Kate DeAngelis | November 2018

ECA

SUPPORT FOR

COAL

IN THE FACE OF

OECD

FINANCING RESTRICTIONS

Friends of the Earth United States

ECA Support for Coal in the Face of OECD Financing Restrictions

Kate DeAngelis | November 2018

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Introduction

In order to avoid the worst impacts of climate change, no new fossil fuel power plants should have been built after 2017.[1] Despite this, little-known government agencies called export credit agencies (ECAs) are still providing many billions in financing to fossil fuel projects all over the globe. From 2013 to 2015, the world's largest ECAs provided an annual average of USD 38 billion in support of fossil fuels.[2] Eighty-eight percent of ECA support for energy projects went toward fossil fuels, compared to seven percent for clean energy projects.[3]

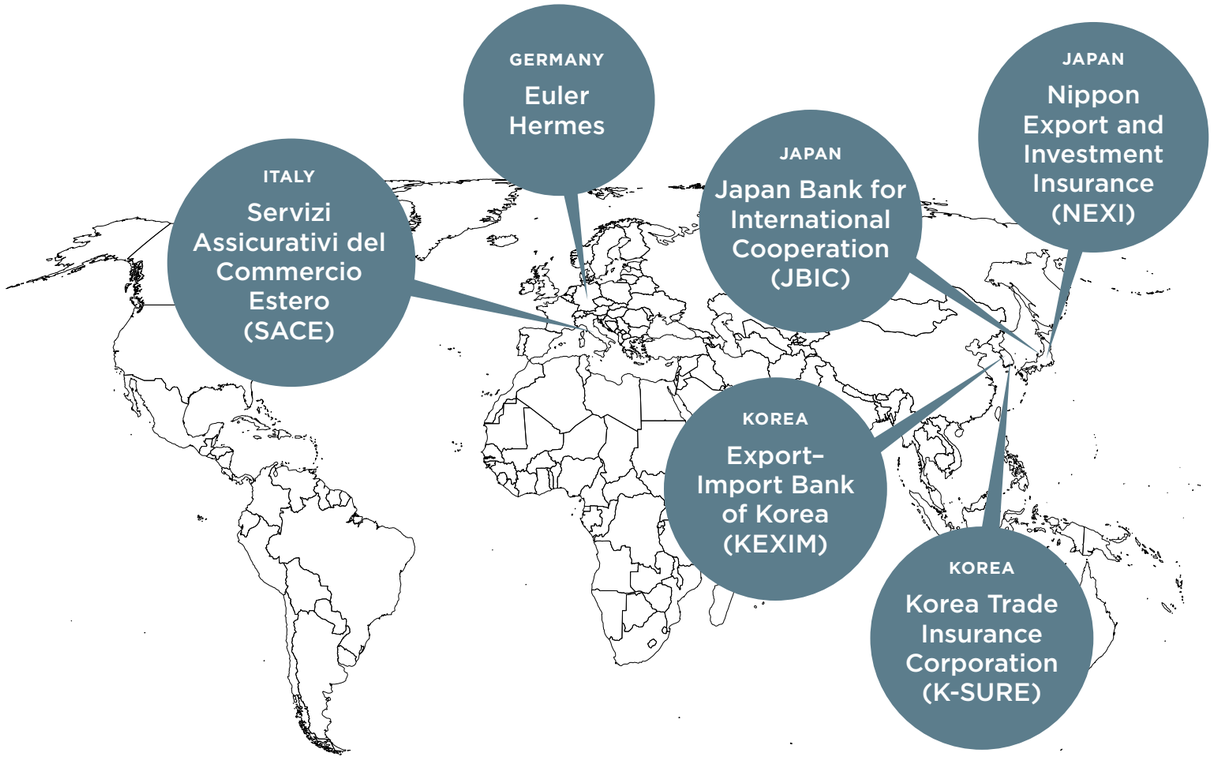
ECAs provide government-backed guarantees, insurance, credits, and loans to support the export of goods and services. This public support leverages private sector investment, making it easier for companies to do business in other countries, especially risky markets. The high credit ratings of ECAs — due to sovereign government backing — and their guarantees for exports make their investment crucial for the realization of many energy projects, particularly those that are high-risk. Consequently, ECAs are driving the financing of fossil fuel production that would not occur otherwise.

This report analyzes potential and current support for coal plants by ECAs in the Organization for Economic Cooperation and Development (OECD), which includes most of the world's largest ECAs (though, notably, not China).

International restrictions placed on coal financing by most of the world's largest ECAs in 2017 should prohibit such coal financing. In flagrant violation of these restrictions, ECAs, especially those of Korea and Japan,[4] could support up to 15 coal plants; ECAs have recently decided to support five and are considering support for ten. Located mainly in Southeast Asia, these plants would have a total capacity of over 14,000 MW. For decades to come, these plants and their supporting infrastructure would lock countries into a dependence on an energy source that pollutes local air and water, worsens the impact of climate change, and has deadly health impacts. In order to avoid these devastating outcomes, ECAs must end support for all fossil fuel projects.

1 Alexander Pfeiffer et al., *The '2°C Capital Stock' for Electricity Generation: Committed Cumulative Carbon Emissions from the Electricity Generation Sector and the Transition to a Green Economy*, Applied Energy (2016), https://www.oxfordmartin.ox.ac.uk/publications/view/2119.
2 Alex Doukas et al., *Talk Is Cheap: How G20 Governments are Financing Climate Disaster* (July 2017), https://foe.org/resources/talk-cheap-g20-governments-financing-climate-disaster/. This figure does not include countries that are not stand-alone G20 members, such as the Netherlands and Norway. The Netherlands, for instance, provides an additional EUR 1.8 billion each year to fossil fuel projects. Niels Hazekamp & Wiert Wiertsema, *Towards Paris Proof Export Support: Why and How the Dutch Government Must Exclude Export Credit Support for Fossil Fuel* (June 2017), http://www.bothends.org/uploaded_files/document/1Paris_Proof_Export_Support_June_2017.pdf.
3 Kate DeAngelis & Alex Doukas, *Financing Climate Disaster: How Export Credit Agencies Are a Boon for Oil and Gas* (Oct. 2017), https://foe.org/resources/financing-climate-disaster-export-credit-agencies-boon-oil-gas/.
4 Two of the Indonesian plants – Cirebon 2 and Tanjung – supported by Korean and Japanese ECAs were among the largest ECA deals to close in Asia in 2017. Sergio Lopez, Jonathan Bell & Tom Nelthorpe, TXF Asia Briefing, p. 6 (2018).

Table 1. Relevant Export Credit Agencies

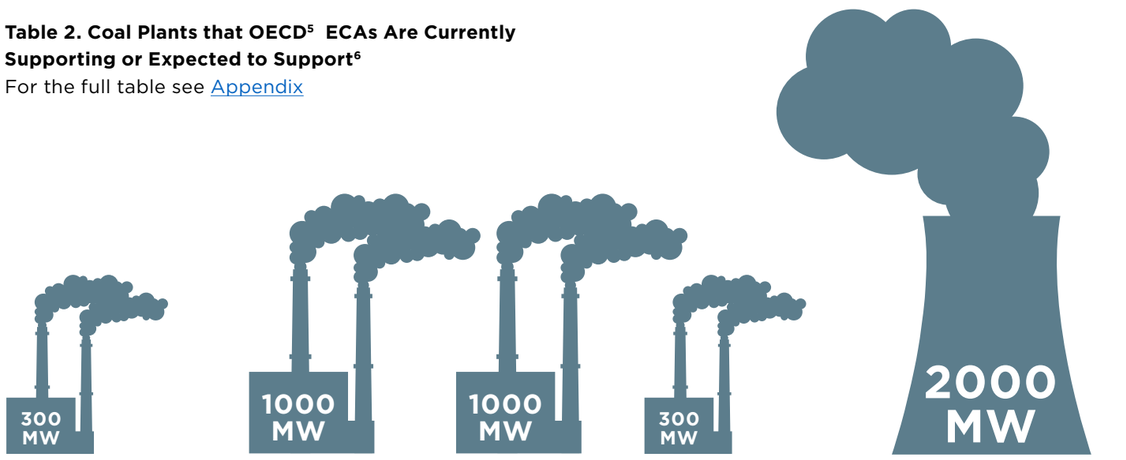


Country	ECA
Germany	Euler Hermes
Italy	Servizi Assicurativi del Commercio Estero (SACE)
Japan	Japan Bank for International Cooperation (JBIC)
	Nippon Export and Investment Insurance (NEXI)
Korea	Export–Import Bank of Korea (KEXIM)
	Korea Trade Insurance Corporation (K-SURE)

Violations of the OECD Coal Sector Understanding

Recent progress has been made in reducing the carbon pollution that ECAs support. In 2015, the OECD Export Credit Group agreed to restrict its support of coal-fired power plants. The restrictions went into effect 1 January 2017. The OECD Sector Understanding on Export Credits for Coal-Fired Electricity Generation Projects (CFSU), as the restrictions are called, prohibits OECD ECAs from supporting coal plants unless they use ultra-supercritical technology or are smaller plants in the poorest countries (less than 300 MW for subcritical and less than 500 MW for supercritical). Despite these restrictions, OECD ECAs may soon support as many as 15 coal plants, despite their highly questionable eligibility for financing (see Table 2).

