



FIAT CHRYSLER AUTOMOBILES

Grand Challenges Scholar Program (GCSP) – UFMG 2019

“The Value of GCSP to Employers”

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Vehicle Safety & Regulatory Compliance

Belo Horizonte/MG, Brasil

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AUTO INDUSTRY CHALLENGES

ALTERNATIVE PROPULSION

SAFETY REGULATION

ENERGY EFFICIENCY

AUTONOMOUS

CONNECTIVITY

SCALE ECONOMY

NEW BUSINESS MODELS

EXPENSIVE ENTRY LEVEL CARS

GLOBAL BRANDS COOPERATION

FCA

FIAT CHRYSLER AUTOMOBILES



STUDENTS



MULTIDISCIPLINARITY
skills



CRITICAL THINKING



WIDE VIEW
of science



ENTREPRENEURSHIP
view

FCA

FIAT CHRYSLER AUTOMOBILES



EDUCATION



PARTNERSHIP

University-Company



focus on universities

VOCATIONS and **SKILLS**



APPLIED KNOWLEDGE

to humanity needs



REAL CHALLENGES

overcoming

FCA

FIAT CHRYSLER AUTOMOBILES

UNIVERSITY-COMPANY PARTNERSHIP



RD&I projects



Professional
training



FCA

FIAT CHRYSLER AUTOMOBILES

U F *m* G



PUC Minas

USP



POLITECNICO
DI TORINO



THE OHIO STATE
UNIVERSITY

CENTER FOR
AUTOMOTIVE RESEARCH

UNIVERSITY-COMPANY PARTNERSHIP



RD&I projects

3D Matrix Methodology

Projects - Identify internal demands (technological gaps & problems solution)

Partners – Identify Universities and Science & Technology Institutes to run projects

Funding - Identify Funding or Public Tax Incentives

- Ex.: - **SIM Center** in partnership with **PUC-Minas** using **INOVAR-Auto** incentive
- **Hybrid Plug-in Vehicle multi fuel including Ethanol** in partnership with **UFMG** and **PUC-Minas** to attend **ANEEL/CEMIG** notice

Develop University training program for specific FCA demands

Employee
Community



Professional
training

- Ex.: - **Technological Residency** master's degree program to **community** (UFMG, PUC-Minas, UFU, USP)
- **Master's degree to employee training** (UFMG, PUC-Minas, UFSC, etc)

Advance Personalized Learning

Make Solar Energy Economical

Enhance Virtual Reality

Reverse-Engineer the Brain

Engineer Better Medicines

Advance Health Informatics

Restore and Improve Urban Infrastructure

Secure Cyberspace

Provide Access to Clean Water

Provide Energy from Fusion

Prevent Nuclear Terror

Manage the Nitrogen Cycle

Develop Carbon Sequestration Methods

Engineer the Tools of Scientific Discovery

14
Goals

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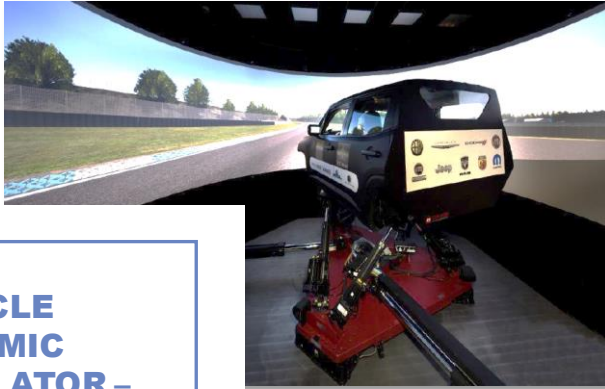
Enhance Virtual Reality

Restore and Improve Urban Infrastructure

Secure Cyberspace

Develop Carbon Sequestration Methods

Enhance Virtual Reality



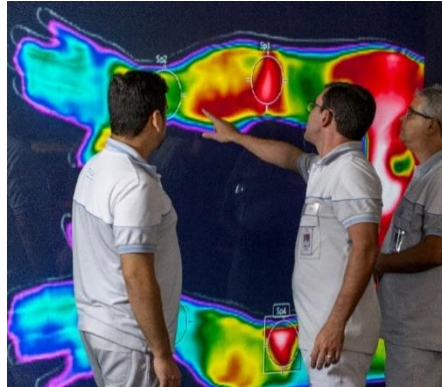
VEHICLE DYNAMIC SIMULATOR – SIM CENTER

Partnership between
FCA and PUC-Minas



MANUFACTURING

Study **better solutions** for
manufacturing process



ENVIRONMENTAL HEALTH AND SAFETY

Care for
employee
health



LATAM DESIGN CENTER

Design
internationally
awarded

Enhance Virtual Reality

Restore and Improve Urban Infrastructure

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Develop Carbon Sequestration Methods

