

DEDICATED TO MAKING A DIFFERENCE

# Mobility 2030

Meeting the challenges to sustainability



Ewald Breunese  
Shell Nederland  
FIA-ADAC Conference  
Brussels, 5<sup>th</sup> April 2005



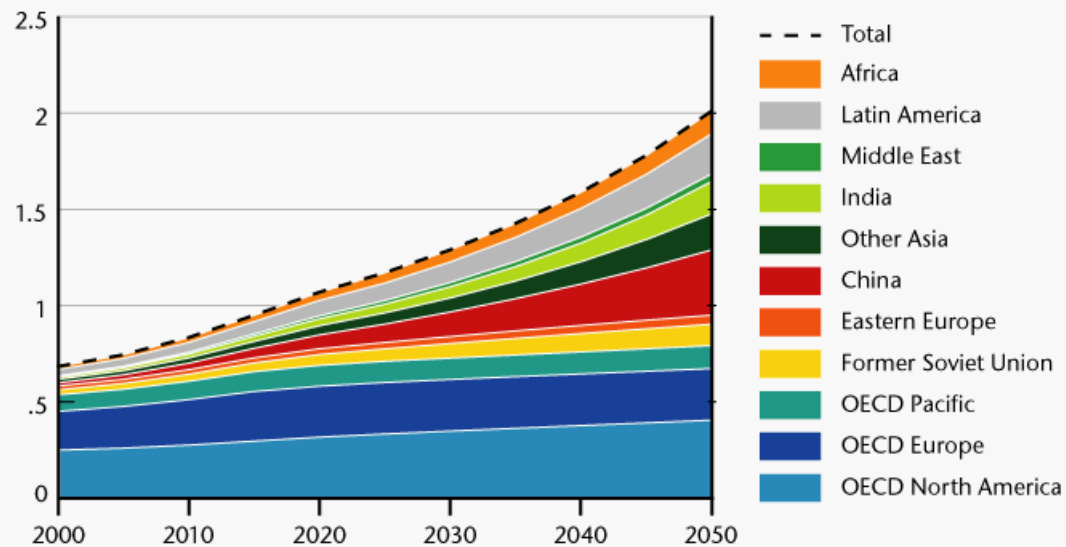
World Business Council for  
Sustainable Development

The Sustainable Mobility Project

# Growth in motorization

## Projected total stock of light duty vehicles by region

Billions of Vehicles



Source:  
Sustainable Mobility Project calculations.



World Business Council for  
Sustainable Development



## Sustainable mobility

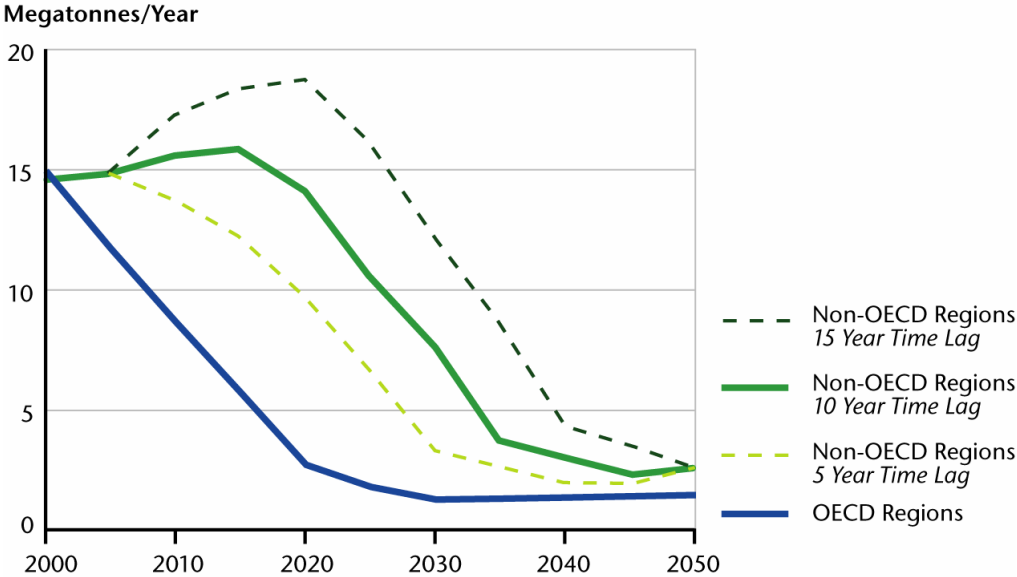
The ability to meet the needs of society to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological values today or in the future.