Table 2. Coal Plants that OECD[5] ECAs Are Currently Supporting or Expected to Support[6]
For the full table see Appendix



Morupule B
ECAs:
JBIC, NEXI, KEXIM
Under consideration

BOTSWANA

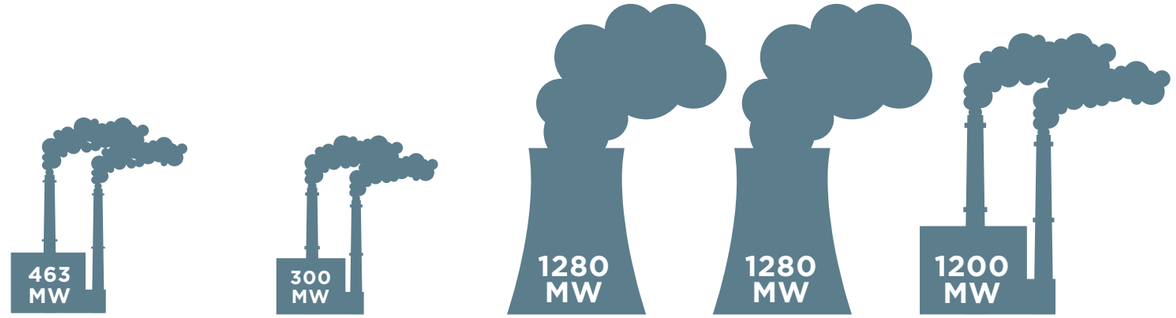
Cirebon Phase 2[7]
ECAs:
JBIC, NEXI, KEXIM
Supported

Cirebon Phase 3
ECAs:
JBIC, KEXIM
Under consideration

Kalselteng 2[8]
ECAs:
JBIC, NEXI
Supporting

Tanjung Jati B Unit 5 and 6[9]
ECAs:
JBIC, NEXI
Supporting

INDONESIA



Ulaanbaatar CHP5
ECAs:
KEXIM, JBIC
Under consideration

MONGOLIA

Moatize
ECAs:
KEXIM
Under consideration

MOZAMBIQUE

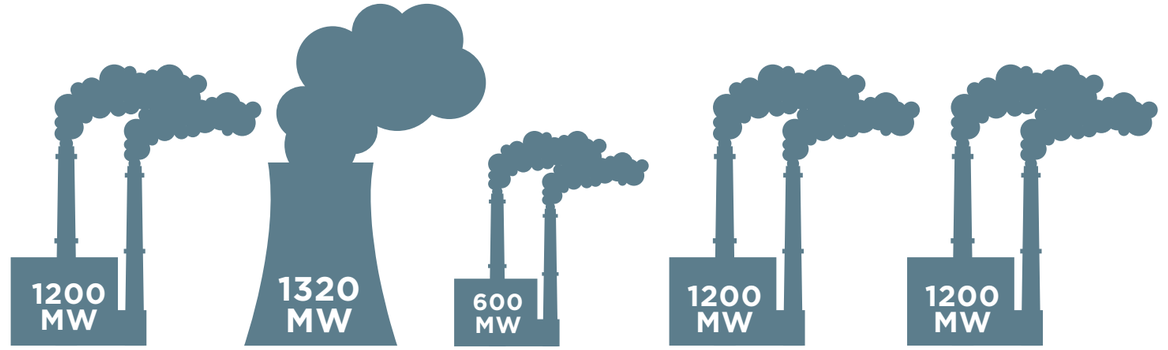
Toyo-Thai (Inn Din)
ECAs:
JBIC
Under consideration

Toyo-Thai (Hpa-an)
ECAs:
JBIC
Under consideration

MYANMAR

Long Phu 1
ECAs:
K-SURE, SACE, Euler Hermes
Under consideration

VIETNAM



Nghi Son 2[10]
ECAs:
JBIC, KEXIM
Supporting

Van Phong I
ECAs:
JBIC
Under consideration

Vinh Tan 4 Expansion[11]
ECAs:
JBIC, NEXI, KEXIM, K-SURE
Supporting

Nam Dinh I
ECAs:
KEXIM
Under consideration

Vung Ang 2
ECAs:
JBIC
Under consideration

VIETNAM

[5] China is not a member of the OECD, so this list does not include the China Export-Import Bank's support or potential support for coal power plants.

[6] The author sent this list of projects to the ECAs in Table 2. The ECAs either confirmed their involvement or refused to comment on their consideration of these projects. If the ECA did not explicitly deny its consideration of a project, the author assumed ECA support was still possible. These e-mail exchanges are on file with the author.

[7] In 2017, Cirebon Phase 2 received financing. JBIC, Project Finance for Expansion of Cirebon Coal-fired Power Plant in Indonesia, Press Release, 14 Nov. 2017, https://www.jbic.go.jp/en/information/press/press-2017/1114-58532.html.

[8] In June 2017, Kalselteng 2 received financing. JBIC, Buyer's Credit for National Power Company of Indonesia: Supporting Export of Facilities for Kalselteng 2 Coal-Fired Power Plant by Japanese Companies, 21 June 2017, https://www.jbic.go.jp/en/information/press/press-2017/0621-55725.html.

[9] In 2017, Tanjung Jati B Units 5 and 6 received financing. JBIC, Project Finance for Re-expansion of Tanjung Jati B Coal-Fired Power Plant in Indonesia, Press Release, 27 Feb. 2017, https://www.jbic.go.jp/en/information/press/press-2016/0227-53953.html [hereinafter "Tanjung Press Release"]; NEXI, Indonesia / Loan Insurance for Expansion of Tanjung Jati B Ultra-supercritical Coal Fired Power Plant, Press Release, 27 Feb. 2017, http://nexi.go.jp/en/topics/newsrelease/2017021701.html.

[10] In 2018, Nghi Son 2 received financing. JBIC, Project Finance and Political Risk Guarantee for Nghi Son 2 Coal-Fired Power Generation Project in the Republic of Vietnam, Press Release, 13 Apr. 2018, https://www.jbic.go.jp/en/information/press/press-2018/0413-010921.html.

[11] In April 2017, Vinh Tan 4 expansion received financing. JBIC, Buyer's Credit for Vietnam Electricity (EVN): Supporting Export of Facilities for Vietnam's First Ultra-Supercritical Coal-fired Power Plant, 11 Apr. 2017, https://www.jbic.go.jp/en/information/press/press-2017/0411-54873.html.

Most of These Coal Plants Violate the OECD CFSU

Most coal plants listed in Table 3 are ineligible for support due to the requirements established under the OECD CFSU.

Table 3. Eligibility of Coal Plants for OECD ECA Financing
For the full table see Appendix

Morupule B
INELEGIBLE
Plant exceeds the 300 MW limit for subcritical coal plants

BOTSWANA

Cirebon Phase 2[12]
ELEGIBLE
Ultrasupercritical

Cirebon Phase 3
ELEGIBLE
Ultrasupercritical

Kalselteng 2
INELEGIBLE
Subcritical coal plant in a non-IDA country

Tanjung Jati B Unit 5 and 6
ELEGIBLE
Ultrasupercritical

INDONESIA

Ulaanbaatar CHP5
INELEGIBLE
Plant exceeds 300 MW limit for subcritical coal plants

MONGOLIA

Moatize
INELEGIBLE
Plant exceeds 300 MW limit for subcritical coal plants

MOZAMBIQUE

Toyo-Thai (Inn Din)
ELEGIBLE
Ultrasupercritical

Toyo-Thai (Hpa-an)
ELEGIBLE
Ultrasupercritical

MYANMAR

Long Phu 1
INELEGIBLE
Supercritical over 500 MW

VIETNAM

Nghi Son 2
INELEGIBLE
Supercritical over 500 MW

Van Phong I
INELEGIBLE
Supercritical over 500 MW[13]

Vinh Tan 4 Expansion
ELEGIBLE
Ultrasupercritical

Nam Dinh I
UNKNOWN
Technology not disclosed

Vung Ang 2
UNKNOWN
Technology not disclosed

VIETNAM

[12] In April 2017, a district court revoked the environmental permission for the Cirebon 2 coal plant. A new permit was submitted to JBIC and NEXI in July 2017. JBIC, Press Release, Project Finance for Expansion of Cirebon Coal-fired Power Plant in Indonesia, 14 Nov. 2017, https://www.jbic.go.jp/en/information/press/press-2017/1114-58532.html.

[13] Pöyry, Press Release, Pöyry awarded owner's engineer services assignment for Van Phong 1 coal-fired power plant project in Vietnam, 13 Aug. 2013, http://www.poyry.com/news/poyry-awarded-owner-s-engineer-services-assignment-for-van-phong-1-coal-fired-power-plant-project-in-vietnam.

1. Technology Requirement

The CFSU establishes a technology requirement that only allows ECAs to support ultrasupercritical coal plants unless the coal plants are located in the poorest countries (referred to as IDA-eligible[14]). Six of the projects in Table 3 are eligible because they are ultrasupercritical plants, even though research has shown that ultrasupercritical plants are only marginally more efficient.[15] Moreover, the CSFU standard for ultrasupercritical — less than 750 grams of carbon dioxide per kilowatt-hour — is above what is normally considered ultrasupercritical — 740 grams of carbon dioxide per kilowatt-hour. Thus, this definition is even less efficient than what is typically considered ultrasupercritical. Six of the projects in Table 3 are eligible because they are ultrasupercritical plants. The technology for another two of the coal plants is unknown, but they would be ineligible unless they are ultrasupercritical because of their size and location. The remaining listed coal plants are ineligible to receive ECA support under the CFSU because they are subcritical or supercritical plants that are either too many megawatts or not located in an IDA-eligible country.

