Deep Retrofit Energy Model (DREeM) and Energiesprong

1. Summary

The Nottingham Deep Retrofit Energy Model (DREeM) programme follows the Energiesprong approach to full-house retrofitting. This approach has been widely utilised and formulated in the Netherlands.

An Energiesprong retrofit consists of a full-house upgrade including a thermally efficient façade, solar PV roof and in-house 'energy hub'. Currently the scheme is focused on the social housing stock as a sector receiving efficiency investment, often single installation, already.

The scheme is reliant on initial funding, partially from the EU, to kickstart initial retrofit of housing. An 'energy plan' is then set up with the homeowner, paid to the landlord (in this case Nottingham City Council), and reinvested into other Energiesprong retrofits. Over time a domestic and international supply chain is expected to develop, reducing costs of the model.

In the case of a UK exit from the EU, a large proportion of funding to carry out the retrofits would need to be sourced from elsewhere with loss of access to EU funding pots. This may be in the form of a Shared Prosperity Fund proposed by the UK government.

2. Description

Overview

The Energiesprong scheme is a highly successful approach to energy efficiency upgrades across the Netherlands, implemented by the Dutch Government. It sets standards to achieve net zero energy homes. Typically this involves a 3-D scan of a pre-existing house, to appropriately install a new thermally efficient façade, solar PV roof and 'energy hub' which includes air or ground source heat pumps and optional batteries. Across the Netherlands, over 1,000 Energiesprong retrofits are now carried out every year.

Nottingham City Homes was the first housing association in the UK in December 2017 to use the Energiesprong approach under an initial ten house pilot project (see Figure 1), although up to 400 homes are expected to be retrofitted in this way. The bulk of the extended rollout is to fall under the Deep Retrofit Energy Model (DREeM) programme, which is a project backed by the European Regional Development Fund to improve energy efficiency in homes and public buildings in Nottingham. The DREeM programme is a scalable demonstration project, which tests the roll out of financial and commercial model of retrofits to homes and public buildings to increase energy efficiency and renewable energy generation. The aim is for the amount of energy used by a building annually to be equivalent to the amount of renewable energy created on site.

Nottingham City Homes and Nottingham City Council procured Melius Homes Ltd to deliver Energiesprong retrofits. The scheme saw installation of new outside walls and windows, a solar roof and efficient heating system including ground source heat pumps and battery and thermal storage within 15 days. As of 12 June 2017, Melius House Ltd was granted executive approval to extend the Energiesprong roll-out to 155 homes across Nottingham. The delivery of more retrofits was awaiting grant funding which has been partly secured through £5mn courtesy of the ERDF on 8 January 2019. As of April 2019, Moat Homes and Engie became the second developers of Energiesprong retrofits to 5 houses in Essex.

Figure 1: Nottingham pilot houses before and after retrofit

Source: Melius Home

Key Points

The scheme is particularly unique in the way its funds are recycled. The occupier of the household pays a flat rate tariff for hot water, heating and electricity outlined in their 'energy plan'. This income is less sensitive to fluctuating energy prices due to lower energy consumption which provides the occupier with a more cheap and secure energy plan. The fees under the energy plan are paid to Nottingham City Homes as the landlord, which is then able to reinvest such income into other similar developments. An energy guarantee of 30 years associated with Energiesprong retrofits, covered by high indoor climate and energy performance standards, also helps to maintain certainty in a fixed cost payment plan.

The whole-house retrofits were carried out within fifteen days meaning that residents did not need to move out during the makeover. This is possible through an integrated supply chain and the construction of tailored building parts in advance through the use of 3-D scanning for each individual property.

Another important aspect is emphasis on comfort and aesthetics, not cost savings. In previous UK approaches, such as the Green Deal, there has been a narrow focus on carbon dioxide savings leading to damp properties with insufficient ventilation. The new focus on an energy service agreement model and energy efficiency improvements allows for a zero-carbon house with increased comfort and aesthetic value.

In facilitating the scheme, Energiesprong UK acts as an intermediate (much like the market development team in the Netherlands) and not a deliverer of the retrofits. It is a consortium of 14 organisations including Nottingham City Homes and Melius Homes. Its role is to influence and facilitate change with industry stakeholders, Refurbishment Solution Providers (RSPs), the supply chain and government. Example changes in the Netherlands include changes to law to allow for energy service contracts to be combined within rents, and introduction of mortgages which can be classified as 'green'. This intermediary role is deemed as critical to the success of Energiesprong retrofits.

