



Green or Black investment? Options, bonds and equity plays

June 2012

Passion to Perform

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We present a think-piece on environmental risk



- many assets in the European utilities sector are subject to environmental risk
- the risk profiles for different assets are very different in nature
- we suggest a possible qualitative analytical framework for evaluating these risks
- we illustrate how such a framework might be applied to assets and companies in the European utilities sector

Living in a world of environmental uncertainty



- changing environmental regulation is introducing new risks and opportunities
 - how do investors treat these risks?
 - should companies make green or black investments?
- problems with traditional valuation models
 - using a base case cashflow scenario and arriving at a DCF using a WACC may tend to under or overvalue some investments
- an alternative valuation framework
 - categorizing real assets according to whether they behave like equities, bonds or options
 - implications for valuation (does DCF fairly value, overvalue or undervalue these assets?)
 - implications for financing and portfolio optimization

Valuation framework for Green and Black investments



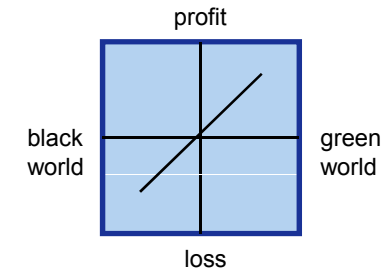
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1) Green equity plays



— investments which make more money if the policy backdrop becomes greener, and less money if the policy backdrop becomes blacker

— smooth profile of higher or lower returns:



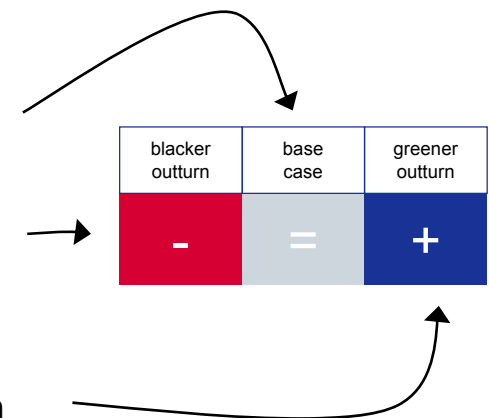
— example would be a wind farm selling power into a wholesale market where prices are set by fossil generation – as the carbon price rises the revenues and profits rise

— traditional DCF and WACC approach might be appropriate

— if environmental risks are evenly balanced, then using a central carbon price scenario should give an appropriate valuation

— if the world turns out to be blacker than expected (lower carbon price) the investment would be worth less than the base case valuation

— if the world turns out to be greener than expected (higher carbon price), the investment would be worth more than the base case valuation

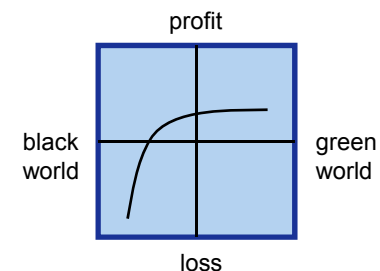


2) Green bond plays



— investments which look to give a steady return, but could become stranded if green policies are abandoned

— mostly making fixed and moderate profits, but with extreme downside in a very black world:



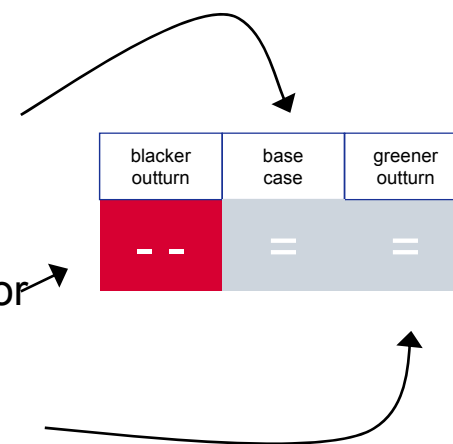
— example would be a wind farm selling power under a fixed feed-in-tariff, making steady profits but with a risk that the FIT is abandoned or reduced

— traditional DCF might overvalue green bonds

— the base case / central scenario might miss the potential low probability/large downside catastrophic risk

— if the world turns out to be blacker than expected then the investment could be worth a lot less (eg FIT subsidies cancelled for existing projects)

— if the world turns out to be greener than expected, the asset continues to make steady returns and the central case DCF is fine (but no extra upside)

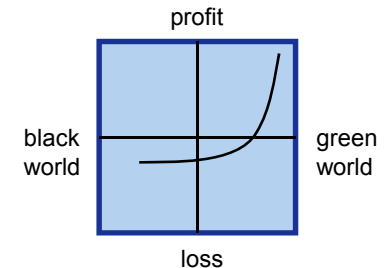


3) Green options



— investments which look to have a low value in a base case but could be very profitable if enhanced green policies are introduced

— mostly low value / loss making, but with extreme upside in a very green world:



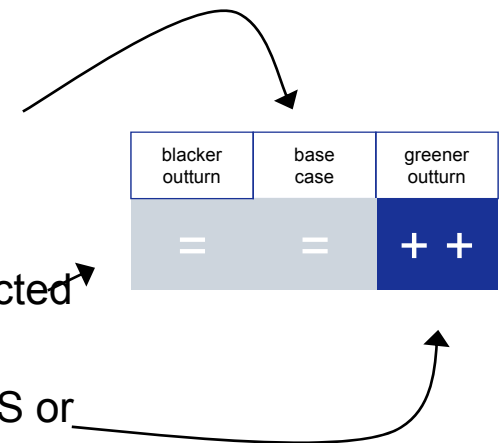
— example would be investing in CCS retrofit capability when building a power station, but only expecting to use this option if the emissions performance standard requirements are accelerated

— traditional DCF might undervalue green options

— the base case / central scenario might miss the potential low probability/large upside out of the money option value

— if the world turns out to be blacker than expected (eg no EPS is introduced) the investment has a low or negative value, as expected in the central case

— if the world turns out to be greener than expected (eg forced CCS or closure), the investment is worth a lot more than the base case valuation

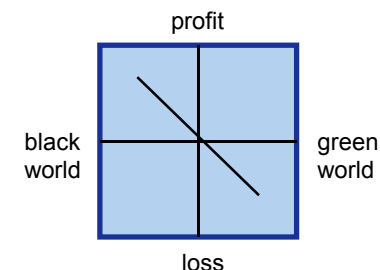


4) Black equity plays



— investments which make more money if the policy backdrop becomes blacker, and less money if the policy backdrop becomes greener

— smooth profile of higher or lower returns:



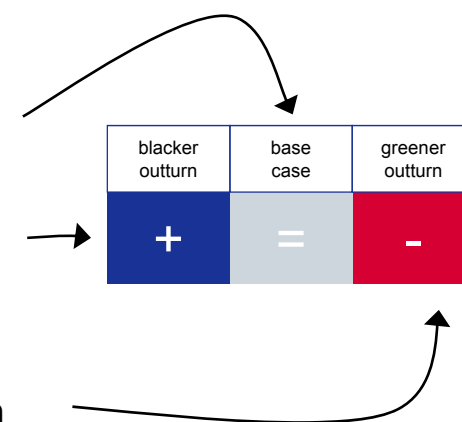
— example would be a lignite power station – if the carbon price falls the costs fall by more than the revenues, and therefore profits rise

— traditional DCF and WACC approach might be appropriate

— if environmental risks are evenly balanced, then using a central carbon price scenario should give an appropriate valuation

— if the world turns out to be blacker than expected (lower carbon price) the investment would be worth more than the base case valuation

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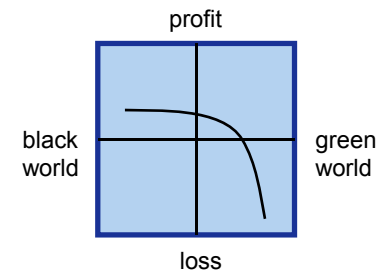


5) Black bond plays



— investments which look to give a steady return, but could become stranded if additional green policies are introduced

— mostly making fixed and moderate profits, but with extreme downside in a very green world:



