Japan India Symposium for
Decarbonisation for Global South

Best Practices of Toyota Kirloskar Motor on Sustainability for Mutual Learning

Presented by –
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TOYOTA KIRLOSKAR MOTOR PVT. LTD.,

TOPIC: Best Practices of TKM on Sustainability for Mutual Learning

Abstract:

TKM has made major strides in the realm of sustainability. There have been several innovations that have been initiated in manufacturing and use of technology which would enable the shift towards decarbonization efforts. CSR, community initiatives and partnerships with suppliers and other stakeholders have played an important role. This talk focuses on the learnings from TKM experience on Sustainability and areas of focus for future efforts.

TKM Journey towards ENVIRONMENT SUSTAINABILITY

Toyota Kirloskar Motor Pvt. Ltd.,

JOURNEY TOWARDS CARBON NEUTRALITY & NET POSITIVE IMPACT

Global Policy & Management commitment

Toyota Environmental challenge 2050

Mr. Uchiyamada, Chairman
Toyota Motor Corporation

Announced Toyota's Vision 2050 in Toyota Environmental forum on October 14th, 2015

Management Commitment

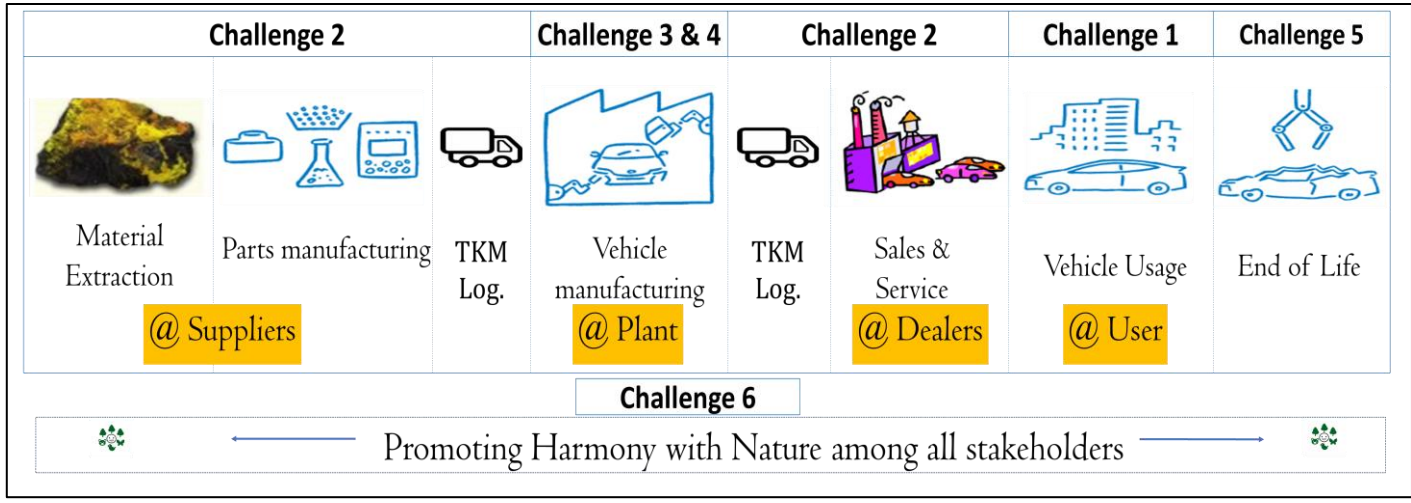
We firmly believe in the philosophy of
" Respect for the planet"

we reaffirm our commitment, to contribute to the society by ensuring Environment protection, throughout life cycle of our products, operations & Service.

Sustainable Development Goals (SDG)

12 of the 17 SDG's linked to Toyota 2050 Challenge

Lifecycle of Vehicle



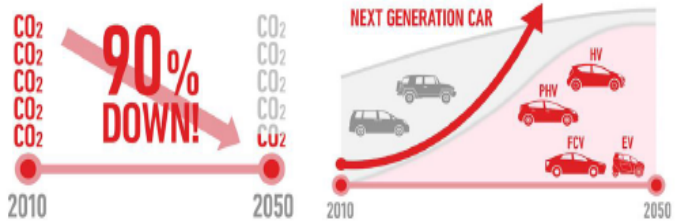
Toyota Environment challenge 2050

Toyota Environmental Challenge 2050

Challenge to Zero

CHALLENGE 1

New Vehicle Zero CO_2 Emissions Challenge

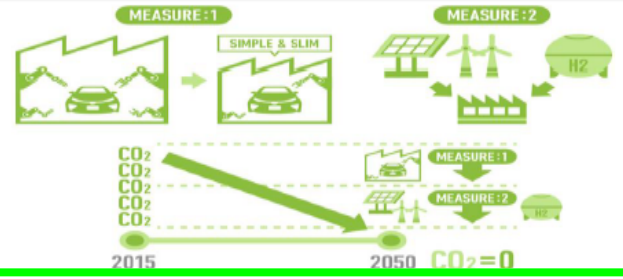


CHALLENGE 2

Life Cycle Zero CO_2 Emissions Challenge

CHALLENGE 3

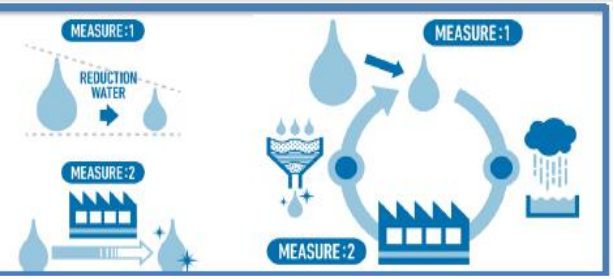
Plant Zero CO_2 Emissions Challenge



Contribute to Plus

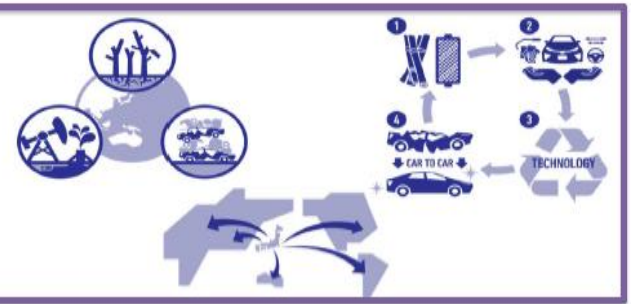
CHALLENGE 4

Challenge of Minimizing and Optimizing Water Usage



CHALLENGE 5

Challenge of Establishing a Recycling-based Society and Systems



CHALLENGE 6

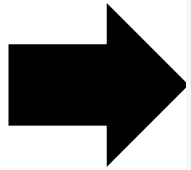
Challenge of Establishing a Future Society in Harmony with Nature

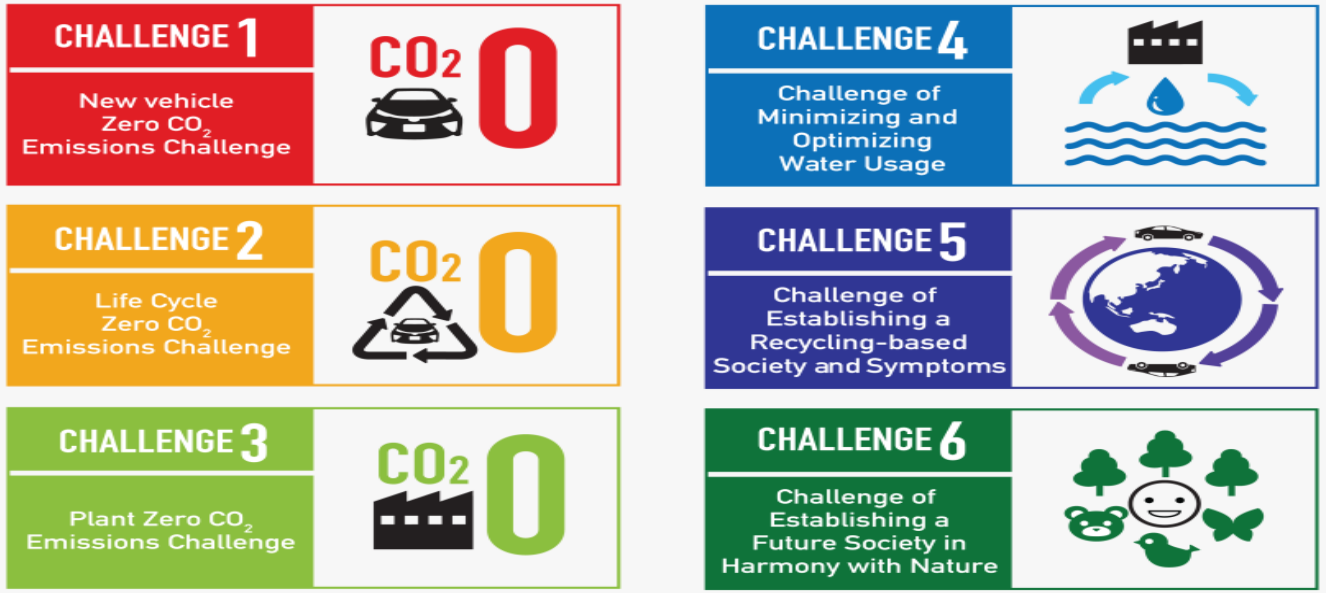
The first 3 Challenges are focused towards Achieving ZERO CO2 and next 3 challenges focused towards creating Net Positive impact in society

Toyota Environment challenge 2050 linked to SDGs

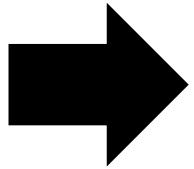
Toyota Environmental Challenge 2050

12 of the 17 SDG's linked to Toyota 2050 Challenge – Direct/ Indirect link

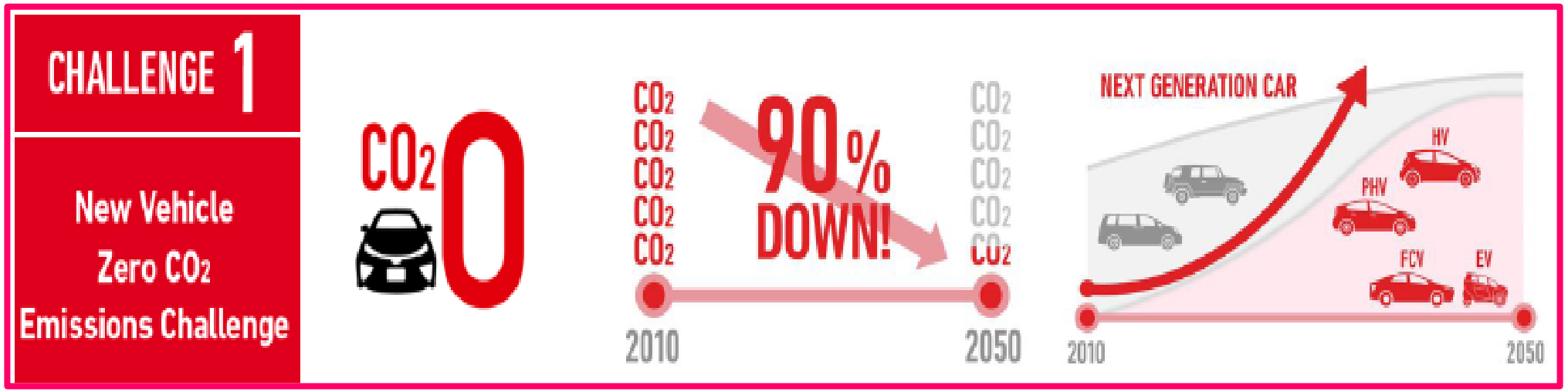




Plan towards aligning to the remaining SDGs



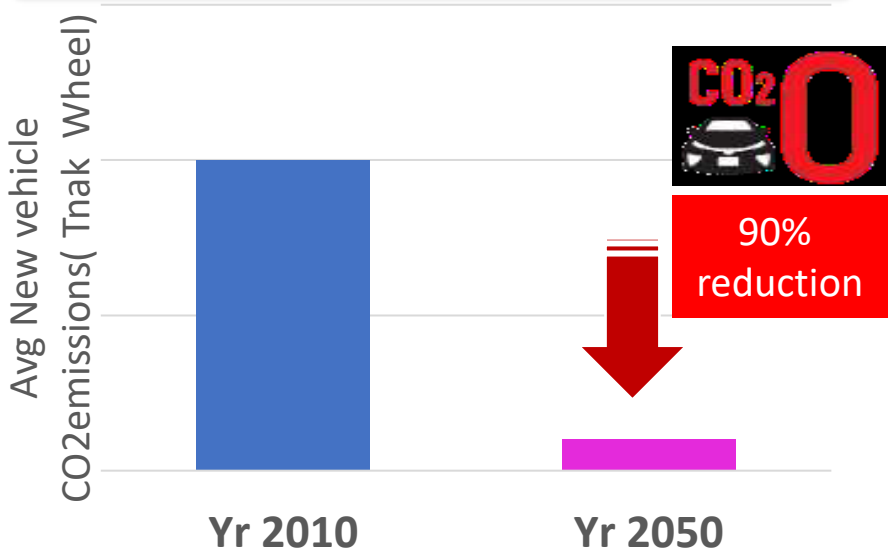
Activity	Details
Diversity & Inclusion	22% increase in women diversity by 2030
Skill Development Initiatives	Toyota Technical Education Programme Toyota Technical Training Institute Toyota Koushalya Toyota Education and Skill Promotion
Partnership with Organizations	Ecozone & Community engagement programs


