



wondrwall®

INTELLIGENT LIVING

#NETZERONOW

UK House Builders must achieve at least **75%** CO₂ emissions reduction in new build homes by 2025* to support a balanced pathway to net zero

* The Future Homes Standard: 2019 Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for new dwellings | Jan 2021

Foreword

UK construction has responded well to the challenges posed by the COVID-19 pandemic. After an initial slump, the industry bounced back by September 2020, buoyed by clear indications from central government that maintaining momentum in the sector was critical in their 'build back better' economic recovery plan and the financial stimulus to back this up.

As the roadmap to normality becomes more clearly defined, it is inevitable that our attention will refocus on the overarching challenges facing the industry.

Economic factors and the availability of suitable land for development are still stifling the industries ability to meet new build completion targets. With some industry commentators estimating this to be in the region of 345,000 completed new build homes per annum, which is 61% higher than even pre-COVID levels.

We also can't get away from the fact that humanity is facing a global climate crisis. To tackle this the UK has made a world-leading commitment to achieve net-zero greenhouse gas (GHG) emissions by 2050. With domestic emissions in 2019 amounting to 87 Mt CO₂e, approximately 17% of total UK GHG emissions, it is vital that the building sector does not delay in acting on this.

Legislators are playing their part, rewriting building regulations to enforce immediate energy performance increases and introducing The Future Homes Standard; which will effectively end the use of natural gas to heat new build properties from 2025.

While there is uncertainty around biomass and hydrogen as a feasible alternative to gas, it seems clear that house builders will need to focus on electricity as their immediate solution.

Every member of the team here appreciates the challenges facing the sector, the complexities of dealing with a housing crisis, wrapped in a public health emergency, inside a bubble of climate change. It is an opportunity for Wondrwall though to support house builders through this difficult transition.

Wondrwall is a technology company dedicated to changing the way we live and how we use energy. It is our vision to make the world's homes ecologically sustainable, using self-learning technology and renewable energy, not just to mitigate the impact we have on our environment but to deliver peoples energy needs in a way which is economically-viable and socially just.

This document will give you an overview of Wondrwall's Net Zero Energy solution. We look forward to changing the world with you.

Daniel Burton

Wondrwall Group | CEO & Founder



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Wondrwall Net-Zero Homes...



Stand out from the crowd

Wondrwall technology will give your development a unique competitive edge without significant impact on build costs.



Meet customer needs

Wondrwall attracts digitally-connected, environmentally-conscious buyers and tenants with a demand for sustainable, energy-efficient properties.



Sell faster

Wondrwall enabled-homes speed up developer's build programmes and consistently sell faster than homes of similar price per square foot.



Fully compliant

Whether it is improved EPC ratings, Part L 2021 or The Future Homes Standard, Wondrwall ticks every box.



Simple to use

You don't have to be a tech guru to use Wondrwall, ease of use consistently rates highly across all demographics.



Save money

Wondrwall's intelligent net-zero homes are affordable to build and can reduce a residents energy bills by up to 90%.



Reduce CO₂ emissions

Each year a Wondrwall Net-Zero Homes removes an average of 4.5 tonnes of CO₂ emissions from the atmosphere.

Wondrwall is an award-winning technology company dedicated to changing the way we live and how we use energy.

Wondrwall gives the home a brain and the intelligence to control itself, saving time, money and the environment.



Home Automation Powered by Self-Learning Artificial Intelligence



**OPTIMISED ENERGY PERFORMANCE VIA
CLOUD-BASED MACHINE LEARNING**



**ACCESSIBLE TO ALL THROUGH VOICE,
TOUCH & APP USER INTERFACES**



MULTI AWARD-WINNING TECHNOLOGY

The Wondrwall Light Switch is at the heart of an intelligent net-zero home. Each switch runs its own operating system and houses 13 different sensors covering temperature, humidity, power, motion, luminosity, touch and sound.

The Wondrwall Light Switch is easy to install and compatible with any standard one-gang back box. Up to three lighting circuits (with a neutral line) can be wired to each switch and lighting throughout the home can be controlled by push-to-talk voice commands or via the Wondrwall app.

