

# **CarbonWorks**

## **JV Suez x Fermentalg**

Questions related to regulation  
regarding the use of industrial [CO<sub>2</sub>  
& mineral inputs] for algae growth  
process

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# Summarized questions

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- What about the qualification of the CO<sub>2</sub> from biogas generated from Anaerobic Digestion units.
  - 1<sup>st</sup> regarding the inputs
  - 2<sup>nd</sup> regarding the purification process.
  
- Same question on other inputs sources from industrial flows (gas and liquid):
  - Fermentation, Hydrothermal gasification, Gasification, Combustion, Mineralization, Gas scrubbing, Precipitation (chemical reaction), Waste water reuse.
    - 1<sup>st</sup> regarding the inputs
    - 2<sup>nd</sup> regarding the purification/treatment process.
  
- End-Of-Waste or product qualification of the CO<sub>2</sub> when it is captured and transported?
  - Methanization installation or other industrial plants usually are installed in dense areas.
  - Liquefied or solidified through a pipeline or truck.
  - Same parameters as CCS solutions : geological storage in northern waters.

# Matrix

## Legend

Colour code ⇔ our assessment of current regulatory status

OK from our reading

No clear answer found

Not OK from our reading

## Safety & contaminants

Verify safety/contaminants

*But it seems there is no hazardous residues in the final inputs or algae biomass*

→ Go **GREEN** ?

		CO2 sources			Characteristics		A	B	C	D <sup>2nd Feed</sup>		E	F	G		H
							Food	PetFood	Feed	Aquafeed	Other ?		Agriculture	Bioplastic (GreenChemistry)		
														Food Grade	Other	
1.	<b>Biogas + purification stage (PSA, membrane, cryo, ...)</b>															
1.1.	100% Agriculture (energetic crops, food)			VOC												
1.2.	Waste water															
1.2.1.	Agri-Food industries				V	V	V	V	V	V				V		
1.2.2.	Other industries															
1.2.3.	Municipal			VOC, heavy metals traces, ...				V								
1.3.	Landfill															
1.3.1.	Non hazardous waste (ISDND french)			VOC, heavy metals traces, ...				V								
2.	<b>Fermentation gas</b>															
2.1.	Agriculture (wine, ethanol, silage, ...)			100% agricultural inputs												
2.2.	Other fermentation															
3.	<b>Hydrothermal Gasification</b>															
3.1.	Waste water - hydrothermal gasification			0% hazardous residues												
3.1.1.	Agri-Food industries							V						V		
3.1.2.	Industrial effluent - other							V								
3.1.3.	Municipal							V								
3.2.	Landfill			0% hazardous residues												
3.2.1.	Non hazardous waste (french ISDND)							V								
4.	<b>Syngas from Gasification/Pyrolysis</b>															
4.1.	Biomass (wood, agriculture, natural inputs, ...)				V	V	V	V	V	V			V			
4.2.	Traditional waste (CSR, sludge, ...)												V			
5.	<b>Combustion + purification stage</b>															
5.1.	CSR (french for refuse-derived fuel RFD)			Dioxins, heavy metals, ...									V			
5.2.	WWTP (sludge)			Dioxins, heavy metals, ...									V			
5.3.	Biomass												V			
6.	<b>Mineralisation (Solid form of CO<sub>2</sub>)</b>															
6.1.	Carbonates combined with nutrients				V	V	V							V		
7.	<b>Other inputs (Water, Minerals &amp; Chemicals)</b>															
7.	<b>From gaseous state (chemical reaction)</b>															
7.1.	NOx (capture & filter regeneration)				V	V	V	V	V	V			V		V	
7.2.	Ammonium (NH4) salts (Sulfuric acid, ...)															
7.2.1.	100% agriculture biogas				V	V	V	V	V	V			V	V	V	
7.2.2.	Agri-food pure biowaste, Food industries waste water				V	V	V	V	V	V			V	V	V	
7.2.3.	Other inputs (municipal waste water, landfill)				V	V	V	V	V	V			V	V	V	
7.3.	...															
8.	<b>Liquid and solid state</b>															
8.1.	Aquaponie (waste water reuse for nutrient & water recovery)								V	V			V			V
8.2.	Liquid exhaust from hydrothermal gasification				V	V	V	V	V	V			V			V
8.3.	Lagune (STEU – waste water reuse / eutrophisation)								V	V			V			V
8.4.	Struvite (STRUBIAS)															

# THANK YOU





## **CONTACT**

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