Naked Energy.

Changing Energy for Good

Welcome to Naked Energy.

Climate change is the single biggest challenge facing humanity — and time is running out to tackle it.

The Intergovernmental Panel on Climate Change has calculated that we have less than ten years left in which to halve global emissions, a key element in keeping warming within 1.5˚C and avoiding climate catastrophe. The time for taking action is now. Which is what Naked Energy is doing.

We are a British design and engineering business, leading global innovation in solar thermal and solar PVT with a mission to change energy for good. Our business has set out to decarbonise heating and cooling globally, supporting the transition to net zero carbon.

The production of heat — for water, space heating and industrial processes — accounts for half of all energy consumed on the planet and is responsible for 40% of all emissions worldwide.

Decarbonising heat is one of the most vital ways in which we can fight climate change and help achieve the goals of the Paris Agreement, but the scale of that challenge is yet to be fully recognised.

Which is where Naked Energy comes in.

Our unique technology takes the most efficient photovoltaic cells and integrates them with innovative thermal vacuum tubes, creating a hybrid system that is far more effective than conventional photovoltaic solutions. Our products produce more energy from less space, with up to 3.5 times the carbon savings compared with conventional photovoltaic systems and up to 50% greater returns, as well as reduced regulatory and reputational risk.

"Decarbonising heat is therefore one of the most vital ways in which we can fight climate change and help achieve the goals of the Paris Agreement."

In this brochure, you can find out more about Naked Energy's three products, Virtu^{HOT}, the next generation in solar thermal technology, Virtu^{PVT}, which is redefining solar energy, and Clarity$^{24-7}$, our cutting-edge digital performance monitoring platform. Together, these products offer an affordable way to reduce your carbon footprint and truly change energy for good.

Christophe Williams
CEO, Naked Energy

Our mission — to change energy for good

The impacts of climate change, such as more extreme and devastating weather events, are already being seen around the world and will affect all of us. Tackling climate change and avoiding the most severe impacts requires immediate, meaningful action to cut greenhouse gas emissions and create a net zero–carbon world.

Naked Energy is accelerating that transition by decarbonising heat generation — responsible for over half of all energy demand globally.

Leveraging our innovation and our engineering capability, we are revolutionising solar with the world's highest energy–density solar technology. We call it Virtu. It provides more energy in less space, delivering greater returns and reducing costs, regulatory and reputation risks for our customers.

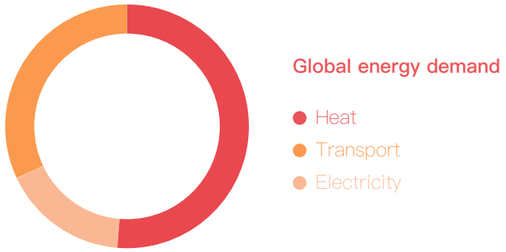
And, just like our technology works well in concert with other systems, we work with our network of like–minded partners across the world to deliver affordable, zero–carbon heat and power, one rooftop, façade or ground–mounted array at a time.

> “ Naked Energy offers the world's highest energy–density solar technology. Our system delivers more energy in less space, reduces carbon emissions, and cuts the cost of heat.

Solar thermal — powering the transition to net zero

The world needs a huge amount of heat. Globally, more than half (51%) of all energy demand is for heat — for warming buildings, food and beverage production, countless industrial uses and much else. But heat production is still far too reliant on burning fossil fuels, creating 40% of the world's carbon emissions as well as price, reputational and regulatory risks. Only 10% of heat production currently comes from renewable energy, compared with around 33% of electricity production.

The Paris Agreement's target of a transition to net zero by 2050 can only be achieved by decarbonising heat. One solution is distributed renewable heating systems, such as solar thermal. These systems provide a reliable, affordable and more resilient energy infrastructure — key to supporting the transition to net–zero carbon. Solar thermal offers more efficient, high–density, zero–carbon heat, making it a cleaner, cost–effective alternative.



Additionally, inter–seasonal storage enables end–users to benefit from solar thermal throughout the year. Thermal energy is collected and stored in warmer months for use when it is needed at colder times of the year. This also relieves pressure on the electricity grid as the world increasingly moves away from fossil fuel–derived energy to electricity, such as for transportation.

The International Energy Agency estimates that solar thermal and geothermal production will meet 75% of all heat demand by 2050 — putting solar thermal energy at the heart of meeting the Paris Agreement target.

51%

of all energy demand globally is for heat.

virtu

Solar heat and power

The Virtu product range is suitable for end–customers with a constant heat demand, such as hospitals, new build residential where sustainability is designed in, new or retrofit multi–unit residential developments, hospitality and leisure centres, as well as different forms of manufacturing, including food and beverage.

It represents a new and revolutionary category of solar technology, delivering:

> **More carbon savings**
Virtu saves up to 3.5x more carbon per m^2 than conventional PV and solar thermal technology

> **Beautiful aesthetics**
Virtu is a visually stunning representation of a commitment to sustainable energy, whether on a flat or pitched roof or a building façade

> **Risk reduction**
Virtu protects customers from volatile fuel prices and ensures compliance with more demanding energy and climate change legislation

> **Lower installation and maintenance costs**
Designed from an installer perspective Virtu is easy to install and keeps maintenance to a minimum, backed by a warranty of up to 10 years

> **Greater returns**
Virtu delivers up to 50% greater financial returns per m^2 than conventional PV and solar thermal technology

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Suitable for end–consumers with a constant heat demand:

> Public buildings, e.g. hospitals

> New residential developments

> Multi–dwelling residential

> Hospitality and leisure

> Manufacturing

> Food and beverage

Low install cost

> Simple modular assembly
> Lifted to roof pre or post assembly
> Fits in service elevators
> Use of a crane not necessary
> Mounting included
> Manifolds included

Low Profile

> 26.5cm height from roof/façade
> Simplifies planning permission/local approval
> Low wind shear

