



Programme Area: Smart Systems and Heat

Project: WP3 Business Model Development

Title: Business Model Initial Scope & Strategy

Abstract:

This report is produced by ESC outlining the project scope, deliverable, methodology and the summary of the output produced till date by the project team to meets the original deliverable around Scope and Strategy.

Context:

The case for heat decarbonisation is widely acknowledged, with studies showing that it is more cost effective to tackle CO₂ emissions from buildings than cutting more deeply in other sectors. The real challenge is establishing new heating solutions that substantially remove natural gas use from homes whilst making the solutions financially viable and attractive to consumers. Around 20,000 homes each week will need new heating system installations between 2025 and 2050 to meet decarbonisation targets; a rate fifty times greater than achieved to date. The current market will not deliver at scale for residential low carbon heat transition given: unappealing consumer propositions, a fragmented industry structure, a lack economic drivers and need for holistic policy framework. The Energy Technology Institute commissioned the Energy Systems Catapult to deliver a business model development project to develop a number of specific business propositions that could stimulate new thinking for models to be introduced into the market from just before 2020 through to the late 2020's.

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Smart Systems and Heat Programme

Business Model Project Initial Scope and Strategy



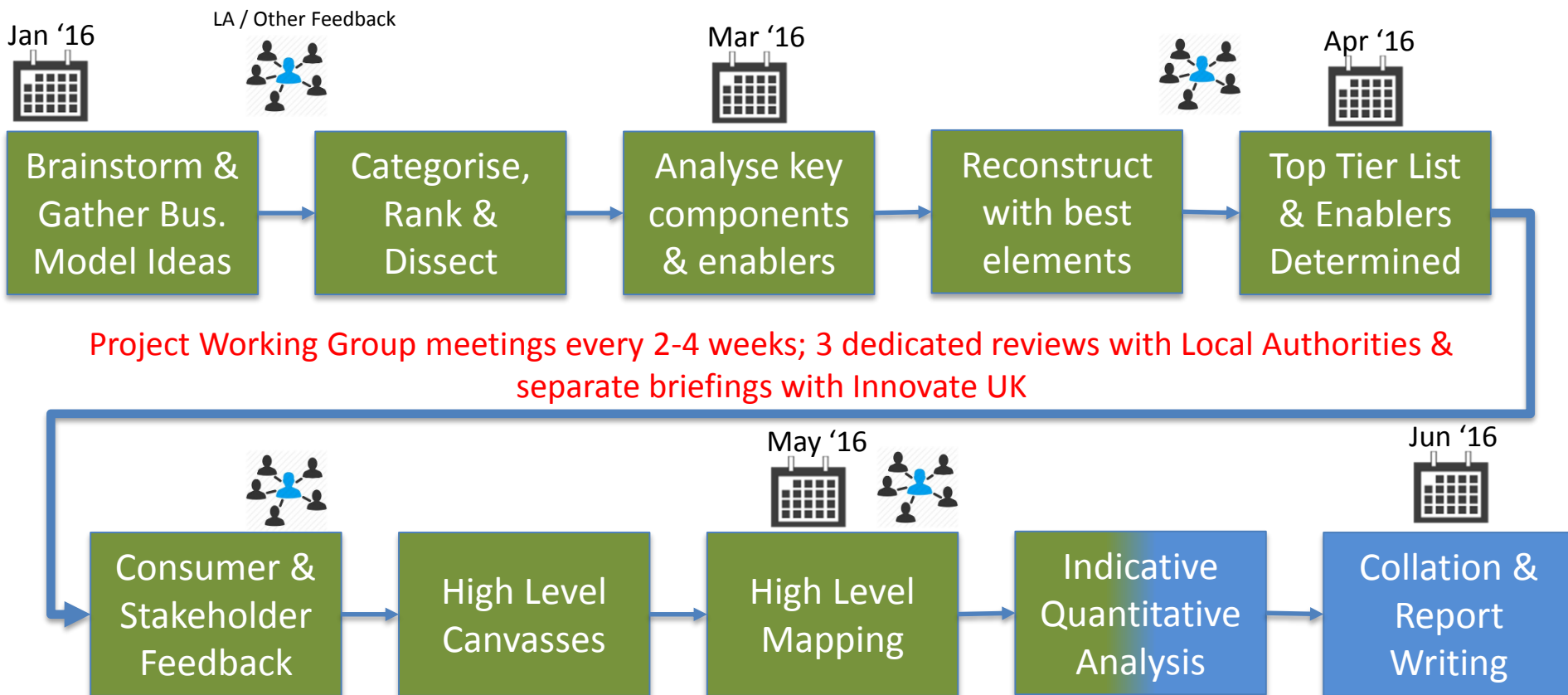
Business model objectives

- Develop a number of specific **business propositions that could be launched into the market** from just before 2020 through to the mid-late 2020's
- Provide examples of **different business propositions** that could be attractive to customers and investors against which to test thinking about wider policy and market development
- Provide a set of examples of business operations for which **EnergyPath Operations** could be used to evaluate
- Provide options for **Phase 2 demonstration** projects

Business Model Project Deliverables

1. Shortlist of identified business models and key attributes
2. Summary of prioritisation methodology & results of application
3. High Level Business Process Maps for top tier Business Models
4. Short Report on application of BMET to evaluation of models
5. Roadmaps for Top Tier business models (Transitions)
6. Final report and future pathways for the Business Models

Project process overview



Project Working Group

ESC	John Farrington, Jonathan Watkins, Alkesh Acharya, Grant Bourhill, Raj Gadepalli, [Rebecca Wilkes – consumer insight]
EDF	Alastair Davies, Sarah Bee, Bogi Hojgaard
Hitachi	Ram Ramachander, Seiji Sato
DECC	Jon Saltmarsh, Shane Long, Ioannis Orfanos



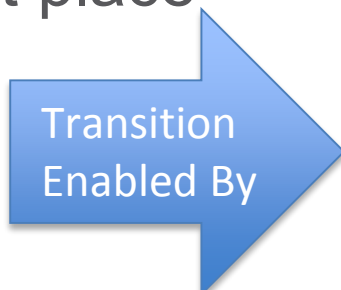
Greater Manchester Combined Authority
 Newcastle
 Bridgend
 Wider ESC Team (e.g. Consumer Insight)
 Innovate UK
 Andrew Haslett

Residential comfort is achieved in a manner that is atypical of today's consumer market place

Producer Orientated

(e.g. Energy Sector)

- Energy sold in technical units
- Confusing technical choices
- Reactive / distress purchase
- High capital cost demands
- Bill uncertainty – client takes risk
- No assurance of comfort
- Varying trust in providers



- Data / ICT
- Policy
- Business Models
- Integrated & new technology

Consumer Orientated

(e.g. Home improvement, media services)

- Sold against desired outcomes
- Focus on outcome not technology
- Proactive & planned home upgrade
- Smoothed financing
- Bill predictability & peace of mind
- Comfort assured
- Accredited & trusted providers

Our starting point: More value in well-being than kWh of heat ...