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# Reduce conventional emissions from transport

## Transport-related NOx emissions



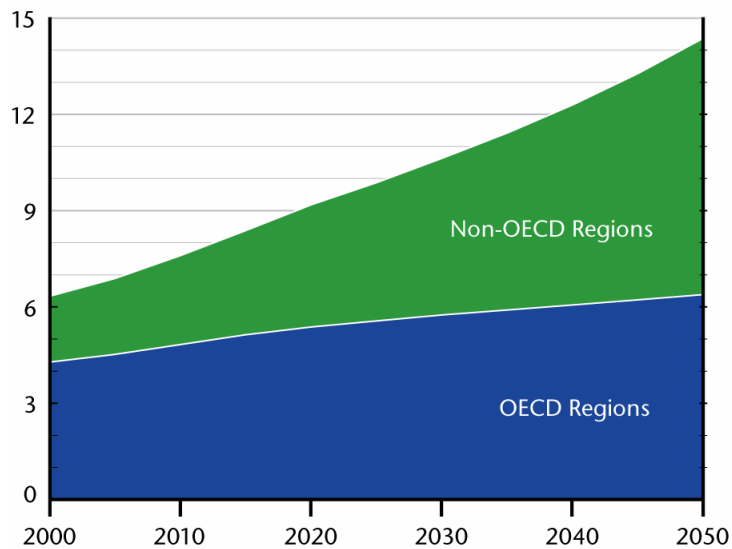
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Goal | Assessment | Factors | Tools | Implementation

# Reduce GHG emissions from transport

## Transport-related Well-To-Wheels GHG emissions

Gigatonnes CO<sub>2</sub>-Equivalent GHG Emissions /Year



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# Reduce GHG emissions from transport

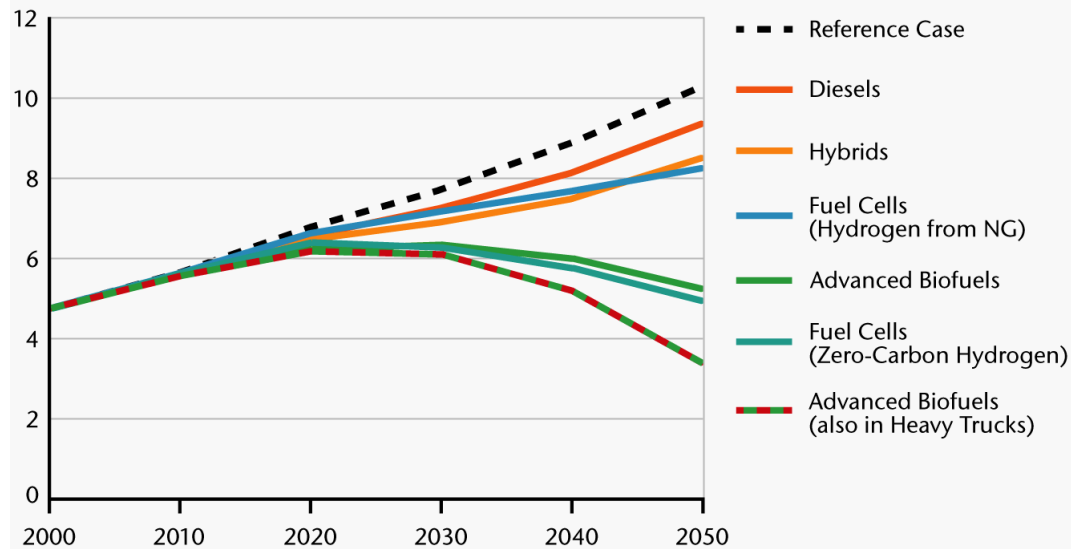
- **Vehicle Technologies**
  - Improvements to Conventional ICEs
  - Hybrid-Electric Systems
  - Fuel Cells
- **Fuel Technologies**
  - Existing Infrastructure
    - Unleaded Gasoline
    - Low and Ultra Low Sulphur Gasoline and Diesel
    - Non-Crude Oil Blend Components incl. “Gas-To-Liquid” (GTL), e.g. Fischer-Tropsch (FT) Fuels
    - Biofuels and Biofuel Components
  - Separate Infrastructure
    - CNG
    - LPG
    - Hydrogen