Once installed, the Wondrwall Light Switches combine to create a multi-sensory network, capable of understanding human behaviours and environmental factors within the home.

Wondrwall combines the data collected with external information such as weather, energy carbon content, geo-location data and resident's preferences and actions. Cloud-based machine learning then analyses an average of 20,000 datapoints every day, without any input from the occupant, to control and optimise energy efficiency of each home.



Heating

Wondrwall knows how long it will take your home to reach ideal temperature at different times of the day ensuring there isn't a moment of discomfort. Intelligently identifying your temperature preferences from past behaviour enables Wondrwall to wake you to just the right temperature in the morning while timing your heating to avoid wasting energy. Wondrwall's intelligence enables it to make real-time adjustments to usual routines. This means if you're delayed on your route home from work or going out for dinner, Wondrwall will pick up on this and pause the heating until you are back on track, saving you the cost of heating an empty home.

Lighting

The most advanced light switch in the world offers touch-sensitive control of your lighting and so much more. In the morning, Wondrwall will help to wake you and recognises when the home is unoccupied, turning off any lights that have been left on. If you wish, you can activate 'Away' mode where Wondrwall will turn on and off certain lights in the home to simulate occupancy and when you get home after dark, Wondrwall welcomes you home by turning on the lights to greet you. But that is not all, Amazon's Push-to-Talk Alexa Platform is built into every light switch, making it possible to control your homes lighting by voice.

Security

Wondrwall is always on guard to catch intruders. Our motion sensors in every light switch work to detect the presence of trespassers and can be individually controlled to ensure that if you have a large pet, its presence does not accidentally sound the BS / EN 50130-4 compliant alarm. When an alarm is triggered, Wondrwall responds by sounding the siren, flashing the internal and external lights and alerting the home owner via the Wondrwall App. The key fob ensures further protection with proximity-based arming and disarming of security features, as well as letting you know who has arrived home.

Safety

Wondrwall enhances the standard safety features of a home. Each key fob has a built-in panic button, so your loved ones are never truly alone - with a single press sending an alert to all pre-programmed contacts simultaneously.

Entertainment In Every Room

Music

Wondrwall can connect to your media too, playing music through speakers built in to each switch. For the ultimate in sound quality, Wondrwall can play music through SONOS speakers in the home. These can be controlled via Wondrwall by voice or through the Wondrwall app from anywhere in the home.

Voice Control

All the functions of Wondrwall can be controlled by voice. Using Amazon's Push-to-Talk Alexa Platform, Wondrwall can do so much more - weather or travel information, order from Amazon, retrieve the day's events from your Google calendar for example. Using the Amazon Alexa platform, Wondrwall can also work with and control other smart home devices too.



Ultra-efficient Intelligent Multi-Zone Gas-Free Heating



ALL-ELECTRIC INTELLIGENT HEATING AND HOT WATER



MULTI-ZONE TEMPERATURE CONTROL NEVER HEATING EMPTY ROOMS



ULTRA-EFFICIENT IMMEDIATE HEAT TO RESPOND TO OCCUPANT ACTIVITY

Wondrwall infrared panels and underfloor heating deliver heating in a stylish, comfortable, energy efficient and highly controllable way. Creating a drier, warmer, healthier home while reducing energy consumption.

Wondrwall learns and works around the occupant, learning how the home is used, which rooms they spend the most time in, how they prefer their heating and how much hot water they actually consume. Wondrwall then automatically heats the occupied rooms while avoiding heating empty rooms/homes.

In doing so, Wondrwall seamlessly and intelligently supports and enhances the living environment, ensuring occupants are always comfortable and reducing energy consumption without them lifting a finger.

Combining Home Automation with Wondrwall gas-free heating and the Wondrwall intelligent water cylinder, which monitors consumption to ensure no energy is wasted heating and reheating unused water, Wondrwall can reduce a homes energy consumption and costs by up to 50%.

The Future Of Domestic Heating

Wondrwall has selected a number of heating technologies that best fit with the responsive, data-driven way our system works.

