Turning the promise of synthetic biology into commercial reality for health and energy

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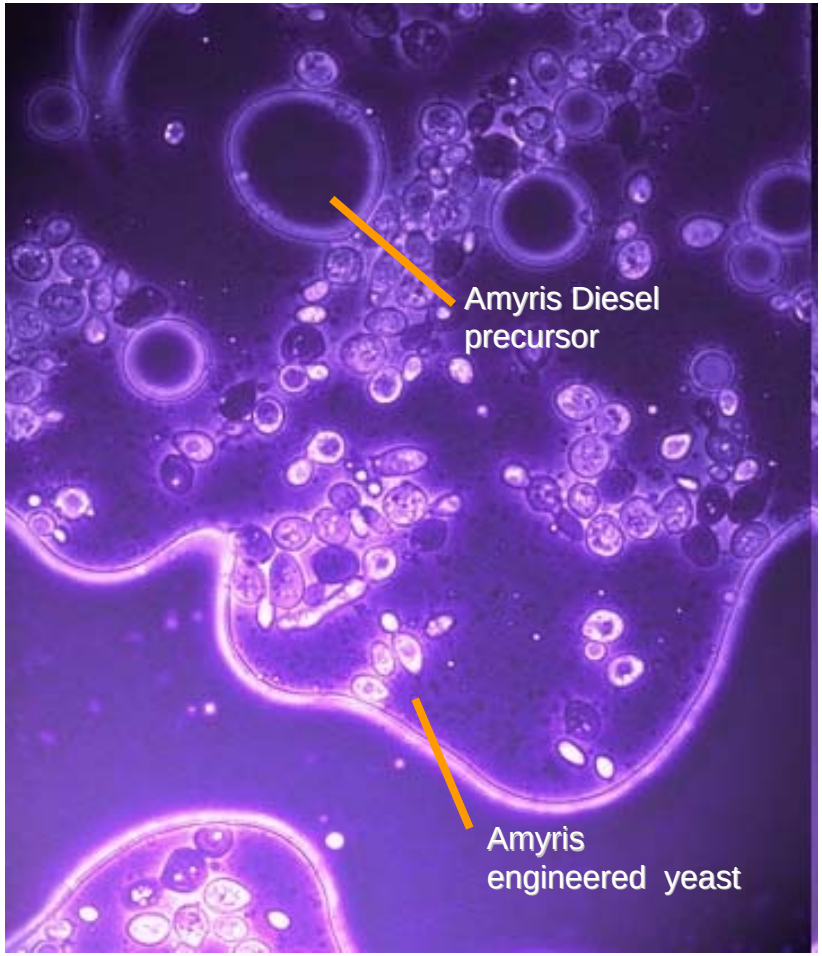
Amyris Biotechnologies Inc.

Leading the "next generation" of renewable products

- Started in 2004 by four postdocs from UC Berkeley Professor Jay Keasling 's lab
- Initially funded in 2005 by a grant from the Gates Foundation to develop a lower cost, consistent supply of artemisinin
- Venture funded by leading investors; over $160MM in grants and equity financing
- Pioneering yeast technology enabling production of more than 50,000 hydrocarbon molecules
- Product portfolio - anti-malarial drug, diesel, jet fuel and a wide-range of chemicals
- Issued US patents covering diesel, jet, and lubricant products
- Marketing and distribution channels to deliver products in the United States and other global markets

Micrograph of fermentation fluids from production of Amyris Diesel (April, 2008)



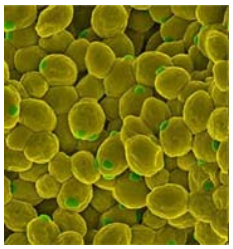
Technology Enables Broad Product Opportunities

Traditional oil source

Oil +  Refinery = **Petroleum products**

Amyris renewable pathway

Sugar cane +



Amyris genetically engineered yeast +

Cane mill = **> 50,000 isoprenoid compounds**

Bio-derived products

diesel
2020 estimate 450 billion gallons

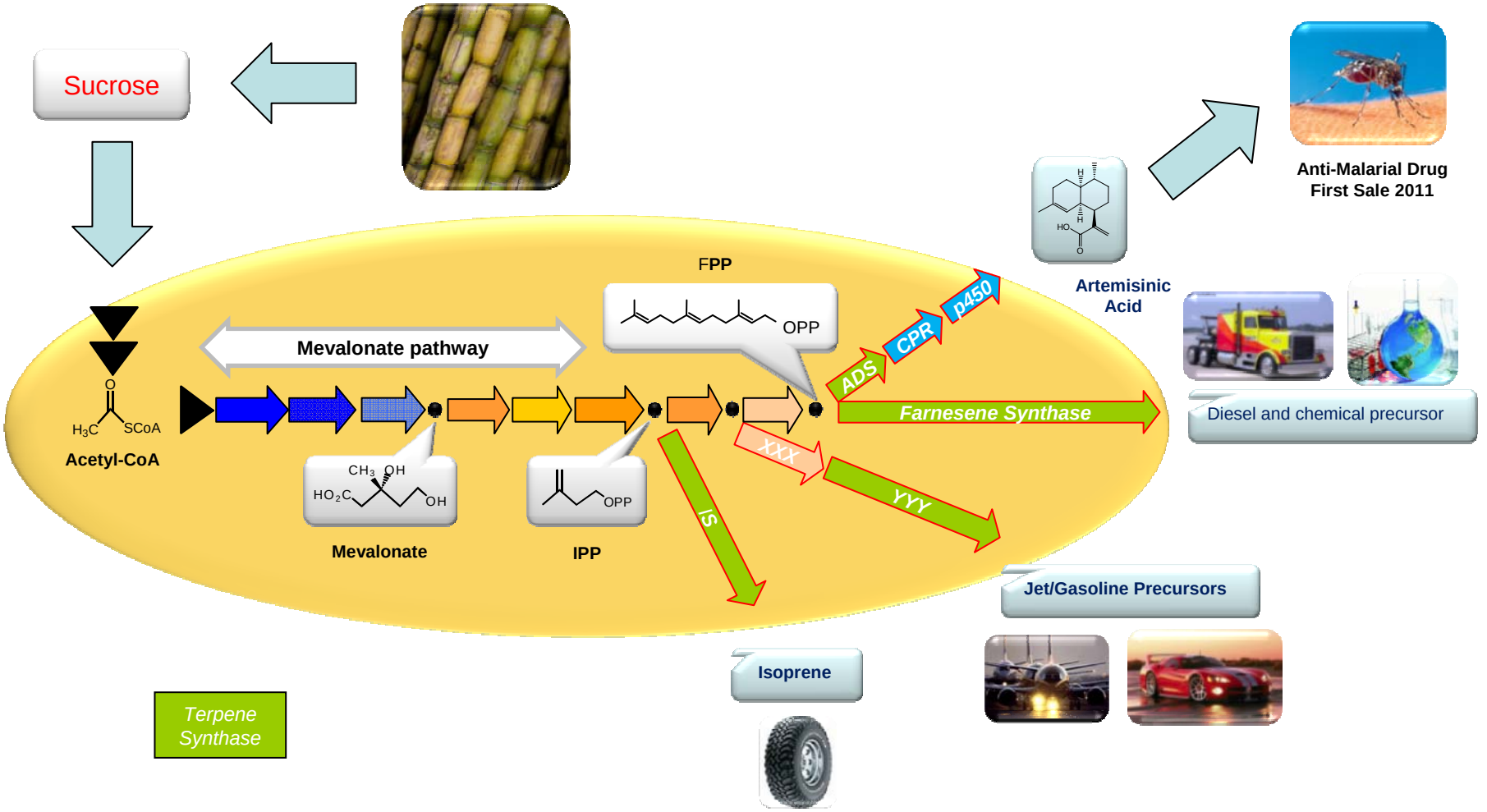
jet fuel
2020 estimate 124 billion gallons

