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Global Alliance for Clean Cookstoves

Indonesia Market Assessment

Sector Mapping

Introduction

- This Market Assessment was conducted by Accenture Development Partnerships (ADP), the not-for-profit arm of the global management consultancy, Accenture, on behalf of the Global Alliance for Clean Cookstoves (the Alliance).
- It is intended to provide a high level snapshot of the sector that can then be used in conjunction with a number of research papers, consumer surveys and other sources (most published on the Alliance's website) to enhance sector market understanding and help the Alliance decide which countries and regions to prioritize.
- It is one of sixteen such assessments completed by the Alliance to:
  - Enhance sector market intelligence and knowledge.; and
  - Contribute to a process leading to the Alliance deciding which regions/countries it will prioritize.
- Full slate of market assessments include studies in: Bangladesh, Brazil, Colombia, East Timor, Ethiopia, Ghana, Indonesia, Kenya, Mexico, Nigeria, Peru, Rwanda, South Africa, Tanzania, Uganda and Vietnam.
- Each assessment has two parts:
  - Sector Mapping – an objective mapping of the sector.
  - Intervention Options – suggestions for removing the many barriers that currently prevent the creation of a thriving market for clean cooking solutions.
- In each Alliance study a combination of ADP and local consultants spent 4-6 weeks in country conducting a combination of primary (in-depth interviews) and secondary research. They used the same Market Assessment 'Toolkit' for each country so that comparisons can be made. The Toolkit is available free of charge to all organizations wishing to use it in other countries.
- **The Alliance wishes to acknowledge the generous support of the following donors for the market assessments: *Barr Foundation, Dow Corning Corporation, Shell Corporation, Shell Foundation,* and the governments of *Canada, Finland,* and *Spain*.**

This market assessment was produced by Accenture Development Partnerships (ADP) on behalf of the Alliance. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of the Global Alliance for Clean Cookstoves or its partners. The Alliance does not guarantee the accuracy of the data.

Agenda

- Executive Summary
- Project Approach
- Sector Mapping
  - Macro Environment Assessment
  - Indoor Air Pollution Assessment
  - Consumer Assessment
  - Cookstove Industry Assessment
  - Carbon Financing
  - Sector Mapping Summary

Indonesia Sector Mapping

Macro

- With over 237 million people, Indonesia is the fourth most populated country in the world
- 127 million people live in rural areas and 31.6 million people live below the poverty line
- Indonesia is the largest ASEAN (Association of Southeast Asian Nations) economy, and the manufacturing sector accounts for 26.4% of total GDP
- Indonesia has successfully transitioned democracy and increased regional autonomy
- The Yudhoyono administration is establishing incentives to reduce bureaucratic delays for foreign investment (small, domestic businesses do not meet this bureaucracy)
- Several Government programs are focused on reducing deforestation and land degradation while increasing energy efficiency awareness and utilization
- Indonesia's poor infrastructure and island geography lead to high business operating costs
- Indonesia is rich in a wide range of both non-renewable and renewable energy resources

Indoor Air Pollution (IAP)

- Use of biomass and rudimentary stoves by approximately ¾ of households in Indonesia results in significant IAP and health damage across the country
- Consumer awareness is low, although people do complain of breathing and eye discomfort
- NGO awareness of IAP is high and several organizations have initiated pilot cookstove programs
- Pertamina's kerosene to Liquid Petroleum Gas (LPG) program could be complemented by an IAP awareness campaign
- Several existing cookstove programs have begun to create market-based industries for niche cookstoves

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Indonesia Sector Mapping

Consumer

- At lower incomes typical diets include rice with some modest garnishing and vegetables, while people with higher incomes spend more on fish, meat, eggs, dairy and fruit
- Due to varying fuel costs and availability, households often use different fuels for cooking different types of food
- Customers are segmented into two geographic segments; those regions targeted by the LPG conversion program (Java, Sumatra, Kalimantan and Sulawesi) and the segment not targeted by the conversion program (Papua, Maluku, and NTT)
- Each segment is further divided based on rural/urban situation and income segment
- Urban and rural segments, coastal urban and peri-urban regions, have started to face firewood availability issues

Cookstove Industry

- The majority of households in urban areas own LPG stoves, however rural areas still largely rely on traditional biomass stoves
- Indonesia has a huge industry in basic stoves, and whole villages are in the business of selling stoves
- Most people are in the habit of buying stoves, however, only at a very low price point
- The Government's LPG subsidy has accelerated transition from kerosene to LPG stoves, however, explosive accidents has deterred consumers in rural areas from switching
- Many people prefer wood, due to the instability of modern fuel; wood is both collected and purchased
- There is an unwillingness to pay upfront premium**s** because people do not always see the long term economic benefit of improved stoves

Indonesia Sector Mapping

Carbon Financing

- Potential carbon financing options can reduce the price of clean cookstoves
- Indonesia already has one Clean Development Mechanism (CDM) - accredited stove program and others are in the approval process
- Indonesia has a Designated National Authority for CDM projects, a CDM-approved stove design, and projects which are currently receiving CDM Certified Emission Reductions (CER)
- Indonesia has potential for carbon financing activities in support of a clean cookstove program through bundling of national carbon finance projects

Conclusion

- Indonesia's high prevalence of IAP can potentially be reduced with a cookstove solution that leverages the existing stove industry; although low price points and high distribution costs will cause challenges

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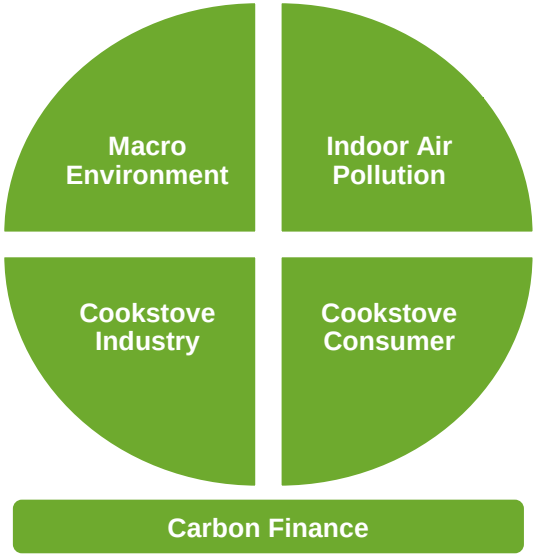
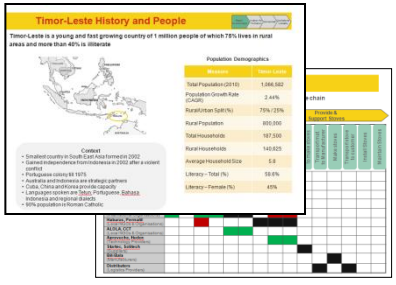
Project Approach

A structured approach first assessed the market for a cookstove industry and then used the sector mapping output to develop the intervention options and operational plan

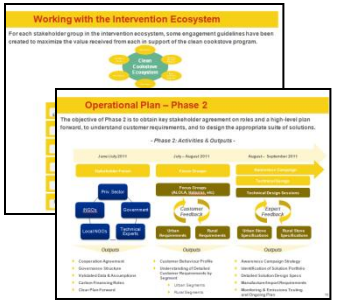
Sector Mapping





Sector Map

Strategy Development



Intervention Options And Operational Plan

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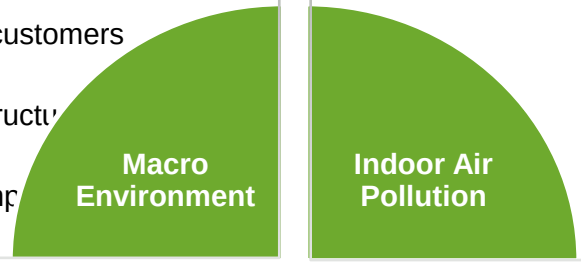
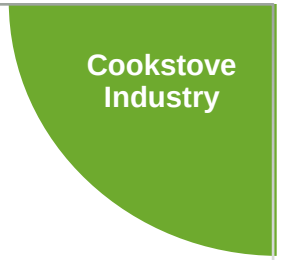
Sector Mapping Approach

Sector Mapping for a cookstove industry was conducted across four dimensions – macro environment, indoor air pollution, cookstove consumer, and current cookstove industry



- Social: What are the country demographics, cultural practices, and population distribution across regions?
- Political: What is the political environment, how stable is Government and what political risks will any program face?
- Economic: How much money do our potential customers have and what is their economic cycle?
- Technological: How sophisticated is the infrastructu our region and what is the plan for progress?
- Environmental: How do ecological conditions imp success of an IAP program?

- What is the current IAP exposure profile of our target market? (primary cause of IAP and size of problem)?
- What lessons can we learn from historic IAP programs?
- What are the opportunities / threats of current and future IAP programs?
- Who are the key actors involved in IAP programs?



