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The Power of Natural Resources

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Born in 1977. Benjamin Block received a Master in finance and economics with honours from the New York University's Stern School of Business in May 2007.

Professionally, Benjamin Block has held various engineering and managerial positions in the energy and software sectors. He has architected award-recognised software applications that have been critical to the success of multi-billion dollar organisations. He is also an active entrepreneur, having been involved with the founding of multiple startups, including Tackle.com, a sports-related social network. Benjamin Block will be joining Ardsley Partners, a hedge fund, where he will serve as a sector analyst for renewable energy and clean technology.

He first became interested in renewable energy as an undergraduate student at the University of California, San Diego, where he completed a degree in physics with specialisations in biology and computer science. There, he wrote his senior topic on phototropic energy sources. He also engaged in research in solid-state physics and bio-electrical cancer detection.

Using Project Finance to Deliver Clean Energy to Emerging Market, Benjamin Block's contribution to the St. Gallen Wings of Excellence Award, is available for download on our homepage www.stgallen-symposium.org.

Using Project Finance to Deliver Clean Energy to Emerging Markets

Introduction

I am not going to argue that we, as a planet, need to reduce our carbon footprint; I take this as “truth”. The Intergovernmental Panel for Climate Change (IPCC) suggests that we need an 80% reduction in carbon emissions by 2030 in order to achieve climate stability.¹ These figures were calculated by scientists who are experts on the subject, and I will not dispute their figures. If they are wrong, and the situation is less dire than projected, it will be a happy error, particularly for the 14 million Bengalis whose homes would be jeopardised by a 1 meter rise in sea levels.² I am not here to argue the problem; I am here to be part of the solution.

George Monbiot, in his book *Heat*, has laid out a prescription for the necessary reductions. It relies on technology solutions; including battery-powered cars, next-generation wind turbines, and concentrated solar power. To believe in this solution, you must be an optimist. You must also be able to mobilise tremendous amounts of capital and a similar amount of public support.

Apparently, the investment community has decided to back this movement; 14% of all venture capital dollars were invested into clean technologies at the end of 2006.³ As Ray Lane, a partner at the venerable venture capital firm Kleiner, Perkins, Caufield, and Byers said at a recent cleantech investment conference, “Green is green”.⁴ The world’s financiers are banking on the fact that carbon-free energy sources will emerge as economically viable in time for them to harvest substantial profits.

More importantly, public support for this cause is starting to swell. Even the United States, the world’s largest polluter, has shown willingness to act. President Bush, perhaps reluctantly, made mention of the need to reduce carbon dependence in his recent State of the Union address. This is a major concession for a Texas oil man. I think this is a sign of change, and a good one at that, because real change will require government leadership: through subsidies, tax credits, public works, and carbon cap-and-





trade schemes that account for the *Gaia Cost* – the long-term economic cost of carbon dependency.

The short-term costs of reducing atmospheric carbon will be high. In the long term, however, through economies-of-scale and more efficient technologies, I believe we can see cheaper energy that leverages natural resources (e.g., sun, wind, and water) that are available in abundance.

Today, more than 60% of the world's man-made carbon emissions are generated by rich nations.⁵ Fortunately, these countries have the economic resources to raise the capital required to reduce their carbon footprint. They also are able to absorb higher short-term energy prices in order to create long-term stability and public good. I am hopeful that the world's rich nations will soon embark on a course to catalyse this change.

But what about the developing countries that produce the remaining 40% of world carbon emissions? These countries are experiencing astounding GDP growth. They also are home to a huge percentage of the planet's population. Should these nations grow using traditional, carbon-based energy sources, the effort set forth by the rich countries will be in vain: Monbiot argues that the OECD would then have to achieve a 90% cut in GHG emissions. This would be an exponentially more daunting task.

Yet, surely it is mean-spirited to ask poor nations to absorb higher-than-necessary energy costs when they suffer from much lower per capita GDP than we do. Surely it is foolish to think that the governments of countries like India will be able to finance the massive public works required to deliver clean energy to their population; not when there currently are cheaper and less risky technologies at their disposal; and not when they are committed to provide healthcare and social services for hundreds of millions of people living below world poverty standards.

