UNI5-ELEMENTS

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Smart Transport Grid open platform for deploying Battery-less & Track-less mass shared Multi-Modal Electric Mobility system for commuter & freight transport. (90% cheaper/ km then Metro rail, can be deployed faster (< 2 months) & charged by distributed Renewable Energy)

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Technische Universität Berlin

Climate-KIC ALUMNI ASSOCIATION

eit Climate-KIC

Uni5Elements – "Smart Transport Grid" shortlisted as one of the fifty smart solutions in stage 1 to transform India by Department of Science & Technology – Government of India & IIM Calcutta. February 2018.

Department of Science & Technology
Government of India

SMART FIFTY

IIM CALCUTTA
INNOVATION PARK

CONGRATULATIONS *Uni5Elements - Smart Transport Grid for Batteryless & Trackless , mass shared multi-modal Electric Mobility as a service (FB107537UD)*

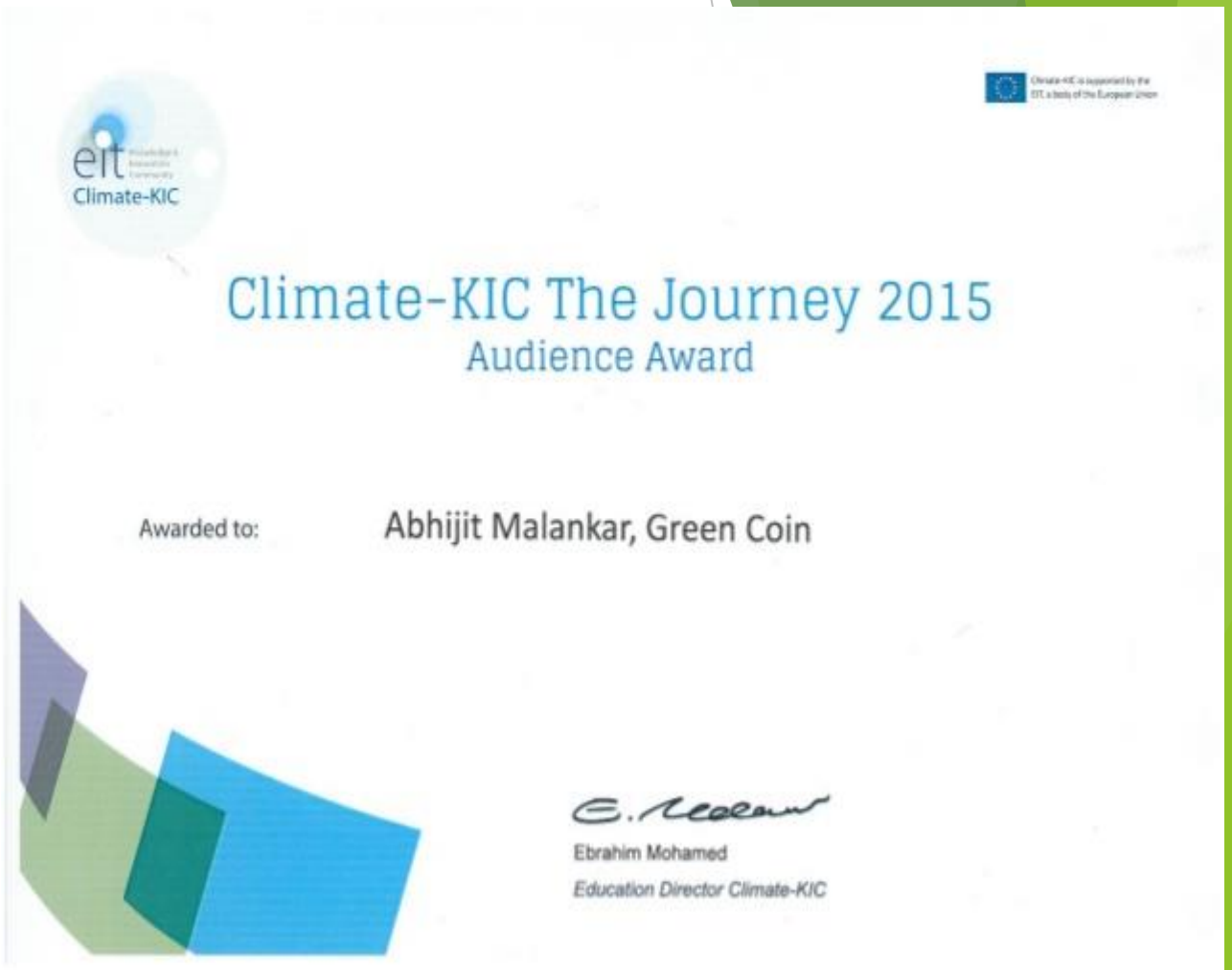
For making it to "Top Stage 1 STARTUPS list of the SMART FIFTY" contest from 15000 entries.

