



Smarter Network Storage

SGF Presentation

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Agenda

- **Project recap**
- The SNS facility
- The SNS commercial model
- Regulatory & Market learning/barriers
 - FiT payments
 - Climate Change Levy
 - DuOS related
 - Frequency product-related
 - Previously published learning
- Update on SNS Economic Case

SNS - Project Aims

CHALLENGES

High CAPEX cost of commercial storage technologies = multiple 'stacked' benefits needed

Challenges in accessing multiple benefits & optimising

Limited experience of any proven business models

Uncertainty in policy and regulatory landscape

Limited experience and confidence in storage as network-connected assets

AIMS

Demonstrate multi-purpose application of storage – sharing learning on the realisable benefits

Develop novel optimisation & control systems for storage

Provide insight & assess viability of multiple business model variants

Assess regulatory & legal barriers, make recommendations & develop commercial arrangements for shared use

Deployment & operation of large-scale battery energy storage – adding to body of learning for DNOs

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Meet the SNS Facility

Gradient patterned exterior to improve visual amenity & meet planning consents

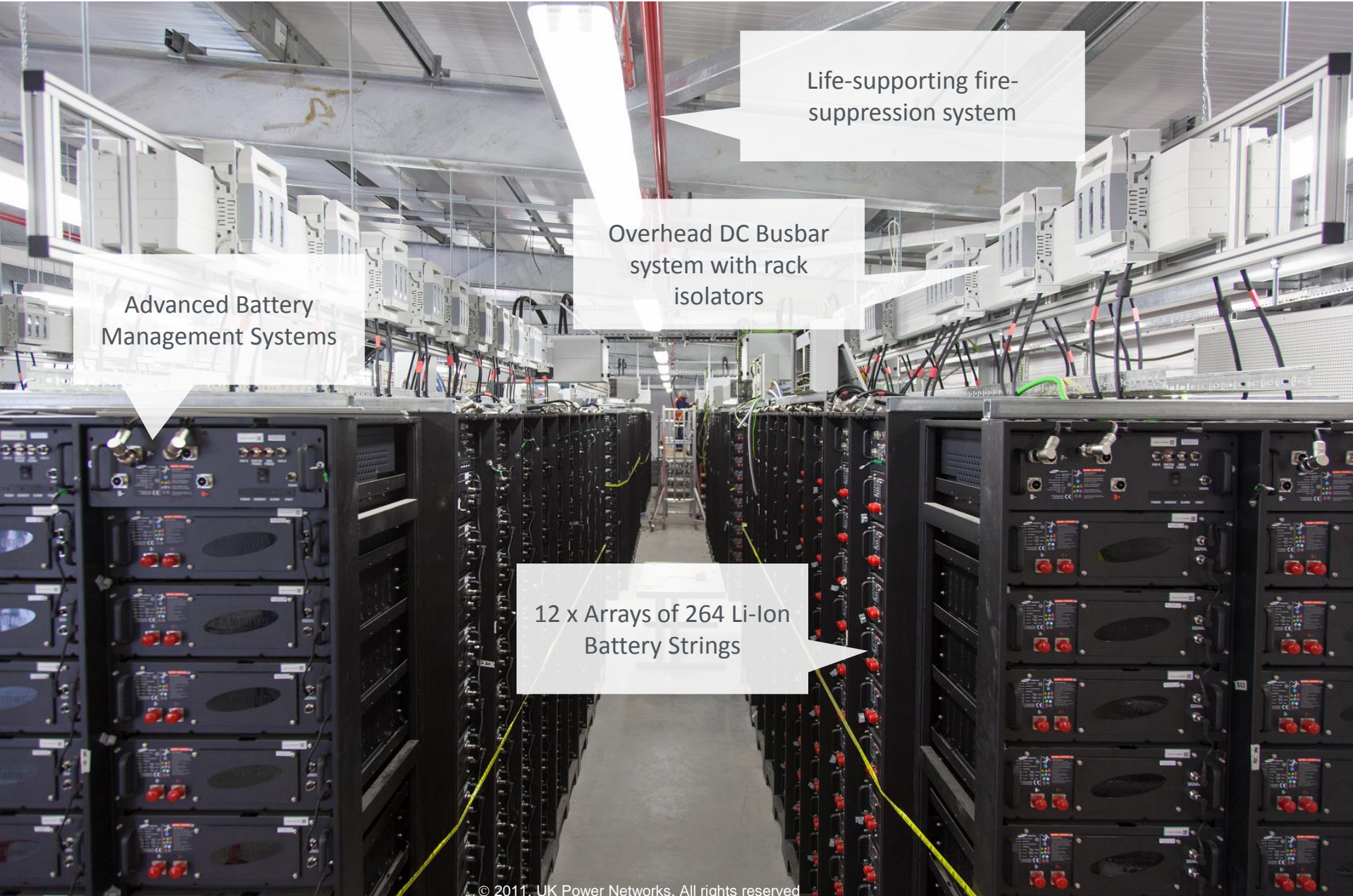
765m² purpose-built facility. Steel structure with Kingspan cladding

