




Specialty Bio-Chemical Expertise

HPD[®] Evaporation and Crystallization

WATER TECHNOLOGIES



Veolia Capabilities for Bio-Chemical Producers

Specialty Bio-Chemical Expertise

HPD® Evaporation and Crystallization systems from Veolia Water Technologies provide innovative process solutions for the production of organic specialty chemicals

These systems allow production of a wide range of high-quality chemicals such as:

Organics

- Ethanol
- Succinic Acid
- Acrylic Acid
- Malic Acid
- Methionine
- Caprolactam
- Lactic Acid
- Glyphosate
- Bisphenol A

Inorganics

- Boric Acid
- Titanium Dioxide

Byproducts

- Ammonium sulfate
- Sodium sulfate
- Sodium chloride
- Ammonium acetate
- Gypsen/Calcium sulfate
- Ammonium thiosulfate

Specialty Chemicals Project Capabilities

- More than 95 years of industrial evaporation and crystallization experience
- Process Development of customized solutions with extensive laboratory and pilot testing facilities including in house analytical capabilities
- Materials of construction for corrosive operating environments
- Global turnkey project execution, modularized supply, and process guarantees

A Preferred Partner for Project Development

- In-house Research & Development Center
- Expertise in FEED or phased engineering contracts for challenging process designs and highly complex projects
- In-house, cross-discipline teams including process, mechanical, electrical/instrumentation, structural and civil engineering

Process Equipment

Evaporator Technologies:

- Thermal Vapor Recompression evaporator
- Mechanical Vapor Recompression evaporator
- Multiple Effect evaporator
- Multiple Effect Distillation evaporator
- Long-tube Vertical (Rising-Film and Falling-Film) evaporator
- Forced Circulation evaporator
- Calendria evaporator
- Multi-stage Flash evaporator
- Horizontal Spray Film evaporator

Crystallizer Technologies:

- Draft Tube Baffle (PIC™) crystallizer
- Vacuum crystallizer
- Cooling crystallizer
- Forced Circulation crystallizer
- Growth™ (Oslo type) crystallizer
- Reactive crystallizer
- Adiabatic Flash crystallizer
- Calendria crystallizer



Research & Development Center

A world-class, 50,000+ square-foot research facility is dedicated to support new process development for Veolia's HPD® Evaporation and Crystallization Technologies. These capabilities provide clients with the confidence that the commercially installed system will perform as designed.

- Complete range of analytical, bench and pilot-scale testing capabilities
- Detailed sample and product analysis
- Extensive cataloging of physical and chemical pilot evaluations and critical design data
- Development of commercial processes based on new, unknown feed stocks to define product specifications

We are the specialists of new product and chemical compound development in partnership with our clients.



