

# Chapter 1

## Introduction

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# Chapter 1

## Introduction

The issue of climate change continues to be prominent on the global agenda, despite the rising concerns about energy security. Governments are strengthening their policies to achieve the goals of reducing greenhouse and CO<sub>2</sub> emissions to net zero, with the aim of containing global warming below 1.5 degrees or 2 degrees. Southeast Asia is no exception. Policymakers in Southeast Asia have to carefully craft various policy instruments to accelerate action, considering which instruments to apply in what order and when. Decarbonisation entails a significant change in all aspects of society and the economy, and policies need to take into account the reactions of various stakeholders. It will be helpful to examine public perceptions of various policies and technological options, including their willingness to pay (WTP) for new policies.

This report presents the results of a 3-year survey project on WTP for and perceptions of climate-related technologies across 9 cities in 7 ASEAN countries. The project began in 2019 and the survey period overlapped with the global coronavirus disease 2019 (COVID-19) pandemic. Despite this hardship, surveys were completed in all target countries. Nevertheless, the pandemic affected the respondents of the survey, as they suffered from fear of getting the virus compounded by the anxiety of financial difficulties. Thus, the WTP levels found in this report would be biased and probably conservative.

The background of this study was already presented in the previous report (Yoshikawa, 2021), but global energy and climate policy remains in flux. For instance, despite severe influence of COVID-19, RE achieved record growth globally (International Energy Agency (IEA), 2022a). The following is a brief update of energy and climate policy.

## **1. Recent Trends in Global Energy and Climate Policy**

### **1.1. Strengthening global climate policy**

Globally, climate policy continues to be strengthened. The United Nations (UN) brought nearly 200 countries together for the 2021 global climate summit, known as COP26, held in Glasgow, Scotland, with the UK presiding. A total of 197 countries signed the outcome document, called the Glasgow Climate Pact and (United Nations Framework Convention on Climate Change (UNFCCC), 2021) finalised the so-called Paris Rulebook, which describes the detailed operationalisation of the Paris Agreement. According to the UN News, initially ‘the phase-out of unabated coal power and of inefficient subsidies for fossil fuels’ was intended to be mentioned in the Glasgow Climate Pact, but in the end this was revised to merely ‘phase down’ (United Nations, 2021) coal use. However, even this was a very big achievement, and COP26 was the first time in history that the UN parties agreed to a position on phasing down a particular type of fossil fuel. Viet Nam was amongst the signatories for coal phase-out (Dan, 2021; Henry, 2021). The United States and China also issued the Joint Glasgow Declaration (Office of the Spokesperson, 2021) committing to cooperate on climate change issues in the 2020s.

### **1.2. Increasing concerns about climate**

Nevertheless, concerns about climate change are becoming ever more serious. Reports by the IPCC Working Groups I and II established that human-induced climate change impact is unequivocal and widespread (Intergovernmental Panel on Climate Change (IPCC), 2021). and the Working Group III demonstrated that carbon dioxide emissions must reach net zero (Intergovernmental Panel on Climate Change (IPCC), 2022) in the 2050s in order to contain global warming below 1.5 degrees C. Major transitions in the energy sector are required to limit global warming, including a substantial reduction in fossil fuel use, promotion of electrification, improvement in energy efficiency and support for clean energy such as solar and wind power. Economically speaking, there is sufficient global capital and liquidity (Intergovernmental Panel on Climate Change (IPCC), 2022) to achieve a net zero goal when governments and public sectors are aligned. In Asia, the Asia Green Growth Partnership Ministerial Meeting (AGGPM) Public–Private Forum (Arifin et al., 2022) has been held for the last couple of years, to promote energy transitions; in addition, proactively engaged in renewable energy, the Asian Development Bank (ADB) started a feasibility study called

Energy Transition Mechanism (ETM) (Asian Development Bank (ADB), 2021), to find funds to purchase coal-fired power plants and retire them.

