Carbon Beta™ of Securities and their Impacts on Equity Portfolios

Innovest
STRATEGIC VALUE ADVISORS
Toronto • New York • London • Paris • Sydney • Tokyo • San Francisco

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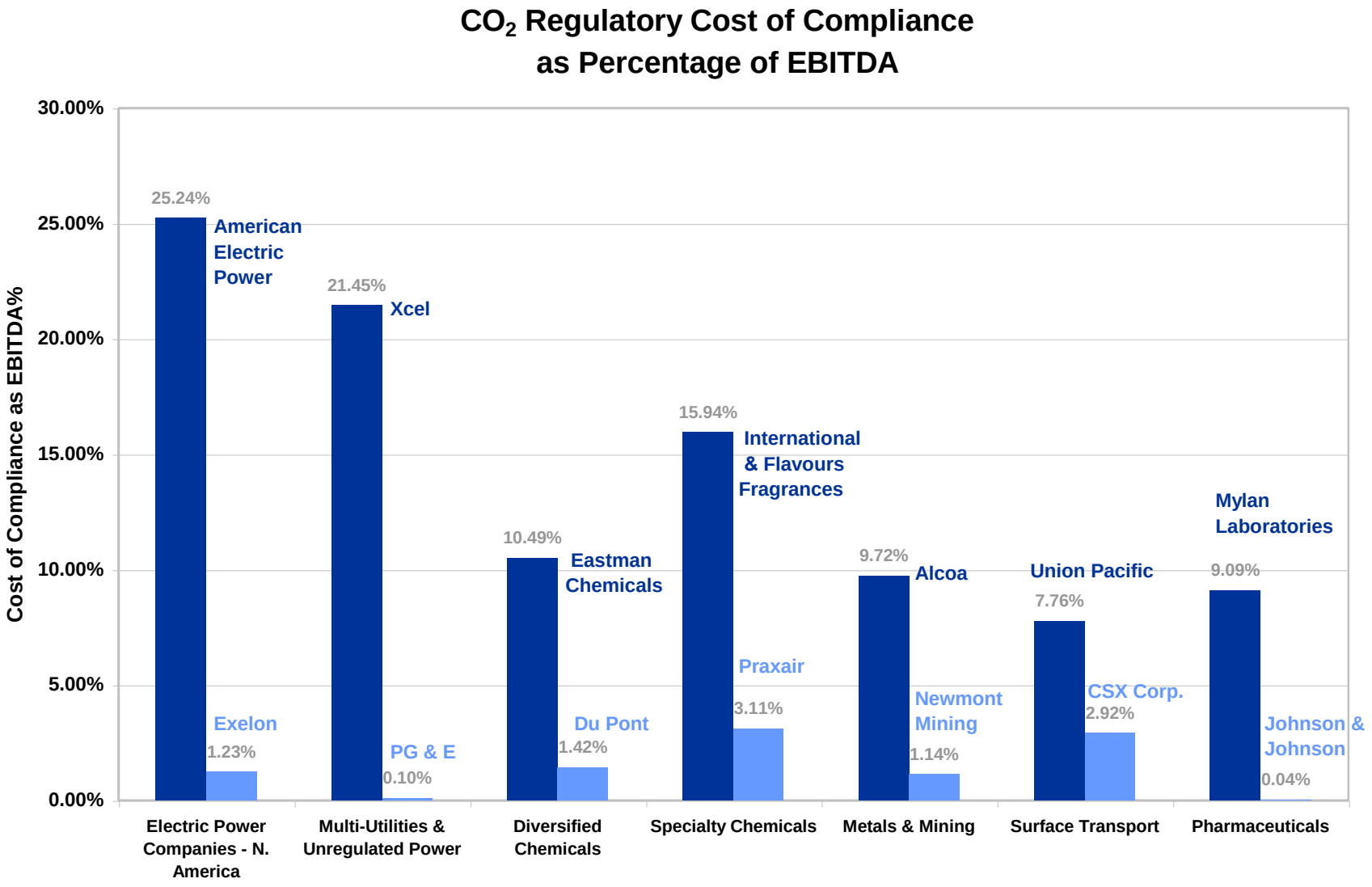
Climate Change: The Logic for Investors

- Companies' "sustainability" characteristics are becoming increasingly critical to their competitiveness, profitability, and share price performance.
- Sustainability analysis can provide additional insights about companies' strategic management capabilities, organizational agility, and therefore their financial performance potential
- Climate change is emerging as the #1 global sustainability risk driver
- Climate risk exposure varies widely, between and even within industry sectors; yet those exposures are *not* fully priced into asset values.
- Robust climate risk/opportunity data and analysis are scarce and difficult to obtain; this can create a major information advantage for investors.
- Those opportunities can be exploited through a portfolio of major global companies with superior "carbon risk" management, as well as particularly strong exposure to the opportunities being created by climate change.
- *Combining* world-class fundamental and/or quantitative analysis with institutional-quality carbon risk research creates optimal portfolio performance.

"Carbon Beta™" Varies Widely – Both Between and Within Sectors



What are the Investment Risks?

- Physical
- Litigation
- Regulatory
- Competitive
- Reputational

Each of these can affect:

- CAPEX
- Operating Costs
- Cash Flow
- Cost of Capital

What Drives Companies' "Carbon Beta"?

- Strategic governance (the extent to which companies integrate climate change factors into their business planning impact overall risk)
- Product mix – direct, indirect, and embedded carbon intensity (i.e. value chain emissions profile)
- Energy intensity, consumption patterns and electricity source mix
- Geographic distribution of production assets relative to specific regulatory and tax-related considerations
- Business regimes that determine the ability of companies to recoup carbon-driven higher compliance and operating costs from customers
- Technology trajectory – level of progress achieved towards adapting and replacing production technologies (some companies can reduce emissions at much lower cost than others)
- Ability to identify and monetize revenue opportunities (manufacturing cost efficiencies, new product/service opportunities, emissions trading and clean technology)

Carbon BETA™ Multidimensional Analysis

CLIMATE RISK HAS FOUR DIMENSIONS, NOT ONE

It is sometimes (erroneously) assumed that companies' "carbon footprint" is the paramount or even the only factor to be assessed in determining their risk for investors.

