DROP-IN FUELS

J-P. HÉRAUD / MAY 17TH 2019

WHO ARE WE?

A public-sector R&I body

A training center

An industrial group

An international scope in the fields of energy, transport and the environment

WOMEN, MEN AND RESOURCES

1,638
employees

1,115 researchers
of which **220** publishers (HCERES criteria)

2 facilities:
Rueil and Solaize

€125.1M
budget allocation
in 2017

€150.1M
own resources
in 2017

50%
of the IFPEN budget
devoted to NETs

One of the only French public research bodies to self-fund
over 50% of its budget

SUBSIDIARIES AND SHAREHOLDINGS(*)

Refining processes, petrochemicals, biofuels, gas treatment and catalysts

Axens – Powering integrated solutions

PROSERNAT

HEURTEY PETROCHEM

EURECAT

Energy transition

SMEs and start-ups

96,67 % DRIVE QUANT

50 % TEOS

24 %

20 % 23 % easyLi

20 % la Cie des Mobilités

Investment funds

Demeter / Demeter 2 /
Demeter 3 Amorçage /
Demeter 4 INFRA / Demeter 6 Amorçage /
Agrinnovation / Paris Fonds Vert

3E

Rhône-Alpes regional fund

Geosciences consulting and software

100 % BeicipFranlab

100 % TECHadvantage

100 % IFP TECHNOLOGIES (CANADA) INC.