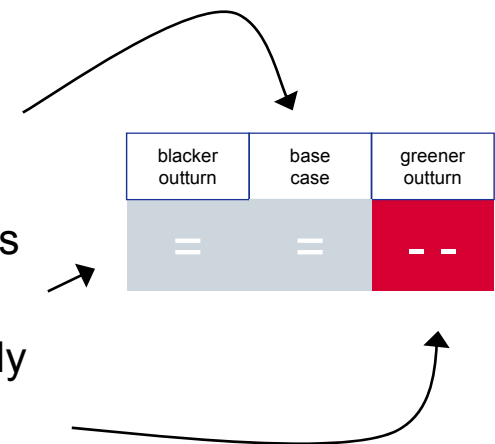
— example would be a German coal power station, operating in a coal-fired power market but facing the risk of forced closures or CCS (emissions performance standard)

— traditional DCF might overvalue black bonds

— the base case / central scenario might miss the potential low probability/large downside catastrophic risk

— if the world turns out to be blacker than expected then the returns remain moderate and the central scenario is correct

— if the world turns out to be greener than expected (eg forced early closure of coal or CCS), the asset suddenly becomes worthless

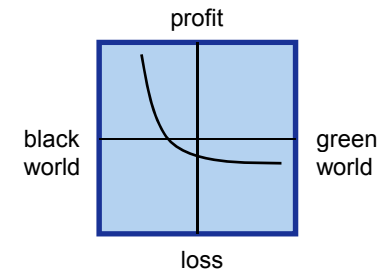


6) Black options



— investments which look almost worthless in most scenarios but could be very profitable if green policies collapse

— mostly low value / loss making, but with extreme upside in a very black world:



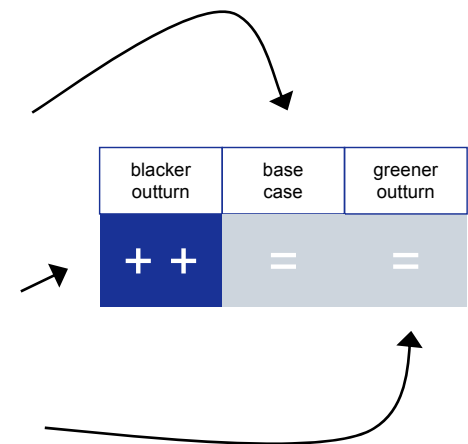
— example would be a UK coal power station from 2017, facing a high carbon price floor – looks to be unprofitable but could be very valuable if the UK carbon price floor were ever abandoned

— traditional DCF might undervalue black options

— the base case / central scenario might miss the potential low probability/large upside out of the money option value

— if the world turns out to be blacker than expected (eg carbon floor abandoned) the investment would be worth a lot more than the base case valuation

— if the world turns out to be greener than expected (eg forced early closure of coal), the investment is worthless as expected in the base case



Valuation framework for Green and Black investments



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Valuation implications



- if using a traditional DCF approach with a central case and WACC, check whether the profits are likely to have equity, bond or option-like characteristics when subject to environmental risk
 - 1) if the investment behaves like a typical equity play, a traditional valuation approach may be appropriate (but consider whether environmental risks are symmetric or asymmetric, systemic or diversifiable)
 - 2) if there is a low chance of a catastrophic downside, consider applying a discount to the DCF valuation base on an extreme downside scenario multiplied by a low probability (or explore if there are cheap hedging options which could offset the downside case)
 - 3) if the investment looks unattractive on a central case, but has the chance to be highly valuable, consider using an option-type valuation, or adding an option value to the base case valuation (alternatively consider how the option could be valuable to a portfolio if paired with an opposite bond)

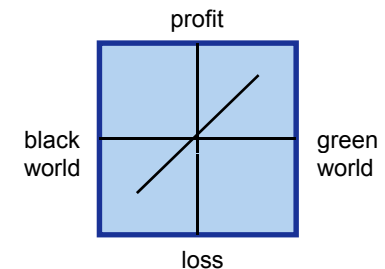
Financing implications



— the characteristics of projects under environmental risk may influence the financing approach for the investment

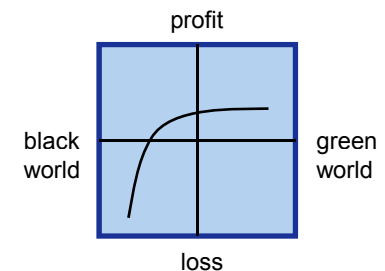
1) Green equity – mixed financing

if the investment behaves like a typical equity play, a mix of equity and debt may be appropriate, with the amount of debt limited by the lower plausible bound in the range of returns



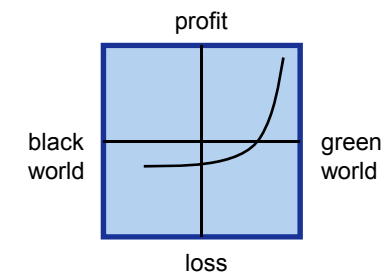
2) Green bonds – debt finance / project finance

projects with steady returns and only a low risk of a large downside may support high leverage (depending on the perceived risk of the catastrophic downside), and might be funded on a project-finance basis to limit the equity exposure in the low probability downside case



3) Green options – equity financing

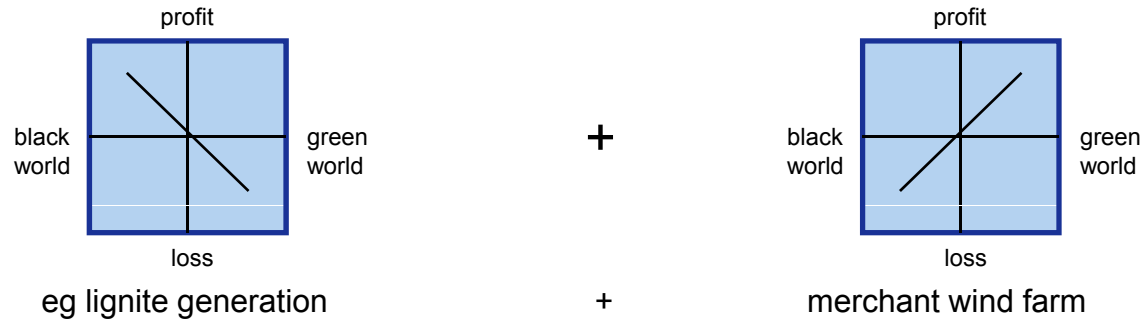
may be relatively small investments but must be equity funded since they do not produce positive returns in the base case. they should normally be held within a broad portfolio, but could be paired specifically with an opposite bond type investment if it acts as a natural hedge to catastrophic risk (eg CCGT + CCS retrofit option)



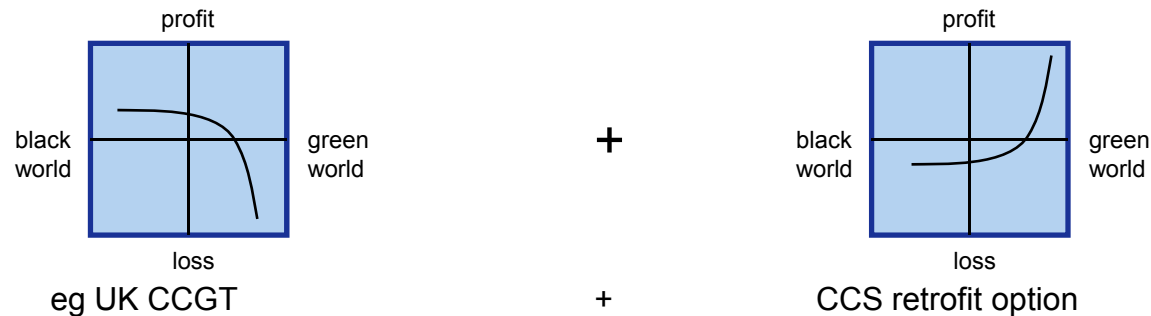
Portfolio implications for companies / investors