CHALLENGE 1
New Vehicle
Zero CO2
Emissions Challenge
CO2
0
CO2
CO2
CO2
CO2
CO2
90%
DOWN!
CO2
CO2
CO2
CO2
CO2
2010
2050
NEXT GENERATION CAR
HV
PHV
FCV
EV
2010
2050

Toyota's strategy for Decarbonisation

Challenge 1 – New Vehicle CO_2

New Vehicle Zero CO_2 Emissions Challenge



90% reduction in new vehicle CO_2 emissions by 2050

Toyota Fundamental Stance

Energy Conservation

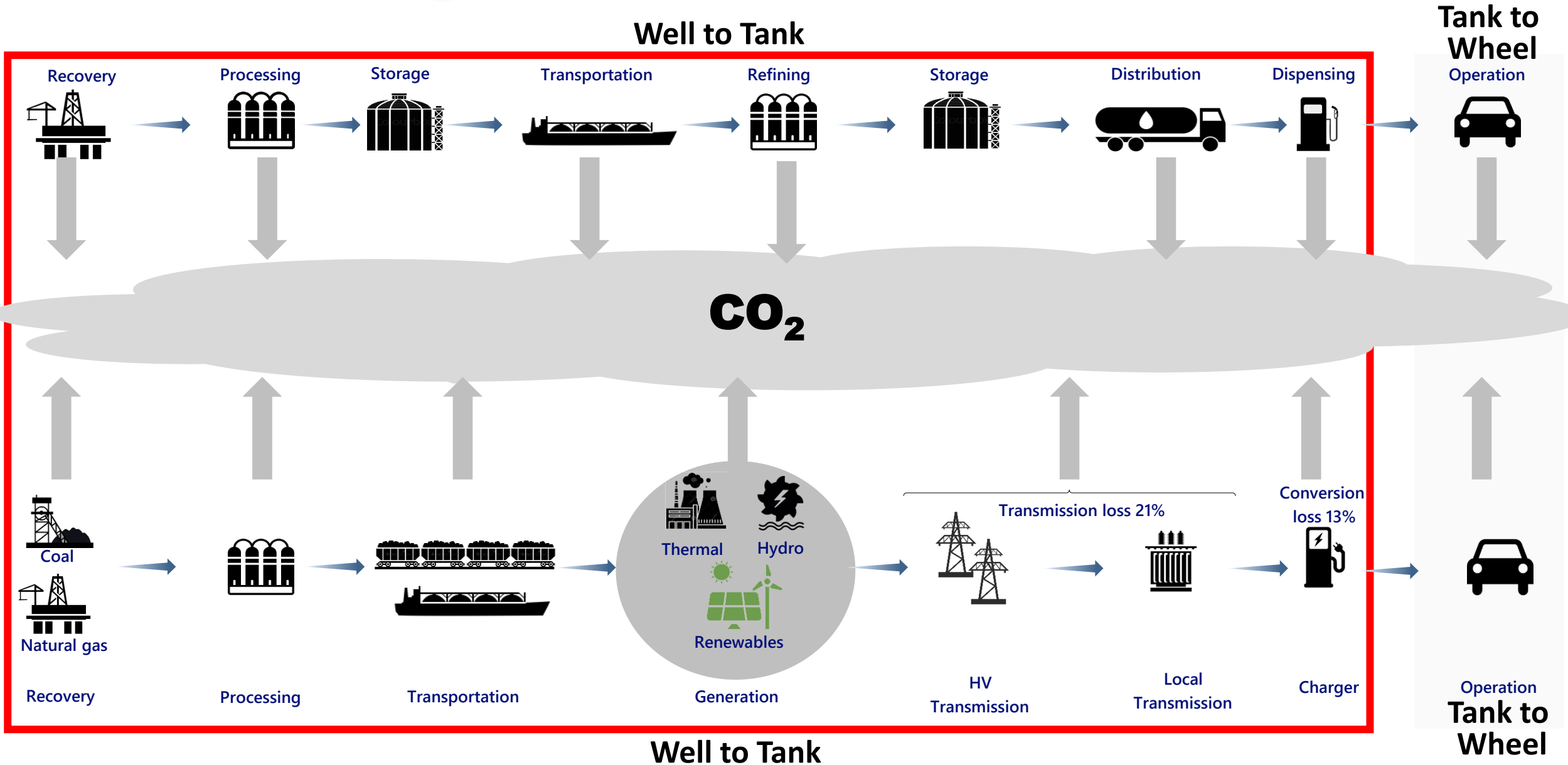
Energy Diversification

When widely-used, eco-friendly cars can contribute to environmental protection

+ Pursuing the Joy of Cars

Responding to environmental issues while pursuing the Joy of Cars

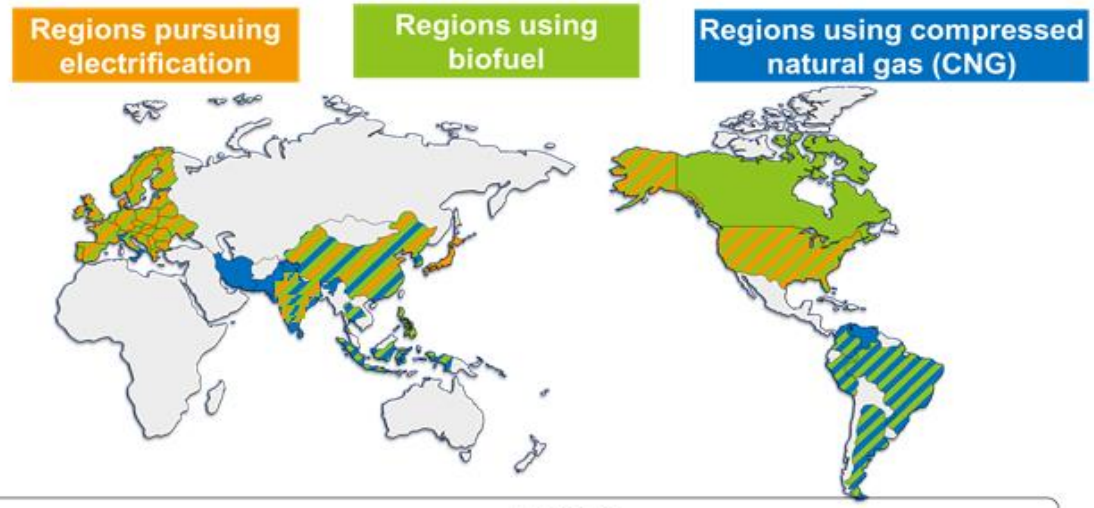
Well to Wheel CO_2 emissions



Well to Tank

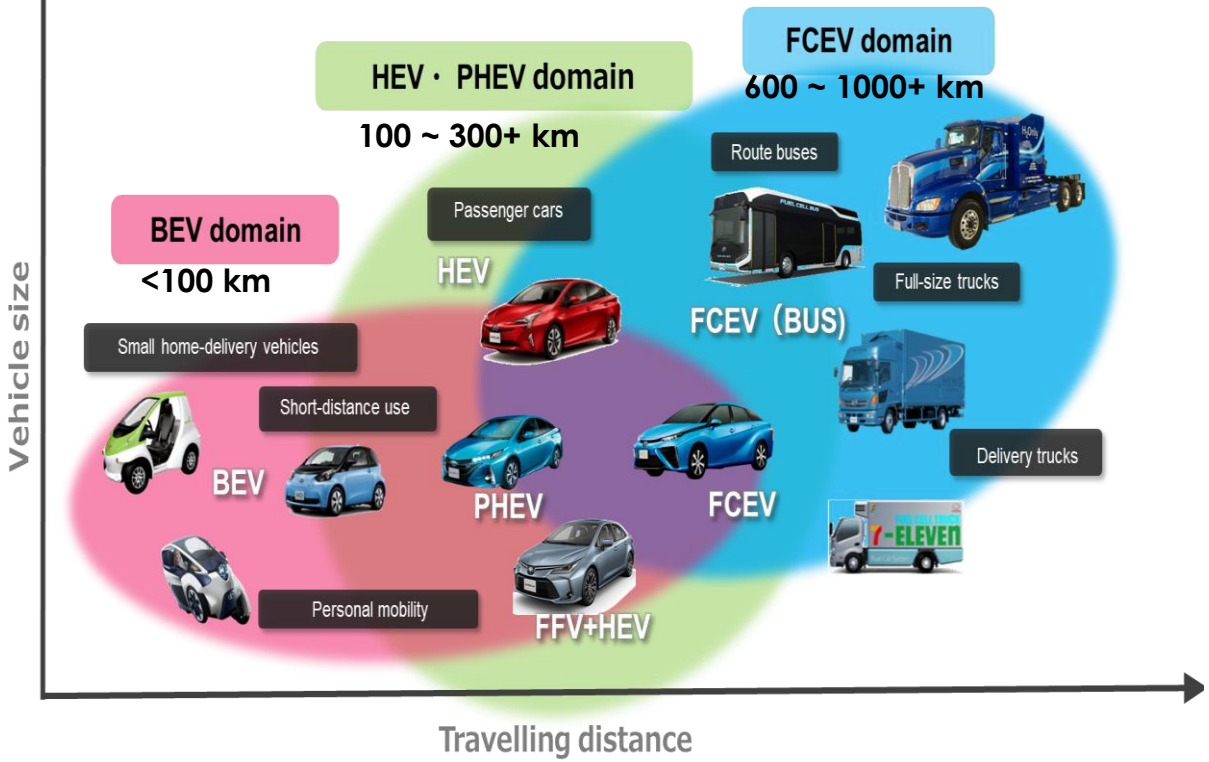
Reducing Well to Tank Emissions is more critical

