ESG: ASSESSING OPERATIONAL, CLIMATE AND NATURAL CAPITAL RISKS

The Credit Roundtable/Fixed Income Forum

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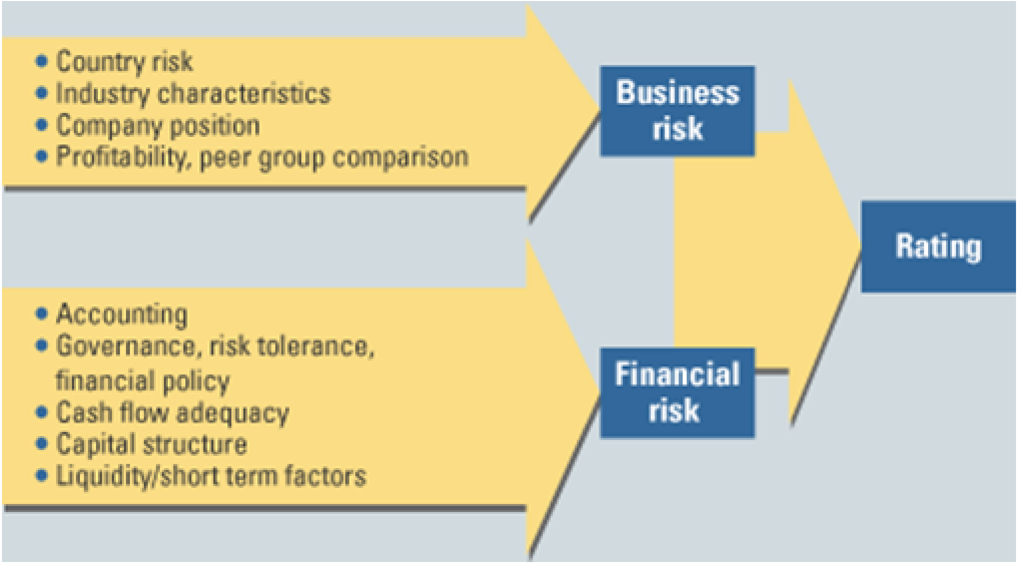
SOCIETE GENERALE
Cross Asset Research

ESG FACTORS FOR CORPORATE FIXED INCOME ANALYSIS

ENVIRONMENTAL	SOCIAL	GOVERNANCE
Climate change	Employee relations	Shareholder rights
Biodiversity	Human rights	Incentives structure
Energy resources and management	Customer/stakeholder relations	Audit practices
Biocapacity and ecosystem quality	Product responsibility	Board expertise
Air/water/physical pollution	Health and safety	Independent directors
Renewable and non-renewable natural resources	Diversity	Transparency/disclosure
	Consumer relations	Financial poicy
	Access to skilled labor	Business integrity
		Transparency/ accountability

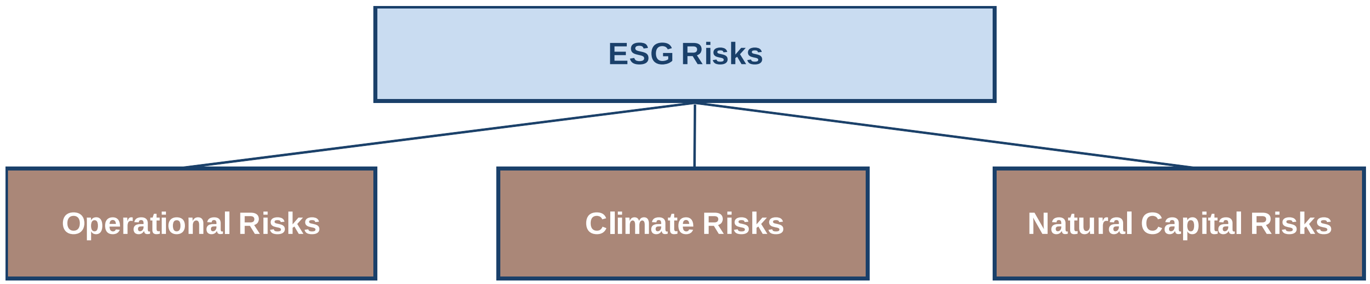
Source: Principles for Responsible Investment, 2013

