Indonesia Rice Cooker Market Study and Policy Analysis

Final Report

June 8, 2020

CLASP
Ipsos

This report has been produced by CLASP and Ipsos, June 2020.

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List of Abbreviations

°C	Celsius degree
B2TKE	Balai Besar Teknik Konversi Energi National Laboratory for Energy Conversion Technology
B4T	Balai Besar Bahan dan Barang Teknik Center for Material and Technical Products
BARISTAND	Balai Riset dan Standarisasi Industri Center of Industrial Research and Standardization
BAT	Best Available Technology
BAU	Business-as-usual
BPMB	Balai Pengujian Mutu Barang Center of Product Quality Testing
BPS	Badan Pusat Statistik Indonesian Bureau of Statistics
C2C	Consumer-to-consumer
CO_2	Carbon Dioxide
DOE	Department of Energy
EBTKE	Direktorat Jenderal Energi Baru, Terbarukan, dan Konservasi Energi Directorate General of New Renewable Energy and Energy Conservation
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GHG	Greenhouse Gas
Gr	Grain
GWh	Giga Watt per Hour
H	Hour
HS	Harmonized (Commodity Description and Coding) System
IDI	In-Depth Interview
IDR	Indonesian Rupiah
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
KAN	Komite Akreditasi Nasional Indonesian National Accreditation Committee
KESDM	Kementrian Energy dan Sumber Daya Mineral (also MEMR)
kg	Kilogram
KJ	Kilojoule
KWh/yr	Kilo Watt-Hour / year
L	Liter
LSPro	Lembaga Sertifikasi Produk Product Certification Body
MBOE	Million Barrel Oil Equivalent
MEMR	Ministry of Energy and Mineral Resources of the Republic of Indonesia (also KESDM)
MEPS	Minimum Energy Efficiency Standard (also SKEM)
MWh	Megawatt-hour
NDA	Nondisclosure Agreement
NDC	Nationally Determined Contributions Efforts declared by countries to reduce national emissions

NPWP	Nomor Pokok Wajib Pajak Tax Identifiifcation Number
P2TP	Pusat Penelitian Teknologi Pengujian Technology Testing Research Center
P3TKEBT	Pusat Penelitian Pengembangan Teknologi Ketenagalistrikan Energi Baru Terbarukan dan Konversi Energi Research Center of Electricity Technology Development in Renewable Energies and Energy Conversion
S&L	Standards and Labeling
SES Level	Socio-Economic Status Level
SKEM	Standar Kerja Energi Minimum (also MEPS)
SNI	Standar Nasional Indonesia Indonesian National Standard
TKDN	Tingkat Konten Dalam Negeri Domestic Content Level
USD	United States Dollar
V	Volt
W	Watt

Executive Summary

Indonesia is the 4th largest country in the world, with over 265 million people in 2018.[1] Gross domestic product (GDP) has been growing by around 5% annually over the past decade,[2] while per-capita income has been concurrently growing by almost 4% annually.[3] The country's steady economic growth has contributed to a doubling in electricity consumption, from 129 TWh in 2008 to 256 TWh in 2018.

The residential sector is the primary electricity user, responsible for nearly 40% of consumption, followed by industrial (37%), commercial (23%), and transportation (0.11%).[4] Coal is the main fuel in electricity generation, responsible for 58% of primary energy consumed, followed by natural gas (27%), renewables (hydro, geothermal, solar, and wind; 8%) and oil (6%).[5]

Under the Paris Agreement, Indonesia committed to reducing greenhouse gas (GHG) emissions by 29% below a business-as-usual (BAU) baseline by 2030, or by 38% below BAU by 2030 with international support. Reaching these unconditional and conditional targets, will require reductions in energy consumption of 19% and 24% below BAU.[6]

The Ministry of Energy and Mineral Resources (MEMR or KESDM), through its Directorate General of New Renewable Energy and Energy Conservation (EBTKE), aims to reduce national energy consumption across all sectors by 17% in 2025 relative to BAU through various policies,[7] including energy efficiency standards and labeling for household electric appliances. Energy efficiency regulations for air conditioners and compact fluorescent lamps are already in place, and MEMR plans to issue additional Ministerial Regulations this year to further reduce household energy consumption.

As the leading international voice and resource for appliance efficiency policies and market acceleration initiatives, CLASP, together with local partner Ipsos, conducted a comprehensive study of rice cookers in Indonesia. The goal of the study was to characterize the market; inform the development of appropriate and robust rice cooker testing, standards, and labeling requirements; and assess the potential impacts of these energy efficiency policies.

The team contacted seven manufacturers and received detailed data from four. The team then supplemented these with inputs from the trade association, market data from a retail tracking service, and model information from 70 traditional stores and 33 modern stores in the main cities of Sumatera, Java, Kalimantan, and Sulawesi. The team also collected government data, compared other countries' standards, reviewed manufacturers' websites, and incorporated the findings of CLASP's forthcoming 5000-household, nationwide residential end-use survey. Finally, the team developed policy recommendations and analyzed them using CLASP's Policy Analysis Modeling System (PAMS).

The key findings, summarized below, will inform EBTKE of the opportunity for ambitious energy efficiency policies for rice cookers that save money and reduce energy and CO_2 while taking into account the current range of products on the market.

Key Findings in the Market Study

As rice as the staple food in most parts of Indonesia, rice cookers are used daily in 70% of households.[8] Almost 13 million rice cookers were sold in the country in 2018 and around 56 million units are currently in use. Most of them were assembled locally with only 26% being fully imported, mostly from China. Products that are locally assembled also contain components that are imported, such as the heating element and electronic control unit.

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[1] MEMR, Handbook of Energy & Economic Statistics of Indonesia, 2018, p. 3.
[2] GDP Growth (annual %) - Indonesia. (n.d.). World Bank Open Data | Data. https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2018&locations=ID&start=1961&view=chart
[3] Indonesia Economic Snapshot. http://www.oecd.org/economy/indonesia-economic-snapshot/
[4] MEMR, Handbook of Energy & Economic Statistics of Indonesia, 2018, pp. 41-53.
[5] Statistics Report 2018. PLN. https://www.pln.co.id/stakeholder/laporan-statistik
[6] Government of Indonesia, First Nationally Determined Contribution Republic of Indonesia, November 2016, p.10.
7 President of Indonesia, Presidential Regulation Number 22 of 2017 about National Energy General Plan (RUEN), p. 30.
[8] CLASP 5,000-household Residential End Use Survey.

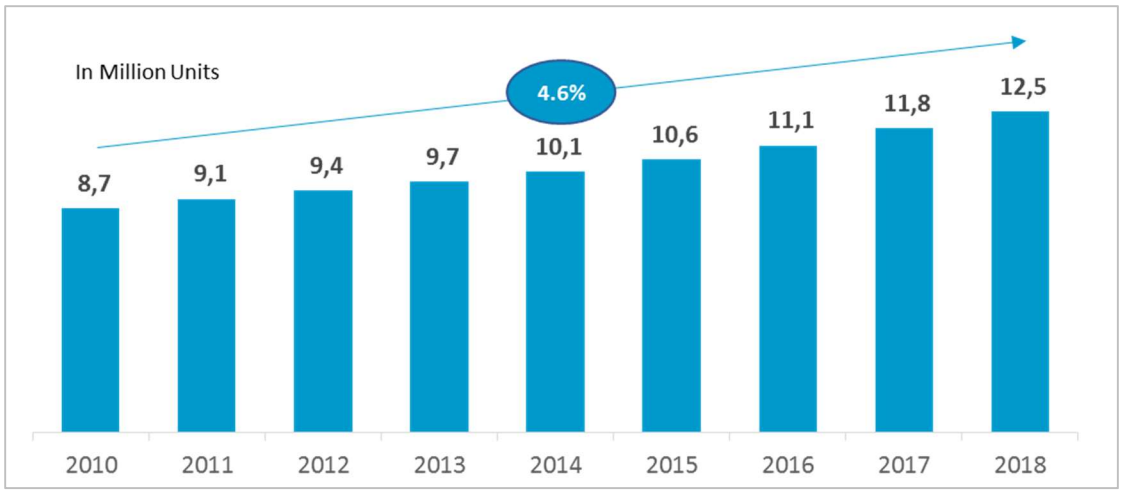


Figure 1: Rice cooker historical sales

Table 1. Rice cooker imports

Type of Product	Sales Volume in 2018	Market Share by Volume	Local Content %
Fully Imported	3.27 Million	26%	-
Locally Assembled 1	6.24 Million	50%	≤ 70%
Locally Assembled 2	2.94 Million	24%	> 70%

There are more than 500 rice cooker models available in retail, under more than 100 brands, though the majority of these are small or non-existent.[9] In contrast, two of the largest brands have a quarter of the market share each, while the 11 top brands have 84% of the market share. With the Indonesian national safety standard being mandatory in the near future,[10,11] it is expected that there will be a decrease in low-end models and brands due to the expense of safety testing.

The rice cooker market is expected to continue to grow through 2025, at which point it will reach saturation, and growth will slow. The annual sales forecast for 2030 is 19.6 million units, and nearly 90 million rice cookers are projected to be in use in that year.

[9] No address or other documentation available. These may exist only to market one shipment of a particular model of rice cooker, and may disappear from the market once the model is sold out.
[10] General: SNI 7859-2013; Rice Cooker and Electric Kettle: SNI IEC 60335-2-15-2011
[11] Vista Labs, "Draft Decree for Appliances and Machines Utilizing Household Electricity", July 3, 2019. https://www.vista-compliance.com/news/newsposts/2019/newspost190703

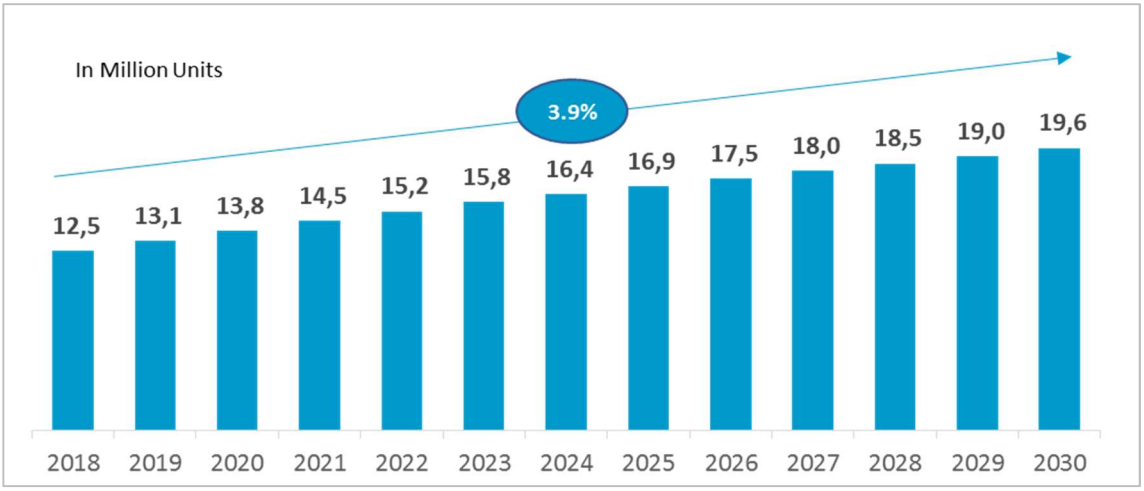


Figure 2: Rice cooker sales forecast

While advanced rice cookers that have digital controls, multiple functions, and induction heating are available in the market, the majority of rice cookers sold only have manual control, basic cooking and warming function, and resistive heating. These units have nameplate input power of 300 to 450 W and rice cooking capacity of 1 to 2 L. As lifespan depends on product quality, most rice cookers are used for 2 to 6 years. CLASP estimated the average usage as 1.5 cooking events and 7.2 hours of warming per day.[12]

Policy Options, Recommendations, and Impact Assessment

EBTKE had drafted an energy efficiency regulation in 2018, setting minimum energy performance standards (MEPS) and labeling criteria for rice cooker products and defining an efficiency test procedure. A review of existing testing infrastructure shows that laboratories have adequate capability and capacity to provide test services and support a certification process. However, upon closer evaluation of the test procedure in the draft regulation, CLASP recommends clarifying the volume measurement and specifying the warming temperature.

CLASP also assessed the performance of models in the market against the draft MEPS and labeling criteria, supplementing lab test data for 14 models with the estimated performance of 120 additional models found in retail stores. All the models analyzed met the draft performance requirements and the vast majority were at 4 stars, the highest labeling level, indicating that the draft would have practically no impact. In addition to this, since the specified levels do not vary with volume, they would unfairly target smaller rice cookers, which tend to have proportionally more surface area and consequently higher thermal losses.

[12] Based on CLASP/Ipsos 5,000-Household Residential End Use Survey and Ipsos 500-person rice cooker-user survey, which included small business users.

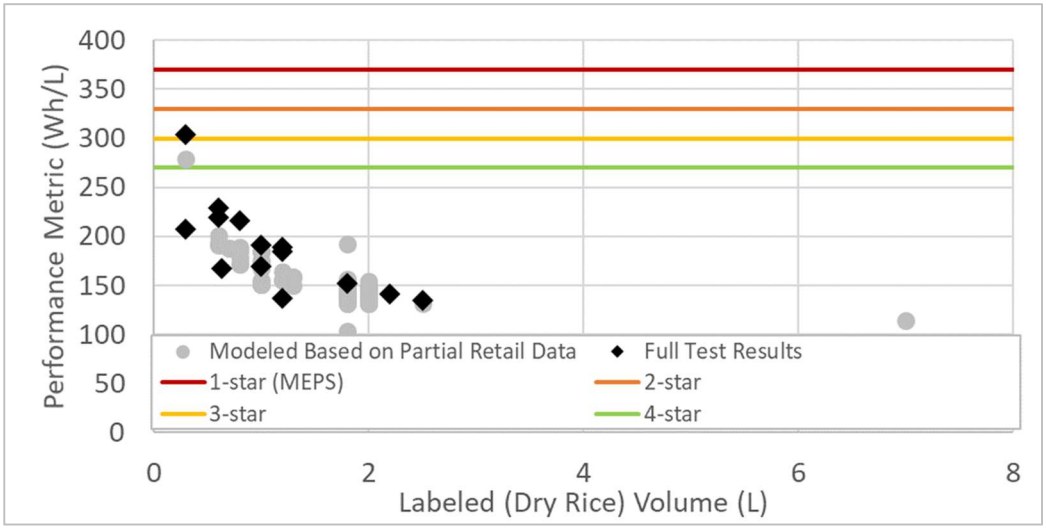


Figure 3: Rice cooker market performance distribution against EBTKE's draft regulation, where higher performance metric indicates higher energy consumption and lower efficiency

To address these concerns, CLASP has developed and recommends the following requirements, which depend on the measured volume of the container, filled with water to 80% of its maximum volume.

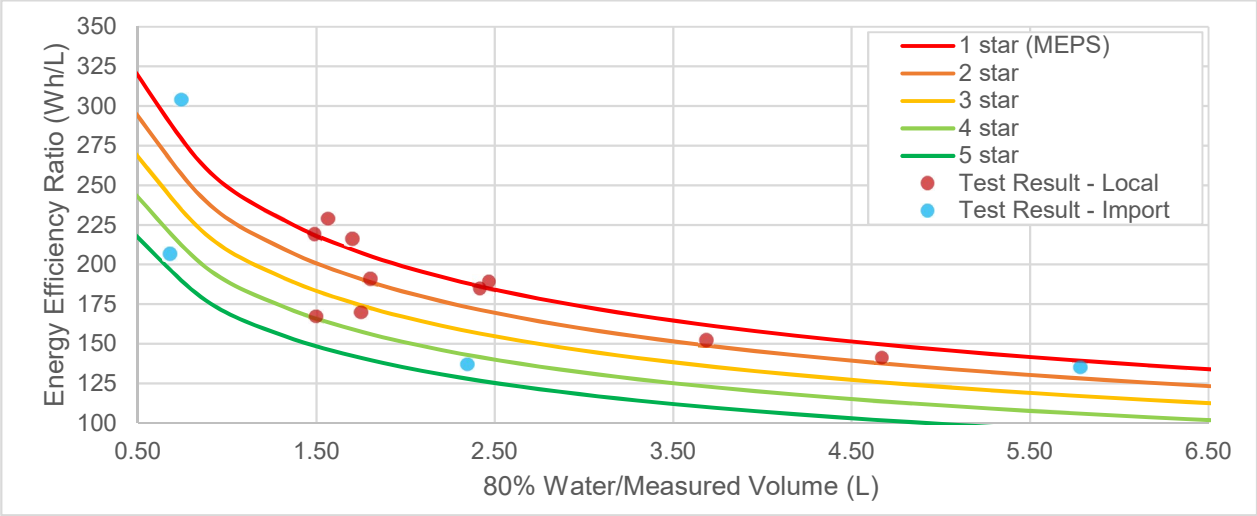


Figure 4: CLASP's recommended requirements compared to the performance of tested models.

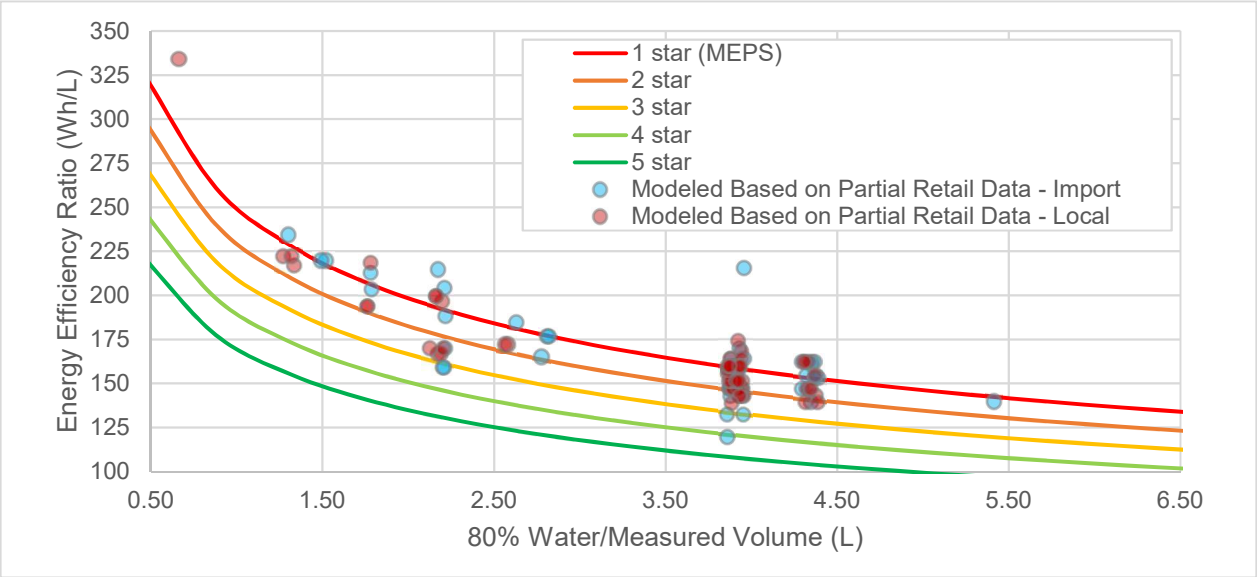


Figure 5: CLASP's recommended performance requirements compared to the modeled performance of models based on partial retail data.

CLASP's recommended requirements would be met or exceeded by 57% of tested models, including 50% of locally manufactured models. Despite a price increase of 5,000 IDR due to the imposed MEPS level, consumers would save 32,000 IDR over the product's average four-year lifetime from lower electricity bills. This recommendation would result in positive paybacks to consumers and significant energy and CO_2 savings to the Republic of Indonesia.

Table 2. Summary of national savings from CLASP's recommended policy and EBTKE draft regulation

	Final Energy Savings (TWh)		CO_2 Mitigation (Mt)	
Policy Option	**2020-2030**	**Annual in 2030**	**2020-2030**	**Annual in 2030**
Draft EBTKE MEPS	0	0	0	0
CLASP Recommended MEPS	**3.7**	**0.6**	**3.3**	**0.5**

CLASP presented the preliminary findings of this market study to a wide audience in a National Workshop in Jakarta held on November 20, 2019. On January 30, 2020, EBTKE held a Focus Group Discussion (FGD), in which CLASP was invited to present these recommendations to a smaller group of key stakeholders, namely major manufacturers, approved testing facilities, government research laboratories, and technical experts. The stakeholders could voice their opinions, provide inputs, and state possible concerns regarding CLASP's recommendations.

During the January FGD, EBTKE and stakeholders agreed on CLASP's recommended MEPS and comparative labeling requirements, covering rice cookers with dry rice cooking capacity of up to 3 L. During subsequent discussions in February 2020, EBTKE decided to;

- Fully include CLASP's MEPS and labeling requirements in the revised draft regulation
- Apply the recommended volume definition, namely the measured volume of the container, filled with water to 80% of its maximum volume measured to the lip of the container, as the independent variable in determining the requirement levels
- Set a minimum temperature of 65 °C to be retained for the warming mode testing, to reflect the sufficient temperature required to inhibit bacteria growth during long period of warming

With these decisions, the first rice cooker policy in Indonesia can be foreseen to bring great impacts to the consumers, manufacturers, and the country. At the national level, Indonesia would gain significant national level energy savings of at least 3.7 TWh from 2020 to 2030 and 0.6 TWh in 2030 and mitigate GHG emissions of at least 3.3 $MTCO_2$ from 2020 to 2030 and 0.5 $MTCO_2$ in 2030. In addition to this, the market would be protected from low efficiency rice cooker imports, promoting fair competition.

Ringkasan Eksekutif

Indonesia adalah negara ke 4 terbesar di dunia, dengan lebih dari 265 juta jiwa pada tahun 2018.[13] Produk Domestik Bruto (PDB) telah tumbuh sekitar 5% per tahun selama dekade terakhir,[14] sementara pendapatan per kapita telah secara bersamaan tumbuh hampir 4% per tahun.[15] Pertumbuhan ekonomi yang stabil di Indonesia telah berkontribusi menaikkan konsumsi listrik dua kali lipat, dari 129 TWh pada tahun 2008 menjadi 256 TWh pada tahun 2018.

Sektor perumahan adalah pengguna utama listrik, menyumbang hampir 40% dari konsumsi, diikuti oleh industri (37%), komersial (23%), dan transportasi (0,11%).[16] Batubara adalah bahan bakar utama dalam pembangkit listrik, yang menyumbang 58% dari energi primer yang dikonsumsi, diikuti oleh gas alam (27%), energi terbarukan (air, panas bumi, tenaga surya, dan angin; 8%) dan minyak bumi (6%).[17]

Berdasarkan Perjanjian Paris, Indonesia berkomitmen untuk mengurangi emisi gas rumah kaca (GRK) sebesar 29% di bawah *baseline* Bisnis-Seperti-Biasa (BSB) di tahun 2030, atau 38% di bawah BSB pada tahun 2030 dengan dukungan internasional. Mencapai target tanpa syarat dan bersyarat ini, akan memerlukan pengurangan konsumsi energi 19% dan 24% di bawah BSB.[18]

Kementerian Energi dan Sumber Daya Mineral (KESDM), melalui Direktorat Jenderal Energi Baru Terbarukan dan Konservasi Energi (EBTKE), bertujuan untuk mengurangi konsumsi energi nasional di semua sektor sebesar 17% pada tahun 2025 dibandingkan dengan kondisi BSB melalui berbagai kebijakan,[19] termasuk kebijakan efisiensi energi untuk peralatan listrik umum rumah tangga. Peraturan efisiensi energi untuk AC dan lampu neon ringkas (*Compact Fluorescent Lamp*, CFL) sudah berjalan, dan Kementerian ESDM berencana untuk mengeluarkan Peraturan Menteri tambahan tahun ini untuk mengurangi konsumsi energi rumah tangga lebih lanjut.

Sebagai perwakilan suara dan sumber daya internasional terkemuka untuk kebijakan efisiensi alat dan inisiatif percepatan pasar, CLASP, bersama dengan mitra lokal Ipsos, melakukan studi komprehensif penanak nasi di Indonesia. Tujuan dari penelitian ini adalah untuk mengkarakterisasi pasar; menginformasikan perkembangan uji penanak nasi, standar, dan persyaratan pelabelan yang tepat dan kuat; dan menilai potensi dampak kebijakan efisiensi energi ini.

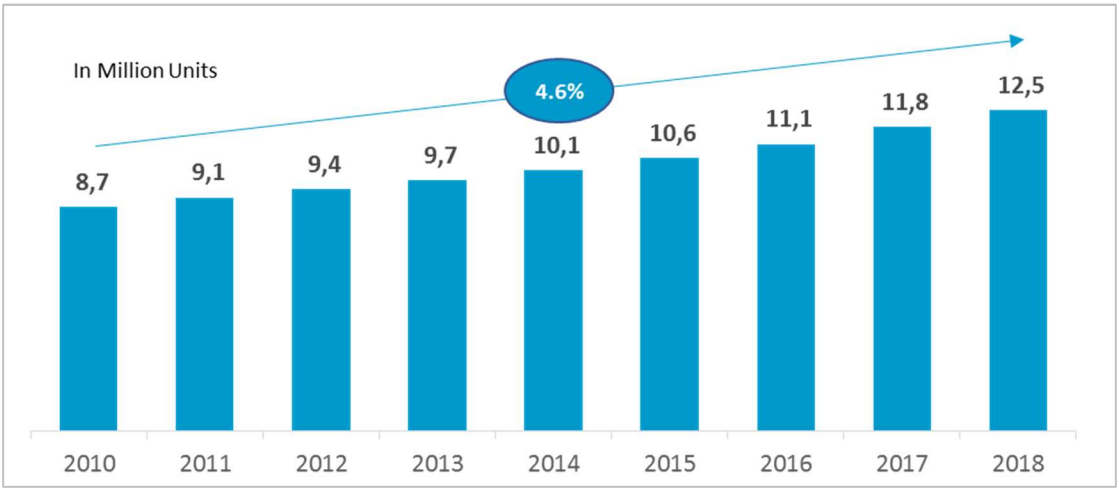
Tim menghubungi 7 produsen, menerima data rinci dari 4 di antaranya. Tim kemudian menambahkan data ini dengan masukan dari asosiasi perdagangan, data pasar dari layanan pelacakan ritel, dan model informasi dari 70 toko tradisional dan 33 toko modern di kota-kota utama di Sumatera, Jawa, Kalimantan, dan Sulawesi. Tim juga mengumpulkan data pemerintah, membandingkan standar negara lain, mengulas informasi dari produsen, dan memasukkan temuan survei nasional yang dilakukan oleh CLASP tentang penggunaan akhir pada rumah tangga yang meliputi 5000-rumah tangga. Akhirnya, tim mengembangkan rekomendasi kebijakan dan melakukan analisis dengan menggunakan Sistem Pemodelan Analisis Kebijakan (PAMS) dari CLASP.

Temuan utama yang dirangkum di bawah ini, akan memberikan informasi kepada EBTKE tentang kesempatan untuk kebijakan efisiensi energi yang kuat untuk penanak nasi yang penghematan uang dan mengurangi energi serta CO_2 sambil memperhitungkan kisaran produk saat ini di pasar.

[13] KESDM, Buku Pegangan Statistik Energi & Ekonomi Indonesia, 2018, p. 3.
[14] Pertumbuhan PDB (tahunan %) - Indonesia. (n.d.). Data Terbuka Bank Dunia | Data. https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2018&locations=ID&start=1961&view=chart
[15] Cuplikan Ekonomi Indonesia. http://www.oecd.org/economy/indonesia-economic-snapshot/
[16] KESDM, Buku Pegangan Statistik Energi & Ekonomi Indonesia, 2018, pp. 41-53.
[17] Laporan Statistik 2018. PLN. https://www.pln.co.id/stakeholder/laporan-statistik
[18] Pemerintah Indonesia, Kontribusi Republik Indonesia yang Pertama Ditentukan Secara Nasional , November 2016, p.10.
[19] Presiden Indonesia, Peraturan Presiden Nomor 22 tahun 2017 tentang Rencana Umum Energi Nasional (RUEN), p. 30.

Temuan Utama dalam Studi Pasar

Karena beras adalah makanan pokok di sebagian besar wilayah di Indonesia, penanak nasi digunakan sehari-hari oleh sebanyak 70% rumah tangga.[20] Hampir 13 juta unit penanak nasi dijual di Indonesia di tahun 2018, dan sekitar 56 juta unit sedang digunakan. Mayoritas dari penanak nasi tersebut dirakit di dalam negeri. Hanya 26% sepenuhnya diimpor, dan sebagian besar didatangkan dari China. Produk rakitan dalam negeri juga mengandung komponen yang diimpor, seperti elemen pemanas dan unit kontrol elektronik.



Gambar 6: Penjualan historis penanak nasi

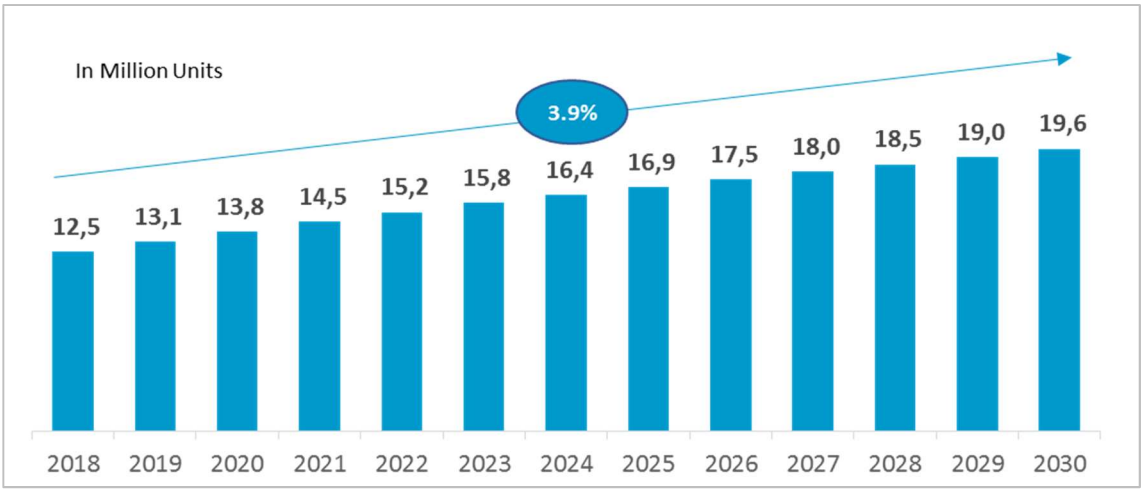
Tabel 3. Pendataan penanak nasi rakitan dalam negeri dan impor

Tipe produk	Volume penjualan di tahun 2018	Pangsa pasar berdasarkan volume	Konten lokal %
Sepenuhnya Impor	3,27 Juta	26%	-
Rakitan Dalam Negeri 1	6,24 Juta	50%	≤ 70%
Rakitan Dalam Negeri 2	2,94 Juta	24%	> 70%

Ada lebih dari 500 model penanak nasi tersedia di ritel yang terdaftar di bawah lebih dari 100 merek, meskipun sebagian besar dari model tersebut hanya tersedia dalam jumlah sangat kecil atau bahkan tidak ada sama sekali.[21] Sebaliknya, dua merek terbesar masing-masing memiliki seperempat dari total pangsa pasar, sementara 11 merek teratas memiliki 84% dari pangsa pasar. Dengan diwajibkannya standar keamanan nasional Indonesia dalam waktu dekat,[22,23] diharapkan akan adanya penurunan jumlah model dan pengurangan merek kelas bawah dikarenakan oleh biaya pengujian keselamatan.

