



The Apex
CONSULTING GROUP

THE CASE FOR ELECTRICITY EXPORTS FROM CLEAN ENERGY

A position paper that examines several of the key arguments being presented at the National Level for and against the export of clean electricity from Indonesia.

July 2022

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Executive Summary

Indonesia sits on the doorstep of a US\$ 15 billion renewable energy investment bonanza. If embraced, Indonesia will be empowered to leapfrog its capacity to generate solar power at scale and on a commercially viable basis, insulating the country from the ever-present threats of global fuel price fluctuations. Alternatively, failure to embrace this opportunity will allow other middle-income nations in the region to reap these benefits.¹

The essence of the program is to have Indonesia export clean electricity to Singapore, which is engaged in several major initiatives to import renewable energy. Singapore has already commenced importing electricity from Laos to Singapore via Thailand and Malaysia. The proposed clean electricity export program from Indonesia does not entail diverting any electricity currently produced by Indonesia for its domestic market. This is purely a case of producing additional energy that was never expected to be produced domestically, and as the source of energy is renewable, there is also no depletion of precious domestic natural resources.

This program will encourage the development of domestic manufacturing of solar energy panels and related equipment. This will be achieved by developing the world's largest solar PV power plant that exports its power directly to Singapore. The proposed export program will generate new forms of international income and Foreign Direct Investments for Indonesia. At the same time, being a facility at scale will encourage the development of large-scale and thus competitively priced panels and other solar equipment in Indonesia. This will be a game-changer for Indonesia to enter the league of countries able to produce large-scale solar electricity on a commercially viable basis.

Competitively priced solar panels and related equipment will allow Indonesian power producers such as PLN and Pertamina to produce and deliver solar-generated power at competitive prices into the various grids across Indonesia. Being able to produce and deliver electricity at prices that compete with traditional power sources will be a significant factor in supporting the long-term energy transition in Indonesia. When it is ready, this will enable the country to dramatically increase its use of solar energy to meet its domestic electricity requirements.

Significant economic multiplier effects also exist. In addition to encouraging the development of a competitive manufacturing industry for solar panels and related materials, the capacity to generate solar power at competitive prices will also encourage investment in Indonesia by Industry 4.0 enterprises and others that depend upon green energy. The shareholders of the large digital companies, including the data centre management conglomerates, are mandating their companies to transition to green energy in the next few years, not the middle of the century. Additional benefits will include an increase in employment and high-income generating opportunities for skilled workers.

¹ <https://www.asiafinancial.com/australia-asia-sun-cable-project-wins-government-support>

Active participation in the program provides Indonesia with a leading platform for the energy transition. Indonesia's leadership role with the G20 this year, including its stated priority agenda of the energy transition, offers an ideal opportunity for Indonesia to demonstrate clear leadership by declaring support for the proposal to export renewable electricity from Indonesia to Singapore.

The security of Indonesia's telecommunications network can be strengthened by leveraging undersea electricity cables. The South China Sea is increasingly a zone of regional and broader competition among great powers. The integrity and security of the numerous telecommunication sea cables across this sea face challenges if they require repairs when access in certain waters is under threat. The presence of an electric cable connecting Indonesia directly with Singapore will allow additional telecom cables to be installed together, thus creating additional capacity and security for Indonesia's telecommunications and data needs.



Introduction

The opportunity for countries in the region to export electricity across national boundaries has created a situation of being in the “right place at the right time”. The demands to transition to renewable sources of energy are a significant benefit to potentially renewable energy powerhouses like Indonesia to fill the gap as traditional energy sources are replaced by renewables. Singapore is driving this regional development as it needs to replace its old and conventional sources of electricity with offers to import significant amounts of renewable energy. The process has now begun as renewable energy from Laos is being imported via Thailand and Malaysia, proving the viability of international trade in electricity in Southeast Asia.²

A recent agreement between Australia and Indonesia to create another cross-national trade in electricity for sale in Singapore reflects further evidence that this industry will grow in the future. Yet, this project from Australia will only see Indonesia secure benefits from “toll fees” from being a transit zone for the cable. Indonesia will likely not receive any of the economic benefits of having significant Foreign Direct Investment (FDI) into Indonesia or any of the gains from infrastructure development of the construction itself.

Given its proximity, Indonesia enjoys several obvious competitive advantages over other potential exporters of electricity to Singapore. The ASEAN Centre for Energy and various institutions have discussed and started work on creating an ASEAN-wide electricity grid (ASEAN Power Grid initiative⁴). The Singapore-Indonesia electricity trade program will be a significant catalyst in making this a reality due to the required amount of energy that will need to be imported into Singapore⁵ and other regional countries. This will provide economies of scale benefits, allowing the interconnection of transmission lines to be used for large amounts of electricity transfer.

It will likely take Indonesia more than ten years to be ready to install and use even a small percentage of the same amount of solar PV-based electricity that would be built for electricity export. Leveraging the capacity of a giga-scale power plant, the Indonesia-Singapore electricity trade program would allow Indonesia to dramatically upscale its solar generation capacity as part of its broader efforts to transition its domestic needs towards renewables.

2 <https://www.straittimes.com/singapore/environment/singapore-begins-importing-renewable-energy-from-laos-via-thailand-malaysia>

3 <https://techwireasia.com/2021/09/australia-singapore-solar-energy-project-gets-green-light-from-indonesia/> and <https://www.power-technology.com/news/sun-cable-aapowerlink-project/>

4 <http://agreement.asean.org/media/download/20140119102307.pdf>

5 <https://www.straittimes.com/singapore/environment/asean-power-grid-option-for-spore-to-source-green-energy>

More recently, there have been obvious signs that Singapore would like to partner with Indonesia directly.⁶ Singapore believes Indonesia could be a new import supplier to help secure its decarbonisation targets. Views within Indonesia are mixed, with a number of views being articulated, both for and against the proposition.