Toyota thinking way: Diversification



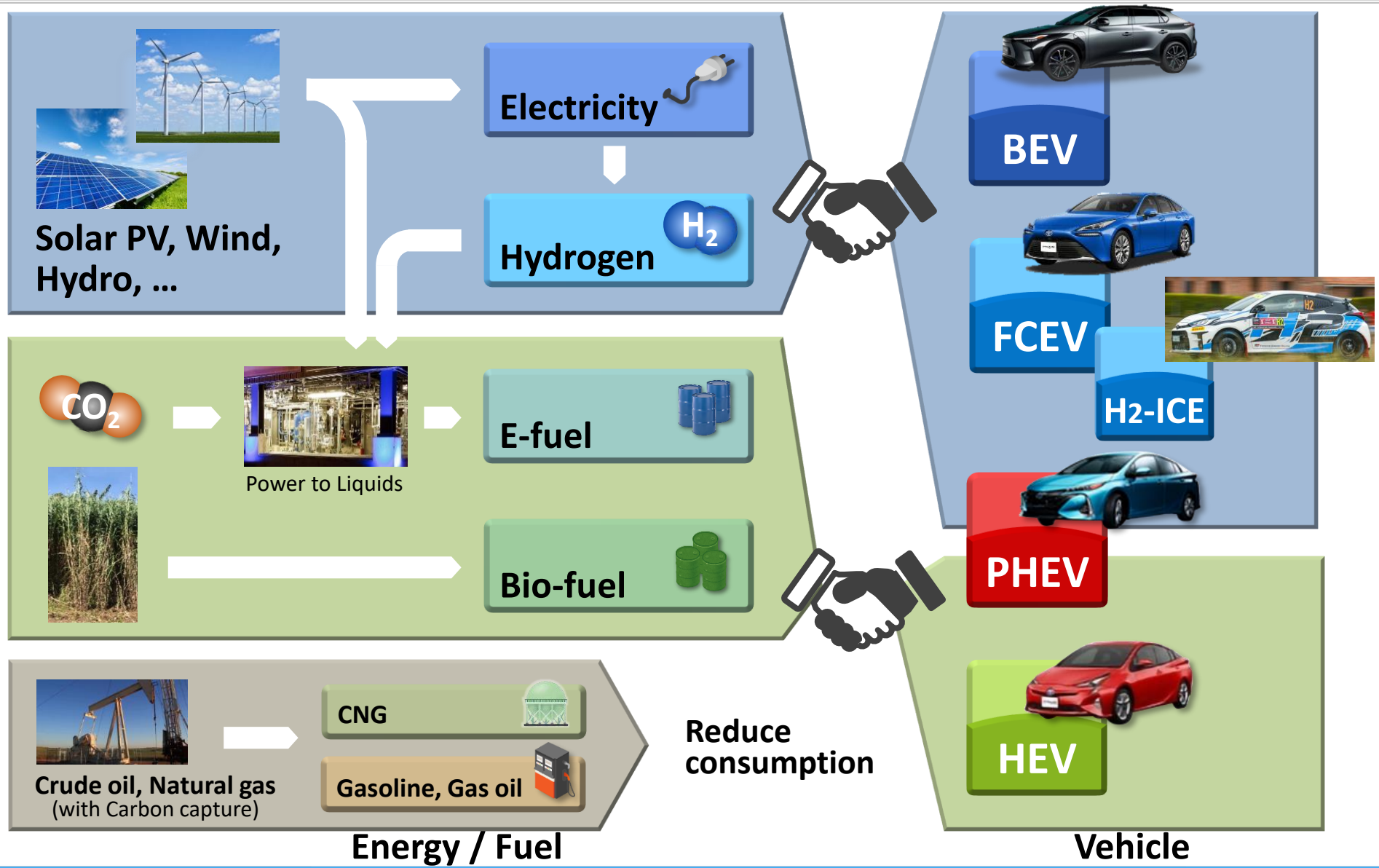
SUIT REGION ENERGY MIX & NEEDS

SUIT CUSTOMER NEEDS



Introduce technology(ies) to suit country's Energy mix & Consumer needs

Sustainable Carbon Neutral Mobility



Both technologies go forward carbon neutrality together

Regions pursuing electrification

Regions using biofuel

Regions using compressed natural gas (CNG)

Norway

Abundant Hydro Power

BEV Suitable

Japan

Energy Security Issues

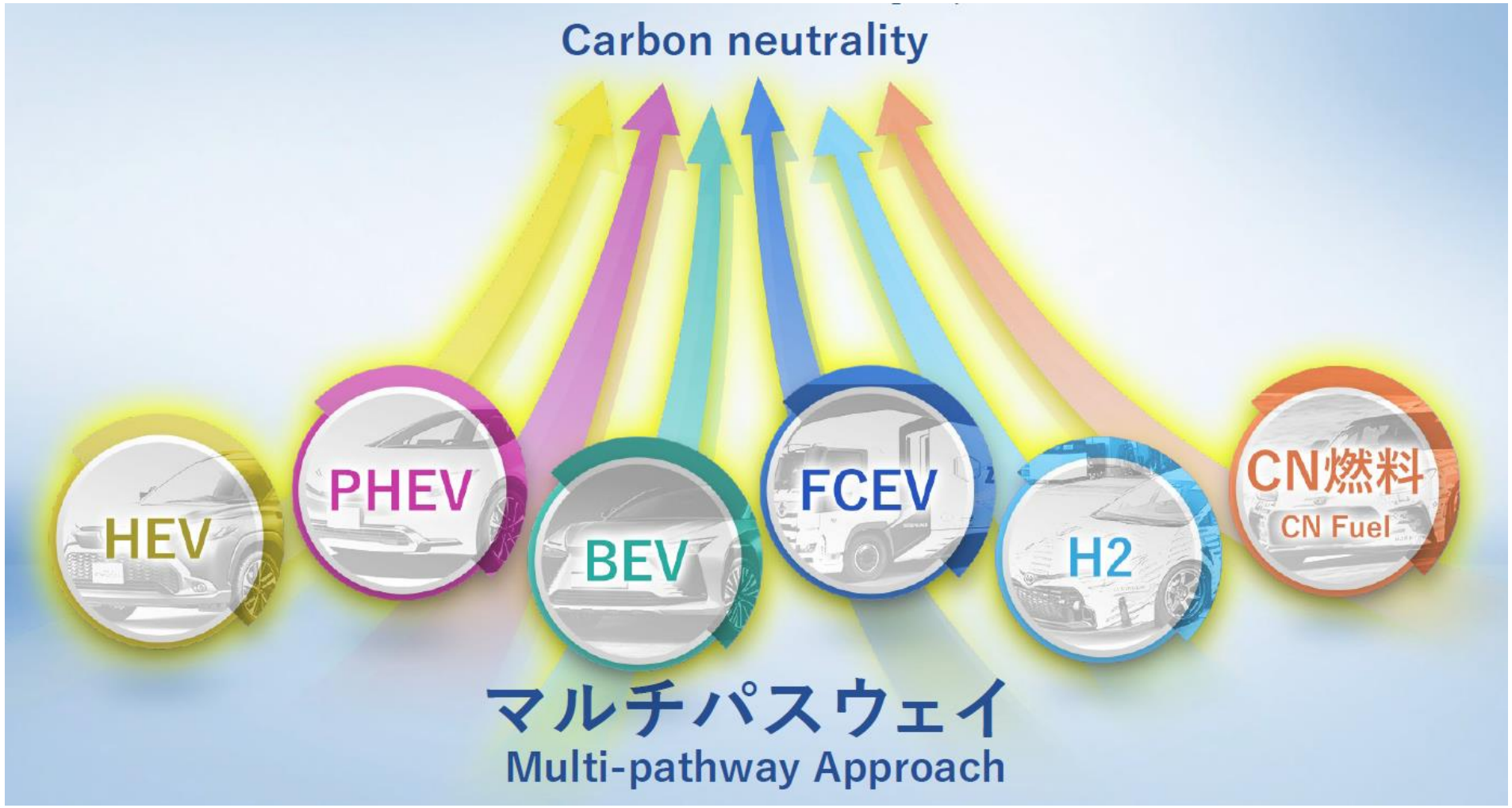
FCEV Suitable

Brazil

Surplus Ethanol

E100 Cars Suitable

Toyota's strategy for 2030, and beyond

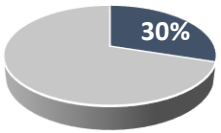


Toyota take Multi-pathway Approach towards Carbon Neutrality

Government action: Alternate Transport fuels

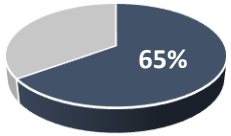
Policy

India Imports



Crude import =30 % of Total India's import

Trade deficit – 170 Bill. $



Crude contribution = $170B

Policy aligned towards COP27 & Energy independence

① Alternate Fuels

② Electrification

Immediate Term

CNG Compressed Natural Gas

- **10,000 stations** CNG Stations by 2030 & **CNG corridors**
- 18% H-CNG (Hydrogen blended CNG)

Ethanol

- Ethanol blending **(E20)** by 2025 ; FFV mandate by 2026
- Govt. has allowed **2G (second generation) ethanol** by using

Electrification (BEV)

- **FAME 2 Incentives** for faster BEV penetration
- **PMP & PLI** Scheme (ACC/AAT)*

Mid-Long term

CBG Compressed Bio Gas

- 62 million tonnes of CBG Potential in India/ Year
- 5,000 CBG plants with 15 million tonnes of CBG

Hydrogen

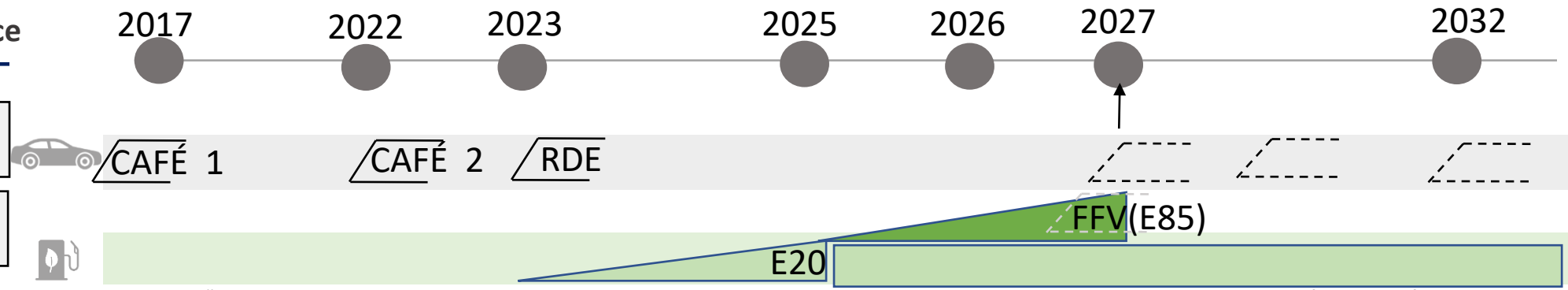
- **Green Hydrogen policy** announced.
- **National Hydrogen Mission** announced.

Methanol

- Methanol can be blended with gasoline and diesel
- Target of **15% blending** by methanol in gasoline/diesel.

*PMP : Phased Manufacturing Program, PLI : Production Linked Incentive, ACC : Advanced Chemistry Cell, AAT ;Advanced Automotive Technology

Regulation



CAFÉ : Corporate Average Fuel Economy ; RDE " Realtime Driving Emissions WLTP : World Harmonised Light vehicle Test Procedure FAME : Faster Adoption & Manufacturing of Electric vehicles

Govt. creating MULTIPLE PATHWAYS towards Net ZERO

Toyota action in India for FFVs

Launch of Demo FFV vehicle, Oct 2022

Unveiling prototype of world's 1st BS-6 Stage-II compliant , Electrified FFV, Aug-2023

Increase awareness to stakeholders

1. Display at iCAT Nugen'19 event
2. xEV Test drive for GoI Ministers

Engimach '21; Gujarat

Mirai launch by Min. Gadkari ji

H2 ICE Corolla Cross

Mirai and Hydrogen Society at AutoExpo 2023

Mirai at India Energy Week 2023 Bengaluru, Karnataka

2019 | 2020 | 2021 | 2022 | 2023

Mirai Gen #1 in India

Indo Japan G2G WorkshopIndo-Japan

Mirai Gen #2 in India

Hydrogen/FCEV Demo at Kerala

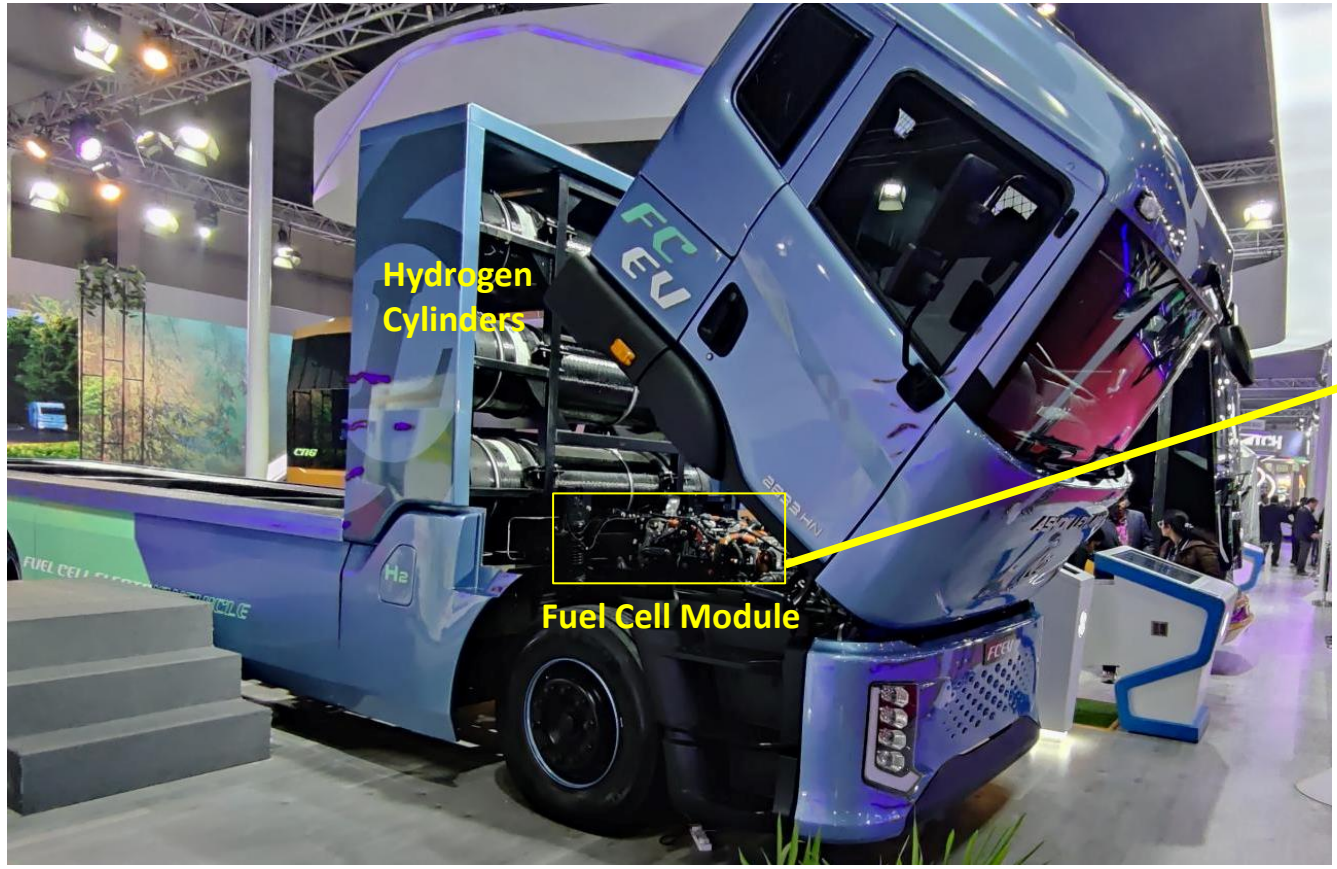
1st Refuelling at IOCL R&D (Faridabad)