Enablers

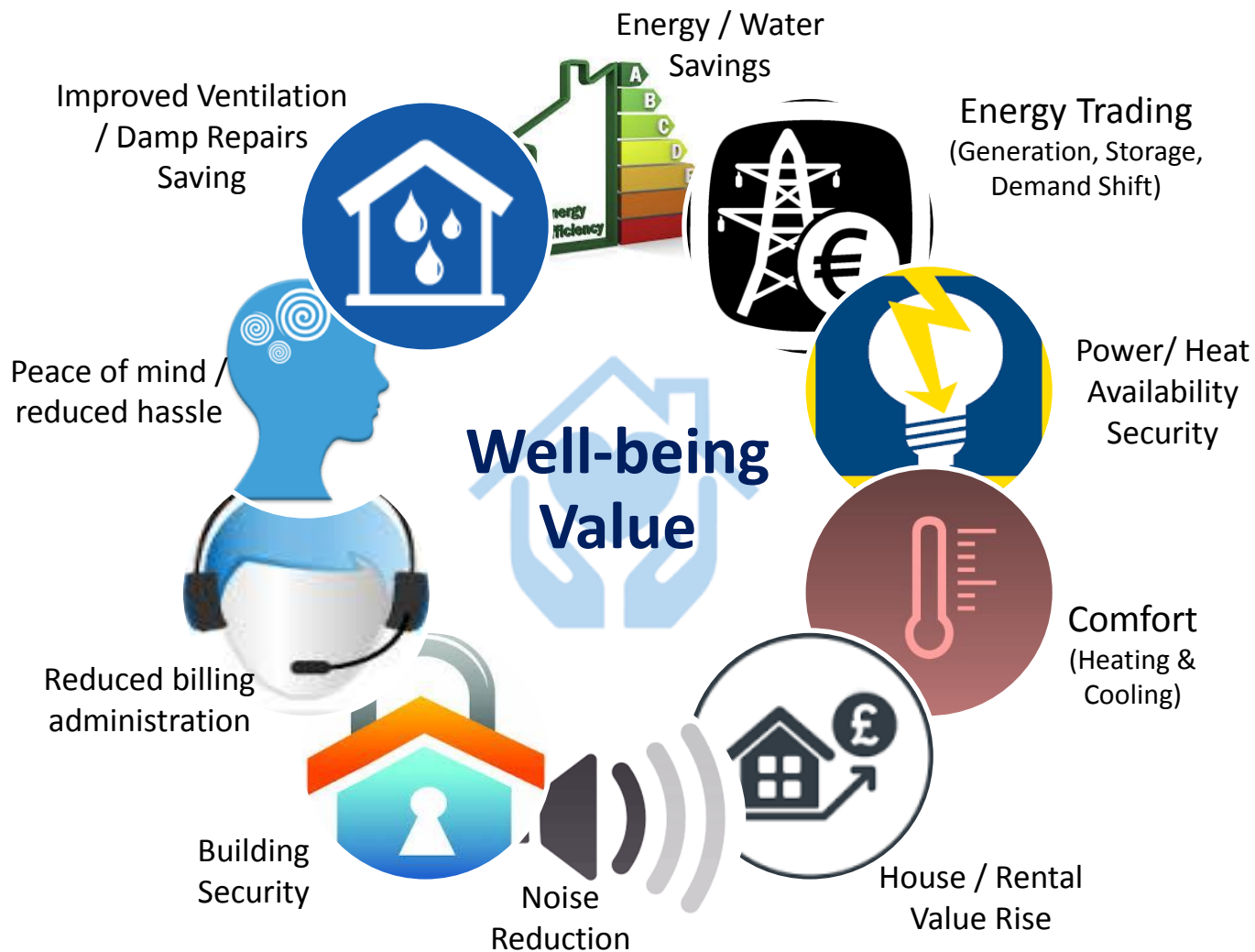
Home Energy Management

Energy Trading Platforms

Policy & Tax/Benefits Redistribution

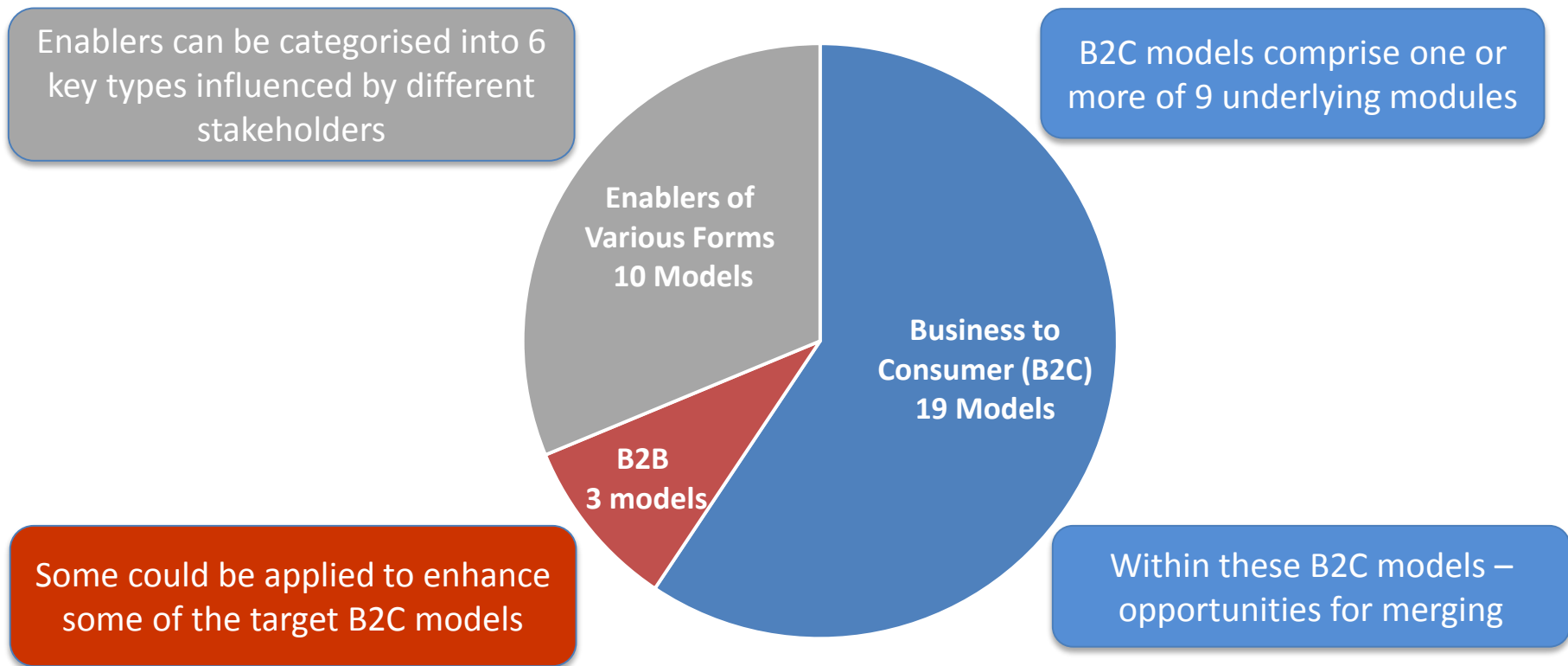
New Energy Technologies

New Business Models / Entrants



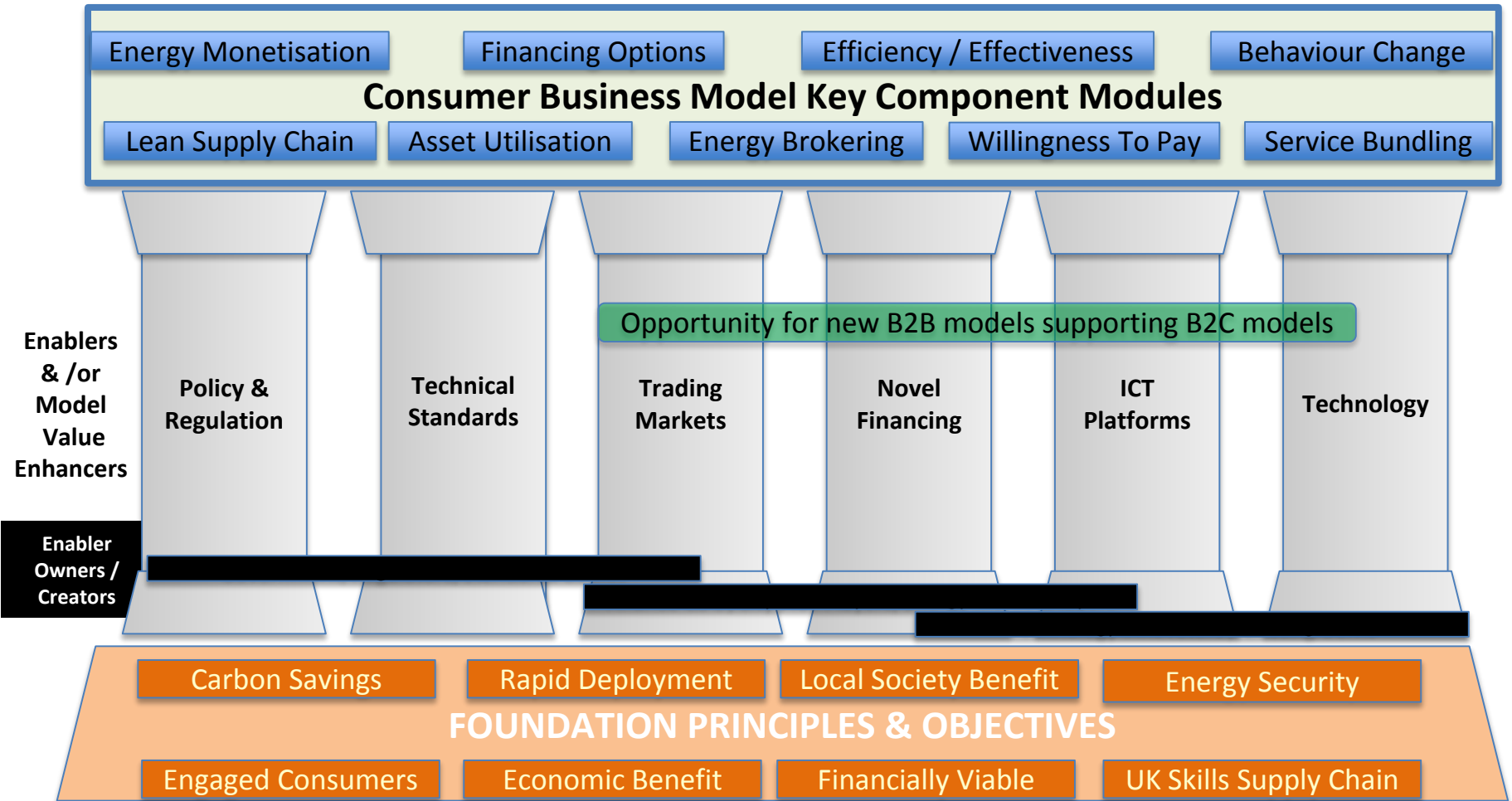
*Moving from Cost of Heating to **Cost of Wellbeing** in the home*

32 business model ideas in brainstorming phase – (over 20 sources of input)



