

NSG

GROUP

UoL Careers Development Day

Mark McLachlan - NSG Group

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Who are we?

NSG Group – Nippon Sheet Glass



The NSG Group is one of the world's largest manufacturers of glass and glazing products for the architectural, automotive and technical glass sectors. With around 26,000 permanent employees, we have principal operations around the world and sales in over 100 countries.

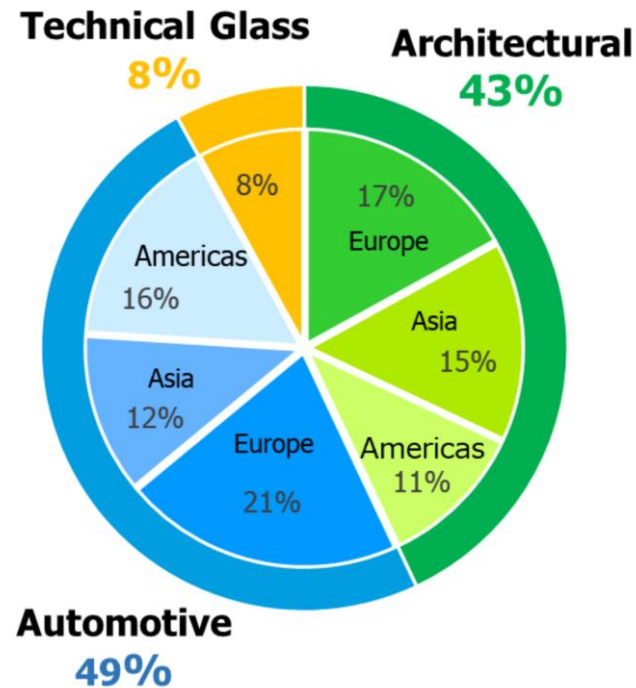


- Established by the Pilkington Brothers in 1826
- Originally headquartered in St. Helens, UK.
- Invented the Float glass process in 1952
- Bought by NSG Group in 2006



What do we do?

Revenue by Business and Region



Architectural

↑ Optiwhite™ used for Midtown Hibiya in Tokyo

↑ Glass for electrochromic applications
Courtesy of View Inc.

↑ Antiviral glass

↑ Glass for thin film Solar panels
Courtesy of First Solar Inc.