Scores

Carbon Management Strategy: Each company is assessed relative to peers on its carbon management strategy. In particular, we look at stated goals and policies to address climate change challenges.

Carbon Risk Exposure: Risk exposure trends related to climate change are assessed for the sector as a whole, and the company in particular. Three categories of risk are addressed: direct risk, indirect risk (upstream the supply chain) and market related (GHGs emissions related to product in use)

Strategic Carbon Opportunities: Each firm is assessed for its ability to develop and commercialize strategic carbon opportunities relevant for its sector. These may be comprised of anything from direct technical solutions to changes in services and operations management that address climate change and lower emissions.

Improvement Trend: The overall trend for the company vis-à-vis climate change risks and opportunities is assessed.

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AES Corp.

Industry: Electric Power Companies - N. America
Country: United States
Analyst: TBD
Rating Outlook: Steady
Ticker: AES-N
Customize:

IVA Rating	BB
Carbon Beta™ Rating	BBB
Global Compact PLUS	
Business Activities	

Carbon Financials

Compliance Costs

WACCRT™ *(b):*	0.05%
Industry Discount Rate *(c):*	0.07%

	Exp. Case	Min.Case	Max. Case
NPV cost to meet target year($1000)	$272,300,180	$173,323,882	$428,275,515
Exposure (% of EBITDA)	0.235%	0.15%	0.37%

Company Carbon Positioning

Total CO2 Emissions (tons):	49,622,319
Industry Benchmark (Total CO2 tons):	52,068,106
Relative Carbon Market Risk Exposure *(d):*	0.95
Carbon Intensity (tons CO2 eq./USD sales in millions):	1,919
Industry Benchmark (tons CO2 eq./USD sales in millions):	1,408
Relative Carbon Efficiency Performance *(e):*	0.73

Carbon Management Strategy

AES s above average CO2 emissions rate for its generating capacity in the United States exposes the company to future federal legislation on climate change. Furthermore, AES has significant generating capacity in Europe and in areas of the US with greenhouse gas (GHG) emissions schemes in place or under development. In an effort to mitigate the company s risk and capitalize on growing profit opportunities in this area, AES continues to develop GHG emission offset projects under the Clean Development Mechanism of the Kyoto Protocol. The company has announced a planned partnership with GE Energy Financial Services. The partnership would seek to create 10 million tonnes of greenhouse gas offsets annually by 2010. These offsets would be achieved primarily through the reduction of emissions of methane. Additional offsets would be created through energy efficiency projects and renewable energy development. AES s strategy and disclosure in this area are in line with the sector average practices

Carbon Beta™ Rating	BBB
Carbon Intensity *(a):*	1918.57
Carbon Direct Intensity:	5
Carbon Indirect Intensity:	4
Carbon Market Sensitivity:	5
2005 Sales (USD millions):	$8,363
Carbon Improvement Vector	▲

Carbon Scores

Carbon Management Strategy:	5
Carbon Risk Exposure:	3
Carbon Strategic Opportunities:	9
Carbon Performance Improvement:	7

