

The Challenge: Decarbonisation & Climate Change

Climate Change will be a much more serious, long-term problem for humanity than COVID-19.

"Climatic changes already are estimated to cause over 150,000 deaths annually."

World Health Organisation

"Scientists say recent extreme weather events were made more likely by human-caused climate change."

American Meteorological Society

"Taken as a whole, the range of published evidence indicates that the net damage costs of climate change are likely to be significant and to increase over time."

Intergovernmental Panel on Climate Change

"Global warming is likely to be the greatest cause of species extinctions this century. The IPCC says a 1.5°C average rise may put 20-30% of species at risk of extinction. If the planet warms by more than 2°C, most ecosystems will struggle."

WWF

150,000
deaths a year are caused by climate change

If we keep burning fossil fuels at our current rate, all our fossil fuels could be depleted as early as 2060.

However, remember, "if we are to limit global warming to the 'relatively' safe level of 2°C, by 2050, 80% of coal, 50% of gas and 30% of oil reserves are "unburnable".

UCL Institute for Sustainable Resources.

	CIA World Fact Book*	BP World Energy Data 2019*
Oil	32 years – 2052	50 years – 2070
Natural Gas	40 years – 2060	50 years – 2070
Coal	70 years - 2090	132 years – 2152

*Projections

Managing a globally successful low-carbon energy transition is important to the future of humanity and the planet – and presents unprecedented challenges and opportunities.

"Energy is the dominant contributor to climate change, accounting for around 60% of total global greenhouse gas emissions."

United Nations' Sustainable Development Goal 7: Ensure access to affordable, reliable, sustainable and modern energy

"Reducing carbon emissions is an important and necessary aim – but it should not allow us to ignore the energy needs of the billions of underprivileged people around the world."

Dr Angela Wilkinson, World Energy Council Secretary General and CEO

"The rise in 'prosumers' – people both producing and using energy - is shifting how we power our homes and our communities. It is considered one of the most exciting trends in renewable energy."

World Energy Council

"Shifting to a digital, decarbonised, and decentralised energy system presents unprecedented challenges including extreme weather, grid reliability and resilience, and cyber security threats."

World Energy Council

60%
of global greenhouse gas emissions come from energy.

Decarbonising to eliminate the use of fossil fuels is probably the largest, most wide reaching and expensive project humanity has ever attempted to undertake.

"A climate-safe path would require cumulative energy investments of USD 110 trillion by 2050 but achieving full carbon neutrality would add another USD 20 trillion. However, the socio-economic gains of such an investment would be massive, with savings eight times more than costs when accounting for reduced health and environmental externalities."

IRENA Global Renewables Outlook 2020

How we respond to these challenges will affect not just the energy sector, but all industries, governments and consumers.

The Opportunity: Decarbonisation of the Built Environment

The built environment is a major source of carbon emissions.

“Buildings and construction are responsible for 39% of all global carbon emissions, with operational emissions (from energy used to heat, cool and light buildings) accounting for 28%, and the remaining 11% coming from embodied carbon emissions.”

World Green Building Council

“Global building stock will double in area by 2060 to accommodate the largest wave of urban growth in human history.”

Architecture 2030

“Overall, in 2019, the buildings and construction sector moved away and not towards the Paris Agreement. CO₂ emissions from the sector were the highest ever recorded.”

Global Status Report for Building and Construction 2020

Decarbonising the Built Environment is probably the most complex of all the Decarbonisation sectors.

“The Construction industry is slow to adopt new technologies that streamline workflows and improve data collection.”

KPMG

“Within the buildings sector, for every \$1 spent on energy efficiency, \$37 is spent on conventional construction approaches.”

Global Status Report for Building and Construction 2020

“Buildings sector is losing momentum towards decarbonisation and has, in fact, almost halved its progress from 2016 to 2019.”

GlobalABC Buildings Climate Tracker

‘How’ to Decarbonise the Built Environment

Without practical digital solutions that consider a holistic approach to decarbonising the built environment errors are highly likely, resulting in more capital and operational costs and a high probability of failing to decarbonise in time.

This is where IES, and our ICL Digital Twin technology, provide the ultimate “how” solution. How to implement a coherent and effective decarbonisation plan for the built environment.

- 1 How do we drastically reduce carbon emissions from buildings, cities, transport, electricity and heating? Think deeply and you’ll soon be overwhelmed by the enormity of what is entailed and the various routes one might take.
- 2 How exactly do we take the advice offered by governments and international organisations? They have provided excellent advice on ‘how’ to drastically cut emissions using EUIs, energy efficiency mandates, compliance codes, rating systems, district heating/cooling, renewable energy solutions, low carbon heat, and improving occupant behaviour. But how do you assess the many options, make the right decisions and eliminate the risks?
- 3 How do we make a coherent and effective decarbonisation plan, understand the actual impact of the different solutions, how they act holistically, and, most importantly, track and monitor the progress of the plan?