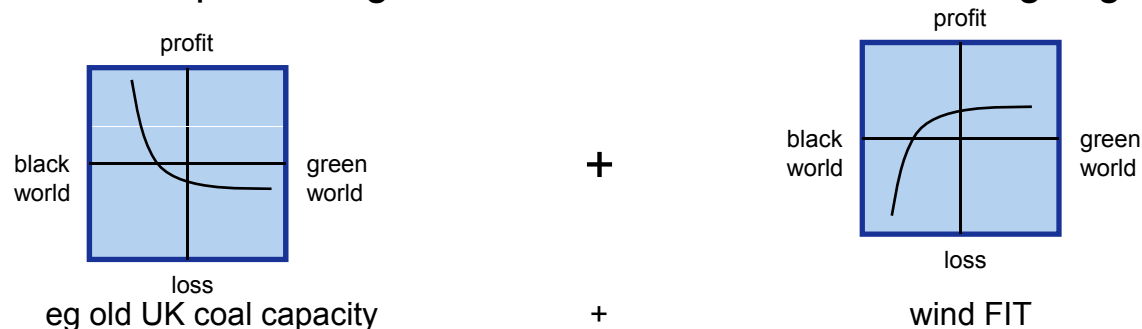
- companies with black equity might invest in green equity projects to balance the portfolio



- companies with black bonds might want to mitigate this risk by investing in green options



- companies with black options might be more relaxed about investing in green bonds



Some examples of application to European utilities

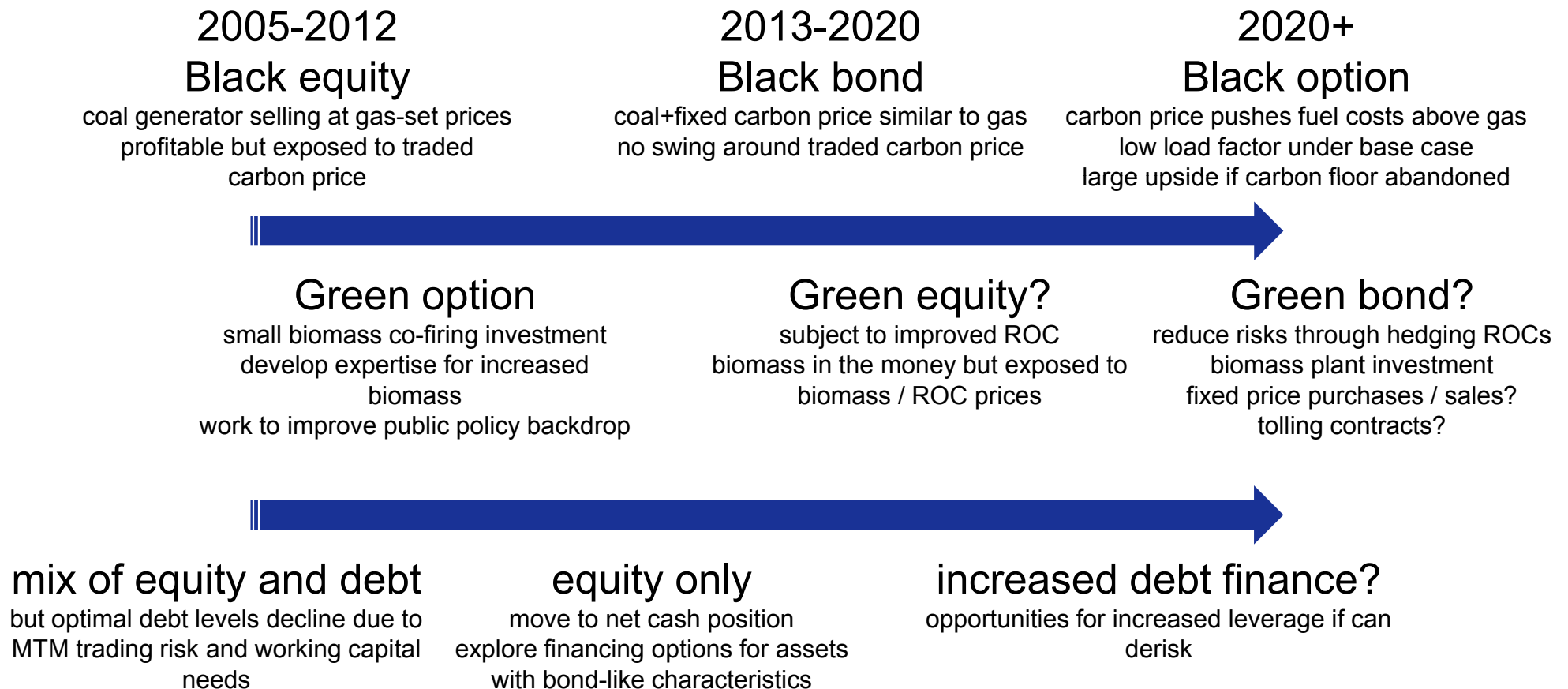


- Drax – a story in transition
- Spanish renewables – green options becoming green equity becoming green bonds
- European carbon price – green equity plays
- SSE – a portfolio analysis
- RWE – black equity with a growing green hedge
- UK networks – neutral safe havens becoming green plays?

Drax: investment story in transition



- Drax as a coal generator is moving from being a black equity play to a black bond play to a black option play. However, its biomass strategy started as a green option and is moving to being a green equity play, and even a green bond play over time.

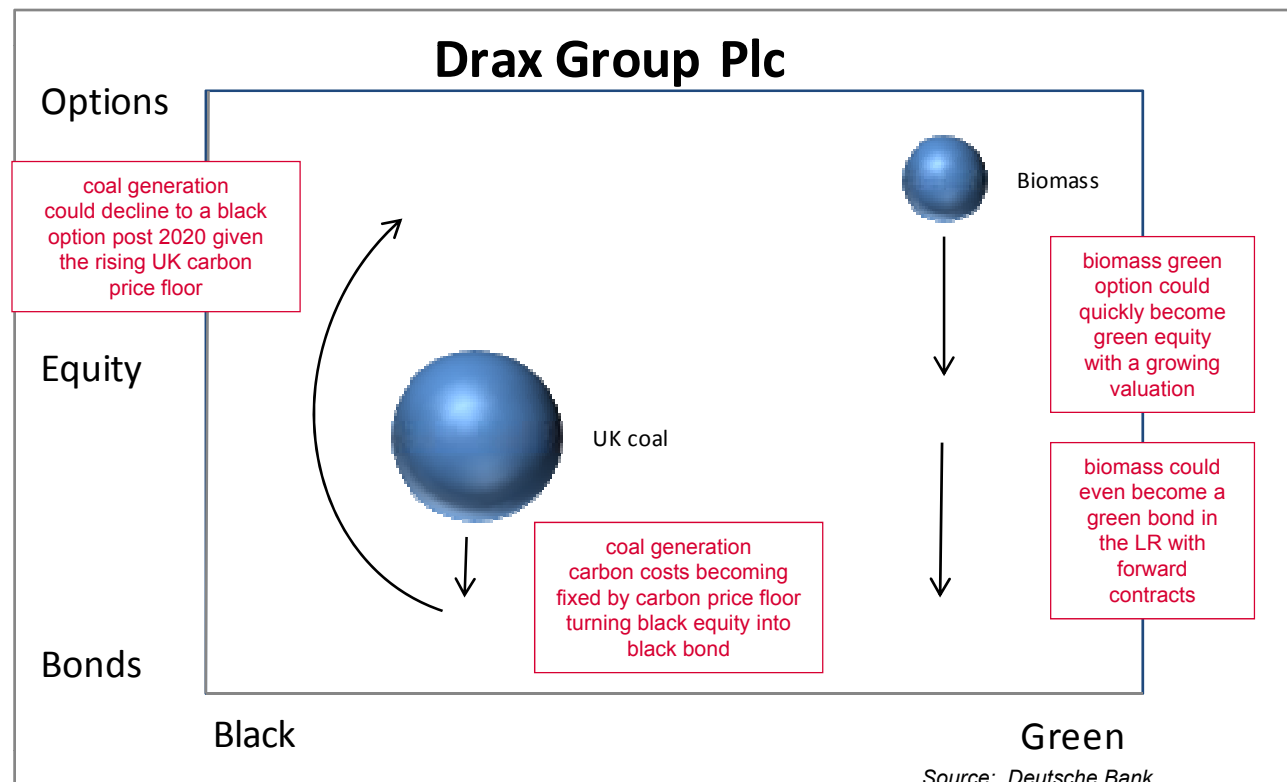


Source: Deutsche Bank

Drax: visual illustration of environmental positioning



- showing approximate relative value split of different types of asset (size of bubble)
- black to green spectrum shows the qualitative exposure to greener or blacker policy changes
- options – equity – bond spectrum shows nature of financial returns on the asset when subject to environmental risk (not to commodity risk, other types of political risk)