The Wondrwall Hot Water Cylinder works day and night, all year round, whatever the weather, to provide hot water. The cylinder learns how much hot water you use and will only heat what you need. On it's own, the Intelligent Hot Water Cylinder can reduce the cost of energy required to heat water by 20%. When combined with Wondrwall's intelligent energy management system, which will heat water using low-cost off-peak tariffs, dramatically reduces energy costs and carbon emissions even further.



Infrared heating panels simply run on electricity, so there is no need to install a boiler and additional pipework for them to run. The panels themselves can also be used to heat a whole house and since they can be turned on and off as needed and produce heat almost instantly, you can very easily produce a zone heating system (for each room or more) to match your requirements.

The cost of running an infrared panel versus an electrical convection heater is far cheaper as they require less power output to provide the same level of heat – a 600w infrared panel will provide the same level of heating comfort as a 1500w convection heater, so they roughly require a third of the input, hence are cheaper to run. Combined with Wondrwall's zonal controls, this cost is reduced even further.

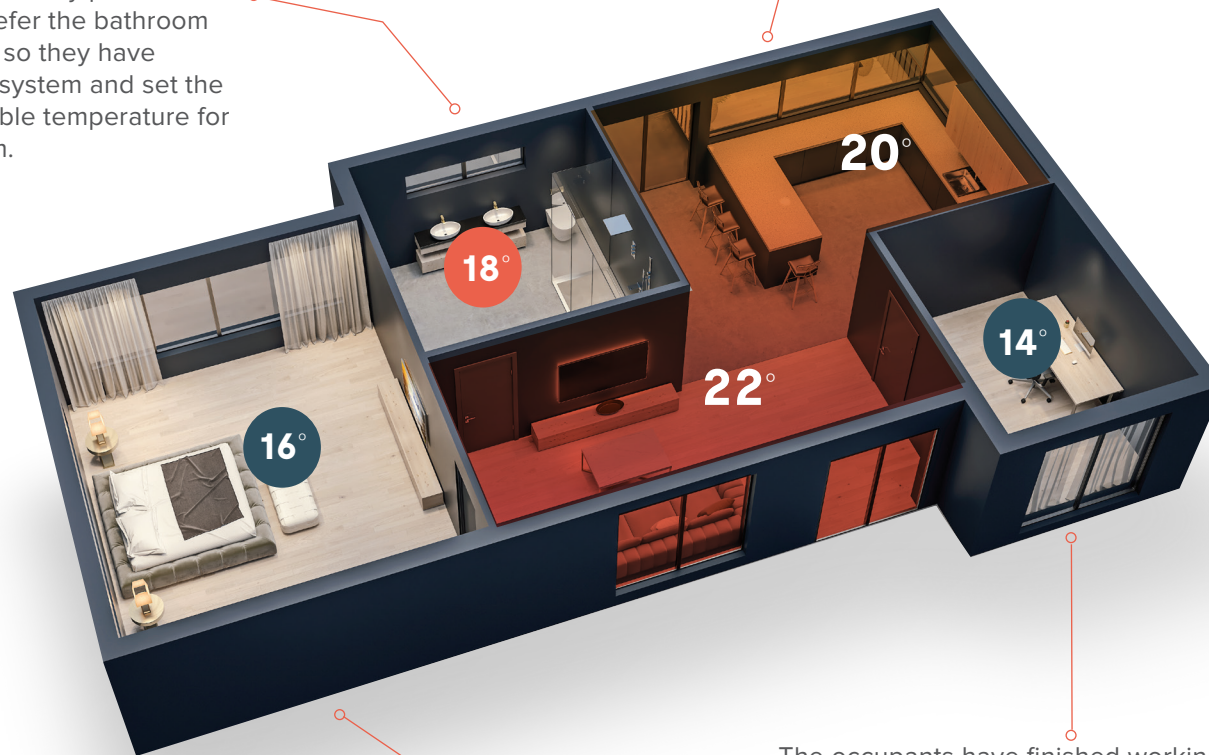
Infrared heating panels can be mounted on the ceiling, so you don't lose any floor area like you would with radiators. By doing this it also increases the heating coverage of the panels. For example an 850w panel will heat a 13.5m² area if hung on a wall, but a 17m² area if attached to the ceiling. With Wondrwall quality panels you can also be sure that they are going to last and will not need any maintenance with a typical life of > 100,000 hrs (> 34yrs at 8hrs a day).