# Reduce GHG emissions from transport

## Hypothetical potential of individual technologies to lower road transport Well-To-Wheels CO<sub>2</sub> emissions

Gigatonnes CO<sub>2</sub>-Equivalent GHGs



Note:

The cases represent very high hypothetical levels of technology penetrations, thus they cannot be added together.



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# Challenges of increased Mobility

- 'Sustainable Mobility'



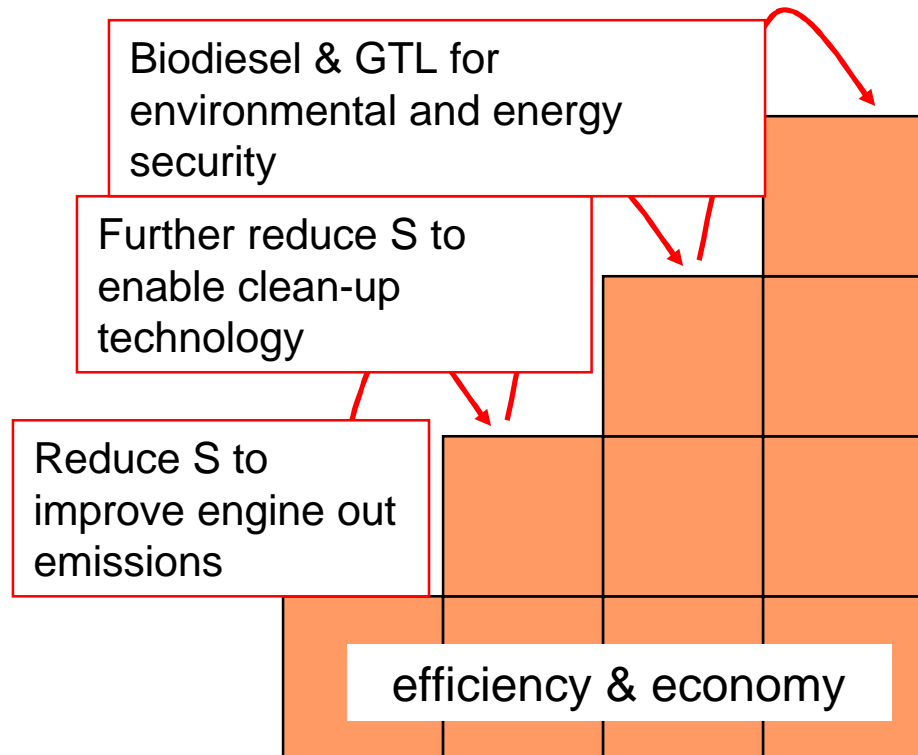
Maintaining mobility while reducing local and global environmental impacts

- Economic and Social sustainability criteria also need to be met
- Consumer acceptance a challenge.

