Phytonix
Solar Chemicals™

- Low-Cost Butanol
- from Carbon Dioxide Emissions

Accredited Investor Presentation

April 2018

Gordon Skene, Chairman & Executive VP

Gordon@Phytonix.com

Focus: Industrial Butanol Market

$9 Billion/year

Plastics

Paints

Household Cleaners

Solvents

Perfume

Adhesives

N-Butanol = Normal Butanol = Butanol = C_4H_9OH

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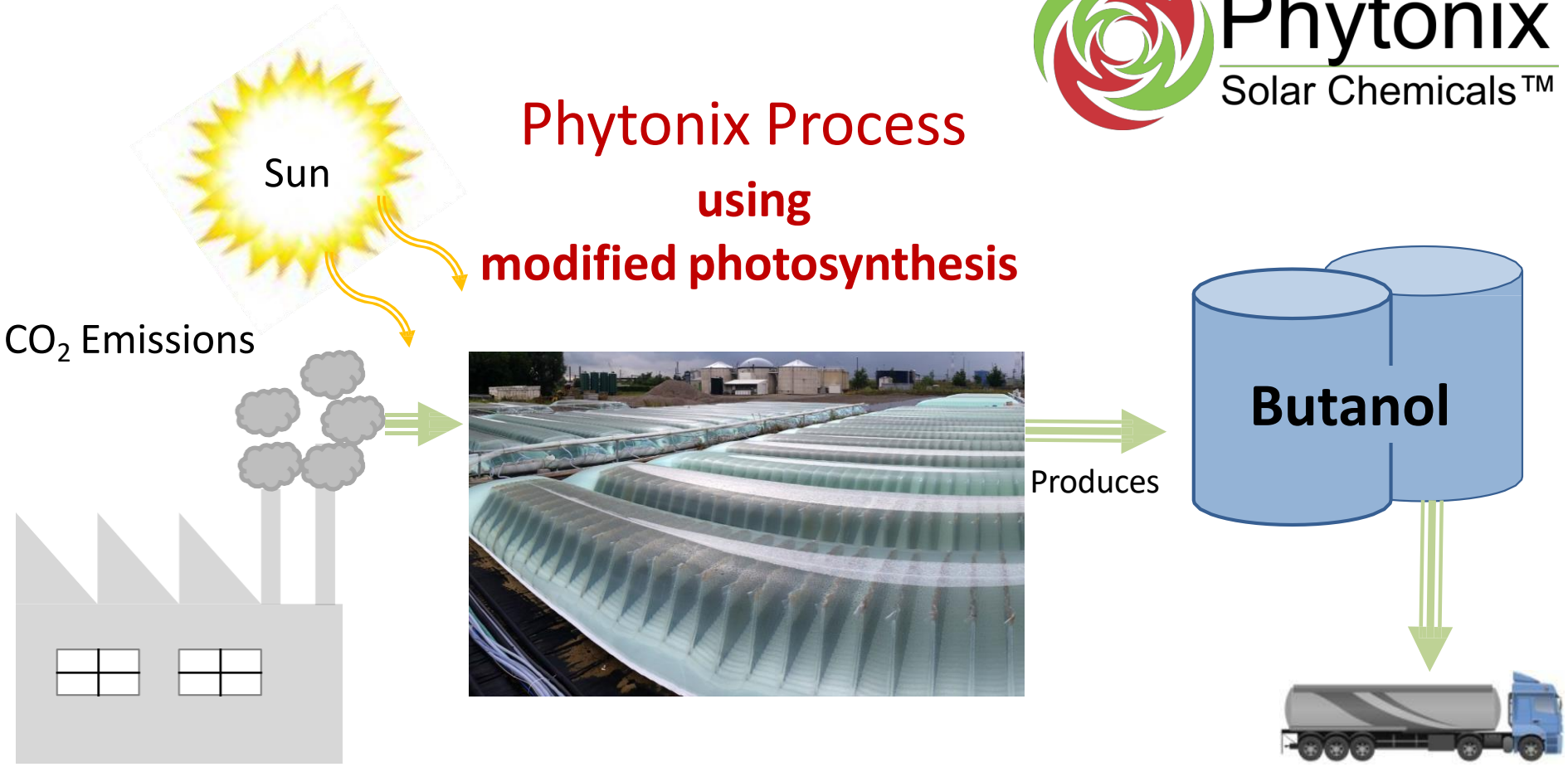
Phytonix Process
using
modified photosynthesis

