



ENABLING FRAMEWORKS

A REPORT FOR LINCOLNSHIRE COUNTY
COUNCIL DESCRIBING THE ENABLING
FRAMEWORKS METHODOLOGY FOR MANAGING
COMPLEX WHOLE SYSTEMS CHALLENGES

APRIL 2020

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ENABLING FRAMEWORKS

A METHODOLOGY FOR
CONSIDERATION BY
LINCOLNSHIRE COUNTY COUNCIL

Global Smart Transformation Ltd. (GST) and Sustainable Direction Ltd. (SD) were commissioned by Lincolnshire County Council (LCC) to provide insights into two aspects of the current energy landscape currently challenging local business, councils and end users alike.

The first, delivered by SD, is to understand the Demand Curves for the Greater Lincolnshire Local Enterprise Partnership (GLLEP) area. This is the subject of a separate report. The second, is the development of a process to allow the complexity of the energy transformation that is currently globally underway to be contextualised in a local approach that is led by local stakeholders, for the benefit of the local community while addressing the opportunity to contribute to national strategy and export potential. The process development is known as a portfolio of Enabling Frameworks that allow LCC, local stakeholders and external interested parties to coalesce around desired outcomes, rather than technology initiatives or vested interest inputs. This report outlines the first step of that journey and offers some recommendations for how implementation could be taken forward.

"Enabling Frameworks – is a process to ensure outcome focus for local communities in a whole systems context"

It must be emphasised this is not trying to deliver a roadmap or a specific solution, rather this is a process that will ensure the widest stakeholder engagement and consideration of whole systems impacts in order to arrive at the most appropriate solution for the local community. It's a process not a solution!

EXECUTIVE SUMMARY

ENABLING FRAMEWORKS – THE PROCESS EXPLAINED

WHY ENABLING FRAMEWORKS?

- > Today the Energy System and everything it connects to or touches is not just changing, it is radically transforming!
- > This makes understanding what is important and what is challenging difficult to understand – it is often referred to as a ‘Complex Systems of Systems’ problem or in academic circles referred to as a ‘Wicked’ problem
- > Whole Systems Analysis combined with practical knowledge of several areas is needed, from Policy, Legislation and Regulation – Commercial business modelling – Technical (the way technology is glued together) and Societal Needs and Acceptance
- > Enabling Frameworks are designed to allow a process to take the guess work out of how all these aspects can come together to deliver the desired outcomes we wish to see. It does not try to solve the problem – it ensures the problem is solved by the most appropriate solution for the locality – not the one that technologists want to sell you.

ENABLING FRAMEWORKS - WHAT ARE THE BENEFITS?

- > EF's allow the outcome to be the focus – not technology or loud voices
- > EF's are technology and commercially agnostic
- > EF's drive consistency and rapid deliverability by bringing appropriate and readily available tools together to manage, design and deliver the process – no new stuff needed
- > EF's are devised to enable appropriate skills to be deployed at appropriate times
- > EF's unlock local natural resources, combine local know-how, enhance local decision making, focus on outcomes and not inputs, they embrace sustainability development goals, decarbonisation ambitions, circular economy principles and local capability.

Enabling Frameworks provide a clear route, in a very complex environment, to get things done rapidly with evidence and confidence that all stakeholders can help shape the outcome but not derail it and while focusing on the outcome.



BACKGROUND

ENABLING FRAMEWORKS – THE HISTORY

The concept for Enabling Frameworks has been developed over six years. The author was the lead architect of the idea from conception to implementation and was undertaken as part of an Institution of Engineering and Technology (IET) / Energy Systems Catapult (ESC) project that was sponsored by the department for Business, Energy and Industrial Strategy (BEIS) and the Office of Gas and Electricity Markets (OFGEM).

The new concept was driven by the realisation from within industry that the drive to achieve major decarbonisation targets that were enshrined into law would require a different approach to achieve the desired outcomes. This started with the electricity system but has since spread to encompass the whole energy system.

The development of whole systems analysis started from a technical standpoint to understand the missing functionality that was required to transform our electricity system to embrace high levels of renewables that were, mainly, intermittent in nature while retiring major central generation from fossil fuel sources.

By identifying the missing technical functionality, it was clear this new functionality represented a very complex set of cross sector, multi-utility and inter-disciplinary set of challenges that was beyond just the technical issues being investigated. These technical issues were, to a greater or lesser extent, being blocked, constrained or shaped by the commercial, regulatory and market structure these new functions were operating within. In order to deliver the desired outcomes at the speed, affordability, certainty for investors and to meet the technology agnostic architecture that would need to be designed – a re-imagined governance and delivery model would be needed.

Work was then undertaken with a large set of diverse stakeholder engagement groups to understand what could be done to adapt, modify or re-imagine the different structures to provide a process that overcame these barriers. This work helped to highlight the need for whole system thinking and contributed to the current drive across all of government, local government, industry, academia and society for whole systems analysis to be embraced to understand highly complex interactions between, legislation, regulation, commerce, business models, technical wizardry and societal needs and acceptance.

The LEP and LCC are, therefore, the benefactors of a large wealth of knowledge, experience and aligned thinking. The adaption for local understanding and implementation is a key element of this particular commission.



METHODOLOGY

ENABLING FRAMEWORKS – AN OUTCOME FOCUSED JOURNEY OF DISCOVERY

The first key step is understanding that Energy is now the key enabler of all other activities. Not a single sector can deliver their products, services or solutions for society without Energy being available, affordable and sustainable. Every sector from agriculture, industry, healthcare, commerce, finance, transport, retail, public sector, water, waste, tourism, and all of the other sectors rely on the underlying price of energy and its availability in order to deliver their products, services and solutions.

The inter-relationships for this become very evident when we consider an example. Let's take the requirement for electric vehicles. Road transport and the availability of charge-points intersect between the electricity distribution grid, the national transmission grid, the planning departments, the developers, the land owners, digital communications infrastructure, etc. These are not normally considered as a whole system – the roads are looked after by one department, the power by another, the communications by another,

the regulations and standards by various, the market players are just that, market players. The way this all comes together is very fragmented, if at all. This is only one of many, many examples that are concurrently running.

The Enabling Framework methodology for local implementation aims to provide a process of facilitation in order to bring these disparate activities together in a way that makes sense for the local community. In other words, the process is driven by the desired outcomes (society

wishing to have low carbon forms of transport), not the need for Electric Vehicles (in this example).

Whole Systems approaches, such as the Enabling Frameworks methodology, embrace the principles of the Circular Economy, the idea of Place as an anchor to leverage the sustainable use of natural resources and as the magnet for high value skills and jobs. Driving outcome focused activity, rather than input (such as technology or ideology) changes the narrative and allows all stakeholders to be part of the solution.

