

PRESENTATION TO

MegaFlorestais Working Group

**Santa Fe,
New Mexico**



Three Reasons The Demand for Timber is Rising (and why you will be managing a more valuable resource)

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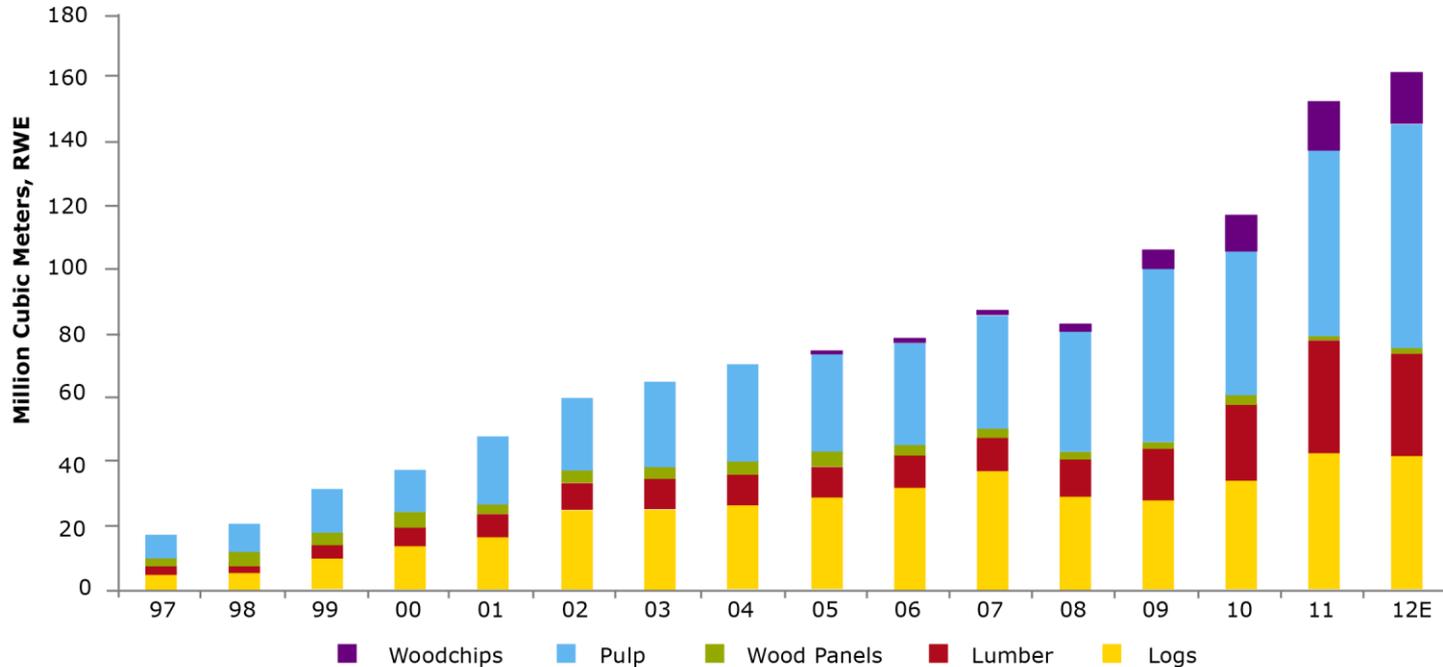
We expect the demand for virgin wood fiber to increase significantly in the future for 3 key reasons:

- 1. Rise in Asia's wood fiber deficit;**
- 2. Decline in the relative supply of recovered paper;**
- 3. Growth of the bio-energy/chemical sector.**

Asian Timber Deficit

- ▲ China's timber deficit is currently over 160 million cubic meters (roundwood equivalent)
 - It will likely exceed 200 million cubic meters by 2015.
 - By comparison, Canada's national harvest in 2010 was only 142 million cubic meters
- ▲ The biggest share is in the form of wood pulp, then logs and lumber.
- ▲ The timber deficit grew at ~17% compounded annual growth rate from 1997-2011, but slowed to 5-6% in 2012 due to the weak global economy.

China's Growing Timber Deficit , 1997 - 2012E



Asian Timber Deficit

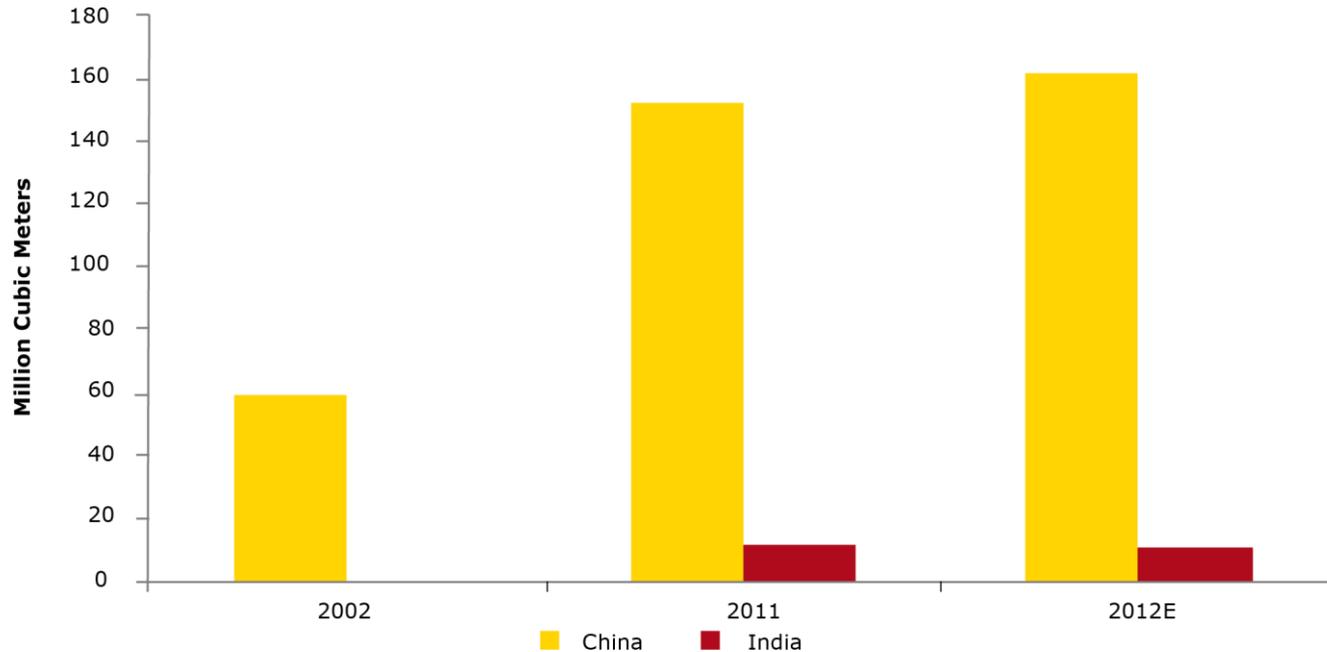
China has begun the process of outward investment in forest resources, and this is expected to become a growing trend:

- ▲ CIC and Russia Forest Products
- ▲ Greenheart in New Zealand and Suriname
- ▲ China National Building Materials in New Zealand
- ▲ China Timber Resources Group in Guyana
- ▲ Sun Paper in Laos
- ▲ Several companies in Russia, e.g., China Yantai Northwest Forestry and Yangxin Eurasia Wood work
- ▲ China Timber (COFCO in Gabon)
- ▲ Zaozhuang Mining in western Canada (Resurgence)
- ▲ Sustainable Forest Holdings Ltd. In Brazil

Asian Timber Deficit

- ▲ India's economic growth is much less "wood intensive" than is China's.
- ▲ India's economy in 2011 was the same size as China's in 2002, but its timber deficit was only one-fifth the size of China's.
- ▲ Going forward we expect India's timber deficit to grow significantly, but to remain much smaller than China's.