2. Applicable Support

The CFSU applies only to types of financing covered under the OECD Arrangement on Officially Supported Export Credits, which includes export credit guarantees and insurance, direct credit/financing and refinancing, and interest rate support. ECAs could still technically provide other types of support, such as an investment loan, even though this support undermines the purpose and spirit of the CFSU. For example, JBIC supported the Tanjung Jati power plant with a loan agreement for project finance, so the CFSU technically would not have applied to this loan.[16]

3. Environmental and Social Impact Assessment Requirement

The CFSU allows ECAs to support any coal plant for which an environmental and social impact assessment (ESIA) was completed before 1 January 2017 and "acted upon expeditiously." The completeness of many, if not all, of the ESIAs is questionable at best. Furthermore, more than a year and a half has passed since the 2017 deadline; therefore, the ESIAs have not been acted upon "expeditiously" and should not be eligible for this exemption. ECAs are exploiting the ESIA exemption to incorrectly justify their ongoing support for coal plants that would otherwise be ineligible for financing. For example, JBIC is using this exemption in its support of the Nghi Son 2 coal plant in Vietnam. Despite claiming that the ESIA was completed in 2015, JBIC obtained the ESIA in June 2017 and only made it publicly available in February 2018.[17] Similarly, the ESIA for Kalselteng 2 in Indonesia is dated 2015 but was not released on its website until April 2017.[18] The ESIAs for Long Phu 1 and Vung Ang 2 in Vietnam, Moropule in Botswana, and Ulaanbaater CHP5 were provided before 2017,[19] but all clearly lacked essential elements to be considered fully completed ESIAs.[20] No public ESIAs are available for the other ineligible or unknown technology coal plants — Moatize, Nam Dinh 1, and Van Phong 1.

[14] World Bank, Borrowing Countries, http://ida.worldbank.org/about/borrowing-countries (last visited 26 Apr. 2018). International Development Association (IDA) is part of the World Bank. An IDA-eligible country is classified by the World Bank as being among the world's poorest.

[15] Lindee Wong et al., *The Incompatibility of High-Efficient Coal Technology with 2°C Scenarios* (2016), https://www.ecofys.com/files/files/ecofys-2016-incompatibility-of-hele-coal-w-2c-scenarios.pdf. The energy conversion of ultrasupercritical coal plants is only three percent more efficient than supercritical and seven percent more efficient than subcritical. *Id.* at 2. In addition, it is important to note the definition of ultrasupercritical used in the CFSU is even less efficient than what is typically considered ultrasupercritical.

[16] Tanjung Press Release, *supra* note 9. JBIC has since announced that it is applying the OECD Arrangement to all of its support, whether or not the type of support technically is covered.

[17] Marubeni Corp., *Bao Cao Danh Gia Tac Dong Moi Truong* (2015), https://www.jbic.go.jp/ja/business-areas/environment/projects/pdf/60385_2.pdf.

[18] JBIC, Projects whose Loan Agreement was Executed (Projects for which JBIC Received Screening Form after April 1, 2015), https://www.jbic.go.jp/en/business-areas/environment/projects/page.html?ID=54664&lang=en (last visited Sept. 11, 2018).

[19] NEXI, Environment: Information on the Project [16-01], http://nexi.go.jp/en/environment/a/2016062101.html (last visited May 23, 2018); Long Phu 1 Thermal Coal Plant Feasibility Study, https://www.agaportal.de/_Resources/Persistent/2ec4c6beea3308c8e970a5687f01a80fc9f13764/EIA%20Vietnam%20Kohlekraftwerk.pdf (last visited May 23, 2018); JBIC, Projects for Which JBIC Has Already Acquired Environmental Impact Assessment (EIA), https://www.jbic.go.jp/en/business-areas/environment/projects/page.html?ID=49320&lang=en (last visited May 23, 2018); Mott MacDonald, Draft Environmental and Social Impact Assessment - MON: Combined Heat and Power Plant Number 5 Project, Project No. 46915-014 (Oct. 2015), https://www.adb.org/sites/default/files/project-document/175845/46915-014-esia-01.pdf; Asian Development Bank, Combined Heat and Power Plant Number 5 Project: Draft Environmental and Social Impact Assessment (Oct. 2015), https://www.adb.org/projects/documents/mon-combined-heat-and-power-plant-number-5-project-esia.

[20] *E.g.,* Bruce Buckheit, *Smoke and Mirrors: Debunking the Doctored Numbers on Long Phu-1 Greenhouse Gas Emissions* (2017), https://1bps6437gg-8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/2017/10/2017.08.02_SmokeandMirrors-Long-Phu-Emissions-report.pdf; Doug Norlen, *Failure to Comply: How Long Phu 1 Violates Funders' Environmental and Social Policies* (2017), https://1bps6437gg8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/2017/10/2017.08.07_Failure-to-Comply-Long-Phu-Policy-Compliance.pdf.

Table 4. ESIA Status for Non-Ultrasupercritical Coal Plants
For the full table see Appendix

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REQUIREMENT

Morupule B	Kalselteng 2	Ulaanbaatar CHP5	Moatize
Completed: August 2016 **Made public:** Unknown	**Completed:** 2015 **Made public:** April 2017	**Completed:** 2015 **Made public:** Unknown	**Completed:** Unknown **Made public:** Not public
Insufficient ESIAs Inaccurate assessment of solar as an alternative; underestimation of CO2 emissions	**Insufficient ESIAs** No analysis of the alternatives; insufficient detail of the mitigation of air pollution, finding the decrease of ambient air quality to not be an important impact	**Insufficient ESIAs** Only available in draft form	**Insufficient ESIAs** Unknown
BOTSWANA	**INDONESIA**	**MONGOLIA**	**MOZAMBIQUE**

Long Phu 1	Nghi Son 2	Van Phong 1[22]	Nam Dinh I	Vung Ang 2
Completed: Not dated **Made public:** September 2016	**Completed:** 2015 **Made public:** February 2018	**Completed:** Unknown **Made public:** Not public	**Completed:** Unknown **Made public:** Not public	**Completed:** 2011 **Made public:** 2018
Insufficient ESIAs No baseline information, examination of alternatives, identification of cumulative and associated risks and impacts, among other missing elements[21]	**Insufficient ESIAs** No assessment of cumulative impacts	**Insufficient ESIAs** Unknown	**Insufficient ESIAs** Unknown	**Insufficient ESIAs** No consultation with local communities
VIETNAM				

[21] Norlen, *supra* note 20.

[22] The government approved the ESIA in 2018. *SĐn sàng cho NhiĐt* ĐiĐn *Vân Phong 1*, Khanh Hoa Online, 18 Mar. 2018, http://www.baokhanhhoa.vn/kinh-te/201803/san-sang-cho-nhiet-dien-van-phong-1-8072701/.

Some Private Institutions Leading the Way Ahead of ECAs

Public support for coal projects by ECAs stands in contrast to the actions of some private institutions. As of 1 June 2018, 19 banks no longer support coal mines, and 16 banks no longer support coal-fired power plants.[23] The banks that have revised their polices to exclude both coal plants and coal mines include BNP Paribas of France, Deutsche Bank of Germany, and ING of the Netherlands.[24]

Even those banks that still allow support for more efficient coal plants have pulled out of projects; for example, ANZ decided not to support the Song Hua 1 coal plant in Vietnam after adopting a policy restricting coal financing.[25] In addition, Allianz of Germany and Nippon Life Insurance of Japan are refusing to provide insurance for the construction and operation of coal mines and coal plants.[26]

Private banks are declining to support a number of the specific projects that ECAs are supporting. While JBIC and KEXIM pledged their support for Nghi Son 2 in Vietnam, Standard Chartered decided against backing the project, finding that the coal plant was too dirty.[27] In addition, the French banks, Société Générale and Crédit Agricole, are not supporting Cirebon 2 and Tanjung Jati B Units 5 and 6 in Indonesia based on their pledges to end support for new coal plants.[28] Meanwhile, JBIC and NEXI are supporting both projects, and KEXIM is supporting Cirebon 2. Finally, new policies at three private Japanese banks — Sumitomo Mitsui Banking Corporation (SMBC), Mitsubishi UFJ Financial Group (MUFG), and Mizuho Financial Group — may force them to revoke their support for Van Phong 1 in Vietnam and Morupule in Botswana.[29]

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[23] For a complete list of banks, see Banktrack, List of Banks that Ended Direct Finance for New Coal Mines/Plants, https://www.banktrack.org/page/list_of_banks_that_ended_direct_finance_for_new_coal_minesplants (last visited 13 Aug. 2018).