19 out of the 32 were strictly B2C models

New Business Model Architecture



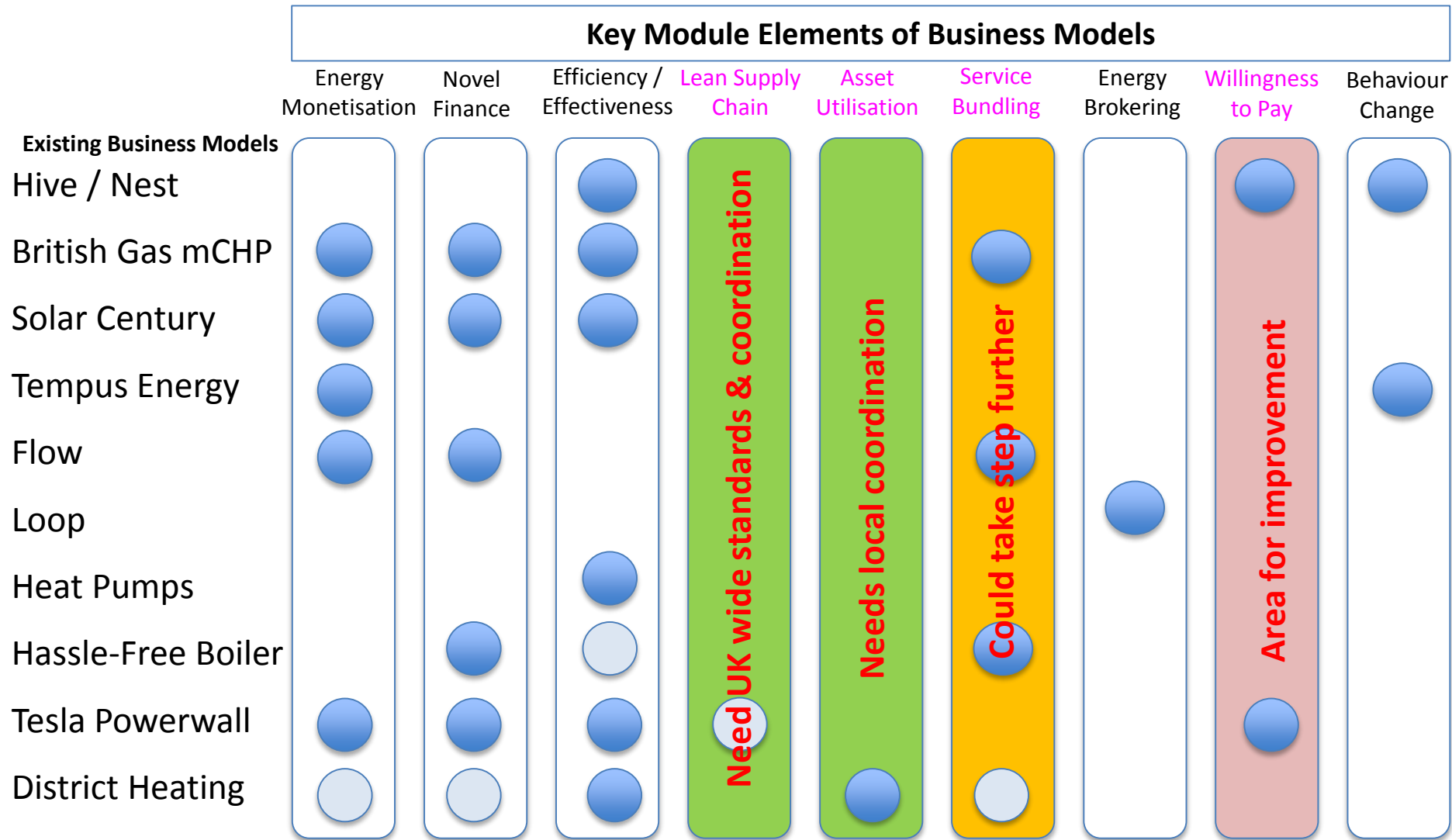
- Without enablers some business models may have only niche applicability
 - Enablers can come from private sector in many cases
- B2B business (e.g. Market Maker) models may help unlock new B2C models

55 sub-module elements were identified ... Card game devised to create new business models



Example of business model constructed during workshop with 3 local authorities

Mapping Existing Models across the Key Components

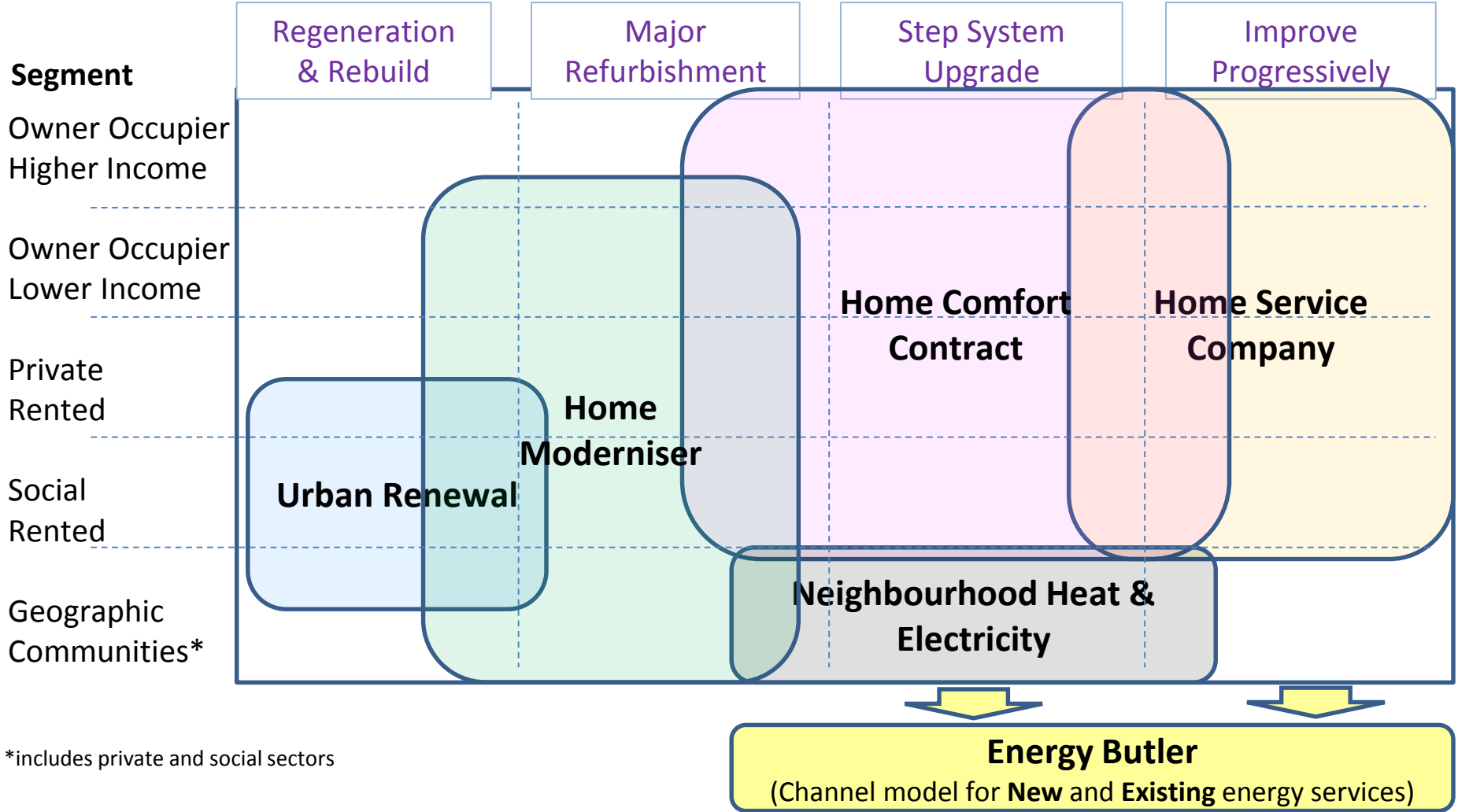


Opportunities for our approach to enhance these models

Following reconstruction approach 5 optimised business models were devised

Level of building refurbishment

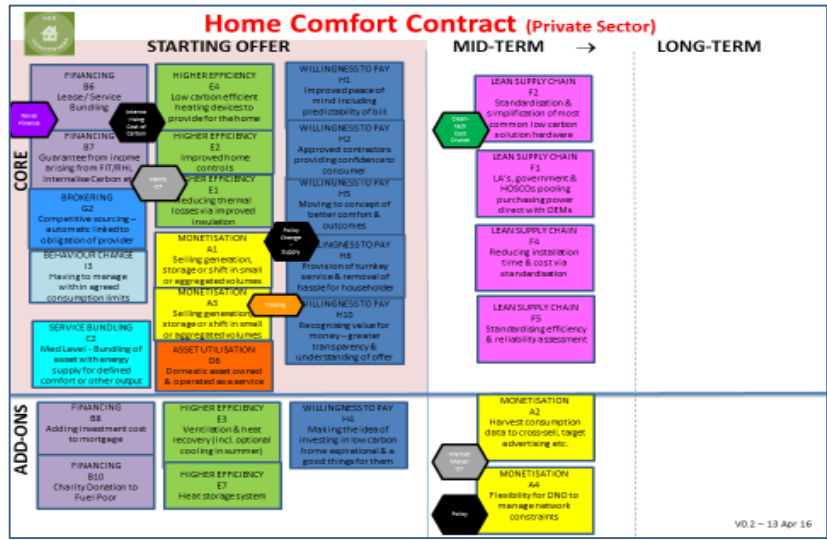
Increasing number of applicable dwellings ⇨



