

Venture Capital Finance



DOE Biomass Conference
July 2014



FLAGSHIP VENTURES

Priced Out of Oil ... Into What?

Energy Source

Sun:

Oil (6.2 GJ/bbl)

\$10/bbl =

Coal:

Natural Gas (N America)

Biomass (15 GJ/dt)

\$60-100/dt =

Natural Gas (ex N America)

Oil (6.2 GJ/bbl)

\$100/bbl =

Corn

\$4-7/bu=

Commodity Price

\$0 / GJ

\$1.6 / GJ (late 1990s)

\$3 – 6 / GJ

\$3 – 4 / GJ

\$4 – 6 / GJ

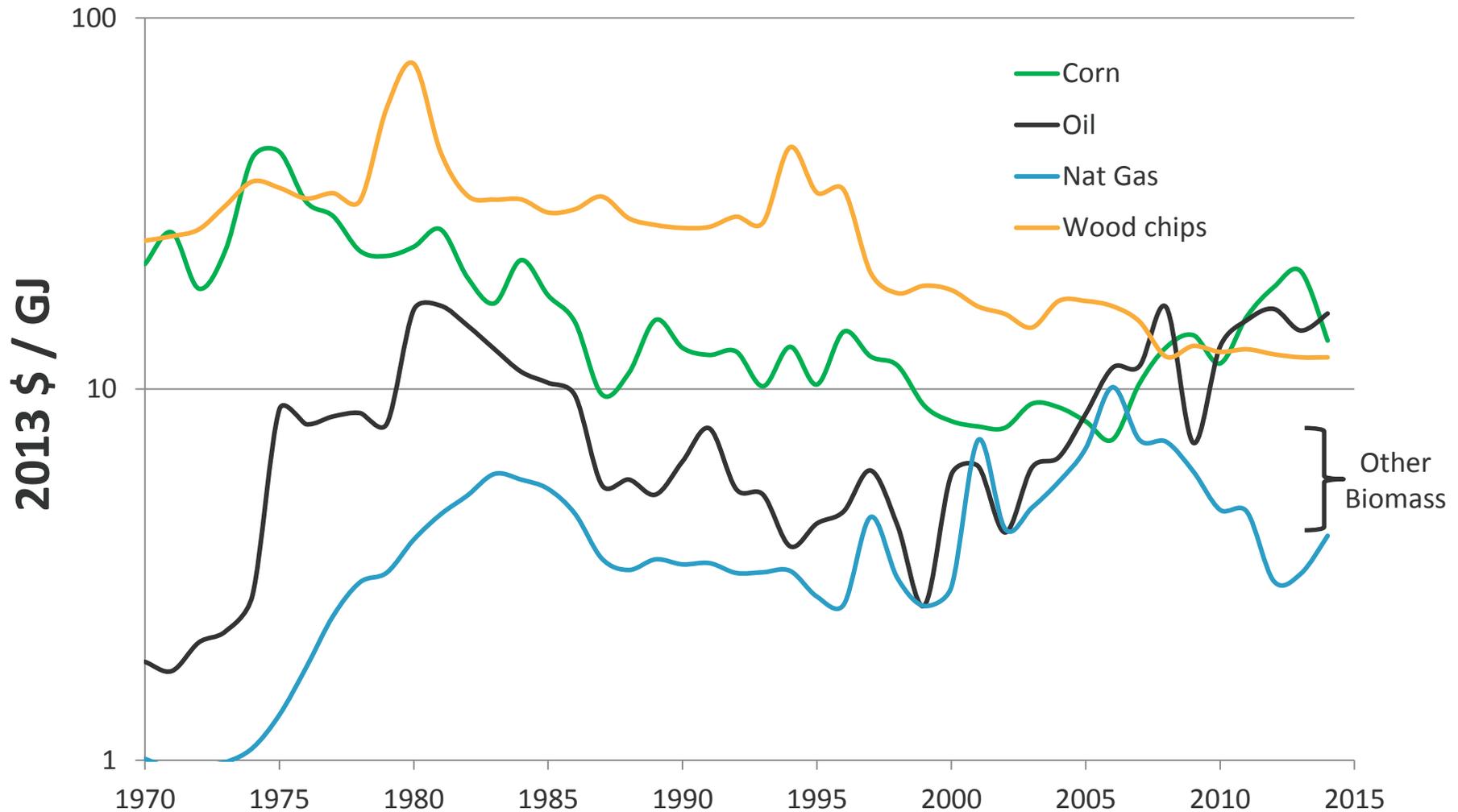
\$10 – 15 / GJ

\$16 / GJ

\$10 – 20 / GJ

- Higher oil prices create a disruptive opportunity for lower cost feedstocks
- North American shale gas is a game changer (vs rest of world)
- Untapped potential in biomass, especially outside North America. Challenges: supply scale, logistics, conversion technology, consistency

Input Commodity Values (USA)