Spanish renewables: green transition



- Spanish generators with renewables exposure have moved from green options to green equity to green bonds:

Green options

small installed capacity but large development pipeline
large upside potential if green policies support rapid wind construction rollout

Green equity

mix of existing wind farms and new projects under development
growth rate and valuation multiple depending on rate of expansion / attractiveness of support regime

Green bonds

slowdown or halt to new project development
steady returns from existing projects under FITs
growing risk of policy intervention to cut subsidies for existing projects



option value

traditional DCF may undervalue the option value of the development pipeline

DCF

central case DCF with modest growth probably gives roughly fair value

bond valuation

simple central case DCF may overvalue the assets since it ignores the fear of negative policy intervention
factoring in an assessment of low probability / high loss case may be needed



equity financing

equity funded development of pipeline

mixed financing

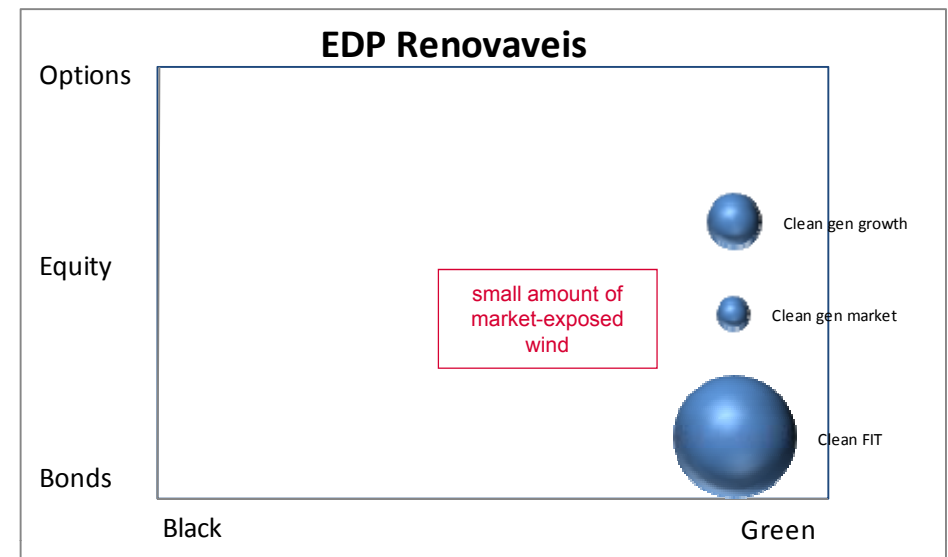
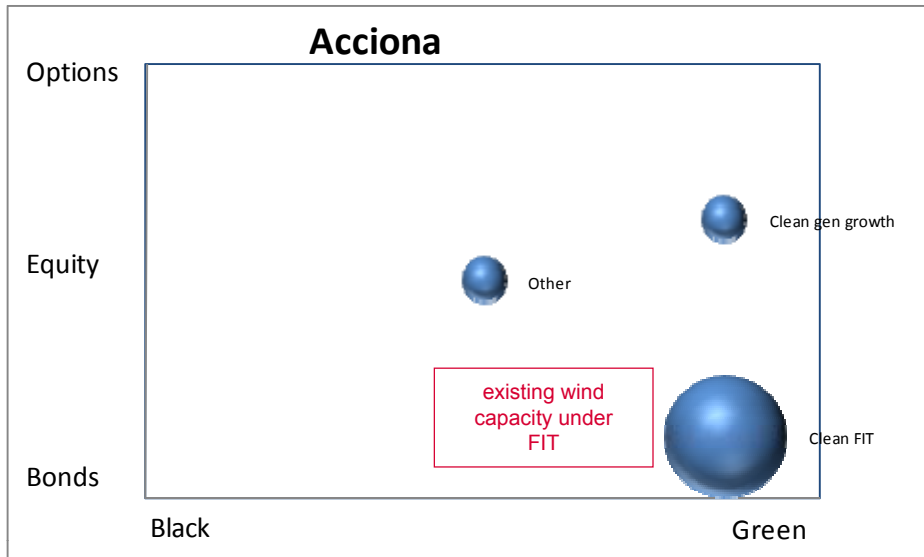
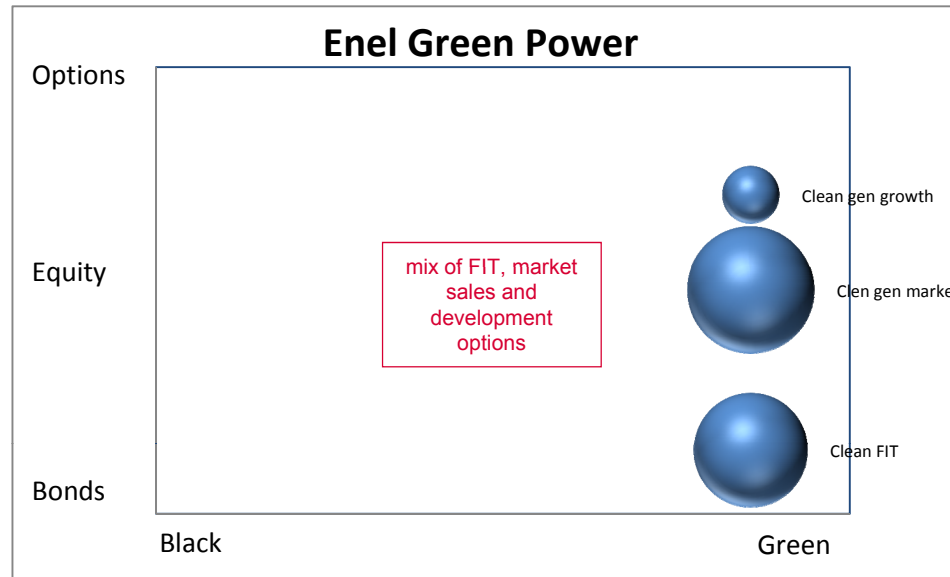
growing use of debt for existing projects, with equity base to support growth

debt financing (under stress)

largely debt funded existing projects
little new development
pressure to inject equity if downside risk perception increases and no natural hedges can be found

Source: Deutsche Bank

Environmental positioning: Renewable plays

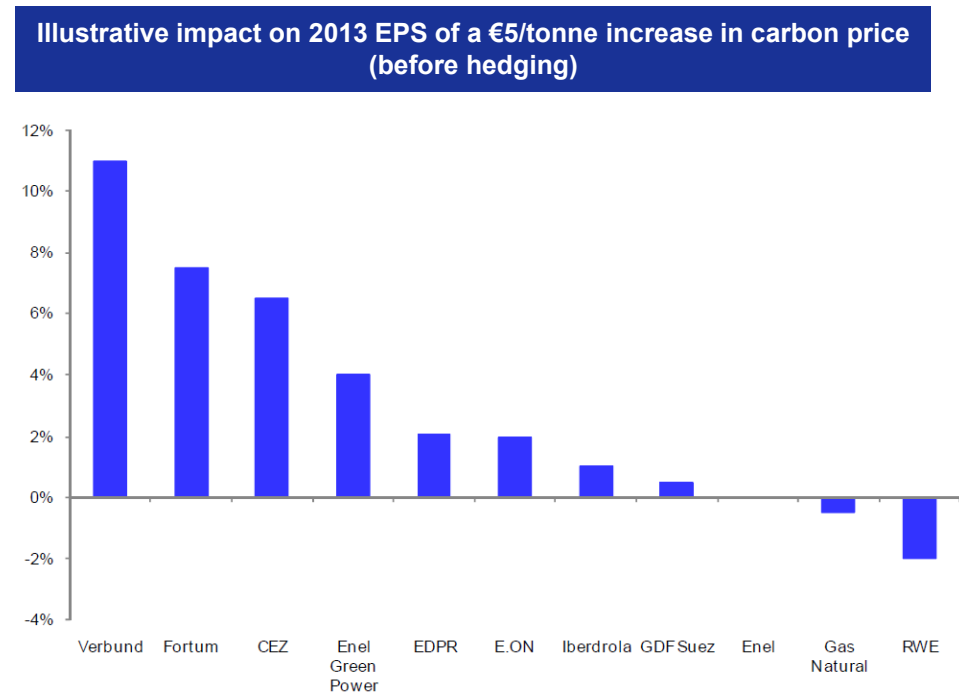


Source: Deutsche Bank

European carbon price: green equity plays



- generators with low carbon intensity (eg hydro) selling into markets with high carbon price-setting plant (eg Germany) have green equity characteristics with respect to the EU ETS
- Verbund, Fortum, CEZ and Enel Green Power are currently the key green equity plays on the ETS
- there is not a good natural hedge within utilities since RWE only has relatively limited downside exposure
- there may be a better hedge in other sectors (eg airlines?)
- UK generators are moving from equity to bond-type risk around carbon with the introduction of the UK carbon price floor



Source: Deutsche Bank

CEZ: Green equity with hidden black bond?

