Reduce Inefficient Electricity Consumption to Save Our World

Take an action to minimize climate change by reducing inefficient electricity consumption and educating ASEAN society through interactive mobile apps platform.
Small steps can help save the world!

MATRIX EXPLORER TEAM
RINI NUR FATIMAH
MUHAMMAD FIJAR ASWAD

ASEAN DATA SCIENCE EXPLORERS

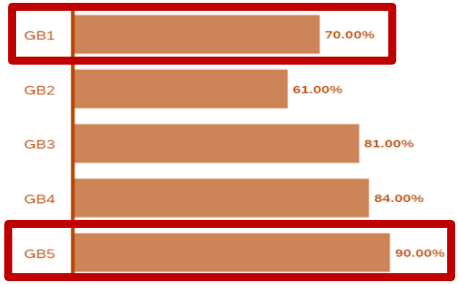
YESA!

Your Electricity Saving Assistant

Help you cut your inefficient electricity consumption

Problem

General Barrier to Using Electricity Efficiently



GB1: Not enough information about energy saving
GB2: Don't know how to practice energy saving for certain appliances
GB3: Cost for Energy Efficient Appliances is relatively high
GB4: No time-based scheme for electricity tariff
GB5: No system to support energy saving such as home energy management system

Source: Akil et al (2021)

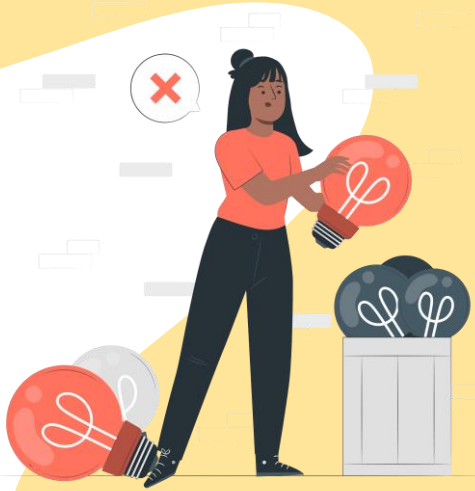
No system

Less information

6/10

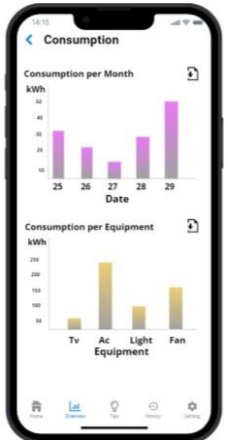
Low level of awareness

Source: Pew Research Center Survey (2018)

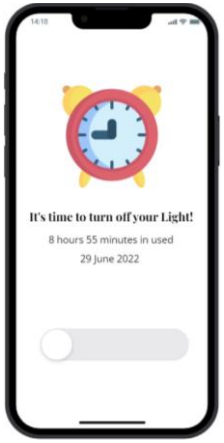


Solution

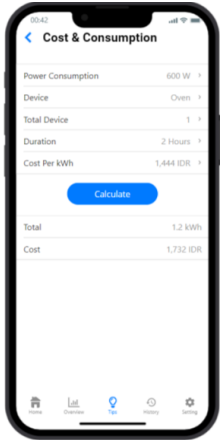
Manage and Educate



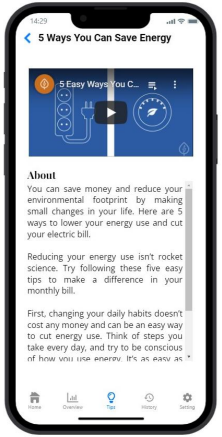
Meaningful Graph



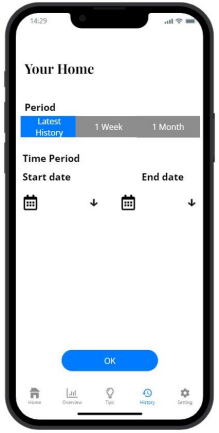
Good Reminder



Problem Solving Assistant



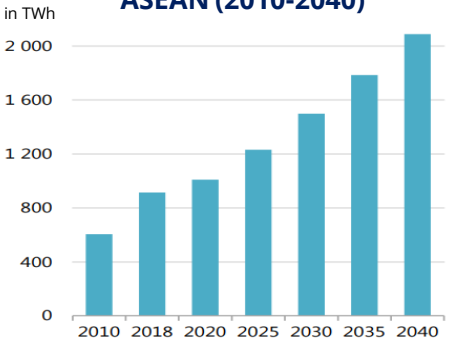
Educational



Traceable

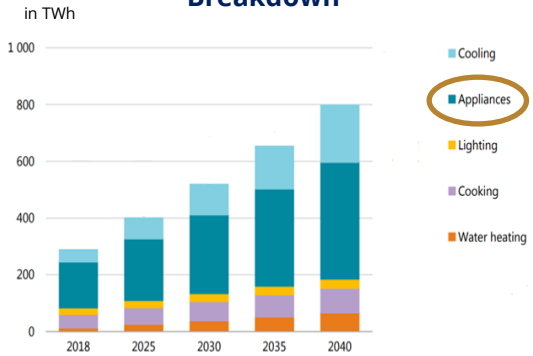
Why now?