Carbon Documents

Carbon Disclosure Project (CPD) Response
Company Carbon Profile

Carbon Sector Snapshot

FPL Group Inc	AAA
Exelon Corp.	AA
Calpine Corp.	AA

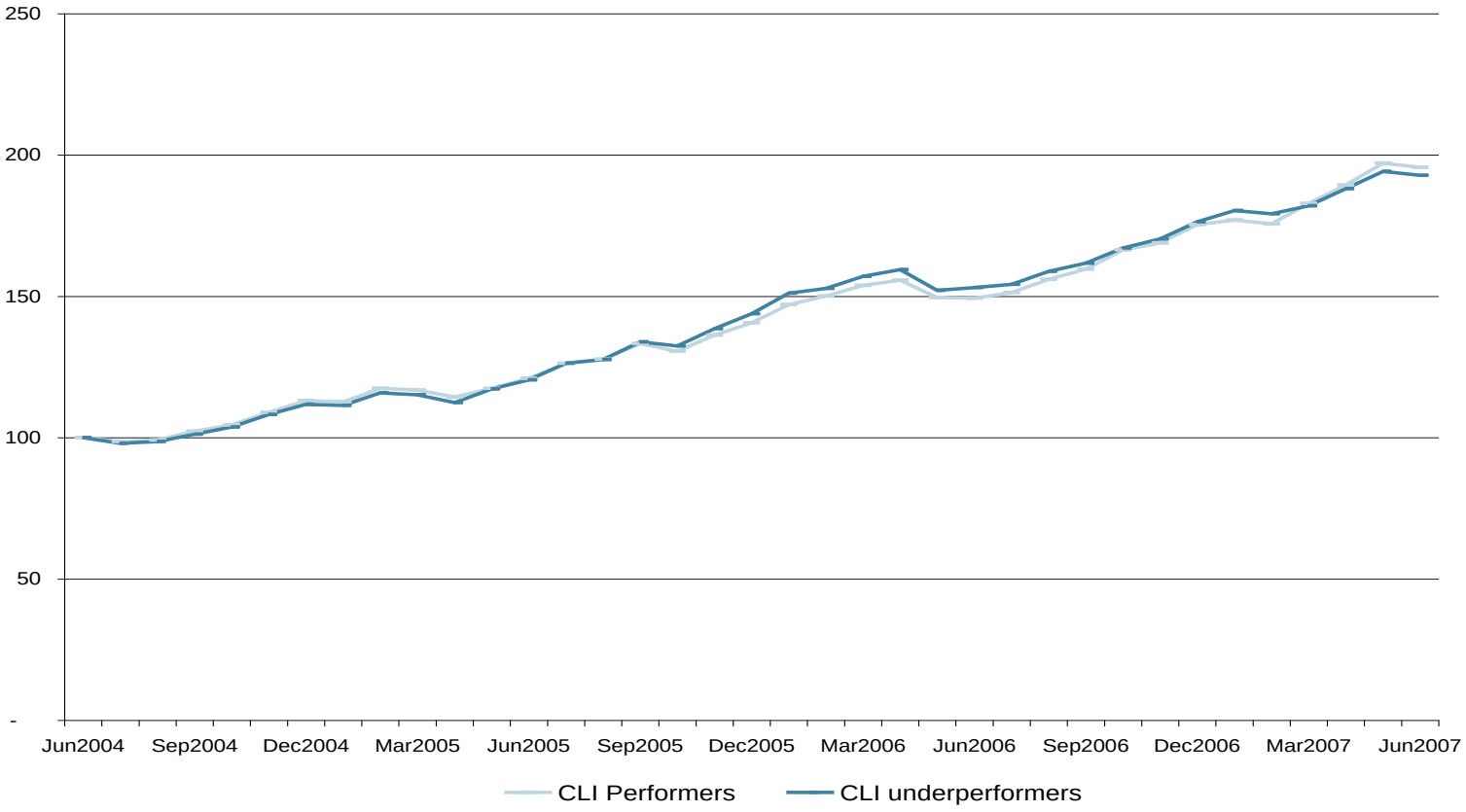
Carbon BETA™: Compliance Cost

Elements that integrate the compliance cost model:

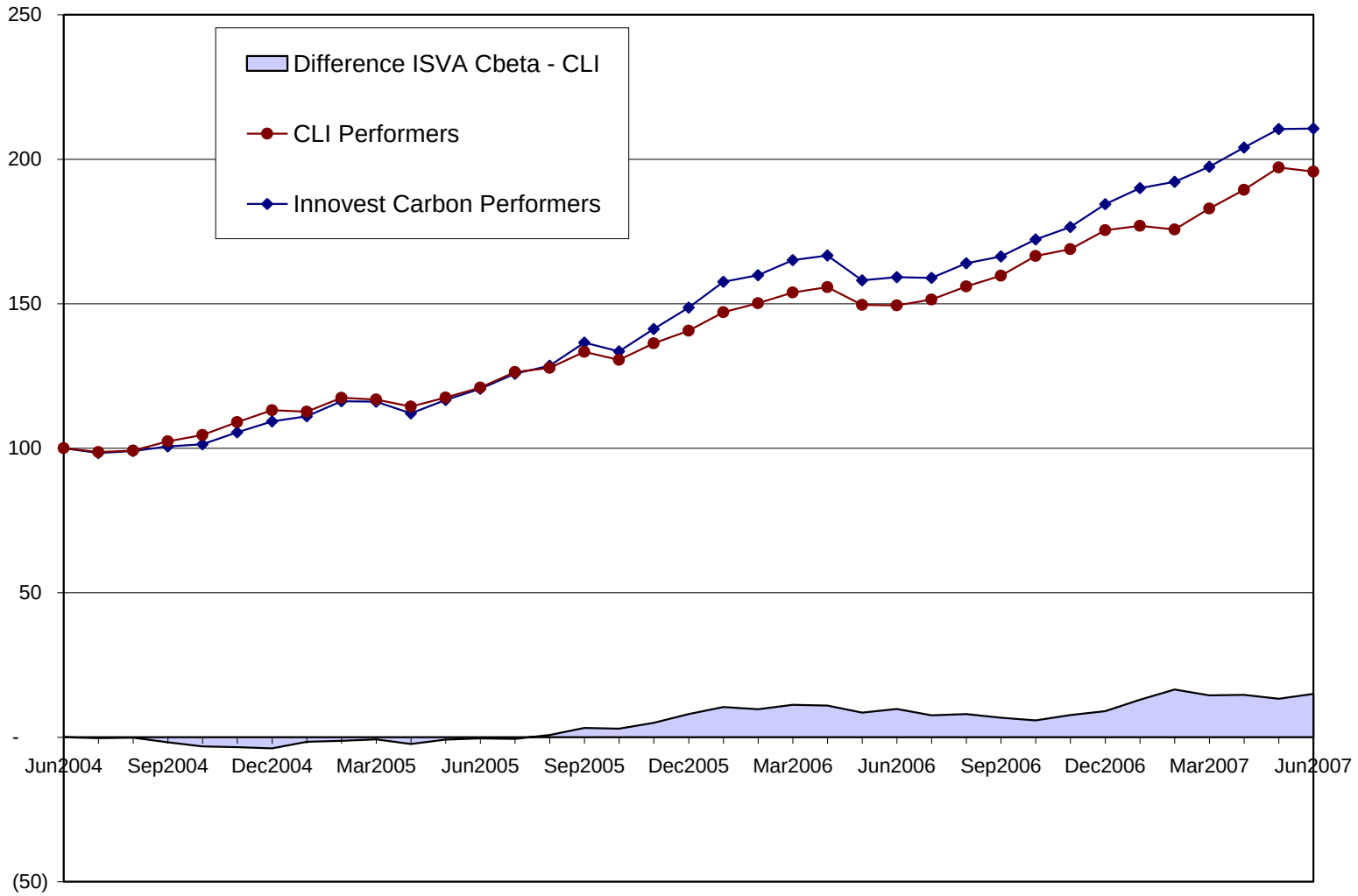
- Weighted Average Country Carbon Reduction Target (WACCRT©), represents the aggregate extent of emissions reductions over the full range of a firm's industrial activities according to applicable legislations, domestically and internationally.
- Industry Discount Rate, is calculated from the Weighed Average Cost of Capital (WACC) from each specific industry.
- Carbon Cost, is the weighted price for three different scenarios (expected, maximum and minimum price) per emission allowance ($ per ton of CO_2 equivalent).
- Net Present Value of costs of meeting emissions reduction targets. For calculating this figure we estimate the abatement compliance cost for each year during the commitment period.