Restore and Improve Urban Infrastructure



Technologies of Pavement
(influence in fuel consumption)



Roads signs compatible
w/ ADAS technologies



Roads planned accord
the fleet growing



Solar Roads
(Photovoltaic Panels in pavement
to Recharge EV and PHEV)



Recharge Stations
for EV and PHEV



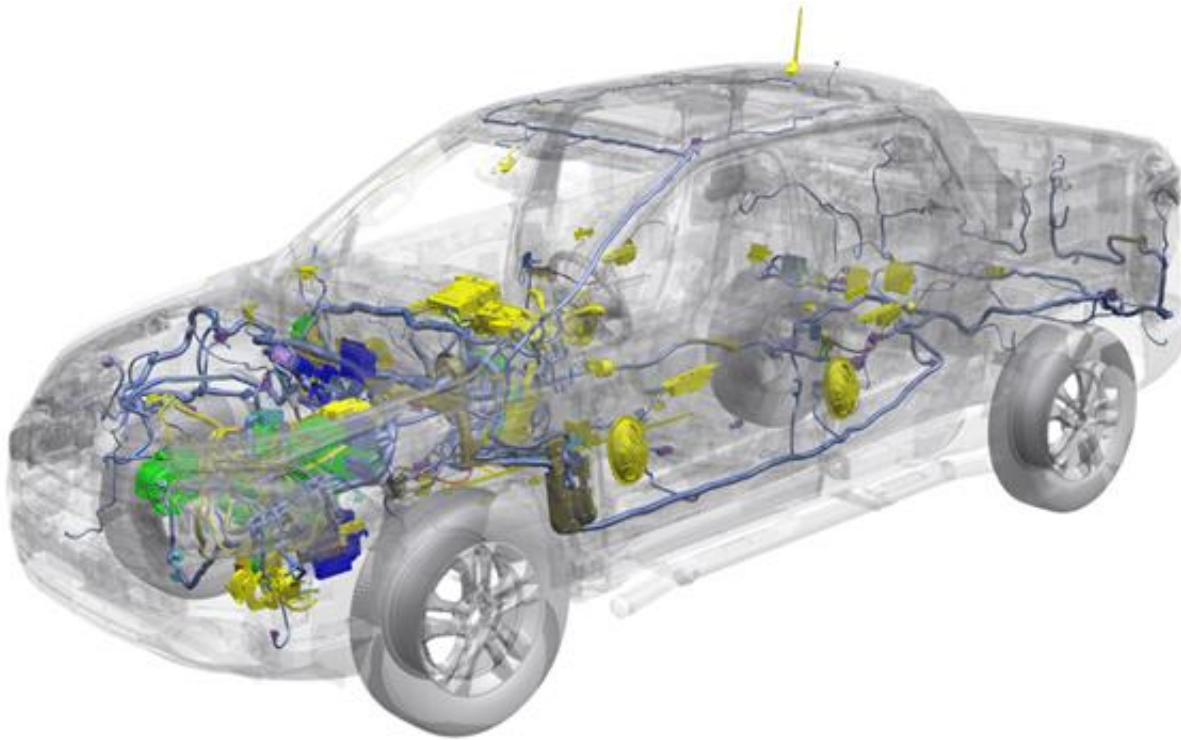
Network Connections
(4G, 5G, WiFi ...)