specialty chemicals: synthetic rubbers, lubricants, etc.

malaria drug
non-profit: treat over 200 million people annually

- Markets growing faster than GDP
- Chemicals price point not directly correlated to price of crude oil
- Structurally advantaged, low-cost producer

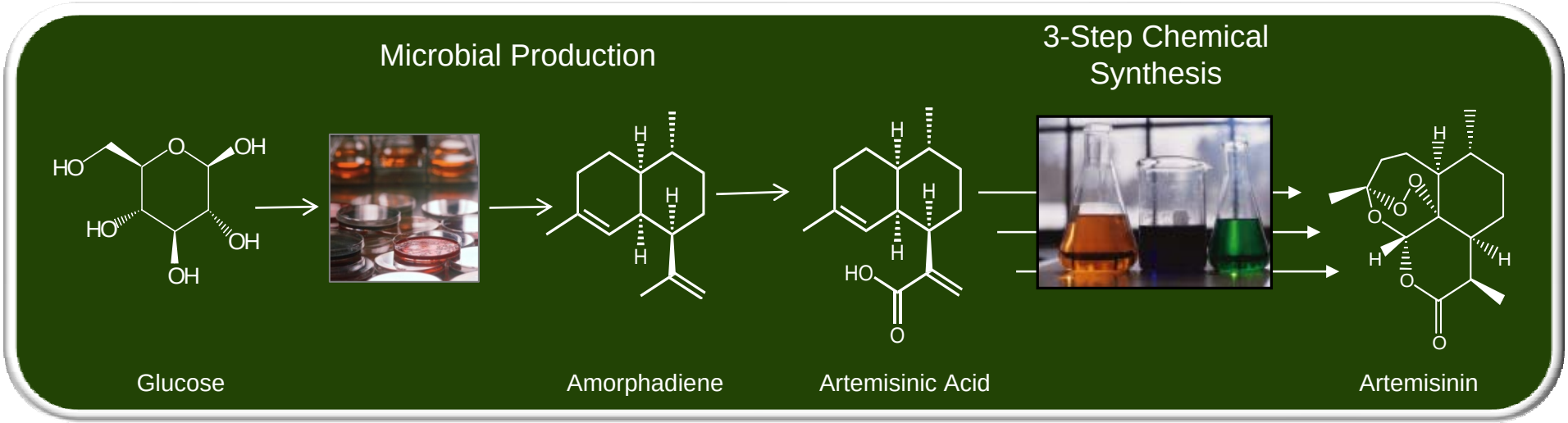
A platform technology for production of multiple products



