Financing Electricity Generation Growth and Development: Currency Risk and WPU® Indexed Bonds

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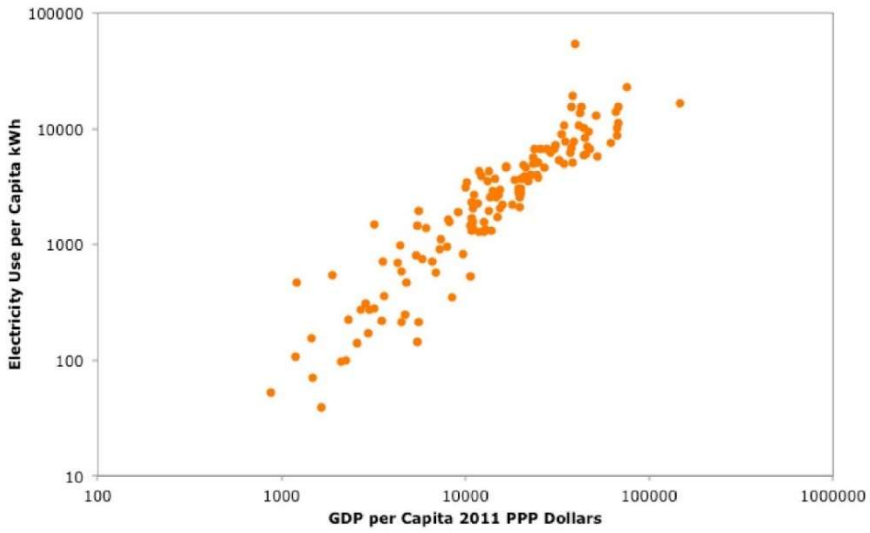
Economic shifts, new technologies, and a global effort to reduce environmental pollution and avoid climate change have all increased current and future demands for investment in electric power generation by multiple trillions of dollars.[2] A global shift towards electricity for transportation, heating and cooling, industrial processes, and other uses of energy will be a fundamental part of the necessary shift from fossil fuels to renewable sources of energy, driven both by economics and by the avoidance of climate change.

Although sometimes cast in these terms, required electrification is **not** a trade-off between climate change and development. In fact, economic growth and development across countries is very closely tied to the growth of electric power use, as shown in Figure 1. The growing demand for artificial intelligence, data centers, and declining costs for electric powered vehicles will ensure that this correlation continues into the future.

Figure 1. Per Capita Electricity Use and GDP (2014)



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[2] Costs of capping the rise in average global temperature to 1.5 degrees Centigrade have been estimated to require $100-300 trillion in investment by 2050. See: "Costing the earth: What will it take to make the green transition work?" Barclays, August 22, 2023 https://www.ib.barclays/our-insights/3-point-perspective/costs-of-the-green-transition.html.

Stern, David, et. al. "The Impact of Electricity on Economic Development: A Macroeconomic Perspective" University of California at Berkeley, 2019, https://escholarship.org/content/qt7jb0015q/qt7jb0015q.pdf?t=psd398

Building electric generation capacity will require multi-trillion-dollar investment in the APEC region. These will typically be in the form of large projects with payouts over decades. Financing these required investments will be a major challenge in most APEC economies. The first obstacle is the limited size of domestic bond markets in most developing and emerging economies, and market for long-term bonds is especially limited. The second obstacle in many of these economies is high domestic interest rates. The commercial viability of long-term projects is highly sensitive to the interest rate. Even modest increases in long-term rates can doom otherwise viable projects.

While domestic financial resources can and should contribute to financing the energy transition, foreign finance will be absolutely essential in raising sufficient funds and interest rates that make projects viable. But relying on foreign finance creates the additional obstacle of foreign currency risk, since the revenue streams of infrastructure projects are in local currency. Foreign currency risk has been consistently identified as an obstacle to infrastructure investment in emerging markets and developing economies.