Toyota steadily increase interaction & awareness to stakeholders

Toyota collaborating with local Auto OEMs to spread H2/FC

Ashok Leyland FCEV (On display at Auto Expo'23)

[Purpose : Proto Examination & Feasibility study]



Toyota Fuel Cell Module - 80 kW

CHALLENGE 2

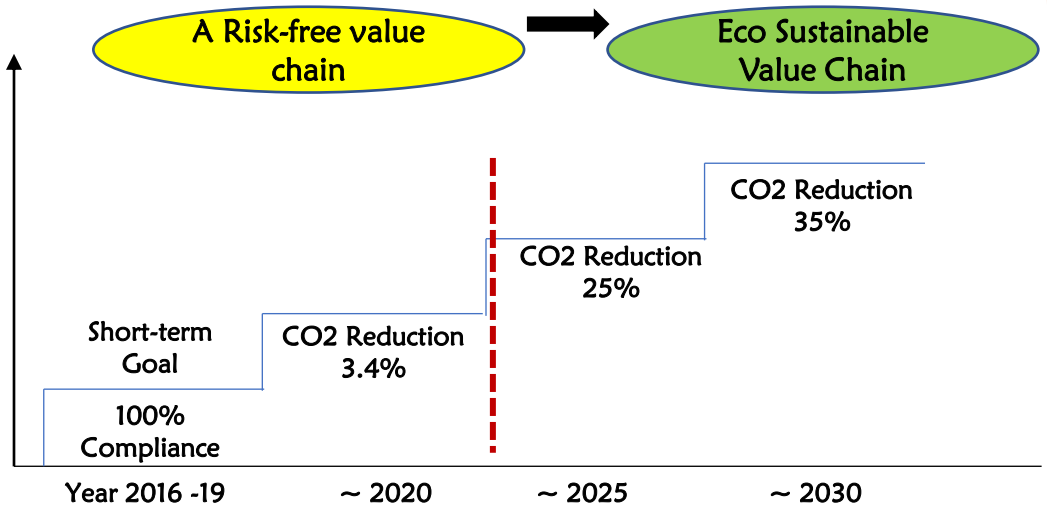
Life Cycle
Zero CO_2
Emissions Challenge

Challenge No.2 : Value Chain (Suppliers, Dealers & Logistics)

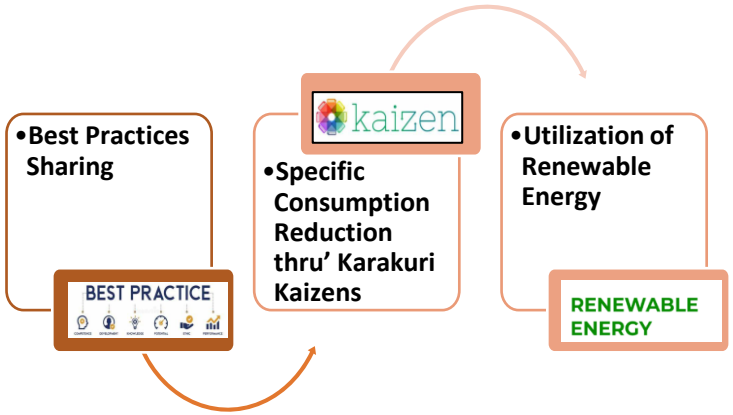
Challenge No.2 : Life cycle Zero CO2

INITIATIVES @ VALUE CHAIN

Roadmap towards CO2 Reduction

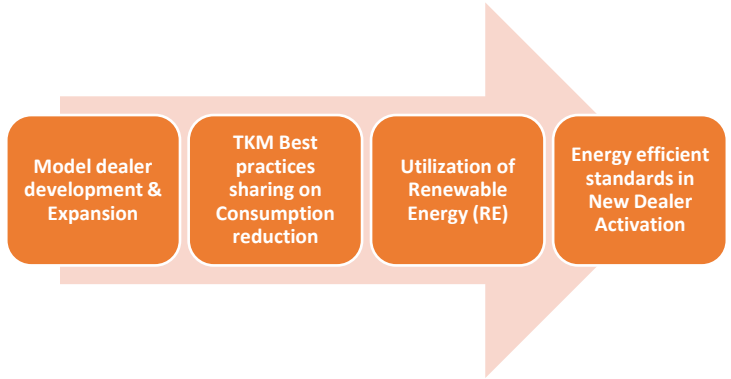


Approach - Suppliers



Supplier YoY 3.5% reduction to reach 35% by 2030

Approach - Dealers

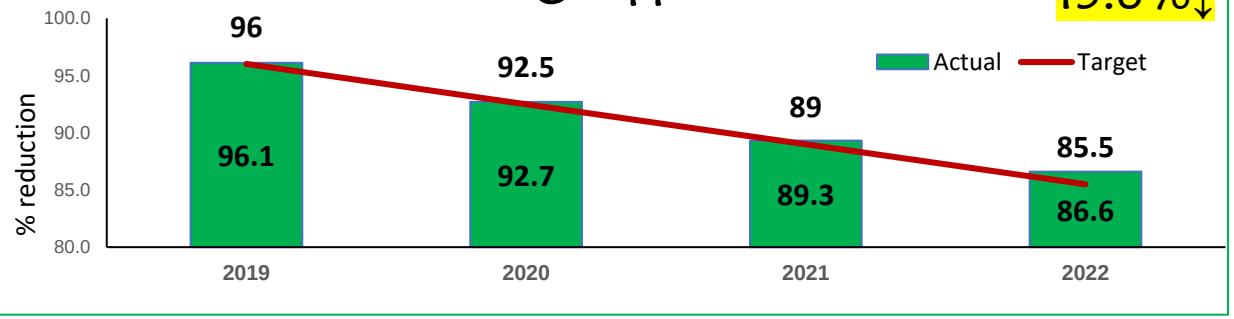


Dealer YoY 3% reduction to reach 30% by 2030

Results

Co2 Emission @ Suppliers

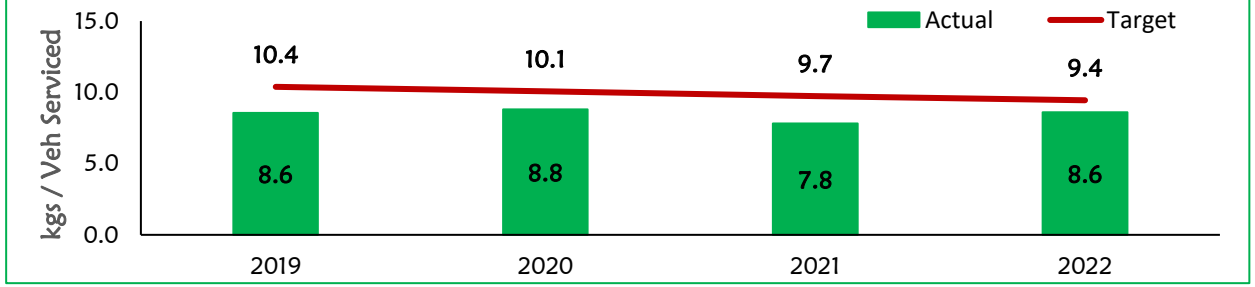
15.6%↓



Cumulative reduced 165 K tons from 2019 base

CO2 Emission @ Dealership

30%↓



Cumulative 30% reduction from 2019 base

Striving towards achieving carbon neutrality across the value chain operations

Challenge No.2 : Life cycle Zero CO2 @ Logistics operation

Strategy for Sustainable Logistics

1. Bring suppliers to nearest location (Distance Reduction)
2. Alternative Logistics (Rail, Sea. Etc)
3. CO2 reduction using TPS way (Loading Efficiency, alternative route etc) * TPS – Toyota Production System

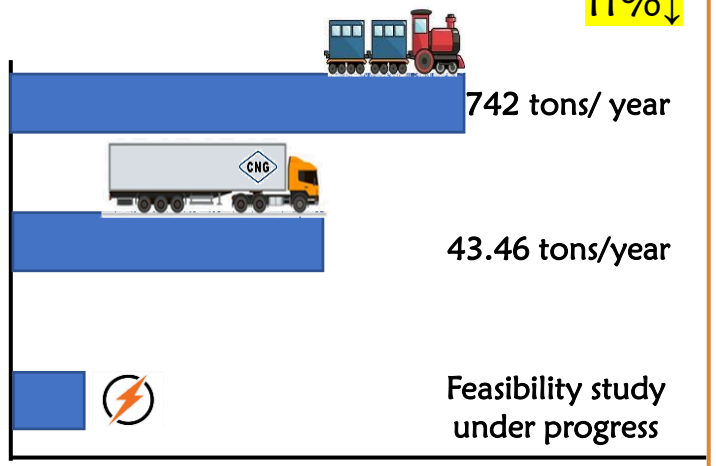
1. Relocation of Supplier – Distance Redn.

14%↓

Benefits:
CO2 : 3064 tons/year

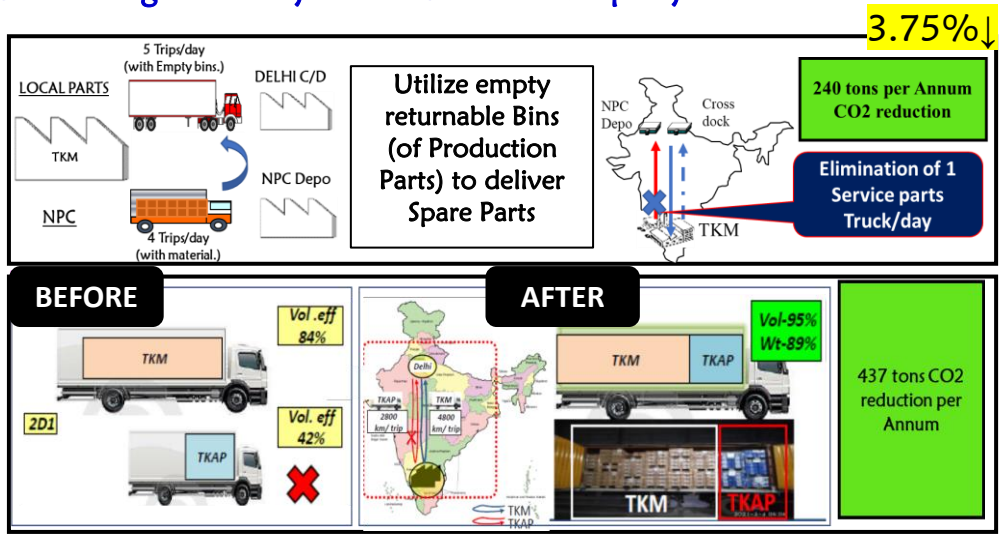
2. Alternative Logistics (Rail, Alternate Fuel)

11%↓

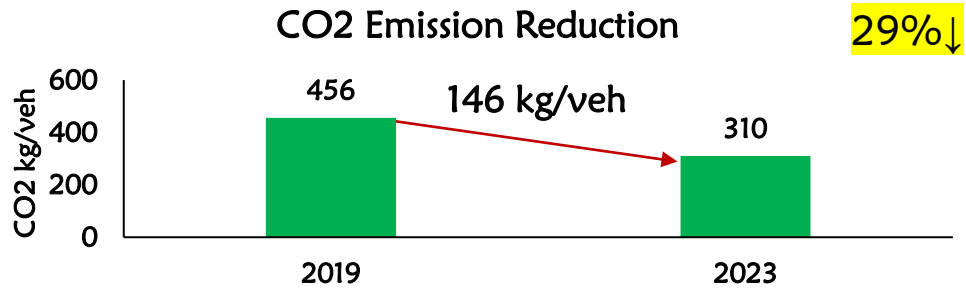


3. Loading Efficiency - Inter & Intra Company Collaboration

3.75%↓



Results



Way forward

Explore new technology adaptions like LNG, Alternate Fuel & EV

Adopting multiple pathway approach towards reducing carbon emission

Challenge No. 3 : Plant Zero CO2

Toyota Environmental Challenge 2050

TKM Journey - ECO Sustainability

Towards **Carbon Neutral**

"Plant ZERO CO2"

7 AFFORDABLE AND CLEAN ENERGY

Goal 7 - Affordable & Clean Energy

Ensure access to affordable, reliable, sustainable, and modern energy for all

India's 2030 Commitment in COP26 :

- Non-Fossil Energy - 500 Gigawatt (GW).
- Renewable Energy Requirement- 50%.
- Carbon Emission Reduction -1 Billion Tons from 2005 Base.

