Ajay Kshatriya
General Manager

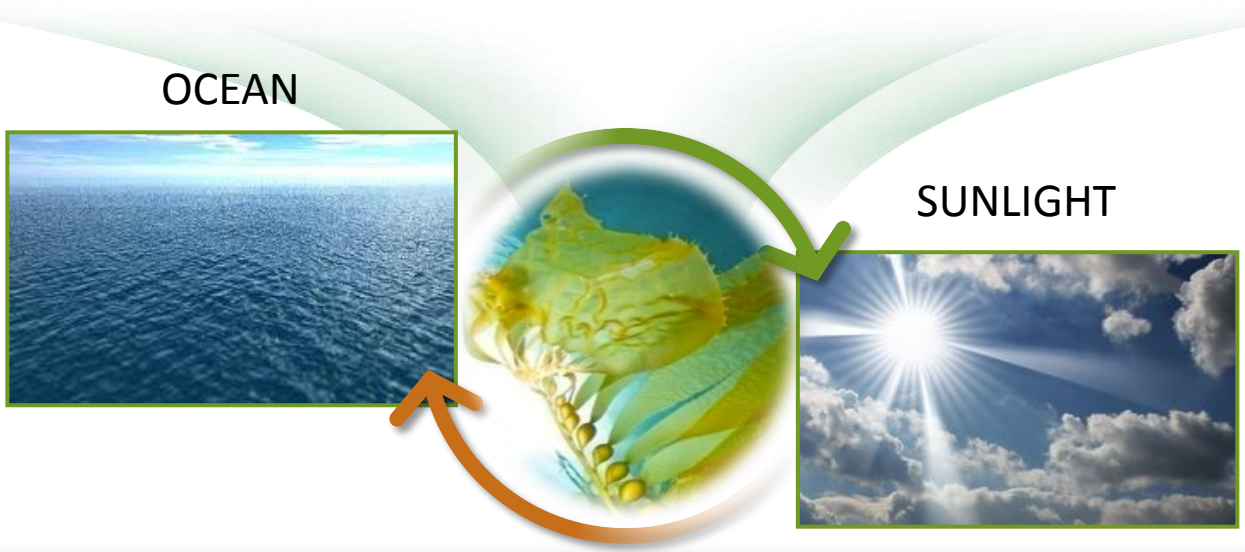
Renewable Products from Seaweed

October 10, 2012

Seaweed Is the Future of Feedstocks

Oil is affordable,
but unsustainable

The current renewable solutions
are not affordable or scalable



"Lowest Cost Producer" of Renewable Chemicals and Fuels

Seaweed Is Abundant and Sustainable

ABUNDANT

- One of fastest growing plants on earth
- Available worldwide
- 2 billion MT potential

SCALABLE

- 10 million MT currently produced
- Existing 5,000 Ha commercial scale farms
- Small repeating units