Intelligent Multi-Zone Heating

The heating is controlled by an intuitive programming system, where you can schedule zones individually, adding custom intervals across a weekly planner. In this scenario, the occupants prefer the bathroom to be at a consistent temperature so they have overridden the home automation system and set the bathroom to remain at a comfortable temperature for when they need to enter the room.

At this time of day occupants are gathered in the living and kitchen area. Wondrwall knows that they prefer the home to be at 24° in the evening and are more active in the living area. Wondrwall maintains the desired temperature while continually adapting to any unexpected changes in behaviour using the temperature and motion sensors in the Wondrwall Light Switches.



The occupants have finished working in the home office and Wondrwall knows that the bedroom doesn't need to be heated till 10pm, so these rooms are left at an ambient temperature - saving energy and cost.

Tuesday 10th November | 7:00pm

Net-Zero Energy With Solar PV and Battery Storage



CLEAN RENEWABLE ENERGY WHEN
THE OCCUPANT NEEDS IT MOST



REDUCING DOMESTIC CARBON
EMISSIONS TO NET-ZERO



INTELLIGENT ENERGY MANAGEMENT
GENERATE / IMPORT / EXPORT
REDUCING ENERGY BILLS BY UP TO 90%

Until recently, home owners and tenants have had little choice in how they consume and pay for domestic electricity. With Wondrwall, that can change for the better. Enabling homes to create and automatically manage its own clean energy.

By including Wondrwall's complete Net-Zero Energy solution in your development, you can easily convert today's new build properties into All-Electric, Carbon-Free, Net-Zero Homes at a fraction of the cost typically associated with these types of properties.

Wondrwall users can benefit from time-of-use tariffs, allowing Wondrwall to take any additional energy required from the grid at off-peak rates and store this energy for use at peak times. Occupants will also earn money as Wondrwall automatically exports unrequired energy from the Solar generation back to the grid at the most expensive time of day.

Active energy trading combined with time-shifted consumption and intelligent demand reduction can result in an energy bill saving of up to 90%.

Net-Zero Carbon-Free Homes

Solar PV

Ultra-high efficiency, tier 1, solar modules from Wondrwall generate electricity to meet the energy requirements of the home. Solar generation is matched to the estimated load consumption of the home to ensure that Wondrwall Net-Zero homes generate as much energy in a year as it consumes. The all-black panels blend into the design of the roof and can be mounted in-roof to deliver an aesthetically pleasing look and design.

Hybrid Inverter

The Wondrwall intelligent hybrid inverter combines a solar inverter, charger and battery inverter into a single unit to deliver the most efficient use of your available energy. The Wondrwall Hybrid Inverter connects wirelessly to the Home Automation platform to ensure optimum control of the generation, storage and consumption of energy.

Home Battery

The Wondrwall battery is a high capacity lithium-ion battery that stores free solar energy generated during the day and low-cost off-peak electricity for use at peak times, reducing electricity costs and reducing the load on the grid. The Wondrwall battery will also provide a backup power supply for your home in the event of a power outage.



