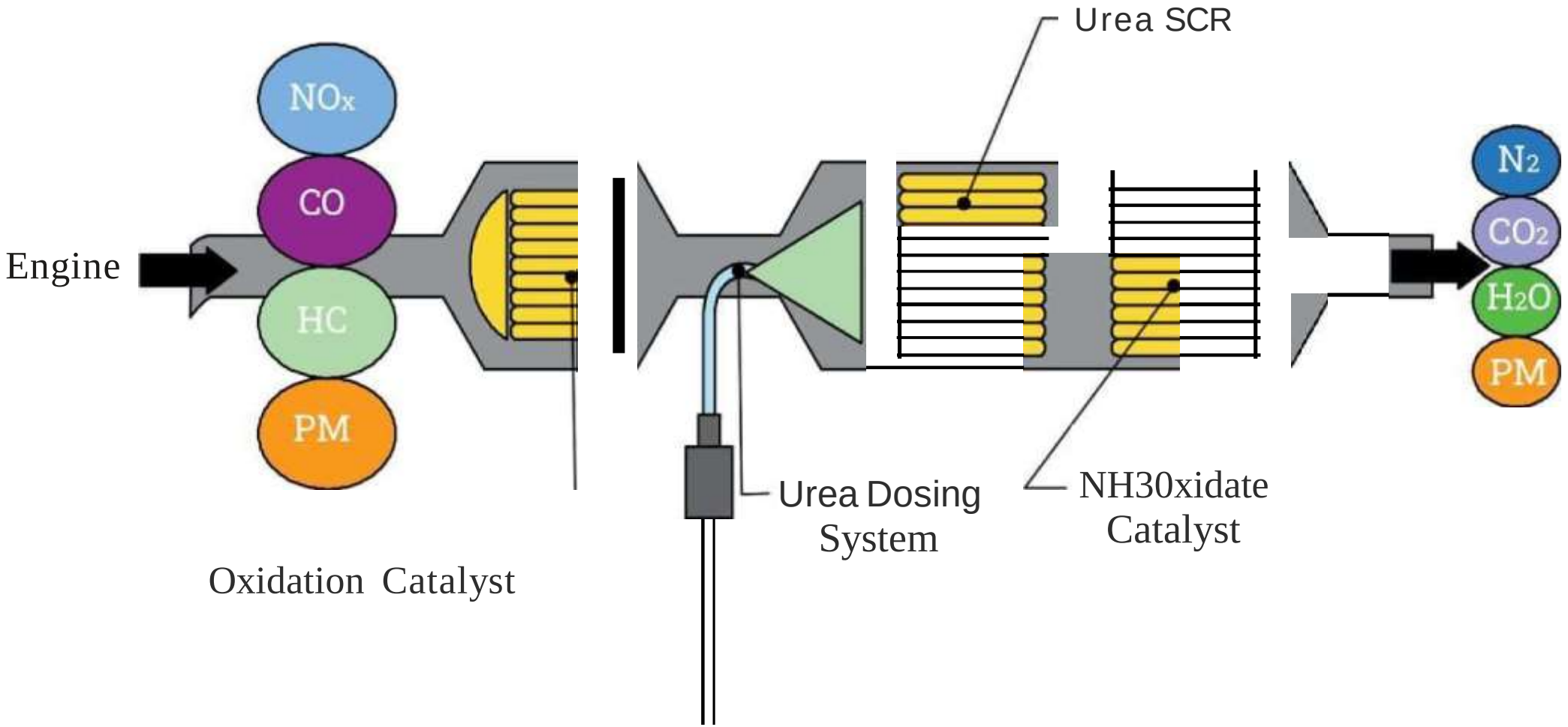
23ME704 : Automobile Engineering

Unit V
Emissions from Automobiles

Mrs. P. Shruthi

Assistant Professor, Mechanical Engineering Narsimha Reddy Engineering College (Autonomous) Secunderabad, Telangana, India- 500100.

Emission Control System



Pollution Control: Automobiles

- Pollution control in automobiles
  - Carbon monoxide and Hydrocarbon emissions- Catalytic converter
  - Nitrogen oxides emissions- Recirculating exhaust gas
- Automobile emission regulations plan in US has not been effective
  - Pollutants may be low when car is new
    - Many people do not maintain them properly
  - Strategies
    - Effluent fees replace emission controls
    - Reduce the number or type of cars

Volkswagen's alleged pollution-hiding cars

US Environmental Protection Agency says VW admitted it had equipped cars with software to cheat emissions tests

Which models?