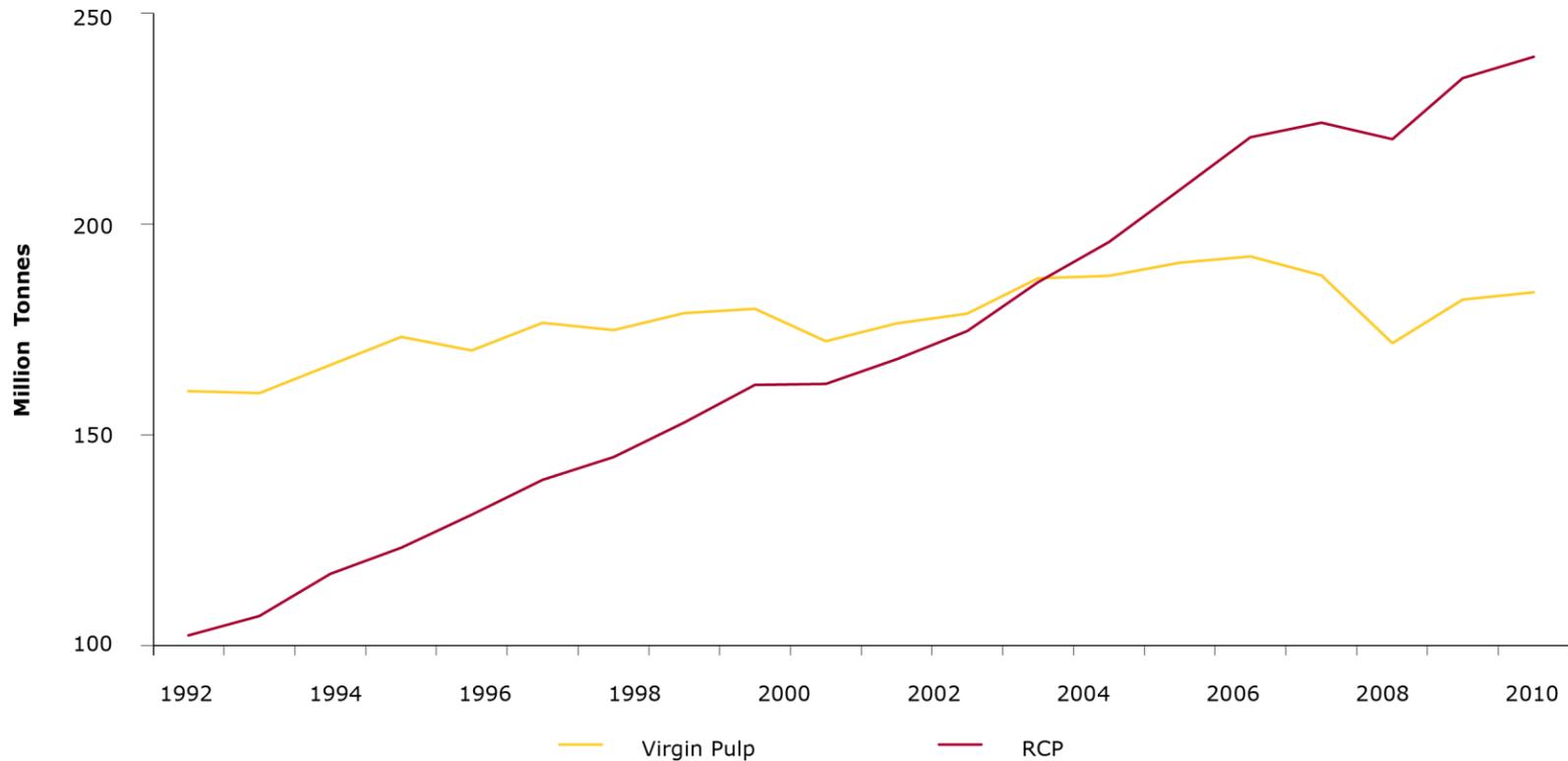
Timber Deficit in China and India



Virgin vs Recovered Paper

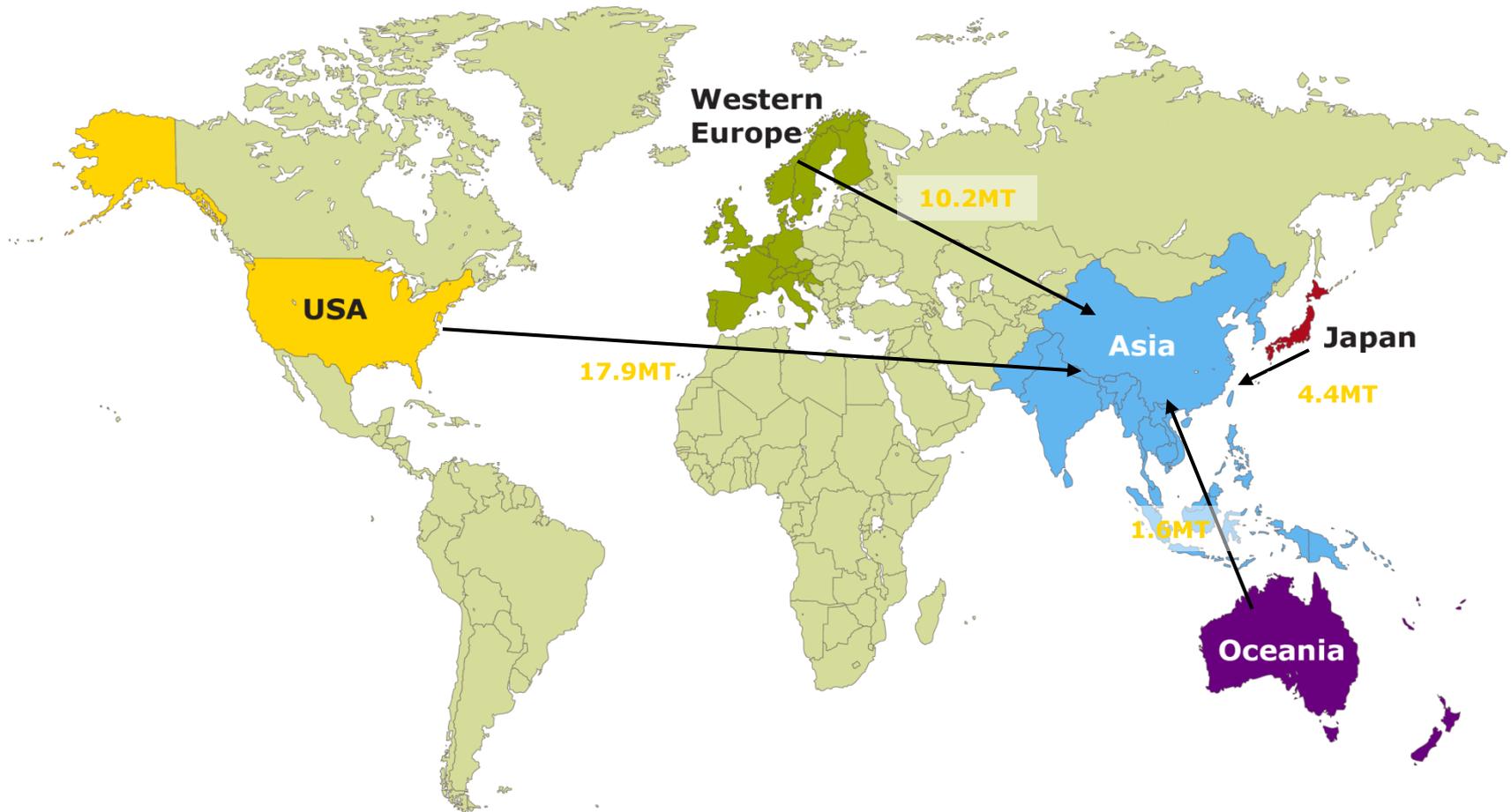
- Since 1990, the bulk of the growth in global paper & board production has been fueled by recovered fiber – not virgin wood fiber.
- The consumption of recovered paper (RCP) has increased ~140%, while virgin pulp consumption has increased by only ~15%.
- RCP now accounts for >50% of the fiber consumed by the global paper & board industry.

