Improved Energy Efficiency of Float Glass Production

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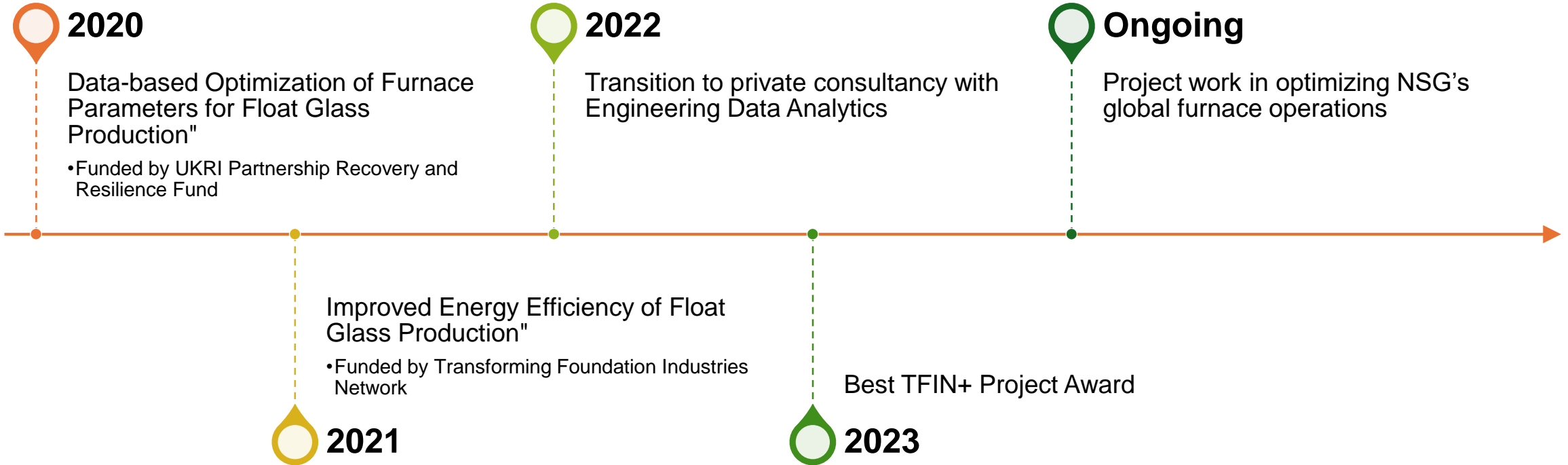# Introduction to AI-Driven Float Glass Production Optimization

OVERVIEW OF AI APPLICATION IN OPTIMISING FLOAT GLASS PRODUCTION

COLLABORATION WITH NSG PILKINGTON

Project Background and Funding Timeline

2020

Data-based Optimization of Furnace Parameters for Float Glass Production"

• Funded by UKRI Partnership Recovery and Resilience Fund

2022

Transition to private consultancy with Engineering Data Analytics

Ongoing

Project work in optimizing NSG's global furnace operations

Improved Energy Efficiency of Float Glass Production"

• Funded by Transforming Foundation Industries Network

2021

Best TFIN+ Project Award

2023

Deployment and Testing of AI Solution

- AI solution currently deployed across multiple NSG furnaces worldwide

- Aim: Reduce carbon emissions in float glass production

Publications Inspired by the Project

Echeverria-Rios, Diego, and Peter L. Green. "Predicting product quality in continuous manufacturing processes using a scalable robust Gaussian Process approach." *Engineering Applications of Artificial Intelligence* 127 (2024): 107233.

Peter L. Green. "Distributed Gaussian Processes with Uncertain Inputs" - To be published in *IEEE Access*
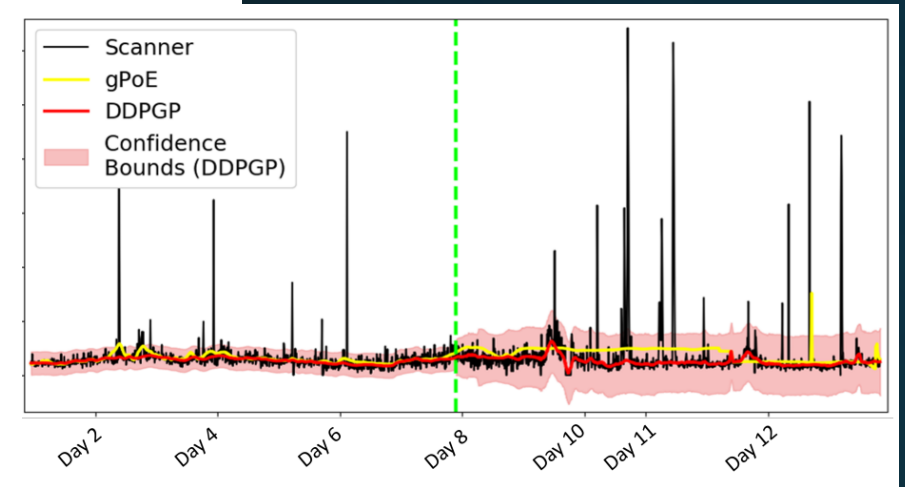
Impact on Employment and Skill Development