February 2018

DR. SUBHRANGSHU SANYAL
CEO-IIM CALCUTTA INNOVATION PARK

Uni5Elements - International Awards

At MES 2015 conference (India) winnning first prize cash award of € 350 and citation for best business plan covered on TU Berlin webpage (- Click link) .



Winning the prestigious audience award at Climate KIC clean tech summer school Journey 5 & 6 finals 2015 in West Midlands - Birmingham - UK (- Click link).

Uni5Elements - shortlisted in top 5 from among 98 entries from India for GIZ mentoring bootcamp in Berlin - July 2016.

Potential Venture Partners.

Potential Multi-Modal EV Partners

Potential Academic Partners

Government Organisations

Case Studies.

Case Study 1:

" Electric Vehicles will be one of the four front runners combining growth and scale to dominate low carbon technologies between 2015-25 ".

By - EQUITY RESEARCH November 28 , 2016 by Goldman Sachs , The Low Carbon Economy : Technology in drivers Seat & EQUITY RESEARCH November 30, 2015 by Goldman Sachs , The Low Carbon Economy , GS SUSTAIN equity investor's guide to a low carbon world, 2015-25 .

Case Study 2:

Working Paper :
Motorized Two-Wheelers in Indian Cities : A Case Study of the City of Pune.

By – EMBARQ – India – 2014

Motivation.

"The desire that guides me in all I do , is the desire to harness the forces of nature to the service of Mankind."

- Nikola Tesla

" To go fast , go alone , but to go far go together."

- African proverb

Main Aims.

- **Providing Reliable Mobility option.**

  (Efficient , Cost effective , fast deployment , scalable)

- **Should be based on Multi-Modal , shared , Electric Mobility.**

- **Have near “Zero” Carbon Foot-print.**

Aligns with “Government of India” Goals

- 100 % Electric Mobility by 2030
  - Our Aim is to put 5 million EVs on road in 5 years.

- Renewable energy generation of 175 Gigawatt by 2022
  - Upto 10 GWp Renewable Energy Generation for Transport Grid

- Make in India
  - Trolley Buses , EV Charging Infra. , Electric Vehicles & Renewable Energy Generation can all be made Locally.

Global Problem.

Smog
(Lianyungang - China)

Traffic Pollution
(Delhi - India)

Local Problem.

Increased Air Pollutants

Severe Health Impacts

AIR SCARE Levels of pollutants in Delhi's air between October 22 and November 2 this year

POLLUTANT	AREA	LEVEL	PERMISSIBLE LIMIT
PM* 10	Punjabi Bagh	711g/m3	60-80g/m3
PM 2.5	Punjabi Bagh	450g/m3	60-80g/m3
Nitrogen dioxide	Anand Vihar	267g/m3	60-80g/m3
Carbon monoxide	Airport	7.3mg/m3	2-4mg/m3
Sulphur dioxide	Airport	32.8g/m3	60-80g/m3

** Particulate Matter: Suspended particles in the air such as soot, smoke, dust etc. Post-Diwali, the levels of sulphur dioxide increase by as much as 10 times, while nitrogen dioxide and PM increase by 2-3 times*

