

Exploring Indonesia's energy policy failures through the JUST framework

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ABSTRACT

The COVID-19 pandemic has provided momentum for the global energy transition and countries, including Indonesia, should take this opportunity to accelerate this process. This paper reviews Indonesian energy subsidy policy failures using the JUST Framework developed by Heffron and McCauley (2018) and the day-watchman approach by Sokolowski (2020). This article aims to provide different views on why energy subsidy policy failures have hampered Indonesia's energy transition, primarily focusing on the need for urgent policy reform to accelerate its energy transition. The paper utilises quantitative, qualitative, and comparative analyses to assess Indonesian energy policy failures, highlighting different strategies in reforming its energy subsidy policies. The countries selected for comparative study are classified into: OECD and Non-OECD countries. The result confirms that despite the Indonesian Government's efforts in reforming fossil fuel subsidies and improving renewable energy development, Indonesia is no better than comparative countries and should learn from others (France, Spain, and Brazil). Additionally, the result shows that giving more fossil fuel subsidies hampers a country's renewable energy development and energy transition. Therefore, fossil fuel subsidy reform would be conducted most effectively through balanced energy regulation of the day-watchman approach.

1. Introduction: energy subsidy policy failures

Countries now recognise the energy and environment nexus as important in aligning policy with their climate goals. According to Heffron et al. (2018) this has two significant impacts: Firstly, a country can design Renewable Energy (RE) policy knowing that traditional energy strategies, relying on cheap readily available fossil fuels, are no longer adequate to meet the system's demands. Consequently, RE, low-carbon energy, and energy efficiency are becoming essential energy mix components. Secondly, and more importantly, climate change is having a significant impact on current and future energy policies. Therefore, the energy-environment nexus should be considered when designing Fossil Fuel Subsidies (FFS).

Multiple studies have explored the impact of FFS. It is claimed by some developing and emerging economies that FFS is a social welfare tool for improving vulnerable communities. However, it is also widely known that FFS can cause increases in Carbon Dioxide (CO₂) emissions. Hence, FFS could hamper transitioning to a low-carbon economy (Elgouacem, 2020). Notably, some countries support FFS for both production and consumption. The International Institute for Sustainable

Development (IISD) (2020) published an extensive report on the trade impacts of FFS at various stages of fossil fuel product value chains (Moerenhout and Irschlinger, 2020). One of the main findings was that FFS could reduce competitiveness on alternative sustainable and climate friendly energy sources, i.e. RE sources (Moerenhout and Irschlinger, 2020).

For this reason, Rentschler and Bazilian (2017) stated that FFS reform is acceptable on health terms, and because FFS disincentivise investment in alternative energy sources, discourage innovation and efficiency, and increase fiscal burdens. However, FFS reform would increase the externality costs of fossil fuel consumption and production. Furthermore, they crowd out funds for health, education, and other public infrastructure projects, encouraging corruption, poverty, and income inequality. A number of studies have shown that in most cases, especially in developing countries, those who benefit most from FFS are the upper-income level (Whitley and van der Burg, 2015; Rentschler, 2016; Rentschler and Bazilian, 2017; Couharde and Mouhoud, 2018; UNEP, OECD and IISD, 2019; Moerenhout and Irschlinger, 2020).

Indonesian FFS reform started in the late 1990s and was driven by macroeconomic factors including the 1997 economic crisis which forced

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the Government of Indonesia (GoI) into FFS reform (Aswicahyono et al., 2009; Hill, 2013). However, the main issue with FFS reform is that it often fails to address its target, i.e. poverty reduction (Beaton and Lontoh, 2010; Chelminski, 2018; Meilanova, 2020). Fossil fuel dependency is a major hurdle facing Indonesian FFS (Nugroho, n.d.). For over 20 years, the GoI has attempted FFS reform through the National Team for the Acceleration of Poverty Reduction (TNP2K), including implementing initiatives such as removing industrial diesel and fuel oil from subsidy, the programme converting kerosene to liquid petroleum gas, energy diversification and retail fuel price adjustment (Ministry of Finance, n.d.). This provides an opportunity to assess and implement FFS reform when fossil fuel prices are low and to take this green recovery approach (Sanchez et al., 2020).

The Covid-19 pandemic has led the Asian Development Bank (2020) to forecast a growth rate of negative 1% for Indonesia's economy. However, economic recovery is predicted with growth of 5.3% in 2021. Phoumin (2020) stated that Association of Southeast Asian Nations (ASEAN) states should see the post COVID-19 world as an opportunity for heavily fossil fuel-based countries to reform their FFS when fossil fuel prices are low. Subsidy policy should be revisited and only the vulnerable and in need should receive targeted subsidies in the future (Sanchez et al., 2021).

Sokołowski and Heffron (2021) proposed a new definition of energy policy failure in light of the energy transition, the 2015 Paris Agreement, and the requirement of meeting energy and climate commitments. This is given as: *When energy policy fails to satisfy local, national, and international energy and climate goals across the activities of the energy life cycle, and when 'just' outcomes are not achieved.* We based our analysis on this definition, in particular, how Indonesia can reform its energy policy, accelerate the energy transition through reforming FFS and addressing the current energy triangle, namely: *energy security and access (universal access to secure and reliable energy supply); environmental sustainability (environmental sustainability across the energy value chain); and economic growth (the ability to support economic development and growth)* (World Economic Forum, 2018). This paper applies the 'JUST' (Justice, Universal, Space, and Time) framework developed by Heffron and McCauley (2018) and the day-watchman approach (Sokołowski, 2020) to review Indonesian and comparative countries' FFS policies. Furthermore, this paper reviews Indonesia's position in terms of its JUST metric in the energy transition process and analyses the country's FFS policy using the day-watchman approach. Additionally, Indonesian energy sector policy recommendations are formulated, especially regarding energy subsidies policy, and the success or failure of FFS reform is examined from a regulatory framework standpoint.

This paper employs a quantitative, qualitative, and comparative analytical methodology. Indonesia is now classified as a middle-up income country (emerging economy) and the largest ASEAN economy (World Bank, 2020). Indonesia should note how other developed countries have successfully adapted their energy transition policies. Using the Energy Transition Index (ETI) 2021 as reference, the ten best practices are selected from developed countries who are also Asia Pacific OECD and non-OECD members (World Bank, 2020). The ETI conducts an assessment of transition readiness by examining the interdependencies of energy system transformation with macro-economic political, regulatory, and social factors. The ETI framework consists of energy system performance (balancing the energy triangle), enabling dimensions for: energy transition, capital and investment, regulation and political commitment, institutions and governance, infrastructure and innovative business environment, human capital and consumer participation, and energy system structure (World Economic Forum, 2021). Energy Policy Tracker (EPT) (Energy Policy Tracker, n.d) is referenced to conduct a quantitative analysis. EPT provides data on government spending for energy in recovery packages. Therefore, these two OECD and non-OECD groups, both being G20 members, are assessed by the EPT. This paper then compares Indonesia to France, Spain and Brazil based on qualitative and quantitative analysis results using the

JUST framework.

This paper offers three major contributions. (1) Evidence on how the JUST framework and the day-watchman approach are used to assess current energy subsidy policy implementation, followed by literature on energy subsidy policy failures and reform. (2) This paper adopts an original methodology in justifying Indonesia's level of advancement in policies supporting the energy transition progress. (3) Finally, interdisciplinary research on energy policy is provided, involving economics, law, policy, and environmental issues. Overall, this paper provides an insight into how the JUST framework imparts understanding of the way justice has been done through implementation of FFS policy. Furthermore, the day-watchman approach helps the government address policy failures whilst protecting public interest and society.