Enhance Virtual Reality

Restore and Improve Urban Infrastructure

Secure Cyberspace

Develop Carbon Sequestration Methods



+

39

**Electronic Central
Units**

Fiat Toro MY'19

+

297.198

**function technical
requirements**

+

15.000.000

lines of code

Enhance Virtual Reality

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COP – Conference Of Parts

COP 21

- Held in 2015 at Paris
- 92 countries signatory
- Global Warming reduction



COP 22 Morocco COP 23 Germany COP 24 Poland

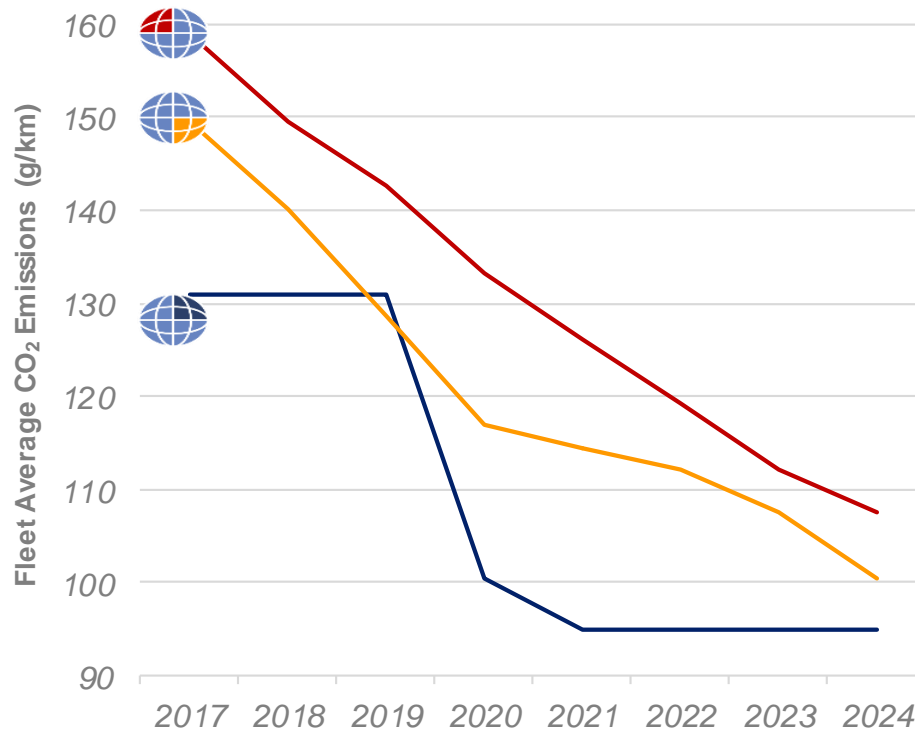
- Ratification of global actions to reduce Global Warming



Brazilian Commitment:

- GHG reduction:
 - 37% until 2025
 - 43% until 2030
- Energy Matrix Improvement:
 - Increase 18% of bioenergy by 2030
 - Increase of Ethanol offer

A High voltage electrification is needed to reach CO₂ compliance in three of the regions; non-compliance results in substantial fines and lack of ability to sell vehicles



USA

- 2018 – 150 g/km
- 2023 – 112 g/km, 25% stringency increase
- Must Comply



China

- 2018 – 140 g/km
- 2023 – 107 g/km, 24% stringency increase
- Must Comply

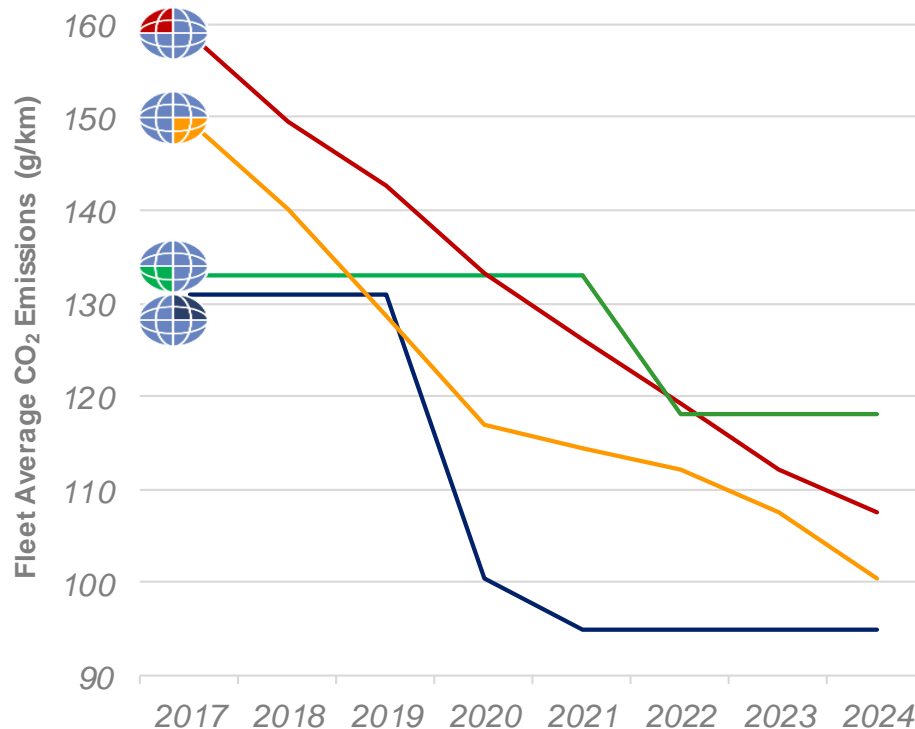


Europe

- 2018 – 131 g/km
- 2023 – 95 g/km, 28% stringency increase
- Substantial fines for fleet if over target