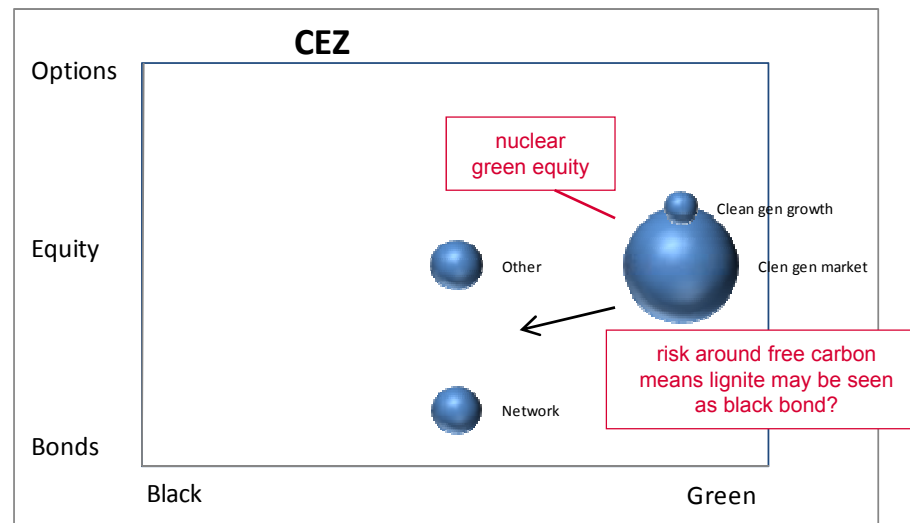
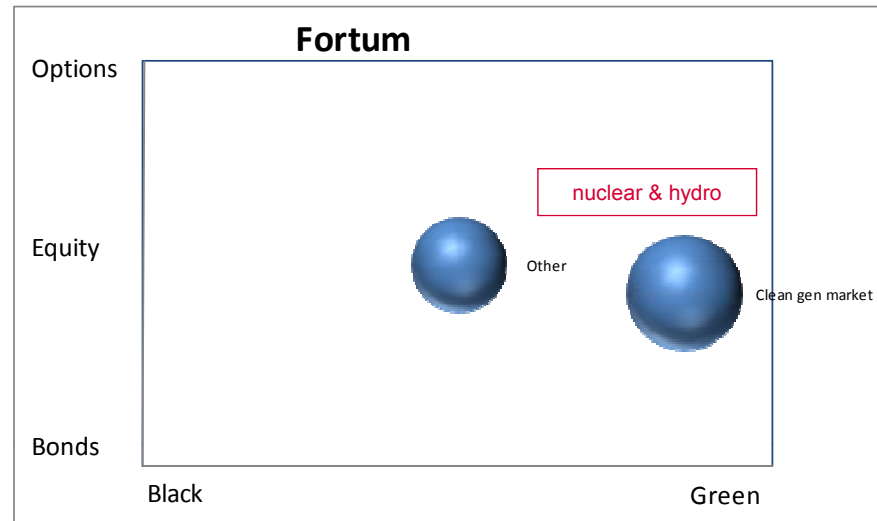
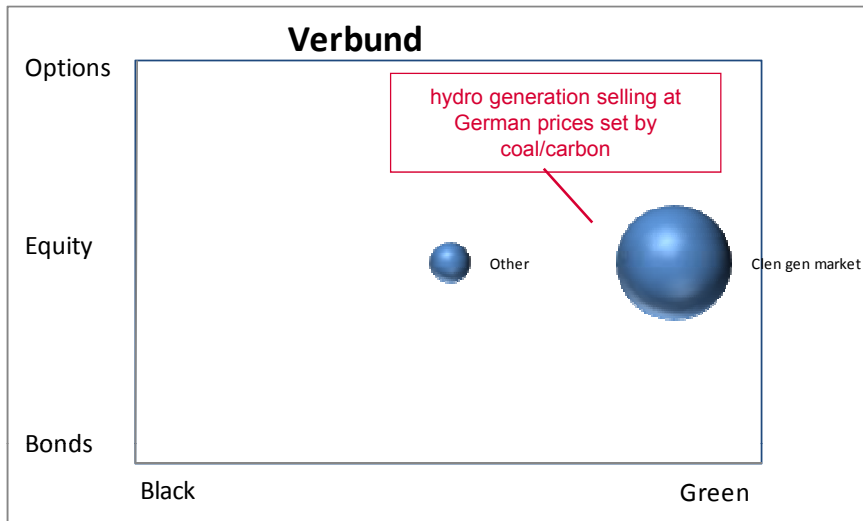


- CEZ is a green equity play:
 - it makes higher profits with a higher carbon price since it has nuclear generation and its lignite generation is partly offset by free carbon credits

- is new nuclear a green option?
 - only go ahead if likely to get govt support or be in the money?

- do we need to worry about the hidden black bond?
 - is there a risk that free carbon allowances will be removed or taxed?
 - if so we may need to consider applying a discount to the central case DCF to reflect a low probability of a large downside event

Environmental positioning: Clean generators



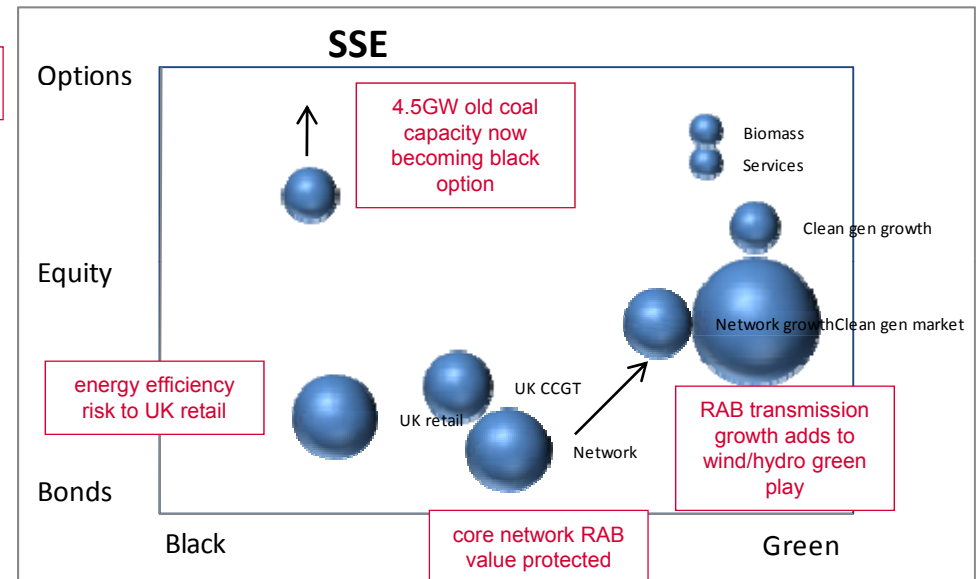
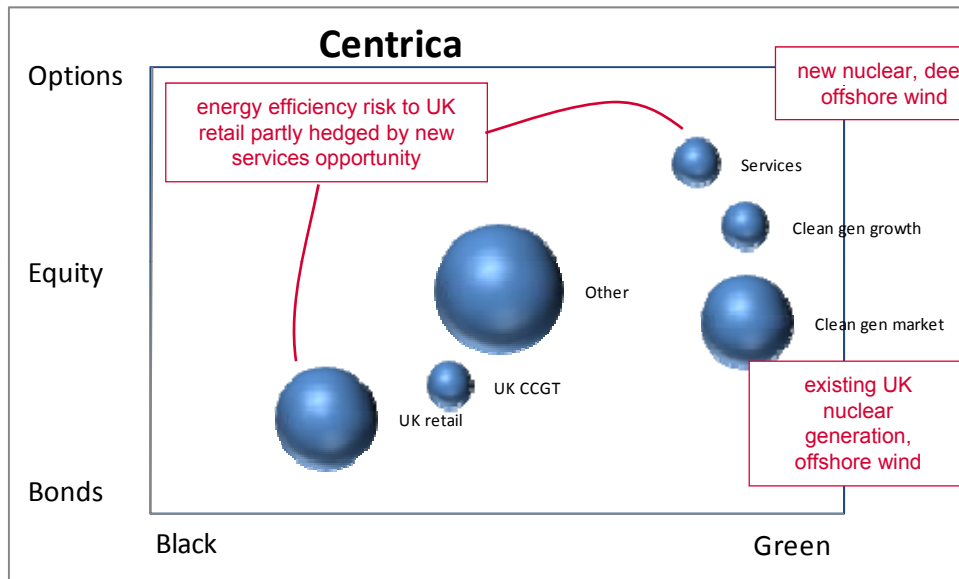
Source: Deutsche Bank