482,000 diesel-fueled cars in the United States

Jetta (2009 - 2015)
Beetle (2009 - 2015)
Audi A3 (2009 - 2015)
Golf (2009 - 2015)
Passat (2014 - 2015)

Why diesel?

Diesel can be more polluting than gasoline

Pollutants include nitrogen oxides (NOx)

What does the software do?

Detects when a car is undergoing official US emissions testing

Turns full emissions controls for NOx on only during the test

What happens at other times?

Emissions controls are turned off, vehicle emits NOx at up to 40 times standard

What does NOx do?

Linked to increased asthma attacks, other respiratory illnesses and cardiovascular related effects

Source : USEPA/Autonews.com

AFP

Signicent

BIOFUEL TECHNOLOGY

The biofuels are the pressing priority and absolute necessity due to depleting petroleum derived fuels.

CHALLENGES

- Inconsistent microalgae production
- Increased greenhouse gas intensity
- Conversion technology
- Integrated biorefinery Approach
- High production cost

INNOVATION

- Plant breeding strategies
- Genetic modification and synthetic biology
- Introducing chemo and bio-catalyst systems
- Introducing flexible-fuel vehicles (FFV)
- Alternative sources and changing landscapes

SOLUTIONS

- Environment-Friendly Biodiesel
- Using Emulsion technology
- Micro-reaction transesterification

MARKET TRENDS

$230.5B
(2025)
Market size (USD)

6.9 CAGR
(2020-2025)
Global Market

KEY PLAYERS

cosan · Green Plains · ABENGOA · NESTE · Bluefire

Download

www.signicent.com

Biodiesel production process from non-edible oilseeds

Collecting seeds from trees.