And so, this is the problem that I will tackle: how can rich nations foster environmentally-sound economic growth in emerging markets? I contend that the solution is within our grasp. It relies

on *generation skipping*: the process of passing over existing generations of technology in favor of new ones; it relies on capital markets providing the funding gap and earning returns commensurate with typical, first-world projects; finally, it relies on international financial intermediaries (i.e., the World Bank) advising and guaranteeing clean energy projects.



Project Finance

I recently sat down with an executive at one of the U.S.'s alternative energy project financiers, MMA Renewables. This company finances the construction of renewable energy plants by contracting with engineering firms to build plants, by negotiating long-term Power Purchase Agreements (PPA) with utilities, and by installing any other appropriate risk mitigation measures (e.g., energy hedges). After they have reduced project risks to levels commensurate with the appetites of their investors, they sell syndicated project debt, backed by the cash flows generated by electricity sales, to public and private investors. Everybody wins: utilities get energy at competitive rates; investors get decent returns; and the public gets carbon reduction.

According to this executive, who left a large investment bank because he “wanted to do *good* and to make money doing it”, the tax-adjusted returns on these projects are somewhere between mezzanine debt and equity.⁶ He does not hesitate to emphasise the *tax-adjusted* part – these returns rely on government tax credits – or that these returns are only possible when utilities offer credible, long-term PPAs.

After this conversation, I thought about applying the same project structures to developing countries. On the surface, it seems like a natural fit. Construction and land costs in these countries are lower, and retail electricity prices are generally higher. All else equal, these projects should offer higher returns than their OECD counterparts.

On the other hand, developed countries can afford to offer tax



advantages to clean energy project investors; after all, these projects generate jobs which ultimately provide *trickle down* tax revenue. More importantly, project developers can more-or-less insulate their investors from risk because of the stability of the utilities purchasing their electricity – essentially, they borrow at or near the cost of debt of their customers. And all of this is without mentioning the stable legal and financial institutions that underpin all developed market transactions.

In developing countries, however, even where there are local tax incentives for project investors, there are still penalties for repatriating income to their native countries. Investors also face significant political and currency risks when making private placements in emerging economies. These risks necessitate higher returns: returns that are generally unavailable given the prevailing technologies and energy prices that govern renewable energy project cash flows.

Thus, it has largely been incumbent upon emerging market governments to finance their own public works (sometimes with the help of the World Bank). To eliminate risk, they use established, hydrocarbon-based technology. This gets the job done: it provides energy to their citizenry at the lowest possible public fiscal expense. But it adds to our carbon problem. In China, for example, 70% of energy comes from coal-fired plants.⁷ According to Doug Ogden, director of the China Sustainable Energy Program, this is “the dirtiest energy mix on the planet”.

Generation *Leapfrogging*

By allowing developing countries to fuel their energy needs through carbon-intensive technologies, we ignore a great opportunity: the opportunity to *leapfrog* a technology generation. Consider the African telecom industry: in 2005, only 3% of Africans had access to a landline; yet 60% were in reach of a cellular signal.⁸ By skipping fixed-line telephony in favor of cellular technologies, African governments avoided costly infrastructure investments that would have been replaced by cellular infra-



structure eventually. Moreover, the global cellular industry benefited from a larger market – inviting greater economies-of-scale and promoting investments in new technologies.



We have the same opportunity to leapfrog energy infrastructure in the developing world. Yet, for the reasons discussed above, developing countries cannot afford the additional risk and expenditure of building a clean energy infrastructure. Unless there is intervention, they will continue to build power plants that exacerbate our global climate problem. What's worse, each new fossil fuel power plant has a run life of 10–30 years. A wealthy country might feasibly be able to absorb the cost of decommissioning a plant prior to the end of its economic life. A poor country decidedly can not.

To skip a technology generation and avoid increased carbon emissions, project financiers must find ways to fund clean energy projects in developing nations. I contend that this can be (and must be) profitable, but that it requires legislation by the world's rich nations, as well as mediation by the World Bank and its affiliates.