Compatible with any roof type

6 X M8 mounting slots provide compatibility with, for example, clamp and rail systems.

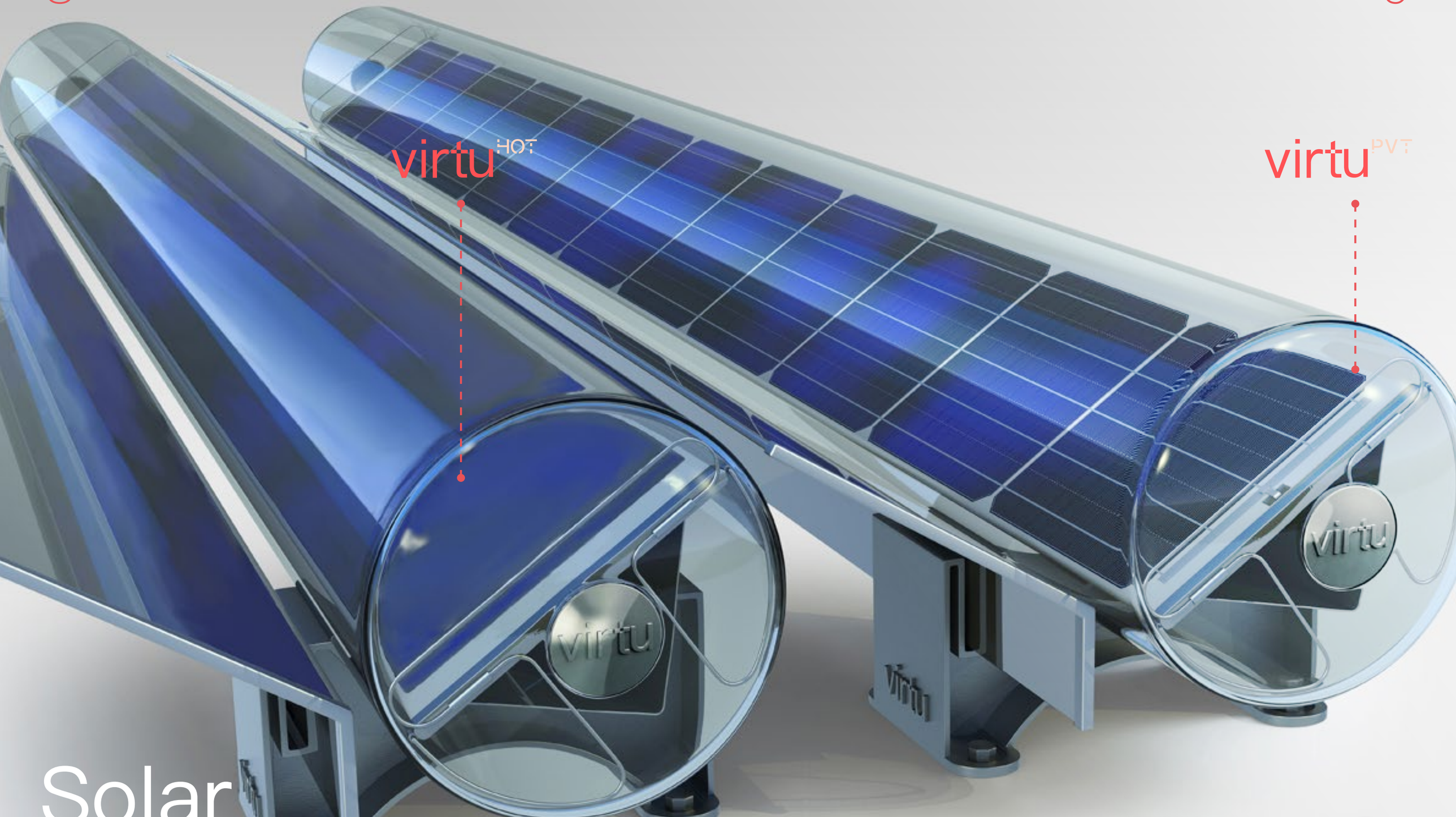
Suitable for:

> Raised seamed roofs
> Trapezoidal roofs
> Sarnafil roofs
> Nicholson fittings
> Pitched roofs
> Façade mounting

Self ballasting

In–built ballast trays can be loaded with concrete blocks.

> No need for roof penetration
> No need for additional mounting
> Suitable for:
  > Felt roofs
  > EPDM roofs
  > Rubber roofs
  > Sarnafil roofs