The Projection of Electricity Demand in ASEAN (2010-2040)



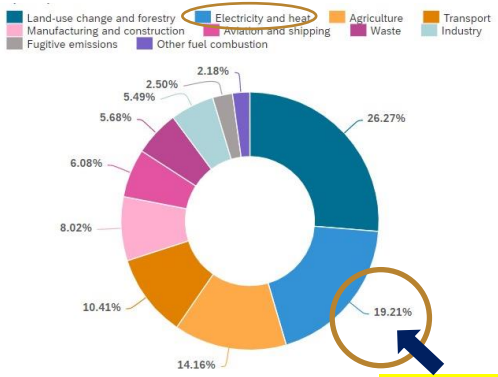
Source: International Energy Agency (2019)

ASEAN Household Electricity Demand Breakdown



Source: International Energy Agency (2019)

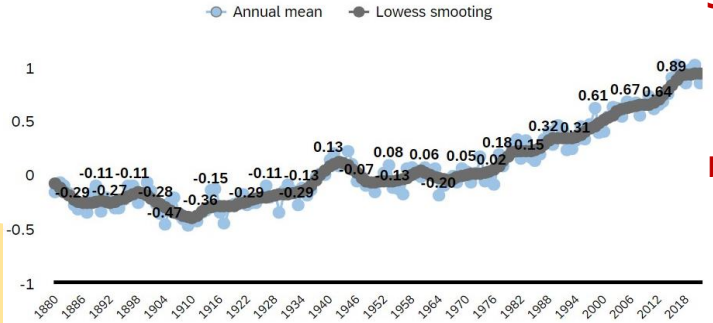
Greenhouse Gas Emission by Sector in 2018



Source: Climate Watch Data (2019)

Electricity & heat

Global Land-Ocean Temperature Change Index



Source: NASA Goddard Institute of Space Studies (2022)

3.5°C

by 2100

Disaster Projection in 2100 for ASEAN Region

Source: Alexi Rosenfeld via Getty Images

5 out of 10 countries experience **EXTREME RAINFALL**

Source: thejakartaposts.com

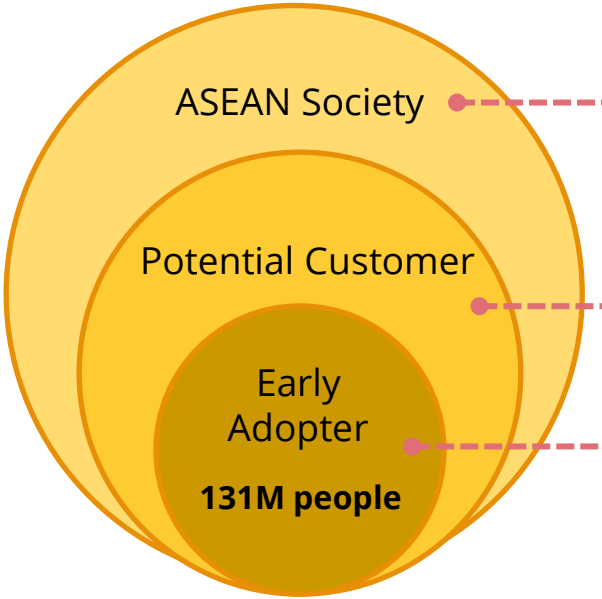
6 out of 10 countries experience **FLOODING**

Source: Wf Sihardian via Getty Images

5 out of 10 countries experience **DROUGHT**

Source: ASEAN State of Climate Change Report (2021)

Customer



92% of total population with electricity

Source: ASEAN Key Figures (2021)

People who want to save money on electricity

Environmental enthusiast, Millennials
(48% of the total population in Indonesia)

Source: BPS (2020), Kelompok Diskusi dan Kajian Opini Publik Indonesia (2021)

Development Plan

2024

Launch

Promoting YESA! to Indonesian society.

2025

Update

Integrating YESA! with smart home devices.

2026

Collaborate

Collaborating YESA! with electricity providers to create a whole integrated system.