This position paper examines several of the key arguments being presented in Indonesia.

6 <https://www.straitstimes.com/business/economy/singapore-companies-ink-two-deals-to-import-solar-power-from-indonesia>



ECONOMIES OF SCALE WILL ENABLE THE COMMERCIAL VIABILITY OF BASELOAD SOLAR PV ELECTRICITY GENERATION



Economies of Scale Will Enable the Commercial Viability of Baseload Solar PV Electricity Generation

Among the key constraints facing the solar energy industry in Indonesia is the need to create the scale of deployment necessary to produce competitively priced clean energy compared to other traditional forms of electricity generation based on fossil fuels. PLN considers solar PV only viable as a small project, and for PLN, power plant size is a key factor. For PLN, there are considerable costs entailed in managing a vast array of power agreements with all electricity generation plants. Therefore, PLN understandably prefers to manage fewer but larger power plants.

Modern electricity grids⁷ are now moving towards a distributed generation model⁸ to increase reliability, reduce costs, and maximise the ability to use available renewable energy sources nearby. Costs can be reduced through distributed generation⁹ by building localised power plants to meet the needs within specific regions, resulting in fewer losses that result from longer transmission cables. Distributed generation also increases reliability as many power plants are available to cover any failure of a few. In the case of an outage of a larger power plant within a grid, many more electricity consumers lose power, which usually leads to large portions of the grid being taken down. Solar PV systems, including multi-gigawatt projects, are part of the distributed generation model due to their ability to be installed across the network.

Solar power generation sites, which can generate as much power as a large coal-fired power plant, would be a valuable addition to PLN's mix of power sources. However, in the absence of specific incentives and a willingness from PLN to accept and fast-track PV deployment that would help leapfrog the size of solar power plants to a large scale, the fossil fuel-based status quo is maintained. The absence of PLN's willingness to accept the deployment of large-scale solar power generation facilities inhibits the development of the industry and the supporting infrastructure, suppliers, and expertise needed. This, in turn, thwarted the potential for solar energy plants to be of a scale sufficiently large to be able to genuinely compete with traditional sources of energy to secure commercially viable contracts with PLN. The absence of PLN support for the potential emergence of genuinely large-scale and commercially feasible solar generation in Indonesia.

Traditional power plants with generators powered by fossil fuels such as coal enjoy significant government subsidies and forced industry incentives and domestic price caps in Indonesia. There is also no requirement to compensate for the costs of pollution created in the regions around their operations. Nor is there a requirement to pay for the costs of disease and illnesses that may befall people who live within the pollution zones. These latter costs are covered by public insurance systems like BPJS or directly by the families of those who fall ill.

⁷ https://www.researchgate.net/publication/303784934_Managing_the_Future_of_the_Electricity_Grid_Distributed_Generation_and_Net_Metering

⁸ <https://grist.org/fix/our-power-grids-are-failing-distributed-energy-resources-might-be-our-way-out/>

⁹ <https://smartgrid.ieee.org/bulletins/july-2017/distributed-energy-resources-operations-in-the-modern-grid>

“ solar generation is penalised through a tariff cap of 75% of the cost of generation ”

The Domestic Market Obligation and Domestic Price Obligation for coal producers is a means of subsidising coal-fired power generation. Even though most of the burden is borne by the coal producers, the Government does not receive the tax revenue that would have been created if it was sold at the market price. Solar power production does not enjoy such subsidies as there are no costs related to producing solar power energy that is not directly covered. Unfortunately, the opposite policy has been put in place by the Government, whereby solar generation is penalised through a tariff cap of 75% of the cost of generation, predominantly from the already subsidised tariffs paid to fossil fuel generators from sources such as coal.

In the absence of Government endorsement and domestic deployment mandates it is highly unlikely for a significant expansion of the scale of domestic solar power generation. The creation of export capacity based on foreign electricity users taking on the risk and cost of a new Indonesian-based power generation site offers a very rare opportunity for Indonesia to dramatically raise its capability to generate giga-scale solar energy at commercially viable tariffs.

In essence, this approach will allow Indonesia to short circuit the “chicken and egg problem” of a lack of support, deployment, and penetration by leveraging the export of solar power to Singapore as a catalyst to kick-starting a large-scale and commercially viable solar power generation sector in Indonesia. At the same time, export projects offer significant flow on growth and support industry development opportunities within the domestic economy of Indonesia.

It is relevant to note, that Indonesia has had a target of multiple GWs of solar PV installation since 2011, including up to 5 GW of solar PV in its national planning documents. Only approximately 100 MW of solar PV systems have been signed with or developed by PLN in the last decade.

If this trend continues, it will be impossible for Indonesia to transition to a carbon-neutral this century.

Without an electricity export program, Indonesia will continue to lag in preparing its manufacturing industries, human resources, policy and regulatory landscape, and the investment ecosystem in support of large-scale solar PV projects and the zero-carbon transition more generally.



Upskilling the Indonesian Workforce

A significant benefit of having giga-watt scale solar PV installations in Indonesia is the development of its workforce with the skills required for internationally funded projects. Even if the electricity is exported, the fact that up to 10 GWp of solar PV projects will be installed in Indonesia provides significant opportunities for Indonesia's workforce to step up and be available to work on these projects. Any benefits presumed to be lost due to the selling of clean electricity to Singapore are by far offset through the development and upskilling of the local workforce for both manufacturing and project implementation.