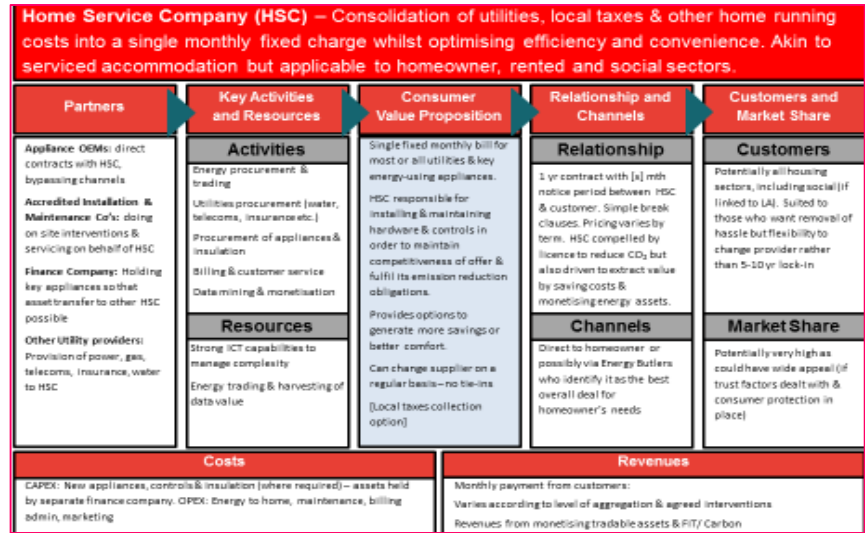
'A business model for every home'

Describing the Top Tier Business Models

A: Card deck: business model elements



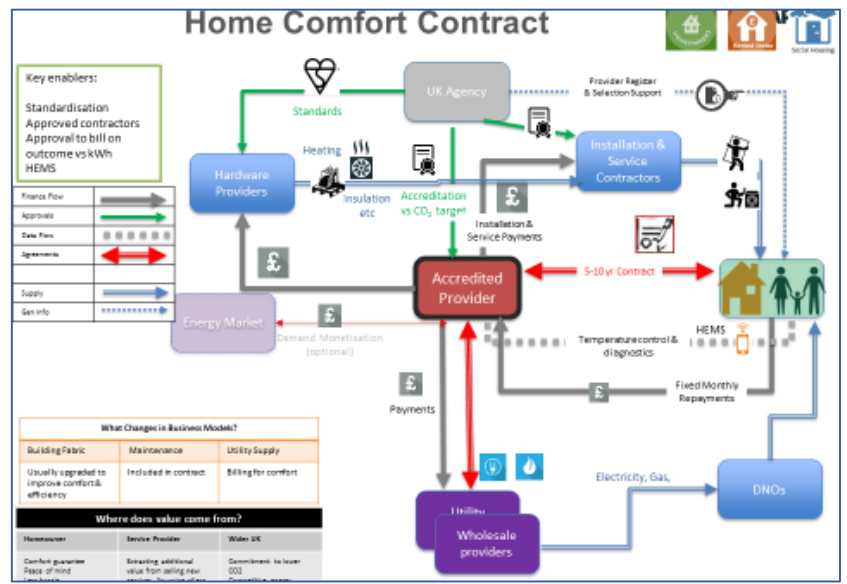
B: Business Model Canvass



C: Participant Roles Overview

Party	Core Model Role	Options / future role
Accredited Provider	<ul style="list-style-type: none"> Procures at best cost gas & power for heating Manages all billing and customer service Monitors and manages home via HEMS to meet agreed comfort level Identifies and effects changes to meet its CO₂ reduction targets Procures, finances & manages installation of insulation and new home heating systems Monetises demand shift, forecasting, data in the market 	<ul style="list-style-type: none"> Provision of ventilation offer Heat storage capability Bundling of other services
Installation & Service Contractors	<ul style="list-style-type: none"> Install and manage any relevant energy appliances in home (paid for by Provider) 	
Wholesale Providers	<ul style="list-style-type: none"> Provide utilities to Homeowner via contract with Provider 	
Hardware Providers	<ul style="list-style-type: none"> Manufacture heating hardware & insulation against standards set by UK agency Deliver direct to installers but paid by Provider 	
Catapult / UK Agency / Skills bodies	<ul style="list-style-type: none"> Provides licence to Provider to operate outcomes model and audits compliance with CO₂ reduction targets Provides accreditation for installer companies Provides low lifetime cost appliance standards to Hardware OEMs 	

D: Business Model High Level Process Flow

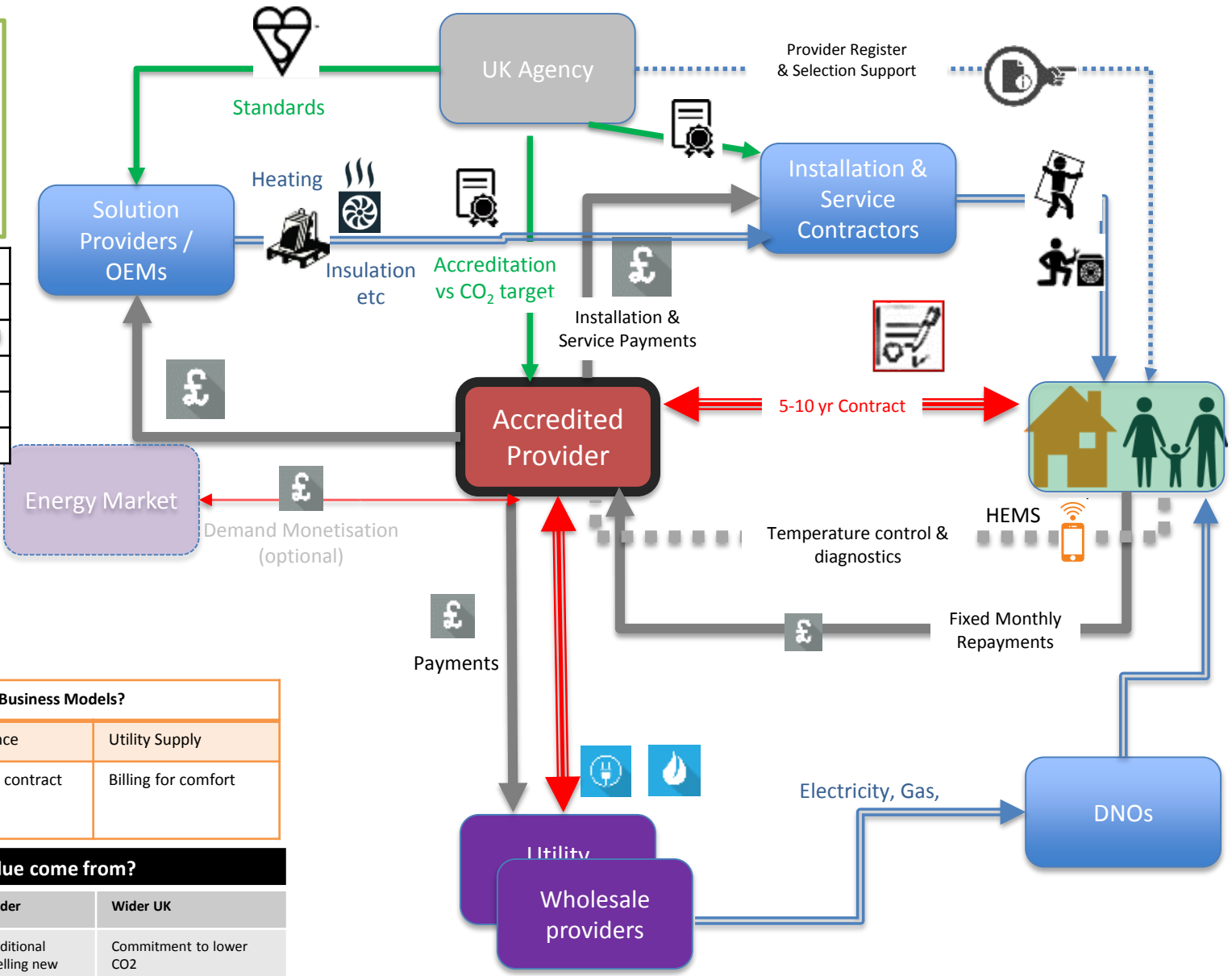


Home Comfort Contract



- Key enablers:**
- Standardisation
 - Approved contractors
 - Approval to bill on outcome vs kWh
 - HEMS

Finance Flow	→
Approvals	→
Data Flow	⋯
Agreements	↔
Supply	→
Gen Info	⋯



What Changes in Business Models?

Building Fabric	Maintenance	Utility Supply
Usually upgraded to improve comfort & efficiency	Included in contract	Billing for comfort

Where does value come from?

