

The Ballard logo is a white, stylized, sans-serif font with a registered trademark symbol, set against a solid blue rectangular background. The background of the entire slide is a scenic landscape featuring a multi-lane asphalt road with yellow and white lane markings, curving along a rocky cliffside. Beyond the road is a large, calm body of water, possibly a lake or a wide river, with distant mountains under a clear blue sky. The lighting suggests a bright, sunny day.

BALLARD®

# Ballard UK Education Programme

*Putting fuel cells in the hands of the next generation*

# About Ballard UK

- Operational for 10+ years
- Previously *Arcola Energy*
- Acquired by Ballard Power Systems in 2021
- UK operation specialises in fuel cell system integration
- Ballard Power Systems produces fuel cell stacks
- ~60 staff in UK
- 1,000+ staff globally
- UK operations based in London, Coventry & previously Dundee
- Global operations in Canada, US, Denmark & China
- HQ in Vancouver, Canada



# Education Programme

- Acquired as part of Ballard UK
- Operational for 10+ years
- Solo operation with admin support
- Not-for-profit
- Funded through:
  - Project comms/dissemination budgets
  - Public engagement grants
  - Local government
  - Commercial deliveries
  - Industry partnerships
  - Equipment hire & training
  - Equipment production



## Hydrogen Challenge

Our flagship activity in which participants design and build a hydrogen powered vehicle from LEGO components.

Format - Structured 90-120min workshop or unstructured drop-in activity. Delivered at Public Events (expos, science festivals, motorsport), universities, networking events, team-building days, etc.

## Schools' Hydrogen Challenge Competitions

Delivering to schools in a specific location or across an entire city, region or country.

Culminates in a final event as a focal point for stakeholders.

Primarily delivered in partnership with local businesses, government and educational institutions.

## Consultancy

Providing advice and insight on educational H2FC off-the-shelf products, equipment production and one-off, interactive display pieces.

## Lectures

Including "an introduction to hydrogen and fuel cell technologies" and "the role of public engagement in changing public perception of hydrogen and fuel cell technologies".

## Equipment Hire

Supplying our hydrogen challenge equipment and associated training to 3rd-party providers for a limited period.



# Hydrogen Challenge

- 1.5-2hr structured workshop or unstructured drop-in activity
- Participants build a model hydrogen vehicle from LEGO components
- Vehicles are powered by a miniature hydrogen fuel cell system
- Structured workshops include presentation and Q&A covering -
  - Fossil Fuels VS Renewables
  - Energy Storage
  - Electrolysis
  - Fuel Cells
  - Fuel Cell Applications
  - Energy Efficiency
- The aim is to build the most energy efficient vehicle *or* the vehicle which travels the furthest distance on a limited fuel supply
- Participants take an iterative approach, redesigning their vehicles multiple times in search of the perfect balance of characteristics



# Locations

## UK

- London
- Edinburgh
- Glasgow
- Aberdeen
- Inverness
- Dundee
- Stirling & Falkirk
- Perth
- Fort William
- Wick
- Cardiff & Swansea
- Hull
- Sheffield & Rotherham
- Isle of Wight
- Orkney
- Bradford



## INTERNATIONAL

### South Africa

- Limpopo

### United Arab Emirates

- Dubai
- Abu Dhabi
- Sharjah

### Indonesia

- Jakarta
- Surabaya
- Bandung
- Palembang
- Yogyakarta
- Surakarta



# Case Study: South Africa

- Supporting 300-ton nuGen™ zero-emission haulage solution (ZEHS) reveal
- Scale -
  - 5 Schools
  - 15 Workshops
  - 1 Final
- Staffed by Anglo American's "Innovate Create Transform (ICT) Champions"



# Case Study: Scotland

- Supporting COP26 + multiple Scottish H2 projects
- Scale
  - 2021
    - 7 Cities/Regions
    - 165 Workshops
    - 6 Regional finals
    - 1 Grand final
  - 2022/23
    - 8 Cities/Regions
    - 190 workshops
    - 8 Regional finals
    - 1 Grand final
- Staffed by local University students & partner professionals





# Student Facilitators

- Our model uses undergraduates, graduates and researchers to deliver and facilitate the workshops
- Provides them with experience in public speaking, STEM education & teaching
- Paid opportunity
- Connects students with employers and provides career models for participants
- Uses universities and colleges local to delivery such as University College London, Imperial College London, University of Edinburgh, University of St Andrews, Cambridge + many more



# Schools' Hydrogen Challenge Competition

## Stakeholder Responsibilities

### **Ballard UK**

- Overall logistics
- Equipment supply and maintenance
- Facilitator training
- Content adaptation
- Winners prizes
- Final catering arrangements
- Leading/overseeing all workshops (scale dependant)
- Leading final event
- Stakeholder engagement
- Feedback collection
- Evaluation