This paper consists of 7 sections. Section 2 discusses the timeline of Indonesia's energy subsidy policies from 2009 to date and their success. The GoI has incorporated energy subsidies into the National Income and Budget Expenditures (Indonesian State Budget, so-called APBN) based on economic assumptions set out by the Ministry of Finance. Moreover, the pandemic's economic impact will also be included alongside JUST energy framework strategies aimed at improving or creating successful energy subsidy policy coupled with the day-watchman approach in the selected OECD and non-OECD countries. These frameworks and approaches are discussed in Section 3. Section 4 provides the methodology and how the data in this article were collated and analysed (such as selected countries and data sources). Section 5 and 6 presents both the quantitative, qualitative, and comparative analysis, including insights gained from France, Spain, and Brazil using the aforementioned framework and approach. Finally in section 7, this paper concludes with an analysis of comparison countries and recommendations.

2. Literature review

2.1. Energy subsidy policy in Indonesia

Since the start of this discussion in 2009 at the G20 Pittsburgh Summit (G20 Research Group, 2009), a range of insights into reforming FFS in different countries have been provided by a number of international institutions including: Overseas Development Institute, Oil Changes Initiatives, OECD, IISD, International Monetary Fund (IMF), and World Bank. Many scholars agreed that economic, social, and environmental costs associated with FFS could be avoided through reform (Granado et al., 2010).

One crucial problem faced by Indonesia is its dependence on fossil energy. Fossil fuel consumption in Indonesia increased significantly from 53.4% in 1990 to 74.2% in 2018 (International Energy Agency, n.d). This rise from 2010 onwards did not seem to be influenced by a decrease in FFS (OECD and IISD, n.d). OECD and IISD data (n.d) show that Indonesia has reformed its FFS. However, despite significant RE sources, reliance on fossil fuels remains strong (International Energy Agency, n.d). Even until 2050, as stated in the energy mix policy, the role of fossil-based energy is still dominant at 69% of total energy demand (IRENA, 2017). The implications are twofold. Firstly, Indonesia faces an energy deficit resulting from declining energy production combined with growing energy demands. Indonesia has been a net importer of oil since 2004 and may also become a net importer of natural gas by around 2030 (Agarwal et al., 2020). Secondly, the use of fossil energy, namely the burning of coal, natural gas, and oil for electricity and heat is considered to be the largest single source of global greenhouse gas (GHG) emissions (United States Environmental Protection Agency, n.d). Consequently, fossil energy will threaten the government's national programme of combating climate change and global warming, and it is alarming to note that shifting to new and RE has been very slow (Asian Development Bank, 2020).

Regarding oil imports, Indonesia should provide consumer FFS to compensate for the differences between the higher international benchmark price and lower domestic prices. Indonesia provides its

citizens with subsidised energy as a public service obligation, justified by the benefits from domestic production of oil through their cheap prices. Unfortunately, Indonesian fuel subsidies drain the public treasury, diverting funds from projects that could deliver long-term economic growth and development including infrastructure, education, health, and social protection. During 2005–2014, Indonesia's subsidy expenditure accounted for 10%–20% of total government spending, equivalent to around 3% of GDP (OECD, 2019). Nonetheless, the government grasped the opportunity to reform FFS offered by falling world oil prices in 2013, 2014 and 2015. Until recently, Indonesia subsidised fuel and electricity to keep energy affordable and raise household purchasing power (Asian Development Bank, 2015).

Sadly, Indonesia's FFS did not work as intended with 40% of subsidy benefits going to the top income decile and less than 1% to the poorest (OECD, 2019) and so in effect, fuel subsidy spending has a relatively low impact on reducing income inequality. Therefore, it is no surprise that subsidies have reinforced existing income inequalities (Coady et al., 2015). Research has argued that fuel subsidies in Indonesia are far less effective at reducing poverty and inequality than other social assistance programmes e.g. the Family Hope Programme and the Smart Indonesia Programme scholarship (OECD, 2019). In addition, subsidies had unintended consequences namely increased demand, traffic congestion and environmental damage, costing an estimated US\$ 4–8 billion annually (Davis, 2014).

Relatively cheap subsidised fuel creates greater consumer demand thus promoting inefficient consumption. It also incentivises purchasing fuel for uses other than that initially intended. For example, the wide discrepancy seen between subsidised and non-subsidised fuel prices has led to cases where subsidised fuel intended for domestic use being illegally bought by the industrial sector, or even smuggled abroad (OECD, 2019). Other fraudulent FFS practices include, use of illegal levies, creation of fictitious poverty areas, subsidy exclusion of certain impoverished groups, and inclusion of local elites (Lestari, 2020). Clements et al. (2013) argued that the failure of Indonesian FFS reforms could be the result of ad-hoc price adjustments without clear long-term goals, together with the inability to depoliticise pricing and subsidy policy. These price adjustments were executed through direct government intervention via State Budget Law, Government Regulation, Presidential Decree and Ministerial Rules.

Fuel subsidies disincentivise the development of RE, thus are a barrier to a clean energy system transition (Bridle et al., 2019). Subsidised fossil fuel prices and electricity have made RE sources less competitive, discouraging their utilisation. Although, Indonesia aims to accelerate RE development, their FFS are greater than the support given to renewables (MoF, 2021). India is facing similar issues on energy poverty with policies which increase coal capacity, whilst simultaneously wanting to increase RE and create a more sustainable energy mix (Sokolowski, 2019).

By 2025, Indonesia is aiming at a 23% share of renewables in its energy mix and an increase of around 7% from 2016. Energy and Mineral Resources Ministry data shows that renewables contribution to Indonesia's total energy consumption rose from 9.15% in 2019 to 11.51% in 2020 but still fell short of the targeted 13% (Harsono, 2021; Ministry of Energy and Mineral Resources, 2021c). Generation for renewables has been stagnant since 2011, ranging from around 11%–13% of the total electricity mix with hydropower and geothermal the main contributors (Tampubolon et al., 2019).

According to Overland et al. (2021), although ASEAN's RE targets are relatively moderate, these may still be missed. This said, Indonesia RE development still lags behind its neighbouring ASEAN countries. For example, Indonesia has only tapped into about 2% of the combined potential of geothermal, solar, wind, hydro, and biomass energy sources with just 6.2% of its electricity coming from renewables in 2019 (Agarwal et al., 2020; MEMR, 2020). Meanwhile, the Philippines has managed to generate more than 20% of its electricity from renewables (Department of Energy, 2019). Vietnam attracted USD 5.2 billion worth

of renewables investment in 2018, while Indonesia drew only USD 0.8 billion (Vakulchuk et al., 2020). Indonesia has the highest financing costs in the region for RE projects due to uncertain and unbalanced contract risk allocation, including the practice of renegotiating contracts and power purchase agreements design, stringent local content requirements, and risks from inexperienced RE developers (Asian Development Bank, 2015). These unfavourable factors together with an unstable policy and regulatory environment have resulted in RE development growing slower than expected, despite tax incentives and enhanced local government participation being introduced to attract RE investment (Lestari, 2020).

The removal of Indonesian fuel subsidies could be the trigger which makes RE more competitive. Renewable projects need to be accelerated to cut energy system costs, avoid air pollution and carbon-dioxide emissions and potentially save up to USD 53 billion per year by 2030, amounting to an estimated 1.7% of Indonesia's GDP (IRENA, 2017).