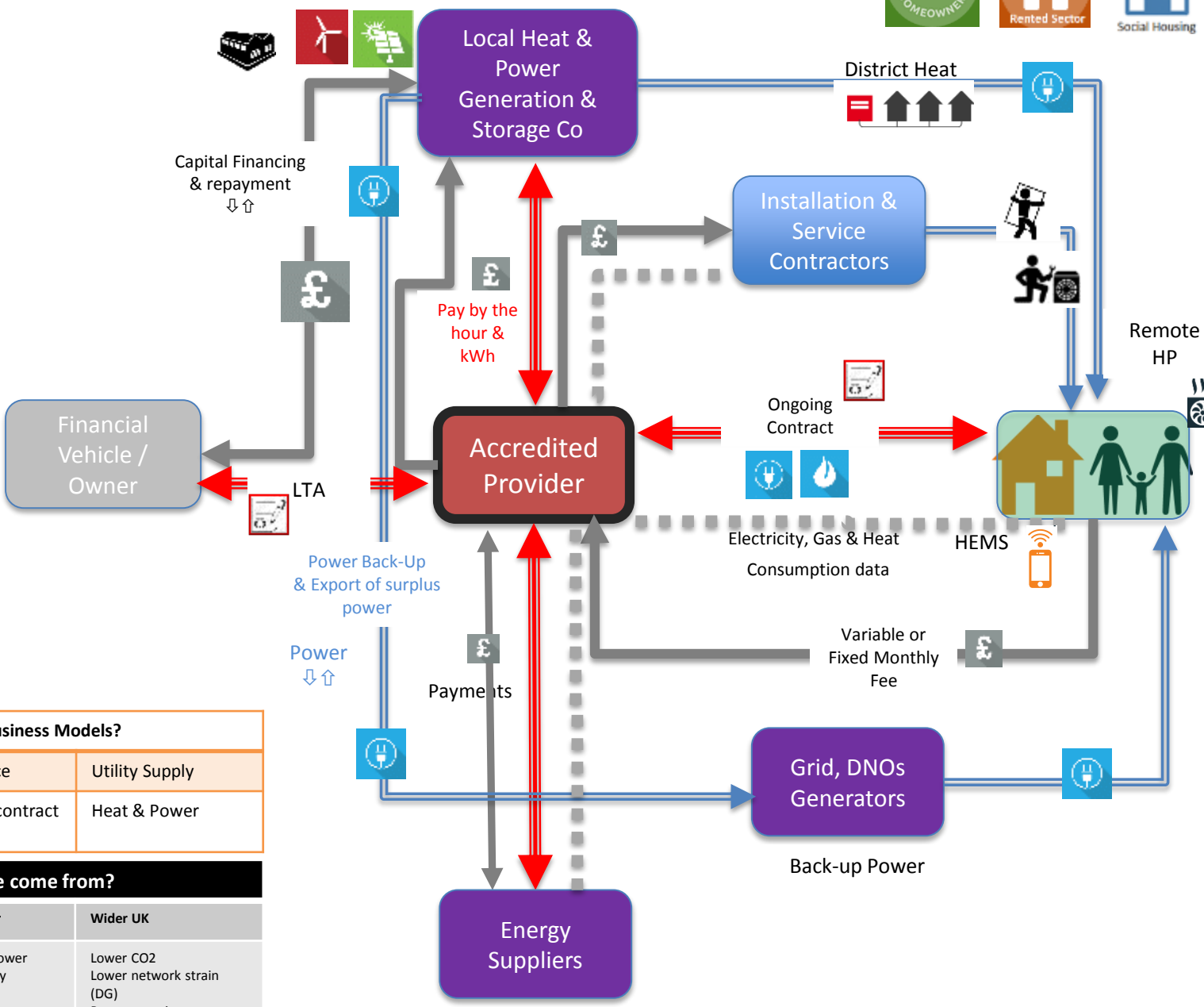
Homeowner	Service Provider	Wider UK
Comfort guarantee Peace of mind Less hassle Improved house	Extracting additional value from selling new services. Sourcing of gas & heat. Enhanced consumer value	Commitment to lower CO ₂ Competitive energy Secure heating

Neighbourhood Heat & Power



- Key enablers:**
- Approved contractors
 - HEMS
 - Trading for surplus power
 - Policy inc. Consumer regulation,
 - Standardisation

Finance Flow	→
Approvals	→
Data Flow	→
Agreements	↔
Supply	→
Gen Info	→



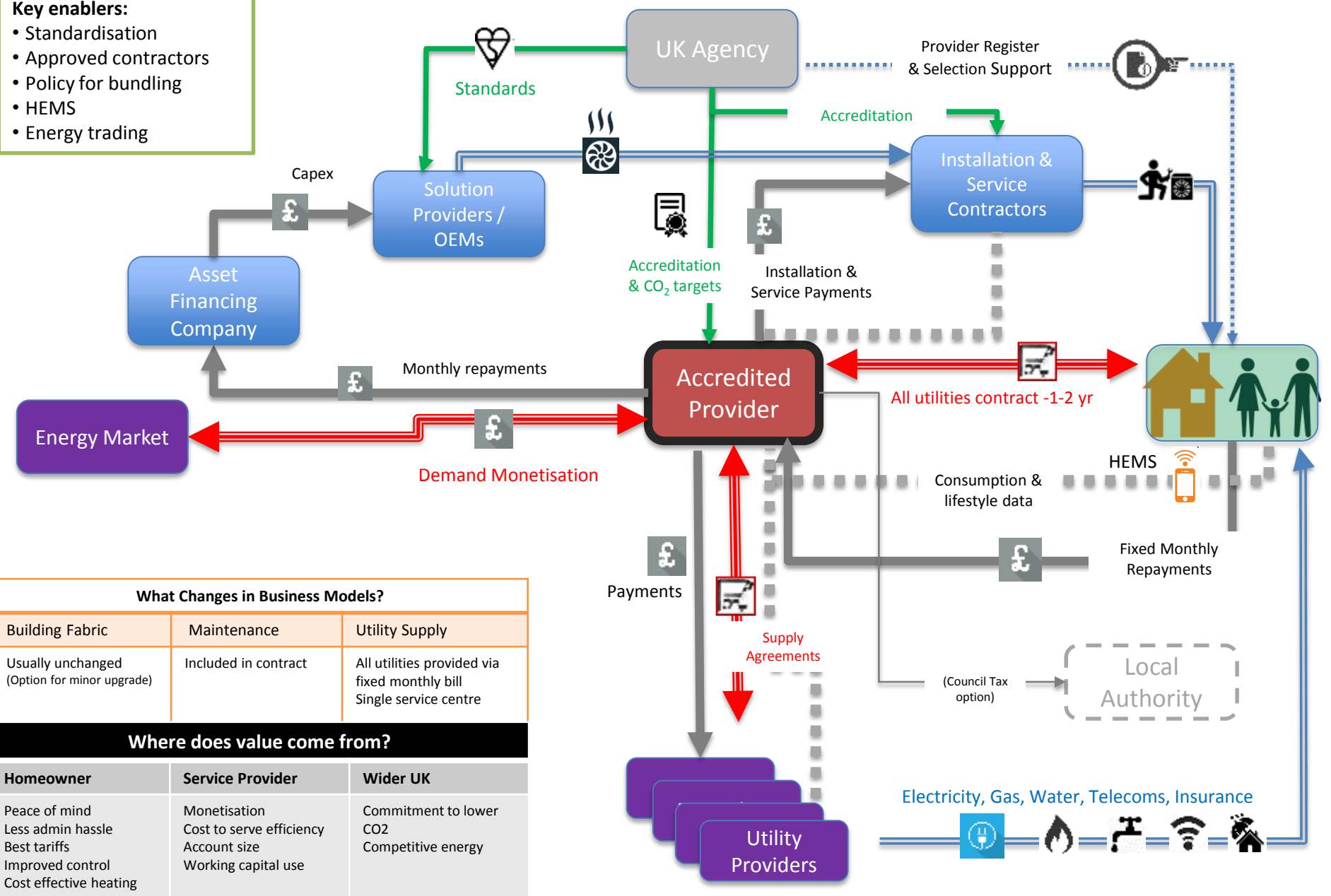
What Changes in Business Models?		
Building Fabric	Maintenance	Utility Supply
Change to district heat or heat pump	Included in contract	Heat & Power

Where does value come from?		
Homeowner	Service Provider	Wider UK
Peace of mind Community provider Resilient supply	Selling heat & power Long term supply contract Monetising spare power	Lower CO2 Lower network strain (DG) Power security



Home Service Company

- Key enablers:**
- Standardisation
 - Approved contractors
 - Policy for bundling
 - HEMS
 - Energy trading