S&P'S CORPORATE RISK FACTORS: THE WAY WE SEE THE WORLD



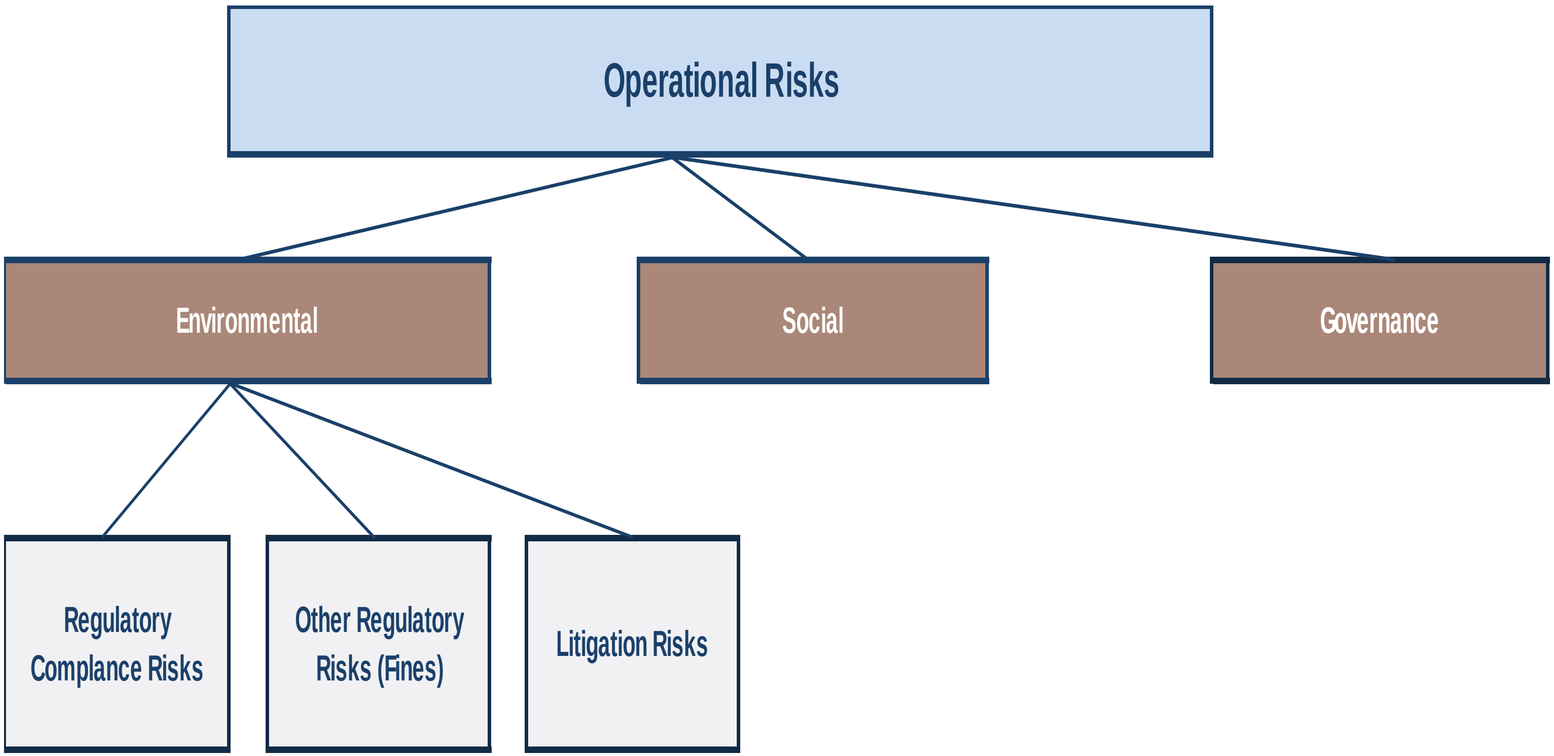
Source: Standard & Poor's, 2013

AN ALTERNATIVE RISK TYPOLOGY



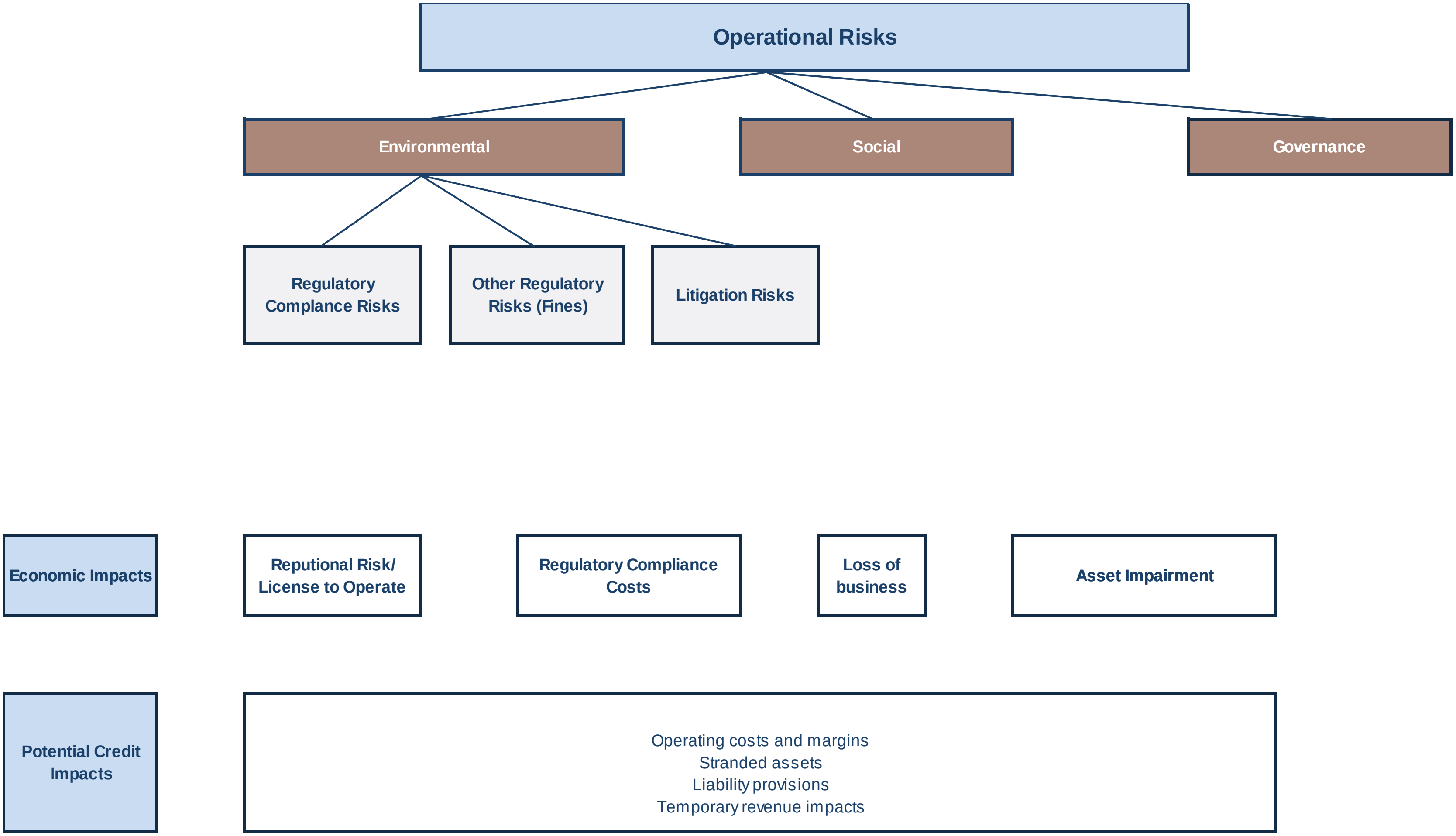
Source: SG Cross Asset Research

OPERATIONAL RISK TYPOLOGY



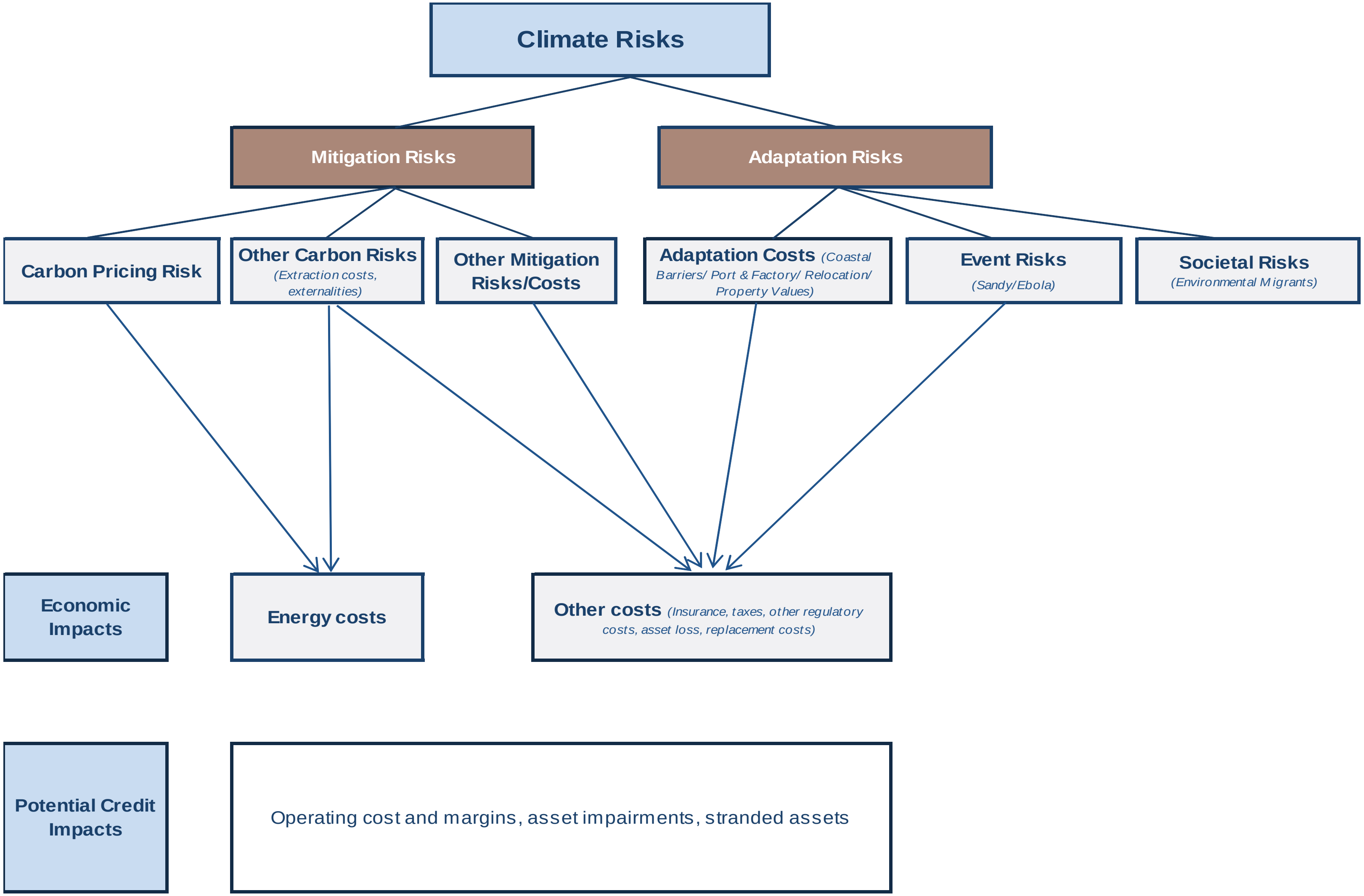
Source: SG Cross Asset Research

AND A MORE GRANULATED ASSESSMENT



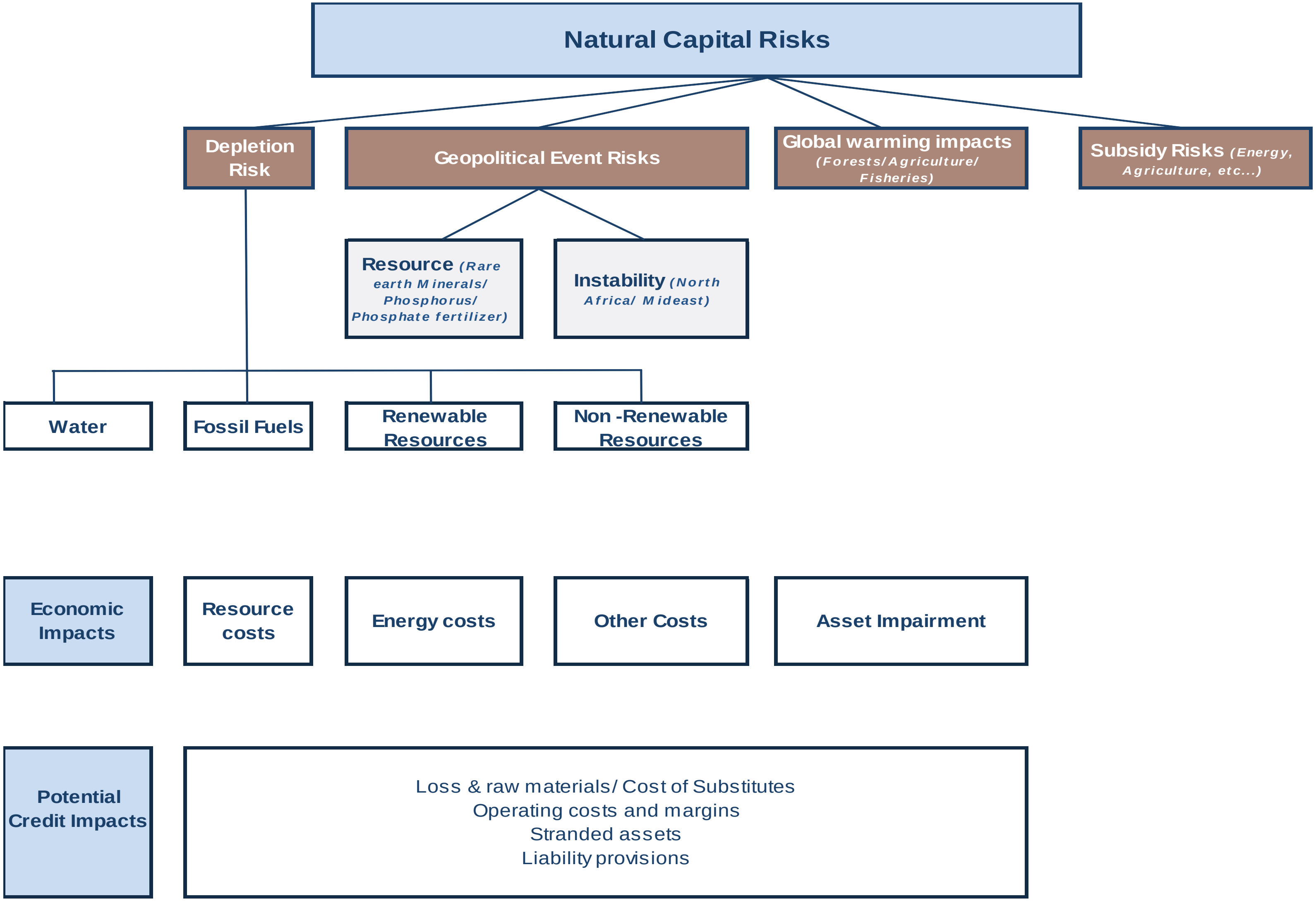
Source: SG Cross Asset Research

CLIMATE RISKS



Source: SG Cross Asset Research

NATURAL CAPITAL RISKS



Source: SG Cross Asset Research

TRANSPORTATION: OPERATIONAL RISKS

NON-ROAD TRANSPORT	AIRLINES	MARINE TRANSPORT	RAIL OPERATORS
OPERATIONAL RISKS			
ENVIRONMENTAL			
Regulatory Compliance Risks	Increasing--In addition of carbon risks described elsewhere, noise reduction concerns remain an issue, and have been targeted by regulators in many regons.	Moderate--in comparison with airlines and railroads, marine transport, being mostly an international enterprise, is relatively modestly regulated, mainly by the Internatinal Maritime Organization (IMO).	Freight rails generally regulated industries, and often state-owned in any event. In the US (and possibly Canada), dramatically increased oil shipments by rail will likely prompt some increase in regulation, following several catastrophic events where human error apparently was the cause.