Changes to transportation fuels are required to meet sustainability challenges

# Conventional Fuels: Cleaner Gasoline and Diesel

For the next 30 years and beyond, it is likely that diesel and gasoline will remain the most affordable and convenient fuel



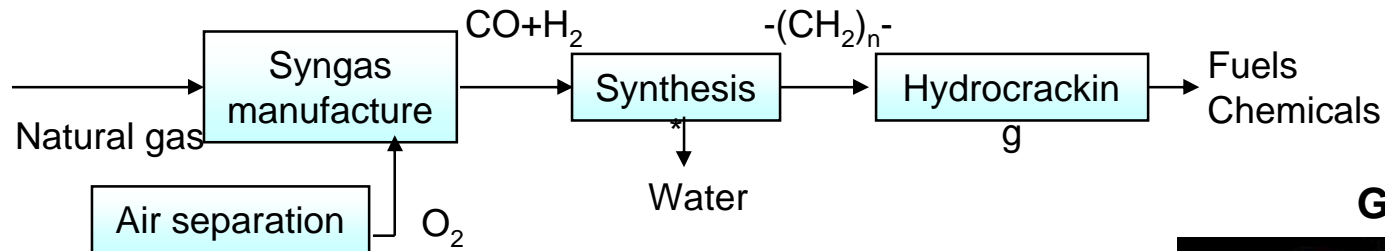
Diesel staircase



Shell station in Argentina

# Gas to Liquid (GTL) Fuels will play an important role in the future (mid & long term)

## Simplified Process



Shell operates the worlds only commercial GTL plant of its type in Malaysia (operating since 1993)

