
PRIVATE
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CONFERENCE 2019
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GRAND HYATT INCHEON, REPUBLIC OF KOREA
#GPIC2019

E-Mobility Solutions: Investment Barriers in Developing Countries

15:20 - 16:10 - #GPIC2019

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E- Mobility Solutions – Investments Barriers in India

October 7, 2019

Sadashiv S. Rao

CEO

NIIF Infrastructure Finance Limited

India

National Investment and Infrastructure Fund (NIIF)

- NIIF is an investor-owned, professionally-managed fund manager, anchored by the Government of India (49% stake) in collaboration with leading global and domestic institutional investors (51% stake).

- NIIF currently manages over USD 3 billion of capital commitments across three funds, each with its distinct investment strategy.

- NIIF funds have investment mandates to invest in infrastructure assets and related businesses that are likely to benefit from the long-term growth trajectory of the Indian economy.

- Over time, NIIF seeks to become one of the main channels of investment into Indian infrastructure.

NIIF Infrastructure Finance Limited

- NIIF Infrastructure Finance Limited (NIIF IFL) is majority owned by NIIF.
- NIIF IFL is a specialized debt financing vehicle for operating infrastructure projects.
- NIIF IFL commenced operations in September 2015 and currently has a loan book equivalent to USD 730 mio.
- NIIF IFL raises resources by way of long-term bonds from institutional investors.
- Credit rating of AAA from domestic credit rating agencies.

NIIF IFL thus represents a safe asset class for investors looking to take exposure to Indian infrastructure.

Inevitability of Migration to EVs in India

- India is the third highest consumer of crude oil (after USA and China). About 80% of the requirement is met by imports – issue of country's energy security & balance of payments.

- As per the 2018 WHO report India has 14 of the 20 most polluted cities in the world. The transport sector is one of the major sources of pollution.

- Second most populous country in the world with rapid urbanization – India is expected to see 500 million people living in its cities by 2030.

- Automobile ownership in India is still low with only 18 cars per 1000 citizens compared to 69 in China and 786 in USA. With increase in standard of living, the demand for vehicles is expected to increase.

Inevitability of Migration to EVs in India … contd.

- Reducing Total Cost of Ownership (TCO)

  - TCO for electric commercial passenger vehicles is currently about 15% higher than that for Internal Combustion Engine (ICE) vehicles. However, with the migration to stricter emission norms starting April 2020 (expected to increase capital cost of petrol and diesel vehicles by 8% - 15%), commercial electric passenger vehicles are expected to have a lower TCO as compared to ICE vehicles.

  - The gap in case of private passenger vehicles expected to narrow from about 40% to 15%.

- Rise of sharing services such as Uber / Ola, which are more amenable to migration to electric vehicles due to higher utilization as compared to private cars, which reduces cost of ridership despite high initial cost.

The Government of India is seized of the matter and has been taking steps in the right direction.

Steps taken by the Government

- Goods & Service Tax (GST) on EVs has been reduced to 5% (as compared to 28% for vehicles with internal combustion engines).

- Various states have provided exemption from Road Tax for e-buses.

- Government of India has launched the scheme for Faster Adoption & Manufacturing of Hybrid and Electric vehicles (FAME) in March 2019.
  - Outlay of Rs.10000 crore (USD 1.4 billion) for 3 years till FY2022.

Steps taken by the Government … contd.

- The salient features of FAME:
  - Focus on incentivizing purchase of EVs for public transport (heavy usage vehicles which minimizes the TCO, vehicles typically used within cities and can work with less wide-spread charging infrastructure)
  - Incentives of USD 1.2 billion including:
    - Setting up 2700 charging stations (USD 140 mio)
    - 7090 buses (USD 500 mio)
    - 55000 4 wheelers (USD 85 mio)
    - 500,000 3-wheelers (USD 350 mio)
    - 1 mio 2-wheelers (USD 280 mio, only segment where incentives available for private vehicles also)

Steps taken by the Government … contd.

- 64 cities selected for e-bus subsidy allocation.