Forced ventilation, and air-conditioning – directed and dampened to reduce noise

Adjacent to existing substation for direct-network support

Raised 2m off the ground to meet EA requirements for flood mitigation & H&S needs

SNS Battery Hall



Life-supporting fire-suppression system

Overhead DC Busbar system with rack isolators

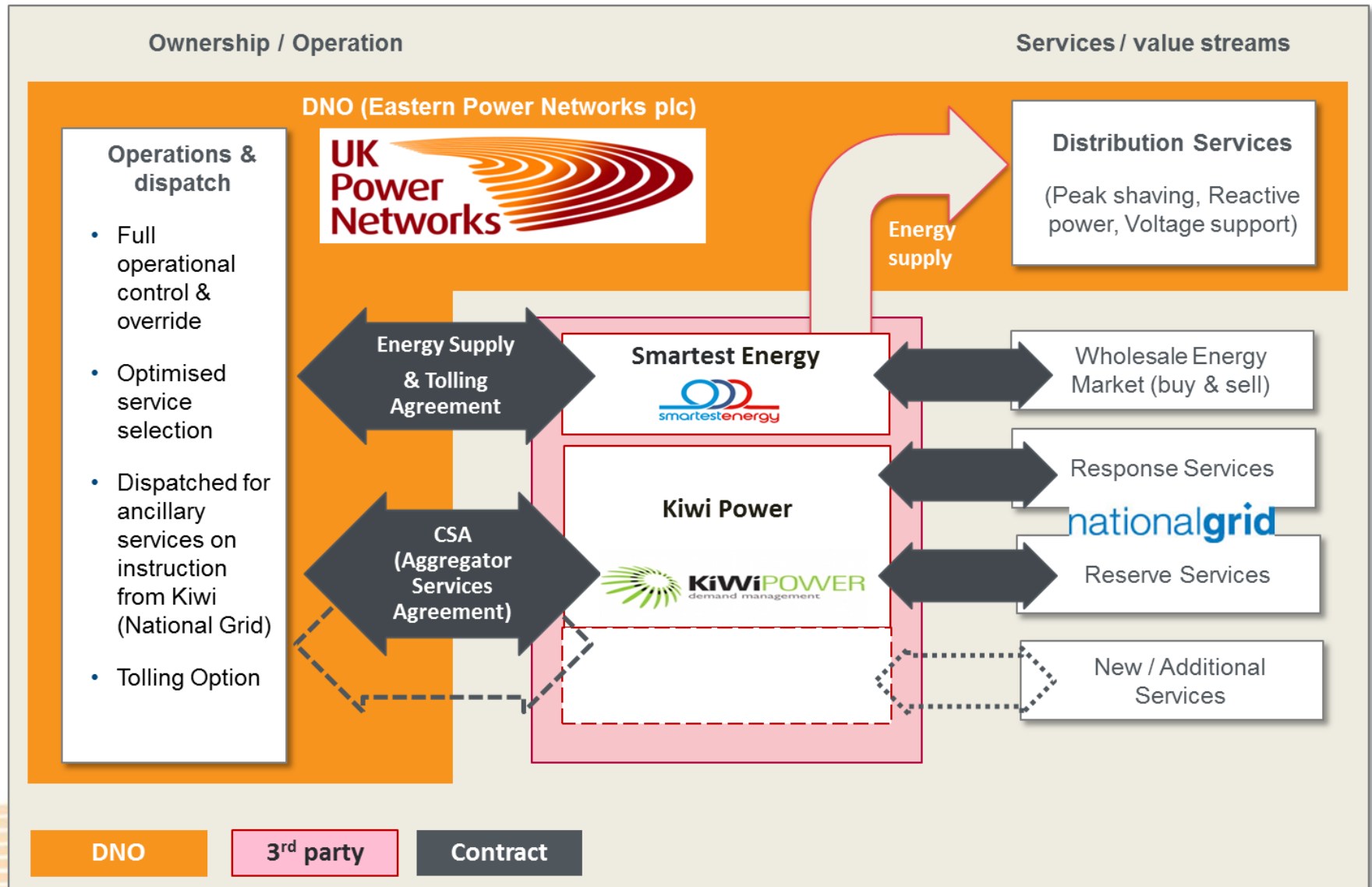
Advanced Battery Management Systems

12 x Arrays of 264 Li-Ion Battery Strings

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SNS Commercial Operating Model



