



# HYDROTRUX

## DRIVE CHANGE

[HYDROTRUX.CO.UK](http://HYDROTRUX.CO.UK)

- PROVEN TECHNOLOGY THAT REDUCES TAILPIPE EMISSIONS UP TO 40% UPON CONVERSION
- TWO DAY INSTALLATION WITH PREPROGRAMMED H2 MAP SPECIFIC TO YOUR FLEET VEHICLES
- 4 CUSTOMIZED LEASE/PURCHASE OPTIONS TO CHOOSE FROM
- PRODUCT WARRANTY INCLUDED
- INCREASED MILEAGE EFFICIENCY
- INCREASED LIFE SPAN OF THE DPF
- MANUFACTURED IN THE UK

Industry reality is not reflected in government mandates

### WHAT MUST BE DONE

- Space must be made for bridge technologies in legislative policies.
- Collaboration among tech providers will ensure comprehensive decarbonization plans for all size fleets
- Endorsing a more competitive tech landscape to provide more options to fleet managers
- H2 production DEDICATED to the transport industry must be encouraged. This means implementing a multi-feedstock decentralized production/storage/refuelling approach
- Private market incentives – There are subsidies for H2 production, subsidies for electric vehicles but little to no subsidies for 22T-44T HGV class.
- Safe handling education and certifications need to be developed
- R&M packages need to evolve to incorporate commercialized bridge technology as a “bolt on after-market” product.



# Helping build a Circular Ecosystem for Scottish Businesses

- ✓ The Conversion of HGV's is done with tried, tested and proven technology the performance of which can be consistently measured and monitored.
- ✓ By provided our local fleets with HAAS contracts, we will ensure that emission reductions are achieved and provide weekly immutable emissions data reports to the fleet and local participatory government or association (if applicable).



**CONVERSION:** - GET THE FLEETS HYDROGEN READY

**PRODUCTION:** - PRODUCE GREEN HYDROGEN WITH BY-PRODUCTS SUPPORTING THE CIRCULAR ECONOMY

**REFUELLING:** - MAKE FUELLING UP WITH H2 AS EASY AS FUELLING UP WITH DIESEL (10 MIN TO FILL OR LESS)



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## BENEFITS TO THE REGION

As more and more organisations are reinforcing their Social Responsibility Policies this is now starting to impact the supply chain. In addition, local government policy is now enforcing a clean air policy initially across larger cities of which will eventually cascade down to towns and ports. In Scotland - Glasgow, Edinburgh, Dundee and Aberdeen are implementing a Low Emission Zones (LEZ) in May/ June next year 2024 which incurs a penalty of £60 per day for HGV's. **Hydrotrux's platform reduces the emission of HGV fleet beyond the current LEZ requirements (Euro 6 compliant) and beats the Paris Accord's emissions reduction agreement by 10%.**

Scenario: Return to base	Diesel Baseline	Case 1	Case 2	Case 3	
Hydrogen displacement	0	20	30	40	%
Diesel consumption	280.00	224.00	196.00	168.00	L
Energy consumed per trip	10.16	10.16	10.16	10.16	GJ
Diesel energy consumed	10.16	8.13	7.11	6.10	GJ
Hydrogen energy consumed	0	2.03	3.05	4.06	GJ
CO2e produced (Diesel)	744	595	521	447	kg CO2e
CO2e produced (H2) <b>Electrolysis</b>	0	52.83	79.24	105.66	kg CO2e
CO2 produced (combined)	744.37	648.32	600.30	552.28	kg CO2e
CO2 reduction per trip	0	96.05	144.07	192.09	kg CO2e
Days of operation	260	260	260	260	days
<b>CO2e per truck per year (kg)</b>	<b>0</b>	<b>24,972</b>	<b>37,458</b>	<b>49,944</b>	<b>kg CO2e</b>

### ENVIRONMENTAL BENEFIT:

Each HGV converted reduces (approx.) **24,972 kg CO2e/year**

**For each HGV Converted we remove the equivalent of 5 passenger vehicles off the road.**



# **BENEFITS TO THE REGION**

## **ECONOMIC BENEFITS TO THE REGION**

An HGV can remain in a fleet from 5 to 20 years and Hydrotrux is both an environmental and financially sustainable solution to lower emission and fuel costs without putting the HGV fleet and business under huge financial stress. The current availability of alternatives to all diesel vehicles are not economical. Coupled with the fact that replacement technologies are not freely available or practical.

