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Frameworks for Energy Investment in Development Organizations

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Introduction

Every year, capital is sunk into a range of energy projects, including the installation of new generation capacity, the extension of transmission lines, or the search for new hydrocarbon deposits. In 2015, this energy-specific investment totaled $1.8 trillion worldwide—more than 9.3 percent of overall investment and nearly 2.4 percent of total world GDP.[1] The origins of this investment capital are similarly varied, consisting of both private-sector sources such as retained earnings, bank borrowings, and equity markets, as well as public-sector entities. Of this latter category, international financial institutions such as the World Bank, the Asian Infrastructure Investment Bank, and aid agencies like the U.S. Agency for International Development (USAID) or the Japan International Cooperation Agency (JICA), have proved particularly important. As described in CSIS's 2017 report *Energy and Development: Providing Access and Growth*,[2] these public-sector organizations fill a crucial niche in the energy investment ecosystem, where their ability to catalyze private-sector participation has enabled the financing of numerous projects around the world. But while most of these public-sector entities publish individual descriptions of their own energy lending frameworks—for instance, what kind of projects they invest in, why they invest in them, and how much they invest—synthesizing a collective account has been difficult, due in no small part to variations in definitions, accounting practices, and data disclosures.

Nonetheless, by comparing the evolution of policy frameworks and lending volumes of a few key organizations—the latter of which is detailed in the graphic below—a few crosscutting conclusions emerge: First, nearly every organization studied has elevated the importance of "sustainability" issues, sometimes under an explicit climate-change and decarbonization heading, but also under a variety of other mantles, such as pollution control or social responsibility. Second, with the maturation of the Millennium Development Goals in 2015, most organizations have either prioritized their own country-level energy policies or pivoted to other multilateral agreements—most notably the Sustainable

[1] World Bank, "Data Catalog: Gross capital formation (current US$)," 2017, https://data.worldbank.org/indicator/NE.GDI.TOTL.CD; International Energy Agency, "World Energy Investment 2016," September 2016, https://www.iea.org/publications/freepublications/publication/world-energy-investment-2016.html.
[2] Sarah Ladislaw and Philippe Benoit, *Energy and Development: Providing Access and Growth* (Washington, DC: CSIS, November 2017), https://www.csis.org/analysis/energy-and-development.

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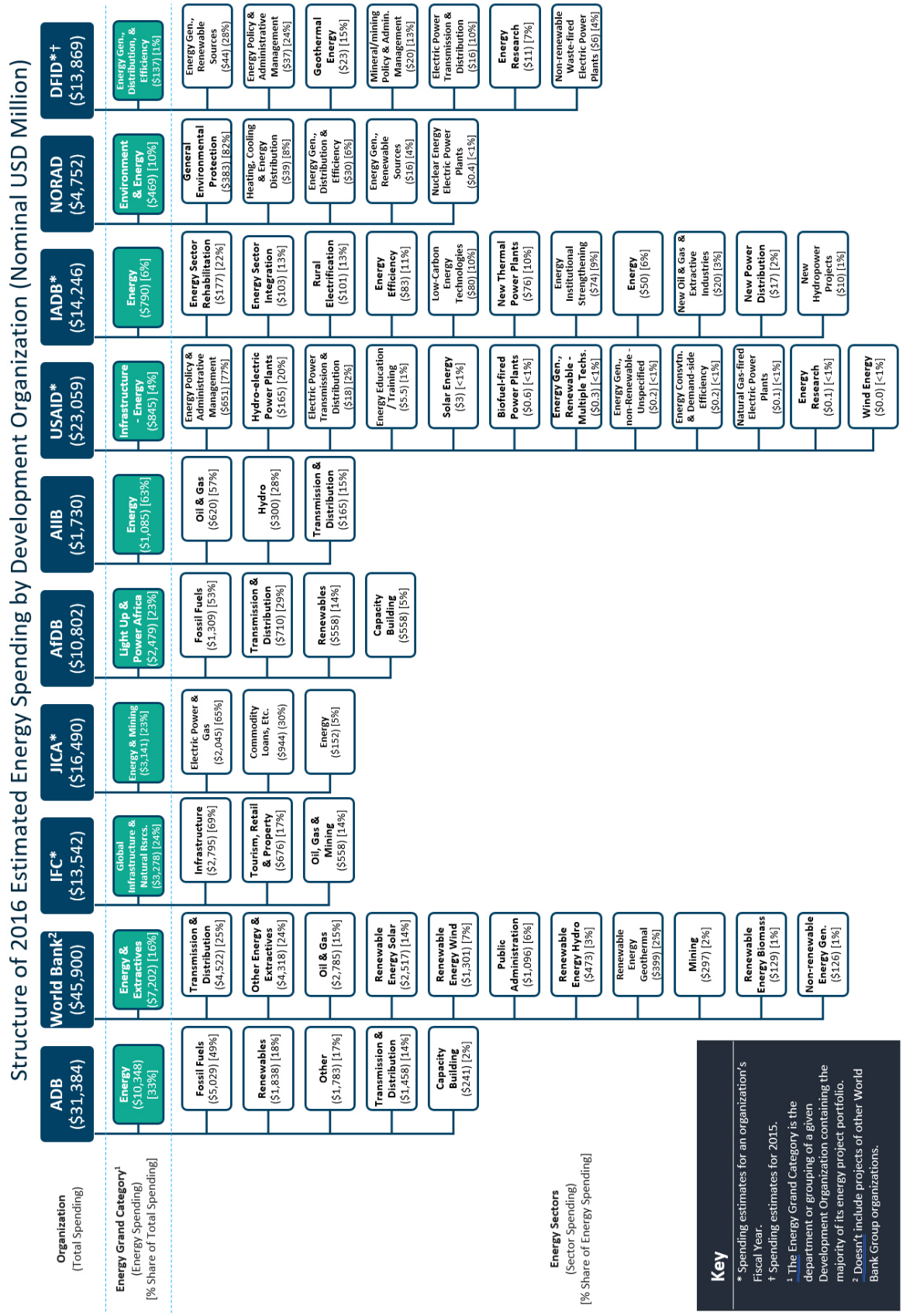

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Source: Data scraped from organizations' financial disclosures. See Methodology for details on tabulation.