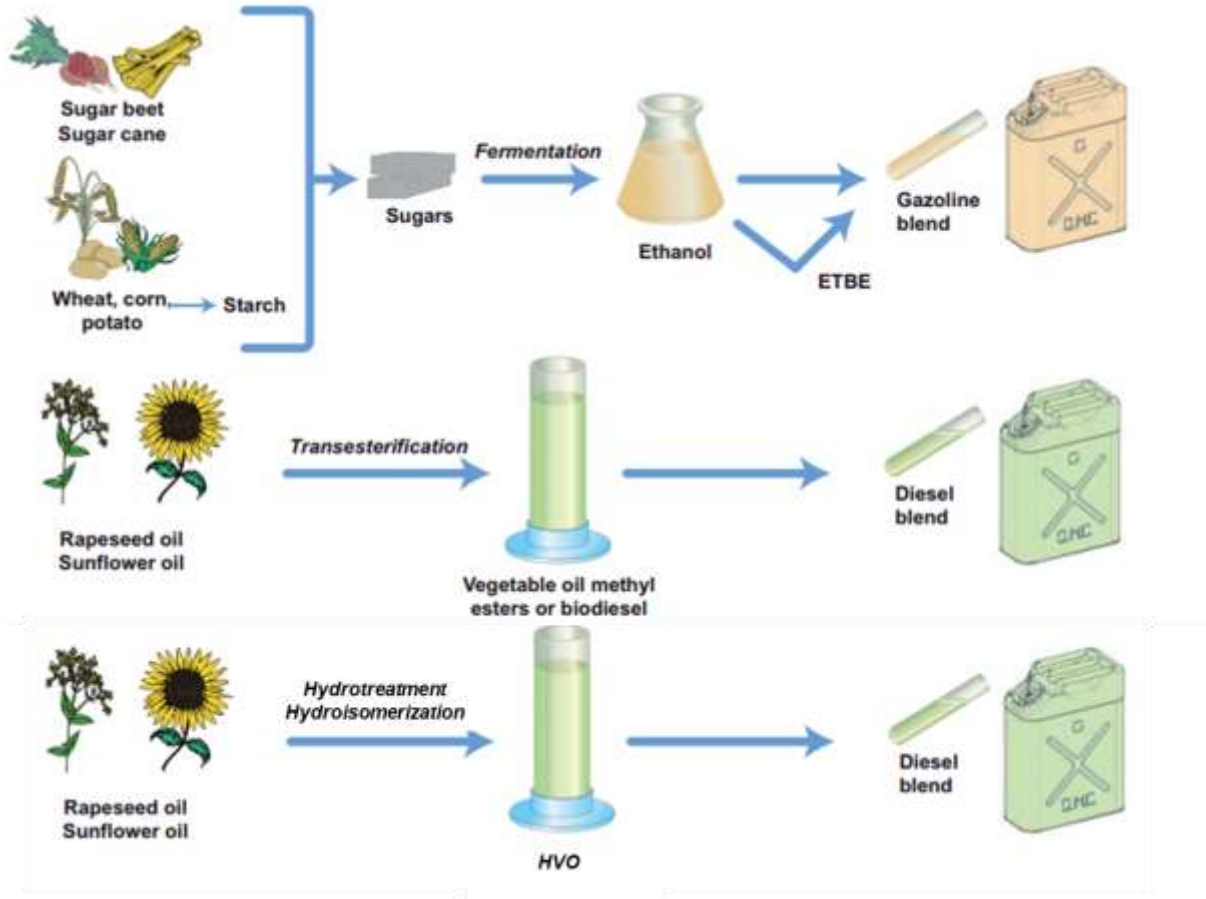
Training

62 % IFP Training

** As of 2 july 2018*

CONVENTIONAL BIOFUELS

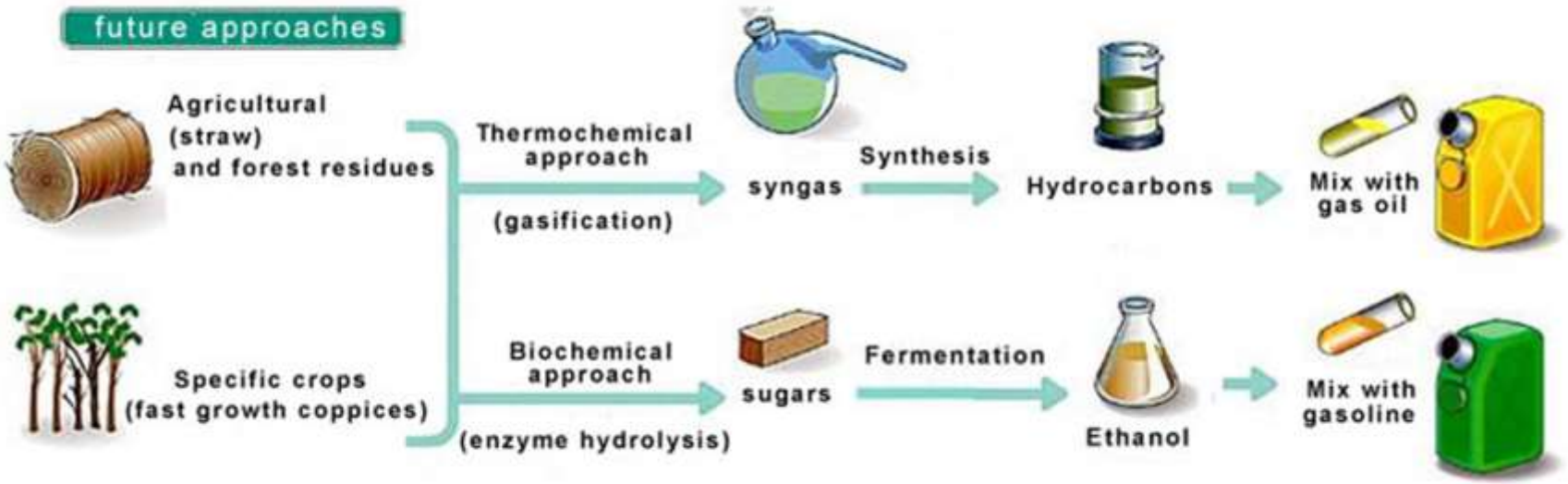
IFPEN biofuels technology



Vegan®

ADVANCED BIOFUELS

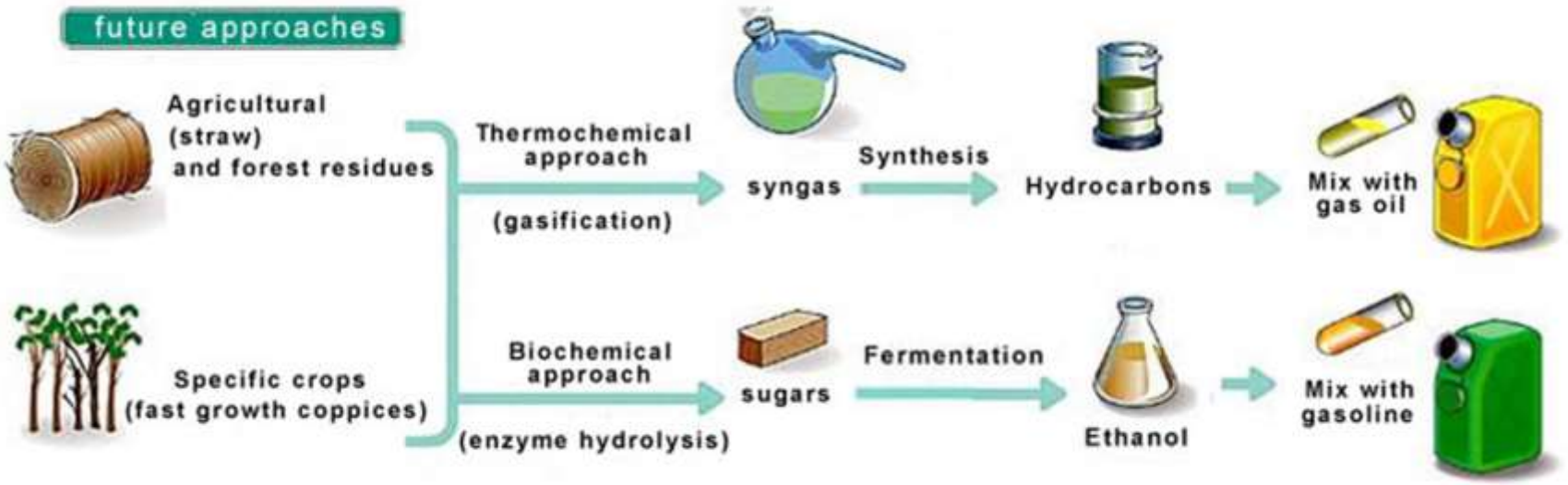
IFPEN biofuels technology



PROJECT BioTfueL

ADVANCED BIOFUELS

IFPEN biofuels technology



PROJECT BioTfueL

Projet FUTUROL PROCETHOL 2G

Vegan®

Hydroconversion of liquid lipidic sources into high quality transportation diesel and jet fuels