“There is significant and largely untapped potential to use digital solutions for design, construction, operation, and refurbishment or demolition to make buildings more energy efficient. Digital tools can support energy efficiency throughout the lifetime of a building.”

Global Status Report for Building and Construction 2020

The goal of IES is to become market leader in tools for Decarbonisation of the Built Environment through its building physics based Digital Twin.



Leading Global Innovator of Sustainable Analysis Technology

Our Mission

Better Buildings: Smarter Cities

We believe that every building of every city in the world can be decarbonised. Our purpose is developing the technology to make that happen. Our ultimate aim is to create a built environment that is resource and energy efficient. Eliminating global reliance on fossil fuels and promoting comfort, health and wellbeing, and fairer access to energy for every citizen in the world.



25 Years of IES

IES Founded

- Right from the start, our founding principle was to ensure efficient use of energy across the built environment.
- Before Climate Change, there was concern over the exhaustion of our fossil fuel reserves. However, both problems are about energy efficiency.
- No matter how we produce energy in the future, we should do so in an efficient and cost effective manner, that democratises energy and can resolve problems such as fuel poverty.

1994

2004-2010

UK Market Leader & Going Global

- APACHE dynamic simulation engine developed into the UK market leading Virtual Environment (VE) software.
- VE launched in the US, where it continues to hold a strong position against 'free' DOE backed tools.
- Offices in Ireland, USA, Australia, India and Singapore.

A Focus on Research & Development

- Focus shifted onto R&D in order to develop interfaces for APACHE suitable for a less technical, broader user base.
- Dedicated R&D division opened
- Won over €1.6m from 45 European and UK funded grants.

2011-2015

Introducing the ICL

- Launched the Intelligent Communities Lifecycle (ICL) Digital Twin Platform
- Celebrated 25 years of IES.
- Won 5 awards and shortlisted for 7 including the Scottish VIBES and Energy Awards.

2015-2016

The Digital Revolution

- Ability to incorporate operational data from an existing building into VE models developed.
- First Tools from R&D projects commercialised.
- Energy App created for Glasgow.

2019



Products for the Entire Built Environment Lifecycle

When IES was founded over 25 years ago, our long-term ambition was to create an intelligent tool, that leveraged our core APACHE simulation engine, to significantly improve built environment performance and operational control. Improving energy efficiency in buildings, reducing fossil fuel use and ensuring buildings are also healthy and comfortable.

APACHE

Our Dynamic Thermal Simulation Engine.

The strong foundation on which everything is built.

Based on fundamental physics principles.

A robust simulation engine for the built environment.

The piece no one else has.



The Virtual Environment

Delivered the power of APACHE to Building Services Engineers and AEC market.

Reduced energy and fossil fuel use in over one million buildings.

For example, Alpin Ltd saved 101M kWh and 44,000+ MT CO₂e, across 30 projects.

The ICL

The ICL unleashes the power of our APACHE system further, making it accessible and useful to a much broader audience.

- Quickly simulate accurate energy demand profiles for any building with minimal data
- Link its power with operational data from buildings via IoT sensors and BMS systems
- Understand how the built environment interacts and responds to its surroundings
- Create an Intelligent Building Controller that links it to cloud computing and weather forecasts
- Virtually test and assess Energy Conservation Measures that decarbonise buildings
- Test and design heat/cooling/power networks between multiple buildings
- Masterplan communities that are not only zero-carbon but achieve positive-energy

Links to ICL Digital Twin Resources

Videos



Introducing the ICL



Digital Twins for the Built Environment



B1M Documentary: How Buildings can power the world



ICL YouTube Playlist



How Digital Twins help Build Back Better: The Challenges and Opportunities



World Green Building Week 2020 Webinar - Digital Solutions for Zero-Carbon: Limerick



Upskilling Sessions



B1M Documentary: How Construction Technology Could Solve The Climate Emergency



Digital Twins – The latest buzz word! But what does it mean for the built environment?



On Demand Product Demos

Products



Case Studies



NTU EcoCampus Singapore



City of Limerick Ireland



Heriot Watt University Edinburgh



Sharjah Humanitarian City Campus UAE



ESFA Schools Operation UK



SSE Council Office Re:fit UK



Stirling City Council Scotland



Eday Community Energy Orkney Islands Scotland



University of Nottingham Project SCENe: Trent Basin, UK