Litigation Risks	Low--asymmetric risk; low probablitlity but high visibility events.	Low--asymmetric risk	Low--asymmetric risk
Other Environmental Risks	Aerosols and Ozone depletion; Contrails; disposal of older aircraft	Accidents resulting in spills, limitts on discharge in territorial waters.	Derailments resulting in spills are a general concern; oil spills are increasing; trains carrying oil from Canada and the Dakotas have exploded in Alabama, North Dakota, and Quebec; Rail shipment of crude oil within the United States has risen pver 4,000% since 2009 because of lack of sufficient pipeline capacity; disposal of used tank cars.
GOVERNANCE RISKS			
Regulatory Compliance Risks	Heavily regulated industry, both nationally and internationally, requiring strong compliance measures.	Loosely regulated industry, with modest national regulatory constraints, although compliance measures could be more stringent going forward; regulatory enforcement a perpetual concern.	Already regulated in most areas; compliance measures could become more stringent going forward.
Litigation Risks	Low--asymmetric risk; low probablitlity but high visibility events	(1) Litigation complicated--national/internaional legal spheres don't overlap much. (2) Most shipping companies privately held	Low--asymmetric risk
Other Risks			
SOCIAL RISKS	Reputational issues generally a concern	Reputational issues generally not a concern	Reputational issues generally a concern
Regulatory Compliance Risks			
Litigation Risks	Low--asymmetric risk; low probability but high visibility events	Low--asymmetric risk; low probablitlity but high visibility events--and even here insurance generally covers exposure	Generally low, except in cases of derailment--these risks appear to be rising in the US
Other Risks	Labor force often unionized, requiring strong relationshsip management measures; Conflict between expected growing national and international volume trends and resistance to airport expansion.	Crews generally underpaid, and there are moves afoot to improve average pay; port expansion in heavily urbanized areas.	Labor force often unionized, requiring strong relationshsip management measures.

Source: SG Cross Asset Research

TRANSPORTATION: CLIMATE RISKS

	AIRLINES	MARINE TRANSPORT	RAIL OPERATORS
CLIMATE RISKS	**The global transportation system runs almost entirely on fossil fuels. Adhering to the 2° scenario implies the need for rapid adoption of measures to curb CO_2 growth in the sector.**	**The global transportation system runs almost entirely on fossil fuels. Adhering to the 2° scenario implies the need for rapid adoption of measures to curb CO_2 growth in the sector.**	**The global transportation system runs almost entirely on fossil fuels.**