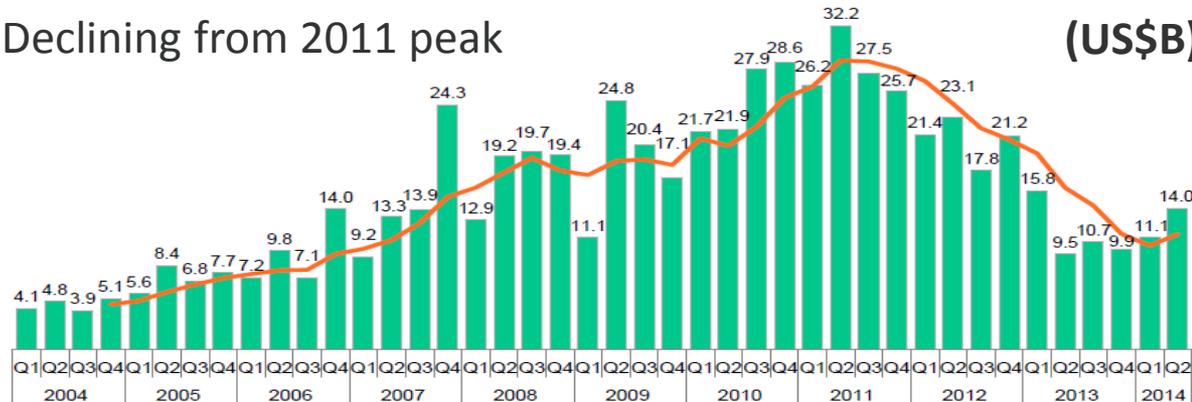


Inflation adjusted

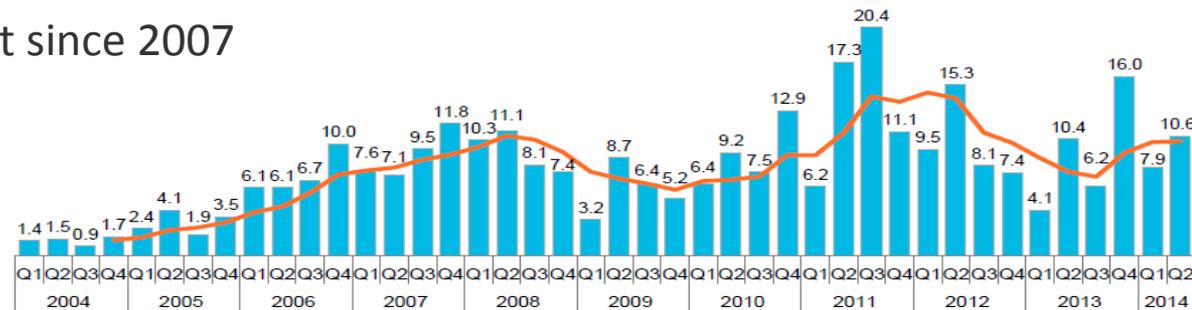
Clean Energy Investment: 3 stories in 3 regions

Europe. Declining from 2011 peak

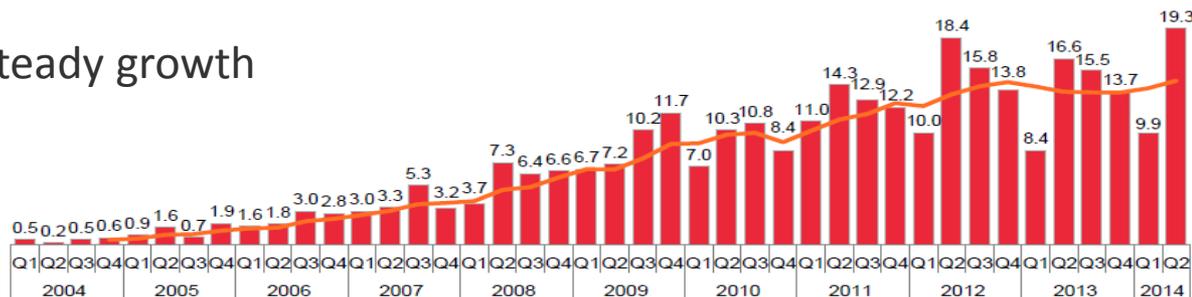
(US\$B)