ENABLING FRAMEWORKS – THE PROCESS EXPLAINED

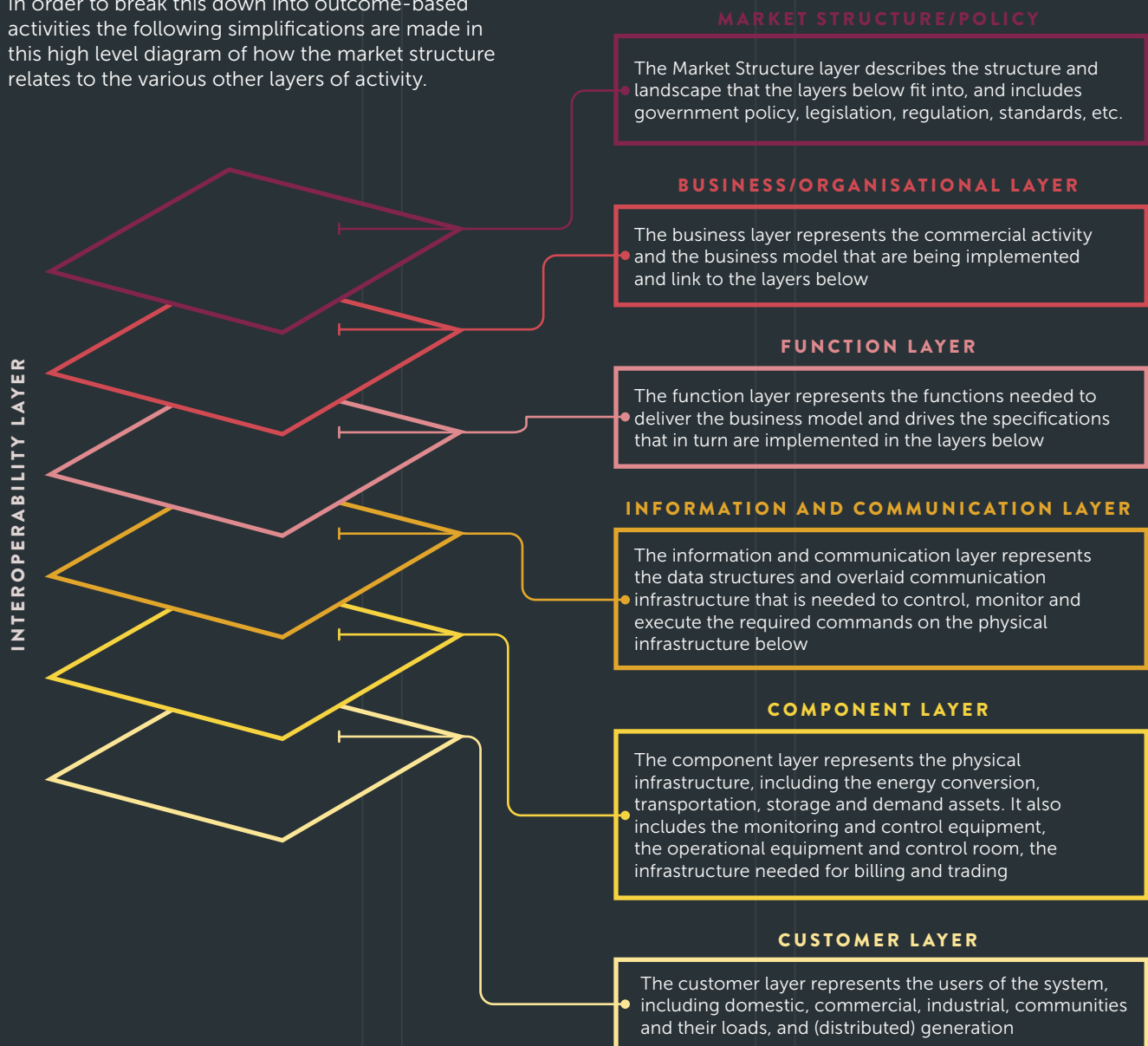
In order to understand the process of whole systems analysis, key elements must be identified and understood. Who are they? What are they? How do they contribute to the whole? What is their relationship with each other?



The landscape for Energy is a complex one, the different stakeholders involved, the different legislation, the regulation, the market dynamics and many other attributes contribute to the complexity.



In order to break this down into outcome-based activities the following simplifications are made in this high level diagram of how the market structure relates to the various other layers of activity.



This diagram allows us to be able to understand the complex relationships that exist in the same plane but importantly, also, through the different layers.

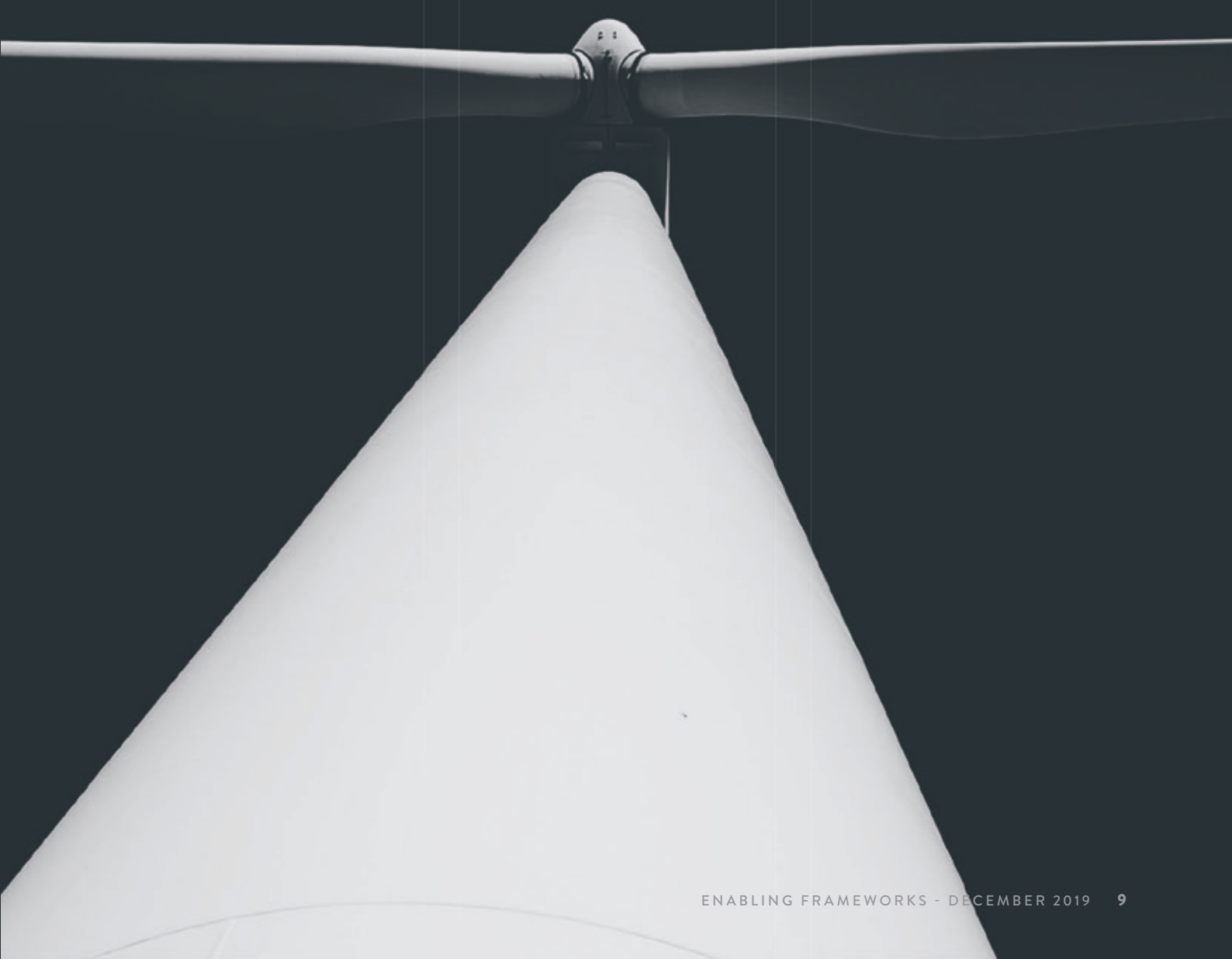
- > The Market Structure layer is depicted by the laws and policy decisions that government make
- > Below this the functions which are needed to delight customers are specified
- > Finally, the customer layer which is the non-regulated (in terms of regulated monopolies) layer where the customers have PV, EVs, the Internet of Things (IoT), etc. reside and are impacted by all of the above layers.
- > The next layer the Business and operations layer is where commercial business aligns itself under the constraints that the Market Structure above places on them. Commercial business models are therefore designed in order to deliver legal products, services and solutions
- > Below the functions layer - the digital and analogue communications infrastructure that controls and monitors the physical components (such as transmission, distribution, etc) that connect customers to utilities

