

## Untying the Gordian Knot: Catalysing Green Energy Investments in Emerging and Developing Economies

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*This report is part of the Observer Research Foundation's "Financing Green Transitions" series which aims to find potential linkages between private capital, in all its forms, and climate action projects. The series will primarily examine domestic and international barriers to private capital entry for mitigation oriented climate projects, while also examining potential avenues for private capital flow entry towards adaptation and resilience projects.*

### INTRODUCTION

Climate change remains one of the largest threats to the world and there have been a number of steps taken to mitigate its effects. The Paris Agreement, an international climate treaty ratified by the vast majority of sovereign nations, sets forth a strategy to curtail the rise in global temperatures over the next 80 years. A key clause within the Paris Agreement guarantees \$100 billion in annual funding from traditional economic powers in order to help catalyse low carbon transitions for nations that have not had the benefit of

using fossil fuels to accelerate their development cycle.

The developed world has failed to live up to its commitments, however, with current estimates indicating that only half of the pledged funds are currently being provided.<sup>1</sup> To achieve the goals of the Paris Agreement, alternative sources of financing are needed. The largest pool of capital in the world lies in the hands of institutional investors – the pension funds, insurance companies and

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sovereign wealth funds that have more than \$100 trillion worth of global assets under their management.<sup>2</sup> Recent technological advancements have increased the profitability of climate action projects such as renewable energy, making them attractive investment opportunities for institutions in theory. In practice, however, only one percent of the \$100 trillion has gone to climate action projects, with a significantly smaller proportion flowing to the developing world.<sup>3</sup> The lack of investment can be ascribed to a number of barriers that impede private capital flows for climate action projects in developing nations.

As part of the Observer Research Foundation's *Financing Green Transitions* series, the barriers present within emerging and developing economies such as India,<sup>4</sup> Nigeria<sup>5</sup> and South Africa<sup>6</sup> have been examined. This paper aims to provide an overview of barriers applicable across the developing world and offer recommendations on how to overcome them.

## **BARRIERS TO PRIVATE CAPITAL IN THE DEVELOPING WORLD**

A significant barrier to private capital investment in climate action projects is off-taker risk. In the context of clean energy, off-taker risk can be defined as the possibility of non-payment by the purchaser – a power distribution company in most cases. Overwhelmingly, power distribution sectors in the developing world are public sector entities, which essentially makes the government the de facto distributor of power. While ventures backed by a sovereign government are usually considered to be safe investments, perceived economic fragility and

the potential for prolonged delays in payment has increased the risk in the eyes of investors conducting business in developing economies. Irrational pricing, power theft, poor integration of renewable energy sources to electrical grids, and susceptibility to political influence are common to power sectors across the developing world,<sup>7</sup> further spurring investor uncertainty.

Moreover, inadequate policy measures, regulatory uncertainty and political malfeasance have also created an unappealing environment for private capital across emerging and developing economies. Attempts made by central governments to implement measures incentivising clean energy investments do not always have the desired effects. Policy initiatives can be ineffectual for a number of reasons including incongruence within the overall domestic policy framework, insufficient input from the private sector, and lackadaisical execution of policies on subnational levels.<sup>8</sup>

A third hurdle for investors has been the unavailability of debt financing at domestic and international levels. Clean energy projects incur significant start-up costs and generate modest revenues over a long-time period.<sup>9</sup> These characteristics necessitate long term debt, which is not often available in developing economies. Long term debt from international or multinational banks is also difficult to obtain due to the implementation of the Basel III liquidity norms,<sup>10</sup> especially for “risky” assets such as clean energy projects in developing countries.

## **MITIGATING OFF-TAKER RISK**

As mentioned in the previous section, off-taker risk in developing economies generally

stems from inefficiencies within power distribution companies. Consequently, effective mitigating actions must first aim to reform the power distribution sector in the developing world. Given the multitude of factors that contribute to the inefficiency, there are a variety of solutions available, ranging from small tweaks to wholesale structural changes.

### **Power Theft**

One of the contributors to the poor financial health of the power sector in developing economies are losses incurred from transmission and distribution leakages. Electricity theft can be particularly problematic in such countries, leading to a significant loss in revenue (estimated to be \$16.2 billion in India in 2014).<sup>11</sup> A possible preventative measure aimed at stopping electricity theft could be subsidies from the government for the implementation of smart meters. Smart metering can combat theft through constant up to date monitoring of electricity usage, by directly linking the meter to the distribution company's central system. With smart meters reducing the need for meter monitoring by distribution company workers, corruption can be minimised. In addition to the tactical placing of smart meters on high usage sites, governments should encourage the development of a more honest employee ethos within power distribution companies through better targeted incentive schemes. There are also less technical approaches to improving electricity security, for which central or state governments can provide funding. For example, distribution companies can be asked to implement tamper proof electricity cabling or deploy barbed wire fences around power lines to prevent direct hooking.<sup>12</sup>

There are also other methods that can be used to prevent electricity theft. The Electrical and Electronics Engineering department at the University of Ilorin has devised a smart meter prototype which can detect electricity theft, stop the power supply to guilty consumers and alert the electricity companies' employees.<sup>13</sup> Similarly, CWG PLC has created a system that can provide electricity providers with the location of any incidence of theft within a span of minutes. The solution is relatively cost efficient due to its use of mounted microcomputers.<sup>14</sup> Funding directed towards studying the viability of such measures in emerging economies or inventing new technology related methods should also be encouraged in emerging economies.