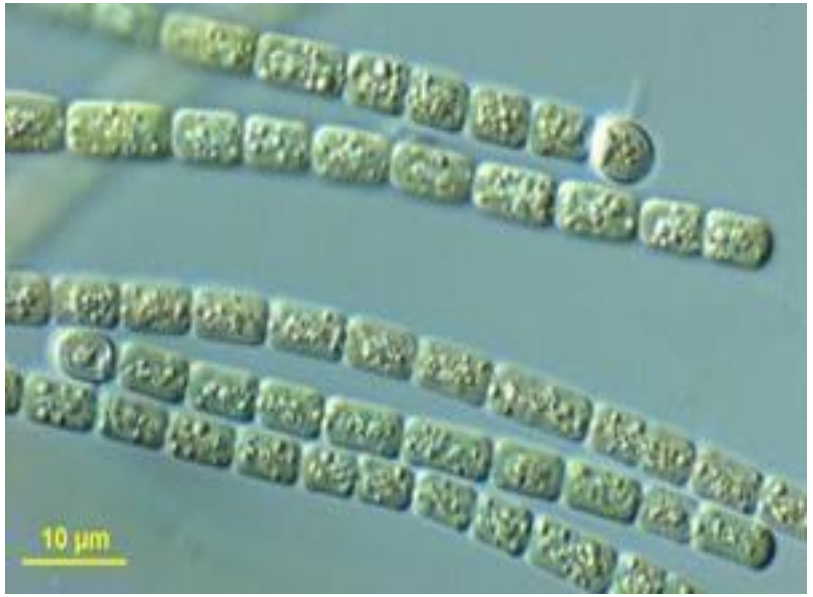


Estimated production cost
≈ $1.95/gallon

Wholesale Price
≈ $5.75/gallon
(Q1, 2018)

High-Value, High-Margin Product

Phytonix uses cyanobacteria to produce butanol from CO_2



Cyanobacteria are tiny photosynthetic plants found in:

- **Fresh water**
- **Salt water**

Phytonix genetically engineered cyanobacteria
consume CO_2 emissions to secrete 100% butanol

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Phytonix's Key Scientists

Angstrom Laboratory, Uppsala

Dr. Peter Lindblad

Dr. Pia Lindberg

World leaders in synthetic biology, photosynthesis and cyanobacteria to produce "solar chemicals".

All IP developed by Angstrom under contract is owned 100% by Phytonix.

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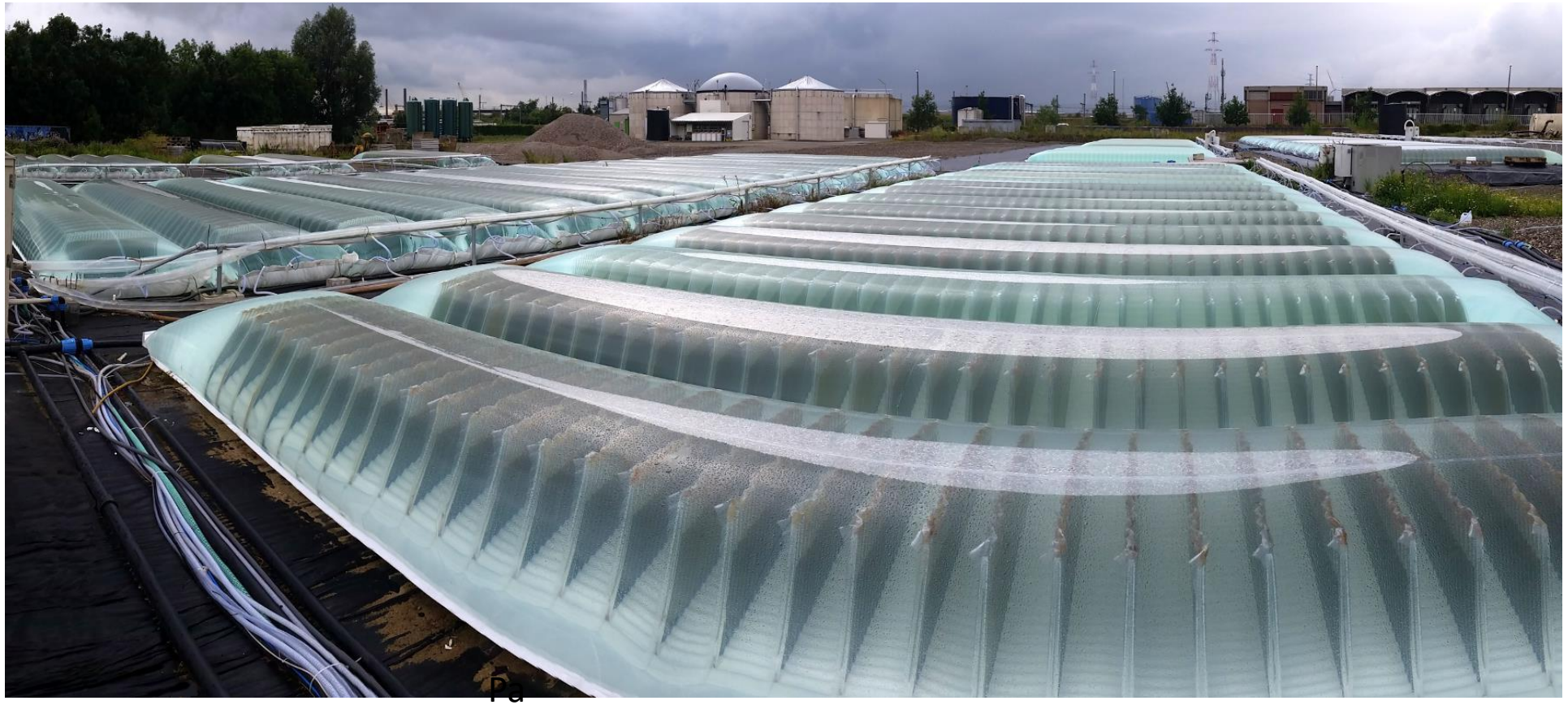
Photobioreactors (PBRs) to Grow Cyanobacteria – Proven



Cyanobacteria are cultivated in PBRs containing water.
Cyanobacteria consume CO_2 to produce pure butanol.