[24] BNP Paribas, Newsroom, BNP Paribas dedicates Đ15BN in financing for renewable energy and reinforces its carbon risk management policies, 19 Nov. 2015, https://group.bnpparibas/en/press-release/bnp-paribas-dedicates-e15bn-financing-renewable-energy-reinforces-carbon-risk-management-policies; Danièle Guinot, *BNP Paribas ne financera plus de nouvelle centrale à charbon*, Économie 25 Jan. 2017, http://www.lefigaro.fr/societes/2017/01/25/20005-20170125ARTFIG00351-bnp-paribas-ne-financera-plus-de-nouvelle-centrale-a-charbon.php; Deutsche Bank, News, Amended guidelines for coal financing, 31 Jan. 2017, https://www.db.com/newsroom_news/2017/medien/amended-guidelines-for-coal-financing-en-11466.htm; ING, Newsroom, ING ends new coal financing, continues to reduce coal portfolio, 27 Nov. 2015, https://www.ing.com/Newsroom/All-news/ING-ends-new-coal-financing-continues-to-reduce-coal-portfolio-.htm.

[25] Market Forces, *ANZ's Coal Policy. Weak, but at Least Effective!*, 28 Feb. 2017, https://www.marketforces.org.au/anzs-coal-policy-weak-but-at-least-effective/.

[26] Allianz.com, Statement on Coal-Based Business Models, May 2018, https://www.allianz.com/v_1525407938446/media/press/document/Allianz-statement-on-coal-based-models_EN.pdf; Chisaki Watanabe, *Nippon Life Takes Hard Line in Japan's Anti-Coal Finance Shift*, Bloomberg Environment, 13 July 2018, https://news.bloombergenvironment.com/environment-and-energy/nippon-life-takes-hard-line-in-japans-anti-coal-finance-shift.

[27] Mari Tanao, *Is Japan Finally Turning away from Coal?*, The Japan Times, 30 July 2018, https://www.japantimes.co.jp/opinion/2018/07/30/commentary/japan-commentary/japan-finally-turning-away-coal/#.W3HTProna5s.

[28] Crédit Agricole, Projet de centrale à charbon de Cirebon 2 en Indonésie, https://www.credit-agricole.com/responsable-et-engage/une-strategie-rse-creatrice-de-valeur-pour-le-groupe-credit-agricole-et-de-bien-commun-pour-nos-parties-prenantes/nos-positions/projet-de-centrale-a-charbon-de-cirebon-2-en-indonesie. (last visited 13 Aug. 2018); *Société générale renonce à financer une centrale à charbon en Indonésie*, La Tribune, 3 Jan, 2017, https://www.latribune.fr/entreprises-finance/green-business/societe-generale-renonce-a-financer-une-centrale-a-charbon-en-indonesie-628118.html; Crédit Agricole, Précision du Crédit Agricole sur le projet de centrale à charbon de Tanjung Jati B 2 en Indonésie, https://www.credit-agricole.com/web/index.php/responsable-et-engage/une-strategie-rse-creatrice-de-valeur-pour-le-groupe-credit-agricole-et-de-bien-commun-pour-nos-parties-prenantes/nos-positions/precision-du-credit-agricole-sur-le-projet-de-centrale-a-charbon-de-tanjung-jati-b-2-en-indonesie (last visited 13 Aug. 2018); Isabel Esterman, *French Bank Backs out of Financing Indonesian Coal Plant*, Mongabay, 4 Jan. 2017, https://news.mongabay.com/2017/01/french-bank-backs-out-of-financing-indonesian-coal-plant/.

[29] Market Forces, Coal Cuts: Three Leading Japanese Banks' Coal Policies Rule Them Out of Nearly a Third of New Coal Power Deals, https://www.marketforces.org.au/research/global-coal-finance/japanese-bank-policies/ (last visited 31 Aug. 2018).

Impacts: Pollution, Renewables, Climate Pledges

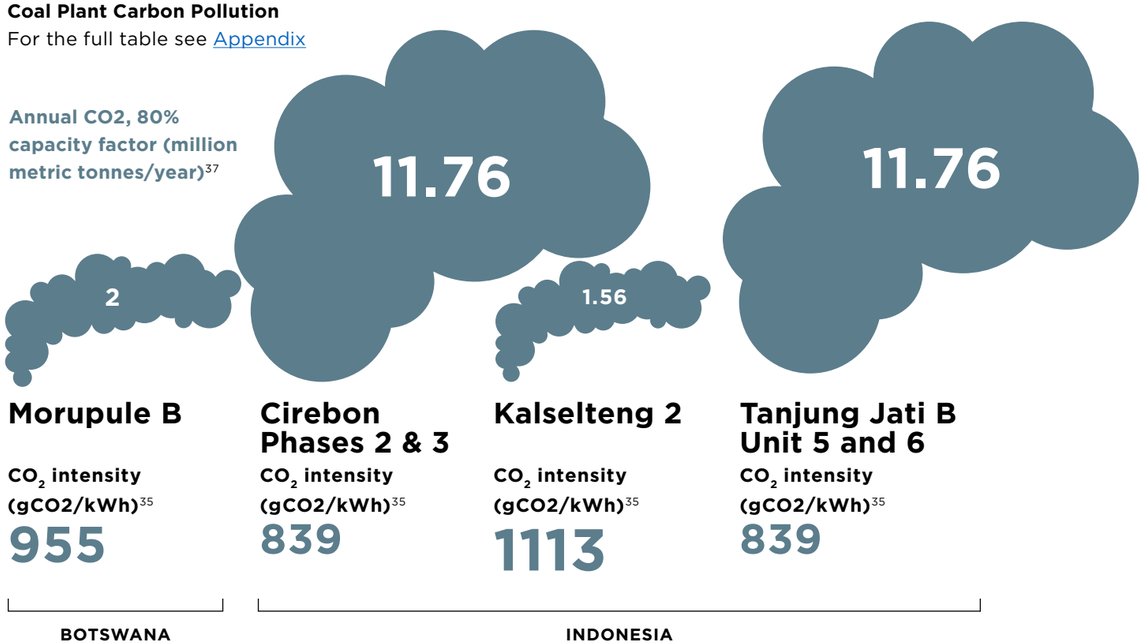
Projected Carbon Pollution

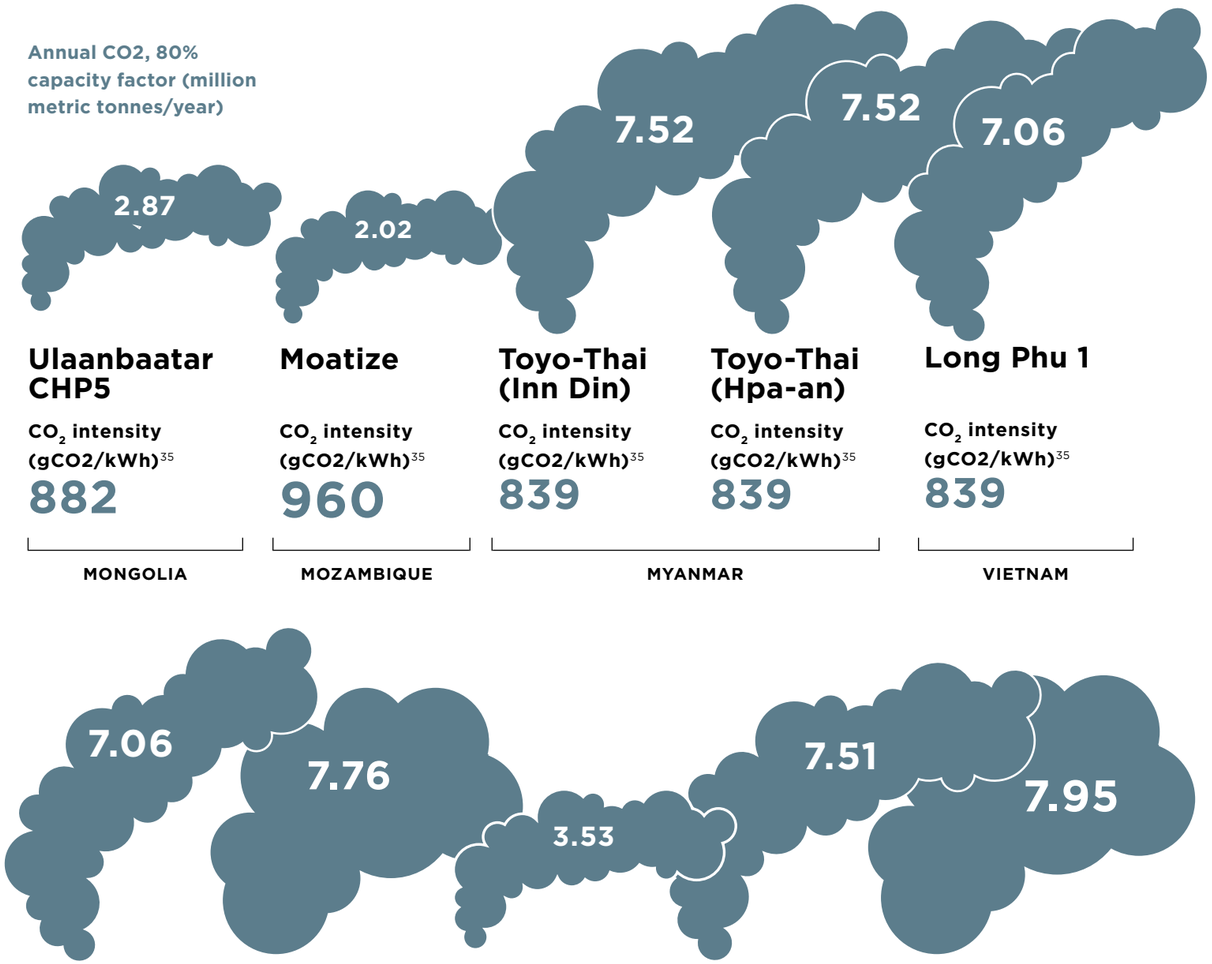
If they move forward, the 15 coal plants that OECD ECAs are currently considering or have decided to support since the coal financing restrictions went into effect will have a devastating impact on the climate. Table 5 lays out their estimated annual carbon dioxide emissions. Twelve are located in Southeast Asia — a region where plans to build new coal plants "spell disaster" for the climate, according to World Bank Group President Jim Yong Kim.[30] At the 80-percent-capacity factor, the total annual emissions are equivalent to more than 18 million cars driven for a year or the per capita emissions of 8.7 million people in Japan and 7.1 million people in Korea.[31] Even at the lower capacity factor, these coal plants would produce as much carbon dioxide pollution as almost 12 million cars driven for a year.[32]