Aided NSG recruitment in AI and data science

In particular: new role for **Jay McEveley** to support knowledge transfer and apply AI across various business areas

Glass Futures council member

Plus session for NSG Blackbelt course (2022, 2024)

Founding of Engineering Data Analytics Ltd

Establishment of consultancy: **Engineering Data Analytics Ltd**

Now part academic and consultant

Cross-Disciplinary Applications

Skills and experience extended to other sectors, including **anti-microbial resistance** research

Gerada, Alessandro, Gareth Roberts, Alex Howard, Nada Reza, Anoop Velluva, Conor Rosato, Peter L. Green, and William Hope. "Simulation to optimize the laboratory diagnosis of bacteremia." *Microbiology Spectrum* (2024): e01449-24.

Howard, Alex, Peter L. Green, Anoop Velluva, Alessandro Gerada, David M. Hughes, Charlotte Brookfield, William Hope, and Iain Buchan. "Bayesian estimation of the prevalence of antimicrobial resistance: a mathematical modelling study." *Journal of Antimicrobial Chemotherapy* 79, no. 9 (2024): 2317-2326.

Rosato, Conor, Peter L. Green, John Harris, Simon Maskell, William Hope, Alessandro Gerada, and Alex Howard. "Bayesian Calibration to Address the Challenge of Antimicrobial Resistance: A Review." *IEEE Access* (2024).

Alex Howard, David Hughes, Peter Green, Anoop Velluva, Alessandro Gerada, Simon Maskell, Iain Buchan, and William Hope. "Personalised antimicrobial susceptibility testing with clinical prediction modelling informs appropriate antibiotic use" *Nature Communications* (Accepted)
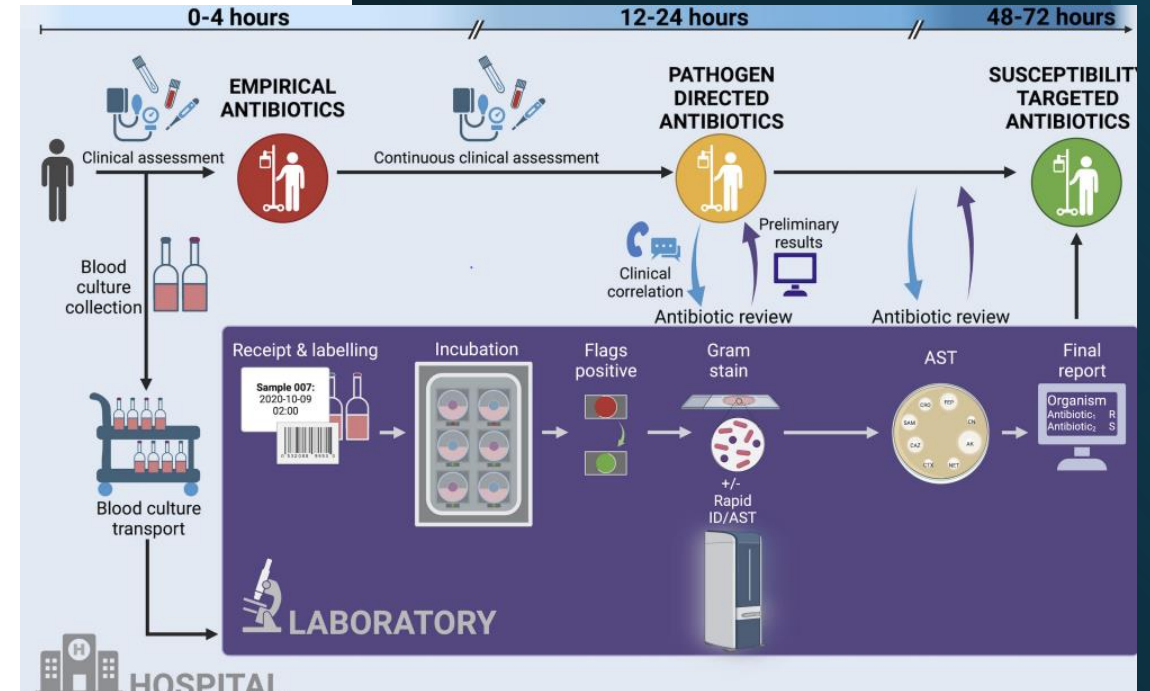
Conclusion and Future Outlook

Summary of achievements: AI-driven optimisation, emissions reduction, publications, job creation

Potential for future applications and continued impact in the glass industry and beyond