



What are Digital Twins and how can they support Food & Drink Manufacturers on the path to Net-Zero?

Online Demo

Adam Goves, Sector Lead - Manufacturing and Infrastructure

Laurie McKelvie - ICL Senior Operations Consultant



Your Presenters Today

Adam Goves, Sector Lead - Manufacturing & Industry, IES

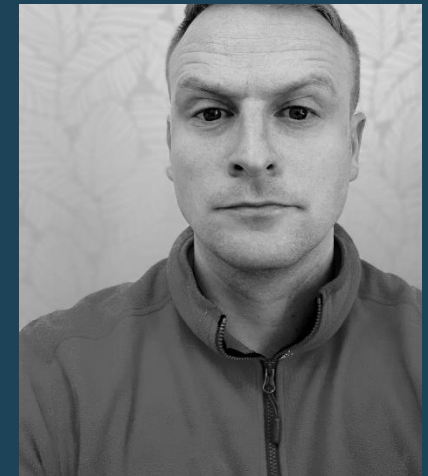
Adam has been working in decarbonisation, energy use reduction, energy security and renewable energy generation for over 20 years now. He has extensive experience in managing client relationships and delivering mutually beneficial contracts focused on engaging with the journey towards Net Zero. In his current role as Sector Lead for Manufacturing & Industry at IES, he brings a wide-ranging understanding of the renewable energy market and the opportunities that technologies bring to both new and existing buildings, as well as extensive experience in energy assessment and analysis.



Laurie McKelvie, ICL Senior Operations Consultant, IES

Laurie has worked within the Building Services Industry for over 10 years and has amassed a wealth of practical, project and academic experience during this time. With over eight years of Building Services Consultancy experience, Laurie has developed a wide range of expertise focused on sustainability-lead design solutions and has led large-scale projects and teams through the entire construction process.

Laurie has also gained valuable site experience working within a site facilities team developing and implementing practical energy management and plant replacement strategies for the site. He has also developed a high level of competency in dynamic energy modelling which has complemented his understanding of built environment energy and carbon reduction strategies.



About IES

Home to the largest building physics analytics team in the world



29

Years of building
analysis



Apache

World renowned
simulation engine



75,000+

Projects per year



>1,000,000

Buildings



40

Power stations
prevented

Our Locations



Our Clients Include

JOHN LEWIS
& PARTNERS

NHS
SCOTLAND

TOYOTA

Walmart

CBRE

AIRBUS

University
of Glasgow



WALT DISNEY

Building and Construction Authority


What IS a Digital Twin?

- A virtual replica of a building and processes which gathers real data and uses physics-based simulations to respond and behave in the same way as its real-world counterpart
- Allows you to analyse how your buildings and associated infrastructure are performing now, gain insights into how they should be performing and explore different scenarios to understand the impacts of future changes
- Provides investment-grade decision support information to improve asset performance, influence future process and building designs and retrofit to reduce investment risks



Audience Poll

How far along in your decarbonisation & Net Zero journey do you think you are?

1. Not started yet  10. Fully optimised



Digital Twins for the Food & Drink Industry

ICL Digital Twins help you identify and deliver:

