



Introducing Novagreen

December 2012

Novagreen-Presentation

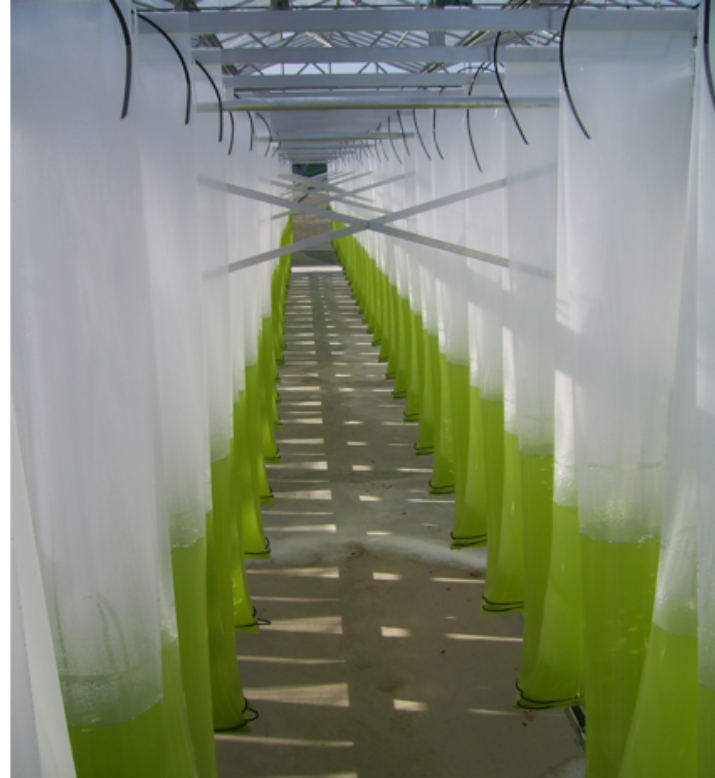
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Dipl.-Ing. Rudolf Cordes



Novagreen in a minute

1. Developer and producer of microalgal production facilities
 - V-reactors
 - H-reactors
 - Harvesting/post-harvesting technology
2. Project Development for microalgal production sites
 - Luxembourg, Russian Federation
 - Ahlhorn, Bassum, Gardelegen/Gatersleben, Germany
3. Production of microalgae for:
 - Food, Feed, Nutraceuticals, Cosmetics, Pharmaceuticals
 - Biological standards, transgenic microalgae
 - Nanostructures, anti-cancer compounds, fibers