Transporting seeds to extraction centers

Processing oil in Transesterification

Biodiesel ready for fuel consumption

By-products - oil cakes and glycerine

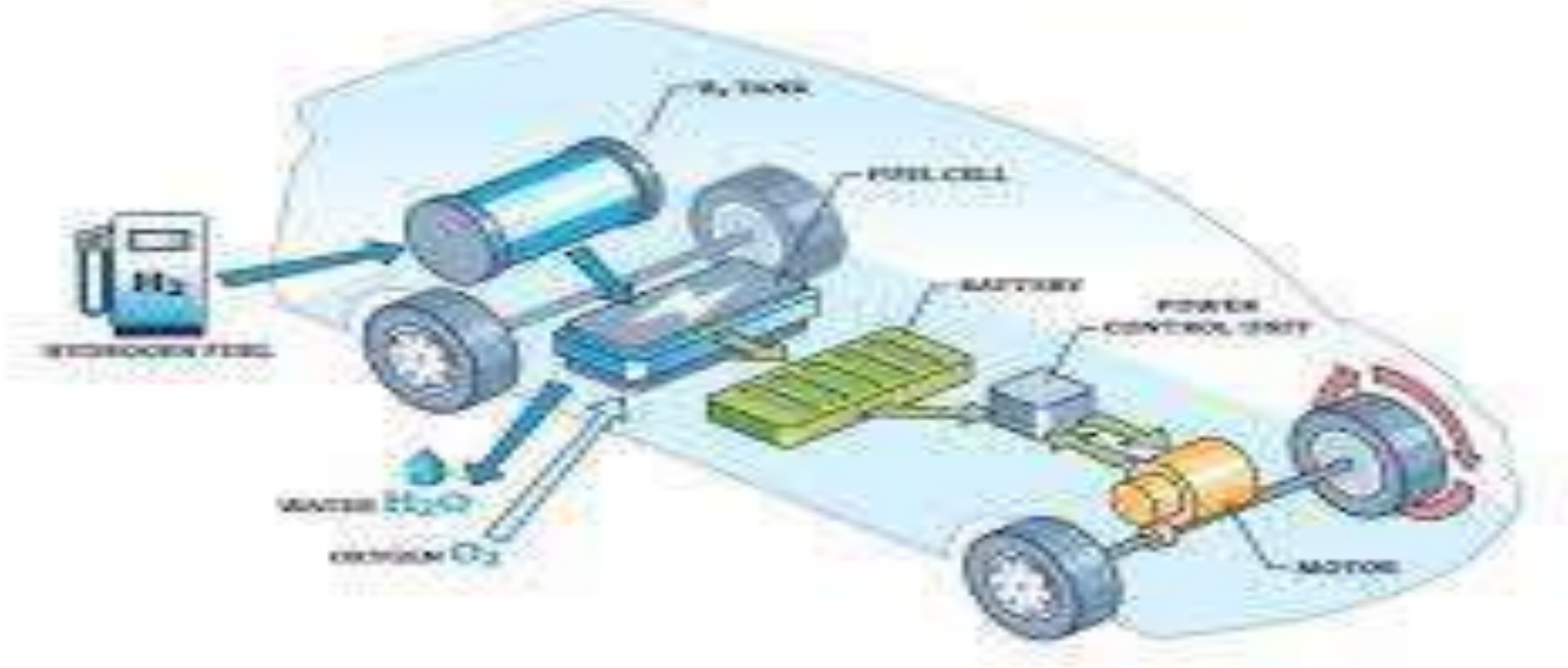
Ethanol

What it is: It's a cheap non-petroleum based fuel. As with methanol, E-85 is the primary ethanol alternative fuel. The use of ethanol in vehicles is not a new innovation. In the 1880s, Henry Ford built one of his first automobiles to run on ethanol.

How is it produced: It can be produced by fermentation of vegetables and plant materials. In India, its main source is molasses - a byproduct of sugarc ane. Its done in three stages

1. Extra ction of juice from sugarcane
2. Fermentation of the juice
3. Distillation

HYDROGEN CAR



Advantages of Hydrogen Fuel Cell Cars:

Zero-Emission:

FCEVs produce no harmful tailpipe emissions, contributing to cleaner air and reduced greenhouse gas emissions.

Fast Refueling:

Refueling an FCEV with hydrogen takes a similar amount of time as refueling a gasoline car, typically around 5 minutes.

Long Range:

FCEVs can achieve a longer driving range compared to many battery-electric vehicles

Challenges of Hydrogen Fuel Cell Cars:

Infrastructure: The availability of hydrogen refueling stations is limited compared to gasoline stations and charging stations for electric vehicles.

Hydrogen Production and Storage: The production and storage of hydrogen can be energy-intensive and costly