Using this model, we can begin to understand that knowledgeable facilitation is really important not only across the different layers but to facilitate between them as well. Today, this is not coordinated. It is left to what is called “market forces”. In a quiescent state this has just about worked but in a transformational state - market failure is occurring and uncertainty reigns.

The essence of the Enabling Framework is to ensure knowledgeable facilitated leadership that understands the breadth as well as the depth of detail that is important. That is not to say a single person must understand everything – this is impossible today. The process is designed to ensure these points are covered and that all stakeholders are embraced to gain the ‘wisdom of the crowd’.

To date government has facilitated technologies – not outcomes. Therefore, incentives have driven perverse market behaviours – e.g. wind and solar generation incentives has then driven the need to manage the demand side by asking people to change their behaviours and or move their usage. This was not planned but was a surprise to industry and the authorities as the need for something to match the intermittency of these new generation sources that had not been considered when incentives for wind and solar were put in place.

The key to outcome focus is the need for ‘adaptability in flight’ as technology change and societal needs are an ever-changing target. Outcomes are therefore defined based on lifestyle choices for citizens – delivering a warm home, electricity for rural communities, etc. This then defines several different options for delivery of these outcomes. E.g. Local Combined Heat and Power, Gas Supply required from the mains, Electricity to cope with heating as well as EV’s or Electricity cables laid to rural communities or local generation and private wire solutions.



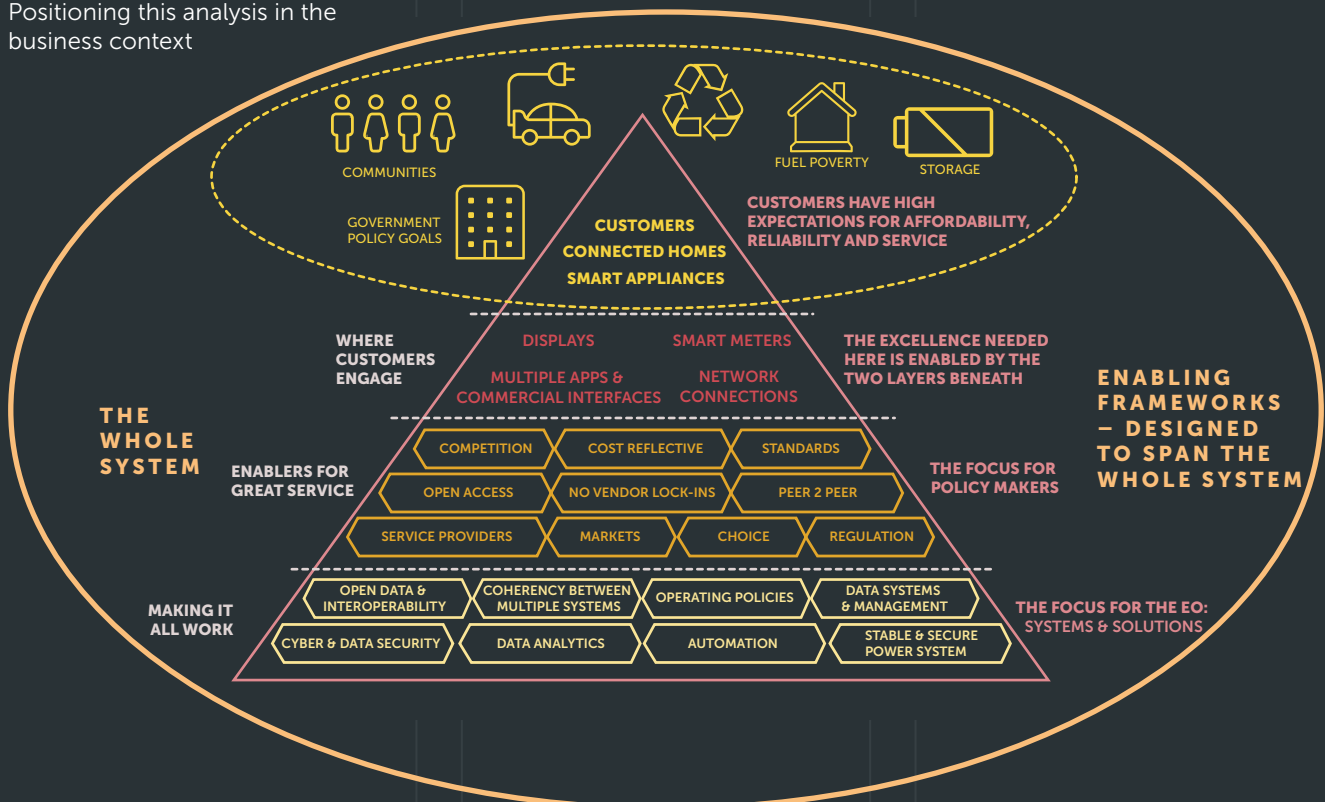
A laser focus on outcomes drives the thought process on:

- > the use of local natural resources
- > the building of a local skills base
- > the intention to ensure the solution derived complements other activities and does not duplicate or hinder

- > the ability to select circular economy solutions over non-sustainable solutions
- > the active management over the life cycle of a function
- > These are all missing elements today. Enabling Frameworks allow the challenges to be re-imagined and a collective narrative to be built, owned and implemented. This will make projects investable, relevant to local communities and productive for industry and the public sector as well as providing society the expected outcomes.