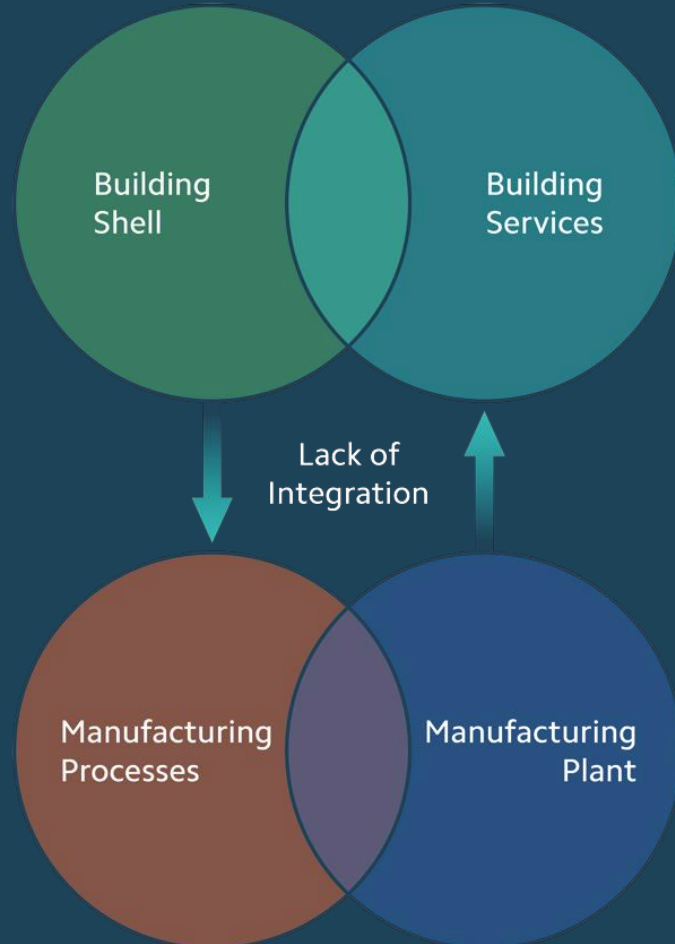
- Energy use reductions
- Energy cost reductions
- ESG monitoring and reporting
- Waste heat management reductions
- Carbon reductions and Net-Zero road mapping
- Manufacturing process efficiency improvements
- Building efficiency improvements

Increase production efficiency, reduce energy use, lower energy costs & divest from fossil fuels with Net Zero road mapping and ESG reporting

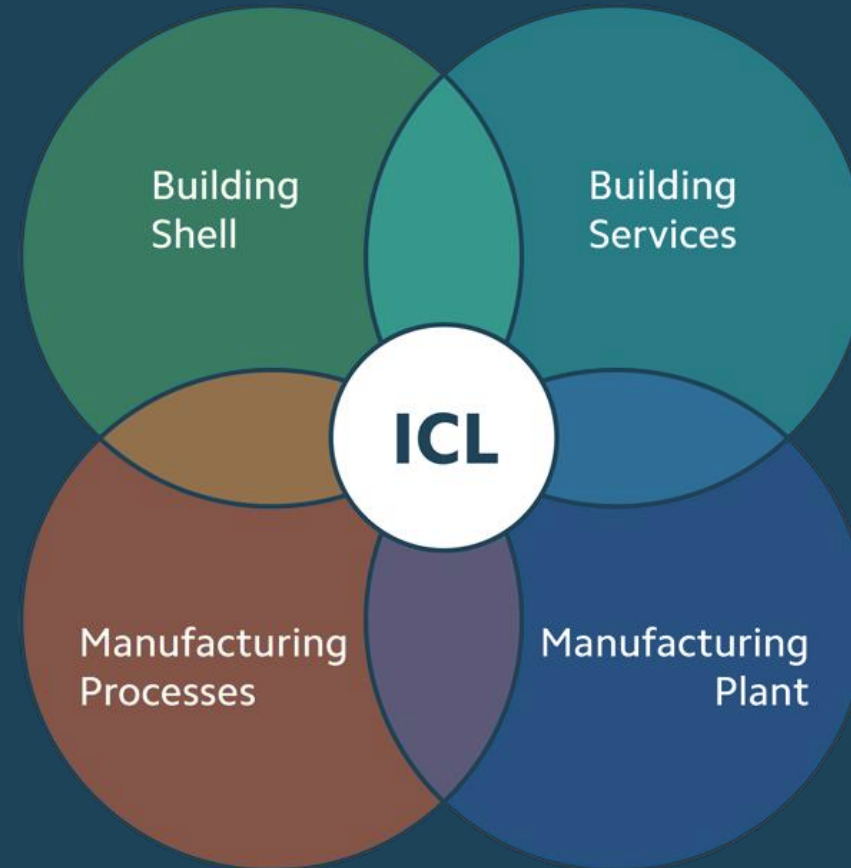


Holistic Approach to Production Modelling

Key Issue:

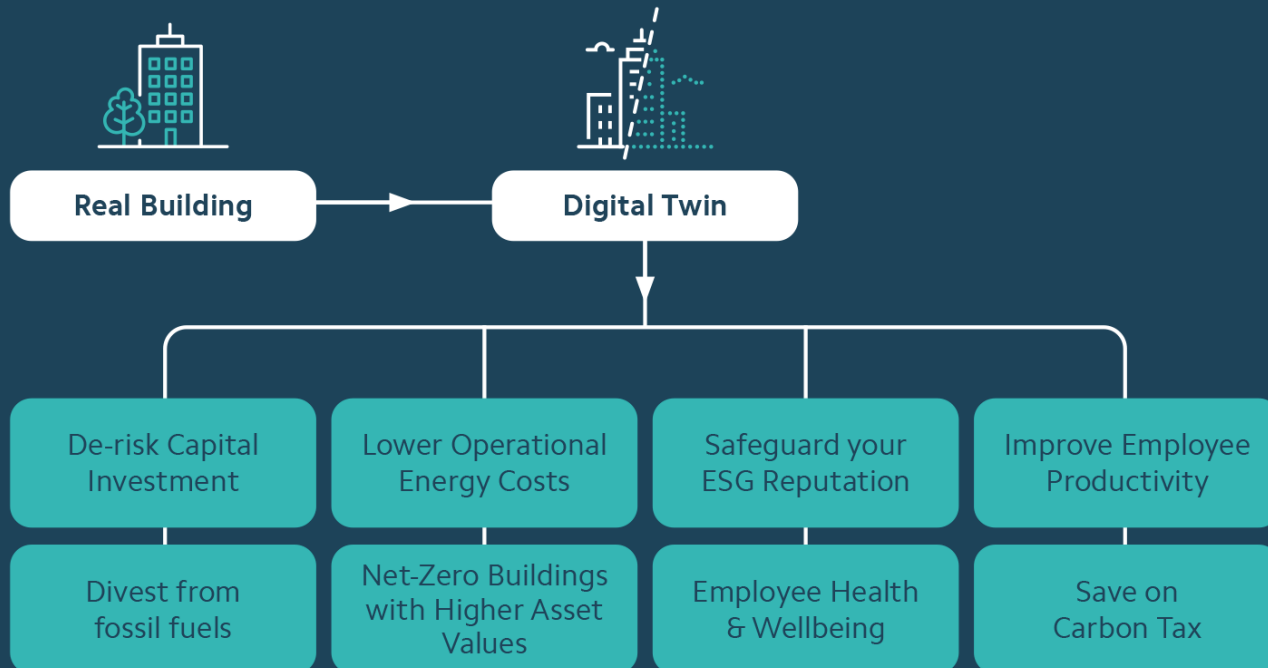


Solution:



Our Digital Twin Solution

- The IES Digital Twin is a detailed, calibrated, evolving digital representation of your buildings, processes, infrastructure, energy usage and waste generation
- It's a Lifetime Digital Asset for monitoring, energy cost risk reduction, ESG reporting, carbon reduction and net-zero investment road-mapping



Our Approach

Simplified data management, organisation and visualisation

- Access entire operational data for complex processes in one place from anywhere

Digital Twin of processes and buildings

- Virtual copy of facility to analyse and understand future operations without physically changing anything

Simulation & analysis of changes to process layouts, behaviours, & technologies

- Reduce energy consumption and improve energy efficiency of operations and buildings
- Analyse and understand impact and benefit of potential local energy production
- Simulate the potential for waste heat recovery and reuse



Simplified Data Management, Organisation & Visualisation

- Long on data; short on insights - users have multiple lines, data sources and systems, but no unified access to production data
- Import data from variety of sources - BMS, sensors on equipment, IoT sensors, virtual sensors, existing databases, utility bills
- Manual or automated data uploads
- AI & machine learning - fills gaps in data and checks sensors are within range
- Data visualised through online dashboards - view production data securely anywhere in the world



Simulate & Analyse Changes to Equipment Operation & Technologies

- Digital Twins can be used to model numerous scenarios to improve the effective and efficient running of manufacturing and packaging processes
- Optimal scenarios for both technical and economic requirements can be simulated, chosen and actioned
- Simulations and analysis may include:
 - Changes to operating profiles to reduce energy consumption
 - Impact and benefit of potential local energy production for use in the facility instead of supply from the grid
 - Simulate the potential for waste heat recovery and reuse



How We Cut Energy Costs

1 Data Gathering

Together, we will identify and gather energy consumption and metering data, system performance data, manufacturing process data, building performance and building use data including occupancy profiles.