[20] CLASP, Survei Nasional Penggunaan Akhir Perumahan Indonesia 5000-Rumah tangga.
[21] Tidak ada alamat atau dokumentasi lain yang tersedia. Ini mungkin ada hanya untuk memasarkan satu pengiriman model penanak nasi tertentu, dan dapat menghilang dari pasar begitu model terjual habis.
[22] Umum: SNI 7859-2013; Penanak Nasi dan Ketel Listrik: SNI IEC 60335-2-15-2011
[23] Vista Labs, "Draft Keputusan untuk Peralatan dan Mesin yang Menggunakan Listrik Rumah Tangga", July 3, 2019. https://www.vista-compliance.com/news/newsposts/2019/newspost190703

Pasar penanak nasi diperkirakan akan terus tumbuh sampai tahun 2025, di mana pada titik itu akan tercapai titik saturasi, dan pertumbuhan akan melambat. Perkiraan penjualan tahunan untuk tahun 2030 adalah 19,6 juta unit, dan hampir 90 juta penanak nasi diproyeksikan akan digunakan pada tahun itu.



Gambar 7: Perkiraan penjualan penanak nasi

Meskipun penanak nasi canggih yang memiliki kontrol digital, beberapa fungsi, dan pemanasan induksi tersedia di pasar, mayoritas penanak nasi yang dijual hanya memiliki kontrol manual, fungsi dasar memasak dan pemanasan, dan pemanas resistif. Unit-unit ini memiliki daya input yang tertera pada tanda pengenal mulai dari 300 sampai 450 W dan kapasitas menanak nasi mulai dari 1 sampai 2 L.

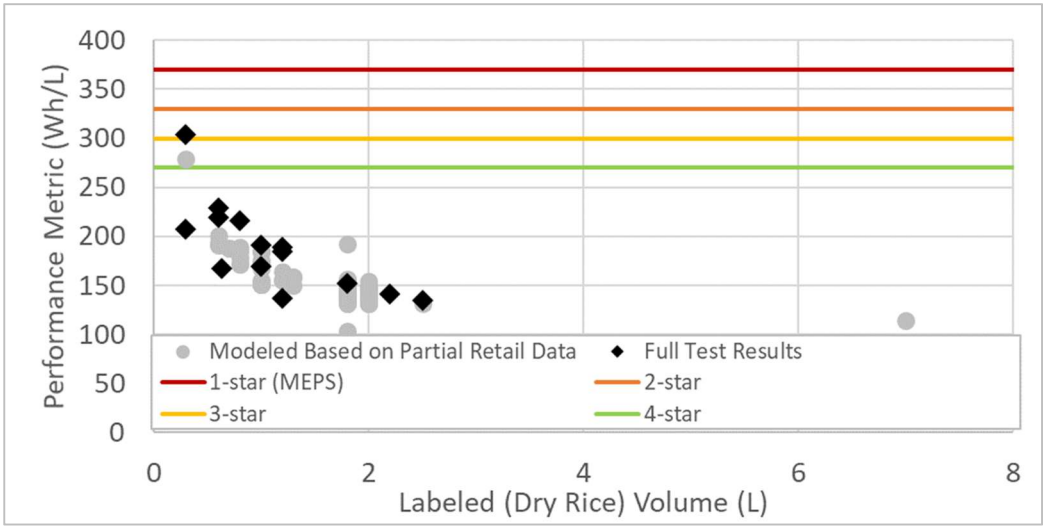
Karena umur pakai tergantung pada kualitas produk, kebanyakan penanak nasi digunakan selama 2 sampai 6 tahun. CLASP memperkirakan penggunaan rata-rata1,5 kali memasak dan 7,2 jam pemanasan per hari.[24]

Pilihan Kebijakan, Rekomendasi, dan Penilaian Dampak

EBTKE telah menyusun regulasi efisiensi energi di tahun 2018, yang meliputi pengaturan Standar Kinerja Energi Minimum (SKEM), kriteria pelabelan untuk produk penanak nasi, dan penetapan prosedur uji efisiensi. Sebuah tinjauan terhadap infrastruktur pengujian yang ada menunjukkan bahwa laboratorium memiliki kemampuan dan kapasitas untuk menyediakan layanan pengetesan dan mendukung proses sertifikasi. Namun, setelah evaluasi lebih rinci terhadap prosedur pengetesan pada rancangan peraturan tersebut, CLASP merekomendasikan untuk mengklarifikasi prosedur pengukuran volume dan menentukan suhu pemanasan.

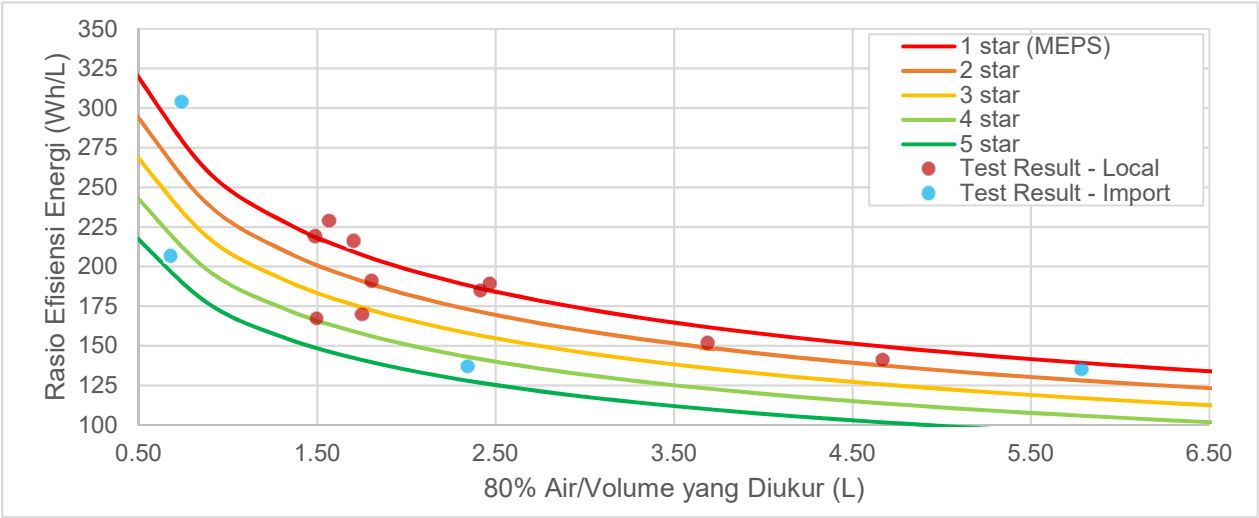
CLASP juga menilai kinerja model di pasar terhadap rancangan SKEM dan kriteria pelabelan, melengkapi data uji lab untuk 14 model dengan perkiraan kinerja dari 120 model tambahan yang ditemukan di toko-toko ritel. Semua model yang dianalisis memenuhi persyaratan rancangan kinerja dan sebagian besar berada di bintang 4, tingkat kinerja energi tertinggi. Hal ini menunjukkan bahwa rancangan peraturan hampir tidak memiliki dampak. Selain itu, karena level yang ditentukan tidak bervariasi terhadap volume penanak nasi, level kinerja energi pada rancangan regulasi sebelumnya akan secara tidak adil menargetkan penanak nasi yang lebih kecil, yang cenderung memiliki luas permukaan yang lebih proporsional dan mengakibatkan kehilangan energi termal dalam jumlah yang lebih tinggi.

[24] Berdasarkan CLASP/Ipsos Survei Penggunaan Akhir Perumahan 5000-Rumah tangga dan Ipsos survey 500 orang pengguna penanak nasi, termasuk pengguna bisnis kecil.

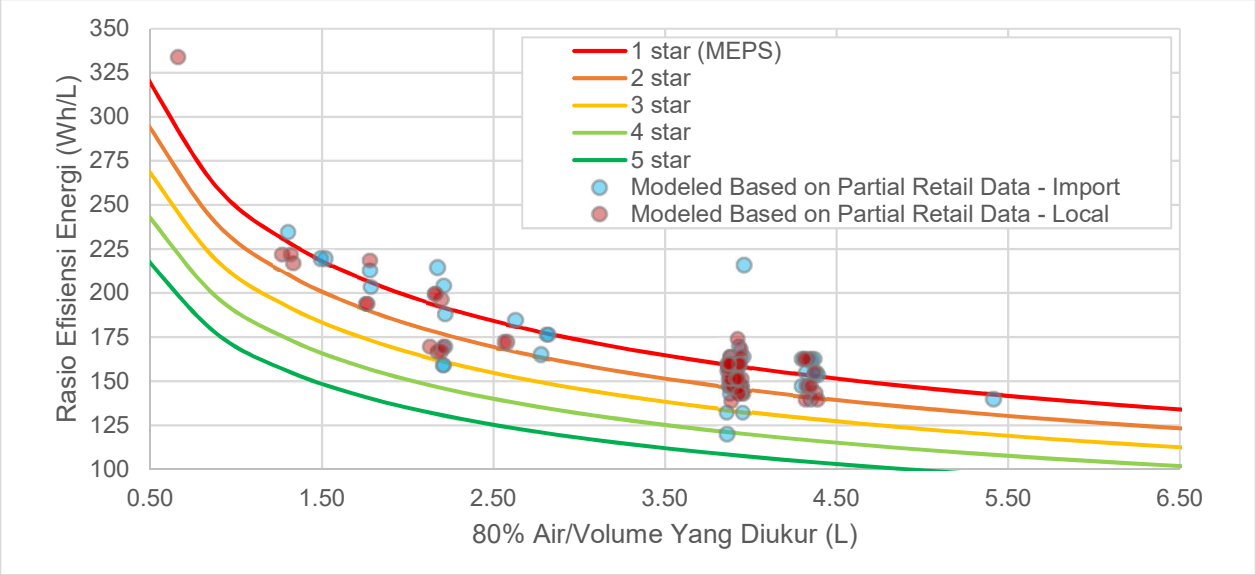


Gambar 8: Distribusi kinerja pasar penanak nasi terhadap rancangan peraturan EBTKE, di mana metrik kinerja yang lebih tinggi menunjukkan konsumsi energi yang lebih tinggi dan efisiensi yang lebih rendah

Untuk mengatasi hal ini, CLASP telah mengembangkan dan merekomendasikan persyaratan sebagai berikut, dimana nilai level kinerja energi tergantung pada volume yang diukur dari wadah yaitu diisi dengan air sampai 80% dari volume maksimum.



Gambar 9: Persyaratan yang direkomendasikan CLASP dibandingkan dengan kinerja dari model yang diuji.



Gambar 10: Persyaratan kinerja yang direkomendasikan CLASP dibandingkan dengan kinerja yang dimodelkan dari model berdasarkan data ritel parsial.

Persyaratan yang direkomendasikan CLASP ini akan dipenuhi atau dilampaui oleh 57% dari model yang diuji, termasuk 50% dari model yang diproduksi di dalam negeri. Meskipun kenaikan harga diestimasikan sebesar Rp.5.000 karena tingkat SKEM yang diberlakukan, konsumen akan menghemat Rp 32.000 selama empat tahun rata-rata umur pakai produk ini dari tagihan listrik yang lebih rendah. Rekomendasi ini akan menghasilkan keuntungan positif kepada konsumen dan penghematan energi dan CO_2 yang signifikan untuk Indonesia.

Tabel 4. Ringkasan dari penghematan nasional dari kebijakan yang direkomendasikan CLASP dan rancangan peraturan EBTKE

	Penghematan Energi Akhir (TWh)		Mitigasi CO_2 (Mt)	
Pilihan kebijakan	**2020-2030**	**Tahunan pada tahun 2030**	**2020-2030**	**Tahunan pada tahun 2030**
Rancangan peraturan SKEM EBTKE	0	0	0	0
Rekomendasi SKEM dari CLASP	**3,7**	**0,6**	**3,3**	**0,5**

CLASP memaparkan temuan awal dari studi pasar ini ke khalayak luas dalam Lokakarya Nasional di Jakarta yang diadakan pada tanggal 20 November 2019. Pada tanggal 30 Januari, 2020, EBTKE menggelar *Focus Group Discussion* (FGD), di mana CLASP diundang untuk menyampaikan rekomendasi tersebut kepada kelompok pemangku kepentingan utama yang lebih kecil, yaitu produsen besar, fasilitas pengetesan yang diakui, laboratorium penelitian pemerintah, dan para ahli teknis. Pemangku kepentingan bisa menyampaikan pendapat mereka, memberi masukan, dan menyatakan kemungkinan-kemungkinan yang harus diperhatikan terkait rekomendasi CLASP ini.

Selama FGD Januari, EBTKE dan pemangku kepentingan menyetujui SKEM yang direkomendasikan CLASP dan persyaratan pelabelan komparatif, meliputi penanak nasi dengan kapasitas penanak nasi kering hingga 3 L. Selama diskusi berikutnya pada bulan Februari 2020, EBTKE memutuskan untuk;

- Sepenuhnya memasukkan SKEM yang yang diusulkan oleh CLASP dan persyaratan pelabelan di dalam revisi rancangan peraturan tersebut;
- Menerapkan definisi volume yang direkomendasikan, yaitu volume yang diukur dari wadah, diisi dengan air sampai 80% dari volume maksimumnya yang diukur sampai ke bibir wadah, sebagai variabel bebas dalam menentukan tingkat kebutuhan; dan
- Mengatur suhu minimum 65°C yang harus dipertahankan pada pengujian mode pemanasan, untuk mencerminkan suhu yang cukup yang diperlukan untuk menghambat pertumbuhan bakteri selama periode pemanasan yang panjang.

Dengan keputusan ini, kebijakan penanak nasi pertama di Indonesia diproyeksikan akan berdampak besar bagi konsumen, produsen, dan negara. Di tingkat nasional, Indonesia akan mendapatkan penghematan energi tingkat nasional yang signifikan dari setidaknya 3,7 TWh dari tahun 2020 sampai 2030 dan 0,6 TWh pada tahun 2030 dan mengurangi emisi gas rumah kaca minimal 3,3 $MtCO_2$ dari tahun 2020 sampai 2030 dan 0,5 $MtCO_2$ pada tahun 2030. Selain itu, pasar akan dilindungi dari penanak nasi impor yang efisiensi energinya rendah, mempromosikan kompetisi yang lebih adil.

1 Background and Introduction

Indonesia is home to over 265 million people.[25] It is the fourth most populous country in the world and its rapidly expanding economy is the largest in Southeast Asia. GDP per capita has risen by 70% during the past two decades and while the end of the commodity price boom weighed on incomes and government revenues, GDP has continued growing at around 5% per year, while per capita income has grown at almost 4% per year.[26]

The manufacturing sector has played an important role in the country's development and it is positioned to continue as an engine of economic growth for the national economy.[27] The home appliances segment in particular has benefited from increasing investments in the country by multinationals such as LG, Sharp, and Panasonic. According to the Ministry of Trade, Indonesia was home to 235 companies in the electronics and home appliance manufacturing business (including component makers) in 2014.[28] The country has one of the strongest manufacturing sectors in the world, accounting for 20.5% of GDP in 2018.[29] The Asian Development Bank expects Indonesia's GDP growth rate to average around 6% between 2020 and 2024 due to its growing manufacturing sector.[30]

Growth in the manufacturing sector has also been attributed to the change in consumption patterns in the country. The middle-class consumer segment is anticipated to grow from 88 million people in 2014 to 140 million by 2020.[31] Retail sales grew by 3.7% in 2018 and household consumption grew 5.5% in 2018, up from 4.9% the year before.[32]

Economic growth has been accompanied by a rise in energy consumption and greenhouse gas (GHG) emissions. Electricity consumption has doubled over the past decade, from 129 TWh in 2008 to 256 TWh in 2018. The residential sector is the primary electricity user, responsible for nearly 40% of consumption, followed by industrial (37%), commercial (23%), and transportation (0.11%) sectors.[33] Coal is the main fuel in electricity generation, responsible for 58% of primary energy consumed, followed by natural gas (27%), renewables (hydro, geothermal, solar, and wind; 8%) and oil (6%).[34]
Indonesia is the world's 11th highest CO_2 emitter when considering only emissions due to energy.[35] Indonesia's success in achieving its national climate pledges will be critical to keeping the planet's temperature rise below the 2 °C (3.6 °F) threshold called for in the Paris Agreement. Per the Nationally Determined Contributions (NDCs) of Indonesia, energy efficiency is one of the key measures to reduce GHG (greenhouse gas) emissions from the energy sector. In its NDC, Indonesia committed to reducing greenhouse gas (GHG) emissions by 29% against a business-as-usual (BAU) baseline by 2030, or to reach 38% below BAU by 2030 with international support.[36]

To achieve these reductions and mitigate the effects of climate change on island countries such as Indonesia, EBTKE under MEMR is implementing policies targeted at both energy supply and demand,

[25] Ministry of Energy and Mineral Resources, Republic of Indonesia, Handbook of Energy & Economic Statistics of Indonesia, 2018
[26] Indonesia Economic Snapshot. http://www.oecd.org/economy/indonesia-economic-snapshot/
[27] The Jakarta Post, Business; https://www.thejakartapost.com/news/2019/02/11/manufacturing-sector-to-drive-indonesias-economy-bappenas.html (accessed on 22 May 2019)
[28] Global Business Guide, Indonesia; http://www.gbgindonesia.com/en/manufacturing/article/2015/electronics_and_home_appliances_manufacturing_in_indonesia_finding_its_edge_11128.php (accessed on 22 May 2019)
[29] The Jakarta Post, Business; https://www.thejakartapost.com/news/2018/12/31/manufacturing-sectors-contribution-to-gdp-above-world-average-minister.html (accessed on 22 May 2019)
[30] The Jakarta Post, https://www.thejakartapost.com/news/2019/02/11/manufacturing-sector-to-drive-indonesias-economy-bappenas.html (accessed on 22 May 2019)
[31] Consumer Durables study by BCG, November 2015
[32] Oxford Business Group; https://oxfordbusinessgroup.com/analysis/loosening-belt-growing-middle-class-boosts-consumer-spending (accessed on 23 May 2019)
[33] Handbook of Energy & Economic Statistics of Indonesia, 2018, pp. 41-53.
[34] Statistics Report 2018. PLN. https://www.pln.co.id/stakeholder/laporan-statistik
[35] Energy Information Administration, 2017 International Emissions, https://www.eia.gov/international/data/world/other-statistics/emissions-by-fuel (accessed 27 February 2020).
[36] Government of Indonesia, First Nationally Determined Contribution Republic of Indonesia, November 2016, p.10.

including the efficiency of household products. MEMR aims to reduce energy consumption across all sectors by 17% in 2025 relative to BAU through various policies, including minimum energy efficiency standards (MEPS) and comparative labeling for energy-using products.[37]

MEPS currently exist for compact fluorescent lamps and room air conditioners, and standards for other products are either in development or pending approval. However, limited or non-existent data on the appliance market makes it challenging for EBTKE to estimate the CO_2 reduction potential of other products, to be used as the basis for product selection for new MEPS levels and compliance efforts. Therefore, CLASP and its partners undertook market studies for four products—fans, lighting, refrigerators, and rice cookers—to inform EBTKE's analysis of the market and the characteristics of these products, and to calculate the energy and CO_2 reduction potential from setting ambitious efficiency policies.

As the leading international voice and resource for appliance efficiency policies and market acceleration initiatives, CLASP, together with local partner Ipsos, conducted a comprehensive market study in Indonesia. This study assesses the potential impact of energy efficiency policies for rice cookers based on product-level data and market characteristics. Four manufacturers provided market data, which Ipsos supplementded with data from a retail tracking service to obtain a comprehensive view of the market.

This report first describes the results of the market assessment, and then looks at the policy options and their impacts.

Market Assessment:

- **Section 1** provides an introduction, background and study objectives;
- **Section 2** describes the approach including scope and key activities;
- **Section 3** provides the overview of the market including key players and a discussion on supply chain and describes the market assessment findings; and
- **Section 4** presents data on market characteristics.

Policy Options and Impacts Assessment:

- **Section 5** summarizes the current draft MEPS and labeling requirements;
- **Section 6** summarizes the current test method referenced by the draft MEPS and compares it to international test methods as well as lab capacity;
- **Section 7** describes the approach to analyzing alternative policies;
- **Section 8** presents the policy options;
- **Section 9** reviews the impacts on consumers, manufacturers, and the nation; and finally
- **Section 10** contains conclusion and recommendations.

[37] President of Indonesia, Republic of Indonesia Presidential Regulation Number 22 of 2017 about National Energy General Plan (RUEN), p. 30.

Market Assessment

2 Market Assessment Methodology

Understanding the characteristics of the rice cooker market provides technical evidence to support MEPS design and impact analysis, which requires identification of the baseline and evaluation of the impacts of potential policy pathways. CLASP, in collaboration with Ipsos, applied the following approach to achieve the project objectives. The study framework is described in the following figure. Two separate data acquisition studies were conducted in parallel. Results were combined for the final analysis.

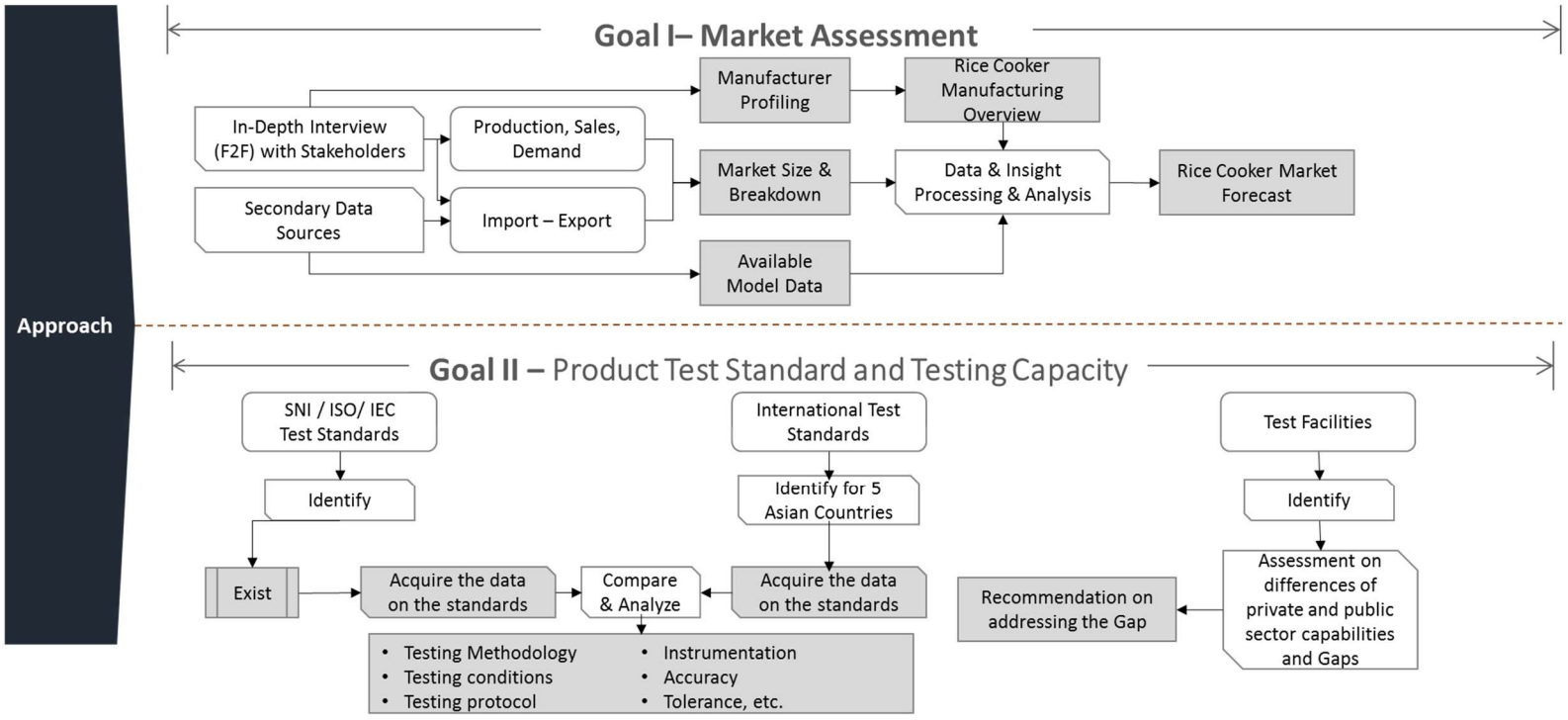


Figure 11: Study framework for rice cooker market assessment

Market Assessment

Step 1 - Data Collection

Ipsos collected the following inputs through various sources and activities;

Table 5. Rice cooker market assessment data acquisition

Data type	Data Input
Demographic Data	• Population count and number of households in Indonesia • Spending on household electronics, electricity u/sage
Market Data	• Market structure: manufacturers, importers, and distribution channels • Household ownership levels • Annual sales of product and market share of product categories and specifications • Imports vs. local manufacturing • Local components used in local manufacturing

Data type	Data Input
Product Data	• Specifications (Function, Control Technology, Heating Technology, Container Type, Volume, Power Requirement, Price Level) • Manufacture information (manufacturer, model) • Relative energy efficiencies • Average lifetime and usage

Ipsos's data collection plan included outreach to relevant stakeholders, listed in Appendix A. The data were gathered through the following methods:

- *Data request to government agencies:* Import and export data for Rice Cookers was requested from Ministry of Trade and Ministry of Industry. Given the lack of data on local manufacturing, trade information, and stock, these values were calculated by Ipsos.
- *In Depth Interview (IDI) and data request to rice cooker manufacturers (assemblers) and importers:* Ipsos held in-depth interviews with representatives of the local manufacturers to understand market trends and obtain detailed production and import volume data. Out of more than 25 manufacturers and importers that were contacted, only 7 responded and unfortunately none provided production data in detail, even after NDA was signed with the companies. Their refusals were due to concerns over data privacy. Ipsos continued with the data collection efforts through these subsequent methods, while keeping communication line open with the contacted manufacturers throughout the duration of the market study.
- *Rice cooker retail sales tracking:* Sales of electronics within the modern retail were tracked by a third-party agency (unnamed due to their data usage policy). In addition to this data source, limited data on traditional retail was also obtained; however, there was no data on online retail.
- *Desk research:* Ipsos Knowledge Center conducted desk research to gather any available material related to the rice cooker market in Indonesia, supplemented by various household electronic reports from Euromonitor, BMI, SPEEDA, MarketLine, and Indonesian Statistic Bureau.
- *In depth interviews with end-users:* Ipsos conducted ~20 interviews with rice cooker end users that were encountered at the modern and traditional retail stores while they were looking for new rice cooker products. The main information gathered were the rice cooker product preference in terms of technology, usage pattern, purchase pattern, and lifetime.
- *Product data collection from retail stores (visits) and online stores (desk research):* Ipsos collected data from 70 traditional stores and 33 modern stores in total from main cities of Sumatera, Java, Kalimantan, and Sulawesi. These stores were located in urban areas, within the center of electronics trade hubs and local markets.
    - In total, there are 99 brands and 417 models are identified as "continuous products", for being consistently available in the market.
    - There are also another 81 brands and hundreds of models that are identified as "one-time model", mainly imported product without brands that are rebranded by the importer and sold in the market due to the lack of enforcement in standards and regulations.
    - There is a lack of enforcement on the safety standard as the rebranded products in traditional market were often found without SNI (Safety) label or using fake label.[38]

[38] Conclusion on the fake labeling is due to some of these rebranded products are seen to have SNI sticker, but do not provide the SNI serial number or the serial number is fake and do not match when checked.

Table 6. Survey of rice cooker retail stores

Region	City	Traditional Stores	Modern Stores
North Sumatera	Medan	10	5
South Sumatera	Palembang	10	5
Java	Jakarta	20	8
	Surabaya	10	6
Kalimantan	Balikpapan	10	4
Sulawesi	Makassar	10	5
Total		**70**	**33**

Aside from the offline stores, Ipsos also scanned through the online market for rice cooker products. The variation of products found in online stores is lower, and low-end products are generally harder to find in online stores. Product data were gathered through nameplates, and manuals available through inspection.

Step 2 - Data Validation

Ipsos conducted a quality check of the collected product data. The retail tracking provides both the data from modern and traditional retail, but not online retail. To complete the data, insights through online sales were collected through Ipsos' store surveys and discussions with rice cooker distributors and manufacturers. The final data were communicated back to the manufacturers and distributors, of which only 1 manufacturer and 1 distributor did not respond. The rest of the respondents agreed with the market data collected and calculated by Ipsos, +/- 5%.

The rice cooker market assessment is based on market findings from IDI with both stakeholders and end-users. Initial findings found that there are 180 brands in the market; however, upon further inspection, many of these products are rebranded low-priced units that are usually not sold continuously. These brands are filtered and grouped in a separate category, designated as "other brands" for the data analysis. Duplicates within product specifications data were removed, including models with missing or insufficient information.

Some models in the dataset are missing one or several characteristics. For this reason, the analysis of product attributes excludes models without that attribute. Maximum power consumption and volume of the container are usually available in the product specifications; however, information on the container materials and insulation used on the product is not available for some models. This unfortunately reduces the number of the datasets that can be used for baseline power consumption analysis

Rice Cooker Usage Behavior

Step 1 – Survey Design

As there was no valid source of rice cooker usage behavior in Indonesia to be referenced for this market study, Ipsos conducted its own online based survey to better understand rice cooker consumer behavior. The survey design is as follows;

- Total of 500 respondent, spread to 5 areas (100 respondent per city)
- Area targeted: Greater Jakarta, Greater Surabaya, Jogjakarta, Medan, Makassar
- Respondent Criteria:
    - Age 20-50, Male and Female
    - SES Level: Lower 1, Middle 2, Middle 1, Upper 2[39]
- Survey Question Summary:
    - Detail of Rice Cooker Owned (Power, Type of Technology, Type of Heating Technology, Container Volume, Inner Container Material)
    - Rice cooker usage behavior (Frequency of usage for cooking, frequency of usage for warming, average duration of warming per day, average volume of rice cooked and warmed, keep plugged / not)
    - Rice cooker ownership behaviour (Years of use for currently used rice cooker, reason for changing from previously owned rice cooker, treatment for the retired rice cooker, total number of rice cooker unit owned, total number of rice cooker unit operated, reason on wattage choice, reason on volume choice, etc.)

Step 2 – Survey Execution

The survey was aimed to understand the behavior of using rice cooker, that can be used to estimate the average power consumption of rice cooker in Indonesia. During the survey execution, it was found that rice cookers are also widely used by small household businesses that serve food in the neighborhood areas, thus, Ipsos made an addition of 100 booster samples for this respondent group.

[39] Detail on the SES determining questions can be found on Appendix D

Test Method and Capabilities of Local Laboratories, Energy Efficiency Regulation Review

Step 1 – Laboratory Data Collection

Data collection for test method, testing capacity, and testing capabilities of local laboratories were mainly acquired through:

- Direct data request to the laboratories
- Conducting In-Depth Interview with the laboratory's representatives

Ipsos acquired the following information from the laboratories:

- Electronic appliance energy efficiencies testing capabilities (focusing on rice cooker)
- Methodology of rice cooker energy efficiency testing and the standard reference (including test parameters and conditions)
- How the actual rice cooker energy efficiency test is being conducted in reality
- Capacity of conducting the energy efficiency test in a year
- Lab equipment used and any related certification or accreditation status of the laboratory
- Future plan the development of lab capabilities related to electronic appliance energy efficiency testing

The specified test procedure in the draft regulation was used as the main reference to derive which equipment are used and needed in the test procedure. Testing capacity was assessed based on average duration of testing for each lab, parallel testing capabilities, and average working days for the laboratories. These resulted in the maximum number of efficiency tests that can be done in a year.