Development Goals to serve as guiding principles for their energy lending. Third, spending on energy has grown in both relative and absolute terms for the majority of studied organizations. Fourth, most groups have steadily deemphasized, at least rhetorically, the "affordability" measure of their programs, possibly due to the current environment of low energy prices. Finally, increasing emphasis has been placed on the catalytic potential of energy investment. For groups such as the International Finance Corporation (IFC) and the World Bank, not only does their energy investment help by directly financing projects, but it also serves to attract additional lending from private parties through "de-risking" practices, such as the extension of loan guarantees or the deployment of aggregation funds. The ability to catalyze additional funding is particularly important for those institutions with strong climate-change-oriented goals and objectives.

Asian Development Bank (ADB)

The Asian Development Bank's energy policy in 2009 was predicated on three pillars: (1) promoting energy efficiency and renewable energy; (2) maximizing access to energy for all; and (3) promoting energy-sector reform, capacity building, and governance.[3] Today, this policy continues to serve as the official framework for the bank's energy investment, although it has since been supplemented with an energy "focus area" regime consisting of four priority "issues." Of the four, three are essentially identical to the three pillars found within the original 2009 policies, with the fourth "regional cooperation" issue focused on "using different peak times of neighboring countries . . . [to] reduce the need to build new power generation plants in each country."[4] This widening of the bank's scope can also be seen in its expansion of energy-related program spending, which according to the ADB's official estimates rose in not only absolute terms from $2.221 billion in 2009 to $10.390 billion in 2016, but also as a share of the bank's total outlays, climbing from 15 percent to 33 percent over the same period.[5]

World Bank

Over the last decade, World Bank energy investment has increased from $3.03 billion in 2006 to $7.202 billion today. At the time, the bank's programs were generally tied to the Millennium Development Goals to eradicate poverty and promote environmental sustainability. This would, however, begin to change, with the combination of the 2012 launch of UN Secretary-General Ban Ki Moon's 2012 Sustainable Energy for All (SE4ALL) initiative and the promulgation of the UN Sustainable Development Goals in 2015, leading the bank to articulate a more explicit three-part energy strategy to "(1) expand access to energy that is affordable to low-income consumers; (2) promote energy efficiency practices to moderate consumption patterns in energy-intensive economies . . . [and] (3)

[3] Asian Development Bank (ADB), "ADB's Work in the Energy Sector," 2017, https://www.adb.org/sectors/energy/adb-support-energy.
[4] ADB, "Regional Cooperation in the Energy Sector," 2018, https://www.adb.org/sectors/energy/issues /regional-cooperation.
[5] ADB, *ADB Annual Report 2009: Volume 1* (Washington, DC: ADB, 2010), https://www.adb.org/sites/default/files /institutional-document/31322/adb-ar2009-v1.pdf; and ADB, *ADB Annual Report* 2016 (Washington, DC: ADB, 2017), https://www.adb.org/sites/default/files/institutional-document/237881/adb-annual-report-2016.pdf.

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facilitate a shift to cleaner energy sources where feasible."[6] Today's World Bank energy strategy retains this emphasis on access and seeks to amplify its impact via four main strategic areas of focus: "(1) Increasing our focus on countries with low levels of energy access that have prioritized energy issues in their country strategies with the World Bank; (2) Helping to mainstream sector-wide approaches for universal energy access;(3) Supporting mobilization of sector-level financing . . . working with other development partners and private sector stakeholders; [and] (4) Working to build global knowledge on energy access through [information] products."[7]

Japan International Cooperation Agency (JICA)

According to the organization's 2013 Strategy Paper, JICA's energy policy serves—and in the absence of any more recent strategies, likely continues to serve—three purposes: first, contributing "to realizing a low-carbon society that can develop sustainably"; second, furthering "inclusive growth and poverty reduction by improving energy access"; and third, "boosting global vigor by utilizing Japan's excellent technologies and knowhow." More concretely, JICA's projects can be thought of as falling into at least one of five silos: (1) improving "upper level energy policies," by helping governments formulate their own policies or encouraging the adoption of power technology standards; (2) promoting "energy access," by expanding the recipient's power grid and electrifying those areas that are unable to connect to the main grid through renewables; (3) developing low-carbon power generation, including high-efficiency coal plants, hydropower, and geothermal; (4) improving energy efficiency through a combination of incentives and physical infrastructure upgrades; and (5) encouraging energy conservation. As a result, JICA's approach is best understood as a hybrid that marries investments in physical power generation and transmission infrastructure with funding for the development of institutional capacity in recipient states—areas in which Japanese utilities have historically excelled.

JICA's process of selecting projects is also informed by its "3L" policy, which stresses that projects be not only low-cost, but also low-carbon and low-risk, with the latter referring specifically to "reducing risks that threaten a stable supply of energy . . . realizing the best mix of energy, avoiding or reducing climate risks, and ensure power system stabilization."[8] It should, however, be noted that the 3L framework is not completely deterministic, with most strategy documents produced by the agency emphasizing that the three metrics are intended to be employed "in a well-balanced way"[9] and that project selection is to be cognizant of the unique circumstances in each country as "it is quite important to undergo the process of formulating support strategies and extracting specific cases through an analysis of individual countries."[10] As a result of this flexibility, the 3L policy is also currently used to inform the agency's work on the SDGs, which JICA has made a centerpiece of its

[6] World Bank, "Energy Overview," 2018, https://web.archive.org/web/20130601180307/http:/www.worldbank.org/en/topic/energy/overview.
[7] World bank, "Energy Overview," 2017, http://www.worldbank.org/en/topic/energy/overview#2.
[8] Japan International Cooperation Agency, "JICA's Strategy Paper for Energy Sector (Provisional Translation)," May 2013, 7, http://gwweb.jica.go.jp/km/FSubject0901.nsf/3697cc3aeafc2aef49257712001ba986/4567aa1447e6db2f49257ba6002b3c7e/$FILE/position_paper_energy_en.pdf.
[9] Japan International Cooperation Agency, "JICA's Position Paper on SDGs," September 2016, 7-3.
[10] Japan International Cooperation Agency, "JICA's Strategy Paper for Energy Sector (Provisional Translation)," 12.

