

# NanoSUN

Delivering the connective tissue for the  
Hydrogen fuel market



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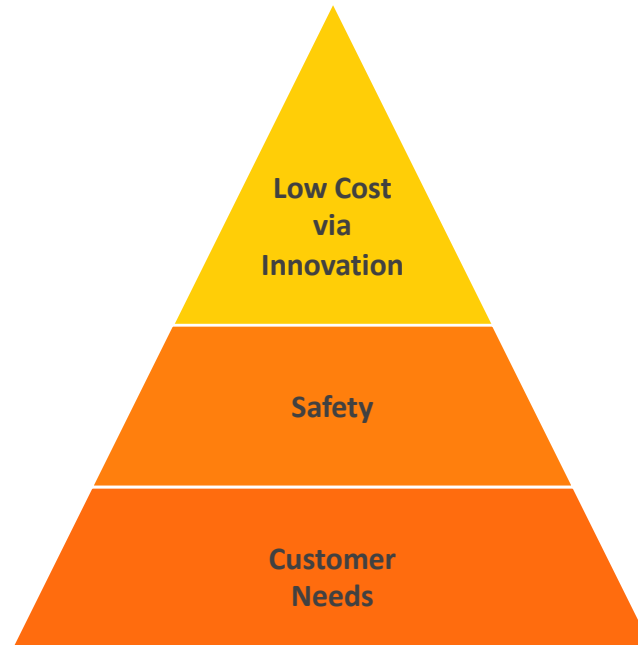
# Who Are We?

Why we exist

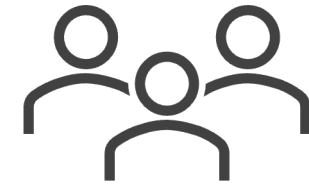


To **accelerate** adoption of **Hydrogen** as **fuel** in the **Energy Transition**

What we do



How we do it



**Fun**  
**A**ccountability  
**S**tretch  
**T**eam

# 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**

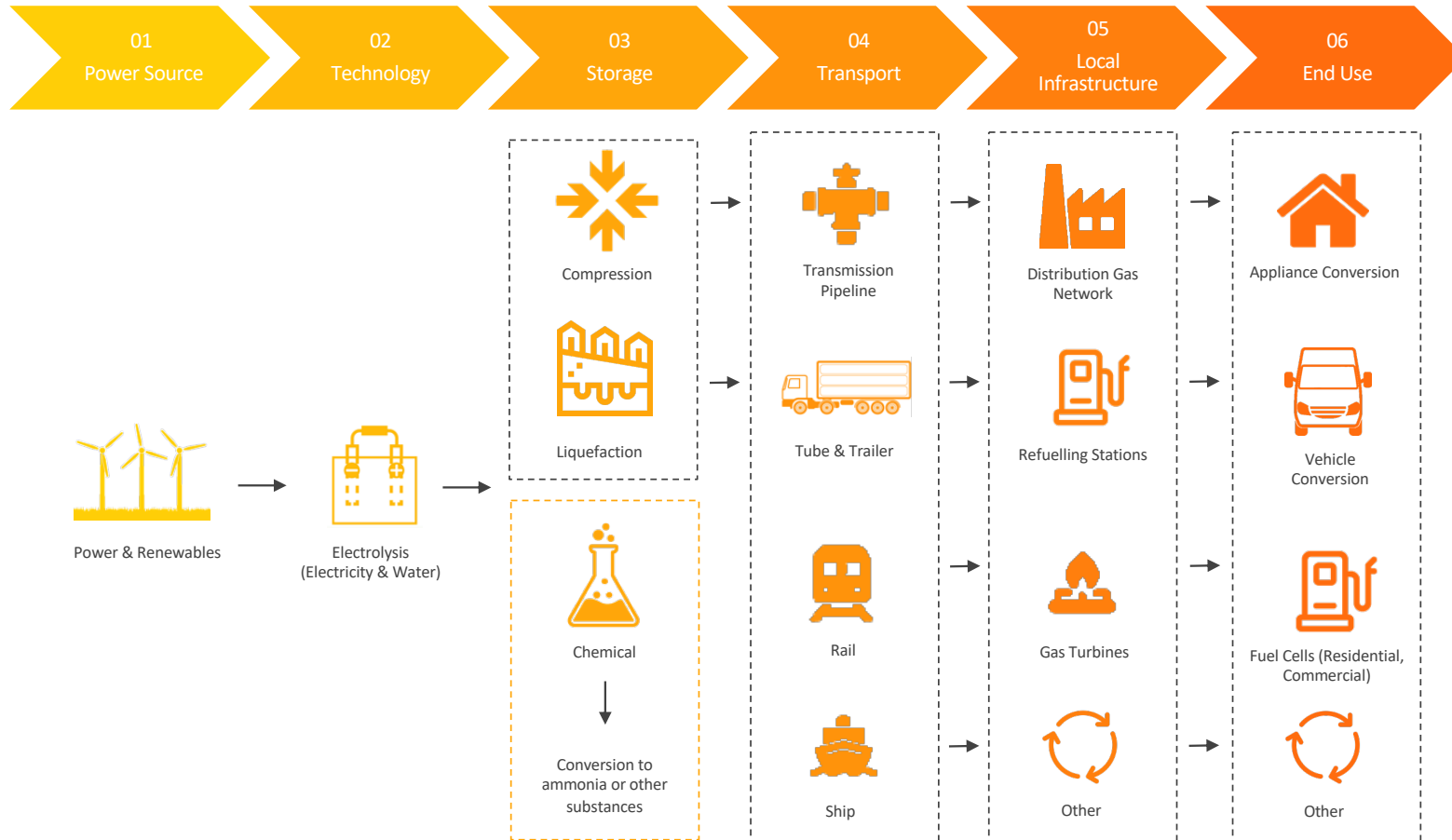
- ✓ Up to now it's been sub-scale, expensive and unreliable
- ✓ Regulation, financing and construction has been clunky