Compliance Cost			
WACCRT™ *(b)*			-16.51%
	Exp. Case	**Min. Case**	**Max. Case**
Carbon Cost ($/ton CO_2)	$28	$18	$45
NPV costs to meet target year ($1000)	$311,497	$190,693	$499,932
Exposure (% of EBITDA)	**17.19%**	**10.52%**	**27.59%**
	Industry discount rate *(c)*		*9.16%*

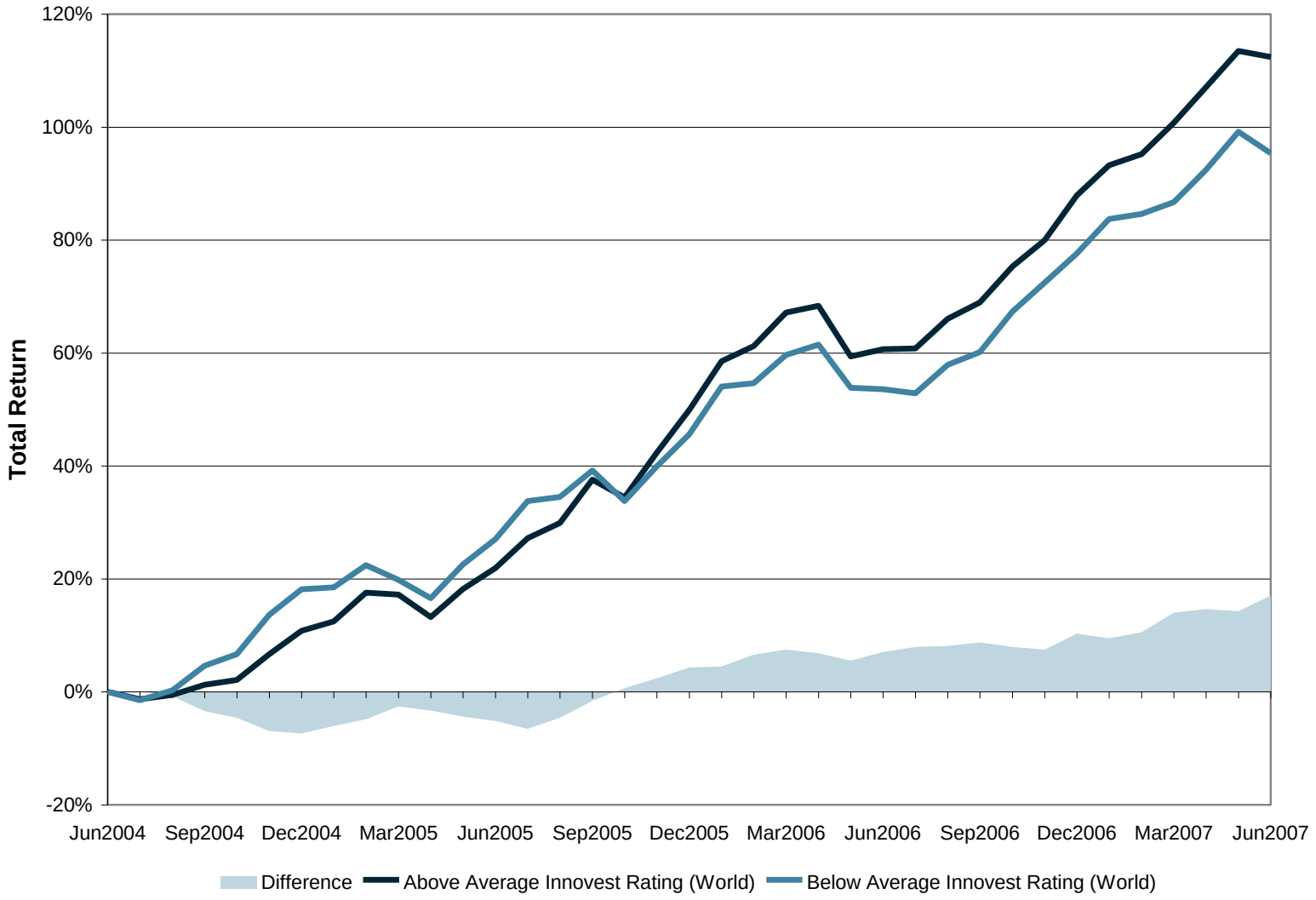
The “Disclosure Quality Premium” is Essentially Zero!