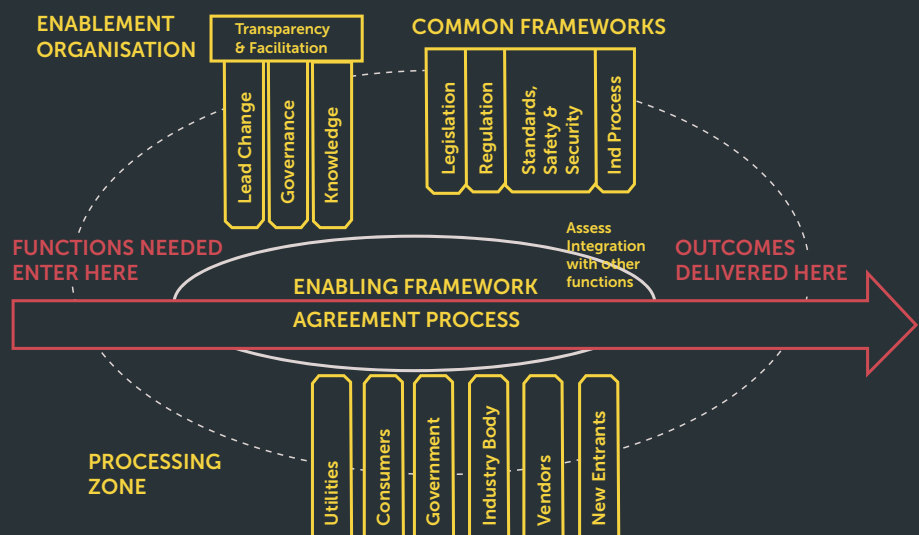
Enabling Frameworks must span the whole system

Positioning this analysis in the business context



Enabling Framework process flow

Armed with this knowledge an Enabling Framework can be initiated. The following very high-level process flow describes how the functions that are required to be delivered (e.g. the new pipeline or the CHP solution) need to be facilitated to ensure they fit with the other key aspects that are important to comply with.



ENABLING FRAMEWORKS

– THE ELEMENTS EXPLAINED

The previous Enabling Framework contains a number of important elements to the structure of the framework. These will be explained individually here and then each will form a complete process flow in order to deliver the desired outcomes defined.

The first important element is the key formulation of the required outcome. This may sound easy, but it is probably the hardest element to define and it impacts the entire process and outcomes delivered. The responsibility for formulating this is with the Enablement Organisation and is detailed using the Outcome Definition process.

OUTCOME DEFINITION

- > What are the functional needs for this outcome? Examples of this could be a land footprint for a building, water supply, waste of all kinds removed from it, energy supply, communications both analogue and digital, resilience requirements – flooding or other constraints, etc
- > What Skills will be required to deliver, operate, maintain, decommission, etc?
- > What physical infrastructure exists or is needed? Transportation, communications, energy, water, waste, etc
- > What supply chain requirements will be needed? Logistics, processing, delivery, etc
- > There are many more questions on the whole systems check list and these questions need to have clarity (not necessarily answers as these can emerge in the process but they must be asked in the right manner in order to get a clear outcome) in order to proceed.



The key ingredient to the above formulation is delivered by the Enablement Organisation (EO). The EO is the key facilitator and lead to ensure all aspects of the Enablement process are adhered to and delivered in an Inclusive, Agile, Transparent and Iterative Learning manner.

ENABLEMENT ORGANISATION (EO)

- > The EO can be an existing or newly formed entity to deliver the leadership and facilitation qualities that are needed for this role. It must be stressed – this is NOT a project management role, it is far more complex and detailed and requires high caliber staff to be successful. There is a very balanced requirement to be a facilitator first but know when leadership is required to move the process forward
- > There is a need for this entity to have a whole systems understanding covering Market Structures and their implications, Business Models and the way these fit in the market structure, Technical requirements (but agnostic to technology), Societal understanding. These skills, competencies, experience and knowledge exist but are rarely understood by those that are steeped in traditional silo based delivery models
- > This entity has to understand how to access and guide all stakeholders that may have different contextual relationships with the functions being delivered. Examples are: users, suppliers, vendors, regulators, those impacted by the function but not directly involved, legislators, entrepreneurs, innovators, academia, the list continues...
- > The entity also tracks the function after it leaves the process to ensure there is knowledge about the life cycle requirements e.g. when the function needs updating (maybe due to technological change or societal needs changing). This will also ensure no duplication or incorrect replication of the function is made across the region served by the entity.

STAKEHOLDERS NETWORK

The real key to ensuring that the most appropriate delivery of the function is provided and the acceptance by society at large of the function once delivered, is to ensure that all stakeholders that wish to engage are given the opportunity to contribute.

This is achieved by ensuring the right stakeholders are attracted to join the network and that they are both 'users' and 'providers' of the intended function. In this way the wisdom of crowd sourcing will uncover solutions, business models and societal benefits not considered previously. The ability to tap into this wisdom is an important element to understand the breadth of how a function may be delivered other than by traditional means.

There are also different categories of stakeholders which have different roles in the delivery, usage and maintenance of a function. This has traditionally been a major problem to ensuring new concepts and alternate delivery methods are considered due to certain categories being seen as 'the only' ones that know or should defined the future. Examples of this have been seen across the utility sector or big business is able to have a louder voice at the table than any other potential solution.

In order to manage the vast range of different groups or individuals that may wish to engage we can allow them to self define their interest level, their responsibility and accountability that they will have to contractually sign up for on a Stakeholder Network. This is based on the well-known RACI type model – Responsible, Accountable, Consulted or Informed.

COMMON FRAMEWORKS

The final element of the process are known as Common Frameworks. These are frameworks that may affect the function in terms of legal requirements, standards that are based on national or locally required needs (Cybersecurity, Physical Security, Health and Safety, etc.), these are givens and are not negotiable but need to be applied to the function in a standard way to ensure not only compliance but interoperability with other functions.

This is not just a one-way taking of rules though. If the function demonstrates that the Common Frameworks are not being maintained by national or local government, the Stakeholder base will provide evidence in order to demonstrate the need for change/enhancement or renewal of the Common Framework in question. In this way a continuous live update and agile process to maintain functions and frameworks will automatically exist.

THE FRAMEWORK PROCESS

Consider the Enabling Framework process flow diagram above. The EO needs to be the one that is alerted or self identifies a need for a new functional requirement probably due to a new outcome or revised outcome requirement. Normally an Outcome based requirement will stimulate the need for multiple functions to deliver it: Energy, Water, Waste, Communications, etc. This means a number of parallel Enabling Framework processes may be active at one time.