Large Scale Solar Energy Production Will Encourage Economies of Scale in Manufacturing

Closely related to the issue of economies of scale for solar power generation is the domestic capability and capacity to manufacture the components, panels, and other material goods needed to construct and maintain such power generation capacity. Indonesia generates well below 1 percent of its electricity needs from solar power generation. This figure is very low by the standards of all other oil and gas importing nations in the G20.¹⁰ Not surprisingly, Indonesia's manufacturing capacity for solar energy components and panels is also nascent in scale.

As a result, the domestic manufacturing sector is not competitive compared to the major producers from countries like China. Considering the low domestic demand, it is not reasonable to expect the sector in its current state to achieve the economies of scale in production needed to become competitive internationally. This also makes it difficult for domestic manufacturers to produce quality bankable products at a price that would support domestic solar electricity generating facilities to produce at competitive tariffs. While local content obligations would certainly help shield domestic producers from international competition, it will also continue to subvert the capacity of Indonesian solar generators to achieve competitive tariffs for clean power production.

In many respects, this dynamic creates another "chicken and egg" dynamic. Manufacturers, whether domestic or foreign investor producers, have no incentive to invest in serious production expansion that would enable them to achieve genuine commercial competitiveness as there

¹⁰ G20 Electricity Review 2021 <https://ember-climate.org/app/uploads/2022/02/Global-Electricity-Review-2021-Indonesia.pdf>

“ with the prevailing anti-dumping laws in many countries, Indonesian-made solar PV panels and components could be attractive to the worldwide market ”

is insufficient domestic demand for components and panels. There is also little incentive for prospective solar power developers to invest in large-scale projects if they are compelled through various local content scheme requirements to procure more expensive components and panels. All this does is raise the base cost of renewable energy power generation to levels that leave them uncompetitive against other conventional power sources. An industry can never evolve and expand in the absence of demand.

Instead of regulating local content obligations, Indonesia could support domestic producers of solar PV components by providing incentives for exporting their products to the vast global market. Especially with the prevailing anti-dumping laws in many countries, Indonesian-made solar PV panels and components could be attractive to the worldwide market. Additionally, if required to compete with international suppliers, Indonesian producers and manufacturers will build their capacity to produce world-class products instead of only meeting local content obligations, which exclude high quality and more advanced technologies from the international market.

Once again, the proposal to export solar-generated power on a large scale would constitute a circuit breaker to this conundrum. The emergence of GWs of solar projects in Indonesia would offer game-changing demand prospects for domestic manufacturers and their financiers that would eliminate the market risk of making significant investments in productive capacity and related contemporary technologies.

Mega-solar electricity generation facilities would also spur the development of other critical ancillary services for the sector, such as servicing and maintenance and different skilled workforce needs. The circuit-breaking effect of large-scale solar power generation capacity in Indonesia, albeit initially for the export market, would undoubtedly boost the potential for other large-scale and commercially viable projects to be developed that would be directed specifically to servicing the Indonesian market.

A large competitive manufacturing sector in Indonesia would further assist other prospective solar power generating companies, including SOEs such as PT. Pertamina (persero) and PT. PLN (persero) play a significant role in Indonesia’s energy transition.



THE IMPERATIVE FOR CLEAN ENERGY IN ADVANCED MANUFACTURING AND INDUSTRY 4.0



The Imperative for Clean Energy in Advanced Manufacturing and Industry 4.0

Among Indonesia's key challenges in creating a major EV industry is the lack of decarbonised energy sources along the manufacturing and supply chain. Indonesia enjoys a confluence of natural resource advantages and easy access to other necessary resource inputs. It can also benefit from changing regional production dynamics combined with a supportive domestic policy framework. This is creating a truly historic opportunity for Indonesia to finally create a genuinely nationally led automotive sector led by the EV sector.¹¹

One gap in the picture, which has yet to be filled, is Indonesia's continued overdependence upon carbon-intensive power sources. This is a significant threat to the industry, given that consumers will be increasingly unwilling to purchase electric batteries and vehicles manufactured using fossil fuel energy.

¹¹ https://australiaindonesia.com/wp-content/uploads/2021/06/EV_062021_English_v2.pdf and https://australiaindonesia.com/wp-content/uploads/2021/06/EV_062021_Indonesian_v1.pdf