Challenge No.3 : Plant Zero Co2

Toyota Environmental Challenge 2050

STRATEGY

1. SUPPLY
- Towards 100% Renewable energy / Natural Gas

→ ELECTRICITY
- Solar plant installation
- Green power purchase

→ LPG
- Change fuel source to PNG


2. CONVERSION
- Technology adoption

→ Conversion
- Chiller, Compressor
- Heat pump

3. CONSUMPTION
- Energy Efficient Equipment's

→ Consumption
- Karakuri Kaizens
- Energy Efficient Equipment's

→ Lighting / Comforts
- LED
- Smart ACs


Clear Roadmap and approach towards Plant Carbon Neutral

Challenge No.3 Supply – Moving towards Green power

Toyota Environmental Challenge 2050

In-House

Phase 1 : 3.2 MW
TKM Roof Top & Ground Mounted
<2014>

Phase 2 : 5 MW
TKM Roof Top
<2016>

Outside

Phase 3 : 18 MW
Offsite Solar
<2018>

Joint Venture

Phase 4 : Future Demand – 27.2 MW
Offsite (Group Captive - JV)
Solar – 14 MW & Wind – 13.2 MW
<2023>

❶ Electricity :

i. Sustain RE-100 with Group Captive <JV Company>

ii. Yokoten across Value chain - Supplier & Dealer Promotion

- *Achievement : Supplier - ▼ 25%, Dealer - ▼ 15%*
- *Continue Initiatives……*

❷ Gas:

TKM CO_2 Emission will only be due to LPG & PNG.

Action :

Step-1 : Source change Low carbon fuel ▼ 4.02 %,

- *LPG → Natural Gas (Co2e Reduction 27 %)*

Step-2 : Exploring alternative solutions ▼9.98 %,

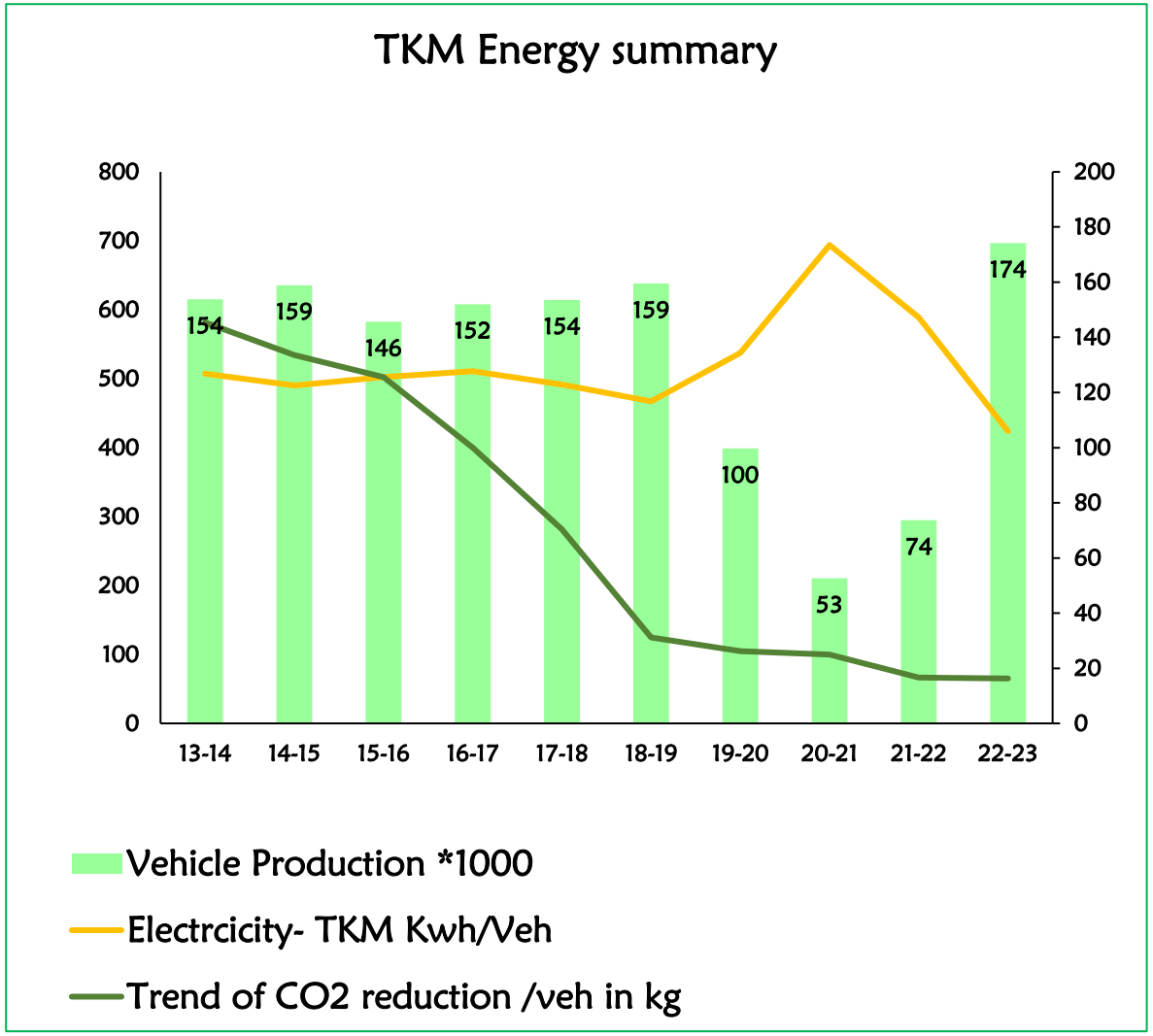
- *Solar Reflector + Heat pump (Co2e Reduction 2.07%)*

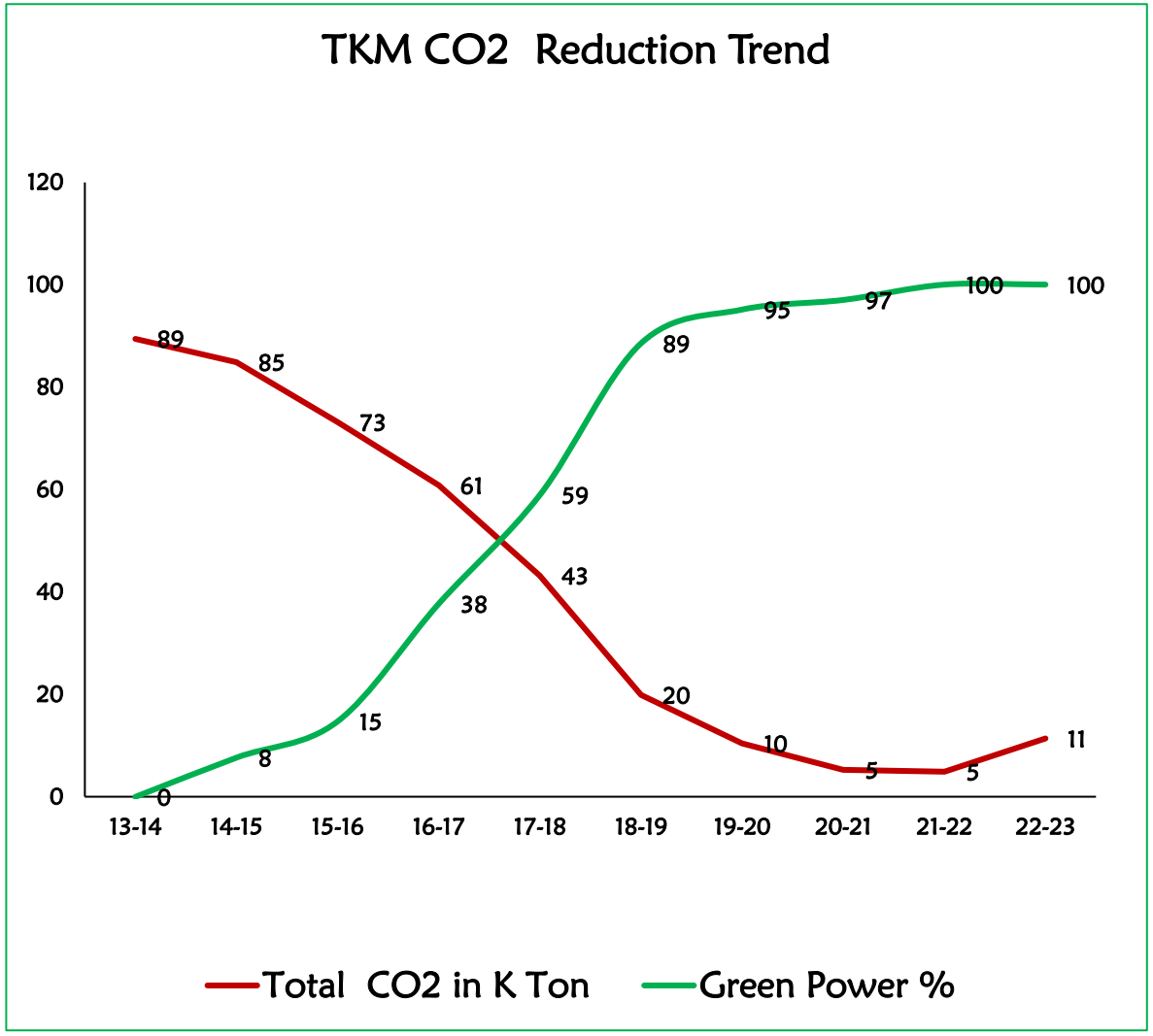
Step-3 : Feasibility for CBG/Hydrogen/Carbon credit policy

Towards Carbon Neutral – Plant Zero CO2 Management

Toyota Environmental Challenge 2050

ENERGY SUMMARY





Cumulative CO2 Reduction – 352,171.16 tons (From 2014 to March 2023)