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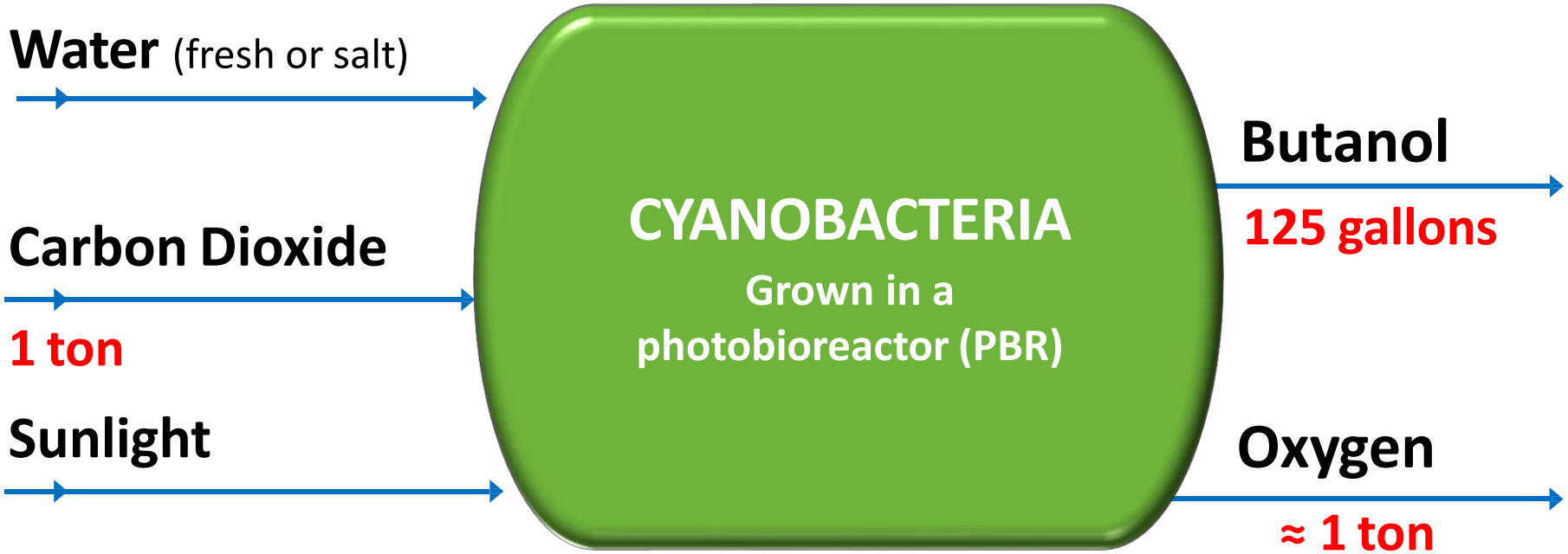
Carbon-Negative Process



Phytonix Photosynthesis Formula:

