

## Main cellulosic EtOH running demos (>1000 t/y) in EU

<b>Plant Owner</b>	<b>Location</b>	<b>Input capacity (t/year)</b>	<b>Output capacity (t/year)</b>
<b>Clariant (ex Sud Chemie)</b>	Straubing, Germany	Agriculture residues, wheat straw	1 000
<b>Abengoa Bioenergy, Biocarburantes Castilla y Leon, Ebro Puleva</b>	Babilafuente, Salamanca, Spain	25 000 t/year (barley/wheat straw, corn stover)	4 000
<b>Inbicon (Dong Energy)</b>	Kalundborg, Denmark	30 000 t/year (wheat straw, other lignocellulosics)	4 300
<b>Chempolis</b>	Oulu (Chempolis R&D Center), Finland	25 000 t/year (non-wood, non- food raw material)  formicobio™ process	running ?
<b>Beta Renewables (JV Chemtex (M&amp;G), TPG, Novozymes)</b>	Crescentino, Italy	Non-food biomass (giant cane and wheat straw)	40 000

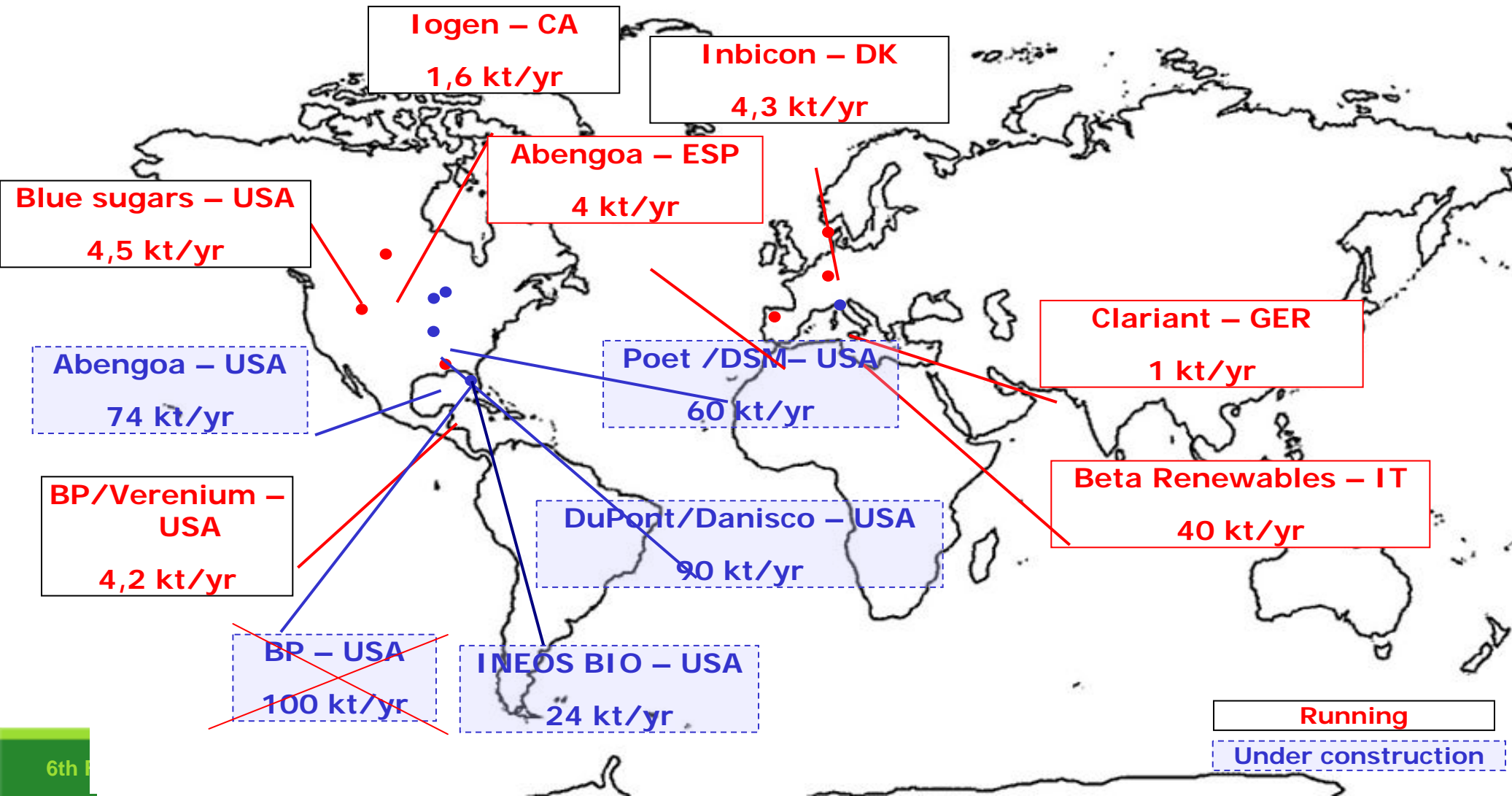
## Main announced EtOH G2 demos (>1000t/y) in the EU