Pulp and RCP Consumption in World Paper and Board Production



Trade in Recovered Paper: 2011

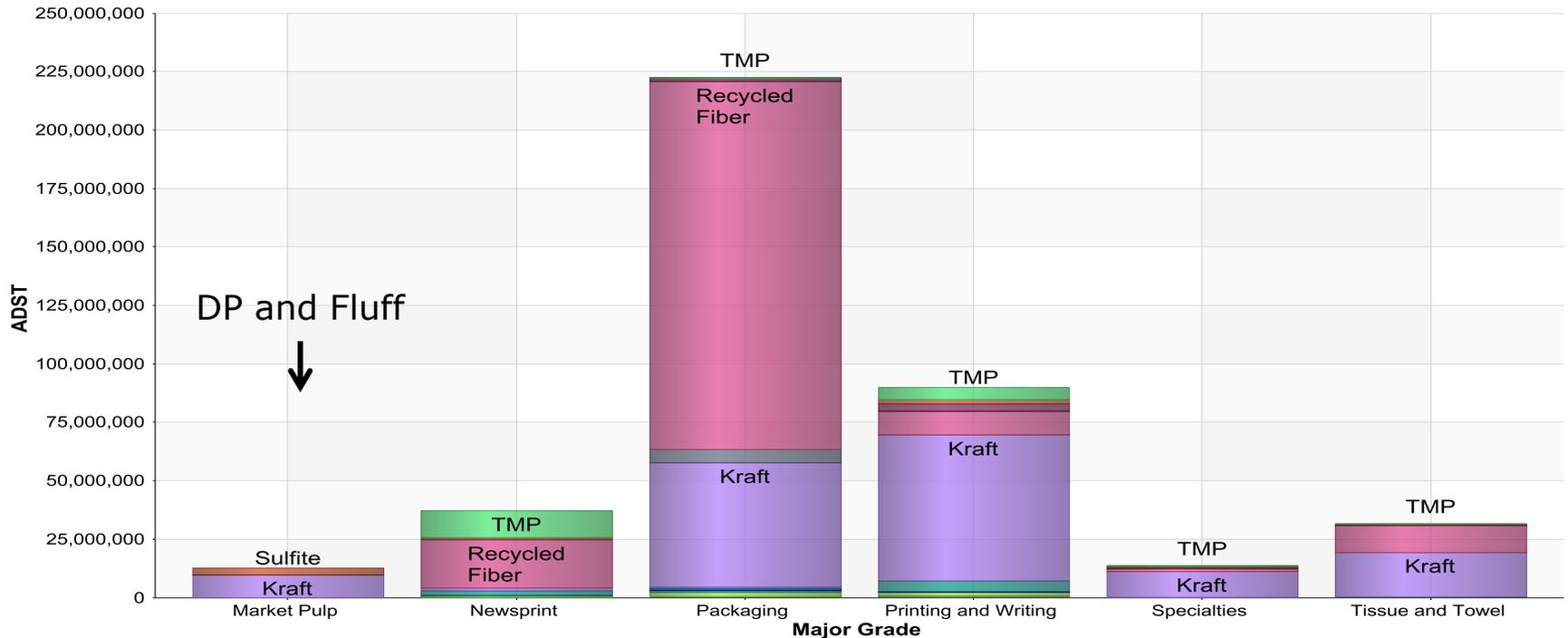
Asia is driving the demand for recycled paper; ~50% of imports from USA, and ~30% from W. Europe



Fibers Used To Produce Different Paper Grades

Different grades of paper are seeing widely different growth rates, and this will have important effects on RCP demand and availability

- Fast-growing paper grades, such as tissue & packaging, will have historically used more RCP
- Newsprint and Printing & writing paper, the traditional sources of RCP, however, are actually declining in consumption – causing a decline in the supply of RCP.

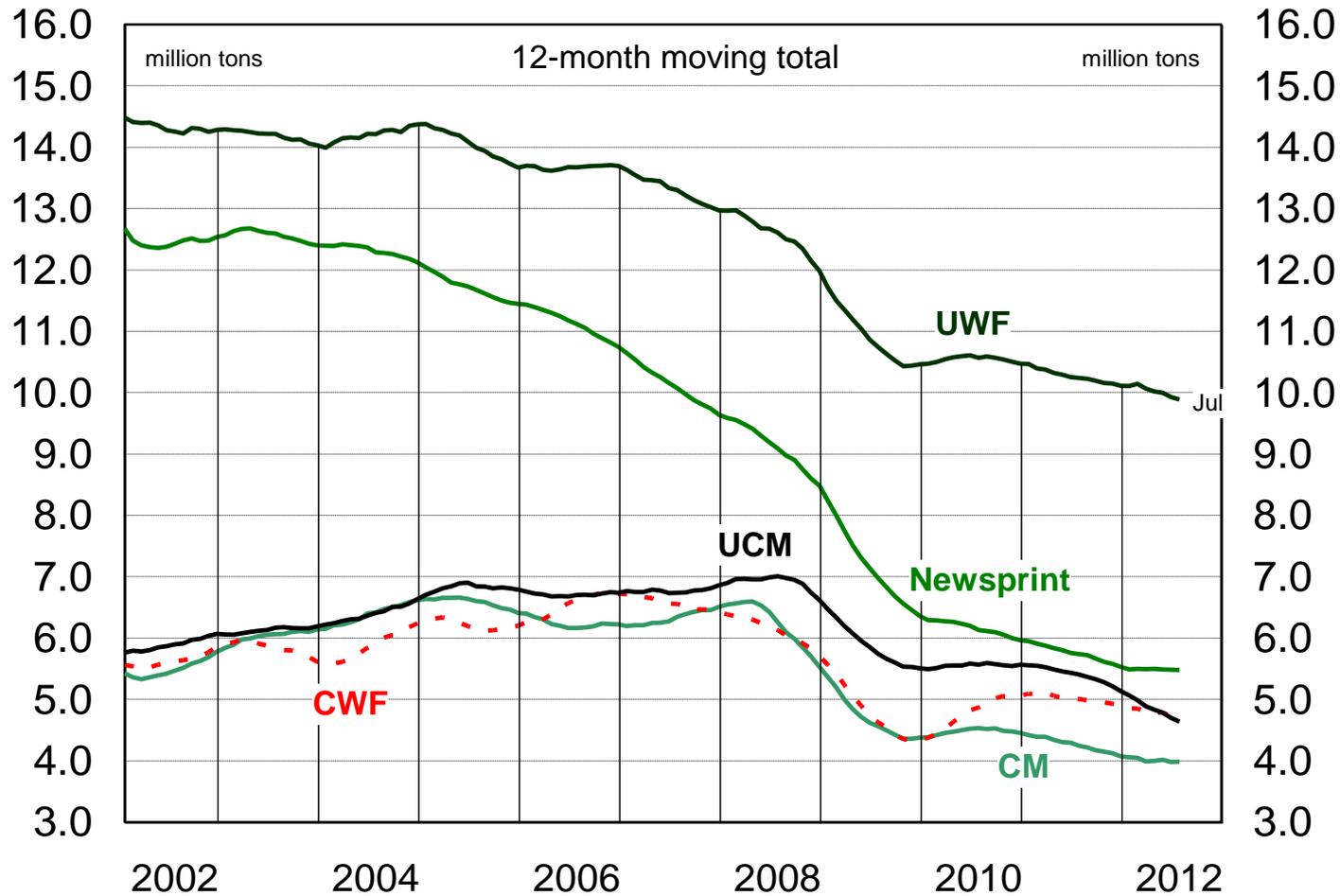


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Source: FisherSolve™



All Printing and Writing Grades In Decline in North America & Europe

N. American Paper Demand



Data Source: PPPC



Global Recovered Paper

- ▲ A global shortage is expected for recovered paper (RCP).
- ▲ Expect an increase in the relative price of RCP, which will stimulate the demand for timber.
- ▲ The impact will be greatest in Asia, where it is expected to accelerate the rise in Asia's timber deficit.
- ▲ The increase in demand will be greatest for pulp wood and sawmill & forest residues.