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Application of FiT payments for Storage Operators

Description of barrier/issue	<p>Renewables Obligation, FiT (CfD's and small-scale) payments are levied by suppliers on demand customers</p> <p>By default, storage operators are subject to these supplemental charges</p> <p>As energy is subsequently exported back to the grid, these payments are levied a second time on subsequent use of this energy by a pure demand customer, leading to a 'double count'.</p>
Impact	<p>'Double charging' of FiT (& RO) payments on energy temporarily held by electrical storage. Equates to c£14/MWh (in SNS case).</p> <p>Disadvantage for storage operators vs generators due to additional opex costs (when metered)</p>
Mitigating Options	<p>Amendments to FiT scheme guidance to exempt storage from these supplier obligations; or subsidies to recompensate/correct double count.</p>

Application of CCL for Storage Operators

Description of barrier/issue	<p>Climate Change Levy - tax on energy use by I&C customers, administered by HMRC.</p> <p>Renewable energy exempt, through the application of Levy Exempt Certificates issued at the original point of generation; which are passed on to Energy Suppliers</p> <p>CCL would by default be applied to storage operators on import. On subsequent export, CCL's would be levied a second time on subsequent consumption</p> <p>Storage cannot be considered to be eligible for LECs as a renewable-source – it is not the original point of generation.</p>
Impact	<p>Double charging of CCL on energy held by storage operators, or duplicate issue of LECs.</p> <p>Disadvantage for storage operators vs generators due to additional opex costs</p> <p>Ambiguity over the formal application of CCL charges by suppliers</p> <p>Likelihood of inconsistent application of charges, and reluctance of suppliers to investigate/secure HMRC guidance.</p>
Mitigating Options	<p>Case-by-case confirmations of exemption by HMRC</p> <p>Formal exemptions issued for longer-term clarity for suppliers/storage operators</p>

Distribution charges-related

Description of barrier/issue	<p>Challenging for storage operators to access & secure value from network services</p> <p>Connections processes typically caters for firm demand/generation connections only.</p> <p>Reactive power charges levied by DNOs; but with no mechanisms for recognising provision of reactive power when delivered for network support.</p>
Impact	<p>High connections costs, where contributions to security of supply are not recognised</p> <p>Underutilisation of storage benefits and lost value propositions for storage operators (with inverter capabilities).</p> <p>Bias towards network-operator owned storage, where network support benefits can more easily be accessed.</p>
Mitigating Options	<p>Evolution of DUoS and connection charging methodologies to accommodate storage developers wishing to offer network services.</p> <p>Development of reinforcement deferral and ANM 'products/services' from the DNO</p> <p>Initial steps could involve greater transparency about sites requiring intervention (e.g. heat maps).</p>

Limitations of existing market products / value propositions

Description of barrier/issue	<p>Current balancing services designed with generators in mind, leading to some delivery challenges for storage operators in some scenarios</p> <p>In particular:</p> <ul style="list-style-type: none">- Response to multiple consecutive frequency events in Static Frequency response.- Response to sustained high frequency levels in Dynamic Frequency response. <p>Fast acting response is not recognised or compensated, despite reducing overall requirement for response volume and improving national security margin</p>
Impact	<p>Commercial disadvantage for storage operators and potential penalties due to perceived under-delivery in some circumstances.</p> <p>No recognition of value of fast acting response, tends to inflate overall volume requirements and costs of national balancing; and disincentivises storage</p>
Mitigating Options	<p>Negotiations with National Grid on a case-by-case basis - but puts existing operators previous experience of the balancing markets (diesel generators for e.g.) at significant competitive advantage</p> <p>Seek to develop more 'storage' friendly terms for balancing services products; including those that recognise more accurate and speedier response.</p> <p>Expand scope of 'Shared Services' work to incorporate storage flexibility in addition to DSR.</p>