2.2. COVID-19 and the energy sector in Indonesia

COVID-19 severely impacted the global economy, compounding an Indonesian economy already compromised by the aforementioned policy failures. Furthermore, this pandemic has pushed back the global climate agenda and negatively affected RE development in Indonesia and many other countries (Karmaker et al., 2021). Economic recovery has become a global priority with incentives and fiscal support being shifted towards this (Hoang et al., 2021). However, many also see the pandemic as the impetus for a global energy transition. COVID-19 has created opportunities for drafting effective policies and regulatory frameworks and protecting RE investment and growth (Hoang et al., 2021). Many see this as an opportunity to establish green recovery budgets and accelerate green investments (e.g. energy efficiency infrastructures, RE development and clean energy infrastructure) (Kuzemko et al., 2020). Some argue that green investments have significant impacts in boosting the economy and creating jobs (Rosenow et al., 2014; Garrett-Peltier, 2017; Hepburn et al., 2020).

Many reports detail the impacts of COVID-19 on energy sectors and their possible far reaching effects regarding climate change. Figueres (2020) stated that COVID-19 and the climate turning point happened simultaneously, in which reducing GHG emissions to combat climate change has become significant. IRENA (2020) also reported that despite its huge negative social impacts, COVID-19 also positively affected the energy sector, in particular energy transition and climate change mitigation. Global COVID-19 restrictions reduced emissions significantly compared to the previous year (IRENA, 2020). However, this reduced energy demand had a significantly negative effect on fossil fuel sectors. Unavoidable pandemic-related unemployment was widespread, particularly in the fossil fuel sector whilst RE was highlighted as a more sustainable energy source (Kuzemko et al., 2020). IEA (2020) also highlighted that the economic recovery should be aligned with Sustainable Development Goals where energy resilience and sustainable development are at the heart of the recovery. It also mentioned that annual CO₂ emissions declined by 8% compared to 2019, a turning point for a more sustainable and cleaner energy policy. Therefore, COVID-19 has, in general, contributed to an acceleration of the energy transition. In this respect Kuzemko et al. (2020) concluded that in the post-pandemic era "state support and policy intervention have been key to promoting efficiency and accelerating decarbonisation of the energy system".

Nationally, Indonesia's energy sector model stipulates, in Article 6 Government Regulation no. 79/2014, that "the energy resources are no longer as export commodity only, but as the engine of national growth" (IRENA, 2020a). This paradigm should apply to different energy sources including RE. The pandemic has had a massive global impact and created the need to strategise their policies (Suharsono et al., 2021). As one of the most influential sectors, the Ministry of Energy and Mineral Resources has out a strategy for tackling the impacts of COVID-19 on the energy sector. The Director General for New and Renewable Energy

stated that the RE sources should be one of the main strategies for post Covid-19 economic recovery (Tasrif, 2020). This aligns with the energy transition agenda and the overall National Energy Policy of reaching 23% new and renewable energy mix sources by 2025, thereby contributing to the 29% emission reduction by 2030 (Government of Indonesia, 2016).

Impacted by Covid-19, Indonesian energy usage decreased by up to 11% compared with the business-as-usual-scenario (Yudiartono, 2021) and consequent emission reductions as projected by the Climate Action Tracker (Climate Action Tracker, n.d). The question remains whether Indonesia, as the fourth most populous country, will manage its future emissions and contribute to combating global climate change.

3. Theoretical perspective: the JUST framework and day-watchman approach

Numerous studies on justice in the Indonesian energy sector have been conducted using the JUST framework (Fathoni et al., 2021; Setyawati, 2021; Setyawati, 2021). According to Setyawati (2021) Indonesia's energy justice vision has resulted in policies and efforts solely concerned with distributive energy justice in terms of energy accessibility and affordability. Similarly, Indonesia subsidises its fossil fuels to improve energy access and affordability. This article will now use the JUST framework to analyse FFS policy in Indonesia.

3.1. The JUST framework

Heffron and McCauley (2018) established the JUST conceptual framework to qualitatively measure the legal or policy changes that has led to the field of energy transition becoming a major research topic amongst climate, energy, and environmental researchers. Heffron and McCauley (2018) classify this framework into four main categories *Justice, Universal, Space, and Time* (see Fig. 1).

Distributional justice considers the impact of energy infrastructure development to the area where it is located (Heffron et al., 2018). The use of space in some areas in Indonesia, for example solar photovoltaic (PV) development, could become a community issue. Land access is one of many issues in energy infrastructure development in Indonesia (Kennedy, 2018). Communities adjacent to such projects are significantly impacted due to possible land loss and environmental impacts such as pollution due to heavy transportation (Sumarno, 2020). This also highlights the issue of distributional justice that energy

development brings to surrounding communities.

While distributional justice relates to communities, procedural justice relates more to government regulation and policy implementation, e.g. environmental regulation enacted by Indonesia's Ministry of Environment and Forestry. For the extractive industries, environmental impact is often discussed in cases where restorative justice plays a role (McCauley and Heffron, 2018).

As explained by McCauley and Heffron (2018), recognition justice in this framework emphasises those aspects of society that would be impacted unfairly because of energy activities, e.g. impacts such as burning forests to free land for extractive activities. The private sectors involved in land clearance in Central Kalimantan were polluting not only other parts of Indonesia but also neighbouring countries (Crippa et al., 2016; Tacconi, 2016). In the context of FFS, these subsidies contribute to rising CO₂ levels and discourage investment in carbon-neutral technologies (Hoffert, 2010).

The Kyoto Protocol and the Paris Agreement are examples of cosmopolitan global justice. More than 190 countries agreed to combat climate change and keep global temperature rise below 1.5 °C. Each country has its own strategy to achieve this, i.e. Indonesia has a Nationally Determined Contributions (NDCs) target for 30% emission reduction by 2030.

Justice in the terms of space refers to where an event is happening, and the aforementioned example, Central Kalimantan land clearance, and in a wider context, Indonesia's NDCs target and strategy implementation. The Time aspect of the framework can be seen, for example, in the NDC targets, with Indonesia aiming at a 30% emissions reduction by 2030. This paper evaluates FFS reform within the JUST framework.

3.2. The day-watchman approach

The challenge for Indonesia's fossil-fuel subsidy reform could be viewed through the lens of regulatory approach, i.e. to what extent state institutions intervene, directly or indirectly, in tackling energy issues through legislation. For example, every year the GoI and Parliament have to agree on a State Annual Budget Act in which FFS are crucial elements. In this respect, one could reasonably argue that Indonesia's approach to FFS reform is to adopt a narrow view of regulation, rather than a broad one (Barton, 2006). This means regulation is limited to rules derived from the binding legislation without taking into account social control (Barton, 2006).