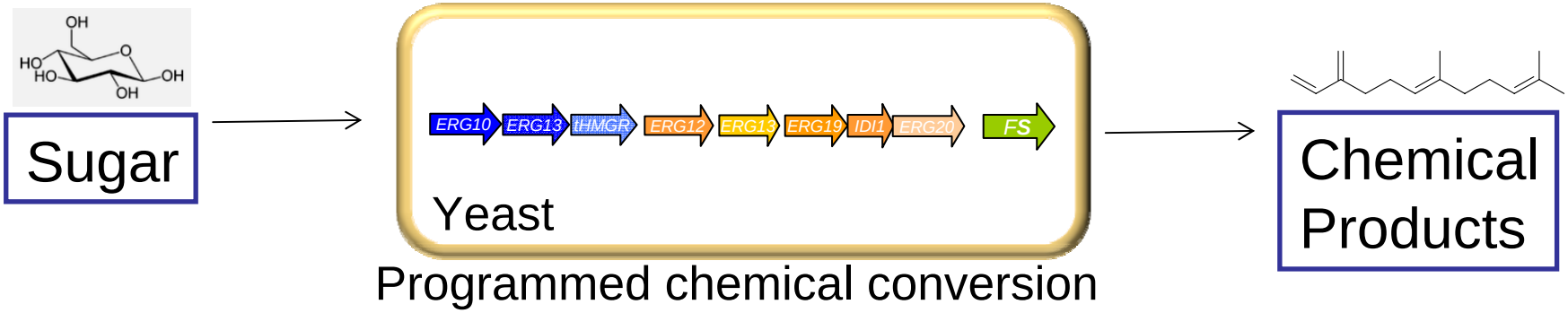
Artemisinin Project

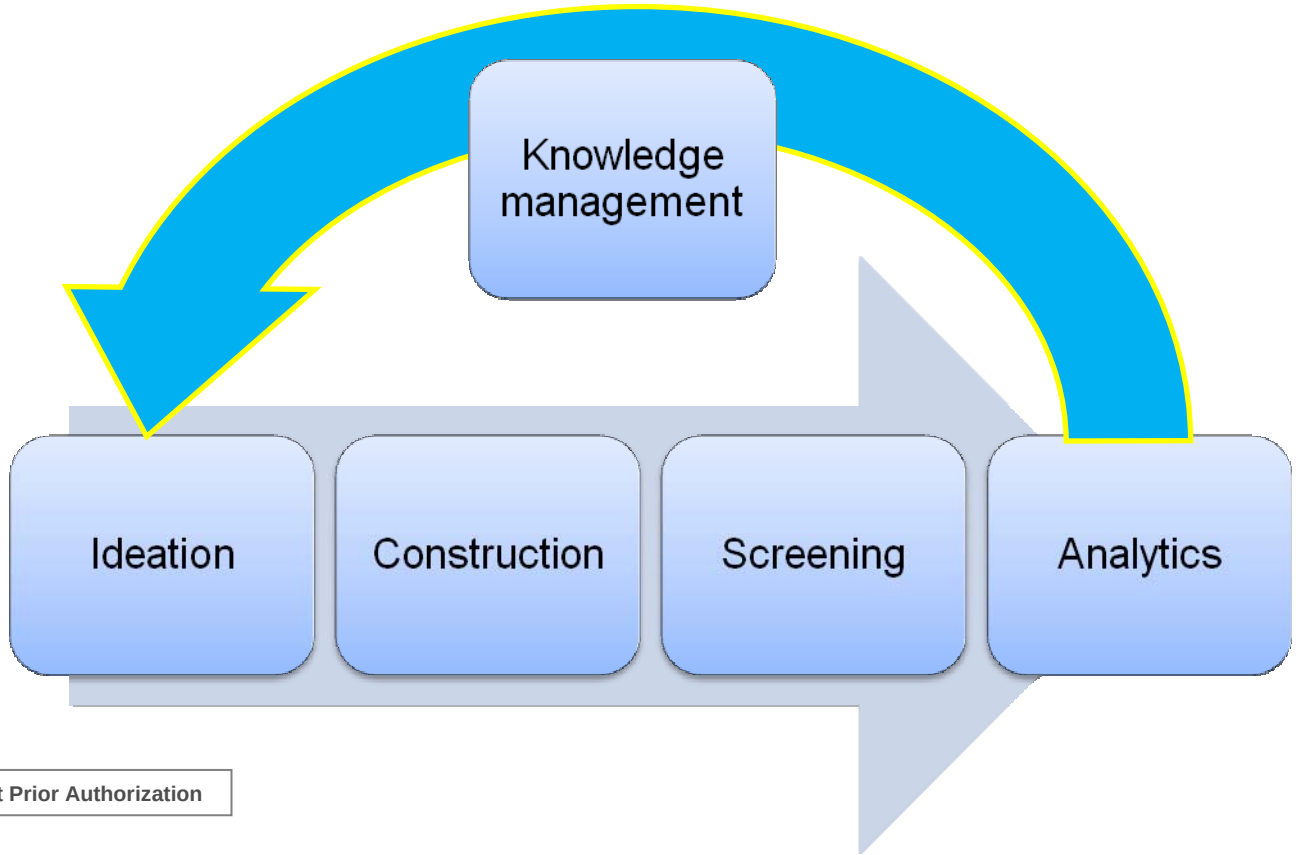
April, 2008 - Announced partnership with sanofi-aventis for microbial artemisinin

- Nonprofit project
- Lives saved due to scalable supply of inexpensive drug
- $20+MM to develop a platform for isoprenoid production



Amyris process for microbe development
Engineering cycle to increase performance





The heart of synthetic biology is standardization

- **Tool Standardization**

Consistent, simple and reliable enzyme and/or chemical treatments for the genetic manipulation of organisms

- **Parts Standardization**

Genetic elements that can be easily interchanged using the same or similar tools

- **Process Standardization**

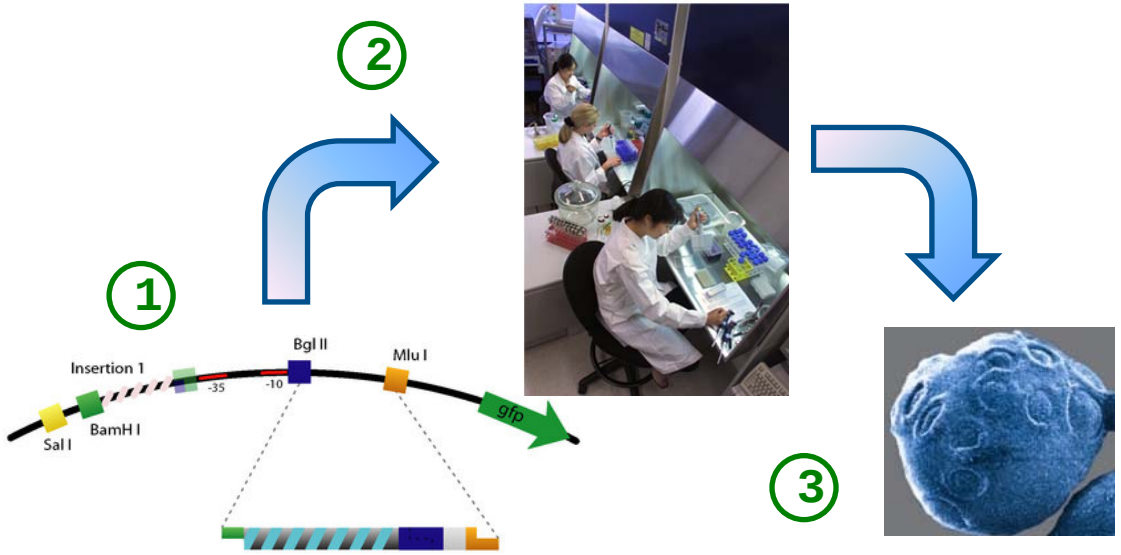
Consistent, simple and reliable methods for the insertion and deletion of genetic elements