Technical Glass

↑ SELFOC™ Lens Array

↑ Metashine™

↑ Antibacterial and antiviral coated glass

↑ Glass cord

↑ Super Glass Paper™

NSG Group

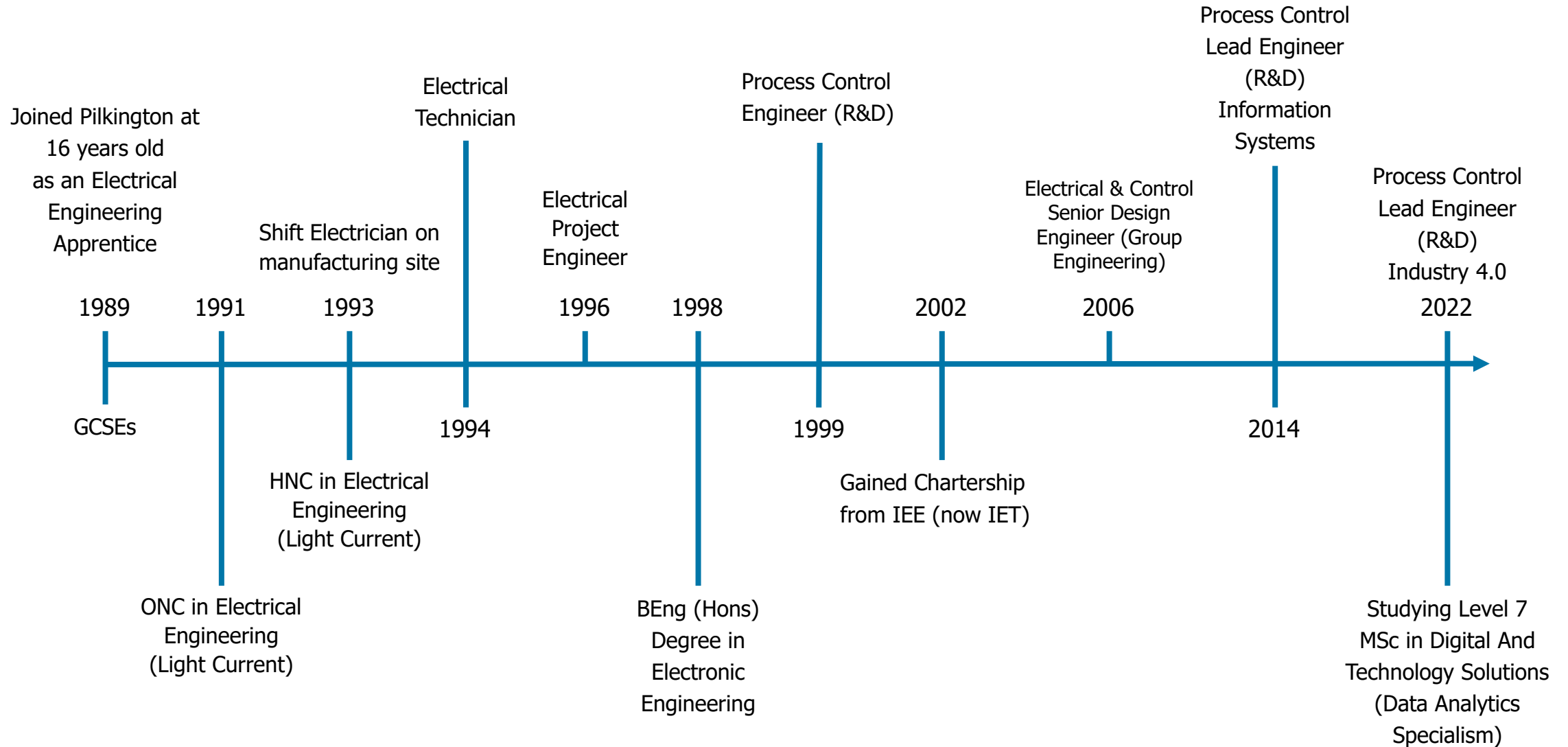
Automotive

Courtesy of General Motors

- Windshields with head-up display (HUD)
- Lightweight laminated glass
- Infrared reflective solar control coating

- Glass compatible with ADAS*

Who am I?



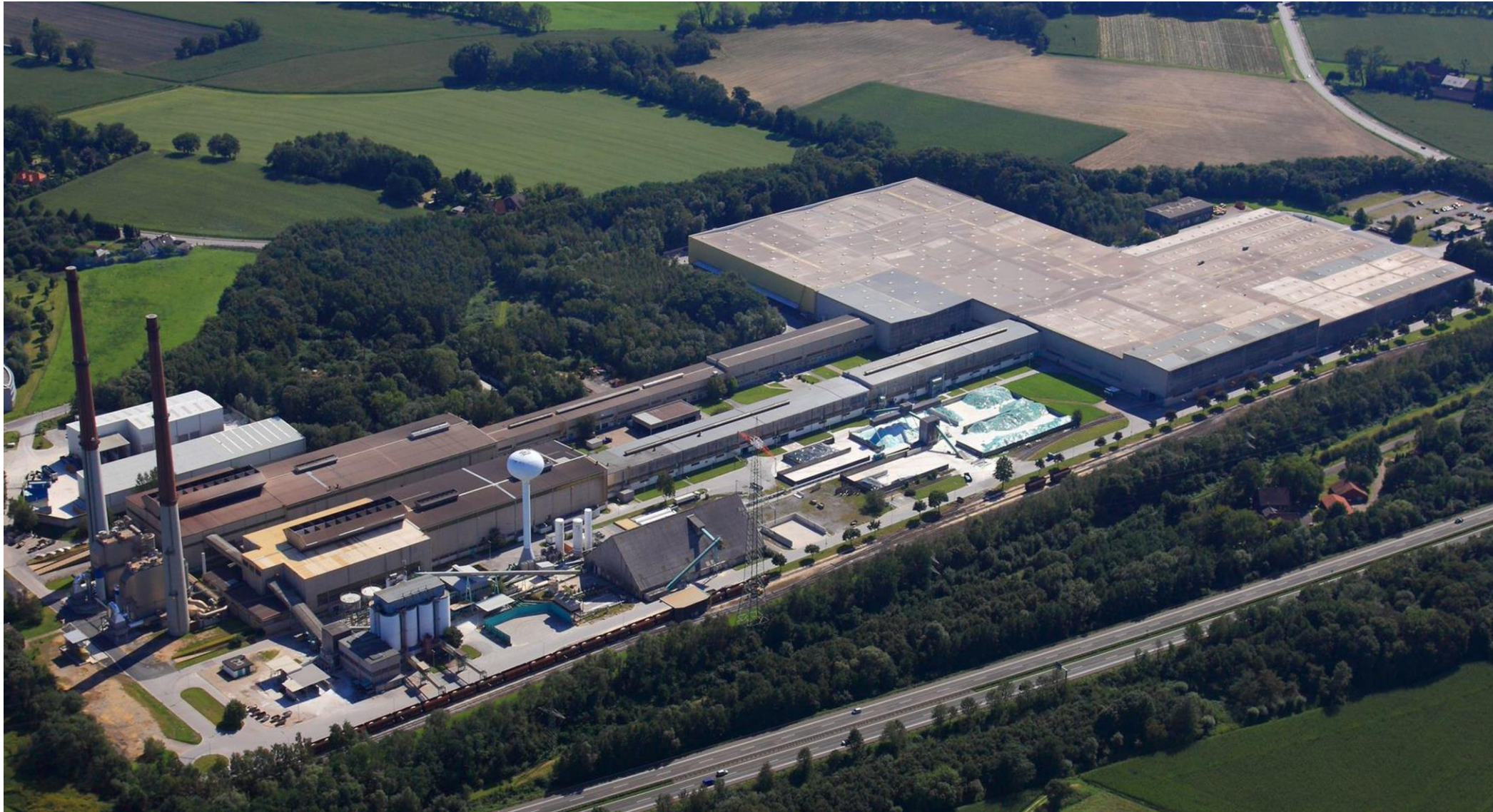
My current role

- Process Control Lead Engineer - Industry 4.0
 - IoT Devices and Applications Project Manager
 - AI Furnace Project – Technical Lead
 - Online Coatings ICAP – In Control Action Plan (statistical based control)