Solar Redefined

TÜVRheinland CERTIFIED

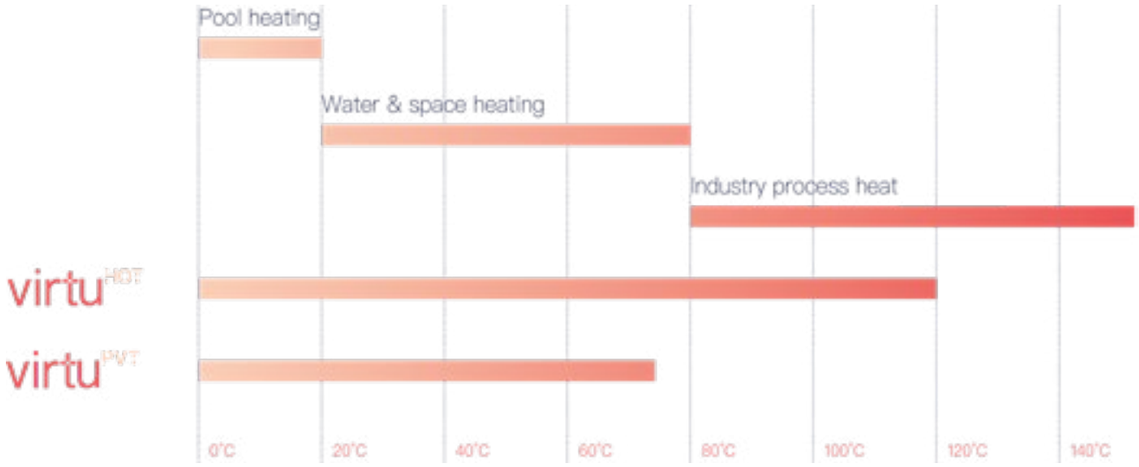
SOLAR IMPULSE EFFICIENT SOLUTION

WINNER

From installers, for installers

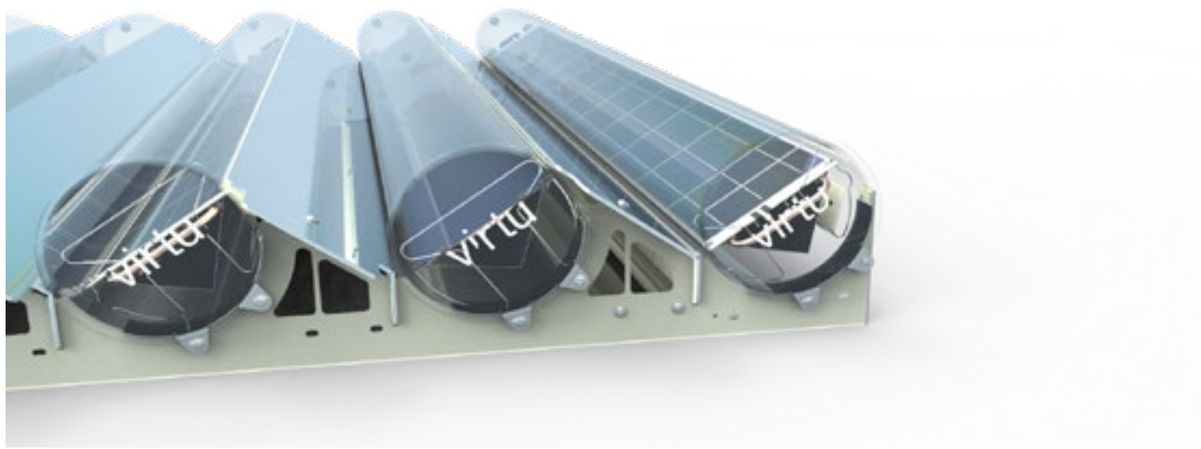
Naked Energy's products are designed with installers in mind. The core design has benefited from multiple workshops with experienced installers, whose valuable insights have been integrated into design and innovation for transportation, installation and maintenance. From Virtu's low–profile design to the modular assembly, our innovation keeps life simple for installers and maintenance teams.

Perfectly matched –
The ideal temperature for many heat processes.



Integration with other technology

Virtu is a complementary technology. Like all solar thermal technologies, it can be easily combined with existing technologies, such as heat pumps. This integration is most efficient when Virtu pre–heats the system, which is then topped–up and maintained by the back–up heat source. It contributes to the decarbonisation of heat and utilises existing high–efficiency heat generation assets. Virtu enables the energy transition to low–carbon heat in small steps as the energy grid evolves.



Virtu can lower your cost of heat and carbon emissions when integrated with:

> Air–source and ground–source heat pumps

> Gas heating

> Electric heating

> LPG and other fuels

> Biofuels

> Hydrogen

Benefits of an integrated approach:

> Reduced operational cost of heat pump through offsetting energy demand

> Self–sufficient, secure, zero fuel cost, zero–carbon energy

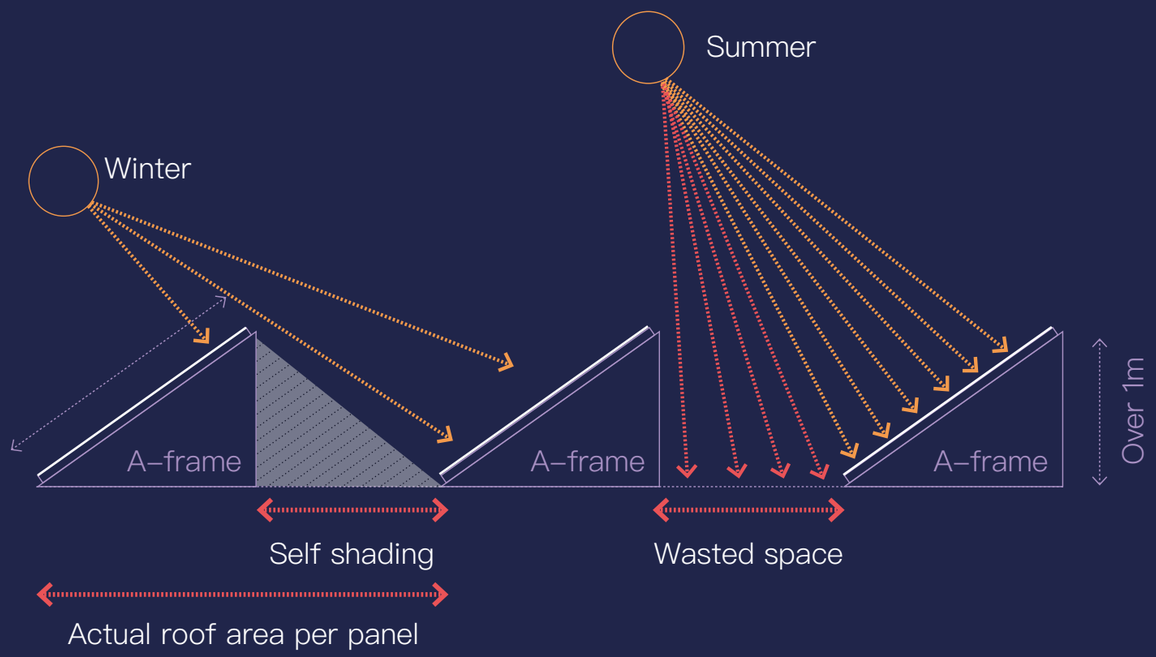
> Reduced reliance on the electricity grid

Standard panels **waste space**

> Panels/collectors tilted towards the sun on A–frames

> Spaced to avoid self shading in winter

> Roof area required is larger than panel gross area

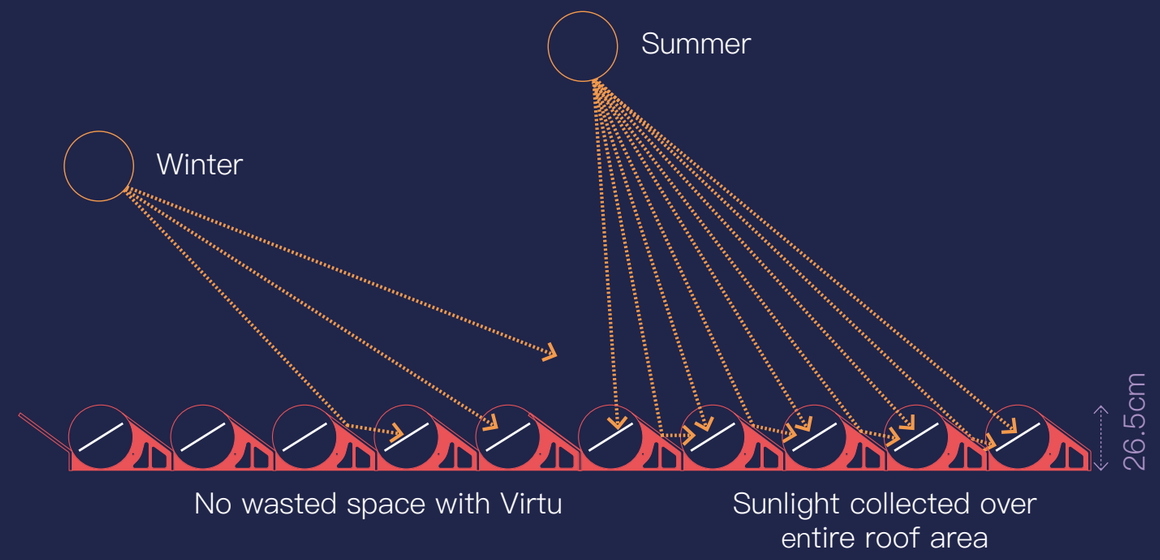


No wasted space with **virtu**

> Absorber plates are **tilted to optimum angle** within tubes

> Integrated reflector **captures sunlight** in space between tubes

> **More energy, less space**



Not to scale. Virtu stands at 26.5cm high, compared to over 1m for tilted flat panel

* Schematic shows flat roof example

more energy, less space

virtu HOT

We have developed the world's highest energy density solar technology delivering zero carbon heat, affordably.