The Bio-Economy is Now Mainstream

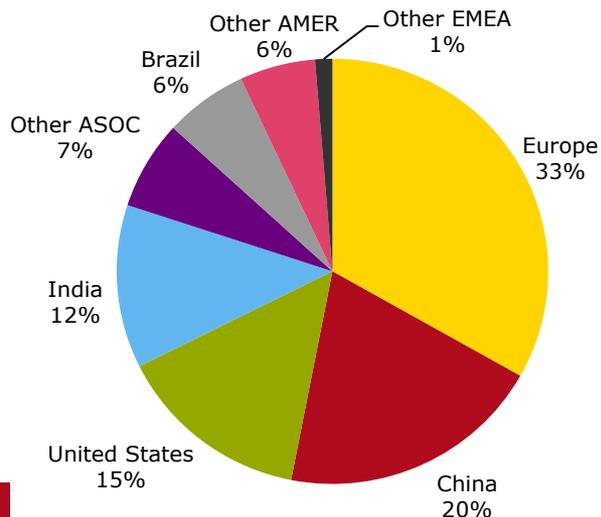
- ▲ Today, 30 of the Fortune 100 companies are invested in the production of biofuels and/or bio-based materials, or their distribution
 - BP, Shell, Valero, Dow, Dupont, Roquette, Coca-Cola...

- ▲ The Bio-economy has many segments:
 - Bio-electricity
 - Bio-transportation fuels
 - Bio-chemicals
 - Bio-materials

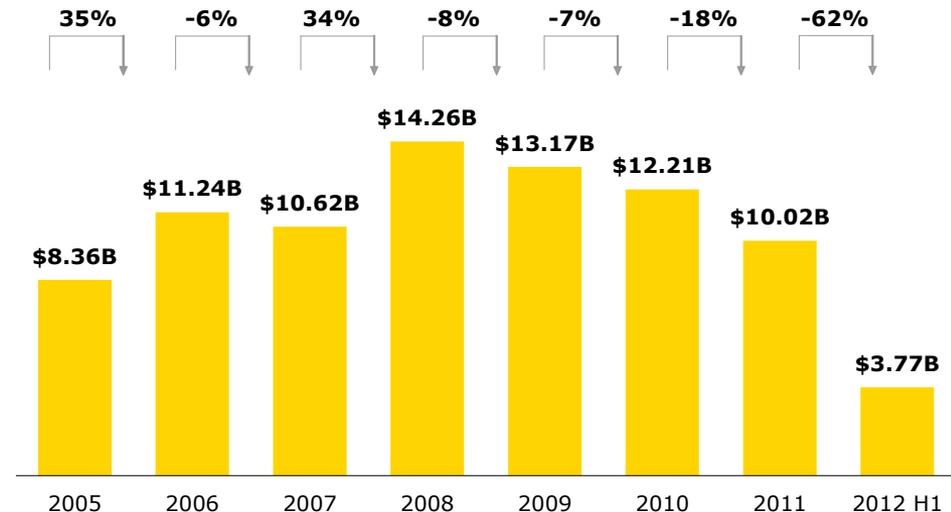
Investment

- ▲ Europe is the leader, accounting for ~1/3 of global investments in Biomass-based power
 - EU expects to double biomass capacity by 2020 to ~26 GW (~\$50 Billion)
- ▲ China is now targeting to increase biomass power from <4.5 GW in 2011 to 8 GW by 2015 and 18 GW by 2020
- ▲ If we believe the national targets around the world, there will be upward pressure on the price of biomass
- ▲ Despite the targets, global investments in energy plants using biomass (i.e., solids) have steadily declined since 2008. The decline is due to economic & policy uncertainty.

Global Asset Financing in Biomass and Waste-to-Energy (2005-2012 H1)



Cumulative Growth in Biomass and Waste-to-Energy Asset Financing (US\$)



Bio-Energy Policy

- ▲ Most bio-energy investments would not be undertaken without some form of government support
- ▲ The EU, China and the U.S. are all providing support to their domestic bio-energy sectors
- ▲ However, due to increasingly tight government budget constraints, there is growing risk to direct financial support from governments
 - “Let there be no doubt that the first overwhelming priority of the government has to be to get the deficit down” – Chris Hulne, Energy and Climate Change Secretary (U.K.), December 2010

Europe

- ▲ Binding targets for 2020:
 - 20% reduction of CO₂ emissions
 - 20% energy from renewable sources
 - 20% improvement in energy efficiency
 - 10% biofuels in transport

- ▲ Bio-energy is planned to play an unusually large role in meeting these targets.

- ▲ A rise of 90%-170% is expected over the next four years in biomass-based power capacity
 - Of the feedstock, roughly 85% is expected to come from forestry residues and sawdust

- ▲ If the target is met, it is estimated that the EU will have to import ~200 m³ of biomass by 2020
 - Roughly equal to China's expected timber deficit.

China

- ▲ The Chinese Government is now leading the world in supporting the Renewable Energy and Clean Technology sectors
 - Over \$40 Billion invested in 2010
 - Number of national climate change policies in China is twice as large as that of the U.S. at the federal level
 - Special focus on incentives and mandates, that are supported by investment and enabling legislation
 - Stringent capacity requirements by sector, with clear interim targets
 - Experimenting with regional/provincial carbon trading schemes

- ▲ Bio-Energy in the 12th Five Year Plan:
 - Target of 18 GW of biomass power by 2020
 - ⇒ up from <4.5 GW in 2011
 - ⇒ 2020 target recently reduced from 24 GW – Why?

Europe & Asia are the Centres for Biomass Demand

Global Biomass Shipping Routes



Note: Dotted cycles represent the major demand centres; the strength of the arrows is relative to their importance as trading routes.

Source: Bloomberg New Energy Finance, IEA.

Case Study 1: Pellets, Suzano Renewable Energy

- ▲ Suzano is one of the largest eucalyptus pulp producers in the world, located in Brazil
 - Currently making an investment of ~\$550 million in bio-energy projects.
- ▲ Highlights:
 - Based on ~120,000 ha of eucalyptus plantations in N.E. Brazil; close to ports
 - Energy oriented clones (high lignin content/calorific value) – cannot be used to produce pulp
 - Forest yield ~60-80 m³/ha/year (vs ~35-50 for pulp oriented clones)
 - Harvest in 2-3 years (vs 7 years for pulp)
- ▲ Three-phase growth strategy
 - Phase 1: Construct three 1 million tonne wood pellet plants (start-up 2014), with off-take agreements with European power utilities
 - Phase 2: Add 2 more pellet plants (2017/2018) – increases pellet capacity to 5 million tonnes. Emphasize torrefied pellets in Phase 2.
 - Phase 3: Commercialize biomass-to-liquids technology (date TBD)

Unique Bio-Energy Policy in the USA

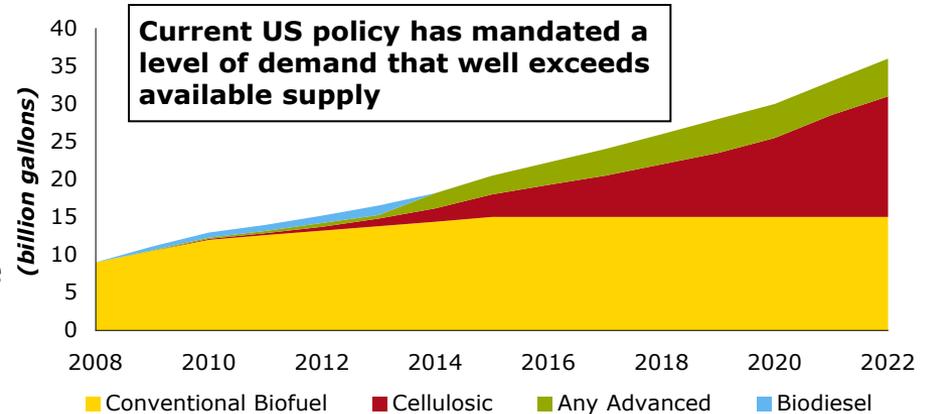
U.S. Government's Renewable Fuel Standard – 2 ("RFS2")