Standardization & Automation of Strain Engineering

Rapid, reliable microbial engineering

AMYRIS

Standard practice



Automated Strain construction

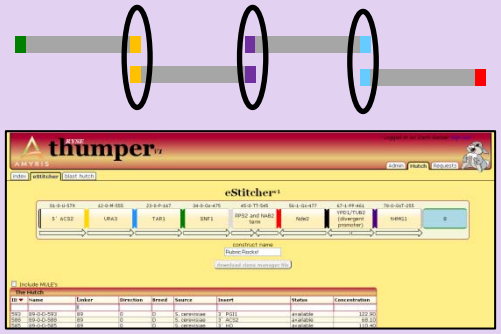
Traditional construction

1. Labor intensive planning
2. Hand crafted construction
3. Relatively slow, expensive, error-prone
4. 4 week cycle, 40 strains per cycle with 4 FTEs

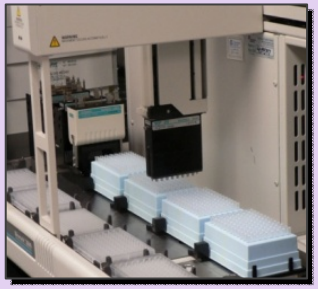
Automated construction

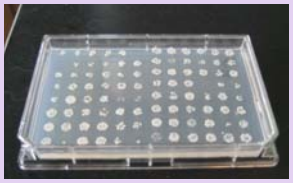
1. Computer assisted design
2. Robotics platform for unit operations
3. Fast, inexpensive, reliable
4. 6 week cycle, 5000 strains per cycle with 4 FTEs