VEGAN: LIPID LIQUID FEEDSTOCKS

VEGETABLE OIL

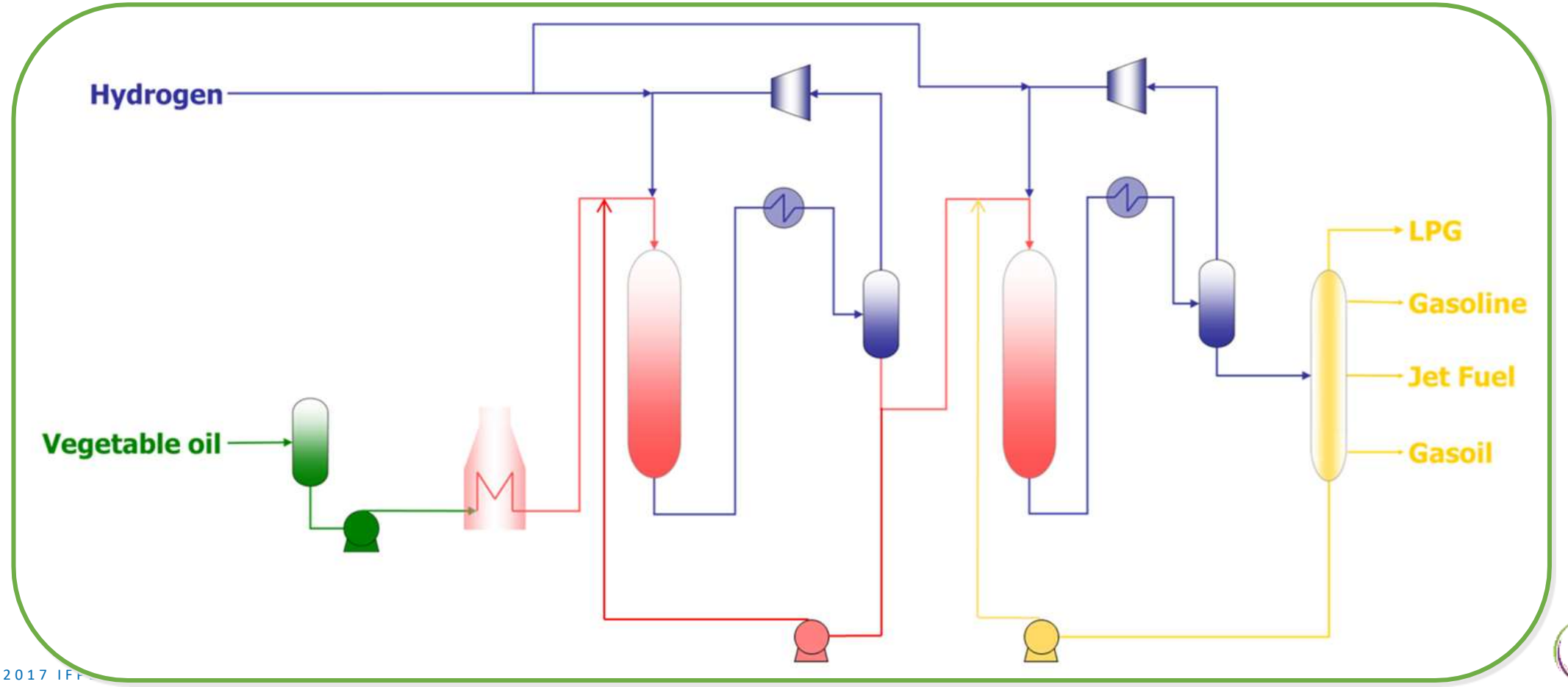
Palm, sunflwoer, jatropha, …

USED COOKING OIL

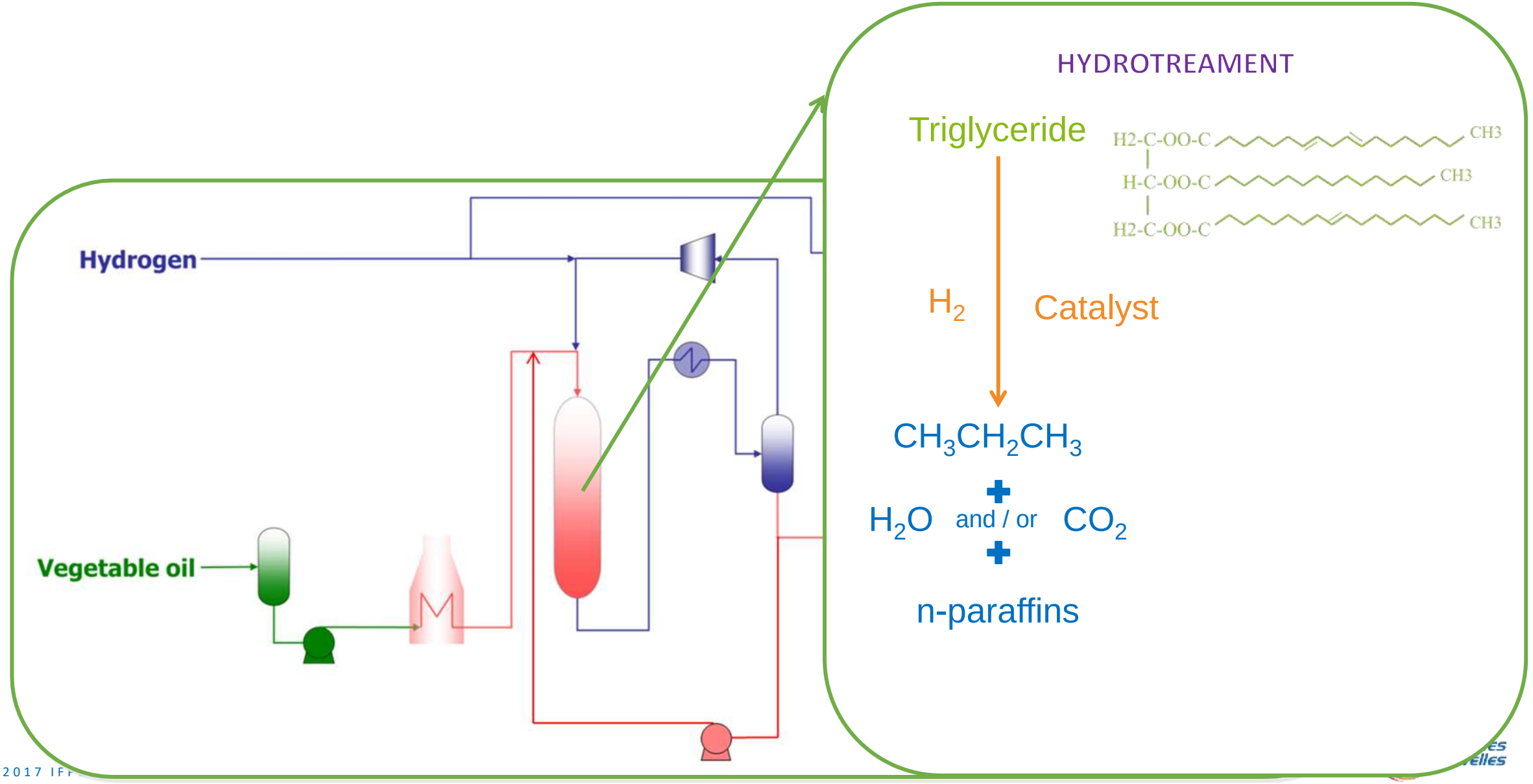
ALGAE OIL

FAT ANIMALS OIL

VEGAN: HVO PROCESS SCHEME



VEGAN: HVO PROCESS SCHEME



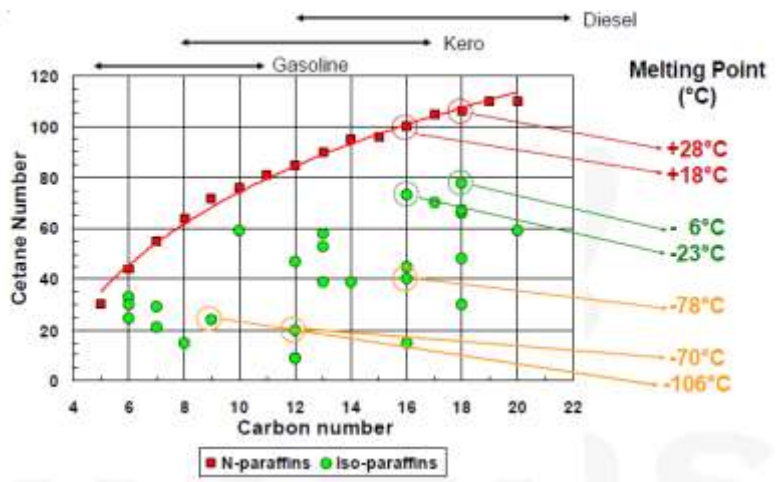