- Countries I have been fortunate enough to visit through my work:

France	Russia	Vietnam	Argentina
Germany	Poland	Malaysia	Brazil
Belgium	Italy	Singapore	Chile
Netherlands	Sweden	Australia	
Finland	China	Hong Kong	

Typical float glass manufacturing site



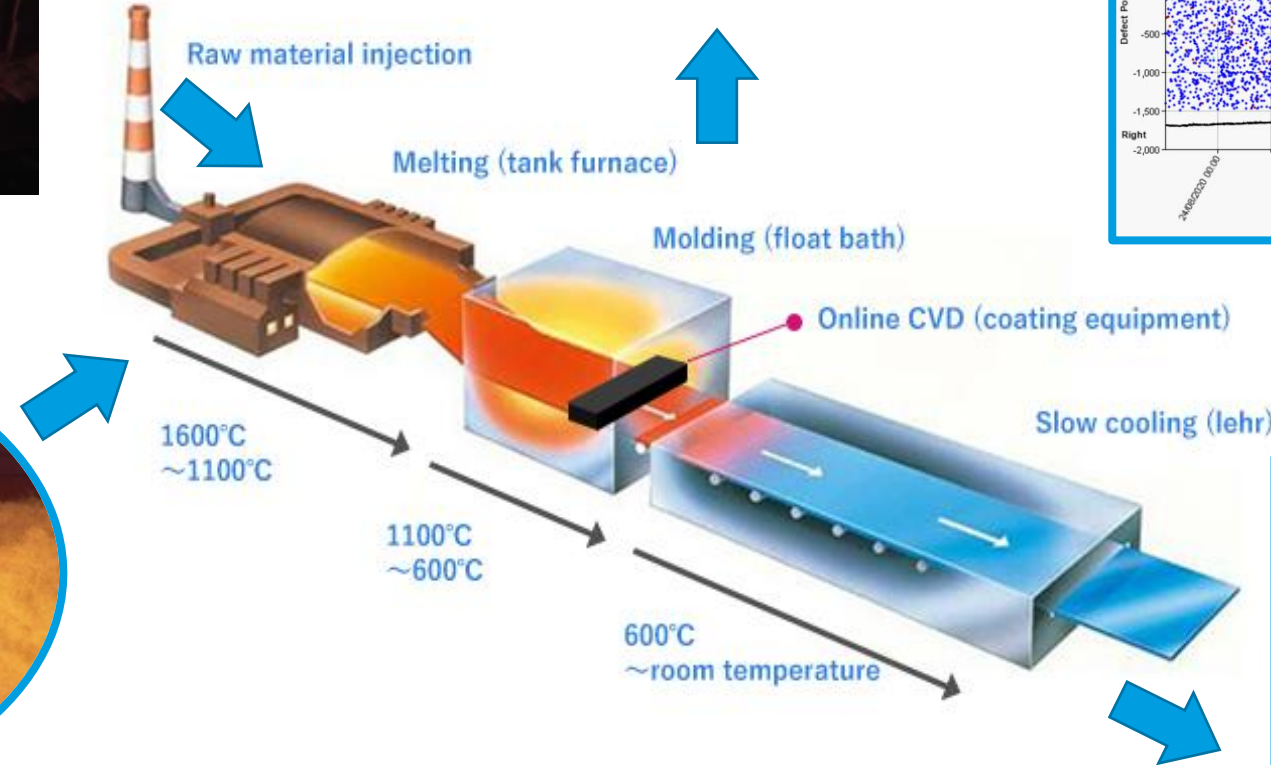
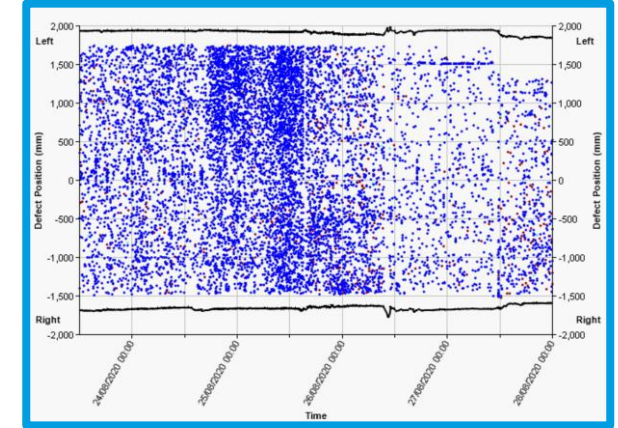
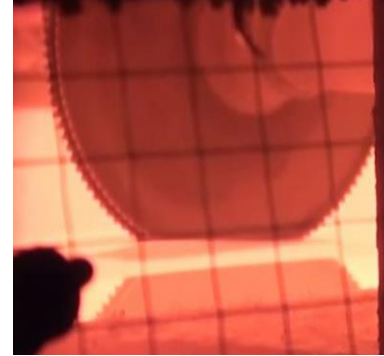
Large scale manufacturing



