



# Moat Homes, Maldon Energiesprong pilot

## Home Zero delivers the UK's First Housing Association Pilot of Energiesprong retrofit to properties in Essex

In 2018, EQUANS was successfully awarded the contract to deliver an energy saving retrofit programme to five properties in Maldon, Essex, by our client, Moat. Moat were looking to implement energy improvements to their existing housing stock; addressing the issues of fuel poverty and improving the health and wellbeing of their residents. With an ambitious target to reduce the level of carbon dioxide per house by 3.2-tonnes per year, the Energiesprong model offered an innovative solution which also responds to shared targets for delivering net zero carbon homes.

With UK households currently accounting for approximately 27% of the entire UK's CO2 emissions, the home energy landscape needs to evolve.

Energiesprong, originally developed in the Netherlands, is a revolutionary, whole house refurbishment standard and funding approach, with the project in Maldon being financially supported by E=0 (InterregNWE) a European Union initiative.

### Identification of Pilot Properties

Early consultation with residents was essential, when the project plans were still at a formative stage; ensuring residents' views were listened to and considered before making decisions. As part of the consultation process, the architect produced story boards, explaining the initial proposals and what would be involved.

Following consultation, five properties were selected from an initial ten proposed, with weekly client progress meetings being followed by ongoing weekly meetings with the residents.

### Thermal Performance Measures, Offsite Manufacturing Solutions and Energy Pods

#### Offsite Modular Construction

For this programme, EQUANS worked closely with insulation specialists, Mauer UK, for the offsite construction of modular fabric improvements such as the insulated façade and roofing system.

By utilising an offsite modular construction approach, EQUANS has been able to reduce onsite build time as the process allows for both the enabling works and panel manufacture to be completed simultaneously. The benefits of this approach also mitigates environmental impacts on neighbouring properties. Utilising this innovative modular construction method has additional benefits as a result of being, predominantly, built in a factory controlled environment:

- Negates weather-associated setbacks on site
- Minimises disruption, including traffic, noise and dust pollution and other negative impacts for the school population and local community
- The use of detailed designs and precision equipment within a controlled setting reduces waste and contributes to delivering EQUANS commitment to divert waste from landfill.
- Supports programme certainty in respect of budgets, deadlines and quality control



As the Energiesprong approach is carried forward to future programmes, the insulated roof panels, complete with integrated PV solar panels, will also be fully preconstructed offsite.

### Insulation

The exposed location of the properties meant that residents were living in draughty and cold conditions. This was exacerbated by large underfloor, uninsulated voids.

To address this, bonded polybead insulation was installed into the 300mm void below the floors of the pilot properties.

Additionally, to mitigate the heat loss originally identified by the thermal imaging surveys, insulated wall panels were installed; extending below the damp proof course.

The insulation of highly insulated roof panels and replacing the old dormer and Velux windows with new, triple glazed windows also contribute to maximising insulation and minimising draughts.

### External Energy Pods

#### Air Source Heat Pumps (ASHP)

Air Source Heat Pumps offer an energy-efficient alternative to traditional heating systems by exploiting 'free' heat from the air. They are extremely efficient and therefore provide significant reductions in heating costs and environmental emissions.

ASHPs are installed externally, drawing heat from the air in the same way that a fridge extracts heat from its inside, working in all weathers to harness heat from the air even when outside temperatures are as low as -20oC.

Housed within external 'Services Pods', the ASHP units utilise advance technologies to deliver improved efficiencies including ultra-quiet operation, with sensors attached to the rear of the external unit measuring outside ambient temperature and moderating heat generation for optimum operation.

Residents are able to monitor and control their heating and hot water via the display screen installed in their homes.

#### Mechanical Ventilation and Heat Recovery (MVHR) Units

Regulated by a thermostat and intelligently sensing changes in ambient temperature and moisture, the MVHR units draw steam, condensation and odours from inside the homes; reducing humidity levels and providing year round good indoor air quality by maintaining the continuous flow of fresh air.

The internal high efficiency tubular heat exchange cell enables the air to cyclone around the central barrel, like a corkscrew. At the same time, fresh air from outside is supplied via tubes, collecting up to 75% of extracted heat before returning it to the room.

#### Solar Panels, Battery and Plug Electricals

Integrated solar panels on the roofs will provide a significant proportion of electricity needs during the daytime. To maximise the benefits of optimum PV energy generation, any unused electricity is directed to charging the on-site batteries and storing electricity for later or for times of higher energy use, typically in the evenings. Any excess electricity generated above this, is then directly discharged into the national grid. If residents use more energy than is generated by their solar panels, they will then draw electricity from their energy supplier.

### The Comfort Plan Agreement

The Comfort Plan is a legal agreement between residents and EQUANS which provides a guaranteed level of comfort for their homes, including indoor temperature (guaranteed to 21°C year round in the living room), volume of hot water, plug electricity and renewable energy allowances for a fixed monthly fee.

The default energy allowance within each Comfort Plan Agreement for Moat residents estimates that they will need 2300kWh from the national grid, in addition to the energy generated from their solar PV and battery systems.