Automated strain engineering is a reality at Amyris



Computer aided design (CAD) & RYSE





Automated rational strain engineering

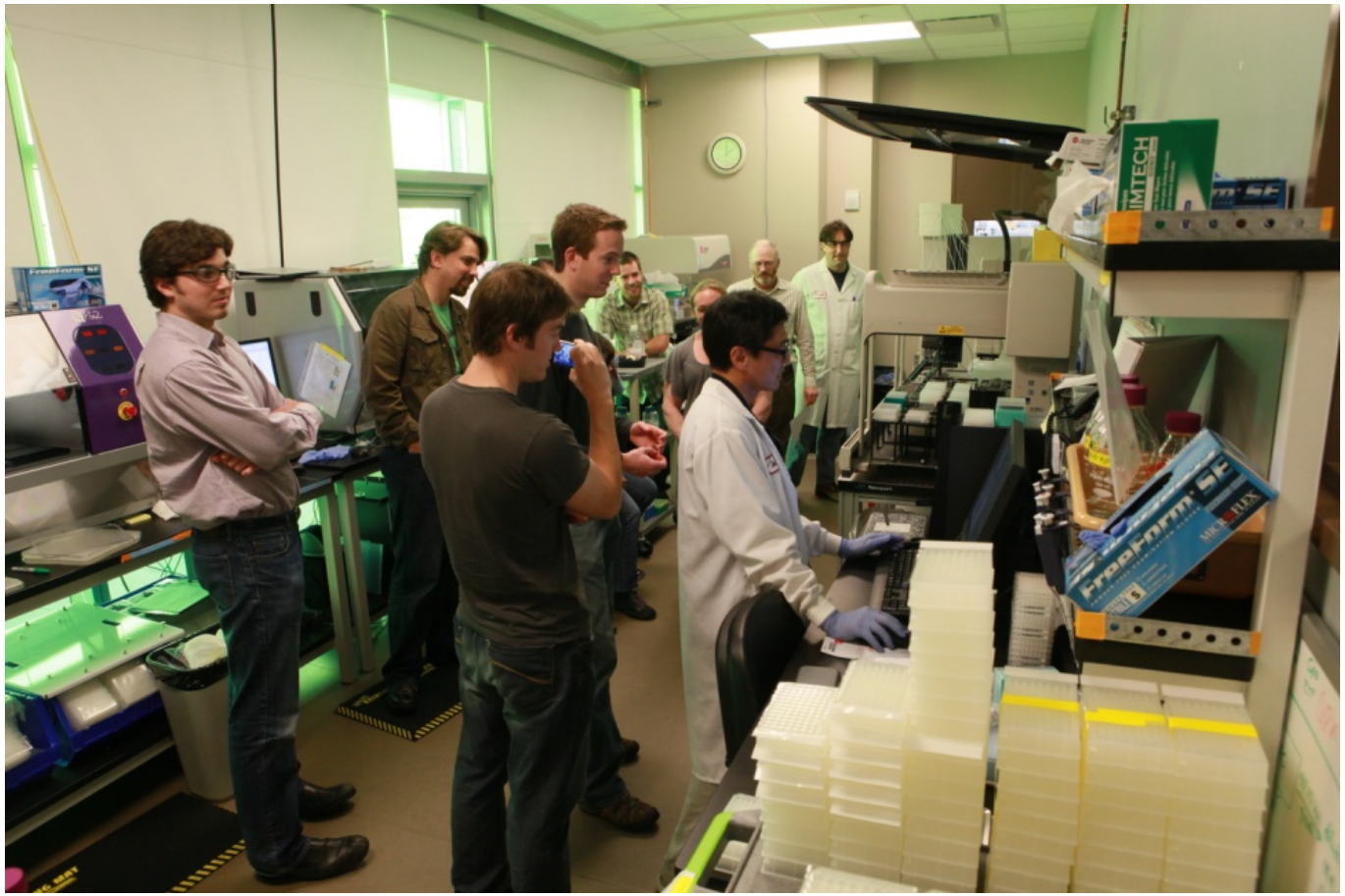
HTP Screening

Production in Brazil

300 liter fermentation

2 liter fermentation

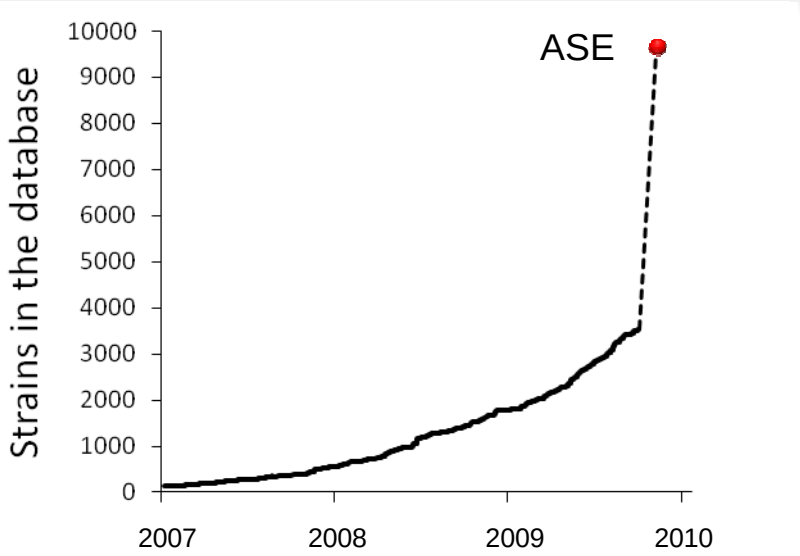
The first run of ASE

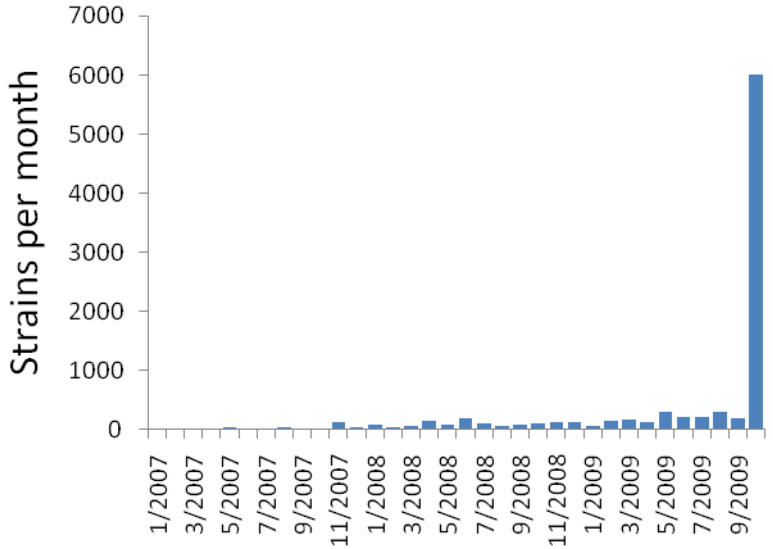


WHY? Automated strain engineering standardizes parts, reduces failure rates, decreases costs, increases strains tested.

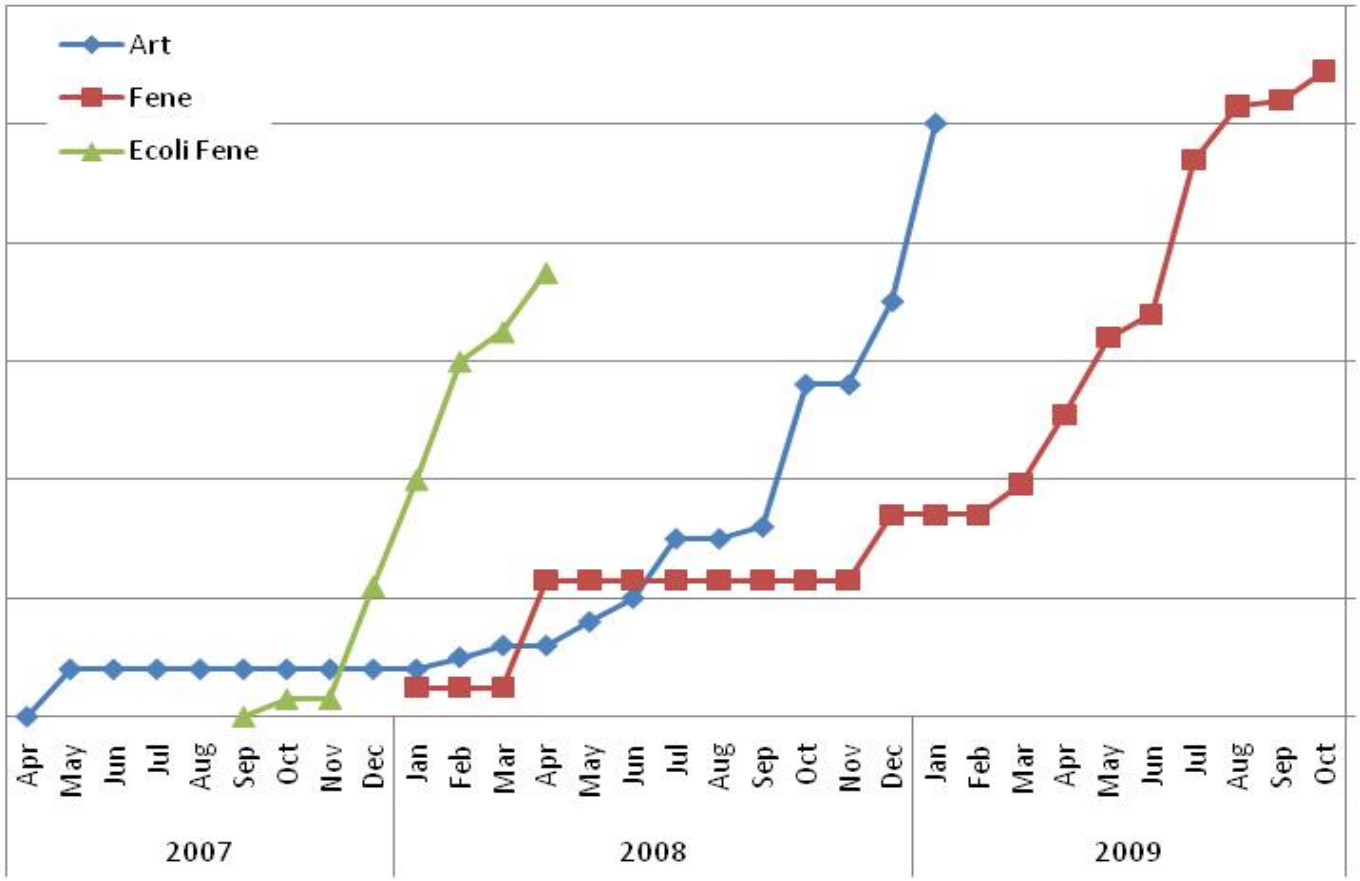
- Traditional strain engineering
  - 250 strains/month
  - 10 strain/biologist/month
  - $2,400/strain
  - First attempt success rate: 70%