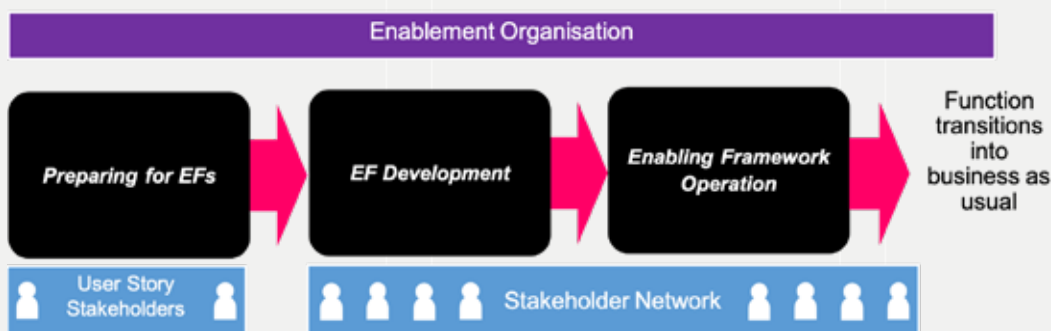
Once the EO has identified and specified the Outcome needs, a formal broadcast to the Stakeholder Community is prompted to identify the process that is about to begin to formulate the needed functions and interest is sort from that community to register their interest.

The EO will form a Stakeholder Network to help deliver the required functionality. A Programme plan, timescale, budget and procedure will be kicked off in a number of Agile Sprints. The Agile process is important to use due to the speed and risk reduction that this methodology delivers in gaining greater and greater insight into the detail while maintaining deliverables that are able to be tested after every Sprint.

By using a dynamic live Stakeholder Network the need for consultation is eliminated and the inclusive and transparent approach means that no one organisation or individual can direct, veto or frustrate the process.

The Enabling Frameworks process ensures each EF is compatible and interoperable with the others. The way that EF's are built is using the 'story telling' methodology which basically compiles many use cases into a story to drive out the functionality really required and the possible solutions framework needed to support technology, new business models and Societal needs and acceptance. The following provides a stepwise view of how these are developed.

From function to Business As Usual via EF assembly line and EF operation (assembly line comprises pre-structuring and EF development)





LINCOLNSHIRE COUNTY COUNCIL

ENABLING FRAMEWORKS – LOCAL IMPLEMENTATION

THE GENERIC ENABLING FRAMEWORK PROCESS HAS BEEN DESCRIBED IN THE PREVIOUS SECTION.

This section will explore how this process could be applied in Lincolnshire. The proposals here have been informed by two workshops held with different stakeholder groups to test and gain insight for the development and proposal for both the Demand Curve work, which is contained within a separate publication, and the Enabling Framework activity (this report).

A short note on the questions raised in the workshops is appended in Appendix A. It is note worthy that both the workshops highlighted the need for a process to overcome market challenges that each participant had experienced and had caused projects to be delayed or shelved.

Lincolnshire and Greater Lincolnshire has several Councils, Institutions, Industrial giants and many small businesses across a multitude of sectors which are all considering very similar challenges.

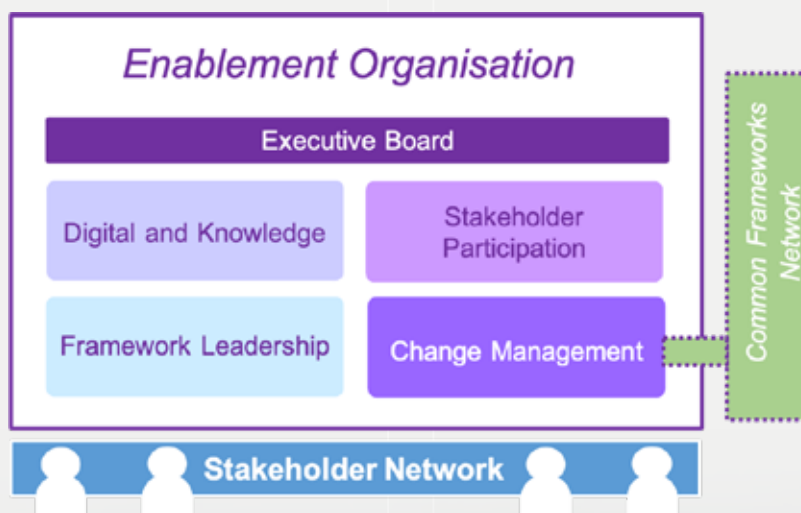
A national Industrial Strategy and Clean Growth Strategy places a layer of ambition over these entities and there identifies another major challenge – who is leading and who is facilitating a coordinated response to this high-level outcome-based requirement? LCC has initiated a number of initiatives that have been informed by Enabling Framework principles. The Local Industrial Strategy (LIS) and the Energy Strategy are examples of these initiatives.

It is proposed that the GLLEP and LCC jointly become the EO. Other key advisory bodies such as the Energy Council, among many others such as Utilities, local SMEs, local corporations, academic institutions, etc, should form a key element of the body of a Stakeholder Network.

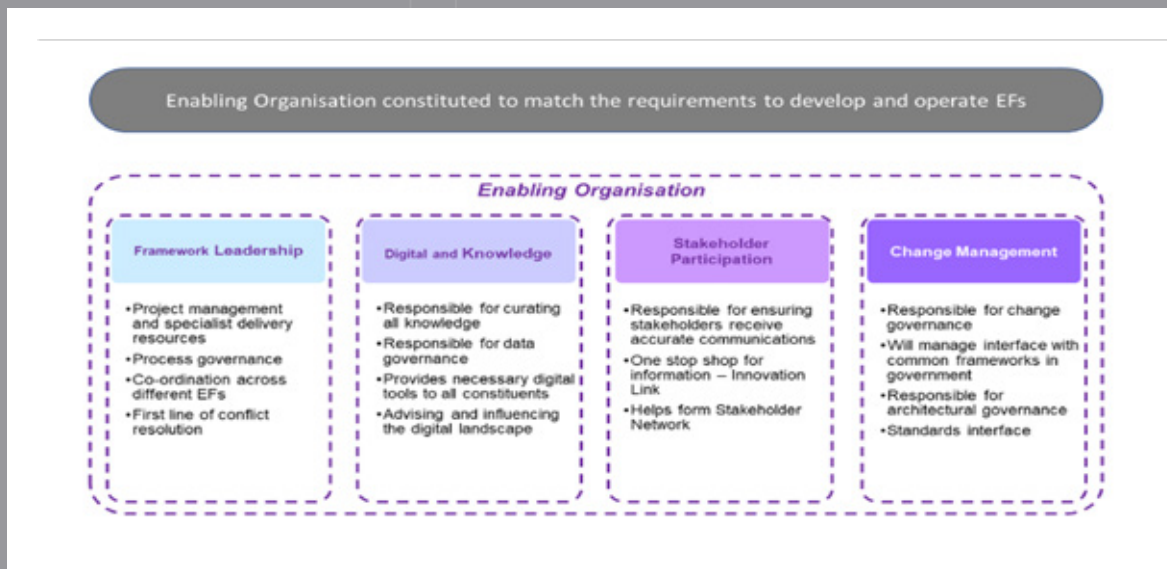
The EO will need specialist help to begin with to train and mentor in order to up skill key people and provide an environment for organic growth from Lincolnshire.

