Policy and Climate: The State of Global Play

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Stanford Investment
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Climate Policy Initiative (CPI) works with the public and private sector to decrease the cost – and increase the value – of low-carbon alternatives.

Our team of advisors and analysts has deep expertise in finance, strategy and policy for clean energy and infrastructure, and works with governments, utilities, companies, banks, investors, and foundations around the world to lower the cost of the transition to a low-carbon energy system.
THE FLOWS OF CLIMATE FINANCE 2013

The Flow of Climate Finance 2013, also known as the 'spaghetti' diagram, illustrates the landscape of climate finance flows along their life cycle for the latest year available, mostly 2012.

SOURCES AND INTERMEDIARIES

INSTRUMENTS

CHANNELS

USES

Notes: Figures are indicative estimates of annual flows for the latest year available, 2011 or 2012, available according to the data source. Flows are expressed in US$ billions and rounded to produce whole numbers. Estimates spanning multiple years are adjusted to produce annual equivalent estimates. Where ranges of estimates are available, the mid-point is presented. The diagram distinguishes between ‘instrumental costs,’ that is, financial resources that cover the private finance, between a chosen, more efficient option and costlier climate-friendly ones and do not need to be paid back — and capital investment, which are tangible investments in mitigation or adaptation projects that need to be paid back. Categories not representing capital investment or a mix of capital investment and instrumental costs are instrumental costs only. The group of National Finance Institutions includes Sub-regional entities. Most costs presented relate to commitments in a given year due to limited availability of disbursement data.
Government budgets face the biggest potential change due to mitigation policies – Oil and Gas is a good example.

Governments and Government owned companies will receive close to 90% of the net present value of future oil production between now and 2050.
Governments control the largest share of potentially stranded assets – Coal fired power plants is another example

Government Owned

ListCo – Government Share

ListCo – Investor Share

Publicly traded – IOU/IPP

Private/Ind. Cogen/Other

Ownership, control and risk are not always aligned

Public Market Investors Own, Control and Suffer Climate Risk for only 11% of Coal Power Plants globally

Ownership,
control and risk are not always aligned

Government Controlled (61%)

Investor Controlled (27%)

Other (12%)

Taxpayer at risk (55%)

Investor at risk (17%)

Ratepayer at risk (16%)

Other (12%)

Unregulated Regulated

GW installed capacity

China
India
Europe
US
Other*

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Institutional Investors are well positioned for renewable energy projects but illiquidity, project size constraints, and diversification requirements limit direct investment.
Integrating the pieces into a new model presents the sixth challenge
Employing these models in ways that link into developers’ initial investment decisions could significantly reduce renewable energy costs

<table>
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<th>Model</th>
<th>Change in Cost from Current Industry Model</th>
<th>Levelized Cost of Energy ($/MWh)</th>
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- With today’s model a typical wind project today could cost around $80/MWh
- The financial crisis has caused banks to reduce the term of debt offered – This could add 15-24% to energy costs
- Some developers enhance returns by selling projects to other investors – only 3% would go back to lower prices
- As risk falls and competition increases, some utilities are financing on balance sheet – This could reduce cost by 6%
- New business and financing models that are linked to developer investment decisions could reduce costs by 20%

* This model assumes the developer can monetize excess accelerated depreciation benefits immediately; an inability to do so increases the cost of renewable energy and the benefit of new business models
Renewable Energy and Clean Infrastructure could provide an excellent match for an institution’s investment needs, if structured appropriately.

Direct Investment in Renewable Energy projects offers liability hedging at higher returns:

**Typical Renewable Energy characteristics versus liability hedging needs**

**Risk**

With appropriate contracts and regulation can be very low with Beta approaching zero.

**Cash Flows**

High initial investment followed by steady cash flows mimics fixed income, but with potentially lower default risk (depending on regulation and contract/tariff counterparty).

**Returns**

Similar to corporate bonds, but with a slight premium for similar risk categories.

**Duration**

Very long durations potentially available.

**Growth and inflation hedge**

No growth, but cash flows available to re-invest; can provide energy price hedge.

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“Return Seeking”

“Liability Hedging”
Several issues with current renewable energy offerings reduce the value of these investments to institutions

**Issue with current offerings**

- **Illiquid infrastructure investments**
  Direct investments in projects can be difficult to sell if unexpected cash needs arise. This illiquidity can discourage investors or limit its share in the portfolio. Illiquidity can also raise costs as investors may need to offset illiquid investments with very liquid, but lower return, assets elsewhere in the portfolio.

- **High transaction costs**
  Direct investment can be expensive as transactions take time and require highly skilled and expensive resources. The higher return of direct investment may only justify the cost for investors seeking to make multiple high value investments over which team costs can be spread.

- **Insufficient projects suitable for direct investment**
  Many projects seem too small to justify transactions costs (requiring aggregation and bundling) or may be too large for a single investor (requiring syndication or an intermediary). A shortage of projects in the “sweet spot” creates competition which pushes down returns.

