IAR PÔLE DE COMPÉTITIVITÉ INDUSTRIES & AGRO-RESSOURCES

Louis TIERS

I.A.R. – France

DETAILED REPORT ON SECOND-GENERATION INDUSTRIAL PRODUCTION PLANTS FOR ETHANOL

Intelligence économique - offre de service

Collecte d'information

Accès rapide à plus de 10 000 sources de données technico-économiques

Tremplin
Première plateforme de veille stratégique sur l'innovation végétale

Réseau IAR – Informations exclusives

Analyse

Méthodologies IAR Intelligence
10 ans d'expertise sur les bioproduits et procédés

IAR INTELLIGENCE ECONOMIQUE

Fonctions

Approvisionnement

- Quantifier la disponibilité réelle en biomasse
- Evaluer sa compétitivité (prix et qualité)
- Identifier des sources d'approvisionnement

Technologies et procédés

- Identifier et analyser les brevets d'intérêt
- Positionner votre technologie et orienter son développement
- Identifier de nouveaux partenaires technologiques et industriels

Produits et Marchés

- Identifier et évaluer vos débouchés
- Evaluer l'impact des réglementations
- Positionner votre bioproduit
- Identifier vos premiers clients ou early adopter

Références Clients

Groupe et ETI

- SUEZ environnement
- Ceva
- Groupe Soufflet

PME

- MOLYDAL
- Sparflex SOLUTIONS PACKAGING

Laboratoires et transfert de technologie

- LCMuB
- SATT GRAND EST

Institution publique

- ADEME Agence de l'Environnement et de la Maîtrise de l'Energie

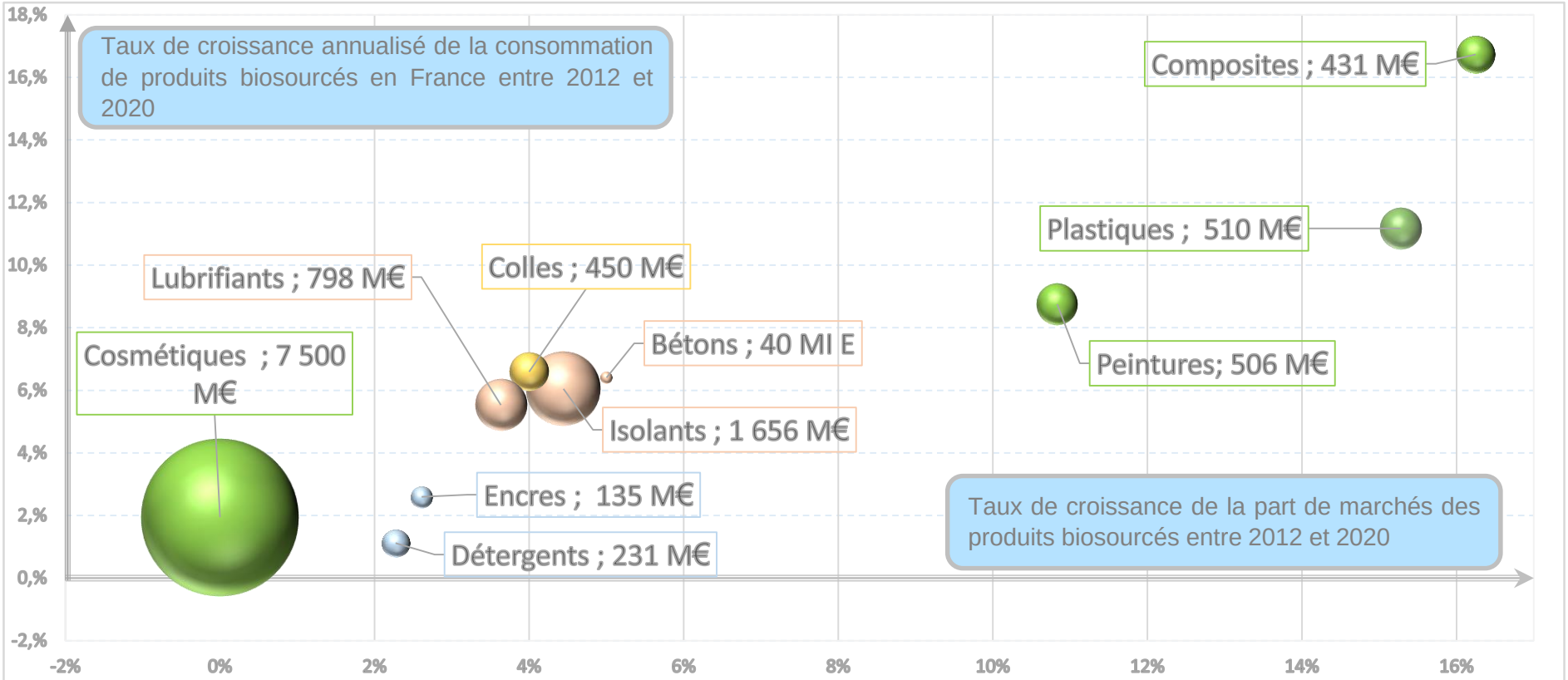
Exemple de réalisation - étude :