- What cooking devices are currently owned and used within the region?
- Who are the main cooking device designers & suppliers?
- How attractive is the industry from a commercial perspective and what are likely to be some of the industry challenges?

- What is the profile of the target market?
- How can the customer population be segmented / categorized?
- How big is each customer segment and what are its characteristics?
- What are the specific needs of each customer segment?

Carbon Finance

- What carbon financing options exist for the country?
- What structures exist which can be leveraged for future carbon financing components?
- Which entities are likely to fill the required roles in the carbon finance operating model?

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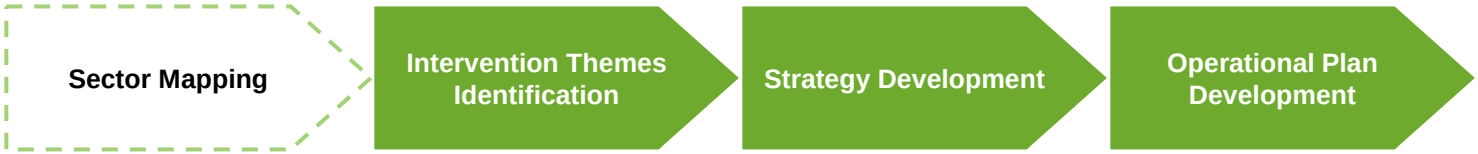
Intervention Options Approach

The Strategy Development was conducted by using the sector mapping as an input to identify intervention areas, and develop recommendations and an operational plan



- Catalogue favorable and unfavorable factors contributing to the development of a cookstove industry ~~on~~ in the following dimensions:
  - Macro Environment
  - Indoor Air Pollution
  - Consumer
  - Current Cookstove Industry

- Identify possible interventions to promote a clean cookstove industry by:
  - Addressing the unfavourable factors
  - Aligning with the favorable factors

- Customer Segment Strategy:
  - Identify appropriate technology to serve each customer segment
  - Develop a holistic customer strategy including marketing, and financing
- Overall Strategy:
  - Develop a strategy for stakeholder engagement across the segments
  - Develop a strategy for raising awareness across the segments
  - Identify possible NGOs and programs to partner with

- Develop an operational plan that includes:
  - Detailed immediate next steps
  - Short term (3-6 months) activities and milestones
  - Long term (6 months – 2 years) high level directional plan

Acknowledgements

Many organizations made valuable contributions to this study with their knowledge of Indonesia or experience in cookstove initiatives

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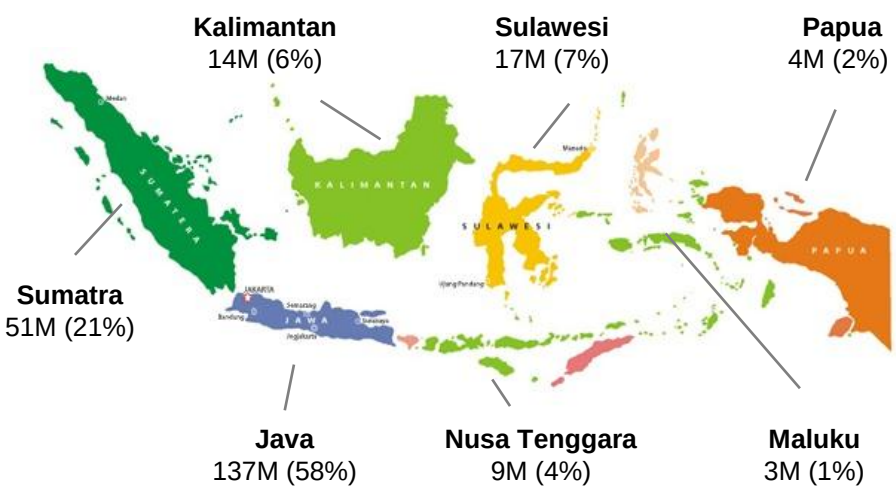
Social Environment

Indonesia has over 237 million people living in 59 million households; 52% of the population is rural and 13.3% lives below the poverty line

Regional Population Distribution



Context

- Largest country in South East Asia comprising of 17,508 islands, with rich cultural diversity
- Official language: Bahasa Indonesia
- 86% Muslim, 9% Christian, 2% Hindu, 3% others

Measure	Indonesia
Total Population	237.6M
Annual Population Growth Rate	1.07%
Rural / Urban Split	52%/ 48%
Rural Population	120M
Total Households	59M
Rural Households	31M
Average Household Size	4
People Below Poverty Line	13.3%
Life Expectancy at Birth (years)	71.3
Literacy – Total (%)	90%

- Implications -

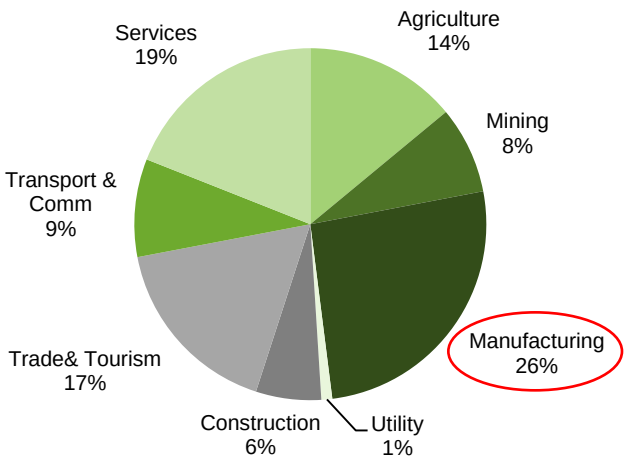
A cookstove intervention can serve a large market size; cultural diversity between regions should be taken into consideration in any intervention

Source: USAID, Indonesian 2010 Census Data, CIA World Factbook

Economic Environment

At $755 billion, Indonesian GDP is the highest in ASEAN with manufacturing as the largest component; most economic activity is located in Java

Indonesian GDP Composition



Key Indicators	Indonesia
GDP	USD 755B
GNI Per Capita (2009)	USD 2,580
Economic Growth Rate (2010)	6.1%
Inflation Rate (2010)	5.1%
Unemployment (2011)	7.7%
Ease of Doing Business Rank	121
GDP by Sector (2010)	• Agriculture: 16.5% • Industry: 46.4% • Service: 37.1%
Access to Finance	• Commercial bank prime lending rate – 12.29% • 50K MFIs, Bank Rakyat Indonesia is largest with 3.5M+ active borrowers • 25% micro enterprises have access to micro credit

Context

- 62% of non-oil GDP originates in Java island
- Of the 20,325 medium and large scale industries in Indonesia 84% are located in Java island

- Implications -

A cookstove intervention can benefit from Indonesia's strong manufacturing sector and microfinance sector

Note: USD 1 = IDR 8,500

Source: Business Monitor, CIA World Factbook, World Bank July 2011, Indonesia 2010 Census

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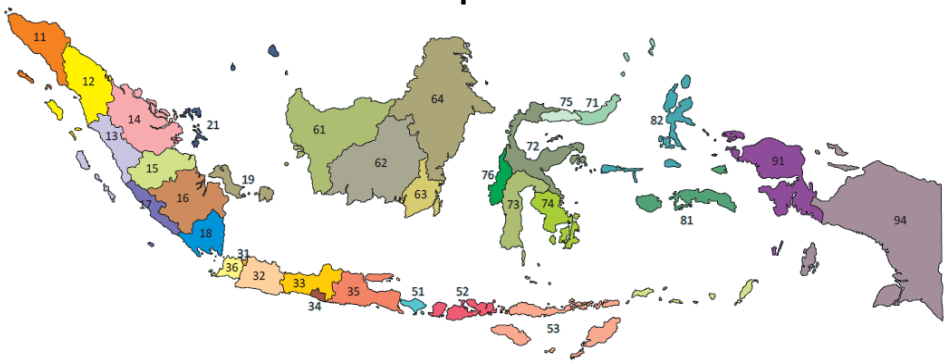
Political Environment

Provincial Governments have considerable autonomy, only select NGOs are permitted to work in states like Papua

Political Map of Indonesia



Administrative Map

- 33 provinces, each with own local Government and legislation, headed by a governor
- Considerable provincial autonomy to implement own agendas with central Government creating enabling legal and policy environment

Current Political Situation

- President Susilo Yudhoyono has been head of state and the Government since October 2004
- Liberation movements in Aceh and Papua make them politically sensitive regions; several NGOs are banned from operating in Papua

Relevant Govt. Agencies

- Ministry of Energy and Mineral Resources defines policies
- Other related Government agencies include Ministry of Empowerment, Ministry of Cooperatives Small and Medium Enterprises, and the National Council on Climate Change

Working with Government

- *"Government organizations lack systems for transparency and accountability"*
- *"Efficiency of state institutions is limited by bureaucracy"*

