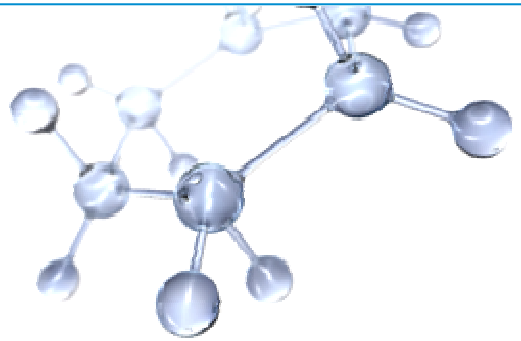
ExxonMobil

Taking on the world's toughest energy challenges.™

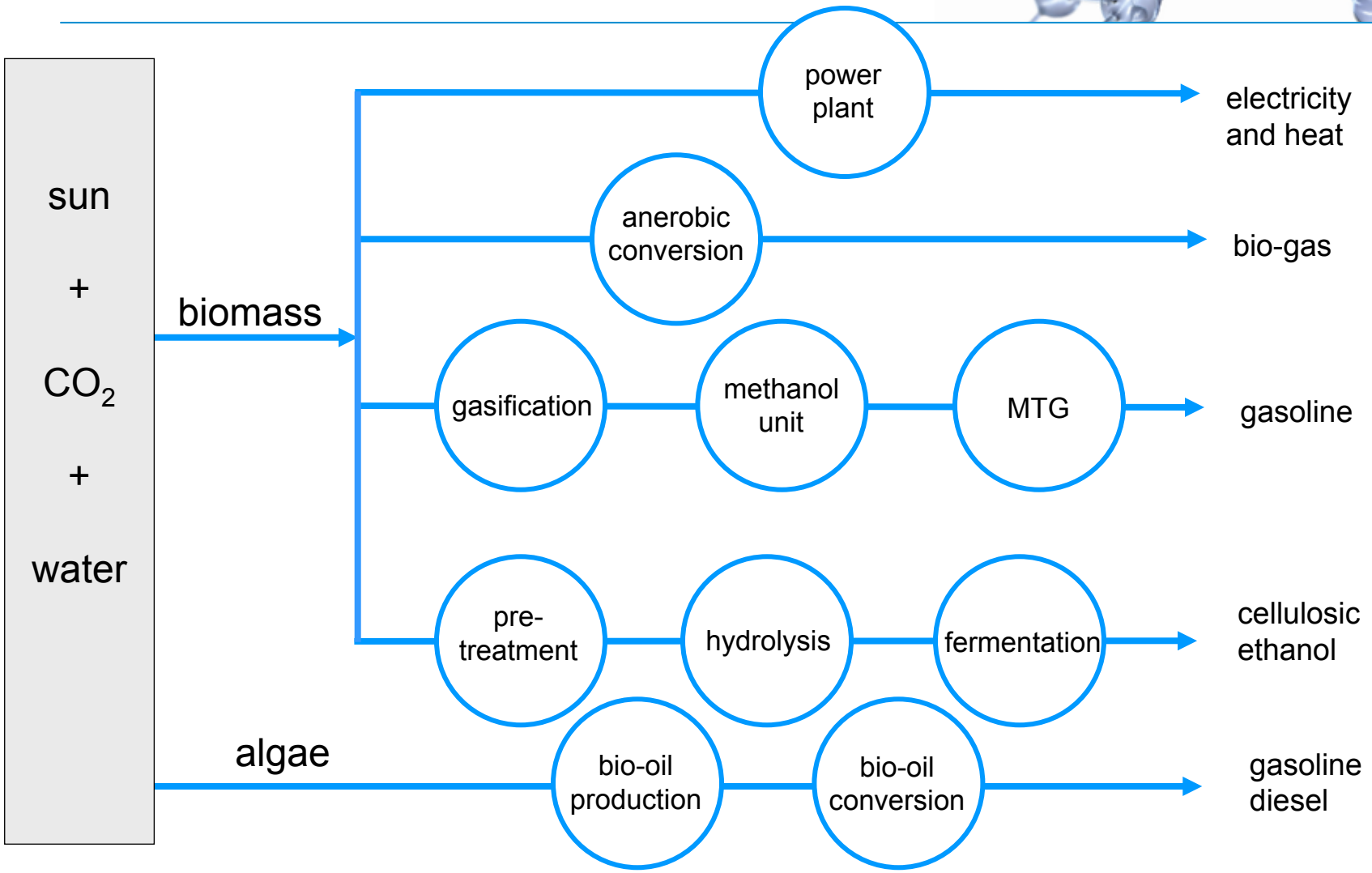


algae biofuels

David Stern

This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1 of ExxonMobil's latest report on Form 10-K). This material is not to be reproduced without the permission of Exxon Mobil Corporation.

many bio-energy pathways emerging



ExxonMobil
Taking on the world's toughest energy challenges.™

algae-based biofuels

- ExxonMobil alliance with Synthetic Genomics Inc
  - focus on development of advanced biofuels from photosynthetic algae
  - compliments ExxonMobil's ongoing efforts to advance breakthrough technologies to meet the world's energy challenges

Sunlight | **Carbon Dioxide** | **Water** | **Algae** | **More Algae Containing Hydrocarbons** | **Oxygen**

- benefits of using algae for biofuels production:
  - can be grown using land and water unsuitable for food production
  - potentially yield greater volumes of biofuels per acre than other biofuel sources
  - could be used to manufacture biofuels similar to today's transportation fuels
  - growing algae consume CO_2; algae-based biofuels could provide GHG mitigation benefits versus conventional fuels

ExxonMobil
Taking on the world's toughest energy challenges.™

algae-based biofuels – key challenges

- ExxonMobil and Synthetic Genomics will develop innovative solutions to the challenges of large scale production and commercialization of algae-based biofuels
  - identifying and developing algal strains that achieve high bio-oil yields at lower cost
  - determining the best production systems for growing algal strains
  - developing integrated systems required for full scale, economic production of biofuels
- if successful, algae-based biofuels could help augment the world's transportation fuel supply and assist in reducing greenhouse gas emissions

ExxonMobil
Taking on the world's toughest energy challenges.™

ExxonMobil – SGI alliance

algae growth → algae harvesting → bio-oil recovery → bio-oil transport & storage → bio-oil conversion → biofuel products

- R&D program
  - targets production of bio-oils from photosynthetic algae for conversion to advanced biofuels compatible with today's vehicle and fuels infrastructure
  - if R&D milestones are successfully met, ExxonMobil expects to spend more than $600M

ExxonMobil

- Leadership role in engineering, process development and scale up
- Key role in upgrading bio-oil produced by photosynthetic algae into finished products, and total process integration for development and commercial applications

SYNTHETIC GENOMICS®

- Leadership role in biological research for algae strain development, growth and harvesting
- Key role in bio-oil recovery research and development

conclusion

- population and economies will expand; energy demand and CO_2 emissions will rise
- integrated set of solutions required
  - increase efficiency
  - expand supply
  - mitigate emissions
- technology breakthroughs are critical
  - algae-based biofuels could contribute to set of solutions
- meeting this demand will require a global effort

ExxonMobil
Taking on the world's toughest energy challenges.™