2 Accurate Modelling & Identification of Energy Savings

We put the available data sets through our world renowned Digital Twinning software to provide insights into energy wastage. We then identify key energy saving measures with accurate forecasting of potential savings and payback periods.

3 Step towards Net-Zero

We can further develop the Digital Twin to take you to the next stage and test scenarios that moves you to net-zero & energy self sufficiency.



Direct Engagement and Partnering Options

- IES Consulting can engage directly with your organisation and your energy and sustainability teams
- IES Consulting can engage with your existing energy and sustainability partner organisations to enhance their offerings to you, working in collaboration to deliver improved results.

Example partner companies:



Foster + Partners



Microsoft

Scope 3 - IES for supporting farming futures: Environmental resilience - Innovate UK

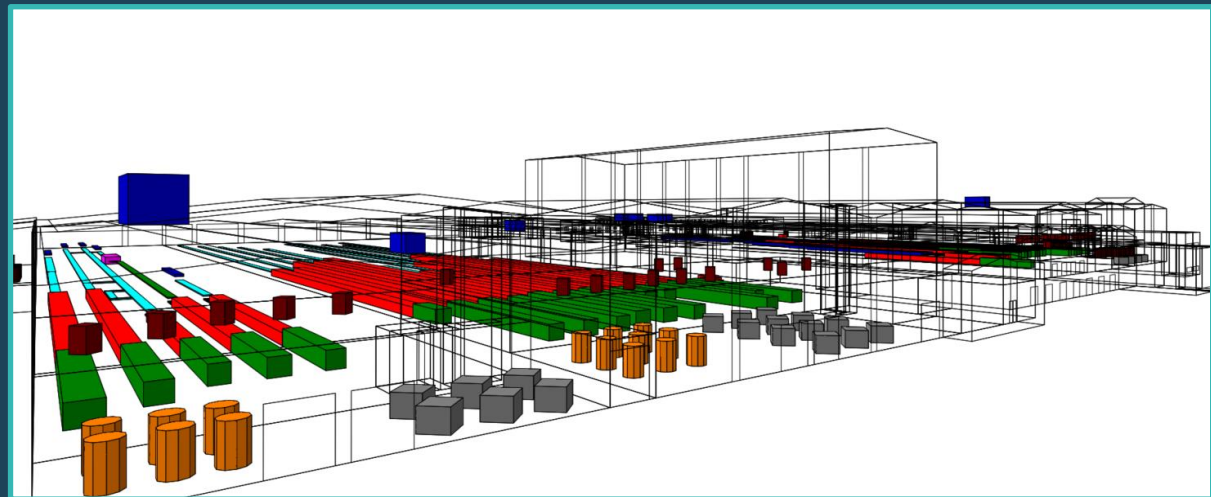
1. Funding call from the Department for Environment, Food & Rural Affairs (Defra) - July 19th deadline
2. Solutions to *“resolve key issues affecting the sector, where sustainable and resilient farming solutions can mitigate climate challenges and increase productivity”*
3. Projects must seek to significantly improve:
 - a) productivity
 - b) sustainability and environmental impact of farming
 - c) progression towards net zero emissions
 - d) longer term resilience
 - e) food security
4. Proposals must
 1. demonstrate environmental benefits and societal impact
 2. ensure your solutions are closely aligned with industry priorities to deliver business-orientated and transformative opportunities
 3. consider how it will encourage dissemination and knowledge exchange to the wider sector

Funding support of
between 50% and
70% available

Example: Food Manufacturer, Spain

IES was asked to perform the following:

- Create model of factory and processes
- Import data & create profile of energy demand from different processes and systems
- Create electricity cost tariff planner for financial year
- Run analysis for possible load shifting
- Change times equipment is used to move energy consumption to cheaper hours
- Results: Immediate 6 month savings = €18,111: Initial ROI under 1 Year