- Implications -

A cookstove program should align plans across Government levels and should partner with organizations that have local presence in politically sensitive regions

Source: Business Monitor Indonesia Political Outlook

Transport Infrastructure

Eastern islands are accessible only by water or air, raising distribution costs; within the islands difficult terrain and limited road network make transportation difficult and costly

Intra Island

Roads
- Network varies by island; Java has 7% of land area and 27% of road network while Maluku and Papua have 23% of land area and 7% of road network
- Difficult geological and weather conditions hamper infrastructure development
  - Steep mountains, fragile soil and heavy rainfall affect infrastructure quality in Papua and West Timor

Railways
- Four railway systems, one in Java and three in Sumatra; none in East Indonesia

Inland Waterways
- More than 10,000km of navigable waterways in Kalimantan and Sumatra

Inter Island

Ports and Shipping
- Approximately 300 public ports of which 43 are international liner service ports
- Shipping is prevalent for inter-island goods distribution
- Key ports across country are:
  - Java: Tanjung Priok, Surabaya, Semarang, Cirebon
  - Sumatra: Belawan, Padang, Panjangon
  - Kalimantan: Balikpapan, Banjarmasin, Samarinda
  - Sulawesi: Ujung Pandang, Bitung
  - Maluku: Ambun
  - Papua: Sorong

Air
- Extensive air transport network with 652 airports
- Air transport required for remote regions in East Indonesia

- Implications -

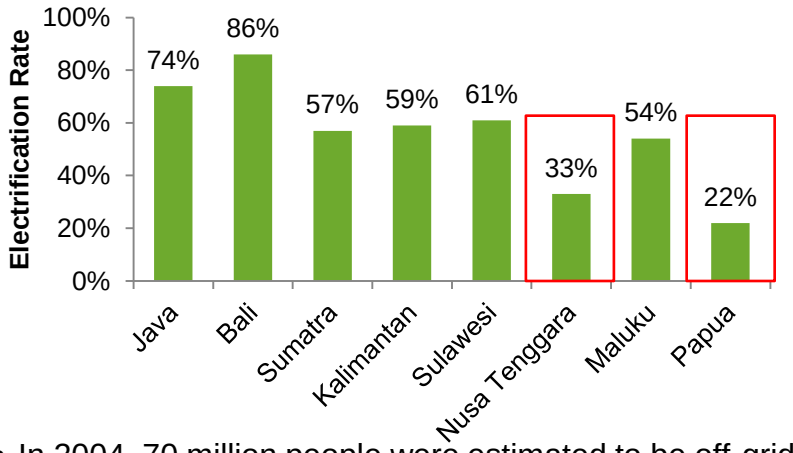
Alternate business models or distribution channels may need to be considered for cookstove dissemination in East Indonesia

Source: Business Monitor Indonesia Report 2010, World Bank

Infrastructure

Access to electricity remains challenging in rural areas; cellular and internet services have increased communication within the country

Power Supply



- In 2004, 70 million people were estimated to be off-grid
- ~50% of rural households do not have access to electricity; Nusa Tenggara and Papua have the lowest electrification rate
- Indonesian Government has set a goal to increase electricity coverage to 90% of population by 2020

Telecommunication

- Telecommunications market is underpenetrated compared to other ASEAN countries:
  - Only 40% of population has landline service
  - 78% mobile phone penetration rate vs. 122% (Malaysia) and 144% (Singapore)
- Although lagging behind its regional neighbors, telecommunications network development has increased significantly in Indonesia due to the roll out of a wireless network
- Internet access remains limited; approximately 30.3 million internet users exist as of 2009

- Implications -

Lack of stable power supply may limit production in some regions to low-tech cookstoves; cellular phones could be a potential medium for cookstove awareness campaigns

Source: Business Monitor Indonesia Report 2010, World Bank 2009, World Bank: The Global Partnership on Output Based Aid

Natural Resources

Indonesia is rich in resources such as petroleum, coal and forests; however supply is threatened by over exploitation

Fossil Energy

Oil
- Net importer of oil
- 0.36% of world's proven reserves
- Aging oil fields and lack of investment in new equipment has reduced production

Natural Gas
- 1.69% world's proven gas reserves
- 53% of gas produced was exported

Coal
- Produced 229 million tones in 2008, of which 70% was exported
- 126.07 billion ton coal proven reserve, contributing to 0.57% of total world's proven reserve

Natural Forest

- Large rainforests with extensive biodiversity; total forest area estimated at 98 million hectares
- High deforestation rate - between 1982 and 2005, about 34 million hectares of forest were cleared
- Forests in Sulawesi almost completely cleared, forests are predicted to disappear in Kalimantan and Sumatra if current forestry trends persist
- Indonesia's forests also store high quantities of carbon; the extensive forest clearance in Indonesia has caused the release of carbon to the surrounding environment, contributing to global warming

- Implications -

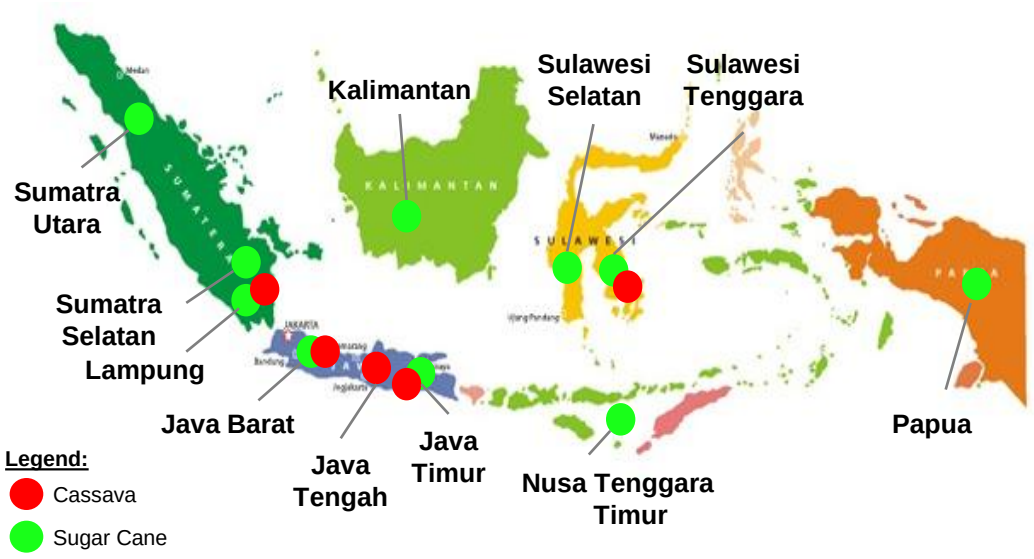
Cookstove awareness campaigns should emphasize the importance of consumer education on the environmental benefits of using clean cooking fuel

Source: Indonesia Energy Scenario to 2050: Projection of Consumption, Supply Options and Primary Energy Mix Scenarios; CIA World Factbook; Global Business Watch Indonesia; Global Forest Watch

Renewable Energy

Indonesian Government is committed to develop the bio-fuel sector for alternate energy

Bio-ethanol Production Region



- Indonesia has abundant bio-fuel sources such as palm, sugarcane, cassava and jatropha
- Target is to grow production capacity to10.22M kl of bio-diesel and 6.28M kl of bio-ethanol by 2025
- Government to provision 6.5M hectares of land for production – 3M for expansion of palm oil plantation, 1.5M each for jatropha and cassava, and 0.5M for sugarcane
- Bio-fuel to be used in transportation, commercial industries and power plants; no plans for household consumption
- Dumai, in Riau province, established as center of bio-fuel production

- Implications -

A cookstove program could consider using bio-fuels particularly in regions that produce bio-fuels

Source: Asia Pacific Economic Cooperation; Biofuel Industry in Indonesia: some Critical Issues, USDA Foreign Agricultural Service

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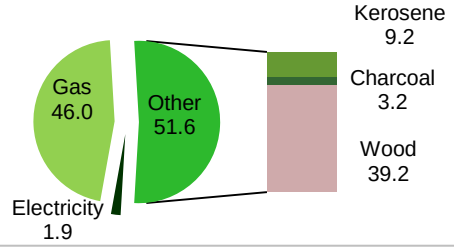
Indoor Air Pollution in Indonesia

Indoor Air Pollution Assessment

The use of biomass and rudimentary stoves by the majority of households in Indonesia results in significant IAP and health damage across the country

IAP Cause	Scenes	Comments
Cooking Fuel		**Distribution of Households by Cooking Fuel** 
Cooking Device		• Biomass dependent households use basic stoves made of mud, brick or clay • Some remote households cook with three stone fires • Kerosene stoves were widely adopted due to former fuel subsidy • Government distributed 52M LPG stoves since 2007
Housing Structure		• In Java, majority households cook indoors; As per survey in Yogyakarta, 57% cooked indoors in separate kitchen, 28% cooked indoors in merged room and 15% cooked outdoors • Outdoor cooking is more common in remote areas