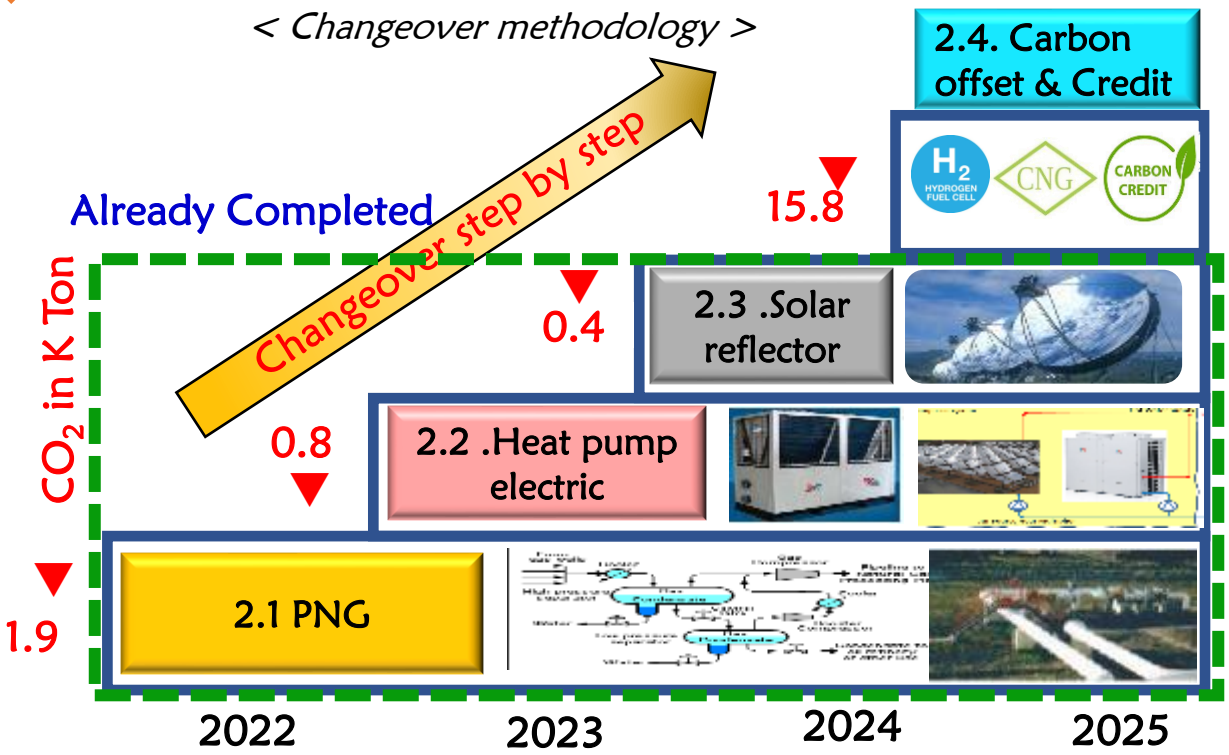
Milestone for Migration <Change to Heat Source> :

Toyota Environmental Challenge 2050

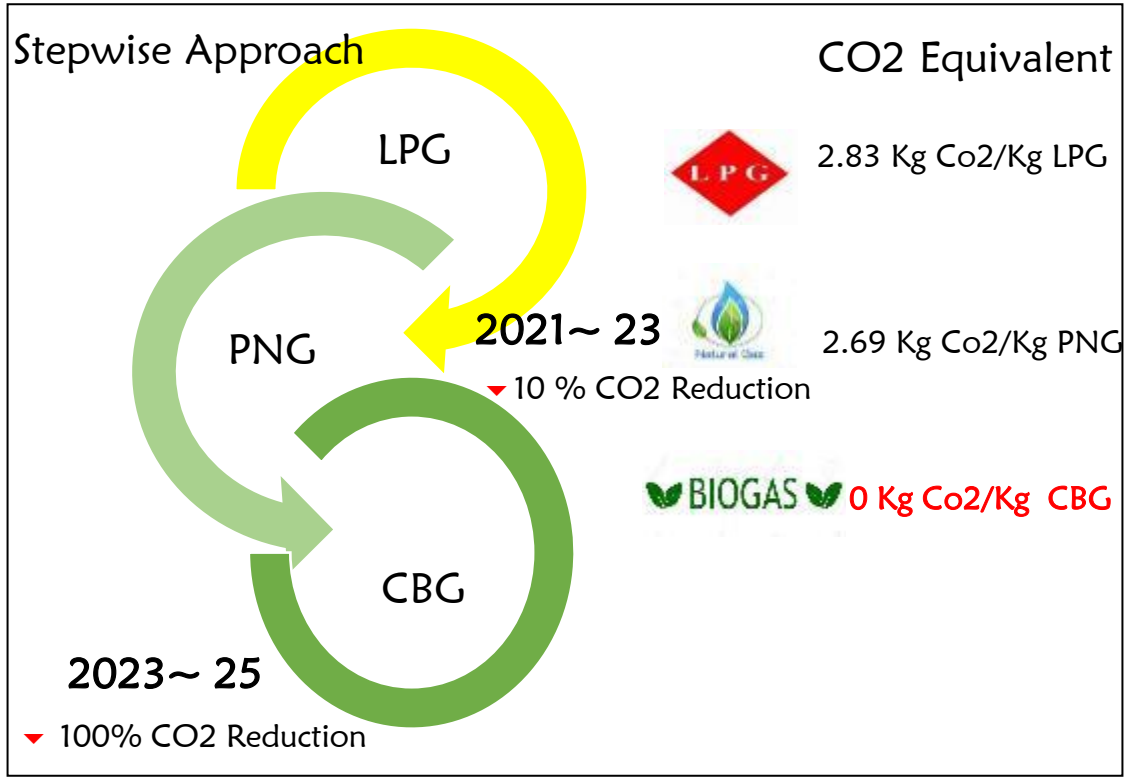
i. Challenges :

- Study for new technology by demonstration project for replacement
- Change source with available technology
- Move to Zero Carbon fuel < CBG .... >

< *Changeover methodology* >



ii. Alternate / Change over : < CBG >



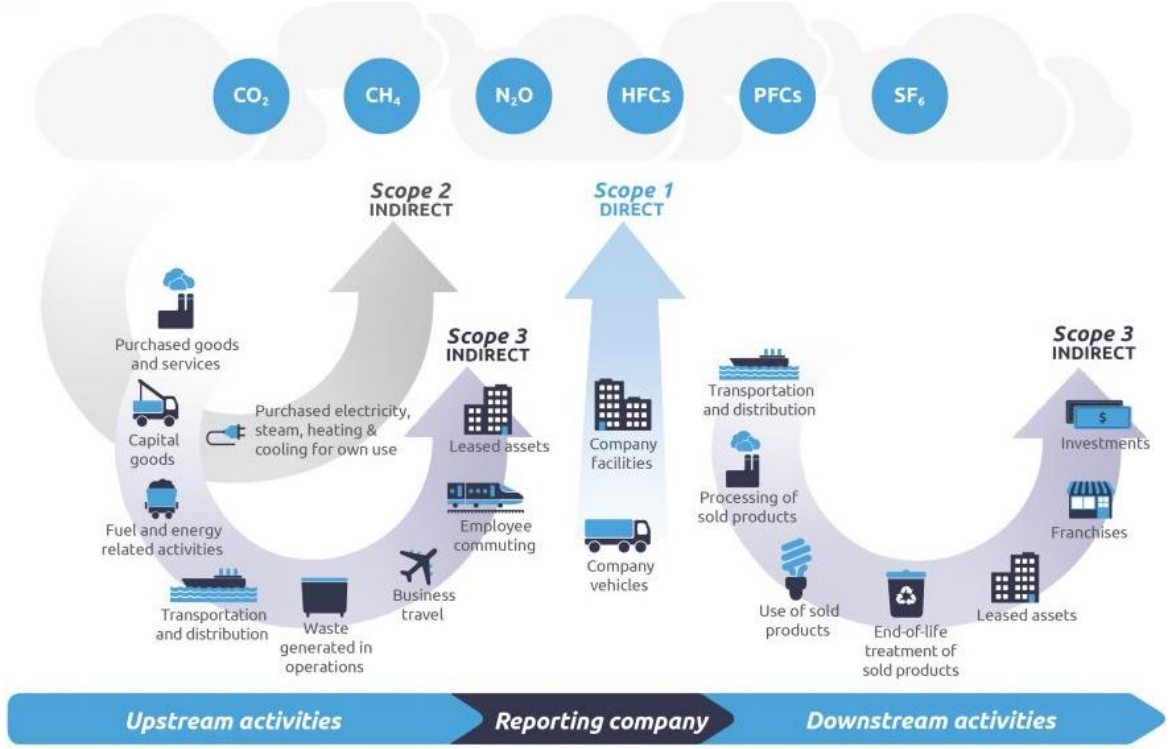
iii. CBG Challenge

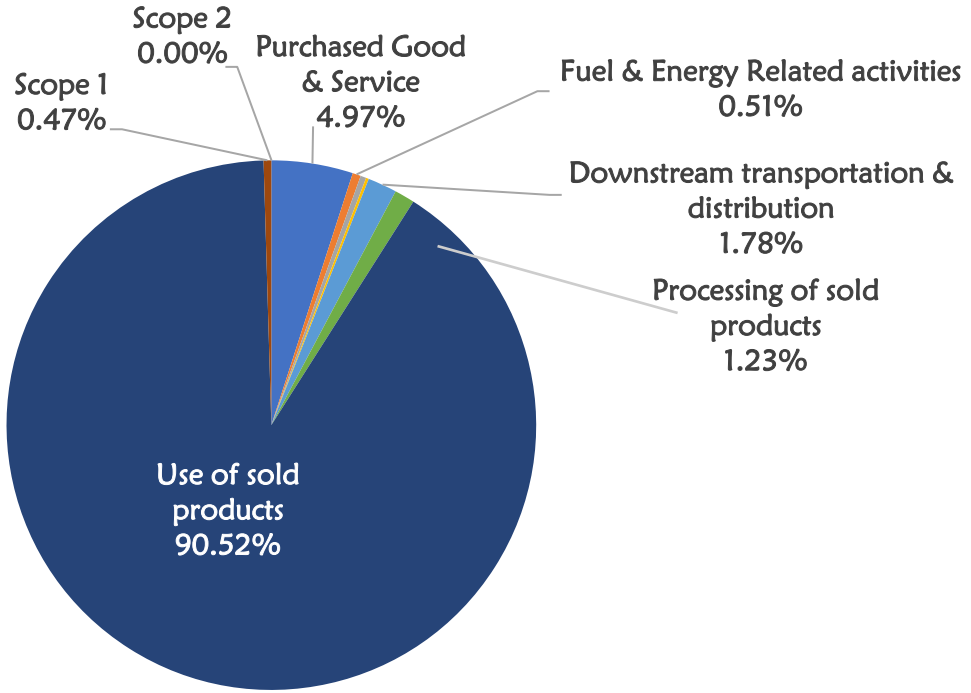
- Availability
- Transportation
- Huge area for set-up
- Storage

TKM committed to achieve Plant Carbon neutrality by Yr. 2035
and Expand activity across Value chain

TKM India - GHG Accounting Progress

Toyota Environmental Challenge 2050





Scope 1:

Direct GHG Emissions: Emissions from sources owned or controlled by the company (LPG/PNG & internal vehicles)

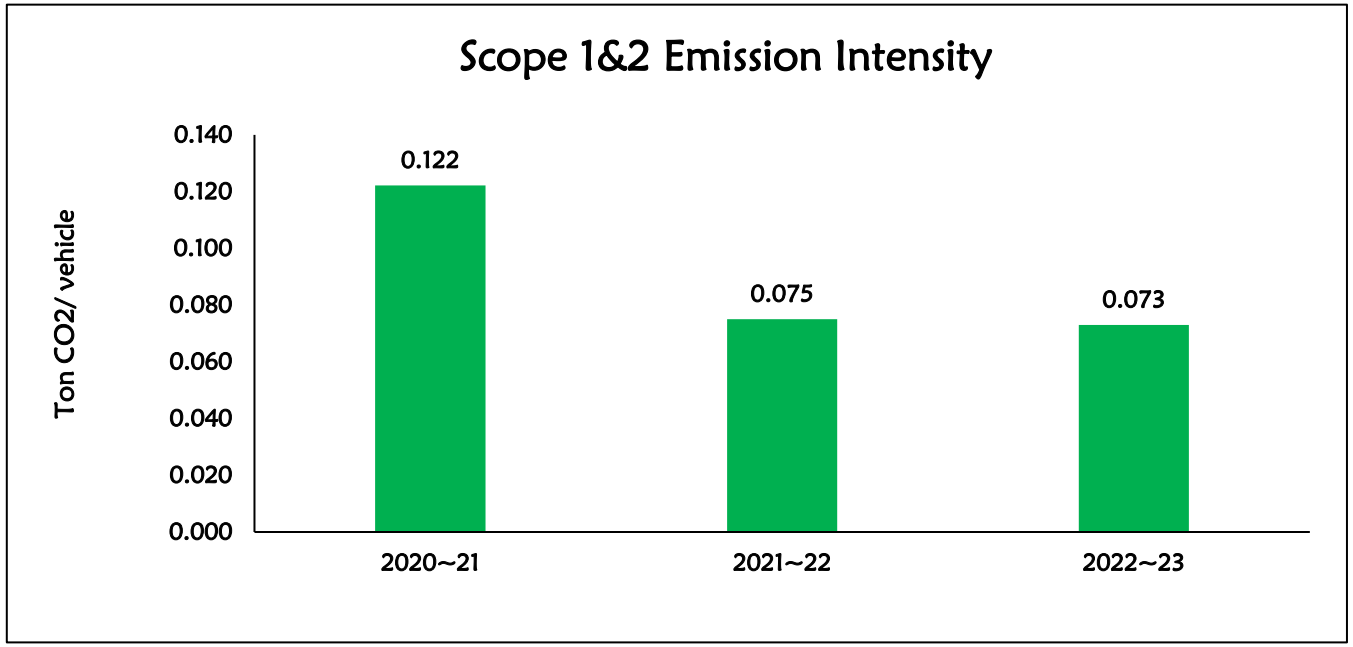
Scope 2 :