## **2. Global Trend in Renewable Energy and Costs**

### **2.1. Shifting energy landscape: Renewables achieving record growth**

Against this background of climate change concerns and the intention of the international community to take climate action, in 2021 renewables achieved a record growth, 3% higher (International Energy Agency (IEA), 2021c) than 2020, which was already exceptional. According to the IEA's report *Renewables 2021*, the forecasted renewable power capacity to be added in 2021 was almost 290 GW (International Energy Agency (IEA), 2021a). Solar PV led renewable power expansion in 2021, followed by wind and hydropower. Solar PV accounted for almost 60 % (International Energy Agency (IEA), 2021a) of the worldwide renewable capacity expansion. The growth of hydropower, bioenergy, geothermal, and concentrated solar power only achieved 11 % (International Energy Agency (IEA), 2021c) of the RE capacity expansion worldwide. Biofuels' growth slowed down as the price more than doubled by October 2021. China remains the leading country in renewable capacity expansion, achieving 43 % (International Energy Agency (IEA), 2021a) of the renewable capacity expansion worldwide. Four markets—China, Europe, the US, and India—are the global leaders (International Energy Agency (IEA), 2021a) in renewables, achieving 80% of renewable capacity expansion worldwide.

### **2.2. Technologies achieving advancement along with strengthened climate policy**

Technology advancement contributes to renewable energy expansion globally, along with strengthened climate policy. The cost of renewables fell globally with the impact of the global COVID-19 pandemic and the resulting disruption, according to the International Renewable Energy Agency (IRENA) report (International Renewable Energy Agency (IRENA), 2021a) In particular, solar PV and wind power technologies have (International Energy Agency (IEA), 2022b) achieved remarkable cost reduction in the last decade. Both the global weighted-average levelised cost of electricity (LCOE) of utility-scale solar PV and that of residential PV systems fell significantly. Utility-scale solar PV dropped in cost by 85 %, (International Renewable Energy Agency (IRENA), 2021a) between 2010 and 2020. The operating costs for

solar PV and onshore wind are lower than those of coal-fired power plants. Renewables contribute to energy security, as an affordable source of energy.

### **3. Energy and Climate Policy in ASEAN**

Renewable energy is achieving record growth globally (International Energy Agency (IEA), 2022b). In ASEAN, however, the RE growth is rather gradual, though nine of ten ASEAN Member States (AMSs), that is, Indonesia, Malaysia, Myanmar, Viet Nam, Thailand, Lao PDR, Brunei Darussalam, Cambodia, and Singapore (all except the Philippines) have made a commitment or pledge to reach net zero CO<sub>2</sub> emissions. In 2020, shares of installed power capacity are as follows (Muhammad Rizki Kresnawan and Beni Suryadi, 2022): Coal and gas are major sources of power supply in ASEAN, at 31.4% and 30.9% respectively. Oil contributed only 4.2%. RE share increased from 18.5% to 33.5% between 2006 and 2020. Of the RE categories, hydropower was the largest contributor, achieving almost 21% in the power capacity mix. The total of the RE remainder was as follows: solar PV, bioenergy, geothermal, wind, and other at 12.5%. Therefore, ASEAN countries need to significantly expand its renewable capacity to honour their pledge or commitment to net zero.

### **4. Changes in consumer mindset due to COVID-19**

#### **4.1. COVID-19 pandemic impacts on ASEAN countries**

As COVID-19 spread in ASEAN countries, our survey took place in 7 countries, 5 of which were highly affected by the pandemic (ASEAN Biodiaspora Virtual Center (ABVC), 2022). The outbreak of COVID-19 had negative impacts on both consumer mindset and the economies of ASEAN countries. Policy interventions, such as lockdowns, travel restrictions, and so forth, in particular social distancing policy, made respondents in the surveys very alert towards survey staff members, and some refused to participate in the survey, concerned with COVID-19 exposure.

#### **4.2. Financial difficulties hitting households in ASEAN countries**

During the initial stages of the COVID-19 pandemic, ASEAN households suffered from financial difficulties, loss of employment, decrease in sales of family businesses, etc. In particular, more than 75% of households in Indonesia, the Philippines, and Thailand

experienced financial difficulties, according to ADBI's database (Peter J. Morgan and Long Q. Trinh, 2021). In fact, financial difficulties in these countries were significantly higher compared to the rest of ASEAN. The financial difficulties experienced by the respondents negatively should have affected their WTP, suggesting that the WTP would be higher under more normal circumstances.