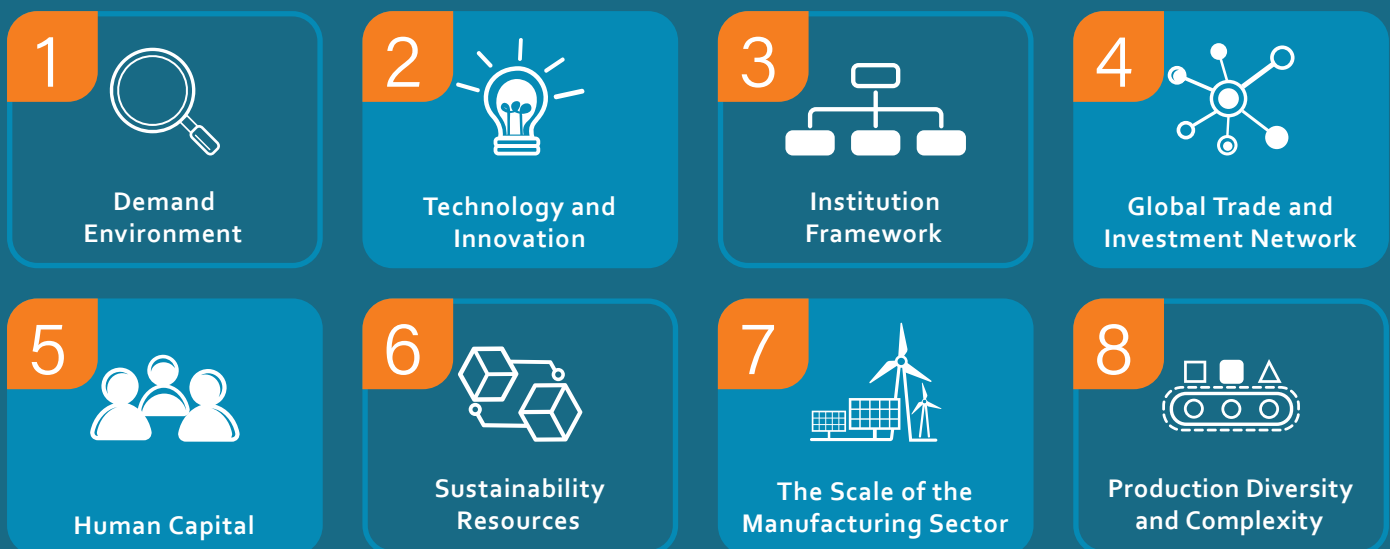


MYTH #1: Exporting Electricity to Singapore Will Give Singapore an Investment Edge

Exporting electricity to Singapore will create industrial advantages not only for Singapore but will create even greater advantages for Indonesia. There have been concerns expressed that if Indonesia were to export solar power to Singapore, it would undermine Indonesian efforts to develop its advanced manufacturing capacity. This would certainly include concerns about Indonesia's capacity to optimise the potential benefits from Industry 4.0 developments.

There are several points to note in relation to this position.

In a report for Indonesia's Ministry of Industry, A.T. Kearney noted eight factors that drive the country's readiness for Industry 4.0:¹²



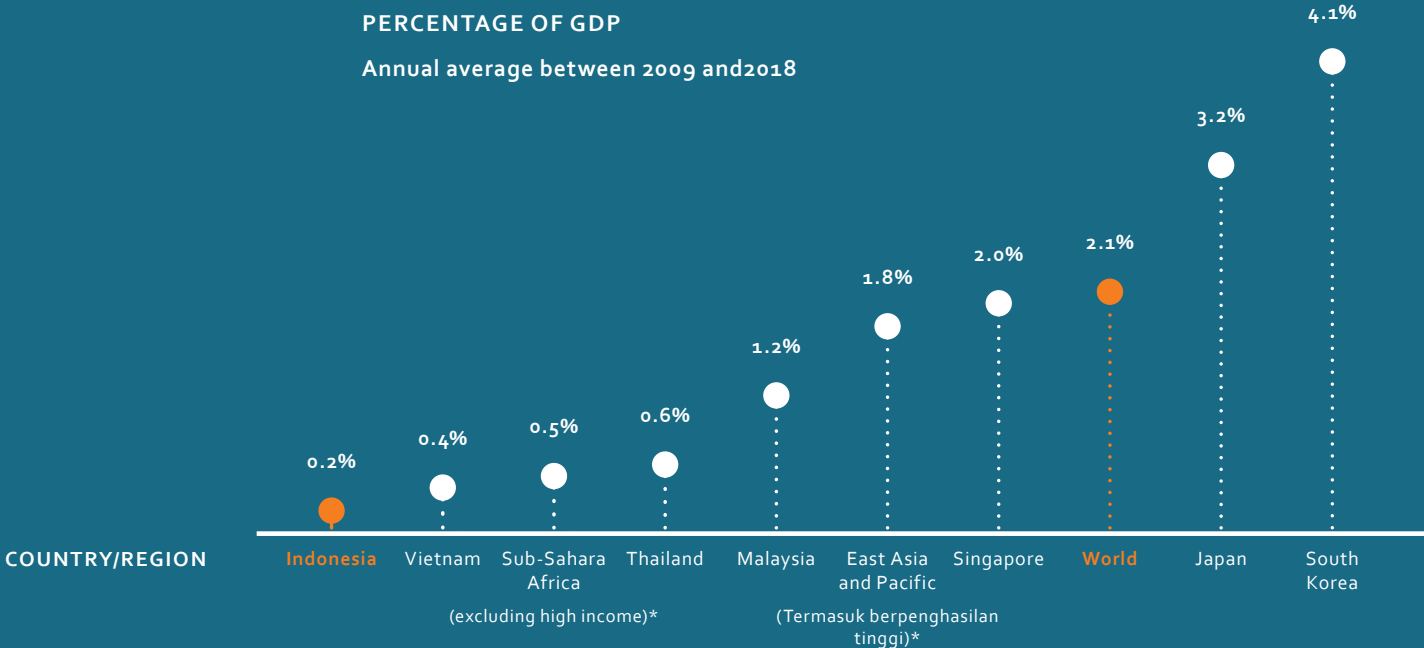
In many respects, to suggest that exporting solar energy to Singapore will somehow thwart Indonesian ambitions to advance its own Industry 4.0 ambitions misses critical domestic challenges that Indonesia faces. For example, on the issue of technology and innovation, all of which are driven by research and development, Indonesia invests significantly less than other countries in the region and globally.

Data from the World Bank indicates the average percentage of a nation's GDP directed towards research and development. With a considerably smaller per capita income, Vietnam still invests twice as much of its GDP in R&D as Indonesia.