- Model Concession Agreement (MCA) prepared for O&M of e-buses on PPP model:
  - 15 year concession.
  - Concessionaire to incur the capex for procurement of buses, setting up of O&M infrastructure, O&M of buses.
  - Concessionaire to receive revenue from the State Transport Undertakings (STUs) - per km opex with minimum assured kilometers
- Key financing challenges faced by the Concessionaires:

Key Challenge	Description	Solutions Available / required for scale up
Credit Risk of STUs & Contract Bankability	Most of the STUs are under huge losses – high credit risk	MCA provides for escrow account for collections – limited comfort.
Technology Risks	New technology with no operational history in the Indian scenario	All the OEMs currently have tie-ups with overseas counter-parts who provide technical support.
Financing risk	Banks looking at project level financing but tenure is short, typically 5-6 years	Longer tenure financing needed (in line with concession tenure), at competitive interest rates.

Factors that could improve availability of financing

- Capacity-building in domestic financing institutions / banks for evaluation of such projects, using experiences from established markets.

- Loan tenor limitations of domestic lenders: Take-out financing products from multilaterals / financiers with greater experience in financing EVs.

- Domestic financiers may not be able to offer fine interest rates (credit risk of STUs / technology risk):
  - Soft lines of credit to domestic financiers for financing EV projects
  - Partial credit guarantees to mitigate specific risks.

- Factors that could further encourage EVs in India:
  - Govt. should mandate electricity utilities to provide power for EV charging at lower tariffs for a pre-determined period - say next 5 years.
  - Govt. needs to allocate land from its land bank at low prices for charging stations.
  - Govt. should make it mandatory to install charging infrastructure at government offices, new residential / commercial buildings.

THANK YOU

ANNEXURES

Solar Power in India

- Solar power introduced in India in 2009, but was plagued by high capital costs, resulting in high tariffs of about Rs.18 per unit (against conventional power cost of about Rs.3 per unit).

- The Government of India (GOI) launched the National Solar Mission (NSM) in 2010, with the objective of having 22000 MW of grid-connected solar power by 2022. Various innovative measures were adopted to address the investors' concerns and give an impetus to solar power:
  - Existing / New specialized credit-worthy central government-owned entities were roped in as counterparties - National Thermal Power Corporation Limited (NTPC) / Solar Energy Corporation of India (SECI) – ***Credit risk issue addressed***.
  - Bundling of expensive solar power with cheaper conventional power / capital subsidies were introduced ***– Commercial viability issue addressed.***
  - Solar power purchase obligations introduced on the power utilities ***– Regulatory push.***
  - Concept of large solar parks (500 MW+ at one location) introduced – land acquisition, common infrastructure including power evacuation arrangements provided by government agencies – ***practical on-the-ground project implementation hurdles addressed by the government agencies.***

- **Solar tariffs in India have reduced gradually to as low as Rs.2.44 per unit (without any subsidy).**
- **As of March 2019, India has installed solar capacity of 31500 MW, with another 18400 MW in the pipeline.**

CNG in India

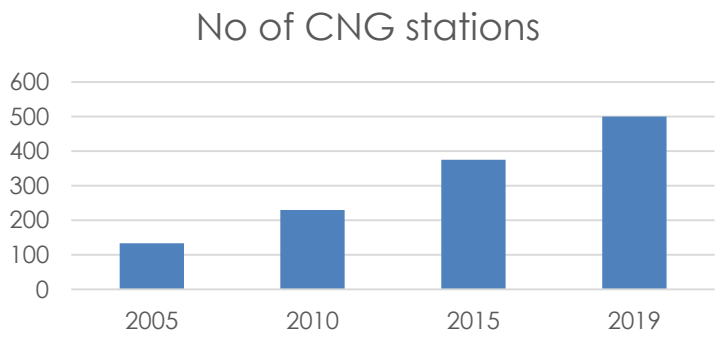
In 1998, responding to a Public Interest Litigation filed by an environmental activist, the Honourable Supreme Court of India issued a directive for conversion of all buses, taxis and three-wheelers in New Delhi to CNG. It also ordered setting up of approx. 70 CNG stations to cope with the demand – ***Regulatory push.***