Step 2 – Regulation Overview

The input for the regulation review is based on;

- Energy efficiency regulation draft on specification, labelling, and testing method acquired from EBTKE
- Desk research on other Asian countries rice cooker energy efficiency testing and labeling regulation, country observed are Japan, South Korea, China, Thailand and Hong Kong

The test method reference within the draft regulation was compared with other countries' test method reference. The purpose of the comparison is to see whether there are gaps between the reference draft regulation that still need to be addressed so that the test lab can accommodate the testing once the MEPS standards are enforced to the manufacturers. Contacts were established with the laboratories, except for the manufacturer laboratories that had data privacy concerns and were not willing to share information. The laboratories that Ipsos acquired data from are listed below;

Government Lab	B2TE, B4T, BPMB, BARISTAND, P2SMTP, P3TKEBT
Private Lab	SUCOFINDO, TUV Rheinland, Qualis
Manufacturer Lab	Polytron, Panasonic, Maspion, Miyako

3 Rice Cooker Industry at a Glance

3.1. Supply Chain Analysis

Distributors play a large part in the rice cooker supply chain throughout the country, especially for the traditional trade channel since sales of products sold through traditional retail are mainly driven by the distributors that procure it either from local manufacturer or importer.

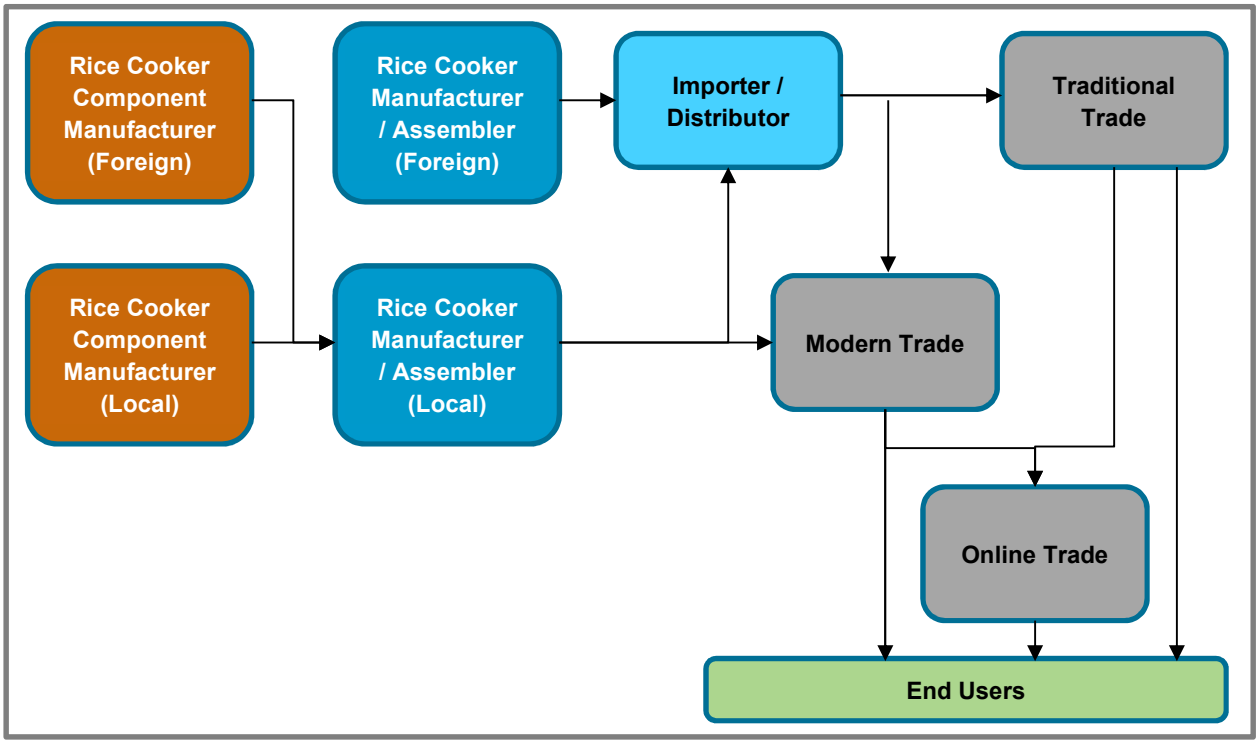


Figure 12: Diagram of supply chain for rice cookers

The second-hand market is estimated to be very small as most old or non-functioning rice cookers are thrown away and scrapped for components by recyclers. In some parts of Indonesia, there are second-hand markets, but Ipsos estimates these to be very small, at less than 25,000 units per year in total, or 0.2% of the market. Based on Ipsos' conversation with traditional retail players that sell second-hand rice cookers, these units are usually used for less than 2 year, often not more than 1 year, and are very low-priced.[40]

By volume, around 53% of the imported and locally manufactured rice cooker are sold through traditional retail trade channel which consist of small privately-owned stores or electronic centers. Online retail holds 13.5% share, and some of this share is generated by both the modern and traditional retailers, which sell their products through e-commerce marketplace portals. The main difference is that modern retail stores usually have "official stores" on the main e-commerce portals and their own webstore to cater to their online customers, while traditional retail stores usually sells through consumer-to-consumer (C2C) marketplace platforms.

[40] Sample encountered by Ipsos shows the price range of IDR 50k to IDR 200k, generally less than 30% of the original product price

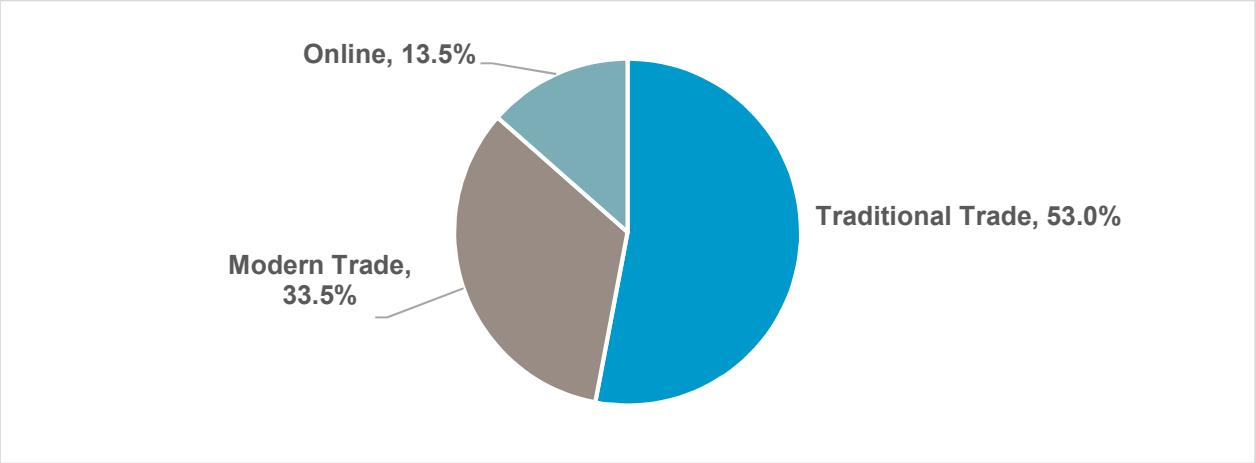


Figure 13: Rice cooker sales channel, by volume[41]

Modern retail, such as supermarkets and specialized electronic stores, holds the remaining 35% share. Best Denki, Electronic City, Trans Mart, and Hyper Mart are a few examples of the modern retailers, while the traditional retail channel players are usually concentrated within the electronic center in each city, such as "Glodok Market" in Jakarta. Sales of rice cooker are increasing online, along with the general trend of increasing household electronics sales through online channel.

3.1.1. Import

In 2018, the annual rice cooker sales volume was estimated to be more than 12 million units with an average yearly growth rate of 5% in the last five years.[42] Most of the products were locally manufactured or assembled, while around 26% of the units were imported as fully assembled units in 2018, as seen in the table below.

Table 7. Rice cooker product source, market size, market share and local component in 2018

Type of Product	Sales Volume in 2018	Market Share by Volume	Local Content %
Fully Imported	3.27 Million	26%	-
Locally Assembled 1	6.24 Million	50%	**≤ 70%**
Locally Assembled 2	2.94 Million	24%	**> 70%**

Fully assembled import volume exceeded 3 million in 2018. 97% of this volume originated from China. Tabulated data of rice cooker imports and the top three import sources are presented in

[41] Ipsos estimate. All unsourced figures are the results of this original research.
[42] Based on Ipsos's market sizing calculation through the market retail data and input from rice cooker manufacturers and distributors.

Table 8.

Table 8. Import volume of fully assembled rice cooker in Indonesia[43]

Import to Indonesia				Units	
Source	**2014**	**2015**	**2016**	**2017**	**2018**
World	2,750,000	2,130,000	2,030,000	2,920,000	3,270,000
					Top 3 Countries
China	2,300,000	1,820,000	1,980,000	2,860,000	3,190,000
Vietnam	374,000	247,000	20,800	9,380	31,400
Thailand	38,500	34,300	23,800	17,800	18,100

To date, there are 16 companies that have local assembly facilities, producing units with varying degree of local content. Manufacturing activities in these facilities range from combining broken-down units to assembling from individual components. Materials and components are sourced from both foreign and local sources. There are also more than 100 companies that are importing fully assembled products, mainly from China. These products are merely rebranded to be sold in the Indonesian market. This explains the availability of 180+ brands in the market found in the store survey. The assemblers are mainly located in Greater Jakarta and Greater Surabaya area, as well as in Greater Medan and Batam area at smaller scales.

By monetary value, it is estimated that imports of fully assembled rice cookers are valued at around IDR 1 trillion. The total rice cooker market itself is valued at around IDR 8 Trillion on retail price. Considering that there should be usually around 50% price difference between the recorded import price and the actual retail price, the retail value of those imported rice cooker is estimated to be around IDR 2 Trillion, which is roughly around 25% of the total market value.

3.1.2. Export

Although small in value and volume, Indonesia does export rice cooker products that are locally manufactured or assembled. With assumption that the average export price of rice cooker from Indonesia is at around 50 to 60% of the imported rice cooker price, there should be around 300 thousand units exported from Indonesia in 2018. 93% were exported to Vietnam, and the remaining exported to Timor - Leste and Bangladesh as shown in the table below.

Table 9. Export volume of fully assembled rice cooker in Indonesia[44]

Export from Indonesia				Million units	
Destination	**2014**	**2015**	**2016**	**2017**	**2018**
World	383,000	450,000	407,000	465,000	323,000
Top 3 Countries					
Vietnam	352,000	423,000	372,000	441,000	300,000
Timor - Leste	11,500	18,800	18,700	13,800	13,000
Bangladesh	11,600	4,350	10,500	3,940	6,630

[43] Import volume in units calculated based on the ratio of ITC Trade Map import value (in US dollars) and 2018 imports of 3.27 million units.
[44] Export volume in units calculated based on the ratio of ITC Trade Map import value (in US dollars) and 2018 imports of 3.27 million units, multiplied by ITC Trade Map export value and a factor of 2 to reflect lower price for export units.

The value of the export has been fluctuating over the past 5 years; however, the general trend shows that the export value is declining. These trends are highly influenced mainly by demands in Vietnam and Bangladesh, where high fluctuations are observed. The majority of the exporting activity is held by Miyako, a local manufacturer that provides low-priced models with local components. For most manufacturers, export market is considered unattractive and more focus is placed on the local market instead. Based on this trend and information, it is unlikely that Indonesia will become a major exporter in the near future.

3.1.3. Local Manufacturing

Rice cooker manufacturers and assemblers that sell their product in Indonesia usually modify the units to lower power rating or wattage. This is due to the generally low household power capacity connection, which is usually less than 900 W, or even only 450 W for households receiving subsidized electricity.

The market itself consists of a vast number of brands. Based on the store survey, there are at least 180 brands found in modern and online stores. However, only around 90 brands are considered continuous, having existed in the market within the past 3 years. Brands outside the top 10 are usually only found in the traditional retail. The top ten leading brands on the market are Cosmos, Miyako, Maspion, Yong Ma, Philips, Sharp, Sanken, Kirin, Panasonic and Denpoo. Sales of these top ten brands combined make around 80% of the total annual sales in 2018.

Cosmos, the market leader in Indonesia started the company by selling rice storage units or cabinets,[45] which then expanded their products to rice cooker and other small household appliances. Rice cookers are differentiated according to their functionality; cooking and warming, and multifunction[46] (sometimes referred to as Magic Com[47]). These are manufactured and assembled in Cipondoh, Tangerang, in Banten Province.

Another top player, Miyako was established in 1970 as PT Kencana Gemilang. Its products are manufactured and assembled in their own factory in Banten. Most rice cooker parts are domestically sourced; however, heating plates and electronic parts are imported from either China or Japan. Maspion is a local brand that started as oil lamp manufacturer. Later, Maspion expanded its business to household appliances. Their rice cookers are manufactured in their own facility located in Surabaya.

Yong Ma is a company from Korea that established their Indonesian business in 1979 under PT Yong Ma Electronics. In May 1995, Yong Ma started to export Magic Jar[48] and Magic Com. Yong Ma products are known for their digital rice cooker products. PT Signify Commercial Indonesia, commonly known as Philips, is one of the market leaders for lighting and household appliances. Other brands in the traditional market was not further assessed since there are at least 100 brands that are originally non-brand products from China that are rebranded to be sold in Indonesia.

[45] In Indonesia, it is common for a household to have a specialized rice storage unit or appliances, in form of light cabinet. Some brands such as cosmos manufacture rice storage product, complete with buttons that release exact measurement of rice for easier cooking process
[46] Multifunction rice cooker is defined as rice cooker that are digital, programmable, and have other function aside from cooking rice and can cook other food aside from rice depend on the programming.
[47] Magic Com is a loose term in Indonesia started by rice cooker manufacturers to refer to multi-function rice cooker product, most of the manual type do not have automatic feature to switch from cooking to warming
[48] Magic Jar is a loose term in Indonesia started by rice cooker manufacturers to refer to rice warmer products, which can't cook rice on its own and only function to warm the rice

Table 10. List of key rice cooker brands and the respective manufacturers and importers

No.	Manufacturer / Importer	Brand	Import/Local
1.	PT Star Cosmos	Cosmos	Local
2.	PT Kencana Gemilang	Miyako	Local
3.	PT Philips Indonesia	Philips	Import
4.	PT Yong Ma Electronics	Yong Ma	Import
5.	PT Maspion Kencana	Maspion	Local
6.	PT Sharp Electronics Indonesia	Sharp	Local
7.	PT Sanken Indonesia	Sanken	Local
8.	PT Aditya Sarana Graha	Kirin	Import (Assembled in Indonesia)
9.	PT Panasonic Gobel Indonesia	Panasonic	Import
10.	PT Denpoo Mandiri Indonesia	Denpoo	Import (Assembled in Indonesia)
11.	PT Electrolux Indonesia	Electrolux	Import
12.	PT Hartono Istana Teknologi	Polytron	Local

3.1.4. Level of Local Content Value

In Indonesia, there are various advantages, incentives, and tax breaks provided to companies that maintain certain level of local content value (TKDN, "Tingkat Konten Dalam Negeri", translated to Domestic Content Level) in their products. These incentives vary for different industrial sectors and specific circumstances. For example, existing companies may not benefit from TKDN regulations, but new companies that establish their manufacturing in Indonesia that produce units within the defined range of TKDN would gain additional tax breaks for a given year.

The calculation of local content level is regulated in Ministry of Industry Regulation, No. 16/M-IND/PER/2/2011 about Provisions and Procedures for Calculating Domestic Content Level. The regulation provide definition as follows;

- Domestic Content Level applicable to domestic product, which is defined as *"goods / services including design and engineering, produced or carried out by companies that invest and produce in Indonesia, in which for the production or work process, can be using imported materials/service"*
- Level of local content is defined as *"the amount of domestic components in goods, services, and a combination of goods and services"*
    - Domestic components in goods are the use of raw materials, design and engineering that contain elements of manufacturing, fabrication, assembly, and final completion of work originating from and carried out domestically
    - Domestic components in services are the use of services until the final delivery by utilizing manpower including experts, work tools including software, and supporting facilities originating from and implemented in the country
    - Domestic components in the combination of goods and services are the use of raw materials, design and engineering that contain elements of manufacturing, fabrication, assembly, and the final

completion of work and use of services by utilizing workers including experts, work tools including software and supporting facilities until with the final handover originating from and carried out domestically

- Level of local content is calculated based on a comparison between the price of finished goods minus the price of foreign components against the price of finished goods
  - Price of finished goods are the production costs incurred to produce goods / service which includes raw material, direct labor cost, and factory / production facility overhead
  - Price of finished goods should not include profit, company overhead, and tax
- Level of local content is determined by;
  - For materials, by the country of origin
  - For tools and facilities, based on ownership and country of origin
  - For labor, based on citizenship

Level of local content is usually self-assessed. In some cases, a company might request for a certificate based on the assessment; however, it is not typically done unless a regulation is released for the product or the industry's local content level.

As of 2019, there is no discussion towards regulating the local content of rice cookers. Ministry of Industry has expressed that all of electronic manufacturing will eventually be included; however, the focus will be placed on high-value products that are imported in large volumes or assembled and manufactured using high number of imported components. Rice cookers would be in lower priority based on these observations;

- More than half of the components are produced locally
- Around 26% of the product sold locally are fully imported
- The products are relatively cheap compared to another household electronic

To date, there is no regulation on the minimum local content level for rice cooker products. Some other household electronic products do acquire benefits for having higher local content. Most of these benefits are in form of lower taxes, which affects the product's final price.

Ipsos categorized rice cooker local content between "above 70%" and "70% or below" as it is the median that Ipsos found among rice cooker products in the market. Based on the table below, the majority of rice cookers have less than 70% of their components sourced locally, with the average around 55%.

Table 11. Local component content of locally manufactured / assembled rice cooker

Type of Product	Local Component Category	Average Local Content %	Total Average Local Content
Locally Assembled 1	**≤ 70%**	**55%**	**61.4%**
Locally Assembled 2	**> 70%**	**75%**	

The percentages are calculated based on the values of the components. The following components are commonly imported from foreign sources:

- *Heating element*: The most commonly imported component for Rice Cooker. Although there are some local suppliers in Indonesia, the price and technology are usually as competitive compared to the foreign suppliers. As rice cookers with induction technology, all heating elements are imported.

- *Rice cooker body and casing*: Most low-priced rice cookers have plastic casings, which are often in lower prices and manufactured in China.
- *Electronic components*: Mainly for digital rice cookers. Most electronic circuits and controls are pre-made and assembled in facilities outside Indonesia considered the brands' manufacturing hub before exporting to Indonesia.

An average local content level for rice cookers with more than 70% of their components sourced locally, is 75%. The manufacturers of these rice cookers usually limit imported components to the heating element and source other components locally. These types of products are usually lower-priced and manually operated. Across all cooker manufacturers and assemblers in Indonesia, Ipsos estimates the local content level to be around 61%. Since Indonesia has a free-trade agreement with China through FTA, it is believed that the volume of the imported rice cookers and the components would not be declining soon, and would increase as it is generally most cost-effective to import the fully assembled product on small scale or import components on large scale from China.

3.1.5. Data Validation

The data gathered were validated through various methods depending on the source and the type of data. In general, quantitative data were compared with different sources while qualitative data were validated by comparing insights from other respondents and checking for discrepancies. The table below is provided as the summary of how the data was validated.

Table 12. Data validation overview

Data / Insight Category	Validation Method

Import - Export	• The data are gathered through multiple sources such as;
	  ○ Local statistic office
	  ○ ITC Trade Map
	  ○ HIS Markit
	• The data were cross-referenced, checking for consistencies
	• The value or item is consulted with local market players that are involved in import and export activities
	• Total import volume is consulted with the association and the local market players that import their products

Local Content Value	• The data is gathered through in-depth interview with each manufacturer • The result was validated by checking the final data with the association and the market players
Sales Channel	• Sales channel data is acquired from the combination of retail sales tracking data and in-depth interview with online channel marketplaces • The validation is done by checking the results with the manufacturers, distributors, retailers, and online marketplace

3.2. Key Players

Ipsos estimated the brand shares of rice cookers sold in Indonesia based on the retail tracking data, complemented by the results from store IDI and survey, distributor IDI, and manufacturer IDI. Based on the data, half of the market is dominated by the 2 main brands who assemble their product locally.

In total, there are 11 key brands that are covered in the brand share, while the rest of the brand are labeled as “others”. These low-volume brands have annual sales in thousands of units. Among the 5 key brands, only 1 that is known to fully import their product to Indonesia, the rest assemble their products locally with varying degree of local content. The top 2 long-established brands that dominate the market have a wide range of products, ranging from the low-price units costing around 20 USD, to high-end models with induction pressure heating technology costing hundreds of dollars.

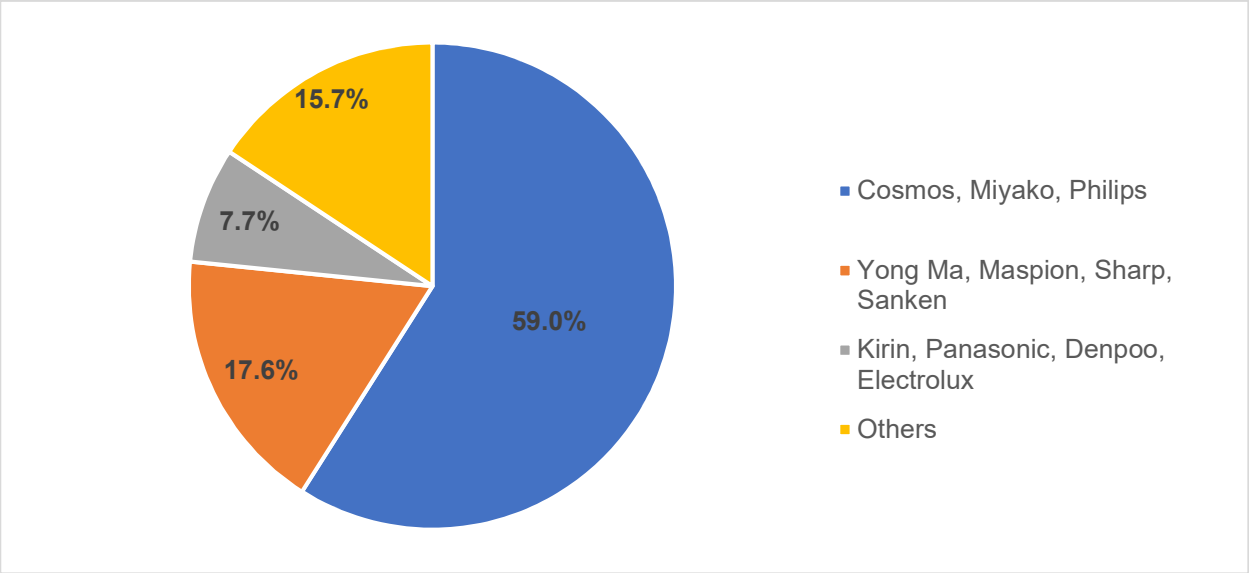


Figure 14: Market share of rice cooker brands sold in Indonesia in 2018[49]

The figure on the brand share shows that the top 3 rice cooker brand hold nearly half of the overall market share for Indonesia’s rice cooker market in 2018. Other brands have significantly smaller market share compared to the top three brands.

[49] Based on retail tracking data and Ipsos Analysis

4 Market Characteristics

4.1. Market Size

4.1.1. Market Demographics at a Glance

Indonesia is home to 265 million people in 2018, divided into approximately 68 million households across the country. With rice as the staple food in most parts of the country, majority of the household own rice cooker appliance within their home, reportedly at nearly 70% penetration on the national level.[50]

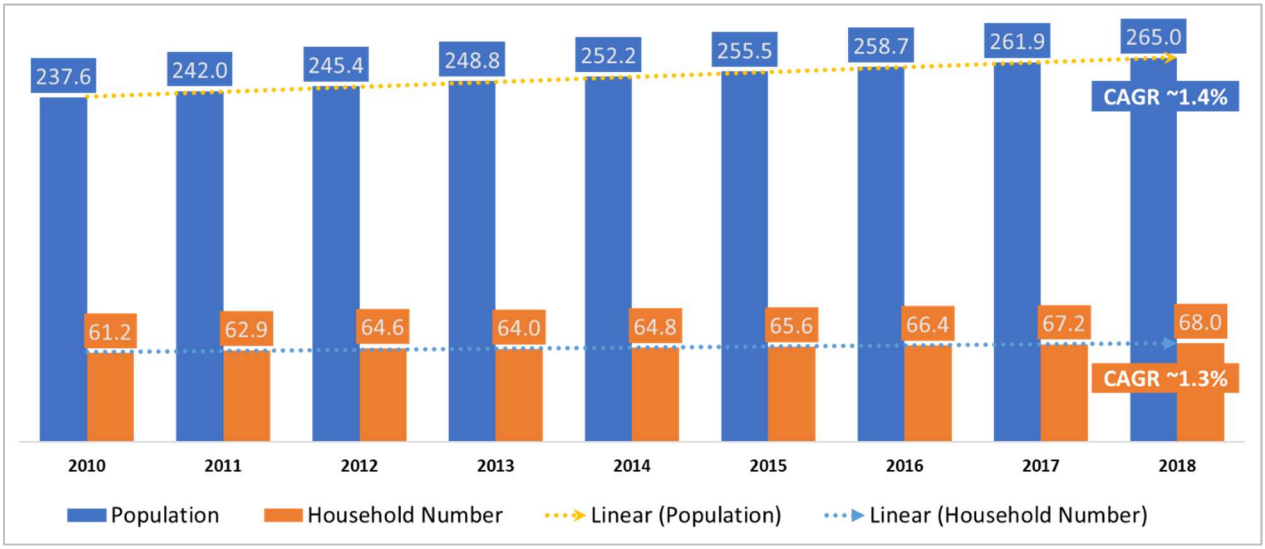


Figure 15: Indonesian population and household numbers, 2010 - 2018 (in millions)[51]

While sizable, Indonesian population and household is not spread evenly. 60% of the population reside in Java. The island has higher economic activity compared to other Indonesian major islands. Aside from households, small household food businesses that are using rice cookers with volumes less than 3 L are also covered in this study.

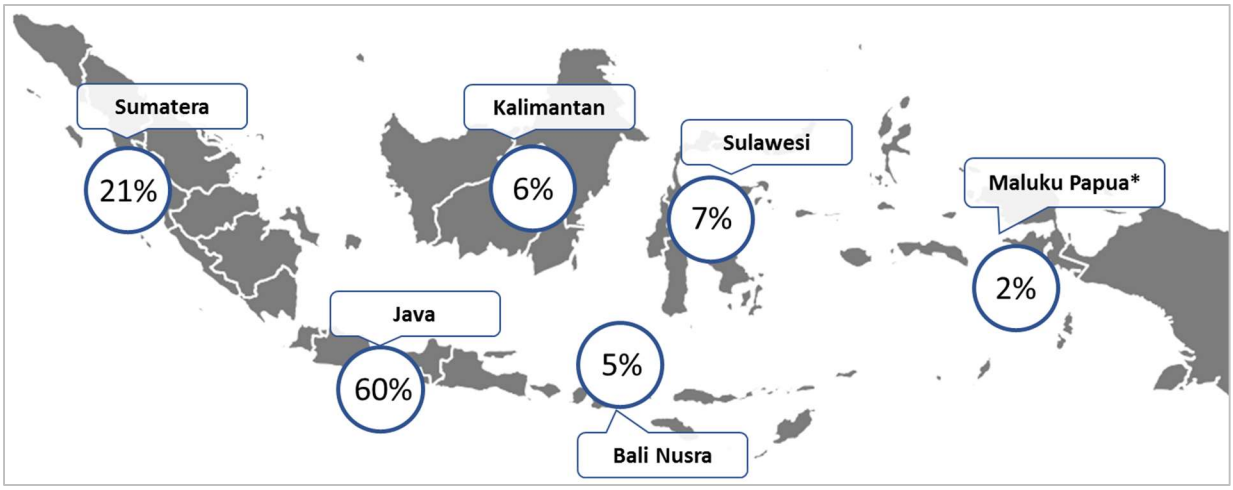


Figure 16: Indonesian household population distribution[52]

[50] CLASP 5,000-Household Residential End Use Survey
[51] BPS
[52] BPS, National Survey 2015

Overview of Ipsos Residential End Use Survey and Result Overview

Along with this study, Ipsos conducted a residential survey the main objective to gather detailed data on household electronics equipment ownership and usage. Rice cooker is one of the products covered in the study. The detail of the survey is as listed below;

Table 13. Ipsos residential end-use study coverage

Residential End Use Study	
Surveyed households across Indonesia	5,000
Number of provinces	34
Number of city / districts	98
Period of survey	7 months

The key result from the study on rice cooker covers penetration rate and average age of rice cooker in-use. The penetration rate data was combined with the estimated number of households to generate the estimated number of rice cooker in-stock at the national level.

Table 14. Ipsos residential end-use study result on rice cooker

Penetration	Stock (Penetration x Ownership)	Average Age
69.8%	45,291,892	4.3 years

Based on the study result, the penetration rate of the rice cooker in Indonesia household is 69.8% with average lifespan of 4.3 years. The estimated stock from residential end-use study is smaller compared to the initial estimation calculated in this study since the study includes rice cookers with volumes less than 3 L used in small businesses.

Assumptions Used in Calculation

While the sales are based on retail data, the calculations of stock and forecasted shipments were based on several assumptions listed below;

- The sales number in each year goes to in-stock number directly each year.
- Rice cooker sold will be out of use starting from year 2 since there will be certain percentage of rice cooker unit that are out of use. The number is based on “retirement rate” shown in section 4.1.3.
- For different types of rice cookers, the retirement rate is assumed to be the same. Only new sales composition that will be affecting the composition.
- From year 6, the remaining stock of rice cooker units that have not been retired yet, will be replaced by the time year 7 is reached.
- Slightly decreasing sales in the future, based on qualitative insights from key manufacturers interviewed.
- Slightly reduced retirement rate, based on qualitative insight from manufacturers since newer rice cooker models last longer.

4.1.2. Sales Trend and Forecast

The basis for new rice cooker sales volumes is established through the electronic household appliances retail sales tracking data. This data was improved and adjusted using information from manufacturers, Ipsos retailer survey and IDI, as well as other secondary information sources. Sales of new rice cookers cover three sales channels; traditional, modern, and online retail.