**The cost of scraping vehicles with a significant unused road life is neither environmentally nor financially sustainable for existing fleets.**

**Hydrotrux bridges the gap between current options and future technology solutions by providing significant reductions in tailpipe emissions now to meet new emissions regulations at an affordable price.**

## **NSET Theme**

- ✓ **ENTREPRENEURIAL PEOPLE & CULTURE**
  - ✓ **NEW MARKET OPPORTUNITIES**
  - ✓ **PRODUCTIVE BUSINESS & REGIONS**
- Hydrotrux will be manufacturing/fabricating and training with a special focus on depressed market territories. Drawing in opportunity for existing companies to grow and new companies to start up.
  - **On average our projects contribute 5 NEW Green highly skilled jobs along with 5-10 NEW general labour positions and support several existing business in the area throughout the local area.**



# BENEFITS TO THE REGION

## SOCIAL BENEFITS TO THE REGION

There are approximately 7,700 HGV's with 90% of those trucks completing runs within the borders of Scotland and approximately 70% are used for food and drink delivery. Hydrotrux's competitive edge is our low-cost solution to convert diesel trucks across OEM tech platforms to run on H<sub>2</sub> and diesel without unnecessary fuel anxiety.

### **Our business by nature:**

- ✓ **Supports the “green skills” mandate through training mechanics at existing transport/logistics businesses,**
- ✓ **Creates secondary and tertiary, general labour jobs in economically depressed regions of the country.**
- ✓ **Leads by example by paying all staff living wage +10%**

## NSET Theme

- ✓ **SKILLED WORK FORCE**
  - ✓ **FAIR AND EQUAL SOCIETY**
- 
- Hydrotrux has already hired a new graduate (mechanical engineer).
  - Hydrotrux will **train existing mechanics** to install and maintain the H<sub>2</sub> conversion kits (green skilling).
  - Hydrotrux believes that trades and unskilled work support stabilizes the most vulnerable community members in under-utilized economic zones.
  - Hydrotrux has committed to paying 10% above living wage for its employees
  - Hydrotrux has committed to equal pay for equal work – filling in the gender gap



# HOW THIS PROJECT CONTRIBUTES TO THE LOCAL CIRCULAR ECONOMY

ICE to HICE modification will **reduce** the immediate pressure to create new vehicles and the associated new raw materials.

Utilizing by-products from the Agriculture Sector for hydrogen fuel production will **reduce** the need for raw material extraction.

ICE to HICE conversion **recycle** existing vehicles into lower emission vehicles. Creates new skills for existing mechanics



**Reuse** of by-products from other sectors for hydrogen production reduces the need for raw material extraction.

The **Reuse** or repurposing of CO<sub>2</sub> to be used in the food industry (packaging, carbonated drinks) eliminates waste, adds to supply of necessary products without the need to generate from other sources

**Remanufacture** or retrofit of diesel engines with a conversion kit reduces the need to make new engines.

Referenced from: <https://unctad.org/topic/trade-and-environment/circular-economy>



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# Warranty, Maintenance, and Resale Value

- ✓ 4 Finance options to choose from depending on fleet business structure.
- ✓ HYDROTRUX via its tech supplier Hydra Energy will provide product warranty on the Hydrogen conversion kit
- ✓ Training for your mechanics included
- ✓ **AI generated H2 mapping for ECU customized for each vehicle converted calibrated in hours not months**
- ✓ No excess operator training required
- ✓ No fuel anxiety
- ✓ No maintenance concerns throughout 5 years and over 350,000 km. SAE has confirmed this technology to be best in market to decarbonize HGV industry as of 2023.
- ✓ Similar operational costs as hydrogen fuel has proven to increase fuel efficiency with diesel and offsets cost of H2 to the fleets. Potential savings from extended lifespan of DPF.
- ✓ Converted vehicle returned to original condition and resold at end of life for similar resale price as other (unconverted) vehicles in partner's fleet.