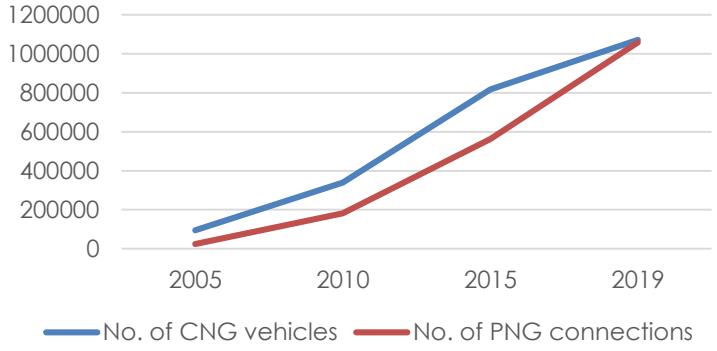
The Government allocates the domestically-produced natural gas (which is cheaper than imported gas) on priority to CNG / PNG applications. As a result, CNG / PNG prices are lower than those of alternative fuels – ***Commercial viability addressed.***

Government facilitation by getting existing petrol / diesel fuel stations to provide space for CNG stations - ***practical on-the-ground project implementation hurdles addressed by the government agencies.***

CNG in India

- IGL Limited, joint venture of the Govt. of Delhi and other government-owned oil marketing companies, began operations in New Delhi in 1999 with 9 CNG stations. Despite initial hiccups (waiting time of upto 8 hours for refueling), the company has witnessed stupendous growth.





- The Delhi model has been replicated across the country over the years. After nine rounds of bidding, the country will have a pan-India CNG / PNG network:

Parameter	
No. of geographical areas	178
% of country's area	35%
% of population covered	50%

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HYDROGEN VISION

Sae Hoon Kim, Dr.-Ing

HEAD OF FUEL CELL CENTER
VICE PRESIDENT

✓ The automotive industry is facing challenges & opportunities

GLOBAL ENVIRONMENTAL CHALLENGES

CLIMATE CHANGE

- Reducing CO2 emissions

* COP21, PARIS 2015

AIR QUALITY

- Restriction on ICE vehicles

ENERGY SECURITY

- Diversification of energy sources

COUNTRIES

NORWAY / NETHERLAND

ICE Vehicle sales to be prohibited from 2025

FRANCE / UK

Diesel Vehicle sales to be prohibited from 2040

CHINA

New conventional vehicle manufacturers (including HEV, PHEV) to be prohibited from entering the market from 2019

OEMs

VW plan to stop developing gasoline & diesel cars from 2026

'18. 12

DAIMLER

Daimler to make its vehicles Carbon Neutral by 2039

'19. 5

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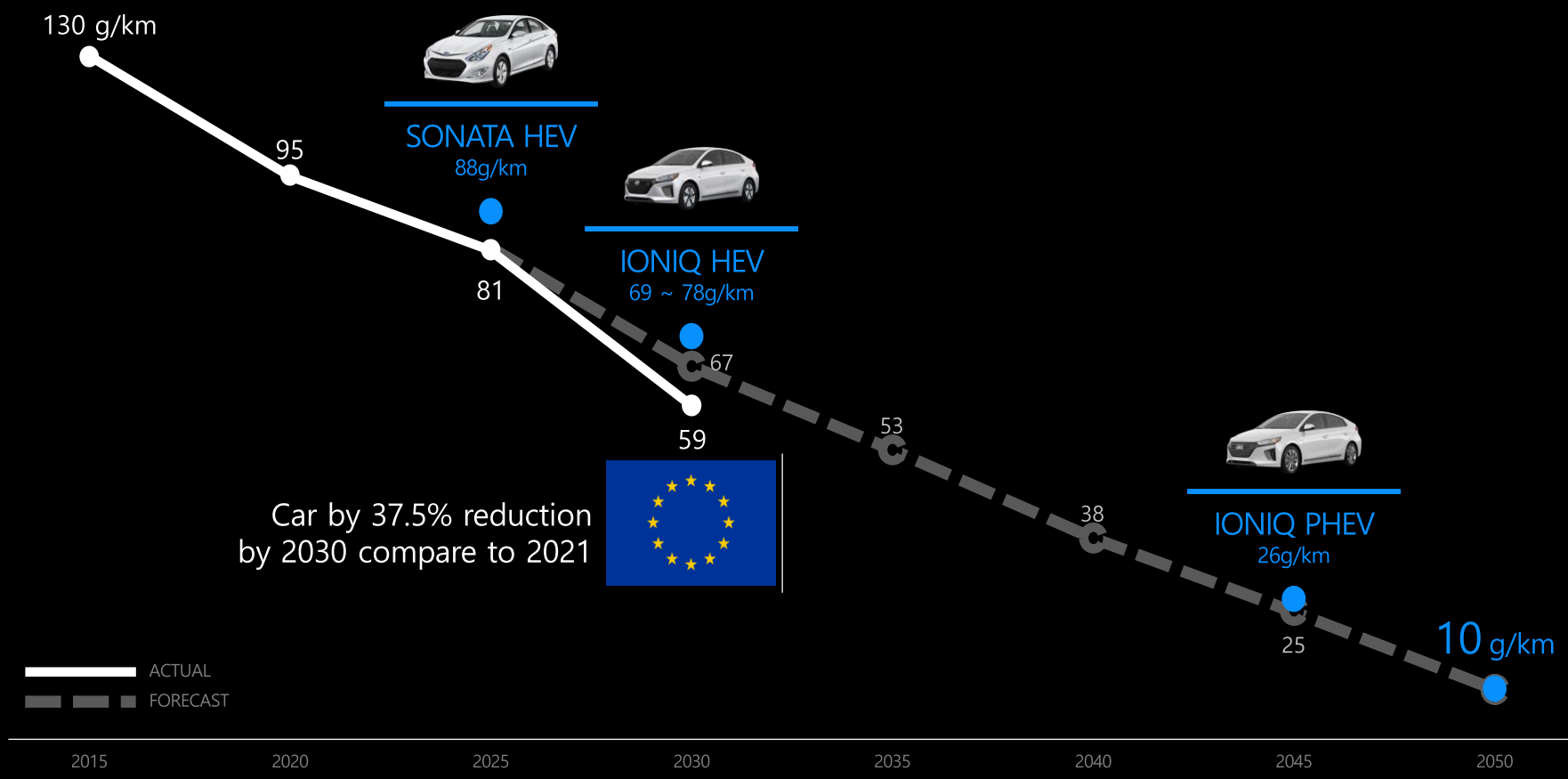
HMG to produce 44 eco-friendly vehicles by 2025

