

Annual Impact Report 2020

Institute for Essentials Services Reform





Institute for Essential Services Reform (IESR)

Accelerating low-carbon energy transition in Indonesia



Foreword



Muhamad Suhud
Chairman of
IESR Executive Boards

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**Regulation
improvement
becomes an
essential key to
achieve Indonesia
that is emission-
free,”**

A sure-fire step towards low-carbon development according to Paris Agreement's objective must begin with a clear roadmap. During this past one year, Institute for Essential Services Reform (IESR) has been encouraging the government to plan the energy transition in Indonesia in detail, and involve all parties to suppress negative impact of energy transition.

In the beginning of 2020, pandemic storm and economic recession wave have made the government to focus more on economic recovery. Whereas, the economic recovery should be able to go hand in hand with improving Indonesia's climate ambition by encouraging the utilisation of renewable energy more massively, especially observing the trend of renewable energy technology and its cost that is getting lower.

Regulation improvement becomes an essential key to achieve Indonesia that is emission-free. The right regulation will create a qualified ecosystem and encourage big investment in renewable energy. The growing renewable energy adoption will enable Indonesia to recover from multiple sides, economically, socially, and environmentally.



Fabby Tumiwa

IESR Executive Director

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The most prominent impact of our programs and activities is mainstreaming the narrative of the energy system transition to a low-carbon energy system and encouraging the adoption of solar PV policies in Indonesia, especially rooftop solar PV, ”

2 020 was a hectic year for IESR. Amidst the pandemic storm, we have continued to push forward with energy transition agenda in Indonesia. All of our resources have been focused to disseminate narrations about the importance of energy transition towards decarbonisation to all stakeholders in Indonesia. *Kajian Peta Jalan Transisi Energi di Indonesia* (A Study on Energy Transition Roadmap in Indonesia), is one of the first studies for Indonesia which comprehensively analysed energy transition from various aspects: energy planning, impact on coal industry, economic impact, and energy transition in transportation sector.

IESR was also the one that is quite early to deliver the idea to the government for implementing “green economic recovery post-Covid-19,” through the installation of rooftop solar power plant with the program called “*Surya Nusantara*” (Solar Archipelago). This idea was received by the technical ministry and included in the ministry’s programme plan. This idea was also conveyed to President Joko Widodo when we were invited to a meeting in the National Palace. We believe that high quality studies conducted by IESR, supported by intensive communication to public will contribute to the direction of the government’s policy and regulation regarding renewable energy, electricity, and energy transition agenda in Indonesia.

There were many things that we have tried to do in 2020, but never enough to promote decarbonisation of energy system in Indonesia that is fair and people-oriented. There are still many things to do as we continue to improve the quality of all components in IESR, so that our works would significantly impact the improvement of policy, regulation, planning and implementation, as well as give as many benefits as possible for the community.

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About IESR: Accelerating Transition towards Low- carbon Energy System in Indonesia

Institute for Essential Service Reform (IESR) is a think tank institution that actively conducts advocacy and campaign to promote the fulfilment of energy needs in Indonesia according to fair principle in harnessing natural resources and the sustainability of ecology. IESR activities include analysis, research, public policy advocacy, campaign of specific issues, and collaboration with various organisations, government and non-government institutions.

IESR Programmes 2020 - 2023

Focus	Objective
 ENERGY TRANSFORMATION	To encourage energy system change towards the zero-carbon emission energy system through the improvement of renewable energy development and utilisation
 GREEN ECONOMY	To transform Indonesia economic system towards low-carbon economic system.
 SUSTAINABLE ENERGY ACCESS	To promote the provision of quality and sustainable energy access, and encourage public participation to support energy decarbonisation.
 SUSTAINABLE MOBILITY	To build solutions for the distribution of people, goods, and services by utilising a low-carbon, efficient, reliable, and integrated transportation system.



IESR's Contribution towards Energy Transition in Indonesia

Highlight

Since 2017, Institute for Essential Services Reform has been introducing transition narration towards clean energy, and conducting policy advocacy to accelerate renewable energy in Indonesia. As a result, although political commitments of the policy makers often ebb and flow in general, the adoption of energy transition idea is gaining more attention in both the mass media publications and conversations between policy makers in this country. The perception regarding energy transition within the government has also been shifted from putting more consideration on the renewable energy equitability factor¹ to gradually giving freedom to renewable energy, especially in the electricity power sector.

Supported by four thematic programmes, IESR consistently publishes studies and research products that are based on data, innovative, and with proven quality to convince policy holders, especially the Indonesian government to make a more ambitious commitment in order to fulfil the mandate of Paris Agreement to limit earth's temperature rises to below 1.5 degree Celsius. The four programmes are Energy Transformation, Sustainable Energy Access, Sustainable Mobility, and Green Economy.

¹ EBTKE, "Menteri Jonan Jelaskan Faktor Pertimbangan Dalam Transisi Energi", accessed from <https://ebtke.esdm.go.id/post/2018/11/15/2053/menteri.jonan.jelaskan.faktor.pertimbangan.dalam.transisi.energi> on the 18th July 2021, at 15.03



Encourage changes in coal industry to immediately transition into a more sustainable industry

IESR through the Energy Transformation Programme launched a study on energy transition roadmap in Indonesia. This report was the first to comprehensively review the energy transition from multiple aspects, i.e., energy planning, changes in energy system, and impact on coal industry and local economy. This report shows that in the near future, as the commitment of many countries worldwide to reduce their carbon emission is getting stronger, and renewable energy technology is becoming more competitive, coal-fired power plant (CFPP) will no longer be economical; thus, it will affect coal demand. In the discussion titled *Peta Jalan Transisi Energi Indonesia Menuju Sistem Energi Rendah Karbon* (Indonesia Energy Transition Roadmap towards Low-carbon Energy System), Adrian Lembong, General Treasurer, *Asosiasi Produsen Listrik Swasta Indonesia*/Director, PT. Adaro Power acknowledged the finding of that study.



Push the government and PLN to prioritise clean energy development

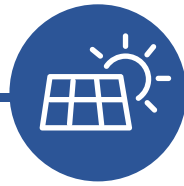
Through a study that is based on strong methodology and data, IESR continues to encourage the acceleration of renewable energy development. In September 2020, IESR launched a study which reviews *Rencana Umum Energi Nasional* (national energy plan) and points out that Indonesia needs to increase the capacity of its renewable energy power plant from initially only 300-500 MW per year to at least 2-3 GW per year (or increase from 10.5 GW in 2020 to 23.74 GW in 2025) to achieve the national energy mix target according to RUEN.

The study has opened a room for discussion for a more massive renewable energy integration to achieve zero-emission target in accordance to Paris Agreement, and inspired the Ministry of Energy and Mineral Resources (*Kementerian ESDM*) to be more ambitious in encouraging renewable energy utilisation.



Adrian Lembong
Director of
PT. Adaro Power

“Currently, building a CFPP has become very difficult because there are no more CFPP suppliers and financial support. The fact is that the moratorium of CFPP will become not only a political decision, but also an economic reality in the future,”



Support the National Movement of A Million Rooftop Solar (*Gerakan Nasional Sejuta Surya Atap (GNSSA)*)

As one of the declarators of GNSSA in 2017, IESR along with the Ministry of Energy and Mineral Resources (*Kementerian ESDM*), Association of National Solar Energy (*Asosiasi Energi Surya Nasional* (AESI)), Indonesian Community of Renewable Energy (*Masyarakat Energi Terbarukan Indonesia* (METI)), and other solar energy activists are still committed to achieve the target of 1 million rooftop solar power plant.

Until the end of 2020, the target of 1 million rooftops or 1 GW of cumulative rooftop solar power still had not been achieved. However, since GNSSA was implemented, there was an increase in PLN's customers who installed rooftop solar PV, from 268 in 2017 to more than 2.500 in October 2020. The total capacity of rooftop solar PV for PLN's customers who use net-metering reached 11.5 Megawatt (MW). The increase in rooftop solar PV also occurred in the commercial and industry (C&I) segments for their own use.

Increased interest in rooftop solar PV was triggered by regulations issued by the Ministry of Energy and Mineral Resources, i.e., *Permen ESDM No. 49/2018* which was revised with the issuance of *Permen ESDM No. 13/2019* and *Permen ESDM No. 16/2019*. Increase in demands also promotes the growth of service provider company for rooftop solar PV installation (EPC company). From the market survey conducted by IESR, it was

revealed that there is a tendency of increasing public interest in using rooftop solar PV in urban society as a part of green and modern lifestyle (*eco-lifestyle*).

IESR also encouraged the government to develop rooftop solar PV for households, business and commercial sector, and UMKM (micro, small, and medium enterprise). Compared to a utility-scale solar power plants development which requires sufficient land, time, and financing, as well as PLN as the electricity buyer, electricity from rooftop solar PV can be utilised for each segment's own use. Furthermore, IESR study showed that until 2030, market potential for rooftop solar PV in Java and Bali for residential segment could reach 10 – 12 GW.



PLN's customers who installed rooftop solar

268

2017

>2.500

October 2020



Provide High Quality Information on rooftop solar PV

The lack of reliable information and poor socialisation on regulation regarding the utilisation of rooftop solar PV has made it difficult for the community to decide installing rooftop solar PV. In addition, the availability of information about on-grid rooftop solar PV installation procedure, availability of good quality products, benefits for users, and where to buy the products is still limited and only concentrated in big cities in Java Island.

To bridge the scarcity of information regarding rooftop solar PV, IESR through its Sustainable Energy Access programme has launched SolarHub Indonesia portal. Other than information about rooftop solar PV, SolarHub is also equipped with a sophisticated calculator which could calculate the need of rooftop solar PV for future user's building, the investment cost, and how much electricity they could save from the solar power system that will be installed.



Support the regional government to develop regulation and incentive to attract clean energy investment

Renewable energy development needs to be implemented in the provincial level considering that there is *Rencana Umum Energi Daerah (RUED)* or regional energy plan which is derived from *Rencana Umum Energi Nasional (RUEN)* or national energy plan. IESR through its Sustainable Energy Access programme has provided technical assistance to two provincial governments in Indonesia, namely Central Java and Jambi, to formulate policy framework and develop supporting ecosystem for renewable energy. Through the cooperation with these two provinces, IESR has been working to help the provincial government to attract investment, bridge the investor to partner with the regional government in developing renewable energy, and develop business model (case study) that can be used as a reference.



Improve community's understanding on renewable energy

IESR promoted increase in community's understanding by conducting various information dissemination and community education activities. During pandemic, IESR held various webinars on energy which were open for public. IESR also conducted digital campaign via various social media channels to reach young people, influencer, and policy makers. Dissemination of information and IESR's view on energy policy and regulation were also presented in printed and electronic mass media. IESR Director and staffs become key opinion leaders for energy, climate change, and transportation issues.

One of the efforts to reach young people was done by Green Economy programme through Climate Innovation Hack 2020 competition. IESR encouraged the community that cares about the environment to produce a video about the importance of renewable energy and its positive impact on the environment. Seven videos were selected as finalists in Climate Innovation Hack 2020. After the competition, these champions received a mentoring class on renewable energy issues. The ultimate winner of this competition, Vokasinema Community, said that they are getting more interested in incorporating climate change theme in their next video works or short movie.



Spread knowledge and idea in higher education in Indonesia

IESR contributed to strengthening energy transition idea and renewable energy development in Indonesia by becoming resource person in various events that were held by students and universities. IESR staffs also set aside some time to teach in multiple programmes and classes at the university, became peer reviewer in various scientific studies and journal articles, and provided assistance and mentoring to some students to work on their bachelor, masters, or PhD thesis.

Through those diverse activities, new insights on renewable energy, energy transition, and energy policy in Indonesia can be created and they will shape the perspective and attitude of Indonesian young people who will become future leaders to implement the energy transition agenda.



Resonate the World with Energy Transition Digital Advocacy

Institute for Essential Services Reform (IESR) also felt the impact of Covid-19 pandemic which has caused the institution to adapt to the situation by shifting its advocacy approach from mostly face-to-face meeting into utilising online world as its advocacy media during the pandemic.

Energy transition digital advocacy in its journey has brought more experts and policy makers together who discussed and shared their opinion during some events held by IESR. Moreover, number of media coverage on IESR advocacy activity and research result has significantly increased. This indicates that although Covid-19 pandemic limited our space, it could not hinder energy transition narration from being delivered so that the renewable energy development in Indonesia will be prioritised by policy makers.

Ensuring Energy Access for Poor Families during Covid-19 Pandemic, IESR Recommended Alternative Energy Pricing Scheme

Covid-19 pandemic has made Indonesia's economic wheel to slow down, even led to recession. BPS recorded that Covid-19 has forced the open unemployment rate to rise at 7.07 percent of 138.22 million work force. This indicates that there are 9.77 million people who are openly unemployed². In addition, throughout 2020, Indonesia's economic growth was negative in the 2nd quarter (- 5.32%) and the 3rd quarter (- 3.49%).

Since March 2020, IESR has predicted that the strong surge of this pandemic wave will eventually shut poor families' access to electricity supply should the government do not take any immediate action.

“The government needs to provide a subsidy in the beginning to maintain the purchasing power of poor households, prevent the number of poor people from increasing, and ensure energy access for the community,”

Fabby Tumiwa, Executive Director of IESR³

IESR recommended incentive provision for poor household-scale electricity customers under the 450 VA and 900 VA categories. IESR considers that most households in these groups are not permanent employees who have fix monthly income; thus, a disrupted daily income will make it difficult for them to pay the electricity bill.

IESR recommended the government to provide an incentive by waiving electricity bill for the first 50 kWh usage. Referring to several research, IESR mentioned that normal electricity consumption in poor or non-able households ranges from 40 kWh to 60 kWh per month. This alternative electricity pricing scheme will ensure the government to guarantee those groups' rights for energy⁴.

Although the government did not fully accommodate IESR's recommendation, in early April 2020 President Joko Widodo instructed to provide electricity price discount for poor people group. PT PLN (Persero) followed up the instruction by fully waiving the electricity bill for 24 million customers in the 450-volt ampere (VA) subsidy group. PLN also gave a 50% discount to seven million customers in the 900 VA subsidy category. This policy has been implemented since early April and will end in June 2020.⁵

Ismono, one of the community members who received aid stimulus in Demak, stated that Covid-19 has made his stationery business unprofitable.