As argued by Sokołowski (2016) this regulatory regime derives from

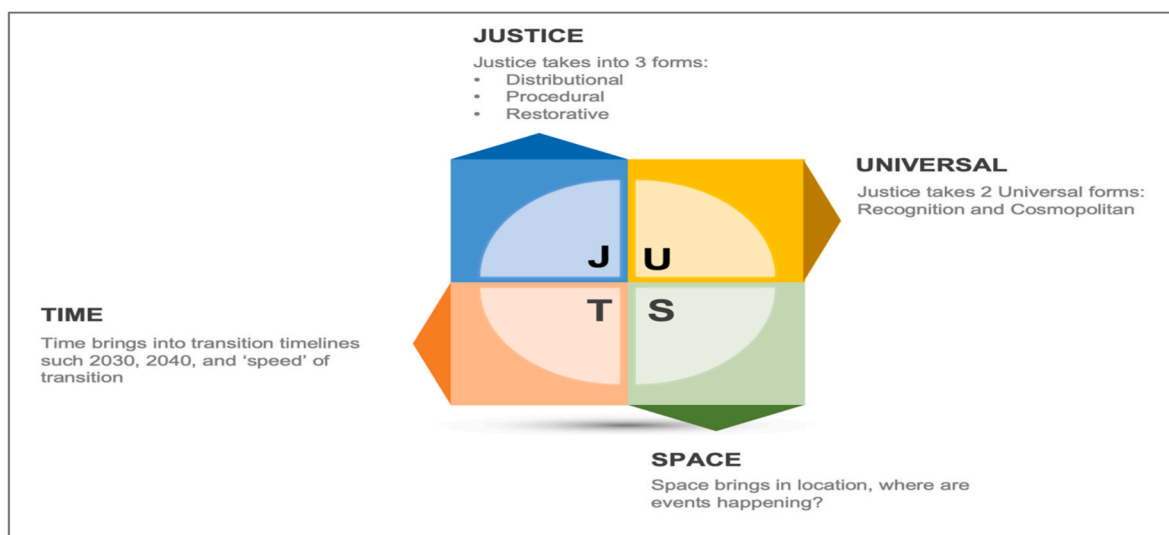


Fig. 1. The JUST framework.
Source: Heffron and McCauley (2018).

an assumption that the state has the direct power to adjust and correct market inefficiencies and failures to protect public interest (see also Prosser, 2010). In this case, the role of private (business) entities is so weak that fair and effective competition is very difficult to establish. To bridge the gap between the two extremes of ‘public ownership’ and ‘private competition’ (Thatcher, 2002), Sokołowski (2020) introduced a day-watchman approach which acts as a middle ground, balancing the role of state and market in protecting public interest. This approach contains pillars of policy and regulation that must: (1) *have clear objectives*, (2) *power to make rules and standards*, (3) *power to grant authorisations and permits*, (4) *legal orientation of public regulation*, (5) *monitoring and surveillance*, and (6) *mitigating and sanctioning* (Sokołowski, 2020). This approach provides a space for regulatory activities in which the regulator (day-watchman) develops the game rules, provides information to market players and enforces rules via sanctions (Sokołowski, 2016). This approach falls under the procedural justice in the JUST framework.

4. Methodology

4.1. Data selection

This paper is a comparative study applying both quantitative and qualitative analyses. The countries selected for comparative studies are G20 countries, ETI 2021 (World Economic Forum, 2021), OECD countries and non-OECD countries (see Fig. 2).

115 countries were assessed in the ETI report (World Economic Forum, 2021), the countries selected in this paper are a part of them. Those selected must have higher ETI index scores than Indonesia. The selected countries are classified into two categories, OECD, and non-OECD. They must also be G20 members and countries assessed in the EPT. Table 1 below lists the countries selected:

These countries are expected to provide insights and best practices for Indonesia in regards to the low-carbon economy transitioning. Identifying FFS policies in these countries is this paper’s focus. To

Table 1
Countries selection.

OECD		Non-OECD	
Countries	ETI Score	Countries	ETI Score
Sweden	79%	Brazil	66%
Norway	77%		
Finland	73%	Argentina	62%
United Kingdom	72%		
New Zealand	71%	Vietnam	57%
France	71%		
Netherlands	71%	China	57%
Spain	68%		
Germany	68%	Indonesia	56%
Canada	67%		

Source: Selected by Authors from World Bank (2020), World Economic Forum (2021), OECD (n.d), EPT (n.d)

identify this, the JUST framework is applied to analyse the number of policies supporting fossil fuels and clean energy, and the support the government gives to fossil fuels and clean energy in the selected countries.

4.2. Data analysis

This paper utilises: data from the United Nations, particularly for its NDC target period (UNFCCC, n.d); EPT to identify each countries policies for supporting, and the financial assistance committed by each government for fossil fuels and clean energy (Energy Policy Tracker, n. d); Fossil Fuel Subsidy Tracker for the amount of subsidy given in each country (Fossil Fuel Subsidy Tracker, n.d); and current CO₂ emissions from the World Bank Database and Global Carbon Project (Global

Table 2
Terms and definitions used in the analysis.

Term	Definition
Justice:	
Procedural justice	Justice in the form of regulation, procedures, and policies in the selected countries.
Restorative justice	Restorative justice aims to restore the harm done to people and/or society/nature.
Universal:	
Recognition justice	Recognition justice highlights those aspects of society that would be impacted unfairly because of energy activities (e.g. impact of fossil fuel consumption to global emissions).
Cosmopolitan justice	Cosmopolitan justice recognises that all ethnic groups are members of a single community with a shared morality (e.g. Paris Agreement).
Space	Justice in the terms of space refers to where an event is happening. This event is happening in the selected OECD and non-OECD countries.
Time	Time refers to the period when the NDCs target are achieved in the selected countries
Fossil fuel unconditional	Support given to the fossil fuel sector without any mitigation actions or requirements towards the impacts of fossil fuel production/consumption. There is no requirement for the fossil fuel sector to take actions against climate change or to support energy transition in their activities.
Fossil fuel conditional	Support given to the fossil fuel sector conditional on where this sector must take necessary measures/actions to reduce the impact of fossil fuel and/or to support the clean energy sector. In this context, this refers to policies that support fossil fuel production and consumption with a consideration for climate targets or additional pollution reduction requirements.
Clean unconditional	Support given to the clean and low-carbon energy sectors and transitioning away from fossil fuels that is accompanied by proper safety measures in their energy activities.
Clean conditional	Support given to the clean and low-carbon energy sectors and to transitioning away from fossil fuels but with no specific implementation of proper environmental safeguards

Source: Energy Policy Tracker (n.d.) and Heffron and McCauley (2017, 2018).

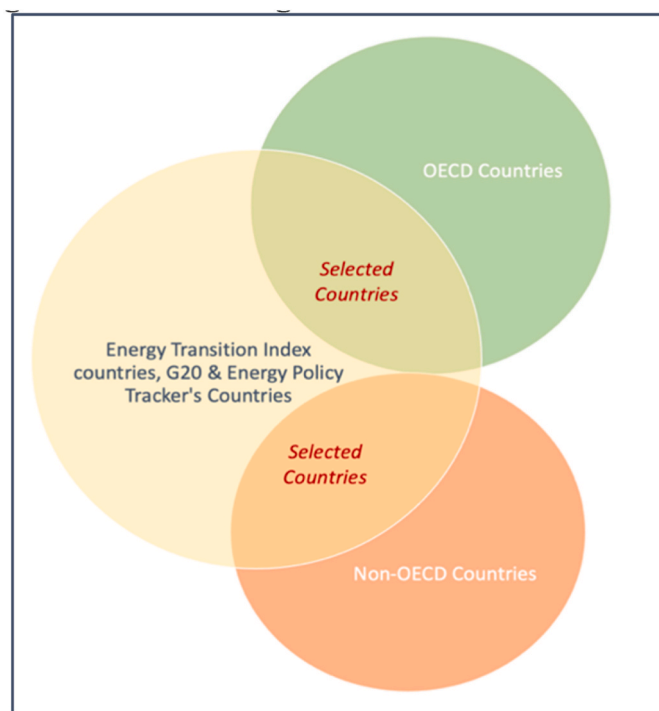


Fig. 2. Venn diagram of countries selected.
Source: Created by Sumarno based on ETI by World Economic Forum (2021); Energy Policy Tracker (no date)Tn.d. and OECD (2020)

Carbon Project, n.d; Ritchie and Roser, n.d; World Bank n.d). See Table 2 for the terms and definitions used in the analysis.