'19. 1.

Fuel Economy Regulation

/ EU



History of Hyundai FCEV

✓ Hyundai Motors has paid its devotion in developing FCEV

1998 — Initiated Fuel Cell development

2000 — First developed FCEV model (Santa Fe-based)

2004 — Independent development of stack

2005 — Independent development of Fuel Cell system

2007 — Independent development of FCEV powertrain

2013 — 1st generation FCEV (Tucson ix)
"The world's 1st mass production"

2015 — US WardsAuto World
"10 best engines in US market"

2018 — 2nd generation FCEV (NEXO)
"Superior maximum range and energy efficiency"

HYUNDAI MOTOR GROUP

✓ All-new dedicated FCEV, offering Hyundai's most advanced future technologies

1. Advanced Power Electric System

- The world-best driving range
- Refueled within 5 minutes
- System efficiency 60%
- In-house development for MEA, Metal Bipolar Plate

2. Durability & Storage

- Durability equivalent to conventional ICE : 160,000km /10 years
- The world-first 700 bar / Type4 3 tanks system : Cargo Volume Maximization

3. State-of-the-art ADAS Systems

[Contribution to the environment]

- AIR CLEANING EFFECT

The high-performance air filter can filter micro-particulates smaller than particulate matter (PM) 2.5

- FCV : SUPPLY ~ 10KW OF ELECTRIC POWER

100,000 FCVs : Equivalent to a nuclear power plant (~ 1GW)