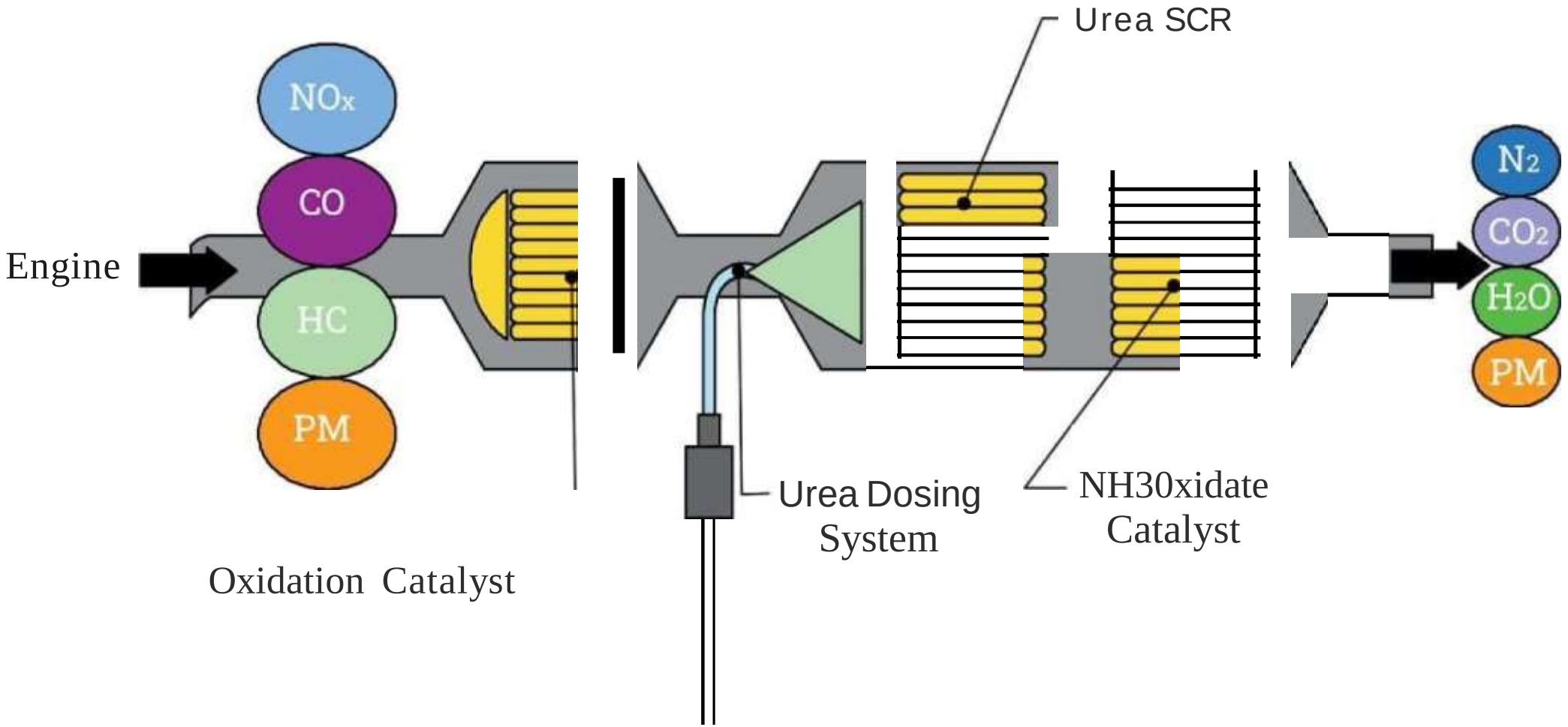
23ME704 : Automobile Engineering

Topic: unit 5 alternate fuels pollution control methods

Mrs. P. Shruthi

Assistant Professor, Mechanical Engineering
Narsimha Reddy Engineering College (Autonomous)
Secunderabad, Telangana, India- 500100.

Emission Control System



Pollution Control: Automobiles

- Pollution control in automobiles
  - Carbon monoxide and Hydrocarbon emissions- Catalytic converter
  - Nitrogen oxides emissions- Recirculating exhaust gas
- Automobile emission regulations plan in US has not been effective
  - Pollutants may be low when car is new
    - Many people do not maintain them properly
  - Strategies
    - Effluent fees replace emission controls
    - Reduce the number or type of cars

Volkswagen's alleged pollution-hiding cars

US Environmental Protection Agency says VW admitted it had equipped cars with software to cheat emissions tests

Which models?

482,000 diesel-fueled cars in the United States

Jetta (2009 - 2015)
Beetle (2009 - 2015)
Audi A3 (2009 - 2015)
Golf (2009 - 2015)
Passat (2014 - 2015)

Why diesel?

Diesel can be more polluting than gasoline

Pollutants include nitrogen oxides (NOx)

What does the software do?

Detects when a car is undergoing official US emissions testing

Turns full emissions controls for NOx on only during the test

What happens at other times?

Emissions controls are turned off, vehicle emits NOx at up to 40 times standard

What does NOx do?

Linked to increased asthma attacks, other respiratory illnesses and cardiovascular related effects

Source : USEPA/Autonews.com

AFP

Signicent

BIOFUEL TECHNOLOGY

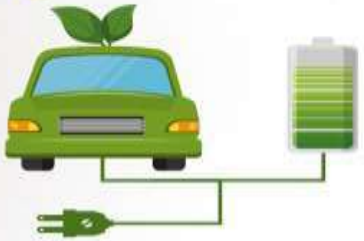
The biofuels are the pressing priority and absolute necessity due to depleting petroleum derived fuels.

CHALLENGES

- Inconsistent microalgae production
- Increased greenhouse gas intensity
- Conversion technology
- Integrated biorefinery Approach
- High production cost

INNOVATION

- Plant breeding strategies
- Genetic modification and synthetic biology
- Introducing chemo and bio-catalyst systems
- Introducing flexible-fuel vehicles (FFV)
- Alternative sources and changing landscapes



SOLUTIONS

- Environment-Friendly Biodiesel
- Using Emulsion technology
- Micro-reaction transesterification

MARKET TRENDS

$230.5B
(2025)
Market size (USD)