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



- ✓ 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**

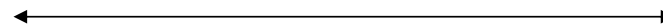
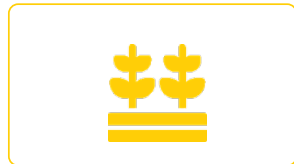
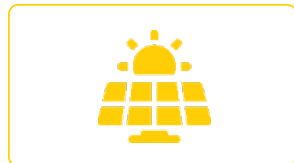


H<sub>2</sub>



**£3m - £5m**  
(18-24 months)

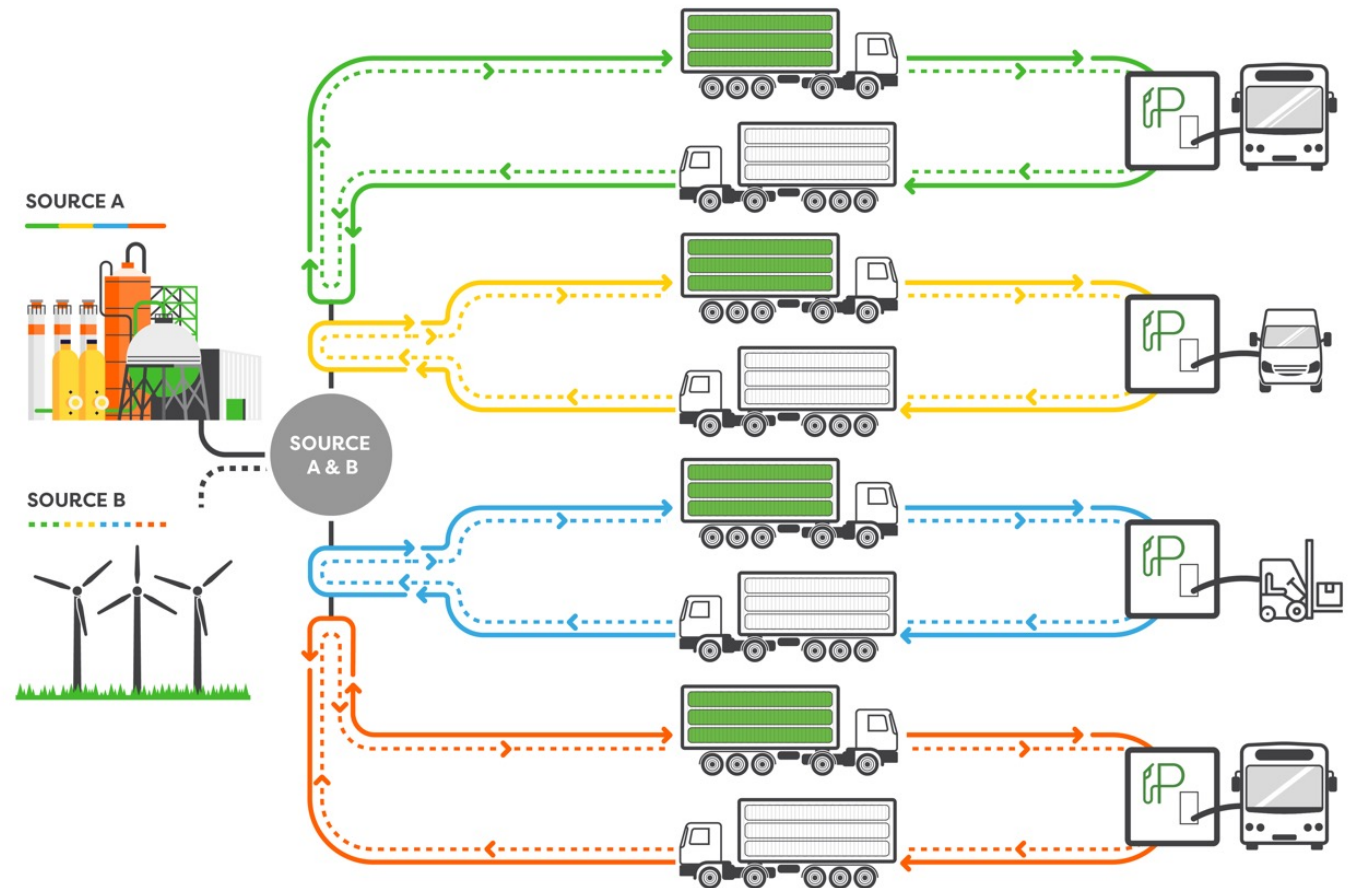
Reinvented Hydrogen Fuel Value Chain - **Solution**