VirtuHOT is the next generation in solar thermal technology. It's a solar thermal collector that heats water from the power of the sun to up to 120°C.

Solar thermal can decarbonise global heat demand across a number of sectors, from manufacturing to hotels and leisure centres. By using Virtu, customers can reduce their dependency on fossil fuels and future–proof hot water supply.

virtu PVT

Revolutionising solar heat and power.

VirtuPVT redefines solar energy. It's a hybrid solar collector that combines solar photovoltaics (PV) and solar thermal technology, to generate both electricity and heat from a single solar collector.

Unlike solar PV, which generates only electricity, VirtuPVT captures more of the available energy increasing overall efficiency.

Certification and testing

As with any new technology, case studies detailing a history of performance are hard to provide. To give customers confidence in Virtu, Naked Nergy has commissioned 3rd party testing and certification with TÜV Rheinland.

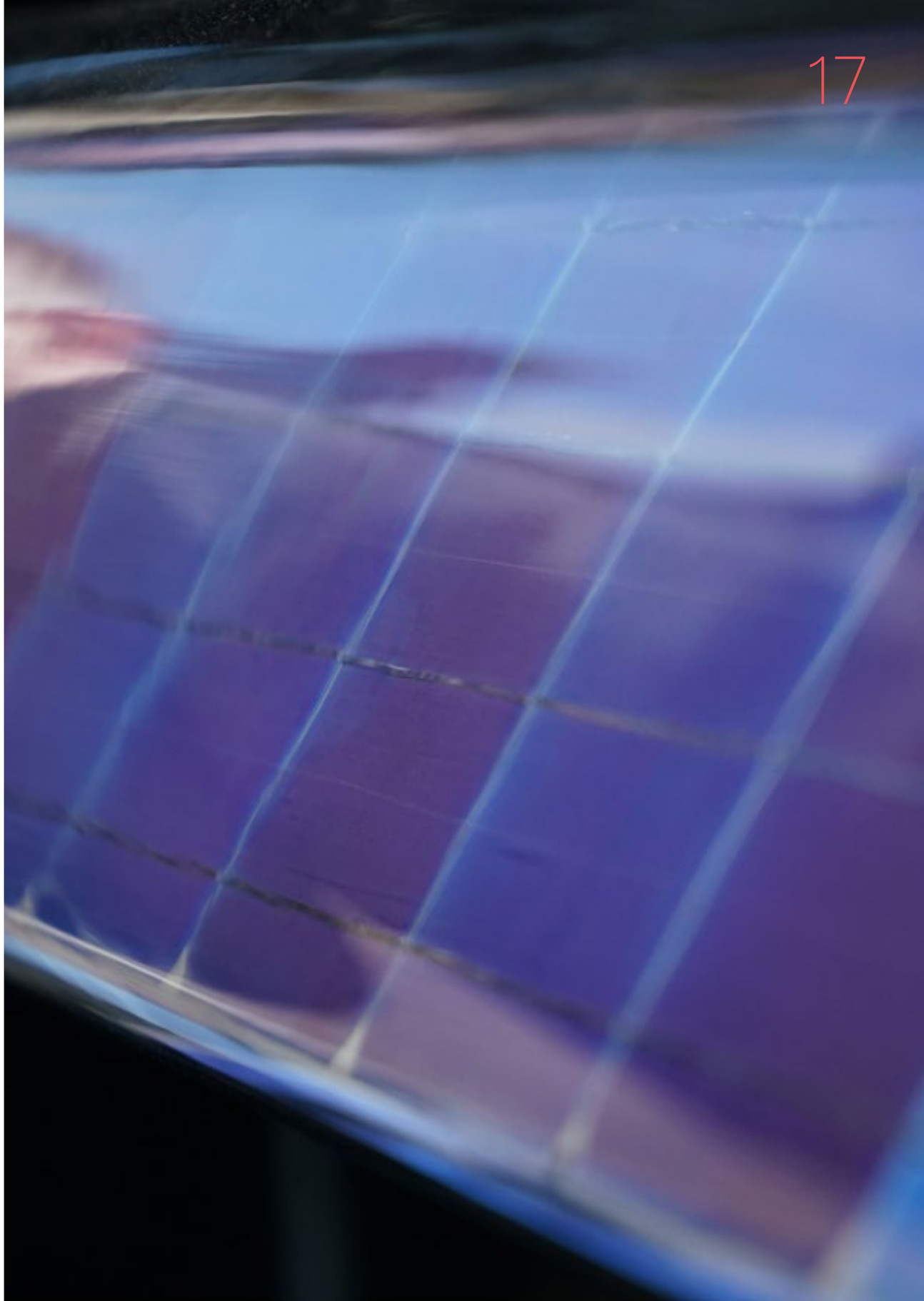
TÜV Rheinland is an independent inspection service that has been a global leader since its foundation 145 years ago. TÜV Rheinland certification is globally recognized and ensures the authenticity of a company's safety and performance claims in compliance to international standards.

Testing includes but is not limited to:

> Determination of performance data by means of a unique indoor solar simulator
> Sample production site inspections
> Testing of cyclical mechanical stress
> Hail testing with ice balls of different hail classes
> Testing of ageing processes by means of climate chambers (humidity/frost, damp/heat, temperature cycles)
> Cyclical outdoor and indoor shock tests on collectors
> Rain penetration tests
> Testing of frost resistance
> Fire tests on collectors