### **Local education institution or STEM organisation**

- Providing training venue (optional)
- Workshop & Final event staff

### **Local authority**

- Contacting schools & scheduling workshops
- Providing venue for final (optional)
- Final transport logistics
- Provide training venue (where required)
- Assisting in contacting local businesses to fund
- Assisting in contacting education institutions to facilitate
- City leader as speaker/prize-giver at Final

### **Local business**

- Financial backing
- Local content
- Employees as workshop staff (voluntary & optional)
- Branded gifts for finalists and/or additional winner prizes
- CEO or similar as speaker/prize-giver at Final



# Partners & Clients



**MAYOR OF LONDON**

# Outcomes

- 125,000+ hands-on participants
- 100 million media reach
- Lectures for 10,000+ attendees
- 100s of students & professionals trained
- Over 40 large scale deliveries (of over 1000 participants)
- Consistent positive feedback (all event evaluation scores 80%+)



- Education
  - School student engagement with renewables, hydrogen, engineering and technology
  - Building links to skills and pathways to careers in STEM
  - University student training in science communication
- Equity, Diversity and Inclusion
  - Mixed student groups and consistent track record of success in engaging girls with engineering and technology
  - Targeting schools in disadvantaged communities



- Engagement and market development
  - Community engagement in clean technology, science and engineering
  - University, public, industry and City leader engagement with hydrogen and fuel cells as Ballard
  - Partner and customer engagement through sponsorship or joint projects
- Commercial
  - Revenue-generating marketing and market development through sponsorship, public funding and commercial projects
  - Delivers “Community Benefit” outcomes for customers under public procurement requirements

# Business Case

- Effective marketing and Market Development
  - Students, parents, universities and City leaders associate Ballard with hydrogen and fuel cells
  - Soft end-user engagement and ecosystem development with partners
- Added-value offer to customers and partners
  - Community benefits for public procurements
  - Public and decision-maker support for policy change
- Alignment with values and ESG strategy
  - Models “Here for Life”
  - Evidences Ballard culture and commitment to DEI
- Reputational
  - Regarded as providers of high-quality education support the “Just Transition”
  - Enhances perception as Industry Leaders
- Largely self-funded programme - revenue generation to cover core and programme costs

# What Education Can Do For...

## Young Participants

- Hands-on experience with hydrogen fuel cell technology.
- Pathways to further education and careers in green tech.
- Designed to level playing field for lower/mixed-ability groups.
- Local facilitators provide inspiration and links to future study/careers.

## University Student Participants

- Networking/social event for new students.
- Unintimidating introduction to hydrogen and fuel cells.
- Increased understanding of how H2FCs fit within wider energy system.
- Inspiration to explore/research topics related to H2FC technology.

## Adult Participants

- Dispels the myths and misconceptions surrounding H2 & FC technology.
- Explains how H2FC transport overcomes the drawbacks of BEVs.
- Explores safety compared to ICE and BEV.
- Informs on current state and future of hydrogen fuel cell industry.

## Families

- Flexibility to engage all ages.
- Children entertained whilst parents engaged.
- "Stealth" marketing/communications via child to parent dissemination.
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## Professional participants

- Fun and engaging introduction to H2FCs for businesses entering the sector.
- Challenging yet fun team-building/networking exercise.
- Increased understanding of technology for those not directly involved.
- Breakout activity for conferences and training days.

## University Students Facilitators

- Experience teaching as a potential future career.
- Gain experience of and confidence in public speaking.
- Enhance CV through temporary employment for client/Ballard.
- Inspire young people with their passion for learning.

## Partner Professional Facilitators

- Teaching hours count towards STEM Ambassador/ESG/CSR/etc goals.
- Chance to inspire next generation/speak on their own work experiences.
- Explain roles and responsibilities of their position within business.
- Speak on first-hand experiences of working within the industry.

## Councils

- Typically delivering for free to schools.
- Content adaptation to highlight local projects/rollouts.
- Provides focal point for VIPs and media coverage.
- Increased support/understanding of local projects.

## Partners/Clients

- Content adaptation to promote locally relevant projects.
- Promote business to future clients/workforce/customers.
- Direct engagement with socially conscious university students.
- Demonstrate commitment to high-quality STEM outreach.

## Global Hydrogen Fuel Cell Industry

- Public pressure for policy change and infrastructure rollouts.
- Increased awareness/understanding of the benefits of H2FC technology.
- Encourages technological one-upmanship between regions/countries.
- Increased R&D via university research collaborations.



Thank you for listening



Any questions?