### **RENEWABLE ENERGY INTEGRATION**

In general, efficient renewable energy development is dependent on a nation's transmission and distribution infrastructure. The main issue in emerging economies is that the growth of renewable energy capacity outstrips that of the infrastructure needed to distribute the generated power. Developing countries, therefore, should prioritise the expansion and enhancement of their grids to accommodate renewable energy sources. Unfortunately, sluggish bureaucracy often results in delayed updates to existing electrical grid infrastructure. Employing the private sector or privatising parts of the electricity transmission and distribution infrastructure is a possible way to bypass such delays.

The progress of renewable energy integration to the electrical grid is also hampered by intermittency problems, as wind and solar power cannot provide a constant flow of electricity generation unlike their fossil

fuel counterparts. To address this issue, countries should seek to develop appropriate storage batteries that can account for irregularities in renewable electricity flow and ensure reliable provision. Intermittency issues can also be managed through the use of advanced analytics, which can provide more accurate forecasts for future renewable energy availability.

A recent development designed to lower renewable energy transmission and distribution leakage—the ‘green energy corridor’ in India—could also be applied to other developing countries. This corridor seeks to connect areas with a surplus of renewable energy to those with an electricity deficit. By implementing such a corridor, emerging economies can prevent the traditional power loss that is prevalent in the renewable energy sector. A green energy corridor project can be promoted by encouraging public-private partnerships for investments in electrical grid infrastructure, while also making land acquisition processes more efficient.<sup>15</sup>

Another solution to renewable energy grid integration issues could be the implementation of a ‘must run’ clause in power procurement contracts. ‘Must run’ status prioritises electricity from renewable sources over that generated by fossil fuels, thus bypassing intermittency related leakages. Further to this, if a ‘must run’ mandate isn’t strictly adhered to, then renewable power generators receive compensation for curtailment. This provides a significant incentive for distribution companies to transmit electricity from renewable sources, while also creating the additional benefit of providing revenue certainty to producers and investors.

Small changes, such as those pioneered by Texas grid operator ERCOT, can also help renewable energy grid integration. ERCOT uses 5-minute dispatch intervals compared to the larger dispatch intervals used in developing economies, which allows for greater incorporation of renewable energies given their inherent variability. ERCOT also use a 3 percent upper limit target for curtailment which has been proven to be particularly efficient, especially during peak periods.<sup>16</sup>

## **POWER PRICING**

While transmission and distribution losses are partially responsible for the poor financial health of the power sector in developing economies, loss generating activities primarily occur due to the regulation of electricity prices. Electricity rates in developing economies are usually subject to government mandates designed to provide affordable electricity to large portions of the poverty-stricken population. This, unfortunately, forces distribution companies to provide electricity at rates lower than the cost of procurement.<sup>17</sup> The losses result in diminished demand for power, debt spirals and en masse bailouts for the sector, in certain cases.

The power pricing issues prevalent in most developing economies can be solved by privatising the power distribution sector and lifting the regulations governing electricity rates. Private companies have a fiduciary responsibility to their shareholders to operate at a profit and have greater incentives to reduce operational inefficiencies and transmission and distribution losses. They will also ensure correct pricing, according to what the market dictates. Privatising the power distribution sector can also counter

governmental overreach, which can be problematic in certain developing economies. By allowing the market to determine the best sources of power procurement, undue political influence and corruption can be held in check, further bolstering investor confidence.

In order to continue providing affordable electricity to its constituents, the government can subsidise electricity for disadvantaged groups through the use of tax credits, fund transfers to utilities or direct cash pay-outs to the affected population. Alternatively, a hybrid model can be utilised; a model where pricing is unregulated for corporations or consumers wishing to procure electricity above a certain threshold, while general electricity rates continue to be regulated. This hybrid model, used during the privatisation of Chile's electricity sector in the 1970's led to an increase in profit margins for power distribution companies, a decrease in transmission and distribution losses, and a thirty percent drop in average electricity prices, indicating that such a reform is indeed economically viable.<sup>18</sup>

## REMOVING REGULATORY BOTTLENECKS

Given the nascent nature of the renewable energy sector, many developing nations are still in the process of formulating renewable energy policies. Hastily implemented policies and regulations have contributed to investor uncertainty, as renewable energy policies are oftentimes contradicted by other macro-policy initiatives. These policies have also allowed state governments to exploit loopholes or simply disregard central government led initiatives, creating further obstacles for private capital flow. To overcome these barriers, developing nations must create

a comprehensive framework for renewable energy policies that is congruent with other policy frameworks. The renewable energy framework should include inputs from relevant stakeholders, while also providing mechanisms that ensure proper follow-through on the subnational level.