ENVIRONMENTAL

- No freshwater or fertilizer
- Low carbon footprint
- Cleans nutrient pollution

LOW COST

- No lignin to degrade
- Co-product opportunities
- High sugar content

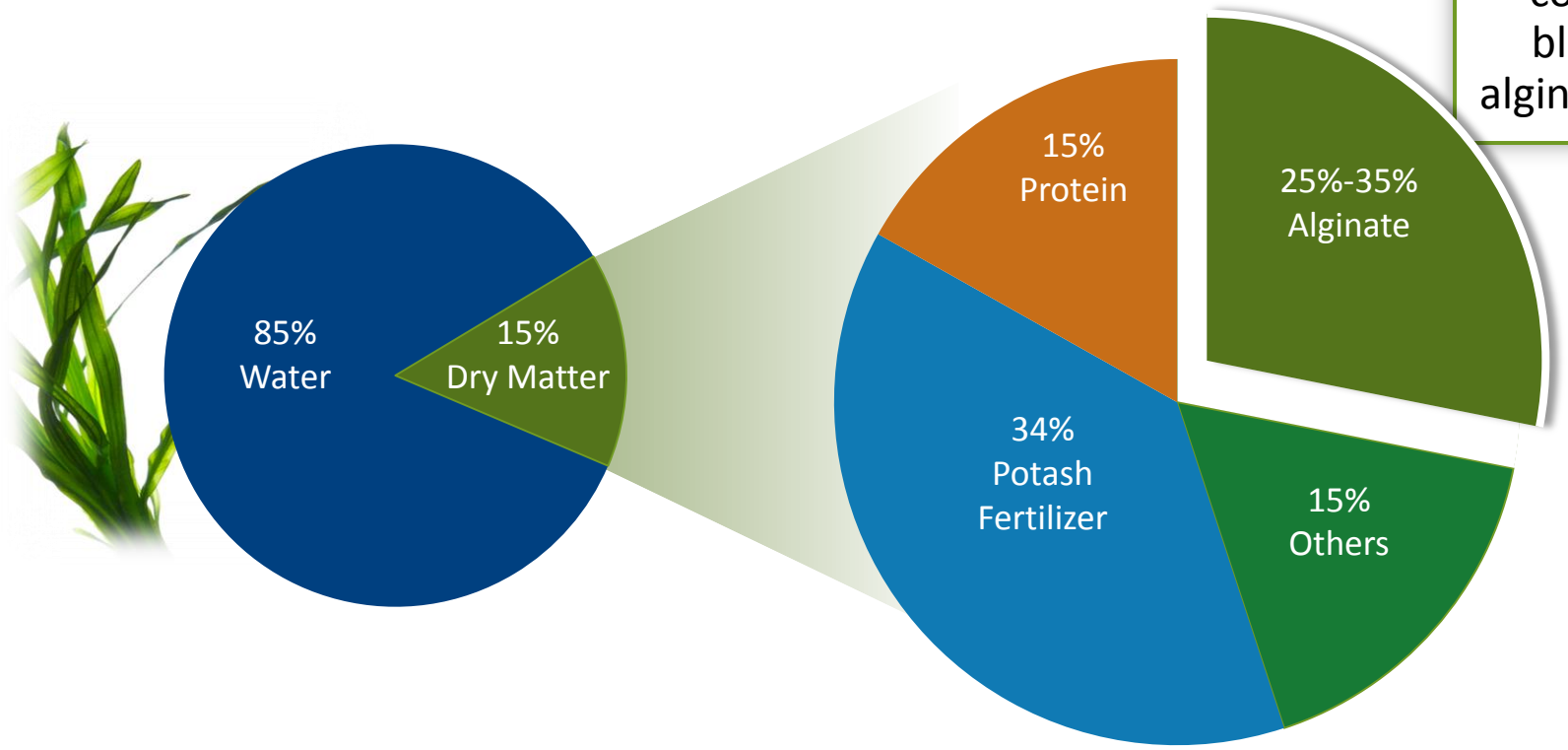
Experienced Management Team to Build and Grow a Successful Business

DANIEL TRUNFIO	Chairman and Chief Executive Officer
DR. RICHARD BAILEY	Chief Technology Officer
RIC LUCIEN	Chief Financial Officer
DR. YASUO YOSHIKUNI	Chief Science Officer
YUKI KASHIYAMA	General Manager, Global Biomass Sourcing
AJAY KSHATRIYA	General Manager, Chemicals
DR. CANDACE SWIMMER	Sr. Director, Research
DR. NICK OHLER	Sr. Director, Engineering

Commodity and Supply Chain	Biology and Chemistry Process Development	Scale-Up and Commercialization

Only Bal Has Technology to Unlock Seaweed's Full Value

Seaweed's High Value Composition



Bal is the ***only*** company with blocking IP on alginate conversion

Bal has the Technology for Simultaneously Producing Multiple Seaweed Products from a Single Process

Patented

Co-products

Protein (Animal Feed)

Potash (Fertilizer)

Alginate Intermediate

Catalysis

Patented

Chemicals

Patented

Fuels

Fermentation

Partner Products

Bal Technology Receives the Highest Honor

"Research Article"

An engineered microbial platform for direct biofuel production from brown macroalgae

Adam J. Wargacki[1,*], Effendi Leonard[1,*], Maung Nyan Win[1,*], Drew D. Regitsky[1], Christine Nicole S. Santos[1], Peter B. Kim[1], Susan R. Cooper[1], Ryan M. Raisner[1], Asael Herman[1,5], Alicia B. Sivitz[1,6], Arun Lakshmanaswamy[1], Yuki Kashiyama[1,2,3], David Baker[4], and Yasuo Yoshikuni[1, §]

Abstract

Prospecting macroalgae (seaweeds) as feedstocks for bioconversion into biofuels and commodity chemical compounds is limited primarily by the availability of tractable microorganisms that can metabolize alginate polysaccharides. Here, we present the discovery of a 36-kbp DNA fragment from *Vibrio splendidus* encoding enzymes for alginate transport and metabolism. The genomic integration of this ensemble, together with an engineered system for extracellular alginate depolymerization, generated a microbial platform that can simultaneously degrade, uptake, and metabolize alginate. When further engineered for ethanol synthesis, this platform enables bioethanol production directly from macroalgae via a consolidated process, achieving a titer of 4.7% vol/vol and a yield of 0.281 wt ethanol/wt dry macroalgae (equivalent to ~80% of the maximum theoretical yield from sugar composition in macroalgae).