MITIGATION RISKS			
CARBON PRICING RISKS	Potentially Very High--airlines are a significant contriubtor to CO_2 generation, with CO_2 emission growth rates above the global average. According to ICAO, aviation (as of 2013) accounted for about 5% of global radiative forcing--aviation would be the 7th largest emitter of greenhouse gasses. Next generation of aircraft will improve fuel efficiency by 20%. Meaningful carbon pricing would have a material impact on operational costs.	High--Marine transport is a big business, and generates about 4% of global CO_2, wth CO_2 emission growth rates above the global average. KPMG--"Marine Transportation is vulnerable to greenhouse gas regulatory risk as total emissions from the industry are increasing over time. Relative carbon emissions per ton of fuel or per mile are improving as larger, more efficient ships come into service and slow-speed steaming becomes more widely adopted but this is offset by the increase in demand for shipping being driven by globalization. Gains from slow steaming are likely to be lost as freight rates pick up from their current lows, which will likely result in shipping lines increasing vessel speeds again to meet demand."	Overall climate risk modest--lowest CO_2 generation per passenger than autos or airlines (50kg per passenger vs 250 kg for large car.) High speed rail consumes 29% less energy than traditional rail, and reduces CO_2 by the same amount.
OTHER CARBON RISKS	Contrail issues, ozone issues are both likely to receive more regualtory scrutiny going forward.	Reduction of SO_2 emissions from new regulations will diminish the "cooling effect" that SO_2 discharge has had on CO_2 emissions, perhaps exacerbating the latter.	
OTHER MITIGATION RISKS	High Speed Trains pose a competitive risk to passenger traffic; rail may poase c ompetitive threat to air freight.	Increasing, especially as shipping volumes are expected to increase over time; these include sulphur fuel regulations to control the discharge of sulphur oxides--these kick in in 2015.	
ADAPTATION RISKS			
ADAPTATION COSTS	Probably modest--airlines mostly uninvested in physical infrastructure that supports the industry	Ships, by definition, float. Ports, by definition, are generally found at sea level--which exposes existing port facilities to potential relocation risk costs.	Permafrost melting could affect rail infrastructure in northern countries. Coastal flooding could affect rail operators with significant coastal or riverfront trackage, raising potential relocation cost issues.
EVENT RISKS			
SOCIETAL RISKS			