¹² <https://www.kemenperin.go.id/download/19347>

RESEARCH AND DEVELOPMENT EXPENDITURE AS PERCENTAGE OF GDP

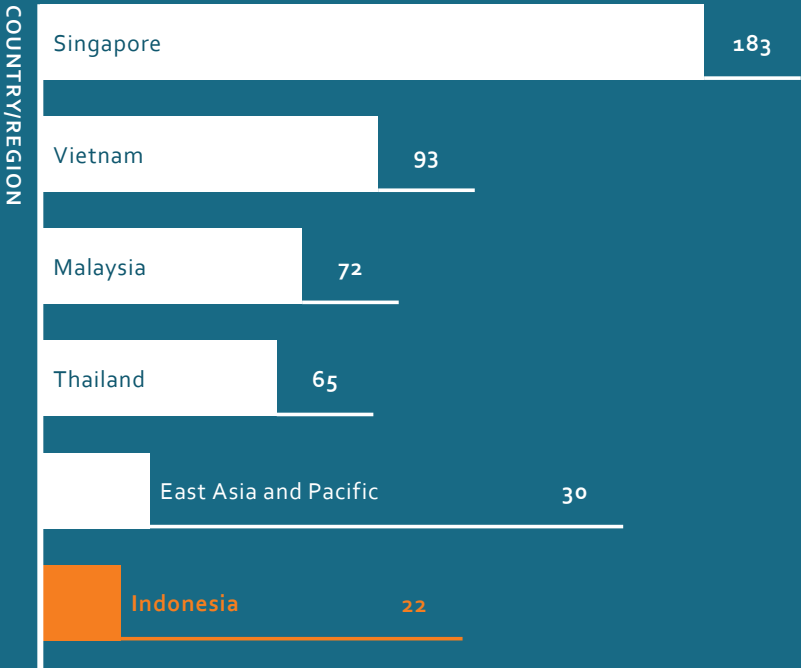
Annual average between 2009 and 2018



Source: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS>
 *Data from 2007, the last time this data was calculated

EXPORT OF GOODS AND SERVICES AS % GDP

2011-2020



Source: <https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS>

Singapore invests ten times as much of its GDP on R&D compared to Indonesia. Indeed, the nations of sub-Saharan Africa invest more than twice as much of their respective GDPs in R&D as Indonesia.

At the same time, the differences between Indonesia and Singapore are again very evident in terms of global trade.

The export of goods and services from Indonesia is valued at 22% of total GDP. The average of all countries across East Asia and the Pacific is 30%. In other economies of ASEAN, the figures are increasing in Singapore, where the value of goods and services exports far exceeds the total value of GDP, indicating an economy deeply engaged in trade networks.

Altogether these contrasts indicate that Singapore is much further advanced along the pathway towards Industry 4.0 than Indonesia. Secondly, the basic structures of the Singaporean and Indonesian economies are so different that it would be more natural to see them as complementary rather than competitive. Because of this, cooperation between Indonesia and Singapore presents multiple benefits without subverting Indonesia's economic competitiveness. The bottom line is that Indonesian exports of solar electricity to Singapore do not represent a strategic threat to Indonesian ambitions for Industry 4.0 or other advanced manufacturing.



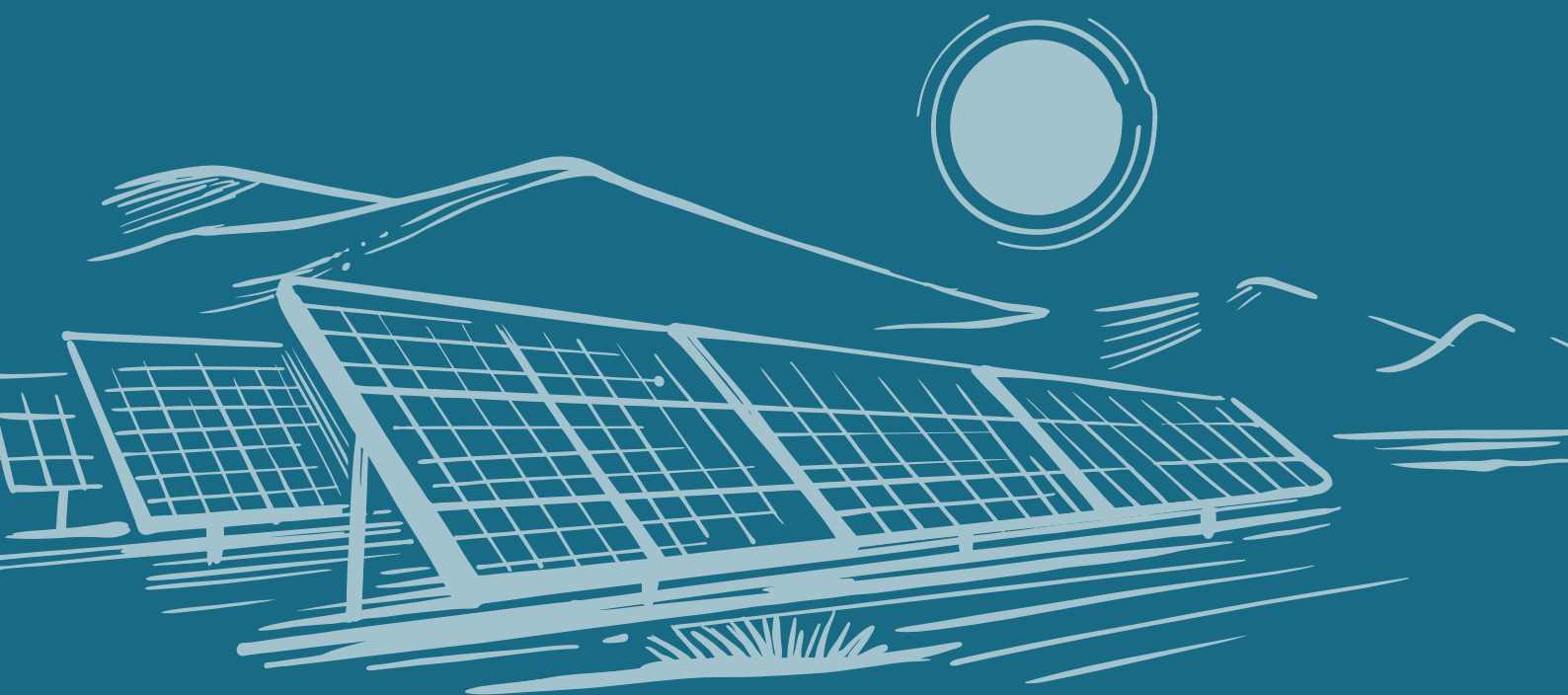
**MYTH #2:
Exporting Indonesia
Solar Electricity
to Singapore Will
Detract from
Domestic Needs**

A common view is that the export of electricity from Indonesia to Singapore will reduce the supply of clean energy domestically within Indonesia. The fundamental flaw in this argument is that it presumes this electricity is being generated now or would have been generated in the first place were it not exported to Singapore. Unfortunately, no such capacity currently exists.