Note: Illustration purposes only, regional compliance is achieved through different drive cycles and credits

INOVAR AUTO and ROTA2030 have set the CO₂ emission targets to Brazil;



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Brazil

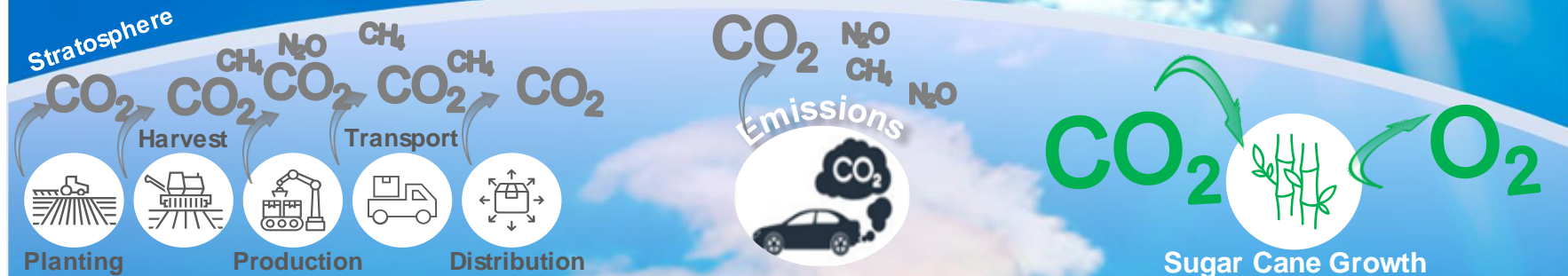
- 2018 – 133 g/km
- 2023 – 118 g/km, 11% stringency increase
- Substantial fines for fleet if over target

Well-To-Wheel Concept – Renewable Fuel

Photosynthesis

Production + Vehicle Use

≈ 70 to 80%



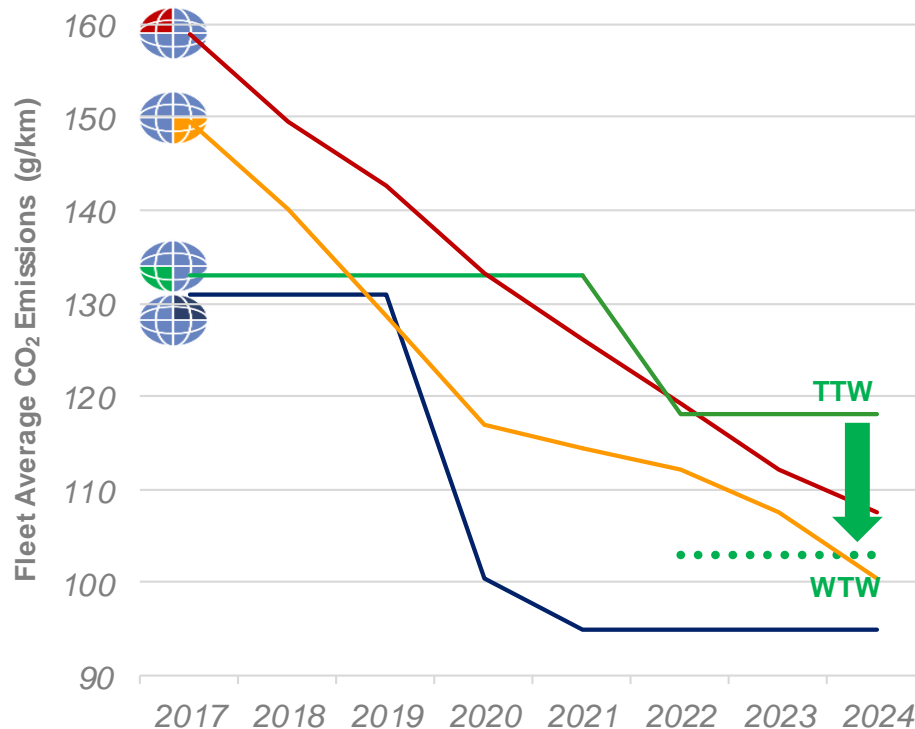
CO_2 Emissions
in fuel PRODUCTION
(Well-To-Tank)

CO_2 Emissions
Fuel USE in vehicle
(Tank-To-Wheel)