The four main aspects of the JUST metric measured in this paper are justice, universal, space, and time. Each of the aspects is worth 25% with a combined total of 100%. The following is the details of these aspects:

1. Justice. Our analysis focuses on procedural (regulation and policy) and restorative justice (restoration of impacted sectors) by looking at how many fossil fuel conditional and clean unconditional policies are listed in the EPT. We use these parameters (Energy Policy Tracker, n. d.) because they identify the energy sector policies of a country (procedural justice) that require fossil fuel sector action or investment to restore or reduce their impacts (restorative justice).
2. Universal. We look at the amount of subsidy supporting fossil fuels, both clean conditional and unconditional by each country. We measure this as the support given for both the fossil fuel and clean energy sectors and which brings with it impacts, either increases and decreases, in global GHG emissions (Hoffert, 2010; Qi et al., 2014).
3. Space. Here we analyse the annual CO₂ emissions to date produced by a country since the 1997 Kyoto Protocol, and how much this has contributed to global emissions. We also evaluate by what extent their CO₂ emissions have increased since then. The cut-off date chosen was the year of the Kyoto Protocol signing because this was the first universal agreement on combating climate change.
4. Time. This examines the period that the countries' NDCs are to be achieved according to their commitments.

This paper also qualitatively analyses phasing out countries' FFS by creating a pattern on OECD and non-OECD nations. This analysis supports the result of the quantification in Section 5 and provides insights into how successful developed countries are in phasing out their FFS, supporting RE and how these policies support their economies.

5. Results and discussion

5.1. Justice

The EPT classifies the support given to clean energy and fossil fuel sectors into four categories: fossil unconditional, fossil conditional, clean unconditional, and clean conditional. The justice element looks at the number of policies that safeguard the support for clean unconditional and fossil conditional where the support given to these sectors also considers climate targets and other environmental concerns. The justice element also includes procedural justice, represented by the policies that are in place, while restorative justice is represented by the type of policy, and whether these consider environmental impacts and mitigation.

According to Mayer (2009), two important rules of economic policy theory are: (i) if all targets are to be met, the number of policy instruments must be at least as large as the number of targets; and (ii) in the case of trade-offs between target variables, policy-makers must use a social welfare function to determine which combinations of instruments maximises the degree to which a consistent set of targets can be met. Hence, we looked at the number of policies safeguarding these categories (clean unconditional and fossil conditional supports) in each selected country which are proportional to the total number of policies applied to their energy sector. The final score is the average of the number of policies for clean unconditional and the number of policies

Table 3
'JUST' framework metric for 'justice'.

Justice Score	Indonesia	OECD	Non-OECD
Number of policies for clean unconditional	3.33	4.97	3.81
Number of policies for fossil conditional			

Source: Authors' calculation using data from Energy Policy Tracker (n.d)

for fossil conditional. See Table 3 below for the quantification result for the justice metric.

The result from Table 3 shows that Indonesia scores lowest in this metric compared to OECD and the Non-OECD countries. However, all scores are relatively low. There are more policies supporting fossil-fuel and/or clean industry with no climate change mitigation or environmental impact measures. Hence, it is not only Indonesia that needs to consider enacting measures and policies that support clean energy to help meet climate targets and reduce environmental impacts.

As a G20 member, Indonesia is committed to FFS reform. However, according to the EPT (n.d) Indonesia currently has only four policies supporting clean unconditional, one supporting clean conditional, five supporting fossil unconditional and, five supporting other energy, mainly fossil fuels. The highest number of policies supporting clean unconditional belongs to Spain, with 89 policies out of 167, only 14 of which support fossil fuel unconditional and six policies supporting fossil conditional. France is another exceptional OECD example with four times more policies supporting clean unconditional than fossil unconditional. Moreover, France has twice as many policies supporting fossil conditional than fossil unconditional.

In the non-OECD countries, Brazil has the highest number of policies supporting clean unconditional, with 11 out of 44 policies, and 14 supporting fossil fuel. Brazil also has the highest ETI score amongst the selected sample and has only 25% of total policies supporting clean conditional and 2% supporting fossil conditional. This shows that both Indonesia and the non-OECD countries need to further improve their energy policies, support cleaner unconditional subsidies, and look to OECD countries to create just policies for the energy transition process.

With the lowest score, Indonesia needs to redesign its support policies into a more environmentally friendly form, and thereby accelerate the energy transition in a just way. This is where the day-watchman approach is useful. The regulator (government) formulates better policies, provides the fossil fuel and clean energy sectors with information, and enforces rules with sanctions (Sokołowski, 2016). This is intended to improve the effectiveness of these support policies and help the country achieve its targets.

5.2. Universal

Money is used to support energy sectors, both fossil fuel and RE. The Energy Policy Tracker (n.d) identifies the amount of support going to fossil fuel and clean energy. The support these categories receive from government plays a role in improving the welfare of society (e.g. health, economy, environment) and achieving the country's NDC targets. Energy sector subsidies can affect global emission levels and contribute to climate change by, for example, encouraging consumers to use more fossil fuels. Therefore, support given to clean energy improves its competitiveness and encourages a move away from fossil fuels.

Universal metric utilises the amount of support the clean energy sector (both conditional and unconditional) and fossil conditional receive. Each category is proportional to the total support given in selected countries. We do not include fossil unconditional since this policy does not represent how countries ensure justice is being done when supporting the energy sector. See Table 4 below for the quantification result for the universal metric.

According to the table above, Indonesia is shown to have the lowest score in this justice element. Very little of Indonesia's COVID-19

Table 4
'JUST' framework metric for 'universal'.

Universal Score	Indonesia	OECD	Non-OECD
Clean unconditional support score	0.44	3.99	1.87
Clean conditional support score			
Fossil conditional support score			

Source: Authors' calculation using data from Energy Policy Tracker (n.d)

recovery package was allocated to the energy sector (Ministry of Finance, 2020). The GoI allocated FFS under a scheme called social protection, and with others being assigned under miscellaneous support given to societies. Of the 695.2 trillion IDR (Indonesian Rupiah), USD 48.3 billion recovery package, only 15.6% went to FFS with non-going to the clean energy sector (MoF, 2021) explaining Indonesia's low score. According to the EPT (n.d), the support given to the state-owned railways is considered clean conditional since only relatively clean energy sources (electricity, gas, and biofuel) are used compared to aviation.

According to the EPT (n.d), for both France and Spain (OECD countries), the amount of money going to each of the three categories is higher than the money going to fossil unconditional. The total amount given out by France and Spain was USD 52 billion and USD 15 billion respectively, with the support given to fossil fuel unconditional amounting to USD 7.4 billion in France and USD 1.9 billion in Spain.

Meanwhile, non-OECD Brazil also invested the largest amount of money into clean unconditional (USD 1.2 billion), twice the amount going into fossil unconditional. China, however, gave the largest amount to clean conditional (USD 27.9 billion) but none invested in clean unconditional. This amount is USD 10 billion more than the money invested into fossil unconditional.

FFS has hidden its fossil fuel real costs, which include externalities of fossil fuel usage (e.g. CO₂ emissions that directly impact health). Reforming FFS and allocating support for RE will do more justice to and deliver greater benefits for society (Bridle, 2018; Simpson and Clifton, 2016). This policy action will deter industry or consumers from using fossil fuels and as RE becomes more competitive, making transitioning more likely, whilst simultaneously reducing CO₂ emissions. France, Spain, Brazil, and China have recognised there is an opportunity to use their recovery budgets to accelerate RE growth and achieve their climate targets. However, this is not the case with Indonesia. Although Indonesia has missed this opportunity, these goals could still be fulfilled through its state budget, achieving 100% RE by 2050 (Ministry of Energy and Mineral Resources, 2021b). Therefore, it is important to consider these other countries when looking at strategies aimed at reforming FFS and supporting RE.