The Wondrwall App

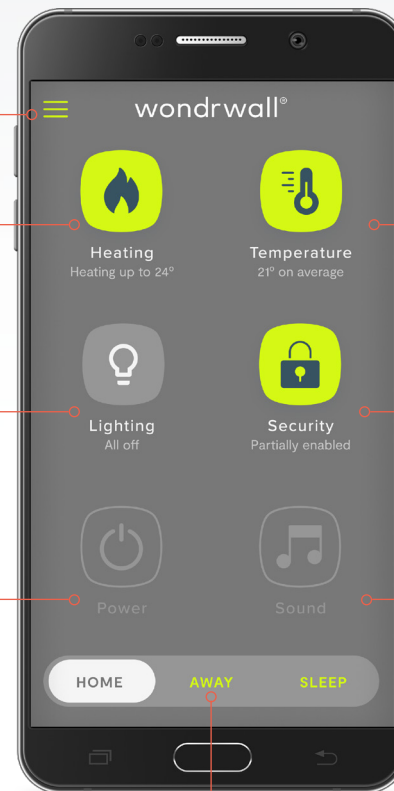
At any point, the occupant can override the home automation settings for the home using the Wondrwall app. From the main home screen you will find the six key 'widgets' which control all the main functions of Wondrwall Net-Zero Home. You will also find the Menu button where you can access all the main settings for the app and a toggle for the homes programmable 'scenes'.

Menu
Here is the menu, where you can view your device list, notifications, locations, members and settings

Heating Widget
Here you can view all your heating devices, turn them on and off and set their schedules

Lighting Widget
Here you can control all the lights in your home and turn them all on or off

Energy Widget
Here you can view the energy performance of your home using data from your smart meter (if available) and solar system



Temperature Widget
Here you can see the home average temperature, as well as each device temperature reading

Security Widget
Where the motion sensor is positioned

Entertainment Widget
If a SONOS speaker is detected on your home network, the entertainment widget will automatically be enabled