Technology: The V-System



Today the V-System is considered the Gold Standard

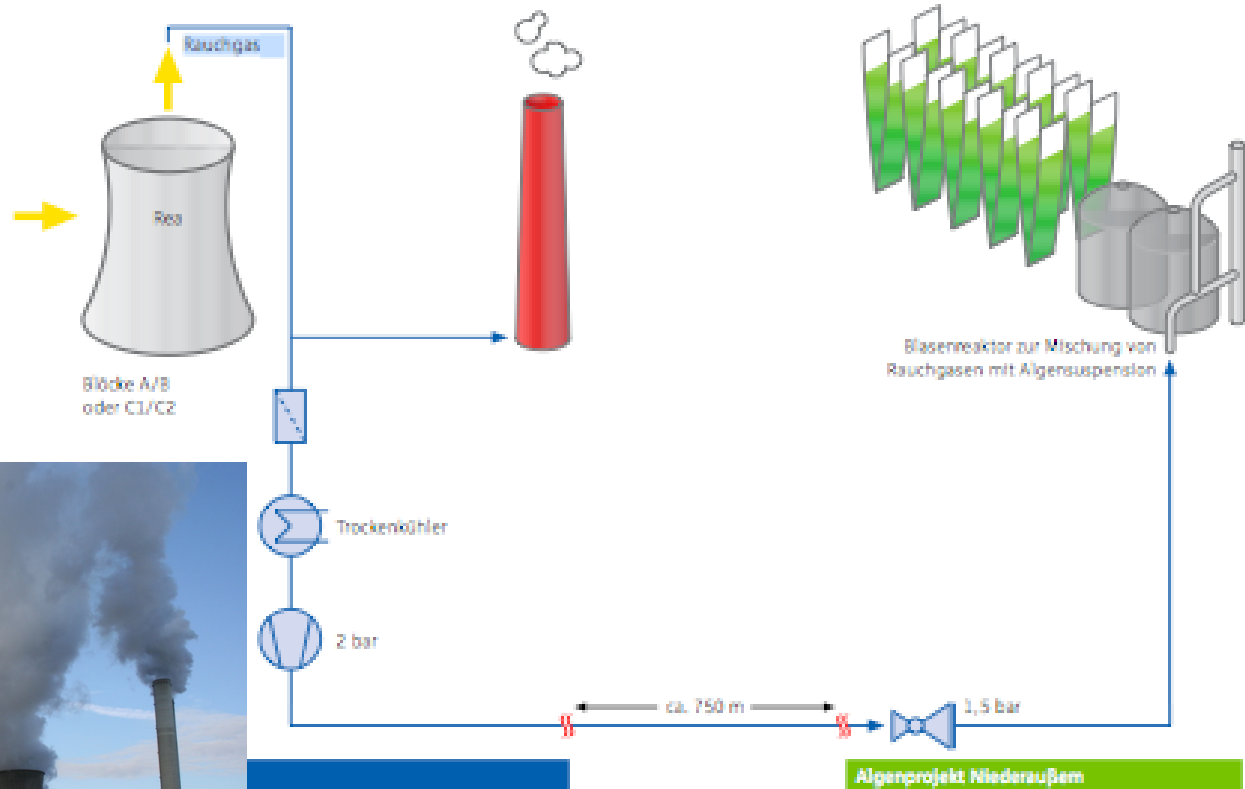
Technology: V-System



NOVAgreen

NOVAgreen

RWE Project: Basic Principle



RWE Project



An inside view

RWE Project



1000 m² Bioreactor at RWE Powerplant

Versatility of V- System:

Microalgae

Chlorella

Nannochloropsis

Haematococcus

Scenedesmus

Dunaliella

Isochrysis

Pavlova

Rhodomonas

....



Cyanobacteriae

Spirulina platensis

Spirulina maxima

Filamentous algae

Spirogyra

Oedogonium

Alearo/Aufwind

Jetfuel aus Algen

FZ-Jülich

EADS

RWTH Aachen

OMV

FH Lausitz

Fraunhofer Gesellschaft

andere

FP7 Biorefinery

Value-added ingredients from algae and energetic conversion of the rest

Copenhagen University (DK)

University of Warwick (GB)

University of Aalborg (IS)

ITN Marie Curie

„Photocomm“

Terpenoide, anti-cancer products in algae and cyanobacteria

Uni of Copenhagen (DK)

Uni of Warwick (GB)

Univ. of Turku (FIN)

University of Freiburg (D)

Algaefuel (P)

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ITN Marie Curie

„Redirect“

Terpenoide, anti-cancer molecules

Copenhagen University(Dk)

Uni of Warwick (GB)

INRA (F)

University Hopsital

Groningen (NI)

University of Aureyri (IS)

FP7 Synthetic Biology

New organisms to produce high value ingredients

University of Cambridge (GB)

Israel Institute of Technology (Isr)

Woods Hole Oceanographic Institute (USA)

University of Glasgow (GB)

Copenhagen University (DK)

John Innes Center (GB)

Max Planck Gesellschaft (D)

ERANET: PlantPower

Synthetic pathways in algae, chloroplasts and mosses

UC Berkeley (USA)

Copenhagen University(DK)

University of Warwick(GB)

Evolva Biotech (DK)

Leo Pharma (DK)



AlgaeFermFeed

Production of algae, use as feedstuff after fermentation

University of Aarhus (DK)

Various Danish research organisation

Deutsche Rentenbank

Production of algae, use as feedstuff after fermentation

Hochschule Osnabrück (D)