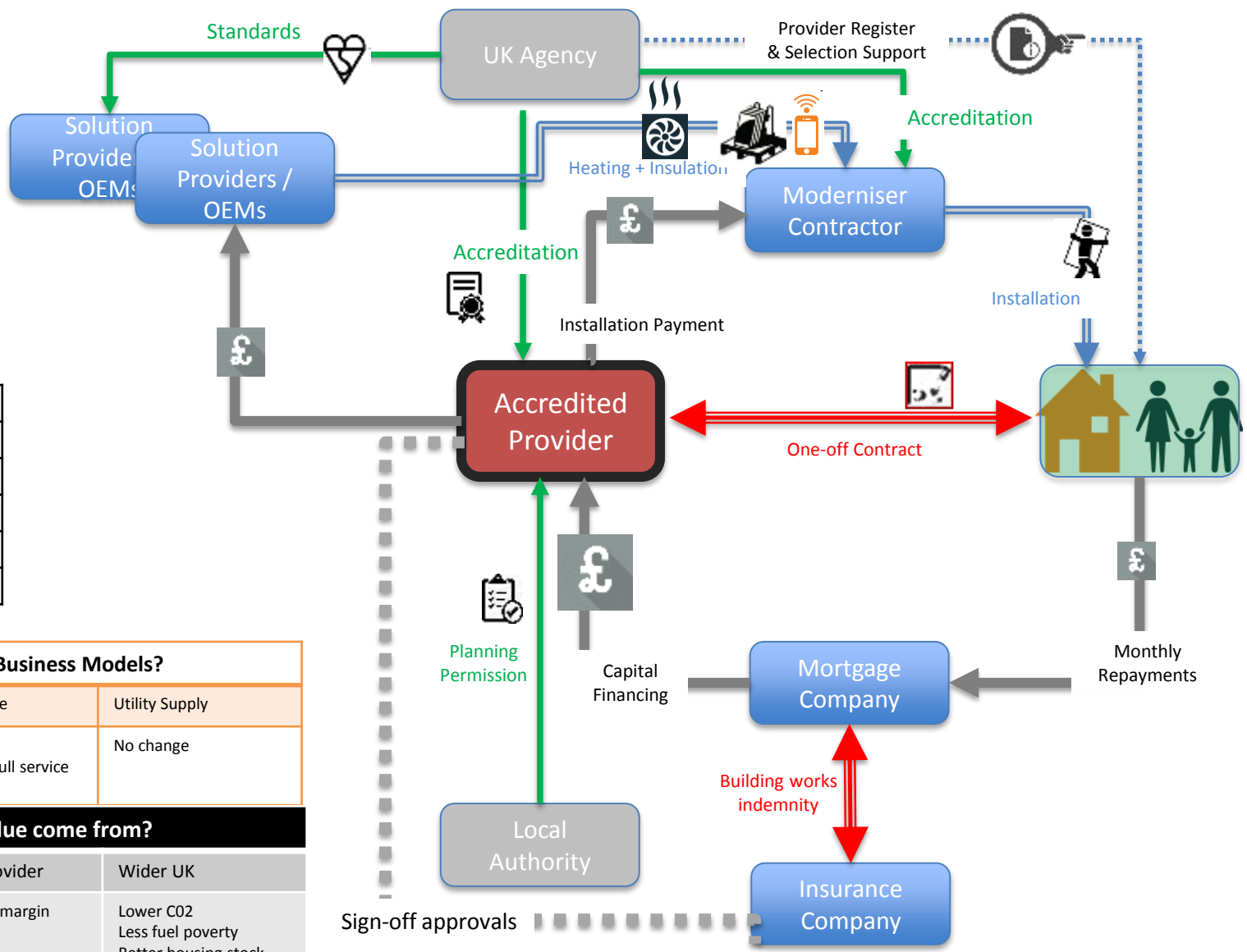


What Changes in Business Models?		
Building Fabric	Maintenance	Utility Supply
Usually unchanged (Option for minor upgrade)	Included in contract	All utilities provided via fixed monthly bill Single service centre
Where does value come from?		
Homeowner	Service Provider	Wider UK
Peace of mind Less admin hassle Best tariffs Improved control Cost effective heating	Monetisation Cost to serve efficiency Account size Working capital use	Commitment to lower CO2 Competitive energy



Home Moderniser

- Key enablers:**
- Standardisation
 - Approved contractors
 - Mortgage financing



Finance Flow	Grey arrow
Approvals / Accred.	Green arrow
Data Flow	Dotted grey arrow
Agreements	Red double-headed arrow
Supply	Blue arrow
Information	Dotted blue arrow

What Changes in Business Models?		
Building Fabric	Maintenance	Utility Supply
Completely modernised – v. low carbon	No change (Option for full service provision)	No change

Where does value come from?		
Homeowner	Service Provider	Wider UK
Lower bills Higher house value Better comfort Lower maintenance Lower cost of capital	Renovation margin	Lower CO2 Less fuel poverty Better housing stock Local jobs Lower peak demand

Consumer feedback on Top Tier models

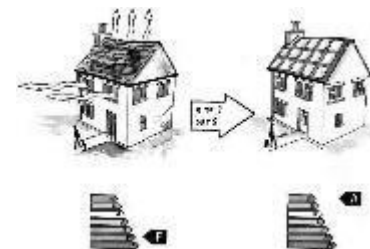
- Positive reaction to the business models – surprising level of engagement
- Fixed bills, paying for outcomes & neighbourhood aspects well received
- Need to develop implementation & communication of each model to address:

COMFORT LEVEL	TEMP	MINS	HEAT SYSTEM & MAINTENANCE	FIXED COST
GOLD			✓	£ XXX
SILVER			✓	£ XX
Bronze			✓	£ X



- Lack of trust in energy market players
- Fear of novelty and ability to deliver business models
- Provision of contractual safeguards and flexibility
- Clarity on estimated costs and financial obligations on consumer

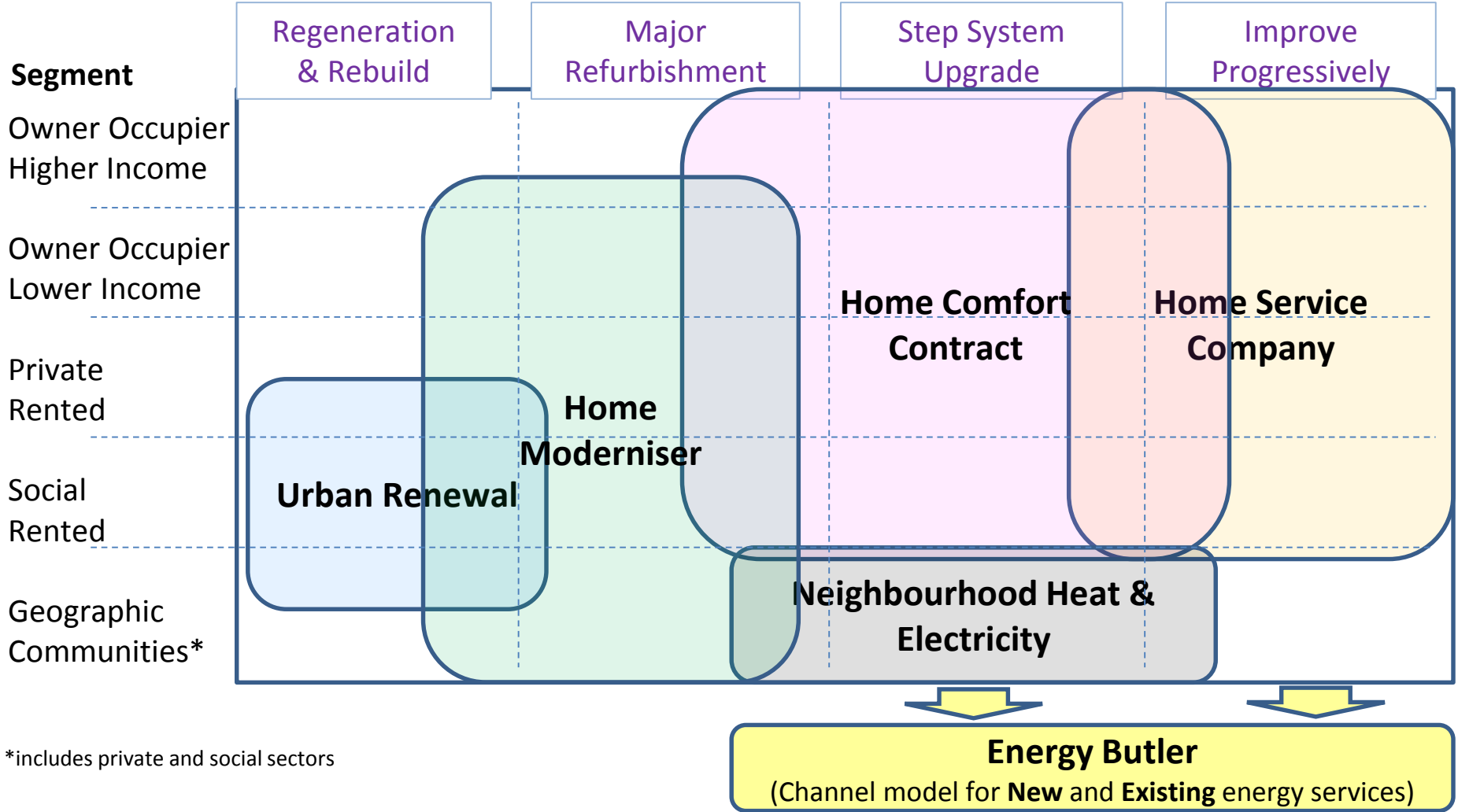
- Successful ‘show home’ demonstrators will play a vital role



