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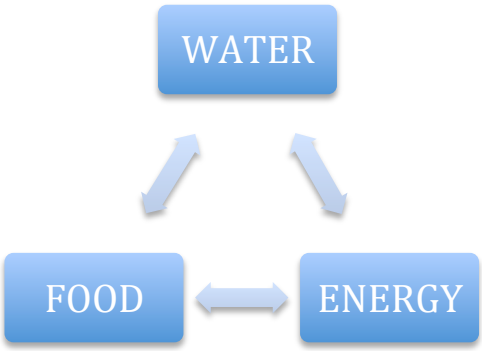
The Corporate Stress-Nexus: Using a Resource Scarcity Lens to Understand Environmental Challenges.

Companies come in all shapes and sizes, but for the purpose of this essay I will focus on large cap companies as they are the ones which tend to have more exposure to environmental risks throughout their local and global supply chains, and also have the capacity (both human and financial capital) to work towards a solution. Environmental issues are also multi-faceted, and are increasingly combining and intensifying to the extent that they pose a serious threat to the longevity of companies, and indeed capitalism (Harvey, 2005). From pollution in Chinese cities, to droughts in California, to the need to reduce global greenhouse gas emissions, environmental issues are increasingly filling our news headlines and taking up space in the C-suite agendas (Parris, 2006). The 21st Century will be defined by both environmental and social issues affecting the way our companies work (Klein, 2014), and how to deal with environmental issues is of particular concern due to their perverse and complex nature. As such, companies can (and do) approach them from a variety of angles. This essay argues that approaching these issues from a resource scarcity lens, and in particular the idea spear-headed by Shell of the 'stress nexus' between water-energy-food, is a better approach than the complex and convoluted 'climate change' debates.

While climate change arguably gets more 'air time', resource scarcity is perhaps a more tangible way for companies to explore the complex and inter-related issues relating to the environment. Resource scarcity, which can be defined as the declining availability of necessary inputs to both companies and societies which they depend on, covers a wide range of environmental issues, including water scarcity, changing agricultural productivity, deforestation etc. These resources are being affected by our changing environment but form the basis of our global economy as they are used by companies to provide our basic goods and services (Dicken, 2007). For the purpose of this essay I will focus on resource scarcity as it relates to the stress nexus of water, energy and food, which helps identify the interconnected nature of our resource dependency (Figure 1).

Figure 1.



This illustration demonstrates the importance of the interdependence of resources for companies (and indeed society by extension). For example, companies around the world now rely on a stable and secure supply of energy – whether this be a financial company which relies on computers and fibre optic networks to trade shares or a retailer which has a vast distribution network reliant on a fuel-based transport and having shops with lights on. However, none of this would be possible without water to cool power stations and run hydroelectric dams. Energy relies on a dependable water supply (IEA, 2012), as was evident in Australia's Millennium Drought in 2007 when water supplies became so low in Victoria that three coal power stations were temporarily shut down to ensure domestic supplies (Rodriguez and Madrigal, 2014), and the Snowy Mountain Hydro system was operating at only 8% of capacity (Smart and Aspinall, 2009). So energy needs water, but water also requires energy to extract it from the ground, and food production also requires both energy and water. A change in the availability of any or all of these three key resources, and company profits will be hit (Satterthwaite, 2007). As such, resource scarcity offers a holistic but tangible lens through which to measure and manage environmental issues now facing companies. By focusing on how the availability of these basic resources are being affected, companies can monitor their use of and exposure to these resources and the associated risks. Lowenstein (1996) famously described that you "manage what you measure" and by focusing on these three key areas, companies can start to measure their risks and manage them effectively by setting targets and adaptation policies to avoid stranded assets.

As well as providing a holistic and measurable way for companies to start thinking about environmental issues, the use of a resource scarcity lens is much more tangible than 'climate change'. By those in business, climate change can still be seen as a campaign or debate, with arguments put forward by scientists and activists alike (Painter, 2009). In contrast, resource scarcity is much more tangible and real for companies – it is already visibly affecting bottom lines and they are having to react and respond. Clark (2014) produced an FT report saying that water scarcity and its associated impacts on food and energy were already a "massive issues" for companies around the world, with the World Bank (2014) calculating that companies had spent in excess of $84bn on water-efficiency management from 2011-2013 in recognition that water scarcity was a real risk to their business. Companies are also concerned by the shift towards a lower carbon economy, not necessarily due to their ethical worries about climate change, but because of the efficiency and cost-savings available from implementing distributed power systems in their manufacturing plants, with Wal-Mart and Google already on their way to reducing their dependency on the grid. Changing energy landscapes are thus a real concern for companies as has been seen in the uptake of Tesla's new 'Power Wall' units (BBC, 2015). Environmental issues can therefore be seen as tangible to business' bottom lines when seen as an input and scarcity issue.

As previous examples of Tesla and Wal-Mart show, this focus on resource scarcity allows a focus on adapting to a low carbon economy without pandering to the conventional focus on mitigation of climate change which is often politically fraught and seen as a global issue that

than a local one for companies. By focusing on the potential for disruptive technologies and therefore recognizing that fossil fuels might become a scarce resource (due to carbon pricing, disruptive technologies or physical scarcity) then companies can recognize the need to adapt current supply chains and operational practices without concerns of being branded as 'green washing' as they can demonstrate the impact on the company financials. Agricultural productivity is also likely to change and is being affected by several environmental issues, including more frequent extreme weather events destroying crops and degrading soil quality due to over-exploitation. Companies thus need to focus on adapting to those changes to ensure future profits, either by shifting their supply chains (Laurence C. Smith, in his book 'The New North', would argue that Russia and Canada are the places to invest in agricultural land as they will be largely unaffected or even benefit from environmental issues of the 21st Century), or by investing in better technologies, from drought resistant crops to more efficient machinery or pesticides. Resource scarcity, much more so that current climate debates within the CSR world, allow for a practical discussion of adaptation strategies rather than mitigation whilst also acknowledging the likelihood of a low carbon future (Houghton, 2009). This facilitates the implementation of ordered change management (Kotter, 1997) rather than just efforts to cut carbon emissions, which will only achieve so much in reducing environmental issues, with these issues often broader than just carbon and climate change – such as deforestation and soil erosion.