Conventional Bio-Chemical Processes

Raw Materials



Petroleum



Natural Gas

O_2 , N_2

SO_2



Corn

Commodity Chemicals

Benzene

Xylene

Toluene

Butane



Oil

Secondary Commodity Chemicals

Ethyl Benzene

Cyclohexane

Cumene

p-Xylenes

Isobutylene
Butadiene

Biobased Syn G

Styrene

Phenol

Methanol

Intermediates

Polystyrene

Bisphenol A

Fertilizer

Ether

Uses



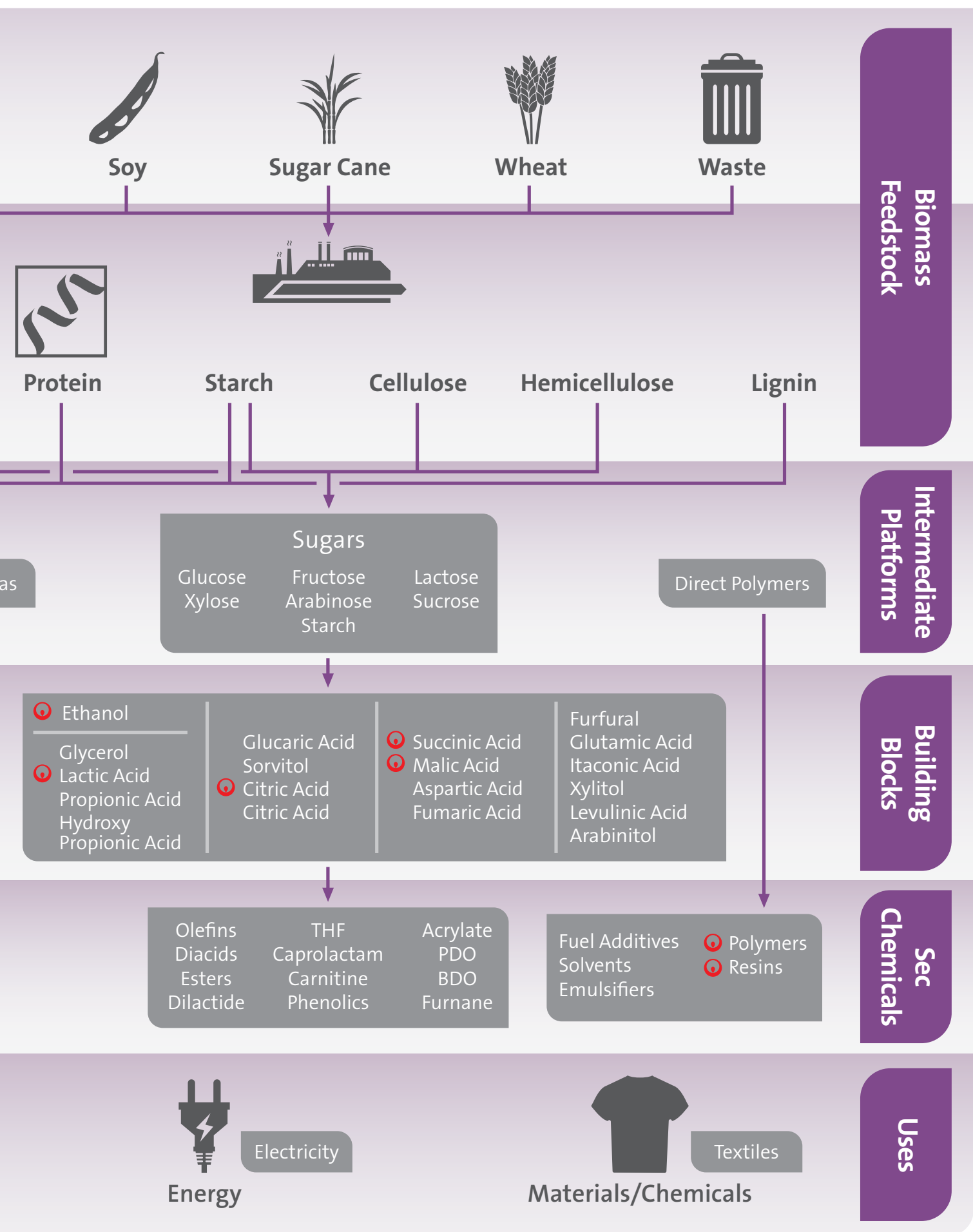
Food

Food Oil



Feed

Fish



Biomass Feedstock

Intermediate Platforms

Building Blocks

Chemicals

Uses



Sugars

Glucose	Fructose	Lactose
Xylose	Arabinose	Sucrose
	Starch	

Direct Polymers

<ul style="list-style-type: none"> Ethanol Glycerol Lactic Acid Propionic Acid Hydroxy Propionic Acid 	<ul style="list-style-type: none"> Glucaric Acid Sorvitol Citric Acid Citric Acid 	<ul style="list-style-type: none"> Succinic Acid Malic Acid Aspartic Acid Fumaric Acid 	<ul style="list-style-type: none"> Furfural Glutamic Acid Itaconic Acid Xylitol Levulinic Acid Arabinitol
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<ul style="list-style-type: none"> Olefins Diacids Esters Dilactide 	<ul style="list-style-type: none"> THF Caprolactam Carnitine Phenolics 	<ul style="list-style-type: none"> Acrylate PDO BDO Furnane
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<ul style="list-style-type: none"> Fuel Additives Solvents Emulsifiers 	<ul style="list-style-type: none"> Polymers Resins
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Energy

Electricity

Materials/Chemicals

Textiles

Resourcing the world

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