The recent development of external finance raised in local currency does not alter this conclusion. The number of economies able to borrow externally in foreign currency remains small, and volumes, particularly for long-term capital remain small. What's more, local currency debt is issued at domestic, not foreign, interest rates. It's crucial to recognize that, even when borrowing in domestic currency, foreign exchange risk does not disappear. It is reflected in the higher interest rates necessary for foreign creditors to bear the exchange rate risk.

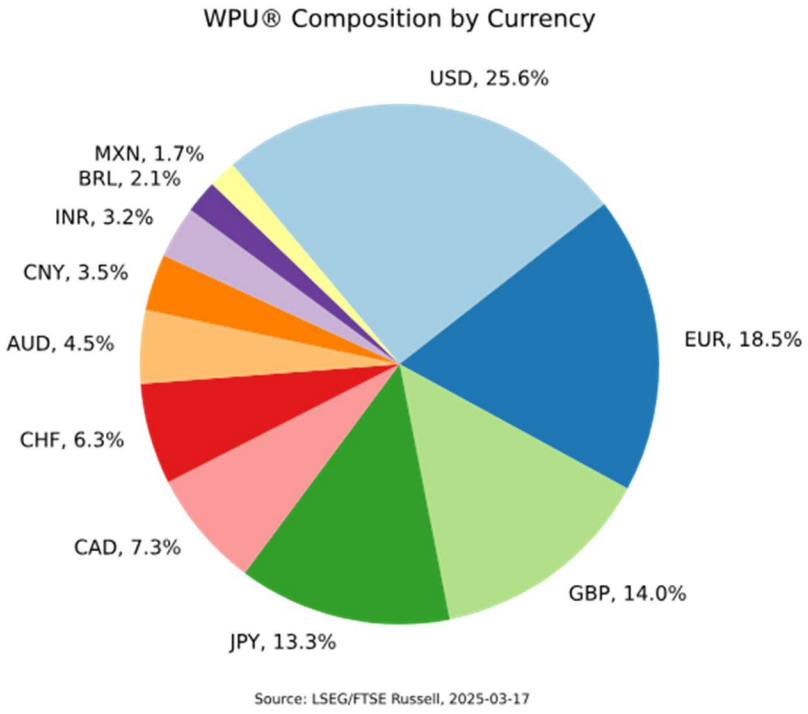
There is no magic bullet that will eliminate foreign currency risk, short of the development and deepening of long-term domestic bond markets. But this has a time horizon at least as long as the energy transition, and *a successful energy transition requires funds now.*

While foreign currency risk cannot be eliminated, it can be reduced. Almost all external borrowing is denominated in a single currency. Most often this is the US dollar, but there are also external loans denominated in the currencies of other APEC members. The risk to the borrower – most recently illustrated by the sharp appreciation of the US dollar – is that the currency in which they borrowed externally appreciates not only against the local currency but also against foreign currencies generally.

Fortunately, single currency foreign exchange risk can be greatly reduced by diversification across currencies. While the principle is clear, its application in the case of a foreign currency bond is not immediately obvious. Fortunately, reducing single currency borrowing risk does not require multi-currency borrowing. Instead, the currency risk of a bond servicing obligation can be

reshaped easily and at low cost by indexing interest and principal repayments to a group (basket) of widely traded international currencies.

The World Parity Unit (WPU®) index was designed for just such a purpose. WPU® is based on a basket of 11 widely traded international currencies, explicitly chosen to reduce overall currency volatility. WPU® includes the most important development market currencies, but also the currencies of four major emerging markets, Brazil, China, India, and Mexico. WPU® was designed after consultation with the major central banks. The annual update of WPU® weights is based on published rules and the daily WPU® settlement rate is calculated by FTSE-Russell division of the London Stock Exchange.