2. Participants

Participants of Nottingham City Council: Energiesprong

The following parties are responsible for the retrofits in Nottingham:

- Nottingham City Council is the district council covering the unitary authority of Nottingham and is responsible for authorising planning consent and allocating state funding
- Nottingham City Homes is a not-for-profit Arms Length Management Organisation (ALMO) and a partner in Energiesprong UK, and is responsible for managing Nottingham City Council's social housing stock. It selected the ten homes part of the Energiesprong retrofit and is a partner of the wider Energiesprong UK organisation
- Melius Homes is a contractor and partner of Energiesprong UK that was procured for retrofitting the Nottingham City social housing stock. It has been announced that Melius homes will continue to carry out future retrofits across Nottingham City in the future
- The European Union provided funding through its REMOURBAN strand of its Horizon 2020 scheme. REMOURBAN is a smart city project to improve overall town and city sustainability. Nottingham is one of the cities chosen under the scheme, and as a result Nottingham City Council could contribute some of this towards the Energiesprong retrofit amongst other sustainable improvements. Its funding provided to the wider Energiesprong UK consortium also under the Horizon 2020 scheme but under its Transition Zero strand, meant that the Energiesprong UK team was able to contribute expertise to the Nottingham retrofits as well
- Energiesprong UK leant valuable expertise and guiding throughout the project, as well as contributing a proportion of its funding to the Nottingham City retrofits.
- Interreg Europe is an EU funded organisation that helps to facilitate change in policy across local and regional governments. In Nottingham City's Energiesprong venture, it contributed funds towards its development

Participants of wider Energiesprong UK organisation

This includes the other 12 members of Energiesprong UK, and those not directly involved in the retrofits in Nottingham, but a part of the wider Energiesprong movement and influence in the UK.

- Accord Group
- Clarion Housing Group
- Moat
- Optivo
- Your Homes Newcastle
- Beattie Passive
- Engie
- Mears
- Sustainable Group
- Wates
- Energy Saving Trust, and
- National Housing Federation

3. Financials

Funding for Nottingham City Council's Energiesprong retrofits was included within a finance package to create 155 retrofitted homes. As a result, funding for the 10-house pilot demonstrated in 2017 was taken as a proportion of this package.

Financial information is displayed in two forms. Proposed funding breakdown before the 10-house pilot in December 2017, and funding breakdown after actual costs incurred from the 10-house pilot were accounted for in October 2018.

Figure 2: Capital expenditure and funding breakdown

Capital expenditure split	Approved budget (2017)	Revised budget (2018)
Nottingham City Council	£5,286,000	£5,922,000
ERDF DREeM	£4,214,000	£4,425,000
Interreg	£0	£580,000
Total	£9,500,000	£10,927,000

Source: Nottingham City Council

Approval for allocation of funds for the 155 Energiesprong retrofits was given on the following grounds:

- Resulting additional investment into Nottingham City Council properties through grant of £626,000 leading to a total grant for its housing scheme of £4,840,000;
- Despite a rise in the cost per property, this is offset by saving in 30-year housing revenue account;
- Evidencing a reduction in costs during the programme which shows transformation and long-term impact;
- Allows for development of a business model that will make DREeM more affordable and sustainable;
- Leads to regeneration of entire area;
- An expected significant reduction in fuel poverty; and
- A commitment of the contractor to invest in a Nottingham-based factory to employ via the Nottingham Jobs Fund.

The total cost of Energiesprong retrofits for 155 homes is now anticipated to be £10,700,000.

Nottingham City Council was able to increase its contribution through match funding proposed and included within the energy budget line of the Housing Revenue Account, outlined as part of its 30-year business plan in June 2018.

The project is expected to deliver a 20% saving between current costs of retrofits and those at the end of the project.

4. Replicability

General requirements

The UK (along with France and the Netherlands itself) was chosen after an Energiesprong initial analysis of 10 EU countries. The research found a number of factors contributing to its suitability. These include

- The socio-economic setting;
- Political support – the UK has a target to ensure all fuel-poor homes achieve an energy efficiency rating of C by 2030;
- Available financing – EU funding and LA budgets for increasing the efficiency of households; and
- Technical characteristics – examples include limited district heating, sufficient stock volume with some homogeneous characteristics and climatic circumstances.

These were all deemed to increase the likelihood of success for the Energiesprong approach across the UK. The consortium of 14 participants of Energiesprong UK is also considered a key sign of its potential success.

Scope

At least 11mn UK homes are suitable for Energiesprong retrofits. This consists of 2.3mn social homes, 7mn privately owned homes in England and 1.8mn homes in Scotland, Wales and Northern Ireland. The total UK social housing stock is equal to 4.9mn homes. This is split at 2.1mn (34.7%) provided under Local Authorities (such as Nottingham City Council) and 2.8mn (56.3%) by housing associations. This creates a substantial opportunity for the Energiesprong scheme to be rolled-out nationwide.

Scalability

A key feature of the Energiesprong initiative is an increase in cost savings over time once an integrated supply chain is established. Cost reductions under scale are shown in Figure 3.

There are plans to scale-up Energiesprong internationally which will further drive down costs. Currently (May 2019), there are retrofit plans across the Netherlands (14,400), France (6,550) and the UK (225) primarily with but with intentions also to replicate across Germany (26) and Italy (5).