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international cooperation efforts. According to the organization's 2016 SDG strategy, JICA considers "affordable and clean energy" (goal seven) to be an "intermediate goal" that will take more time to address than hunger, health, education, and sanitation, but less time than the ultimate goals of poverty alleviation, gender equality, and reduced inequality.[11]

While these objectives are nominally similar to those advanced by many of the other organization's surveyed, the emphasis that organization places on both the scale of its investments and their technological component is especially significant. Furthermore, its operations—and those of USAID, UK Department for International Development (DFID), and Norwegian Agency for Development Cooperation (NORAD)—are also differentiated by the fact that "JICA is not a multilateral donor like the World Bank and other international organizations, but a bilateral donor that functions as part of Japan's foreign policy."[12] As a result, JICA "selectively and intensively distribute[s] its resources to specific targets" that are not only capable of leveraging the agency's—and by extension, Japan's—"relatively abundant financial resources" and "excellent technology and abundant experience," but are also compatible with Japanese foreign policy.[13]

International Finance Corporation (IFC)

In 2007, the IFC's energy strategy focused on the provision of four key services: (1) financing assistance; (2) technical assistance to governments working "to manage environmental and social issues"; (3) supporting local businesses; and (4) addressing governance issues through technical support and multilateral forums.[14] At the time, the IFC's strategy also contained a relatively explicit expression of some of its specific priorities, namely that "[w]e give particular focus to . . . projects in Africa, and to gas investments."[15]

By 2012, the IFC's approach was largely the same as it had been in 2007, with its services remaining focused on the extension of financing for private-sector clients, and the provision of technical assistance to governments. The five-year intervening period did, however, see one notable addition, namely new language highlighting the importance of "transparency and governance to combat corruption."[16] The next four years between the 2012 and 2016 annual reports saw a similar pattern of refinement. However, judging by the budget, the importance of energy—or at least the "oil, gas, and mining" component—has declined in both relative and absolute terms since 2007. While oil, gas, and mining commitments accounted for 11 percent of total commitments in 2007 (or $2.794 billion), that share would fall to 5.28 percent ($2.392 billion) in 2012, before rising slightly to 5.34 percent ($2.780 billion) in 2016.[17]

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[11] Japan International Cooperation Agency, "JICA's Position Paper on SDGs," 7.
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Ibid.
[16] International Finance Corporation (IFC), *IFC Annual Report 2012* (Washington, DC: IFC, July 2012), 13, https://www.ifc.org/wps/wcm/connect/2be4ef804cacfc298e39cff81ee631cc/AR2012_Report_English.pdf?MOD=AJPERES.
[17] Uses the "Committed portfolio by industry," "Committed portfolio," and "FY16 committed portfolio" metrics from the 2007, 2012, and 2016 annual reports, respectively.

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African Development Bank (AfDB)

Composed of the African Development Fund (ADF), the Nigeria Trust Fund (NTF), and the eponymous African Development Bank (AfDB), the African Development Bank Group is one of the most significant lenders on the continent. Within the energy sphere, the AfDB's activities are largely contained under the Light Up and Power Africa heading—one of the bank's five development priorities known as the "High 5s"[18]—which is in turn guided by a variety of overlapping frameworks established by "the new deal on energy for Africa," a partnership-driven initiative to achieve no less than "universal access [to energy] by 2025—100 per cent access in urban areas, [and] 95 per cent access in rural areas."[19] Structurally, this New Deal has four essential building blocks: (1) the buildout of additional on-grid generation capacity; (2) the construction of off-grid generation to reach rural inhabitants; (3) accelerating the building of transmission and distribution lines; and (4) broadening access to clean cooking stoves.[20] Although the bank notes that its timeline for universal access is notably more aggressive than those advanced by other major international initiatives such as SE4ALL or the seventh SDG, it argues that this more rapid approach is necessary, as "business as usual will not change the energy outlook for Africa . . . [because] population growth will absorb most of the new connections."[21]

This emphasis on access is also reflected in the bank's all-of-the-above approach to energy investment, which while cognizant of environmental concerns, is "energy resource neutral, using renewables and non-renewables alike, and technology neutral."[22] Although the precise composition of the continent's future energy mix is uncertain, the AfDB's strategy documents make repeated references to the rapid electrification programs enacted by Bangladesh, Vietnam, and China—all of which pursued comparable all-of-the-above development strategies that proved heavily reliant on the exploitation of both renewable and nonrenewable sources of energy. According to the bank's 2016 *The New Deal on Energy for Africa Draft Report*, the Chinese example is particularly noteworthy as "Africa needs to achieve just one-third of China's annual capacity until 2025 to have sufficient energy to 'light up and power Africa.'" And while the AfDB has noted the need to pursue an electrification approach that is at least nominally greener than the Chinese example by "complementing coal- and gas based technologies with renewable energy,"[23] bank officials maintain that energy access will remain the organization's priority, with then-President Donald Kaberuka

[18] Akinwumi Adesina, "Inaugural Speech: African Development Bank," African Development Bank, September 2015.
[19] Stefan Nalletamby et al., "The Bank Group Strategy for the New Deal on Energy for Africa 2016–2025," African Development Bank, June 2016, 1, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Bank_s_strategy_for_New_Energy_on_Energy_for_Africa_EN.pdf.
[20] African Development Bank (AfDB), "The New Deal on Energy for Africa Draft Report," January 2016, 5, https://www.afdb.org/en/news-and-events/a-new-deal-on-energy-for-africa-power-potential-and-partnership-15310/.
[21] Ibid., 14.
[22] Akinwumi Adesina, "A New Deal on Energy for Africa—Power, Potential, and Partnership," AfDB, January 21, 2016, https://www.afdb.org/en/news-and-events/a-new-deal-on-energy-for-africa-power-potential-and-partnership-15310/.
[23] AfDB, "The New Deal on Energy for Africa Draft Report," 25.