²BPS, "Agustus 2020: Tingkat Pengangguran Terbuka (TPT) sebesar 7.07 persen", accessed from <https://www.bps.go.id/pressrelease/2020/11/05/1673/agustus-2020-tingkat-pengangguran-terbuka-tpt-sebesar-7-07-persen.html>, on the 22nd April 2021 at 13.00.

³Yanita Petriella, "Pro Kontra Perluasan Stimulus Listrik", accessed from <https://ekonomi.bisnis.com/read/20200408/44/1224158/pro-kontra-perluasan-stimulus-listrik> on the 15th April 2021 at 11.30.

⁴Aris Prasetyo, "Daya Beli Masyarakat Turun, Insentif Tarif Listrik Diusulkan", accessed from <https://www.kompas.id/baca/ekonomi/2020/03/30/daya-beli-masyarakat-turun-insentif-tarif-listrik-diusulkan/> on the 22nd April 2021 at 14.00.

⁵Norman Harsono, "Jokowi announces free electricity, discounts for households hardest hit by COVID-19 impacts", accessed from <https://www.thejakartapost.com/news/2020/03/31/jokowi-announces-free-electricity-discounts-for-households-hardest-hit-by-covid-19-impacts.html>, on the 23rd April 2021 at 14.00.

“Currently schools are closed, so my revenue decreases until almost one hundred percent. Previously I could get 1-2 million, but now it decreases up to 75%. So I think applying the discount and full bill waiver for the 450 VA and 900 VA customers is perfect. Electricity bill for as much as 50 thousands a month can be used for other needs,” he said during the first *Diskusi Daring Pojok Energi* (Energy Corner Online Discussion) with the topic *Jaring Pengaman Sosial Sektor Energi Di Masa Pandemi Virus Corona* (Social Security Net in Energy Sector during Covid-19 Pandemic) (14/04/2020).⁶

IESR appreciated the government’s action. However, for future reference IESR suggested the government to conduct an evaluation towards energy access provision.

“The government needs to integrate socio-economic poverty and energy poverty data. All this time the social security net is associated with poverty rate and income, but there is no standard measurement for energy poverty itself,” said Fabby.⁷



⁶IESR, “Pojok E-Nergi: Jaring Pengaman Sosial Sektor Energi di Masa Pandemi Virus Corona”, accessed from <https://iesr.or.id/en/pojok-e-nergi-jaring-pengaman-sosial-sektor-energi-di-masa-pandemi-virus-corona> on the 22nd April 2021 at 15.00.

⁷ ESDM, “Pemerintah Beri Keringanan Listrik untuk Stimulus COVID-19”, accessed from <https://www.esdm.go.id/id/berita-unit/direktorat-jenderal-ketenagalistrikan/pemerintah-beri-keringanan-listrik-untuk-stimulus-covid-19> on the 16th April 2020 at 10.30.

Rising from Economic Adversity Post-Covid-19, the Government Has Been Interested in Adopting IESR's Idea on Solar Archipelago

Number of Covid-19 patients in Indonesia keeps increasing since its first case occurrence in March 2020. The government also takes transmission prevention measure by issuing a policy on activity restriction through the implementation of PSBB, and suppresses the impact of crisis by preparing social security net and financial support for affected business and UMKM (micro, small, and medium enterprise). However, IESR considers that the government also needs to prepare a concrete step for economic recovery post-Covid-19 pandemic, so that the country could be back on track to the path of positive economic growth, equitable infrastructure development, and poverty reduction.

Furthermore, apart from the pandemic issue, Indonesia should also be prepared for climate change threat that triggers several hydro-meteorological disasters and causes greater loss. In addition, the natural disaster could potentially exacerbate the transmission of Covid-19 pandemic if the shelters are limited and health facilities are unreliable.

IESR sees that Covid-19 creates opportunity for Indonesia to enter low-carbon economy growth path that could result in high and sustainable economic growth as well as overcome the climate crisis issue. Therefore, IESR provides recommendation to the government, especially President Joko Widodo, to formulate post-pandemic economic recovery stimulus package that is integrated with energy transition to achieve energy system that reduces dependency on fossil-fuel, accelerate renewable energy development, create job opportunities in short term, strengthen the national renewable energy industry, and reduce greenhouse gasses emission.

In April 2020, IESR recommended *Surya Nusantara* (Solar Archipelago) programme to the government to accelerate economic recovery post-Covid-19 pandemic and address the aforementioned challenges.



1 GWp

rooftop solar PV installation



500-600K

poor households who receive electricity subsidy of 1.5 kWp – 2 kWp each, which is on-grid



30.000

workers absorbed both directly and indirectly for the whole year



Rp. 1,3 trillion

saving the electricity subsidy per year



1,05 million tonnes/year

greenhouse gases (GHG) emission that potentially mitigated which could contribute to the achievement of target for reducing 29% GHG emission in the nationally determined contribution (NDC)

The government, through the Ministry of energy and Mineral Resources (*Kementerian ESDM*) expressed its interest in adopting this IESR's idea into a national programme. IESR and Kementerian ESDM then held an intensive discussion to finalise this programme plan in expectation that it could be implemented in 2021 and continued until 2025 to support the achievement of 6.5 GW target from solar power as stated in the Perpres No. 22/2017 about RUEN.

The Director of Various New Energy and Renewable Energy of Ministry of EMR, Harris sent positive signal towards *Surya Nusantara*. Regarding the need for the programme's budget stimulus as much as 15 trillion in the first year which could decrease from year to year as the price of solar module decreases, Harris stated that it could be accommodated in the national budget (*Anggaran Pendapatan dan Belanja Negara (APBN)*) and aimed to help poor community and poverty-prone community or PLN customers who receive subsidy from the government.



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**“At the moment,
Surya Nusantara
programme
is still under
discussion,”**

Harris Yahya
Director of Various New Energy
and Renewable Energy of
Ministry of EMR

In the online discussion of
Hackathon New Energy Nexus

Responding to the Urgent Need of Indonesia Energy Transition Roadmap, IESR Initiated 4 Study Series

Institute for Essential Services Reform (IESR) realises that by managing energy transition process properly, then the positive impact towards sustainable economic growth, reduction of carbon emission, and the fulfilment of Paris Agreement could be optimised. On the other hand, energy transition could also bring negative impact in the economy, social, and even environment if the process is not maturely prepared. To encourage Indonesia developing energy transition roadmap as soon as possible, IESR launched four thematic study series.

1. Reviewing RUEN to Accommodate Energy Transition

“Utilisation of renewable energy has already become the priority of national energy development and utilisation stated in the national energy policy (*Kebijakan Energi Nasional (KEN)*), but has not been reflected in the achievement of national energy plan (*Rencana Umum Energi Nasional (RUEN)*) until 2020. Regardless of the ambitious target, some indicators and assumptions that were used to model energy supply and demand in the RUEN were also developed based on the database and information in 2015. Whereas, during this past five years the indicators and assumptions in socio-economic, and techno-economic fields have undergone significant development,” explained Fabby Tumiwa, Executive Director of IESR during the launching of a study on energy transition roadmap in Indonesia (28/9/2020).

As implied in the title ***National Energy Plan (RUEN): Existing Plan, Current Policies Implication and Energy Transition Scenario***, the writer of the study, Agus Praditya Tampubolon analysed the National Energy Plan (RUEN) 2017 using three scenarios (realisation, current policy, and energy transition scenario) to evaluate and project the achievement of initial RUEN target which starts to become irrelevant if juxtaposed with the energy transition phenomenon in many different parts of the world.

Agus applied coal-based steam power plant (PLTU) development restriction parameter in the energy transition scenario. As a result, the portion of renewable energy in the main energy mix, which is 18% according to RUEN, will increase to 20% in 2025.

Through this study, IESR recommended three important points to the government

1 The government should review the parameter and assumption used in RUEN 2015-2050

2 The government should increase the portion of renewable energy that is in line with the effort to reduce fossil fuel, for instance by reducing coal-fired power plants (CFPP)

3 Study on alternative scenario development in the national energy provision plan which integrates bigger portion of renewable energy



Saleh Abdurrahman

The expert staff of environment and spatial planning in the General Secretariat of Ministry of Energy and Mineral Resources
in the report launching of Energy Transition Roadmap in Indonesia

"In 2050 it will increase to around 66-69%," he explained.

Responding to the report and recommendations from IESR, Sugeng Mujiyanto, The Head of Energy Policy Facilitation Bureau and National Energy Council Assembly (*Biro Fasilitasi Kebijakan Energi dan Persidangan Dewan Energi Nasional (DEN)*) assumed that although his institution always review RUEN annually, another review will be held if there is an urgent condition.

"For example, as we saw on TV yesterday the Director of Pertamina stated that oil (BBM) demand decreased around 25-26% due to Covid-19 pandemic. This is quite significant. If such an issue persists, we must also review it (RUEN) again," he explained.

Meanwhile, Saleh Abdurrahman, an expert staff in the field of environment and spatial planning (*Staf Ahli Bidang Lingkungan Hidup dan Tata Ruang*) in the General Secretariat of Ministry of Energy and Mineral Resources, admitted that he is interested in IESR's recommendation on alternative scenario regarding energy transition.

"IESR's energy transition scenario of course becomes such a great input. We don't want to rely on fossil energy forever, so I think we still have enough time to prepare it. I would love to have IESR continues to enrich us with how we can make the energy transition also results in sustainable economic transition with higher added value," he said.

During its 5th Plenary Session in April 2021, the National Energy Council (*Dewan Energi Nasional (DEN)*) decided to discuss about national energy grand strategy (*Grand Strategi Energi Nasional (GSEN)*) as the perfection of *Rencana Umum Energi Nasional (RUEN)* considering the inputs from related ministries, institutions, BUMN, private sectors, and stakeholders.⁸

One of the strategies that was brought forward by the government was optimising solar energy utilisation.

"We will try to make solar power as the backbone later, which is getting more economical in its development," said Arifin.



Sugeng Mujiyanto

The Head of Energy Policy Facilitation Bureau and National Energy Council Assembly
in the report launching of Energy Transition Roadmap in Indonesia

⁸Humas EBTKE, "Sidang Paripurna Ke-5 DEN: Grand Strategi Energi Nasional Penyempurnaan dari Rencana Umum Energi Nasional (RUEN)", accessed from <https://ebtke.esdm.go.id/post/2021/04/21/2845/sidang.paripurna.ke-5.den.grand.strategi.energi.nasional.penyempurnaan.dari.rencana.umum.energi.nasional.ruen?lang=en> on the 17th June 2021 at 11.45.



2. Moratorium Policy on Coal-Fired Power Plant (CFPP) Will Prevent Future Loss

To deal with global energy transition trend which brings consequence to coal industry, the Indonesian government needs to prepare a strategy that will promote the development of renewable energy industry, for the sake of maintaining economic resilience and fulfil the Paris Agreement in terms of climate and environmental benefit.

Indonesia is one of the biggest coal producers with its export quantity reached 80 percent of the total coal production, and its domestic coal consumption in the coal-fired power plants (CFPP) itself was almost 95 million tonnes in 2020. However, coal export destination countries such as China and India have shifted their focus into massive development of renewable energy and planned to reduce their coal-based steam power plant.

Technology development has made it possible for renewable energy to compete economically with coal-based steam power plants, and of course it is more environment-friendly.

“China as one of Indonesia’s coal export destination countries has considered to limit coal consumption because it contributes to air pollution. The President of the People’s Republic of China even enacted net zero emission in 2060. Furthermore, as occurred in 2013-2015, when the coal price declined, the Chinese government started to limit coal import to protect the domestic coal,” described Deon Arinaldo, the writer of ***Energy Transition in the Power Sector and Its Implication for the Coal Industry*** report.

This study developed three scenarios of coal projection until 30 years ahead. As a result, all scenarios showed a decline in Indonesia’s coal demand.

“Even in the sustainable development scenario, in 2050, the potential decline of coal demand reaches 86% of the demand in 2018,” said Deon.

The downward trend of coal demand will affect the coal industry, which will not only affect the non-tax state revenue (*Penerimaan Negara Bukan Pajak (PNBP)*) source, but also the local own-source revenue (*Pendapatan Asli Daerah (PAD)*) as the primary revenue source of coal-producing regions.

To avoid experiencing loss, the Indonesian government needs to map the affected industry, region, and community so that it will not result in significant economy contraction.

Through this study, IESR recommended the government to adopt three strategies to diminish the impact of energy transition. First, the government should carry out a moratorium of CFPP construction to minimise the potential of stranded assets and enlarge the room for renewable energy mix. Second, the currently operating and economical CFPP needs to conduct a retrofit, i.e., making the development more relevant and more flexible for renewable energy. Third, the government should plan to accelerate the closure of CFPP (*coal-phase out*) by considering the efficiency and preparedness of electric power system and alternative technology for renewable energy. For coal industry, business diversification

to a more sustainable industry is certainly required to maintain and improve the company's competitiveness in mid- and long-term.

Responding to Deon's elaboration, Sujatmiko, The Director of *Pembinaan Pengusahaan Batubara* ESDM said that coal potential in Indonesia is still abundant, 149 billion tonnes of coal and 38 billion tonnes of asset reserve,⁹ so it is still worthy of being relied on as the driving force of the economy. However, he did not deny the fact that in the future an innovation is required in coal business world to make it in alignment with the Paris Agreement, that is to reduce greenhouse gases emission.

"As the way to achieve it, we are currently developing coal downstream industry such as coal gasification, coal liquefaction, and coal quality improvement. The government, through the Job Creation Act (*UU Cipta Kerja*) will also provide non-fiscal incentive for coal development such as providing mining permit, as well as fiscal incentive such as up to 0 percent royalty to improve the economy of coal down-streaming," he explained.