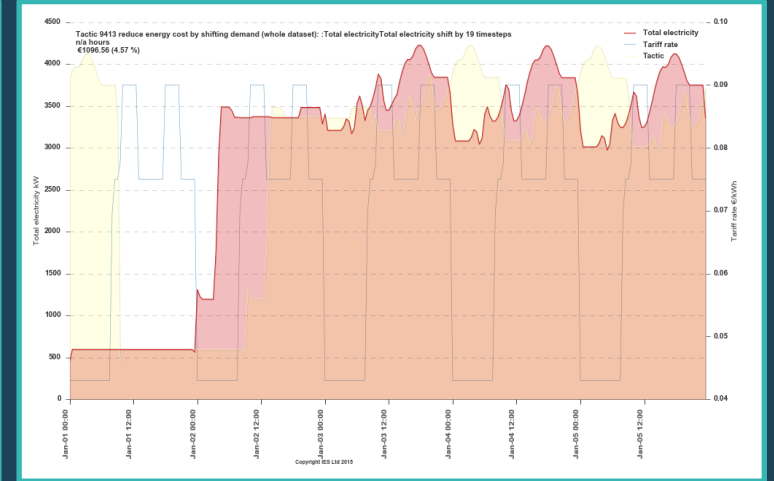
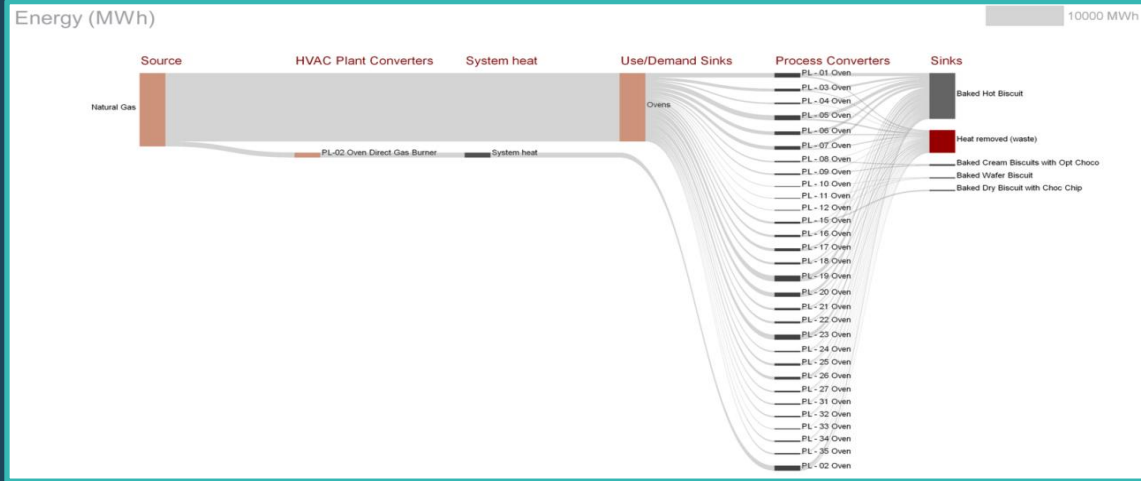
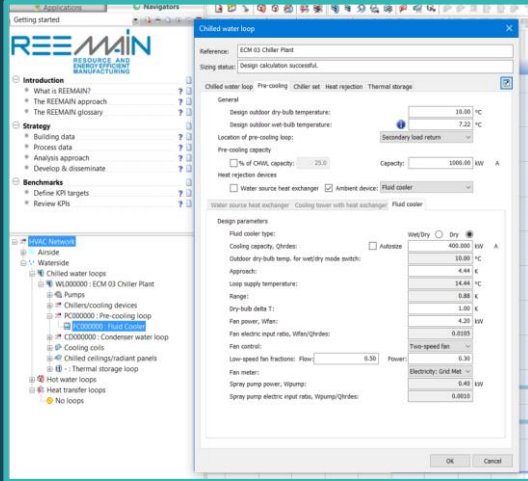