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stating in 2015 that "to every single African country . . . the biggest impediment to economic growth is energy, and we don't have this kind of luxury of making this kind of choice."[24]

The increasing importance of energy in the bank's lending priorities can also be seen in both the structure and magnitude of the organization's lending approvals. While in 2006 the bank's energy activities were largely confined to the "power supply" category—itself a subsector of the larger "infrastructure" sector—in 2016 the area was rebranded as the "light up and power Africa" sector as part of the "high 5s" reform, which made energy one of the bank's five key priorities, alongside promoting agriculture and rural development, accelerating industrialization, enhancing regional integration, and improving quality of life. Since 2006, the AfDB's energy "approvals"—a blanket term consisting of loans, grants, debt reductions, equity participations, guarantees, and various loan preparation services—has also grown in both absolute and relative terms, from $252 million in 2006 (6.3 percent of total approvals)[25] to $2.024 billion[26] (18.7 percent) in 2016[27]—although at least some of this growth is probably attributable to the reordering of accounting classifications as part of the aforementioned "High 5s" reforms.

Asian Infrastructure Investment Bank (AIIB)

The AIIB's energy investment is designed around six principles: "Principle 1: Promote energy access and security"; "Principle 2: Realize energy efficiency potential"; "Principle 3: Reduce the carbon intensity of energy supply"; "Principle 4: Local and regional pollution management"; "Principle 5: Catalyze private capital"; and "Principle 6: Promote regional cooperation and connectivity."[28] It should, however, be noted that these principles will likely change in the future, and the AIIB has cautioned that the six principles are only meant to "guide the build-up of the Bank's energy portfolio during the early years of operation."

The bank's strategy can also be viewed through a sectoral lens, with the AIIB stating that its "process for selecting projects will focus on projects that, among others: improve country and regional activity; promote efficiency along the supply chain; and use proven, transformational, low carbon-intensity technologies that are economically and financially viable."[29] The bank does, however, stress that it isn't necessarily opposed to projects that rely on fossil fuels, writing that it "would finance investments that are demonstrably compatible with a country's transition toward sustainable, low-carbon energy" and that, for example, "[c]arbon efficient oil and coal-fired power plants would be considered if they

[24] Reed Landberg, "African Development Bank defends lending to support coal power over 'expensive' solar, wind," *Mail & Guardian Africa*, March 19, 2015, http://mgafrica.com/article/2015-03-19-african-development-bank-defends-lending-to-support-coal-power-over-expensive-solar-wind.
[25] African Development Bank and African Development Fund, *Annual Report 2006* March 17, 2007, xxiv, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/AfDB%20Group%20Annual%20Report%202006.
[26] Assumes a 0.744 UAC / USD exchange rate for 2016. Exchange rate data from AfDB's 2016 Annual Report.
[27] AfDB, *Annual Report 2016* (Abidjan, Cote d'Ivoire: AfDB, May 2017), 44, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/AfDB_Annual_Report_2016_EN.pdf.
[28] Asian Infrastructure Investment Bank (AIIB), "AIIB Energy Sector Strategy: Sustainable Energy for Asia Discussion Draft for Consultation," January 2017, 17, https://www.aiib.org/en/policies-strategies/strategies/.content/index/Energy-Strategy-Discussion-Draft.pdf.
[29] Ibid.

replace existing less efficient capacity or are essential to the reliability and integrity of the system, or if no viable or affordable alternative exists in specific cases."[30]

U.S. Agency for International Development (USAID)

In 2012 USAID self-described its energy projects as performing five key tasks: (1) supporting the construction and rehabilitation of infrastructure; (2) improving the overall regulatory climate to boost energy-sector performance and increase private-sector participation and investment; (3) enhancing the operational and commercial performance of energy firms and utilities; (4) promoting increased energy trade; and (5) helping countries reduce their overall carbon emissions.[31]

The relative importance of energy was arguably elevated between 2012 and 2016, if the agency's changed strategic goals are any indication. By 2016, energy had assumed a more central role, with strategic goal three explicitly calling for the agency to "promote the transition to [a] low-emission, climate resilient world while expanding access to sustainable energy." The magnitude of energy-related expenditures, however, appears to have fallen, with USAID net spending on "infrastructure"—the sector under which all energy projects fall—falling from $759 million in 2012 to $530 million in 2016—although it is not clear from the official estimates whether this larger decline also occurred within the energy subcategory.[32]

Inter-American Development Bank (IDB)

The IDB has changed little since 2006 in terms of both the scope and the thematic purpose of its energy investment strategy. In reading the IDB's 2006 annual report, three elements seem particularly prominent: (1) the need for projects designed "to help mitigate the impact of high oil prices; (2) the repeated emphasis placed on improving the reliability of energy products and services in the region; and (3) the emerging importance of sustainability in the region's energy practices" Taken together, these energy programs comprised $1.044 billion worth of the bank's 2006 investment portfolio, compared to $548 million in 2016.[33]

Thematically, today's energy program seems to maintain the same commitments to affordability, reliability, and sustainability, but with an added emphasis on energy as a tool for furthering regional economic integration—namely through improvements to regional infrastructure and harmonizing

[30] Ibid.
[31] U.S. Agency for International Development (USAID), "USAID Energy," 2018, https://web.archive.org/web/20120702014042/https:/www.usaid.gov/what-we-do/economic-growth-and-trade/infrastructure/energy.
[32] USAID, *Agency Financial Report Fiscal Year 2012* (Washington, DC: USAID, November 2012), 31, https://www.usaid.gov/sites/default/files/documents/1868/afr12.pdf; USAID, *Agency Financial Report Fiscal Year 2016* (Washington, DC: USAID, November 2016), 31, https://www.usaid.gov/sites/default/files/documents/1868/USAIDFY2016_AFR_508.pdf.
[33] Inter-American Development Bank (IDB), *Annual Report 2006* (Washington, DC: IDB, January 2007), 43, https://publications.iadb.org/bitstream/handle/11319/1513/IDB%20Annual%20Report%202006.pdf?sequence=1&isAllowed.