VEGAN: HVO PROCESS SCHEME

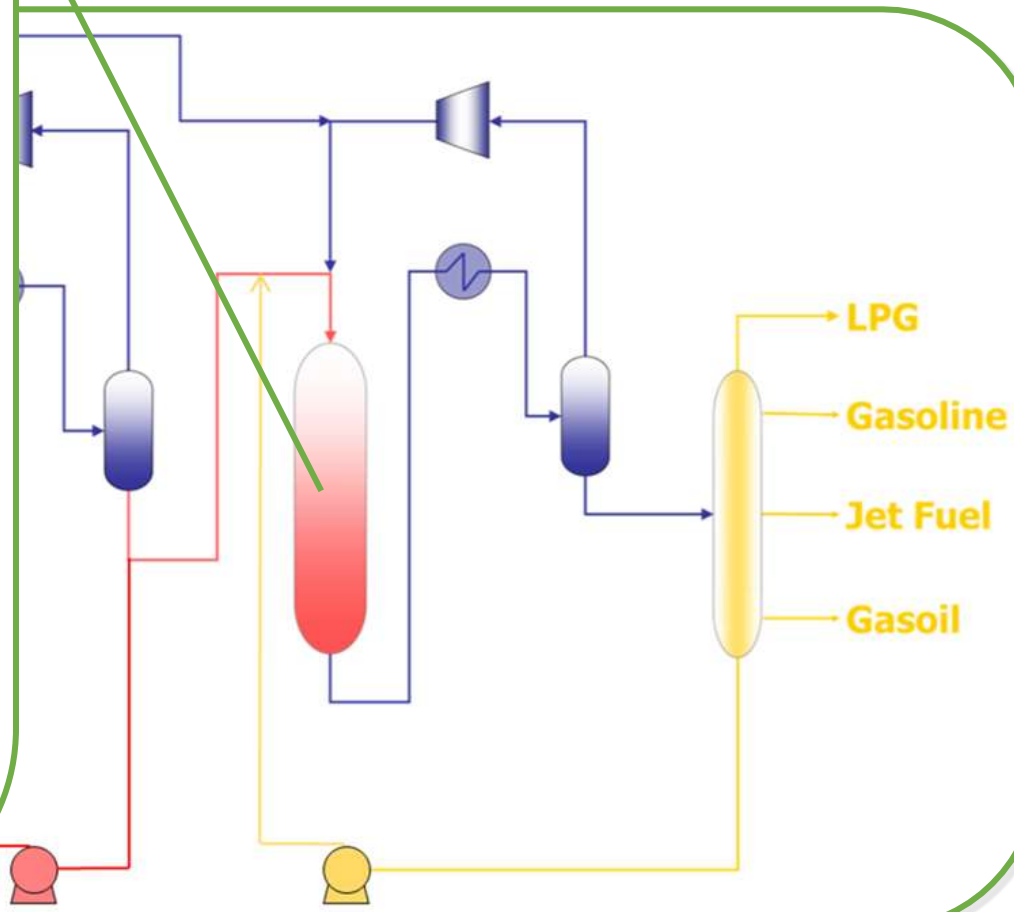
HYDROISOMERISATION

n-paraffins

H_2 Catalyst

i-paraffins





VEGAN: BIOJET PROPERTIES

		ASTM D7566 Specification	HVO Biojet
Density	[-]	730 to 770	
Freezing point	[°C]	Max – 40	
Flash point	[°C]	Min 38	
Viscosité @ -20°C	[mm^2/s]	Max 8	

VEGAN®

2007 — **Technology and catalyst development**

Today — **Industrialization**

TOTAL LA MEDE
500 kt/y capacity
Start-up mid 2019

TOTAL

PROJECT BioTfueL

Production of second-generation biojet fuel and biodiesel by thermochemical conversion of lignocellulosic biomass