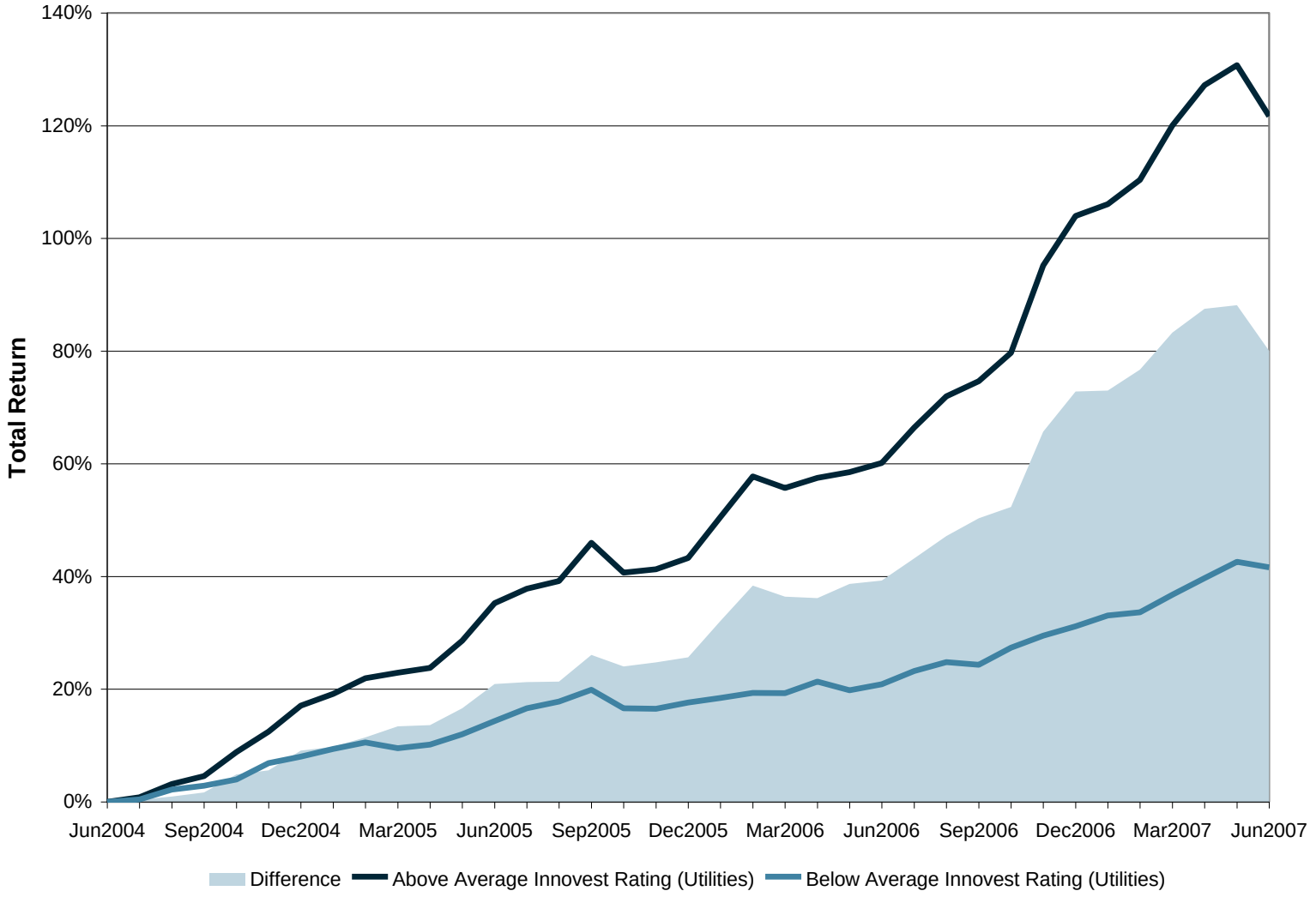
Disclosure is NOT Enough!



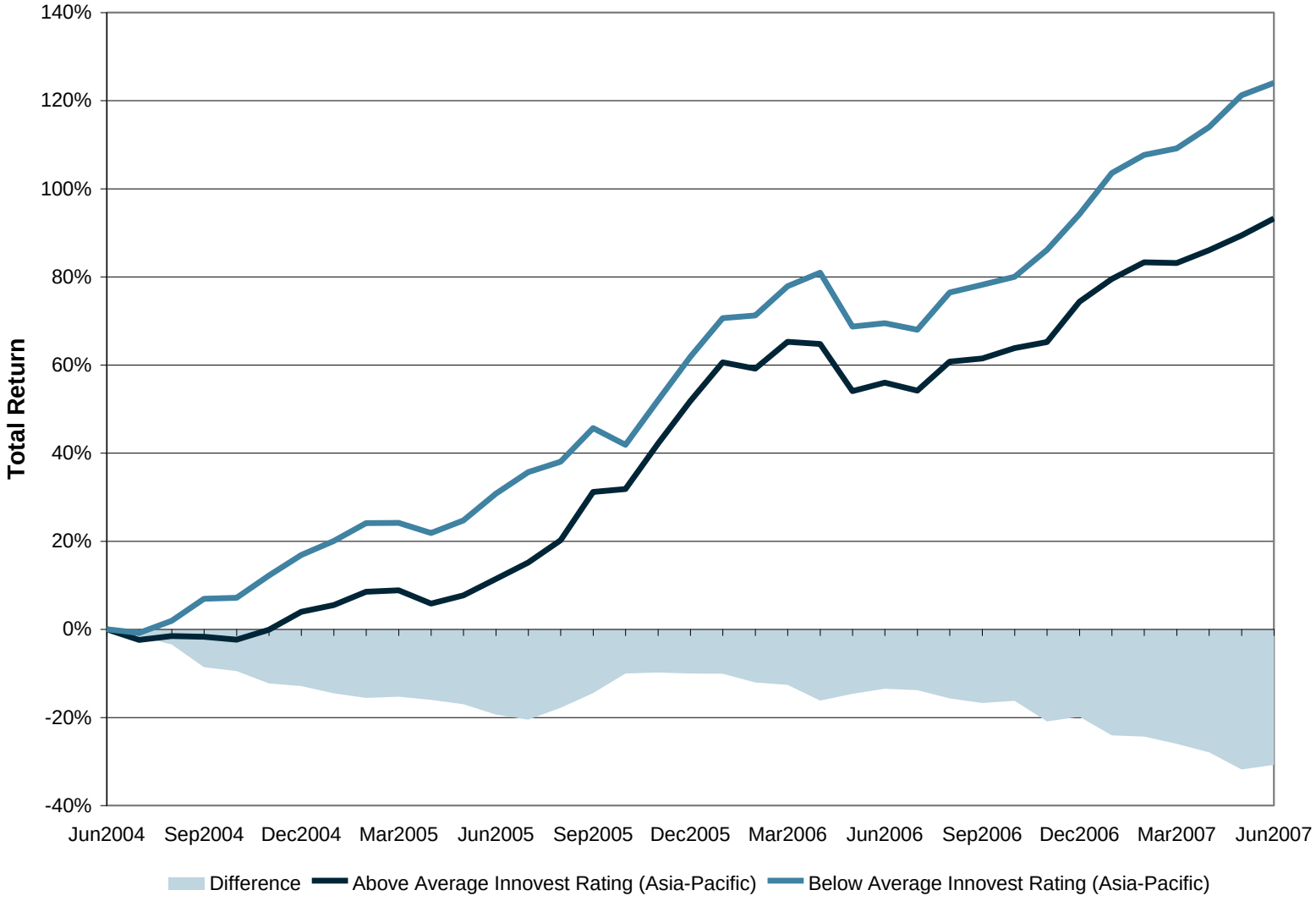
Carbon Beta© Performers vs. Laggards Globally