\* Fischer-Tropsch Synthesis

## GTL Fuels

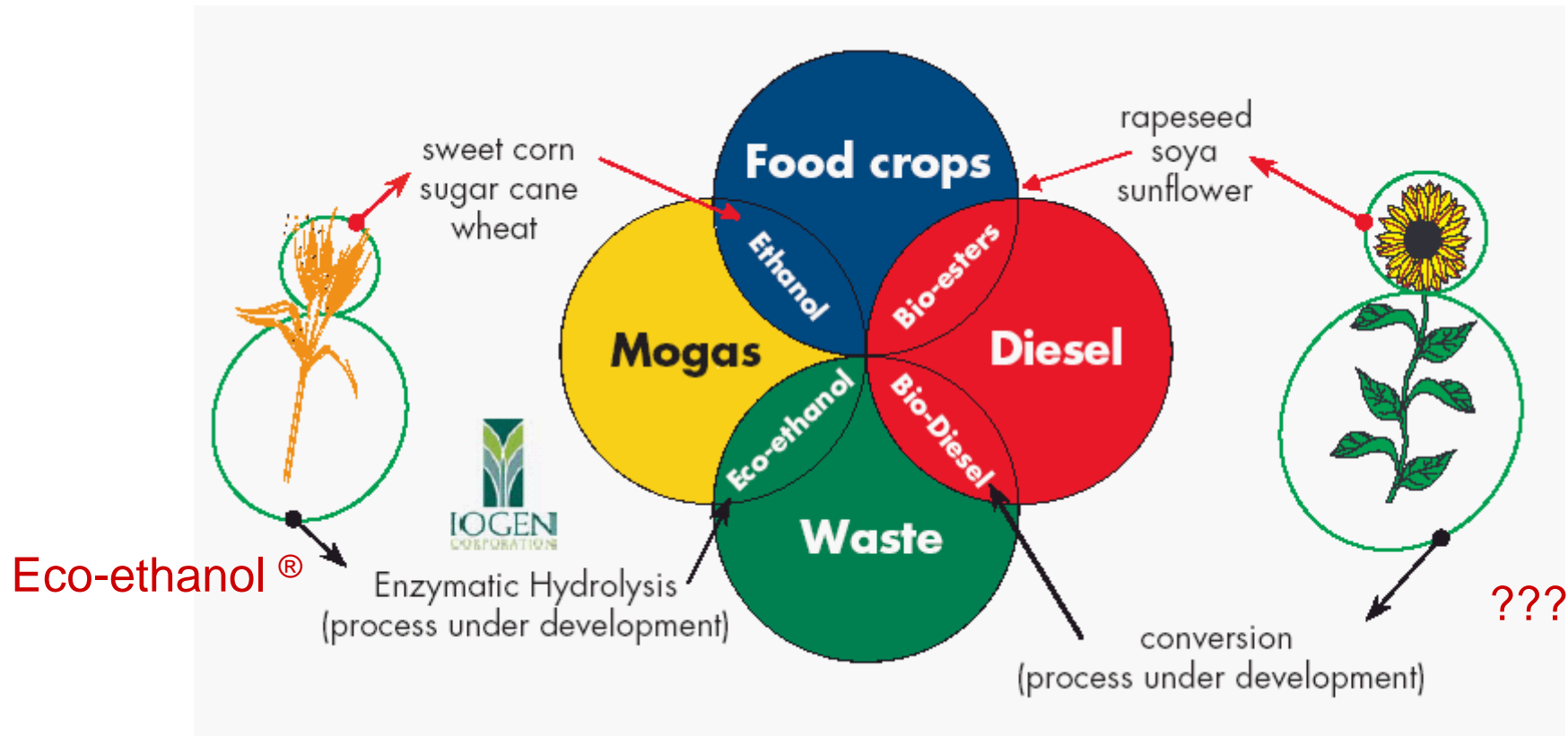
*Clear, clean products*



Use Natural Gas feedstock to produce high quality products:

- Diesel, Kerosene, Base Oils & Chemicals

# Introduction of Bio-fuels



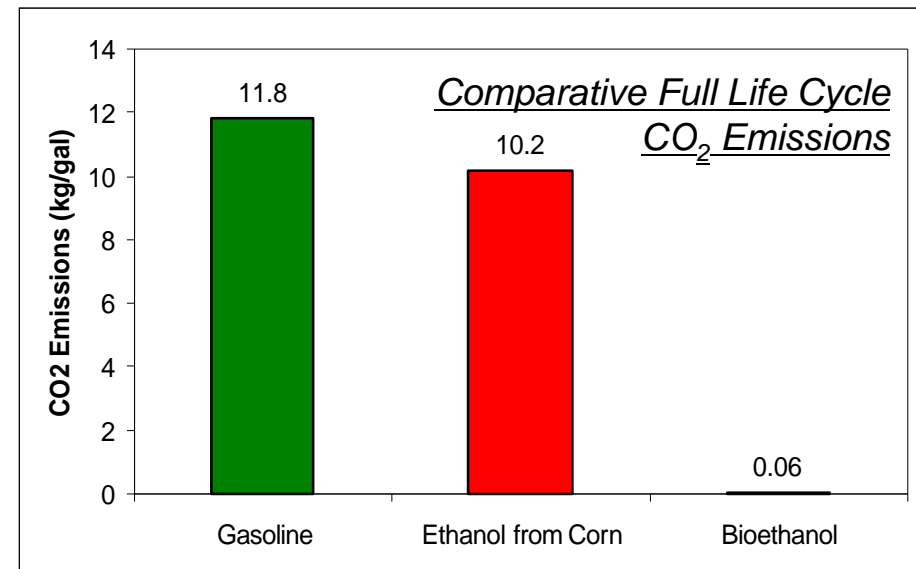
Shell: Largest blender of 1<sup>st</sup> generation transport bio-fuels.  
Commercial 2<sup>nd</sup> generation biofuels plants expected 2007.

# Advanced (2<sup>nd</sup> generation) Bio-fuels have a stronger value proposition

- Significant Greenhouse Gas reduction potential on well-to-wheel basis
- Do not use food crops as feedstock
- Can use existing distribution infrastructure

Societal issues – food vs.  
fuel  
Environmental issues

Shell promotes the use of Life cycle analysis as a basis for measuring the costs and benefits associated with bio-fuels



\* Source: "Scenarios for U.S. Carbon Reductions" USDOE 1997

# Hydrogen fuel cells – Shell position

Hydrogen produced from renewable sources is the ultimate solution for the long term (2020+) combining both local and global environment advantages.

Shell Hydrogen are involved in dedicated cross-industry partnerships to address the challenges and opportunities.