KILLER AIR

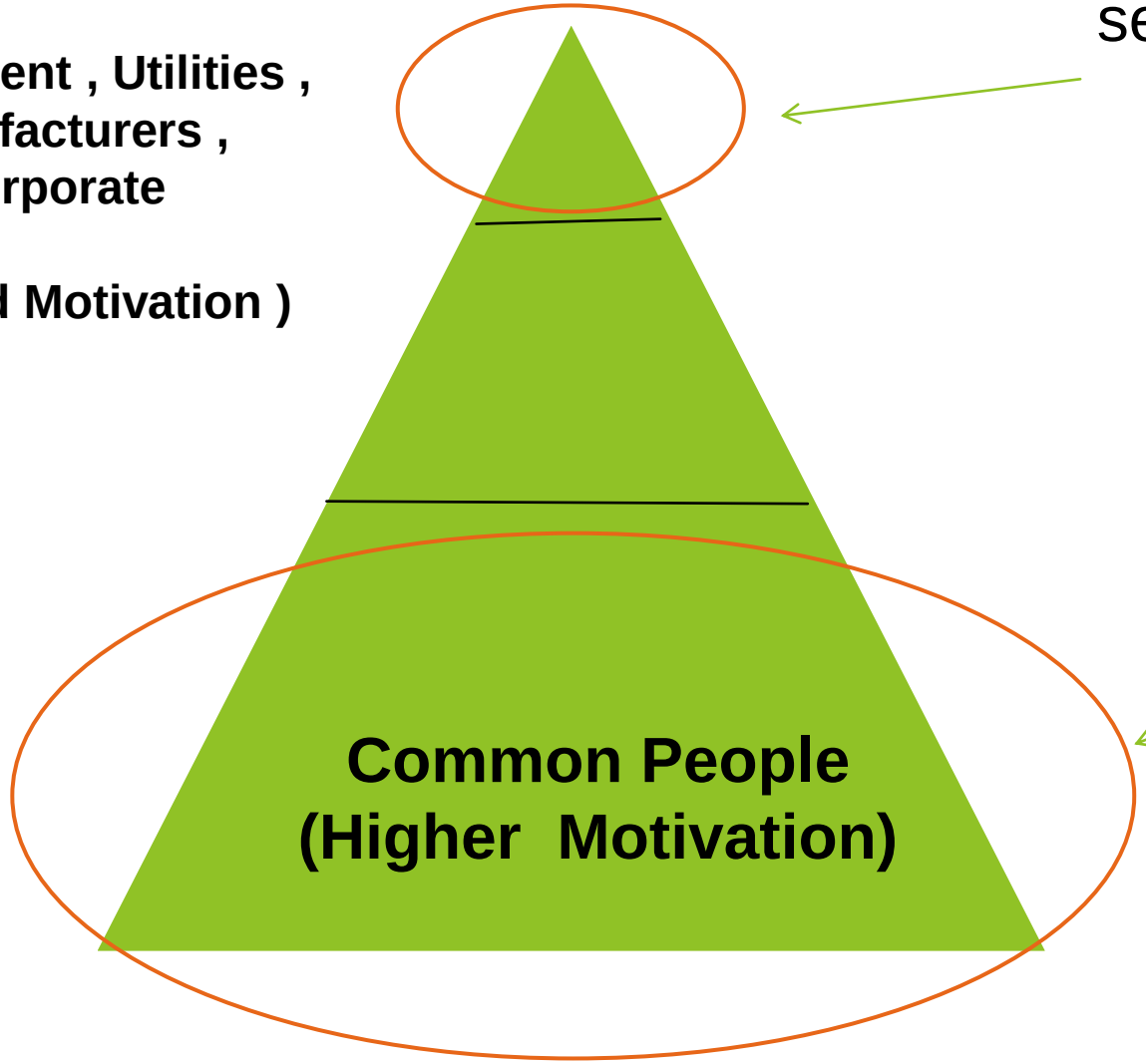
Estimated health impacts of air pollution in Delhi

- Premature mortality: **7,350 to 16,200**
- Chronic bronchitis in adults: **53,500**
- Acute bronchitis in children: **391,000**
- Cardiac hospital admissions: **6,700**
- Asthma attacks: **6 million**
- Days with restricted activity: **51 million**
- Days with respiratory symptoms: **244 million**

Actual Problem.

Government , Utilities , Manufacturers , Corporate

(Limited Motivation)



Current focus segment to solve issues .

Essential focus segment to solve issues .

Quest for solution.

Analysis of basic needs at Base of Pyramid

- ***Transport / Mobility (Passenger / Goods / Business)***
- **Food , Water , Air**
- **Communications**
- **Energy**

Focus area for solution.

Example:Pune Mobility Scenario Today !!!

- Population of 10 + million
- 5 Million+ 4 wheelers
- 11 Million+ 2 wheelers
- Auto Manufacturing & Education Capital
- High levels of air pollution , swine flu capital
- Metro / Subway planned will take 5-10 years to start only on 3 routes of 55 kms ($530 m / km) ($ 28 Billion) (98 % more costly than Trolley Bus)
- Roads have taken over Rivers , Trees , footpaths , gardens , empty spaces & hills .

Is replacing fossil vehicles with personal EVs the complete solution?

Fossil Fuel Vehicles → **Electric / Hybrid Vehicles**

"NO !!!"
The traffic congestion still remains !!!

What is an effective EV solution for Indian Market ?

