the data flow from bottom up projects and how it needs to be coordinated layer by layer. (happy to discuss this – it is part of our SIF Beta NZT project application).




***Q1.What are your views on our regulatory guiding principles that will inform the development of accountable investment planning and delivery?***

We agree with Ofgem's principles but believe one critical gap remains:
Distribution planning is currently blind to street-level LV behaviour because the UK does not yet have a unified data layer capable of representing real-time and forecasted energy demand at the level where constraints actually occur.

A regulatory principle must explicitly include:
"The development and use of a unified, street-level LV data layer as an input to network planning."
This is essential because:

- Decarbonisation is happening on the LV network (heat pumps, EVs, solar, batteries).
- These assets increasingly behave as autonomous market participants, responding to national prices.
- Without coordination, they create synchronised demand spikes at exactly the scale where DNOs currently have the least data and least visibility.

Accountable planning requires granular, real-world LV data, coordinated across local authorities, community delivery bodies, and DNOs, and structured so it can grow into a fully functional Smart Local Energy System (SLES).

***Q2.Are the proposed objectives for the long-term integrated network development plans appropriate?***

The objectives are directionally right, but insufficient unless they explicitly recognise the need for street-level intelligence.
Today, DNOs receive:

- high-level regional forecasts
- NESO - FES/ DNO D-FES scenarios
- LCT uptake assumptions

But they lack:

- real-time and historic *per-street* LV load data
- household-level LCT clustering patterns
- community-level retrofit and heat transition plans
- visibility of when flexibility is actually available, and at what scale

We propose adding a new objective:
"To integrate street-level LV data and local flexibility potential into network development plans, enabling anticipatory investment at the scale where electrification stress arises."

This ensures that LV networks—currently the weakest part of the energy transition—become the primary planning unit rather than an afterthought.

***Q3.What are your views of proposed structure and contents of the plan?***

The structure needs an additional section focused specifically on:
Local LV Data Integration & Smart Local Energy System Readiness
The structure should include:

- a unified LV data layer shared between DNOs, local authorities, that local projects can 'plug in' to
- per-street community energy management layer that will map and share data from EVs, heat pumps, flexibility assets and building characteristics
- coordination signals and market interfaces needed to operate local flexibility
- data required to avoid national price signals driving local constraint events- by driving local price signals that can override national signals if they will be detrimental to the local network.

Including these aspects in this structure would ensure that plans move from broad strategic forecasting to operationally meaningful, locally grounded planning.

***Q4.Do you agree with the proposed use of tRESP outputs in DNOs' network impact assessments?***

tRESP should guide high-level strategy, but DSOs should be required to pair it with:

- Site-specific digital visibility,
- Dynamic headroom forecasting, and
- Real-time flexibility availability (e.g., hydro ramping signals, sub-hourly reservoir state-of-storage).

tRESP alone cannot capture simultaneity risk, clustered LCT connections, or operational flexibility.

***Q5.What are your views on the guidelines for proactive investment decision-making across all DNOs?***

We support Ofgem's approach, but the guidelines will not deliver their intended outcomes unless proactive investment explicitly includes the missing middle: the unified LV data layer and the Smart Local Energy System (SLES) middleware.
Today, DSOs lack real-time visibility "behind the secondary substation". They cannot see feeder-level real time voltages, headroom, phase imbalance, or the availability of local flexibility from distributed assets such as hydropower, batteries or EVs. Without this visibility, proactive investment is reactive by default, because DSOs cannot assess where real time flexibility is viable, how much is available, or whether it can reliably defer reinforcement.

The SLES middleware layer provides the operational environment where DSOs can run local congestion management, publish locational signals, and dispatch flexibility in real time. Without investment in this layer, DSOs cannot implement dynamic, LV-specific services.

The system will be moving toward sub-hourly, algorithmic, real-time coordination, with 15-minute scheduling and continuous optimisation. DSOs cannot operate effectively in this environment using static flexibility auctions.

We therefore recommend that proactive investment guidelines explicitly include funding for LV visibility infrastructure, dynamic digital twins, SLES middleware, and local market-enablement tools. Without this, local flexibility and local value will remain inaccessible, and reinforcement will continue to dominate investment decisions.

***Q23. Notwithstanding the proposals we have set out under 'Redefining Connections Types', do you have alternative proposals for what DNOs need to do to speed up connection times for LCTs, and*** *what incentives (other than those we have discussed in this chapter, obligations and/or funding may be required to support this?*

We strongly believe that DNOs cannot enable smart, flexible local energy systems under the current data architecture. The fundamental barrier is the absence of a unified, street-level LV data layer that provides visibility, coordination and market access for local flexibility.
Today, DNOs are expected to facilitate flexibility without having the underlying digital infrastructure to see where flexibility exists, when it is available, or how it is behaving at the LV level. Because of this, flexibility remains:

- invisible,
- uncoordinated,
- nationally driven, and
- locally destabilising.

1. Street-level LV data must be the foundation of a smart local energy system
DNOs currently lack granular information on:

- per-feeder EV ownership and charging behaviour
- clustering of heat pumps and hybrid systems
- rooftop PV and battery export patterns
- local voltage issues, thermal constraints, and coincidence peaks
- actual availability of domestic flexibility (e.g., hot water, thermal buffers, EVs, batteries)

Without this visibility, DNOs cannot:

- forecast where local flexibility will be needed
- identify when reinforcement can be deferred
- route local price signals to households
- design markets around real local constraints
- verify whether flexibility actions actually helped

A unified LV data layer, shared with local authorities, LDVs, community programmes and trusted partners, is essential to make flexibility real rather than theoretical.
This layer must become the operational backbone of every Smart Local Energy System (SLES).