## BUT

- Long way on the path to commercialisation
- First solutions may be as early as 2015 ?  
*(these will be less sustainable options)*
- Final path for hydrogen production still under development



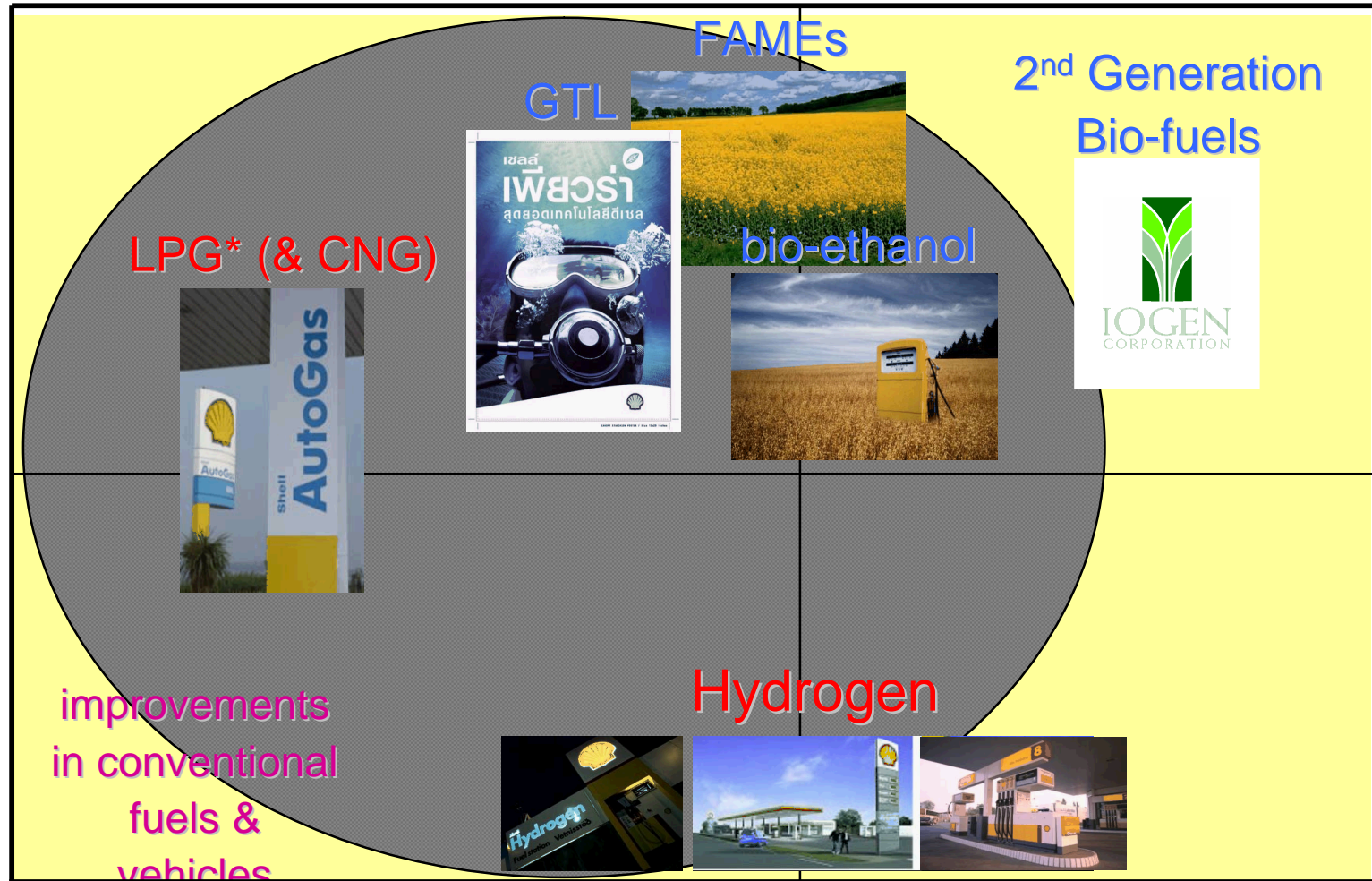
# Key options for the future

local emissions

global emissions

short-to-  
mid term  
solutions  
(20 years)

long-term  
solutions  
(2020+)



\* require non-conventional vehicle technology