Problématique : sélection des thématiques d'intérêt pour la formulation d'un appels à projet chimie du végétal

Réalisation : évaluation du potentiel économique et technologique de 13 filières industrielles sur le développement de produits biosourcés – approche comparative

Client : ADEME

ADEME
Agence de l'Environnement et de la Maîtrise de l'Energie



Extrait de l'étude : matrice comparative des marchés des bioproduits

Pôle Industries & Agro-ressources

Global competitiveness cluster

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Monograph

Industrial sites - 2nd Generation Ethanol

For more information

Louis Tiers – tiers@iar-pole.com

Project manager in Business Intelligence

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IAR INTELLIGENCE ÉCONOMIQUE

SUMMARY

1° Methodology

2° Context of 2nd generation Biofuel industrialization

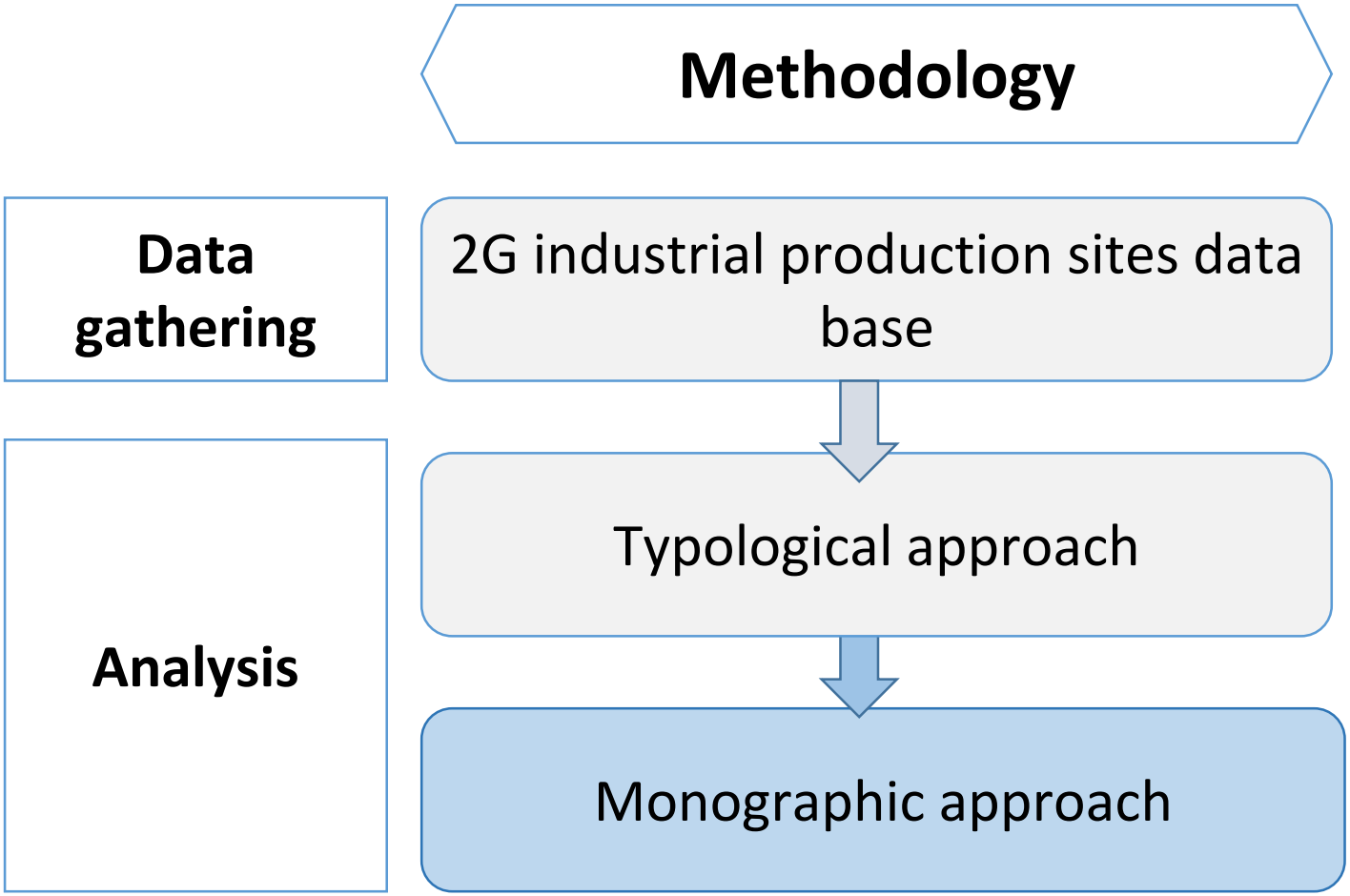
3° Overview of players' positioning

4° Examples - two different cases :