$$4CO_2 + 5H_2O + light \rightarrow C_4H_9OH + 6O_2$$

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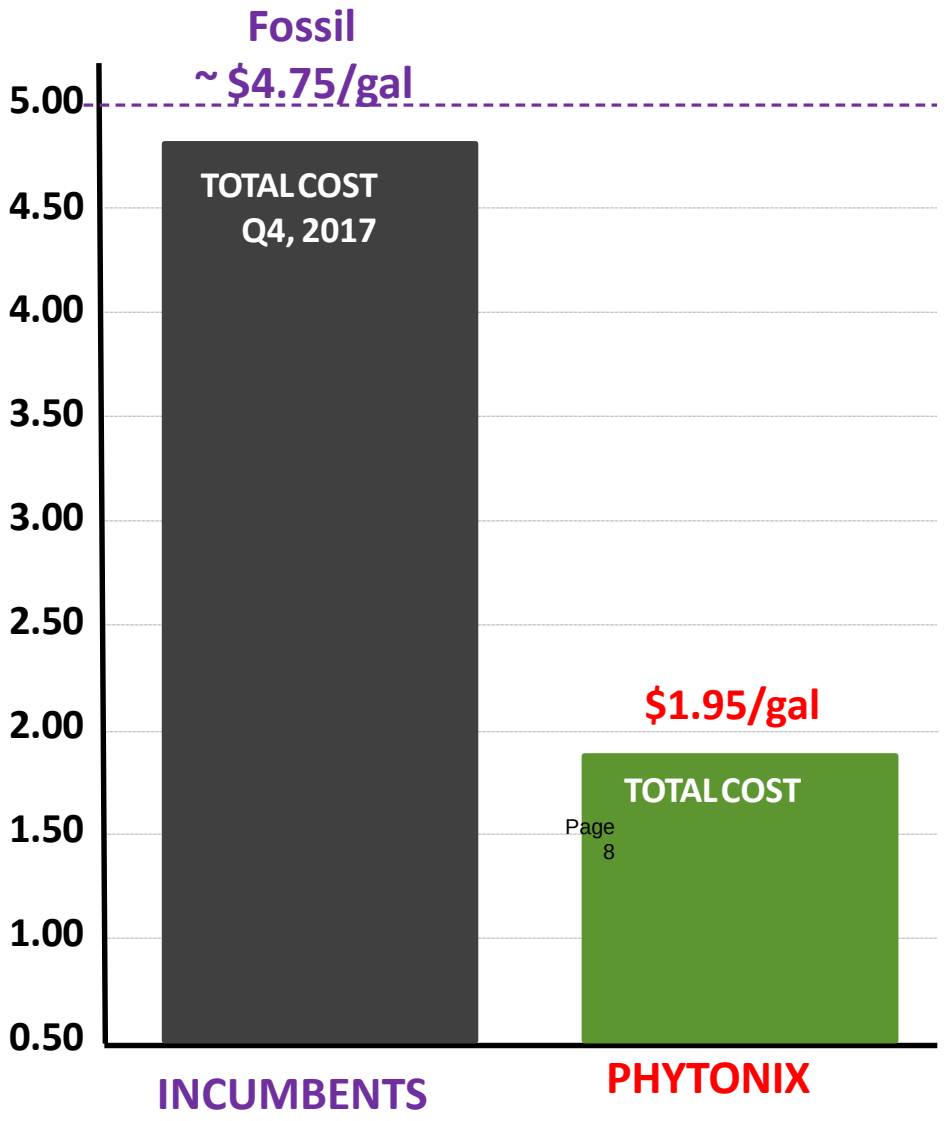
Phytonix: Low-Cost Butanol Producer



Incumbent Producers: Propylene feedstock cost (Q1/18) = $2.75/gallon of butanol

Phytonix CO_2 feedstock cost = $0.35/gallon of butanol

(assumes cost of CO_2 = $40/ton)

Competitors using propylene (BASF, DOW/DuPont, OXEA, Eastman, etc.)

- huge carbon footprint.

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Pilot Plants with Industrial Partners

Pilot plant projects initiated with 2 Industrial Partners

- ❑ **$5M+ of revenue from each pilot over 2½ years.**
- ❑ **Covers over 50% of our burn rate.**

- **Shaw Industries (CO_2 from natural gas power plant)**
  - **Pilot plant will be located in Columbia, South Carolina.**
- **European Power Co. (coal-fired power plants)**
  - **Pilot plant will be located in Europe.**
  - **1st progress payment (Sept. 2017) = $800K.**
- **Potential partner: Praxair Inc.**
  - **Plus CO_2 emitters in other industrial sectors.**

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Business Model at Commercial Scale

Large Industrials emitting CO_2 fund 100% of CAPEX

- ❑ **Minimizes dilution to Phytonix shareholders**

Returns to Plant Owners <u>after</u> Phytonix fees:

- **IRR ≥ 50%**
- ❑ **Payback < 2 years**

Phytonix <u>Recurring Revenue</u> from Plant Operations:

- ❑ **6% to 9% of butanol sales**
- ❑ **10% to 20% of Plant Pre-Tax Profit**
- ❑ **Consumables: cyanobacteria + PBR replacement parts**
- ❑ **Monetization of GHG reductions**

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Management Team

MANAGEMENT + BOARD OF DIRECTORS

- **Bruce Dannenberg** — **Founder & CEO**
- **Gordon Skene** — **Chairman & EVP**
- **Michael Weedon** — **Independent Director**
- **Rick Hopp** — **Independent Director**
- **Bill Cory** — **Independent Director**

TECHNOLOGY & ENGINEERING TEAM

- **Dr. Peter Lindblad:** — **Organism Development**
- **Patrick Neill:** — **Director of Engineering**
- **Dr. James Lee:** — **Phytonix, Business,**

Advisors with expertise in:

Chemicals Market, Climate Change Policy, Business, Finance, Synthetic Biology, Clean Technology.

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Mini-Pilot Plant to Produce Butanol

Producing butanol at mini-pilot scale indoors is a key step towards scaling the Phytonix process to large outdoor plants at customer sites.

