BERGEN SUMMER RESEARCH SCHOOL
GLOBAL CHALLENGES

GROUP 5

POLICY BRIEF

ADVANCING SOLAR SUBSIDIES IN INDONESIA

ISSUE AT HAND

- National subsidies can incentivise solar energy production and are known to support the transition from a reliance on fossil fuel-based energy (e.g., coal) and mitigate emissions.

- Indonesia has committed, via the Paris Agreement, to increase its solar energy production. However, Indonesia has untapped potential for producing domestic solar energy, with solar energy accounting for only 1.7% of its renewable energy generation.

BACKGROUND

Potential for Solar Energy

- Indonesia is the fourth-largest producer of coal globally (IEA, 2025). Its energy system relies heavily on fossil fuels, especially coal. As of 2022, coal is responsible for 58% of Indonesia's carbon emissions. In 2023, coal was used for 35.2% of Indonesia's total energy production and 69.1 % of its electricity production. Oil and natural gas are responsible for 42% of Indonesia's total energy production (IEA, 2025). This heavy reliance on fossil fuels challenges the country`s climate commitment to net zero by 2060 (CCPI, 2025).

- At the same time applying the right policy approach on the energy sector presents a huge opportunity to reduce carbon gasses emissions with the help of renewable energy. In addition, Indonesia is optimally located to generate solar electricity. Its estimated potential for solar energy generation is 3.3 to 20 TW (Halim et al., 2024). Indonesia crosses the equator, providing the country with abundant sunlight necessary. The temperature and daylight hours are also relatively constant over seasons (Dang, 2017). However, solar photovoltaic cell systems installed capacity has yet to reach 1 GW and is at a much lower adoption rate than its neighbouring countries (Halim et al., 2024; Mulyani et al., 2024).

- Solar photovoltaic cell systems (PV) generate electricity from sunlight. These systems are a strong solution to reduce carbon emissions from a country's electricity generation, as they promote environmental sustainability and reduce carbon emission (Mulyani et al., 2024).

Existing Policy

- Indonesia is a signatory to the Paris Climate Accord to maintain the global temperature rise at or below 2 degrees. As part of this, the government must add 9-15 GW of solar energy annually until 2030. As of August 2024, only 0.7177 GW had been achieved (Halim et al., 2024).

- Thus far, Indonesian government is not incentivizing home owners to purchase new PVs. In 2024, Indonesia abolished its program to pay homeowners for excess electricity generated from PVs via Permen ESDM No. 2/2024. This decreased home owner incentives to install them. In addition, no national policy incentivises large scale solar developments, such as "solar farms".

- Progress is also limited by dependence on sole electricity provider Perusahaan Listrik Negara (PLN). Other constraints include insufficient infrastructure and technology (e.g., the electrical grid cannot handle and balance higher amounts of electricity) (Halim et al., 2024).

Solar Subsidies Effectiveness

- The Feedback-based knowledge Repository for IntegrateD Assessments (FRIDA) is used to assess solar subsidies on achieving the Paris Agreement 2 degree temperature rise limit. The model assesses the outcome of surface temperature rise, gross domestic product (GDP), and labour share of GDP. Although this model is primarily used on the global scale, we use it to test the effect of the different policy scenarios in the Indonesian context. FRIDA shows that solar energy subsidy on its own does not result in significant long-term improvement in temperature globally (3.1C by 2150 vs 3.5C by 2150 at status quo).

- Additional policy measures will need to be included to effectively achieve the Paris Goals. Addition of slow-implemented carbon taxation to solar subsidization results in improvement of the temperatures (2.6C by 2150), whilst avoiding the long-term and short-term economic downturn or income inequality. More targeted methods, such as heavy coal taxation, did not yield better results than carbon tax.

- Solar subsidies have also been found to be effective in other countries, making solar subsidies a viable policy option for Indonesia to achieve its solar energy targets. For example, in the USA the government price support increases residential solar demand by 255% relative to our counterpart where there are no subsidies (Abajian & Pretnar, 2024).

NEXT STEPS / RECOMMENDATIONS

- Evidence illustrates that solar energy subsidies should be combined with other policy measures to achieve Indonesia's climate goals. The carbon tax is a promising secondary policy measure. Solar panels can then be bought by both individuals and larger companies.

- Thus, we recommend solar subsidies and carbon taxation. In addition, these policies would not be sufficient to mitigate climate change alone, and further policies to phase out coal and other fossil fuels in the energy mix will also be needed.

HIGHLIGHTS

★ Indonesia has committed to increasing its solar energy production by 2030 and has a large potential for solar energy generation of 3.3 to 20 TW

★ Despite this, its PV's capacity has yet to reach 1 GW. This is lower than neighboring countries and short of its ambitious climate goals that aim to reach net zero by 2060.

★ Current PLN electricity monopoly, infrastructure, technology, and policy are not conducive to solar energy transition.

★ We recommend solar subsidization and concurrent slow-implemented carbon tax as interventions to achieve surface temperature goals and avoid long-term economic downturn.

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