SSE: Portfolio play



- SSE's portfolio can be categorized by asset type with respect to environmental risk:
 - coal capacity: black options – will be rapidly forced off the system by the UK carbon price floor but could have high valuation in case the carbon floor is abandoned (may also have some green option value if high penetration of wind makes standby capacity valuable)
 - CCGT capacity: black bonds – generally will give steady returns but could have extreme downside if accelerated mandatory CCS is required, or if energy efficiency / high wind build undermines load factors with no compensating capacity payment
 - current hydro / wind capacity: green equity – zero carbon generation benefitting from rising UK power price as carbon price rises
 - new wind capacity: green bonds – once wind feed-in-tariff contracts for differences are introduced, new wind projects should make fixed returns as long as FIT is not abandoned
 - residential supply: black equity/bond with green option? retail faces downward pressure on volumes and rising costs through increased energy efficiency obligations, but development of services offering could allow a new profit stream from insulation / smart metering etc
 - electricity transmission network: neutral turning into green equity – previously steady RABs now growing strongly to facilitate connection of green generation, growth depends on rate of wind build etc

Environmental positioning: UK market plays



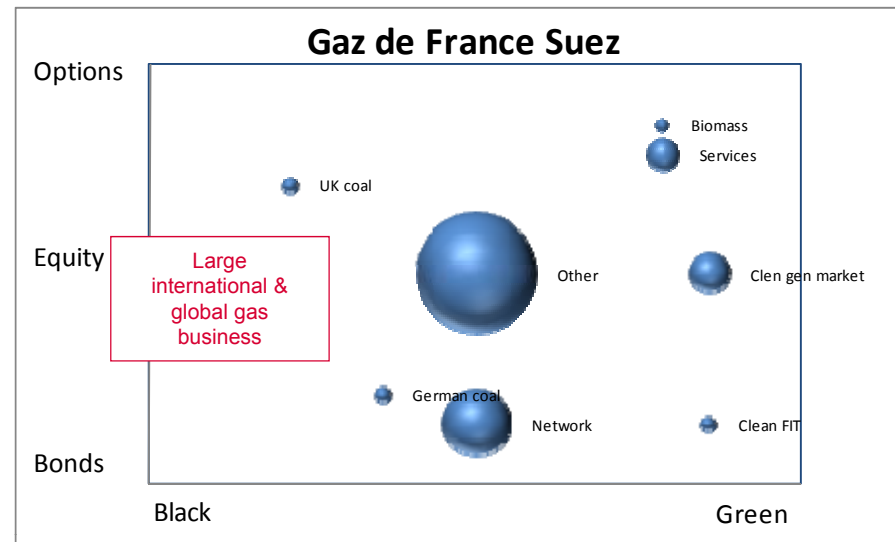
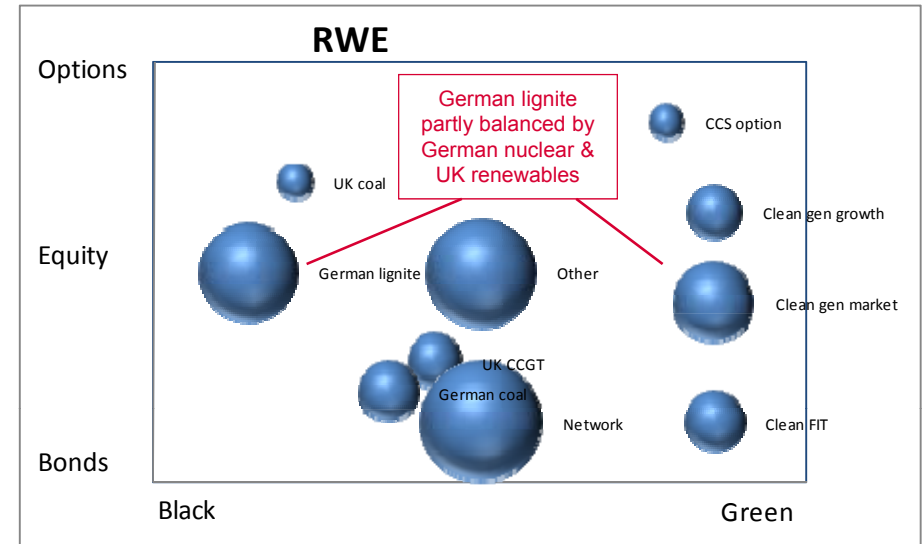
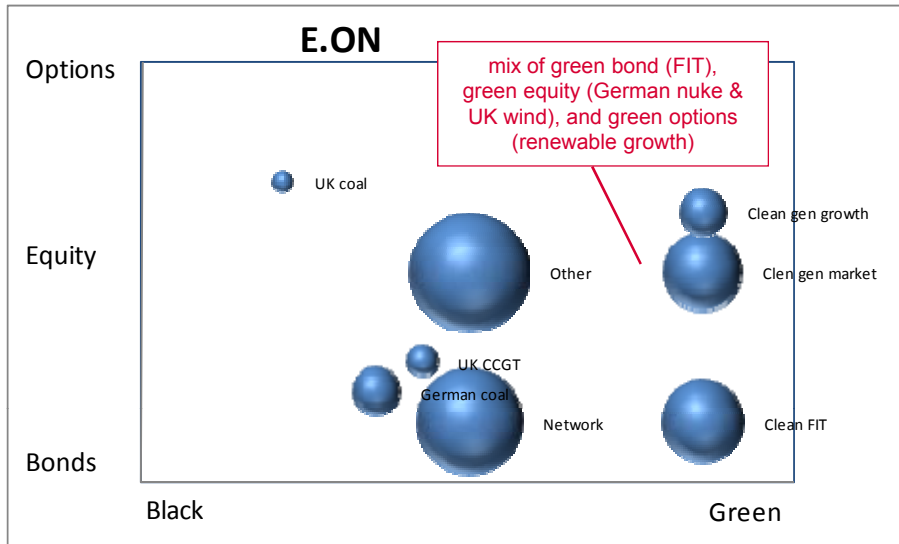
Source: Deutsche Bank

RWE: Black equity with a growing green hedge



- is the optimal portfolio strategy for RWE changing?
 - black equity: with the end to free carbon allowances, RWE becomes to some extent a black equity play, with higher carbon emissions than the average price setting plant (across Germany, UK, Netherlands) and therefore negatively exposed to higher carbon prices
 - green equity hedge? UK wind investment would currently be a hedge since it is a green equity play, selling zero carbon generation at market prices including a carbon cost
 - green bond? but UK wind is becoming more bond like with the fixing of the proposed UK carbon price floor
 - green bond: new UK wind investments will become even more of a green bond when the FIT is introduced (so would new UK nuclear sold under FIT, though now less relevant)
 - alternative green equity investments? does RWE need to look for alternative green equity investments as a hedge to German lignite? examples could be European hydro generation (or fixed price import contracts from NordPool?), or CCGTs in central Europe (ie lower carbon intensity than price setting plant)
 - would green options be better? is RWE actually a black equity play or a black bond? if the risk that matters is possible legislation to cap station emission factors then maybe development of CCS options would be more important than green equity investments, early development of an offshore wind pipeline of projects also has option-like characteristics