2027

Expansion

Expanding YESA! into industrial sectors

2029

Enlarge

Bringing YESA! to other ASEAN member state

Sustainability Strategy

Key Partner


Project owner


Investor

NGO


Institutional


Government

ASEAN

ASCC Section A.1, D.3, C4

High-Level Concept

Easiest way to be a green climate contributor

ASCC Section C.3

Unfair Advantage

First mover

Value Proposition


Manage


Educate

Promotion Strategy


Social media


Influencer


Ambassador

Cost Structure


Development


Promotion

Revenue Streams

AEC Section B.4


Business partnership with electronic devices company


Integrated system installation services

Impact and Contribution

68.7M

Household in Indonesia

Source: BPS (2019)

130 kWh

Average monthly electricity consumption

Source: Ministry of Energy and Mineral Resources Republic of Indonesia (2020)

13 USD

Average monthly electricity bill

10%
reduction

and

50%
Total households in Indonesia

535M USD

Annually saving

Target 7.3 - indicator 7.3.1

2.5 Mton

Annually carbon emission reduction

Target 13.2 - indicator 13.2.2

Changing Lifestyle

Raising people's awareness

Target 13.3 - indicator 13.3.1 & ASCC section C.4

Sustainable Development Goals

Ensure access to affordable, reliable, sustainable and modern energy for all

Take urgent action to combat climate change and its impacts

Target 7.3: By 2030, double the global rate of improvement in energy efficiency

Indicator **7.3.1**
Energy intensity measured in terms of primary energy and GDP

Target 13.2: Integrate climate change measures into national policies, strategies and planning

Indicator 13.2.2
Total greenhouse gas emissions per year

Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Indicator 13.3.1
Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (*a*) national education policies; (*b*) curricula; (*c*) teacher education; and (*d*) student assessment

ASEAN Blueprint

ASEAN Socio-Cultural Community 2025

Section A.1. Engaged stakeholders in ASEAN processes
Point ii. Promote partnership frameworks and guidelines in engaging the stakeholders for the effective implementation of ASEAN initiatives and promotion of public awareness of ASCC programmes and accomplishments.

Section C.3. Sustainable climate
Point ii. Facilitate the development of comprehensive and coherent responses to climate change challenges, such as but not limited to multi-stakeholder and multi-sectoral approaches;
Point v. Strengthen the effort of government, private sector and community in reducing GHG emission from main activities of development;
Point vii. Strengthen global partnerships and support the implementation of relevant international agreements and frameworks, e.g. the United Nations Framework Convention on Climate Change (UNFCCC).

Section C.4. Sustainable consumption and production
Point ii. Promote environmental education (including eco-school practice), awareness, and capacity to adopt sustainable consumption and green lifestyle at all levels
Point iii. Enhance capacity of relevant stakeholders to implement sound waste management and energy efficiency

Section D.3. A climate adaptive ASEAN with enhanced institutional and human capacities to adapt to the impact of climate change
Point i. Expand regional cross-sectoral platforms and establish shared strategies to respond to the impacts of climate change;

ASEAN Economic Community 2025

Section B.4. Productivity-driven growth, innovation, research and development and technology commercialization
Point iii. Enhance the support system and enabling environment to nurture a highly mobile, intelligent and creative human resource that thrives on knowledge creation and application

Section C.2. Information and communication technology
Point iii. Innovation: Support ICT innovations and entrepreneurship as well as new technological developments such as Smart City, and Big Data and Analytics

Section C.4. Energy
Point iv. Energy Efficiency and Conservation: Reduce energy intensity in ASEAN by 20 percent as a medium-term target in 2020 and 30 percent as a long-term target in 2025, based on 2005 level

“Save Energy,
Save Money,
Save the Planet”

Reference

Akil Y, Wardi, Muslimin Z, Amar K. Managing Electricity Consumption for Household Sector in Indonesia. *Przegląd Elektrotechniczny*. 2021. (doi:10.15199/48.2021.05.06)

Badan Pusat Statistik (2019). Rumah Tangga dan Rata-Rata Banyaknya Rumah Anggota Rumah Tangga Menurut Provinsi, 2019. (https://www.bps.go.id/indikator/indikator/view_data_pub/0000/api_pub/bmc3elVuWGROc3JRL3RPQTBrU2dadz09/da_03/1)

Badan Pusat Statistik (2020). Jumlah dan Distribusi Penduduk. (https://sensus.bps.go.id/main/index/sp2020)

Chan H, Overland I, Suryadi B. The Paris Agreement and the Energy Policies of the ASEAN Member States. ASEAN Centre for Energy. 2020. (https://aseanenergy.org/policy-brief-the-paris-agreement-and-the-energy-policies-of-the-asean-member-states/)

Climate Watch Data (2019). Greenhouse Gas Emission by Sector. (https://ourworldindata.org/emissions-by-sector)

Global Carbon Project (2019). Annual CO2 Emission per Country. (https://ourworldindata.org/co2-emissions)

International Energy Agency (2019). Southeast Asia Energy Outlook 2019. (https://iea.blob.core.windows.net/assets/47552310-d697-498c-b112-d987f36abf34/Southeast_Asia_Energy_Outlook_2019.pdf)

