Delivering the connective tissue for the Hydrogen fuel market
Who Are We?

Why we exist

To accelerate adoption of Hydrogen as fuel in the Energy Transition

What we do

Low Cost via Innovation

Safety

Customer Needs

How we do it

Fun
Accountability
Stretch
Team
The revolution of hydrogen as a fuel at scale is just starting

**Hydrogen is a great clean fuel for commercial transport**

✓ No emissions but water
✓ Super fast refuelling capability (minutes, rather than hours)
✓ Hydrogen fuel cells are now long life, reliable and cheap
✓ Drive train + fuel weight similar to ICE
✓ Rising Hydrogen CAPEX is growing capacity and lowering cost

**What’s missing? An affordable hydrogen refuelling station network**

✓ Up to now it’s been sub-scale, expensive and unreliable
✓ Regulation, financing and construction has been clunky

This is the problem NanoSUN solves for buses, forklifts, delivery vans, HGVs and off-road construction equipment

Hydrogen, as a fuel, has failed to get off the launch pad until now…
Strong focus on Opposite ends of Value Chain
Transport, Storage & Delivery cost issues lying in wait

- **Power Source**
- **Technology**
- **Storage**
- **Transport**
- **Local Infrastructure**
- **End Use**

- **Power & Renewables**
- **Electrolysis (Electricity & Water)**
  - Compression
  - Liquefaction
  - Chemical
  - Conversion to ammonia or other substances

- **Transport**
  - Transmission Pipeline
  - Tube & Trailer

- **Local Infrastructure**
  - Distribution Gas Network
  - Refuelling Stations

- **End Use**
  - Appliance Conversion
  - Vehicle Conversion
  - Gas Turbines
  - Fuel Cells (Residential, Commercial)
  - Other

- **Source:** Citi GPS Report, November 2022

- **Huge investment being directed at production and end use**
- **OEMs and producers assume that transport and local infrastructure “will be available”**
- **Little innovation in middle ground. High-cost, mature technologies are propagating**
The Hydrogen Value Chain

Today’s Hydrogen Fuel Value Chain - **Problem**

- Production
- Distribution
- Dispensing
- Consumption

Reinvented Hydrogen Fuel Value Chain - **Solution**

- Production
- Distribution
- Dispensing
- Consumption

**Today’s Hydrogen Fuel Value Chain**

- £3m - £5m
  (18-24 months)

**Reinvented Hydrogen Fuel Value Chain**

- £0.6m
  (~6 months)
Mobile Refuelling is the Connective Tissue

- H2 production is most efficient at large scale, often in remote areas.

- Fleet deployment is diffuse
  - Near to population centres
  - Early adopters with 1-10 vehicles
  - Scaling to 10s of vehicles per site. 100s rare.

- Even largest scale fleets have multiple depots so fixed infrastructure investment is a major decision.

- NanoSUN’s Pioneer fleet grows with vehicle fleet. Phased, efficient use of capital.
The World’s First Mass Manufactured Mobile Refueler

- A unique dual solution, a tanker and fuel pump in one.
- A green mobile solution that is easy to transport, fulfilling distributor needs.
- Factory built and fast to deploy, 6 months from decision to implementation.
- Cost effective, less than half the cost of smallest conventional station.
- Reliable, with no rotating machinery to breakdown.

Making hydrogen available anywhere at anytime...
Decant fill (tube trailer mode)

Cascade fill (Individual sequential control)

How many vehicles can you fill?

Vessel 1

Pressure (bar)

0

200

400

7 Fills

18 Fills
NanoSUN’s patented flexible cascade system for greater H2 utilisation...

- Multiple full fills achieved.
- No compressor required.
- No high-power electricity supply required.
Knocking down the barriers for on-road & off-road vehicle fleet owners

- **Buses**
  Refill times similar to a fixed stations with the added advantage of no delay between vehicles.

- **Trucks**
  Benefit from high operational flexibility, allowing for long-haul deliveries.

- **Vans**
  Refuel a typical dual fuel hydrogen delivery van up to 60 times directly at the point of use.

- **Construction**
  No need for a compressor presents quieter refuelling option for urban areas.

- **Material Handling Equipment**
  Refuel forklift trucks at least 450 times - safely, quickly and inexpensively.

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Pioneer Solution

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High CAPEX fixed filling stations
NanoSUN we’re selected to participate in the EIC-EIT Climate Race to Net-Zero— which helped us to calculate the climate impact of our products by validating our Lifecycle Assessment analysis.

Considering best and worst-case scenarios around green/blue hydrogen and utilisation rates of a Pioneer, the lifecycle assessment, checked & approved (in Q3, 2022) by EIC-EIT, demonstrates that:

Every Pioneer fill saves 4.2 - 5.8 tCO2e = 4 - 6 months average UK person's carbon footprint

Just 10 - 13 Pioneer fills required until pay-back of manufacture emissions

In its lifetime, a Pioneer mitigates 1,600 - 16,000 tCO2e = taking 80 - 820 cars off the road for 10 years