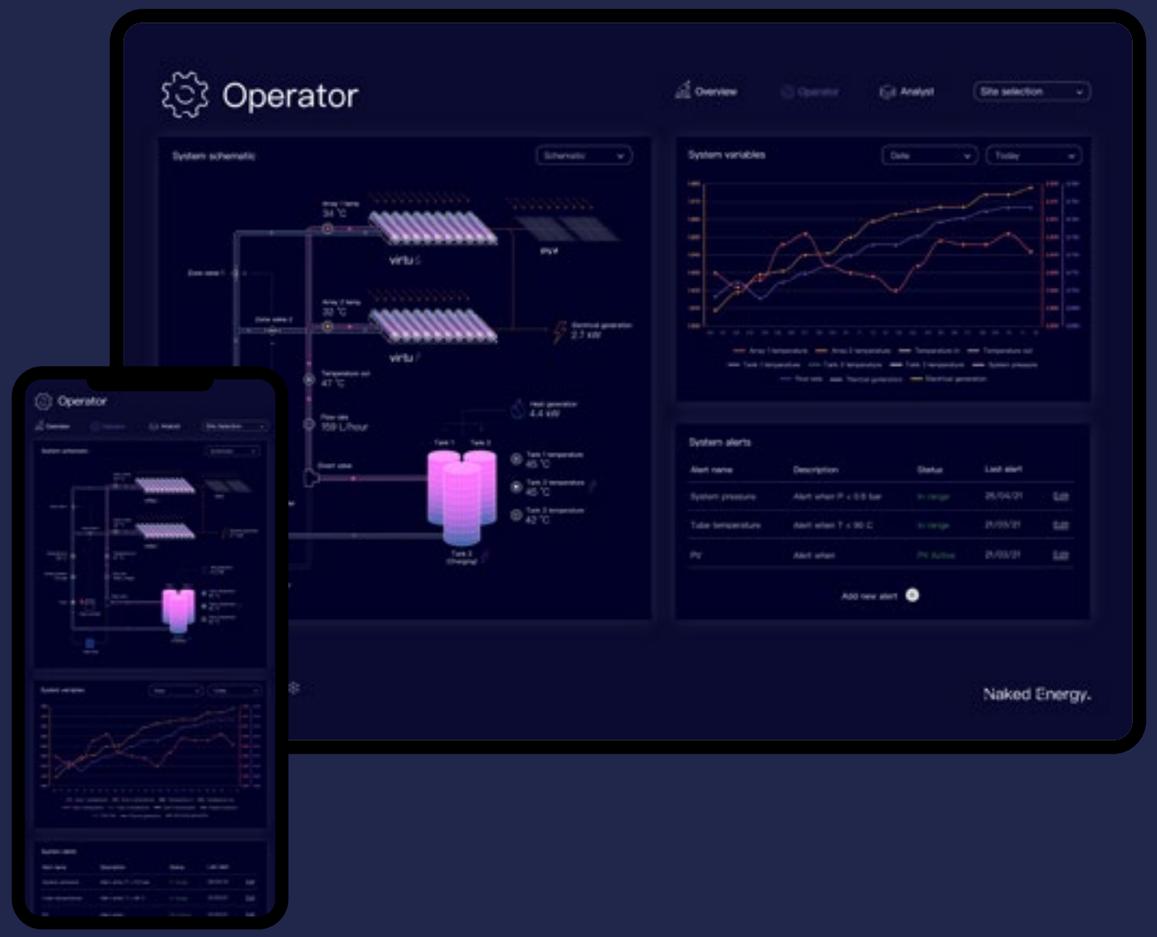
Our Virtu products are also Solar KEYMARK certified, a Europe–wide certification for solar thermal products that guarantees:

> All requirements of the European Standard are tested by independent bodies
> High–quality products
> The product sold is identical to the tested product
> Confirmation that products are fully tested according to the relevant standards
> Eligibility for subsidies



clarity[24–7]

Cutting edge monitoring platform



Clarity[24–7] is our cutting–edge monitoring platform, providing real–time data on the thermal and electrical outputs of our solar collectors and systems. Clarity[24–7] offers visibility of key information to end users and other stakeholders.

The data provided enables full carbon and performance reporting, as well as valuable insights into system operation and maintenance requirements. Data can be easily integrated with Microsoft Azure, enabling even more detailed analysis using Azure's suite of applications.

Features include:

> Thermal/electrical output monitoring

> Financial and sustainability reporting

> Carbon reporting

> Fault detection

> Performance optimisation

> Integration with other renewables on site

Case study — The British Library

The British Library has partnered with Naked Energy and Convert Energy to install 710 VirtuHOT and 240 VirtuPVT collectors. The 950 collectors contribute to the buildings