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energy regulations[34]—improving public governance, and addressing inequality.[35] The bank's strategy is also clearly cognizant of Latin America and the Caribbean's energy security challenges, with regular references to the importance of diversifying not only the region's energy suppliers, but also its mix of fuel types.[36] The economic value of a project is not, however, the only arbiter of a given project's worth, and the IDB has repeatedly reaffirmed its commitment to environmental and sustainability metrics,[37] and currently requires the completion of Environmental (and Social) Impact Assessments for projects "with potentially substantial environmental and social impacts" by the borrower, which are then further reviewed by the IDB.[38] While no explicit energy-specific strategy is promulgated in the IDB's annual report, the IDB regularly references its energy work in terms of its linkages to other larger multilateral initiatives, namely the UN's SE4ALL and the Canadian Extractive Sector Facility.

Norwegian Agency for Development Cooperation (NORAD)

Although documents outlining older energy policy frameworks are scant, NORAD does maintain a detailed database charting expenditures on energy and its various subcategories.[39] By plotting these values over time, several trends become clear. First, spending on Environment and Energy has grown significantly in absolute terms, from NOK 723 million ($82.1 million[40]) in 2000, to NOK 3.604 billion ($428.6 million[41]) in 2016—an almost fivefold increase. Second, of the various components of NORAD spending, Environment and Energy has been among the fastest growing, with its share of development aid growing from 5.6 percent in 2000 to 21.3 percent in 2013, before settling at a still-significant 9.8 percent in 2016. Third, while spending on the environment was roughly equal to spending on more conventional energy supply and distribution programs for much of the 2000s, by 2009 this parity had broken down, with General Environmental Protection's share of the overall Environment and Energy budget growing from 40 percent in 2008 to 75 percent in 2009, 74 percent in 2014, and 82 percent in 2016.[42]

[34] IDB, "Update to the Institutional Strategy 2016–2019," 2016, http://www20.iadb.org/intal/catalogo/PE/2015/15841.pdf.
[35] IDB, *2016 Annual Report* (Washington, DC: IDB, April 2017), 6, https://publications.iadb.org/bitstream/handle/11319/8218/Inter-American-Development-Bank-Annual-Report-2016-The-Year-in-Review.pdf?sequence=4&isAllowed=y.
[36] Jed Bailey, *Inter-fuel Competition in Electricity Generation: A Latin American & Caribbean Experience* (Washington, DC: IDB, December 2012), http://services.iadb.org/wmsfiles/products/Publications/37660032.pdf.
[37] IDB, "Corporate Results Framework 2016–2019: Revised Version," 2016, http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=39981281.
[38] IDB, "Environmental (and Social) Impact Assessments (EIAs)," 2017, https://www.iadb.org/en/projects/environmental-impact-assessments-eias%2C18890.html.
[39] Norwegian Agency for Development Cooperation (NORAD), "Norwegian Aid Statistics," 2017, https://www.norad.no/en/front/toolspublications/norwegian-aid-statistics/?tab=history.
[40] Assumes an 8.81 NOK / USD exchange rate for 2000. Exchange rate data from Federal Reserve Economic Data (FRED).
[41] Assumes an 8.39 NOK / USD exchange rate for 2016. Exchange rate data from FRED.
[42] Assumes a 1.57 USD/GBP (British pound) exchange rate for 2009/2010, a 1.59 USD/GBP rate for 2012/2013, and a 1.65 USD/GBP rate for 2014/2015. Exchange rate data from FRED.

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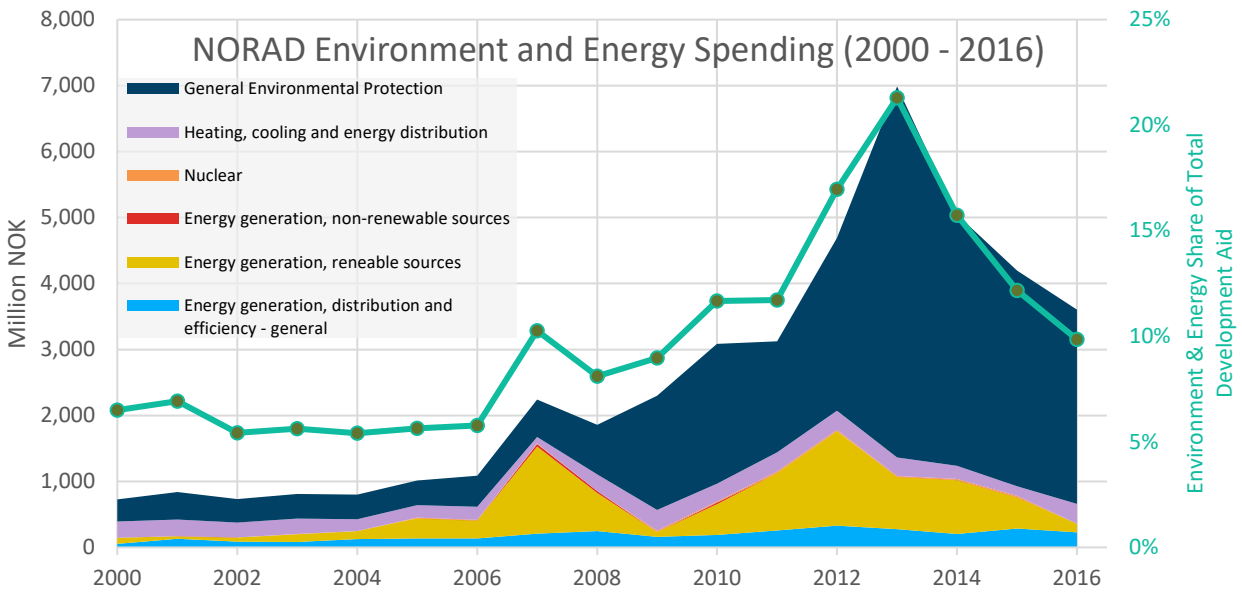