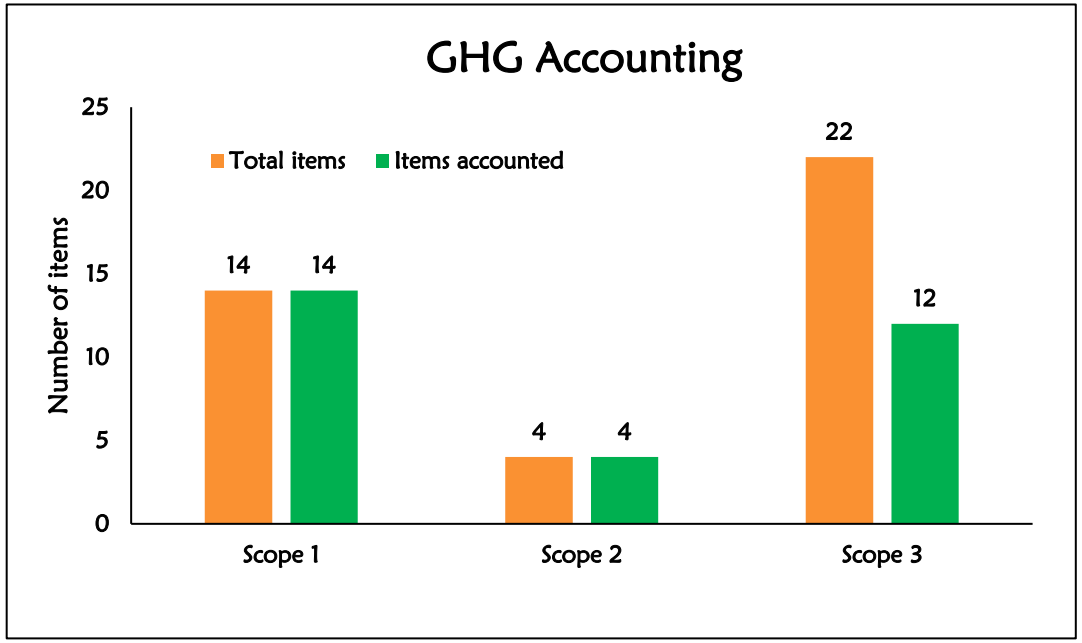
Indirect GHG emissions from purchased electricity & steam.

Scope 3:

Other indirect emissions in value chain : Suppliers, Dealers, Logistics, business travel, use of sold products, Waste generated etc.

TKM India - GHG Accounting Progress





Roadmap

- Not Accounted
- Partially Accounted
- Accounted & validated

2023-24
- Start grasping the data
- Improve grasping mechanism
- Validation & target setting for Scope-1&2

2024-25
- Est. accounting methodology
- Start Accounting
- Achieve Reduction targets

2025-26
- Start Accounting of 100% Scope-3
- Validation & set reduction targets
- Achieve Reduction targets

TKM Journey - ECO Sustainability

Water Management

Minimizing & Optimizing Water Usage

JAL SHAKTI ABHIYAN
Sanchay Jal, Behtar Kal

SUSTAINABLE DEVELOPMENT GOAL 6
Ensure availability and sustainable management of water and sanitation for all

Challenge No.4 : Minimizing & Optimizing Water Usage

Approach towards Mitigating Water Risk

Reduce – Specific Consumption

Kaizen Promotion thru' members involvement

CONTINUE
Specific Water Consumption Reduction Activities

Recycle – (60 ~ 80%)

Advanced technologies (RO & Membrane Bioreactor)

ENHANCE
Recyclability through Technology adoption

Reuse – Rainwater Harvesting Pond (10 ~ 20%)

Rainwater Harvesting Pond (Lines capacity – 25000 m3)

IMPROVE
Storage Capacity Improvement

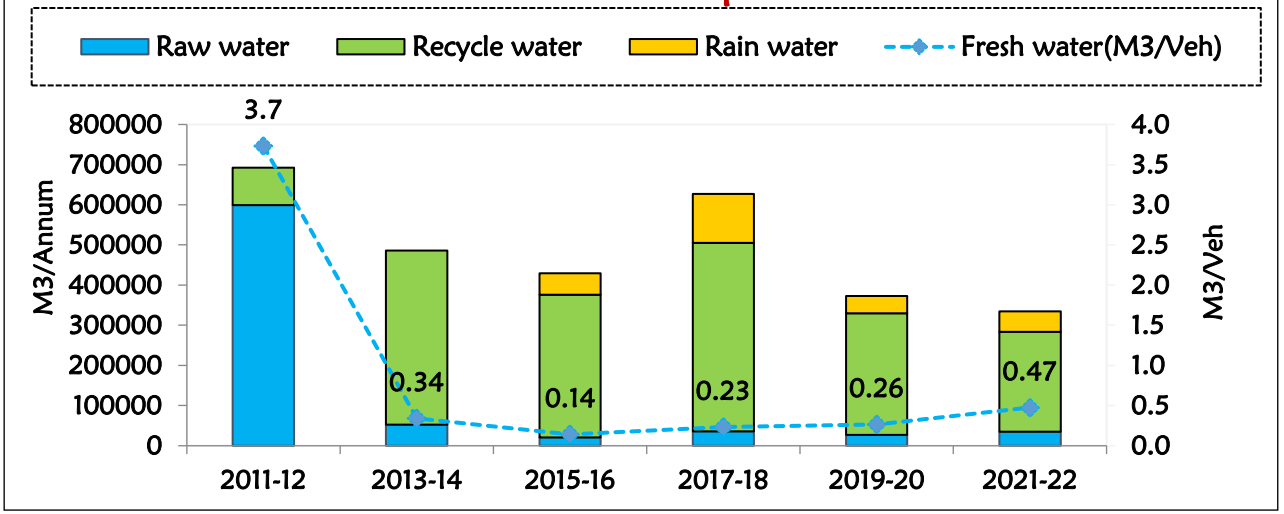
Used for Industrial & Domestic

Collection → Purification → Usage

Process (~ 20%)

Domestic (5~6%) Handwash & Dishwash

Industrial water consumption trend



Groundwater Recharge (Borewell & Pond)

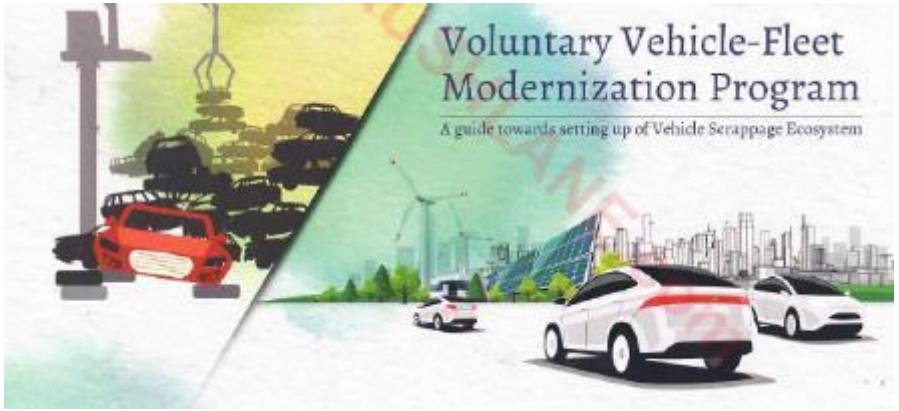
Avg Groundwater level at TKM improved

80ft (2014) --→ 26ft (2022)

Reduced consumption of freshwater by 89% for the year 21-22 for manufacturing.

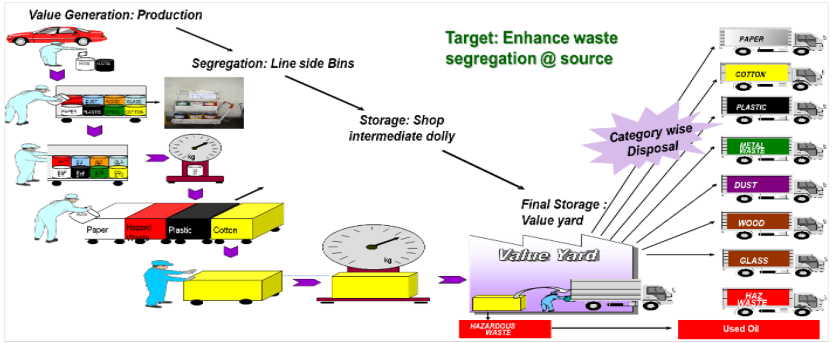
TKM Journey - ECO Sustainability

Waste Management



Challenge No. 5 : Establishing Recycled based Society

TKM Waste Management System ➡Value management System



Category of Waste increased

31 ➡ 59

Enhanced Recyclability of Waste

73% ➡ 96%

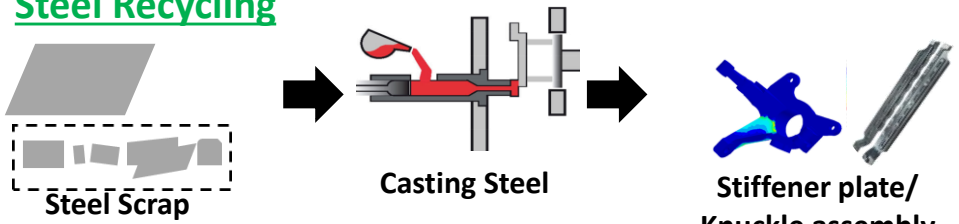
Recycling of Waste thru' Authorized Recyclers

Carton Box | Plastic | Wood waste | Rubber/Tyre Waste

Segregated @ Source ➡ Stored at Centralized Value Yard ➡ Disposed to an authorized recycler ➡ Yearly audits to ensure compliance conditions

Waste Management ➡ Circular Economy

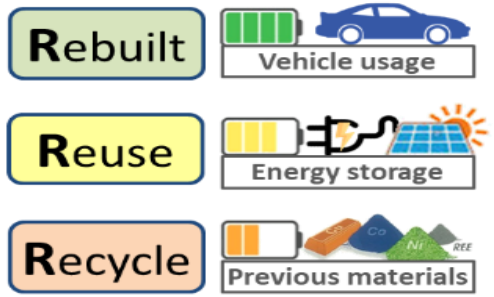
Steel Recycling



Steel Scrap ➡ Casting Steel ➡ Stiffener plate/ Knuckle assembly parts

Hybrid Battery Reusing

Old battery (Li-on, Ni-mh)



Metal Recycling – Under progress

Alloys Scrap ➡ Ingots ➡ Raw mtrl - Engine

96% of waste is recycled & promoting across value chain towards Circular Economy

Recycle based society – End of Life Vehicle

End of Life vehicle Management

a. Background

"End of Life Vehicle" draft guidelines have been released

b. TKM Pilot ELV facility

Exterior parts removal

Body Undock

E/G &TR remove

Recycling details

Total Weight 1596 Kgs

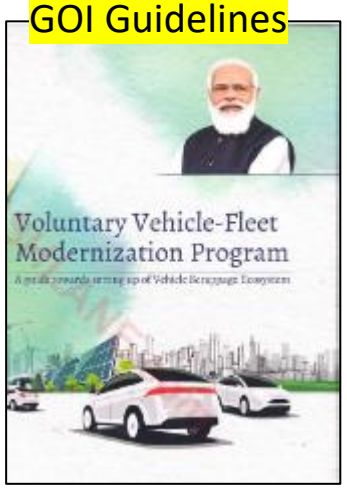
Recycle 1548 Kgs

Incineration 49 Kgs

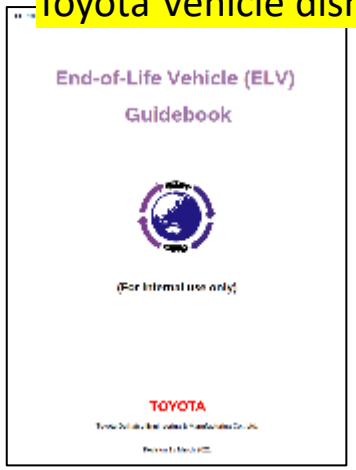
Present Recycling is 96%

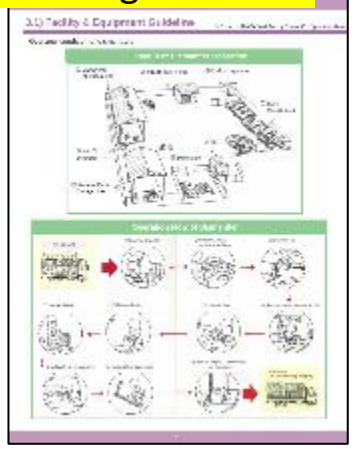
d. Toyota Guidelines on vehicle dismantling