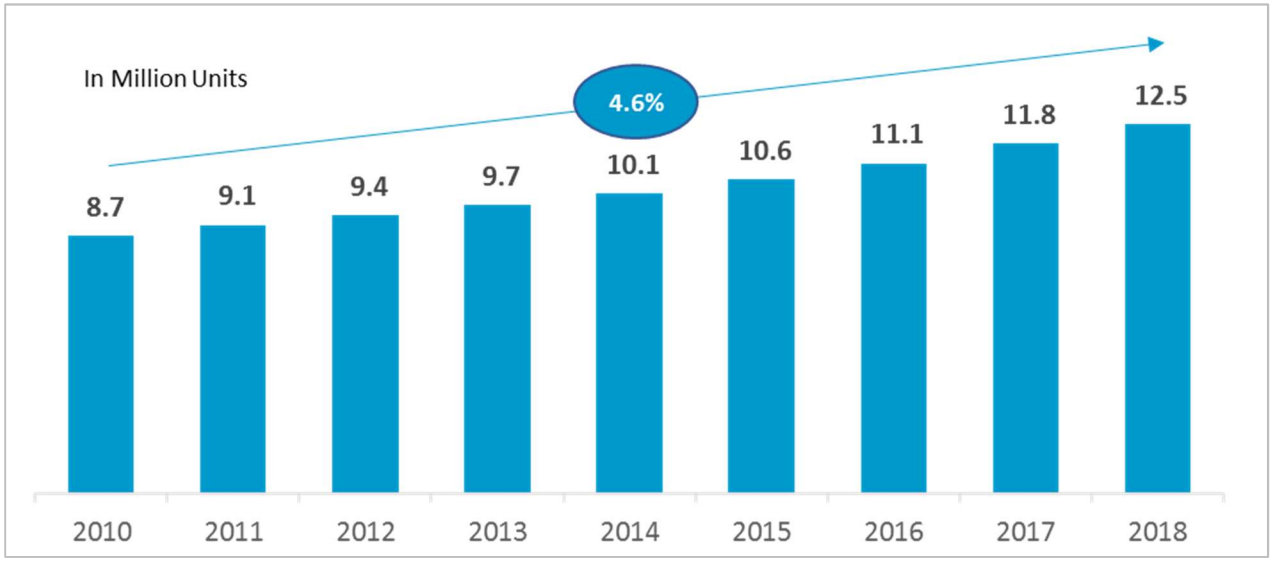


Figure 17: Indonesia historical sales of new rice cooker

The sales numbers show that rice cooker sales increase at an average of 4.58% per annum since 2010. Closer examination however, shows that annual sales increase has been below 3% until 2013, nearly reaching 6% only in 2017. This trend is mainly driven by growth in income that drives the purchase of household electronics,[53] as shown in the residential end use survey. Rice cooker is the 7th most common household electronics after the more basic appliances needs are fulfilled.

By 2017, 98.2% of Indonesia's population had access to electricity, which grew from 94% in 2010. Household electricity consumption grew from 62.3 million MWh in 2010 to 98.4 Million MWh in 2017.[54] Parallel to this significant increase in energy consumption demands, transaction volumes also sharply increase for various electronics-related categories in the e-commerce market.

Table 15. Growth of e-commerce market value in Indonesia (in Billion IDR)[55]

Product Category	2017	2018
Gadget & Accessories	8,018	16,823
Computer & Accessories	3,672	7,814
Electronics	2,313	5,255

[53] Oxford Business Group; https://oxfordbusinessgroup.com/analysis/loosening-belt-growing-middle-class-boosts-consumer-spending (accessed on 23 May 2019)
[54] Handbook of Energy & Economic Statistic of Indonesia, 2018
[55] Based on Indonesia e-commerce data from Bank Indonesia

Several of the key factors used in Ipsos' forecast model are;

- GDP growth
- Population / household growth
- Access to electricity
- Annual rice consumption
- Rice consumption behavior trend
- Lifetime expectancy of rice cooker products
- New entrant to middle-low income class
- Input from manufacturers and distributors

Using the model, Ipsos forecasted the sales volumes of new rice cooker up to 2030. The growth in the future is seen to be slower, mainly as a direct result of lower population growth rate, increasing lifetime expectancy of rice cooker products, and decreasing rice consumption in the higher income group as a result of a shift in diet.[56] Most of the new demands for rice cooker would come from the Eastern part of Indonesia that traditionally does not rely on rice as their staple food. This region would have better access to rice distribution due to improved infrastructure.[57]

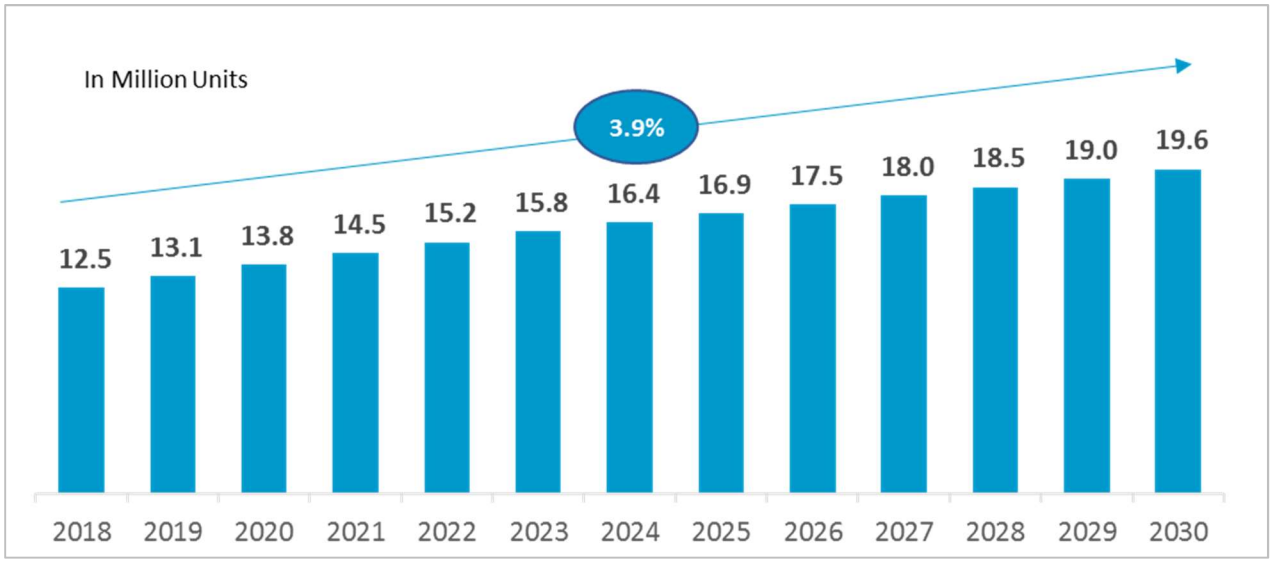


Figure 18: Indonesia sales forecast of new rice cooker

Under these considerations, sales of new rice cooker per year in Indonesia will increase at an average growth of 3.85% per year up until 2030. Energy efficiency regulation might not affect the sales since the end users can simply switch to brands that already passed the certification process. However, if the

[56] Based on Study Report of "Modeling the Future of Indonesian Food Consumption" submitted to Bappenas, WFP, and FAO
[57] Based on publication from BPS "Kajian Konsumsi Bahan Pokok tahun 2017" and "Distribusi Perdagangan Komoditas Beras di Indonesia 2018"

government enforces the local content regulation to be mandatory at higher content level,[58,59,60] the market might be disrupted for a certain period before recovering to the initial trajectory.

Rice cooker sales are mainly driven by replacements of older existing rice cookers in the households. First-time buyer were usually newly formed household or people that move from their parent's house. Based on the survey, people would still buy a new rice cooker even when the older unit is still working. The reasons mentioned in the survey are;

- Older unit looks worn out
- There is newer model that with better looks & function
- Older unit works less efficient (slower, less warm)
- Additional family member, requiring larger capacity rice cooker or additional rice cooker unit

4.1.3. Stock

Stock of rice cooker was calculated mainly using the input from the sales of new rice cooker, combined with the retirement rate of the rice cooker products acquired based on end users IDI, manufacturers and retailers. The assumption is applied to the new rice cooker sold and then scrapped at different years from their sales based on the scrap rate. This retirement rate is illustrated in Figure 13.

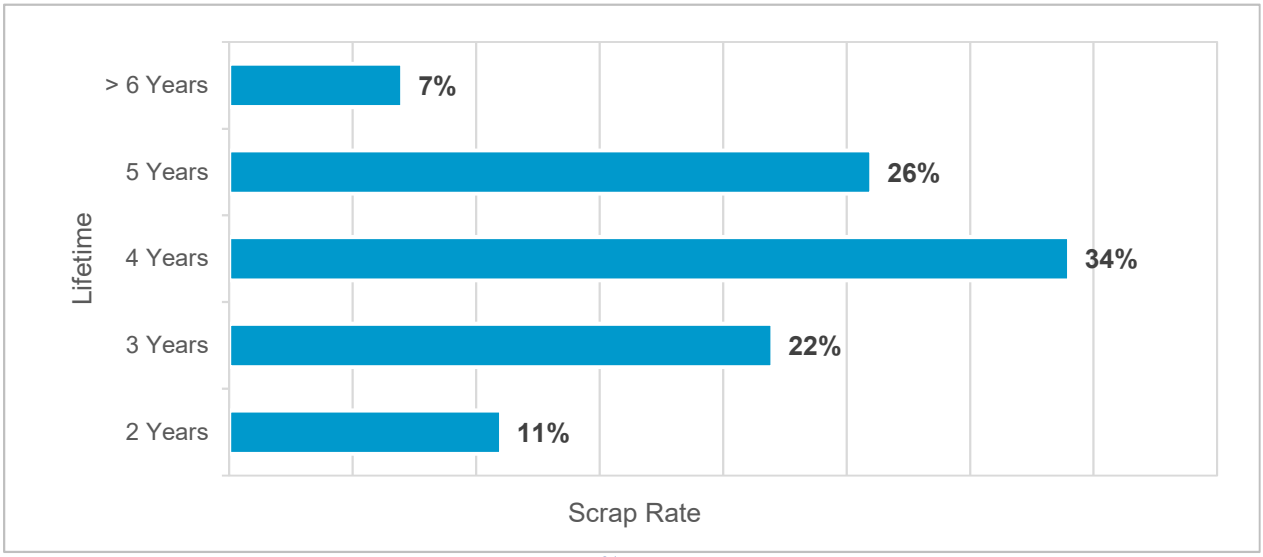


Figure 19: Estimated retirement rate of rice cooker[61]

By calculating the average lifetime of rice cooker based on the retirement rate figure above, the average lifetime of rice cooker is at 4 years, shorter compared to the residential end-use survey result of 4.3 years. The results are relatively comparable, and the difference is expected to be mainly caused by the inclusion of rice cooker usage in small businesses. Small food businesses were not included in the residential end use survey, and rice cooker units used by this user group tend to have shorter lifetime.

[58] Indonesia has enforced regulations for various products and services based on their country of manufacture and source of components. The score system is named TKDN (Tingkat Konten Dalam Negeri) which is translated to local content percentage.
[59] Based on Ministry of Industry Regulation No. 69/2014, the Research & Development aspect considered to contribute 20% of the total local content scoring while the manufacturing contributes 80%
[60] Although local content of products in Indonesia is generally aimed to be high for all products, for some products the local content is not regulated but incentivized.
[61] Based on in-depth interview with manufacturers, retailers, and consumer survey

Table 16. Lifetime result comparison between rice cooker market study and residential end-use study

Rice Cooker Market Study	Residential End Use Study
3.96 years	4.3 years
Covers all rice cooker used under 3 L volume	Covers rice cooker used in household
Slight differences in the lifetime from both study due to rice cooker used in small business tend to have shorter lifetime as it is used more often.	

The bulk of the scrapped rice cooker happens on the third and fourth year of the rice cooker itself, according to the manufacturers. Most of low- and mid-priced rice cookers are designed to have a lifetime of 3-5 years, while higher-priced models can last for up to 10 years.

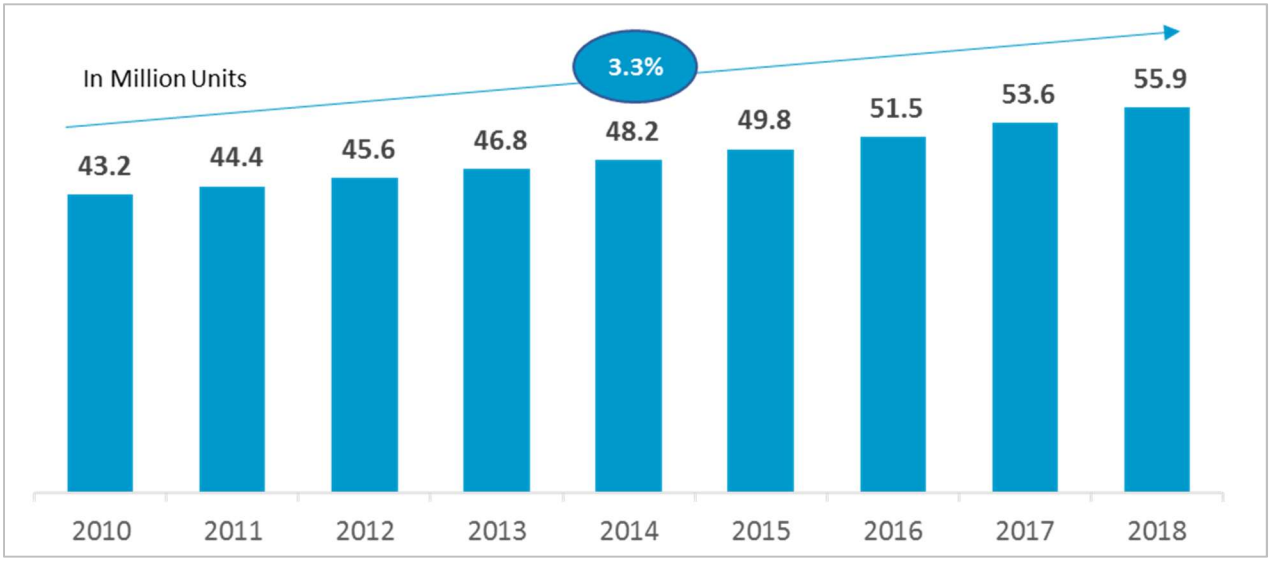


Figure 20: Indonesia historical data of rice cooker stock

Ipsos estimates that there are 56 million rice cookers in-use by household and small business across Indonesia in 2018. The growth rate is shown to be around 3.26% per annum since 2010, which is still below the growth of the sales itself. This trend shows that there are more rice cooker units added to the stock as compared to the units being scrapped or out of use. Comparing with the penetration rate result of residential end-use study that estimates a stock of 45 million units in 2019, the study estimation is around 25% larger, mainly since to the usage of rice cooker in small food businesses were not taken into account in the residential end use survey.

The forecast of rice cooker stock is obtained through the forecast of sales, using the scrap rate with minor adjustment considering that with better model and digital technology, the rice cooker can last longer. The estimated rice cooker stock by 2030 is around 85 million. With this value, the ratio of population to rice cooker shifts from the current 1:5 to around 1:3. Comparing this estimate with other sources available, it seems that growth will decrease at the 1:4 ratio and the market will saturate between 1:3 to 1:2 ratio, depending on the size of household and the rice eating habit in Indonesia.

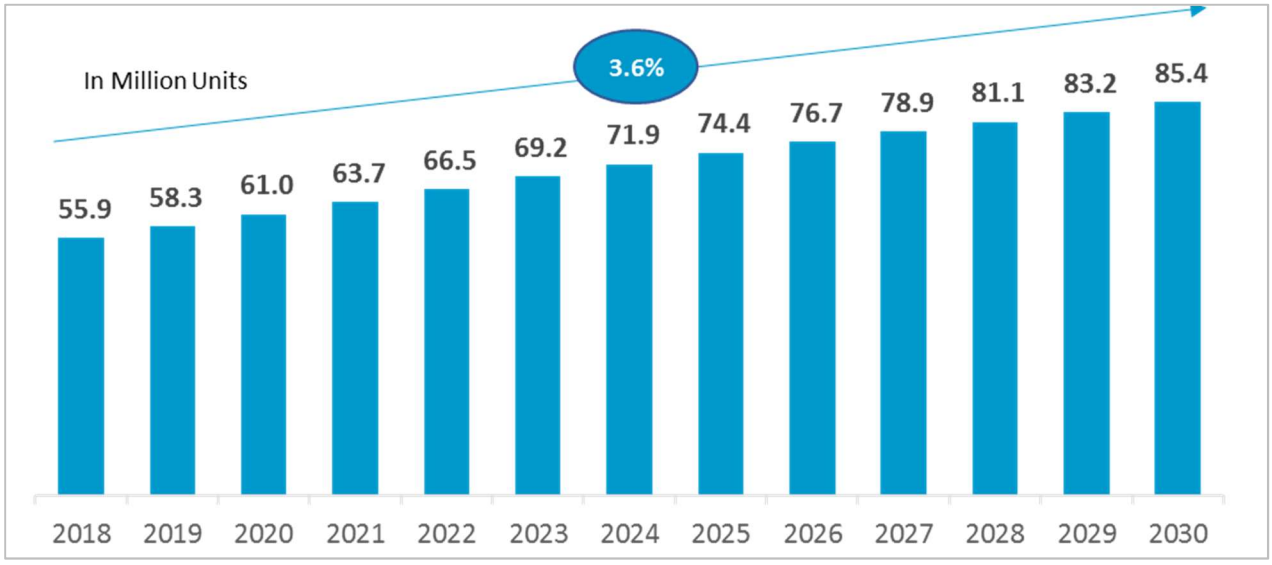


Figure 21: Indonesia forecast of in-stock rice cooker

Based on the forecast of rice cooker stock, the total number of units may grow slightly faster in the future, mainly as a direct result of improved quality of rice cookers with prolonged lifetime. Increase in income, urbanization, and better access to electricity are the main drivers for the increase in rice cooker future stock. It should be noted that the forecast was based on current observations, where there would be no significant disruption through 2030. The estimated 3.60% annual growth of the rice cooker stock in Indonesia through 2030 is higher compared to the past 8 years growth.

4.2. Rice Cooker Types and Market Shares

In Indonesia, it was common to find four types of rice cookers; Cooking Only, Warming Only, Cooking and Warming, and Multifunction. Since 2010, “Warming Only” rice cookers are no longer sold in the market, and it seems that this type is no longer produced.

Based on the findings of the market survey, there are three type of rice cooker commonly found in the market:

- Cooking Only: Functionality limited to only cooking the rice, all manually controlled.[62]
- Cooking and Warming: Functionality limited to cooking and warming rice, sometimes, additional steaming function are added, most of the model in this type are manually controlled.
- Multifunction: Can be used for more than cooking rice. These have cooker, steamer, and other functions. Most of these models are digitally controlled.
    - 3-in-1 type: These are similar to Cooking and Warming types but include a steaming tray. Therefore, this type is included under the “multi-function” type. Based on market survey, Indonesian consumers tend to utilize only cook and warm function and prefer to buy the Cooking and Warming type of rice cooker.

Figure 22. Three common types of rice cooker in the Indonesian market

[62] IDI with retail stores and manufacturers revealed that “Cooking Only” products no longer sell, and the models in the market are older stock that have not been sold

Function

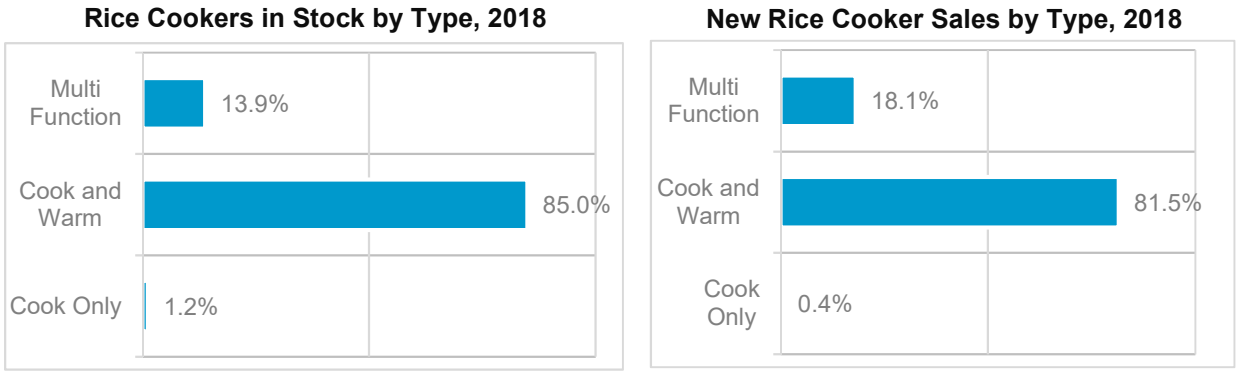


Figure 23: Share of rice cooker based on the type

Based on the trend, it is shown that "Multifunction" rice cooker is getting more popular; however, most consumers still prefer basic rice cooker types with "Cooking and Warming" function. There is a small share for "Cooking Only" rice cookers, which mainly comes from older stock items and low-end products. In several years, it is expected that the cook only rice cooker will be out of the market. As rice cookers generally become more affordable, most people would prefer "Cooking and Warming" rice cookers instead of the less expensive "Cooking Only" type.

Digital or Manual Control

Control systems used in rice cooker products were originally only using a simple on-off switch. When warming mode was introduced, a thermostatically operated switch was introduced to switch between off, cooking, and warming. Some products have automatic switches to change between cooking and warming mode; however, most of the controls are done manually with the use of a simple on-off switch. In the past, some models must be unplugged to be switched off, but such models were no longer seen in the market during Ipsos' retail survey.

In contrast, digitally controlled rice cooker is equipped with a microcomputer controls the power, resulting in better heat and power management compared to a manual switch. The digital version also usually makes it easier for the end user to control the warming time of the rice once it is cooked. Most of the digitally controlled rice cookers are categorized under the "Multifunction" type, which can be used for other purposes aside from cooking rice.

Digital control tends to consume small amount of power when plugged in, even when not turned on (standby mode). Ipsos tested several model of digital rice cookers using watt meter, the measurement shows that on average standby mode power consumption is 2 to 3 W. Manual control, on the other hand, usually does not consume power as long as the rice cooker is not turned on. The majority of consumer prefers mechanically controlled rice cookers since it is easier to use and cheaper than digital control, however, the trend is moving towards digital control as the component is relatively becomes cheaper over time and the manual one often seen by customers as "old technology".

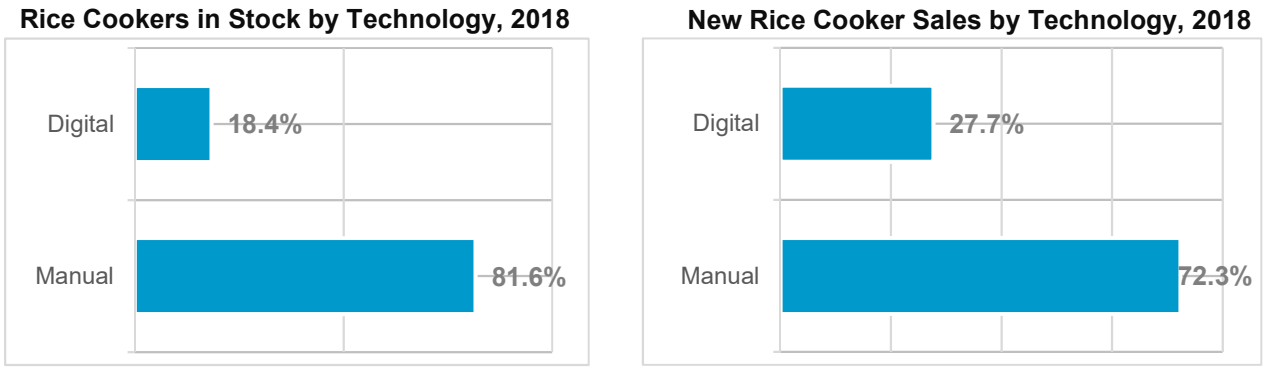


Figure 24: Share of rice cooker based on technology

Heating Element

The heating element is the main component of the rice cooker that transforms electricity into heat that cooks the rice. In the most basic rice cooker, the heating element is usually found at the bottom part of the appliance, where it transfers heat to the container holding the rice and water. Although there are various marketing words for the heating technology, all heating technology can be categorized as "Electric Resistance" type and "Induction" type. Most rice cooker sold are still using electric resistance as it is cheaper and does not require complicated technology.

The figure below shows that induction heating is gaining traction in the market. Although generally more expensive,[63] induction heating is claimed to be more efficient than electric resistance. Inductive heating occurs when electric current flowing through coil in the base of the rice cooker generates a magnetic field, which then induces secondary currents in the metallic walls of the rice container. These currents cause the container to heat up more directly than through imperfect contact with a heater, resulting in higher efficiency.

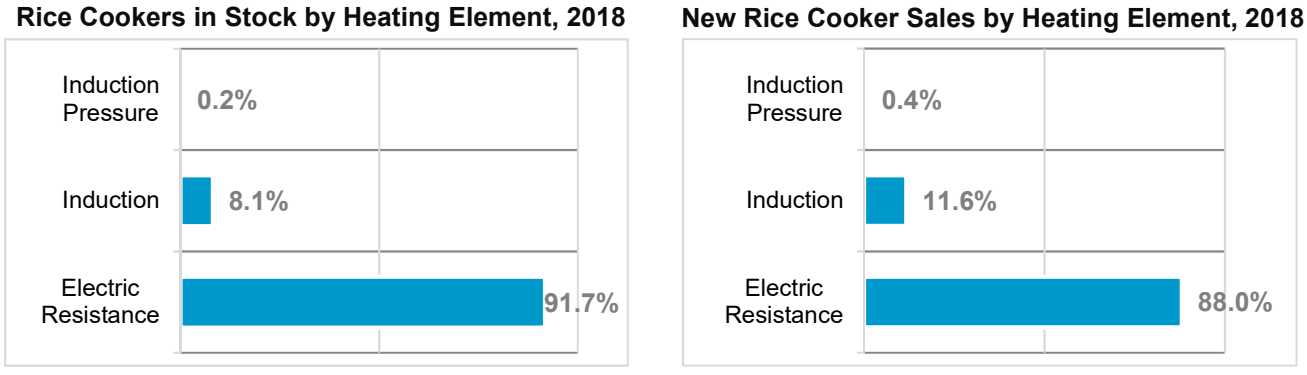


Figure 25: Share of rice cooker based on heating element

For stovetops as reference, research done by the US Department of Energy (DOE) found 74–77% of efficiency for resistance heating and 80–81% efficiency for induction.[64] However, other research on the same subject showed that in general, there is no energy reduction benefit as the higher efficiency due to

[63] However, manufacturers claim induction to be cheaper nowadays to produce compared to the traditional electric resistance, driving manufacturers to push the product into the market.
[64] Technical Support document for Residential Cooking Products, Volume 2: Potential Impact of Alterative Efficiency Levels for Residential Cooking Products (Docket Number EE-RM-S-97-700) by Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division Technology and Market Assessment Group

induction only impacts the initial heating (first 5 minutes).[65] Also, generating heat throughout the rice container through induction can provide more even cooking of the rice compared to traditional electric resistance. However, in recent years, various electric resistance models have put their heating elements not only on the bottom, but also on the sides of the rice container, to ensure even distribution of heat.

Container Material

Inner container material plays a crucial role in heat conductivity which affects electric resistance rice cooker energy efficiency as well as the cooking time. The main material of the pot itself are usually made of either aluminum or stainless steel with the inner pan coated with various surface materials, ranging from non-stick surface, Teflon, ceramic, clay, and other type of materials. Aluminum container materials were generally cheaper and lighter. However, aluminum alone can't be used without any coating as it can seep into the rice being cooked slowly over time.

Based on Ipsos observation on the traditional retail market, there were numerous low-end models with poor-quality non-stick coating. These coatings peel off and drive end users to purchase new rice cookers even though the appliance itself is still working. Stainless steel on the other hand, were hard to be coated with other materials and often just used by itself. The cost for stainless steel container is more expensive and it is heavier compared to the Aluminum one. The main value proposition for rice cooker with stainless steel container is its durability and "health" benefit as stainless steel would not react with the food it is cooked in, although efficiency wise, stainless steel score lower than aluminum due to higher heat capacity which often requires higher power requirement to achieve reasonable cooking time.

In more expensive models commonly use a and even sometimes ceramic material to add the feeling of luxuriousness feel to the appliance as well as improving the heat efficiency, which is making the rice cook faster but have questionable effect on the actual efficiency of the energy consumption. The figure above shows that the usage of aluminum is become more common as the sales of new units are more likely to have aluminum pots than the stock of installed units. As of now, there are no clear study that can show the difference in energy efficiency of rice cooker based on their inner container materials. Based on conversation with the manufacturers, there would be differences as aluminum takes up heat faster compared to stainless steel, but the long-run impact on energy consumption difference should be negligible.

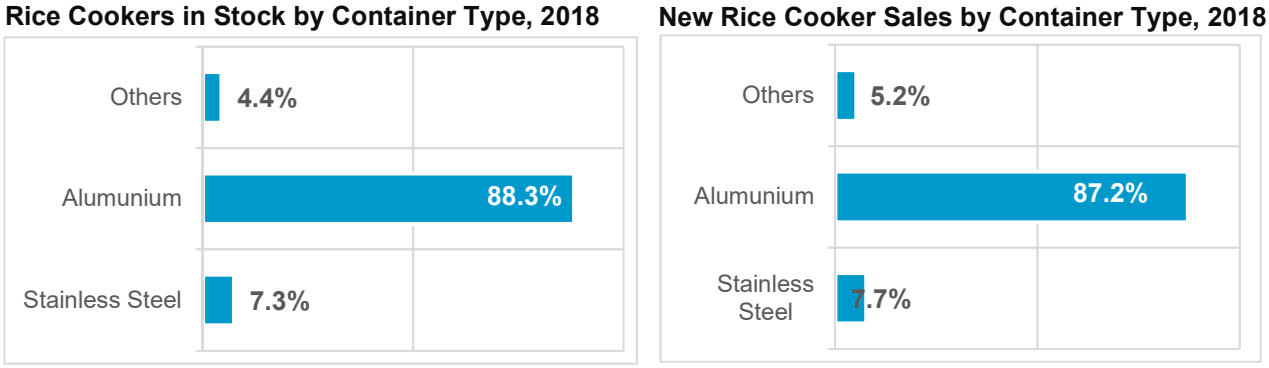


Figure 26: Share of rice cooker based on container type

[65] [6450-01-P] Department of Energy 10 CFR Part 450 [Docket No. EERE-2012-BT-TP-0013] RIN: 1904-AC71 Energy Conversation Program: Test Procedure for Conventional Cooking Products

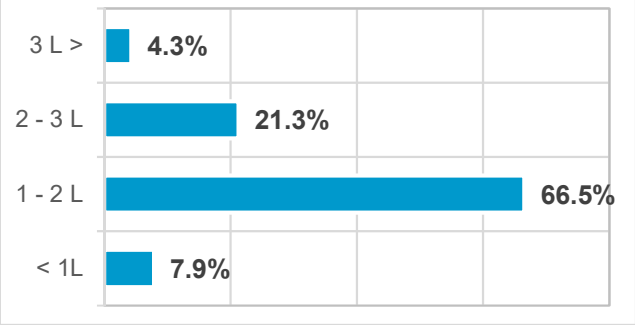
Insulation Material

There are no data on the categorization of rice cooker based by the insulation used, however, based on Ipsos observation and In-Depth Interview with the manufacturers, most of the lower range (price) products are not insulated as it adds more to the production cost as well as the total weight of the product. Some of the middle range and upper range products are insulated with various type of insulation, depend on the manufacturers. Insulation method used are vacuum insulation, air layer insulation, glass wool / fiber glass insulation, polystyrene beads, and rock wool.

Capacity / Volume

Rice cooker capacity is determined by the maximum volume of uncooked rice within the inner pot, the actual volume of the container is always larger as it need to contain the water that are used for cooking the rice and the cooked rice volume later. The actual volume of the container is not usually stated by the manufacturer and its ratio when compared with the uncooked rice volume can vary. For personal (household) and small food business use, the volume ranges from 0.3 liter to 3.0 liter. The volume is usually related to the size of the household: 1.6 to 1.8 liter capacity units are usually enough for a household of 4 to 5 people. Rice cookers with volume of 2 to 3 liter are usually used by larger households or small businesses that sell food, while the smaller capacity below 1 liter are commonly used by households with 2 or fewer.