Fourth, of the five non-environmental programs, NORAD has generally prioritized programs that facilitate the adoption of renewables, with spending on its "energy generation non-renewable sources" category (depicted in red) never rising above 1.8 percent of the environment and energy budget, as it did 2007. Finally, and on the other hand, spending on renewable generation has proved particularly volatile over the past two decades, declining from 13 percent of the environment and energy budget in 2000 to 8 percent in 2002, skyrocketing to 59 percent in 2007, collapsing to 3 percent in 2009, rising again to 31 percent in 2012, and finally coming to rest at 4 percent in 2016.

UK Department for International Development (DFID)

Prior to 2016, references to an energy-specific policy were relatively rare, and were generally limited to actions intended to combat climate change.[43] Under this framework—which appears to have been heavily influenced by the MDGs—energy poverty was envisioned not merely as a question of access to electricity, but of access to clean electricity. To measure this, projects were assessed on three metrics: (1) the "number of people supported by DFID programmes to cope with the effects of climate change"; (2) the "number of people with improved access to clean energy"; and (3) the "number of hectares where deforestation . . . [has] been avoided."

Today's DFID energy programming incorporates two additional frameworks: DFID's Single Departmental Plan—focusing on the linkages between energy poverty and growth—and the Energy Africa Initiative—which is designed to address energy poverty with an emphasis on the household solar market in Africa. According to DFID's official estimates, spending on energy—as measured by gross bilateral official development assistance (ODA) administered by DFID—has risen over time in

[43] UK Department for International Development (DFID), *Annual Report and Accounts 2013–14* (London: DFID, July 2014), 9, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/331591/annual-report-accounts-2013-14a.pdf.

both absolute and relative terms. During FY 2009/2010, for instance, DFID energy spending totaled £52 million ($81 million, or 1.05 percent of total ODA), while in 2012/2013 it grew to £74 million ($117 million, or 1.06 percent of ODA) before rising again to £106 million ($174 million, or 1.47 percent of ODA) in 2014/2015.[44]

[44] DFID, *Annual Report and Accounts 2015–16* (London: DFID, July 2016), 153, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/538878/annual-report-accounts-201516a.pdf.

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Appendix: Methodology

Introduction

Our work reports three kinds of estimates: (1) a Total Spending figure, which encompasses all spending, energy or otherwise, by the organization, whether in the form of loans, grants, investments or other commitments; (2) an All Energy Spending estimate, which represents the sum of all spending directed towards energy projects; and (3) estimates of Category Spending, which decomposes the All Energy Spending into its constituent energy parts as defined by each organization. Generally speaking, the three kinds of estimates are produced using either a "top down" or a "bottom up" approach. Under the top- down approach, the estimates are collected using the already-aggregated figures released by a given organization, and are usually taken directly from a group's annual report. Under a bottom-up approach, the estimates are created by first obtaining project-level data, and then summing this granular data using the organization's own classification scheme to produce a total or subtotal.

Because the development groups surveyed by our research do not adhere to any uniform reporting scheme, the "best estimates" we report are collected using what we consider the best approach possible given a development group's particular circumstances. As a result, estimates for a development group can include both bottom-up and top-down estimates, as shown in Table 1. As a corollary, this also means that the totals may not be mathematically consistent: for instance, if a bottom-up approach is used to calculate total spending for the World bank, it yields a different number than the World Bank reports in its own documents, likely due to double counting, differences in classification protocols, or the timing of projects.

Asian Development Bank (ADB)

All three of the estimates for the ADB were produced using the bottom-up methodology. While a top- down approach could have been employed for the All Energy Spending and Category Spending estimates, the estimates produced by this approach were not significantly different from the bottom-up approach, differing by 1.00 percent on Total Spending, and 0.40 percent on All Energy Spending." We thus elected to use a bottom-up approach for all three groups of estimates in the interest of methodological consistency.

For the Total Spending estimate, data was first pulled from the ADB's Appendix 2, Sovereign Approvals, 2016 and Non-Sovereign Approvals.[45] These projects' Total ADB Approvals were then summed to arrive at the Total Spending estimate. For the All Energy Spending estimate, this data was then filtered to include only those projects falling under the Energy sector heading, and then

[45] Asian Development Bank (ADB), "Annual Report 2016: Data Attachment (Sovereign Approvals 2016)," 2017, https://www.adb.org/sites/default/files/institutional-document/237881/od-appendix2.xlsx.

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summed. Because ADB energy projects are only coded with a general "Energy" tag and lack specific sectoral codes, for the Category Spending estimates, we chose to create five artificial categories to enable some degree of comparability: (1) Fossil Fuels, which consisted of any project that supported the development, refinement, or distribution of any nonrenewable hydrocarbon resource such as coal, oil, and natural gas; (2) Capacity Building, which consisted of any project that involved outlays intended to support the development of government or institutional capabilities in the energy sector; (3) Transmission and Distribution, for projects related to the movement of energy—mostly electricity—from production sites to consumption locations, with the notable exception of pipelines and natural gas distribution lines, which were included under the Fossil Fuels heading; (4) Renewables, for projects concerned with the production or transformation of nuclear, hydro, biomass, solar, wind, geothermal, and tidal resources; and (5) Other, for any remaining projects. We then classified projects with these artificial codes using our best judgment, the results of which can be seen in the underlying data.