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# Truck Conversion Overview



H<sub>2</sub> tanks & gas handling components behind or under cab



H<sub>2</sub> injection manifold in-line with air intake blends H<sub>2</sub> and air before entering engine block



Dedicated controller and wiring harness behind the dashboard (ECU)

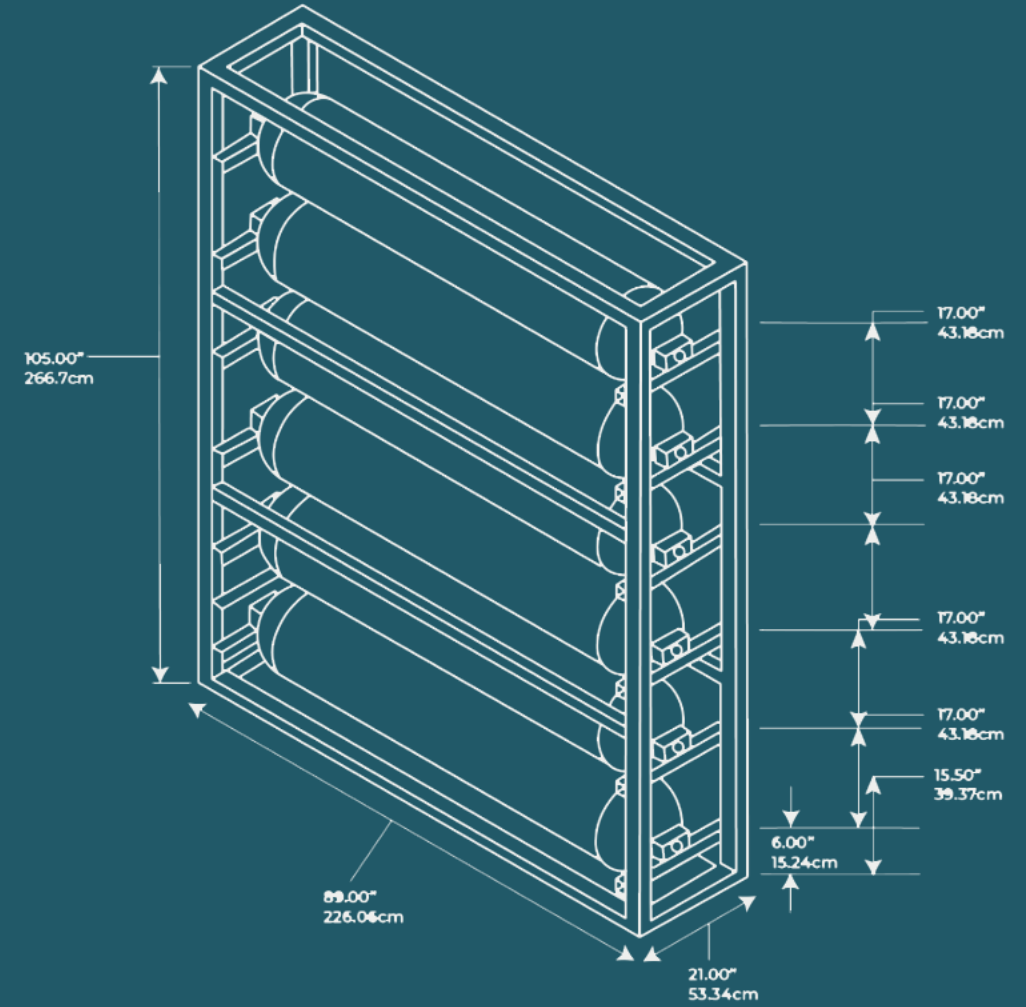


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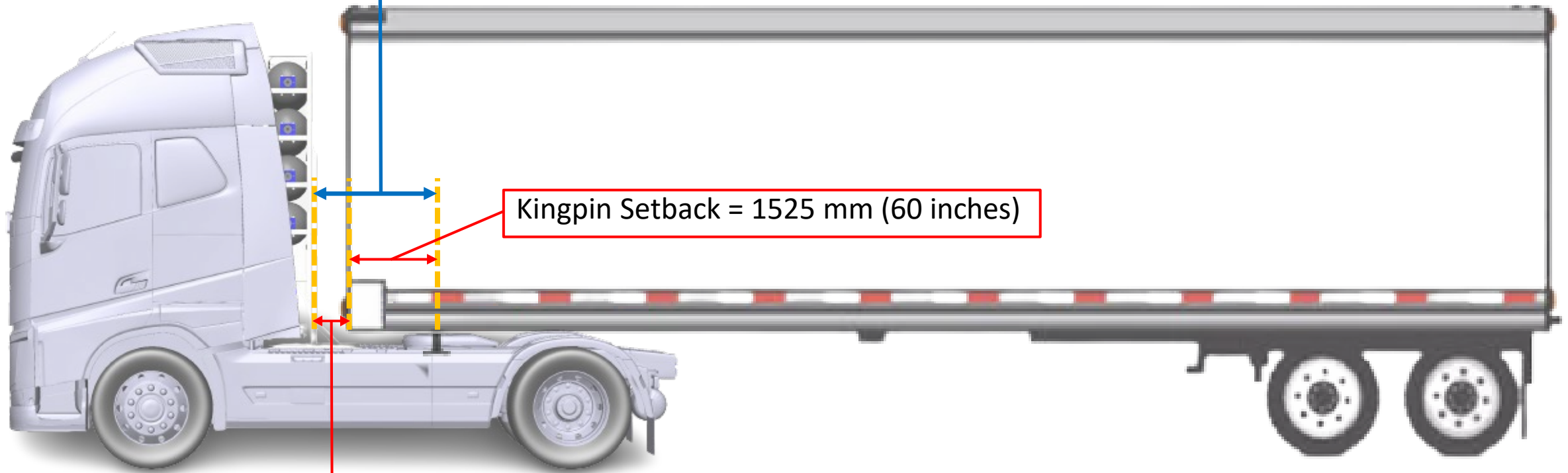
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# System Life Expectancy

- ✓ System life expectancy dictated by compressed gas storage tank life which is 20 years
- ✓ Conversion kit can be swapped from one vehicle to another within the life span
- ✓ Typical fleets we have partnered with replace their vehicles about every 5 years, requiring transferring conversion kit to 3 vehicles over product life or selling into secondary market