- Automated strain engineering
  - 5000 strains/month with 4 FTE's
  - 1000 strains/biologist/month
  - $60/strain
  - First attempt success rate: 90%



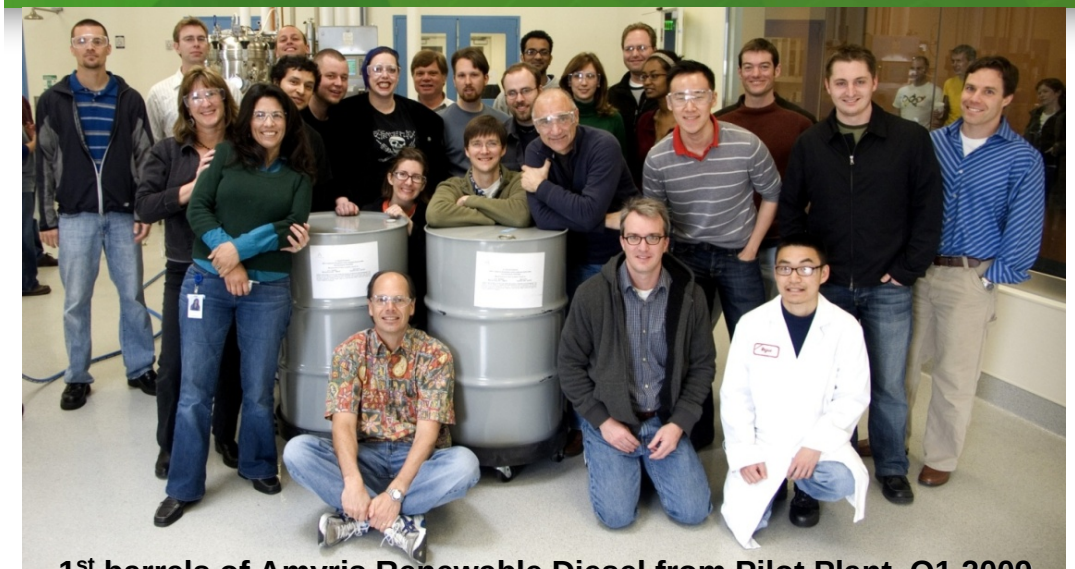


The payoff: Better strains faster



Fermentation derived hydrocarbons = lower processing costs

Production at scale: lab to pilot to commercial



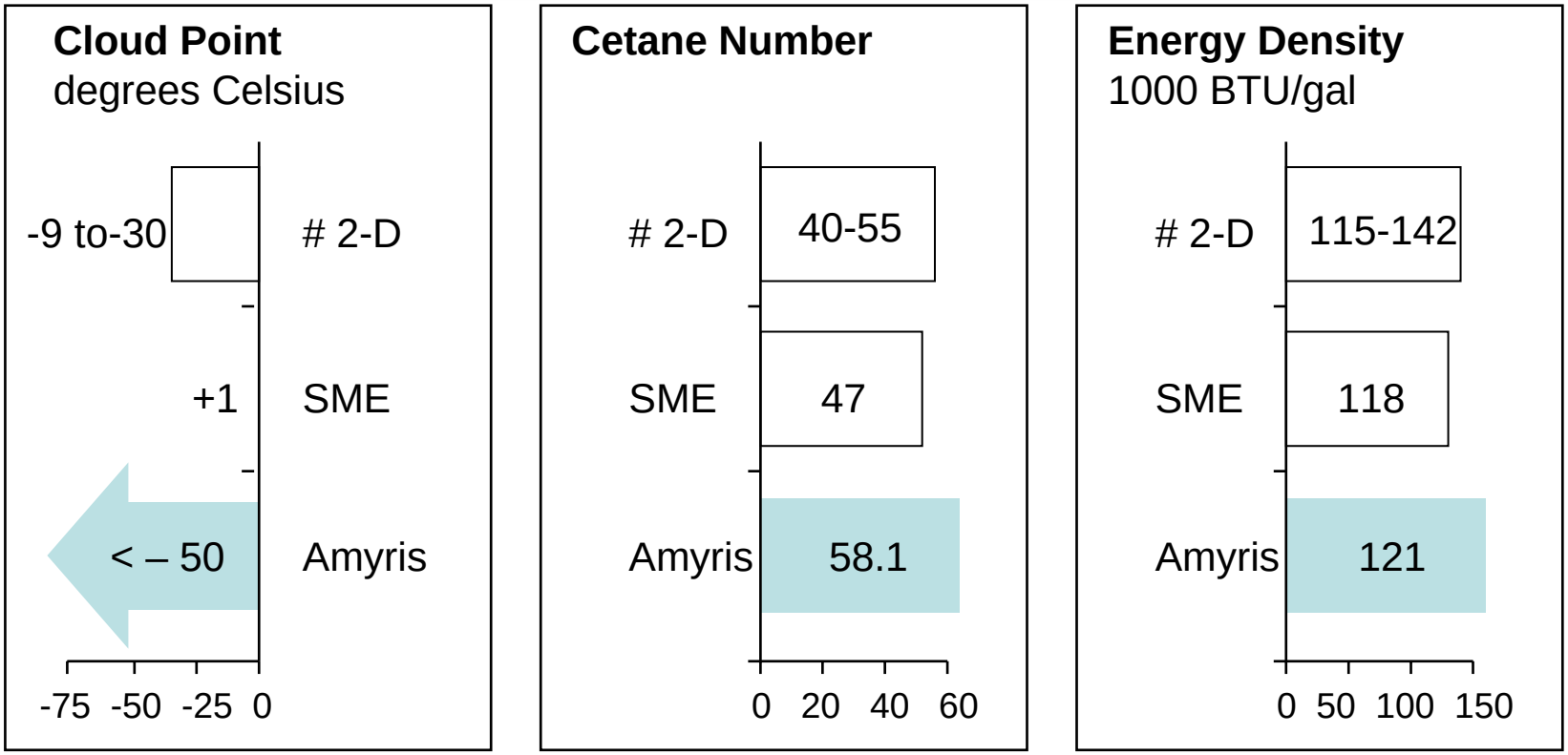
1st barrels of Amyris Renewable Diesel from Pilot Plant, Q1 2009