Compelling Economic Model For a $150 Billion Market Opportunity

PRODUCT PORTFOLIO

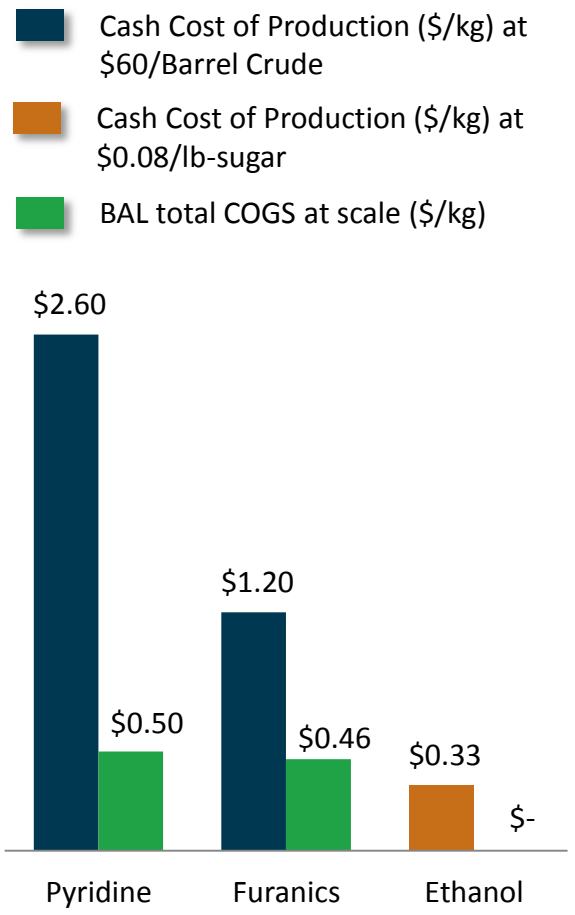
ETHANOL

Statoil

FURANICS

PYRIDINES

PRODUCTION COST



Bal Is Partnering With The World's Largest Seaweed Farmer For Scale-up

Xun Shan Group

- **Largest brown seaweed producer** in the world
- **10,000+ Ha of ocean concessions** for seaweed
- Existing commercial producer of alginate
- **1b in assets**, 3,000 employees
- Expressed interest in aquafarming beyond Chinese waters
- Existing commercial producer of alginate

PHASE I: SEAWEED JV

PHASE II: PRODUCTION JV

Our Strategy is to be the *"Lowest Cost Producer"* of Renewable Chemicals and Fuels

STRATEGY

Feedstock → **Conversion to Product** → **Distribution**

- Our low cost feedstock is delivered through high yield seaweed farming and industrial best practices
- Our low cost carbohydrate is delivered through a conversion process that utilizes a bio-refinery concept to extract maximum value from the feedstock

BUSINESS MODEL

Feedstock → **Conversion to Product** → **Distribution**

XUNSHAN

Statoil

- Partner with Seaweed producer
- Own the conversion of Seaweed into a commercially viable product
- Sell commercially viable product through commercial partner/distributor

Thank You!

VALUE PROPOSITION

- Bal can produce chemicals and fuels below cash cost of production which allows access to several multi-billion dollar markets.

BUSINESS MODEL

- Bal is a conversion company that will outsource biomass supply and leverage partnerships for the production and distribution of chemicals and fuels. Bal will commercialize chemicals in 2015.

EXECUTION

- Successfully executing on multiple components of the integrated supply chain from 'seaweed-to-products'.

STRATEGIC CONTROL POINT

- Bal has blocking IP (60+ patents filed in 16 countries) and has secured marquee international partners like DuPont, Statoil, and Xun Shan Group

WORLD-CLASS TEAM

- Experienced management team and scientific advisors with the expertise and proven track records of commercially scaling the business

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