Carbon Beta© Performers vs. Laggards in the Utilities Sector



Carbon Beta© Performers vs. Laggards in Asia-Pacific



Carbon Price Impacts - Modeling a New Base Load Power Station

- NSW attempting to encourage new private sector investment in base-load power
- Compare two key contenders:
  - Ultra supercritical black coal
  - Combined cycle gas turbine
- What generator type is most cost competitive under emissions trading?
- How do changes in key variables change the picture from the perspective of a project financer?
  - e.g. - Price of emissions permits
    - - Level of auctioning vs. free allocation of permits

Coal vs. gas under emissions trading – key assumptions

	USC Coal	CCGT
Construction costs for 1000MW generator ($ million)	1,800	844
Fuel costs ($/MWh)	11.45	28.40
GHG emissions per MWh (tonnes)	0.84	0.35

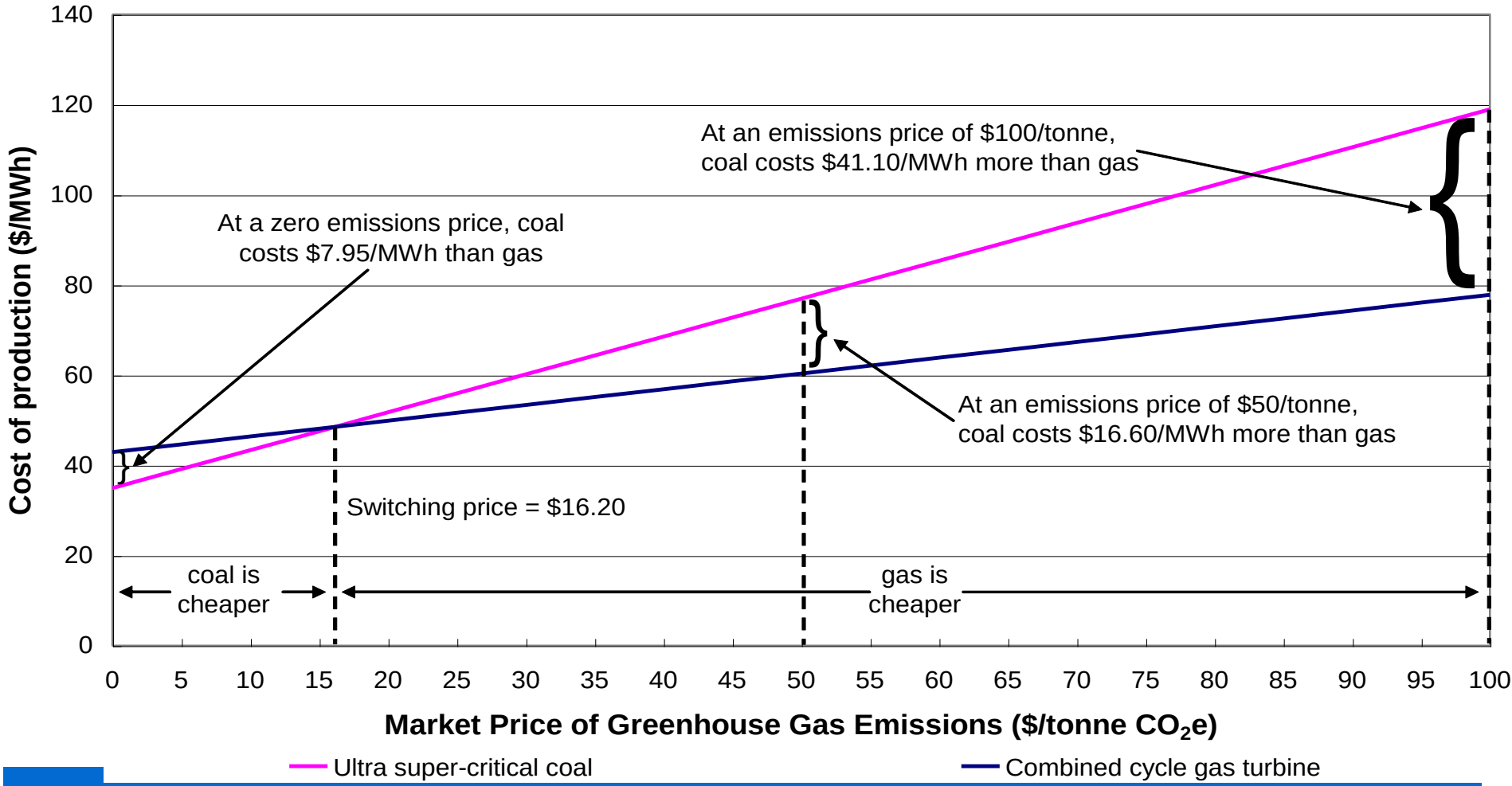
Source: Connell Wagner (2007). Midpoints are used where a range of estimates are provided.

- Ten year time horizon has been used for modelling (from 2010 to 2020)
- Permit allocations fall by 20% between 2010 and 2020, representing a policy-induced reduction in emissions
- Carbon capture and storage is not modeled