The renewable energy framework should aim to make the country an attractive option for global investors by incorporating all key aspects of the sector. Additional focus should be placed on reducing risks and transaction costs in the renewable energy market. The framework should also provide clarity on electrical grid regulations to consumers, investors, and utilities companies.

The renewable energy policy framework must also align with the respective nation's economic, energy and industrial development plans. This would avert explicit or implicit policy conflicts across departments. Inputs from investors, sector experts, and academics are essential to sculpting such a strategy, as weaknesses in current policies can be best understood through open dialogue. Any proposed renewable energy framework must also strike the right balance between consistency and flexibility and be willing to accommodate changes pertaining to the sector at a national and subnational level.

The framework should also ensure smooth implementation processes for any policy measures. It must clearly define departmental roles, while creating structures that allow for coordinated interdepartmental efforts aimed at minimizing any overlap. Additionally, the framework should also implement strict time frames in order to avoid the inertia of bureaucratic red tape.

In order to ensure implementation of policy initiatives on the subnational level, state nodal agencies should be created to handle all administrative matters not under the jurisdiction of the central government. The nodal agencies, headed by central government appointees, should facilitate the transfer of land acquisition rights, expedite appropriate clearances and escalate issues to the appropriate central government bodies when necessary. Mechanisms designed to provide budgetary incentives to compliant states should also be included in the framework.

## **INCREASING ACCESS TO DEBT FINANCING**

Renewable energy projects are usually funded through a mixture of debt and equity for a number of reasons including tax benefits, the possibility of higher returns for investors and substantial start-up costs. However, the long term debt agreements needed by institutional investors are not usually available in developing economies with immature debt capital markets. Banking regulations such as Basel III have also made it difficult to access international debt markets without paying interest rates that make the investment unprofitable. In order to remove this barrier for private capital flows, it is imperative that regulations restricting debt for clean energy projects are lifted, and alternative debt procurement methods are made available to financial markets.

Green bonds are one such possible debt alternative and have gained traction in both the developed and developing world. These financial instruments allow banks or private firms to raise money specifically for certain

sectors/projects, without putting existing capital on the line, essentially transferring risk over to the bondholders. Unfortunately, green bonds are still somewhat problematic, as the risk ratings assigned to the financial instruments rarely exceed the sovereign risk rating of the nation the project is based in. Given the low sovereign risk ratings assigned to many developing nations, green bonds will probably not be able to engender enough institutional investor confidence to significantly catalyse private capital flow for the developing world.

International infrastructure debt funds are a possible solution to the issues created by sovereign risk. Infrastructure debt funds traditionally use funds from customers to invest in multiple projects to diversify risk. The same concept could be applied on a global scale – an international infrastructure project could invest in projects across a number of developing nations in much the same way that multinational development banks do. The costs associated with raising the debt and running the international debt fund, would still result in high interest rates for investors, however.

Effective solutions addressing institutional investor inaccessibility to debt, can not come solely from the private sector. Policies governing banking regulations on the international level have to be addressed, as well. The largest barrier for private sector lending on the international scale are the Basel III norms. The international macro-prudential regulations set forth in the norms, require banks to keep more capital on hand if they invest in projects with higher risk ratings, while also discouraging longer termed debt agreements. While the regulations create

important safeguards against the collapse of the banking sector on the whole, a market failure exists in the case of climate action projects.


To rectify the market failure, amendments regarding the treatment of renewable energy projects need to be made. Specific clauses reducing Risk Weighted Averages (RWA) and credit conversion factors for loans, letters of credit, and revolving liquidity facilities for green infrastructure and clean energy projects should be added. This will reduce interest rates for green loans and catalyse private capital flow for renewable energy projects. Additionally, there should also be amendments made disassociating any climate action project with sovereign RWA factors, which will reduce lending biases against the developing world.

In the same vein, developing nations must also take steps to encourage lending for climate action projects. The Indian government has created regulations compelling banks to loan certain portions of their balance sheets to what they considered to be “Priority Sector” areas. While clean

energy is included in the regulation, the lending requirements for the sector are weak. Raising the lending requirements would increase debt availability within India, while implementation of a similar policy could effectively catalyse private capital inflows for other developing economies.

The developing world could also take their cue from South Africa, which jumpstarted its renewable energy sector by working closely with banks to ensure that sufficient debt was available. Using public sector banks to ensure that any debt financing needs are met could also help incentivise institutional investors.

## THE WAY FORWARD

The issues covered in this paper are important, but are by no means all encompassing. There are a multitude of obstacles that must be overcome to incentivise private capital flows. The Observer Research Foundation, over the next twelve months, will be releasing a number of studies as part of their **Financing Green Transitions** series, delving deeper into the barriers that exist for institutional investors and providing possible solutions. 

### ABOUT THE AUTHORS

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