Various Danish research organisation

Algen-Hydrozyklon zur N- und P- Reduktion

Nachwachsender Rohstoff der Zukunft

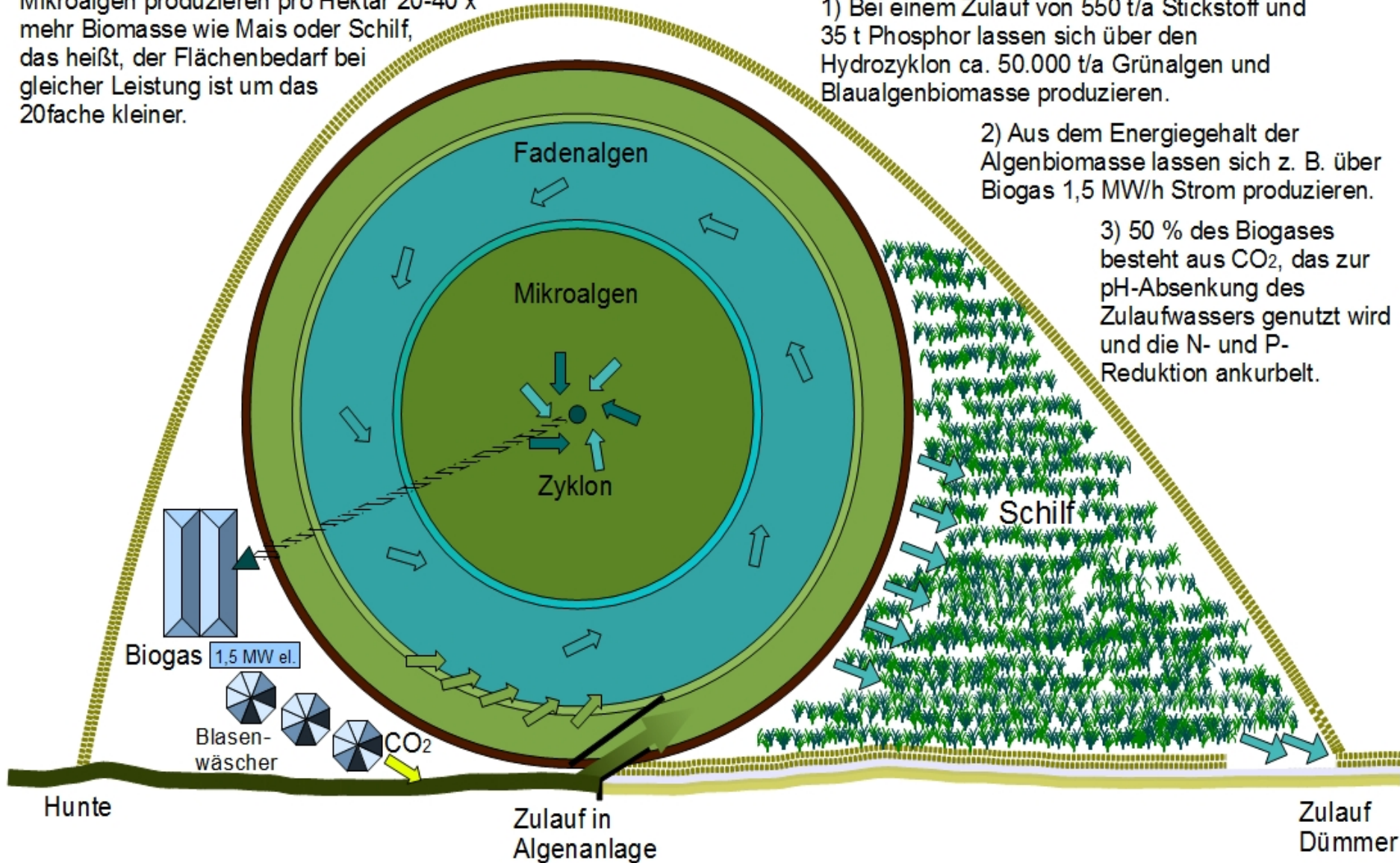
Mikroalgen produzieren pro Hektar 20-40 x mehr Biomasse wie Mais oder Schilf, das heißt, der Flächenbedarf bei gleicher Leistung ist um das 20fache kleiner.

Projektskizze Dümmer

1) Bei einem Zulauf von 550 t/a Stickstoff und 35 t Phosphor lassen sich über den Hydrozyklon ca. 50.000 t/a Grünalgen und Blaualgenbiomasse produzieren.

2) Aus dem Energiegehalt der Algenbiomasse lassen sich z. B. über Biogas 1,5 MW/h Strom produzieren.

3) 50 % des Biogases besteht aus CO₂, das zur pH-Absenkung des Zulaufwassers genutzt wird und die N- und P-Reduktion ankurbelt.



Filamentous Algae





Biofuels from (Micro)algae

Novagreen is provider of:

Three Installations V-System

One Installations H-System

Greenhouse production sites, partly co-financed via PV

Regulatory expertise

Complex water management system

Fertilizer from agricultural sources

Option: clean CO₂ from flue gas

Project Evaluation Dümmer?