Wider Regulatory Barriers to Storage Identified

Regulatory issues for distribution connected storage



Default treatment of storage as generation



Avoiding distortion of competition in generation and supply



Unbundling requirements



De minimis business restrictions

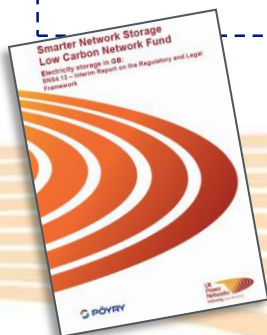


Assessment of economic benefits under price control

High

Medium

Low

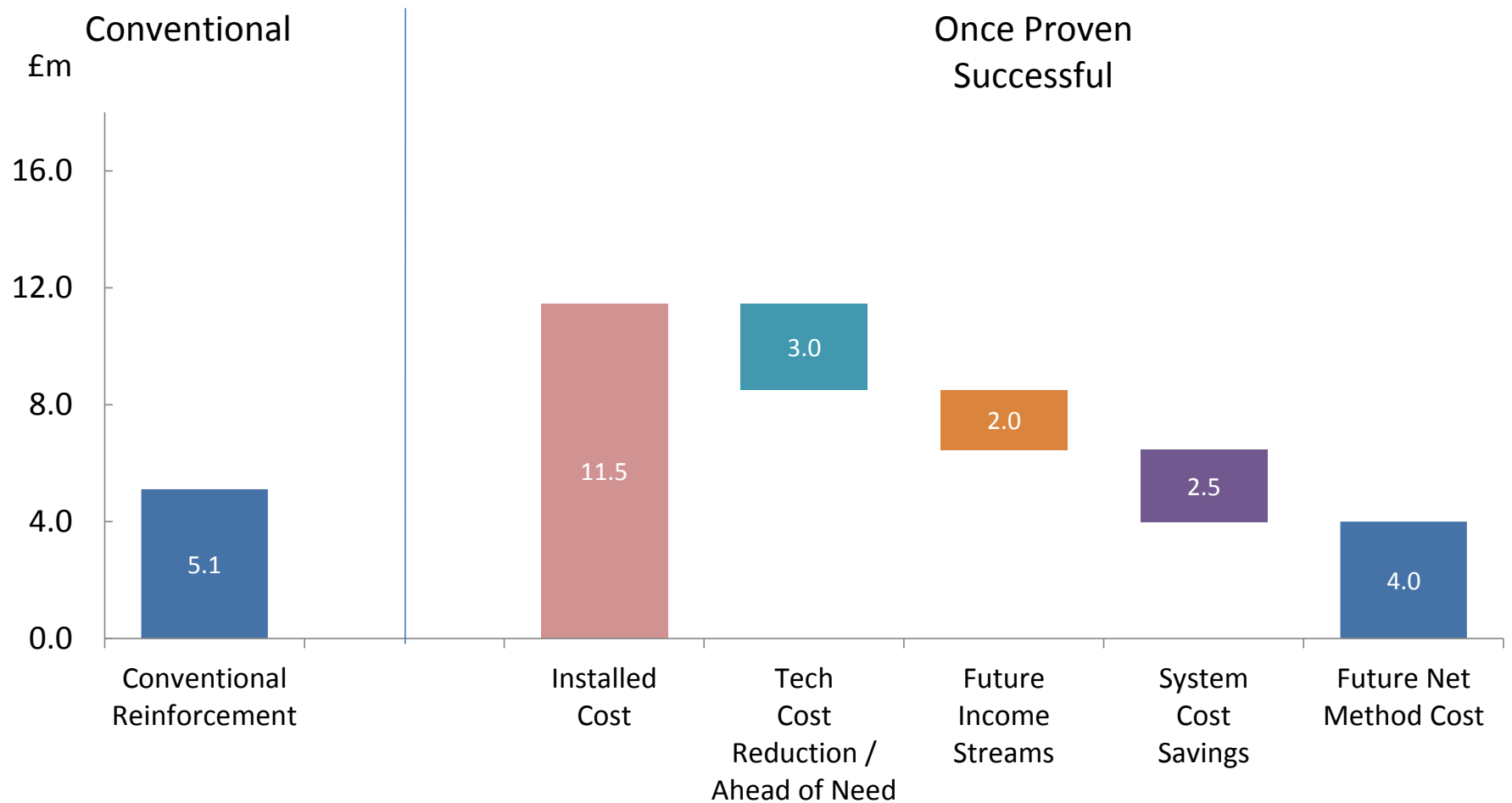


Further information published in [SNS4.13 – Interim Report on Reg & Legal Frameworks](#)