Shared Electric Mobility

- **200 – 300 million people in major cities**
- **Acute shortage of efficient & reliable mobility solutions**
- **Will buy 100 million new fossil fuel vehicles in next 10 yrs (TERI)**

80% for personal transport

- **Co2 emissions increased to 500 mmt / yr (TERI)**

5 Pain Points & - *Its Solutions*

- **High cost of EV / Traffic congestion**
  - *Use of Shared mass Electric Mobility Trolley buses*

- **High Co2 Emissions**
  - *Renewable energy based PPAs for Transport Grid*
- **High CAPEX / OPEX cost of LiON / Lead Battery**
  - *Trolley bus is 100% battery less & trackless solution*

- **Long construction duration – cost escalations**
  - *Trolley bus & transport grid can be deployed in < 2 months*
- **Traffic disruption**
  - *No tracks hence no traffic disruption for Trolley buses deployment .*

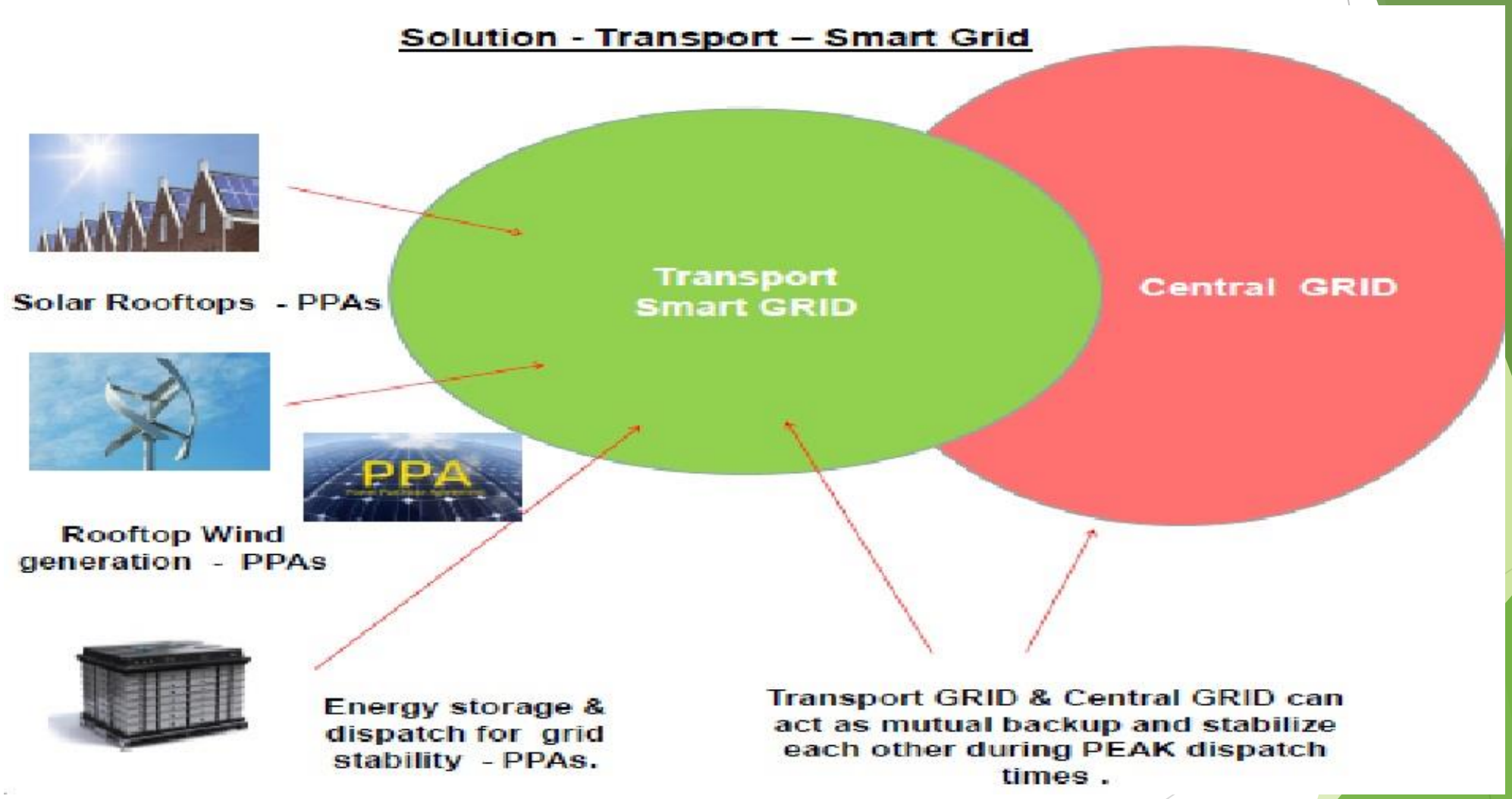
Trolley Bus - Cost Advantages.