Source: SG Cross Asset Research

TRANSPORTATION: NATURAL CAPITAL RISKS

	AIRLINES	MARINE TRANSPORT	RAIL OPERATORS
NATURAL CAPITAL RISKS	"Concerns about waste streams and resource scarcity may lead to increased regulatory focus on end-of-life treatment for transportation sector vehicles (e.g., ship breaking and recycling) and their components (e.g., electric vehicle batteries). More broadly, increasing pressure on global resources may lead to increased regulatory focus on promoting 'closed loop' processes that re-use and recycle resources." (GEO-5)	"Concerns about waste streams and resource scarcity may lead to increased regulatory focus on end-of-life treatment for transportation sector vehicles (e.g., ship breaking and recycling) and their components (e.g., electric vehicle batteries). More broadly, increasing pressure on global resources may lead to increased regulatory focus on promoting 'closed loop' processes that re-use and recycle resources." (GEO-5)	
DEPLETION RISKS	Rare Earth mineral depletion ocncerns probably overstated, but extraction costs likely to rise.		
SUBSIDY RISKS	High--benefit form considerable government assistance in building airports, roads, and maintaining (and often fully funding) national transport agencies. Many global airlines are government owned, and explicitly or implicitly benefit. Many countries provide direct and indirect subsidies--the UK's are estimated at about £8bn-£9bn, the US's are considerably higher, and state-owned mideast airlines at even higher levels. In some cases, these take the form on non-payment of certain fuel taxes, as in the UK.	Moderate, and mostly implicit--port facilities usually government built and maintained (although shippers pay toward operation and maintenance by fees). Shipbuilding, however, is heavily subisidized by a number of governments. Some countries (such as the US through the Jones Act) have protectionist legilation to protect the shipping industry during wartime.	Moderate--US passenger rail generally subsidized, freight rail generally not. However, much of rail infrastructure subsidized in one way or another, Elsewhere, rail operators generally government owned or heavily subsidized, especially in urban areas.
GEOPOLITICAL EVENT RISKS	Supplies of several non-rare earth minerals integral to aircraft engine manufacturing--Molybedium (China), Nobium (Brazil), Cobalt (DR Congo)--are either insecure or reliant on a single country source.		
GLOBAL WARMING IMPACTS			

Source: SG Cross Asset Research

TRANSPORTATION: ECONOMIC IMPACTS

ECONOMIC IMPACTS			
ENERGY COSTS	Energy costs are a significant factor in airline profititability, could be affected by increased carbon costs to the extent that they can't be passed on.	Energy costs are a factor, and an occassionally significant one, in marine transport profitability.	Depends on how you calculate this--rails themselves have great looking efficiency measures relative to other forms of petroleum-based transport; nonetheless, energy represents a significant cost for the industry as an operating expense.
ASSET IMPAIRMENTS	Possibly increasing risk, depending on potential enforcement of a 2° scenario, but will depend on extent to which portions of fleet may need to be retired, and at what speed, in the event of a required upgrade to newer, more energy-efficient, aircraft. This may represent a larger risk for aircraft lessors than for airlines themselves.	Shipping companies that are invested in threatened port infrastructure could see increased risk here. Increased carbon costs could have a negative impact on operating margins, resulting in accelerated shp retirements and increased purchases of newer ships.	Modest, but increasing over time as sea levels threaten coastal trackage, and more extreme heat threatens track integrity.
Trucost Env. Costs/EBITDA (1)	52%	59%	
STRANDED ASSETS RISKS	Probably low risk, but will depend on extent to which portions of fleet may need to be retired, and at what speed, in the event of a required upgrade to newer, more energy-efficient, aircraft. This may represent a larger risk for aircraft lessors than for airlines themselves.	Port facilities appear to be the major candidate, but we would expect port operators to be extremely mindful of sea level rise risks.	Probably modest, except for land and infrastructure in coastal or floodplain areas, or areas subject to natural disasters, particularly flooding

Source: Trucost. SG Cross Asset Research

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