If built, these coal plants would be some of the most polluting power plants in the world. ECA support would actually be moving the world's energy system backwards. The global average emission intensity for new power generation was just over 400 grams of carbon dioxide per kilowatt-hour in 2016.[33] In stark contrast, the average emission intensity for these coal plants is more than twice that, at 881 grams of carbon dioxide per kilowatt-hour. These coal plants would, therefore, make the world's power plant fleet dirtier, increasing the average emission intensity even as the International Energy Agency finds that the world must bring that average down to 100 grams by the mid-2030s.[34]

30 Suzanne Goldenberg, *Plans for Coal-Fired Power in Asia Are 'Disaster for Planet' Warns World Bank*, The Guardian (5 May 2016), https://www.theguardian.com/environment/2016/may/05/climate-change-coal-power-asia-world-bank-disaster.
31 U.S Environmental Protection Agency, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator (last visited 23 May 2018); Janssens-Maenhout, G. et al., Fossil CO2 & GHG Emissions of All World Countries, pp. 116, 191 (2017), http://edgar.jrc.ec.europa.eu/overview.php?v=CO2and-GHG1970-2016&dst=GHGpc.

Table 5. Potential OECD ECA-Supported Coal Plant Carbon Pollution
For the full table see Appendix





32 U.S Environmental Protection Agency, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator (last visited 23 May 2018).
33 International Energy Agency, World Energy Investment 2017 (Aug. 2017), https://www.iea.org/newsroom/energysnapshots/co2-intensity-of-new-power-gen-capacity.html.
34 *Id.*
35 The carbon dioxide intensity is the estimated amount of carbon dioxide (grams) emitted per unit of energy consumed (kilowatt-hour). The estimation is based on the project's planned plant and coal type, with an average value used if plant and/or coal type is unknown. The efficiency and heat rate for different coal plant types are derived from the International Energy Agency, and the emission factor for coal types from the Intergovernmental Panel on Climate Change. More information on the parameters can be found here: https://www.sourcewatch.org/index.php/Estimating_carbon_dioxide_emissions_from_coal_plants. The carbon dioxide intensity estimation includes a 10 percent error band to account for more specific details that can substantially affect intensities, such as (1) the characteristics of the coal, including moisture, fly ash content, and hydrogen content; (2) the actual heat rate of the particular plant; (3) pollution control equipment; and (4) how often the plant is started and stopped.
36 The 52.5-percent-capacity factor is more accurate to calculate a global average because older plants tend to run less often.
37 The 80-percent-capacity figure provides a more accurate estimate for new plants that tend to run more often (up to 90 percent of the time), thereby emitting more carbon pollution.

Other Harmful Air Pollutants and Health Impacts

In addition to carbon pollution, coal plants emit other air pollutants that cause myriad debilitating health impacts. These air pollutants include nitrogen oxide, particulate matter (PM), sulfur dioxide, and dozens of other substances that are hazardous to human health and contribute to leading causes of death: cancer, chronic lower respiratory diseases, heart disease, and stroke.[38]

These pollutants damage the cardiovascular, nervous, and respiratory systems, causing health problems, such as chronic obstructive pulmonary disease (COPD), artery blockages that can lead to heart attacks, asthma attacks from exposure to ozone, permanent heart damage from oxygen deprivation, loss of intellectual capacity, and cerebrovascular disease.

The health damages and other social costs of coal pollution equal up to USD 3.15 trillion annually.[39] The host countries can ill afford these costs. The communities living near these plants often do not have adequate and immediately available medical facilities, nor can they afford the increased hospital visits and medical costs. Moreover, these countries already have high levels of many of the pollutants emitted by coal plants. For example, most of Botswana, Indonesia, Myanmar, and Vietnam have levels of the pollutant PM 2.5 that the World Health Organization has found to cause severe health impacts.[40] Adding more coal plants would expand and increase the dangerous levels of these emissions.

The health damages and other social costs of coal pollution equal up to

USD3.15 trillion

annualy.

[38] Alan H. Lockwood et al., Coal's Assault on Human Health (2009), https://www.psr.org/wp-content/uploads/2018/05/coals-assault-on-human-health.pdf.

[39] International Monetary Fund, Fiscal Affairs Department, *How Large are Global Energy Subsidies? Country-level Subsidy Estimates* (29 June 2015), http://www.imf.org/external/np/fad/subsidies/data/codata.xlsx (total of column F in the "By product (2015)" sheet).

[40] A. van Donkelaar et al., Global Annual PM2.5 Grids from MODIS, MISR and Sea WiFS Aerosol Optical Depth (AOD) with GWR, 1998–2016, Palisades, NY: NASA Socioeconomic Data and Applications Center (2018), https://doi.org/10.7927/H4ZK5DQS; Columbia University, Center for International Earth Science Information Network, Global Annual PM2.5 Grids from MODIS, MISR and Sea WiFS Aerosol Optical Depth (AOD) with GWR, 2015, http://sedac.ciesin.columbia.edu/downloads/maps/sdei/sdei-global-annual-gwr-pm2-5-modis-misr-seawifs-aod/sdei-global-annual-gwr-pm2-5-modis-misr-seawifs-aod-2015.pdf.

Negative Impacts on Renewables

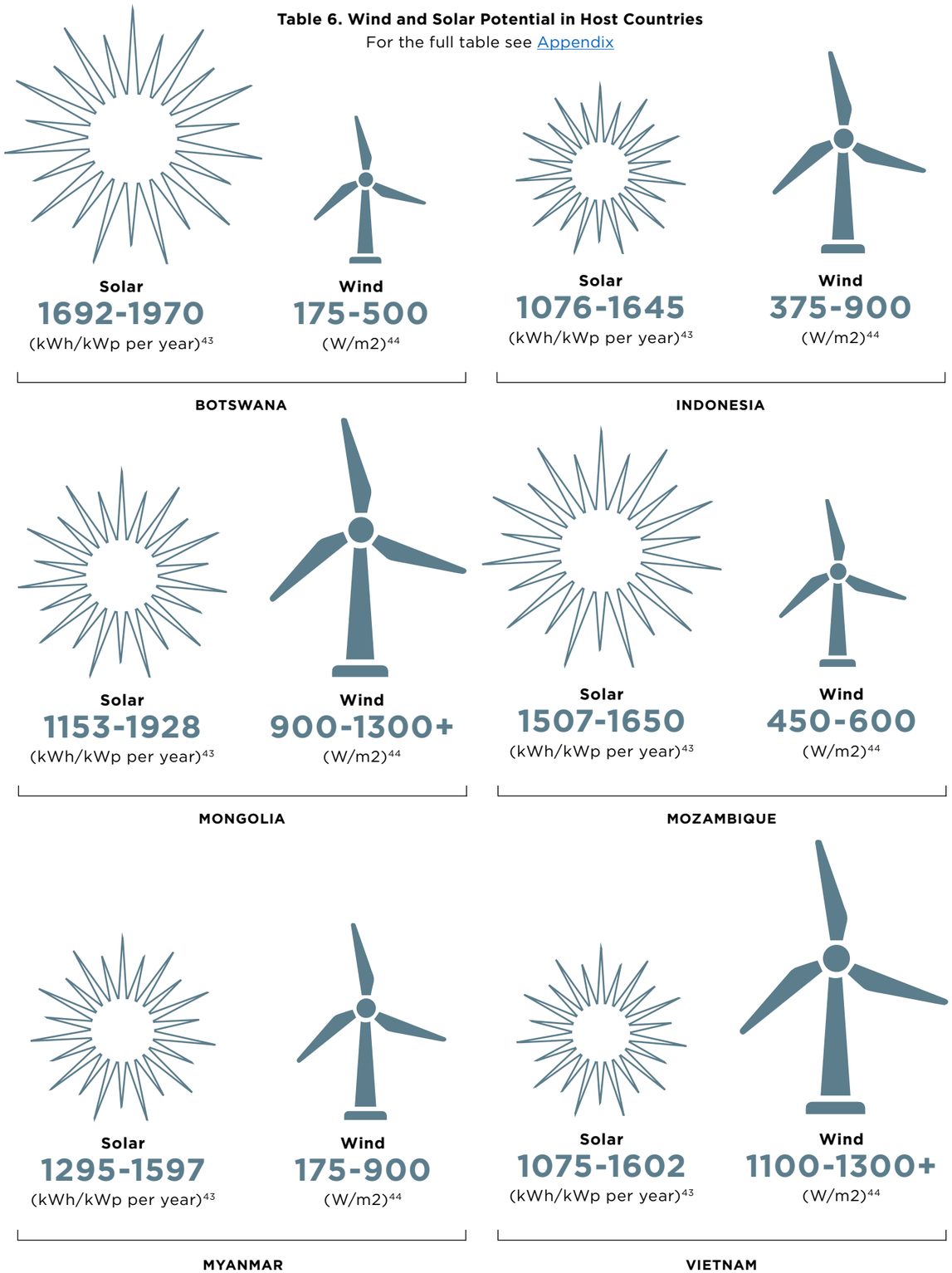
OECD ECAs are supporting these projects even as the host countries have plentiful renewable resources and vast potential for energy efficiency improvements. Solar and wind resources could provide much, if not all, of their energy needs and more efficiently improve access to electricity, especially in rural areas.