IAP Impact (2002)

Mortality from Solid Fuel Use

- 15000K total deaths - 3K ALRI deaths in children <5 years and 12K COPD deaths in adults >= 30 years

Morbidity from Solid Fuel Use

- 321K disability adjusted life years – among top 20 in the World, at par with Kenya

National Disease Share

- 0.7% of national burden of disease attributed to solid fuel use

- Implications -

Intervention programs should aim to replace the use of inefficient stoves, and promote a reduction in wood usage and a conversion to modern fuels

Source: Handbook of Energy and Economic Statistics in Indonesia, MEMR 2009; Masters Thesis by Gitafajar Saptyani

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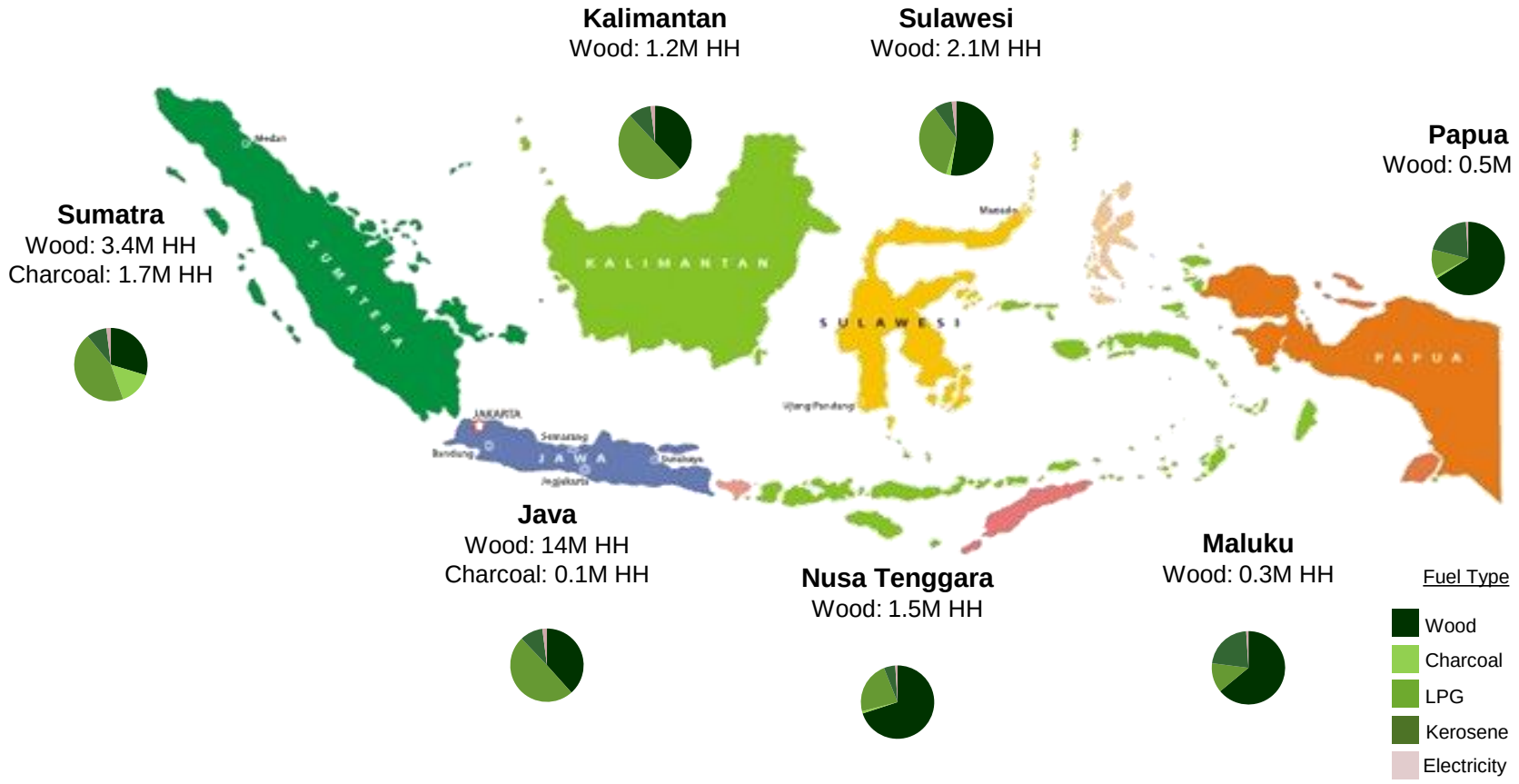
Regional Cooking Fuel Usage

Within each island, relative fuel usage varies; in number of households, charcoal usage is highest in Sumatra while wood usage is highest in Java



- Implications -

A cookstove intervention should incorporate regional habits and requirements and design solutions accordingly

Source: Handbook of Energy and Economic Statistics in Indonesia, MEMR 2009, Yayasan Dian Desa

Indoor Air Pollution Awareness

While the Government does not have an IAP program, the Kerosene to LPG program could be complemented by an IAP awareness campaign; consumer awareness is low

	Awareness Level	Awareness Type	Comments from the Field
Federal Government	Low	• Health ministry in the past has not been interested in IAP programs • Ministry of Energy is interested in promoting clean and renewable energy	"The Government lacks interest; need to bring their attention to IAP" *- Local NGO program lead*
State / Local Government	Low	• Social programs are focused on health and poverty reduction • Development plans and programs differ at each Government level	"Government health clinics in districts organize education but do not specifically focus on IAP" *- Local NGO program officer*
NGOs	Moderate	• ARECOP, the regional coordinating body for cookstove programs, was based in Indonesia and now folded into the NGO Yayasan Dian Desa	"IAP still remains an issue in Indonesia, but we lack the skills to introduce clean cookstoves commercially" *- Local NGO program coordinator*
Consumer	Low	• Consumers experience breathing and eye discomforts, but do not connect it to IAP • Consumers do not have a strong traditional attachment to smoke	"Communities need to be educated on the effects of smoke ~~on~~ **in** the air" *- Cookstove program implementer*

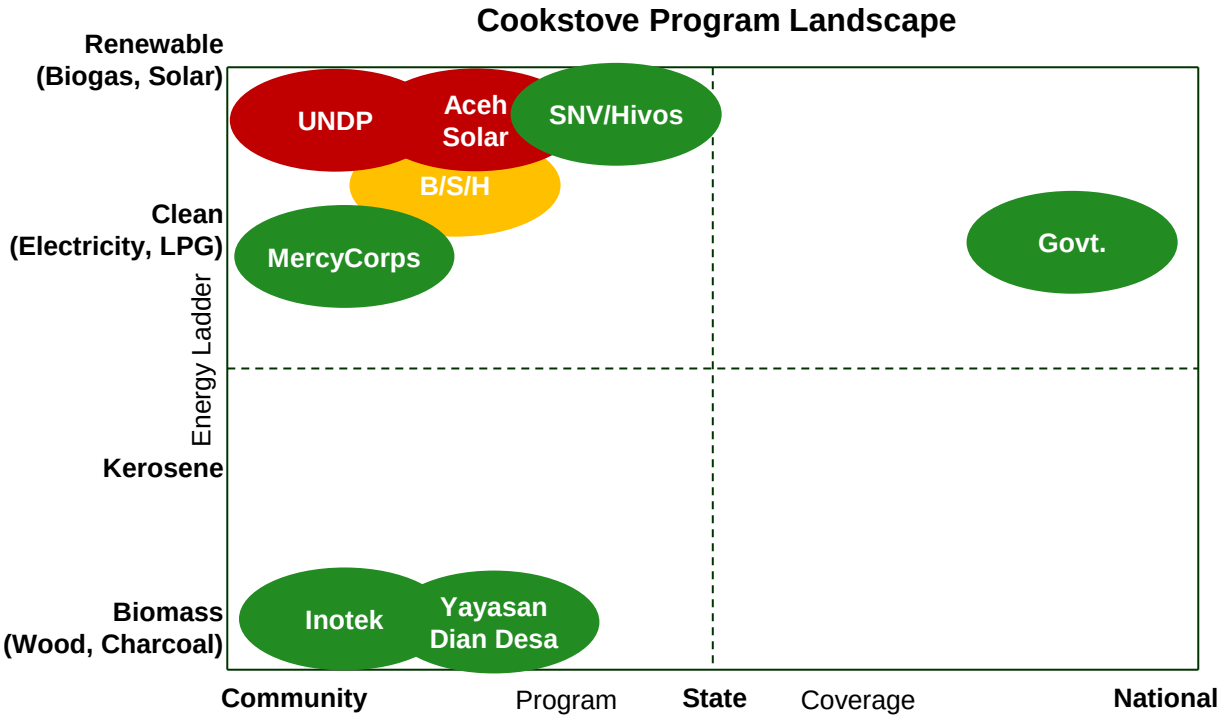
- Implications -

Awareness raising and education are critical components of a successful cookstove intervention