Client:
The British Library

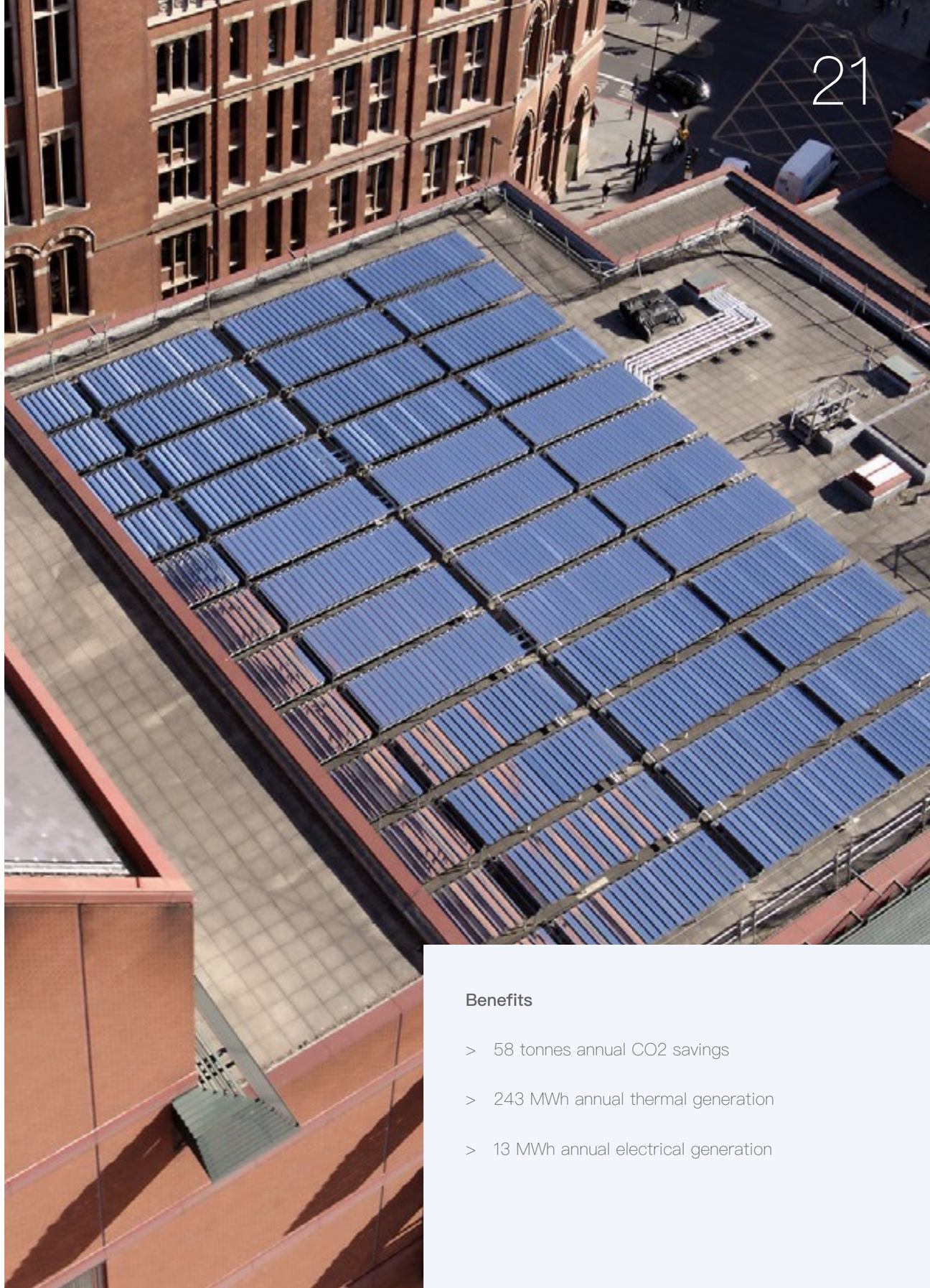
Sector:
Education / research

Location:
London, UK

Technology:
Virtu^{HOT} and Virtu^{PVT}

Background:
The British LIbrary is a research library in London and is the national library of the United Kingdom. It receives copies of all publications published in the UK and Ireland. It has 400 miles of bookshelves and houses more than 14 million books alongside manuscripts and historical items dating back as far as 2000BC. The British Library and CBRE's real estate services team reached out to Naked Energy at the end of 2021 to learn how Virtu can help the institution to decarbonise it's heat and power demand.

Solution:
The Virtu installation supports the library's heat–driven humidity control system to preserve it's collection of books and manuscripts. Additionally, it provides space heating and domestic hot water for users and staff.
By generating solar heat and power on its roof, the British Library is burning less natural gas onsite, reducing its Scope 1 emissions. Every year, the installation will save 267 MWh of gas and 13.5 MWh of electricity consumption. The annual carbon saved will be 58 tons CO2eq per year.



Benefits

> 58 tonnes annual CO2 savings

> 243 MWh annual thermal generation

> 13 MWh annual electrical generation

Case study –
Creighton University

Creighton University is the first North American facility to use Virtu technology to provide heating for their new student residence building, Graves Hall. The use of Naked Energy's Virtu collectors will significantly save on water heating costs and assist the universty in achieving their sustainability goals.

Client:
Creighton University

Sector:
Education

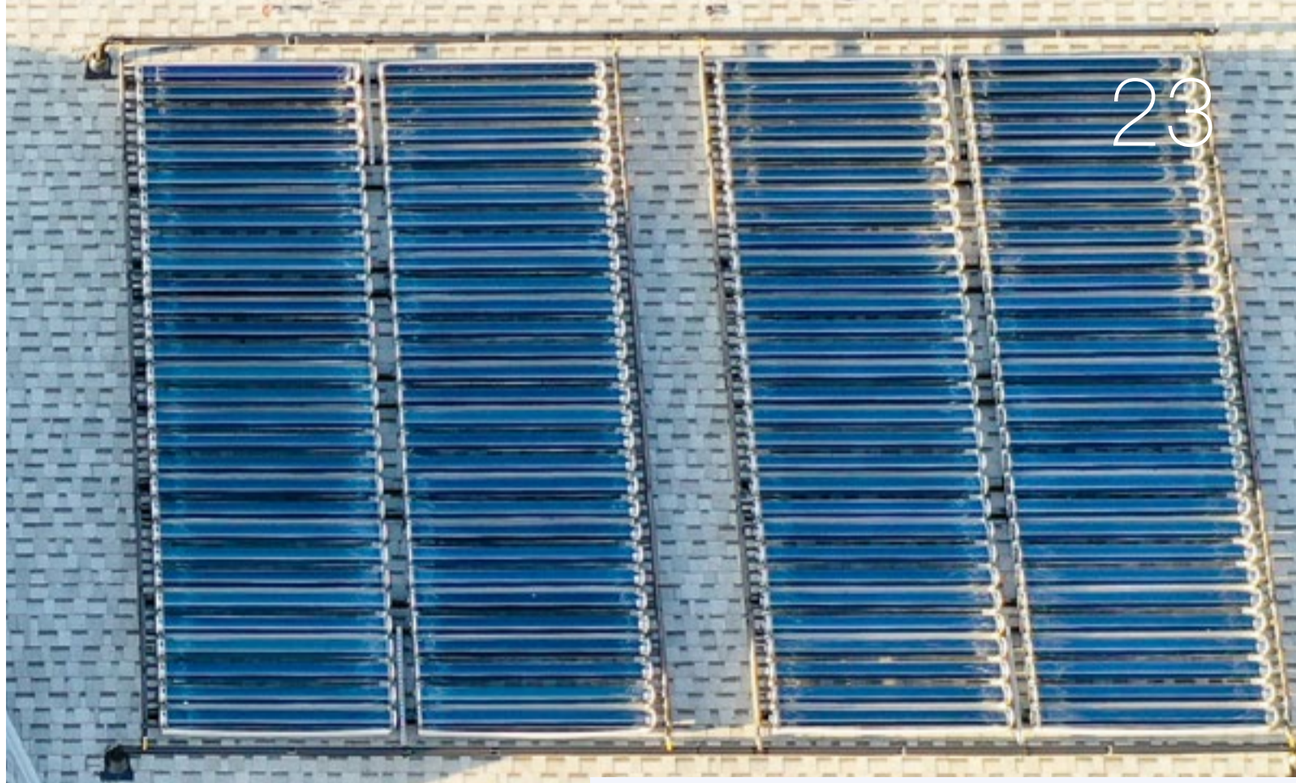
Location:
Omaha, Nebraska, USA

Technology:
Virtu$^{HOT\ HD}$

Background:
Energy conservation is at the heart of Creighton University's Sustainable Creighton Initiative driving the implementation of renewable energy technologies supporting the ongoing decarbonisation of energy demand, eventually meeting its carbon neutrality goal. Creighton University has worked with Naked Energy's partner ELM Solar on the installation of VirtuHOT HD collectors for Graves Hall, housing 400 first year students at the university's Omaha campus.