Large scale manufacturing



The float glass process





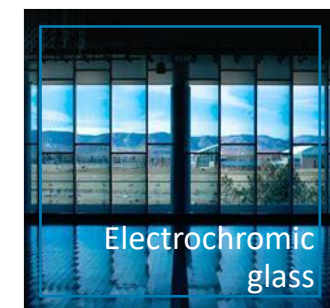
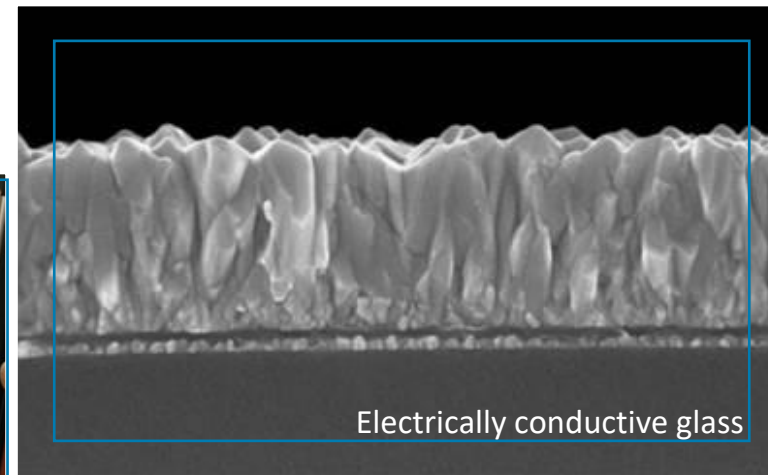
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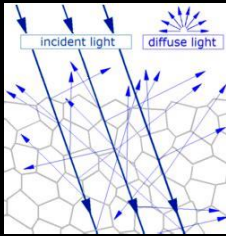
100%

Electrically conductive coatings

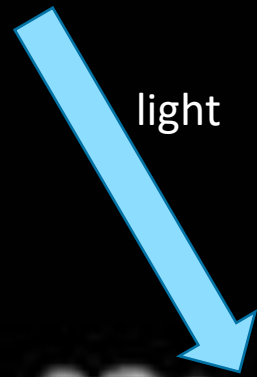
- Coating is a 'transparent conductive oxide'
 - NSG use tin oxide doped with fluorine
 - Swapping some O²⁻ for F⁻ gives extra electrons which can move – carry electric current
- Coatings produced at high temperature (600°C+) in float bath
- TCO products such as NSG TEC™ glass are the basis of many products...

Periodic Table of the Elements



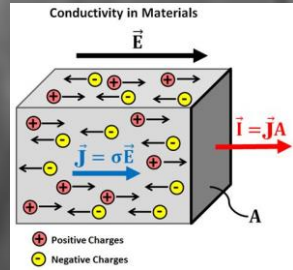


Can be slightly hazy – some light scatter



light

Very hard, rough surface structure compared with smooth float glass



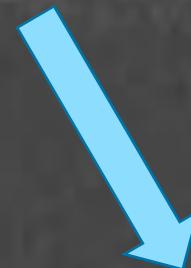
Electrically conductive

E.g. TEC™ glass is a special glass manufactured with a transparent and electrically conductive coating

What is a TCO?