CO_2 Feedstock

1,250 Litre Capacity LED PBR

Butanol Separation System

2-5 Litres per week of Butanol > 99% pure

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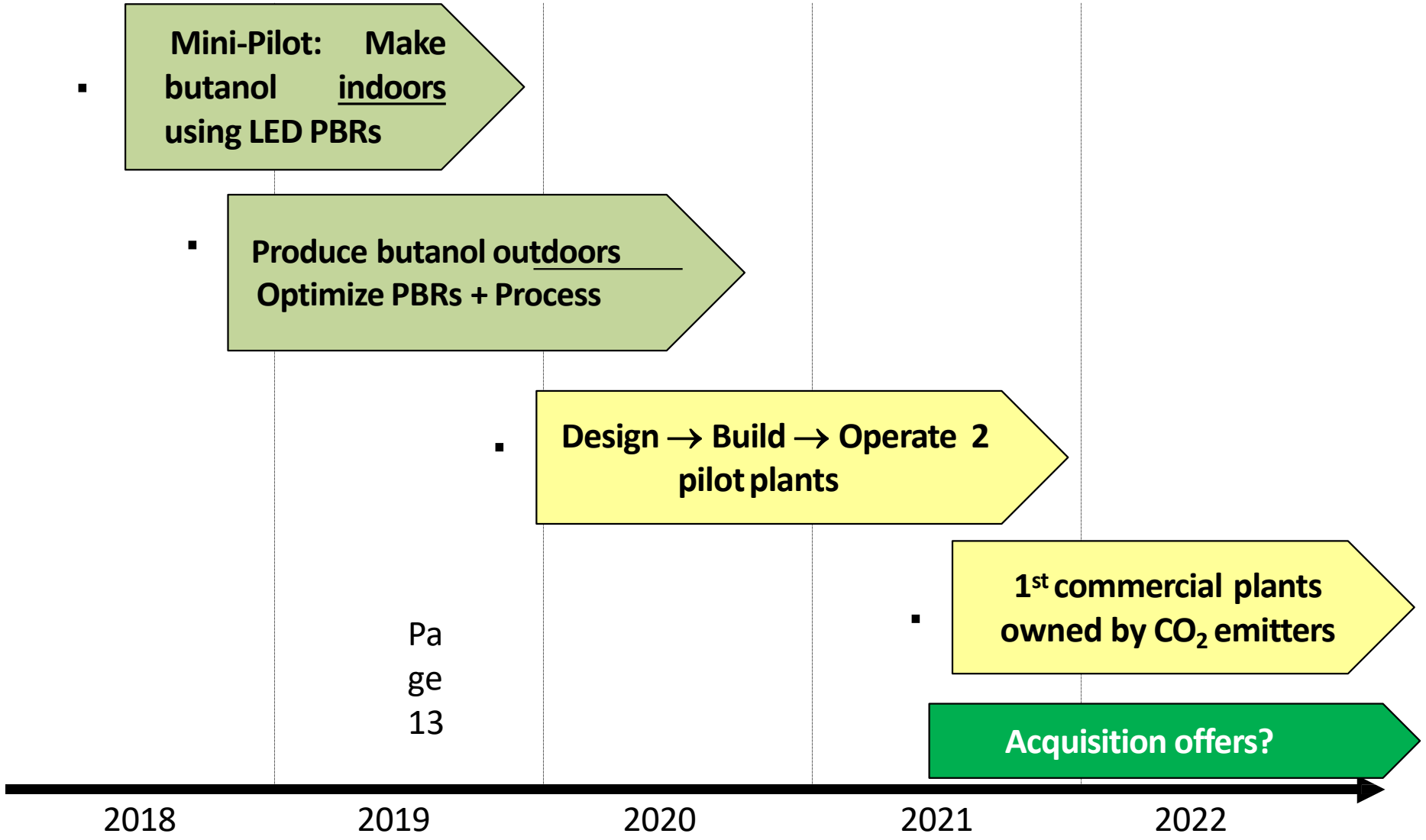
Scaling to Commercial Success



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2018 Equity Offering

Offering: $1,125,000

- 15,000,000 Common Shares
- $0.075/share
- Valuation = $13.0M
  173M shares pre-offering

Uses of Proceeds

- Process optimization
- Build Engineering Team
- Add'l Industrial Partners
- Engineer microbes at UBC to produce 2 new, high-value chemicals from CO_2
  - Grant from GenomeBC

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Keiretsu Due Diligence Report

Contact: swhitford.phytonix@gmail.com

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Investor Liquidity

Prime acquisition candidate.

Potential return: 26X to 40X

Based SOLELY on the industrial butanol market.

Additional Solar Chemicals from CO_2 = Additional Value

For Further Information, please call:

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Backup Slides

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Estimated Value to a Chemical Co. with a 25% Share of the Industrial Market for Butanol

Estimated Savings & Acquisition Value	Valuation & Multiple Conservative	Expected
Cost Savings/gallon	$1.75/gallon	$2.60/gallon
Annual Cost Savings (400M gal)	$0.70 B/year	$1.04/gallon
Cost Savings over 15 years	$10.5 B	$15.6 B
Present Value of Cost Savings (25% disc. rate)	$2.7 B	$4.0 B
Estimated Acquisition Value = 30% of PV	$0.8 B	$1.2 B
Per Share	$2.00/sh.	$3.00/sh.
Multiple on $0.075/sh.	26X	40X

- Maximum estimated shares o/s at acquisition = 400 million (fully-diluted)
- Acquisition Value **based solely** on the industrial butanol market.