### Challenges, Solutions and Learning

#### Learning new habits and fostering positive behaviours

EQUANS 'Placemaking' strategy recognises that more than just structural changes are needed to deliver long-term improvements for communities, and that adapting behaviours in respect of energy consumption is an important factor.

Residents who were part of the pilot had been living in homes with very poor thermal performance for a significant period of time and had developed heating habits to respond to this.

In order to realise the most positive impact from the improvements – optimising both energy and cost savings – residents needed to learn and adopt new behaviours for living in significantly more efficient homes.

### Key features

- ☒ A complete retrofit package was carried out to each property, including pioneering offsite solutions, comprising:
- ☒ EQUANS in house Energy and Innovation team undertaking detailed technical surveys, including:- Air tightness assessments, Thermal imaging surveys, Pre and post Energy Performance Certificate (EPC) assessments, Full SAP energy assessments
- ☒ Delivery of resident engagement workshops in collaboration with Moat and Energiesprong UK
- ☒ Installation of:
  - ☒ High-performance doors and triple glazed windows, Whole house air tightness membrane, Insulated roofing panels incorporating new dormers, Integrated solar panels to roofs with external battery storage units, Insulated external wall panels, Energy Pod, comprising: > Air Source Heat Pump (ASHP) > Mechanical Ventilation and Heat Recovery (MVHR) unit > Hot water storage tank > Energy monitoring equipment
- ☒ 30 year energy performance guarantee
- ☒ 30 year monitoring and maintenance programme

### Duration

- ☒ Start Date: December 2018
- ☒ Completion Date: July 2019
- ☒ Location: Mundon Road, Maldon, Essex

To respond to this, EQUANS implemented bespoke training and produced a residents manual on how to get the most from their newly retrofitted homes and to help them to understand how specific activities may adversely affect energy efficiency.

By offering a 30 year performance guarantee, EQUANS is able to work alongside Moat Homes to monitor energy use and consumption, providing feedback to the residents on ways to minimise cost and maximise comfort.

### Maintaining a consistent aesthetic

Moat owns 34 semi-detached properties on Mundon Road, interspersed with privately owned homes, with the five homes shortlisted for the project all having higher than average energy bills. Given these features, it was important to ensure that any measures implemented did not have a detrimental impact on the outward appearance of individual homes or the wider look and feel of the road.

One example of this related to the dormer windows on the roofs of the properties, which had to be retained in line with planning specifications. This demanded a redesign of the Solar PV systems which were originally planned to be continuous across adjacent semi-detached houses. Measures which needed to be considered during the planning application process included:

- Dormers to remain in-situ and solar PV systems to be redesigned to accommodate.
- Cement tiles fitted to provide consistency to street scene.
- Redundant brick chimneys to remain in-situ. Capped and sealed
- Acrylic brick effect insulation panels colour matched to existing brickwork

### The Outcome

The project in Maldon has resulted in a ground-breaking pilot from which we can further develop our net zero energy home solution. The fabric improvements and low carbon heating, hot water and electricity solutions offer a guaranteed superior indoor comfort and energy performance for Moat's residents for the next 30 years.

With Moat Homes being the first Housing Association in the UK to adopt this pioneering approach, their residents are already benefitting from:

- A significant reduction in their energy bills as a result of energy efficiency and thermal performance improvements and the bespoke 'Comfort Plan Agreement' with fixed fee energy supply

- Homes which are free from the impacts of poor insulation, such as mould, damp and condensation
- A warmer, more comfortable, draft proof indoor climate, with a guaranteed temperature maintained throughout the house in all seasons
- Improved visual appearance of their homes

Aside of the benefits of having healthier and happier tenants no longer living in fuel poverty, Moat will benefit directly through the increased value of this housing stock and diminution of ongoing, and previously excessively high, maintenance costs.

Delivering the Energiesprong model for local authorities and housing associations is a major focus of the Home Zero programme, which contributes to delivering EQUANS wider ambition to 'lead the global zero carbon transition'.

These measures are also essential for tackling fuel poverty and delivering the government's Clean Growth Strategy to get all housing up to a minimum Energy Performance Certificate (EPC) Band C by 2030.

With UK households currently accounting for approximately 27% of the entire UK's CO2 emissions, the home energy landscape needs to evolve. Radical action, combined with innovative solutions, is necessary if we are to meet government targets for reducing CO2 emissions by 80% (based on a 1990 baseline figure) by 2050. EQUANS is uniquely positioned and capable of 'delivering net zero carbon as a service', from construction, through to maintenance and complete supply of domestic energy to the consumer and, as such, we are now working with Moat and other housing associations to identify opportunities for scaling up the model to improve more homes.

**"As Moat prides itself on its environmental responsibility and performance, we were incredibly keen to collaborate with Energiesprong UK and EQUANS to deliver this innovative solution. The whole house retrofit works being undertaken on our five Essex homes implement and encourage sustainable methods of conduct that involves the customer, contractor and housing provider alike. A project such as this operating at scale could help the Government meet carbon reduction targets, whilst simultaneously combatting fuel poverty issues."**

#### Jason Amos

Director of Property Services  
Moat