Source: Interviews

Cookstove Program Landscape

Several organizations have initiated pilot cookstove programs; however, their target markets and implementation approaches vary widely



- Implications -

Multiple entities running cookstove programs provide a large base of collective experience from multiple partners allowing the leverage of existing program reach for future niche interventions

Source: Interviews

Cookstove Program Activity

The majority of cookstove programs are located in Java and while most are still in pilot phase, one program has successfully established a commercial market for efficient charcoal stoves

Aceh Solar Cooker (Closed)
- Target Aceh post tsunami relief
- 1,000 stoves with CDM

MercyCorps
- Target 15K Tofu & Tempe producers in Jakarta
- LPG and biogas stoves

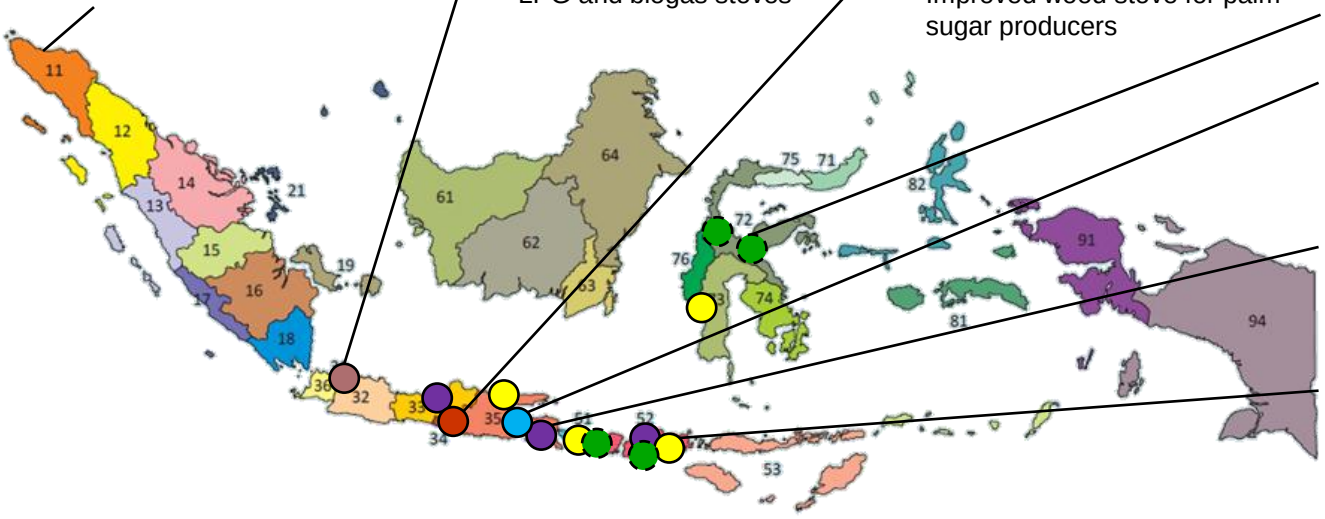
Yayasan Dian Desa
- Commercial market for efficient charcoal stove
- Improved wood stove for palm sugar producers

Bosch Siemens
- Target jatropha oil plantations/ areas of high plant availability
- 2,000 stoves

UNDP Biogas
- Target dairy farmers in Lumajang, East Java
- 15 digesters, ~40 households

Inotek
- Target households in Central and East Java and in West Tengarra
- 4,000 stoves

SNV/Hivos
- Target farmers with at least two cows
- 3,150 digesters or households



11 Aceh	17 Bengkulu	33 Jawa Tengah	53 Nusa Tenggara Timur	72 Sulawesi Tengah	82 Maluku Utara
12 Sumatera Utara	18 Lampung	34 DI Yogyakarta	61 Kalimantan Barat	73 Sulawesi Selatan	91 Papua Barat
13 Sumatera Barat	19 Kepulauan Bangka Belitung	35 Jawa Timur	62 Kalimantan Tengah	74 Sulawesi Tenggara	94 Papua
14 Riau	21 Kepulauan Riau	36 Banten	63 Kalimantan Selatan	75 Gorontalo	
15 Jambi	31 DKI Jakarta	51 Bali	64 Kalimantan Timur	76 Sulawesi Barat	
16 Sumatera Selatan	32 Jawa Barat	52 Nusa Tenggara Barat	71 Sulawesi Utara	81 Maluku	

Ongoing
- SNV/Hivos
- Kopernik
- UNDP Biogas
- Yayasan Dian Desa
- MercyCorps

Planned
- Bosch Siemens

- Implications -

There is potential to leverage existing programs and distribution channels and implement a regional model for scaling a cookstove program in Sumatra, Sulawesi, and more remote areas of Indonesia

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Cookstove Programs (1/3)

While some Indonesian cookstove programs have used subsidy and donation based approaches others have begun to create market-based industries for niche cookstoves

	Govt. (Kerosene to Gas)	SNV/Hivos	Inotek
Partners	• Government of Indonesia • Pertamina	• SNV • Hivos • Rabobank, potentially BNI / Mandiri • Local Manufacturers	• Kopernik • Inotek • Prof. Nurhuda from Brawijaya Univ. (inventor)
What	• Convert kerosene and some firewood using households and SMEs to LPG	• 4 to12 Cubic Meters (cu.m.) household biogas digesters, mainly for cooking • 20 year life	• Efficient biomass stove UB 3.0 manufactured locally by Inotek
How	• Distribute conversion kits that include 3 kg LPG cylinder, single burner stove, tube and regulator • Eligible HH must be an Indonesian citizen and earn <IDR 1.5M per month • LPG refill at 100% subsidy	• Biogas sector development through local entrepreneurs engaged in activities such as construction of digesters, stove manufacturing, etc. • SNV grant to build 8,000 digesters over 3.5 years	• Stove listed on Kopernik's online platform that brings together communities, funders and technology • Recruit women to sell stoves for commission
Financing	• Distributed free to qualifying households	• Digester cost €500, of which €150 is paid by SNV and €350 financed by farmers	• Financed by communities or donors
Challenges	• Convincing people that LPG is less dangerous than kerosene	• Government fully subsidized biogas digester is a constraint • Funding required for next phase	• Stove design needs improvements – wood needs to be cut in small pieces, putting out fire is challenging • Monitoring usage and gathering feedback
Lessons Learnt	• Quality control important to avoid accidents	• Technology should be easy to use and efficient • Develop local partner capacity • Quality control, maintenance and monitoring are critical for sustainability • Need micro credit or financing for expensive technology	• Tap into networks of women organizations • Abandoned importing stoves as it was too difficult to work with Government

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Cookstove Programs (2/3)

Local training and capacity building initiatives are enabling communities to create commercial industries for cookstoves

	UNDP Biogas	Yayasan Dian Desa	Bosch Siemens
Partners	• District Government of Lumajang • KEMCO • PT. Bumi Harmoni Indonesia	• Yayasan Dian Desa • Indonesia Cookstoves Network (JKTI)	• Bosch Siemens Home Appliances • New World Energy
What	• 15 biogas units • Each unit provides cooking fuel, lighting and fertilizer to 2-3 HH	• Improved cook stove projects in Yogyajakarta and Kugo Progo (improved stove for coconut sugar) • To enhance the viability of biomass fuel	• Improved cookstove powered by crude plant oil • Targeting Jatropha plantations throughout NTB and Sulawesi
How	• Dairy cows from HH provide manure	• Cookstove programs are shifting toward using a business model approach • Sell a range of stove models for household and commercial use • Run stove efficiency and emissions testing	• Identifying and training local retailers
Financing	• Dairy farmers paid IDR 10,000 per day for three years	• Market development by using a commercialization approach	• Examining carbon credits and donation options to subsidize cost of stove
Challenges	• TBD	• Lacks commercialization capability – need business plans, mass production, and quality control marketing • Distribution costs are very high	• Quality control implementation • Supply chain impediments • Start-up costs
Lessons Learnt	• TBD	• There is a need for a regional or national network	• Oil plantation involvement is needed for self-sustaining markets

Cookstove Programs (3/3)

Local training and capacity building initiatives are enabling communities to create commercial industries for cookstoves