Rice Cookers in Stock by Labeled (Dry Rice) Volume, 2018



New Rice Cooker Sales by Labeled (Dry Rice) Volume, 2018

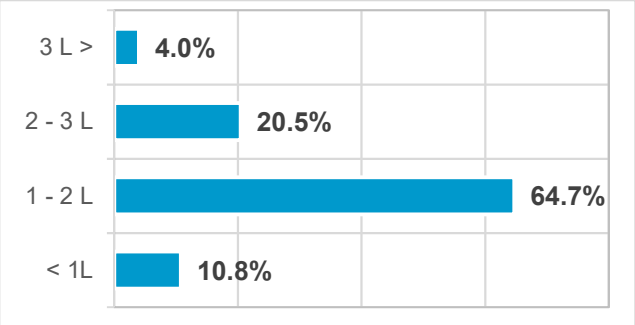


Figure 27. Share of rice cooker based on volume

The figure above shows that most of the rice cooker, both sold and in stock in Indonesia have labeled (dry rice) volume between 1 to 2 liter at more than 60% of share. Recent trend shows that the consumers are moving towards smaller volume which is more flexible. Consumers can cook the rice as needed instead of cooking one big batch and heating it for a long time. The two main factors in the decreasing volume of rice cooker used by average household are;

- **Decreasing size of household**, based on World Bank and UN Global Observatory Projection data, from 2010 to 2012 alone, Indonesia household size has already reduced from 3.81 to 3.78. The figures are projected to be around 3.6 by 2019.
- **Increasing habit of eating out or ordering delivery food, mainly among urban population**, driving less need for cooking rice at home. According to Indonesian Bureau of Statistic on Indonesian food expenditure, the portion spent on prepared food and beverages has increased from 29.6% in 2016 to 32.7% in 2017 and 34% in 2018.

With the factors mentioned above, more people choose to buy rice cooker with lower volume which is also used less frequently as they eat outside the home more or only cooking at home in a certain time of day

(e.g. only for dinner). These habits are captured in the online survey that Ipsos conducted, in which around 24% of households only use their rice cooker 3 days a week, and 11% use it once a week.

Power Requirement

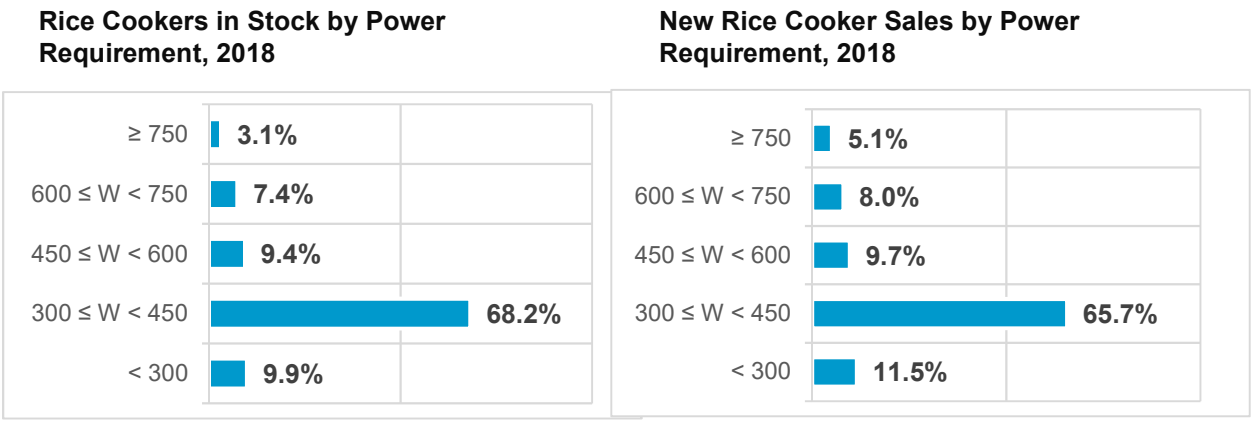


Figure 28: Share of rice cooker based on power requirement

The figure above shows that 78% of rice cooker in stock in Indonesia draws less than 450 W of power, with 300-450 W being the majority, making up more than two-thirds of the total on stock rice cooker unit. The new sales shows that the trend is slowly moving not only towards lower wattage rice cooker, but also towards higher wattage rice cooker instead of mid-level wattage. Nowadays, customers are either prefer lower volume capacity or rice cooker with more advance technology. In 2018, 80% of the rice cooker sold were below 450 W. Lower wattage rice cookers ensure that the typical household of Indonesia, which is limited to 900–1,200 W electrical supply, can have their other electrical appliance run without interruption while the rice cooker is being used. The trade-off to lower wattage, however, is longer cooking time. Nonetheless, according to the typical rice cooker user, cooking time of below one hour is still acceptable.[66]

[66] Based on Ipsos online survey on rice cooker end-users, the answer on cooking time acceptable for the end-users: < 30 minute: 26%; 30 minute – 1 hour: 68% ; 1 hour – 1.5 hour: 6% ; above 1.5 hour: 0%

4.3. Price Analysis

There are various factors that affects the pricing of rice cooker aside from the technology installed. Country of origin, brand, and location of the sales also affects the price. Ipsos collected the average price of rice cooker models available in the market through third-party retail tracking data.

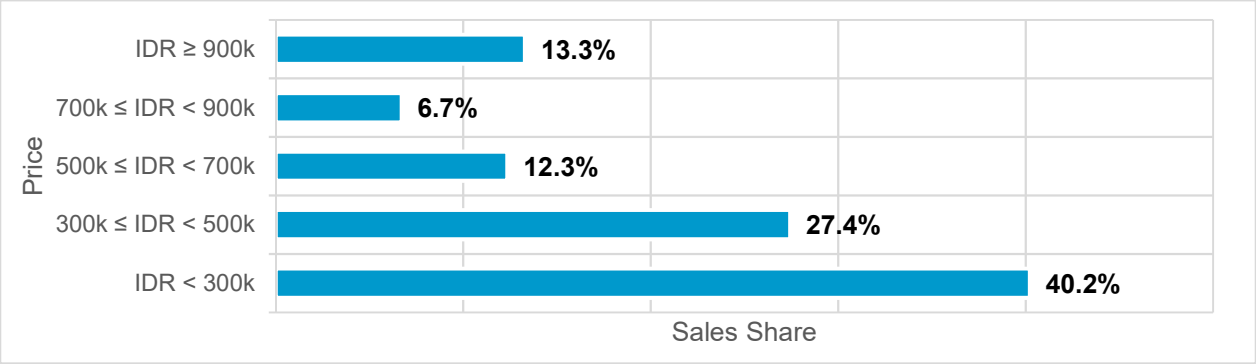


Figure 29: Share of new rice cooker sales based on the price level, 2018

The largest share of rice cookers sold in 2018 were priced below 300k IDR with the next largest share priced at 300k–500k IDR. The price data shows that majority of the rice cooker sold in the market were categorized as mid-range and lower-end models. The data also shows that the mid-range price segment of 500–700k IDR has a lower share compared to the high-end segment priced above 900k IDR, which means that the "luxury" or high-end models have significant sales despite the high price.

Product Cost Distribution

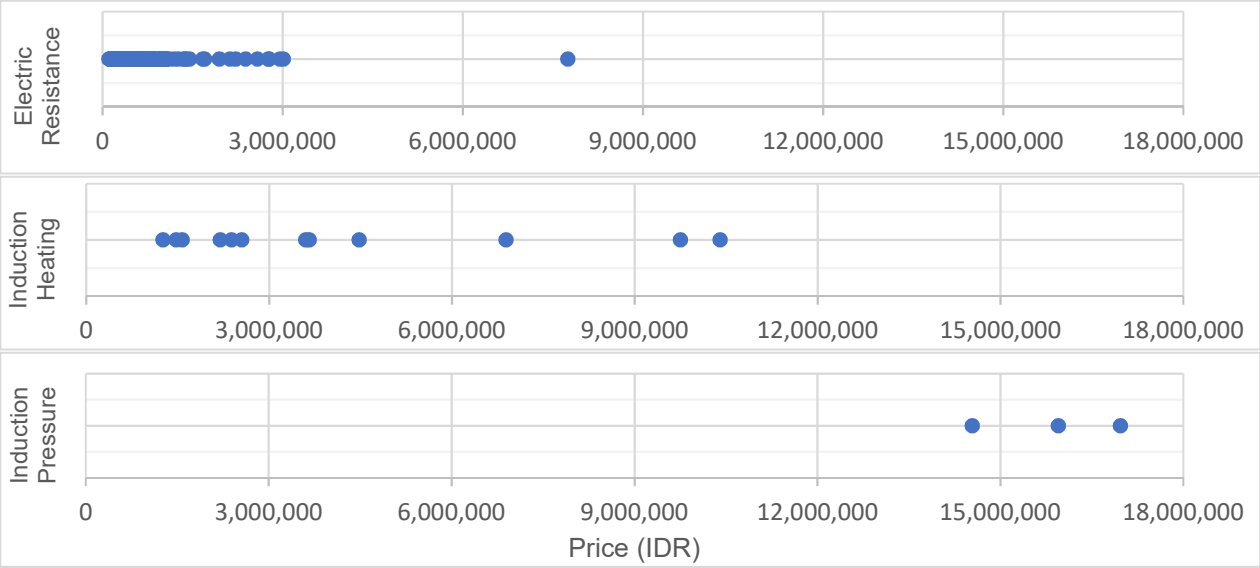


Figure 30: Product cost distribution based on heating technology

Product cost distribution based on heating technology shows that rice cooker with electric resistance technology were priced starting at IDR 100,000 and mostly concentrated below IDR 1 million with some models, usually the luxury one can be priced up to IDR 3 million. Induction heating rice cooker on the other hand shows price point starting above IDR 1 Million and Induction Pressure at IDR 13 Million.

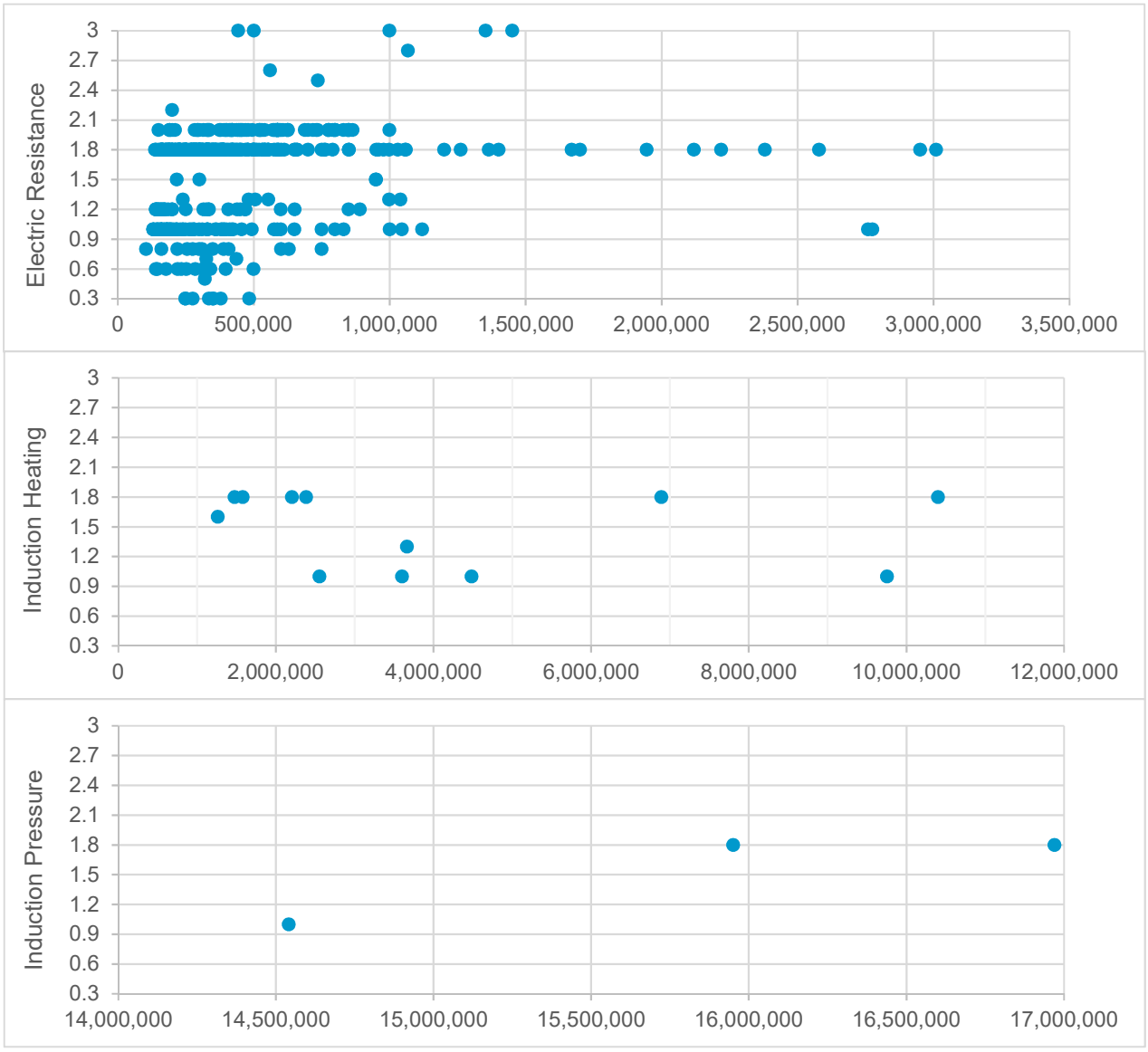


Figure 31: Price distribution (x-axis) of available rice cooker models, by dry rice (labeled) volume in liters (y-axis)

This price distribution shows that different heating technology of rice cooker have quite significant gap on their price range, which becomes a barrier for consumers to adopt better technology in the first place and cannot justify the energy savings generated from better technology of rice cooker. When combined with the container volume data, it is shown that for electric resistance technology, the spread is concentrated on 1, 1.8, and 2.1 liter models. 1.8 liter models are particularly popular for induction heating while for induction heating, there is no pattern due to the smaller number of models available in the first place. The concentration of the available models in a certain container volume shows the popularity of certain container volume.

When combined with power requirement data, the models mapping shows differently, in which most of the electric resistance models priced below IDR 1 million were concentrated below 500 W while the more expensive models in general have higher power requirement. Similar pattern can be seen in the induction heating type, where the more expensive models have higher power requirement in general, this pattern however, is not seen on induction pressure models.

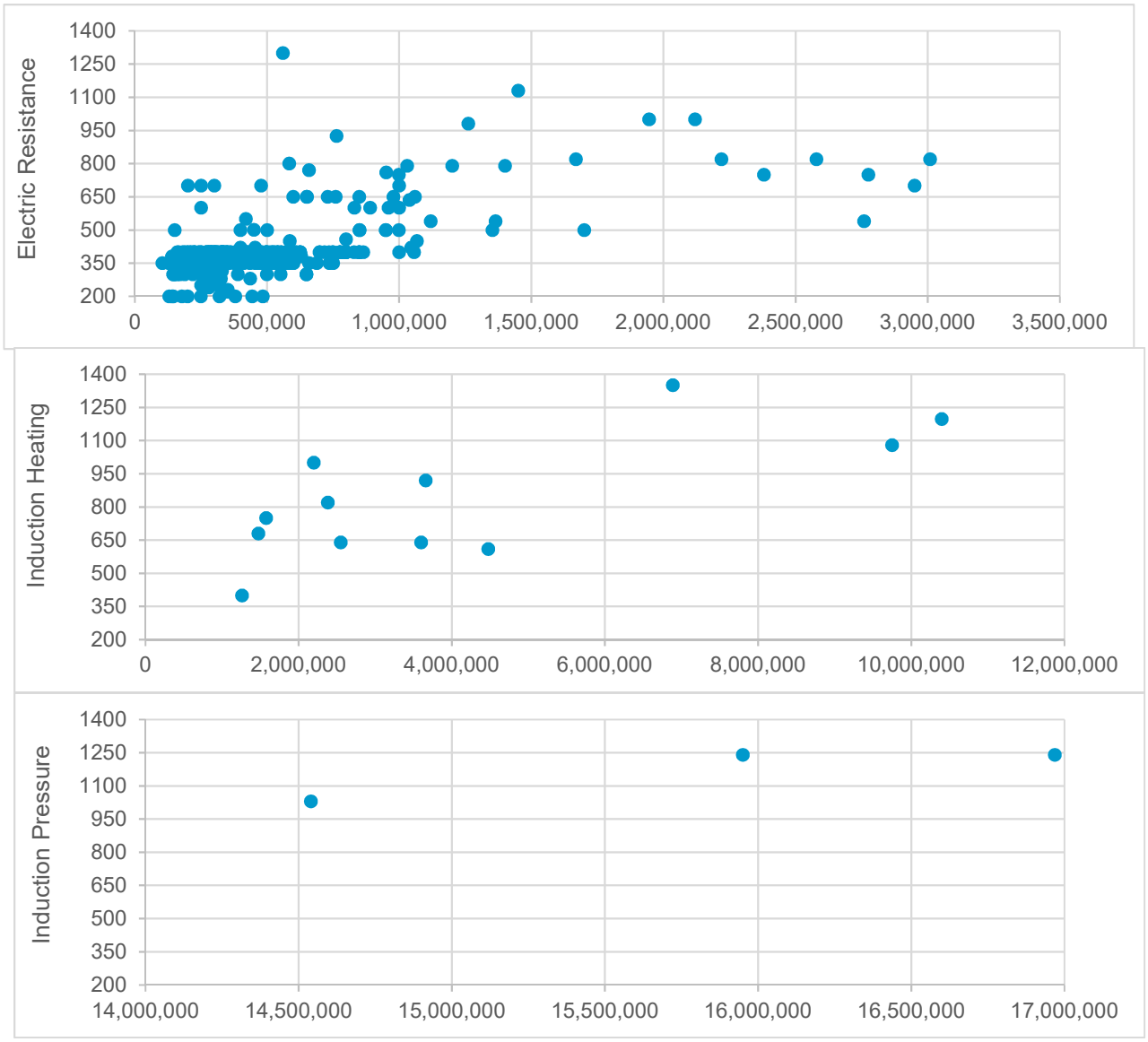


Figure 32: Price distribution of available rice cooker models, by power requirement in W

4.4. Consumer Usage Behavior

Household User

Actual practice of using rice cooker varies greatly depending on the size of household, location, and eating out habits, Ipsos' survey of rice cooker end-users found the usage patterns as described in the table below. The table separate the pattern for household users and small household business users.

Table 17. Cooking frequency and warming duration for household users

Cooking Frequency	%	Total Warming per Day	% from Category	% from Overall
Once a day	**64.2%**	No Warming	3.1%	2.0%
		< 3 hours	24.9%	16.0%
		3 - 6 Hour	8.1%	5.2%
		6 - 12 Hour	**48.3%**	**31.0%**
		12 - 18 hour	10.9%	7.0%
		> 18 hours	4.7%	3.0%
Twice a day	28.2%	No Warming	6.4%	1.8%
		< 3 hours	31.9%	9.0%
		3 - 6 Hour	21.3%	6.0%
		6 - 12 Hour	22.0%	6.2%
		12 - 18 hour	5.0%	1.4%
		> 18 hours	13.5%	3.8%
More than twice a day	7.6%	No Warming	31.6%	2.4%
		< 3 hours	42.1%	3.2%
		3 - 6 Hour	0.0%	0.0%
		6 - 12 Hour	2.6%	0.2%
		12 - 18 hour	5.3%	0.4%
		> 18 hours	18.4%	1.4%

The energy usage per year of rice cooker need to be adjusted based on the usage habits of rice cooker usage shown in the numbers above. Based on it, most household users cook rice once a day, but the duration used for keeping it warm varies significantly. Within the surveyed group that uses the unit for cooking once a day, half of the users use the rice cooker for warming from 6 to 12 hours a day. Taking the average time within each response category (e.g., average of 3-6 hours category is 4.5 hours) and multiplying by the proportion of respondents who provided each response results in 1.4 cooking events per day and 7.3 hours warming per day.

By comparison, the more detailed 5000-household Ipsos residential end-use study found total usage of 6.4 hours for household users, factoring in the slight differences in weekday and weekend use, as well as the roughly 5% of respondents who do not use rice cookers every day. CLASP considered the 5000-household survey more representative, but not as detailed (no split between cooking and warming). Therefore, to develop an aggregate view, CLASP combined the 1.4 cooking events from the 500-person survey, a 30-minute estimated cooking time, and 6.4 hour total use time from the 5000-household end-use survey to arrive at 1.4 cooking events and 5.6 hours of warming per day for household users.

Small Business User

Small business users, such as a small restaurant, use rice cookers more intensively. It is estimated that there are more than 3 million of small business that serve food for their neighborhood and local customers in Indonesia.[67,68] These small businesses are usually home-based, such that usage affects the total household electricity consumption. Based on Ipsos observation and survey, these small businesses typically cook their rice twice a day and use the warming function for 12 – 18 hours.

Table 18. Cooking frequency and warming duration for small household business users

Cooking Frequency	%	Total Warming per Day	% from category	% from Overall
Once a day	21.0%	No Warming	14.3%	3.0%
		< 3 hours	0.0%	0.0%
		3 - 6 Hour	0.0%	0.0%
		6 - 12 Hour	57.1%	12.0%
		12 - 18 hour	19.0%	4.0%
		> 18 hours	9.5%	2.0%
Twice a day	**74.0%**	No Warming	1.4%	1.0%
		< 3 hours	2.7%	2.0%
		3 - 6 Hour	0.0%	0.0%
		6 - 12 Hour	20.3%	15.0%
		12 - 18 hour	**52.7%**	**39.0%**
		> 18 hours	23.0%	17.0%
More than twice a day	5.0%	No Warming	0.0%	0.0%
		< 3 hours	0.0%	0.0%
		3 - 6 Hour	40.0%	2.0%
		6 - 12 Hour	60.0%	3.0%
		12 - 18 hour	0.0%	0.0%
		> 18 hours	0.0%	0.0%

However, it is common for these businesses to have separate rice cookers for cooking and warming. They may even use a gas cooker to cook rice and only use the electric rice cooker for keeping the rice warm as it is generally faster to cook rice with a gas cooker. Again, taking the average time within each response category (e.g., average of 3-6 hours category is 4.5 hours) and multiplying by the proportion of respondents who provided each response results in 1.8 cooking events per day and 13.3 hours warming per day.

Weighting by the stock of household versus commercial rice cookers, results in the following average usage pattern: 1.5 cooking times per day, and 7.2 hours warming per day. These usage estimates are used for calculating the energy consumption and MEPS impacts in Section 7 of the report.

[67] Based on SWA Magazine Jun2019 Edition, page 32, ISSN 2339-1885
[68] These businesses are commonly referred as “Warteg” or “Warung Makan” in Indonesia, they usually operate from their own house, using household electricity supply

Standby Mode

Standby functionality is commonly only available on digital controlled rice cooker as manually controlled rice cookers do not generally draw power even when plugged into the power supply as long as the switch is off. There are some older models that do not have an “off” switch which were found usually in the traditional trade, newer models usually have an off switch as part of its safety feature. Digitally controlled rice cookers typically draw 2–3 watts even when turned off. Most of the owner of manual rice cooker typically unplug the rice cooker when not in use, based on Ipsos’ online survey:

- 79% of the end user practice this regardless the type of rice cooker
- 18% never pull out the power cable
- 3% do not remember

5,000-Household Residential End Use Survey

Information on hourly rice cooker usage was also collected through the Ipsos end use survey of 5000 households, as shown in Figure 27. Averaging across 24 hours, rice cookers are estimated to be used for 6.6 hours per day on the weekdays and 6.8 hours per day on the weekends. Out of all household users, 95% use their rice cookers daily or almost daily, such that the average daily usage is 6.4 hours per day. This is slightly less than the average calculated above, but also does not include business use, which is more intensive.

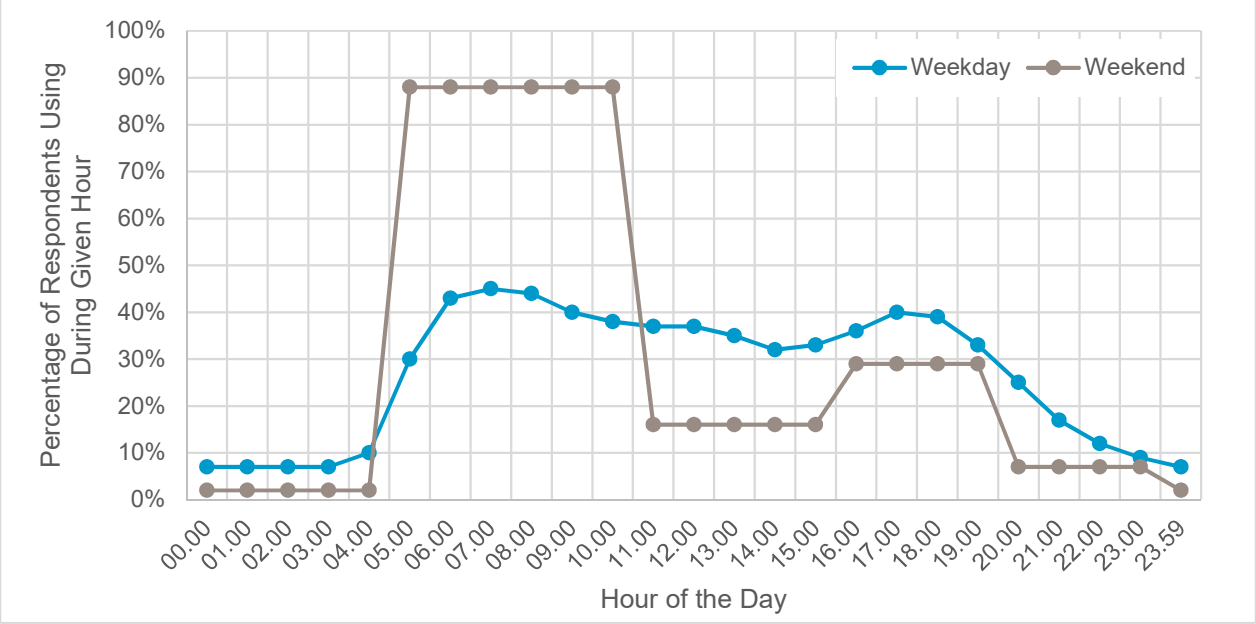


Figure 33: Rice cooker daily use trends for weekdays and weekends

Policy Options and Impacts Assessment

5 Review of Draft Regulation

5.1. Draft Regulation for Rice Cookers

Program scope & technical specification	Application of SKEM and Energy Saving Labelling for Rice Cooker
Existing status	Draft SKEM
Reference with Government regulation[69]	• PP No. 70, 2009 • UU No. 8, 1999 • UU No. 30, 2007 • UU No. 30, 2009 • UU No. 20, 2014 • PP No. 102, 2000 • PP No. 70, 2009 • PP No. 14, 2012 • Per Pres No. 68, 2015 • PMP No. 24/MDAG/PER/4/2016 • ESDM No. 13, 2016
Implementing body	Ministry of Energy and Mineral Resources, Ministry of Industry, Ministry of Trade, National Standardization Body, Nasional Accreditation Committee
Referred test standard	China and Hong Kong Test Standards
Parameters graded	Efficiency, energy consumption per L (for cooking and 5 hour of warming)
Key definitions	Energy Saving Level (Wh/L)
Calculation for efficiency limits for MEPS	a) Efficiency is not directly stated in the labeling b) What is stated is the estimated energy consumption per L. Which is a direct result of the efficiency level
Label band	**Star Rating System: 1-star to 4-stars**

Energy Efficiency Ratio (Watt hour/liter)			
1 Star	2 Star	3 Star	4 Star
331 - 370	301 - 330	271 - 300	≤ 270

Based on the measured power consumption of 1 Time Cooking and 5 hours of warming (tested with water only)

[69] PP = "Peraturan Pemerintah" = Government Regulation; UU = "Undang-Undang" = Act; Per Pres = "Peraturan Presiden" = Presidential Act; PMP = "Peraturan Menteri Perdagangan" = Ministry of Trade Regulation; ESDM = "Energi dan Sumber Daya Mineral" = Ministry of Energy and Mineral Resources Regulation

	Energy Saving Certificate	Standar Kinerja Energi Minimum (SKEM / MEPS)	Energy Saving Labelling
Label criteria for Signs EE label	- Name and address of domestic/imported producers - Name and address of energy utilization equipment importers - Brand, type and capacity/ power/volume/diameter energy utilization equipment - Energy performance value - The statement fulfills the SKEM and the number of stars listed - Date, name, and person in charge's sign for LSPro - LSPro certificate number	- **Energy saving certificate** - NPWP - SNI ISO 9001:2008 Certificate - Picture of energy utilization equipment products - Reading instructions of energy utilization equipment products' code - Planned total production/import for 1 year - Registered Shareholders Certificate (DPS) with business entity according to provisions of government regulations - Tax clearance certificate from the directorate general of taxation **Additional requirement for Importers:** - General import identification number (API-U) file - ISO 9001: 2015 certificate	- **Energy saving certificate** - NPWP - SNI ISO 9001:2015 Certificate - Picture of energy utilization equipment products - Reading instructions of energy utilization - Planned total production/import for 1 year - Deed of Establishment of a Company
Key stakeholders that have been part of developing the draft MEPS	Test Laboratories, EBTKE, Rice Cooker Manufacturers, KAN, BSN		

The draft shows that the draft basically acquire reference from Hongkong and China's standard, however it is quite different in term of labeling, where the labeling is based on the average power consumption of 1-time cooking combined with 5 hours of warming. This is also in contrast to average usage which was found to be 1.5 times cooking and 8.5 times warming per day (see Section 4.4)

5.2. Energy Assessment

As energy efficiency testing is not mandatory yet in Indonesia, there is no good data that can show the energy efficiency level of rice cooker models in Indonesia. The only source available is through testing done by the manufacturers. Ipsos collected this data through manufacturer IDI, although it is not based on any documentation and therefore likely to be overstated. Data from all manufacturers was then averaged and is shown below:

- Best available model: Induction pressure heating, efficiency rated at 88 – 92%
- Second best available model: Induction heating, efficiency rated at 86 – 89%
- Middle level model: multi direction electric resistance heating, efficiency rated at 83 – 86%
- Lowest model available: bottom direction electric resistance heating, efficiency rated at 79 – 83%

Note that these data are based on the commonly used testing method used in Indonesia for rice cooker, which is based on China's method of testing that involves only heating water. Combining the data acquired from IDI with manufacturers and laboratory with the market sizing data, below is the estimated share of rice cooker products efficiency level, categorized by power requirement and heating technology used.

Table 19. Estimated efficiency level of rice cookers sold in 2018 based on type and power

	Market Share from Total	Estimated Efficiency Level
Electric Resistance	**87.70%**	**72 - 86%**
< 300	11.50%	74-80%
300 ≤ W < 450	65.22%	76-84%
450 ≤ W < 600	7.04%	80-84%
600 ≤ W < 750	2.37%	82-84%
≥ 750	1.57%	84-86%
Induction Heating	**11.95%**	**83 - 89%**
< 300	0.00%	-
300 ≤ W < 450	0.46%	83-85%
450 ≤ W < 600	2.62%	84-86%
600 ≤ W < 750	5.59%	84-88%
≥ 750	3.28%	85-89%
Induction Pressure	**0.35%**	**85 - 92%**
< 300	0.00%	-
300 ≤ W < 450	0.00%	-
450 ≤ W < 600	0.03%	85 - 88%
600 ≤ W < 750	0.08%	85 - 89%
≥ 750	0.25%	87 - 92%

In addition to this, the end use survey indicates that the most preferred wattage for rice cookers is below 400 W, as 28% reports to use rice cookers with less than 300 W in power rating and 48% use units with power rating within 300 and 350 W. Based on the table above, it is shown that the baseline level used should be on the electric resistance model with 300-450 W power requirement. This model alone has around 65% market share as it is the most commonly used and sold model in the market. Varying efficiency level is usually correlated with the pricing of the product, as more expensive models usually have better

heating element quality as well as better quality container and casing that contributes towards overall heat efficiency of the rice cooker.