<b>Plant</b>	<b>Location</b>	<b>Input raw material</b>	<b>Output capacity (t/year)</b>	<b>Planned Start-up date</b>
Biogasol (BornBio-Fuel 2)	Aakirkeby, Bornholm, Denmark	Various lignocellulosics incl. grasses, green waste, straw	4 000	2013
INEOS Bio	Seal Sands, Tees Valley, UK	Biodegradable household and commercial waste	24 000	2015
Procethol 2G (Futurol)	Lillebonne, France	Various lignocellulosics	1 500	2015
NER300 project CEG (Sekab)	Goswinowice, Poland	Agricultural residues: wheat straw, corn stover	48 000	
NER300 project BEST	Crescentino, Italy	Giant cane, wheat straw	40 000	

## Main running EtOH G2 demos (>1000t/y) in North America

Plant Owner	Location	Input capacity (t/year)	Output capacity (t/year)
IOGEN Corporation	Ottawa, Ontario, Canada	30 t/d (wheat, barley and oat straws)	1 600
BP (Jennings Demo Facility)	Jennings, LA,US	Sugarcane bagasse, switchgrass, wood products	4 180
Blue Sugars Corporation (KL Energy Corporation)	Upton, Wyoming, US	33 500 t/y (bagasse, wood, pulp) (integr. enz. prod.)	4 500
BlueFire Renewables	California, US	acid hydrolysis, various wood and paper wastes, bagasses	11 100 ?

## 2G Ethanol projects running or in construction 2012 - UE/America (> 1000 t/y)



## Main EtOH G2 demo units outside EU

### • Running

- BP/Verenium j-v – USA – 4180 t/y
- DuPont Danisco/UT-Genera Energy – USA – 750 t/y
- Blue Sugars – USA – 4500 t/y
- Mascoma – USA – 600 t/y
- Iogen – Canada – 1600 t/y
- Jilin Jiuxin Industry group – China – 30000 t/y
- Beijing Tiandi Riyue Biomass technology – China – 8000 t/y
- Chinese Academy of Agricultural Engineering – China – 4000 t/y
- Henan fuel ethanol – China – 8000 t/y (2 units)
- CNPC – China – 3000 t/y (2 units)
- Shandong Longlive Bioenergy – China – 40000 t/y
- Shandong Wande – China – 8000 t/y
- Shandong Xueling Starch – China – 3000 t/y
- ZTE Energy – China – 30000 t/y
- Bioethanol – Japan – 1000 t/y
- Kirin Brewery – Japan – 8000 t/y
- Kirov Biochemical – Russia – 15000 t/y
- Thai Roong Ruang Energy – Thailand – 25000 t/y
- BlueFire Renewables- USA – 11 100 t/y ?

### • Announced

- **Abengoa Bioenergy Biomass of Kansas – USA – 74000 t/y**
- ADM - USA - 3000 t/y
- BlueFire Ethanol - USA – 55000 t/y
- BP – USA – 100000 t/y (canceled)
- Colusa Biomass Energy – USA – 30000 t/y (canceled?)
- **Fiberight – USA – 11000 t/y**
- ICM – USA – 150000 t/y
- **INEOS Bio - USA – 24000 t/y**
- Mascoma – USA – 60000 t/y
- Poet / DSM – USA – 60000 t/y
- IOGEN – Canada – 68000 t/y (canceled)
- Blue Sugars/Petrobras – Brazil – 7900 t/y
- Dupont Danisco - 90000 t/y
- GraalBio – Brazil – 65000 t/y
- TMO/Usina Santa Maria - Brazil- 7880 t/y
- Beta Renewables – USA – 60000 t/y
- Zechem – USA – 750 t/y