6.9 CAGR
(2020-2025)
Global Market

cosan · Green Plains · ABENGOA · NESTE · Bluefire

KEY PLAYERS

Download

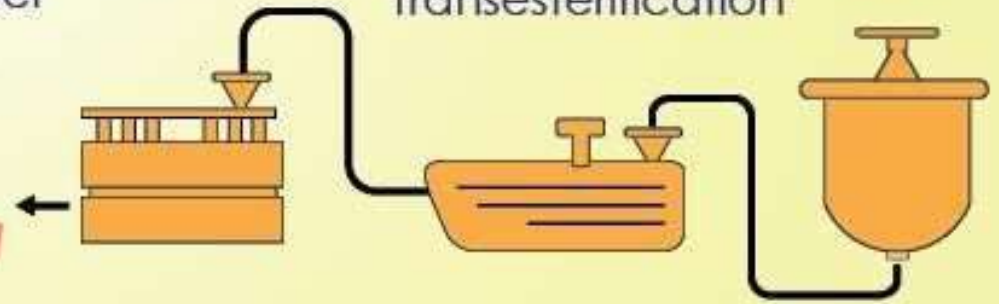
www.signicent.com

Biodiesel production process from non-edible oilseeds

Collecting seeds from trees.

Transporting seeds to extraction centers

Processing oil in Transesterification



Biodiesel ready for fuel consumption

By-products - oil cakes and glycerine

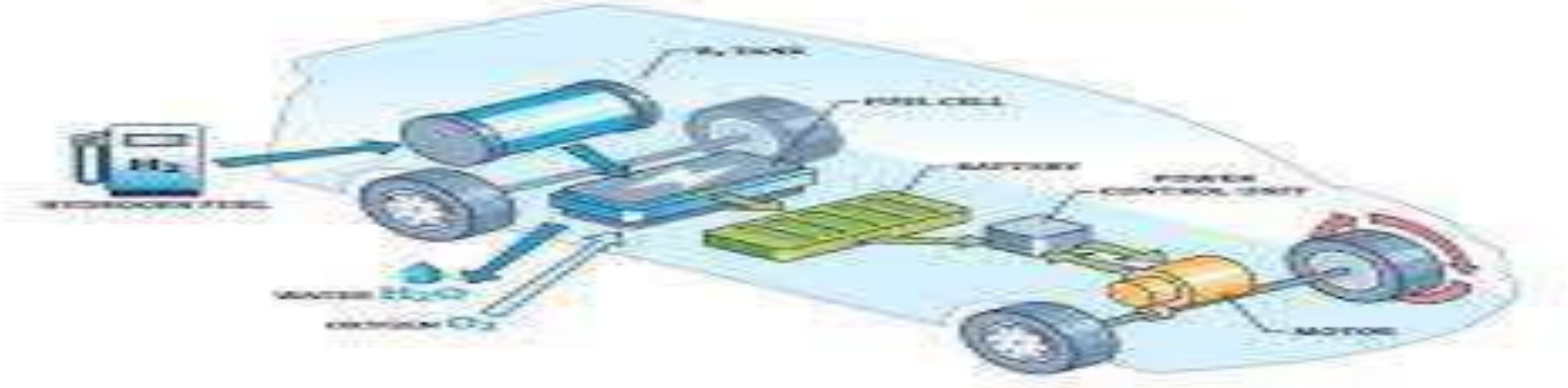
Ethanol

***What it is*:** It's a cheap non-petroleum based fuel. As with methanol, E-85 is the primary ethanol alternative fuel. The use of ethanol in vehicles is not a new innovation. In the 1880s, Henry Ford built one of his first automobiles to run on ethanol.

***How is it produced*:** It can be produced by fermentation of vegetables and plant materials. In India, its main source is molasses - a byproduct of sugarc ane. Its done in three stages

1. Extra ction of juice from sugarcane
2. Fermentation of the juice
3. Distillation

HYDROGEN CAR



Advantages of Hydrogen Fuel Cell Cars:

Zero-Emission:

FCEVs produce no harmful tailpipe emissions, contributing to cleaner air and reduced greenhouse gas emissions.

Fast Refueling:

Refueling an FCEV with hydrogen takes a similar amount of time as refueling a gasoline car, typically around 5 minutes.

Long Range:

FCEVs can achieve a longer driving range compared to many battery-electric vehicles

Challenges of Hydrogen Fuel Cell Cars:

Infrastructure: The availability of hydrogen refueling stations is limited compared to gasoline stations and charging stations for electric vehicles.

Hydrogen Production and Storage: The production and storage of hydrogen can be energy-intensive and costly