In addition to these general findings, Ipsos and EBTKE have received limited test data on rice cookers currently in the market. The energy efficiency ratio (EER) or performance metric specified in the test method is the sum of the cooking energy and warming energy divided by the volume (discussed further in Section 6). However, several test results include only the cooking energy (a function of cooking efficiency, provided above), such that only 14 full test results were available.

CLASP sought to supplement these test results with partial test data collected in retail---some manufacturers list the warming power on their products. This, combined with assumptions on the measured water volume, efficiency, and duty cycle during warming can be used to estimate the energy efficiency factor of these models,[70] to check the representativeness of the limited test dataset.

Below is the efficiency performance of products currently in the market relative to the draft MEPS and labeling criteria:

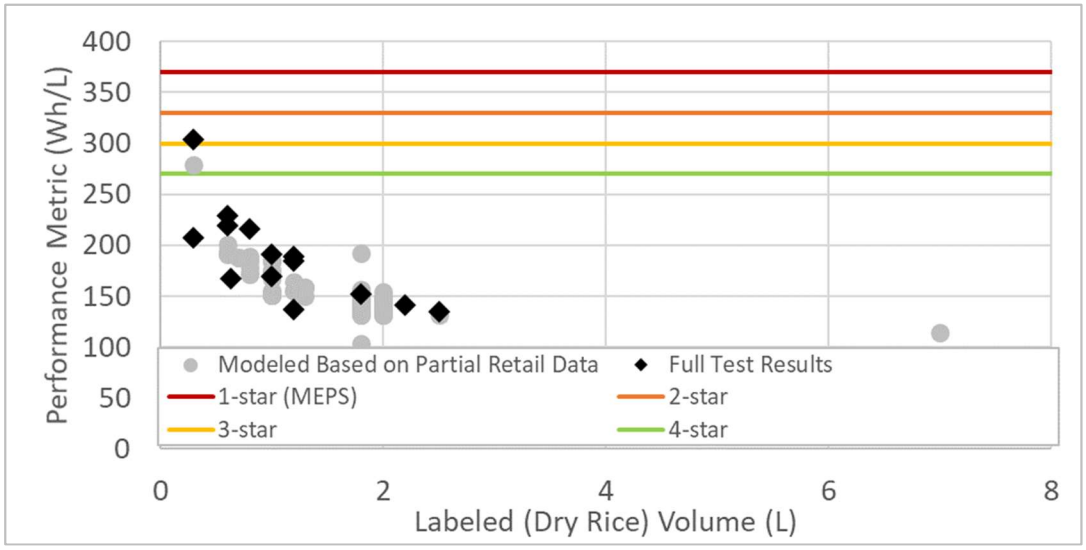


Figure 34: Performance of tested and modeled rice cookers.

[70] The detailed assumptions (based on the performance of products for which full test results were available): 80% measured water volume 2x the dry rice volume, efficiency 72—90% based on technology and power per Table 21, duty cycle 66% or 3.3 hours that the unit is actively warming over the 5-hour warming measurement period.

6 Test Procedure and Testing Capability

6.1. Comparison with Other Countries

To assess the test method in the draft regulations, the test standards from other countries were compared with Indonesia, including Hong Kong, China, Thailand, Vietnam, Japan, and South Korea. Most of the imported electric rice cookers in Indonesia come from these countries. Currently, all these countries already have MEPS and labelling program with their own standard test method.

Testing and Labelling Standard Used by Indonesia and Comparison Countries

For electric rice cooker products, Indonesia currently only requires safety test based on SNI IEC 60335-1:2009 and SNI IEC 60335-2-15:2009. There is no regulation regarding electric rice cooker efficiency and performance. Rice cooker manufacturers in Indonesia mostly do the efficiency testing voluntarily through various test laboratories in Indonesia. Most of these laboratories use the Hong Kong test method, except for two laboratories---one private and one government owned---where the Japanese test method was used alongside the Hong Kong one, providing choices for the manufacturers.

The Ministry of Energy and Mineral Resources currently drafted an energy efficiency test method and condition based on "JIS C9212 1993/Amendment 1:2007" for electric rice cooker and electric rice warmers. This draft would be valid for rice cooker with maximum cooking capacity of 3 L and rated voltage of 250 V. The draft would cover three different types of rice cooker (based on their functionality): cooking only, cooking and warming, cooking and steaming.

Table 20. Energy efficiency test method standards used by Indonesia and comparison countries[71]

	Indonesia (Draft)	Hong Kong	China	Thailand	Vietnam	Japan	South Korea
Test method	Based on JIS C9212 1993/Amendment 1:2007	GB 12021.6-2008 (with modification in efficiency calculation)	GB 12021.6-2008	TIS 2545-2555	TCVN 8252:2009	Top runner program	KS C 9310
Labelling	Standard and 4-star levels	Voluntary energy efficiency labelling scheme for electric rice cookers	China energy label	Energy efficiency label no 5	Energy efficiency rating labelling and standards program	Energy efficiency rating labelling and standards program	Energy efficiency rating labelling and standards program

Hong Kong will revise their standard in 2019. China, Vietnam, Japan, and South Korea impose mandatory labelling program, whereas in Hong Kong and Thailand labelling are voluntary.

[71] http://www.eccj.or.jp/top_runner/index_contents_e.html, http://www.eccj.or.jp/top_runner/index.html, http://www.emsd.gov.hk, http://en.cnis.gov.cn/, http://www.energylabel.gov.cn/en/index.html, http://www.clasponline.org/en/Tools/Tools/SL_Search, http://www.mke.go.kr/language/eng/, http://www.kemco.or.kr/nd_file/kemco_eng/KoreaEnergyStandards&Labeling.pdf, http://labelno5.egat.co.th/index.php?lang=en, http://www.tisi.go.th, https://www.environment.gov.au

Comparison of Testing Method and Condition

As shown in Table 21, testing conditions were found to vary between countries, mainly on the relative humidity, testing medium as well as the number of samples used for simultaneous test. What is interesting from the comparison is that there are only two country (Japan and Korea) that specify the use of rice in the test while other country only specify water. The main reason is that if rice is specified, it will be very hard to standardize as there are a lot of rice variety in the market that would yield different results in the test.

Table 21. Comparison of initial test condition and parameters for rice cooker[72]

Test Parameter / Condition	Indonesia (Draft)	Hong Kong	China	Thailand	Vietnam	Japan	South Korea
Relative humidity	45-75%	45-75%	45-75%	60-75%	45-75%	Not specified	45-75%
Ambient temperature (°C)	23 ± 2	23 ± 2	23 ± 2	25 ± 2	20 ± 2	23 ± 2	20 ± 2
Initial Water temperature	23°C ± 2°C	23°C ± 2°C	Not specified	Not specified	20°C ± 2°C	23°C ± 2°C	20°C ± 2°C
Voltage (V)	Not specified	220 ± 6%	Not specified	Not specified	220 ± 10%	100 ± 1%	220 ± 1%
Power frequency (Hz)	Not specified	50 ± 1	Not specified	Not specified	50 ± 0.5	50 ± 0.1 or 60 ± 0.1	60 ± 0.6
Air pressure (kPa)	86–106	86–106	86–106	Not specified	86–106	Not specified	Not specified
Water volume (in L)	80% of rated capacity	80% of rated capacity	80% of rated capacity	80% of rated capacity	80% of rated capacity	Manufacturer specification	Manufacturer specification
Test medium	Water	Water	Water	Water	Water	Rice - Water	Rice – Water
Sample quantity	2 per model	1 per model	3 per model	Not specified	Not specified	Not specified	2 per model

Japan specifies the type of rice used in testing. The variety of rice used in Japan is “Koshihikari” or unmilled rice which should have a moisture content from 13% to 15% and should be milled at the yield rate of 90 ± 1.5% in mass conversion. While in South Korea, no specification of rice type is included, but only water content in polished rice, which is specified to be between 12-14%. Water used for cooking should be distilled or let settled for 2 hours if using service water.

[72] http://www.eccj.or.jp/top_runner/index_contents_e.html, http://www.eccj.or.jp/top_runner/index.html, http://www.emsd.gov.hk, http://en.cnis.gov.cn/, http://www.energylabel.gov.cn/en/index.html, http://www.clasponline.org/en/Tools/Tools/SL_Search, http://www.mke.go.kr/language/eng/, http://www.kemco.or.kr/nd_file/kemco_eng/KoreaEnergyStandards&Labeling.pdf, http://labelno5.egat.co.th/index.php?lang=en, http://www.tisi.go.th, https://www.environment.gov.au

Table 22. Comparison of initial test condition and parameters for rice cooker - 1[73]

		Indonesia	China	Hong Kong	Thailand	Vietnam
Heat / Cooking test	Water volume	80% of measured capacity of the container (L)[74,75]				
	Thermocouple placement (from the bottom of inner pot, center point)	10 mm	10 ± 5 mm	10 ± 5 mm	Not specified	Not specified
	Turn on cooking mode					
	When water temperature reach:	95°C	90°C	90°C	92°C	90°C
	Cut off power supply					
	Record the highest temperature					
Warming test	Using the same water, cool down until temperature reaches 90°C				N/A	N/A
	Water addition	No	No	No		
	Turn on warm mode					
	Range of water temperature during test	Not specified	60°C - 80°C	60°C - 80°C		
	Energy consumption	Value of energy consumption reading on 5th hours of the test	Average value of energy consumption reading on :4th, 4.5th, and 5th hours of the test			
Standby test		N/A	Average of hourly energy consumption for the first 4 hours plugged in without operating			

Japan's method differentiates rice cookers based on their capacity and type. The instruction mentions that cooking rice must be washed 3 times within 20 seconds each time prior to testing. The mass of water to cook rice is the amount of water designated in accordance with the mass of milled rice and specified by the manufacturer in the operation manuals. Energy consumption efficiency calculation is done by testing rice cooker modes independently; cooking, keep warm, timer, and standby. Each value then multiplied by a coefficient based on the state of usage such as how many times cooking mode is activated throughout 1 year. All 4 results would be summed-up and expressed in annual energy consumption efficiency (kWh/year).

[73] http://www.eccj.or.jp/top_runner/index_contents_e.html, http://www.eccj.or.jp/top_runner/index.html, http://www.emsd.gov.hk, http://en.cnis.gov.cn/, http://www.energylabel.gov.cn/en/index.html, http://www.clasponline.org/en/Tools/Tools/SL_Search, http://www.mke.go.kr/language/eng/, http://www.kemco.or.kr/nd_file/kemco_eng/KoreaEnergyStandards&Labeling.pdf, http://labelno5.egat.co.th/index.php?lang=en, http://www.tisi.go.th, https://www.environment.gov.au

[74] This is different from the rated capacity, where the rated capacity in the product information is referring to the volume of uncooked rice. The test, however is using 80% of the overall container volume capacity

[75] The overall performance will be calculated by applying the power consumed and the volume of the water used in the test which should be measured before the cooking test is started

Table 23. Comparison of initial test condition and parameters for rice cooker - 2[76]

		Japan	South Korea
Rice preparation		Wash cooking rice 3 times within 20 seconds gap each	Wash cooking rice 3 times within 1-minute time frame and leave the water content 12-14%
Cooking test	Cooking Water	Based on manufacturers' specifications	Distilled Water
	Mass of Water	Based on manufacturers' specifications	
	Water temperature shall be (°C):	23±1	N/A
	Inner pan and heater temperature shall be (°C):	N/A	20
	Turn on cooking mode (Should be 10 minutes after rice preparation)		Turn on cooking mode
Warm test	Turn on warm mode, measured hourly for 12 hours		Turn on warm mode for 24 hours, calculate hourly power consumption
Timer mode	Use inner pot without rice, turn on timer		N/A
	After energy consumption settles, measure it for 1 hour		
Standby mode	Use inner pot without rice, turn on standby		
	After energy consumption settles, measure it for 1 hour		

The initial conditions in South Korea efficiency test differs than other countries. The type of rice used in this test is not defined, however the regulation state that the water contained in rice shall be between 12-14%. Test is carried out by washing the rice 3 times within 1-minute time frame. Cooking water must be distilled water or more than 2 hours of settled service water and water volume shall be per manufacturer's instruction. Power consumption should be tracked under a normal cooking course, quantity of rice is determined by listed values in the tables of Appendix B – South Korea.

Warming test shall be conducted after measuring cooking test. Measuring hourly power consumption at warm condition for 24 hours, but if it is completed before 24 hours, it shall be measured and calculated by duration. Both cooking and warming power consumption are measured 2 times respectively, and they shall be averaged. If the results of 2 measurements produced more than 2% error, another test is required to obtain an average value of 3 measurements.

[76] http://www.eccj.or.jp/top_runner/index_contents_e.html, http://www.eccj.or.jp/top_runner/index.html, http://www.emsd.gov.hk, http://en.cnis.gov.cn/, http://www.energylabel.gov.cn/en/index.html, http://www.clasponline.org/en/Tools/Tools/SL_Search, http://www.mke.go.kr/language/eng/, http://www.kemco.or.kr/nd_file/kemco_eng/KoreaEnergyStandards&Labeling.pdf, http://labelno5.egat.co.th/index.php?lang=en, http://www.tisi.go.th, https://www.environment.gov.au

Identified Gaps in Indonesia's Draft Testing Method

Based on Ipsos's observation on the draft regulation and test method, gaps found in the current draft of Indonesia's draft testing method:

1. Position of the thermocouple within the inner container of the rice cooker

   Within the test method of China and Hong Kong, the position of the thermocouple is defined as 10 ± 5 mm from the bottom center of the inner pot while Indonesia's method does not display any tolerance. For measurement, tolerance is important as there is no way that the thermocouple would always be in the same position during test and thus, tolerance is needed.

2. Specification of the voltage and power frequency of the power source

   Hong Kong specifies the power voltage and frequency used for the testing, and provide certain tolerance for it as well, if not specified, there is a chance that the tester might use different power frequency and voltage that might provide different result.

3. Warming temperature range to be maintained

   In Indonesia's standard, there is no specification on what is the temperature of the rice that need to be maintained for the warming activity. Without specification, there might be rice cooker that apply lower power than needed for warming that results in lower power consumption.

   Without range, there is also a chance that the rice cooker applies too much power which will make it overheat, endangering the users and overcooking the rice.

4. Warming test duration

   Rice cookers are used daily by households and small businesses, as indicated in the consumer survey and the residential end use survey. Operating hours differ between households and small businesses.

   The majority of the household users cook once a day and use the unit for warming for 6 to 12 hours, while small business users cook twice a day and keep the rice warmed for 12 to 18 hours.

   On the national level, rice cookers are in-use for 6.6 hours daily on weekdays and 7.6 hours daily on weekends. These considerations can be taken into account to evaluate the set warming duration test of 5 hours.

5. Consistent use of the term "volume" throughout the draft regulation

   Specific definition of the common term "volume" is necessary to be applied throughout the draft regulation. The term can be interpreted in various ways as follows;

   - Gross volume of the rice cooker, as a whole unit
   - Volume of the rice cooker inner container, for its maximum graduated capacity or nominal volume
   - Volume of the rice cooker inner container, for its measured volumetric capacity when filled to the rim or the lip of the container
   - Volume of the rice cooker cooking capacity on the label or as advertised, which refer to the maximum volume of uncooked dry rice grains that can be accommodated by the rice cooker

Currently, the test method uses the term two potentially confusing ways, referring to “Nominal volume” in the test setup, and “Measured volume” in the metric calculation:

c. Prosedur Pengujian

1) Prosedur Pengujian Proses Memasak (*Cooking*)

a) Pada saat akan memulai pengukuran, pastikan kondisi pada persyaratan peralatan pengujian telah terpenuhi.

b) Tuangkan sejumlah (berat) air destilasi kedalam wadah penanak nasi hingga mencapai 80% dari nominal volume wadah penanak nasi. Yang dimaksud dengan 100% nominal volume wadah adalah volume yang mencapai tip atau bibir dari wadah.

4) Penentuan kriteria unjuk kerja

Nilai unjuk kerja = $\frac{E\ total}{Volume\ terukur}$

Nilai unjuk kerja dalam satuan Wh/liter

Test results provided by EBTKE showed the energy efficiency ratio (Wh/liter) calculated twice, once divided by the labeled/dry rice volume and again by the 80% water volume. Clarity in this term is crucial, as the draft test method requires the measured energy consumption to be divided by the “measured volume”. As the dry rice/labeled volume is approximately half of the 80% measured volume used in the test, the use of the wrong volume can change the results by roughly a factor of 2, and could be a potential explanation for why the draft performance levels do not correspond to the efficiencies in the market, as shown in Figure 35, below.

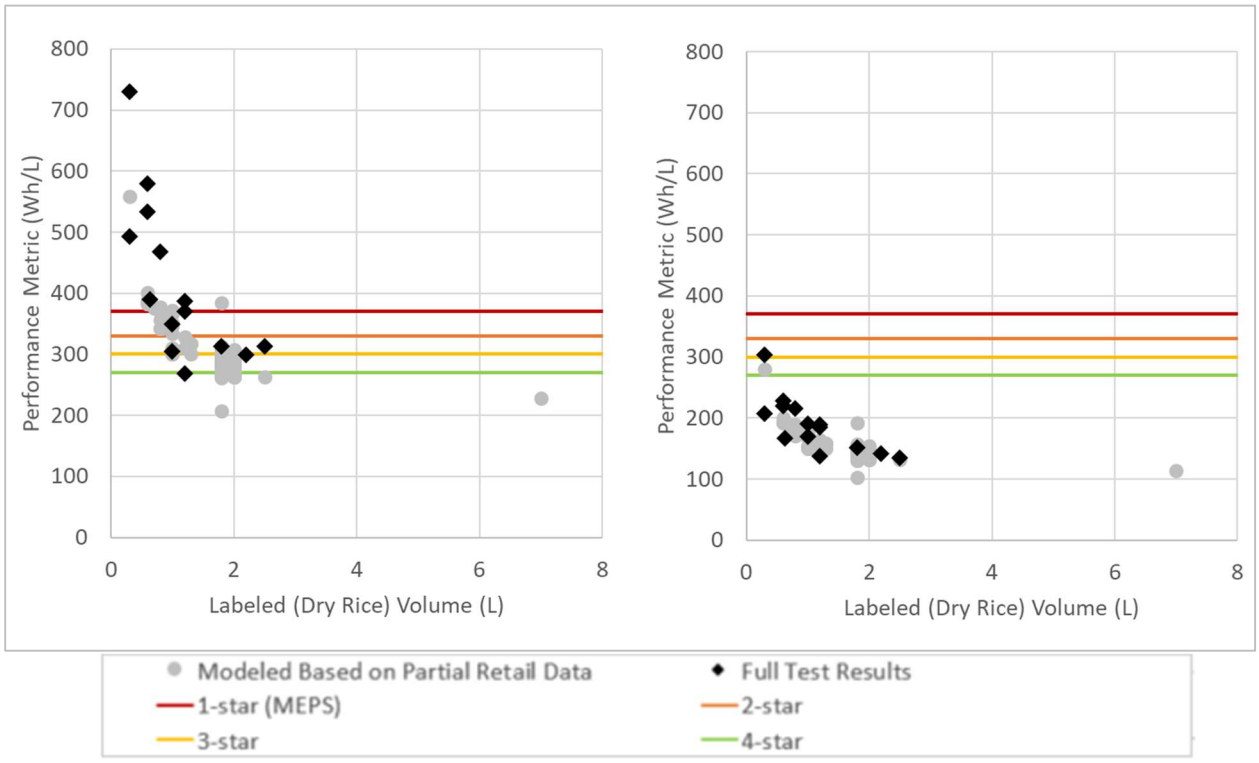


Figure 35: Performance of tested rice cooker models based on dry rice/labeled volume (left) versus 80% water capacity/measured volume used during the test (right)

6.2. Existing Test Facilities and Capabilities

6.2.1. Testing Capacity

The Government of Indonesia appoints National Accreditation Commission (KAN) and Product Certification Institution (LSPro) to evaluate and validate laboratory conditions and standards. Certification must be renewed every 4 years. University laboratories are not obligated to acquire this certification.

Table 24. Local laboratories certification status

No.	Laboratory	Status	Standard Test	Experience	Accreditation
1.	Balai Besar Teknik Konversi Energi (PERMATA Laboratory - B2TKE)	Government	Hong Kong 2003 and 2013	10 units since 2014	KAN No. LP-096-IDN
2.	Pusat Penelitian Pengembangan Teknologi Ketenagalistrikan Energi Baru Terbarukan dan Konversi Energi (P3TKEBTKE)	Government		N/A	KAN No. LP-364-IDN
3.	Pusat Penelitian Teknologi Pengujian (P2TP) - LIPI	Government		30 units since 2015	KAN No. LP-505-IDN
4.	Balai Besar Bahan dan Barang Teknik (Electrical and EMC Laboratory - B4T)	Government	JIS-19212 (Using Water)	10 units since 2015	KAN No. LP-007-IDN LSPro-013-IDN
5.	Balai Riset dan Standarisasi Industri (BARISTAND)	Government	By request	N/A	KAN No. LP-213-IDN LSPro-011-IDN
6.	Balai Pengujian Mutu Barang (BPMB)	Government	N/A	N/A	KAN No. LP-025-IDN LSPro-001-IDN
7.	PT TUV Rheinland Indonesia	Private	Hong Kong 2003 and 2013	3 units	KAN No. LP-015-IDN LSPro-026-IDN
8.	PT Sucofindo (PERSERO)	Private	Hong Kong 2003 and 2013 JIS-19212	30 units since 2015	KAN No. LP-024-IDN LSPro-022-IDN
9.	PT Qualis Indonesia	Private	JIS-19212	45 units since 2016	KAN No.LP-708-IDN
10.	Energy Conversion Research Laboratory (LKEL-Institute Technology Bandung)	University Laboratory	N/A	N/A	
11.	Energy Conversion Research Laboratory –	University Laboratory	Thermodynamics and heat transfer	N/A	

	Politeknik Negeri Bandung			
12.	Electrical Energy Conversion Laboratory (LKEL - Universitas Indonesia)	University Laboratory	By request	N/A

The laboratories mentioned in the table above that have already received accreditation from KAN to issue a certificate on various testing, in which the scope is mentioned in the certificate individually and can be accessed through KAN portal.[77]

All of the laboratories with KAN accreditation have the following standards that allows them to do testing and provide official testing results on electronic appliances safety: (SNI/IEC 60335-1:2009 Household and similar electrical appliances)

- Safety - part 1: General requirements, SNI/IEC 60335-2-15:2009 Household and similar electrical appliances
- Safety - part 2-15: Particular requirements for appliances for heating liquids, ISO/IEC 17025: 2017 General requirements for the competence of testing and calibration laboratories, and ISO 9001: 2015 Quality management system

However, as the SNI system for energy efficiency of rice cooker has not been regulated yet, the laboratories would need to update their scope of service when the regulation on energy efficiency are issued. Whereas for the facility and equipment owned by the laboratories in regard to energy efficiency testing will be discussed in the next section.

6.2.2. Testing Infrastructure

Table 25. Local laboratories status overview

<table>
<tr><th>No.</th><th>Laboratory</th><th>Strength</th><th>Weakness</th><th>Timeframe and Capacity</th><th>Management Standard</th></tr>
<tr><td>1.</td><td>Balai Besar Teknik Konversi Energi (PERMATA Laboratory - B2TKE)</td><td rowspan="3">Equipment available: Temperature Logger, Thermocouple, Power Analyzer, Hygrometer, Power Source, Digital Scales, High Memory Logger, Stopwatch</td><td rowspan="3">Limited government budget</td><td>• Timeframe:1.5 hours/test
• Capacity: 3 units</td><td rowspan="3">• SNI/IEC 60335-1: 2009
• SNI/IEC 60335-2-15: 2015
• ISO/IEC 17025: 2017
• ISO 9001: 2015</td></tr>
<tr><td>2.</td><td>Pusat Penelitian Pengembangan Teknologi Ketenagalistrikan Energi Baru Terbarukan dan Konversi Energi (P3TKEBTKE)</td><td>• Capacity: 3 units</td></tr>
<tr><td>3.</td><td>Pusat Penelitian Teknologi Pengujian (P2TP) - LIPI</td><td>• Timeframe:12-30 minutes/test (depend on the rice cooker size)
• Capacity: 3 units</td></tr>
</table>

[77] KAN LSPro list: http://kan.or.id/index.php/documents/terakreditasi/doc17021/sni-iso-iec-17065/lembaga-sertifikasi-produk

No.	Laboratory	Strength	Weakness	Timeframe and Capacity	Management Standard
4.	Balai Besar Bahan dan Barang Teknik (Electrical and EMC Laboratory - B4T)			• Timeframe:1.5 hours/test • Capacity: >3 units	
5.	Balai Riset dan Standarisasi Industri (BARISTAND)			N/A	
6.	Balai Pengujian Mutu Barang (BPMB)	N/A		N/A	
7.	PT TUV Rheinland Indonesia	Equipment available: Temperature Logger, Thermocouple, Power Analyzer, Hygrometer, Power Source, Digital Scales, High Memory Logger, Stopwatch		• Timeframe:45 mins-1 hour/test • Capacity: 3 units	
8.	PT Sucofindo (PERSERO)			• Timeframe:1-2 hours/test • Capacity: >3 units	
9.	PT Qualis Indonesia			• Timeframe:1 hours/test • Capacity: 3 units	
10.	Energy Conversion Research Laboratory (LKEL-Institute Technology Bandung)	N/A			
11.	Energy Conversion Research Laboratory – Politeknik Negeri Bandung	Equipment available: Temperature Logger, Thermocouple, Power Analyzer, Hygrometer, Stopwatch	Not accredited	• Timeframe:2 days/test • Capacity: 1 unit	N/A
12.	Electrical Energy Conversion Laboratory (LKEL - Universitas Indonesia)			N/A	• SNI/IEC 60335-1: 2009 • SNI/IEC 60335-2-15: 2015

Based on the table above, it seems like all of the laboratories has not taken into account the full requirement of the energy efficiency testing for Rice Cooker which requires cooking test as well as warming test. The cooking test itself should requires less than 1-hour duration or less, depend on the rice cooker unit heating capability, while the warming test would require the device to be run continuously for 6 hours based on the test method.

Based on Ipsos' In-Depth Interview with the laboratories representative that has conducted rice cooker energy efficiency test before, most of the time they only fully implement the reference test method for the cooking part, while for the warming part, it is only sampled for 5 – 15 minute and then extrapolated to get the hourly power consumption rate. By taking into account the actual requirement of the test, Ipsos create the assumption on the actual capacity when the test conducted correctly in table below.

Table 26. Test capacity of laboratories, based on real test duration assumption

No.	Laboratory	Simultaneous Testing Unit Capacity	Simultaneous Testing Per Day*	Total Test Per Year**
1	Balai Besar Teknik Konversi Energi (PERMATA Laboratory - B2TKE)	3	6	1,500
2	Pusat Penelitian Pengembangan Teknologi Ketenagalistrikan Energi Baru Terbarukan dan Konversi Energi (P3TKEBTKE)	3	6	1,500
3	Pusat Penelitian Teknologi Pengujian (P2TP) - LIPI	3	6	1,500
4	PT TUV Rheinland Indonesia	3	6	1,500
5	Balai Riset dan Standarisasi Industri (BARISTAND)	1	2	500
6	Balai Pengujian Mutu Barang (BPMB)	-	-	0
7	PT Sucofindo (PERSERO)	5	10	2,500
8	PT Qualis Indonesia	3	6	1,500
9	Balai Besar Bahan dan Barang Teknik (Electrical and EMC Laboratory - B4T)	5	10	2,500
10	Energy Conversion Research Laboratory (LKEL-Institute Technology Bandung)	0	0	-
11	Energy Conversion Research Laboratory – Politeknik Negeri Bandung	1	2	500
12	Electrical Energy Conversion Laboratory (LKEL - Universitas Indonesia)	0	0	-
			Total Testing Capacity per Year	**~13,500**

**Assuming that a test would require 1 hour for cooking and cooling, continued with 6 hour of warming, total 7 hour which only makes it possible for 2 test per day per testing capacity*

*** Assuming working days of 250 days per year*

Given that there are around 500 models of rice cookers available in Indonesia and that two samples should be tested simultaneously, the testing capacity should more than meet the demand for testing if mandated through policy. However, based on Ipsos' in-depth Interview with the laboratories, there may be some challenges due to reporting and certification.

The lead time for each certification step is:

- Registration 1-2 days
- Verification 1-2 days
- Audit 5-7 days
- Testing ~20 days; including actual testing and issuance of test certificate
- Certification 8-10 days
- Clarification 4-5 days

In average, overall certification process may therefore take up to 2 months per applicant. Since testing can be done in parallel, backlog is not likely to occur at the test facilities, rather at the governmental bodies where certification is issued.

7 Policy Analysis Methodology

To support EBTKE's effort in formulating effective energy conservation regulations, CLASP used the findings from this market study to evaluate the drafted MEPS and labeling policies and develop policy scenarios. CLASP used the Policy Analysis Modeling System (PAMS), which was developed with Lawrence Berkeley National Laboratory to generate assessments that can be used by key stakeholders in the policymaking process.

PAMS is a tool that helps policymakers assess the benefits of energy efficiency policies and identify the most attractive targets for MEPS levels. It is an Excel workbook designed to give first-order policy impacts projections with a minimal preparatory research on the part of local policymakers. The model can be also used to perform robust technical analysis to support the development of MEPS, by customizing the tool with any available country-specific data.

PAMS can estimate savings potential from implementing policies that improve the energy efficiency of products in any economy. The impacts are examined from two perspectives – the consumer and national perspective:

- At the consumer level, savings are estimated using life-cycle cost (LCC) metric - the total costs of owning the appliance, including the purchase price and the electricity cost throughout its life between business as usual and the improved policy scenario.
- At the national level, energy savings are expressed in terms of the reduction in national energy consumption due to more efficient appliances as well as in terms of avoided CO2 emissions resulting from reduced electricity consumption.

In this analysis, CLASP evaluated the impacts to consumers as well as impacts at the national level for selected policy scenarios. Additionally, CLASP estimated the impacts to the manufacturers by calculating the number of models eliminated from the market under more stringent MEPS.

7.1. Baseline Analysis

As mentioned previously in Section 5.2, the full test dataset was supplemented with modeled performance of models found in retail, based on their listed technology, dry rice volume, and cooking and warming power.

7.2. Model Inputs and Assumptions

PAMS estimates the impacts of implementing policies that improve energy efficiency of new equipment by calculating the difference between a business-as-usual scenario (i.e., no policies implemented) and a policy scenario (i.e., higher MEPS or Best Available Technology). The model uses a bottom-up approach, based on a stock model and sales forecasts considering first purchase (increase in number of households and ownership levels) and replacement of retired appliances.

In the model, total energy consumption is estimated per year for the stock in use under each policy scenario. Emissions are estimated using an electricity CO2-intensity emissions factor, CO2/kWh. Costs consider appliance prices (defined for each scenario using a cost-efficiency curve reflective of the market) and local electricity prices to estimate total life cycle cost (purchase price and cost of electricity bill over appliance lifetime).

CLASP used the following data inputs and assumptions to estimate the impacts under different scenarios:

- Annual rice cooker sales data and forecasts from 2020 to 2030 were obtained in this market study by Ipsos and validated by the stakeholders involved throughout the study. The geometric mean compound annual growth rate (CAGR) of sales up to 2030 was estimated at 3.9%.
- Lifetime of 4 years and 6 hours of daily use were assumed, based on inputs from the 5,000-household residential end-use survey and the rice cooker consumer use survey.