- **Market/regulatory barriers and risks**
  Regulation can exclude or discourage investors that are not immersed in the industry, may induce risks or may require risk management techniques that favor incumbents. Policy support and analysis is often necessary to achieve optimum value.

- **Asset owner objectives misaligned with institutions**
  Most assets are currently owned or financed by incumbents or intermediaries (banks, utilities) with objectives that are not aligned with institutional or renewable energy needs. Asset managers/infrastructure funds often ask for high fees that are justified through active management (buying and selling assets) that reduces the liability hedging value of renewable energy ownership.
Properly addressing these issues could create value for institutional investors, project sponsors and energy consumers.

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<td>High transaction costs</td>
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<td>Insufficient projects suitable for direct investment</td>
<td>Create systems to access a larger pool of projects (both large and small)</td>
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<td>Market/regulatory barriers and risks</td>
<td>Diversify across regimes and develop active policy/regulatory management</td>
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<td>Disintermediate banks/Utilities and tailor investment for Institutions</td>
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The key is to begin from the institutional investor perspective and develop new investment models optimized for their needs.

**Issue with current offerings**

- Illiquid infrastructure investments
- High transaction costs
- Insufficient projects suitable for direct investment
- Market/regulatory barriers and risks
- Asset owner objectives misaligned with institutions

**Pathway to value creation**

- Create liquidity through structuring of investment vehicle
- Share transactions costs among investors and develop new methods
- Create systems to access a larger pool of projects (both large and small)
- Diversify across regimes and develop active policy/regulatory management
- Disintermediate banks/utilities and tailor investment for Institutions

**New investment models optimized for institutions**

- Develop new listed vehicles or create liquid market (e.g. YieldCos, Investment Trusts)
- An investment club could share costs to benefit members
- Large projects can be split among investors, while a consortium could aggregate small projects
- Investors working together could invest in a larger, more diverse set of projects
- Investors structure investment vehicles with developers to meet their own investment needs
This group will evaluate the importance of various issues, investment characteristics and barriers for the investment case for institutions.

### Investment Consideration Dimensions

**RETURN**
- Return on investment (ROI) upside
- Cash flow certainty / Dividend security

**RISK**
- Duration
- Environmental/SRI characteristics
- Geographic/Business diversification
- Liquidity
- Inflation hedge value

**EASE of INVESTMENT**
- Pricing transparency
- Transaction cost / Management effort
- Investment cost
- Minimum investment size

### Investment Vehicles

- A. Project bonds
- B. Private placement project debt
- C. Preferred project equity
- D. General partner project equity
- E. Corporate equity
- F. Corporate debt
- G. YieldCo
- H. HoldCo – “Pure” YieldCo*
- I. Renewable energy equity fund
- J. Renewable energy debt fund
- K. Investors Club
- L. Private investor owned company (project developer)

* A “HoldCo” is a YieldCo type investment that offers 100% dividend payout and no growth, therefore eliminating uncertainty around new asset acquisition and development
Direct investment in renewable energy can provide attractive risk/return for institutional investors; particularly for liability hedging.

However, current financing options reduce the value and decrease the attractiveness of these investments to institutional investors.

CPI is looking to coordinate a small set of large institutions seeking to design new types of financing options that will overcome these barriers.

A roundtable to be held in June 2015 will be one important first step in this process.
China Domestic Coal-Fired Power Investment

Total 2012 Estimated Investment: c. USD 40-50 bn.
• India aims to more than double existing renewable energy capacity by 2022.

• Renewable energy is expensive compared to conventional power, and requires policy support.

• In our previous work, we found that high (and variable) interest rate and short tenor of debt add ~30% to the cost of renewable energy.

• Question: What federal policies would be the most cost-effective?

Source: Meeting India’s Renewable Energy Targets: The Financing Challenge (2012), CPI
## Potential impact of financing instruments on the terms of debt

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Potential Reduction in Cost</th>
<th>Potential Increase in Tenor</th>
<th>Enables Fixed Interest Rate</th>
<th>Attracts Private Capital</th>
<th>Mobilizes Additional Foreign Capital</th>
<th>Feasibility of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Bonds</td>
<td>4.5 PTS</td>
<td>10</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
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<tr>
<td>Infrastructure Debt Fund (Mutual Fund)</td>
<td>3</td>
<td>5</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
<td>MODERATE (YES)</td>
</tr>
<tr>
<td>Partial Credit Guarantee</td>
<td>1.9</td>
<td>5</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Partial Risk Guarantee</td>
<td>1.8</td>
<td>8</td>
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<td>✅</td>
<td>✅</td>
<td>MODERATE (YES)</td>
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<tr>
<td>Currency Hedge (Real Exchange Rate Liquidity Facility)</td>
<td>1.4</td>
<td>8</td>
<td>✅</td>
<td>✅</td>
<td>MODERATE (YES)</td>
<td>MODERATE (YES)</td>
</tr>
</tbody>
</table>
A growing population and middle class means it’s more important than ever to use land wisely. To meet our needs we must improve agricultural productivity while avoiding expansion into carbon-rich areas.