5.3. Space

This metric analyses each country's share of cumulative CO₂ emissions in terms of global emissions between 1887 and 2019. This data is taken from the Global Carbon Project (n.d). Each country's total CO₂ emissions are proportional to total global CO₂ emission. The metric works by comparing one country's emissions against another's. Hence,

the lower the emissions the better the country's score will be (see Fig. 3). See Table 5 below for the quantification result for the space metric.

Based on the result shown in Table 5, Indonesia performed slightly higher in this metric compared to the OECD, in fact registering the highest score. According to the World Resource Institute (2020), energy contributes most to overall global emissions. Energy is fundamental in driving a country's economy (Mahadevan and Asafu-Adjaye, 2007; Zhang-wei and Xun-gang, 2012; Keho, 2016). Many studies have found there is a strong relationship between energy consumption and living standards (Stern, 2000; Lambert et al., 2014; Arto et al., 2016; Keho, 2016). That said, OECD countries were the first to use large quantities of fossil fuels to develop their economy during industrialisation. However, Indonesia is still an emerging economy with a rising population of 273 million. This accounts for the slight difference in scores with energy consumption being driven by a population with differences in living standard also affecting energy usage. Amongst the Non-OECD countries, China contributed the lowest score. Until 2019, China had produced 220 Billion Tonnes of Emission (BTOe) cumulatively, with the selected OECD countries at 280 BTOe (Global Carbon Project, n.d) cumulatively. According to Keho (2016), population is one of the main factors influencing energy consumption, and China's main energy supply is coal (IEA, n.d). This explains why China has the lowest score in this metric.

In the current energy transition scenario, Indonesia should lower emissions produced by fossil fuel and develop cleaner sources. Energy policy plays a significant role in reaching this goal (Daszkiewicz, 2020) and achieving NDC targets. As the fourth most populous country, FFS reform would result in less government spending along with decreased fossil fuels consumption, eventually leading to emission reduction. Hence, good FFS policy and reform will help Indonesia achieve its climate targets.

5.4. Time

Energy transition is a process, time being a significant factor for it to happen. 'Time' looks at the NDC's target for the selected countries, in particular, for emission reduction targets taken from UNFCCC (n.d). Each country has a different base year and target for its 2030 emission reduction goal. Here, we look at countries' emission reduction goals based on their NDC. The GHG emission data is taken from the Global Carbon Project (n.d).

According to Table 6, Indonesia scores higher than the OECD regarding its yearly GHG emission reduction ambition. This really depends on the level of GHG emissions represented in each country's baseline year, and by how much they intend to reduce emissions by 2030. Indonesia scored higher than the OECD countries because its baseline year was 2010, only 20 years from the target year of 2030. Most OECD countries' reduction targets are at least 30% from their baseline (UNFCCC, n.d), with the majority having 1990 as their base year. Not only do the non-OECD countries have higher emissions (e.g. China and Brazil) but they also have shortest periods to achieve their targets with 2005 and 2010 baselines. Amongst non-OECD countries, China and Brazil have the highest emissions on their baseline (2005) and have relatively high emission reduction targets, 60%–65% for China, and 37% for Brazil, resulting in non-OECD countries having the highest score overall.

Indonesia is set to achieve 29% emission reduction by 2030 when compared to its GHG emission level in 2010. Presently, fossil fuel dominates Indonesia's energy mix. In 2020, Indonesia only reached

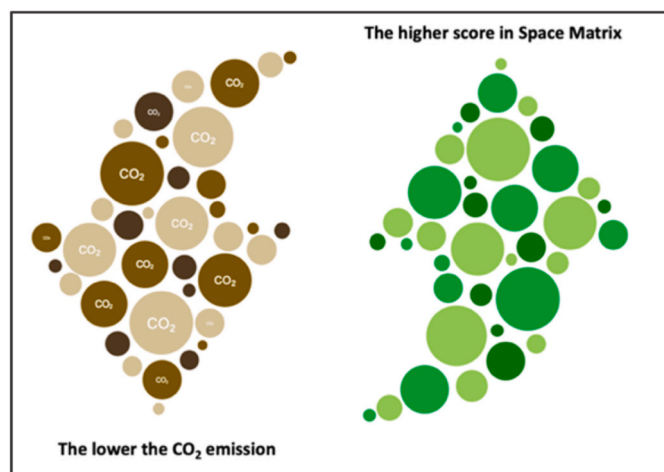


Fig. 3. Space score. Source: Created by Authors (2021)

Table 5 'JUST' framework metric for 'space'.

Space Score	Indonesia	OECD	Non-OECD
Share global CO ₂ cumulative score (2019) ^a	24.957	24.887	24.779

^a Higher score means less share global CO₂ cumulative. Source: Authors' calculation using data from Global Carbon Project (n.d)

Table 6
'JUST' framework metric for 'time'.

Time Score	Indonesia	OECD	Non-OECD
Yearly GHG emission reduction ambition score	3.1	2.5	5.0

Source: Authors' calculation using data from UNFCCC (n.d)

11.5% of its RE goal which is below target (Kusdiana, 2021). This finding further confirms that Indonesia should consider reviewing and improving its FFS policy and consider replacing its subsidies with cleaner energy (Sanchez et al., 2021).

5.5. Overall analysis

In general, there is room for improvement regarding energy policies among the countries with scores below 50. However, with the lowest overall score Indonesia should look towards the best performing OECD and non-OECD countries for policy guidance. This does not necessarily mean that Indonesia is not doing justice in its subsidy policy, but improvement is needed. Fig. 4 provides detail on overall scores for all elements in the JUST Framework for the selected group of countries and Indonesia.

France and Spain have more than 30 policies supporting clean unconditional and invest in clean energy development as well as mitigating the climate impact of fossil industry. Brazil and China have invested in clean energy regardless of the emissions produced. They also have more policies supporting clean energy development and are attempting to phase-out their FFS. The next section discusses the strategies of these countries, and those that could be adopted in Indonesia.

6. Country comparative analysis on FFS policy

6.1. Indonesia and lessons learned

Many countries have committed to phasing-out their FFS including Indonesia as one of the G20. Indonesia has made various attempts to reform their FFS since 2005 (Fig. 5). These policies are still benefiting the fossil fuel industry and making fossil fuel-based energy more economically viable and socially accessible. Although these subsidies are aimed at helping the impoverished, poor implementation has resulted in 40% of the beneficiaries being among the wealthy (OECD,

2019). In this respect, poor and marginalised people have become victims of the failure to phase out FFS. This is far from the recognition justice element introduced by JUST framework. Therefore, this is an added impetus for Indonesia to improve its subsidy policies and accelerate its energy transition in a 'just' way.

For Indonesia, the strategy of phasing-out coal was only introduced in 2021 in the PLN (SOE power plant) intelligent strategy report (Ministry of Energy and Mineral Resources, 2021b) in which the GoI set various strategies to phase-out its coal in its electricity sector and become carbon neutral by 2050. The strategy with its optimistic 40-year timeframe is similar to the coal industry reforms implemented in France.

Indonesia has not implemented a carbon tax on fossil fuel consumption. However, it has conducted pilot projects on carbon cap and trade of 80 coal fired power plants since March 2021 prior to enacting the carbon pricing regulation prepared since 2020 (Ministry of Energy and Mineral Resources, 2021a).