Currently, it is not yet commercially viable to supply all the electricity needs of consumers in Riau Archipelago through a large-scale PV-BESS generation plant. In addition, at this stage, the economy of Riau Archipelago is relatively well supplied with electricity from other sources.

Should the province be connected to the wider Sumatra grid, there may be a case for a gigawatt-scale solar power plant providing the relevant supporting infrastructure such as a competitive domestic manufacturing capacity. At best, the Sumatra grid may be able to integrate 1-2 GW of solar PV and maintain its stability and performance in its current form.

The key point to note on this issue is that there are no opportunities within the Riau Archipelago or Indonesia to install and operate more than GWs of solar PV in the next decade.

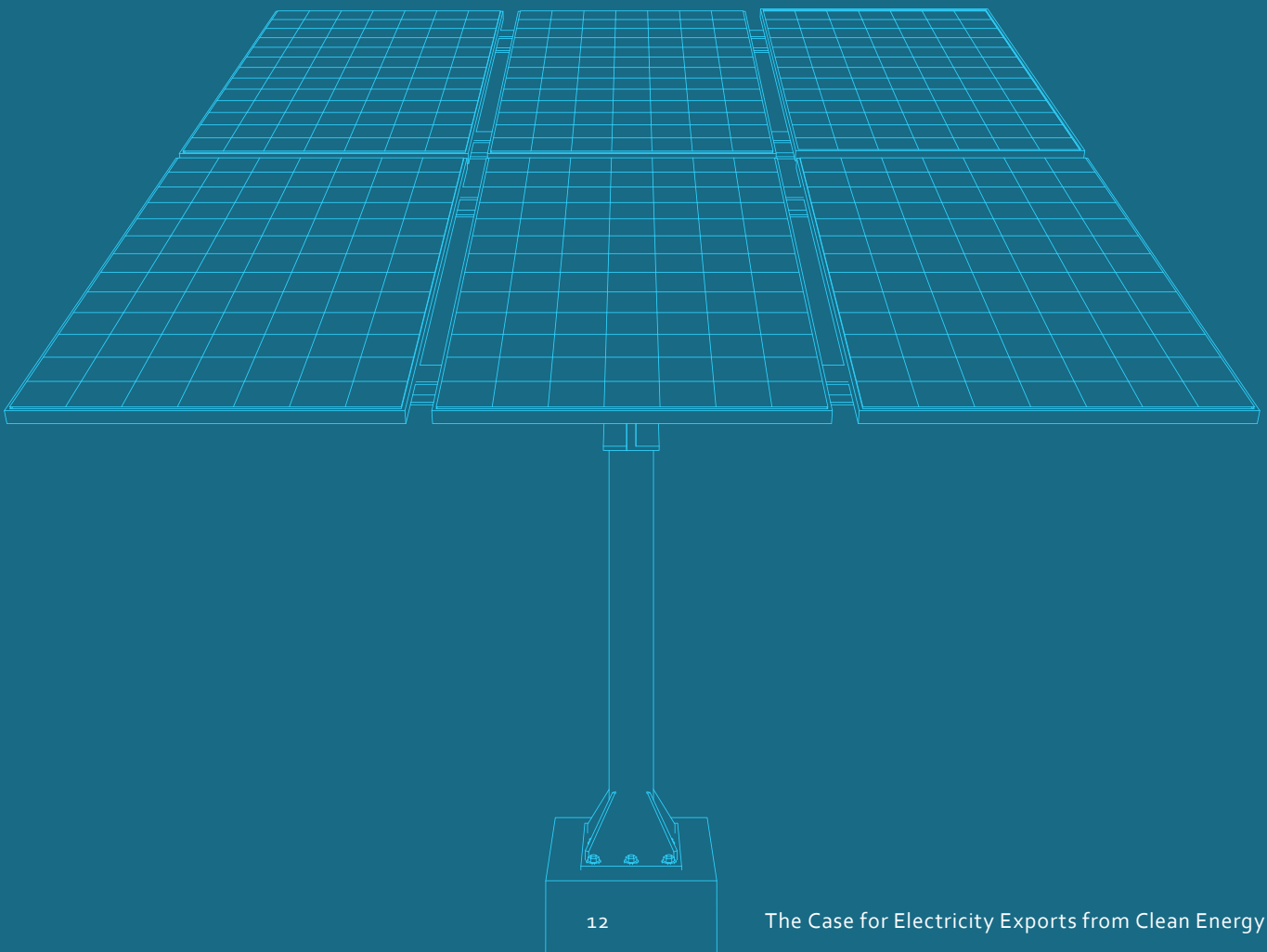


MYTH #3:
**Exporting
Indonesian
Electricity Will
Reduce Availability
in Indonesia is Not
Possible because
Renewable Energy**

Among the great value of an electricity source like solar PV energy is that stocks are not limited, unlike coal or petroleum. There is no rational case to argue that Indonesia must protect its domestic supply of the sun. It is a resource available to all countries, although the level of irradiation may vary between regions. The key consideration relating to this resource is not whether stocks will run out, as is the case for coal or petroleum, but rather at what point it can be generated at scale and on a commercially viable basis sufficient to outcompete traditional sources of electricity at lower prices.