- Electricity price of 1,467.28 IDR/kWh, equivalent to 0.10 USD/kWh was applied, based on the most recent price for non-subsidized tariff for the R-1 residential class, published by PLN for the year of 2019.
- Transmission and distribution (T&D) losses at 9.51%, as published in PLN's annual statistics report for the year of 2018.
- CO_2 emissions factor of 0.807 kg/kWh was applied, as listed in PLN's statement release[78]. (1)
- The standard year or year when policy is implemented is set at 2020.
- Consumer discount rate of 6.1%, national discount rate of 6.5% and real income growth rate of 4.0% from World Bank for 2018.
- Population and urbanization data from United Nations, namely from the 2017 revisions of the World Population Prospects dataset from the Department of Economic and Social Affairs, Population Division.
- Unit energy consumption was calculated based on the baseline values discussed in the previous section.
- The exchange rate used for conversion to and from IDR and USD was 14,124.50 IDR/USD.

Further, specific model assumptions to rice cookers are shown below:

Rice Cooker (1.8 L dry rice cooking capacity)			Notes
Product Lifetime (years)		4	From Interviews with 6 Manufacturers
Stock in 2018 (millions of units)		56	Ipsos Calculation based on Historical Shipment and Lifetime of Rice Cooker
Historical Shipments (millions of units)	**2016**	11.1	Sales data obtained from interviews with 6 Manufacturers, 5 Distributors, 4 Retail Channel player and retail tracking data from retail tracking agency.
	2017	11.8	
	2018	12.5	
Forecast Shipments (millions of units)	**2019**	13.1	Ipsos calculation based on historical shipment and growth trend input from macroeconomy condition, household and population growth, as well as input from manufacturers
	2020	13.8	
	2021	14.5	
	2022	15.2	
	2023	15.8	
	2024	16.4	
	2025	16.9	
	2026	17.5	
	2027	18.0	
	2028	18.5	
	2029	19.0	
	2030	19.6	

[78] PLN Bantah PLTU Jadi Penyebab Polusi Jakarta. (2019, August 3). Retrieved from https://nasional.republika.co.id/berita/pvnraa377/pln-bantah-pltu-jadi-penyebab-polusi-jakarta

Rice Cooker (1.8 L dry rice cooking capacity)			Notes
Energy Consumption (kWh/yr)	**Base case (no MEPS)**	327	Based on assumptions on warming power and efficiency of models available in retail, and 1.5 cooking events and 7.2 hours warming per day.
	Draft MEPS based on 80% water capacity/measured volume[79]	327	
	CLASP Recommended MEPS	319	
Price (IDR)	**Base case (no MEPS)**	486,140	UECs and prices are averages across entire dataset under different standard scenarios, and also include models unaffected by MEPS.
	Draft MEPS based on 80% water capacity/measured volume	486,140	
	CLASP Recommended MEPS	492,119	

[79] See discussion of how volume is defined in the test method in Section 6.1.

8 Policy Options and Results

The efficiency requirements in the draft regulations do not vary with device volume or input power, as shown again in Table 27 below. The energy efficiency ratio is calculated as the sum of cooking and warming energy divided by the volume.

Table 27. Proposed labeling tiers in the draft regulation (MEPS at 1 star)

Energy Efficiency Ratio (Watt hour/liter)			
1 Star	**2 Star**	**3 Star**	**4 Star**
331 - 370	301 - 330	271 - 300	≤ 270

However, the energy losses in the rice cooker during both cooking and warming are primarily due to thermal conduction to the environment, which should primarily depend on the surface area of the rice cooker inner container, as summarized in Equation 1.

Equation 1

$$EER = \frac{E_C + E_W}{V} \propto \frac{S + S}{V},$$

Where:

E_C is the cooking energy consumption,

E_W is the warming energy consumption,

V is the volume,
S is the surface area, and
$\propto$ means “proportional to”.

Furthermore, the surface area, S, is proportional to the square of the linear dimensions of the inner container (the container is typically cylindrical, with roughly equivalent depth, height, and width); and the volume, V, is proportional to the cube of the linear dimensions. Therefore EER will be roughly proportional to the -1/3 power of the volume, as shown in Equation 2, which is corroborated through a best-fit line through the test data, showing an exponent of -0.291, close to -1/3.

Equation 2

$$EER \propto \frac{S + S}{V} \propto \frac{d^2}{d^3} \propto \frac{1}{d} \propto V^{-1/3} = 1/\sqrt[3]{V}$$

Where:

V is the volume,
S is the surface area,
d is any of the linear dimensions,
and
$\propto$ means “proportional to”.

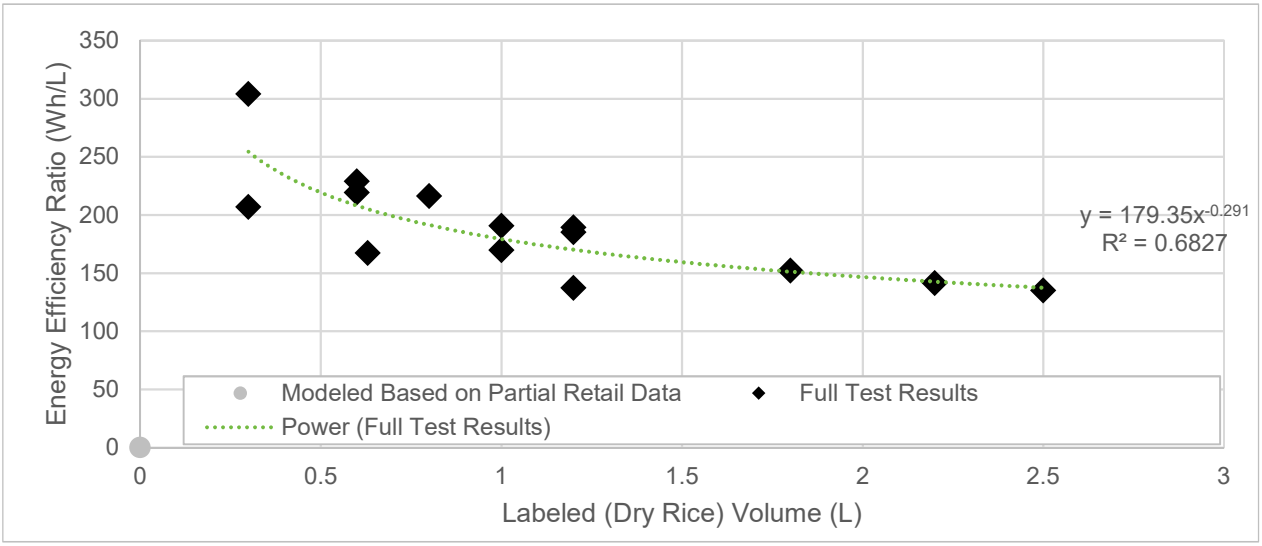


Figure 36: Best-fit power regression line through the lab test results

It should be noted that the best-fit regression only takes into account volume and not other factors such as price or technology. Considering these other factors would result in a higher coefficient of determination (R2). Therefore, CLASP developed performance levels that increase with stringency with the -1/3 power of volume,[80] such that larger rice cookers shall meet more stringent requirements. The proposed performance levels are listed in Table 28 and shown in Figure 37 with the pass rates for each category. To avoid confusion or mislabeling of products, CLASP has expressed the criteria in terms of the measured (80% water) volume of the rice cooker.

Table 28. CLASP recommended labeling tiers and compliance rates (MEPS is at 1 star)

Common Dry Rice/Labeled Volume (L)	80% Water/Measured Volume (Approx. 2.2x Labeled Volume, L)	Energy Efficiency Ratio (Watt hour/liter), Where: *V* is the measured (80% water) volume in liters.				
		1 Star/MEPS	*2 Star*	*3 Star*	*4 Star*	*5 Star*
		$250/\sqrt[3]{V}$	$230/\sqrt[3]{V}$	$210/\sqrt[3]{V}$	$190/\sqrt[3]{V}$	$170/\sqrt[3]{V}$
0.3	0.7	287	264	241	218	195
0.6	1.3	228	210	191	173	155
0.7	1.5	216	199	182	165	147
0.8	1.8	207	190	174	157	141
1.0	2.2	192	177	161	146	131
1.2	2.6	181	166	152	137	123
1.3	2.9	176	162	148	134	120
1.8	4.0	158	145	133	120	107
2.0	4.4	153	140	128	116	104
2.5	5.5	142	130	119	108	96

[80] This is equivalent to dividing by the third root of volume, or $1/\sqrt[3]{V}$.

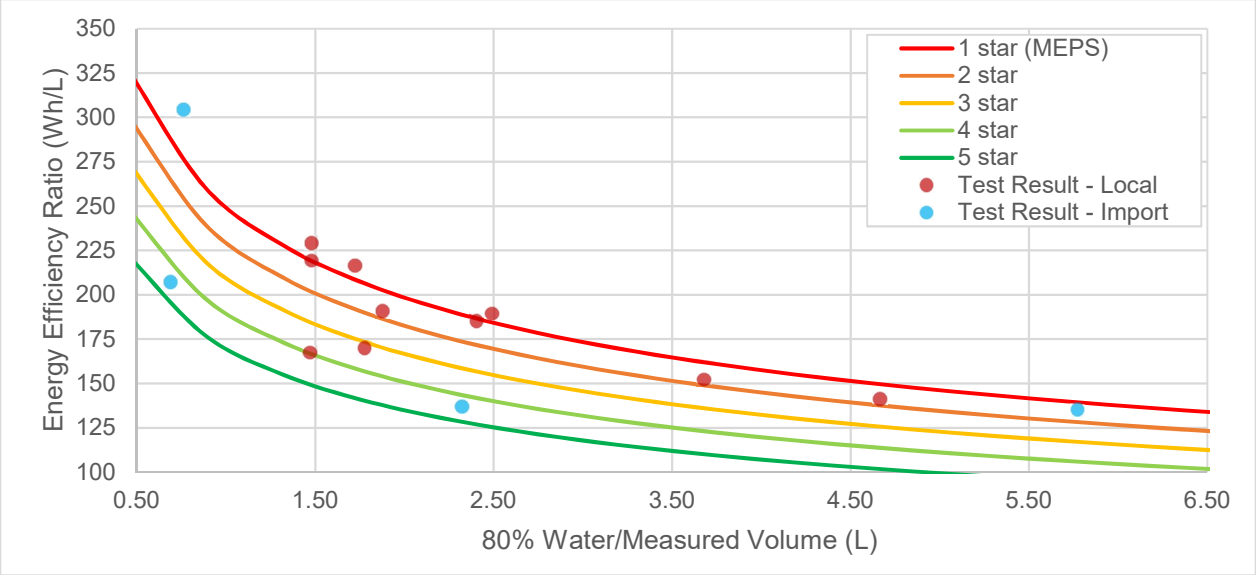


Figure 37: CLASP's recommended performance requirements compared to the performance of tested models

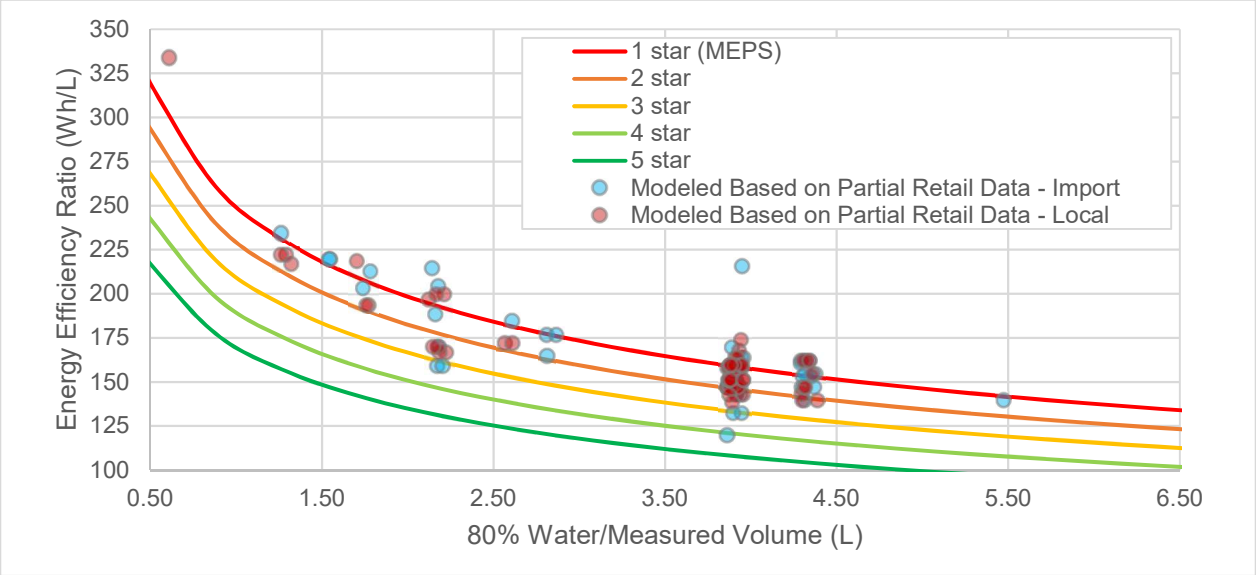


Figure 38: CLASP's recommended performance requirements compared to the modeled performance of models based on partial retail data

9 Impacts Assessment

The impacts from the CLASP-recommended MEPS are presented in the sections below.

9.1. Impacts to Consumers

The impacts to consumers from the CLASP-recommended MEPS are shown in Table 31. The results show a minimal price increase of approximately 5,000 IDR and an energy reduction of as products are redesigned to meet the CLASP-recommended MEPS, but an annual electricity bill savings of approximately 11,000 IDR, which results in a lifecycle cost savings of 32,000 IDR.[81] The cost would be paid back within 0.5 years of the product's 4-year average life.

Table 29. Consumer impacts of different MEPS options

Policy Option	Price Increase (1000 IDR)	Lifecycle Cost Savings (1000 IDR)	Payback Period (years)	Product Life (years)
Draft EBTKE MEPS based on 80% water capacity/measured volume[82]	0	0	0	0
CLASP Recommended MEPS	5	32	0.5	4

9.2. Impacts to Manufacturers

CLASP estimates that 71% of local models would meet the recommended MEPS. However, the market analysis found 81 brands and hundreds of models that appear on the market and then promptly disappear, which may indicate dumping. An efficiency standard could control non-compliant units from the Chinese market.

Table 30. CLASP recommended labeling tiers and compliance rates for locally manufactured models

Performance Data	Non-compliant	Energy Efficiency Ratio (Watt hour/liter), Where: *V* is the measured (80% water) volume in liters.				
		1 Star/MEPS	*2 Star*	*3 Star*	*4 Star*	*5 Star*
		$250/\sqrt[3]{V}$	$230/\sqrt[3]{V}$	$210/\sqrt[3]{V}$	$190/\sqrt[3]{V}$	$170/\sqrt[3]{V}$
Test Result – Local (n=10)	30%	50%	0%	20%	0%	0%
Modeled Based on Partial Retail Data – Local (n=68)	29%	56%	15%	0%	0%	0%
All Local Models (n = 78)	29%	55%	13%	3%	0%	0%

While great efficiency improvements can be made through induction or pressure-cooking technology, these would significantly increase the purchase price and disqualify the vast majority of models that use electric resistance technology. CLASP's proposed levels should be achievable through modifications such as adding insulation or better control of the temperature during warming, to reduce warming power.

[81] This is the average impact across all models in the dataset. For the 30% of non-compliant models, the price increase that is necessary to just meet the CLASP MEPS level would be approximately 12,000 IDR while decreasing annual energy consumption by 28 kWh.

[82] See discussion of how volume is defined in the test method in Section 6.1.

9.3. Impacts at the National Level

While consumer impacts of the regulation are small, the large number of rice cookers in Indonesia results in significant energy and CO_2 benefits to the nation. Table 31 shows the savings over the decade (2020-2030) and annually (in 2030).

Table 31. Indonesian National impacts of different MEPS options

	Final Energy Savings (TWh)		CO_2 Mitigation (Mt)	
Policy Option	**2020-2030**	**2030**	**2020-2030**	**2030**
Draft EBTKE MEPS based on 80% water capacity/measured volume[83]	0	0	0	0
CLASP Recommended MEPS	**3.7**	**0.6**	**3.3**	**0.5**

[83] See discussion of how volume is defined in the test method in Section 6.1.

9 Conclusion and Recommendations

This *Indonesia Rice Cooker Market Study and Policy Analysis* provides the technical evidence to support a revision of MEPS. Government agencies can use this information to define their efficiency baseline for rice cookers, quantify potential energy and GHG emissions reductions in support of national energy efficiency targets or NDC commitments, and estimate other potential benefits from revising the drafted energy efficiency policy requirements.

The analysis presented in this report was based on product data for hundreds of models from over 100 retail stores in Medan, Palembang, Jakarta, Surabaya, Balikpapan, and Makassar. Manufacturers and a retail sales tracking service provided sales data. A 500-person consumer survey across five cities provided additional data on usage and lifetime. Draft results were validated by manufacturers, government officials, and other organizations during a National Workshop on November 20th, 2019. Rice cookers are an important household appliance in Indonesia, contributing significantly to the nation's electricity use due to their high-power draw (hundreds of watts during cooking, tens of watts during warming), high penetration (70% nationally), and frequent use (1-2 cooking sessions per day and multiple hours of warming in between).

Currently EBTKE is developing MEPS and labeling criteria for rice cookers. **Rice cookers found on the market would easily exceed the current draft MEPS,** based on the currently drafted test method, which requires dividing measured energy consumption by the measured volume. CLASP has proposed new requirements based on the use of measured, not labelled (dry rice) volume that result in significant energy savings and furthermore reflect the better performance of larger rice cookers due to their lower surface area-to-volume ratio.

CLASP estimated the energy and emissions savings and LCC savings for consumer, which were significant and positive. Based on this analysis, CLASP recommends adopting higher performance levels to eliminate the least efficient models from the market, some of which may be present as a result of dumping. Higher star levels can encourage the purchase of more efficient -- but also more expensive -- induction and pressure rice cookers.

In preparation to the upcoming revision to the existing draft regulation, a Focus Group Discussion (FGD) was held by EBTKE in Jakarta on January 30th, 2020. Key market study findings and CLASP's recommendations were presented to a smaller group of key stakeholders, namely major manufacturers, approved testing facilities, governmental research laboratories, and technical experts. This FGD serves as a forum for these key industrial representatives to voice their opinions, provide inputs, and state possible concerns for the proposed requirements.

Through this meeting, EBTKE had successfully established a collective agreement between the key stakeholders for a set of requirements presented by CLASP. To address the prior confusion in volume definition, CLASP recommended the use of the measured volume of the container, filled with water to 80% of its maximum volume measured to the lip of the container, as the independent variable in determining the MEPS and comparative labeling requirements. Taking into account performance distribution over the lab tested models, the recommended levels would ensure acceptable level of stringency across the most common rice cooker products in the market. Overall, CLASP's recommendation was well-taken by the industrial representatives, and no concerns were raised for the MEPS and the comparative labeling criteria.

This agreement concluded the FGD, confirming that the requirements proposed by CLASP can feasibly be met by the industry. In the subsequent discussions held in February 2020, EBTKE decided to fully adopt CLASP's recommendation in the revised draft regulation, covering rice cookers with dry rice cooking capacity of up to 3 L. Based on the daily frequency of use of 1.5 cooking events and 7.2 hours of warming,[84] household consumers would save at least 32,000 IDR over the lifetime of the product under these proposed levels. At the national level, Indonesia would reduce energy consumption by at least 3.7 TWh from 2020 to 2030 and 0.6 TWh in 2030 and mitigate GHG emissions of at least 3.3 $MTCO_2$ from 2020 to 2030 and 0.5 $MTCO_2$ in 2030.

[84] CLASP 5,000-Household Residential End Use Survey

Appendix A: List of Sources

Ministries or Other Stakeholders	Data Requested	Status
• EBTKE	• Draft Reference for MEPS Testing Standard (Rice Cooker)	Data Received
• Standardization Administration of China • China National Institute of Standardization	• National testing standard for rice cooker product	Data Received
• Japanese Industrial Standard Committee	• National testing standard for rice cooker product • CNS 2518 Test Method standard	Data Received
• Korean Agency for Technology and Standards • Korea Energy Agency • Korea Energy Management Corporation	• National testing standard for rice cooker product • KS C 9310 Test Method Standard	Data Received
• Thailand Industrial Standard Committee	• National testing standard for rice cooker product MEPS • TIS 2545-2555 Test Method Standard	Data Received
• Electrical and Mechanical Service Department for Hong Kong • Standardization Administration of Hong Kong	• National testing standard for rice cooker product MEPS • GB 12021.6-2008 Test Method Standard	Data Received
• Vietnam Agency for Energy	• National testing standard for rice cooker product MEPS • TCVN 8252:2009 Test Method Standard	Data Received
• PT Sanken Argadwija	• Rice cooker specification data • Rice cooker sales and production data • The standardization used	Data Received
• PT Kencana Gemilang	• Rice cooker specification data • Rice cooker sales and production data • Product standard used	Data Received
• PT Star Cosmos	• Rice cooker specification data • Rice cooker sales and production data • Product standard used	Data Received
• PT Aditya Sarana Graha	• Rice cooker specification data	Data Received

Ministries or Other Stakeholders	Data Requested	Status
	• Rice cooker sales and production data • Product standard used	
• PT Surya Lancar Makmur	• Rice cooker specification data • Rice cooker sales and production data • Product standard used	Data Received Partially: Product Standard Used
• PT Sumber Digital Media	• Rice cooker specification data • Rice cooker sales and production data • Product standard used	Data Received Partially: Product Standard Used
• PT Panasonic Gobel Indonesia	• Rice cooker specification data • Rice cooker sales and production data • Product standard used	Data Received Partially: Product Standard Used
• GABEL (Indonesia Electronic and Electrical Household Appliances Industrial Association)	• Rice cooker sales and production data in Indonesia	Data Not Received
• KAN (National Accreditation Committee)	• Standardization of testing laboratories	Data Received
• BSN (National Standardization Agency of Indonesia)	• Standardization of safety of household electrical appliances (Indonesia National Standard)	Data Received
• Indonesian Bureau of Statistics (BPS)	• Population data • Household data • Electricity consumption data	Latest available data are for 2017, Data Received
• SPEEDA Research	• Rice Cooker Manufacturer company profiles	Data Received
• Euromonitor, Market Line, Global Data, GRS and IECEE	• Electronic Appliances market data • Rice Cooker Manufacturer company profiles	Data Received

Appendix B: Energy Efficiency Testing Details

Indonesia

Performance test formula;

$$P = \frac{\text{Ec} + \text{Ew}}{\text{Measured volume}} \; x \; 100\%$$

P: Performance test calculation (Wh/L)

E_C: Energy consumption in cooking mode (Wh)

E_W: Energy consumption in warming mode (Wh)

Energy efficiency formula;

$$\eta = \frac{1.16 \; G \; (t2 - t1)}{\text{Ec}} \; x \; 100\%$$

η: Heat efficiency (%)

G: Mass of water before test (kg)

t1: Initial water temperature (°C)

t2: Highest water temperature after test (°C)

E_C: Energy consumption in cooking mode (kWh)

China

Energy efficiency calculation;

$$\eta = \frac{1.16 \; G \; (t2 - t1)}{E} \; x \; 100\%$$

η: Heat efficiency (%)

G: Mass of water before test (kg)

t1: Initial water temperature (°C)

t2: Highest water temperature after test (°C)

E: Energy consumption in cooking mode (Wh)

Table 1. automatic rice cooker energy efficiency rating

	Thermal efficiency value (%)				
	Energy efficiency rating				
Rated power P (Watt)	1	2	3	4	5
P ≤ 400	85	81	76	72	60
400 < P ≤ 600	86	82	77	73	61
600 < P ≤ 800	87	83	78	74	62

800 < P ≤ 1000	88	84	79	75	63
1000 < P ≤ 2000	89	85	80	76	64
Standby power (Watt)	1.6			2	

Table 2. for automatic rice cooker with insulation function, heat energy shall not exceed table below

Rated power P (Watt)	Heat consumption (W/h)
P ≤ 400	40
400 < P ≤ 600	50
600 < P ≤ 800	60
800 < P ≤ 1000	70
1000 < P ≤ 2000	80

Hong Kong

Heat efficiency calculation;

$$\eta = \frac{1.16\ G\ (T2 - T1)\ x\ 100}{E}$$

η: Heat efficiency (%)

G: Mass of water before test (kg)

T1: Initial water temperature (°C)

T2: Highest water temperature after test (°C)

E: Energy consumption in cooking mode (Wh)

Table 3. Minimum Allowable Heat Efficiency (%)

Rated Wattage (P)	Minimum Allowable Heat Efficiency (%)
P ≤ 400 W	76
400 W < P ≤ 600 W	77
600 W < P ≤ 800 W	78
800 W < P ≤ 1000 W	79
1000 W < P ≤ 2000 W	80

Table 4. Minimum Warm-keeping Efficiency Allowance (%)

Rated Wattage (P)	Minimum Warm-keeping Efficiency Allowance (%)
P ≤ 400 W	40
400 W < P ≤ 600 W	50
600 W < P ≤ 800 W	60
800 W < P ≤ 1000 W	70
1000 W < P ≤ 2000 W	80

Thailand

Energy efficiency calculation;

$$\eta = \frac{\{Mw\ x\ Cpw\ x\ (Tf - Ti)\} + \{M\ x\ C\ x\ (Tf - Ti)\}}{3600\ \mathrm{x\ E}}$$

η: Heat efficiency (%)

M_W: Initial water mass (kg)

M: Mass of inner pot (kg)

T_i: Initial water temperature (K)

T_f: Maximum water temperature (K)

C_{pw}: Heat of water (kJ/K)

C: Inner pot heat capacity (kJ/K)

E: Electrical energy (kWh)

Table 5. Energy efficiency level criteria of electric rice cooker No. 5

Power (Watt)	Capacity (L)	Energy efficiency (%)			
		Number 5	Number 5 ★	Number 5 ★★	Number 5 ★★★
≤ 2000	≤ 5	87.00 – 88.99	89.00 – 90.99	91.00-92.99	≥ 93.00

Vietnam

Energy efficiency calculation;

$$R\text{đ}(\%) = \frac{\Delta T\ x\ [Q + (W\ g1\ CP1) + (W\ g2\ x\ CP2)] x\ 100}{0{,}24\ \text{x Ec x}\ 3600}$$

R: Energy efficiency level index

△T:

Q:

W:

g1:

g2:

CP1:

CP2:

Ec: Energy consumption in cooking mode (Wh)

Japan

Energy consumption efficiency calculation;

$$\text{E} = \frac{\{(\text{A x}\ N_A) + (\text{B x}\ H_B) + (\text{C x}\ H_C) + (\text{D x}\ H_D)\}}{1000}$$

E: Energy efficiency (kWh/year)

A: Energy in cooking mode per use (Wh/use)

N_A: Number of use per year (use/year)

B: Energy to keep rice warm per year (Wh/h)

H_B: Hours of keeping rice warm per year (h/year)

C: Energy in timer mode per hour (Wh/h)

H_C: Hours in timer mode per year (h/year)

D: Energy in standby mode per hour (Wh/h)

H_D: Hours in standby mode per year (h/year)

Table 6. Coefficients of formula for energy efficiency calculation

Max rice cooking capacity (L)	N_A	H_B	H_C	H_D

0.54L ≤ capacity < 0.99L	290	920	750	2760
0.99L ≤ capacity < 1.44L	340	1540	1190	2990
1.44L ≤ capacity < 1.80L	390	2180	1880	1210
1.80L < capacity	350	2420	1000	2150

Table 7. Target standard values

Heating system	Max rice cooking capacity	Formula for energy efficiency (top runner)	Category	Formula for target standard value
Electromagnetic induction heating system products	0.54L ≤ capacity < 0.99L	$E_K = 0.209M + 49.5$	A	$E_K = 0.209M + 48.5$
	0.99L ≤ capacity < 1.44L	$E_K = 0.244M + 84.9$	B	$E_K = 0.244M + 83.2$
	1.44L ≤ capacity < 1.80L	$E_K = 0.280M + 135$	C	$E_K = 0.280M + 132$
	1.80 < capacity	$E_K = 0.252M + 135$	D	$E_K = 0.252M + 132$
Non-electromagnetic induction heating system products	0.54L ≤ capacity < 0.99L	$E_K = 0.209M + 37.4$	E	$E_K = 0.209M + 36.7$
	0.99L ≤ capacity < 1.44L	$E_K = 0.244M + 77.1$	F	$E_K = 0.244M + 75.6$
	1.44L ≤ capacity < 1.80L	$E_K = 0.280M + 101$	G	$E_K = 0.280M + 99.0$
	1.80L < capacity	$E_K = 0.252M + 124$	H	$E_K = 0.252M + 122$

E_K: Standard energy efficiency (kWh/year)

M: Mass of evaporated water (gram).

(Note) It is the mass of water expelled from the rice cooker when measuring energy consumption per cooking rice, and it is the average value of all values obtained at measuring energy consumption during cooking rice. Further, the mass of water expelled from a rice cooker is calculated by subtracting measured weight of the rice cooker within one minute after the completion of cooking prior to opening the lid from weight of the rice cooker containing water and rice before start cooking.

South Korea

Table 8. The mass of rice of maximum cooking capacity

Max cooking capacity (N)	Mass of rice (gr)
1 person (0.18L) ≤ N < 3 persons (0.54L)	150
3 persons (0.54L) ≤ N < 5 persons (0.90L)	300
5 persons (0.90L) ≤ N < 7 persons (1.26L)	450
7 persons (1.26L) ≤ N < 9 persons (1.62L)	600
9 persons (1.62L) ≤ N < 11 persons (1.98L)	750
11 persons (1.98L) ≤ N < 13 persons (2.34L)	900
13 persons (2.34L) ≤ N < 15 persons (2.70L)	1050
15 persons (2.70L) ≤ N < 17 persons (3.06L)	1200
17 persons (3.06L) ≤ N < 19 persons (3.42L)	1350
19 persons (3.42L) ≤ N < 20 persons (3.60L)	1500

Table 9. The mass of rice of maximum cooking capacity

Max cooking capacity (N)	MEPS	Standard power consumption (TEPS)
N < 6 (1.08L)	P ≤ -13.9N + 258.5	P ≤ -10.0N + 186
6(1.08L) ≤ N ≤ 10(1.08L)	P ≤ -13.9N + 258.5	P ≤ -5.0N + 156
10(1.80L) ≤ N ≤ 20(3.60L)	P ≤ -13.9N + 258.5	P ≤ -4N + 146

Energy efficiency index calculation;

$$\mathrm{R} = \frac{Power\ consumption\ per\ person\ (Wh/person)}{\mathrm{TEPS\ (Wh/person)}}$$

R: Energy efficiency level index

Table 10. Energy efficiency level

R	Standby power	Level
R < 1.00	≤ 1.0 W (off mode) ≤ 3.0 W (active standby mode)	1
R < 1.00	N/A	2
1.00 ≤ R ≤ 1.13	N/A	3
1.13 ≤ R ≤ 1.26	N/A	4
1.26 ≤ R ≤ 1.39	N/A	5

Appendix C: List of Brands, Manufacturers, and Source of Products

List of Rice Cooker brands in Indonesia based on their brand and manufacturers as well as source of products, along with their SNI Safety certification status (As of September 2019).
Note that there are a lot of companies, even the larger one that do not have safety certification for their rice cooker yet because it is not being mandated yet.