Following reconstruction approach 5 optimised business models were devised

Level of building refurbishment

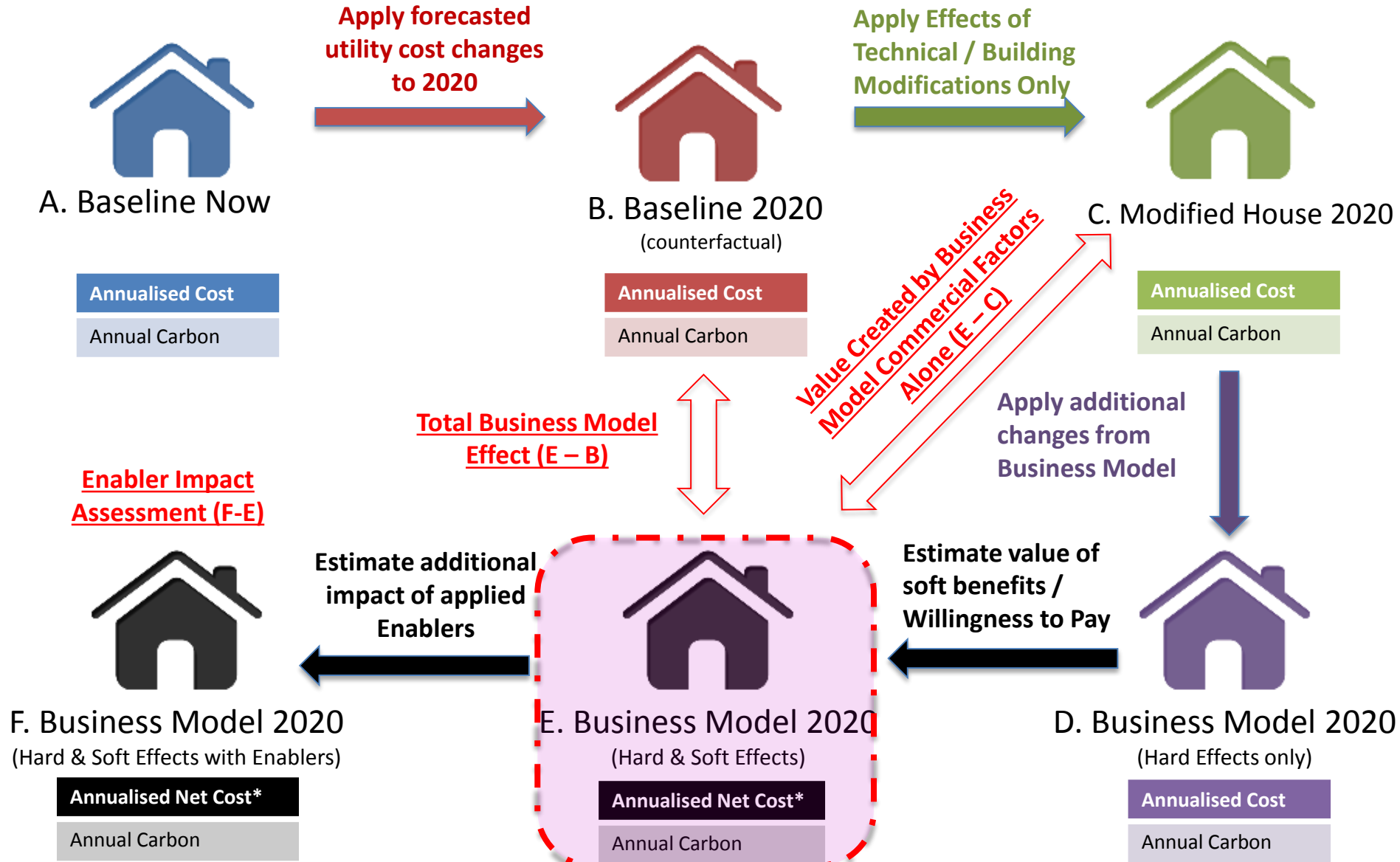
Increasing number of applicable dwellings ⇨



'A business model for every home'

Analytical Cases for Each Business Model

* Net cost = Hard Cost & value of soft benefits / Willingness to Pay (WTP)



Willingness to Pay (WTP) Elements –suggested applicability

Soft / Willingness to Pay Benefit	Home Service Company	Home Comfort Contract	Home Moderniser	Neighbourhood Heat & Electricity	Urban Renewal
Change in house value			✓		✓
Ongoing convenience & removal of hassle	✓	✓		✓	
Comfort and Control	✓	✓	✓	✓	✓
Noise insulation		✓	✓		✓
Community value / benefit				✓	✓
Damp / air quality / health		✓	✓		✓
Security of power supply & heat				✓	
Predictability / fixed billing peace of mind	✓	✓		✓	
Elimination of surprise costly repairs	✓	✓		✓	
Avoiding upfront cost of capex	✓	✓	✓	✓	
Higher rent earning power		✓	✓		
Trusted providers (with guarantees)	✓	✓	✓	✓	✓
Space Savings				✓	
Perceived safety benefits				✓	

3rd party analysts to assign upper and lower range of WTP for each business model

QUESTIONS



Appendices

(Please note that these are not in their final versions and are pending editing for the final report)

Top Tier Business Models

Home Service Company

Consolidation of utilities, local taxes & other home running costs into a single monthly fixed charge whilst optimising efficiency and convenience. Akin to serviced accommodation but applicable to homeowner, rented and social sectors.

Home Comfort Contract

Long term contract whereby the supplier undertakes to guarantee and cover all necessary investments for an agreed comfort / temperature level for a fixed monthly price. Electricity retail offer combined.

Home Moderniser

An aspirational home upgrade & improved occupant well-being through major improvement of insulation, controls, low carbon heating system within a full system approach. Financed via the mortgage and/or cash contribution from the homeowner

Neighbourhood Heat & Electricity

A community-scale low carbon heating & power solution option with a strong local identity. Using distributed generation and storage assets run for the community providing heat via local networks or via heat pumps in some homes.

Urban Renewal

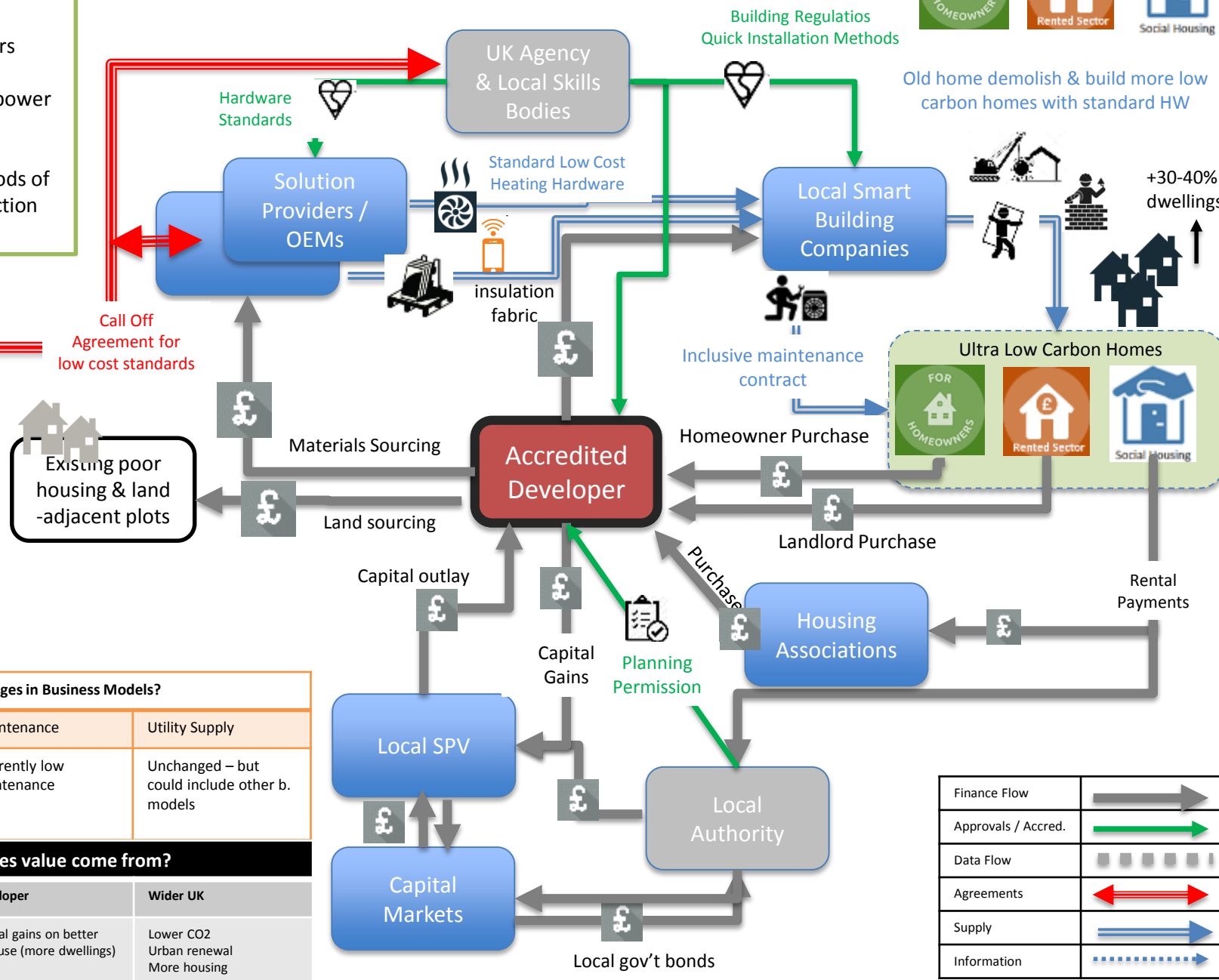
Accelerated regeneration of old, poor quality & lower density housing stock to provide more housing, urban renewal & near zero carbon homes, funded in part from the value created by higher dwelling density & home value / rental enhancements & better use of land.

Urban Renewal



- Key enablers:**
- Approved contractors
 - Standardisation
 - Pooling purchasing power
 - Planning Permission
 - Innovative financing
 - Building during periods of low private construction activity

National Local Authorities



What Changes in Business Models?		
Building Fabric	Maintenance	Utility Supply
More dwellings. All v low carbon Better quality More secure	Inherently low maintenance	Unchanged – but could include other b. models

Where does value come from?		
Homeowner	Developer	Wider UK
Lower energy bills Higher comfort Better living environment	Capital gains on better land use (more dwellings)	Lower CO2 Urban renewal More housing

Finance Flow	→
Approvals / Accred.	→
Data Flow	→
Agreements	↔
Supply	→
Information	→

Comparison of Business Models

	Home Service Company	Home Comfort Contract	Home Moderniser	Neighbourhood Heat & Electricity	Urban Renewal
Novelty	High	High	High	Medium	Medium
Service Aggregation	High	Medium	As-Is	Medium	Could vary
Degree of renovation	Low – Medium	Medium	Medium – High	Low-Medium	Total – rebuild
Contract term	12 months +	10 yrs + with flexibility	None	Continuing contract	n/a
Financing	Pay-as-you-go + lease option	Long Term Lease Contract	Upfront on mortgage	Pay-as-you-go	Via capital gains
Emotional outcome	Removal of hassle	Guarantee of comfort	Aspirational new feel home	Community empowerment	New homes
# of providers	Few nationals & some locals	Choice of local & nationals	Wide choice of accredited	Single provider	Regional / LA backed

Models covering all sectors with distinct features for consumer

One of 32 high level canvasses for the Long List

Home Services Company (HoSCO): Bundling of utilities, relevant hardware, controls, maintenance and local taxes for a fixed monthly fee linked to comfort, service level and consumer profile.