- Iogen & Raizen

- Poet & DSM

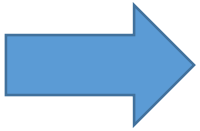
METHODOLOGY : MONOGRAPH

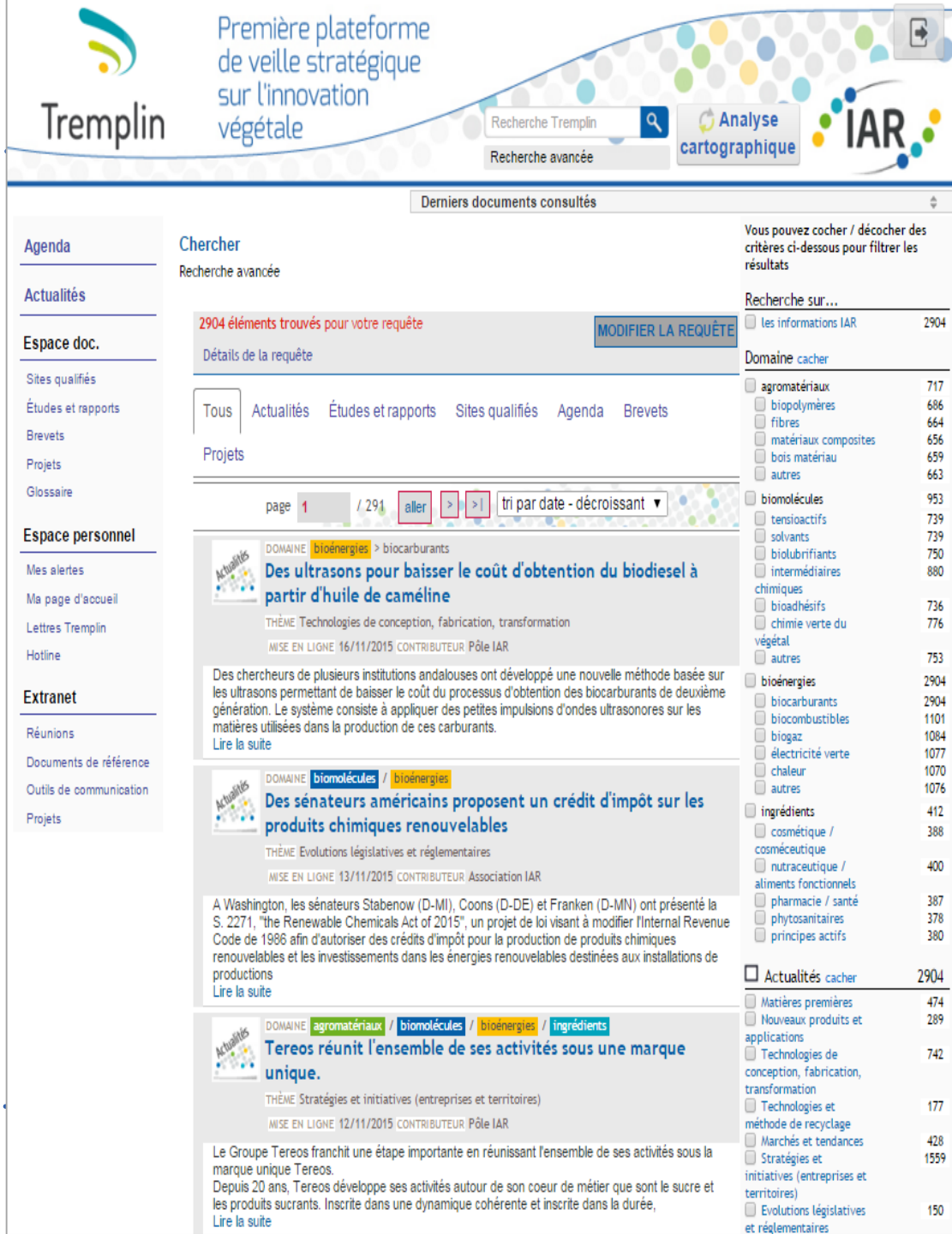


TOOLS : TREMPLIN

Tremplin — Première plateforme de veille stratégique sur l'innovation végétale

- Agro-materials
- Biomolecules
- Biofuels
- Ingrédient





CONTEXT

- Reminder : emerging technology
- Difficult economic situation: no profitablity if the crude oil price is lower than < 70 $ (according to Dupont)
- Difficult regulatory environment in the USA:
  - Critiscim of RFS System from industrial lobbies
  - Outlet with californian market (low carbon fuel standard)
- Less favourable regulatory environment in the EU: no transport industry objective in EU by 2030 – only national objectives (Italy, Nordic countries, in progress in France)
- Favourable situation in Brazil and China

CONTEXT

Running-in-phase sites: new technical problems:

- **Ineos Bio**… fermentation inhibitors in Syngaz
- **Beta renewable:** biomass impurity => investment in new equipement before the pre-treatment
- **Raizen**: biomass impurity
- **POET DSM: on progress …important changes in the design of the second production plant**

  ”Will we reach the nameplate capacity of the plant with this design? It is too soon to tell. But the important thing is that the second plant never looks exactly like the first plant, and we are working on the engineering, looking towards those future plants.” DSM Bio-Based Products’s new chief, Atul Thakrar