IEA World Energy Balances (2020). Electricity Consumption by Sector. (https://www.iea.org/data-and-statistics/data-product/world-energy-statistics-and-balances)

Jareemit D, Limmeechokchai B. Impact of Homeowners Behaviors on Residential Energy Consumption in Bangkok, Thailand. Journal of Building Engineering. 2018. (https://doi.org/10.1016/j.jobe.2018.10.030)

Kelompok Diskusi dan Kajian Publik Indonesia (2021). Survei: Mayoritas Anak Muda Indonesia Peduli Isu Lingkungan Hidup. (https://databoks.katadata.co.id/datapublish/2021/10/29/survei-mayoritas-anak-muda-indonesia-peduli-isu-lingkungan-hidup)

Ministry of Energy and Mineral Resources of Republic Indonesia (2020). Statistik Ketenagalistrikan. (https://gatrik.esdm.go.id/assets/uploads/download_index/files/8f7e7-20211110-statistik-2020-rev03.pdf)

NASA Goddard Institute for Space Studies (2022). Land-Ocean Temperature Index. (https://data.giss.nasa.gov/gistemp/graphs/graph_data/Global_Mean_Estimates_based_on_Land_and_Ocean_Data/graph.txt)

Pew Research Center (2018). A Look at How People Around the World View Climate Change. (https://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/)

The ASEAN Secretariat (2015). ASEAN Economic Community Blueprint 2025. Jakarta: ASEAN Secretariat.

The ASEAN Secretariat (2016). ASEAN Socio-Cultural Community Blueprint 2025. Jakarta: ASEAN Secretariat.

The ASEAN Secretariat (2021). ASEAN Key Figures 2021. Jakarta: ASEAN Secretariat.

The ASEAN Secretariat (2021). ASEAN State of Climate Change Report (ASCCR). Jakarta: ASEAN Secretariat.

APPENDIX 1-a

Indonesia	
Type of INDC mitigation target	Relative to business-as-usual (BAU)
INDC target	**Unconditional:** 29% greenhouse gas emissions reduction by 2030 **Conditional:** Up to 41% of emissions reduction by 2030 BAU scenarios of emission projection started in 2010 with projected emissions of approximately 2,869 $GtCO_2e$[3] in 2030
Time frame/ timeline	2020 to 2030
Energy Policies and Measures	1) Shares of new and renewable energy in the primary energy supply: at least 23% by 2025, and at least 31% by 2030 2) Mitigation actions and emissions reduction compared to BAU (unconditional; conditional) i) Implementation of clean coal technology in power plants (75%; 100%) ii) Renewable energy in electricity production (7.4GW; 132TWh) iii) Implementation of biofuels in transportation (Mandatory B30) (90%; 100%) iv) Additional gas distribution lines (100%; 100%) v) Additional compressed-natural gas fuel stations (SPBG) (100%; 100%)

Cambodia	
Type of INDC mitigation target	Relative to business-as-usual (BAU)
INDC target	A maximum reduction of 3,100 $GgCO_2eq$[2] (27%) compared to business-as-usual emissions of 11,600 $GgCO_2eq$ In which: i) 1,800 $GgCO_2eq$ (16%) are from energy industries ii) 727 $GgCO_2eq$ (7%) are from manufacturing industries iii) 390 $GgCO_2eq$ (3%) are from transportation iv) 155 $GgCO_2eq$ (1%) are from other sectors
Time frame/ timeline	2020 to 2030
Energy Policies and Measures	The NDC target represents major efforts from energy use in various sectors: 1) Climate Change Action Plans (2014-2018) for Manufacturing Industry and Energy, and Transport Sectors 2) Renewable energy in power grid and off-grid electricity 3) Promote end-use energy efficiency 4) Promote renewable energy and energy efficiency in manufacturing industries 5) Mass public transport 6) Improve vehicles' energy efficiency through eco-driving and use of hybrid cars, electric vehicles and bicycles. 7) Promote energy efficiency in buildings and cookstoves 8) Use of biodigesters and water filters to reduce waste emissions 9) Use of renewable energy for irrigation and solar

Source: Chan et al (2020)

APPENDIX 1–b

Malaysia	
Type of INDC mitigation target	Intensity target
INDC target	**Unconditional:** Reduce the greenhouse gas emissions intensity of GDP by 35% by 2030 relative to the emissions intensity of GDP in 2005 **Conditional:** Reduce the greenhouse gas emissions intensity of GDP by 45% by 2030 relative to the emissions intensity of GDP in 2005
Time frame/ timeline	2021 to 2030
Energy Policies and Measures	1) National Petroleum Policy (1975) 2) National Energy Policy (1979) 3) National Depletion Policy (1980) 4) Four-Fuel Diversification Policy (1981) 5) National Forestry Policy (1978, Revised 1992) 6) National Policy on Biological Diversity (1998) 7) Five-Fuel Policy (2001) 8) National Policy on the Environment (2002) 9) National Strategic Plan for Solid Waste Management (2005) 10) National Biofuel Policy (2006) 11) National Energy Policy (2008) 12) National Green Technology Policy (2009) 13) National Policy on Climate Change (2009) 14) New Economic Model, Government Transformation Programme and Economic Transformation Programme (2010) 15) Renewable Energy Policy and Action Plan (2010) 16) Second National Physical Plan (2010) 17) Low Carbon Cities Framework (2011) 18) National Automotive Policy (2014)