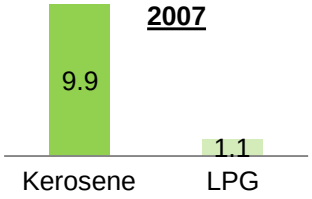
	MercyCorps	Aceh Solar Cooker	
Partners	• SEEP • Swisscontact • PUPUK • Ministry of Environment • KOPTI • The Indonesian Tempe Forum	• Klimaschutz e.V. • PT Petromat Agrotech	
What	• Increases efficiency and product quality for tofu and temp producers through a market approach to gas and biogas sales • Total market of factory owners in Indonesia is 125,000, mostly located in Java, with smaller producers in Sumatra, Kalimantan, Sulawesi, and Papua	• Sabang Islands/Aceh/Indonesia and Aceh Tenggara • Transfer and spread cookers and ~~of~~ heat retaining containers	
How	• Train soybean distributors to sell stove equipment to producers and link to leasing companies	• Deliver partially prefabricated cookers • Employ about 10 people who are trained and supervised to assemble the solar cookers	
Financing	• Leasing companies/cooperatives and Government DNS program	• Tsunami relief duty exemption • CDM carbon credits	
Challenges	• Promoting and scaling beyond Jakarta • Supplier capacity • Variability in stainless steel prices	• Duty exemption process	
Lessons Learnt	• If some change everyone will copy • Train distributors to stock to control for prices changes	• Solar cooker is not idea for all types of food, such as meats	

Kerosene to LPG Conversion Program

Government of Indonesia and Pertamina are implementing a nationwide program to convert household kerosene users to LPG

Situation

- Till 2007, Kerosene widely used as cooking fuel and heavily subsidized by Government
- Kerosene market characterized by supply shortages and price fluctuations
- LPG usage limited to rich households

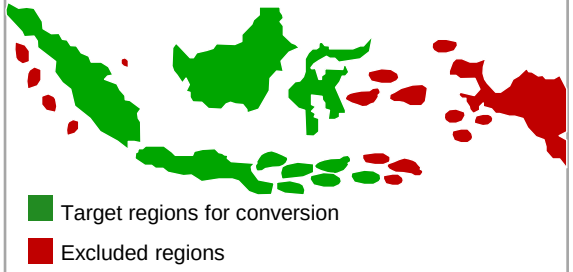


Challenges

- Safety concerns caused by LPG related accidents
- Lack of proper training on LPG use
- Lack of quality control for conversion kit equipment
- Lack of infrastructure for distribution to remote islands

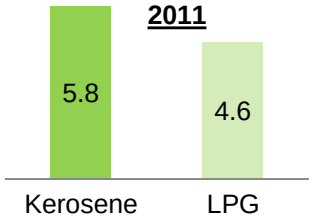
Conversion Program

- Implement from 2007 to 2012
- Distribute LPG conversion kits (3kg LPG bottle, single burner stove and regulator set) to eligible households and small businesses
- Transfer subsidy from kerosene to LPG, thereby reducing kerosene consumption
- Reallocate kerosene to more profitable jet fuel use
- Target market excludes over 2.2M households in East Indonesia and remote islands

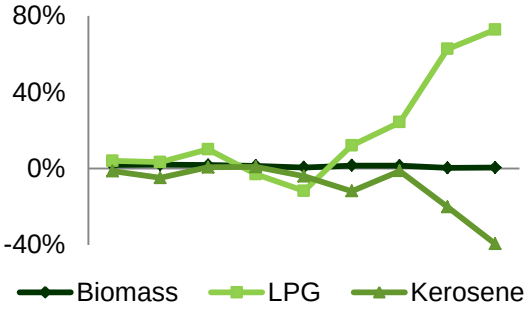


Result

- Distributed 52M conversion kits
- Net savings of USD 3B in Government subsidies



Household Energy Consumption Year on Year Growth (2001 – 2009)



- Implications -

The LPG Conversion program has created a momentum toward modern fuel usage, which a cookstove program can build upon

Source: Pertamina, Handbook of Energy Economic Statistics of Indonesia (2010)

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Related Environmental Programs (1/2)

Several environmental initiatives are underway in partnership with the Ministry of Energy, Mineral Resources, Ministry of Forestry, and the humanitarian sector

Focus	• Green environmental awareness and training	• UN REDD Programme	• Manage forest ecosystems • Clean energy development	• Environmental small grants • Forest watershed management
Participants	• World Bank • Wildlife Conservation Society	• UN-REDD Programme • Ministry of Forestry	• USAID • Tetra Tech ARD	• UNDP • Ministry of Forestry • Yayasan Bina Usaha Lingkungan
Programs	• Environmental awareness and training activities designed to improve rural livelihoods while benefiting the environment and wild habitats in Project areas	• Facilitate the development of a REDD+ architecture in Indonesia • $5.6 M USD approved by the UN-REDD Programme Policy Board for the Indonesia National Programme • Reduce forest-related GHGs	• Reduce threat of deforestation and climate change • Reduce forest degradation from over-harvesting and conversion for 6 million hectares • Low carbon growth development strategies • Implement private sector, local enterprise and market linkage	• Reduce forest and land degradation • Enhance and scale-up existing Government programs • Improve local livelihoods and equitable access to natural resources among the poor • Small grants program to empower communities to protect the environment

- Implications -

A cookstove intervention should explore partnering with existing environmental programs to benefit from the momentum already created

Related Environmental Programs (2/2)

Existing NGO, Government, and humanitarian initiatives are creating distribution channels that span the more remote provinces of Indonesia

	USAID FROM THE AMERICAN PEOPLE / WORLD NEIGHBORS	unicef / USAID FROM THE AMERICAN PEOPLE	care / Australian Government	
Focus	• Adapting to Climate Change in Eastern Indonesia	• Green and clean slums	• Kalimantan forest and climate partnership	• Energy Self-Sufficient Village Program
Participants	• USAID • World Neighbors	• USAID • UNICEF	• CARE • Indonesian Government • AusAid	• Ministry of Energy and Mineral Resources
Programs	• Reduce vulnerability for 2,000 households from improved agriculture, forestry, and water management techniques • Increase awareness of disaster management for 3,000 people	• Build the capacity of water utilities and city water and sanitation working groups, providing community and school facilities, and improving solid waste management • Eastern Indonesia and Jakarta	• Village-based land use planning, community-based forest management, and strengthening local institutions • Sustainable livelihoods opportunities and payment mechanisms to distribute REDD incentives	• Develop villages in Indonesia through energy supply with intervention and investment of technology to produce energy from renewable sources • Looking for a biofuel stove to fit with the program

- Implications -

A cookstove program can align with key focus areas of existing programs and partner in program implementation, training, funding, etc.

Related Programs

Several health, women's empowerment and community development initiatives are underway that have operational frameworks to reach communities

Focus	• PNPM Mandiri VI • Povery reduction and improved local governance	• Humanitarian, health and emergency response	• Market oriented agricultural service	• Water and sanitation program
Participants	• The World Bank • PNPM Mandiri	• World Vision	• World Bank • Ministry of Agriculture	• CARE Indonesia
Programs	• Provides funds to poor rural and urban communities for community-level investment in development priorities • Recently received $531 M USD loan from the World bank to provide block grants and implementation support to 5,000 rural sub-districts	• Disaster preparedness, capacity building and learning efforts on disaster management • Connecting humanitarian agencies in information network • Health and nutrition strategy	• Develop agricultural services system, based on partnerships between farmer groups, public agencies and the private sector • Institutional capacity building	• Targets both rural and urban areas in South Sulawesi, Nusa Tenggara Timur, and Papua • Each community team plans, decides the levy, manages funds, and maintains a water sanitation system

- Implications -

A cookstove intervention can leverage the reach of existing development programs to disseminate stoves, create awareness, and gain credibility in target communities

NGO and Humanitarian Presence

Several humanitarian agencies and NGOs have a presence in Indonesia through related health, environmental, and emergency response initiatives

Java	MercyCorps, World Vision, care, Wildlife Conservation Society, USAID, UNDP
Sumatra	MercyCorps, care, Wildlife Conservation Society, USAID, unicef, UNDP
Kalimantan	World Vision, care, USAID
Sulawesi	World Vision, care, Wildlife Conservation Society, USAID, unicef, UNDP
Nusa Tenggara	World Vision, care, USAID, unicef
Maluku	MercyCorps, World Vision, USAID
Papua	World Vision, care, USAID, unicef, UNDP

- Implications -

A cookstove program should evaluate the potential for a humanitarian approach that uses existing channels and programs for natural disaster response

Agenda

- Executive Summary
- Project Approach
- Sector Mapping
  - Macro Environment Assessment
  - Indoor Air Pollution Assessment
  - **Consumer Assessment**
  - Cookstove Industry Assessment
  - Carbon Financing
  - Sector Mapping Summary

Cooking Habits

Foods vary with income levels, with convenience food consumption rising near urban centers, while cooking habits vary with stove ownership, fuel availability and cooking requirements

Type of Food

- At lower incomes typical diets include rice with some modest garnishing and vegetables
- Moderately higher incomes permit a more varied diet with a significantly higher share of spending on fish, meat, eggs, dairy and fruit
- Indonesian consumers are increasingly purchasing convenience food, prepared meals, and snacks

