

## Nanomaterials redefining gas usage for a greener world

**moflaunch** is commercializing advanced adsorbent materials called metal organic frameworks (MOFs). Because of its extremely high surface area, MOFs can soak up large amount of gases. MOFs can propel Natural Gas Vehicles by enabling high gas storage capacities at much lower pressures. MOFlaunch unlocks the potential of MOFs to revolutionize transportation and gas storage in the years to come.

### Problem

Natural gas vehicles (NGVs) are a promising alternative to traditional petroleum powered cars



Reduced pollution



Lower fuel and maintenance costs



Safer than liquid fuels



More sustainable than petrol

Yet NGVs account for only 1% of global vehicle population. Massive adoption is hindered by expensive and inconvenient refueling and storage systems

#### NGV Driver / Owner



The tank is big, bulky and takes up a lot of space!

Natural gas stations are few and far between. I may not be able to drive further!

#### Natural Gas Companies



High pressure operation makes NGV refueling infrastructure CAPEX costs are very high...

Should we risk investing even if there is little adoption of NGV?

### Solution

#### MOFs in NGV tanks



enable high storage capacity at **much lower pressure**

- Eliminate need for costly refueling infrastructure
  - Possibility of refilling at homes!
- Reduce strength requirement on tanks
  - May be free shaped to fit free car space
  - Need not to be as strong and thick

Potentially a key enabling technology for NGVs!

### Technology



**Metal-organic-frameworks** have the highest surface-area of any known material

**1 gram = 1 football field area**

Plenty of sites where gas molecules can adsorb ("stick") to

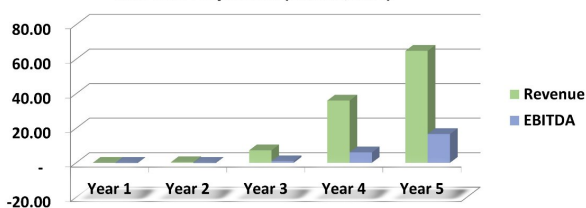
**very good at storing gases**

### Differentiation

|                                      | Reduced emission | Less investment for refueling infrastructure | Less energy requirement for fuel storage | Fuel storage capacity |
|--------------------------------------|------------------|--|--|-----------------------|
| MOF-based Adsorbed Natural Gas (ANG) | ✓                | ✓  | ✓  | ✓                     |
| Carbon-based ANG                     | ✓                |  |  |                       |
| Petrol                               |                  | ✓  | ✓  |                       |
| Liquefied Natural Gas (LNG)          | ✓                | ✓  |  |                       |
| Compressed Natural Gas (CNG)         | ✓                |  |  |                       |

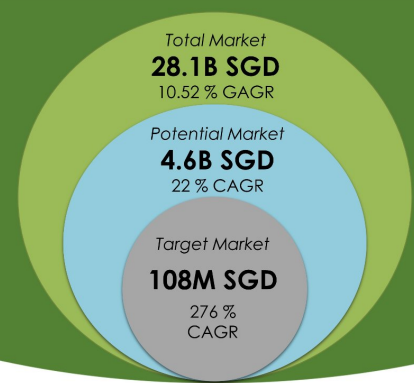
### Financials

Five Year Projections (Million, SGD)



|         |       |       |      |      |      |
|---------|-------|-------|------|------|------|
| Revenue | 0.01  | 0.38  | 7.20 | 36.0 | 64.8 |
| EBITDA  | -0.22 | -0.22 | 0.91 | 5.99 | 16.6 |

### Market



### Contact

moflaunch@gmail.com

Potential future applications: Carbon dioxide capture, hydrocarbon separation, catalysis, industrial cooling system, toxic gas handling, healthcare/pharmaceutical, odor control, fragrance delivery...