CO_2 Absorption in
Photosynthesis

Total CO_2 Emissions “WTW- Well-to-Wheel”

The share of Ethanol use and the renewal based on “Well-to-Wheel” concept leaves Brazil in a competitive position in CO₂ emissions;



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Europa

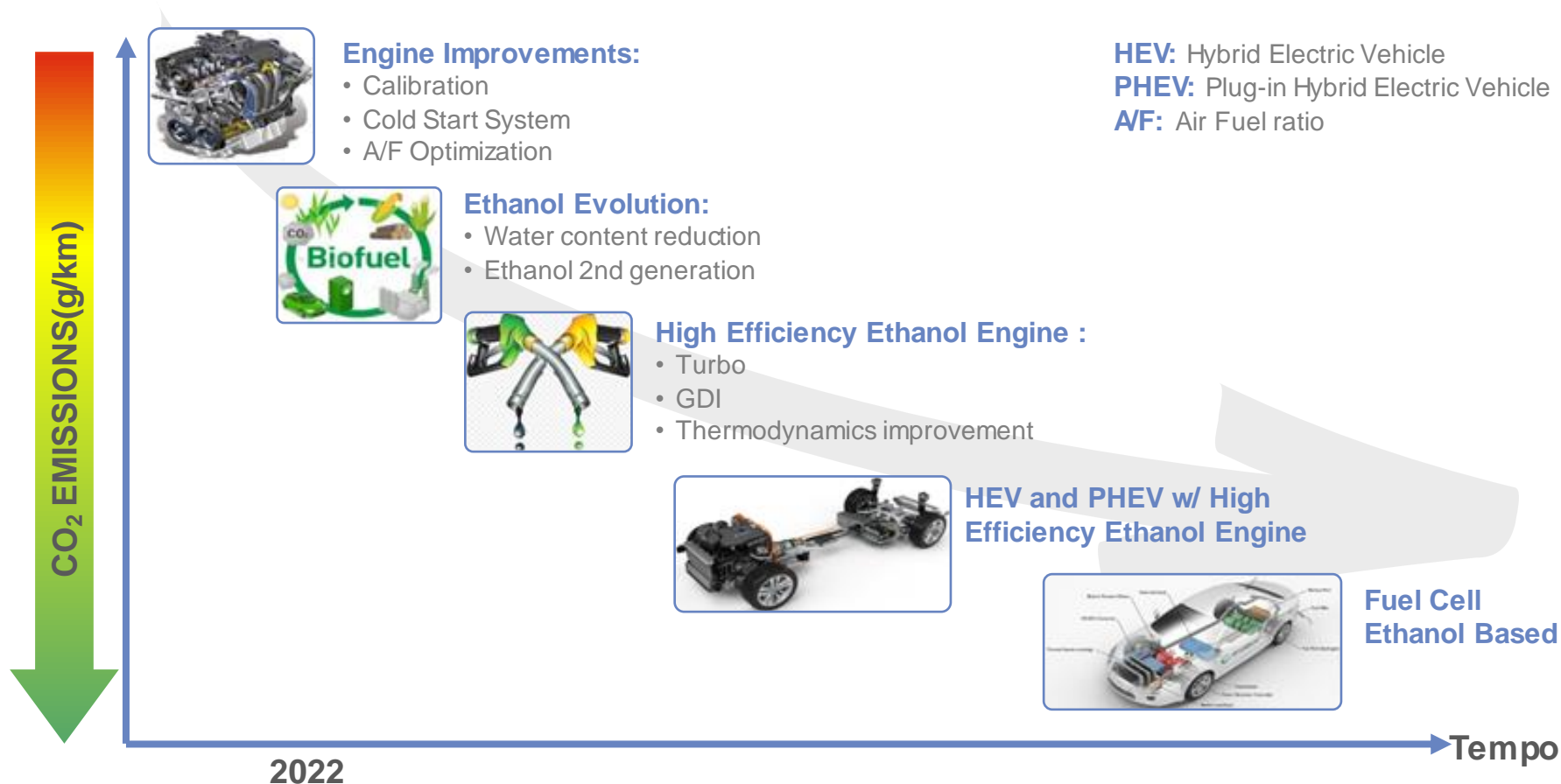
- 2018 – 131 g/km
- 2023 – 95 g/km, 28% stringency increase
- Substantial fines for fleet if over target



Brazil

- 2018 – 133 g/km
- 2023 – 118 g/km, 11% stringency increase
- **2023 – 103g/km (WTW), 23% stringency increase**
- Substantial fines for fleet if over target

Ethanol Technological Route



Thank You!

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