Scenes

Home - Disarm your alarm

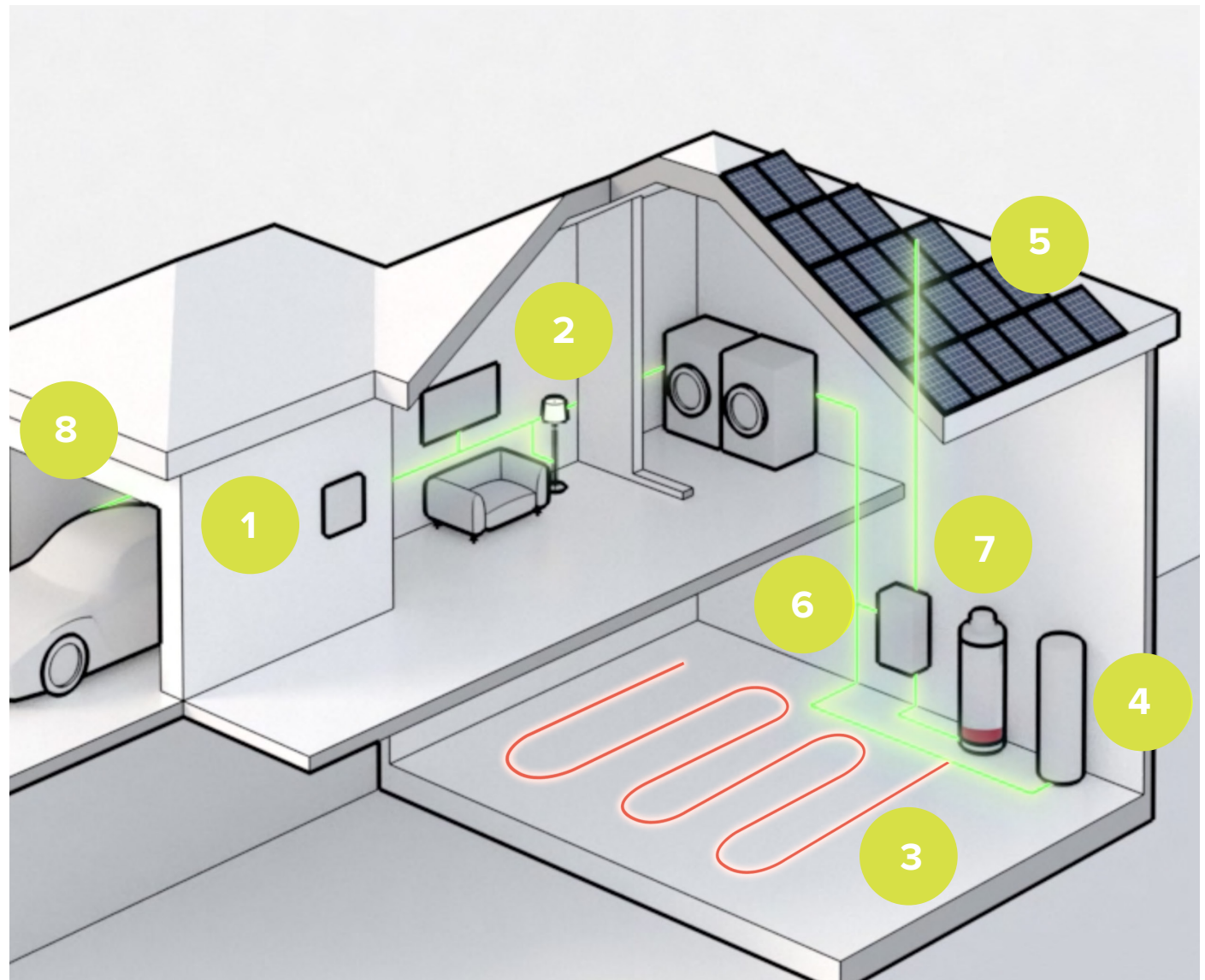
Away - Arm your alarm

Sleep - Customizable version of the Home Scene where you can arm individual switches at night



How It All Works

- 1. Wondrwall Intelligent Light Switches**
The heart of the Intelligent Home. Learns habitational patterns and a home's energy performance, enabling the Wondrwall AI to plot the optimum running of the home.
- 2/3. Wondrwall All-Electric Heating**
Intelligent infrared heating panels and underfloor heating reduce energy consumption and cost by up to 50%.
- 4. Wondrwall Hot Water Cylinder**
Learns to heat only the volume of water that is needed using solar and off-peak energy.
- 5. Wondrwall Solar PV Array**
Optimised design, matched to the load consumption of the home where possible.
- 6. Wondrwall Hybrid Inverter**
Fully integrated and controlled inverter converts DC electricity from the solar or battery into AC electricity for use in the home or for selling back to the grid.
- 7. Wondrwall Residential Battery**
High-capacity lithium-ion batteries store energy created from the solar panels and cheaper off-peak energy drawn from the grid.
- 8. Wondrwall EV Charger**
Meet the additional energy requirements for electric vehicles by diverting surplus solar energy and charging at off peak.



A Technical Team You Can Trust



Whether you are working with Wondrwall as a supply partner or utilising our fully-accredited installation services, you can be confident that you will receive the support you need to deliver your net-zero projects successfully.



DEDICATED ACCOUNT MANAGERS ENSURING CUSTOMER SUCCESS



DIRECT CONTACT TO TECHNICAL TEAM
24/7 ONLINE CHAT FEATURE AND FAQ



COVID-SECURE INSTALLATION & USER ONBOARDING



Benefit Analysis

	Gas Combi	Wondrwall	Heat Pump
Energy Bills	£729	£223	£854
CO ₂	1,473 Kg	168 Kg	1,237 Kg
Maintenance	Annual	Annual	Annual
Lifespan	≤ 10 Years	≤ 25 Years	≤ 10 Years
Cost Breakdown			
Heating	Combi Gas Boiler - £2,250	N/A	Heat Pump - £6,000
	Radiators - £1,800	Infrared Panels - £1,500	Oversized Radiators - £1,800
Hot Water Cylinder	N/A	Intelligent Cylinder - £1,500	Cylinder - £1,500
Heating Controls	Dual Zone - £1,000	Multi Zone - £1,500	Dual Zone - £1,000
Gas Connection	£600	N/A	N/A
Solar PV & Battery	N/A	5.5kWp Solar / 6.5kWh Battery £6,000	N/A
		Plus: Intelligent lighting, heating and security, energy management, Amazon Alexa voice control and SONOS integration	
Solution Cost	£5,650	£10,500 (£4,850 incremental cost)	£10,300 (£4,650 incremental cost)

Modelled on a typical 3 bedroom property with new build standard insulation and draught-proofing

Case Study:

Demanding more from the everyday

Strata are proud to be different. A stand out business that builds homes, not units, unique places to live and grow. The Strata family are very aware of the legacy they leave behind them with the lifestyles and communities they are helping to create.