- ▲ Objective is to stimulate the production of "next-generation bio-fuels"
 - Specific technological pathways must be approved by the EPA
 - The feedstock must come from a renewable and sustainably managed resource
 - Requires 21 billion gallons of advanced bio-fuels by 2022
 - ⇒ Up from <1 bgal in 2012
 - ⇒ 2022 target must include at least 16 bgal of advanced cellulosic bio-fuel
- ▲ RFS2 creates a broad and sizable market in the U.S. for cellulosic fuels with numerous motivated potential customers, but there is still some policy uncertainty
- ▲ Bi-Partisan support (Romney wants to maintain the RFS), but it may be modified regardless of who is President:
 - Interim targets relaxed?
 - Cellulosic and Advanced pools combined?

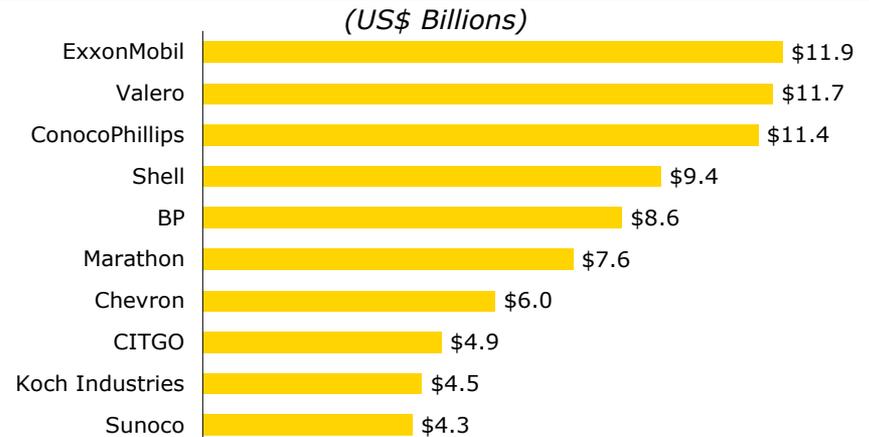


Source: U.S. EPA, Company Website, CIBC World Markets Inc.

RFS2 Mandate (in ethanol equivalence)



Potential Renewable Fuels Spend (RFS2 by 2022)

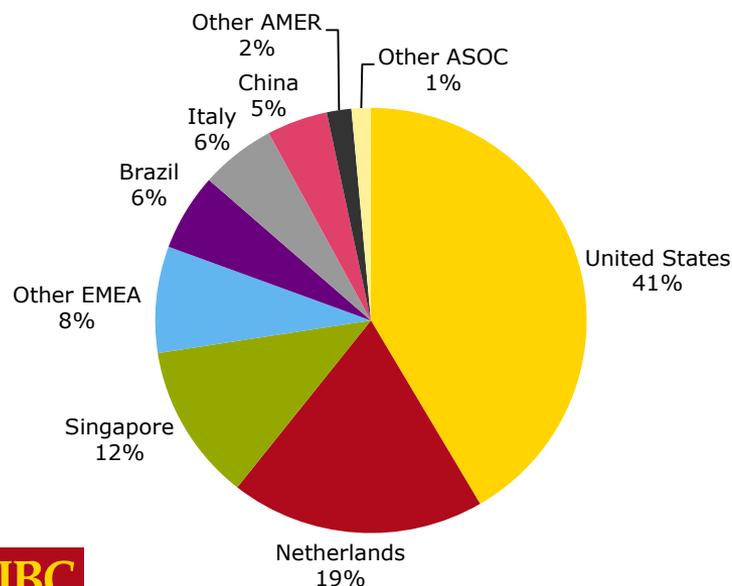


Top Refiners have significant purchase obligations

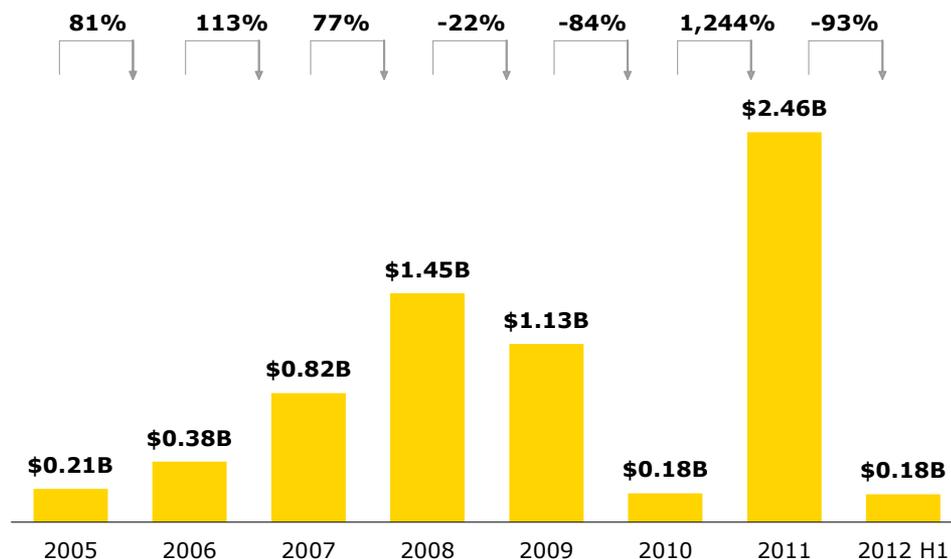
Global Second-Generation Biofuel Investments

- ▲ Due to the global recession, investments in second-generation bio-fuels fell dramatically in 2010, and then rebounded to a record \$2.5 billion in 2011. They contracted in H1 2012 due to economic and policy uncertainty
- ▲ The U.S dominates the investments in this field, with the bulk being cellulose-based. (The large investments in Singapore & the Netherlands largely use palm oil as an input.)
- ▲ We expect the aggregate investment to significantly increase over the next 5-10 years, with most of the rise occurring in the United States and Brazil

Global Asset Financing in Second-Generation Biofuels by Country (2005-2012 H1)



Cumulative Growth in Second-Generation Biofuels Asset Financing (US\$)