Singapore	
Type of INDC mitigation target	Intensity target and peaking target
INDC target	1) Reduce the emissions intensity by 36% from 2005 levels by 2030 2) Stabilise emissions with the aim of peaking around 2030
Time frame/ timeline	2021-2030
Energy Policies and Measures	1) National Climate Change Strategy 2012 2) Sustainable Singapore Blueprint 2015 3) Promote solar PV deployment which: i) facilitates system integration of intermittent sources to ensure grid stability and security ii) addresses non-market barriers to entry without subsidising the consumption of any form of energy iii) supports continued investment in research, development, and demonstration to reduce the cost of solar PV modules and improve their efficiency 4) By 2030, it is estimated that renewable energy could potentially contribute up to 8% of Singapore's peak electricity demand

Source: Chan et al (2020)

APPENDIX 1–c

Brunei	
Type of INDC mitigation target	Policy and actions
INDC target	Renewable Energy: To increase the share of renewables so that 10% of the total power generation is sourced from renewable energy by 2035 Energy Efficiency: To reduce total energy consumption by 63% by 2035 compared to a business-as-usual (BAU) scenario Transportation: To reduce carbon dioxide emissions from morning peak-hour vehicle use by 40% by 2035 compared to a BAU scenario
Time frame/ timeline	By 2035
Energy Policies and Measures	1) Increasing the use of solar power 2) Utilising the 10-15 MW[1] potential of waste-to-energy resources 3) Energy intensity target: 45% reduction in tonnes of oil equivalent per unit of gross domestic product, using 2005 as a base year 4) Policies and regulatory frameworks for energy efficiency and conservation 5) Land Transport White Paper

Lao PDR	
Type of INDC mitigation target	Policy and Actions
INDC target	Implementation of Renewable Energy Development Strategy: 1,468,000 $ktCO_2e$ [4] by 2025 (Base year: 2011) Implementation of the Rural Electrification Programme: 63 $ktCO_2$ /pa[5] (Base year: 2010) Implementation of mitigation actions in the transportation sector (base year: 2007): i) Road network development: 33 $ktCO_2$/pa by 2025 ii) Public transport development: 158 $ktCO_2$/pa by 2025 Expansion of the use of large scale hydroelectricity: 16,284 $ktCO_2$/pa from 2020 to 2030 (Base year: 2015)
Time frame/ timeline	By 2025 and 2030 (mix)
Energy Policies and Measures	1) Increase the share of renewable energy (<15MW) to 30% of energy consumption by 2025 2) Increase the share of biofuels to meet 10% of the demand for transport fuels by 2025 3) Make grid-based electricity available to 90% of households in rural areas by the year 2020, thus reducing the consumption of off-grid fossil fuels 4) Implement the findings of the Nationally Appropriate Mitigation Actions (NAMA) feasibility study in transportation 5) Build largescale (>15 MW) hydropower plants to provide clean electricity to neighbouring countries: approximately 5,500 MW by 2020; 20,000 MW after 2020

Source: Chan et al (2020)

APPENDIX 1-d

Myanmar	
Type of INDC mitigation target	Policy and Actions
INDC target	**Renewable Energy** i) 9.4 GW of hydroelectric power by 2030 ii) At least 30% of rural electrification sources to come from renewable forms of energy **Energy Efficiency** i) Realise a 20% electricity saving potential by 2030 of the total forecast electricity consumption in industrial processes ii) Distribute approximately 260,000 cookstoves between 2016 and 2031
Time frame/ timeline	By 2030
Energy Policies and Measures	1) National Energy Policy 2) Draft of the Long-term Energy Master Plan 3) Draft of the National Electrification Master Plan 4) Draft of the Rural Electrification Plan 5) Draft of the National Energy Efficiency and Conservation Policy, Strategy and Roadmap for Myanmar

Philippines	
Type of INDC mitigation target	Relative to business-as-usual (BAU)
INDC target	**Conditional:** Undertake GHG (CO_2e) emissions reduction of about 70% by 2030 relative to the BAU scenario for 2000-2030
Time frame/ timeline	By 2030
Energy Policies and Measures	1) National Climate Change Action Plan (NCCAP) of 2011 2) Ecological Solid Waste Management Act of 2000 3) Biofuels Act of 2006 4) Renewable Energy Act of 2008