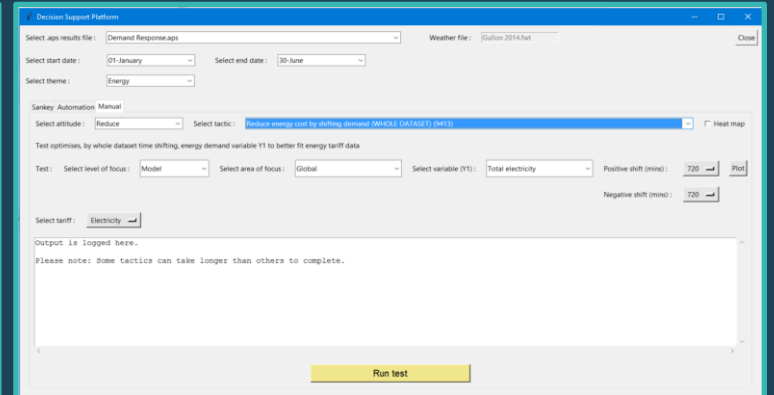
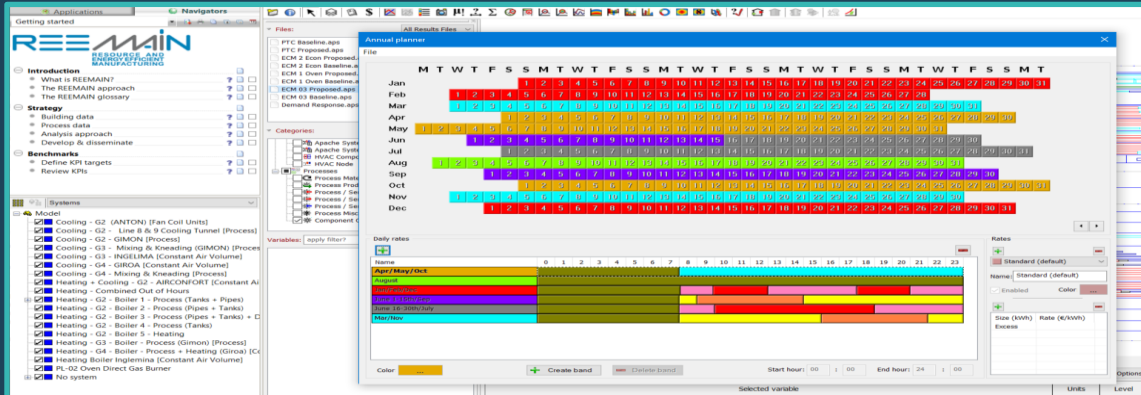