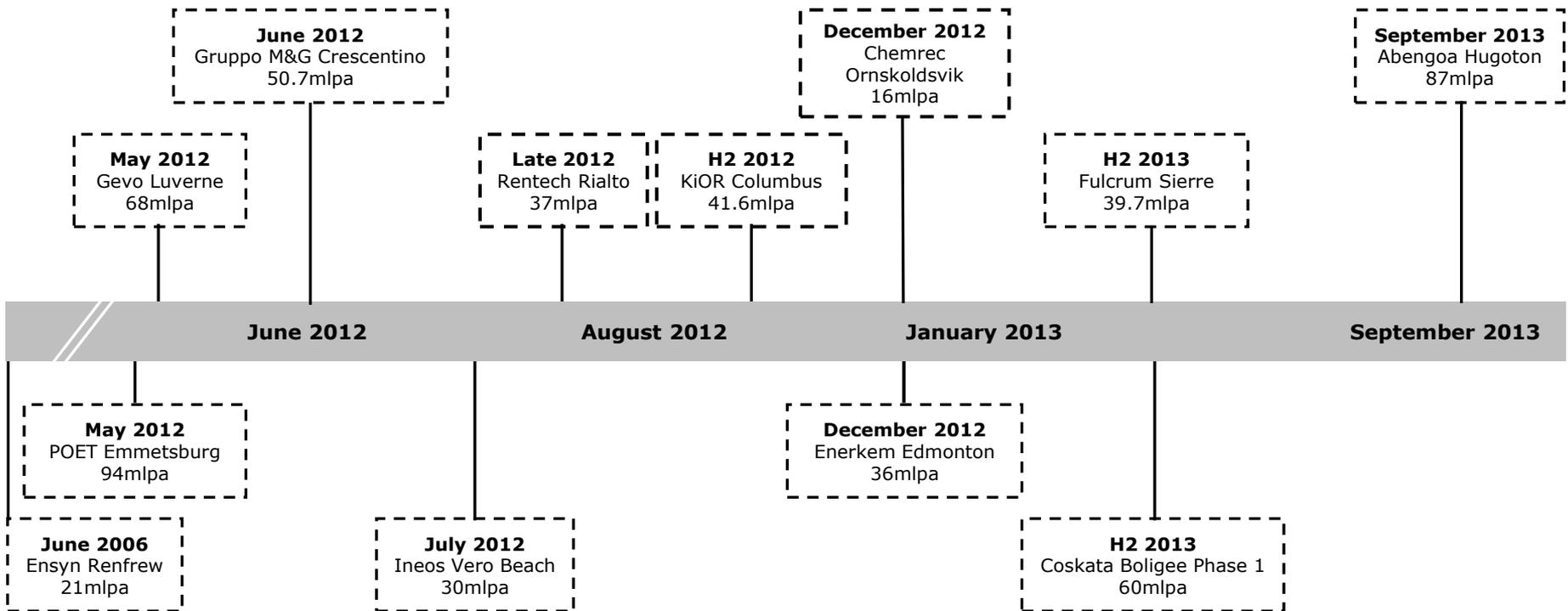


Source: Bloomberg New Energy Finance, CIBC.

A Number of Commercial Scale Bio-Fuel/Chemical Plants are Currently Being Constructed

- ▲ Expect new information over the next 12-18 months as these plants start production – we can learn a lot if we pay attention. Possible construction of 27 bio-refineries in N. America by 2015 – producing 1.6-2.6 billion gallons

Total Advanced Biofuels Capacity in N. America (2013) of ~700 M Litres Per Annum



QUESTIONS

1. What is the view of our Asian colleagues on the Asian timber deficit in the future?
2. Is the growth of bioenergy a major issue in your country? If so, what are you doing about it?

Appendix

Case Study 2: Renewable Fuel Oil (Ensyn)

- ▲ Ensyn's Fast-Pyrolysis process is the only commercially operating biomass to liquid fuels technology

Red Arrow Products Company

- ▲ Commercialized in 1989
- ▲ Four operating facilities
- ▲ Food ingredients and liquid fuels market



Ivanhoe Energy

- ▲ Commercialized in 2004
- ▲ 1,000 BDTPD
- ▲ Heavy oil facility
- ▲ Petroleum upgrading



Renfrew Facility

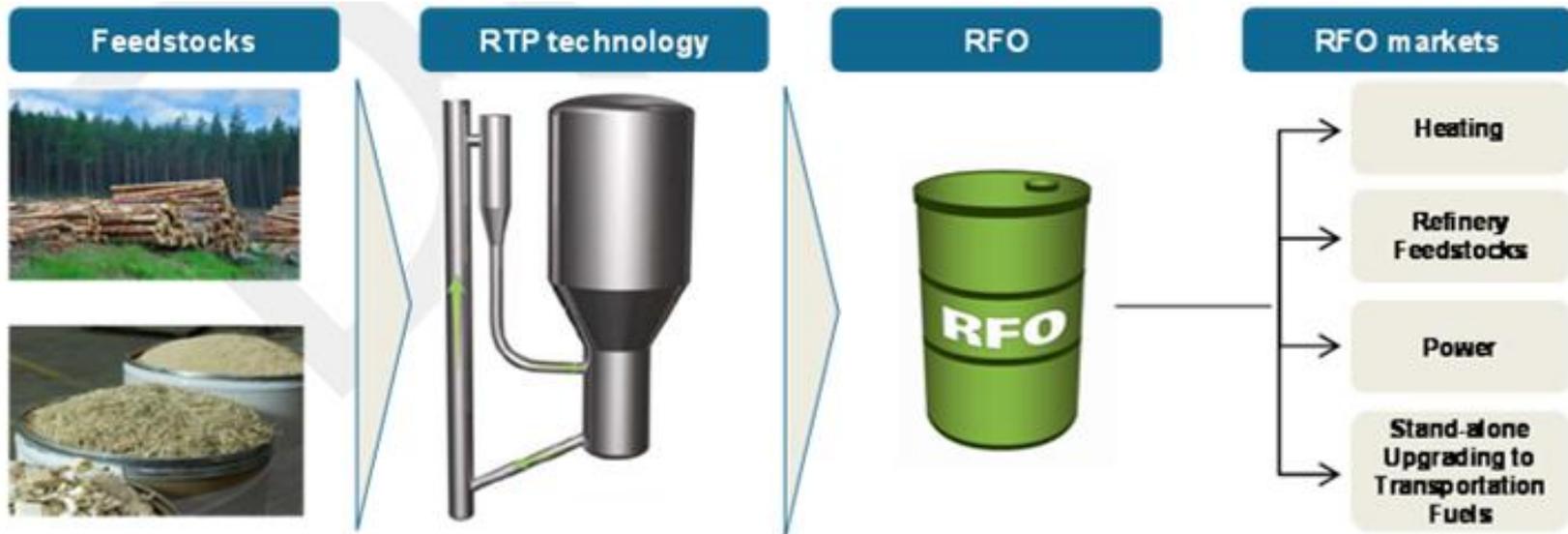
- ▲ Commercialized in 2007
- ▲ 100 BDTPD
- ▲ Renewable fuels



Over 100 million liters (30 million gallons) of Renewable Fuel Oil (RFO) produced to date

- ▲ Benchmark plant consumes 400 ODMT of biomass, and produces 850 BOE per day (23 million gallons/year of RFO)
- ▲ Capital cost is \$60-\$100 million, depending on existing infrastructure & location