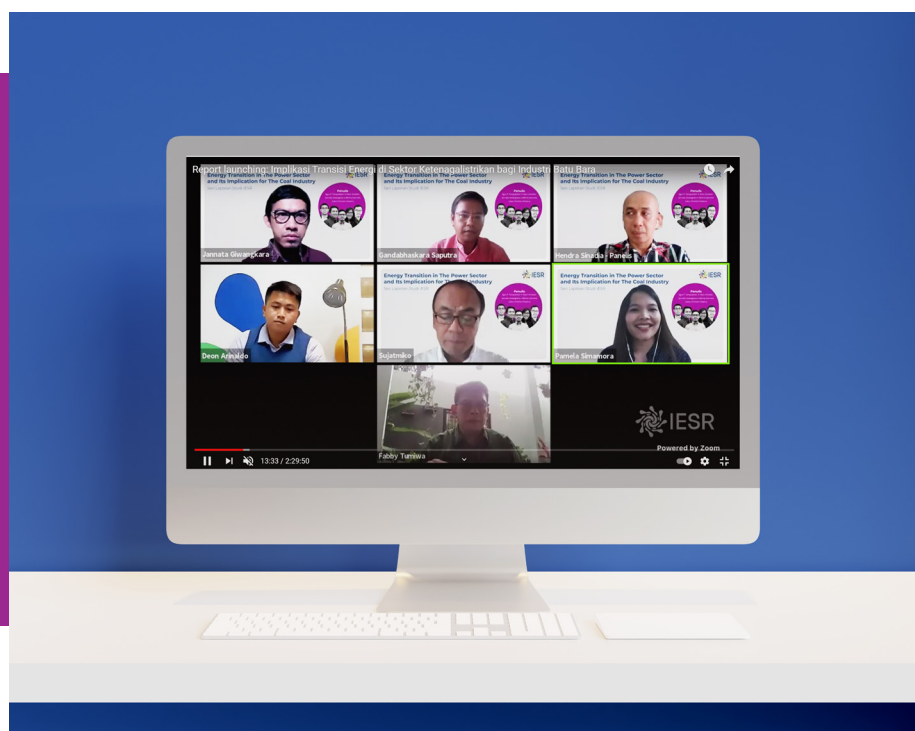
Quite the opposite, Deon considered this step has not been able to address the real main issue.

"Coal gasification to produce synthetic gas is actually not a new technology. It is even more complicated and more expensive than direct processing of natural gas. In addition, the demand of this coal gasification product is synthetic gas. Can it compete with synthetic gas product from other commodities? And then, is there any the domestic market that can absorb it?" he elaborated.

On the other hand, Hendra Sinadia, the Executive Director of *Asosiasi Pertambangan Batubara Indonesia (APBI-ICMA)* saw that the coal market is still promising for the next 20 years, but he agreed should the government immediately take the lead in renewable energy transition process so that the interests of all parties, including coal business practitioners could be well-accommodated.

Furthermore, IESR will continue to encourage the government to focus more on the development of renewable energy and conduct policy advocacy to protect Indonesia from a huge potential loss resulted from investment in the coal down-streaming.

Report Launching:
Energy Transition in
the Power Sector and
Its Implication for the
Coal Industry



⁹Della Syahni, "IESR: Ekspor Bakal Meredup, Hilirisasi Batubara pun Berisiko", accessed from <https://www.mongabay.co.id/2020/11/06/iesr-ekspor-bakal-meredup-hilirisasi-batubara-pun-berisiko/> on the 14th June 2021 at 15.45.

3. In Need of a Mature Strategy, Indonesia Must Ensure that Energy Transition is Justly Carried Out

Energy transition promises a low-emission development that will be beneficial for the sustainability of the earth and a quality future for the generation, but on the other side it will impact the economic and social stability in Indonesia if it is not properly anticipated.

Renewable energy has significantly progressed, and as a result, it triggers energy transition in many countries. IRENA recorded that up until late 2019, the capacity of renewable energy in the world was 2.537 GW, increased 176 GW from the previous year. Reflecting on the energy transition process that happened in Germany, Australia, Canada, and South Africa, Institute for Essential Services Reform (IESR) launched thematical study series report about Indonesia energy transition roadmap titled ***Ensuring a Just Energy Transition in Indonesia: Lessons learned from country case studies***. This study is written by Melina Gabriella and Pamela Simamora.

“Energy transition in its core is actually about people; people who make the decision, and people who will be affected by the decision made,” said the Executive Director of IESR, Fabby Tumiwa (20/10/2021).

In a nutshell, Melina Gabriella described the definition of a just energy transition as an energy transition process that ensures all parties are well-accommodated, or in other words no one is left out and harmed, and it guarantees that cost and benefit coming from the energy transition will be equally distributed.

The report ***Ensuring a Just Energy Transition in Indonesia: Lessons learned from country case studies*** exposed the energy transition journey of four countries which do not always run smoothly. For instance, Ruhr region as the biggest coal producer in Germany, needs about 60 years to carry out energy transition. It was started with the German government provided a significant amount of subsidy to protect coal industry which suffers from the implementation of price liberalisation.

“This action has made the energy transition cost escalated and the economic diversification took longer than it was supposed to be,” said Pamela.

In Indonesia, there are at least five districts that will be affected by the decline in coal export. They are Kutai Kartanegara, Kutai Timur, Paser, Balangan, and Muara Enim District. Those five districts are coal producers in Indonesia. According to IESR’s calculation, approximately more than 100.000 employments in coal industry will be lost.

If the Indonesian government has not anticipated the impact of declining world coal demand, then there will be PDRB decrease in coal-producing regions, deficit in the balance of trade, and increase in the number of

5
districts that will
be affected by the
decline in coal export



**Kutai
Kartanegara,**
East
Kalimantan



Kutai Timur,
East
Kalimantan



Paser,
East
Kalimantan



Balangan,
South
Kalimantan



**Muara
Enim,**
South
Sumatera



100.000
employments in coal
industry will be **lost**

unemployed people who lost their jobs in the coal industry. Nevertheless, if the implementation of a just energy transition succeeds, it will result in benefit and opportunity for Indonesia, such as: cheaper electrical system cost, economic diversification, development of new industry, the emergence of green job opportunity, improvement of air, land, and water quality, and reduced health cost for the community.

Based on the learning from these four countries, IESR persuaded the government to **prepare the strategy and policy to ensure the just energy transition process well-executed** by considering several aspects such as implementation of good governance in planning the energy transition path, the need to create enabling condition for renewable energy investment, the availability of public consultation and social dialogue, stipulation of policy regarding social protection and skill development, economic diversification, and the formulation of funding mechanism to support just transition.

KH. M. Aswin, the Head of Development Planning Agency at Sub-National Level (*Bappeda*) in East Kalimantan Province admitted that since 2007 coal has become the biggest contributor of East Kalimantan's PDRB.

He just complained about limited authority of the province in terms of developing policy regarding coal.

"The regional government could only plan it, but the national government is the one who decides," he added.

East Kalimantan openly accepted IESR's input regarding the preparation for energy transition in its region. Responding to that, IESR visited Samarinda and met the East Kalimantan provincial government, as well as Mr. Muksin, the Head of Paser District's *Bappeda*. After listening to the exposition of study findings stated in the report and the initial analysis of East Kalimantan Province's RPJMD and RUED documents, East Kalimantan provincial government presented information about the actual economic and energy condition in East Kalimantan Province to explore future partnership opportunity.



“

“However, the government has planned the economic transformation to achieve a sustainable economy, with the contribution of oil and gas and coal mining reduced from 45.49% to only 17% in 2050,”

KH. M. Aswin

The Head of Development
Planning Agency at Sub-National
Level in East Kalimantan

4. Contributing to GHG Emission, Transportation System in Indonesia is in Need of Energy Transition

Transportation sector as the biggest consumer of fuel-oil (BBM) emitted greenhouse gases (GHG) for approximately 150 million tonnes in 2017. If this energy consumption pattern persists, then in 2050 it will produce 500 million tonnes carbon emission. To avoid carbon explosion in 2050, for the sake of keeping earth's temperature rise below 1.5° C, IESR suggests the Indonesian government to prepare energy transition roadmap that anticipates the development of low-carbon technology.

Through a study titled ***A Transition Towards Low Carbon Transport in Indonesia: A Technological Perspective***, IESR pushed the government to map the energy transition path so that the potential of negative impact resulted from energy transition stream in transportation sector such as infrastructure unpreparedness or error in technology selection will not happen. This will also prevent the decrease in economic activity or the occurrence of stranded assets.

To achieve zero-emission, renewable energy-based alternative vehicle technology is needed to replace fuel-oil (BBM). Some of the alternative technologies discussed in this report include KBL, BBN, hydrogen fuel (*bahan bakar hidrogen* (BBH)), and synthetic fuel (*bahan bakar sintetis* (BBS)). According to Julius, Researcher and Clean Fuel Specialist, IESR, every decarbonisation option has different potential and limit, so we cannot depend on one of them only.

Julius stated that electrification of light vehicles (such as motorcycle, car, and bus) needs to be prioritised, because it could give many added benefits. Meanwhile, other transportation modes that are difficult for electrification (such as road freight mode, sea transportation, and flight) need to utilise alternative fuel. Biofuels such as biodiesel and bio gasoline are the most promising choices.

“

It is important to have low-carbon transportation-oriented policies such as strengthening the regulation for vehicle emission threshold, application of carbon emission-based tax, and the target to ban the use of fossil-fuelled vehicle. Another important aspect that needs to be taken into account includes the sustainability aspect, both environmental and social from the existing alternative technology options, especially in terms of land use in BBN programme, as well as electricity source and metal component of the battery for electric vehicle ,”

Julius Christian A.

Researcher and Clean Fuel Specialist,
IESR



Responding to this, Firdaus Komarno, the Head of *Pusat Pengelolaan Transportasi Berkelanjutan Kementerian Perhubungan* (Sustainable Transportation Management Centre of Ministry of Transportation) in general agreed on Indonesia's need to carry out energy transition. In his presentation, Firdaus explained that the government has issued various policies to encourage energy transformation in the transportation field. However, he admitted that those policies have not been well-integrated.

"Hopefully, the three ministries, i.e., Ministry of Energy and Mineral Resources, Ministry of

Transportation, and Ministry of Industry will be able to synergise and integrate in the future, in order to monitor this low-carbon development," he expected.

Firdaus has a similar view regarding the challenge of energy transition in Indonesia. The government still faces a challenge due to the absence of electricity tariff determination, so it has not been able to give any certainty to electric vehicle producers. In addition, the government has not yet issued any policy regarding incentive provision for low-carbon vehicle users.



ICEF Urged the Indonesian Government to Harness Energy Transition

Green recovery post-pandemic by implementing energy transition based on renewable energy will help the rise of Indonesia's sustainable economy. Energy system that utilises renewable energy will also smoothen Indonesia's path to contribute in reducing GHG emission to zero in the middle of this century. Indonesia Clean Energy Forum (ICEF) pushed the Indonesian government to harness the global energy transition wave by issuing policy and decision in energy and economic sector that keep up with the current technology and knowledge development.

Kuntoro added that Indonesia needs a national energy transition roadmap, especially because currently countries with developing economy such as Indonesia are in the crossroad to decide the future of their energy system. This Ex-minister of Mining and Energy inferred that when we try to rise and recover from the pandemic, the fulfilment of energy needs in the future must be achieved by utilising carbon-free alternative technology that has become more competitive.

"The development of renewable energy technology that is getting more advanced and economical has made the fossil-based conventional energy system no longer relevant to be maintained," he said.

ICEF sought to promote a constructive energy transition pace by holding an annual event in collaboration with Institute for Essential Services Reform (IESR) titled Indonesia Energy Transition Dialogue (IETD) on the 7th-11th December 2020.

Attending the IETD series, Vice Minister of Finance, Suahasil Nazara said that the government will support novel renewable energy industry through *tax holiday* and *tax allowance* policy.

"We will also allocate budget to the regions for supporting energy sector, including for location financing, business capital injection, and project development," he stated.



“

**Stay adamant
to build fossil
fuel-based
infrastructure
will become an
issue in the long
run with locked
high-carbon
technology and
infrastructure,”**

Kuntoro Mangkusubroto
Chief of ICEF Advisory Board



Indonesia Energy Transition Dialogue: This Year is the Right Moment for Energy Transition

In the third year of its organisation, Indonesia Energy Transition Dialogue (IETD) (7th-11th December 2020) was focused on the role of renewable energy-based energy transition to prompt the economic recovery post-Covid-19 pandemic, while at the same time modernising energy system towards the decarbonisation of Indonesia's energy system halfway through this century.

Discussing with more than 60 domestic and foreign speakers, and reaching approximately 23 thousand people online, IETD event was opened by the Minister of Energy and Mineral Resources, Arifin Tasrif.

Fabby Tumiwa, the Executive Director of Institute for Essential Services Reform (IESR) stated that

the national economic recovery package (*Paket Pemulihan Ekonomi Nasional (PEN)*) post-Covid-19 pandemic of IDR 318 trillion has not been siding with renewable energy.

"According to our study in 2019, Indonesia is capable of adding renewable energy penetration up to 40% in Java-Bali, and Sumatera without compromising the safety and adding the system cost," said the Executive Director of IESR & ICEF, Fabby Tumiwa, Monday (7/12/2020) in IETD 2020 panel discussion event titled "*Transisi Energi: Kunci Membangun Kembali Sistem Ekonomi dan Energi yang Lebih Baik*" (Energy Transition: the Key to Rebuild a Better Economic and Energy System).

Fabby Tumiwa firmly stated that prioritising

economic recovery in renewable energy development will in fact bring Indonesia's economy into positive direction. The development of renewable energy will attract clean energy investment, create new green-job opportunity, and reduce GHG emission and air pollution.

Minister of Energy and Mineral Resources of Indonesia, Arifin Tasrif said that it is crucial for Indonesia to start using renewable energy amidst the economic recovery post-Covid-19 pandemic.

Arifin stated that the government's move must be supported by fiscal policy climate that is in favour of renewable energy industry. Other than that, a regulation is needed to regulate renewable energy business so that it could stay on the assigned track.

Regarding the hosting of IETD itself, the Chief of Indonesian Renewable Energy Society (*Masyarakat Energi Terbarukan Indonesia (METI)*), Surya Darma, admitted that IESR could become a reference for energy transition in Indonesia.