GOI Guidelines



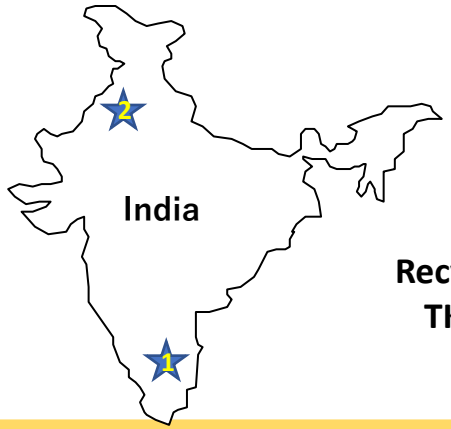
Toyota Vehicle dismantling Guideline





Guidelines on facility setup, dismantling & disposal

e. Inhouse Vehicle Dismantling Facility



Current Recyclability @ TKM is 96%

Joint Venture b/w Toyota Group Company & MSIL*

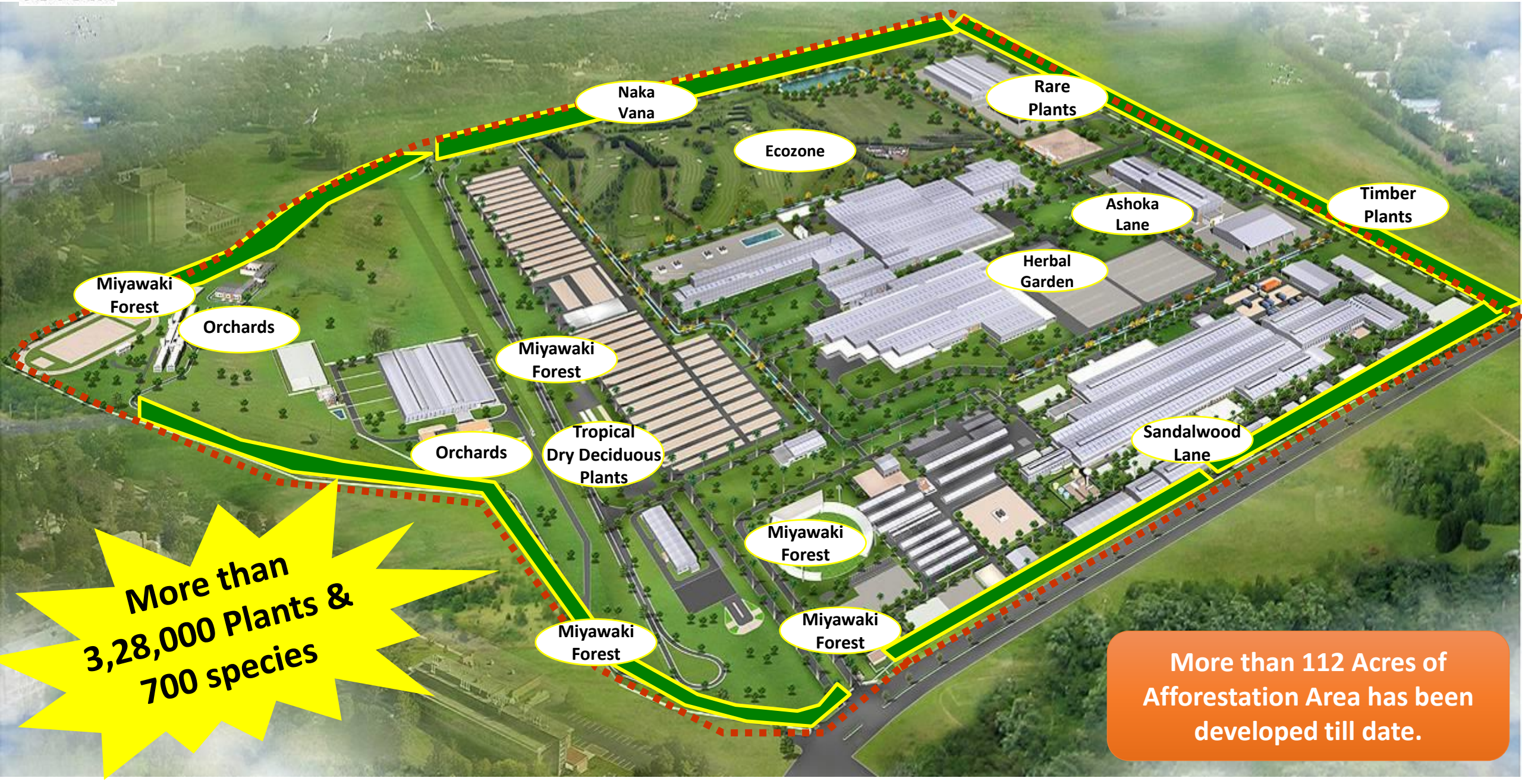
**(Maruti Suzuki India Limited)*

Striving towards CIRCULAR ECONOMY for preserving Natural Resources.

Toyota Environmental Challenge 2050

Other Green Initiatives

Theme-based Afforestation



Green Wave Project : Afforestation growth Monitoring

Afforestation growth Monitoring

Outcomes of Afforestation

CO2 sequestered through Miyawaki Plantation Method	31 tons/ acre
CO2 sequestered through Conventional Pit Method	8.5 tons/ acre

[Source: Bangalore University Survey @TKM]

Approx. 4700 tons of CO2 Emission sequestered (Cum. FY 2009 to FY 2020)

2. Today for Tomorrow

Promote Conservation Initiatives for Society

Pre-Condition:

- Garbage Dump
- Wastewater flowing from surrounding communities – Sullage
- Silt deposition

Post Rejuvenation:

- 3.4 Acres
- Natural wastewater cleaning wetland
- Idol immersion area
- Joggers Path
- Children Play Area

FY21-22 Activities:

- Lake Electrification & Landscape Development
- Consensus building with Town Municipal Council Bidadi for Lake Handover

Beneficiaries:

6 Villages with a population of 8,000 Nos

(Abbankuppe, Bananduru, Ittamadu, Jogaradoddi, Byramanadoddi, Medanahalli)

Lake Handed Over to Town Municipal Council, Bidadi on 9th March 2022

Chief Guest: Shri. A. Manjunath, Hon' MLA Magadi Constituency, Bidadi.

Corporate Social Responsibility

Vision

"To be a socially committed organization, engaged at building vibrant communities in harmony with nature, aiming to become the most admired company in India, and meet customer expectations and be rewarded with smile"

CSR Approach

a. **Child to Community:** Behavioral change program in all CSR intervention

b. **Building resilient Community:** Develop Social Assets & Community Ownership

c. **Collaborative CSR:** Collaboration with Government, Industries Association & other stakeholders for better reach

Focus Area

CARE **Employee Volunteerism Program**

CSR contributes to 8 SDGs

1. Education

1.1 School Infra Development

- 12 schools Completed
- 2,349 children benefitted
- 2 schools under construction
- 1 college under renovation

1.2 School Stationaries distribution

- 280 schools & 16,500+ children benefitted
- FY 2023-24- Notebooks, Bags & other stationary items to Govt schools

1.3 Toyota Anganwadi Development Programme (TADP)

- Pre school intervention
- 30 Model Anganwadi centers
- 835 Students benefitted
- FY 2023-24- 150 centers

1.4 Model school

- Focus on Quality Education
- Digital teaching introduced
- 90 students benefitted

1.5 Social Academy of Learning by Toyota -SALT

- Capacity building of NGOs
- 29 NGO's Trained

2. Road Safety

Toyota Safety Education Programme [TSEP]

Awareness to school children on Road safety etiquettes
< 8 lakhs students & 7 Model schools >

3.Environment

Ecozone

25 Acres (17 theme parks)
37,643 Members Trained

Lake rejuvenation

<8000 members in 6 villages benefitted>

4. Skill Development

Technical Education & Skill Promotion - TESP

< 11 GTTC & 25 ITI's- 1200+ students benefited >

5.Health & Hygiene

5.1 Health Infrastructure

- Modernization of Health centers
- 2 hospitals constructed
- 1.2 lakhs members benefitted

5.2 Project Shaale Arogya

- Health & Vision checkup for students
- 332 schools & 26,005 children
- FY 2023-24 plan to cover 10,000+ Students

5.3 Water Units

- Pure Drinking water for villagers
- 48 units installed till now
- 297 villages & 3.32 lakhs members
- FY 2023-24- 15,000+ Community members

5.4 A Behavioral Change Demonstration [ABCD]

- Sanitation Behavior change Program
- 58,974 students & 1,004 schools
- 13,518 household units constructed
- FY 2023-24- 350 schools & 30,000+ students

Employee Volunteerism

- 27 + Events
- 500+ Volunteers
- 63000+ Lives touched

OVER-ALL IMPACT : 2 Million lives +

First Toyota Case study published from India

IVEY Publishing

HARVARD BUSINESS SCHOOL

Employee Engagement

Employee engagement towards Environment initiatives

Toyota Environmental Challenge 2050

APPROACH

LEARN

Develop Eco Spirit through trainings

PERFORM

Implement learning through kaizen activities

DRIVE

Extend the learning to community and promote Toyota Eco Spirit

Plantation with local community

Cleanup drives @ community

Engaging community

Lake clean up drives

Involvement of employees in various environment activities

TKM Best practices sharing & Members Involvement

Toyota Environmental Challenge 2050

SIAM 14th Lecture

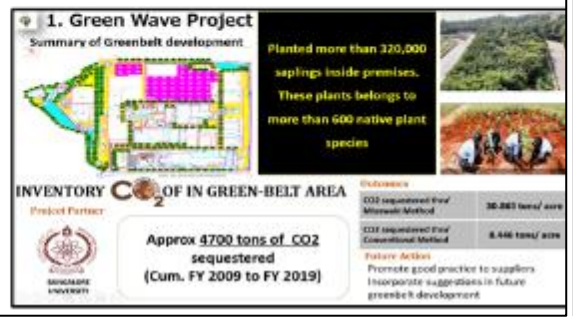
Theme – TKM Journey to Sustainability

Keynote Address by Vice Chairman - TKM

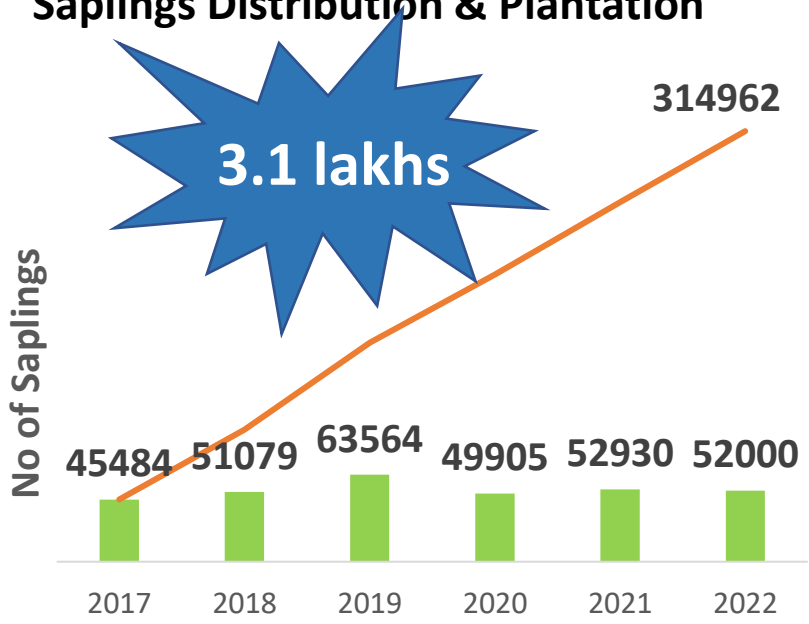
TKM Journey presented by DMD - TKM

CII/ KSPCB EVENT

Theme – TKM Biodiversity Mgmt.



Saplings Distribution & Plantation



Promotion of Toyota initiatives among External stakeholders & our Value Chain

Saplings Distributed to Team members & Family members (as a TKM ECO ambassadors) to plant & Nurture at Society

Thank You

Please do visit Ecozone

Website : https://www.toyotabharat.com/toyota-in-india/environment

email : ***toyotaecozone@toyota-kirloskar.co.in***