Figure 1: Cost reduction trajectory

Housing units	Price per house	Total investment
100	£70,000	£7,000,000
400	£62,000	£25,000,000
500	£55,000	£27,500,000
4,000	£47,500	£190,000,000
Total		
5,000	-	£249,500,000

Source: Transition Zero

5. Future outlook

Policy and funding

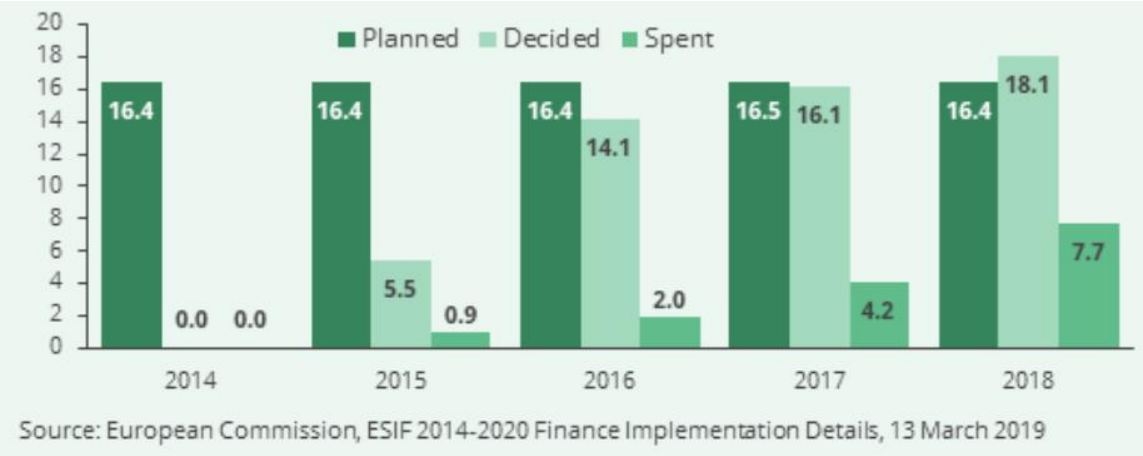
The current approach to Energiesprong retrofits in the UK is heavily reliant on EU funding which accounted for over 40% of funding in the case of Nottingham City Council's Energiesprong retrofits. In the case of a UK exit from the EU by 31 October 2019, access to funding for Energiesprong retrofits to the social housing sector may prove more problematic and, with the private branch of Energiesprong retroffiting still in its infancy, the success of the scheme may be undermined.

An alternative route to success in the case of an EU exit may be the Shared Prosperity Fund (SPF). The SPF is a UK replacement to the structural funding from the EU. It would work in a similar way to EU funding where funds would be allocated to different regions, likely on a by-need basis. Any consultation on the fund is yet to be published lending uncertainty as to how it would operate. Likely themes of the consultation will include; its priorities and objectives, the amount of money to be allocated, the way in which it is administered and who will be administering it. The current structure of EU funding is shown in the two figures below.

Energy savings

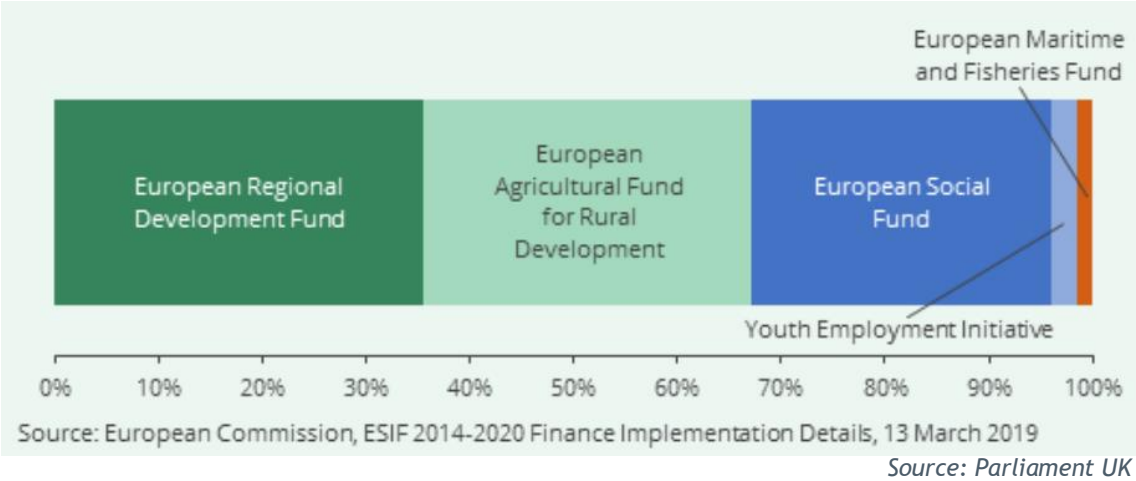
Energy efficiency is becoming a key element of the UK's strategy to tackling emissions from the domestic sector. With a traditionally single-installation approach to upgrading the UK's housing stock becoming increasingly exhausted, there will likely be a look towards more DREeM focused retrofits in the future. This may lead to a greater funding availability and support towards Energiesprong retrofits in the future.

Figure 4: Cumulative 2014-20 totals at year end (€bn)



Source: Parliament UK

Figure 5: Allocations as of 2018, % of all structural funding



Source: Parliament UK