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There are several focuses of the government to foster the development of renewable energy, namely biodiesel development, the development of solar energy as a renewable energy source, and utilisation of biofuels for vehicle,”

Arifin Tasrif

Minister of Energy and Mineral Resources of Indonesia

“

We hope in the future IESR could continue to play its role as an institution that focuses on energy, electricity, climate change, and extractive industry's interest, and also build a synergic partnership with other civil society organisations including METI,”



Surya Darma

the Chief of Indonesian Renewable Energy Society (*Masyarakat Energi Terbarukan Indonesia (METI)*)

Publishing the Main Report, IESR Emphasised Massive Development of Renewable Energy

Institute for Essential Services Reform (IESR) introduced *Kerangka Kesiapan Transisi Energi* (Transition Readiness Framework) in electricity sector in IESR's energy annual report, Indonesia Energy Transition Outlook (IETO) 2021 that was launched on the 26th January 2021. IESR's analysis showed that although it has not been 100% ready, Indonesia is capable of commencing energy transition in electricity sector in 2020/2021. Priority actions that the government could take immediately are strengthening the political commitment, improving the quality of regulations, and ensuring the availability of investment and finance for the development of renewable energy.



to achieve mix
target

23%

installed capacity of
renewable energy
power plants

should reach at least

24 GW

installed capacity of
renewable energy power
plants by 2025,
2-3 GW per year

To make up for the lag, solar power has a great potential to harness, considering that the technical potential of PLTS (solar power plants) in Indonesia is tremendous



655 GWp

for residential sector only



thousands of
gigawatts for large
scale.

“

The condition will possibly be fulfilled with the availability of investment in renewable energy field that reaches US\$ 5-7 billion per year,”

Fabby Tumiwa

Executive Director of IESR

It is not impossible to achieve if Indonesia has the right policy to foster the investment climate in renewable energy. Moreover, having a firm political commitment and policy such as issuing moratorium policy for the construction of steam power plants (*Pembangkit Listrik Tenaga Uap (PLTU)*), reviewing the policy on the construction of coal-fired power plants (CFPP), down-streaming by considering investment risk, subsidy potential, lock-in infrastructure, and carbon emission, as well as gradually shutting down CFPPs that have been operating for more than 20 years will prevent the country from futile investment in the future as a result of CFPP's stranded asset.

Sugeng Suparwoto, the Chief of *Komisi VII DPR RI* agreed that increasing renewable energy mix must become a priority in the government's policy,

including in the discourse to review *Rencana Umum Energi Nasional (RUEN)*.

"RUEN revision should not revise the 23% target of renewable energy, but it should revise the portion of oil, gas, and coal instead. Steps that can be taken are renegotiation and rescheduling of CFPP projects, especially the 35 GW ones, which currently are in the planning process."

IETO 2021 report is the transformation of IESR's flagship report during the past 3 years, i.e. Clean Energy Outlook. Rebranding of ICEO into IETO was made in order to affirm and reflect IESR's mission in supporting the acceleration of clean energy development and reducing the portion of fossil energy in the country in the energy transition framework. This IETO 2021 report do not only focus on analysing the development of clean energy, but also starts to highlight the dynamics and government policy's implementation in fossil energy sector, which presents a clear picture on how far has Indonesia been working on the energy transition path that is getting more progressive not only worldwide, but also in South East Asia.



Report Launching:
Indonesia Energy Transition
Outlook 2021

Climate Crisis, a Universal Issue that Requires All Hands-on Deck

This decade has marked multitude of climate issues such as increase in hydro-meteorological disaster which was triggered by global temperature rise. IESR suggested a video competition called Climate Innovation Hack to create a discussion and raise public awareness on green recovery post-covid-19 pandemic for a better future. *Komunitas Lamongan Teduh* and *Bima British Junior* are among those who were inspired by this competition.

Video teaser of “Unseen”
by Lamongan Teduh

From Self Actualisation to Involvement of People with Disability’s Group towards Climate Awareness

In 2020, *Lamongan Teduh* participated in the video competition held by IESR called Climate Innovation Hack. This competition aimed to promote Climate Transparency Report (previously called Brown to Green Report) to wider audiences. In the submitted video, it involved people with disability (PwD) as the main casts to deliver a message about how climate issue is everyone’s responsibility, including people with disability. Instead of looking at people with disability using a perspective that views them as the ones who need help in environmental issue, Siti Aminatuz, a representative of *Lamongan Teduh*, and her friends believed that people with disability could actively contribute to spread awareness on climate and environmental issue.



“

We know that our friends (PWD) also want to participate in the effort to protect the environment as a respond to climate issue, but up until now there are still very limited means to accommodate their enthusiasm. Therefore, in our video, we presented an issue about the provision of separated waste bin that can be accessed by people with visual impairment by adding braille signs on its lid,”

Siti Aminatuz
Lamongan Teduh



Award Announcement of *Climate Innovation Hack Competition*

Fanda Yoga, the camera man, added that during the video production process although there is a technical challenge on how to direct the casts, the enthusiasm and strong will of the casts to participate in the environment awareness action were evident.

Not only *Lamongan Teduh*, another contestant that participated in the Climate Innovation Hack was Bima British Junior. Located in Mojokerto, Bima, a Visual Communication Design student at Brawijaya University felt challenged to interpret climate crisis theme in his own way.

"I had participated in hundreds on competition though, but none of them was about climate. So this is the first time for me to make a video about climate. It took a longer time for me to carefully learn about the issue and then express it in a video concept," shared Bima.

The challenge was multiplied since IESR required the participants to cite the data from *Brown to Green Report 2019*. Bima's hard work was paid off when his team won the competition. Presenting an idea about making greenhouse *ecobrick* in tourism area as a solution to economic recovery

post-Covid-19 pandemic, Bima became famous in his community and contributed in mainstreaming climate issue to Mojokerto community.

Participating in the competition held by IESR that raised climate issue became an unforgettable experience for Bima. Thus, it has motivated him to dig deeper into the issue for his next project.

"We (Vokasinema) will make a short movie about climate change. This will become a colossal movie because we also want to promote local culture. We have gathered the team and will start the workshop in June. Hopefully, we can start the shooting in October," said Bima.

Interaction with climate issue has reminded Bima about his experience in 2018. At that time, he attended a two-week learning programme held by the Ministry of Education and Culture. Bima got a chance to stay in his mentor's house that has solar panel installed.

"At that time, I was not interested in that particular thing. But yesterday when I read *Brown to Green* report and made a video, I realised that technology (solar PV) is important to reduce emission and address climate issue.

In his opinion, solar panel technology installation is the most effective way to mainstream renewable energy and address climate change issue. However, the most important thing is to tell a story that will raise people's awareness about the benefit of renewable energy to help overcoming the climate change through emission reduction.

"In a community such as in my neighbourhood, we need people who could fill in the knowledge gap so that we could understand the issue as a whole, and how one thing (renewable energy) has a significant impact towards climate change. Climate issue has not been considered as a crucial point here, because the effect has not been tangible in the community, unlike Jakarta that often experiences flooding or other things caused by climate or environmental issue. Here in Mojokerto, a real problem like that has never happened, so the community is not aware of the climate change's potential danger," affirmed Bima, closing the conversation.

“

“We want to continue to spread awareness on climate change through our works, so that more people will be aware of the situation that climate change is happening all around the world. It does not only impact the community in vulnerable regions, but if we do nothing, eventually all regions will also feel the impact of climate change,”

Bima British Junior
Vokasinema



Climate Transparency Report: NDC Indonesia is Still Unambitious, the Government Neglects Green Recovery

Until 2019, Indonesia's Nationally Determined Contributions (NDC) has not been renewed to make it more ambitious to reduce 26% greenhouse gases (GHG) emission in 2025 and 29% in 2030. The government has not enforced a firm policy to mitigate the increase of GHG in energy sector. According to Climate Transparency Report notes, energy sector is one of the biggest contributors of GHG emission (27%) after industry (37%) and transportation (27%). Responding to this issue, Institute for Essential Services Reforms (IESR) has ever sent a recommendation letter to the Ministry of Environment and Forestry to renew the NDC by prioritising mitigation effort in energy sector, but unfortunately it has not received any reply.

Whereas, according to IESR's opinion that is summarised in Climate Transparency Report, Covid-19 crisis is the right moment for policy makers to prioritise economic recovery post-Covid-19 pandemic that corresponds with green investment and sustainable development. However, Climate Transparency report also exposed the fact that a lot of financial aid for the economic recovery post-Covid-19 crisis are still directed towards emission-packed sector, especially fossil-energy sector, without any climate prerequisite that demands low-carbon development. Indonesia is not an exception.

In April 2020, Indonesia stipulated economic recovery budget that is not focused on green investment, with almost IDR 100 trillion out of more than IDR 327 trillion will be distributed to state enterprises, i.e. Pertamina (oil), and PLN (electricity). In mid-July 2020, the government has committed to allocate funding of USD 6.49 billion that supports fossil fuel energy, while only about USD 237.17 million is allocated to support clean energy through the

Indonesia Stipulated Economic Recovery Budget

In April 2020

Rp 327 trillion
total economic recovery
budget

Rp 100 trillion
distributed to state
enterprises, i.e. Pertamina
(oil), and PLN (electricity)

In mid July 2020

USD 6,49 billion
fund has committed to
allocate to supports fossil
fuel energy

USD 237,17 million
fund is allocated to support
clean energy

policy that has been issued since early 2020.

IESR argued that the policy will lead Indonesia to greater loss of stranded asset due to energy transition in the future.

“Economic recovery post-Covid-19 pandemic is the right moment for Indonesia to transform into low-carbon economy. Indonesia has an opportunity to align its economic response with long-term decarbonisation strategy,” said Fabby Tumiwa, Executive Director of Institute for Essential Services Reform (IESR).

Moreover, green recovery will create various new employment opportunities that will assist Indonesia to recover in its economic sector.

“Green recovery provides a great opportunity globally to create employments that are in alignment with green initiative, for example in solar energy, as opposed to those in fossil energy. The young generation should start to consider and take the opportunity to work in the environment-friendly field (green job),” he explained.

The Director of Manpower, National Development Planning Agency (*Bappenas*), Mahatmi Parwitasari Saronto stated that another challenge in achieving

green recovery is preparing human resource to implement green job.

Ami suggested several strategies to expedite green recovery such as raising public awareness about green job, supporting the stimulus for the development of green economy, preparing suitable regulations, encouraging vocational institutions to adopt sustainability principle, and encouraging companies to contribute in creating employment opportunities in green job.

“*Bappenas* is ready and guided by low-carbon development policy that is adopted by the government. Currently, green economy is included in the government’s vocational policy strategy that is being formulated,” she concluded.

Climate Transparency Report (previously known as “Brown to Green Report”) is IESR’s study in collaboration with 14 think tank institutions and NGOs from most of the G20 member countries that received endorsement from the Federal Ministry for Environment, Natural Conservation, and Nuclear Safety, German Embassy for Indonesia or German BMU. The Climate Transparency report is the most comprehensive annual review in the world towards climate actions of G20 countries and their transition into carbon-neutral economy.



Until now (June 2021),
Climate Transparency Report
has been downloaded

5.998
times

68,5%

downloaded Indonesia's
profile

Clean Energy Hub: IESR Has Eased the Access to Quality Data on Renewable Energy



The endeavour towards low-carbon energy system in Indonesia requires data availability as well as accurate and accessible information about energy. Data transparency could improve community's awareness and participation, and also affirm the government's commitment to respond to the urgency of climate change mitigation and promote energy transition.

Institute for Essential Services Reform (IESR) is committed to ease energy data and information access by launching two online platforms, namely **Transisienergi.id** and **SolarHub.id**. Although at a glance they seem to have a similar purpose, those platforms use different approach and have different focus in welcoming low-carbon energy system in Indonesia.

Convenient Information Access on Energy Transition

Transisienergi.id platform was developed as an integrated information centre for various types of curated knowledge products on energy transition. Launched on the 10th December 2020 during the series of *Indonesia Energy Transition Dialogue* (IETD) 2020 event, this platform underlines the importance of information access convenience in supporting energy transition agenda in Indonesia. Diverse contents are aimed to encourage active participation of civil society, journalists, policy makers, and scholars in the energy transition agenda.

Transisienergi.id website currently presents 75 curated information in the form of data visualisation, article, publication, info-graph, and podcast. These various types of knowledge products have made it easy for the users to obtain information according to their preferences. Wiki feature is also included, which is a clear description of 185 technical and institutional terms related to energy issue. Other distinguished features are expert information and activity agenda aggregation that can address public's advanced needs and amplify the echo of Indonesia's energy transition agenda.

The existence of this Transisienergi.id is well-received by the stakeholders in energy issue, for instance from *Koaksi Indonesia* that sees an opportunity of the provision of a more comprehensive information about energy transition issue.

With the spirit to make Transisienergi.id the main platform that provides accurate, easily accessed, and complete information on energy transition, features in this platform will be continuously updated, including the improvement of its user experience convenience. One of the features that will be developed in the future is energy transition academy where users could learn about energy transition agenda in a structured manner, and it can be done online. Other than that, progress summary of energy transition process' main indicators in Indonesia will also be added as a new feature called energy transition tracker.



“

Our platform (terbarukan.id) has not included data and information on energy transition. This is where a collaboration between platforms is important to make them more comprehensive,”

Verena Puspawardani
Program Director
Koaksi Indonesia

Solarhub: Fascinating Platform for Solar Panel Enthusiast

The second platform, which is not less strategic, is SolarHub.id that has an objective to facilitate the acceleration of rooftop solar power plants (*Pembangkit Listrik Tenaga Surya (PLTS) Atap*) installation in Indonesia. The main focus of this platform is presenting information about solar energy and connecting future users with service providers in rooftop solar power plants sector. The platform that was launched on the 15th December 2020 has three main features, namely knowledge product, solar calculator, and company directory of rooftop solar PV.

Variety of available knowledge products in SolarHub.id are info-graphical article, and relevant publication

about solar energy development in Indonesia. Besides becoming an education instrument regarding economical, technical, and policy components of rooftop solar PV, the availability of information in this platform could also trigger future user's interest to utilise solar energy. Another main feature of SolarHub.id is solar calculator where users could directly calculate the estimation of system size, cost, and efficiency of rooftop solar PV. Platform visitors will only need to fill in their location, installed capacity, and average monthly bill to obtain the calculated estimation based on the government's regulation.