Environmental positioning: Germans / French



Source: Deutsche Bank

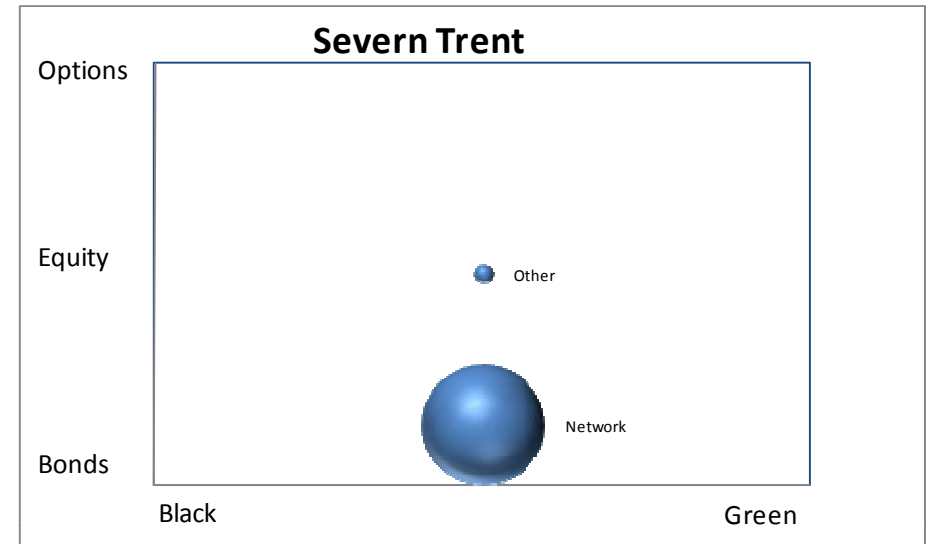
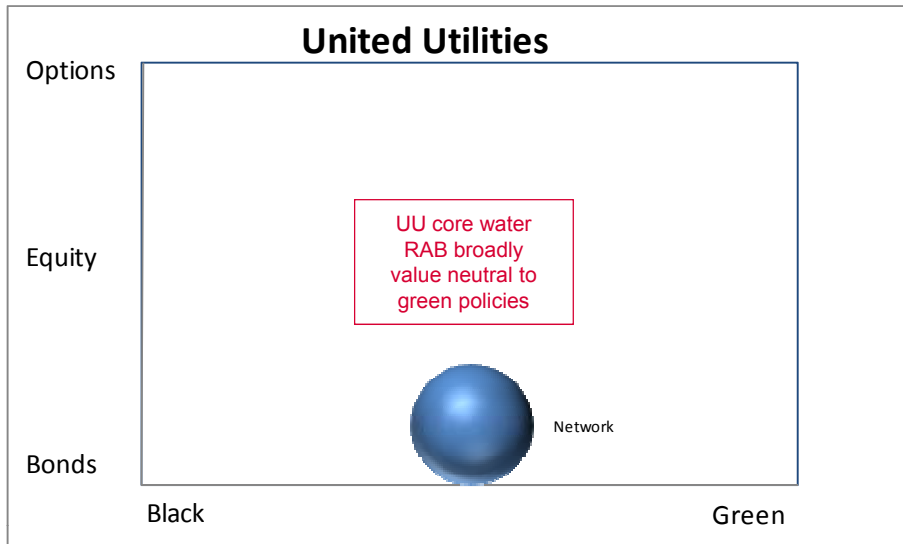
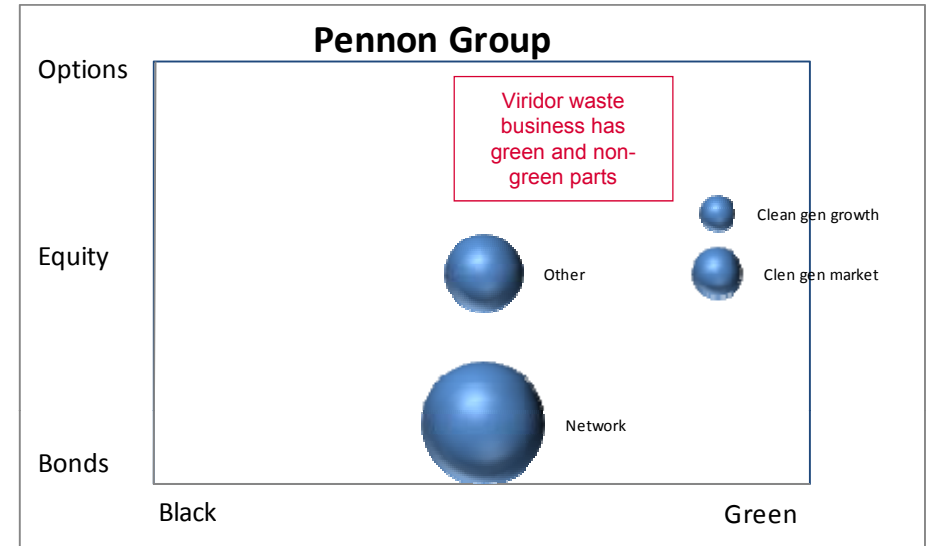
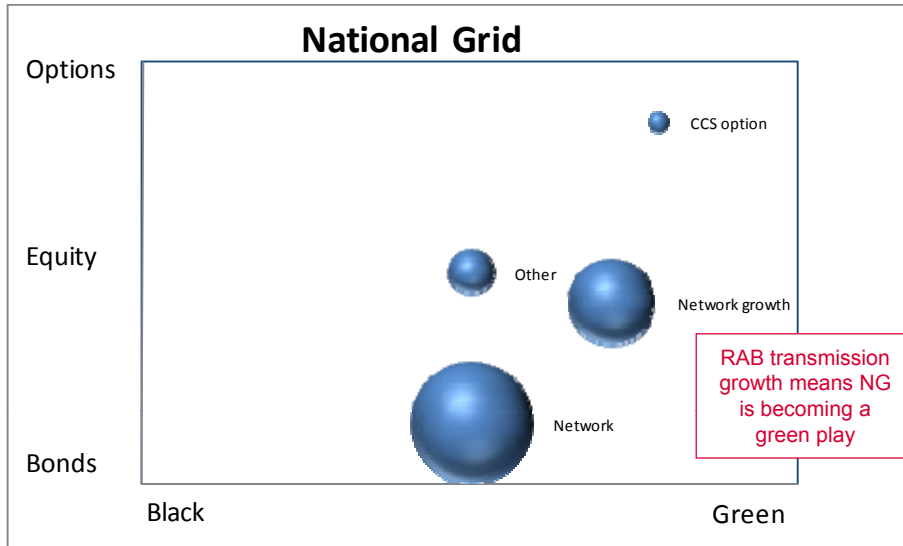
UK networks



- National Grid becoming a greener play
 - UK transmission network growth (with returns > WACC) is partly (but not wholly) dependent on green policies (new wind / nuclear connections)
 - National Grid is also developing an option for CCS investment

- UK waters generally remain safe havens at the moment
 - but Pennon has some green upside (mix of green equity / green option) around energy from waste and landfill gas renewables
 - future environmental changes may make the UK waters more of a green play (eg value-adding network growth coming from climate change policies and investment in water resources / networks / flood defence)
 - on the other hand the UK waters could become slight black equity plays / black bonds (eg exposure to energy / carbon costs) or tougher environmental regulation without appropriate compensation
 - they could mitigate these risks by investing in offsetting assets (green or black bonds, options or equity)

Environmental positioning: UK networks



Source: Deutsche Bank

Conclusions



- the green/black equity/bond/option framework can help to illuminate the nature of environmental risks and opportunities for assets or companies

- investors / companies should be wary of using simple central case DCFs when underlying assets are likely to behave as bonds or options
 - the green/black equity/bond/option framework can help to show whether assets might be under or overvalued