~0.5µm thick

Crystalline tin oxide doped with fluorine



Transparent – looks essentially like normal glass

Digital Signage



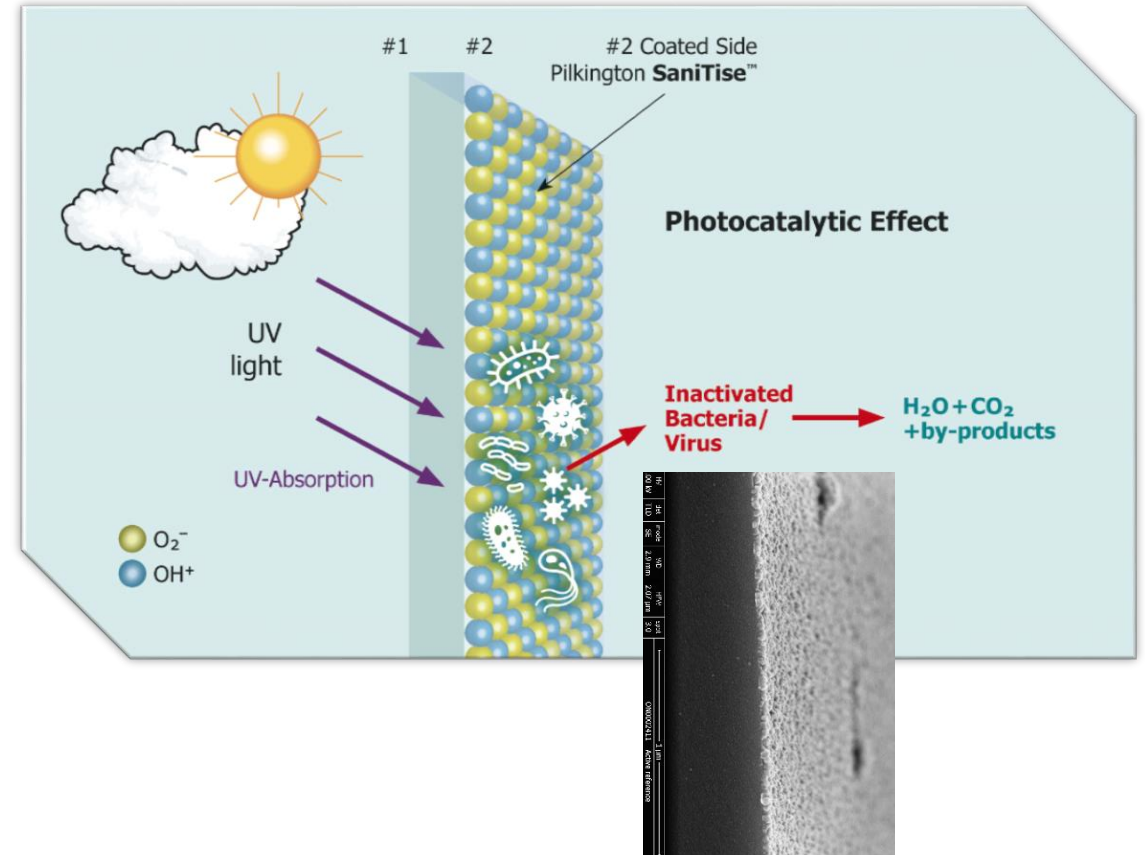
- Glass as an electronic substrate
 - Glass facilitates so much familiar technology we use every day...
 - display glass
 - Touchscreens
 - Automotive interiors
 - LED displays
 - ...



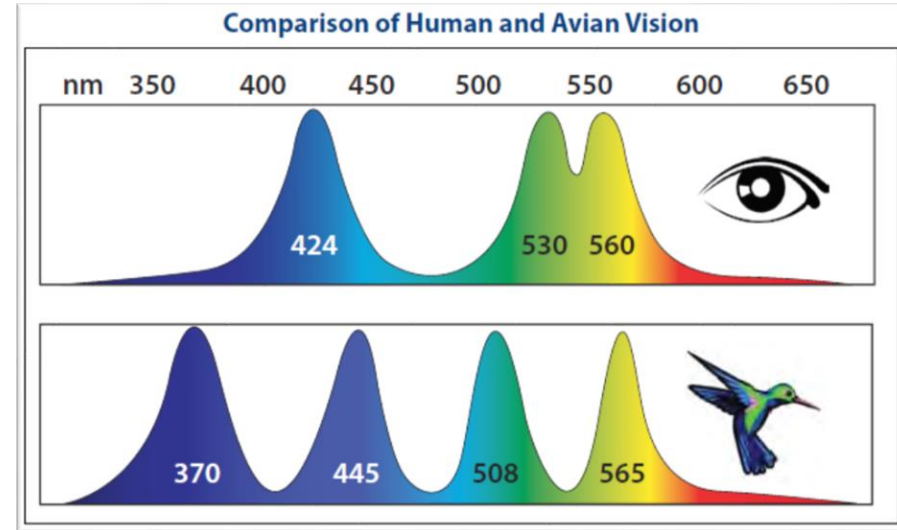
- Other products for digital signage video



New Product: Pilkington SaniTise™



New Product: Pilkington Avisafe™



Automotive Thermal Control

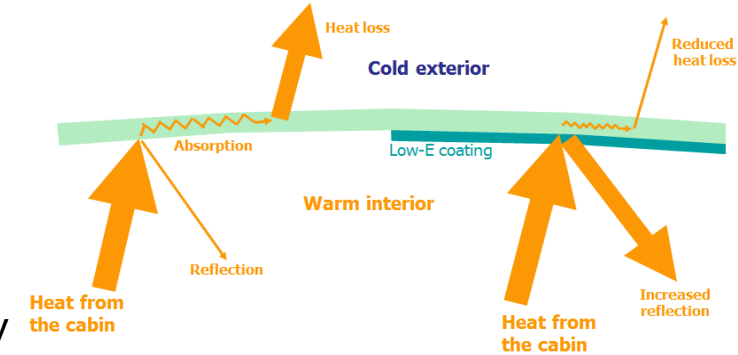
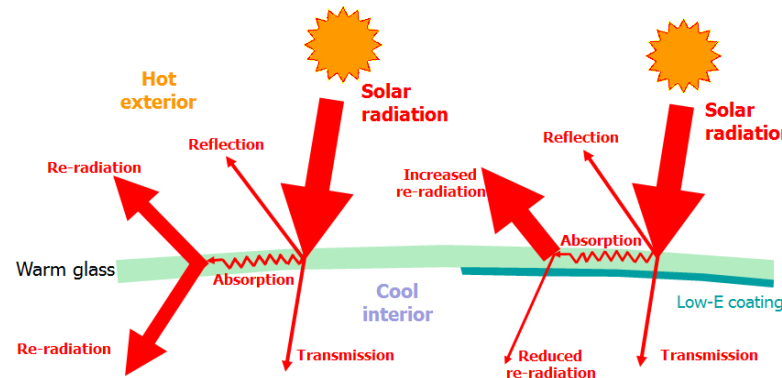
Low-E coated rooflights

Coatings help thermal management important for electric vehicles

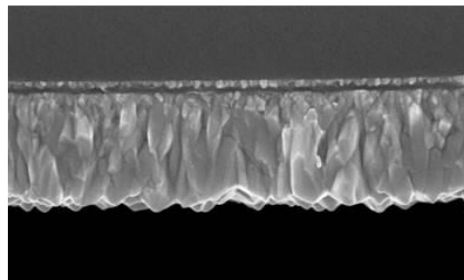


hot, sunny conditions

cold conditions



A further example of the application of a high-temperature electrically conductive coating...