Cooking Habits

- On average families spend 3 hours cooking per day
- Most cooks are women, and the majority cook indoors
- Meals cooked with anglo stoves and charcoal may be considered tastier
- Older generations may prefer traditional stoves for ease and habit of use
- Many households use different types of fuels for different purposes

Dual Usage	Long Cooking Time High Volume (rice, meat, boiling water)	Short Cooking Time Low Volume (vegetables, noodles, tea)
Charcoal and Kerosene	Charcoal	Kerosene
LPG and Charcoal	Charcoal	LPG
LPG and Kerosene	Kerosene	LPG

Fuel Choice

- Implications -

A cookstove solution can potentially be scaled across the country, however it must adjust for the variation in cooking preferences and uses

Source: Food Exporters Guide to Indonesia, 2003

Regional Cooking Habits

Indonesian cuisine and cooking habits vary greatly by regions and provinces; staple food is rice in West Indonesia, cassava in more arid areas, and papeda in Papua and Maluku

Sumatra
- Staple food is rice; meats, vegetables, soy
- Some dishes are cooked for hours in bamboo stalks

Rendang

Kalimantan
- Staple food is rice
- Many areas rely on sustenance hunting and fishing

Java
- Staple food is rice; meats, vegetables, soy

Sate (cooked over a wood or charcoal fire)

Nusa Tenggara
- Cook with less rice and more sago, corn, and cassava

Sulawesi
- Seafood and meat dishes
- Many dishes are roasted on charcoal

Vegetables in earth pit oven

Maluku
- Staple food is papeda made of sago flour; seafood is common
- Famed as the "spice islands"

Papua
- Staple food is papeda made of sago flour; boar and tubers, such as sweet potatoes are common
- Often cooking is done in a pit in the ground over hot rocks

Papeda

- Implications -

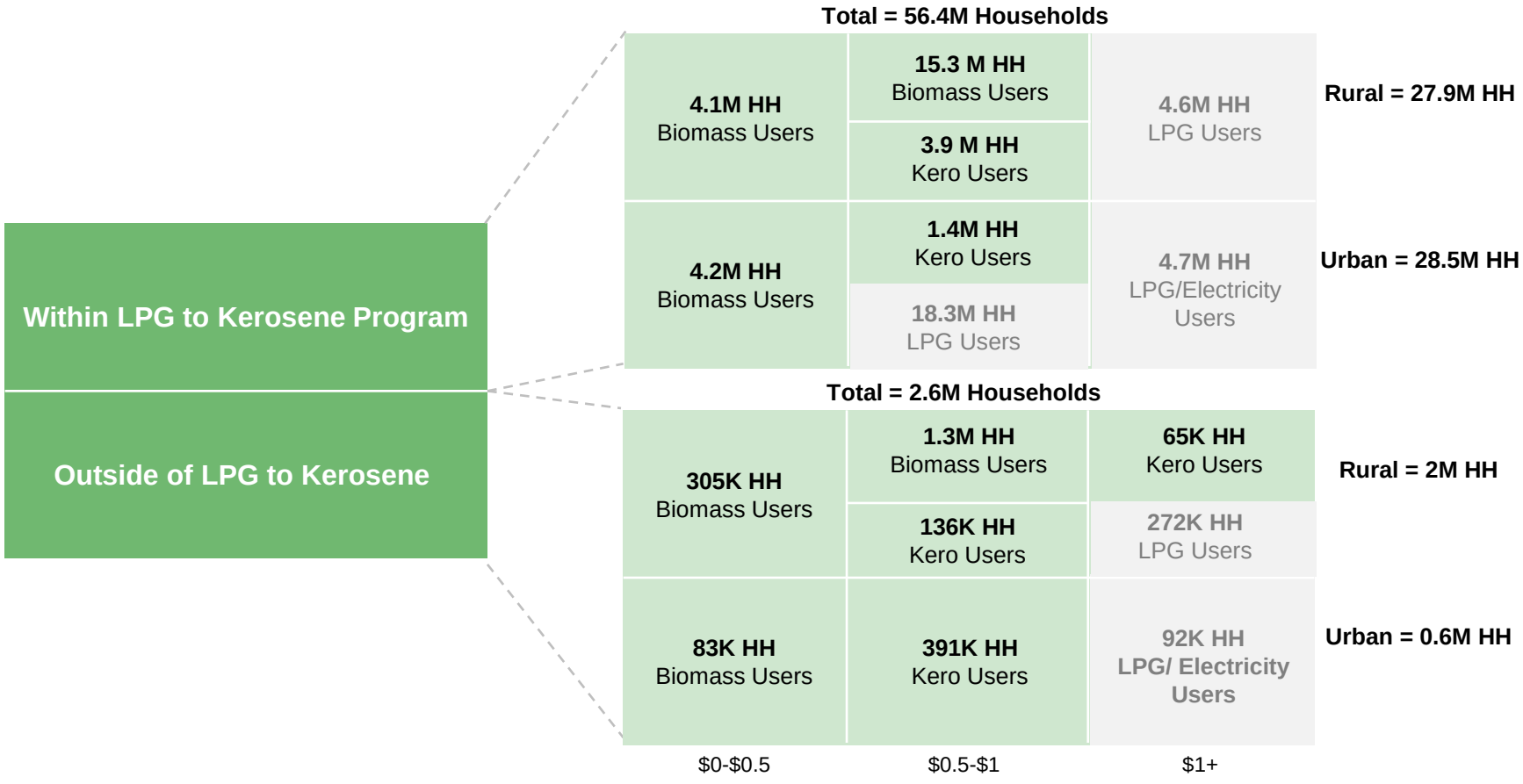
Target segment identification and segmentation should account for regional differences and cultural considerations

Source: Food Exporters Guide to Indonesia, 2003

Target Market Identification

Situation

Majority of the market is biomass or kerosene users in rural and urban areas of West Java, about 2.6 M households are in East Java, outside of the Kerosene to LPG conversion program



- Implications -

The target market comprises a population of over 31 million people mostly located in West Indonesia

Source: Indonesian 2010 Census, Yayasan Dian Desa, Pertamina

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Within LPG to Kerosene Program

Consumer Assessment

The islands of Java, Sumatra, Kalimantan, and Sulawesi were impacted most by the Government Kerosene to LPG Conversion Program

	 Urban Poor	 Urban Traditional	 Rural Poor	 Rural Innovator
Size in HH	• 4.2M	• 1.4M	• 4.1M	• 19.2M
Profession	• Hawkers, odd jobs	• Food stalls, small businesses	• Sustenance farming, animal husbandry	• Farmer, small business
Daily Income	• $0-$0.5	• $0.5-$1.0	• $0-$0.5	• $0.5-$1.0
Cooking Fuel	• Biomass	• Kerosene	• Biomass	• Biomass (80%) • Kerosene (20%)
Cooking Location	• Small, enclosed unit	• Small unit with window	• Inside and outisde	• Inside and outside
Cooking Frequency	• 2-3 times/day	• 2-3 times/day	• 2-3 times/day	• 2-3 times/day
IAP Exposure	• High	• Moderate	• High	• High
IAP Awareness	• Low	• Moderate	• Low	• Moderate to Low
Environment Impact	• High	• Moderate	• High	• High
Barriers to Switch	• Upfront cost	• Ongoing fuel cost, safety	• Cost, fuel supply	• Cost, fuel supply
Willingness to Pay	• Low	• $7.4 USD/week	• Low	• Up to $2.7 USD/week
Purchase Drivers	• Cost saving	• Lower fuel cost, safety, secure supply, health	• Sustainable fuel supply, reduced cost	• Economical benefit, health benefit

Outside of LPG to Kerosene

The islands of Java, Sumatra, Kalimantan, and Sulawesi were impacted most by the Government Kerosene to LPG Conversion Program

	 Urban Poor	 Urban Traditional	 Rural Poor	 Rural Innovator
Size in HH	• 84K	• 390K	• 305K	• 1.5M
Profession	• Hawkers, odd jobs	• Food stalls, small businesses	• Sustenance farming, animal husbandry, hunting	• Farmer, small business
Daily Income	• $0-$0.5	• $0.5-$1.0	• $0-$0.5	• $0.5-$1.5
Cooking Fuel	• Biomass	• Kerosene	• Biomass	• Biomass (86%) • Kerosene (14%)
Cooking Location	• Small, enclosed unit	• Small unit with window	• Inside and outside, cook and sleep in small unit	• Inside and outside, cook and sleep in small unit
Cooking Frequency	• 2-3 times/day	• 2-3 times/day	• 2-3 times/day	• 2-3 times/day
IAP Exposure	• High	• Moderate	• High	• High
IAP Awareness	• Low	• Moderate	• Low	• Moderate to Low
Environment Impact	• High	• Moderate	• High	• High
Barriers to Switch	• Upfront cost	• Ongoing fuel cost, safety	• Cost, fuel supply	• Cost, fuel supply
Willingness to Pay	• Low	• $2,1 USD/week	• Low	• Up to $2.1 USD/week
Purchase Drivers	• Cost saving	• Lower fuel cost, safety, secure supply, health	• Sustainable fuel supply, reduced cost	• Economical benefit, health benefit