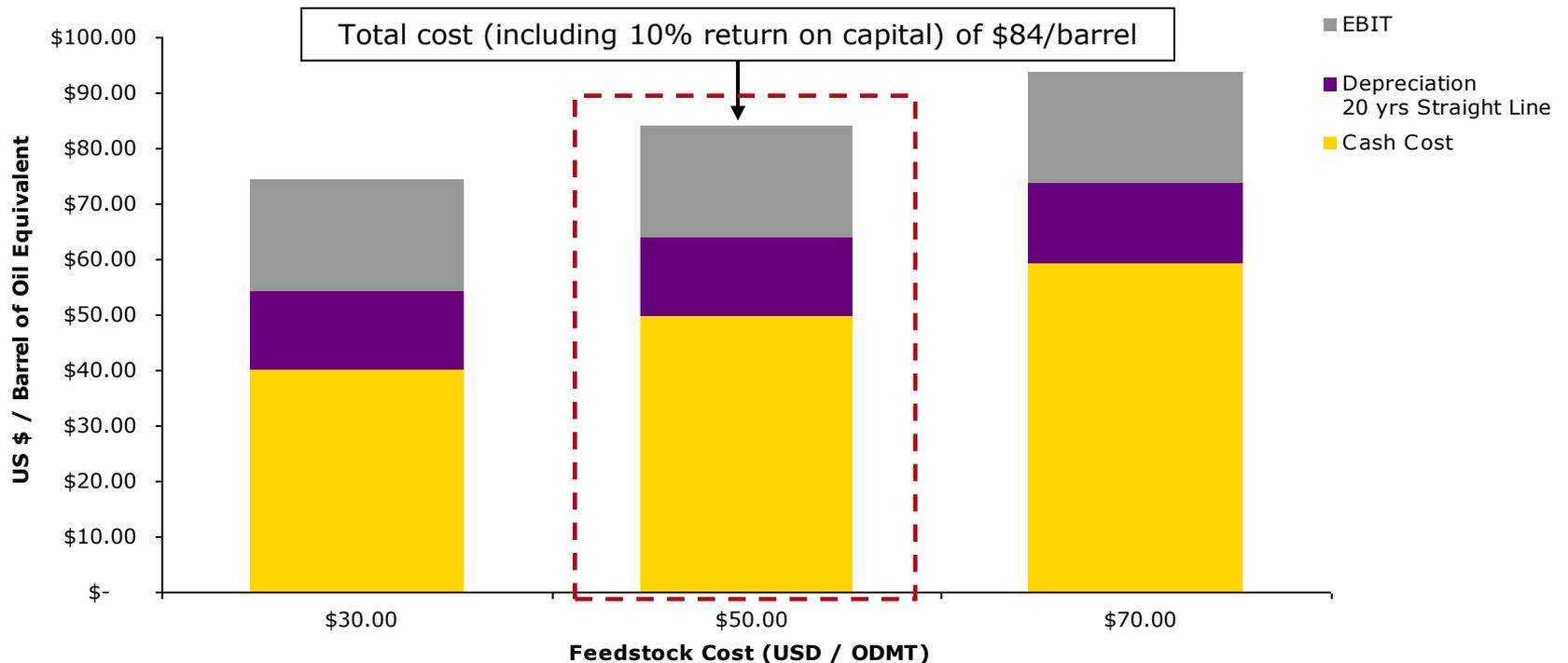
Overview of Value Chain for Ensyn's Renewable Fuel Oil (RFO)



- ▲ Joint venture between Ensyn and Honeywell has resulted in a significant reduction in costs
- ▲ Given biomass price of \$50/ODMT, the cash cost of RFO is now <\$50/barrel of oil equivalent¹
- ▲ Pre-tax unlevered IRR of 18% in base case (assumes no values for environmental attributes likes RINS)

Cost of Producing RFO Under Alternative Biomass Costs (\$/Barrel of Oil Equivalent¹)

Cost Structure, US\$ / BOE Equivalent, 10% Unleveraged Pretax IRR



¹ Source: Management.

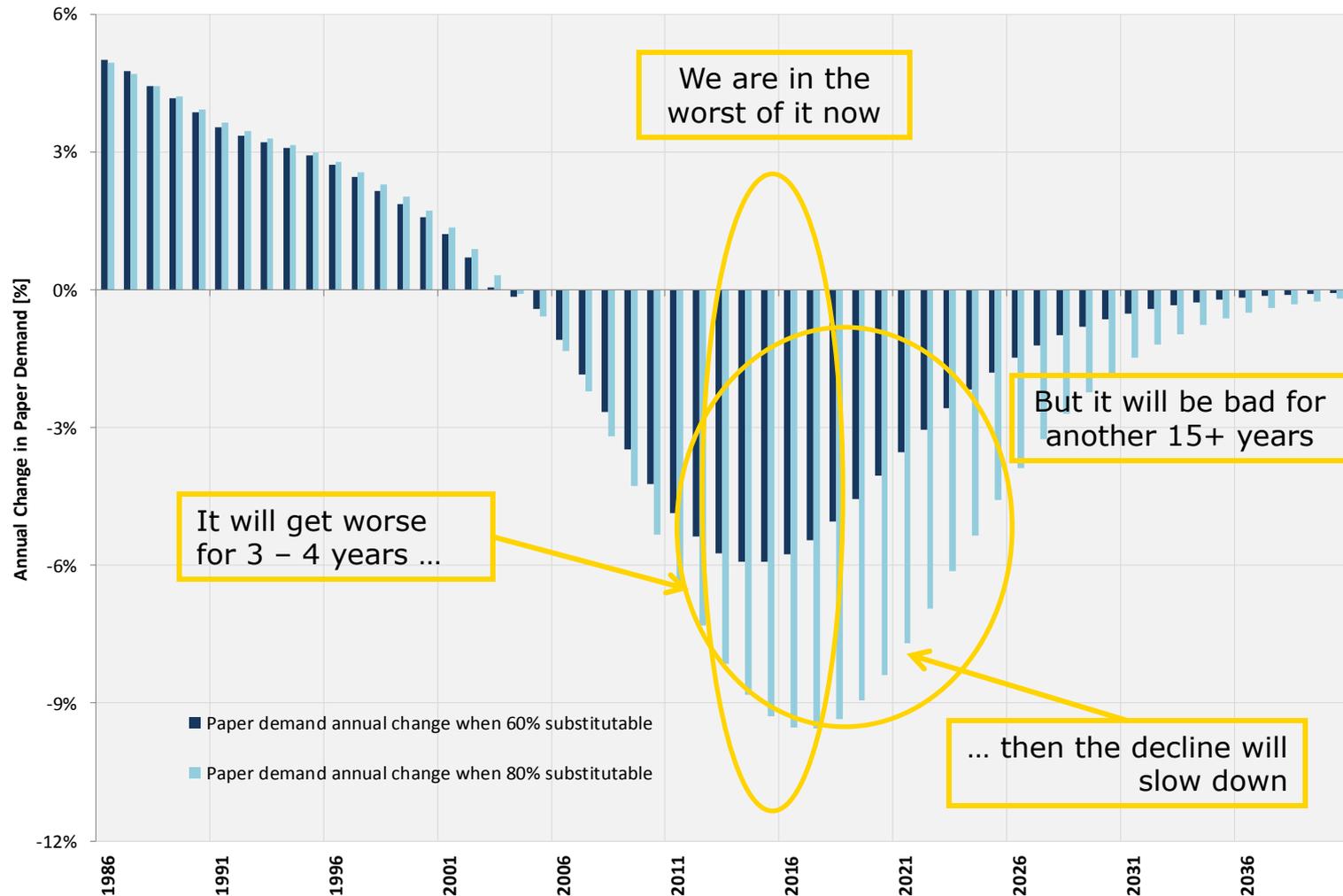
Established Network of Strategic Partners, JV Partners & Investors is Key

- ▲ In October 2012, Ensyn & Fibria Celulose established a strategic alliance
 - 50/50 JV for future investments in the production of cellulosic liquid fuels and chemicals in Brazil
 - Fibria made a \$20 million equity investment in Ensyn
 - Fibria wants 25% of its revenue from bio-energy by 2025