**£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.



Safe Pressure



Easily Scalable



Mobile Deployment



Reliable Network

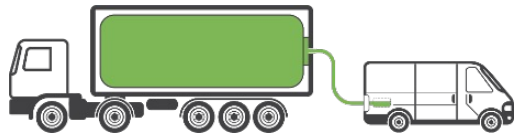


Compact & Transportable

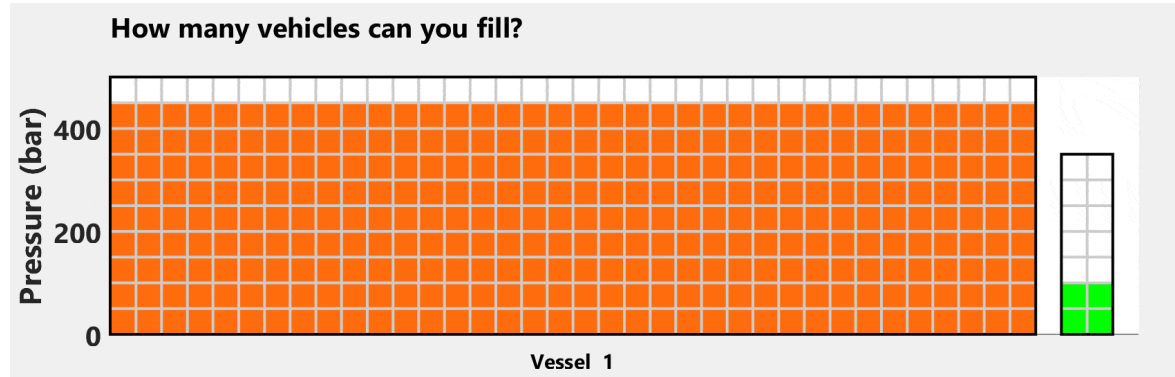
### Making hydrogen available anywhere at anytime...



# Pioneer Cascade Refueller

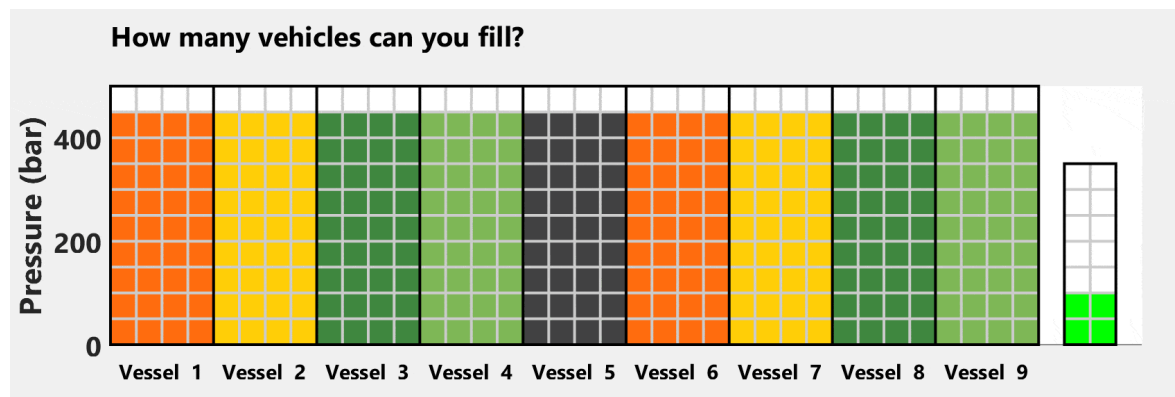
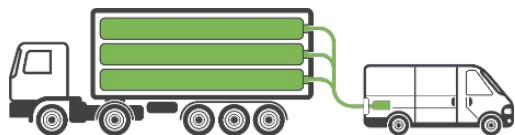