In this way the process once setup, will be self sustaining.

So the EO (GLLEP/LCC) needs to have a format that will deliver the required needs of the EO and should from a governance and structure perspective have a similar format to the diagram below.



The responsibilities of these different aspects should be constituted like this in order to deliver the required level of facilitation, leadership and oversight:



The Executive Board provides a governance structure for the EO and should be populated with independent specialists in the four key areas identified above. Leadership should come from a CEO that understands the required outcomes and has knowledge across all of the four disciplines. The LCC senior leadership team along with the leader of GLLEP should be the reporting route for the EO CEO.

The key priorities for GLLEP and LCC have already been confirmed via the **Local Strategic Plans, The LEP Annual Delivery Plan** and the local and district plans. **Therefore the outcome work that would be required is based on these ambitions but will need a level of whole system analysis not yet performed to understand the priority and missing Enabling Frameworks to achieve successful delivery.**



The Stakeholder Network will need to be widely advertised via all the normal channels and social media. In many cases pro-active word of mouth and targeted groups will also pay dividends in garnering the widest possible user group. In order to provide an accessible platform – large collaboration tools should be considered to allow the widest contribution and engagement.

Tools such as Office 365, Slack, Asana, Podio, Ryver, Trello and Flock all provide different levels of sophistication, cost and user experience but ensure a much wider cohort of stakeholders that normally engage in this type of activity. As indicated in the general description, a registration process that ensures the person engaging self select their level of engagement against a RACI type approach will ensure the unhelpful minority are left as being informed, while those who really have skin in the game are fully engaged and wish to be responsible for the outputs.

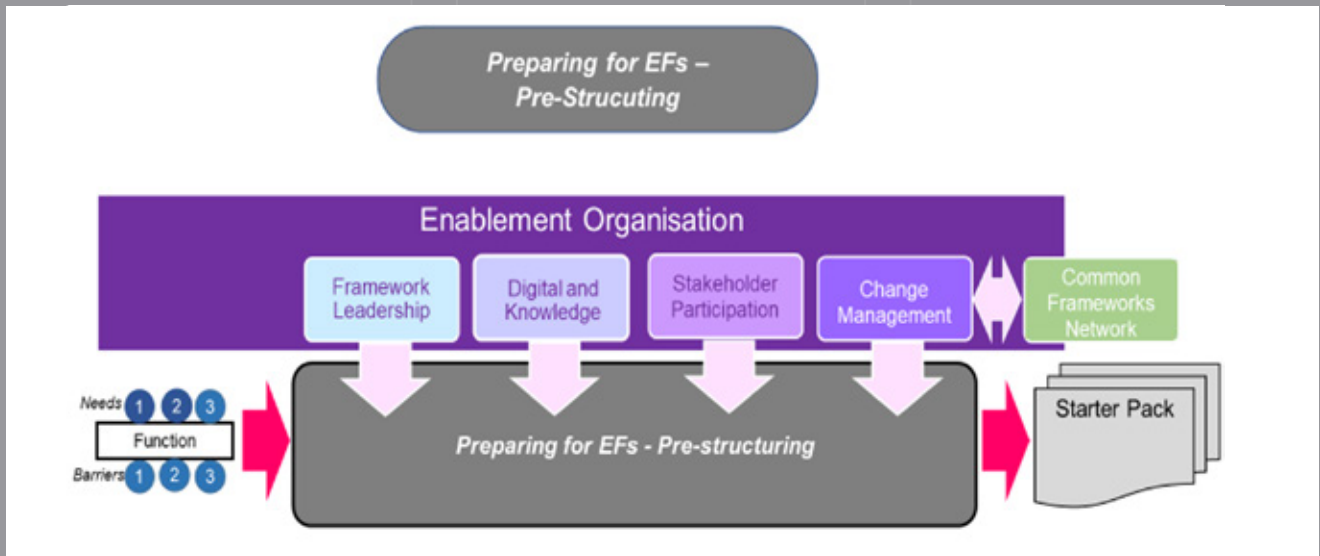
A suggested first cut of Stakeholder Network invitations is outlined below, this is only a start and dependent on the EF detail different cohorts can be assembled from the Stakeholder Network membership to drive particular aspects through. Inclusivity and transparency are important so open invitations, rather than closed groups is absolutely needed.

GOVERNMENT REPRESENTATIVES	LOCAL GOVERNMENT REPRESENTATIVES	INDUSTRY	SMALL, MEDIUM ENTERPRISES	ACADEMIA	NON-GOVERNMENT-ORGANISATIONS
BEIS	Senior representatives from across the different Directorates	Large Corporates (e.g. Siemens)	Representation of relevant micro, small and medium enterprises	University of Lincoln	Citizens Advice
DCMS	Housing	Local Energy Partnership	Federation of Small Businesses	Bishop Grosseteste University	National Farmers Union
DEFRA	Re-Generation	Energy Council			Professional Institutions
	Planning				National Infrastructure Commission

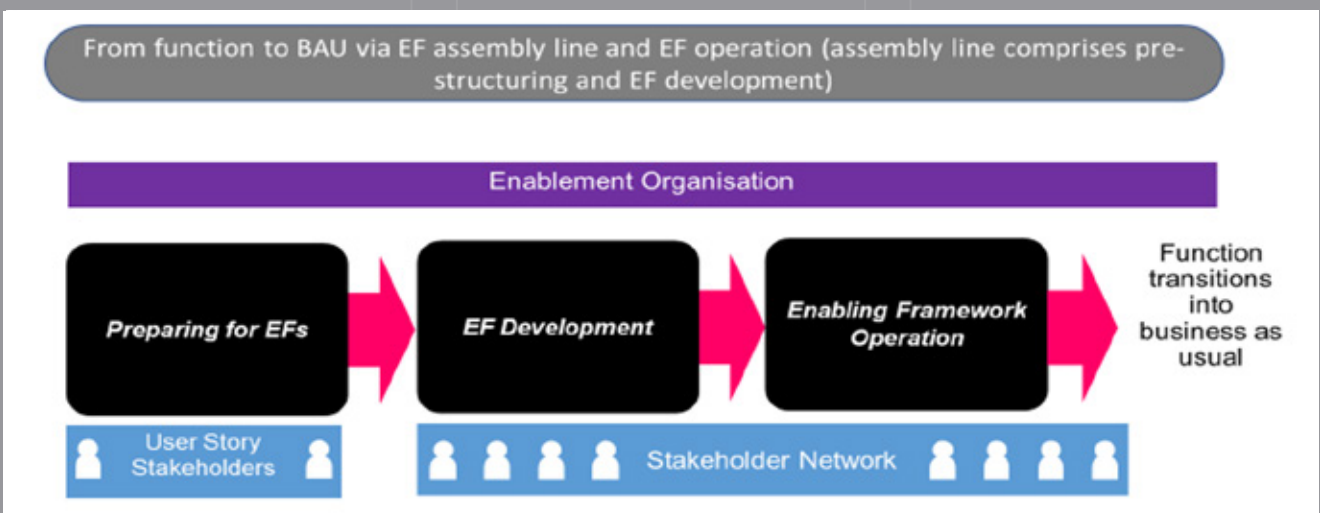
As work progresses, an Agile approach will streamline methods of inclusion to serious actors, very quickly.