The Role of Government

The first step towards this goal is taking Production Tax Credit (PTC) schemes like those employed by the United States and extending them to projects in developing countries. Governments must legislate that income from clean energy ventures in qualified emerging markets would be at least partially immune to income repatriation taxes. It would still be up to investors to negotiate local tax schedules, but emerging market governments would surely have incentive to be lenient in this regard.

With such legislation, there would be fear of a capital flight from developed to developing markets. It is thus incumbent on each government to develop a tax treatment that equilibrates this capital flow. By and large, the opening of this new, high-yield capital market would improve overall returns to capital and thus





boost national capital stocks. Any Solow Growth economist would concede that this is a good thing.

The Role of the World Bank

If a project financier were to embark on the construction of a clean energy plant in a developing nation, it would ultimately rely on that nation's government to be a guarantor of that project: as a party to the PPA and/or as the sovereign presiding over the other contractual aspects of the transaction. Unfortunately, navigating through new financial and legal climates would heap unwanted due diligence costs onto projects and thus lower the potential returns. This is a significant deterrent to new investment.

I argue that an international financial intermediary such as the World Bank or IMF could act as guarantor for many such projects. In this role, the World Bank would guarantee the return of (at least) the invested principal in the case of any project failure not related to plant operation (e.g., a political coup, a renege on the PPA, sovereign default). In exchange for this guarantee, the World Bank would be offered a marginal return or stake in the project. With this credible guarantee, project financiers would be able to avoid due diligence costs associated with doing business in an emerging market.

I suggest this role for the World Bank because of the extensive resources that they already expend in monitoring and working with emerging markets. In particular, I refer to two arms, the International Finance Corporation (IFC) and the Multinational Investment Guarantee Agency (MIGA) that work extensively with developing nation governments to finance new public works. These institutions have amassed a vast knowledge of the legal and financial underpinnings of government institutions. Moreover, via their affiliation with the World Bank, these organisations wield a great deal of influence over governments: for obvious reasons, most governments do not default on debt backed by the World Bank except under the direst of circumstances.



Thus, I submit that the World Bank, with both its on-the-ground understanding of developing market conditions and its governmental sway, is in a good position to serve as project guarantor in many markets. By reducing the due diligence costs for international financiers, it would expedite the provision of clean, affordable energy to developing nations, the development of new and profitable capital markets, and the continued solution to our climate problem.



Conclusions

In summary, I am encouraged by the enthusiasm of the developed world towards reducing its carbon footprint through cleaner technologies. On the other hand, I see this as only part of the solution. Developing countries have an insatiable need for energy. If we do not act to fulfill this need with the same, cleaner technologies that we deploy in richer nations, we will have done nothing to mitigate worldwide potential for environmental fallout.

In this paper, I have presented meaningful steps that can be taken to address this problem. This will not be an easy challenge. On the other hand, the world has been bestowed an abundance of natural resources that can be harnessed to solve our climate crisis. From the winds of the Mongolian Steppe to the beating sun of the Sahara Desert, we are, in the words of noted environmentalist and entrepreneur Amory Lovins, confronted by *insurmountable opportunity*.



- ¹ **IPCC**, Climate Change 2001: The Scientific Basis, <http://www.ipcc.ch/>.
- ² **Pearce, Fred**, “Climate warning as Siberia Melts”, *New Scientist*, 11 August 2005.
- ³ **Richtel, Matt**, “Silicon Valley’s Investors Seek to Sway Washington on Alternative Energy”, *International Herald-Tribune*, 29 January 2007.
- ⁴ **Lane, Ray**. Speech to Clean Tech Investor Summit. 23 January 2007.
- ⁵ **United Nations Statistics Bureau**, 2002 survey.
- ⁶ **Block, Benjamin**. Interview with MMA Renewables. 2 February 2007.
- ⁷ “Global Reality Check”, *Stanford News Service*, 26 October 2006.
- ⁸ **LeFrancier, Sharon**, “Cellphones Catapult Rural Africa to 21st Century”, *New York Times*, 25 August 2005.



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