



Path to Zero Carbon
Improving the energy
performance of manufacturing
facilities



SMART 
advanced manufacturing

ORGANISATION PROFILE

Irish Manufacturing Research is a non-for-profit RTO that helps Irish manufacturing companies to innovate. IMR has 85 people of which 60 are researchers, working in Data Analytics, IIoT, Sustainable Manufacturing, Intelligent Building Systems, Automation & Advanced Control, Circular Economy and Software Engineering.



**IRISH
MANUFACTURING
RESEARCH**

PROPOSAL INTRODUCTION (I)

Vision: The application of renewable technology and artificial intelligence to support the demonstration of a zero carbon building

Motivation: to develop intelligent energy services to demonstrate reduced carbon for factories

Content:

- The application of AI to monitor and enable advanced real-time optimisation through integration of Intelligent Metering/control Systems
- Research into advanced federated machine learning and fog compute architectures to integrate energy and natural resource consumption providing insights and response strategies into productivity, consumption and behaviour in industrial and building environments.
- Developing energy aware buildings by jointly optimising consumption costs, occupancy comfort and CO2 reductions.
- Integration of digital technologies to integrate distributed renewable energy sources and bidirectional charging functionalities enabling neighbourhood optimized storage including management systems for optimal integration, flexibility and interoperability with the grid

PROPOSAL INTRODUCTION (II)

Expected outcome: the development of (i) advanced analytics/AI platforms to optimize factory/building performance for energy and (ii) digital twin models for scenario planning and impact analysis for energy optimization in buildings and (iii) a demonstration of how an energy aware building can integrate with renewables and local storage to optimize performance

Impacts:

- Demonstration of autonomous optimisation of energy based KPI's in a building environment
- National exemplar showing a complex building environments integration into a local grid network, supporting a predominantly renewable energy based national grid with demand response services
- Methodology to demonstrate how to approach an improved carbon footprint in a legacy building

Schedule: duration 24 months

PARTNERS

Current Consortium:

- IMR will offer their Manufacturing Facility in the National Science Park, Mullingar, as a location to test out the solutions and neighbourhood integration. IMR will also support the development of advanced analytics solutions
- Eaton Corporation will supply power management infrastructure and expertise and will be developing intelligent power management services for both within the factory and at a neighbourhood level; Eaton will also offer one of their office buildings as a test site for the joint integration of renewable energy and electric vehicle charging facilities

Partner search: partners with expertise in implementation of energy management solutions for complex environments

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