A final benefit of looking through a lens of resource scarcity rather than climate change is the benefit of scalability. Resource scarcity, like climate change, can be seen to be a large, complex issue with global implications, but ultimately it has local impacts and is directly attributable to a local scale in ways that carbon-related climate issues are not (although some climate changes will have local-specific impacts). Issues such as water scarcity (although also linked to climate change) can be seen on this local scale in California and Brazil at the moment, for example. Soil degradation is often very specific in its location, although whole areas can be affected at once. By focusing on resource scarcity, companies can make environmental issues more scalable and relevant by identifying which issues they are directly exposed to and finding ways to adapt or change in response. Supply chains are often the biggest risk to companies, and by focusing on the individual places and risks, regulatory risks can also be better understood and calculated, rather than trying to focus on the broader issues of regulatory uncertainty under climate change scenarios. Resource regulation tends to be much more localized and efficient/effective than current climate change agendas, as can be seen in the current run-up to COP in Paris. For example, water pricing in the Murray-Darling basin was widely praised for helping to manage water scarcity as a result of the Millennium Drought (Clark, 2014). Similarly, energy policies appear much more effective and certain on a local scale (Backhaus, 2009) and this certainty helps companies invest and plan for the future and understand the current risks surrounding environmental issues.

However, a focus on resource scarcity instead of climate change could arguably lead to some environmental issues being missed in companies' considerations. Air pollution, for example, is

a not a resource *per se*, and therefore would not feature in such an analysis but potentially would be considered under a broader climate change lens (Wisner, 2004). Similarly, extreme weather events may indirectly affect resource scarcity in the short-term but perhaps not effect longer-term planning (Houghton, 2009). Thus a climate change lens may provide a wider scope from which to analyze some of the issues facing companies and society as changes occur and focus more on the indirect externalities rather than only those affecting the inputs to production (Wisner, 2004). Climate risks go beyond resources and should be recognized as such. Arguments could also be made that mitigation of climate change would gain a backseat in corporate agendas, and this would be hugely detrimental in attempts to stay below the 2 degrees IPCC target, with companies currently leading the way globally in their fight as a result of greater disclosure requirements (Clark and Hebb, 2005; Chapman, 2007). The IPCC (2015) recognize the importance of companies in moving away from a fossil-fuel driven economy, and unless dialogues around climate change and the role of GHGs on causing these environmental risks continue, then carbon emission could continue rising and this would have long-term knock-on effects to worsen the large number of other environmental impacts – thus without tackling climate change, other environmental issues will intensify and therefore resource scarcity alone may not be the only or sufficient lens through which to view environmental issues.

However, as this essay has sought to demonstrate, while resource scarcity and climate change are interlinked, due to the nature of companies and their dependence on resources (Cloke et al. 2005), resource scarcity is perhaps the most tangible way for companies to start analyzing and managing environmental risks. In particular, I would argue that a focus on water resources would be a particularly important issue to think about due to its prominence in everyday operations, its tangible nature and its potential to be a huge bottleneck to corporate progress (WRI, 2015). The World Bank (2013) found that water demand will greatly outpace supply over coming decades, so that by 2050 we will require 40% more freshwater than is currently available. Companies, and particularly agricultural and energy/mining sectors are very susceptible to changes in water availability, and water has already been identified as a major risk to the majority of companies in the S&P 500 (CDP, 2014). Water is also causing organizational legitimacy issues for companies, with Coca Cola expelled from operating bottling factories in certain Indian states due to their overexploitation and pollution of local water resources (Davenport, 2014). Supply of water is localized but demand is truly global, and often greatest in the places where resources are already scarce, such as in the North of China. As such, without proper consideration of water scarcity, companies will find themselves at loggerheads with local communities and governments, as well as facing temporary or even permanent stranding if scarcity continues, but companies also have to be aware that water as a resource is a double-edged sword – too little and production will have to halt; but too much and flooding can equally force stranding and destruction of supply chain networks (IEA, 2014). As such, I would argue that water has shown itself to be, and will continue to be, a major challenge to companies, who will have to spend large amounts of money on water security and management in the coming decades (Clark, 2014).

In conclusion, then, I believe that companies can gain a lot from utilizing a resource scarcity lens to identify and reduce the risks from environmental issues of the 21st Century. These issues of resource scarcity are already damaging corporate bottom lines, and although climate change can be seen to be exacerbating resource scarcity, resource scarcity cannot be solely linked to climate change, so such a lens is less politically contentious and more tangible/actionable. In particular, I would propose a lens of the stress nexus, linking water-food-energy security so that these resources are seen as a holistic challenge to companies in seeking to provide for society. However, water is perhaps a key bottleneck for many companies across a range of sectors due to shifting weather patterns and surging demand from agricultural, industrial and demographic pressures, and is both a developed and developing world challenge which could lead to both price volatility and social instability in coming years, and is already costing companies billions of dollars in management costs. While the exposure to resource scarcity may differ from sector to sector, this essay has sought to show its materiality and benefits in making complex and interrelated environmental issues measureable, tangible and manageable.