Another convenience offered by SolarHub.id is the directory of 15 rooftop solar PV service provider companies and installation technicians that spread across big cities in Indonesia. Both from the homepage and solar calculator estimation result page, future users could directly search for rooftop solar PV service provider company or installation technician with the closest location. Each profile of the company or installation technician contains a brief description, product or service choices, address, opening hours, and contact details. All companies and installation technicians registered in the SolarHub.id have fulfilled the verification requirements, including their credibility and portfolio of solar power plants system installation experience.

“



Currently, there are many customers who have installed already, but the narration is not strong enough. With the presence of SolarHub Indonesia, we can provide reliable information for the communitys ,”

Chairman
ATW Solar¹⁰

Information exposure, calculation simulation, and the convenience in searching for rooftop solar PV service provider in SolarHub.id should be able to motivate households as well as commercial and industrial actors to install rooftop solar PV. In line with this, rooftop solar PV service provider companies also believe in the important role of information in encouraging community's enthusiasm.

To make SolarHub.id the spear head of solar energy movement in Indonesia, this site will continue to improve its existing features and add other conveniences. The company directory feature will be developed into an e-commerce specifically dedicated for solar energy, where there will be specific product display and the transaction could be directly processed in SolarHub.id. Another convenience that will be offered is the development of financing model in partnership with several financial institutions.

Users will later be able to discuss with the administrators of SolarHub.id through hotline chat and email. In the long-term development scheme, SolarHub.id also strives to provide the list of companies in every city in Indonesia through One City One EPC initiative. This user convenience-oriented development approach is expected to promote the growth of rooftop solar PV adoption in Indonesia.

¹⁰IESR, “SolarHub membantu masyarakat mendapatkan informasi serta membantu membuat keputusan menggunakan rooftop solar PV”, accessed from <https://iesr.or.id/solarhub-membantu-masyarakat-mendapatkan-informasi-serta-membantu-membuat-keputusan-menggunakan-plts-atap> on the 20th April 2021 at 14.30.

Solar rooftop installed in
Central Java Energy and Mineral
Resources Agency building.

IESR Initiated Renewable Energy Development to the Regions

The regional government has a significant contribution to support the acceleration of renewable energy. In-depth understanding on the local potential and the authority that it holds are valuable assets of the local government to implement the national energy policy and adapt it according to the condition in each region. Knowing this fact, IESR actively conducts approach and study that help the regions to implement policy that supports the renewable energy development.

Jambi's Enthusiasm in Achieving 24 Percent of the Region's Renewable Energy Mix Target 2025

In 2019, Jambi government has completed the regional energy plan (*Rencana Umum Energi Daerah (RUED)*) with the target of regional renewable energy mix is 24 percent in 2025 and 40 percent in 2050. This relatively high target motivates the Jambi government to explore the partnership opportunity with IESR.

"IESR is very competitive in energy sector. We saw that IESR has built a progressive partnership with Central Java through *Jawa Tengah Solar Province*. This became a strong foundation for us to also work together with IESR in order to achieve Jambi's RUED target," said Setyasmoko Pandu Hartadita, the Head of *Seksi Pembinaan dan Pengembangan Energi* in Jambi Province's Energy and Mineral Resources Agency (*Dinas ESDM Provinsi Jambi*).

The invitation was well-received by IESR. Through an intensive discussions, on the 22nd March 2021

Jambi provincial government and IESR signed a Memorandum of Understanding to support the acceleration of renewable energy in Jambi. IESR will provide technical assistance for Jambi government in terms of increasing the utilisation of renewable energy potential, energy conservation, and energy transition.

"Energy transition is a democratic process and choice, a transition from fossil energy-based energy and economic system into renewable energy system that can be done in different governance level, including province level. Following Central Java, Jambi has exhibited a commitment to promote renewable energy development, and IESR appreciated it. Jambi has diverse renewable energy potentials and can be optimally harnessed," said Marlistya Citraningrum, Sustainable energy Access Program Manager.

Central Java Consistently Realises Jawa Tengah Solar Province

"The heat temperature is about 39.6 degree. I believe that with technology, this heat can be turned into clean and renewable electricity," expressed Ganjar Pranowo, the Governor of Central Java (Jawa Tengah), as he was virtually inaugurating rooftop solar PV in Danone-Aqua factory in Klaten, Tuesday (6/10/2020).

The inauguration ceremony was coincided with the first-year anniversary of Jawa Tengah Solar Province declaration that was initiated by Institute for Essential Services Reform (IESR) together with the government of Central Java, for the development of solar energy.

Central Java Province's obsession to develop renewable energy, especially solar energy, was evident in the issuance of governor's circular letter (*Surat Edaran Gubernur Nomor 671.25/000468*) on the 1st March 2019 regarding the implementation of rooftop solar PV construction in Central Java, and Secretary's letter (*Surat Sekda Nomor 671/4649*) on the 19th June 2019 about the execution of *rooftop solar PV* installation in OPD Central Java Province. This letter advised all regional government organisations (*Organisasi Perangkat Daerah (OPD)*) and private companies in Central Java to build rooftop solar PV in their institutions.

Responding to those letters, 17 OPDs in Central Java have allocated their budget to build rooftop solar PV in 2020. However, it was affected by

budget reallocation due to Covid-19 pandemic. In the private sector, PT Tirta Investama (Danone) also felt supported for using rooftop solar PV after the issuance of the circular letter.

Other than that, among 34 provinces in Indonesia, Central Java was one of the first two provinces that finalised their regional energy plan (*Rencana Umum Energi Daerah (RUED)*). But to encourage a more ambitious RUED implementation, the Central Java government works with IESR to become the pioneer of solar province (*Jawa Tengah Solar Province*) by signing a Memorandum of Understanding between the Governor of Central Java and the Executive Director of IESR on the 17th September 2019.

Since the declaration of *Jawa Tengah Solar Province*, through a great collaboration between IESR and the government of Central Java, there was a significant solar power plants development in Central Java. IESR in its Indonesia Energy Transition Outlook (IETO) 2021 report, recorded that there was an increase in renewable energy capacity to 5.1 MWp with the total of 147 users, compared to the condition in the beginning of the declaration when there were only 155,2 kWp and 40 users. The biggest addition was contributed by the industrial sector, for as much as 73% (3.7 MWp) of the total addition of installed capacity. The biggest contributor was the recent installation of 2.91 MWp rooftop solar in Danone-AQUA factory in

Rooftop solar PV di kantor
DPRD Jawa Tengah



Klaten. The rest were spread across various sectors, including the office building of *Dinas ESDM*, province's APBD project, and residential sector.

The Head of Energy and Mineral Resources Agency (*Dinas Energi Sumber Daya Mineral (ESDM)*) of Central Java Province, Sujarwanto Dwiarmoko admitted that since his office started to use rooftop solar PV in 2017, it has been saving 31% of PLN's electricity.

"Central Java received assistance from APBN to build 22 units of rooftop solar PV for *Pondok Pesantren* (Islamic boarding school) with the capacity of 271 KWP in 2019. Whereas, in 2020 rooftop solar PV was built in 14 locations in 11 districts and cities with the total capacity of 505 KWp," he said.

Rooftop solar PV was built in 14 locations in 11 districts and cities with the total capacity of 505 KWp. Intertwining post-Covid-19 economic recovery and renewable energy development, Sujarwanto elaborated that 2021 budget will be focused on rooftop solar PV in UMKM (micro, small, and medium enterprise) and *Pondok Pesantren*.

"We will build about 31 (thirty-one) units of *rooftop solar PV* in 2021 in approximately 8 (eight) districts/cities in Central Java. Our expectation is that with the solar power plants, UMKM and *Pondok Pesantren* could significantly reduce their electricity bill, so the savings can be used to expand the business," he added.

Fully supporting Central Java in harnessing its solar energy potential, IESR has conducted a study on solar energy technical potential in Indonesia and found that Indonesia has an abundant solar energy up to 655 GWp for residential sector, and thousands of gigawatts for large scale. In Central Java alone, according to IESR's calculation, the technical potential of floating solar power plant (*Pembangkit Listrik Tenaga Surya (PLTS) terapung*) in Central Java with its dams could reach 723 MWp. The government of Central Java positively responded this study and committed to support the development of *PLTS Terapung*.

Fabby Tumiwa, Executive Director of IESR, stated that the commitment and spirit of the province are believed to be able to increase the installed capacity of rooftop solar PV in Central Java up to 5.1 MW from various sectors in 2020. Moreover, it is aligned with Central Java provincial government's plan to integrate solar energy utilisation for the sake of economic recovery post-pandemic by installing rooftop solar PV in UMKM.

"With the technology that is modular and can be utilised in various scales, evenly-distributed solar radiation availability in all areas in Indonesia, and investment that can be covered by many different parties, solar energy will become the main driving force of renewable energy development," said Fabby.



“

The investment plan for floating solar power plants will collaborate with IESR, as a follow-up of Jawa Tengah Solar Province, in Waduk (dam) Kedung Ombo, Waduk Gajah Mungkur, Waduk Wadaslintang and Waduk Mrica,”

Ganjar Pranowo
the Governor of
Central Java



A Year with Rooftop Solar Power Plant Installed, SDK Boafeo Has Been Enjoying Convenient Electricity Access Amidst the Covid-19 Pandemic

After a year since their installation in 2019, 2 units of rooftop solar PV with the capacity of 2475 Wp each, and equipped with 2 kWh battery and 3 kWh inverter, are still intact in SDK Boafeo, an elementary school in Maukaro Sub-district, Ende District.

“The condition of the solar panel since its installation is still well-functioning, both during the day and night. The learning process can be carried out from the afternoon until the evening. So far there has never been any problem (damage) during its utilisation,” said Agustinus Rani, the Principal of SDK Boafeo.

He admitted that the learning and teaching activity has been greatly supported, especially in implementing the latest curriculum, K13. Teachers are more flexible in using electric device and audio-visual media to make their teaching material presentation more attractive and interactive to the students. The Principal of SDK Boafeo acknowledged that since its establishment in 1922, this school has only received large-scale solar panel aid in 2019, so it can illuminate all of the dark area and classrooms at school.

“Before the installation of rooftop solar PV, we used a diesel-fuelled electricity generator, which was difficult to find, so the ones who could use the electricity to operate a laptop were only school treasurer and operator,” he explained.

Challenging terrain caused the travelling time could range from 1 to 3 hours from SDK Boafeo to Maukaro Sub-district capital as the city centre if we travel by motorcycle or car.

Ever since the rooftop solar PV operated, currently

9 teachers in SDK Boafeo have been equipped with laptops to support the learning-teaching activity (*Kegiatan Belajar Mengajar (KBM)*)

Immanuel Rangga, the administrative officer of SDK Boafeo, said that the electricity from the rooftop solar PV is also used for illumination when it is cloudy, or when there is a teacher who has to give extra lessons until late in the afternoon.

“Or when a teacher is unavailable during the first and second sessions, he/she can compensate it by giving an afternoon session from 4 to 6 pm. We could not make it too late in the evening though, because the students must return to their houses which are quite far from the school,” he said.

Covid-19 pandemic has made the face-to-face learning activity paused at some point. But since May 2021, the school has obtained permit to resume the learning teaching activity as usual.

“The students were also informed about the benefit of this solar PV, so that they would not irresponsibly throw a stone that could damage this rooftop solar PV,” he said.

This year, the state electricity started to reach SDK Boafeo. Nevertheless, the school will continue to use the rooftop solar PV just in case there might be a black out from PLN.

Rooftop solar PV in SDK Boafeo was initiated by Institute for Essential Services Reform (IESR) in collaboration with *Aliansi Masyarakat Adat Nusantara (AMAN) Nusa Bunga* to encourage the fulfilment of energy access needs that results in the improvement of productive activity, human resource quality, education, and village development.

Communication Consistently Echoing Energy Transition

In order to drive the transformation towards renewable energy, IESR translated its research into communication products that suit the targeted audience. Digital media is the main channel used by IESR to support the advocacy activity during this Covid-19 pandemic period. IESR has conducted 41 online seminars in 2020/2021. In addition, through various online seminars, IESR continued to encourage regional initiatives in the renewable energy development, especially solar energy, such as *Jateng Solar Province* so that it will get more support from the community and be an inspiration for other provinces.



Online seminars in
2020/2021

Youtube channel of IESR Indonesia showed a
significant progress in 2020

26,8k

Total views

1,1k

Subscribers
increased

2020 is the first year for IESR to expand to the podcast medium

11

Podcasts

1.382

Times played

**"Bicara Krisis Iklim:
Apa, Mengapa dan
Bagaimana?"**

The most listened episode

80%

IESR Bicara Energi's listeners were from Indonesia.
The remaining percentage were spread across several
other countries such as United States of America, Japan,
Germany, and Canada

23-27
years old

The majority of
the age range of
listeners (34%)

Media Production

13

Videos

41

Infographics

Mass Media Publication



1.134

Number of publications on IESR's advocacy works regarding energy system in Indonesia in 2020