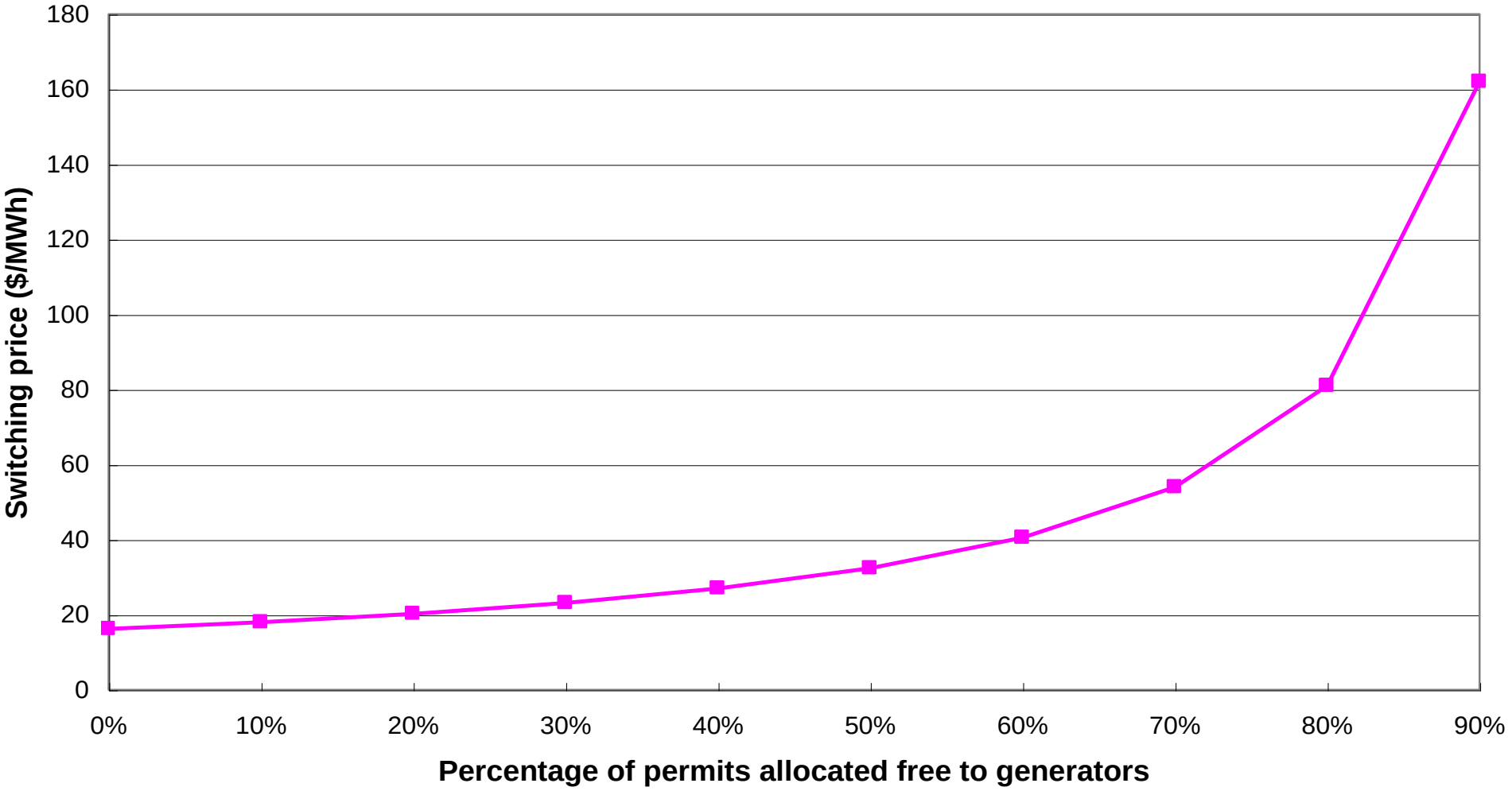
The switching price

What carbon price makes the cost of coal = the cost of gas-fired base load?

Gas Switching Price with 100% Auctioning of Permits



Gas Switching Price Under Various Permit Allocations



Impact on financial ratios

Interest cover:

Pricing scenario	Level of free permit allocation 100%	75%	50%	25%	0%
Case 1a: AUD10	coal	coal	coal	~coal	equal
Case 1b: AUD35	coal	~gas	gas	gas	gas
Case 2a: AUD10-AUD30	coal	coal	~gas	gas	gas
Case 2b: EU ETS	coal	gas	gas	gas	gas

Profit margin:

Pricing scenario	Level of free permit allocation 100%	75%	50%	25%	0%
Case 1a: AUD10	coal	coal	coal	coal	coal
Case 1b: AUD35	coal	coal	gas	gas	gas
Case 2a: AUD10-AUD30	coal	coal	coal	equal	gas
Case 2b: EU ETS	coal	equal	gas	gas	gas

Note: The ~ symbol indicates a marginal preference for a particular fuel. eg. ~gas is a marginal preference for gas.

Asymmetric risk profile

What if we make the wrong decision?

Fuel Choice	Low carbon price	High carbon price
Coal	Positive financial impact relative to gas	Negative financial impact relative to gas – unbounded as carbon price rises
Gas	Negative financial impact relative to coal – bounded by a strictly non-negative carbon price	Positive financial impact relative to coal

For further information

Thank you !

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What Have We Learned So Far?

- The global industrial restructuring towards a "low carbon" future has already begun
- Risks are much more broadly –and unevenly—distributed than previously thought
- Climate risk has *four* dimensions, not just one! Analysis must consider:
  - risk;
  - risk management;
  - market-driven *upside* opportunities
  - Performance improvement vector
- While more & more investors and corporates are now paying attention, most are a *long* way from integrating the net climate exposure of their assets into actual investment strategies
- Investors *can* make money from climate change – and some are already doing so!