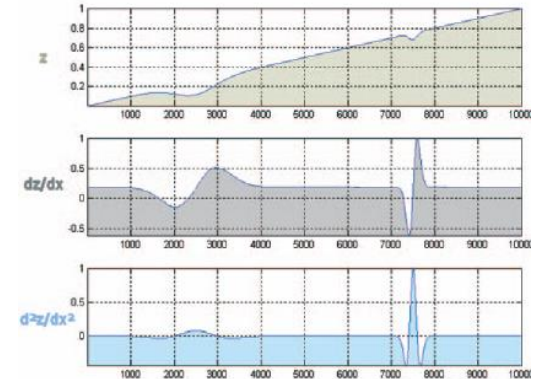
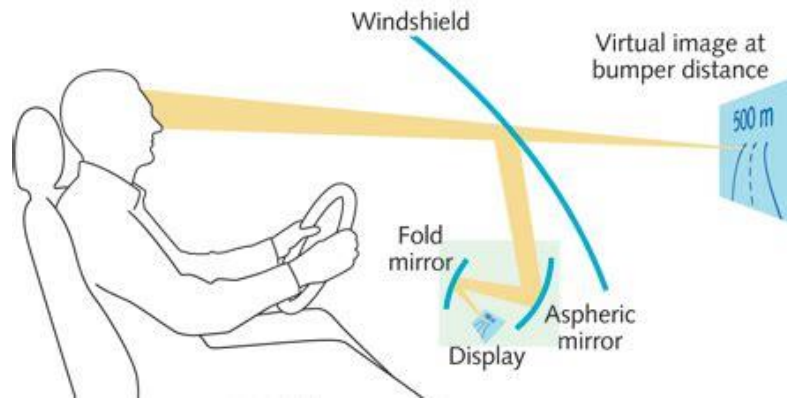


- Absorb more solar radiation, re-radiate only a fraction into the cabin majority away from the vehicle, allowing:
 - cool, comfortable cabin temperatures more easily maintained, due to greater heat rejection
 - reduced air-con load and lower circulation fan speeds, therefore lower CO₂ emissions

Reflect interior radiation, allowing: vehicle cabins to more quickly reach a warm and maintain a comfortable temperature