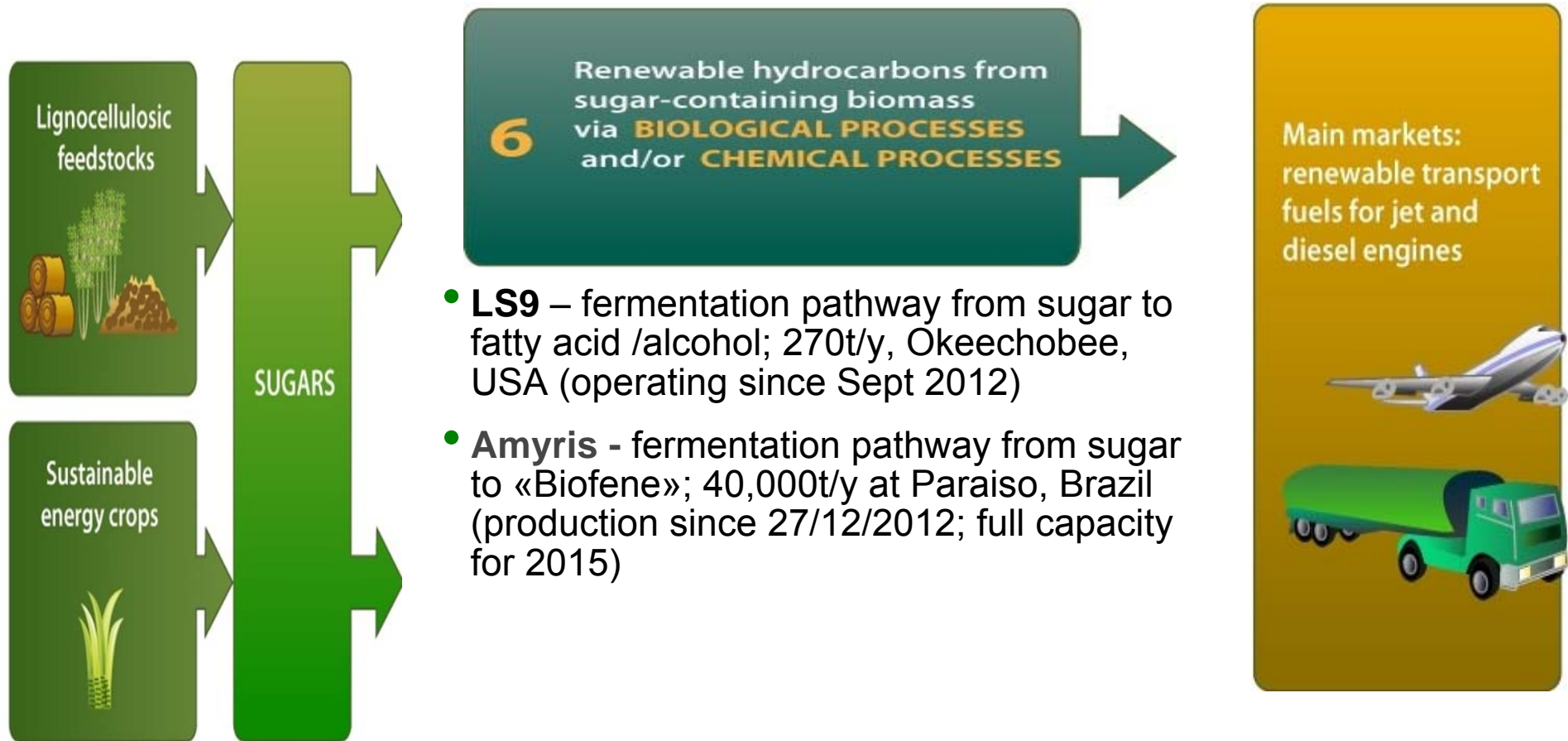
# Biobutanol

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- **Butamax** (JV Dupont/BP): Demo 30t/y Hull , UK (Startup 2010)
- **Gevo:**
  - 55,000t/y Luverne, USA (Operating 17 weeks since May 2012 then switch to EtOH production for flexibility demonstration)
- **Cobalt Technologies:** 1440t/y Thomaston , USA (Startup 2013)
- **Green Biologics**



## Value Chain 6: Biological processes



## Value Chain 6: Chemical processes