**D** = Total Distance from Tank rack to Kingpin on trailer = 2,181mm (85.87 inches)



Kingpin Setback = 1525 mm (60 inches)

Distance Between Corner of trailer & Tank Rack= 656 mm (25.83 inches)





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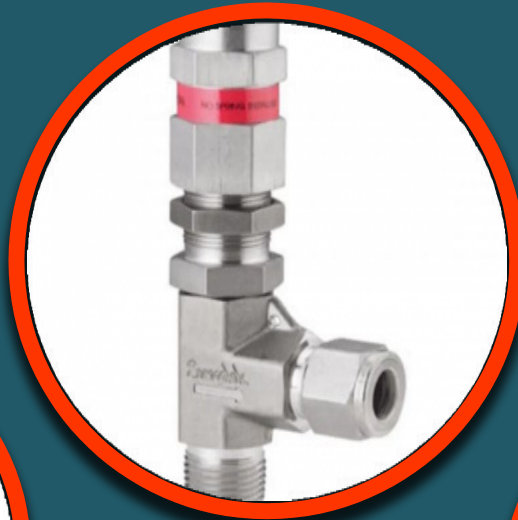
# Vehicle Safety Systems



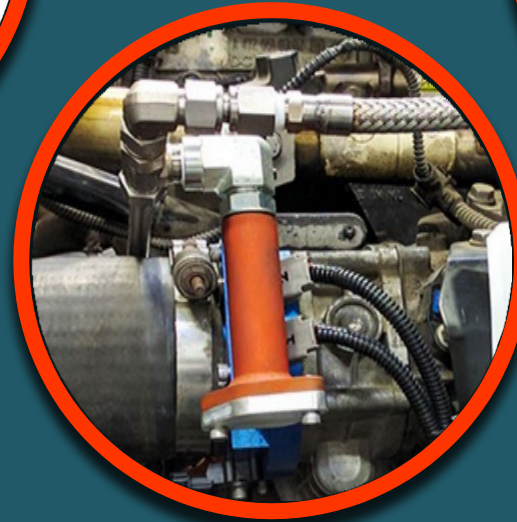
Behind-the-cab mounted storage tanks; pressure, temperature, fire, impact, and rifle tested



T-PRD's on both ends of each tank; will safely vent hydrogen if over-temperature (110°C)



PRD located on low pressure line; will safely vent H<sub>2</sub> if over-pressure (10 Bar)



Continuous leak-check; System will close all valves if a leak occurs and will notify operator



On-board diagnostics; Faults on the vehicle or on the system will disable the system and close all valves



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**Thank you**

**For more information, please contact:**

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