Thus far, the Indonesian parliament has not approved the RE law which is still under review. However, RE tax incentives include tax holidays, tax allowances, and VAT exemption on important items, especially in the geothermal industry have been implemented. According to Guild (2019), these incentives are insufficient. Given that Indonesia is considered to be a country with significant sources of renewable energy, the approval of RE law will not only bring direct benefit to Indonesian people but should also make a positive contribution to the JUST framework's cosmopolitan justice element.

6.2. France and lessons learned

France has reformed its coal subsidies over a 40 years period with the intention of a complete phase out by 2022. This reform has been costly due to workforce subsidies needed to support workers during the transition (Laan et al., 2010; Worrall and Runkel, 2017). To accelerate the transition, the Government aimed to reduce public finance for fossil fuels by announcing a restriction on bilateral support for coal in developing countries. This policy underlines the cosmopolitan justice element of the JUST framework. Simultaneously, they encouraged the diversification of energy and production of other domestically produced electricity sources to replace the declining domestic coal supplies (Barbière, 2015). Other policy measures to reduce domestic fossil fuel consumption included a carbon tax (Worrall and Runkel, 2017) as well as taxes on Sports Utility Vehicles (SUVs) to discourage their use, and the industry

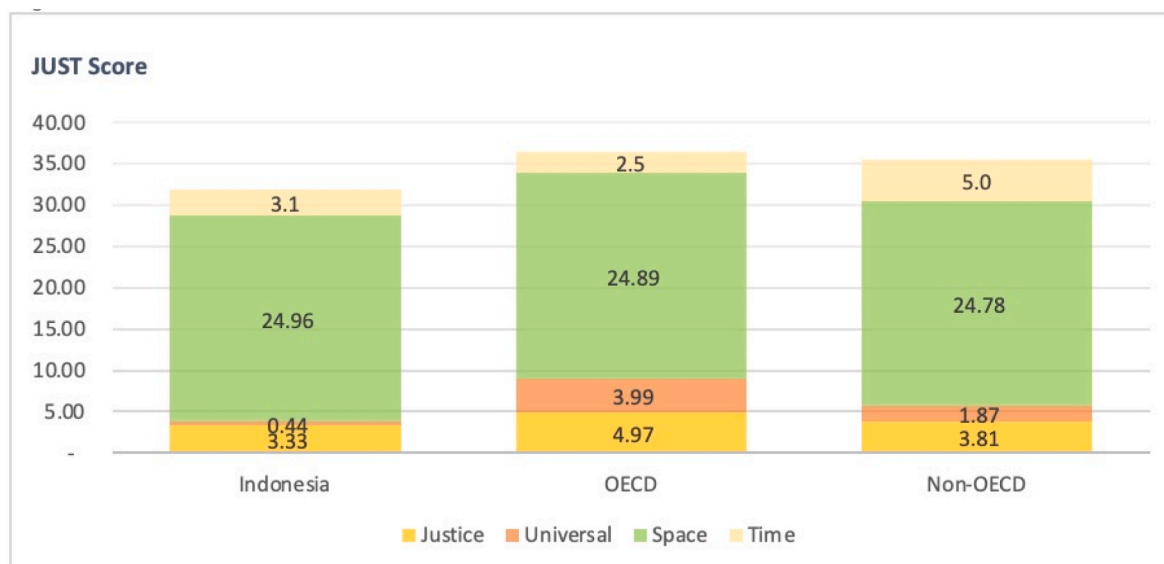


Fig. 4. 'JUST' framework metric score.

Source: Created by Authors based on Authors' calculation on the JUST Framework

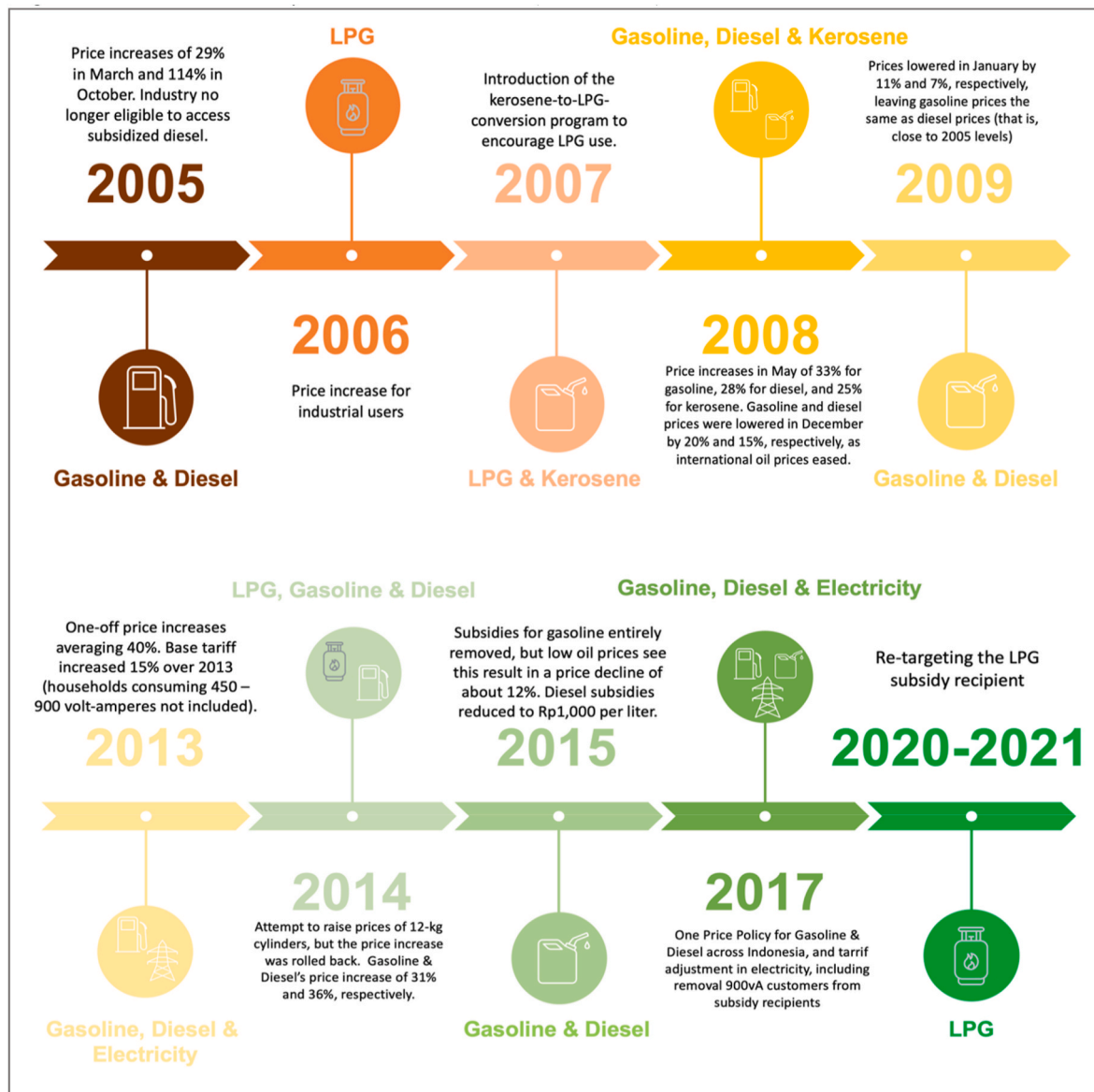


Fig. 5. Fossil fuel subsidy reforms in Indonesia (2005–2021).

Source: Adapted by Sumarno from Beaton and Lontoh (2010), Kuehl et al. (2021)

to be more concerned about its carbon footprint and not just emissions (France24, 2020). Finally, France also imposes RE subsidy policies through tax regulation mechanisms such as VAT reduction for Solar PV and 0% interest loans (Vidalic, 2019). France has made efforts to transition from fossil fuels to a low-carbon economy, also taking justice into account, particularly recognition and cosmopolitan justice elements.