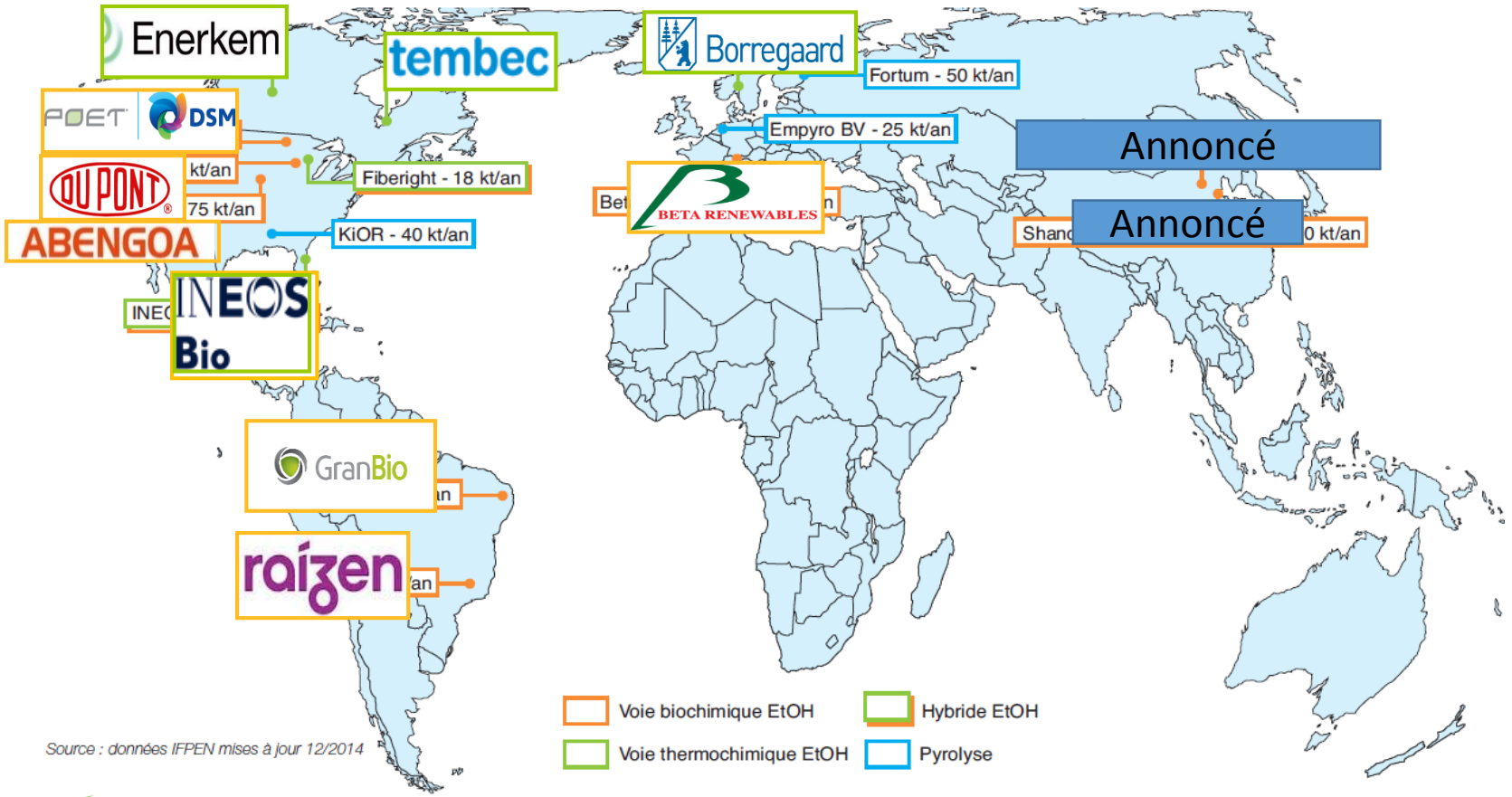
- Dupont … : …

USA Production: 4% of the nominal capacity. No real commercial production in the USA

Current capacity of 2G plants: 25 Mi gal /y is far from 1G: 100 Mi gal/y

INDUSTRIAL SITES AROUND THE WORLD

Fig. 5 – Unités commerciales de biocarburants 2G en construction ou en production (capacité >10 000 t/an)