- **Highly scalable , 130 years old proven system , operational in 43 countries , on 300 locations at the moment.**
- **100% Battery less EV operational model.**
  (90 % less cost / km, no recurring battery expenses)

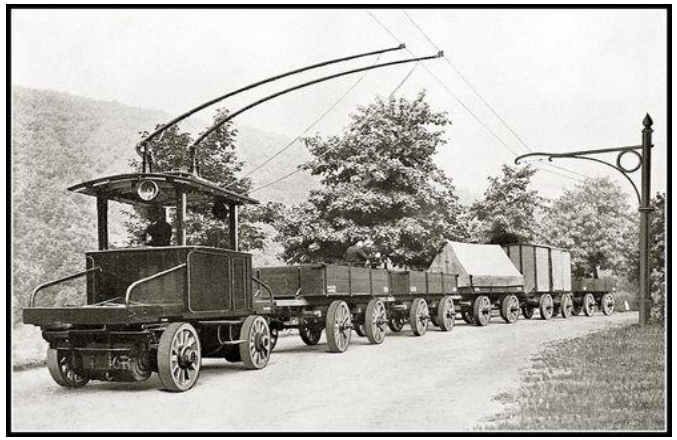
- **Fast Deployment (< 2 months) , being trackless – tyre based**
  (Zero traffic disruption , 90 % less cost / km ~ Metro / Subway)
- **100% shared Multi-Modal EV model for People + Goods transport.**
  (150 – 200 seated EV , Faster ROI , reduced traffic congestion)

Source: UITP – Union Internationale des Transports Publics 2025
PTx2 = Objectif 2025 : Public Transport x 2

Integration of Distributed Renewable Energy in the Smart Transport Grid.