Stakeholders / Partners	Consumer Value Proposition	Customers / Market Share
<ul style="list-style-type: none"> Local service company / 'HoSCO' Local Authorities Insurance companies Utilities Appliance companies Financial regulators / banks Landlords ICT system provider (HEMS, Trading) 	<ul style="list-style-type: none"> The householder pays a single monthly bill for all utilities and taxes – energy, water, insurance, servicing or energy-related appliances, local taxes, internet/phone – all linked to a tiered level of availability and comfort and weighted by level of consumption validated by smart meters, water metering and usual appraisal of risk. Could include house rent too Allows future link of local taxation to resources use in home Single point of collection & contact. HoSCO profitability determined by it using best hardware & control strategies to install in home - tradability, reliability, energy saving. 	<ul style="list-style-type: none"> Private and rented sector Houses and flats All customers with appropriate credit risk
Costs / Risks		Revenues / Benefits
<ul style="list-style-type: none"> Sophisticated IT for aggregation of information & customer service HoSCO skills and trading complexity Current players & equipment cos suffer from disintermediation Need to avoid dominance of HoSCO – abuse of position Data privacy – HoSCO will have huge insights Switchability of provider and installed assets in home 		<ul style="list-style-type: none"> Revenues: Large aggregate subscription for HoSCO to harvest. Income from demand response / comfort level inducements. Significant reduction in total level of service administration costs Customer has one bill & point of contact for all house issues Taxation collection issues nearly eliminated – could eliminate house valuation issues and tax as a function of resource intensity Technology agnostic Low carbon technologies encouraged and demand response reduce emissions relatively quickly and progressively
Adaptability	<ul style="list-style-type: none"> Start small with bundling of utilities first, migration to hardware choice and management later. Taxation can come at any time. Becomes much more viable (and lower total carbon) with HEMS and Energy Trading platforms Scale will require introduction of competing HoSCOs Some local authorities many have the means to set up HoSCOs and privatise later 	
ID No. 8 / HOS V0.1	Categories Covered: ESCO, Bundling, Capex Elimination	Similar To:

Example

Our idea ranking criteria for ideas Long List

Criterion	Assessment Guide	Weighting
CO₂ reduction potential	Likely carbon savings at aggregate level from power source to home affected by business model	● ● ●
National Economic Benefit	Likely financial benefits in energy value chain – both hard & soft	● ● ●
Speed of Penetration	How quickly & widespread could model be implemented in UK to have a high level of impact	● ● ●
Potential Customer Acceptance	Likely appeal of proposition to consumers in relevant segments	● ● ●
Adaptability / Future Proof	How robust is model to changes in technology, market, demographics, policy etc	● ●
Local Economic & Social Benefit	Potential impact on local jobs when model deployed at scale	● ●
Financial Risk for Provider of Model	Level of risk to those providing the finance necessary to implement the business model	● ●
Policy Dependence	To what degree is model dependent on or vulnerable to policies in UK or EU	● ●
Proof of Concept Cost	Total funding likely to be needed from government or other stakeholders to effect demo in Phase 2	● ●

Criteria applied to ideas

Customer Acquisition	Adaptability	Local	Weighted Score	Unweighted Rank	Rank	Rank
3	5	5	125	11	3.5	4
3	5	5	109	25	3.5	4
2	3	5	119	21	2	2
3	5	5	0	0	N/A	35.5
3	5	5	85	25	3.5	4
3	5	5	82	23	3.5	4
3	5	5	109	25	3.5	4
3	5	5	89	25	3	9
3	5	5	85	25	3.5	4
3	5	5	0	0	N/A	35.5
3	5	5	79	23	3.5	4
3	5	5	63	25	3	9
3	5	5	95	27	7	17
3	5	5	99	27	8	15.5
3	5	5	0	0	N/A	35.5
3	5	5	69	21	29	14.9
3	5	5	69	21	27	17
3	5	5	79	23	13.5	11
3	5	5	99	27	8	15.5

Enabler Overview Example: Policy

Description

Changes in policy regarding taxation, internalising carbon, building regulations, deregulation, data protection, benefits allocation, incentives etc which either free up the market to make changes and innovate or encourage/force change in direction.

General Benefits / Opportunities

Enables new financing regimes, trading and service bundling. Will have dramatic impact on adoption of insulation and new heating technology.

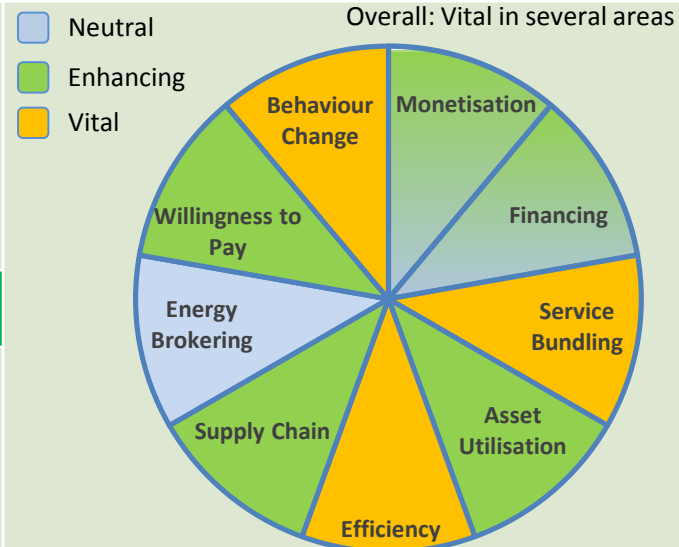
Ideas / Suggestions within this Enabler type

- Pay to Waste – progressive energy tariffs
- Interested Green Landlord
- ESP Emission Reducers
- Winter Fuel to Refurbishment

Key Issues to Address

- Adverse consumer reactions
- Setting level of carbon pricing
- Forcing stricter building regulations

Impact on Business Models



Most Affected Model Elements

- Insulation & heat pump
- High level of service bundling
- Penalising excessive energy use

Who Can Make It Happen?

- DECC / Ofgem
- Treasury
- Government / Consumer Law

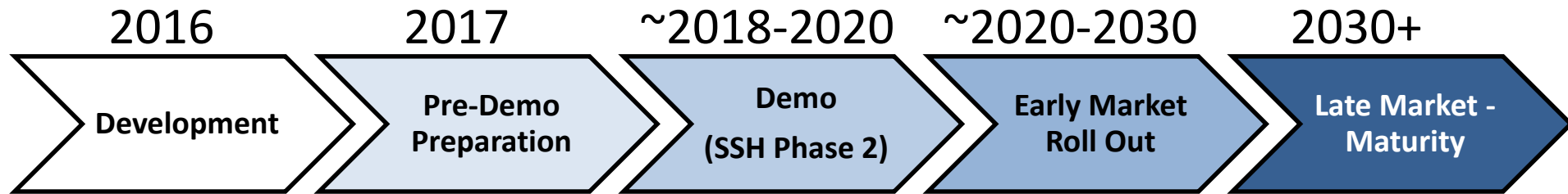
Example

Thoughts on ‘offer transition’ (delivered by evolving existing businesses and new organisations)



Duration	1-3 months	After 1-6m	After 1-12m	After 1-24 m
Purpose	<ul style="list-style-type: none"> • Introduce suitable BM concept & benefits • Gain customer confidence • De-risk outcomes 	<ul style="list-style-type: none"> • Get customer used to remote control of heating • Build trust with provider • Show initial benefits 	<ul style="list-style-type: none"> • Introduce improved appliances where appropriate • Take over appliance ownership & service 	<ul style="list-style-type: none"> • Start extracting value from data, energy trading • Upsell other services / offerings
Changes Applied				
HEMS	○	●	●	●
Remote Control		○	○	○
Energy / Utility Sourcing		●	●	●
Appliance Service		○	●	●
Hardware Ownership Transfer		○	●	●
New Hardware in Home or DH connection		○	●	●
Energy Trading & Monetisation				●

Evolution of Business Models



# Homes per Model	200+ (survey stage) Start demo sites identif'n	500 - 2000	50k to 0.5M per annum (to 20k / wk all models)	100k to 2M per annum
Number of Providers	Securing delivery partners	3-5 (some under LA)	3+ per model	7+ per model
Enablers Needed / Pref'd				
ICT Platforms including HEMS	Lab Testing & Early Trials in Homes	Deployment of upgraded version	Further deployment & upgrades	Further deployment & upgrades
Policy & Regulation	Detailing	Virtualised	Commence National Roll-out	Roll-Out Complete
Novel Financing	Validation	Pilot Schemes	Early market providers	Mature market providers
Trading Markets	New Concept Development	Design of future state & Initial Trials	Launch into market	Fully deployed
	Identifying existing potential providers	Testing of B2B models	Shake out of best schemes	Continued evolution
Technical Standards	Scope Development	Design & validate	Easy options deployment	Full range deployed
New Technology	Not required (exception HEMS & integration)	Feasibility assessment	Piloting & early sales	Mass market penetration