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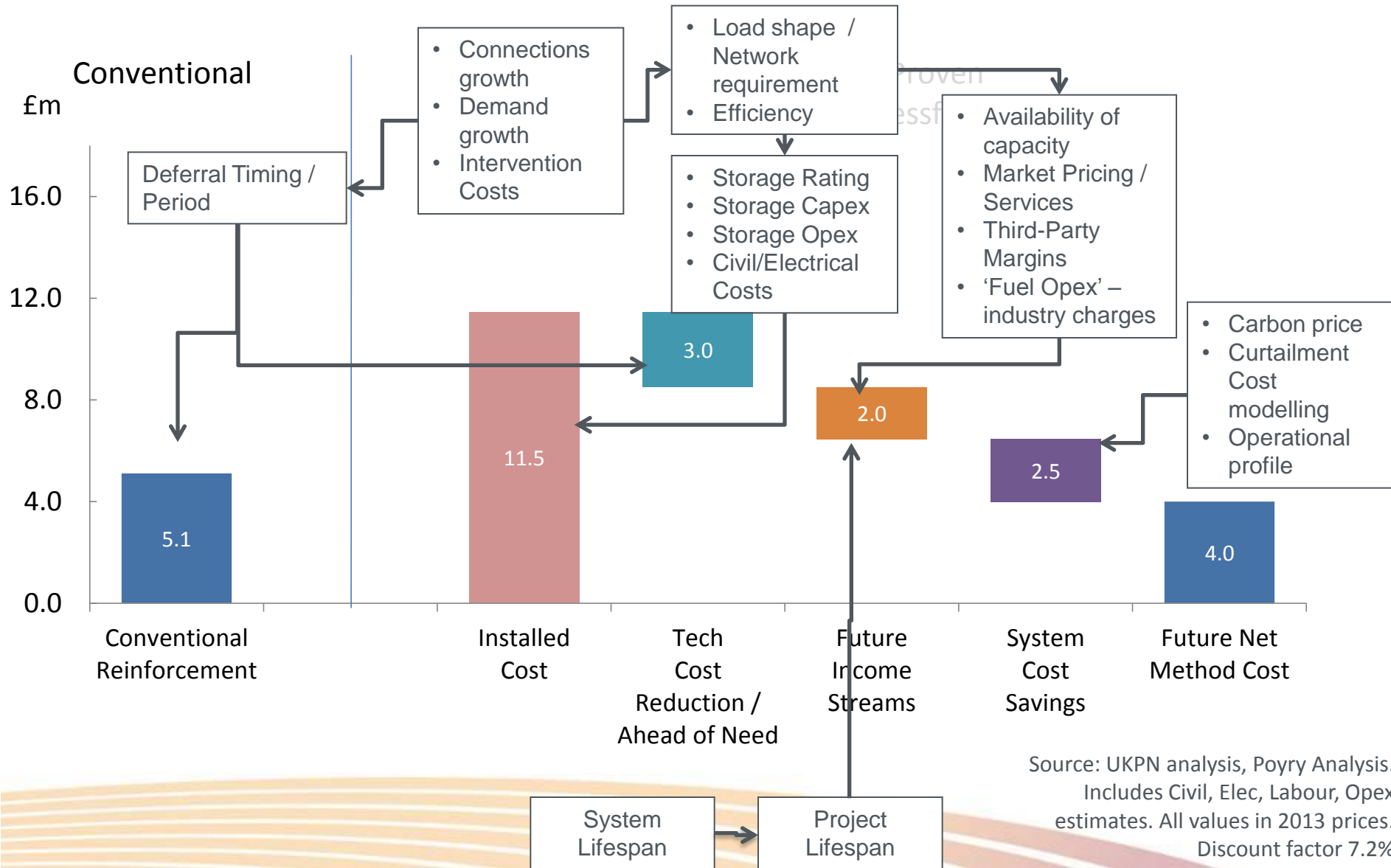
SNS Economic Overview (June 2014)



Source: UKPN analysis, Poyry Analysis.

Includes Civil, Elec, Labour, Opex estimates. All values in 2013 prices. Discount factor 7.2%

Drivers of the Economic Case



Source: UKPN analysis, Poyry Analysis. Includes Civil, Elec, Labour, Opex estimates. All values in 2013 prices. Discount factor 7.2%



Thank you