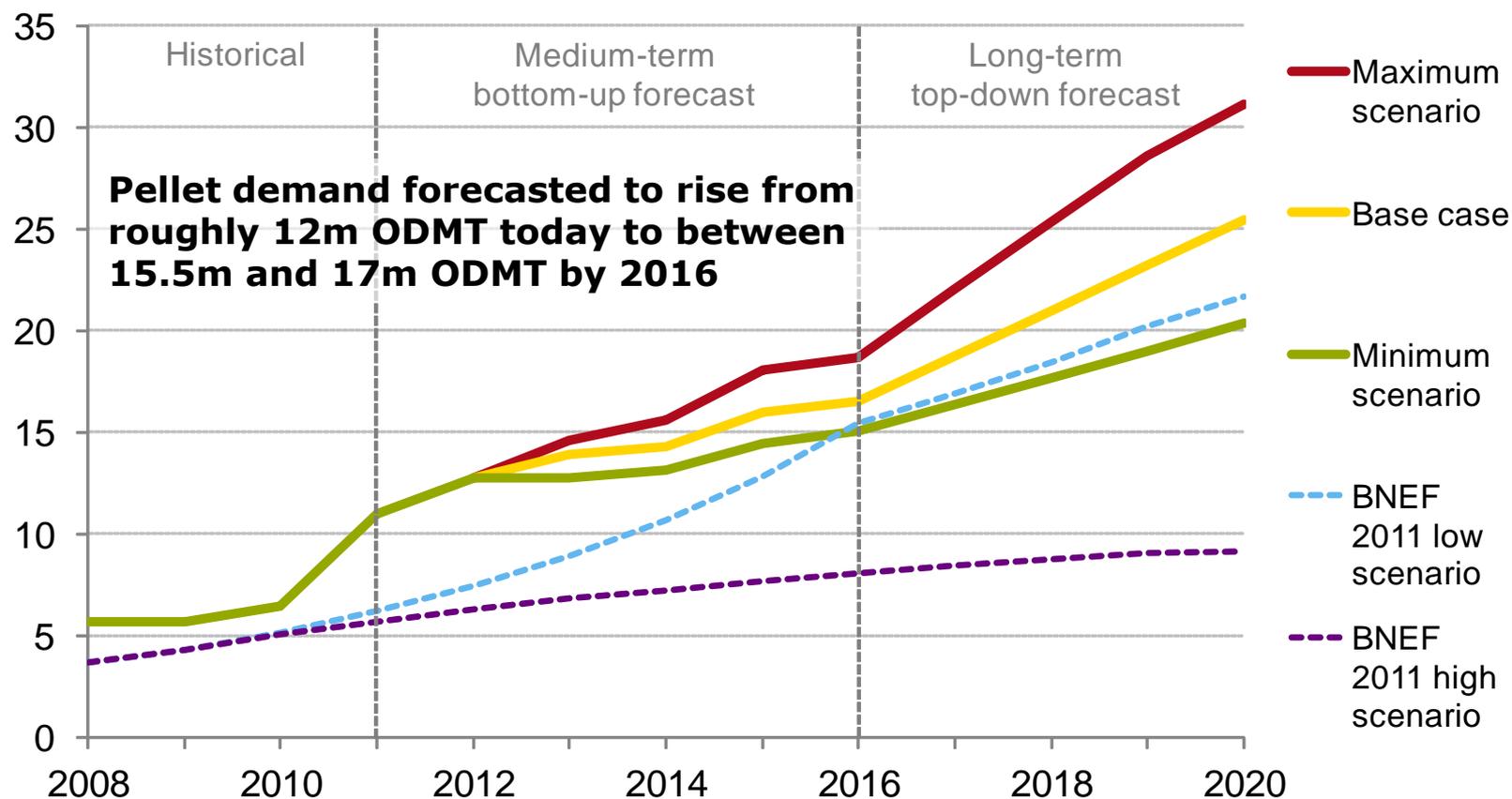
More Years of Declining Demand in N. America and Europe Before Stability

Annual Percent Change in Demand Due to E-media Substitution in North America



- ▲ By 2020, wood pellet demand is expected to be in the range of 20.3 to 31.2m ODMT
- ▲ Recent forecasts have been revised sharply upward since 2011 – last year, the forecasted range was 9.1M to 21.6 million by 2020.

EU-27 Pellet Demand Forecast, 2008–20 (million ODMT)



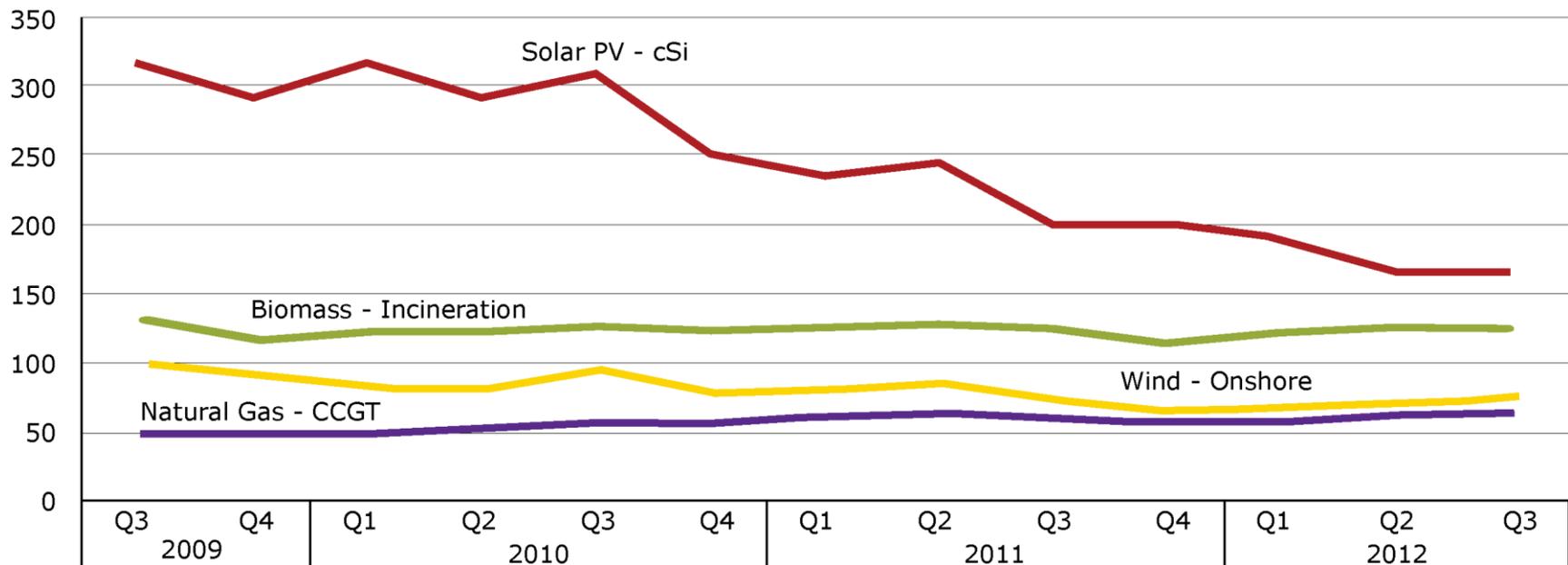
Note: Dashed lines represent BNEF's earlier forecast from March 2011.
Source: Bloomberg New Energy Finance.



Since mid-2009

- ▲ Natural Gas is the lowest cost source. On-shore Wind isn't that much higher, but it is intermittent
- ▲ Solar PV & On-shore Wind power costs have fallen ~50%, but bio-electricity has not.
- ▲ The relative cost of bio-electricity will likely continue to deteriorate going forward. Should the forest sector be focusing on producing other forms of bio-energy like cellulosic biofuels?

Levelized Cost of Electricity (Nominal prices, US\$/MWh)*



- ▲ Mr. Roberts is a Vice-Chairman of Wholesale Banking, and Managing Director in Investment Banking with CIBC World Markets Inc. He leads the bank's Renewable Energy & Clean Technology Team. Don also provides senior coverage for companies in the Global Forest Products Industry
- ▲ In 2012, Mr. Roberts was chosen by Corporate Knights Magazine as the individual in the Financial Services sector who contributed the most to sustainable development in Canada
- ▲ During a sabbatical year in 2009 Mr. Roberts designed and guided the Future Bio-Pathways Project on behalf of the Forest Products Association of Canada
- ▲ Prior to assuming his current position, investor surveys consistently ranked Don among the top equity research analysts covering the North American forest products industry over an 18 year period. Previous to entering the financial services industry he was Chief Economist for the Canadian Forestry Service. In addition to his work with CIBC World Markets Inc., Don is also
 - An Adjunct Professor in the Department of Forest Resource Management at the University of British Columbia (Vancouver);
 - On the Board of Directors, Rights and Resources Institute (Washington, D.C.); and,
 - Serves in an advisory capacity for a range of government, industry, and NGO groups.
- ▲ Mr. Roberts has a Bachelor's degree in Agricultural Economics from the University of British Columbia, a Master's degree in Forestry Economics from the University of California at Berkeley, and both an MBA and doctoral studies in International Finance and Economics from the University of Chicago. He is also a certified Board Director with the Institute of Corporate Directors