This would be far better for the environment, local communities, and economic development. In Vietnam, for instance, the World Bank concluded that increasing energy efficiency and use of renewables would save USD 8.1 billion in spending and USD 17.6 billion in fuel by 2030.[41] Moreover, the World Bank has explicitly recommended the displacement of new coal-fired generation with alternative energies, such as wind and solar.[42] ECAs are letting companies treat developing nations as a dumping ground for uncompetitive projects and technologies to boost profits of the ECA countries' construction and coal turbine manufacturing companies — taking advantage of lower air quality regulations.

Table 6 provides the potential amount of electricity that could be produced from solar and wind in the countries targeted by OECD ECAs for coal development. To put wind resources in perspective, consider India, a global leader in installed wind capacity. India has wind potential at 50 meters of mainly 200 W/m2 and at 200 meters of mainly 400 W/m2,[45] but has installed wind capacity of 32.9 GW.[46] Table 6 reveals that parts of Botswana, Indonesia, Mongolia, Mozambique, Myanmar, and Vietnam have greater wind potential than India. For a comparison of solar resources, Germany has 39. GW of installed solar capacity,[47] but much less solar potential than the countries in line for ECA-backed coal plants. In another example, Los Angeles, which has a solar potential of 1775 kWh/kWp,[48] has the most installed solar of any city in the United States at 349.3 megawatts.[49] All of the coal-targeted countries have either more than, or nearly as much, solar potential as Los Angeles.

Cost is also becoming less of a barrier for solar and wind, even in these countries. This reduction in cost is due to solar technology becoming more efficient at creating electricity and less expensive.[50] The global average cost of wind is USD 0.05 per kilowatt-hour, and in some places it is even as low as USD 0.03, which is roughly the same as for fossil fuel generation.[51] Currently, more than 30 countries have reached grid parity, so that renewables cost the same as fossil fuels; 80 percent of the world is expected to reach grid parity within the next couple of years.[52] In addition, energy storage technologies are becoming more advanced and affordable, which will likely lead to higher percentages of wind and solar in these countries' energy mixes.[53]

Table 6. Wind and Solar Potential in Host Countries
For the full table see Appendix



[41] Audinet et al., Exploring a Low Carbon Development Path for Vietnam, World Bank Group, 2016, http://documents.worldbank.org/curated/en/773061467995893930/pdf/102363-PUB-VN-Low-cost-carbon-date-Jan-20-2016-9781464807190-Box-394380B-PUBLIC.pdf.

[42] *Id.* The Vietnamese government recently established a feed-in tariff of USD 0.0935 per kWh for a 20-year term for both grid-connected and rooftop solar photovoltaic power projects, applicable to projects achieving commercial operation before 30 June 2019. Circular No. 16/2017/TT-BCT.

[43] World Bank Group et al., Global Solar Atlas, http://globalsolaratlas.info/ (last visited 9 Aug. 2018).

[44] World Bank Group et al., Global Wind Atlas, https://www.globalwindatlas.info/ (last visited 9 Aug. 2018) [hereinafter "Global Wind Atlas"]. The potential depends on the height – either 50, 100, or 200 meters – with the wind potential usually being higher at greater heights.

[45] *Id.*

[46] Global Wind Energy Council, Global Wind Statistics 2017, p. 2 (14 Feb. 2018), http://gwec.net/wp-content/uploads/vip/GWEC_PRstats2017_EN-003_FINAL.pdf.

[47] World Energy Council, Solar in Germany, https://www.worldenergy.org/data/resources/country/germany/solar/ (last visited 9 Aug. 2018).

[48] World Bank Group et al., Global Solar Atlas, http://globalsolaratlas.info/?c=34.139088,-114.301758,8&s=34.011689,-118.185425 (last visited 24 May 2018).

[49] Abi Bradford & Bret Fanshaw, *Shining Cities 2018: How Smart Local Policies Are Expanding Solar Power in America* (Apr. 2018), https://environmentamerica.org/sites/environment/files/reports/EA_shiningcities2018_scrn%20%282%29.pdf.

[50] World Economic Forum, Renewable Infrastructure Investment Handbook: A Guide for Institutional Investors, p. 5 (2017), http://www3.weforum.org/docs/WEF_Renewable_Infrastructure_Investment_Handbook.pdf.

[51] International Renewable Energy Agency, Renewable Power Generation Costs in 2017, pp. 2-3 (Jan. 2018), https://www.irena.org/publications/2018/Jan/Renewable-power-generation-costs-in-2017.

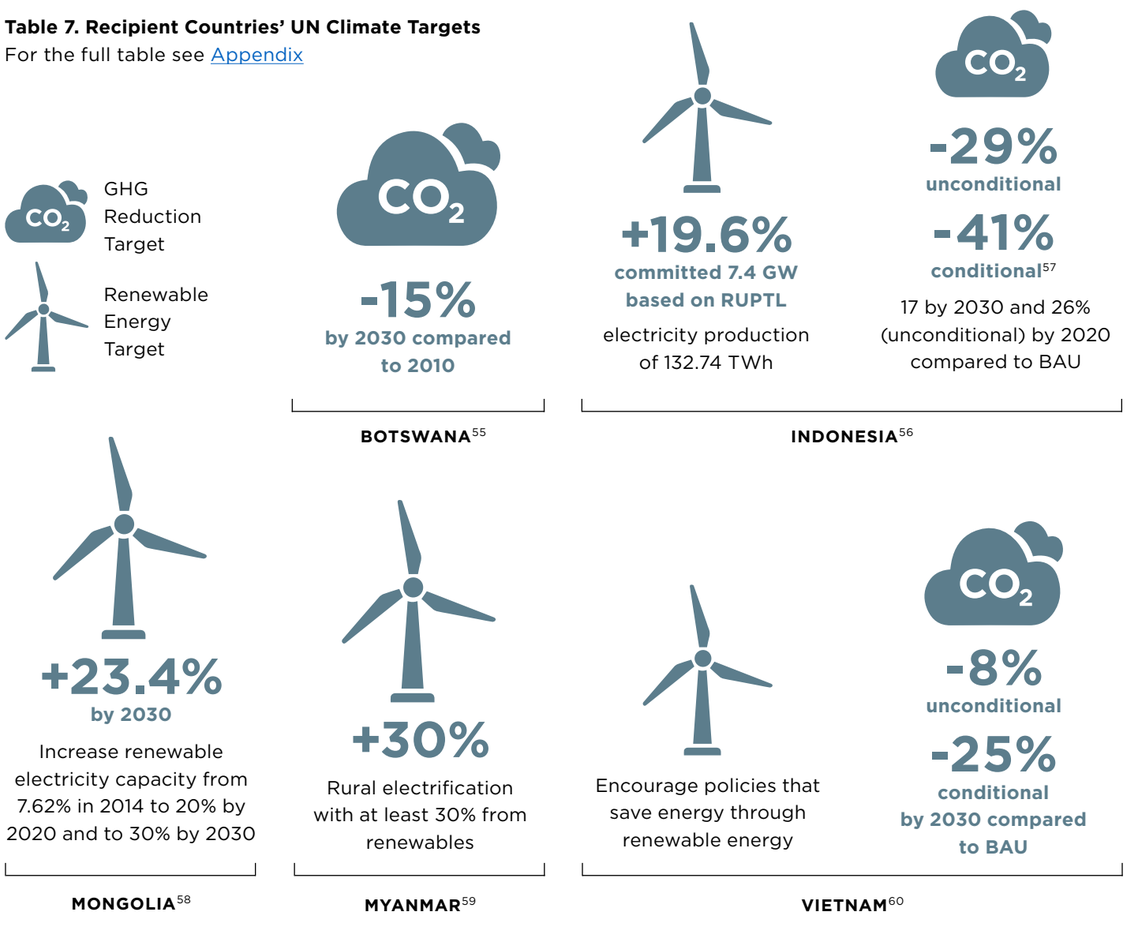
[52] World Economic Forum, *supra* note 50.

[53] Pablo Ralon et al., Electricity Storage and Renewables: Costs and Markets to 2030 (Oct. 2017), http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Oct/IRENA_Electricity_Storage_Costs_2017.pdf.

Undermining UN Climate Pledges

All of the host countries except Mozambique have established targets under the 2015 United Nations Paris Agreement. These pledges, known as nationally determined contributions (NDCs), establish goals for reducing their greenhouse gas emissions and increasing their production of renewable energy. ECAs' support of coal plants in these countries undermines their pledges by increasing emissions and discouraging a shift to renewables. For example, Indonesia will not be able to decrease its emissions below a business as usual (BAU) scenario if financial institutions continue to support coal projects over renewables. While Indonesia's NDC allows for coal, the four Indonesian coal plants listed in this report alone would account for a disproportionate amount of Indonesia's allowed emissions,[54] undermining its ability to meet its emission reduction target.