Wondrwall was proud to get the opportunity to work with the team at Strata, in conjunction with Together Houses, to deliver a series of 15 reduced energy and full carbon net zero homes at their 360 site in Chesterfield.

The two and three-bedroom, Milan and Paretti house styles were selected to showcase the full potential of the Wondrwall Energy system. Both designs were constructed with a Structural Insulated Panel system, ensuring draught proofing and air-tightness for the homes were in line with the Code for Sustainable Homes four, five and six performance.

Wondrwall's accredited installation team deployed the full Wondrwall Energy solution; comprising home automation, electric underfloor heating, intelligent hot water cylinder, in-roof mounted solar PV, hybrid inverter and home battery across both first and second fix.

Improved EPC ratings and achieving specified energy savings isn't the only value Wondrwall added to the development. Dedicated technical and marketing support, along with COVID-secure onboarding ensured the project was delivered smoothly, on-time and within budget.

"We started trialling Wondrwall technology in 2018. It has been an exciting journey and we're thrilled to see Wondrwall go live at 360. Here at Strata, we're about delivering experiences which go beyond expectations and Wondrwall is a partner that helps us to deliver on that objective."

Mark Rosindale | Strata Homes





EliteNuGEN



EliteOFFSITE



Case Study:

Flexing to meet the needs of MMC

Elite Homes specialise in the transformation of land into stylish, high-quality residential apartments and houses in pioneering new build schemes. Elite Homes pride themselves on sustainable best practices throughout their building developments and have been awarded the RTPI South East Awards for Planning Excellence in 2018, named Sustainable Development of the Year 2021 by the British Home Awards and WhatHouse Awards for their Priddy's Hard development in Gosport, Hampshire.

Wondrwall worked with Elite Homes to deliver a full net-zero solution at Plot 10. The project involved installing home automation, ceiling-mounted infrared heating panels, battery storage and 20 JA Solar 325W panels on a flat roof to the panelised new build homes.

Fixed mounting frames for the solar panels were specified, which meant Wondrwall had to liaise with the roof manufacturer to determine the nature of the roof covering and establish the location of suitable fixing points. Once confirmed, Wondrwall was able to provide bespoke fittings for the single-ply membrane used on the properties roof.

"Wondrwall demonstrated a flexible approach throughout, doing whatever was required to ensure the successful delivery of the project."

Site Manager | Elite Homes



www.elitehomesltd.com

Case Study:

A day in the life of a net-zero home

Wondrwall partnered with one of the UK's top 10 home builders, Keepmoat Homes, to deliver 5 low-carbon homes as part of their Connell Gardens site in one of Manchester's up-and-coming suburbs, West Gorton.

A whole house approach was taken for the three bedroom homes with increased fabric specifications, Wondrwall's energy-saving home automation system along with dual-aspect solar PV (4.48kWp), hybrid inverter & battery (6.5kWh).

The properties energy performance was monitored over a 12 month period to prove the effectiveness of low carbon technology in reducing energy bills with only minimal impact on design and build costs.

The results from Connell Gardens demonstrate an estimated annual carbon reduction of 884kg and a £456 (88%) reduction in energy costs for the occupant. Benefits to the developer were not only identified as improvements in EPC ratings and compliance but overall community regeneration and increased customer satisfaction:

"I couldn't be happier. Wondrwall is very easy to use. I don't actually have to do anything and my bills are a lot lower than I have ever paid before."