- real asset characteristics should influence financing decisions
 - the green/black equity/bond/option framework might help to illustrate the impact of policy changes

- portfolio analysis can illustrate potential for hedging either by companies or institutional investors
 - black equity can be hedged with green equity
 - black bonds might be hedged with green options
 - green bonds might be hedged with black options

Appendix: European utilities valuation matrix (12 June 2012)



Country	Company	Current Price	Target Price	Rec.	Mkt Cap (EURbn)	EV (EURbn)	EV/EVITDA (x)			Adjusted P/E (x)			CAGR in EPS (%)	Dividend Yield (%)			CAGR in DPS (%)
							2011	2012E	2013E	2011	2012E	2013E	2010-13E	2011	2012E	2013E	2010-13E
Austria	Verbund	18.7	23.0	Hold	6.5	9.9	11.7	8.0	8.1	25.9	13.7	13.0	3.7	2.1	3.6	3.8	9.3
	EVN	9.5	15.0	Buy	1.8	2.1	5.0	4.6	4.3	11.2	8.2	7.2	2.9	3.4	4.9	5.6	11.3
Czech Republic	CEZ	729.0	900.0	Buy	15.2	21.1	6.8	6.2	6.0	10.9	9.3	8.9	-2.3	5.5	6.4	6.7	-0.3
Finland	Fortum	14.1	20.0	Buy	13.0	17.0	8.9	6.5	6.0	14.0	9.6	8.3	3.3	5.0	6.8	6.9	0.7
France	Gaz de France Suez	16.5	26.0	Buy	36.0	98.6	6.0	5.6	5.1	10.7	10.4	9.0	2.7	9.7	10.0	10.5	3.8
	Suez Environment	8.9	11.0	Hold	4.5	15.0	6.8	5.9	5.5	24.9	10.0	9.3	7.8	5.0	7.4	7.8	1.6
Germany	Veolia Environnement	9.6	10.0	Sell	4.8	18.2	7.2	6.3	6.2	NM	27.5	14.2	-19.8	4.2	7.6	7.6	-16.7
	RWE	28.8	33.0	Hold	18.1	44.4	5.1	5.3	4.7	8.0	7.0	6.5	-13.5	5.3	6.9	7.6	-13.7
	E.ON	14.6	21.0	Buy	28.2	58.9	7.5	7.2	6.5	NM	10.9	8.5	-12.0	5.2	7.4	7.4	-9.8
Greece	Public Power Corp	1.3	5.0	Hold	0.3	5.8	9.5	6.8	6.4	NM	NM	NM	NA	0.0	0.0	0.0	-100.0
Italy	Enel	2.4	3.0	Hold	21.6	106.3	6.7	6.4	6.4	9.3	6.4	6.4	-6.0	6.7	6.1	6.1	-20.6
	Enel Green Power	1.1	1.8	Hold	5.4	10.0	9.2	6.2	5.6	21.9	12.0	9.8	8.9	1.4	2.5	3.1	6.4
	Snam	3.3	4.1	Buy	11.7	23.9	9.4	8.8	8.6	12.9	11.3	10.9	-1.8	6.4	7.6	7.9	4.1
	Terna	2.7	3.3	Buy	5.4	10.9	8.9	8.0	8.3	14.8	12.6	12.4	-2.3	7.0	7.0	7.0	-3.3
	Hera	1.0	1.8	Buy	1.3	3.1	4.7	4.6	4.5	11.9	11.8	10.0	8.7	7.9	8.4	9.2	5.3
	Acea	3.7	7.0	Hold	0.8	3.2	5.0	4.4	3.9	8.3	6.7	5.1	2.4	8.7	10.4	13.7	6.3
Poland	PGE	19.2	24.5	Buy	7.9	6.8	5.1	3.9	4.1	11.7	8.7	9.1	10.1	6.0	4.7	4.4	8.1
Portugal	Energias de Portugal	1.7	2.4	Hold	6.1	25.8	6.9	6.4	6.0	5.6	5.3	5.2	4.4	11.0	11.9	12.8	8.1
	EDP Renovaveis	2.8	4.1	Hold	2.5	6.7	10.5	7.6	6.5	41.7	19.6	NA	53.6	0.0	1.3	2.1	NA
Spain	Enagas	13.2	19.0	Buy	3.0	6.6	7.8	6.9	6.4	9.8	8.1	7.6	5.9	6.6	8.6	9.2	11.7
	Gas Natural	9.1	13.8	Hold	8.4	27.2	6.9	5.7	5.3	11.6	6.4	6.3	17.5	6.6	10.7	10.7	5.3
	Iberdrola	3.4	5.0	Hold	18.4	47.0	8.5	6.0	5.7	11.8	6.7	6.5	-4.8	5.9	10.2	10.2	-1.8
	Red Electrica	32.6	39.0	Hold	4.0	8.7	7.9	6.5	6.0	10.8	7.8	7.0	13.9	6.0	8.3	9.2	13.9
UK	Acciona	40.6	70.0	Hold	2.7	9.2	8.1	6.5	5.8	24.2	13.7	12.0	10.4	4.4	7.1	7.1	0.0
	Centrica	319.2	365.0	Buy	20.0	24.6	6.4	4.9	4.5	12.2	11.3	10.5	5.5	4.9	5.4	5.8	7.9
	Drax Group Plc	540.0	670.0	Buy	2.5	2.3	4.5	6.1	8.2	8.6	11.0	15.8	-18.4	5.9	4.5	3.1	-19.5
	International Power	416.3	420.0	Hold	26.2	43.1	8.7	9.4	8.7	13.8	16.7	15.1	11.2	NA	1.9	2.6	5.9
	National Grid	657.0	580.0	Sell	28.8	53.4	9.1	8.7	9.2	13.4	11.9	12.8	-0.3	6.0	6.3	5.3	-1.5
	Pennon Group	736.0	800.0	Buy	3.2	5.8	11.3	11.1	11.3	16.9	15.1	13.7	8.1	3.7	3.9	4.2	7.2
	SSE	1359.0	1550.0	Buy	15.5	21.7	9.2	8.9	8.8	12.7	12.0	11.7	5.3	6.0	6.4	6.8	6.0
	Severn Trent	1781.0	1700.0	Hold	5.0	10.0	8.9	8.8	8.8	20.3	17.8	18.1	1.1	4.1	4.4	4.6	7.1
	United Utilities	676.5	770.0	Buy	5.6	11.9	9.1	8.9	8.8	17.0	16.0	15.5	3.6	4.9	5.2	5.5	6.1
Sector weighted average*							7.3	6.6	6.3	11.4	10.7	9.7	1.4	5.8	6.9	7.1	-0.2
Sector simple average*							7.5	6.7	6.5	14.0	11.1	10.0		6.1	7.1	7.5	

Source: Deutsche Bank estimates

Simple average excludes Essar

Source: Bloomberg Finance LP, Company data

Appendix 1

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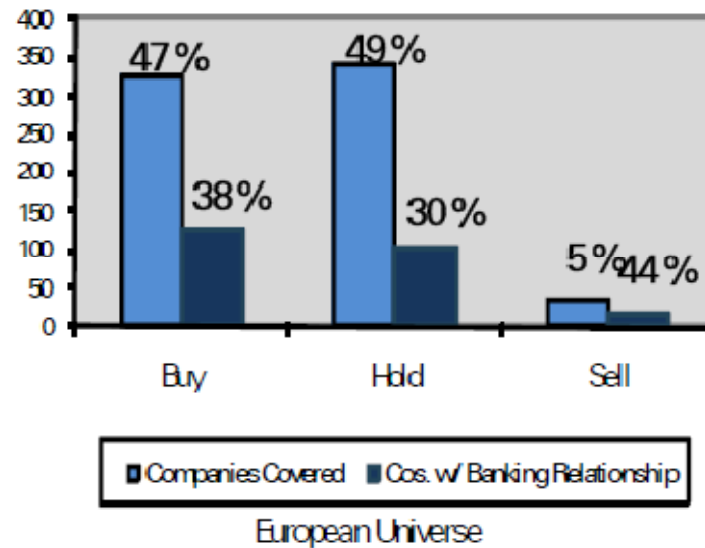
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