869

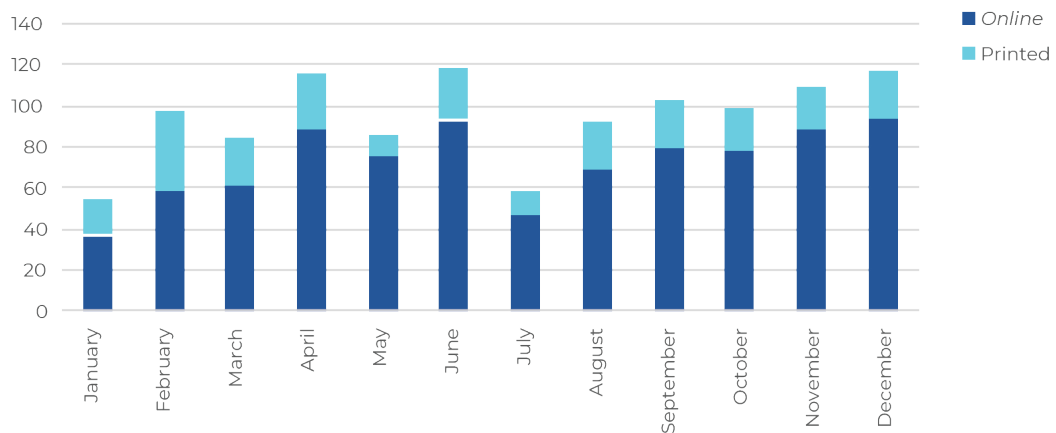
News from **164** online media



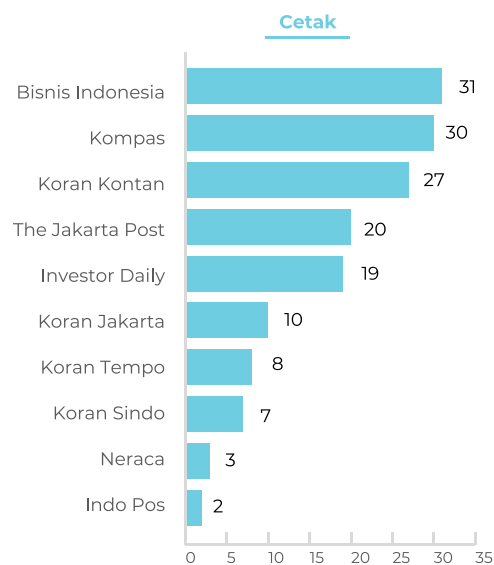
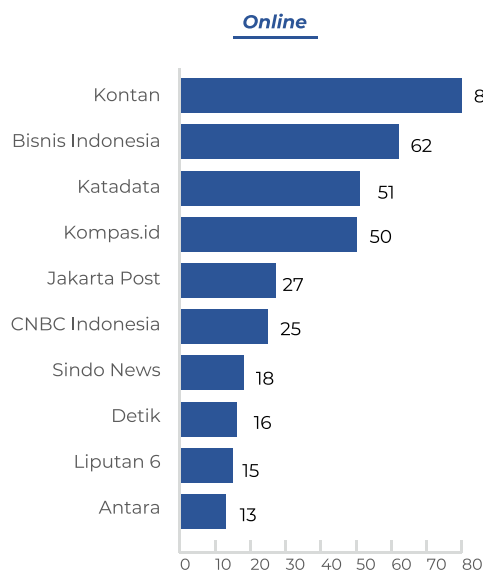
265

News from **34** printed media

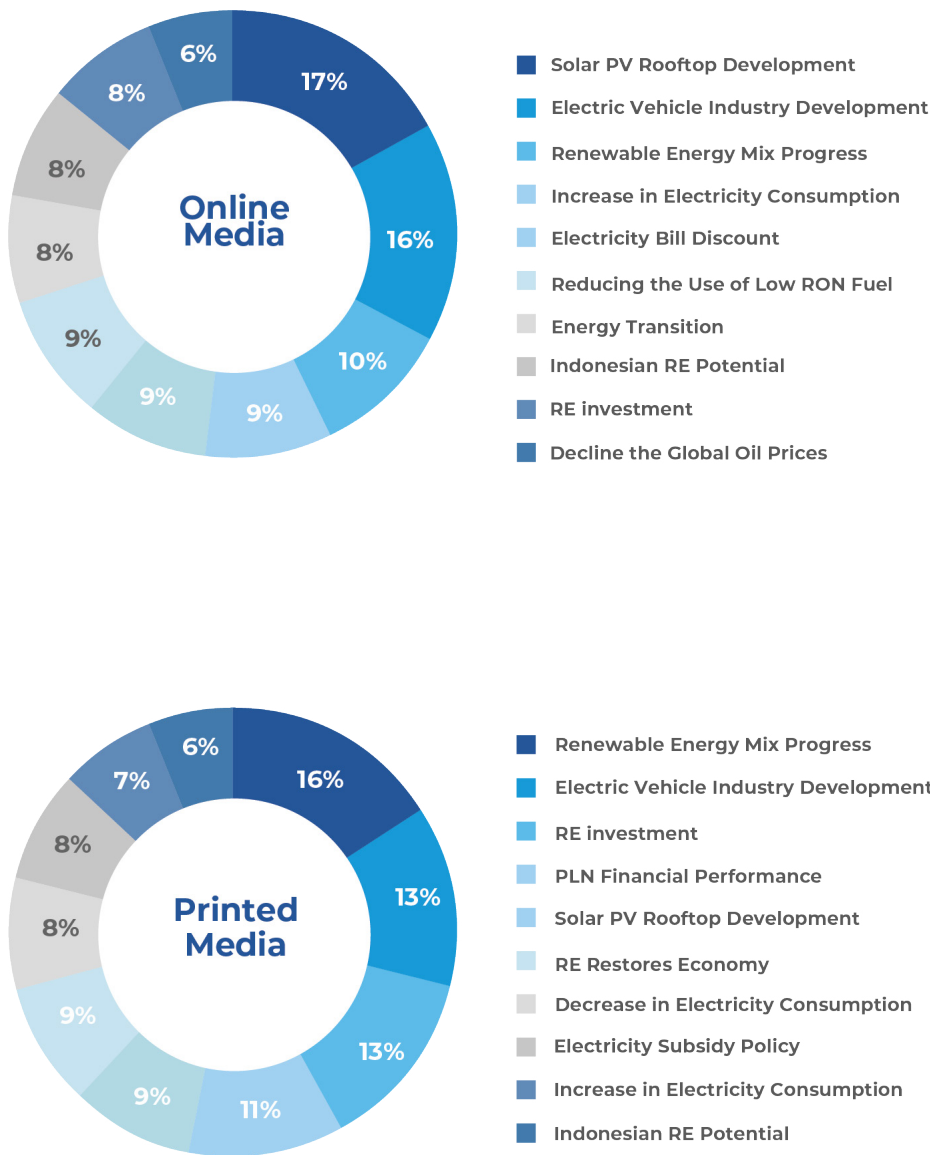
News coverage in online and printed media



The distribution of top 10 media for IESR publication



Distribution of topics presented by IESR in the mass media



Report Citation

IESR's analysis on renewable energy development in Indonesia in every IESR study becomes a reference for numerous publications from various institutions. There were 34 research in total that cited IESR study in 2020. IEA in its study titled *Attracting private investment to fund sustainable recoveries: The case of Indonesia's power sector*, used IESR's findings in the discussion about renewable energy investment challenge in Indonesia.

"Concerns around the bankability of PPAs (the way risks are allocated among actors) combined with low remuneration incentives have also hampered the ability to raise finance for projects. More than a third of the 75 renewable PPAs signed between 2017 and 2018 had not reached financial close by the end of 2019, and five were terminated (IESR, 2019), many of which were for small-scale projects with higher transaction costs."

Furthermore, other think tank organisation such as International Institute for Sustainable Development in its report titled *Achieving Low Solar Energy Price in Indonesia: Lessons learned from the Gulf Cooperation Council region and India*, included IESR's analysis regarding network policy in India which in fact profits renewable energy developers more.

"The Indian Electricity Grid Code is the decisive policy framework to ensure the absorption of electricity from renewable sources into the grid. Established in 2010, the code provides a methodology for renewable energy scheduling as well as incentive mechanisms for states that absorb a significant degree of renewable generation. This gives the motivation for power system operators to utilize as much power as possible from renewable sources (Institute for Essential Services Reform, 2018).

Therefore, Indian developers do not need to worry about land requirements and grid connections, as these all fall within the government's responsibility. These are all in contrast with the system in Indonesia, where road infrastructure and transmission systems both fall under the project developer's responsibility, which understandably would add significant cost to the overall project cost, as reflected in the pricing formula discussed in earlier sections."

In Indonesia, IESR studies were widely cited in various research, thesis, or journal article. One of them can be found in *Bappenas'* journal page about *The Influence of Government Subsidy and Pro-environmental Gaps on Electricity-saving Behaviours of Households in Indonesia* by Dimas Abi Aufan. Citing IESR, this study identified Indonesia's challenge in achieving SDGs.

"Coal-based power plants, which are the majority in Indonesia, are one of the largest contributors to CO2 emissions. Institute for Essential Services Reform(IESR) states that Indonesia experiences significant growth of CO2 emissions for approximately 18% throughout 2012-2017(IESR, 2019). This becomes a challenge for Indonesia in achieving SDGs."(Lampiran 1).

Top 10 Most Downloaded IESR Publication

IESR publications have been downloaded **10.769** times in 2020, with the list of top 10 publications as follows:

No	Publication	Downloaded (times)
1	Indonesia Clean Energy Outlook 2020 Report	1558
2	Climate Transparency Report 2020: Indonesia Country Profile	649
3	National Energy General Plan (RUEN) - Existing Plan, Current Policies, and Energy Transition Scenario (2020)	573
4	Ensuring a Just Energy Transition: Lessons learned from country case studies	420
5	Status Akses Energi Berkelanjutan di Indonesia 2020	395
6	A Transition Towards Low Carbon Transport in Indonesia: A technological perspective	358
7	Climate Transparency Report 2020	335
8	Akselerasi Pembangunan rooftop solar PV Sebagai Strategi <i>Green Economic Recovery</i> Pasca-COVID19 di Indonesia	323
9	Laporan Brown to Green 2019 Profil Indonesia	315
10	Kebutuhan Investasi Energi di Indonesia	290

Social Media Interaction

Website



▲
172,77%

131 K



Bounce
Rate

-47,79%



New visitors

▲
170,30%

128 K



Returning
visitors

13%

Visitor Demographic



Indonesia is
the top visitor



Visitors from
Indonesia mostly
come from the
island of Java



The visitors are
mostly female



The majority of
visitor's age range

**18 - 24
years old**

Social Media

IESR's Social Media
reaches accounts as
many as

885 K



+1.100 
Subscriber 1.486%

 Youtube



+8.000



**Instagram and Youtube are the
most effective social media
platforms for public advocacy**
judging from their increased number of
followers and level of engagement.

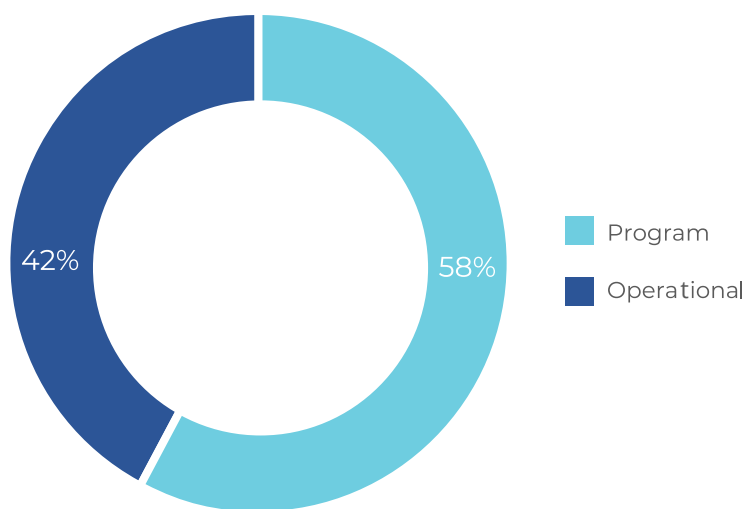


Engagement



IESR Financial Report

IESR Expenses 2020



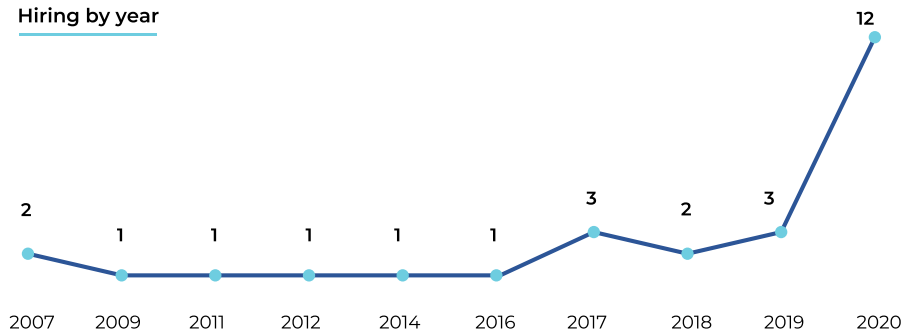
IESR realises that promoting energy transition in Indonesia requires support from comprehensive and quality analysis, dynamic strategy, and continual communication to the stakeholders and broad public. Therefore, it also needs competent and highly committed human resources who envision sustainability.

In 2020, IESR strengthened its capacity by recruiting talented young people with diverse competencies to join IESR. Until the end of 2020, it has 27 staffs (M: 14, F: 13), compared to 2019 with 18 staffs (M: 10, F: 8).

IESR views that mainstreaming gender in the work place is crucial. Therefore, the proportion of female workers is almost half of total IESR employees (48%). Distinguished by their education level, 48% of IESR staffs are Masters and PhD graduates from prominent universities in Indonesia and worldwide.

27
Employees

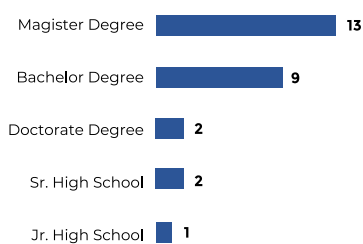
Hiring by year



Gender



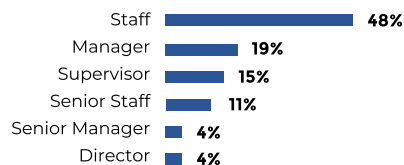
Education



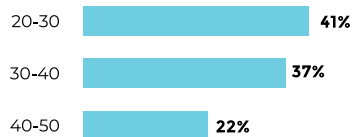
Job Type



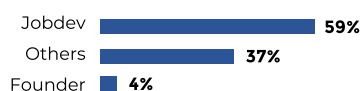
Job Level



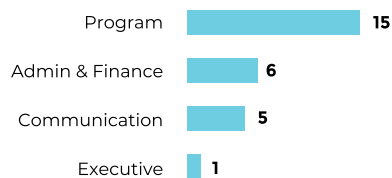
Age



Hire Source



Departement



IESR's Course of Action in 2021

In 2021, IESR will consistently perform its credibility as a think tank organisation in promoting the acceleration of low-carbon development that is based on the 100 percent utilisation of renewable energy. IESR plans to publish a revolutionary report in Indonesia that maps the road to zero-emission in 2050. It is synergised with the world's political agenda that constantly pushes the achievement of Paris Agreement so that the earth's temperature rise is kept below 1.5° Celsius.

Encouraging energy transition efforts by mobilising support from the Indonesian community through various cross-sector and cross-interest public discussions will be the focus of IESR in the future. This objective is part of the causes that *Clean, Affordable and Secure Energy for Southeast Asia* (CASE) project is fighting for.