Solution:
The implementation of 240 VirtuHOT HD collectors supports the university meeting its sustainability goals and control costs: It allows the university to take water heating demands off–grid, conserve grid capacity for other users and create a cutting–edge campus environment with sustainability at it's forefront.

The solar energy generating potential of the south–facing roof is being maximised by VirtuHOT HD's low profile of 26.5 cm (10.4 inches) and modular design featuring angled absorber plates collecting more sunlight than traditional solar panels.



"Partnering with ELM and Naked Energy in bringing this innovative approach to energy conservation to our campus is a tremendous opportunity for us. Virtu aligns seamlessly with our Sustainable Creighton Initiative, creating a cutting–edge campus helping our students and plant thriving in the future."

Rev. Daniel S Hendrickson, President of Creighton University

Benefits

> 15.7 tonnes annual CO2 savings

> 63.800 kWpth thermal capacity

> 74.580 kWh annual thermal output

Case study — The Active Office

SPECIFIC IKC has partnered with Naked Energy to install 40 **Virtu**[PVT] tubes at the Active Office, the UK's first energy–positive office building, to decarbonise heat and power demand.

Client:
SPECIFIC Innovation and Knowledge Centre (IKC)

Sector:
Education / research

Location:
Swansea, UK

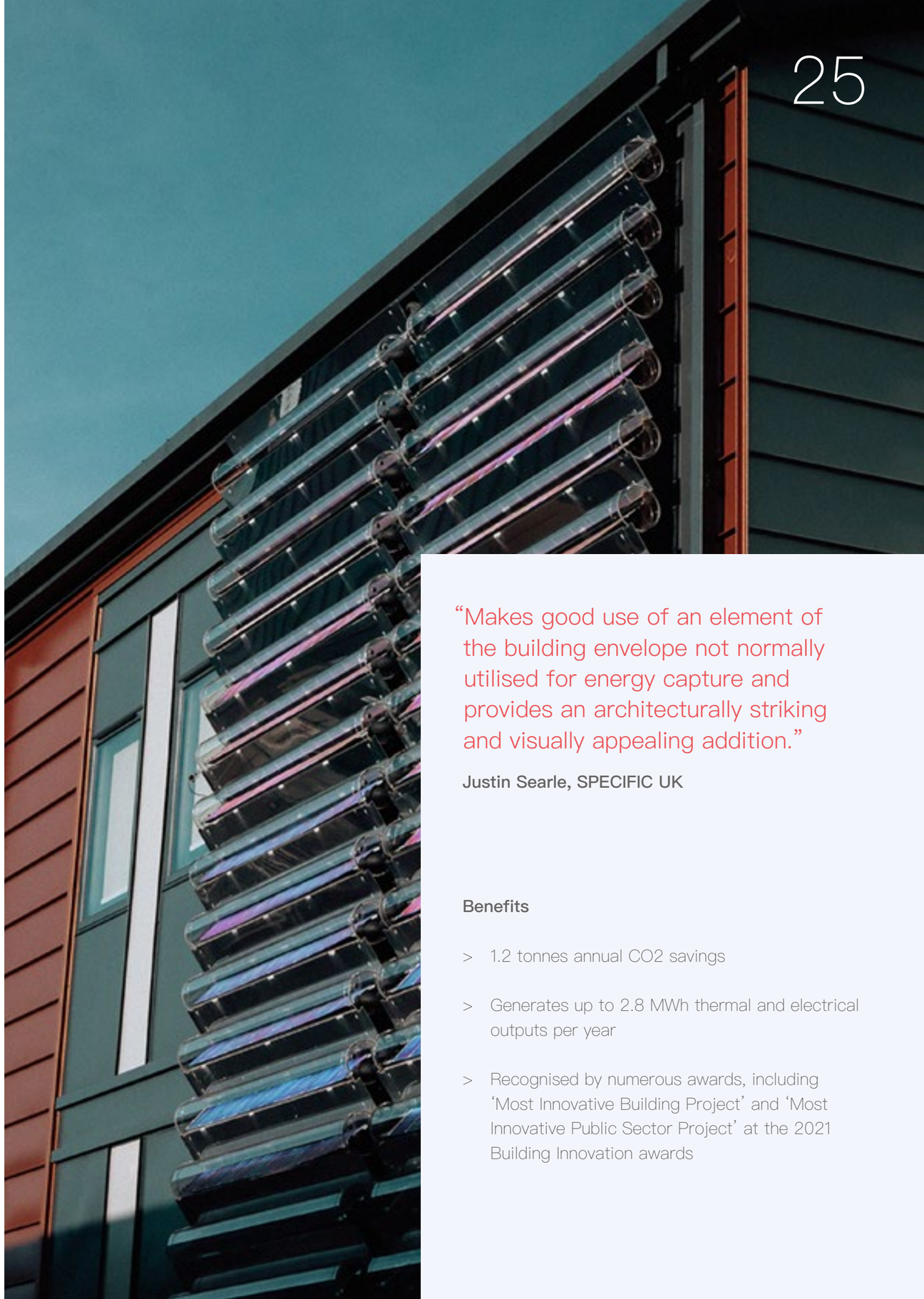
Technology:
Virtu[PVT]

Background:
Led by Swansea University, SPECIFIC is a UK national IKC with partners including Tata Steel, NSG and AkzoNobel. The centre was established in 2011 to research how innovative technologies, such as solar collectors, can be deployed to make buildings more environmentally responsive. Active buildings "support the energy network by intelligently integrating renewable energy technologies for heat, power and transport" (SPECIFIC).

Solution:
The SPECIFIC Active Office is an energy–positive concept: it generates more energy through its renewable energy installations than is used to operate and heat the building. SPECIFIC aimed to demonstrate the active building concept by using commercially available technologies and provide a solution that is replicable and scalable.

A total of 40 VirtuPVT hybrid solar collectors provide domestic hot water and generate electricity for the building.

The collectors are mounted on the south–facing façade of the office and have been operating since January 2019. In combination with a roof–mounted PV array, the electrical output is directly used in the building. The solar heat is stored in a 2,000 litre thermal store via an indirect coil, and this heat is used for sanitary hot water and space heating. The Virtu[PVT] array is monitored using Naked Energy's monitoring platform, Clarity[24–7], which enables SPECIFIC to identify potential outages and track generation.



"Makes good use of an element of the building envelope not normally utilised for energy capture and provides an architecturally striking and visually appealing addition."