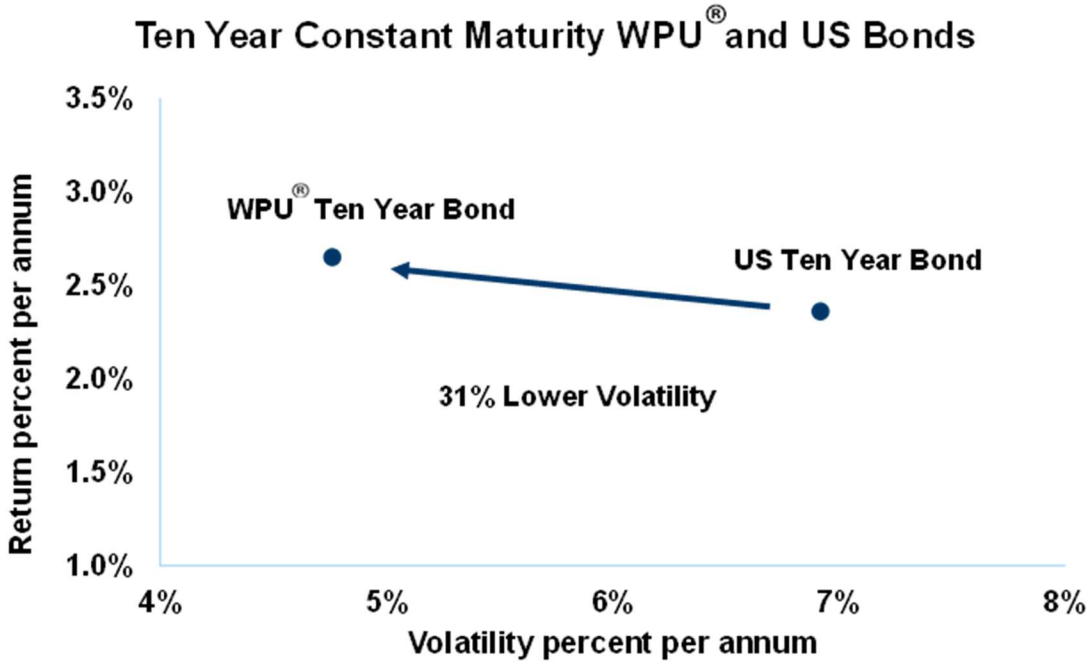


Borrowers can substantially reduce the volatility of repayment obligations due to single currency movements by issuing a bond where interest and principal repayment obligations are indexed to the value of the WPU® basket. Note that WPU® is not a currency, and a WPU®-indexed bond does not change the currency of borrowing or bond servicing. A US-dollar bond issue provides US dollars to the borrower, who in turn pays interest and makes principal payments in US dollars. Instead, dollar servicing amounts are adjusted based on the change of the WPU® index over time.

The principle of indexation is well-established in bond markets, most commonly for inflation-indexed bonds. The legal and technical modifications of a bond contract to provide for WPU®-indexation can be easily made.

In addition, the risk-reduction benefits of WPU®-indexation are substantial. Over the period from December 1998 to April 2023, WPU®-indexation would have reduced the currency volatility of a

10-year US dollar bond by over 30 percent. Due to US tightening, as of June 30, 2023, the ten year WPU® government bond rate was 3.04% p.a., which was 78 basis points lower than the ten year US Treasury yield of 3.82% p.a.. So there is lower risk *and* lower cost by borrowing which is indexed to WPU®. This addresses the core goal of financing a just and affordable energy transition.



Data: FTSE-Russell, Refinitiv, FactSet and MPG calculations. Monthly data from December 1998 through May 2023.

For an investor, the diversification means the risk of a WPU® bond is far lower than for US bonds. In addition, as the US Dollar is only 25% of WPU®, the WPU® bond will perform better when the US Dollar falls, or US yields rise.

Financing the energy transition in the APEC region will involve many challenges. But it is possible to substantially address one of the major challenges – foreign currency risk – through WPU®-indexed bonds.

While this is a brief introduction to WPU® indexed financing, there is further information available on WPU® discussing its construction, investment characteristics and the many frequently asked questions (*WPU® FAQS*).

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