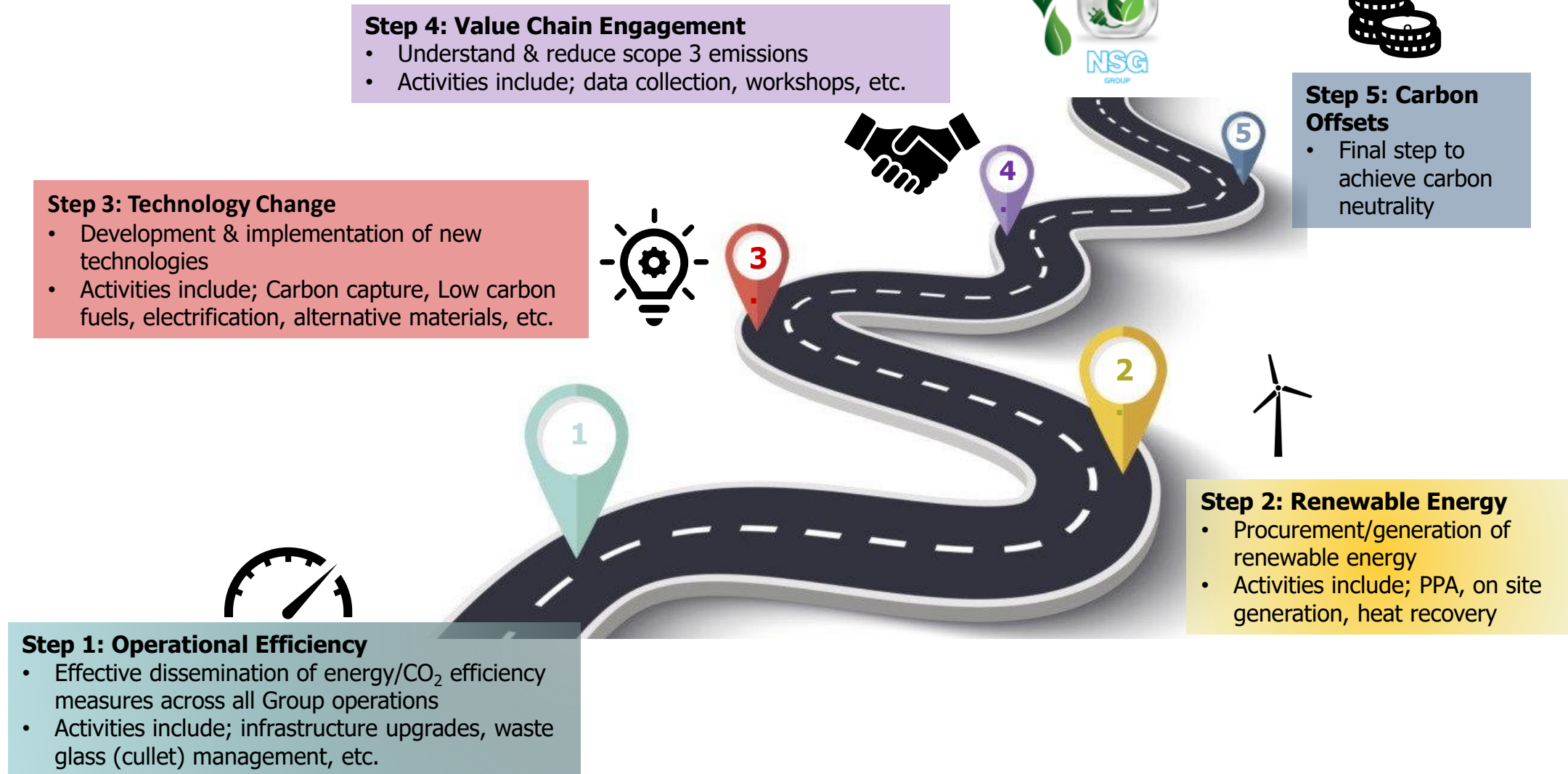
Automotive Improved Safety

- Head Up Display (HUD)
 - Safety improvement – no need to look down at controls
 - Surface shape is critical to get good HUD images
 - Various types of distortion – magnification, rotation – caused by rate of change of curvature...
 - Science / engineering of glass bending is fundamental to solving these problems
- Autonomous driving: Video