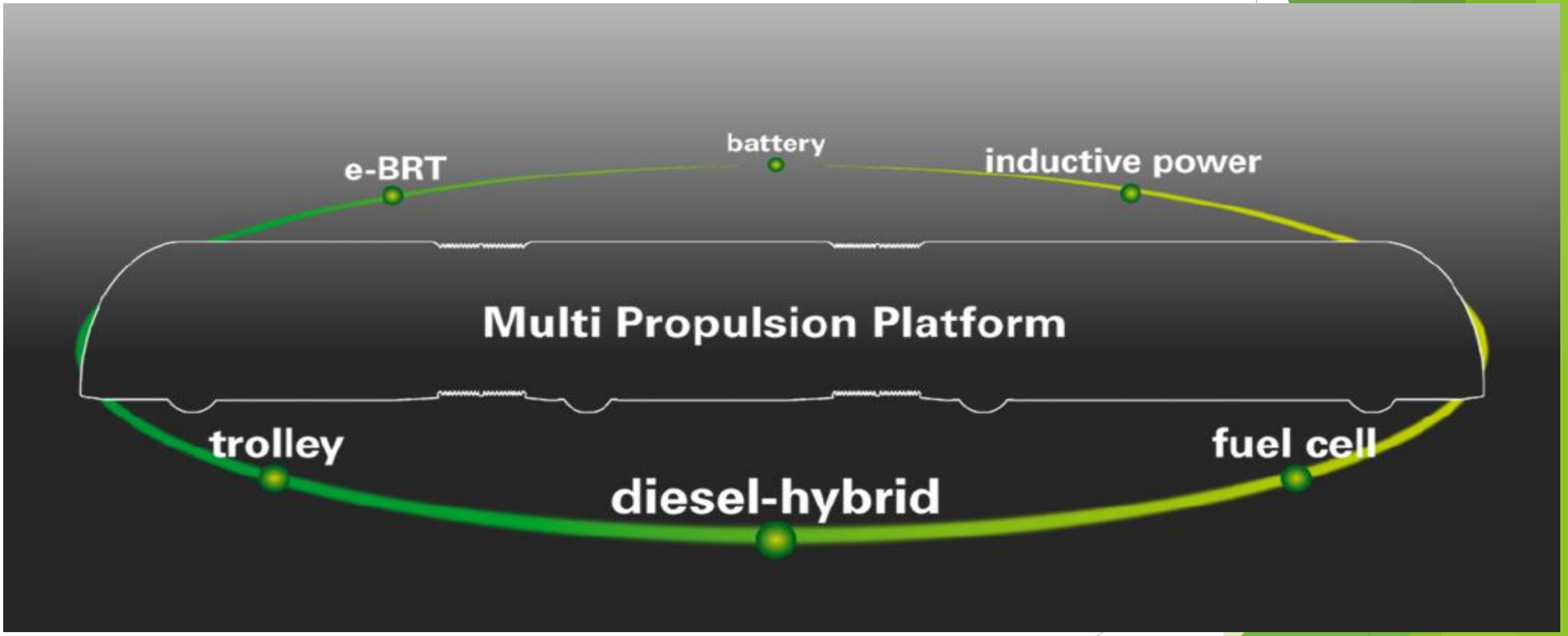


More Applications of Trolley Bus Smart Transport Grid Infrastructure.



Source: UITP – Union Internationale des Transports Publics 2025 PTx2 = Objectif 2025 : Public Transport x 2

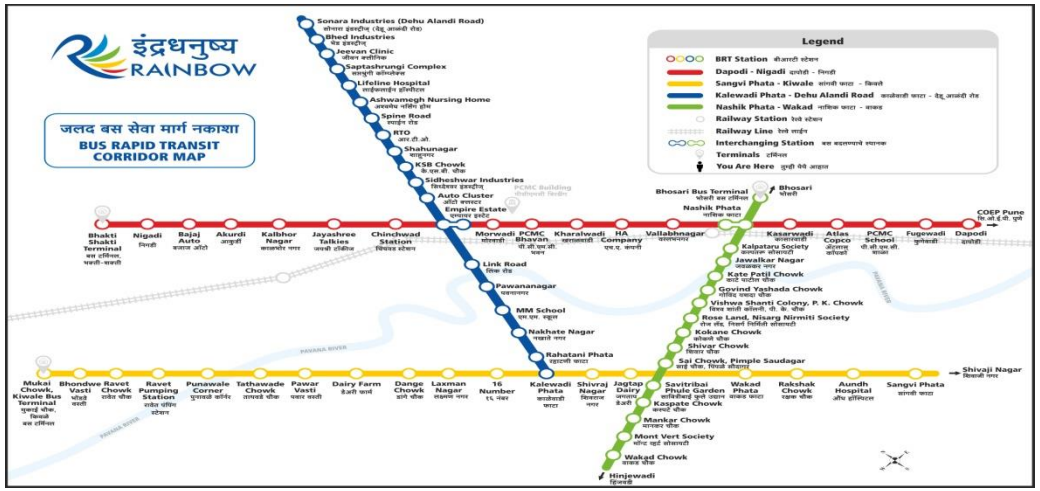
Types of Hybrid propulsions for Trolley Bus system



Source: VanHool

Ideal locations for PoC - Pilot of Trolley Bus (For Commuters & Goods).

BRT – City Arterial Lines



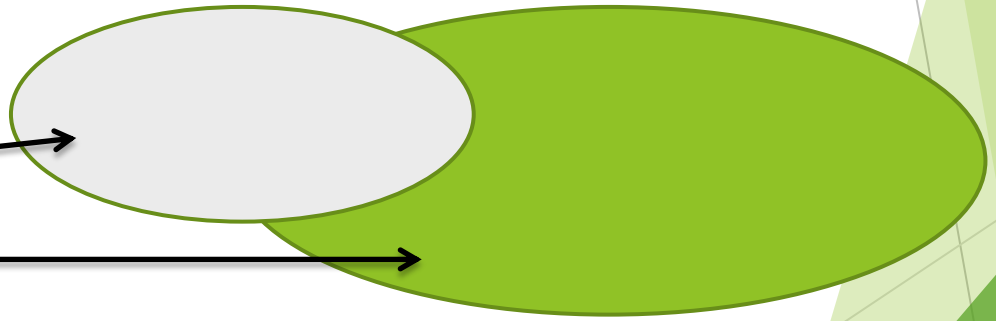
Air Ports

Last Mile / feeder lines for Metro

Sea Ports

Advantages of the solution - Top 7x of15x impacts in 5 yrs

- 5 million shared + private EVs on roads
- 5 million new jobs
- 10 GWp of Renewable Energy Integration via PPAs
- Infra deployment at scale via the private smart transport grid
- Renewable powered "Smart Transport Grid" stabilizing the Main Grid
- Billions of $ saved in fossil fuel & LiON Battery Import Bills
- Reduction of 100 mmt of Co2 emissions / year



CO² FOOTPRINT

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