Among the factors that are working in favour of the solar PV sector is that technological breakthroughs are creating improvements in efficiency and costs of component manufacturing at a rate that vastly exceeds any increase in efficiencies for traditional energy sources. This means that solar PV-generated electricity will simply evolve to become a cheaper option than traditional fossil fuels. Indeed, depending on the scale of the installed capacity of a power plant and the prevailing market prices for fossil fuels that price threshold has already been crossed.

The bottom line on the concern that clean energy exports will reduce the availability of the sun and irradiation resources domestically misses the point that being a renewable resource means it is not depleted whether it is used domestically or exported. The question is how and indeed if a country wishes to benefit from this resource.



THE IMPORT OF CLEAN ENERGY TO SINGAPORE HAS ALREADY BEGUN



The Import of Clean Energy to Singapore has Already Begun

“ The Indonesian Government should consider are whether it wishes to remain a mere “toll fee collector” ”

In many respects, whether Indonesia chooses to support or reject a solar energy export industry to Singapore, be that for reasons of electricity nationalism or fear of providing Singapore with a strategic economic advantage over Indonesia, is essentially irrelevant. Singapore has already begun importing electricity using new and renewable energy sources. The core question for Indonesia is why it should wish to deny itself the opportunity to secure a new source of export and tax revenues.

Singapore alone is projecting the need to invest 15 billion USD in FDI. This figure only covers the solar PV sector. It does not yet include the additional supporting industries and businesses that will need to be created by establishing this industry.

The Indonesian Government should consider are whether it wishes to remain a mere “toll fee collector” for allowing the transportation of electricity via sea cables through its waters. Alternatively, should it decide to embrace the much larger value add that would accrue to Indonesia if it were to begin direct exports of power generated from its skies.

As outlined in earlier segments, establishing multiple large-scale solar power export facilities based in Indonesia, even if the generation is exported, would establish a solid foundation from which a more commercially viable domestic industry will emerge. Indonesian Government policy seeks to raise the percentage of NREs as part of the national energy mix. The offer to buy Indonesian solar-generated power at scale by Singapore offers an opportunity for Indonesia to take the significant next step in scaling solar power generation and to do so without the need to offer subsidies to support the sector’s advancement.

Energy Transition Leadership

One of the three key items on President Jokowi’s agenda for his G20 Chairmanship is to promote energy transition. Indonesia’s journey along that path toward an energy future based on NRE is still at a very early stage, as noted by the fact that solar power generates well below 1% of all electricity generated in the country.¹³ Among the special guests invited to participate at the G20 meeting in Bali in November 2022 is the Prime Minister of Singapore. As a demonstration of Indonesia “walking the walk” on promoting the world’s energy transition, the G20 meeting offers a rare and global platform from which an announcement of a program of mega solar energy export projects linking Indonesia and Singapore could be made.

¹³ Tinjauan Listrik G20 2021 <https://ember-climate.org/app/uploads/2022/02/Global-Electricity-Review-2021-Indonesia.pdf><https://ember-climate.org/app/uploads/2022/02/Global-Electricity-Review-2021-Indonesia.pdf>

Strategic Use of Cable to Carry Addition Telco/Data Transmission Cable

In addition to the benefits of creating long-term export revenue and boosting the capacity and market to encourage Indonesian manufacturers to produce at scale competitively, there is an additional co-benefit that is more strategic. Growing geostrategic competition and tensions in the wider South China Sea suggest there are potential threats to the security of the networks of undersea cables that cross the region in the case of accidents or the need for repairs.

The electricity cable that would connect Riau Archipelago and Singapore can also have an additional telecommunications data cable attached to it. This additional cable could provide Indonesia with a valuable and secure means of helping to ensure its international connectivity is not disrupted because of any incidents in the wider South China Sea region.

Strong Local Support

Provincial leaders of Riau Archipelago, as well as the Karimun District and the City of Batam, are strong supporters of the proposal to house a major program of solar power plants for export from their region. For the leaders in Karimun, the program would represent a major step forward for the district in terms of advancing its own economic development and opportunities both for employment and skills development.

For other leaders in the province, there is a strong recognition that establishing a program of large-scale solar power plants will be a catalyst for growth. It is seen as investment that would also promote the development of related activities such as datacentres in Riau Archipelago, manufacturing of solar PV-related components and other downstream manufacturing of goods requiring green energy in the region.



Carbon Tax Credits

An additional point of contestation about the merits of Indonesia exporting solar power to Singapore is that Singapore will gain decarbonisation benefits by reducing its reliance upon fossil fuels, while Indonesia obtains no such benefits. This need not necessarily be the case as there are provisions within the Paris Agreement for sharing the environmental attributes that arise from cross-border initiatives that reduce greenhouse gas emissions. To achieve this, Indonesia and Singapore could negotiate a bilateral agreement to determine the mechanisms by which carbon credits for Nationally Determined Contribution (NDC) as well as the commercial attributes of the carbon credits for the private sector are shared between the two countries.

Boosting Investments in the Region to Create a Green Hub

Singapore has recently announced a moratorium on new data centres. At the same time, major global digital companies are now being compelled to find alternative locations for establishing their data centres that remain close to Singapore. Shareholders of these companies have mandated that the energy used by these companies is powered by renewable energy within the next couple of years. This offers a great opportunity to attract investments in areas close to Singapore, providing they can demonstrate the availability of renewable energy.

Data centres are just the beginning. Many other industries, from advanced manufacturing to goods and services supplying to the projects, will be required. This will mean a significant multiplier to foreign direct and domestic investments in the province. Investments in healthcare, education, tourism, retail, and hospitality are examples of these multiplier investments that these solar PV mega program will stimulate. Other opportunities will also be created for industries supporting the construction of projects, such as the cable, steel, and cement industries, with a significant purchase scale.