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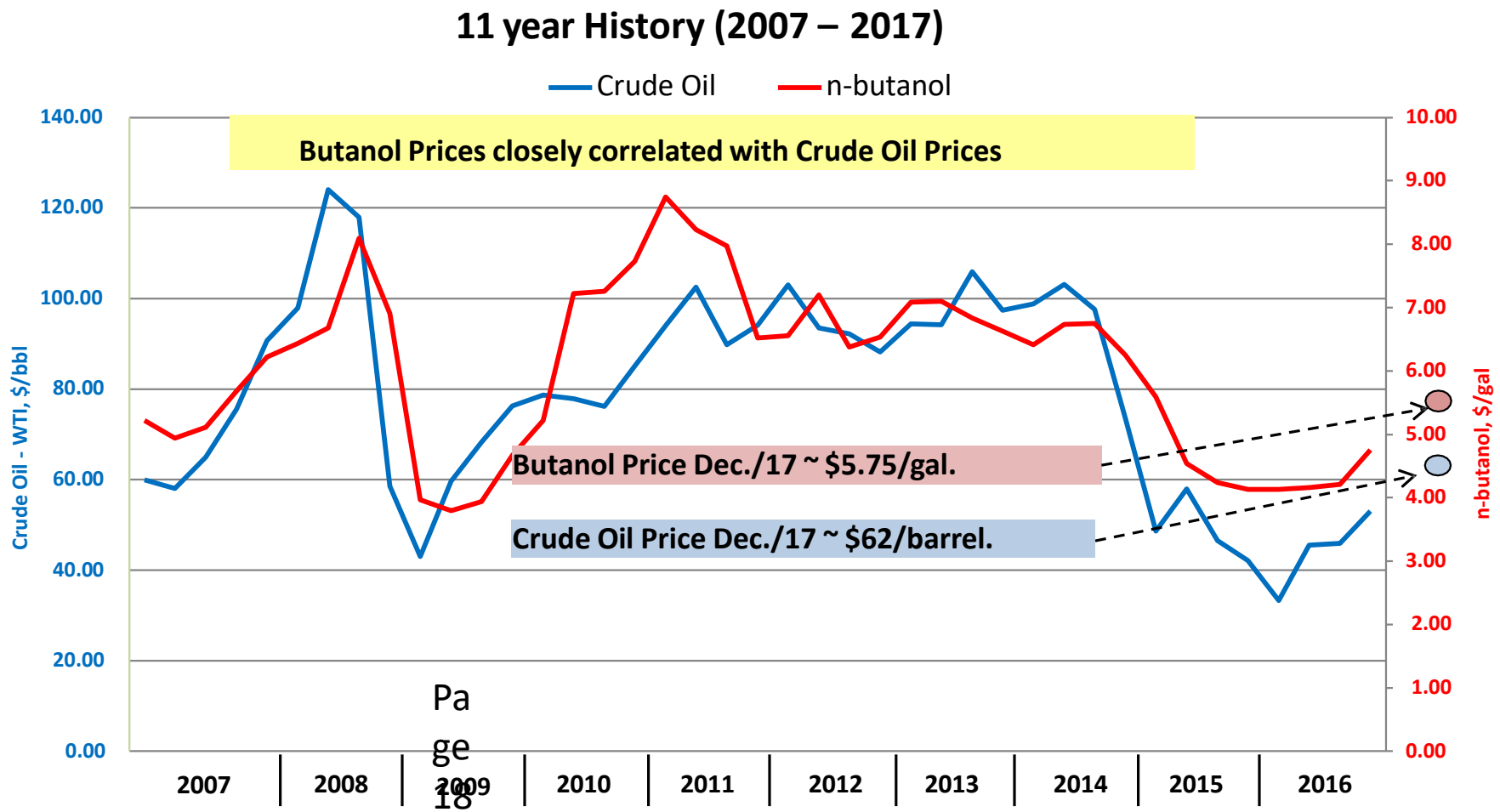
US Wholesale Price Butanol & Crude Oil