2. DNOs must coordinate (not control) local energy behaviour through new local markets
At present, street-level assets — EVs, heat pumps, batteries, solar inverters — respond almost entirely to national price signals such as:

- wholesale price events
- Agile/Tracker tariffs
- ESO balancing services
- national DSR products

This creates situations where:

- 10 EVs on the same feeder start charging at 23:30,
- because the *national* price dropped —
  but the LV network cannot handle it.

This is already causing:

- transformer stress
- repeated voltage dips
- reinforcement pressure
- hidden network risk
- inability to trust domestic flexibility

National signals are *rational* for individual consumers,
but irrational for the LV network.
DNOs must therefore be enabled to introduce local price signals such as:

- local peak avoidance signals
- voltage support markets
- turn-down or turn-up products tied to feeder stress
- local congestion markets
- locational flexibility stacking
- controlled charging windows at street level

These new markets are impossible without the unified LV data layer described above.

3. ED3 must explicitly support the creation of new local flexibility markets
If ED3 does not create a regulatory and market framework for:

- local balancing services,
- local voltage markets,
- feeder-level congestion pricing, and
- LV-specific flexibility signals,

then the system will remain trapped in a national-only coordination model that cannot scale to millions of EVs and heat pumps.
This local market layer is where:

- new products emerge,
- households can earn value,
- local optimisation occurs,
- and reinforcement costs can be deferred.

It will also underpin future commercial models such as:

- neighbourhood flexibility clubs
- local balancing pools
- community-led flexibility aggregators
- heat-EV integrated street schemes
- local price responsive heat networks

This is *exactly* how the value of local flexibility becomes investable.

4. DNOs should not deliver SLES — but they must provide the data layer and coordination framework
We do not believe DNOs should become retailers, aggregators or new energy service companies.
However, DNOs must:

- provide real-time LV constraint visibility,
- publish local flexibility requirements,
- operate neutral market facilitation platforms,
- provide APIs for local service providers,
- standardise LV digital architecture across regions, and
- ensure that local markets can transact safely.

This is similar to the Open Banking or Open Networks paradigm:
DNOs create the platform; others innovate on top.

5. Summary: What ED3 must ensure for Q23
ED3 must explicitly require that DNOs:

1. Develop a unified, street-level LV data layer in partnership with NESO
2. Enable new local flexibility markets tied to actual LV constraints.
3. Provide local price signals and coordination mechanisms to prevent EV/HP synchronisation driven by national prices.
4. Shift from passive planning to active local system management, based on data.
5. Support market entry for community, municipal and private flexibility providers, enabling a diverse ecosystem.
6. Integrate neighbourhood-scale intelligence, such as NZT Block-by-Block data from LDVs and councils.

This is how DNOs can truly enable smart, flexible local energy systems.

- regional demand and generation trajectories
- broad network reinforcement priorities

We recommend that Ofgem explicitly require DNOs to integrate tRESP + LV data layer + local delivery intelligence.
This creates the missing piece that turns high-level planning into investable, real-world delivery.

***Q62. What additional data, digital tools, or visibility improvements are needed to enable DSOs to deliver proactive, spatially targeted network planning in ED3? Please provide examples of gaps or best practices.***
Key gaps:

- Real-time voltage and phase measurements,
- Continuous storage SoC (hydro, batteries),
- Sub-hourly flexibility windows,
- Local balancing potential,
- Feeder-level export limits.

Tools required:

- Dynamic Digital twin nodes with open APIs,
- SLES middleware layer,
- Algorithms for local balancing and flex dispatch,
- Shared dashboards for DSOs.

***Q63. How should DSOs incorporate flexibility services and connection process improvements into their network planning approach to ensure timely, efficient, and predictable connections? Should this be incentivised, and if so, how?***

Flexibility must be integrated as:

- Locational,
- Temporal,
- Dispatch-dependent,
  not as a generic resource.

Incentives should reward DSOs that integrate verified, telemetry-based flexibility into planning.

**Q64 -7 — Enduring role of flexibility**
Flexibility remains critical, but only if:

- It is visible,
- Dispatchable locally,
- Verified through telemetry,
- Delivered at sub-hourly resolution.

This requires SLES and a continuous dynamic LV data layer.

**Q75–80 — Loss optimisation**
Loss optimisation depends on granular LV visibility.
Digital twin nodes allow DSOs to identify:

- Avoidable reverse flows,
- Local balancing opportunities,
- Ramping events that increase losses,
- Optimal local dispatch windows.

Loss optimisation cannot be embedded into ED3 without operational LV data.

**Q81–Q84 — DSO incentive framework**
DSOs should establish:

1. Feeder-level congestion products,
2. Voltage support services,
3. Real-time turn-up/turn-down markets,
4. Ramping services,
5. Local balancing markets,
6. Locational export limiting services,
7. Sub-hourly flexibility blocks (5–15 min).

Hydropower and aggregated local LCT assets are ideal early participants because they can deliver stable, predictable flexibility at any of these timescales.
Static pre-procured auctions cannot expose the value of these services.

***Q131. Do you think that additional delivery incentives might be needed in ED3 and if so in which areas?***
Yes — and two incentives are essential.

**1. Local Flexibility Activation Incentive**
Reward DNOs that:

- create local price signals
- enable peak shaving at LV feeder level
- support voltage management markets
- coordinate street-level DER behaviour

This shifts the system from national-only signals to **granular local balancing**.

**2. LV Data Layer Development Incentive**
Reward DNOs that:

- build unified LV data layers
- share LV data through structured SLES frameworks
- develop interoperable APIs
- support local market operators

This would accelerate the formation of local energy markets and enable genuine local flexibility.