USA. Flat since 2007



China. Steady growth

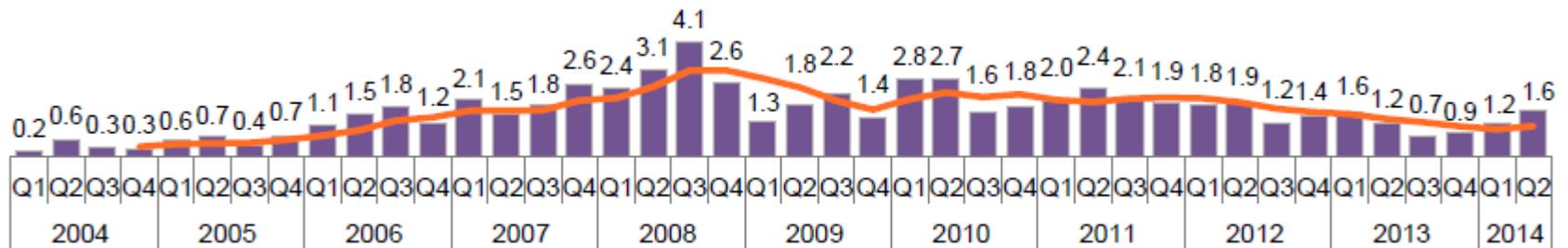


Source: Bloomberg New Energy Finance. Total values in \$B and include estimates for undisclosed deals. Excludes corporate and government R&D and spending for digital energy and energy storage projects

Clean Energy Investment from VC/PE

VC/PE. Declining from 2008 peak

(US\$B)



Risk-adjusted return expectations

- VC/PE 15-25%/yr
- Fortune 500 Working Capital 10-15%/yr
- Project Finance 10-15%/yr
- Development Bank Loan 3-5%/yr

Time horizon:

At 10-15%/yr, it requires 7-10 years just to get back the initial investment ... project time horizon must be much longer

Investment limits:

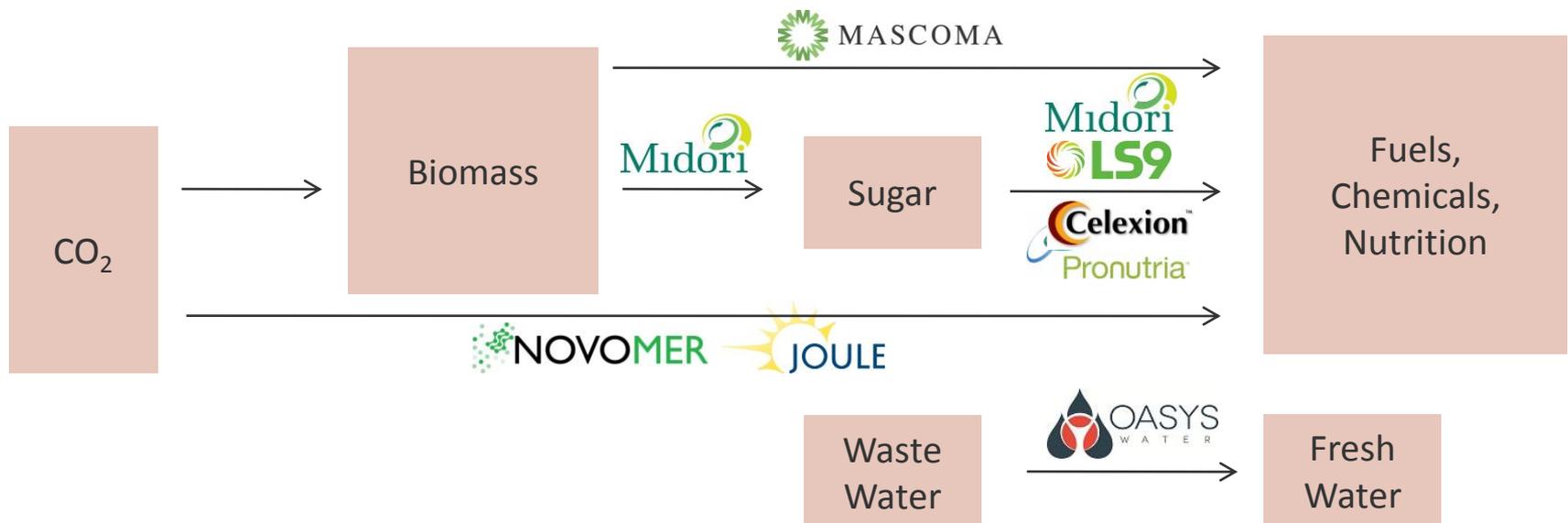
If your project generates \$1/yr in cash in perpetuity, and your return expectation is 25%/yr, you can invest max \$4 (= \$1/25%) into the project.

Investment limits under uncertainty:

If there is a 50% chance the project will succeed, you can invest max \$2 (= \$4 * 50%)

Sustainability Ventures: Case studies from the Flagship portfolio

- Celexion*- sugar to difunctional alkane chemicals
- Joule*- solar CO₂ to diesel
- LS9*- sugar to diesel, fatty alcohols, and other chemicals
- Mascoma- cellulose to ethanol
- Midori*- cellulose to sugar
- Novomer- CO₂ and CO to chemicals
- Oasys – purification of recovered water
- Pronutria*- sugar to protein nutrition



* Flagship VentureLabs companies



Contact Information

Brian M. Baynes, Ph.D.

Partner

Flagship Ventures

1 Memorial Drive #7, Cambridge, MA 02142 USA

+1(617)868-1888

bbaynes@flagshipventures.com