Source : données IFPEN mises à jour 12/2014

PANORAMA 2015

TIME FRAME - INDUSTRIAL SITES AND PROJECTS

Cliquer sur projets pour voir le détail

Pour retourner sur cette slide : cliquer sur les logos en haut à gauche

Before 2010

Tembec
Ethanol – Cn

Booregaard
Ethanol – Nr

Beta Renewable
Ethanol – It
Start-up

Iogen - Raizen
Ethanol – Br
Start-up

Integration of the 2G plants in the production of 1G plants of Cosan (shareholder of Raizen)

GranBio
Ethanol – Br
Start-up

10 new plants
Investment of 1,7 Md $

India - NC
CVC India Infrastructures

China - 2015
M&G Chemicals

Slovakia - 2017
Energochemica

POET DSM
Ethanol – US
Start-up

Finland - NC

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019

Ineos Bio
Ethanol – US
Start-up

Abengoa
Ethanol – US
Start-up

Abengoa - Brazil

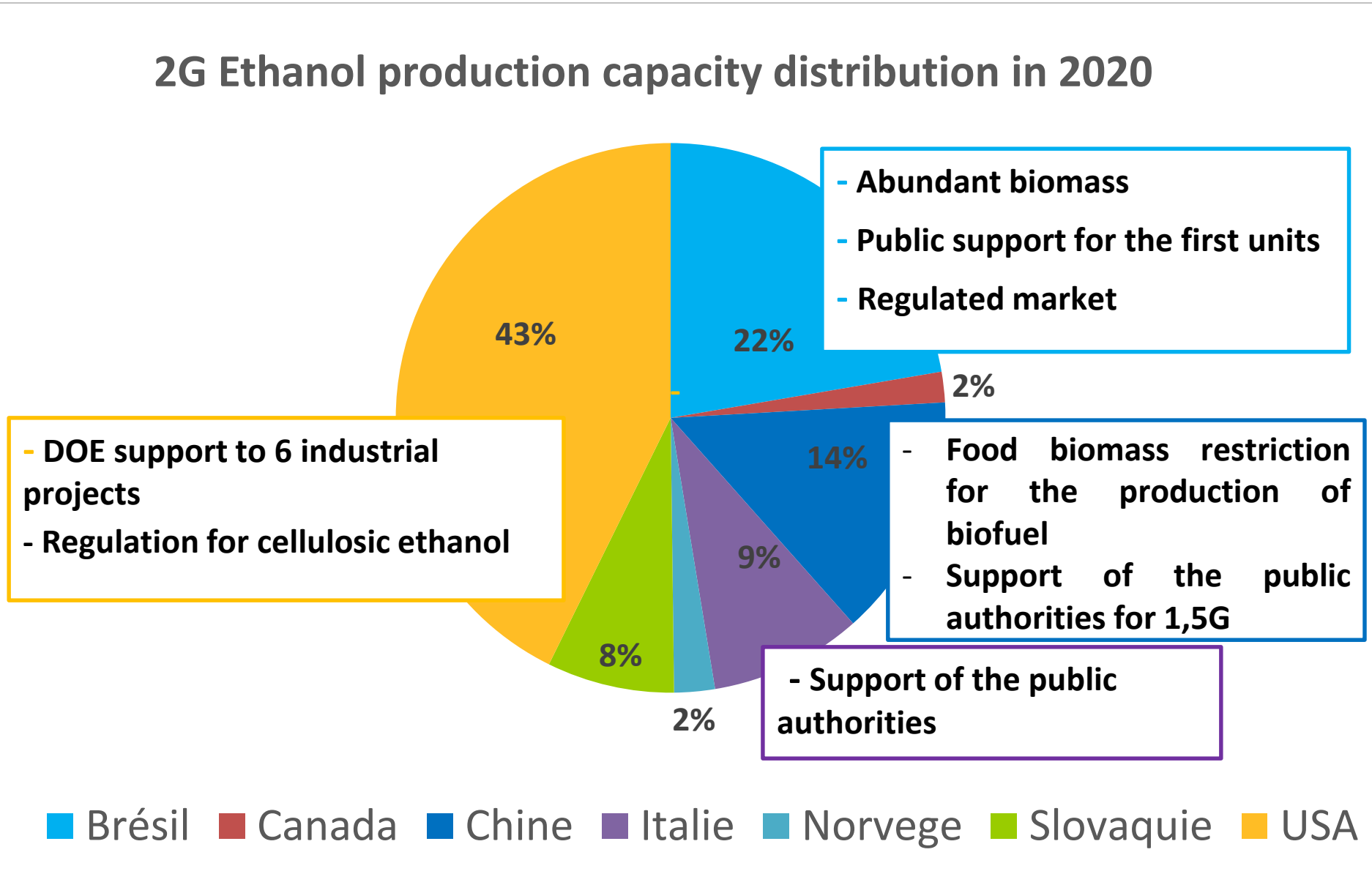
Dupont
Ethanol US
Start-up

Macedonia- NC

Légende

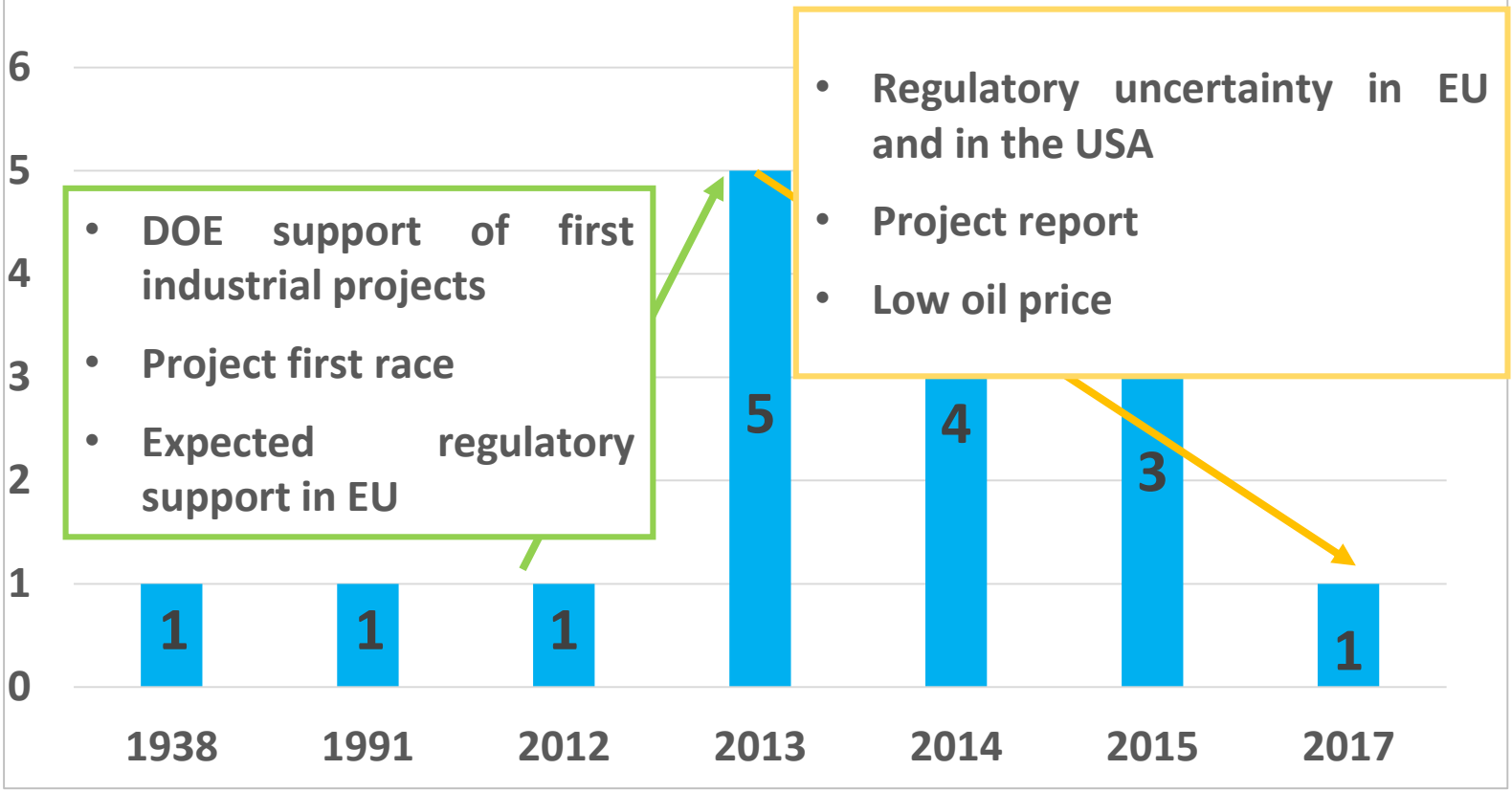
- Running project
- Under construction project
- Announced project
- Techn. Valorisation
- Own production
- JV Investment