Waqas Ahmed | Connell Gardens Resident



1 1.2kWh electricity automatically taken from the grid at the cheapest time of day (<£0.055)

2 6.2kWh surplus electricity sold back to the grid, creating a positive cost differential

3 Home ran completely from stored low cost energy during peak evening tariff (>£0.30)

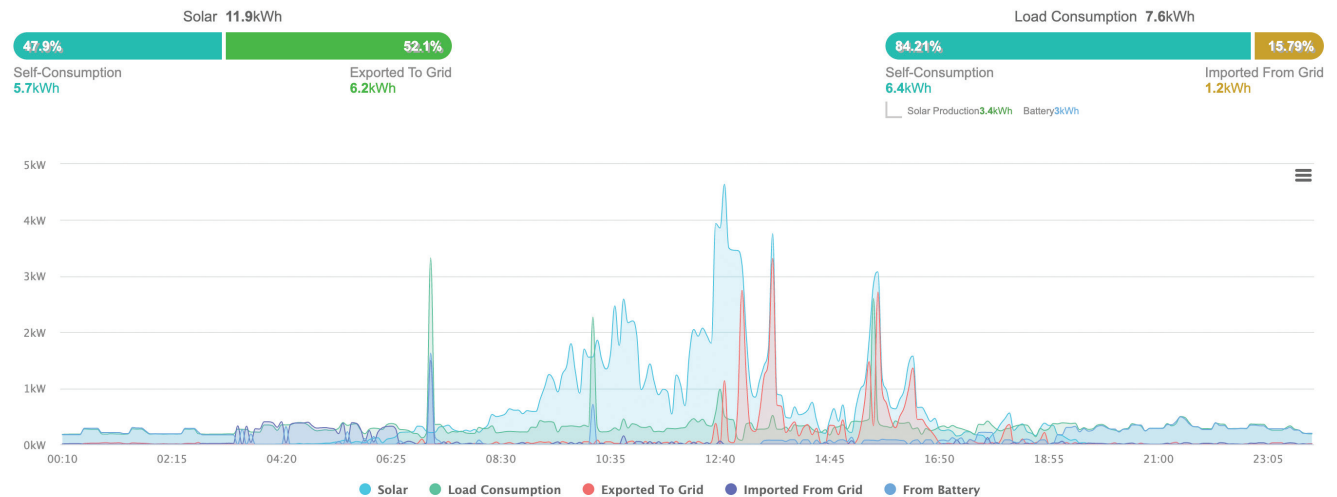


Fig 1: Data analysis from Connell Gardens; highlighting 3 key daily, AI-controlled, energy and cost-saving phases | 05.08.2020



Case Study:

Redefining the rental experience

One of the most intelligent buildings in the world has been developed in Manchester. Anco & CO uses Wondrwall technology to create intelligent, energy-saving homes for a new generation of renters.

Developer DTZ Investors are aiming to revolutionise renting having created 143 one and two-bedroom, fully furnished apartments that are proving that even in the current climate you can still form communities of like-minded people in city centres. With access to communal bars, cafés, co-work spaces, a common room, cinema, rooftop terrace and concierge service, Anco & Co appeals to a tech-savvy generation eager to embrace the full potential of home automation and the sustainability benefits offered by Wondrwall.

Wondrwall is helping DTZ deliver on 3 of their key experiential pillars for Anco & Co; wellness, sustainability and smart tech. Throughout the building Wondrwall has incorporated over 16,000 sensors to monitor energy usage and habitational patterns. Cloud-based machine learning is then capable of analysing the potential 2.15 million datapoints captured every day throughout the building to intelligently control the heating and lighting functions of occupied and unoccupied apartments.

Overall, it is estimated that Wondrwall technology will reduce Anco & Co's operational CO₂ emissions by up to 3,400kg per annum and help to create one of the most energy-efficient residential blocks in the world.



Don't Just Take Our Word For It...

NORTHSTONE

 REDROW

strata

 Keepmoat
Homes

TALO
HOMES

 EliteHOMES

Tailored
Living
Solutions

 McCullochs

Newcastle
City Council 

 Legal &
General

 ENGIE

 MANCHESTER
CITY COUNCIL

 M
MULBERRY
HOMES · DEVELOPMENTS

 this
Land.
A DEVELOPMENT
BUSINESS

IDEAL
MODULAR HOMES





wondrwall®

INTELLIGENT LIVING