## **5. Energy Security is Back: Ukraine Conflict and Implications for RE Transition**

The Ukraine conflict is exacerbating energy security issues. Russia, one of the world's top oil and natural gas exporters (International Energy Agency (IEA), 2021b), started its 'special military operation' into Ukraine in February 2022 (Ministry of Foreign Affairs of Japan, 2022). Russia remains Europe's main supplier; however, the European Commission is determined to reduce the European Union's Russian gas dependence by two-thirds in 2022 (European Commission, 2022b). Europe has been facing increased energy prices for several months (European Commission, 2022a), and uncertainty on supply from Russia is worsening the problem, as Big Oil companies, like BP and Shell, have attempted self-sanctioning on their own (Robin, 2022). In order to stabilise energy prices, the European Commission allows Member States to set and regulate energy prices for vulnerable consumers, households, and micro-enterprises. There is the possibility that the Ukraine conflict might accelerate the European Commission's further investment in RE transition (European Commission, 2022b). In the meantime, the price of crude oil and natural gas has increased in Asia as well. The upward pressure on energy prices might reduce ASEAN's economic resilience after the COVID-19 pandemic (Dylan, 2022). The situation may be made even worse with the global shortage of grains.

## **6. Overview of this Study**

### **6.1. Three-year consecutive survey on WTP across cities in 7 ASEAN countries**

The report consists of the full 2022 survey as well as summary of the past 3 years of research (Table 1.1). This WTP study targets urban areas in 7 ASEAN countries: Thailand, Viet Nam, Lao PDR, Myanmar, the Philippines, Malaysia, and Indonesia. In 2022, the survey was conducted in both Malaysia and Indonesia. What was unique about the 2022 survey in Malaysia was the survey experiment, which randomly assigned different information

materials to survey respondents, investigating how the information presented may affect survey responses. A set of three different information materials on renewable energy was prepared for Malaysia. A survey experiment was also conducted on CDR. The 2022 survey in Indonesia was quite similar to the one conducted in 2021, and the sample size was the biggest amongstst the 7 surveyed ASEAN countries.

**Table 1.1. Survey Outline**

<b>City</b>	<b>Country</b>	<b>Period</b>	<b>Sample Size</b>
<b>Bangkok</b>	Thailand	1. June to August 2020 2. December 2020 to March 2021	1. DCE: 250 2. DCE: 250
<b>Ho Chi Minh City</b>	Viet Nam	May to July 2020	DCE: 319 CVM: 301
<b>Vientiane</b>	Lao PDR	July to August 2020	DCE: 400
<b>Yangon</b>	Myanmar	August 2020	DCE: 250
<b>Mandalay</b>	Myanmar	July to August 2020	DCE: 250
<b>Manila</b>	The Philippines	December 2020 to April 2021	DCE: 250 CVM: 250
<b>Kuala Nerus</b> <b>Kuala Terengganu</b>	Malaysia	1. February to March 2021 2. April to June 2022	1. DCE: 300 2. DCE: 1,050
<b>Jakarta</b>	Indonesia	March to May 2022	DCE: 1,000

Note: DCE stands for discrete choice experiment and CVM, contingent valuation method.

## **6.2. Methods**

Discrete choice experiments (DCEs) and the contingent valuation method (CVM) were employed for the survey in 2020 and 2021. The survey experiment was newly employed in the 2022 survey conducted in Malaysia. Each survey was conducted by local researchers from the author team.

Unfortunately, like in 2020 and 2021, the pandemic impacted the survey this year. Some refused to take the survey for fear of infection, and WTP was undeniably affected by the short-term COVID-19 factor. Thus, the WTP amount revealed in this report would probably be an underestimate for future policy design implications regarding RE and electric mobility (e-motorcycle).

The report is structured as follows. Chapter 2 summarises the policy trends regarding RE. Chapter 3 presents the methodology and survey design. Chapter 4 summarises the sampling strategies adopted for each of the cities included in this research. Chapter 5 provides an overview of the descriptive statistics for the responses. Chapter 6 analyses the results of the survey on WTP for renewable energy in the five ASEAN cities. Chapter 7 provides an overview of the attitude survey on CDR in Malaysia. Chapter 8 provides an overview of the seven-country comparison. Chapter 9 provides policy implications and concludes this report.