Example: Food Manufacturer, Spain

Import data & create profile of energy demand from different processes and systems:

Create electricity cost tariff planner for whole year

Run analysis for possible load shifting



Example: Food Manufacturer, Spain

Immediate Action Identified:

Modify equipment run times to move energy consumption to cheaper hours/renewable source

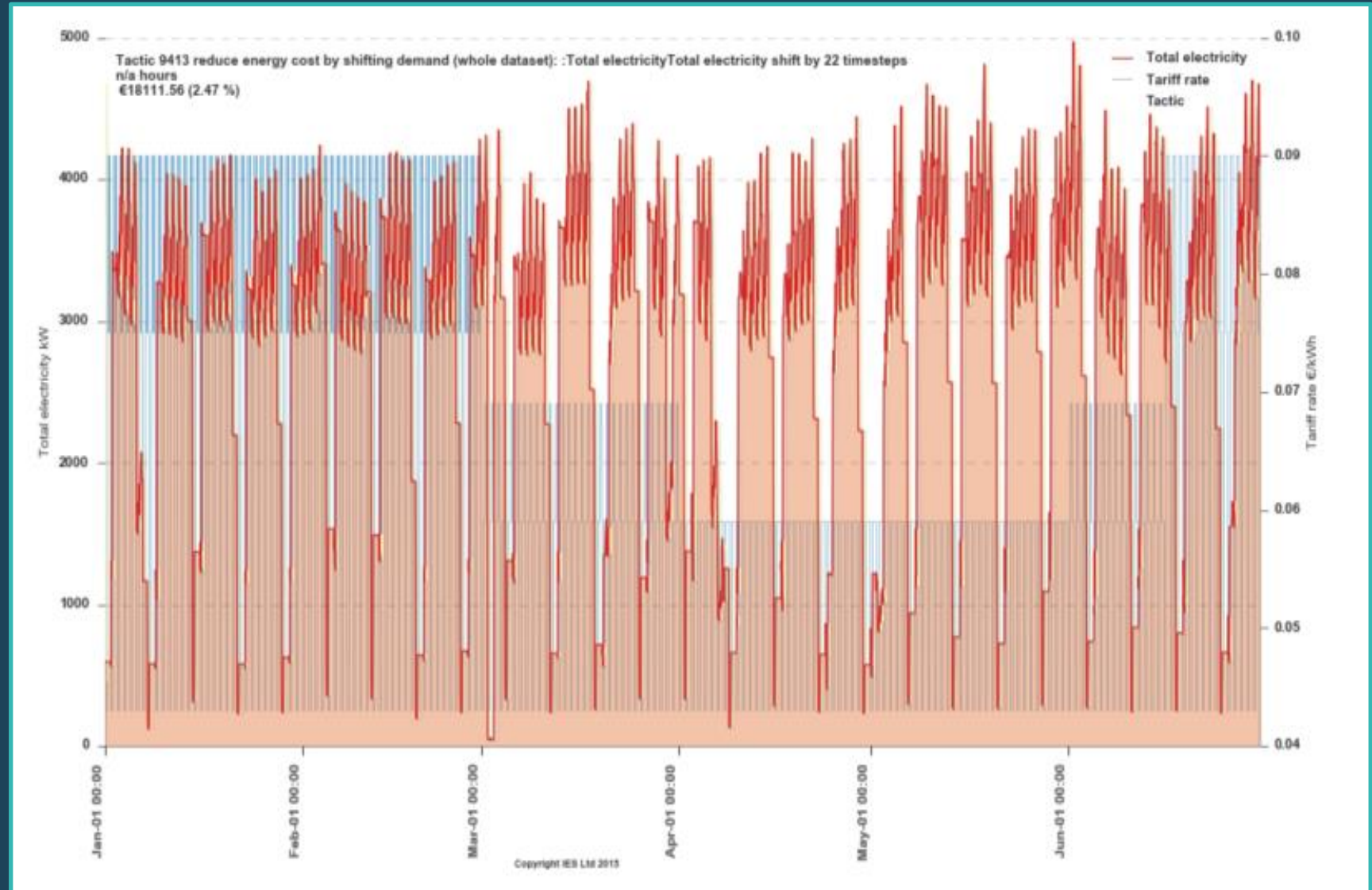
Immediate Results:

Energy savings made

(6 months) = **€18,111**

(1 year) = **€36,222**

Renewable energy generation & detailed Net Zero road mapping opportunities analysed & identified



Your Return on Investment

- 1 Immediate Energy Efficiency Gains**
The process of gathering and collating your built environment and manufacturing process data itself will identify immediate energy and process efficiency gains hidden within. These simple gains alone often cover the capital cost of your investment
- 2 “What If?” Scenario Planning and Strategic Views**
Once the data is collated and your virtual Digital Twin is built, you can run unlimited engineering, control or behavioural scenarios through the model without any risk to the business. You will identify significant and strategic deliverable improvements with fact based analysis.
- 3 A Quantifiable, Measurable and Defined Net Zero Road Map**
You will have the tools at hand to plan ahead towards your Net Zero targets. Your road map will be fact based, reportable, costed, measurable and robust.

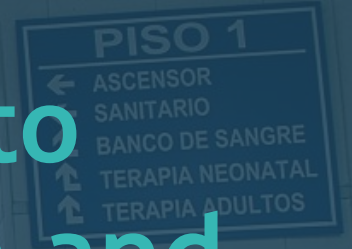
**Immediate energy
and cost savings
of up to 20%**

**Identify and
deliver continued
additional cost
and carbon savings
along your Net
Zero Road Map**

Audience Poll

Which barrier is most difficult to overcome in your decarbonisation and Net-Zero journey?