Justin Searle, SPECIFIC UK

Benefits

- 1.2 tonnes annual CO2 savings
- Generates up to 2.8 MWh thermal and electrical outputs per year
- Recognised by numerous awards, including 'Most Innovative Building Project' and 'Most Innovative Public Sector Project' at the 2021 Building Innovation awards

Industries — range of Virtu applications

Hotels & Leisure Centres

For hotels with high thermal demand all year around, Virtu's high–energy density is ideal, especially for urban environments with limited roof area. Resort–style hotels are often in locations with lots of solar irradiance, but traditional energy sources are expensive, space is limited and not always secure. For these hotels, Virtu can eliminate such challenges while tackling the scope 1 emissions from domestic hot water (DHW), laundry and pool heating.

Manufacturing

To meet net zero targets, manufacturers must dramatically reduce their emissions. This is a significant challenge due to their high–energy usage, combined with legislative pressures to decarbonise. For a typical manufacturing site, energy demand far exceeds the generation capacity of the available area for renewables. Naked Energy's Virtu products generate more energy from less space. Virtu provides pre–heat and process heat up to 120°C while reducing hard–to–tackle scope 1 emissions, unlike standard solar PV technology.

We work with manufacturers of food & beverage, pulp & paper, textiles, pharmaceuticals, fast–moving consumer goods and other manufacturers.

Westgate leisure centre

Multi–unit Residential Developments

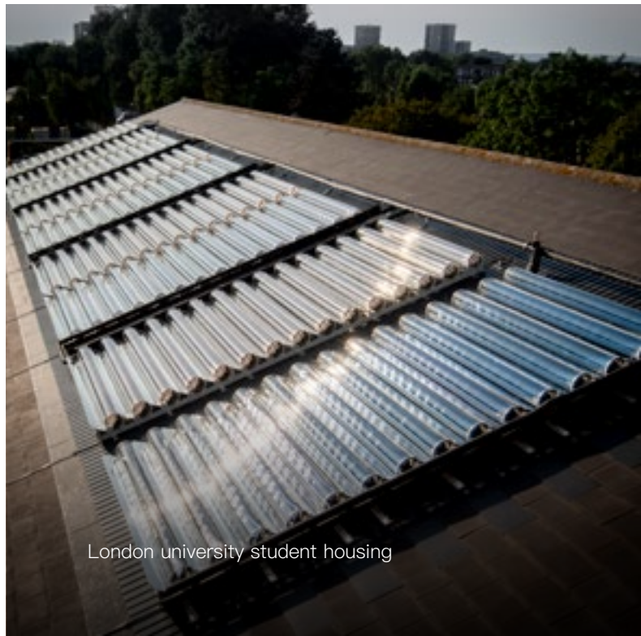
Many new residential developments are moving away from gas for heating. Providing affordable warmth to residents remains a priority. Installing Virtu during retrofit or in new developments can halve residents' energy bills while future–proofing building standards for low–carbon homes. Virtu works in parallel with thermal storage to reduce costly electricity network upgrades and adds to the aesthetic value of the property.

We work with social housing, residential developers, heat networks and care homes.

Public Sector

Governments around the world have committed to net zero. To achieve this, decarbonising heat in public sector assets is a priority. In many countries, governments offer strong subsidy support to finance projects which reduce the carbon emissions of their assets. Our Virtu products are Solar Keymark certified, making them eligible for such funding. Virtu can help decarbonise a range of public sector assets with large thermal demand.

We work with social housing, schools, swimming pools, fire stations, hospitals, university accommodation blocks, prisons and heat networks.



London university student housing

Partners

Naked Energy Partner Programme

We are always looking to expand our network of industry experts committed to a zero–carbon future.

We partner with forward–thinking organisations to transform carbon–intensive heating into sustainable solar thermal with our Virtu products.

Organisations we partner with include:

- Distributors and agents
- Engineers, architects and building designers
- Energy efficiency and renewable energy developers
- EPC contractors
- ESCOs
- Manufacturers
- Installers

The highest energy–density solar collector in the world

If your customers are looking for cutting–edge products with high energy density and high temperature outputs across multiple applications, Virtu is the ideal solution.

Both Virtu^{PVT} and Virtu^{HOT} save your customers money and reduce their carbon footprint by generating free, zero–carbon energy on–site. By reducing their dependence on existing heating fuel such as grid electricity, gas and oil, customers cut their energy bills significantly and minimise exposure to price volatility.

The electricity grid is not yet 100% renewable, which means Virtu products consistently deliver higher carbon savings than electrified heating systems.

Distribution partnerships

We work with international companies as distribution partners. These partners hold, market and sell our stock in their local geographies.

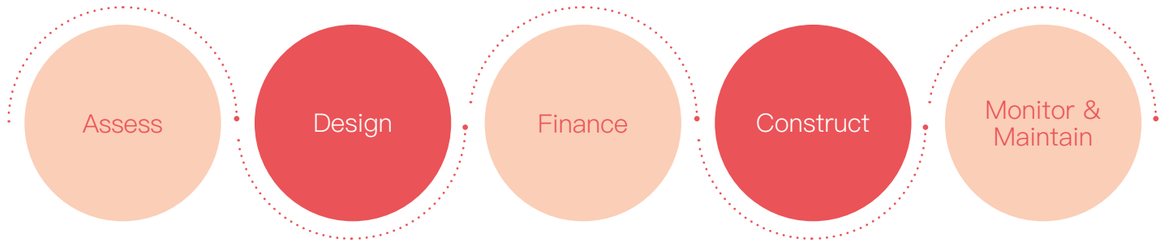
Agent partnerships

We work with agents worldwide who refer projects in their local geographies.

Delivery partnerships

We work with preferred delivery partners internationally who install projects in their local geographies and provide ongoing operations and maintenance support.

Expertise throughout the end–to–end process



At Naked Energy, we want all our customers to enjoy a seamless and worry–free experience. So, we support you at every step of the way, from initial contact right through to installation and beyond.

We actively support every stage of project development, from early assessment and detailed design process, to providing financing partners (we can put together leasing models to assist you). Our experienced, specialist installation managers works with local teams to ensure a smooth installation process. Once an installation is complete, our bespoke monitoring platform, Clarity[24–7], can offer real–time data on system performance and provide alerts to local maintenance teams, so any potential issues are identified and resolved swiftly.

The result is peace of mind and complete satisfaction for the customer at all times.

Naked Energy.

Contact us
Nakedenergy.com
commercial@nakedenergy.com
+44 20 4542 2230

Main office
Unit 72 / Unit 80
Basepoint Business Centre
Metcalf Way
Crawley
West Sussex
RH11 7XX
United Kingdom

London office
Rise
41 Luke Street
Shoreditch
London
EC2A 4DP
United Kingdom