Demo Plant Fermenter, Campinas Brazil Q2 2009

Production at 60,000 L scale, Q2 2009

Products – Renewable Fuels and Chemicals

Diesel fuel registered with the EPA at a 20% blend



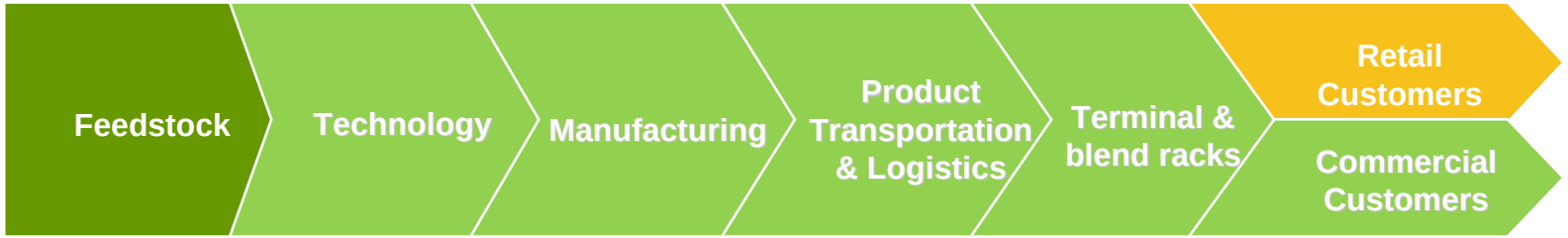
Additional benefits of Amyris renewable diesel compared to #2-Diesel

- 90%+ lower greenhouse gas emissions
- No sulfur
- produces lower NOx and particulate emissions

Note: Amyris diesel will be used in blends with conventional fuels; values shown for Amyris diesel is for our biomass derived blending component; SME = Soy Methyl Esters

Participation in the value chain

Amyris will participate in various aspects along the biofuels value chain



Amyris GreenLane™

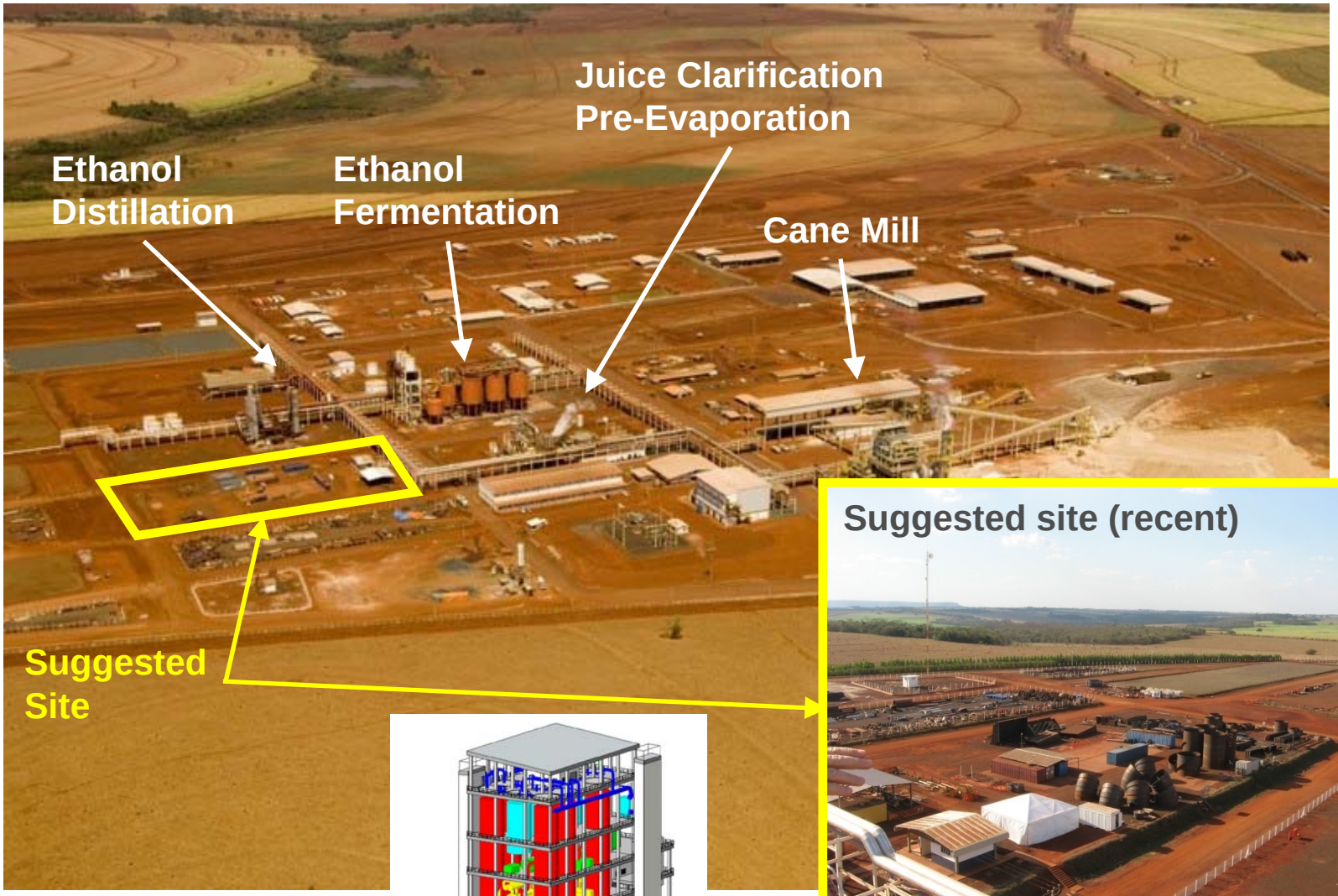
Partner with large scale manufacturer with access to low cost feedstocks