Table 7. Recipient Countries' UN Climate Targets
For the full table see Appendix



[54] Indonesia's NDC assumes a BAU of 2,869 GtCO2e, meaning its unconditional target is 2037 GtCO2e. The total emissions from these four plants (see Table 4) is 25 million tons CO2e, or about 1.2 percent.

[55] Botswana Intended Nationally Determined Contribution, http://www4.unfccc.int/submissions/INDC/Published%20Documents/Botswana/1/BOTSWANA.pdf (submitted Nov. 2016).

[56] Republic of Indonesia, First Nationally Determined Contribution (Nov. 2016), http://www4.unfccc.int/ndcregistry/PublishedDocuments/Indonesia%20First/First%20NDC%20Indonesia_submitted%20to%20UNFCCC%20Set_November%20%202016.pdf.

[57] Unconditional targets can be met without support from developed countries. Conditional targets require international assistance to be met.

[58] Mongolia, Intended Nationally Determined Contribution (INDC) Submission by Mongolia to the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) (Sept. 2016), http://www4.unfccc.int/ndcregistry/PublishedDocuments/Mongolia%20First/150924_INDCs%20of%20Mongolia.pdf.

[59] The Republic of the Union of Myanmar, Myanmar's Intended Nationally Determined Contribution – INDC, http://www4.unfccc.int/submissions/INDC/Published%20Documents/Myanmar/1/Myanmar's%20INDC.pdf (submitted Sept. 2017).

[60] Intended Nationally Determined Contribution of Vietnam, http://www4.unfccc.int/submissions/INDC/Published%20Documents/Viet%20Nam/1/VIETNAM'S%20INDC.pdf (submitted Mar. 2016).

Beyond Coal—ECAs Are Leading Financiers of Oil and Gas

ECA support for fossil fuels extends beyond coal; oil and gas actually receive far greater support. From 2013 to 2015, the world's largest ECAs provided an annual average of over USD 32 billion to oil and gas projects, compared to USD 5.6 billion for coal projects.[61]

Twenty-three percent of ECA oil and gas support was for exploration, meaning that ECAs are encouraging and prolonging the world's dependence on fossil fuels for decades to come. This support for oil and gas projects has a devastating impact on the climate. With a potency 87 times that of carbon dioxide over a 20-year time period,[62] methane emissions from oil and gas may be as bad for the climate as coal.[63]

A number of other institutions have begun restricting support for oil and gas projects. The African Development Bank and the Asian Development Bank do not finance the exploration of oil and gas.[64] The World Bank Group is phasing out investments in oil and gas exploration and extraction by 2019.[65] In addition, the private French bank, BNP Paribas, will no longer support shale gas and oil, oil from tar sands, or oil and gas in the Arctic.[66] Therefore, ECAs' tremendous support for the fossil fuel sector lags far behind many other financial institutions' policies and is inconsistent with the Paris Agreement, which their governments have signed.[67]

ECAs are encouraging and prolonging the world's dependence on fossil fuels for decades to come.

[61] DeAngelis & Doukas, *supra* note 3.

[62] Intergovernmental Panel on Climate Change, Climate Change 2014: Mitigation of Climate Change (2014), http://www.ipcc.ch/report/ar5/wg3/.

[63] Robert W. Howarth, A Bridge to Nowhere: Methane Emissions and the Greenhouse Gas Footprint of Natural Gas, Energy Sci. & Engineering (2014), http://www.eeb.cornell.edu/howarth/publications/Howarth_2014_ESE_methane_emissions.pdf.

[64] Asian Development Bank. Energy Policy, p. 8 (Jun. 2009), https://www.adb.org/sites/default/files/institutional-document/32032/energy-policy-2009.pdf; African Development Bank, Operation Resources and Policies Department. Energy Sector Policy of the AfDB Group, p. 22 (2012), https://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Energy_Sector_Policy_of_the_AfDB_Group.pdf. These policies are based on economic risks, not climate risks.

[65] World Bank Group, Q&A: The World Bank Group and Upstream Oil and Gas (12 Dec. 2017), http://www.worldbank.org/en/topic/climatechange/brief/qa-the-world-bank-group-and-upstream-oil-and-gas; Larry Elliott, *World Bank to End Financial Support for Oil and Gas Extraction*, The Guardian (12 Dec. 2017), https://www.theguardian.com/business/2017/dec/12/uk-banks-join-multinationals-pledge-come-clean-climate-change-risks-mark-carney.

[66] Press Release, BNP Paribas takes further measures to accelerate its support of the energy transition, 11 Oct. 2017, https://group.bnpparibas/en/press-release/bnp-paribas-takes-measures-accelerate-support-energy-transition.

[67] Paris Agreement, art. 2.1(c), https://unfccc.int/sites/default/files/paris_agreement_english_.pdf (agreeing to provide financial flows to encourage low-carbon developme

Conclusion and Recommendations

ECA support for the 15 listed coal plants would violate the OECD CFSU and spell disaster for the climate and public health. ECAs are exploiting the loopholes of the 2015 agreement, blatantly ignoring the restrictions, or both.

The Korean and Japanese ECAs are the main culprits, with Germany's Euler Hermes and Italy's SACE each considering support for one project. ECAs should immediately reject or cancel all current agreements to support these and any other prospective coal plants, as well as other fossil fuel projects.

This report exposes the weaknesses of the current OECD coal financing restrictions. ECAs are set to review the CFSU by mid-2019, which provides an opportunity to close these loopholes and reduce ECA support of future pollution.

ECAs should agree to phase out support for all coal plants no matter the type of technology, size, or when the ESIAs were supposedly submitted. This phase-out of support should also include coal mining; critical infrastructure and related projects, such as coal trains, ports, and shipping; and all oil and gas projects.

The world does not have the carbon budget to allow for a single one of these coal projects to move forward. An immediate transition to renewable energy systems is needed to avert the worst impacts of climate change and facilitate sustainable development.

Appendix

Table 2. Coal Plants that OECD[68] ECAs Are Currently Supporting or Expected to Support[69]

Country	Power Plant	MW	ECAs	Status
Botswana	Morupule B	300	JBIC, NEXI, KEXIM	Under consideration
Indonesia	Cirebon Phase 2[70]	1000	JBIC, NEXI, KEXIM	Supported
	Cirebon Phase 3	1000	JBIC, KEXIM	Under consideration
	Kalselteng 2[71]	200	JBIC, NEXI	Supporting
	Tanjung Jati B Unit 5 and 6[72]	2000	JBIC, NEXI	Supporting
Mongolia	Ulaanbaatar CHP5	463.5	KEXIM, JBIC	Under consideration
Mozambique	Moatize	300	KEXIM	Under consideration
Myanmar	Toyo-Thai (Inn Din)	1280	JBIC	Under consideration
	Toyo-Thai (Hpa-an)	1280	JBIC	Under consideration
Vietnam	Long Phu 1	1200	K-SURE, SACE, Euler Hermes	Under consideration
	Nghi Son 2[73]	1200	JBIC, KEXIM	Supporting
	Van Phong I	1320	JBIC	Under consideration
	Vinh Tan 4 Expansion[74]	600	JBIC, NEXI, KEXIM, K-SURE	Supporting
	Nam Dinh I	1200	KEXIM	Under consideration
	Vung Ang 2	1200	JBIC	Under consideration

Table 3. Eligibility of Coal Plants for OECD ECA Financing

Country	Power Plant	Eligibility	Reason
Botswana	Morupule B	Ineligible	Plant exceeds the 300 MW limit for subcritical coal plants
Indonesia	Cirebon Phase 2[75]	Eligible	Ultrasupercritical
	Cirebon Phase 3	Eligible	Ultrasupercritical
	Kalselteng 2	Ineligible	Subcritical coal plant in a non-IDA country
	Tanjung Jati B Unit 5 and 6	Eligible	Ultrasupercritical
Mongolia	Ulaanbaatar CHP5	Ineligible	Plant exceeds 300 MW limit for subcritical coal plants
Mozambique	Moatize	Ineligible	Plant exceeds 300 MW limit for subcritical coal plants
Myanmar	Toyo-Thai (Inn Din)	Eligible	Ultrasupercritical
	Toyo-Thai (Hpa-an)	Eligible	Ultrasupercritical
Vietnam	Long Phu 1	Ineligible	Supercritical over 500 MW
	Nghi Son 2	Ineligible	Supercritical over 500 MW
	Van Phong 1	Ineligible	Supercritical over 500 MW[76]
	Vinh Tan 4 Expansion	Eligible	Ultrasupercritical
	Nam Dinh I	Unknown	Technology not disclosed
	Vung Ang 2	Unknown	Technology not disclosed

Table 4. ESIA Status for Non-Ultrasupercritical Coal Plants

Country	Power Plant	Date Completed	Date Made Public	Insufficient ESIAs
Botswana	Morupule B	August 2016	Unknown	Inaccurate assessment of solar as an alternative; underestimation of CO_2 emissions
Indonesia	Kalselteng 2	2015	April 2017	No analysis of the alternatives; insufficient detail of the mitigation of air pollution, finding the decrease of ambient air quality to not be an important impact
Mongolia	Ulaanbaatar CHP5	2015	Unknown	Only available in draft form
Mozambique	Moatize	Unknown	Not public	Unknown
Vietnam	Long Phu 1	Not dated	September 2016	No baseline information, examination of alternatives, identification of cumulative and associated risks and impacts, among other missing elements[77]
	Nghi Son 2	2015	February 2018	No assessment of cumulative impacts
	Van Phong 1[78]	Unknown	Not public	Unknown
	Nam Dinh I	Unknown	Not public	Unknown
	Vung Ang 2	2011	2018	No consultation with local communities

[68] China is not a member of the OECD, so this list does not include the China Export-Import Bank's support or potential support for coal power plants.