Source: Chan et al (2020)

APPENDIX 1–e

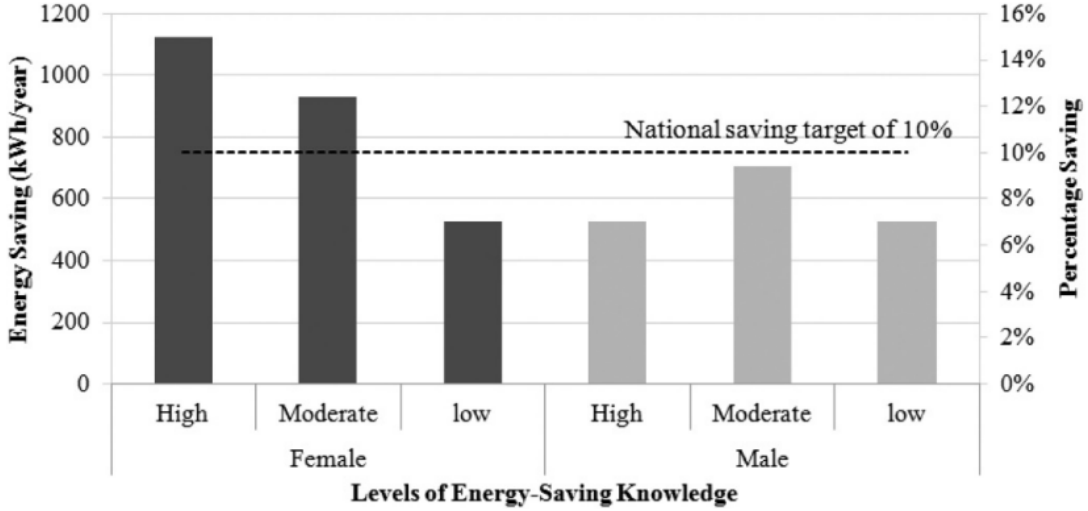
Thailand	
Type of INDC mitigation target	Relative to business-as-usual (BAU)
INDC target	**Unconditional:** Reduce greenhouse gas emissions by 20% from the projected business-as-usual (BAU) level by 2030 (BAU 2030: approx. 555 $MtCO_2e$) **Conditional:** Reduce greenhouse gas emissions by 25% from the projected business-as-usual (BAU) level by 2030
Time frame/ timeline	2021-2030
Energy Policies and Measures	1) Power Development Plan B.E. 2558–2579 (2015-2036) 2) Thailand Smart Grid Development Master Plan B.E. 2558-2579 (2015-2036) 3) Alternative Energy Development Plan B.E. 2558–2579 (2015-2036) 4) Energy Efficiency Plan B.E. 2558–2579 (2015-2036) 5) Environmentally Sustainable Transport System Plan B.E. 2556–2573 (2013-2030) 6) Climate Change Master Plan B.E. 2558–2593 (2015-2050) 7) National Industrial Development Master Plan B.E. 2555–2574 (2012-2031) 8) Waste Management Roadmap 9) National energy targets: i) Achieve a 20% share of power generation from renewable sources in 2036 ii) Achieve a 30% share of renewable energy in total final energy consumption in 2036 iii) Reduce the country's energy intensity by 30% below the 2010 level in 2036

Vietnam	
Type of INDC mitigation target	Relative to business-as-usual (BAU)
INDC target	**Unconditional** Reduce GHG emissions by 8% compared to BAU by 2030, in which: from the energy sector, emission intensity per unit of GDP will be reduced by 20% compared to the 2010 levels **Conditional** Reduce GHG emissions by 25% by 2030, in which: emission intensity per unit of GDP will be reduced by 30% compared to 2010 levels BAU scenario of 2010-2030
Time frame/ timeline	2021-2030
Energy Policies and Measures	1) Law on Economical and Efficient use of Energy (6/2010) 2) National Climate Change Strategy (12/2011) 3) National Green Growth Strategy (9/2012) 4) Decision 1775/QĐ-TTg on "Management of GHG emissions; management of carbon credit trading activities to the world market" (11/2012) 5) Promote effective exploitation and increase the proportion of new and renewable energy sources in energy production and consumption 6) Improve effectiveness and efficiency of energy use, thereby reducing energy consumption 7) Change the fuel structure in industry and transportation

Source: Chan et al (2020)

APPENDIX 2

Homeowner's behavior and their energy saving in Thailand

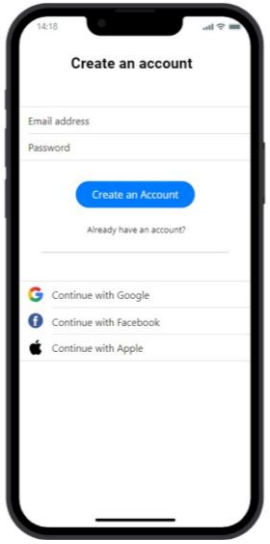


Source: Jareemit & Limmeechokchai (2018)