It is worth noting that France is a leader in European energy decarbonisation due to the various policy and regulatory measures implemented to reduce domestic fossil fuel consumption including a carbon tax on fossil fuel consumption (World Bank, 2017). France's energy market which combines government intervention and market mechanisms has worked well in reforming FFS, allowing energy prices to be set freely by the market, while electricity and gas are protected and regulated through tariffs (Worrall and Runkel, 2017).

6.3. Spain and lessons learned

According to the Justice metric result, Spain has the highest number of clean unconditional policies amongst all of the comparative countries and has invested a considerable sum of money to clean energy. Spain has

created a Green Finance Fund for mitigation and adaptation and also enacted a Law for Energy Transition (Caldés et al., 2019). This law provided funds for the transition process, some of which were raised through a new environmental tax and the abolition of FFS. The Spanish Government has also given private consumers subsidies to invest in RE by divesting funds from fossil fuel industries. A further strategy is that of green procurement where all public administrations must use 100% renewables on their premises. The Spanish Government has also set up a regulatory framework and incentives to private RE generators. This includes non-tax on self-consumption, fair remuneration for electricity fed to the grid and simplified procedures and administration, also emphasising the recognition justice element of the JUST framework. To accelerate renewable development, the Spanish government supported early development and deployment of RE, gradually phasing out and banning most new FFS (Caldés et al., 2019) with a further commitment to phasing out the inefficient FFS by 2025 (Worrall and Runkel, 2017). To achieve this target, the government took a strong action by introducing a number of 'negative externality' taxes including a new tax on the use of hydrocarbons (González, 2016, 2017). In addition, the country also enforced various taxes applied to carbon-intensive energy

products sold, including an Oil Tax, Tax on Electricity and Tax on Coal (OECD, 2016). To balance this pro-government regulatory framework, some pro-market regulations were also introduced to increase competition especially in the electricity, oil, and natural gas sectors (International Energy Agency, 2015).

6.4. Brazil and lessons learned

Brazil launched an ambitious reform agenda during the 1990s to liberalise the energy sector by removing subsidies and allowing private investment. This aimed to drive competition in the energy sector where subsidies were no longer needed. However, this was not very successful due to political challenges.

However, Brazil has supported RE development for the last two decades (IRENA, 2015), with the highest amount of money given to support clean energy and more policies enacted that support them than other selected non-OECD countries. Different policies to incentivise alternative electricity sources include, dedicating funds to finance this programme, grid access policies for RE to receive a tariff discount of 50%, and fiscal incentives for RE development (IRENA, 2015).

Brazil's experiences of reforming FFS somewhat mirrors Indonesia in so much as showing how politically challenging it can be. Brazil's policies in developing RE aligns most with those in France and Spain as compared to the other selected non-OECD countries. This can be seen in how money is given to support clean energy and in regulating the fiscal incentives for its development. This indicates that Indonesia should improve its RE policies and give more support to renewable development.

Based on the Brazilian fossil fuels subsidy case, De Oliveira and Laan et al. (2010) concluded that "*partial reforms lead to only partial benefits*". The pro-market regulatory framework introduced to liberalise the fossil fuel sector has yielded some positive results such as increasing oil reserve, production, and government revenue. However, the government halted full liberalisation by allowing its state-owned oil company (Petrobras) to maintain monopolies and cross-subsidies for some fuels. Consequently, this anti-market framework has resulted in limited economic benefits of liberalisation. This policy could also undermine the universal justice elements of the JUST framework.

7. Conclusion and policy recommendations

The purpose of this paper is to review where Indonesia's FFS policy reforms lie amongst other OECD and non-OECD countries to better inform its energy policy movement towards low-carbon energy in a just way. This paper also reviews how the JUST Framework is implemented and assesses the justice in energy subsidy policies in Indonesia as compared with OECD and Non-OECD countries.

The first metric is the Justice Metric. This metric shows that Indonesia is still behind in its policy making aimed at supporting the just energy transition. However, the selected non-OECD countries are advanced in their energy transition policy making. In the case of Brazil, despite not being very successful in reforming FFS, the government has shown an intention to develop more RE. The result also shows that the energy transition progress of most of the selected OECD countries is advanced as they have implemented more policies to support both clean conditional and unconditional compared to the non-OECD countries.

Indonesia currently has only five policies that support clean energy development (EPT, n.d). Many studies have assessed the importance of government policies on the growth of RE development (Harmelink et al., 2006; Menz and Vachon, 2006; Jacobsson et al., 2009; Delmas and Montes-Sancho, 2011; Polzin et al., 2015). Furthermore, these studies not only highlight the importance of government setting clear and consistent policies which support renewable development, but also policies that align with government objectives in the just energy transition strategies. Policies should be established without harming society and environment, provide support to those most affected by the

transition process, and complement current policies in phasing-out FFS.

The second metric is the Universal Metric. Similar to the Justice Metric's result, Indonesia has not provided enough money to aid RE development whilst still massively supporting the fossil fuel industry. As a G20 member, Indonesia is committed to phasing-out its FFS. However, the current amount of money going into fossil fuels is still much higher than that for clean energy. Despite its abundance, Indonesia has subsidised coal fired power plants to make prices affordable for the poor. However, this has led to RE power plants becoming uncompetitive. Therefore, Indonesia should work towards phasing-out coal subsidies and replace them with cleaner energy sources (Sanchez et al., 2021). However, it is important for the GoI to plan schemes carefully and incentives packages for current coal workers. Imposing a carbon tax on fossil fuel consumption is politically challenging in Indonesia, however, the tax revenue from such a move could be used to incentivise greener activities or clean energy development.

Recent literature on post-pandemic and recovery funds demonstrate that governments need to take this opportunity to develop more RE sources by swapping subsidies to fund RE development (Chen et al., 2020; Creel et al., 2020; Strinati, 2020; Volz, 2020; Sanchez et al., 2021). While some countries have taken this opportunity to accelerate their energy transitions by investing more in clean energy development (O'Callaghan et al., 2020), Indonesia failed to allocate any funds for clean energy development from its COVID-19 recovery package.

The third metric is the Space Metric. As an emerging economy, Indonesia did not use as much fossil fuels in the past as other developed countries. That is why Indonesia does not contribute to global CO₂ emissions as much as that seen in developed or other non-OECD countries (e.g. China due to its large population). The urgency of developing cleaner sources of energy has become more important for the world, as well as for Indonesia.

Learning from the OECD countries' experiences, it is fair to note that the regulatory framework in the energy sector has moved from direct government control to market competition in order to protect public interest. As Sokolowski (2020) notes, the framework has adopted the day-watchman approach to reach a balanced regulation.

The last metric is the Time Metric where NDC targets of all selected countries play an important role in the assessment. Based on this, Indonesia's emission reduction targets are more ambitious compared to the OECD countries. This shows that although Indonesia is committed to combating climate change under different arrangements (such as G20, Paris Agreement), it still needs to improve its policy making in supporting RE, in particular its FFS policies.

Overall, the result shows that despite efforts the GoI have made in reducing FFS and improving its RE development, there is still a lot that can be done to improve the current policies. Indonesia should learn from France, Spain and Brazil that have demonstrated their intention of reforming their FFS and supporting RE development. Finally, the result also shows that allocating more FFS would hamper the development of RE and the just energy transition in a country. This in turn will increase the level of global emissions and the risk of climate change, pushing global efforts in the opposite direction of universal justice.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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