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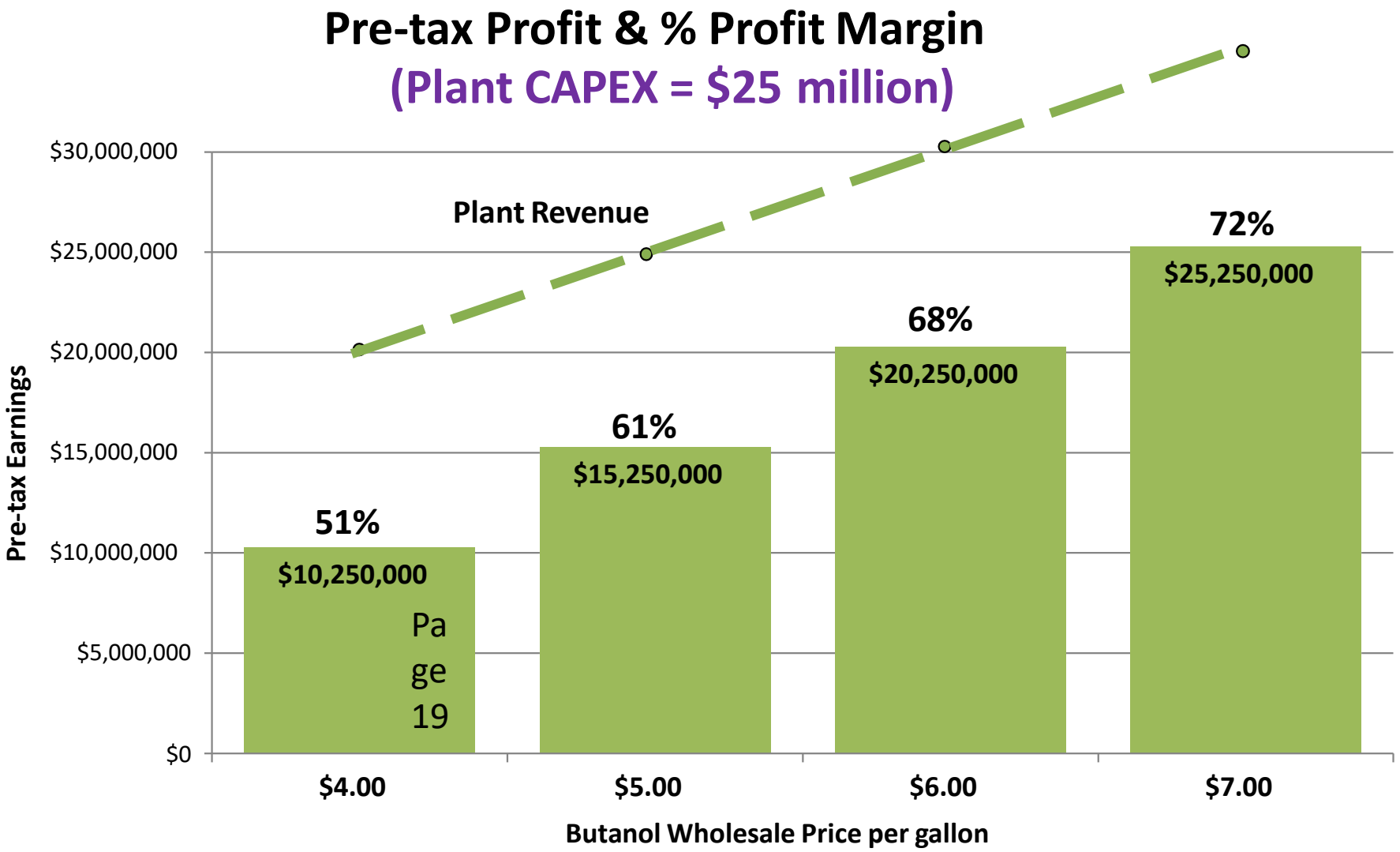
Plant Profit vs. Butanol Price

(5.0M gal/year plant. Production cost est. = $1.95/gallon)



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Phytonix is NOT a biofuel company!

- **Fuels are a low-price, low-margin market.**
- **Wholesale Prices USA (Q1, 2018):**
  - **Gasoline** **≈ $1.70 - $1.75/gallon**
  - **Ethanol** **≈ $1.40 - $1.50/gallon**
  - **Butanol, an industrial chemical** **≈ $5.75/gallon**
- **Potential future Phytonix biofuel market for butanol:**
  - Approved for a 16% blend with gasoline. $200 billion/year.
  - Gasoline engines can run on 100% butanol. $900 billion/year.

Phytonix will initially pursue high-margin, industrial markets for butanol and other solar chemicals.

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Other Phytonix Industrial Chemicals Market > $20 Billion per year

Phytonix can genetically engineer cyanobacteria to produce other valuable industrial chemicals from CO_2

- Iso-butanol
- Pentanol and Iso-pentanol
- Hexanol, Heptanol & Octanol
- Medium & long chain fatty acids: (C_8 octonoic acid, C_{16} palmitic acid, and C_{18} linolenic acid)
- Plus many other chemicals

Multiple chemicals = multiple liquidity events

International Patent Portfolio

UNITED STATES PATENT	**Patent No. US 8,735,651 issued in 2014** *"Designer Organisms for Photobiological Butanol Production from Carbon Dioxide and Water"*
OTHER MAJOR MARKETS	**EU, Eurasia, Australia, South Africa and Hong Kong patents issued** **Patents expected in other major markets**
PATENT COST	**Over $800,000 invested to secure Phytonix patents**

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Phytonix Patent Protection

Key features include:

- Ability to inducibly over-express or disable (under-express) the starch hydrolysis and glycolysis (cyanobacteria food production) pathways.
  This provides a strong barrier to entry.

- *Without the ability to turn the glycogen pathway on and off, the chemical synthesis pathway would directly compete with the organism's glycogen (food) pathway, severely limiting the production of butanol.*

- Ability to halt cell division/replication.