[69] The author sent this list of projects to the ECAs in Table 2. The ECAs either confirmed their involvement or refused to comment on their consideration of these projects. If the ECA did not explicitly deny its consideration of a project, the author assumed ECA support was still possible. These e-mail exchanges are on file with the author.

[70] In 2017, Cirebon Phase 2 received financing. JBIC, Project Finance for Expansion of Cirebon Coal-fired Power Plant in Indonesia, Press Release, 14 Nov. 2017 https://www.jbic.go.jp/en/information/press/press-2017/1114-58532.html.

[71] In June 2017, Kalselteng 2 received financing. JBIC, Buyer's Credit for National Power Company of Indonesia: Supporting Export of Facilities for Kalselteng 2 Coal-Fired Power Plant by Japanese Companies, 21 June 2017, https://www.jbic.go.jp/en/information/press/press-2017/0621-55725.html.

[72] In 2017, Tanjung Jati B Units 5 and 6 received financing. JBIC, Project Finance for Re-expansion of Tanjung Jati B Coal-Fired Power Plant in Indonesia, Press Release, 27 Feb. 2017, https://www.jbic.go.jp/en/information/press/press-2016/0227-53953.html [hereinafter "Tanjung Press Release"]; NEXI, Indonesia / Loan Insurance for Expansion of Tanjung Jati B Ultra-supercritical Coal Fired Power Plant, Press Release, 27 Feb. 2017, http://nexi.go.jp/en/topics/newsrelease/2017021701.html.

[73] In 2018, Nghi Son 2 received financing. JBIC, Project Finance and Political Risk Guarantee for Nghi Son 2 Coal-Fired Power Generation Project in the Republic of Vietnam, Press Release, 13 Apr. 2018, https://www.jbic.go.jp/en/information/press/press-2018/0413-010921.html.

[74] In April 2017, Vinh Tan 4 expansion received financing. JBIC, Buyer's Credit for Vietnam Electricity (EVN): Supporting Export of Facilities for Vietnam's First Ultra-Supercritical Coal-fired Power Plant, 11 Apr. 2017, https://www.jbic.go.jp/en/information/press/press-2017/0411-54873.html.

[75] In April 2017, a district court revoked the environmental permission for the Cirebon 2 coal plant. A new permit was submitted to JBIC and NEXI in July 2017. JBIC, Press Release, Project Finance for Expansion of Cirebon Coal-fired Power Plant in Indonesia, 14 Nov. 2017, https://www.jbic.go.jp/en/information/press/press-2017/1114-58532.html.

[76] Pöyry, Press Release, Pöyry awarded owner›s engineer services assignment for Van Phong 1 coal-fired power plant project in Vietnam, 13 Aug. 2013, http://www.poyry.com/news/poyry-awarded-owner-s-engineer-services-assignment-for-van-phong-1-coal-fired-power-plant-project-in-vietnam.

[77] Norlen, *supra* note 20.

[78] The government approved the ESIA in 2018. *SĐn sàng cho NhiĐt ĐiĐn Văn Phong 1*, Khanh Hoa Online, 18 Mar. 2018, http://www.baokhanhhoa.vn/kinh-te/201803/san-sang-cho-nhiet-dien-van-phong-1-8072701/.

Appendix

Table 5. Potential OECD ECA-Supported Coal Plant Carbon Pollution

Country	Power Plant	CO_2 intensity (gCO2/kWh)[79]	Annual CO_2, 52.5% capacity factor (million metric tonnes/year)[80]	Annual CO_2, 80% capacity factor (million metric tonnes/year)[81]
Botswana	Morupule	955 (860-1051)	1.31820306	2.008690378
Indonesia	Cirebon Phases 2 and 3	839 (755-923)	7.714753771	11.75581527
	Kalselteng 2	1113 (1002-1224)	1.023551867	1.559698083
	Tanjung Jati B Unit 5 and 6	839 (755-923)	7.714753771	11.75581527
Mongolia	Ulaanbaatar CHP5	882 (794-971)	1.882862507	2.86912382
Mozambique	Moatize	960 (864-1056)	1.324177983	2.017795021
Myanmar	Toyo-Thai (Inn Din)	839 (755-923)	4.937442413	7.523721773
	Toyo-Thai (Hpa-an)	839 (755-923)	4.937442413	7.523721773
Vietnam	Long Phu 1	839 (755-923)	4.632067669	7.058388828
	Nghi Son 2	839 (755-923)	4.632067669	7.058388828
	Van Phong I	839 (755-923)	5.095274435	7.764227711
	Vinh Tan 4 Expansion	839 (755-923)	2.314426131	3.526744581
	Nam Dinh I	892 (803-982)	4.925426003	7.505411053
	Vung Ang 2	859 (773-945)	5.214036927	7.945199126
Total			**55.56164942**	**84.66537055**

[79] The carbon dioxide intensity is the estimated amount of carbon dioxide (grams) emitted per unit of energy consumed (kilowatt-hour). The estimation is based on the project's planned plant and coal type, with an average value used if plant and/or coal type is unknown. The efficiency and heat rate for different coal plant types are derived from the International Energy Agency, and the emission factor for coal types from the Intergovernmental Panel on Climate Change. More information on the parameters can be found here: https://www.sourcewatch.org/index.php/Estimating_carbon_dioxide_emissions_from_coal_plants. The carbon dioxide intensity estimation includes a 10 percent error band to account for more specific details that can substantially affect intensities, such as (1) the characteristics of the coal, including moisture, fly ash content, and hydrogen content; (2) the actual heat rate of the particular plant; (3) pollution control equipment; and (4) how often the plant is started and stopped.

[80] The 52.5-percent-capacity factor is more accurate to calculate a global average because older plants tend to run less often.

[81] The 80-percent-capacity figure provides a more accurate estimate for new plants that tend to run more often (up to 90 percent of the time), thereby emitting more carbon pollution.

Table 6. Wind and Solar Potential in Host Countries

Country	Solar (kWh/kWp per year)[82]	Wind (W/m2)[83]
Botswana	1692-1970	Up to 175- 500 in the south
Indonesia	1076-1645	Up to 900 in mountains, 375 along some coasts
Mongolia	1153-1928	900-1300+ in the southern half
Mozambique	1507-1650	Up to 450-600 on the coast
Myanmar	1295-1597	Up to 175 along the coast; up to 900 in the west
Vietnam	1075-1602	1100-1300+ along the coast

Table 7. Recipient Countries' UN Climate Targets

Country	Renewable Energy Target	GHG Reduction Target
Botswana[84]	None	15% by 2030 compared to 2010
Indonesia[85]	19.6% (committed 7.4 GW based on RUPTL); electricity production of 132.74 TWh	29% (unconditional) and up to 41% (conditional)[86] by 2030 and 26% (unconditional) by 2020 compared to BAU
Mongolia[87]	Increase renewable electricity capacity from 7.62% in 2014 to 20% by 2020 and to 30% by 2030	None
Mozambique	None	None
Myanmar[88]	Rural electrification with at least 30% from renewables	None
Vietnam[89]	Encourage policies that save energy through renewable energy	8% (unconditional) up to 25% (conditional) by 2030 compared to BAU

[82] World Bank Group et al., Global Solar Atlas, http://globalsolaratlas.info/ (last visited 9 Aug. 2018).

[83] Global Wind Atlas, *supra* note 44. The potential depends on the height – either 50, 100, or 200 meters – with the wind potential usually being higher at greater heights.

[84] Botswana Intended Nationally Determined Contribution, http://www4.unfccc.int/submissions/INDC/Published%20Documents/Botswana/1/BOTSWANA.pdf (submitted Nov. 2016).

[85] Republic of Indonesia, First Nationally Determined Contribution (Nov. 2016), http://www4.unfccc.int/ndcregistry/PublishedDocuments/Indonesia%20First/First%20NDC%20Indonesia_submitted%20to%20UNFCCC%20Set_November%20%202016.pdf.

[86] Unconditional targets can be met without support from developed countries. Conditional targets require international assistance to be met.

[87] Mongolia, Intended Nationally Determined Contribution (INDC) Submission by Mongolia to the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) (Sept. 2016), http://www4.unfccc.int/ndcregistry/PublishedDocuments/Mongolia%20First/150924_INDCs%20of%20Mongolia.pdf.

[88] The Republic of the Union of Myanmar, Myanmar's Intended Nationally Determined Contribution – INDC, http://www4.unfccc.int/submissions/INDC/Published%20Documents/Myanmar/1/Myanmar's%20INDC.pdf (submitted Sept. 2017).

[89] Intended Nationally Determined Contribution of Vietnam, http://www4.unfccc.int/submissions/INDC/Published%20Documents/Viet%20Nam/1/VIETNAM'S%20INDC.pdf (submitted Mar. 2016).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