Monetizing Carbon Beta in the Fixed-Income Market

North America Corporate Research

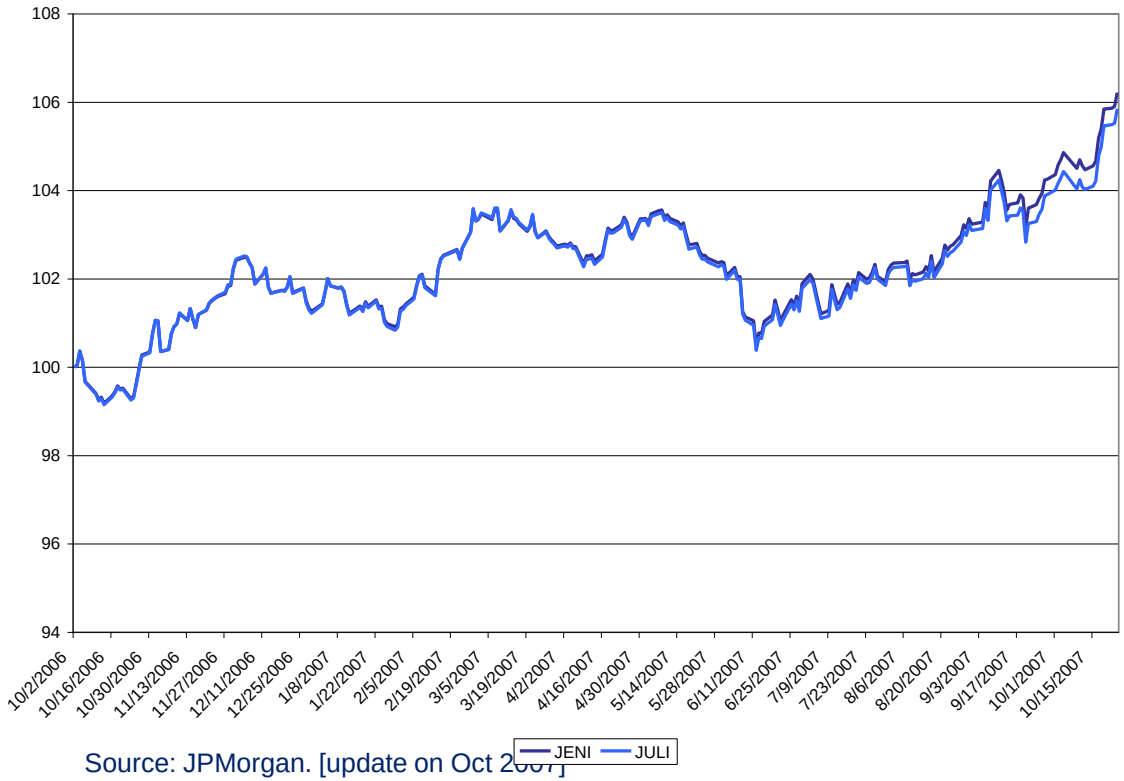
JPMorgan

27 February 2007

Introducing the JENI-Carbon Beta Index

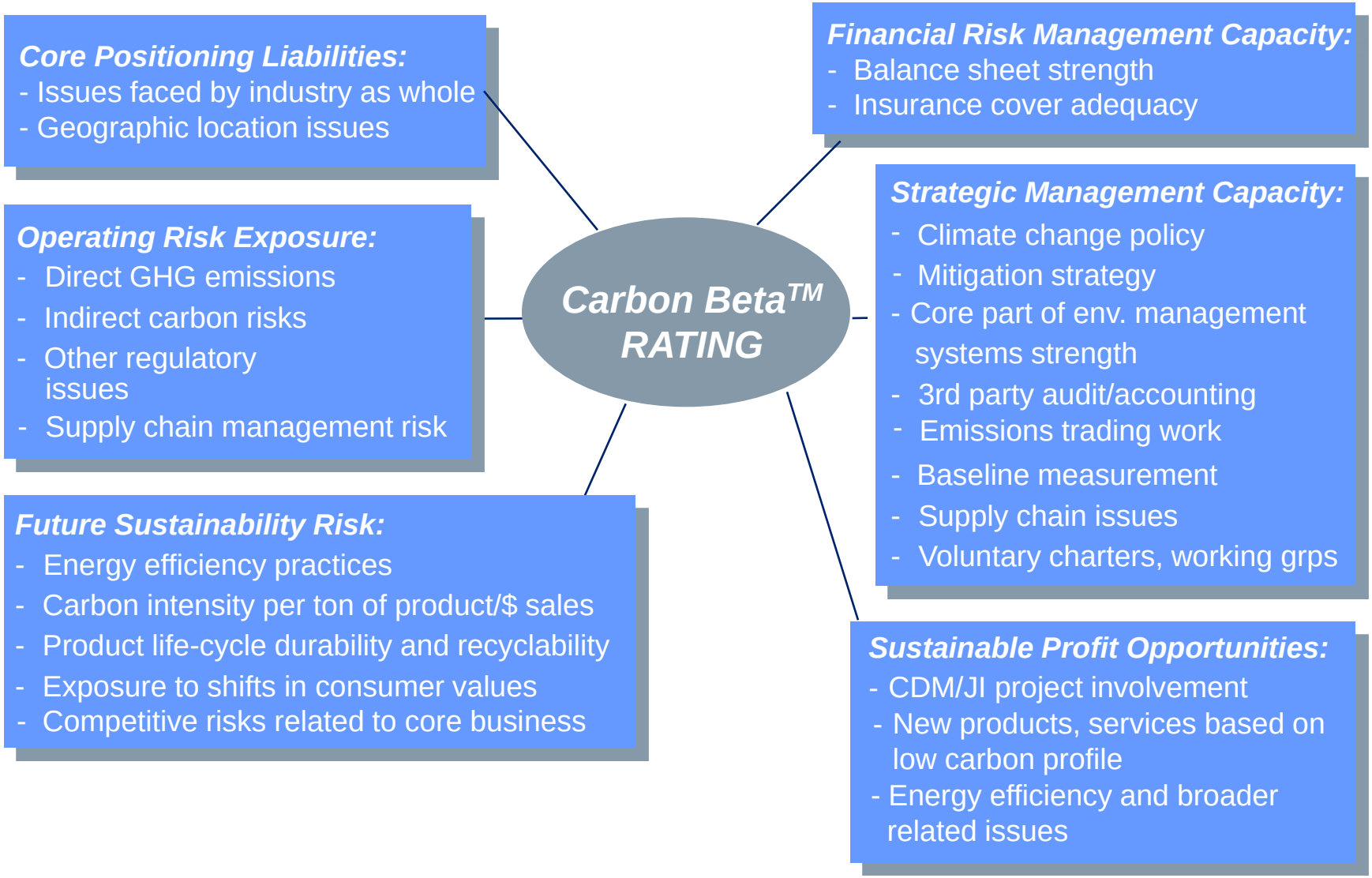
The first corporate bond index to address the risks related to climate change

JENI-Carbon Beta vs. JULI (spreads over benchmark Treasuries) bps



Source: JPMorgan. [update on Oct 2007]

Multi-factor Carbon Beta™ algorithms integrate over multiple data points, including:



4 Carbon Price Scenarios Modelled