R&I

IFP Energies nouvelles

cea

LICENSORS

thyssenkrupp

Axens

Powering integrated solutions

BioTfueL

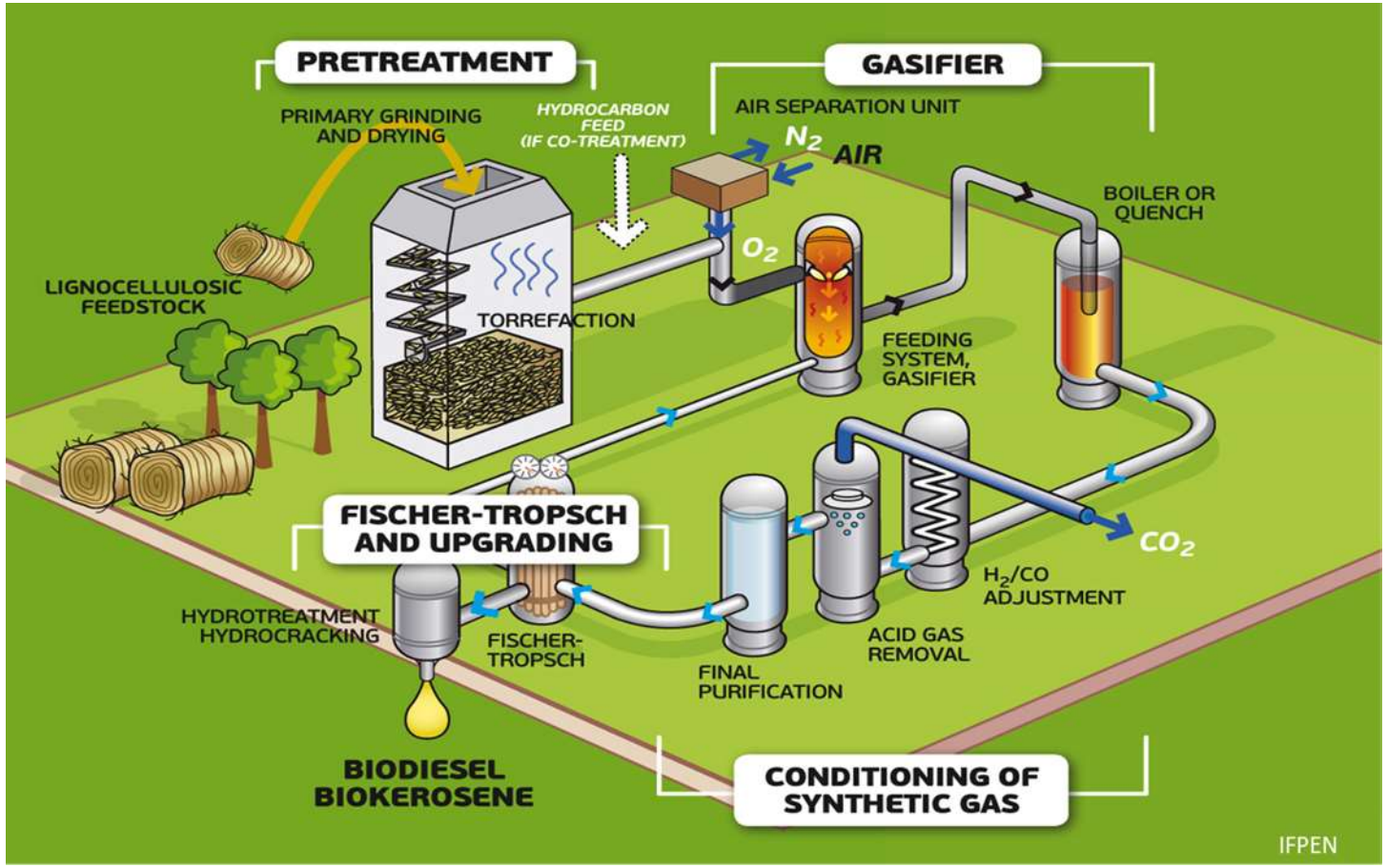
FUEL PRODUCERS

Avril

TOTAL

IFP Energies nouvelles

BioTfueL: B-XTL PROCESS CHAIN



BioTfueL: BIOJET PROPERTIES

		ASTM D7566 Specification	Synthetic Biojet
Density	[-]	730 to 770	
Freezing point	[°C]	Max – 40	
Flash point	[°C]	Min 38	
Nitrogen, mg/kg	[mg/kg]	Max 2	
Water, mg/kg	[mg/kg]	Max 75	
Sulfur, mg/kg	[mg/kg]	Max 15	

BioTfueL

2010	2012	2015	Today	2019
Technologies Sélection	Basic & Financing	Démo plants erection 3 t/h	Start-up	

Production of biojet from biomass via second-generation ethanol

Biomass → Ethanol production → Ethanol → Deshydration → Ethylene → Oligomerisation → Hydrogenation → Jet

Projet FUTUROL PROCETHOL 2G

Production of second-generation ethanol by biochemical conversion of lignocellulosic biomass

