SSAC ENERGY DEMAND MANAGEMENT SCOPING AGREEMENT

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Project Overview

The manufacturing sectors are large and diverse consumers of electricity and heat as well as major contributors to the economy. Access to cost-effective supplies and grid capacity has a major influence on firms' competitive position, opportunities to expand and/or invest in productivity enhancement. Scotland is in a unique position with a growing surplus of renewable electricity and, to sustain this there, is an increasing need to balance supply and demand in periods of low and high renewable output and manage constraints on the grid. Demand side flexibility is a key enabler of this and the manufacturing sector(s) could play a substantial role in providing flexibility through changes in operation and technology while lowering energy costs and emissions. The project goal is to identify how the manufacturing sector can be supported and encouraged to **both** decarbonise through electrification and embrace the opportunities from demand flexibility.

Learning from SSAC roundtable

The roundtable in May 2025 highlighted a diverse set of challenges for the adoption of flexible demand practices including: high electricity costs and transmission burdens compared to gas; technical and attitudinal challenges for operational flexibility; regulatory issues (e.g. slow grid connections); and limitations in grid connectivity and capacity.

The major barrier is the risk of production downtime, as manufacturers prioritise operational continuity above potential energy savings; this is both a technical and mindset issue. There is a lack of clear business cases demonstrating the direct economic benefit, uncertainty about who pays for necessary investments, and difficulty integrating new systems into existing, outdated, industrial setups. Cultural resistance and a skills gap for managing digital energy tools also play a role. Current market structures and policies may not adequately incentivise flexibility.

Existing pilots and exemplars demonstrate the potential of energy monitoring and digital twins. Examples include work with distilleries (e.g. Annandale Distillery/Exergy3 pilot), ferries and port electrification, and data centre rescheduling. However, there is a lack of good examples from the manufacturing sector itself, with flexibility trials focused on residential and small business settings. There is a need to avoid 'pilot fatigue' and move successful trials into routine production with sufficient business confidence and evidence.

Flexible demand management is seen to offer significant co-benefits: potential new revenue streams from participating in flexibility markets; cost reductions through optimized energy use and avoiding peak pricing; and increased operational resilience. It also contributes to carbon savings and aligning energy use with renewable generation and encouraging a 'whole system' view. There are potential new B2B service sectors, opportunities for job growth and wider economic benefits.

Actions

- Document how energy is used across the diverse range of manufacturing sectors.
- Identify the manufacturing processes that may (or not) suit flexibility, the technological and operational interventions to enable it and the costs and benefits of doing so.
- Document current and future market and other mechanisms that may enable cost and revenue benefits from flexibility to accrue to manufacturers.
- Document case studies from Scotland and elsewhere that demonstrate successful approaches.

Outputs

- Identify a set of practical interventions that can be made to raise industry literacy and comfort around flexibility and highlight the commercial opportunities.
- Identify policy and support measures (e.g. fiscal, regulatory, etc.) to support Scottish manufacturers make best use of the opportunities from flexibility.

Timescale

- Create working group – 2 weeks
- Desk-based research / horizon scanning – 6 weeks
- Questionnaire / roundtable – 8 weeks
- Write-up – 5 weeks