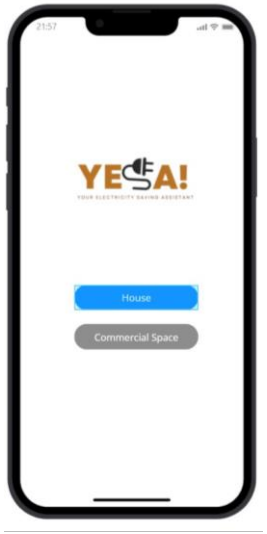
Energy-saving education and information regarding energy efficiency should be seriously promoted. This might help them to adopt a greater role regarding home energy efficiency (**Jareemit, 2018**)

APPENDIX 3-a

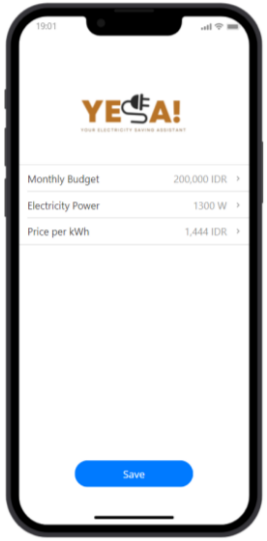
EASY TO USE



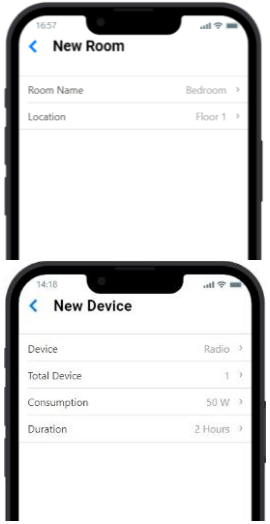
Create account and login



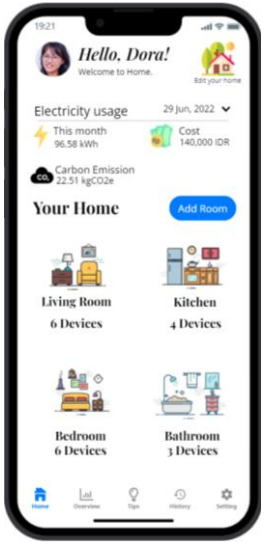
Choose area



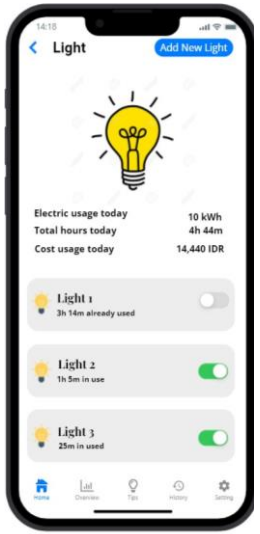
Set your budget, electricity power, and price



Add room and device properties



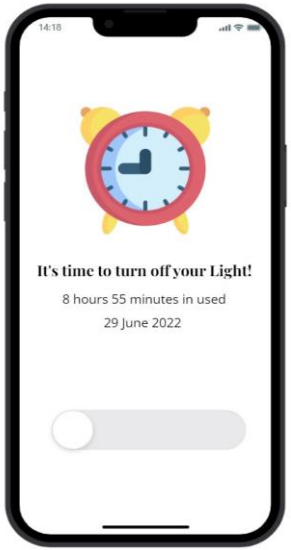
All input devices and your usage summary will be displayed here



Turn ON when actual device is powered on

APPENDIX 3-b

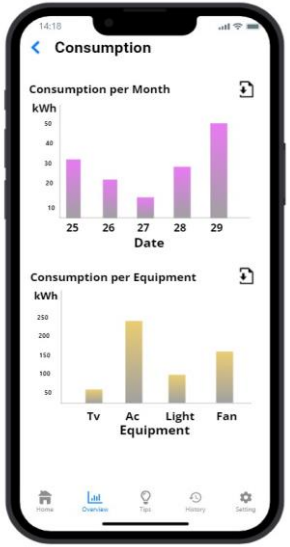
GOOD REMINDER



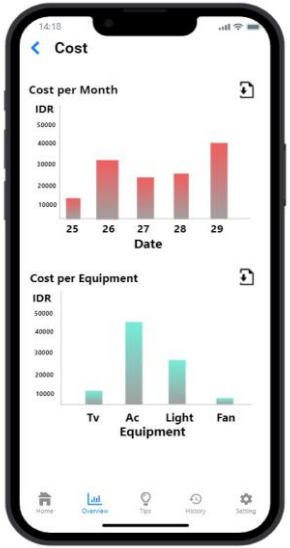
YESA! will always remind you to turn off your devices