R&I

INDUSTRIA

FINANCIAL

Atol™-C2

Production of bio-ethylene from ethanol

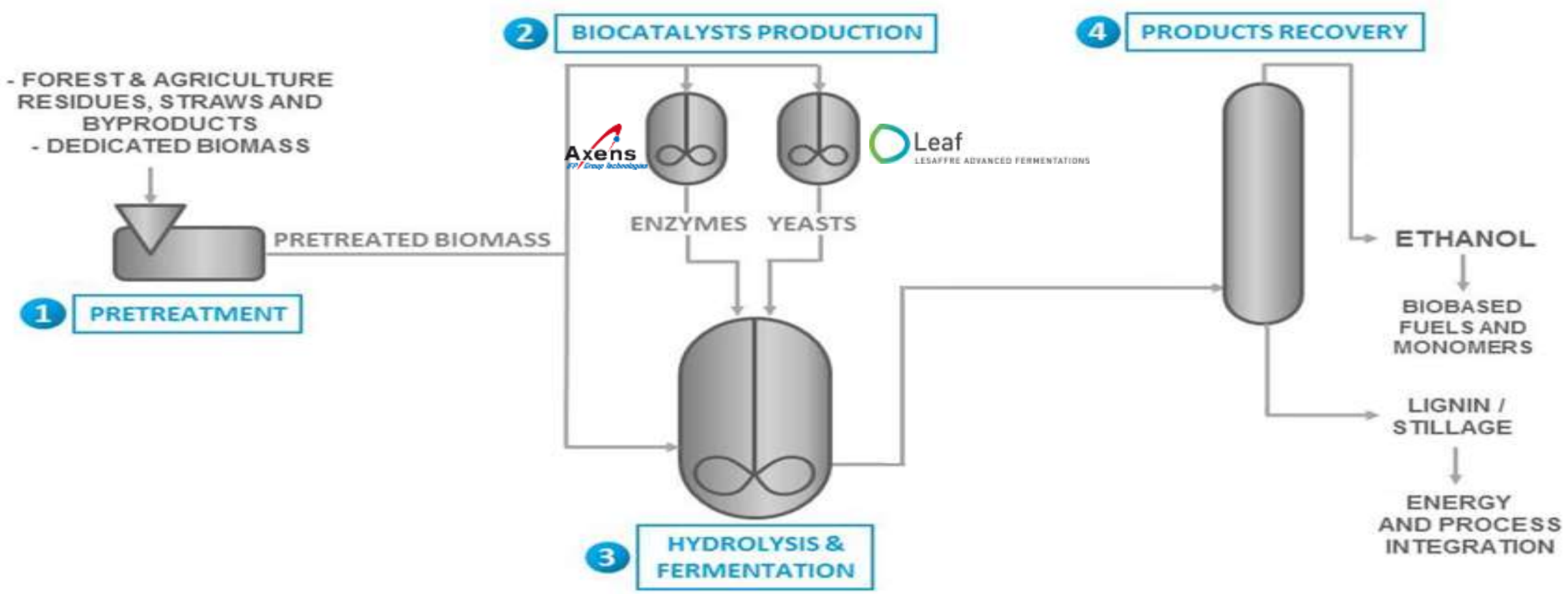
Polynaphtha™

Production of bio-ethylene from ethanol

Hydrogenation of the kerosene olefenic cut

FUTUROL : PROCESS CHAIN

- Cellulosic ethanol : a simple 4 steps process



 |

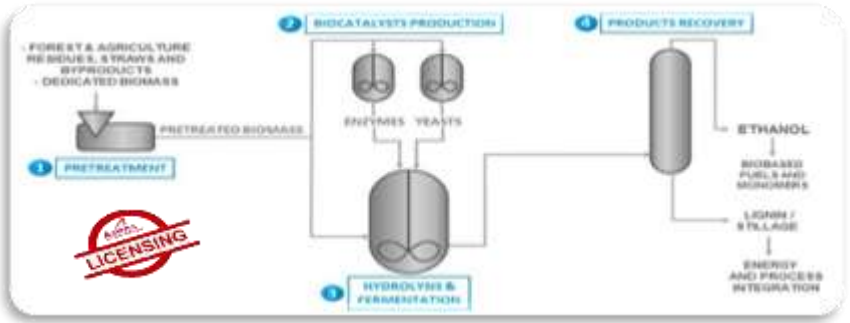
FUTUROL : THE PROJECT

2008 Project start-up

2011 Pilot 1t/j

Today Project end **2018**

Prototype – Pretreatment 100t/j



Axens Process licensing

ATJ: BIOJET PROPERTIES

		ASTM D7566 Specification	Synthetic Biojet
Density	[-]	730 to 770	
Freezing point	[°C]	Max –40	
Flash point	[°C]	Min 38	
Smoke point	[mm]	18	
Viscosité @ -20°C	[mm^2/s]	Max 8	

CONCLUSION

- HVO offers now a solution for biojet production
  - Mix of feedstocks
  - Dedicated catalyst for biojet production
- BTL technology is the ideal way for advanced biojet production
  - High quality biojet
  - 90 % of CO_2 reduction based on fossil fuel for the thermochemical way
  - Biojet from ethanol is an option but seems not the best option
- HVO and BTL biojets are the best solutions to decarbonization of air transport

Innovating for energy

Find us on:

www.ifpenergiesnouvelles.com

@IFPENinnovation