IN CLOSING

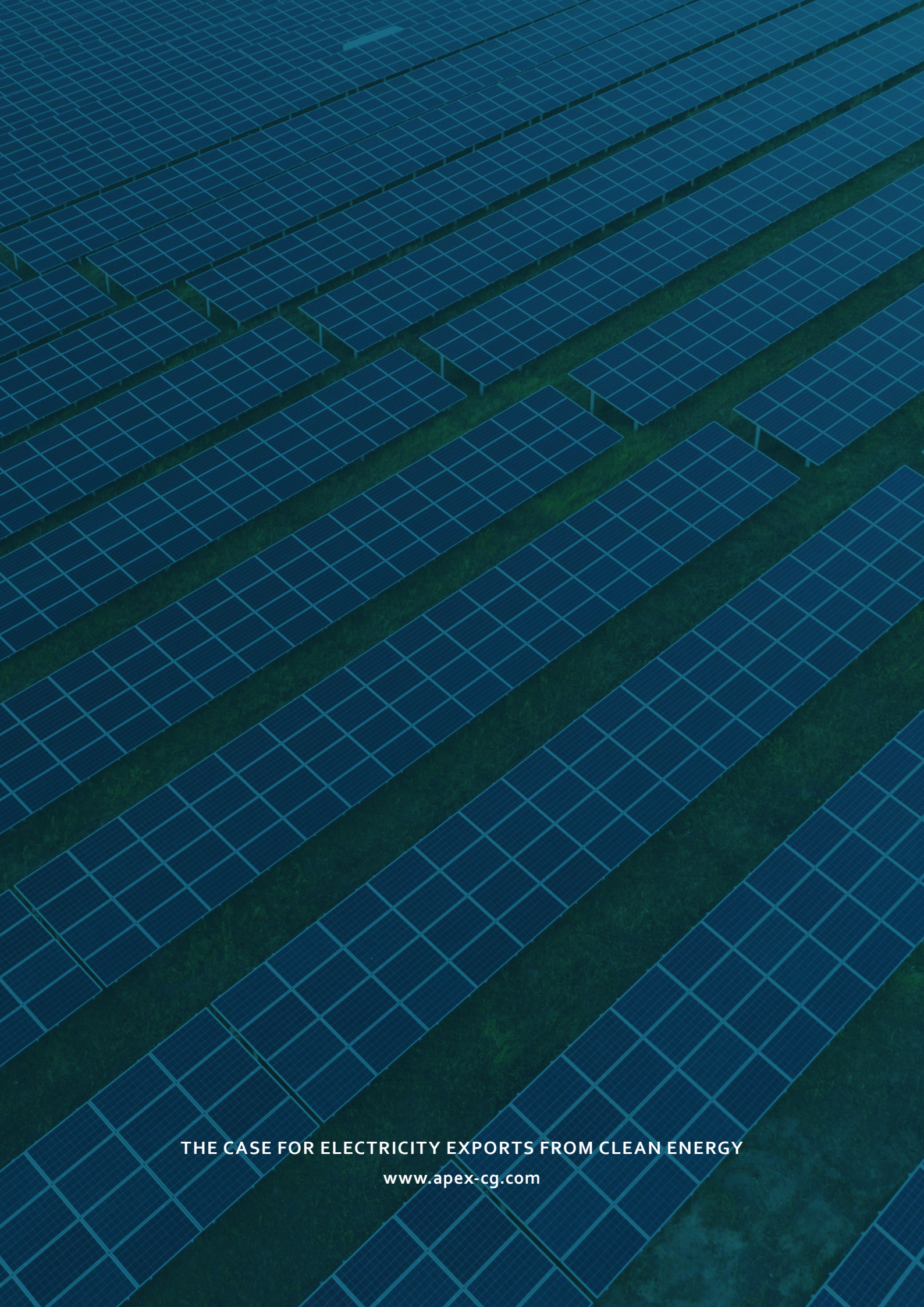
In Closing

Indonesia faces several challenges in meeting its ambitious targets for transitioning to renewable energy. Among these is that solar PV generation is significantly less than 1% of Indonesia's electricity generation mix. To date, PLN has also restricted the use of solar PV energy in small projects, including a maximum limit to rooftop solar PV projects. This means that it has not been possible for solar PV power plants to generate electricity at competitive rates when compared to subsidised coal power projects. At the same time, the lack of significant demand for products like solar panels means that domestic producers cannot produce at scale to compete with imported products or produce sufficient scale to compete with those imports.

The proposal to establish giga-scale solar power facilities inside Indonesia represents a game-changer to the sector. It will require inputs of panels and other equipment at such a scale as to help domestic manufacturers make a case to invest sufficiently to upscale production and technology capabilities to produce at regionally and globally competitive rates.

The power generated by these projects for export to Singapore would create a demonstration effect. This will then result in the establishment of other industrial and human resource capacity development. The proposed program will also lay a solid foundation for Indonesia to accelerate the uptake of new solar power production as demand for energy expands in the future. This will be achieved without burdening the state budget with additional subsidy costs that emerge when global commodity prices for fossil fuels rise. Locally, this investment will also take place in a district with lower-than-average levels of economic output and thus help to promote a fairer distribution of economic activity across Indonesia.

This position paper provides overwhelming evidence that Indonesia will reap significant benefits by embracing the opportunity to export renewable electricity. For both export and tax revenues and to enable the further development of Indonesia's domestic solar PV industry, including its manufacturing capacity as well as upskilling human resources to be competitive in the global market there are compelling reasons for Indonesia to approve the export of clean energy. **End.**



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