- Ability to maximize the reducing power of ATP and NADPH to increase photosynthetic conversion efficiency.

- Proprietary alternative genetic pathways (specific DNA codes) for the synthesis/production of n-butanol.

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Butanol Competition

- **Incumbent fossil-based producers**: BASF, DOW/DuPont, OXEA, Eastman, etc.
  - Expensive, carbon intensive and energy intensive.

- **Fermentation/bio-based producers**: Gevo, Butamax, Cobalt Technologies, Green Biologics
  - Biomass feedstock = expensive, generates CO_2 as a waste product.

- **Phytonix solar-based production:**
  - CO_2 feedstock = very low-cost process, with low energy cost.
  - Highly carbon-negative process.

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Management Team

SENIOR MANAGEMENT + BOARD OF DIRECTORS

Mr. Bruce Dannenberg: Founder, President & CEO. Director. Expertise in commercialization, genetics,

and microbiology, Degrees in Zoology, industrial management (M.S.) & MBA.

Mr. Gordon Skene: Chairman & Executive Vice President. Former CEO of several technology companies and of a VC technology fund. BSc. (Physics & Economics). MSc. Business Administration (Finance). Former Director of Finance for an industrial corporation with sales of $3 billion, listed NYSE.

Mr. Michael Weedon: Independent Director. Former COO of a large chemical company with 25 years of

experience in finance, clean technology and senior management. MBA, Western Ontario.

Mr. Richard Hopp: Independent Director. Over 30 years experience in conventional, and renewable

energy, biomass and in advancing companies from concepts to commercial realities. MA in Admin.

TECHNOLOGY & ENGINEERING TEAM

Dr. Peter Lindblad: Phytonix Technology Director, Organism Development. Director of the Ångström Laboratory and Professor of Microbial Chemistry & Molecular Biology at Uppsala University.

Mr. Bill Cory: Independent Director. Process engineer with 30 years experience in operations mgmt.,

strategic planning and finance. Former executive with Sun Microsystems and Atari. MBA Stanford.

Patrick Neill P. Eng.: Phytonix Director of Engineering: Experienced engineering manager in the

water/wastewater industry, including commercializing new technologies. Formerly with Honeywell.

Dr. James Lee: Phytonix Inventor & Scientist: Expertise and degrees in photosynthesis, plant

physiology, biochemistry, and synthetic biology (Cornell).15 years at Oak Ridge National Lab.

Board of Advisors

Mr. Michael Macdonald: Former Senior Vice President, Global Operations, Methanex Corporation, responsible for all manufacturing activities including eight methanol plants.

Dr. Victor Der: Executive Adviser, Global Carbon Capture and Storage Institute. Former Assistant Secretary, US Department of Energy, leading initiatives in clean coal, carbon capture, and oil & gas R&D. Former Chair of the Carbon Sequestration Leadership Forum Policy Group.

Mr. Peter Hoyle: Product Manager of Quadra Chemicals, a leading North American distributor of industrial chemicals including butanol. Consultant on renewable resources in industrial applications as replacements to hydrocarbon-based materials.

Mr. John Robertshaw: Industrialist and commercial real estate developer with a substantial real estate and private equity portfolio. An active investor in emerging technology companies.

Dr. Thomas Lee: Due diligence lead for the Tech Coast Angels, California (TCA). Anesthesiologist in Orange County, CA and Chairman of the Medical & Life Sciences Committee for the Orange County chapter of Tech Coast Angels (TCA-OC). MD, MBA, and BA (Chemistry).

Dr. David Glass: Extensive experience in regulatory affairs in industrial biotechnology, technology licensing and patent management, including obtaining MCAN-EPA approvals for field tests of genetically modified agricultural microorganisms and plants.

History

2008 - 2010	• Core technology invented by Dr. James Lee. • Phytonix acquires exclusive global technology rights.
2010 – 2012	• Phytonix contracts leading international experts to develop technology and build IP/patent portfolio.
2014	• **Phytonix scientists produce 100% n-butanol** from CO_2 using its proprietary engineered cyanobacteria. • **US patent issued** (No. US 8,735,651).
2015 - 2017	• EU, Eurasia, Australia, South Africa and Hong Kong patents issued. Other key markets to follow. • Pilot projects hosted and funded by 2 industrial emitters of CO_2 negotiated and 1st stage initiated.

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Estimated Butanol Production Cost versus Yield in grams/litre/week

Phytonix Plant Producing Butanol

Lab Yield (Grams/Liter/week)	Yield in Field (Gallons per Acre per Year) ("GPAY")	Unit Cost with $0.55/gallon contingency ($/gallon)
2	13,562	**4.20**
3	20,343	**2.99**
4	27,123	**2.38**
5	33,904	**2.01**
6	40,685	**1.76**
7	47,466	**1.59**
8	54,247	**1.46**

Based on Proviron Photobioreactors

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Phytonix Process Flow Diagram – Modified Photosynthesis To Produce Butanol

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