1. Cost/Return on Investment
2. Internal/C-Suite/colleague buy in
3. External/third party support
4. Supply chain
5. Other priorities



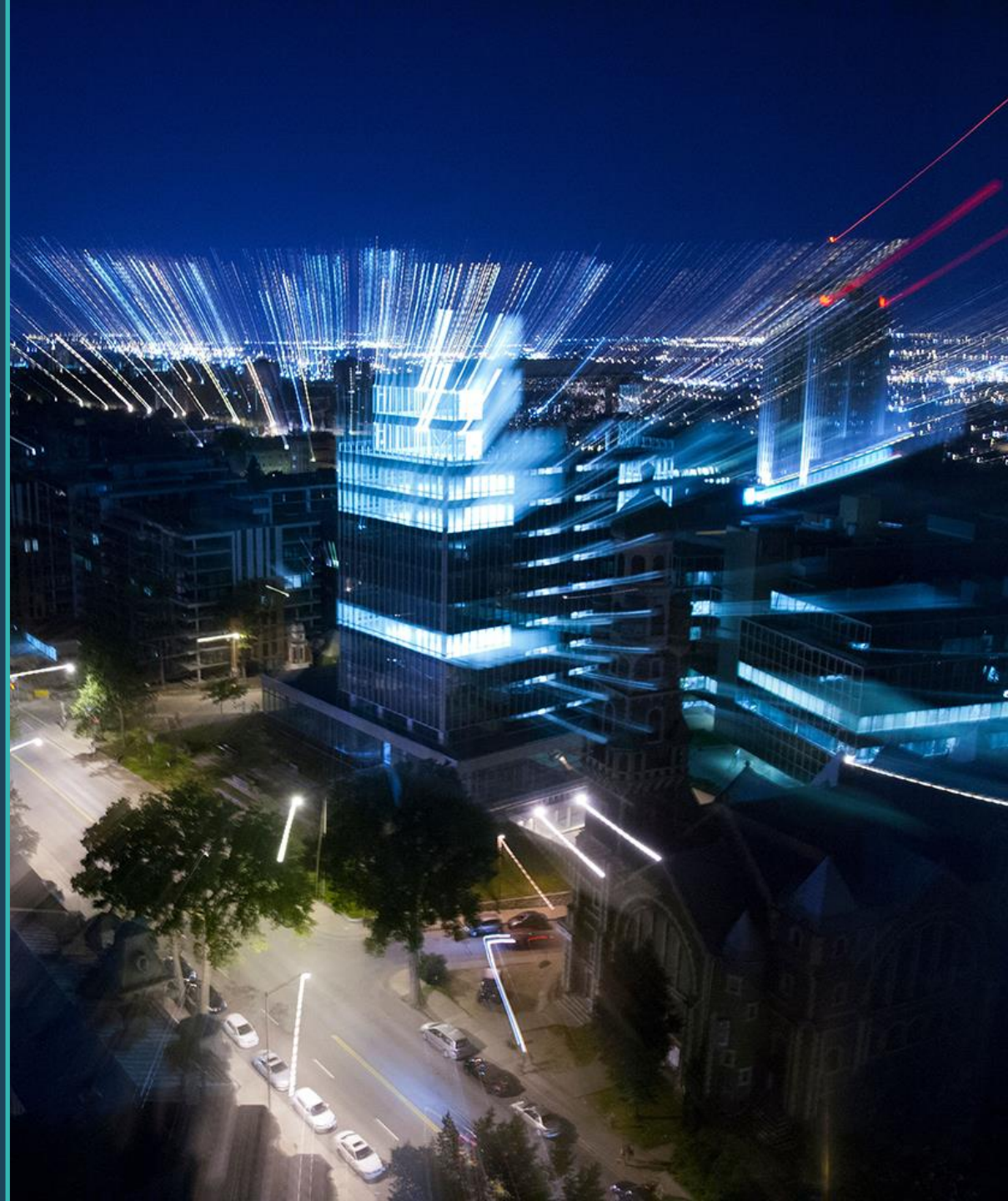
Net Zero Road-Mapping Example

Palm Springs Campus

[Palm Springs Campus.mp4](#)



Live Demonstration





Thank You

Q & A