Decant fill  
(tube trailer mode)



7 Fills

Cascade fill  
(Individual sequential control)

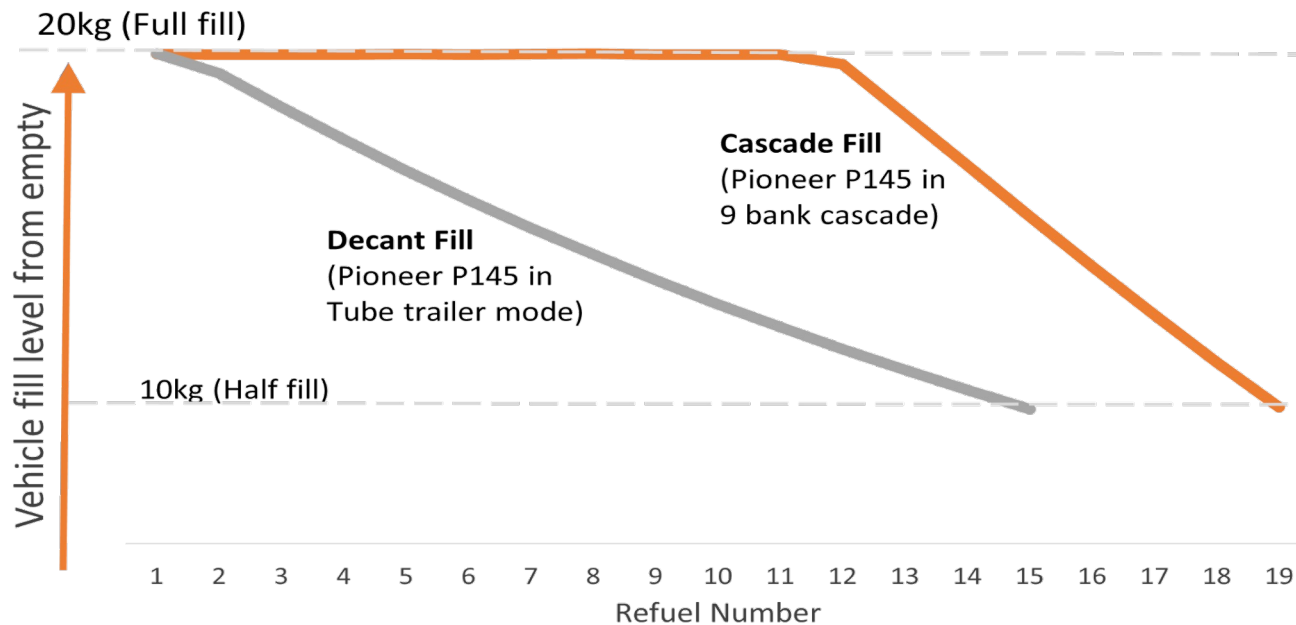


18 Fills



# Pioneer Refuelling Operation

Pioneer P145 Decant vs Cascade - Typical bus application



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.



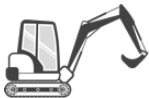
## Trucks

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.

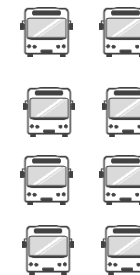
## Pioneer Solution

Demo Fleets

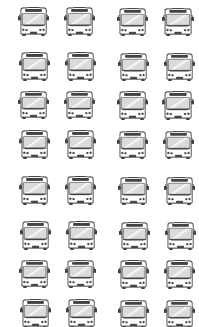


Small scale competitor solutions

Small to Medium Fleets



Large Fleets



High CAPEX fixed filling stations

# Pioneer Lifecycle Assessment

## Good for the climate



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 tCO<sub>2</sub>e**

=

4 - 6 months



average UK person's carbon footprint

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

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In its lifetime, a Pioneer mitigates

**1,600 - 16,000 tCO<sub>2</sub>e**

=

taking 80 - 820 cars



off the road for **10 years**

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