World Bank

Figures for Total Spending ($45.900 billion) and All Energy Spending ($7.202 billion) were both drawn from the World Bank annual report for FY 2016, which covers a period from July 1, 2015, to June 20, 2016, and does not include projects of other World Bank Group organizations. For the Category Spending estimates, data was first extracted using the bank's data portal.[46] The data was filtered using the World Bank API (application programming interface) to include all data with an approval date between January 1, 2016, and December 31, 2016. We then applied a selective filter one-at-a-time to retrieve only those projects with a given category code. This approach leads to some double counting, and provides an energy subtotal of $17.965 billion. According to the World Bank 2016 annual report, which covers a slightly different timeframe of July 1, 2015, to June 30, 2016, the International Bank for Reconstruction and Development (IBRD) lent $4.557 billion, while the IDB lent $2.645 billion, bringing total World Bank energy lending to $7.202 billion. If the project-specific data is tallied over the same period of July 1, 2015, to June 30, 2016, energy and extractives Commitments totals $11.094 billion.

Japan International Cooperation Agency (JICA)

All of three of the estimates for JICA were produced using the top-down methodology. While JICA does not report project-level data, Table 11 of the JICA annual report[47] provides a composition of assistance by sector in FY 2015. That it is unfortunate that this data corresponds to a fiscal, it is the only source of JICA data. To calculate Total Spending, we took the sum of all technical cooperation, loan aid, and grants in 2016. To calculate All Energy Spending, we took the sum of the Energy, Electric Power and Gas, and Commodity Loans. The subtotals for these individual sectors were then used to calculate the Category Spending estimates.

[46] World Bank, "Projects & Operations," 2018, http://projects.worldbank.org/advancedsearch.
[47] Japan International Cooperation Agency (JICA), "Annual Reports—Data and Information, Budget," 2017, https://www.jica.go.jp/english/publications/reports/annual/2016/index.html.

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International Finance Corporation (IFC)

All three of the estimates for the IFC were produced using the bottom-up methodology. First, data was pulled from the IFC Investment Services portal.[48] This data was then filtered to only include projects approved during calendar year 2016. Next, the data was culled of any duplicate projects using the Project Number identifier. The data was then summed to create the Total Spending estimate. For the All Energy Spending estimate, the data was then filtered to include only those that were categorized as falling into the Global Infrastructure & Natural Resources department. These projects were then summed to create the All Spending Estimate. For the Category Spending estimates, the projects belonging to the Global Infrastructure & Natural Resources department were then filtered and summed according to their sector classification. However, some projects that fell into the Infrastructure and Oil, Gas, and Mining sectors were included in departments other than Global Infrastructure & Natural Resources. In the interest of consistency, these projects were unfortunately excluded from the category estimates. However, and despite this exclusion, our estimate of the IFC's total spending was 22 percent higher than the IFC's own estimate, while our estimate for Energy Spending was 24 percent higher. We suspect that the difference may be due to our use of calendar year data—rather than the IFC's preference for fiscal year data—and inconsistent or duplicative coding of the Infrastructure; Oil, Gas, and Mining; and Global Infrastructure & Natural Resources categories.

African Development Bank Group (AfDB)

The underlying data for All Energy and Power Projects was scraped from the AFDB's project portfolio.[49] In cases where a projects approval date was unclear, we elected to conduct secondary research to estimate when the project or loan was obligated or disbursed. These projects—denoted by an approval date of January 1, 2016—represented $861 million worth of commitments, spread across four items. Because the AfDB project portfolio does not disclose the category or grouping to which each energy project belongs, the projects were assigned one of five artificially created categories based upon our interpretation of AfDB project descriptions and, when necessary, secondary sources. These categories are the same as those used for the ADB: (1) Fossil Fuels, which consisted of any project that supported the development, refinement, or distribution of any nonrenewable hydrocarbon resource such as coal, oil, and natural gas; (2) Capacity Building, which consisted of any project that involved outlays intended to support the development of government or institutional capabilities in the energy sector; (3) Transmission and Distribution, for projects related to the movement of energy—mostly electricity—from production sites to consumption locations, with the notable exception of pipelines and natural gas distribution lines, which were included under the Fossil Fuels heading; (4) Renewables, for projects concerned with the production or transformation of nuclear, hydro, biomass, solar, wind, geothermal, and tidal resources; and (5) Other, for any remaining projects. The resulting dataset was then filtered to include only those projects approved during

[48] International Finance Corporation (IFC), "IFC Investment Services Projects," February 2018, https://finances.worldbank.org/Projects/IFC-Investment-Services-Projects/efin-cagm.
[49] African Development Bank (AfDB), "Projects & Operations—Project Portfolio," 2017, https://www.afdb.org/en/projects-and-operations/project-portfolio/.

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calendar year 2016, converted (if necessary) into U.S. dollars, and summed along various categorical lines to produce the resulting subtotals. Due to difficulty with the data-scraping process, we did not produce an estimate for the AfDB's Total Spending—only for the Energy Spending and spending on the five energy subcategories. Our estimate for Energy Spending was, however, 22 percent higher than the figure disclosed by the AfDB, which we suspect is largely due to the project portfolios' exclusion of approvals made by the Nigeria Trust Fund and the African Legal Support Fund—both of which were included the AfDB's annual report.