Using the 'story telling' method of use case development, the EO is able to collate a starter pack that is available to all participants to understand a number of key aspects e.g. what the function needs to achieve, what the state-of-the-art currently is, etc. so that all participants in the process start with the same understanding. **This is demonstrated below.**



Then, the process explained in the methodology section is started, as indicated below, to proceed from a needed function through to **Business as Usual (BaU)**:



There are three general stages envisaged with the EF process, although it must be remembered that the whole process is designed to be iterative so these steps may be repeated – it is unlikely that the whole of the first stage will be repeated bar exceptional circumstances. **These general stages are:**

1. PREPARING FOR THE EF

- > This stage will initially scope the functions for EF, ensuring that all functions' needs and barriers are comprehensively captured
- > This stage will also involve the creation/formation of the stakeholder networks and the common frameworks
- > Pre-structuring is also a key aspect of this stage, with the key output of producing a function's starter pack – once this starter pack can be provided to the stakeholder network, that function will move into the developing EF stage

2. DEVELOPING THE EF

- > This stage is focussed around the stakeholder network discussing/debating how to meet the needs and overcome the barriers of a function
- > The outcome of this process will capture the requirements of the function (to overcome barriers and meet needs) and submitting these requirements to the common frameworks for consideration or the creation of plans and tools for the stakeholder network to implement where appropriate
- > The common frameworks (with the Change Management Directorate) will review and feedback to the stakeholder network in a cooperative manner so that the requirements can be progressed through common frameworks as change recommendations

3. OPERATING THE EF

- > The operational stage will have all constituents and particularly the stakeholder network focussed on delivering the function into BAU
- > The stakeholder network will implement its plans and tools through various activities including participation in trials and demonstrators, this will require monitoring and review of developments and coordination and two-way feedback with common frameworks
- > New requirements or changes to existing requirements may need to be put in place based on new information that arises from the implementation or from new technology or policy developments identified through ongoing horizon scanning.

It should be noted that existing processes are embraced in the EF activity (things like Green Book formulation is absorbed into the process as a part of the Common Frameworks) and new processes are limited to ensuring whole systems practices are embraced in the process where others did not.

There is a whole level of detail that exists below these descriptions but for this commission an outline of the approach that LCC could consider and take further if considered appropriate, was required. It should be noted that there are other commissions that interlink to the approach, the already stated Demand Curve work defines a high-level starting position for understanding energy demand.

A Digital Strategy commission will look at how the digital infrastructure is bound into an Enabling Framework to ensure duplication is avoided and, worse, interoperability and standards do not become challenges once money has been invested and solutions need to be retrofitted.



RECOMMENDATIONS

ENABLING FRAMEWORKS – A JOURNEY

The report has outlined a process that has been developed with a deep understanding of the challenge that national and local authorities face when considering their response to the Energy trilemma – delivering secure, affordable, and environmentally sustainable energy for their local citizens.

The Enabling Framework process is about a journey of discovery, unlocking potential, delivering locally desired outcomes that also help national ambitions and doing this in a sustainable, transparent, inclusive and iterative learning framework.

It is recommended that LCC:

- > Adopts the proposed methodology to inform and deliver their Energy Strategy
- > To form the Enablement Organisation to drive the needed focus for Enabling Frameworks to be delivered and, therefore, the outcomes desired
- > Select a real-life proposal to 'test drive' the Enabling Framework process and drive an outcome-based solution through to conclusion
- > Acquire the needed skill sets in order to ensure the process does not suffer from misunderstandings of how it works
- > Unleash the potential that exists in Lincolnshire and the Greater Lincolnshire area by pro-active facilitation and leadership of the underlying Energy opportunity bequeathed to the county.

Lincoln City Council have expressed interest in trialling the Enabling Framework process.



APPENDIX A

POINTS RAISED FROM WORKSHOP SESSIONS @ LCC STAKEHOLDER EVENT

A Stakeholder meeting was held on 9th October 2019 at Riseholme College Campus to share the work Lincolnshire County Council (LCC) has commissioned to understand the opportunities and challenges that Energy represents for the county.

This followed an earlier stakeholder meeting in July with the LCC traditional utilities and their supply chains. This follow on meeting was to access wider views from all stakeholders.

A diverse set of stakeholders from across the energy landscape were invited to participate, these included those in the regulated utilities through to the end users, those that had a deep understanding of the market structures to those with a greater understanding of local dynamics.

A briefing on the work carried out so far regarding the need to understand:

- > Demand Curves (DC) (understanding the current energy usage and local development and other plans to project future needs) for a PLACE2 and the County, which links to
- > Whole Systems Thinking and processes and the way that decisions made for one user group (e.g. private housing or public sector or NHS) in one area can have a big impact on another user group and places in the same or other areas in terms of energy
- > How progress can be delivered via the Enabling Framework (EF) / Enabling Organisation (EO) who's role it is to facilitate and lead the process and to enable stakeholders to be part of the solution and not the problem.

The group was then asked to consider a number of questions to lead table-based discussions to insights into areas where challenges existed in current processes and test thinking on how these could be reduced / eliminated or circumnavigated. To make this more tangible a case study was given for Holbeach Food Enterprise Zone in order for PLACE, Technology and Processes to be given some substance. The responses have been captured and tabulated below. The version below pertains to the EF responses and a similar version exists to respond to the same points but from a DC perspective.



POINTS RAISED	EF RESPONSE
Energy supply to site: smart monitoring and management of loads	Absolutely required but is challenged as to how this dovetails between the regulated and non-regulated sectors. EF methodology needs to facilitate this approach.
PV on roofs of houses and main building – although commented that layout on plans is a poor design for PV use	Issues of relationships between developers, council planning, regulation, standards, etc. Orientation of buildings designed to maximise plot footprint for commercial gain not energy efficiency. EF methodology needs to facilitate this approach.
Student Accommodation?	This was in relation to ensuring close proximity for efficient use (e.g. reduced travel) and to improve energy sharing between sites. Unfortunately, this requires Investors, developers, Council (planning), Regulation, etc to all be coordinated in time and outcomes – at present they are not. EF methodology needs to facilitate this approach.
Shared generation battery storage between two sites	This becomes an issue under the Electricity Act of 1998 where public supplies of electricity are restricted to only one supplier. Legislation required to change this. EF methodology needs to facilitate this approach.
Heat recovery systems from ovens etc	Planning could help but soon runs into the delivery supply chain being coordinated and aligned as above. EF methodology needs to facilitate this approach.
Central heating system, ground sourced at large scale with gas for peak lopping generation	An integrated multi-vector approach is where EF's really will need to deliver cross sector and vector facilitation. From design to maintenance and decommissioning.
Redesign for net zero emissions	The is the key EF process approach – the need to reimagine our processes to deliver collaboration, competition and regulation that has a common output – not as today.