MACRO TRENDS



MACRO TRENDS

Start-up of new industrial production units



DIFFERENT TYPES OF POSITIONING

Valorisation of agricultural wastes wih low added value and available from 1G ethanol production

POET DSM Joint Venture

IOGEN CORPORATION raízen Joint Venture

ABENGOA

- Close to the agricultural sector (POET, Raizen through Cosan)
- Available biomass (agricultural wastes) at low price due to 1G ethanol production
- Capex reduction due to integration to 1G production site: supply chain sharing and utilities (used water treatment, energy produciotn)
- What about technical integration on the production line?

DIFFERENT TYPES OF POSITIONING

Technology valorisation (technologies suppliers)

BETA RENEWABLES

INEOS Bio

Enerkem

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.

- Partnership with industrials and technologies suppliers - capital investment on first production sites at industrial scale
- Importance to be pionner:
  - Limited market for licensing – few actors to invest and take risks
  - To developp knowledge and to optimise the industrial process
- Important flexibility for the technology in terms of biomass to allow a worldwide valorisation

DIFFERENT TYPES OF POSITIONING

Chemistry company– Ethanol production for chemicals market?

- Agreement with the world leader of detergence to valorise the cellulosic ethanol
- Technology to preserve the lignin to get a better chemical valorisation
- Dupont has also a JV with BP ; Btumax for Ethanol production (mainly fuel market)

DIFFERENT TYPES OF POSITIONING

New actors

- Newly created company owned by the former main shareholder and manager of Braskem
- 15% held by the national banque of economical and social development of Brazil (BNDES)
- Own production supported by others companies technologies
- Technology development
- Interest in chemicals production

IOGEN CORPORATION raizen
Joint Venture

Costa Pinto Ethanol Project

Costa Pinto, Bril

Date dém. : 2013**Date constr. :** 2014

Financement Cap de Prod :
BNDES – 86 Mi $ à hauteur de 90%

Biomass feeding	Technologies	Main production	Secondary production
Bagasse *400 000 t/y* *NC*	**Steam explosion** *Iogen – internal development*	**Ethanol** *40 000 000l/y* *NC* *3 $/gal* - ***Fuels market*** *Regulatory market in Brazil*	**Heat** – On site consumption
Cane straw *NC* *In 2017*	**Enzymes** *Novozymes (IP resale of Iogen enzyme from Iogen to Novozymes)*		
• Sugar cane production capacity of Raizen • Harvest Mechanisation of sugar cane in 2017	**Yeast - xylose et arbinose fermentation** *DSM*		

- Raizen : construction of 7 new plants in Brazil by 2024 (930 Mi $) investisment for a capacity of 1Md l.
- Iogen : construction of one plant in the USA

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Thank you