Asian Infrastructure Investment Bank (AIIB)

All three of the estimates for the AIIB were produced using the bottom-up methodology, and there was no difference between the estimates generated by this approach and those generated by a top-down approach using only the AIIB's annual report. For the Total Spending estimate, data was scraped using individual project documents pulled from the AIIB's approved project portal.[50] These projects were then summed to create the Total Spending estimate. To arrive at the All Energy Spending estimate, these projects were then filtered to include only those falling under the Energy sector. This dataset was then further filtered along the Oil and Gas, Hydroelectricity, and Transmission and Distribution identifiers and summed by their respective categories to produce the Category Spending estimates. It should be noted, however, that while the dataset included in this report consists of only those projects occurring between January 16, 2016, and December 31, 2016, the AIIB has only commenced lending in the summer of 2016. As a result, our totals in fact only represent 6, rather than 12, months of lending activity.

U.S Agency for International Development (USAID)

All three of the estimates for USAID were produced using the bottom-up methodology. First, data was compiled from "Foreign Aid Explorer: The official record of U.S. foreign aid, Complete Dataset."[51] This data was then filtered to include only projects approved during FY 2016. It was then filtered to include only those projects classified as "economic assistance"—thereby excluding military assistance—and only those that had USAID as the funding agency. Crucially, we include both obligations and disbursements, and allow for negative values in order to reflect the net flow of capital. The data was then summed to create the Total Spending estimate. For the All Energy Spending estimate, this dataset was then filtered along "dac_sector_name" to include only those Energy Programs. These projects were then summed to create the All Energy Spending estimate. For the Category Spending estimates, this Energy Programs dataset was then filtered along their "dac_purpose_name codes," which were then summed to produce their respective category estimates. This approach yields estimates for Total Spending and Energy Spending that are nearly twice that of USAID's. We suspect that this may be due to a combination of three factors: first, while we include any project with which USAID is the funding agency, we allow any agency—USAID or otherwise—to act as the implementing

[50] Asian Infrastructure Investment Bank (AIIB), "Approved Projects," 2018, https://www.aiib.org/en/projects/approved/index.html.
[51] U.S. Agency for International Development (USAID), "Foreign Aid Explorer: The official record of U.S. foreign aid, Complete Dataset [Data file]," December 2017, https://explorer.usaid.gov/data.html.

agency. From our interpretation of the agency's annual report, this likely differs from the agency's internal accounting method. Second, we postulate that USAID may undercount the full extent of its activities, as the project data contained in the Foreign Aid Explorer records obligations and disbursements made in the fiscal year in which the transactions occur, rather than the fiscal year that the funds were appropriated. As a result, we expect that the timing of the recordkeeping may differ. Finally, due to the lack of any project-specific identifier, we could be double counting some projects—something that USAID may be able to correct for in its internal accounting procedures.

Inter-American Development Bank (IDB)

All three of the estimates for the IDB were produced using the bottom-up methodology. While a top-down approach could have been employed for the All Energy Spending and Category Spending estimates, the IDB's annual report covers only a fiscal year from July 1, 2015, to June 30, 2016, rather than the calendar year. To produce the Total Spending estimate, data was first scraped from the IDB's project data portal,[52] and then filtered to include only projects approved during calendar year 2016. These projects were then summed to create the Total Spending estimate. For the All Energy Spending estimate, this set of 2016 projects was then filtered to include only those projects with an Energy sector code. These projects were then summed to create the All Energy Spending estimate. For the Category Spending estimates, the set of All Energy Spending projects was then filtered along subsector categories provided by the IDB, and then summed to create their respective categorical estimates. The estimates produced by this technique are significantly different from the figures contained in the IDB's annual report, and our estimates for Total Spending and Energy Spending are 54 and 44 percent higher, respectively. We believe that this variation can be attributed to our use of calendar year data rather than the annual report's fiscal year data, which could be particularly important given the high degree of month-to-month variability in the organization's financing.

Norwegian Agency for Development Cooperation (NORAD)

All three of the estimates for USAID were produced using the top-down methodology. While NORAD does not report project-level data, the Norwegian Aid Statistics portal[53] provides the needed Total Spending, All Energy Spending, and Category Spending estimates.

UK Department for International Development (DFID)

All three of the estimates for DFID were produced using the bottom-up methodology. While a top-down approach could have been employed for the All Energy Spending and Category Spending estimates—as both were contained in the organization's "Annual Report and Accounts"—DFID's annual report covers only a fiscal year from April 2015 to March 2016, rather than the calendar year. However, DFID's project-level data only goes up until 2015. Left with a choice between using FY 2016

[52] Inter-American Development Bank (IDB), "Projects" 2017, http://www.iadb.org/en/projects/project-details,1301.html ?query=&adv=true&Status=APP&Country=PR&tab=1&pagePIP=1&pageAPP=1&order=asc&sort=country&page=2.
[53] Norwegian Agency for Development Cooperation (NORAD), "Norwegian Aid Statistics," 2018, https://www.norad.no/en /front/toolspublications/norwegian-aid-statistics/?tab=sector.

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data and CY 2015 data, we chose to use the latter due to (1) the general preference for project-level data; and (2) the ability to control for seasonality in lending patterns.

To arrive at the Total Spending estimate, data was first pulled from the UK government's Data Underlying SID 2016.[54] This data was then filtered to include only projects where DFID served as the Extending Agency. The "net ODA" of the remaining projects were then summed together to create the Total Spending estimate. For the All Energy Spending estimate, this dataset was then narrowed to include only those projects from ODA Broad Sectors 230, 231, 232, 233, and 236. These broad sectors were in turn used to construct the Category Spending subtotals. The estimates yielded by this project-level approach were not significantly different from those found in the department's "Annual Report and Accounts," with our approach overestimating Total Spending by 3.1 percent, and underestimating Energy Spending by 9.2 percent. We suspect that much of this variation can be attributed to the slightly different timespan covered by our approach, as well as possible differences in exchange rate assumptions.

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[54] UK Department for International Development (DFID), *Statistics on International Development 2016* (London: DFID, November 2016), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/572063/statistics-on-international-development-2016a.pdf.