Furthermore, IESR will support best practices in several regions in Indonesia in their efforts to achieve renewable energy-mix target and promote energy transition process. One of them is Paser District as a district whose regional revenue comes from coal.

APPENDIX 1: Citation

No	IESR Publication	Cited by	Title of Publication	Link
1	Indonesia Clean Energy Outlook: Tracking Progress and Review of Clean Energy Development in Indonesia	Indonesian Journal of Energy - Zagay Y. Berian, Vincent O. Kaulika	Can Energy Trading be a Solution for Indonesia's EnergyMix Goal through Solar Energy?	https://ije-pyc.org/index.php/IJE/article/view/89/37
2	Technical Report: A Roadmap for Indonesia's Power Sector How Renewable Energy Can Power Java-Bali and Sumatera Summary for Policymakers – Indonesia's Coal Dynamics: Toward A Just Energy Transition Ensuring a Just Energy Transition: Lessons learned from Country case studies The Future of Coal in Indonesia study: Coal Dynamics and Energy Transition in Indonesia	Universiteit Twente (Master Thesis) - Rivano William Toontje	Energy future for the new Indonesia's capital city: An energy modelling approach	http://essay.utwente.nl/81733/1/Toontje_MA_BMS.pdf
3	Indonesia's Coal Dynamics: Toward A Just Energy Transition	Pramesti Prihutami, Wahyudi Budi Sediawan, Widi Astuti and Agus Prasetya	Effect of Temperature on Rare Earth Elements Recovery from Coal Fly Ash Using Citric Acid	https://iopscience.iop.org/article/10.1088/1757-899X/742/1/012040/pdf
4	Indonesia Clean Energy Outlook: Tracking Progress and Review of Clean Energy Development in Indonesia	H. S. Ruiza, A. Sunarsob, K. Ibrahim - Bathisa, S. A. Murtia, I. Budiarto	GIS-AHP Multi-Decision-Criteria-Analysis for the Optimal Location of Solar Energy Plants at Indonesia	https://arxiv.org/pdf/2007.15351.pdf
5	Residential Rooftop Solar: Technical and Market Potential in 34 Provinces in Indonesia	Miktha Farid Alkadri, Francesco De Luca, Michela Turrin and Sevil Sariyildiz	A Computational Workflow for Generating A Voxel-Based Design Approach Based on Subtractive Shading Envelopes and Attribute Information of Point Cloud Data	https://www.mdpi.com/2072-4292/12/16/2561/htm
6	Residential Rooftop Solar: Technical and Market Potential in 34 Provinces in Indonesia	A Feisal, B Sudiarto and R Setiabudy	Application of behind the meter battery storage system integrated with net metering in Indonesia	Click here
7	Igniting a Rapid Deployment of Renewable Energy in Indonesia: Lessons Learned from Three Countries	Hamzah Eteruddin, Atmam Atmam, David Setiawan, Yanuar Z. Arief	Effect of Temperature on The Output Voltage of Mono-Crystalline and Poly-Crystalline Solar Panels	https://sinergi.mercubuana.ac.id/id/publications/297901/effects-of-the-temperature-on-the-output-voltage-of-mono-crystalline-and-poly-cr
8	Igniting a Rapid Deployment of Renewable Energy in Indonesia: Lessons Learned from Three Countries	Institute for Economic and Social Research (LPEM) UI - Alin Halimatussadiah, Atiqah Amanda Siregar & Rafika Farah Maulia	Unlocking Renewable Energy Potential in Indonesia: Assessment on Project Viability	https://www.lpem.org/wp-content/uploads/2020/07/WP-LPEM-052-Unlocking_Renewable_Energy_Potential_in_Indonesia.pdf
9	Laporan Status Energi Bersih 2018	IPB - A Damayanti, U J Siregar, F G Dwiyantri	Potency estimation of forest stands biomass in Gunung Walat Educational Forest, Sukabumi, West Java as fuel for electricity generation	Click here

No	IESR Publication	Cited by	Title of Publication	Link
10	Laporan Status Energi Bersih 2018	International Conference on Technology and Policy in Energy and Electric Power (ICT-PEP) - Nur Cahyo; Hamdan H. Alif; Hermawan D. Saksono; P. Paryanto	Performance and Emission Characteristic of Co-firing of Wood Pellets with sub-Bituminous Coal in a 330 MWe Pulverized Coal Boiler	https://ieeexplore.ieee.org/abstract/document/9249930
11	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	Mandala Jurnal Ilmu Hubungan Internasional - Garcia Krisnando Nathanael	Kerjasama Luar Negeri Indonesia dan China: Studi Kasus Ekspor Batubara	https://ejournal.upnvj.ac.id/index.php/JM/article/view/2320
12	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	Universitas Muhammadiyah Malang (skripsi) - Ananda Annisa	Penegakan Hukum oleh Pihak Kepolisian dan Dinas Energi dan Sumber Daya Mineral Terhadap Masyarakat yang Melakukan Pertambangan Batubara Tanpa Izin (Illegal Coal Mining)	http://eprints.umm.ac.id/64864/
13	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	Universitas Ahmad Dahlan - Hanum, Farrah Fadhilah and Rahayu, Aster and Sutopo, Ulung Muhammad and Mufrodi, Zahrul	Coal Fly Ash Characterization from Cement Industry "X" as an Initial Study in Its Utilization	http://eprints.uad.ac.id/19104/
14	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	Universitas Sriwijaya (Master Thesis) - Raharjo, Minto Agung and Bustan, M. Djoni and Haryati, Sri	Pengaruh Kuat Medan Elektromagnetik, Waktu dan Rasio Campuran Partikel Batubara Lignit dengan Pelarut Minyak Diesel Terhadap Kenaikan Nilai Kalor Batubara	https://repository.unsri.ac.id/40772/
15	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	Fellysianus Lung	Sumber Energi Kalimantan Timur (Kaltim) sebagai Penopang Ekonomi Ibu Kota Negara (IKN) Baru	https://www.prosiding.perhapi.or.id/index.php/prosiding/article/view/180
16	The Role of Electric Vehicles in Decarbonizing Indonesia's Road Transport Sector	UPN Jakarta - Hino Samuel Jose	The Quest for ASEAN Electric Car: ASEAN – European Union Electric Car Policy Comparison and its Outlook on the Society 5.0 Era	Click here
17	Igniting a Rapid Deployment of Renewable Energy in Indonesia: Lessons Learned from Three Countries Indonesia Clean Energy Outlook: Reviewing 2018, Outlooking 2019	IISD & Global Subsidies Initiative	Achieving Low Solar Energy Price in Indonesia	https://www.iisd.org/system/files/publications/low-solar-energy-price-indonesia.pdf
18	Indonesia Clean Energy Outlook: Tracking Progress and Review of Clean Energy Development in Indonesia	International Conference on Technology and Policy in Energy and Electric Power (ICT-PEP) - I Made Aryata; Pradita Yusi Akshinta; Indratno Pardiansyah	Energy Investment through Peer to Peer Lending Methods in rooftop solar PV in Indonesia	https://ieeexplore.ieee.org/abstract/document/9249798
19	Akses Energi yang Berkelanjutan untuk Masyarakat Desa: Status, Tantangan, dan Peluang	AIP Conference Proceedings - Muhammad Akvis Fauzi, Prabang Setyono, and Sunu Herwi Pranolo	Environmental assessment of a small power plant based on palm kernel shell gasification	https://aip.scitation.org/doi/pdf/10.1063/5.0030333

No	IESR Publication	Cited by	Title of Publication	Link
20	Indonesia's Coal Dynamics: Toward A Just Energy Transition Climate Transparency, Brown to Green: The G20 transition towards a net-zero emissions economy	Siti Rahma Novikasari, Siti Ruhama Mardhatillah	The Challenges of Carbon Tax Adoption in Indonesia: The Legal System Perspective	Click here
21	Potensi penurunan emisi Indonesia melalui perubahan gaya hidup individu Jejak karbon (Carbon footprint)	Journal Community Service and Empowerment - S. Santhyami, Moh. Isna Al Mubarak, Vakha Yulia Nurzahra	Introduction and early measurement of carbon footprint concepts to respond the challenge of SDGs-Goal 13	https://ejournal.umm.ac.id/index.php/jcse/article/view/12322
22	Residential Rooftop Solar: Technical and Market Potential in 34 Provinces in Indonesia	Jurnal Manajemen dan Bisnis, STIE Indragiri - Kurnia Paranita Kartika, Riska Dhenabayu	The Potential Economic Analysis of Solar Home system with Switching Method on Household electricity Scale	https://journal.stieindragiri.ac.id/index.php/jmbi/article/view/222/201
23	Akses Energi yang Berkelanjutan untuk Masyarakat Desa: Status, Tantangan, dan Peluang	Neliti.com - Cecep Aminudin	Keadilan Ekologis dan Kebijakan Elektrifikasi Perdesaan Berbasis Energi Terbarukan Lepas Jaringan di Jawa Barat	https://www.neliti.com/publications/298804/keadilan-ekologis-dan-kebijakan-elektrifikasi-perdesaan-berbasis-energi-terbaruk
24	Igniting a Rapid Deployment of Renewable Energy in Indonesia: Lessons Learned from Three Countries Residential Rooftop Solar: Technical and Market Potential in 34 Provinces in Indonesia	Norwegian Institute of International Affairs - Roman Vakulchuk, Hoy-Yen Chan, Muhammad Rizki Kresnawan, Monika Merdekawati, Indra Overland, Haakon Fossum Sagbakken, Beni Suryadi, Nuki Agya Utama, Zulfikar Yurnaidi SEMASTER: Seminar Nasional Teknologi Informasi & Ilmu Komputer - Kurnia Paranita Kartika Riyanti, Riska Dhenabayu, Haris Yuana	Indonesia: How to Boost Investment in Renewable Energy Sistem Kendali Jarak Jauh Lampu Tenaga Surya Pada Skala Rumah Tangga Menggunakan Thingsboard	https://www.jstor.org/stable/pdf/resrep26573.pdf http://journal.unilak.ac.id/index.php/Semaster/article/view/6031/2589
25	Strategic Partnership Green and Inclusive Energy Energi Kita Levelized Cost of Electricity in Indonesia	Dinamic: Directory Journal of Economic - Laras A'nnisa, Hadi Sasana, Yustirania Septiani IOP Conference Series: Earth and Environmental Science - A Y Putra, B Sudiarto, and R Setiabudy	Analisis Konsumsi Energi Fosil, Emisi CO2, Konsumsi Energi Terbarukan Dan Pertumbuhan Ekonomi Terhadap Pengeluaran Kesehatan Indonesia Periode Tahun 2000-2017 Techno-economic analysis of remote microgrid and high voltage interconnected grid development in isolated area	http://jom.untidar.ac.id/index.php/dinamic/article/view/1374 https://iopscience.iop.org/article/10.1088/1755-1315/599/1/012020/pdf

No	IESR Publication	Cited by	Title of Publication	Link
27	A Roadmap for Indonesia's Power Sector: How Renewable Energy Can Power Java Bali and Sumatra	Researchgate - Mohammad Rezky, Bambang Heru Susanto	Study Economic Analysis of Underground Coal Gasification to Supply As Fuels For Power Plant In Bengkulu	Click here
	Laporan Status Energi Bersih Indonesia: Potensi, Kapasitas Terpasang, dan Rencana Pembangunan Pembangkit Listrik Energi Terbarukan	Journal of Strategic and Global Studies, UI - D.N. Sahdarani, M.A. Ponka, A.D. Oktaviani	Geothermal Energy As An Alternative Source For Indonesia's Energy Security: The Prospect And Challenges	https://scholarhub.ui.ac.id/jsgs/vol3/iss1/1/
28	Indonesia Clean Energy Outlook: Tracking Progress and Review of Clean Energy Development in Indonesia	Prosiding SISFOTEK - Sadmoko H Pambudi	Analisa Keekonomian Sistem dengan Optimalisasi Pembangkit EBT dan Pertimbangan Biaya Eksternalitas	http://seminar.iaii.or.id/index.php/SISFOTEK/article/view/237
	Indonesia's Coal Dynamics: Toward A Just Energy Transition	Academia, Economics Bulletin - Mohammad Zeqi Yasin	Firm's Trade Activities to Promote Technical Efficiency and Total Factor Productivity: The Growth Accounting and The Stochastic Frontier Approach	https://s.id/Dfomq
29	Begini Progres Kapasitas Pembangkit & Pertumbuhan Konsumsi Listrik di Tanah Air International Institute for Sustainable Development	Report - Anissa Suharsono, Lourdes Sanchez,Vibhuti Garg, Philip Gass	Tackling Coal - Driven Air Pollution in China and India	https://www.iisd.org/system/files/publications/coal-pollution-lessons-indonesia.pdf
	Climate Transparency, Brown to Green: The G20 transition towards a net-zero emissions economy	The Journal of Indonesia Sustainable Development Planning - Dimas Abi Aufan	The Influence of Government Subsidy and Pro-environmental Gaps on Electricity - saving Behaviors of Households in Indonesia	http://jurnal.pusbindiklatren.bappenas.go.id/lib/jisdep/article/view/88
30	Indonesia Clean Energy Outlook: Tracking Progress and Review of Clean Energy Development in Indonesia	Institute of Electrical and Electronics Engineers - Dicky Dwi Putra, Abdurrauf Irsal, Muhammad Alif Mi'raj Jabbar, Adelia Kurniadi, Agus Purwadi, Achmad Munir	Development of Portable Solar Power Plant Equipped with IoT Connectability	https://ieeexplore.ieee.org/abstract/document/9310837/references#references
	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	Jurnal Neraca - Tias Penget Wigati	Pengaruh Rasio Keuangan terhadap Pertumbuhan Laba Dengan Ukuran Perusahaan Sebagai Variabel Moderating (Studi Kasus Pada Perusahaan Sub Sektor Pertambangan BatuBara yang Terdaftar di Bursa Efek Indonesia Periode 2016-2018)	https://jurnal.umpp.ac.id/index.php/neraca/article/view/488
31	Transportasi darat sumbang emisi tertinggi dari total emisi gas rumah kaca sektor transportasi di Indonesia (Siaran Pers)	Economic Journal Trikonomika - Galih Ramadhan, Hastarini Dwi Atmanti	Industrialization and Transport in Indonesia on Environmental Degradation	https://www.jurnal.unpas.ac.id/index.php/trikonomika/article/view/2195/1456 Indonesia Clean
	Energy Outlook: Tracking Progress and Review of Clean Energy Development in Indonesia	International Jorنال on Advance Science Engineering Information Technology - Rislina F. Sitompula, Daniel A. Prima Sinaga	Sustainability Approach of Site Selection for Renewables Deployment in Indonesian Rural Electrical Grids	Click here