YESA! will give you a reminder when your usage almost reached the limit

MEANINGFUL STATISTIC



Electricity consumption (kWh) statistic

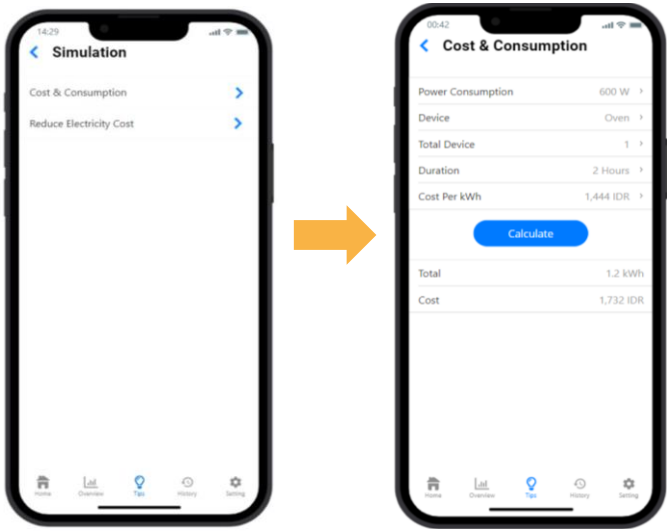


Electricity cost statistic

Electricity usage trend

APPENDIX 3-c

SOLUTIVE ASSISTANT (1/2)

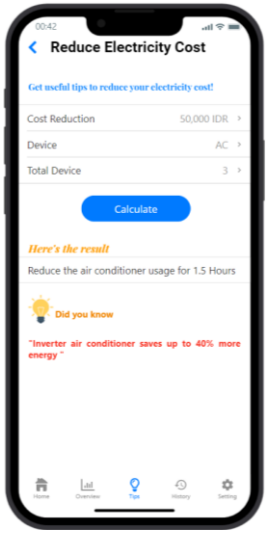


Want to buy new electric device but not sure about the electricity bill?

Input your new device properties and YESA! will give calculation result

APPENDIX 3-d

SOLUTIVE ASSISTANT (2/2)



Want to save some money from electricity usage?

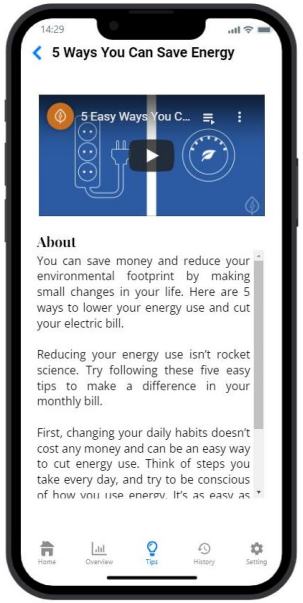
YESA! will help you

Input how much you want to save your money, YESA! will give you suggestion of what to do

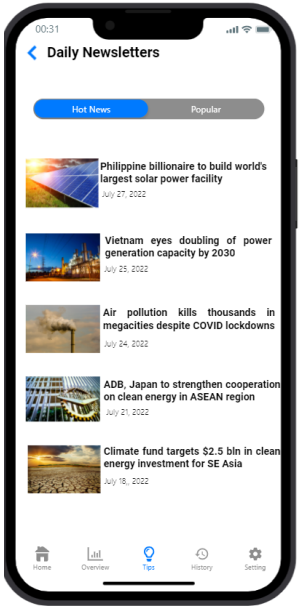
YESA! will provide you some fact about electricity

APPENDIX 3-e

EDUCATIONAL



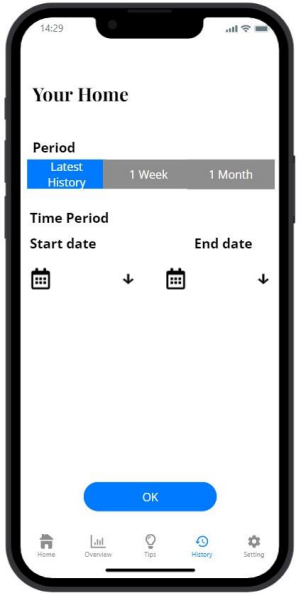
Access a lot of electricity-saving tips



Access daily newsletters about environment

Access your achievement in contributing to saving the earth and cost reduction

TRACEABLE



Access electricity usage data history in the period

APPENDIX 4

Energy management apps comparison

Features	Energy Tracker	Wiser	Energy Cost Calculator	YESA!
Graph/chart	☑	☑	☒	☑
Reminder	☒	☒	☒	☑
Cost calculator	☑	☒	☑	☑
Electricity reduction suggestion	☒	☒	☒	☑
Education	☒	☒	☒	☑
Data history	☑	☒	☒	☑

APPENDIX 5

Business partnership with electronic devices companies