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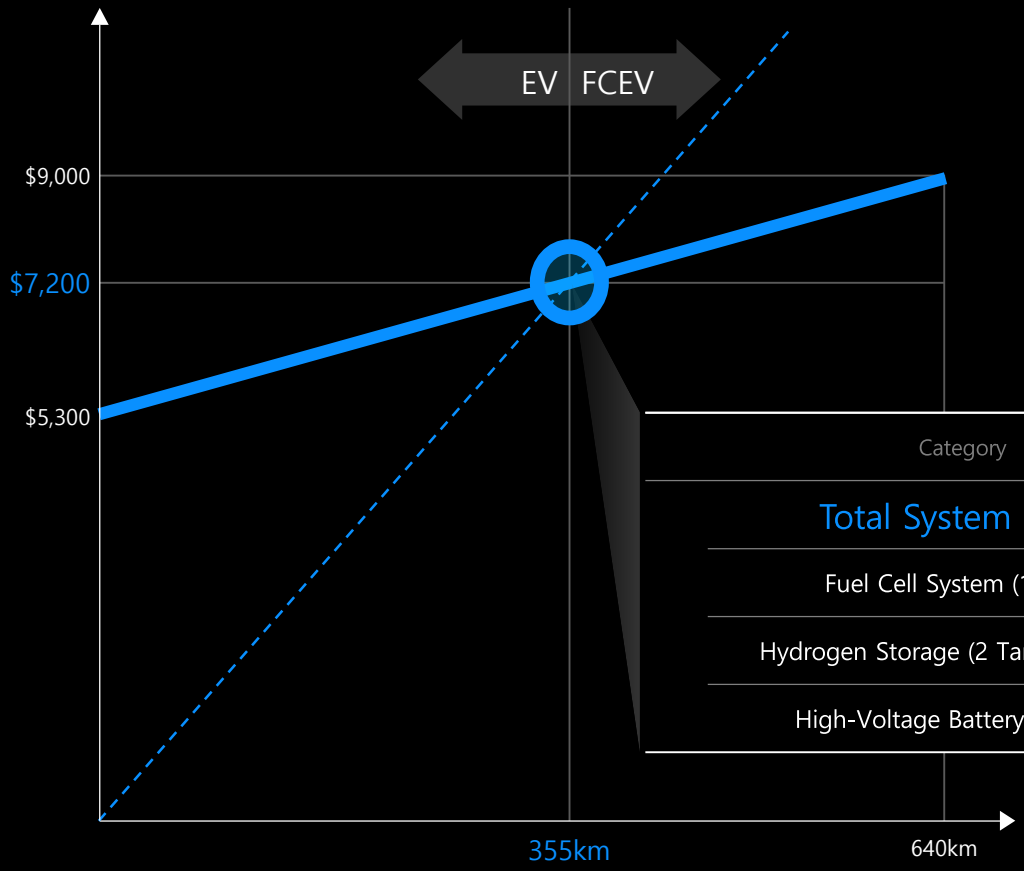
Cost Parity / FCEV & EV



Comparison of Fuel Cell System and Battery System cost

Cost Parity at Approx. 355km

Category	Fuel Cell	Battery
Total System Cost*	$7,200	$7,200
Fuel Cell System (100kW)	$4522	(65.4kWh, $110/kWh* *)
Hydrogen Storage (2 Tank, H2 3.5kg)	$2058	
High-Voltage Battery (for HEV)	$620	

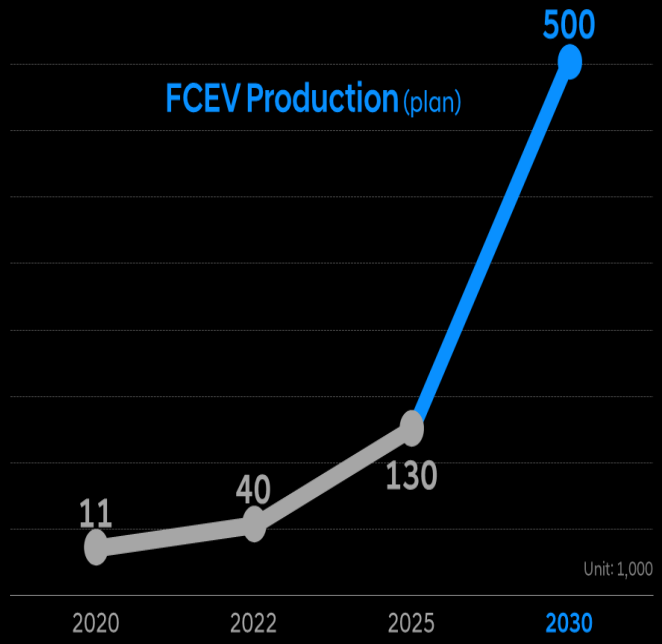
* : NEDO* & DOE* Cost Road map for Fuel Cell System

* * : Bloomberg New Energy Finance forecast (2017, "Lithium-ion Battery Costs and Market")

VISION 2030

✓ Announcement of HMG's long-term roadmap 'Vision 2030' plan (11.DEC.2018)

- Plans to produce 700,000 fuel-cell systems annually by 2030 including 500,000 units for FCEVs
- New Businesses Opportunities for Fuel Cell Systems beyond Automotive Industry



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Thank You