No.	Manufacturer / Importer	Brand	Import/Local	SNI Safety Accreditation
1.	PT Sanken Argadwija	Sanken	Local	SNI/IEC Safety 7859:2013
2.	PT Kencana Gemilang	Miyako	Local	SNI/IEC Safety 60335-2-15:2011
3.	PT Aditya Sarana Graha	Kirin	Local	SNI/IEC Safety 60335-2-15:2011
4.	PT Star Cosmos	Cosmos	Local	No SNI
5.	PT Maspion Kencana	Maspion	Local	No SNI
6.	PT Hartono Istana Teknologi	Polytron	Local	No SNI
7.	PT Sharp Electronics Indonesia	Sharp	Local	No SNI
8.	PT Aditya Sarana Graha	Kirin	Import (Assembled in Indonesia)	SNI/IEC Safety 60335-2-15:2011
9.	PT Denpoo Mandiri Indonesia	Denpoo	Import (Assembled in Indonesia)	No SNI
10.	PT Sinarbaru Indokencana	Airlux	Import (Assembled in Indonesia)	No SNI
11.	PT Aditec Cakrawiyasa	Quantum	Import (Assembled in Indonesia)	No SNI
12.	PT Votre Elekctronics	Votre	Import (Assembled in Indonesia)	No SNI
13.	PT Niko Electronic Indonesia	Niko	Import (Assembled in Indonesia)	No SNI
14.	PT Asa Bintang Pratama	Winlux	Import (Assembled in Indonesia)	No SNI
15.	PT Sanex Elektronik Indonesia	Sanex	Import (Assembled in Indonesia)	No SNI
16.	PT Elina Indonesia	Trisonic	Import (Assembled in Indonesia)	No SNI
17.		Elyon	Import	No SNI
18.	PT Sinar Cahaya Lautan	Solid	Import (Assembled in Indonesia)	SNI/IEC Safety 60335-2-15:2011
19.		U.T.U	Import	SNI/IEC Safety 60335-2-15:2011
20.	PT Indopintan Sukses Mandiri	Namitec	Import	SNI/IEC Safety 60335-2-15:2011
21.	PT Philips Indonesia	Philips	Import	No SNI
22.	PT Yong Ma Electronics	Yong Ma	Import	No SNI
23.	PT Citra Kreasi Makmur	Turbo	Import	No SNI
24.	PT Panasonic Gobel Indonesia	Panasonic	Import	No SNI

25.	PT Electrolux Indonesia	Electrolux	Import	No SNI
26.	PT Oxone Indonesia	Oxone	Import	No SNI
27.	PT Surya Lancar Makmur	Kangaroo	Import	No SNI
28.	PT Hitachi Asia Indonesia	Hitachi	Import	No SNI
29.	PT Tiger Indonesia	Tiger	Import	No SNI
30.	PT Makmur Prima Trading	Bolde	Import	No SNI
31.	PT Tefal Indonesia	Tefal	Import	No SNI
32.	PT Zojirushi Indonesia	Zojirushi	Import	No SNI
33.	PT Stanley Black & Decker	Black & Decker	Import	No SNI
34.	PT Cakrawala Elecorindo	Elecor	Import	No SNI
35.	PT Ace Hardware Indonesia Tbk	Kris	Import	No SNI
36.		KLAZ	Import	No SNI
37.		VitaClay	Import	No SNI
38.	PT Midea Planet Indonesia	Midea	Import	No SNI
39.	PT Subur Semesta	Cmos	Import	No SNI
40.	PT National Super	Natsuper	Import	No SNI
41.	PT Sumber Digital Media	Tanaka	Import	No SNI
42.	PT Home Center Indonesia	Appetite	Import	No SNI
43.	PT Aqua Japan Indonesia	Aqua	Import	No SNI
44.	PT Advance Digitals	Advance	Import	No SNI
45.	PT Blue Gas Indonesia	Vienta	Import	No SNI
46.	PT Sumber Karya Asia	Kazuki	Import	No SNI
47.	PT Karunia Agung Cemerlang	Sanoya	Import	No SNI
48.		Nikita	Import	No SNI
49.	PT RB Shop Indonesia	ReCooker	Import	No SNI
50.	PT Tripacific Electrindo	Sekai	Import	No SNI
51.	Sanyo Electric Co., Ltd	Sanyo	Local	No SNI
52.	PT Toba Anugrah Mulia	Tecstar	Import	No SNI
53.	PT Hi-Cook Indonesia	Hi-Cook	Import	No SNI
54.	PT Ichiko Indonesia	Ichiko	Import	No SNI
55.	Konka Group Co., Ltd	Konka	Import	No SNI
56.	PT Maju Express Indonesia	Mito	Import	No SNI
56.	PT Minami Electronic Indonesia	Minami	Import	No SNI
57.	PT Midea Electronic Indonesia	Midea	Import	No SNI
58.	PT Nanotec Electronic	Nanotec	Import	No SNI
59.	PT OK Home Appliances Indonesia	Ok Zaina	Import	No SNI
60.	PT Xiaomi Indonesia	Xiaomi	Import	No SNI
61.	PT Sumber Karunia Anugerah	Tori	Import	No SNI
62.	Unknown	HK	Import	No SNI
63.	Unknown	Domo	Import	No SNI
64.	Unknown	Godzu	Import	No SNI

65.	Unknown	Homzace Vitacook	Import	No SNI
66.	Unknown	Holmes	Import	No SNI
67.	Unknown	Iona	Import	No SNI
68.	Unknown	In home	Import	No SNI
69.	Unknown	Ichiban	Import	No SNI
70.	Unknown	LKL	Import	No SNI
71.	Unknown	Larette	Import	No SNI
72.	Unknown	Maiko	Import	No SNI
73.	Unknown	MLS	Import	No SNI
74.	Unknown	Newstyle	Import	No SNI
75.	Unknown	Nagoya	Import	No SNI
76.	Unknown	Nippon	Import	No SNI
77.	Unknown	Okayama	Import	No SNI
78.	Unknown	Omicko	Import	No SNI
79.	Unknown	Oryza	Import	No SNI
80.	Unknown	Oishi	Import	No SNI
81.	Unknown	Pasta Koki	Import	No SNI
82.	Unknown	PowerPec	Import	No SNI
83.	Unknown	QQ National	Import	No SNI
84.	Unknown	Riiken	Import	No SNI
85.	Unknown	Singsung	Import	No SNI
86.	Unknown	SOGO	Import	No SNI
87.	Unknown	SuGoal	Import	No SNI
88.	Unknown	Shinil	Import	No SNI
89.	Unknown	Supor	Import	No SNI
90.	Unknown	Selectron	Import	No SNI
91.	Unknown	Sonita	Import	No SNI
92.	Unknown	Takehi	Import	No SNI
93.	Unknown	Shutai	Import	No SNI
94.	Unknown	Wiga	Import	No SNI
95.	Unknown	Yamakawa	Import	No SNI
96.	Unknown	Aletta	Import	No SNI
97.	Unknown	Akebonno	Import	No SNI
98.	Unknown	Beko	Import	No SNI
99.	Unknown	Cuckoo	Import	No SNI
100.	Unknown	Changhong	Import	No SNI
101.	Unknown	Mayaka	Import	No SNI
102.	Unknown	Sayota	Import	No SNI

Appendix D: Screening Question for Rice Cooker Usage Survey

SCREENING

LIVING LOCATION

S1 **INTERVIEWER:** CATAT AREA **(SA)** *RECORD AREA (SA)*

Jakarta	1
Surabaya	2
Jogjakarta	3
Medan	4
Makassar	5

GENDER

S2 CATAT JENIS KELAMIN RESPONDEN **(SA)** *RECORD GENDER **(SA)***

Laki-laki *Male*	1
Perempuan *Female*	2

AGE

S3 Berapa usia Anda pada saat ulang tahun yang terakhir? **(SA)** How old are you based on your last birthday? **(SA)**

INTERVIEWER: CATAT USIA YANG SEBENARNYA DAN LINGKARI KELOMPOK USIA YANG SESUAI *RECORD RESPONDENT'S ACTUAL AGE AND CIRCLE THE APPROPRIATE AGE GROUP*

		Tahun y.o.

Di bawah 20 tahun *Less than 20 y.o.*	1	STOP
20 – 30 tahun *y.o.*	2	LANJUTKAN *CONTINUE*
31 – 40 tahun *y.o.*	3	
41 – 50 tahun *y.o*	4	
Di atas 50 tahun *More than 50 y.o.*	6	STOP

INTERVIEWER: TANYAKAN DAN CATAT TANGGAL LAHIR RESPONDEN *ASK AND RECORD RESPONDENT'S DATE OF BIRTH*

Tanggal *Date*		Bulan *Month*		Tahun *Year*			

EDUCATION

KARTU BANTU *SHOWCARD*

S4 Apakah tingkat pendidikan terakhir yang telah Anda **tamatkan**? **(SA)** ***What is you highest completed education level? (SA)***

Tidak ada pendidikan formal *No formal education*	1	STOP
Sekolah Dasar *Primary school*	2	
SMP *Junior high school*	3	
SMU/SMK *Senior high school*	4	LANJUTKAN *CONTINUE*
Akademi/Politeknik (D3) *Diploma/Junior college*	5	
Universitas (S1) *College/University*	6	
Master/Ph.D. (S2/S3) *Master/Ph.D.*	7	

SENSITIVE INDUSTRY

KARTU BANTU *SHOWCARD*

S5 Apakah Anda atau salah satu anggota keluarga Anda di rumah ini ada yang bekerja dalam bidang berikut ini? **(MA)** *Do you or one of your family members work in one of following industry? **(MA)***

Agen periklanan *Advertising Agency*	1	STOP
Penelitian pemasaran *Market Research agency*	2	
Hubungan masyarakat *Public relation*	3	
Jurnalisme atau media massa seperti radio, televisi, majalah atau koran *Jurnalism or mass media such as radio, television, magazineor newspaper*	4	
Industri perbankan/keuangan atau yang berkaitan. *Banking/finance industry or any related industries*	5	
Tidak satu pun bidang di atas *None of the above*	8	LANJUTKAN *CONTINUE*

PREVIOUS SURVEY PARTICIPATION

S6 Dalam 6 bulan terakhir ini, apakah Anda pernah mengikuti/berpartisipasi/diwawancarai atau menjadi responden sebuah riset/penelitian pemasaran yang berhubungan dengan perbankan? **(SA)** *In past 6 months, have you ever participated in market research activity, being interviewed or participated in FGD/in depth interview related to banking? **(SA)***

Ya *Yes*	1	STOP
Tidak *No*	2	LANJUTKAN *CONTINUE*

PERTANYAAN-PERTANYAAN UNTUK KLASIFIKASI SES RESPONDEN (S7a-S7e) ***QUESTIONS TO DETERMINE RESPONDENT'S SES (S7a-S7e)***

KARTU BANTU ***SHOWCARD***

S7a Hanya untuk tujuan klasifikasi saja, dengan bantuan kartu ini, mohon sebutkan termasuk dalam kelompok manakah jumlah pengeluaran rumah tangga Anda perbulannya, yaitu keseluruhan pengeluaran untuk makanan, pakaian, kendaraan/transport, listrik dan lain sebagainya perbulannya tetapi tidak termasuk pengeluaran-pengeluaran besar yang tidak tetap? **(SA)** *For qualification purposes only, with the help of this showcard, could you please tell which of the following best represents your total monthly household expenditure, that is, total expenditure every month for food, clothes, transportation, electricity, etc., but not including irregular large expenditures?* ***(SA)***

INTERVIEWER: TUNJUKKAN KARTU DEFINISI HAL-HAL YANG TERMASUK PENGELUARAN BULANAN RUMAH TANGGA UNTUK MEMBANTU RESPONDEN *PLEASE SHOW THE FOLLOWING DEFINITION OF TOTAL MONTHLY HOUSEHOLD EXPENDITURE TO HELP RESPONDENT*

SES	Range	Code	Score		
A1	*More than Rp. 7.000.000,-* Lebih dari Rp. 7.000.000,-	1	5	**Termasuk:** ***Includes:***	**Tidak termasuk:** ***Excludes:***
	Rp. 6.000.001 – Rp. 7.000.000,-	2	4	*Daily food* Makanan sehari-hari	*Rent, if paid yearly* Sewa bila dibayar tahunan
A2	Rp. 5.000.001 – Rp. 6.000.000,-	3	4	*Electricity, water* Listrik dan air	*Installment payments* Pembayaran cicilan
	Rp. 4.500.001 – Rp. 5.000.000,-	4	3	*Phone/HP* Telpon/HP	*Household furniture* Furnitur rumah tangga
	Rp. 4.000.001 – Rp. 4.500.000,-	5	3	*Gas/Kerosene* Gas/Minyak Tanah	*Household appliances* Peralatan rumah tangga
				Soap, Cosmetic Sabun, Kosmetik	*Recreation/entertainment* Rekreasi

B	Rp. 3.000.001 – Rp. 4.000.000,-	6	3	*Maid's wages* Gaji pembantu	*Any irregular expenses* Pengeluaran tidak rutin
	Rp. 2.500.001 – Rp. 3.000.000,-	7	3	*Children's school fees* Biaya sekolah anak	
C1	Rp. 2.000.001 – Rp. 2.500.000,-	8	3	*Transportation, Petrol* Transportasi, Bensin	
	Rp. 1.750.001 – Rp. 2.000.000,-	9	3	*Cigarette* Rokok	
C2	Rp. 1.500.001 – Rp. 1.750.000,-	10	3	*Monthly rent* Sewa bila dibayar bulanan	
	Rp. 1.250.001 – Rp. 1.500.000,-	11	3	*Monthly fee/premium* Pungutan, premi asuransi	
D	Rp. 900.001 – Rp. 1.250.000,-	12	2	yang dibayar bulanan	
E	Rp. 750.001 – Rp. 900.000,-	13	2		
	Less than Rp. 750.000,- Rp. 750.000,- atau kurang	14	1		
	Refused Menolak	99	STOP		

KARTU BANTU *SHOWCARD*

S7b

Manakah dari berikut ini yang paling sering digunakan di dalam rumah tangga Anda sebagai sumber air minum? **(SA)**

*Which of the followings that you use most often in your household as source of drinking water? **(SA)***

	Code	Score
Branded packaged water Air kemasan bermerek	1	8

Refill water Air isi ulang	2	6
Tap water in meter Ledeng meteran	3	5
Tap water in retail Ledeng eceran	4	5
Artesian well/pump Sumur bor/pompa	5	4
Protected well Sumur terlindung	6	2
Unprotected well Sumur tak terlindung	7	2
Protected spring Mata air terlindung	8	1
Unprotected spring Mata air tak terlindung	9	1
*River*Air sungai	10	1
Rain Air hujan	11	1
Others Lainnya	12	1

KARTU BANTU *SHOWCARD*
S7c

Manakah dari bahan bakar berikut ini yang paling sering digunakan di rumah tangga Anda untuk memasak kebutuhan sehari-hari? **(SA)**
*Which of the followings that you use most often in your household as fuel for daily cooking? **(SA)***

	Code	Score
Electricity Listrik	1	5
LPG 12 kg Gas elpiji 12 kg	2	4
LPG 3 kg/5kg/10kg Gas elpiji 3 kg/5 kg/10 kg	3	2
Natural Gas Gas kota/Alam	4	2
Kerosene Minyak tanah	5	2
Wood Kayu	6	1
Charcoal Arang	7	1
Bricket	8	1
Other Lainnya	9	1
Not cooking Tidak memasak	10	1

KARTU BANTU *SHOWCARD*
S7d

Manakah dari berikut ini yang merupakan daya listrik yang dimiliki rumah ini? **(SA)**
*Which of the followings power wattage that owned by this household? **(SA)***

	Code	Score
*2.201 watt or more*2.201 watt atau lebih	1	8
1.301 – 2.200 watt	2	6
901 – 1.300 watt	3	5
451 – 900 watt	4	4
*450 watt or less*450 watt atau kurang	5	3
*No electricity*Tidak memiliki sambungan listrik	6	1
*Without meter*Tanpa meteran	7	1

S7e

INTERVIEWER: HITUNG SELURUH SKOR DARI a+b+c+d *CALCULATE ALL SCORE FROM a+b+c+d*

SCORE a	SCORE b	SCORE c	SCORE d	Total Score

INTERVIEWER: TRANSFER TOTAL SKOR a+b+c+d SESUAI DENGAN RANGE YANG ADA DI TABEL DI BAWAH INI *TRANSFER SCORE a+b+c+d TO THE RANGE IN THIS BELOW TABLE*	
	Code
20 – 26 (Upper 1)	1
17 – 19 (Upper 2)	2
14 – 16 (Middle 1)	3
11 – 13 (Middle 2)	4
7 – 10 (Lower 1)	5
1 – 6 (Lower 2)	6

SES

S7 **INTERVIEWER: CATAT FINAL SES (SA)** ***RECORD FINAL SES (SA)***

Upper 1	1	STOP
Upper 2	2	LANJUTKAN *CONTINUE*
Middle 1	3	
Middle 2	4	
Lower 1	5	
Lower 2	6	STOP

Appendix E: Additional Split on the Market Size

Split by Technology, then by Retail Price		
	From Category	**From Total**
Electric Resistance	**87.70%**	**87.70%**
< 300000	45.86%	40.22%
300000 ≤ P < 500000	31.28%	27.43%
500000 ≤ P < 700000	14.08%	12.35%
700000 ≤ P < 900000	5.04%	4.42%
≥ 900000	3.74%	3.28%
Induction Heating	**11.95%**	**11.95%**
< 300000	0.00%	0.00%
300000 ≤ P < 500000	0.00%	0.00%
500000 ≤ P < 700000	0.00%	0.00%
700000 ≤ P < 900000	19.15%	2.29%
≥ 900000	80.85%	9.66%
Induction Pressure	**0.35%**	**0.35%**
< 300000	0.00%	0.00%
300000 ≤ P < 500000	0.00%	0.00%
500000 ≤ P < 700000	0.00%	0.00%
700000 ≤ P < 900000	0.00%	0.00%
≥ 900000	100.00%	0.3500%

Split by Technology, then by Retail Price, then by Container Capacity		
	From Category	**From Total**
Electric Resistance	**87.70%**	**87.70%**
< 300000	**45.86%**	**40.22%**
< 1	15.34%	6.17%
1 ≤ L < 2	69.34%	27.89%
2 ≤ L < 3	12.01%	4.83%
≥ 3	3.31%	1.33%
300000 ≤ P < 500000	**31.28%**	**27.43%**
< 1	12.13%	3.33%
1 ≤ L < 2	65.75%	18.04%
2 ≤ L < 3	17.79%	4.88%
≥ 3	4.32%	1.19%
500000 ≤ P < 700000	**14.08%**	**12.35%**
< 1	4.95%	0.61%
1 ≤ L < 2	46.95%	5.80%
2 ≤ L < 3	41.38%	5.11%
≥ 3	6.72%	0.83%
700000 ≤ P < 900000	**5.04%**	**4.42%**
< 1	2.45%	0.11%
1 ≤ L < 2	35.93%	1.59%
2 ≤ L < 3	55.17%	2.44%
≥ 3	6.45%	0.28%
≥ 900000	**3.74%**	**3.28%**
< 1	0.00%	0.00%
1 ≤ L < 2	68.33%	2.24%
2 ≤ L < 3	20.56%	0.67%
≥ 3	11.11%	0.36%
Induction Heating	**11.95%**	**11.95%**
700000 ≤ P < 900000	**19.15%**	**2.29%**
< 1	25.00%	0.57%
1 ≤ L < 2	75.00%	1.72%
2 ≤ L < 3	0.00%	0.00%
≥ 3	0.00%	0.00%
≥ 900000	**80.85%**	**9.66%**
< 1	0.00%	0.00%
1 ≤ L < 2	75.00%	7.25%
2 ≤ L < 3	25.00%	2.42%

≥ 3	0.00%	0.00%
Induction Pressure	**0.35%**	**0.35%**
≥ 900000	**100.00%**	**0.35%**
< 1	0.00%	0.00%
1 ≤ L < 2	65.00%	0.23%
2 ≤ L < 3	35.00%	0.12%
≥ 3	0.00%	0.00%

Split by Technology, then by Retail Price, then by Container Capacity, then by Power Requirement		
	From Category	**From Total**
Electric Resistance	**87.70%**	**87.70%**
< 300000	**45.86%**	**40.22%**
< 1	**15.34%**	**6.17%**
< 300	48.25%	2.98%
300 ≤ W < 450	51.75%	3.19%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**69.34%**	**27.89%**
< 300	16.04%	4.47%
300 ≤ W < 450	82.73%	23.08%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	1.23%	0.34%
≥ 750	0.00%	0.00%
2 ≤ L < 3	**12.01%**	**4.83%**
< 300	0.00%	0.00%
300 ≤ W < 450	81.50%	3.94%
450 ≤ W < 600	18.50%	0.89%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
≥ 3	**3.31%**	**1.33%**
< 300	0.00%	0.00%
300 ≤ W < 450	17.96%	0.24%
450 ≤ W < 600	36.00%	0.48%
600 ≤ W < 750	23.64%	0.31%
≥ 750	22.40%	0.30%
300000 ≤ P < 500000	**31.28%**	**27.43%**

< 1	**12.13%**	**3.33%**
< 300	67.50%	2.25%
300 ≤ W < 450	32.50%	1.08%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**65.75%**	**18.04%**
< 300	8.08%	1.46%
300 ≤ W < 450	87.12%	15.72%
450 ≤ W < 600	3.15%	0.57%
600 ≤ W < 750	1.65%	0.30%
≥ 750	0.00%	0.00%
2 ≤ L < 3	**17.79%**	**4.88%**
< 300	0.00%	0.00%
300 ≤ W < 450	97.65%	4.77%
450 ≤ W < 600	2.35%	0.11%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
≥ 3	**4.32%**	**1.19%**
< 300	10.00%	0.12%
300 ≤ W < 450	25.00%	0.30%
450 ≤ W < 600	65.00%	0.77%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
500000 ≤ P < 700000	**14.08%**	**12.35%**
< 1	**4.95%**	**0.61%**
< 300	0.00%	0.00%
300 ≤ W < 450	100.00%	0.61%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**46.95%**	**5.80%**
< 300	4.00%	0.23%
300 ≤ W < 450	80.65%	4.67%
450 ≤ W < 600	8.23%	0.48%
600 ≤ W < 750	4.68%	0.27%
≥ 750	2.45%	0.14%
2 ≤ L < 3	**41.38%**	**5.11%**
< 300	0.00%	0.00%
300 ≤ W < 450	80.70%	4.12%
450 ≤ W < 600	18.13%	0.93%

600 ≤ W < 750	0.00%	0.00%
≥ 750	1.17%	0.06%
≥ 3	**6.72%**	**0.83%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	100.00%	0.83%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
700000 ≤ P < 900000	**5.04%**	**4.42%**
< 1	**2.45%**	**0.11%**
< 300	0.00%	0.00%
300 ≤ W < 450	36.18%	0.04%
450 ≤ W < 600	63.82%	0.07%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**35.93%**	**1.59%**
< 300	0.00%	0.00%
300 ≤ W < 450	43.27%	0.69%
450 ≤ W < 600	27.27%	0.43%
600 ≤ W < 750	22.36%	0.36%
≥ 750	7.09%	0.11%
2 ≤ L < 3	**55.17%**	**2.44%**
< 300	0.00%	0.00%
300 ≤ W < 450	93.75%	2.29%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	6.25%	0.15%
≥ 750	0.00%	0.00%
≥ 3	**6.45%**	**0.28%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	23.40%	0.07%
≥ 750	76.60%	0.22%
≥ 900000	**3.74%**	**3.28%**
< 1	**0.00%**	**0.00%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**68.33%**	**2.24%**

< 300	0.00%	0.00%
300 ≤ W < 450	14.27%	0.32%
450 ≤ W < 600	33.33%	0.75%
600 ≤ W < 750	21.20%	0.47%
≥ 750	31.20%	0.70%
2 ≤ L < 3	**20.56%**	**0.67%**
< 300	0.00%	0.00%
300 ≤ W < 450	25.60%	0.17%
450 ≤ W < 600	74.40%	0.50%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
≥ 3	**11.11%**	**0.36%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	62.00%	0.23%
600 ≤ W < 750	26.30%	0.10%
≥ 750	11.70%	0.04%
Induction Heating	**11.95%**	**11.95%**
700000 ≤ P < 900000	**19.15%**	**2.29%**
< 1	**25.00%**	**0.57%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	76.12%	0.44%
600 ≤ W < 750	23.88%	0.14%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**75.00%**	**1.72%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	22.64%	0.39%
600 ≤ W < 750	77.36%	1.33%
≥ 750	0.00%	0.00%
2 ≤ L < 3	**0.00%**	**0.00%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
≥ 3	**0.00%**	**0.00%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%

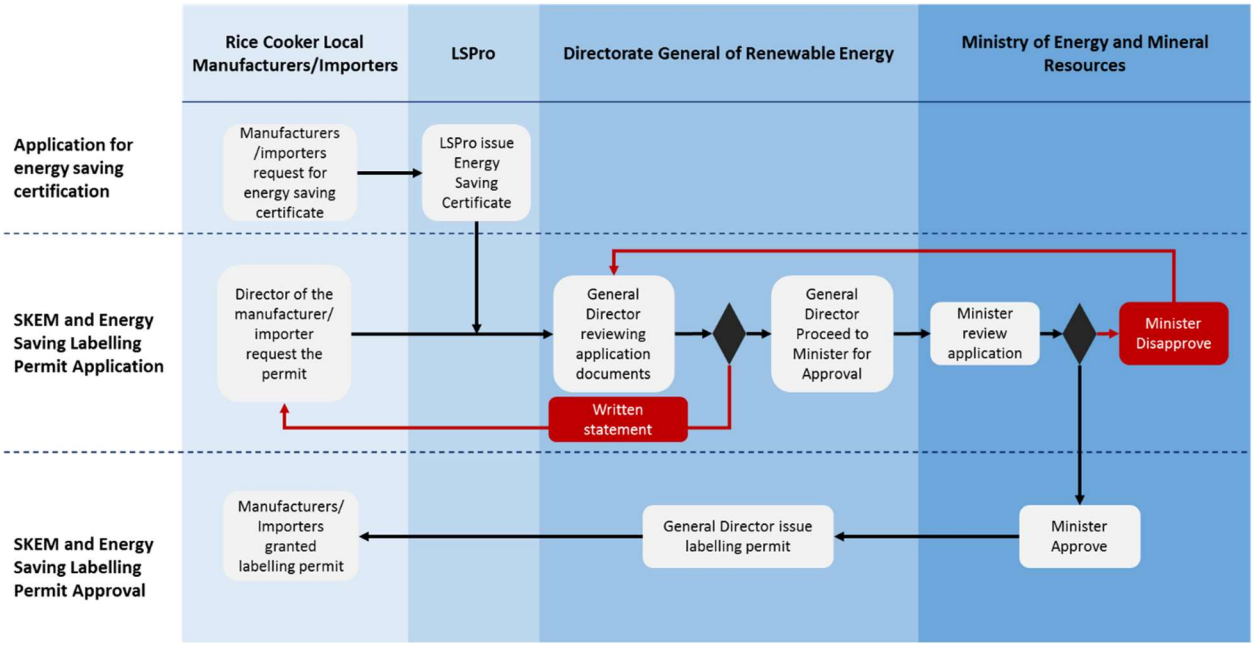
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
≥ 900000	**80.85%**	**9.66%**
< 1	**0.00%**	**0.00%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**75.00%**	**7.25%**
< 300	0.00%	0.00%
300 ≤ W < 450	6.33%	0.46%
450 ≤ W < 600	24.75%	1.79%
600 ≤ W < 750	23.58%	1.71%
≥ 750	45.33%	3.28%
2 ≤ L < 3	**25.00%**	**2.42%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	100.00%	2.42%
≥ 750	0.00%	0.00%
≥ 3	**0.00%**	**0.00%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
Induction Pressure	**0.35%**	**0.35%**
≥ 900000	**100.00%**	**0.35%**
< 1	**0.00%**	**0.00%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%
1 ≤ L < 2	**65.00%**	**0.23%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	33.45%	0.08%
≥ 750	66.55%	0.15%

2 ≤ L < 3	**35.00%**	**0.12%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	23.20%	0.03%
600 ≤ W < 750	0.00%	0.00%
≥ 750	76.80%	0.09%
≥ 3	**0.00%**	**0.00%**
< 300	0.00%	0.00%
300 ≤ W < 450	0.00%	0.00%
450 ≤ W < 600	0.00%	0.00%
600 ≤ W < 750	0.00%	0.00%
≥ 750	0.00%	0.00%

Appendix F: Detailed Assessment of MEPS Draft

Regulation for the Standar Kerja Energi Minimum (SKEM) or in English MEPS has not been published and the drafting process is still under discussion. The regulation will be about the application of SKEM and Energy Saving labelling for energy utilized equipment. The types of equipment required are e.g. Air Conditioner, Lamp, Fan, Rice Cooker, and Refrigerator. The labelling aims to limit the maximum energy consumed by the permitted products. The Ministry of Energy and Mineral Resources, General Directorate of Renewable Energy, National Standardization Agency, National Certification Agency, Local Manufacturers, and Importers are contributing in the regulation drafting process.

Producers and importers are obliged to obey regulations in order to obtain Energy Saving Certificate, SKEM Label, and Energy Saving Label. The process as follows:



Notes:

- *SKEM and Energy Saving Labelling Permit valid for 3 years.*
- *Permit extension should be applied 3 months at the earliest and 1 month at the latest before it is expired with the same application process.*

Overview of the energy efficiency draft regulation for Indonesia

The regulation on the energy efficiency testing and labeling would cover various household electronic appliances, in which Rice Cooker products is one among the soon to be regulated appliances. In order to acquire the labeling rights, the manufacturer need to obtain certification on the energy efficiency level that comes from certified tester / laboratory called LSPro. The requirement is described below. As of now, there is no regulation on the energy efficiency of rice cooker as well as the regulation on the testing method to determine the energy efficiency level. The regulation however, is currently in draft format and the plan is to issue the regulation in early 2020, below is the summary of the regulation.

Requirements on items for energy efficiency labeling on household electronic appliances

	Energy Saving Certificate	Standar Kinerja Energi Minimum (SKEM)	Energy Saving Labelling
Requirement	- Name and address of domestic/imported producers - Name and address of energy utilization equipment importers - Brand, type and capacity/ power/volume/diameter energy utilization equipment - Energy performance value - The statement fulfills the SKEM and the number of stars listed - Date, name, and person in charge's sign for LSpro - LSpro certificate number	- Energy saving certificate - NPWP - SNI ISO 9001:2008 Certificate - Picture of energy utilization equipment products - Reading instructions of energy utilization equipment products' code - Planned total production/import for 1 year - Registered Shareholders Certificate (DPS) with business entity according to provisions of government regulations - Tax clearance certificate from the directorate general of taxation **Additional requirement for Importers:** - General import identification number (API-U) file - ISO 9001: 2015 certificate	- Energy saving certificate - NPWP - SNI ISO 9001:2015 Certificate - Picture of energy utilization equipment products - Reading instructions of energy utilization - Planned total production/import for 1 year - Deed of Establishment of a Company

In this application, the energy efficiency of a rice cooker can be seen from the comparison between energy consumption for cooking rice and / or heating rice for 5 hours in watt hours (Wh) and volume (L). In the HS code, the rice cooker has a volume of up to a capacity of 3 liters. The energy saving sign label criteria are divided into 4 stars. Then it is applied in the energy saving sign label.

Energy Saving Labeling Reference

Energy Saving Level (Watt hour/liter)			
1 Star	**2 Star**	**3 Star**	**4 Star**
331 - 370	301 - 330	271 - 300	≤ 270