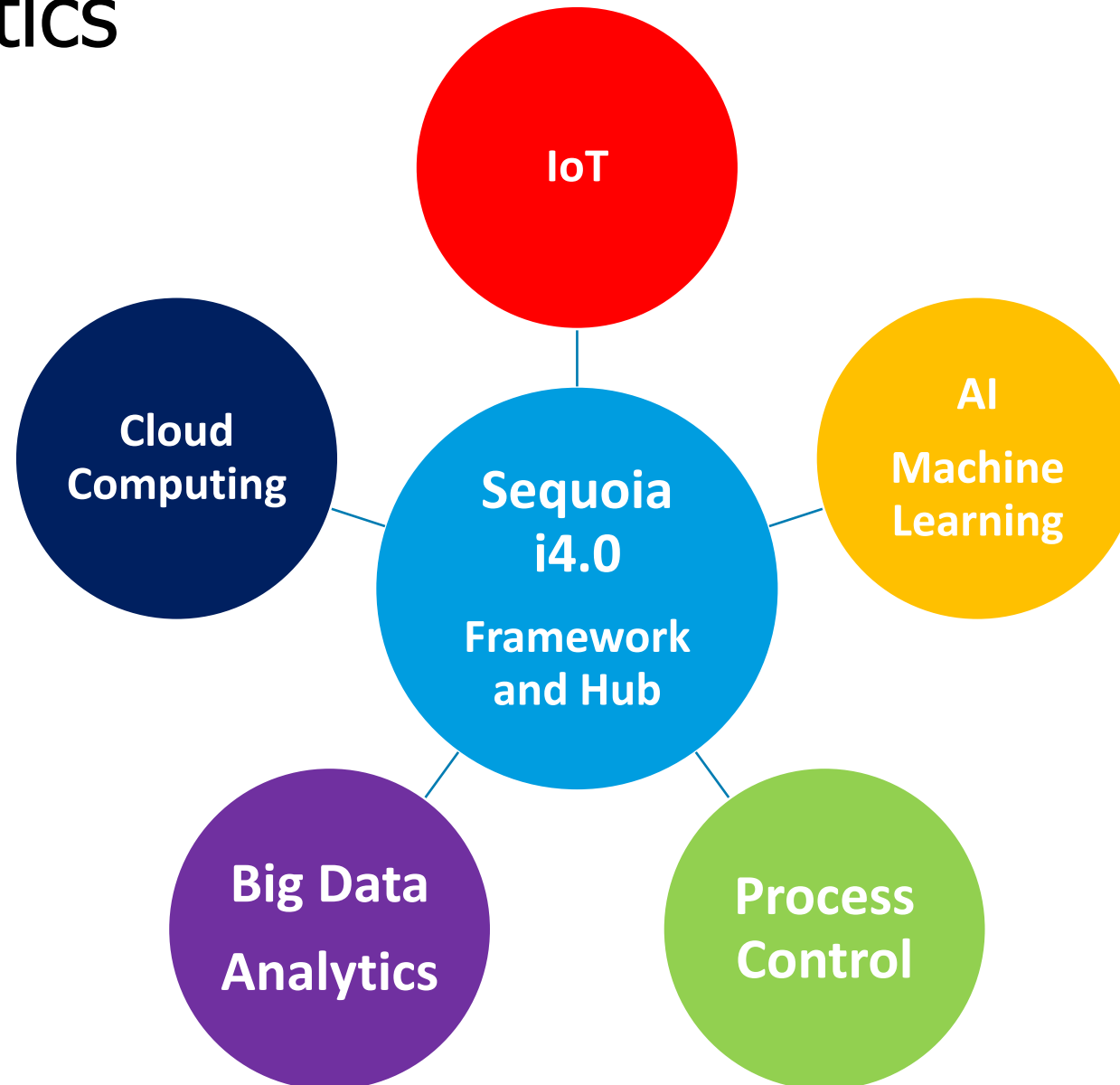




Energy usage and CO₂ reduction



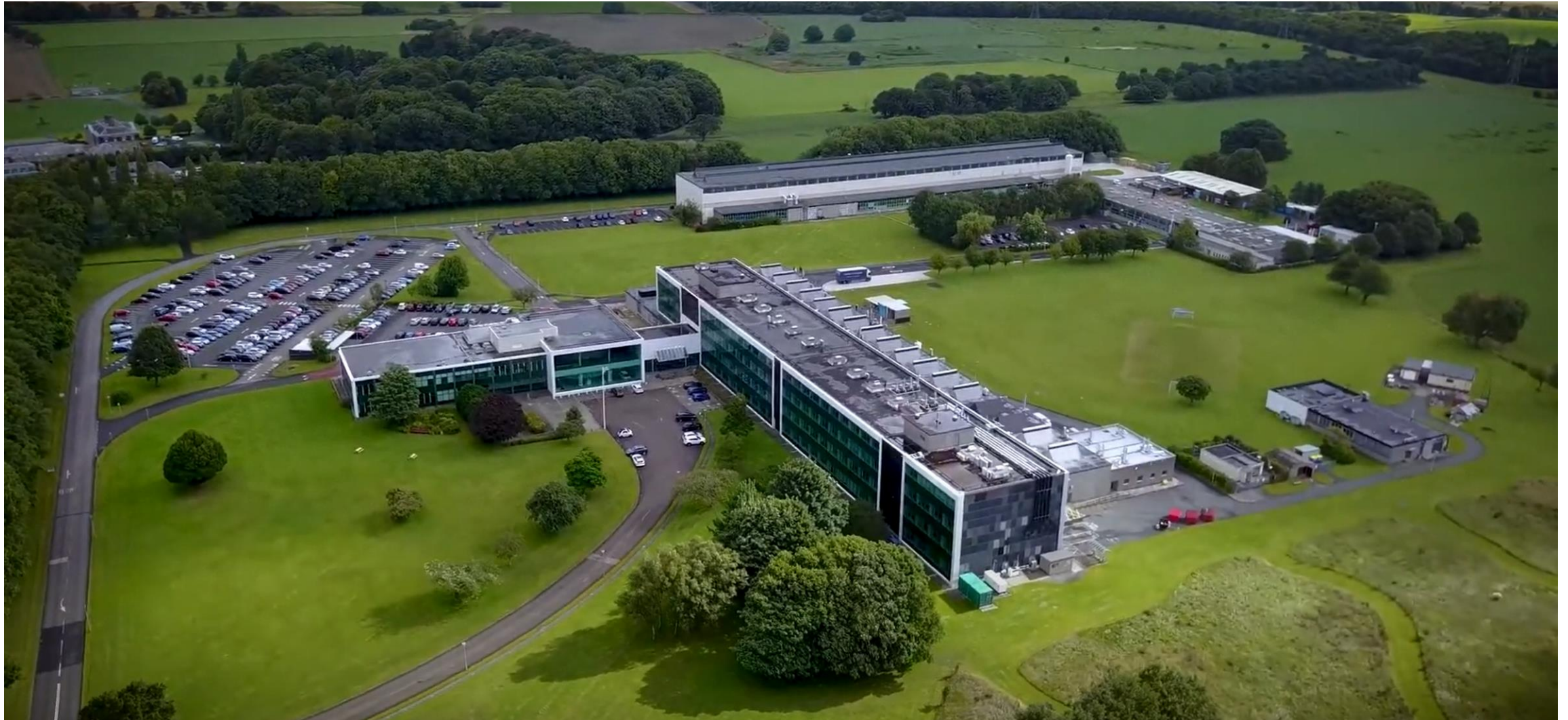
Data Analytics



Where are we going?

- Innovative New Products
 - Solar control products
 - Photovoltaic products
 - Value added projects
- HyNet Project
 - Fuel the glass furnace on green hydrogen
 - World's first trial completed in UK5 in St. Helens
- AI Furnace Project
 - Using machine learning to reduce furnace related quality issues and to minimise fuel usage – Collaboration with UoL Dr P. Green and Dr S. Jayasinghe

NSG Technical Centre – Lathom, Lancashire UK



Career Opportunities

<https://www.nsg.com/en>

<https://www.pilkington.com/>

<https://www.nsg.com/en/careers>

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Any Questions?



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