POINTS RAISED	EF RESPONSE
Resource / awareness of business to reduce energy usage rather than accepting it as an overhead	This is the key EF process approach – the need to reimagine our processes to deliver collaboration, competition and regulation that has a common output – not as today.
Water storage	Water has a large role to play in the efficient use of energy just as waste or any other key resource. EF methodology needs to facilitate this approach.
Shared delivery vehicles in energy supply	This was in relation to ensuring close proximity for efficient use (e.g. reduced travel) and to improve energy sharing between sites. Unfortunately, this requires Investors, developers, Council (planning), Regulation, etc to all be coordinated in time and outcomes – at present they are not. EF methodology needs to facilitate this approach.
Shared generation battery storage between two sites	EF needed to understand inter-connectivity between EV, Hydrogen, electricity, road transport particulates, road transport logistics, built environment, etc, etc.
Solar on housing	As per point on PV above.
Biogas or bio diesel plan to supply university and housing – Biomass plant 5-10 kw for heat to include housing	EF's are technology agnostic, but they should maximise the use of local resources and the logistics for fuel delivery and waste removal. Understanding of the local challenges and opportunities will then be exposed and decision process will be clear, transparent and agile.
Consider 1-acre site needed for biomass plant – but what will reaction be to buying homes near a power plant	As point above. The whole system, including people, need to be embraced in decision making but this must not be a reason to slow / delay decisions. EF's need to provide an active consultation not a reactive approach as today.
Need to consider if wider area outside of Holbeach campus can benefit from any of the local power generation project to get the wider residential/ business community on side of project	Agreed but this requires an understanding of the legislation, regulation, planning, commercial, technical and societal drivers involved. EF methodology needs to facilitate this approach.
Creative mortgage plans on properties – taking in to account energy technologies to be put in place	There is a nascent growth in these ideas today and they exist. The challenge is not being prescriptive and providing choice while at the same time ensuring commercial viability for developers and supply chains. EF methodology needs to facilitate this approach.

POINTS RAISED	EF RESPONSE
Energy Management company to run the site – with varied stakeholder representation	This requires the formation of an IDNO or ESCO vehicle that is regulated. This is actively being considered by the LCC and is part of the EF process analysis.
Install Gas CHP engine which can initially run from the grid	EF's are technology agnostic but the need for whole systems analysis is paramount in the planning stage but needs to also be a live process that is revisited to maintain a timeline that moves with societal need and technology development. EF's try to ensure a living dynamic process to review, maintain, upgrade and retire solutions that are no longer fit for purpose.
Install Gas boiler to provide heat initially running from the grid	Please refer to the above answer.
Install Buffer tank to act as heat reservoir for the district heating scheme heated by either the gas boiler or the CHP when running	Please refer to the above answer.
Install Battery backup and storage system to minimise run time for CHP initially and to provide future flexibility if attached to solar and or wind	Please refer to the above answer.
Install solar to roofs of each new building and connect to battery system	Please refer to the above answer.
Construct AD plant to utilise waste from food industries on site and also potentially food waste from local properties/ business. This can supply electricity via CHP and any surplus could be compressed and used for transport in lorries (preferable given your stats on food miles and new subsidy structure) or injected into grid	Please refer to the above answer.

POINTS RAISED	EF RESPONSE
<p>Possibility of air source on buildings if required but may be unnecessary and too costly</p> <p>This should enable the project to get close to or even achieve carbon zero. With our new AD group and associates we would be in a position to help with the CHP, AD and district heating schemes. I don't think the solar would be too taxing</p>	<p>EF's are technology agnostic but the need for whole systems analysis is paramount in the planning stage but needs to also be a live process that is revisited to maintain a timeline that moves with societal need and technology development. EF's try to ensure a living dynamic process to review, maintain, upgrade and retire solutions that are no longer fit for purpose.</p>
<p>Ascertain and be sure of total power requirement of site</p>	<p>This is a key DC requirement but also provides EF's with the insight to understand how that requirement can be met. There are many ways to deliver the power requirements from centralised to decentralised generation. EF methodology needs to facilitate this approach.</p>
<p>Any solution has to be flexible and scalable</p>	<p>This encapsulates the need for a process such as EF's that will evaluate this requirement and ensure joined up, appropriate, transparent, agile and a learning mechanism to apply to future solutions. EF methodology needs to facilitate this approach.</p>
<p>CHP Engine Battery</p>	<p>EF's are technology agnostic but the need for whole systems analysis is paramount in the planning stage but needs to also be a live process that is revisited to maintain a timeline that moves with societal need and technology development. EF's try to ensure a living dynamic process to review, maintain, upgrade and retire solutions that are no longer fit for purpose.</p>
<p>Buffer tank to store hot water</p>	<p>Please refer to the above answer.</p>
<p>AD plant from food waste? 2.4meg</p>	<p>Please refer to the above answer.</p>
<p>IHA for AD including Acc £20m - £24m</p>	<p>Please refer to the above answer.</p>

POINTS RAISED	EF RESPONSE
Contractors to be obligated to use solar	In order to analyse if solar is appropriate (e.g. commercially viable, technically achievable, societally acceptable, etc) careful consideration as to how any future obligations for legislation/regulation is required. EF's are designed to expose the evidence base to ensure market structure, commercial viability, technical options, societal needs are all considered before advocating for more regulation.
Wind Turbines	In order to analyse if onshore/offshore wind is appropriate (e.g. commercially viable, technically achievable, societally acceptable, etc) careful consideration as to how any future obligations for legislation/regulation is required. EF's are designed to expose the evidence base to ensure market structure, commercial viability, technical options, societal needs are all considered before advocating for more regulation.
Heat source air pumps from Fulletby	In order to analyse if heat source pumps are appropriate (e.g. commercially viable, technically achievable, societally acceptable, etc) careful consideration as to how any future obligations for legislation/regulation is required. EF's are designed to expose the evidence base to ensure market structure, commercial viability, technical options, societal needs are all considered before advocating for more regulation.
Off grid – council energy services	For multiple supply tenants this requires the formation of an IDNO or ESCO vehicle that is regulated. This is actively being considered by the LCC and is part of the EF process analysis.
Buffer tank to store hot water	EF's are technology agnostic but the need for whole systems analysis is paramount in the planning stage but needs to also be a live process that is revisited to maintain a timeline that moves with societal need and technology development. EF's try to ensure a living dynamic process to review, maintain, upgrade and retire solutions that are no longer fit for purpose.
AD plant from food waste? 2.4meg	Please refer to the above answer.
IHA for AD including Acc £20m - £24m	Please refer to the above answer.



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