No	IESR Publication	Cited by	Title of Publication	Link
32	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	Jurnal Media Teknik Sipil - Niko Rizaldi, Ali Imron Rusadi, Gunawan Wibisono, Edy Saputra, Monita Olivia	Studi Parametrik Kuat Tekan Mortar Geopolimer Abu Terbang	https://ejournal.umm.ac.id/index.php/jmts/article/view/12921
	Dinamika Batubara Indonesia: Menuju Transisi Energi yang Adil	PERHAPI - Fellysianus Lung	Sumber Energi Batu Bara Kalimantan Timur (Kaltim) Sebagai Penopang Ekonomi Ibu Kota Negara (IKN) Baru	https://www.prosiding.perhapi.or.id/index.php/prosiding/article/view/180
33	Energi Terbarukan: Energi untuk Kini dan Nanti	Kilat - Nur Chairat, A., Antono, V., Prayudi, P., & Nurhasanah, R	Rancang Bangun Gasifier Tanpa Blower Berbahan Bakar Arang Limbah Perkebunan Kelapa Sawit	https://stt-pln.e-journal.id/kilat/article/view/1049/765
	Indonesia Clean Energy Outlook: Reviewing 2018, Outlooking 2019	Jurnal Rekayasa Mesin, Universitas Brawijaya - Basori Hidayatullah, Dony Hidayat Al-Janan, Danang Dwi Saputro	Pengaruh Panjang Batang dan Bentuk Daun Ekor pada Turbin Angin Sumbu Horizontal dengan Mekanisme Furling terhadap Performa Turbin	https://rekayasamesin.ub.ac.id/index.php/rm/article/view/639
34	Indonesia Clean Energy Outlook: Reviewing 2018, Outlooking 2019	International Energy Agency	Attracting private investment to fund sustainable recoveries: The case of Indonesia's power sector World Energy Investment – Country focus	https://www.iea.org/reports/attracting-private-investment-to-fund-sustainable-recoveries-the-case-of-indonesias-power-sector
35	Indonesia's Coal Dynamics: Toward A Just Energy Transition	PERHAPI - Meiliza Fitri, Wahyudi Zahar	Kebijakan Sektor Industri Pertambangan Indonesia Dalam Revolusi Industri 4.0	http://prosiding.perhapi.or.id/index.php/prosiding/article/view/125
	Residential Rooftop Solar: Technical and Market Potential in 34 Provinces in Indonesia	Kurnia Paranita, Kartika Riyanti, Riska Dhenabayu	The Potential Economic Analysis of Solae Home System with Switching Method on Household Electricity Scale	https://journal.stieindragiri.ac.id/index.php/jmbi/article/view/222/201

APPENDIX 2: Audio Visual Production

A. Videographics

1. Kebutuhan Investasi Energi di Indonesia

It is a videography that represents a study with similar title which informs that the average renewable energy investment in Indonesia throughout 2015-2019 is \$1.7 billion annually (IDR 24 trillion). Whereas, the investment required to achieve the target of 23% renewable energy in 2025 is approximately IDR 1,000 trillion or IDR 150-200 trillion per year.

2. Coronavirus dan Polusi Udara Dunia

At the beginning of Covid-19 pandemic outbreak, several countries applied a lockdown. When the world is “resting”, it was reported that there was increased air quality in some bustling cities in the world including Jakarta, Indonesia. IESR sees this as a great opportunity for all of us to momentarily ponder on this particular issue, that the earth deserves to be protected from destruction so that its environmental carrying capacity could always be optimally supports human’s life.

3. Desa Mandiri Energi

Desa Mandiri Energi (energy-independent village) is a village whose communities have the capacity to fulfil more than 60% of their energy consumption (electricity and fuel) by utilising renewable energy that is produced through harnessing local resource potentials. Some villages in several energy-independent countries were covered in this video, including two villages in Indonesia, namely Kamanggih Village, Sumba and Seloliman Village, Mojokerto.

4. Biogas Mini Rumahan: Energi Alternatif untuk Memasak yang Ramah Lingkungan

It covers the use and utilisation of mini home biogas (*biogas mini rumahan* (biomiru)). Biomiru is an alternative energy for cooking that puts organic waste around the house to use. Thus, biomiru can be applied and used by urban communities.

5. Refleksi 3 Tahun Gerakan Nasional Sejuta Surya Atap

It is a video dedicated to commemorate the 3rd anniversary of *Gerakan Nasional Sejuta Surya Atap*. In this video, there are testimonies from the declarators, including Dirjen Gatrik, Rida Mulyana, who conveys his opinion on the solar rooftop’s progress for the past three years, and his hope for the future.

6. Presentation: RUEN: Existing Plan, Current Policies Implication, and Energy Transition

Video presentasi yang menjelaskan secara singkat laporan “RUEN: Existing Plan, Current Policies Implication, and Energy Transition”. Video ini merupakan salah satu dari serangkaian laporan studi Peta Jalan Transisi Energi di Indonesia.

7. Refleksi 1 Tahun Jawa Tengah Solar Province

On the 17th September 2019, Dinas ESDM of Central Java Province started its partnership with IESR to promote Central Java as the pioneer of solar province (Jawa Tengah Solar Province) in Indonesia, with the purpose to implement a more ambitious *Rencana Umum Energi Daerah* (RUED). In this video, there is a reflection of this project’s implementation presented by Fabby Tumiwa and the Head of Dinas ESDM Jawa Tengah, Sujarwanto Dwiarmoko.

8. Presentation: A Transition Towards Low Carbon Transport in Indonesia - IESR

It is a presentation video that briefly elaborates “A Transition Towards Low Carbon Transport in Indonesia: A Technological Perspective” report. This video is one of the study report series on *Peta Jalan Transisi Energi di Indonesia* (Indonesia Energy Transition Roadmap).

9. Pojok Energi: Peran Pemuda untuk Masa Depan Sistem Energi yang Lebih Hijau

The first episode of *Pojok Energi* (energy corner) was produced to commemorate *Hari Sumpah Pemuda 28 October*. It explores the role of young people who work in the renewable energy field, especially solar energy.

10. Ensuring a Just Energy Transition: Lessons Learned from Country Case Studies

It is a presentation video that briefly discusses “Ensuring a Just Energy Transition: Lessons Learned from Country Case Studies” report. This video is one of the study report series on *Peta Jalan Transisi Energi di Indonesia* (Indonesia Energy Transition Roadmap).

11. Pojok Energi: Peran Energi Surya untuk Menjawab Tantangan Transisi Energi

The second episode of *Pojok Energi* had Andhika Prastawa who held a position as the Chief of *Asosiasi Energi Surya Indonesia* (AESI) at that time as a guest speaker to talk about the role of solar energy in addressing the challenge of energy transition.

12. Energy Efficiency Have A Critical Role in Climate Change Mitigation

It is a videography that exposes the role of energy efficiency in various sectors in order to mitigate climate change.

B. Infographics

Januari

1. Jawa Tengah Provinsi Integritas
2. Cuaca Ekstrem, Banjir Jabodetabek, dan Perubahan Iklim
3. Sumber Energi Memasak di Indonesia
4. Subsidi Energi Tepat Sasaran
5. Indonesia Berpotensi Mengalami Bencana (B2G Report)

Februari

1. Mengganti Pembangkit Listrik Berbasis Energi Fosil ke Energi Terbarukan
2. Coal Export to India
3. Coal Export to Philippines
4. Revolusi Pemanfaatan Energi Surya ala India
5. Daya Tarik Investasi Sektor Energi Terbarukan di Indonesia

Maret

1. Tips Hemat Listrik Saat Work From Home
2. Rekomendasi IESR untuk Terdampak Covid19
3. Permen ESDM 4/2020 Harapan Baru Bagi Iklim Investasi ET
4. Hemat Tagihan Listrik Saat WFH
5. Refleksi 9 Tahun Bencana Nuklir Fukushima Daiichi
6. Kendaraan Bermotor Listrik
7. Penghematan Listrik Saat Nyepi di Bali

April

1. Energi untuk Memasak
2. Subsidi Energi Langsung kepada Masyarakat
3. Jadi Prosumer Listrik (rooftop solar PV)
4. Energi Terbarukan dan Perempuan

Mei

1. Green Jobs
2. Decarbonizing Transport Sector to Increase Indonesia's Climate Change Ambition

Juni

1. Survei Ketidakpercayaan Publik Terhadap Perubahan Iklim yang Disebabkan oleh Manusia
2. Smart Energy Meter

Juli

1. Solar Archipelago/ Program Surya Nusantara
2. Transportasi Umum Berbahan Bakar Listrik
3. Aktivitas Mitigasi yang Dapat Meningkatkan Ambisi Iklim Indonesia

August

1. Minyak Bumi, Batu Bara dan Gas Alam yang Harus Tetap di Dalam Bumi
2. Persebaran rooftop solar PV
3. Philanthropic Opportunities in Indonesia
4. Energi Terbarukan dalam Perspektif Islam

September

1. Keekonomian Pembangkit Listrik di Indonesia
2. Harga Hasil Lelang PLTS Skala Besar
3. Potensi Pasar rooftop solar PV di Jabodetabek dan Surabaya

Oktober

1. 10 Ideas for Green Recovery di Indonesia
2. Potensi Teknis Floating PV Jawa Tengah
3. Proses Produksi Sawit

November

1. 5 Cara Jadikan Kamu Sadar Transisi Energi
2. Hari Pahlawan

December

1. Persebaran rooftop solar PV

C. Podcast

1. Krisis Iklim: Apa, Mengapa, dan Bagaimana?
2. Bicara Transisi Energi di Indonesia
3. Bicara Transisi Batu Bara Menuju Ekonomi Hijau
4. Bicara Perspektif Gender dalam Pembangunan Berkelanjutan
5. Bicara Indonesia Merdeka dari Energi Kotor
6. Masa Depan Minyak dan Gas di Era Dekarbonisasi
7. Masa Depan Bisnis Sektor Energi di Era Dekarbonisasi
8. Pandangan Agama Terhadap Krisis Iklim: PBNU
9. Pandangan Agama Terhadap Krisis Iklim: GKI
10. Pemuda Indonesia Pegiat Energi Terbarukan
11. Peta Jalan Proses Transisi Energi di Indonesia

APPENDIX 3: 2020 Publications



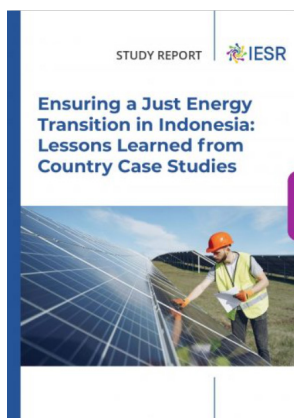
Survei Persepsi Rumah Tangga, Sektor Komersil dan UMKM terhadap Penggunaan rooftop solar PV di Jawa Tengah – 2020



Climate Transparency Report 2020



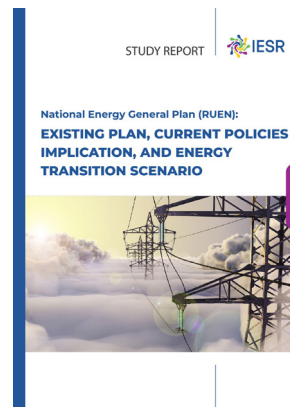
Rekomendasi IESR untuk Presiden Joko Widodo



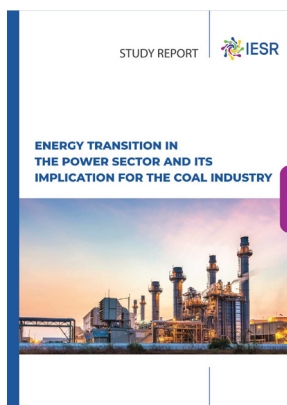
Ensuring a Just Energy Transition: Lessons learned from country case studies



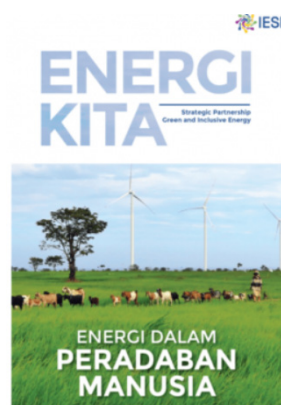
A Transition Towards Low Carbon Transport in Indonesia: A technological perspective



RUEN – Existing Plan, Current Policies, and Energy Transition Scenario



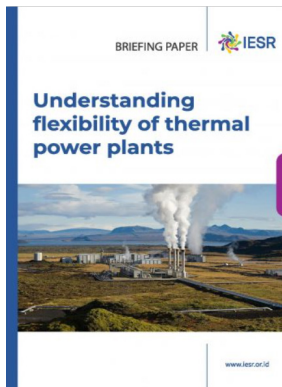
Energy Transition in the Power Sector and its Implication for the Coal Industry



Buletin EnergiKita – I/2020



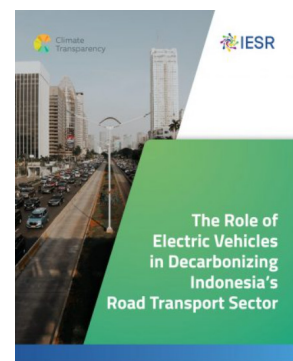
Rangkuman untuk Pembuat Kebijakan: Peranan Kendaraan Listrik dalam Dekarbonisasi Sektor Transportasi Darat di Indonesia



Understanding flexibility of thermal power plants Flexible coal power generation in the power system with higher renewable energy penetration



Akselerasi Pembangunan rooftop solar PV Sebagai Strategi Green Economic Recovery Pasca-COVID19 di Indonesia



The Role of Electric Vehicles in Decarbonizing Indonesia's Road Transport Sector



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