Build production platform from distressed assets

- Take product from plant gate to wholesaler
- Logistics contracts to facilitate high volume distribution

- Sell to fastest growing retail segment
- Access to end customers (commercial accounts)

Critical path to 2011 – commercial plant in Brazil



Plan to commercial production – timeline

2009

R&D center inaugurated in 2008 in Campinas

Q2: Pilot plant operational; Demo Facility opened

Q4: Acquire EtOH Mills

- Ongoing operations provide immediate revenue and cash flow

2010

Begin mill conversion to produce Amyris renewable products

- Engineering of commercial plant has been finalized and EPCM has been engaged

2011

First large scale production of Amyris renewable products

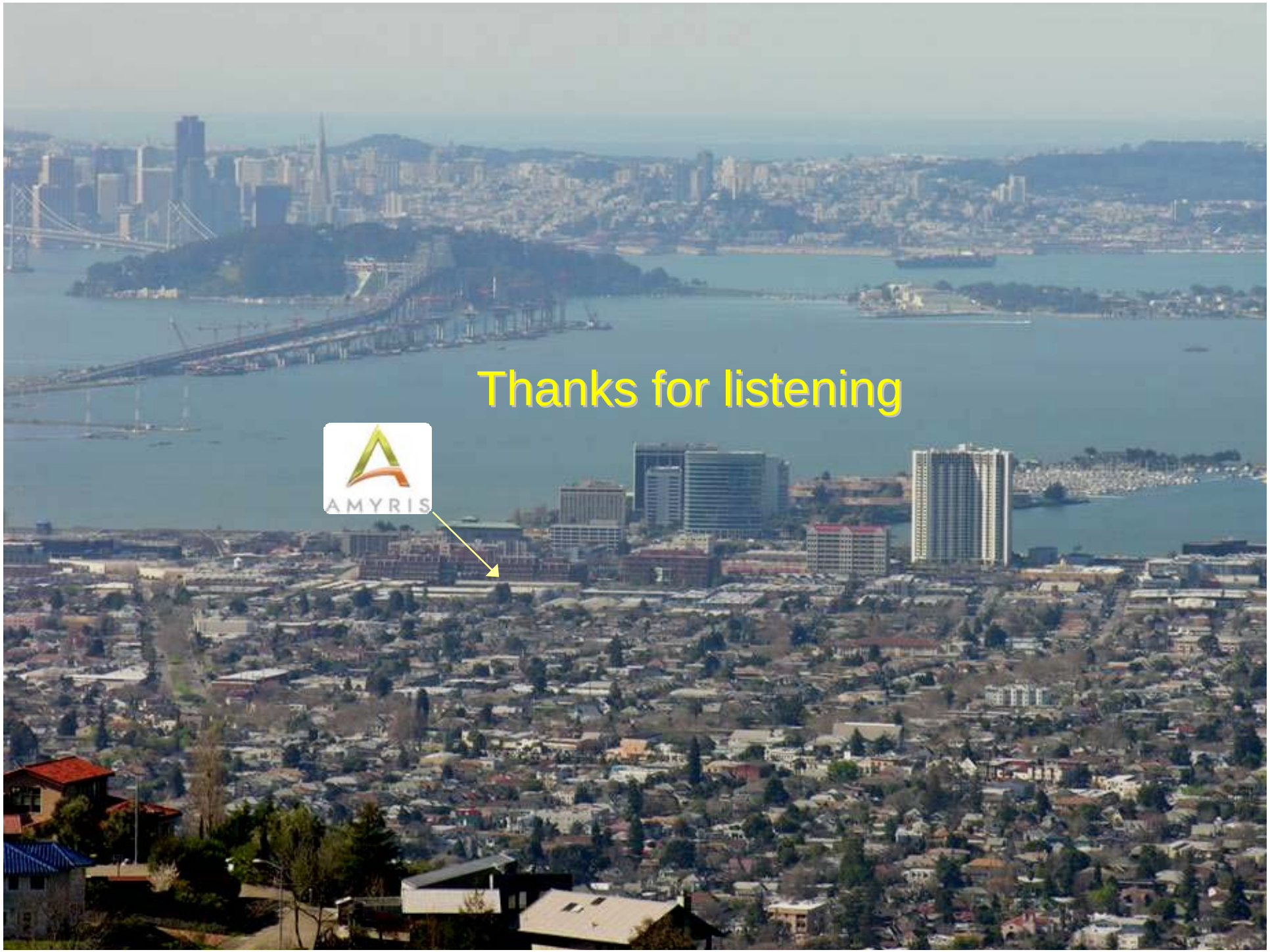
Continue mill conversion and expansion

2012

First commercial production by third party mills under "capital light" strategy

Take-home **messages**

- Standardization of parts, tools and processes has facilitated automated strain engineering
- ASE is game changing for the development of renewables
- Amyris is on track for 2011 commercial production of diesel and chemical products


Thanks for listening
AMYRIS

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