Niche – Biogas

About 43% of Indonesians work in agriculture, and in areas with a high concentration of mammalian livestock households can benefit from conversion to biogas energy

Size in HHs	• 900K
Profession	• Farmer (at least two cows, not free roaming)
Daily Income	• $0.5-$1.0
Cooking Device & Fuel	• Wood, kerosene, or LPG stove users
Cooking Location	• Kitchen, remote areas sleep in same room
Cooking Frequency	• 2-3 times/day
IAP Exposure	• Medium
IAP Awareness	• Low-Medium
Environment Impact	• High
Barriers to Switch	• Resistance to attach a toilet to a biogas plant
Willingness to Pay	• Depends on fuel prices and access to biogas credit
Purchase Drivers	• Sustainable fuel supply, fertilizer as a byproduct • Biogas is a status symbol

Niche – Plant oil

Plant oil cookstoves are a sustainable, clean option for households in areas with a sufficient supply of plants

Size in HHs	• 1.5 M
Profession	• Oil plantation workers, farmer
Location	• Jatropha plantations throughout Java, NTB, Sulawesi and Papua
Cooking Device & Fuel	Targeting primarily kerosene and monetized biomass users (designed to mimic the kerosene stove)
Cooking Location	• Enclosed kitchen
Cooking Frequency	• 2-3 meals/day
IAP Exposure	• Medium
IAP Awareness	• Low
Environment Impact	• High
Barriers to Switch	• Upfront cost
Willingness to Pay	• Varies with subsidy and micro credit availability
Purchase Drivers	• Sustainable, inexpensive fuel; clean stove

Previously unusable arid land can be used to plant these jatropha shrubs, which require very little water and thrive in poor soil

Institutional – Food Stalls

A cookstove program can benefit food stall vendors throughout Indonesia, improving the health of workers and the quality of food provided to consumers

Size	• Niche
Profession	• Food vendor
Location	• Urban and peri-urban areas
Cooking Device & Fuel	• Charcoal and Kerosene
Cooking Location	• Outside and inside
Cooking Frequency	• Several hours/day
IAP Exposure	• Medium
IAP Awareness	• Low
Environment Impact	• High
Barriers to Switch	• Perceived decrease in tastiness of food
Willingness to Pay	• Medium
Purchase Drivers	• Economical benefit, safety

Institutional – Tofu and Tempe Producers

Consumer Assessment

Improved cookstoves can greatly enhance the health and livelihoods of tofu and tempe producers and increase factory production; MercyCorps' program can reach the Indonesia-wide industry

Size	• 125,000 factory owners
Profession	• Tofu and Tempe factory owners • Workers often marginalized migrants
Location	• Mostly located in Java, with smaller producers in Sumatra, Kalimantan, Sulawesi, and Papua
Cooking Device & Fuel	• Wood
Cooking Location	• Enclosed factory
Cooking Frequency	• Several hours/day
IAP Exposure	• High
IAP Awareness	• Medium
Environment Impact	• Medium (health impact high)
Barriers to Switch	• Upfront cost, safety concern
Willingness to Pay	• High
Purchase Drivers	• Increased production, other people having it

Stove for tempe production

Steam boiler for tofu production

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Customer Segmentation Summary

There is a large IAP target market among rural and urban households in both the regions within and outside of the Government conversion program, there is high potential for niche market development

Customer Segment Characteristics

Segment	Size	IAP Exposure	IAP Awareness	Affordability	Willingness to pay	Alternative Use	Distribution Access
Urban Poor	◕	◕	◑	◔	◔	◑	◑
Urban Traditional	◑	◑	◕	◕	◕	◑	◑
Rural Poor	●	●	◔	◔	◔	◔	◔
Rural Survivor	●	●	◑	◑	◑	◔	◔
Biogas	◑	◑	◑	◑	◑	◕	◑
Plant Oil	◑	◑	◔	◑	◑	◔	◑
Food Stalls	◑	◑	◔	◑		◔	◑
Tofu and Tempe Producers	◑	◕	◔	◑	◕	◔	◑

◔ Low ◕ Moderate High
◑ Moderate Low ● High

- Implications -

A cookstove program can potentially impact a variety of customer needs throughout Indonesia by using a multi-solution approach

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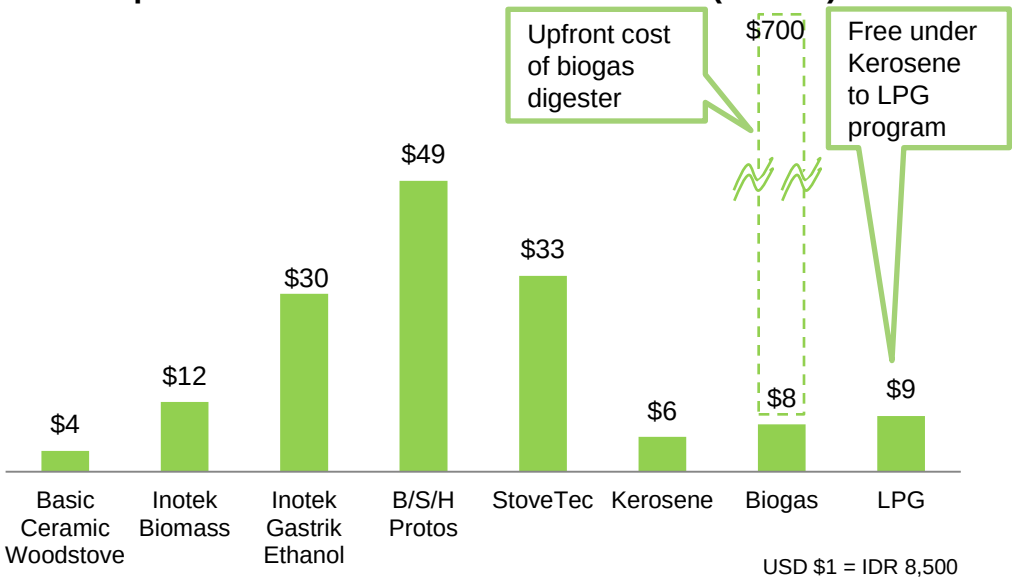
Available Cookstove Usage and Cost

Basic ceramic stoves are locally made and available at low cost while improved stoves have higher prices and limited distribution; free LPG stoves under the Government program are an exception

Upfront Cost of One Burner Cookstove (in USD)



USD $1 = IDR 8,500

Locally Manufactured Wood and Kerosene Stoves

Cookstove Usage

- Java island has villages that produce clay cookstoves and people on the island are in the habit of buying stoves
- Basic clay woodstoves last for 6 months to a year
- Inotek biomass stoves need a combustion chamber replacement once a year which costs about $4
- Inotek Gastrik stoves useliquid bioethanol and require some electricity to convert liquid to gas
- B/S/H Protos stoves use plant oil and require an oil extractor, usually community-owned
- Biogas stoves are applicable in households with at least two cows and require biogas digesters that cost ~$700

- Implications -

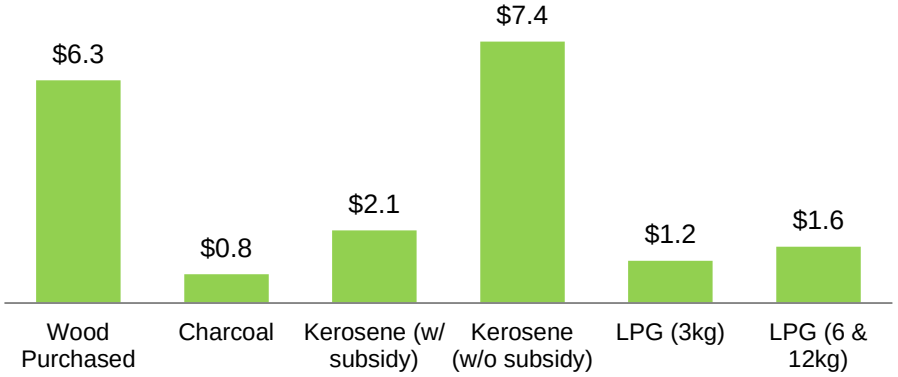
The upfront cookstove cost is a major factor in the limited adoption of modern fuels and improved biomass cooking solutions; a cookstove intervention should aim to reduce this cost

Source: charlesroring.blogspot.com

Available Fuel Usage and Cost

While in the long run wood and charcoal cost more, they can be purchased in smaller quantities requiring less financial outlay

Fuel Cost per Week (in USD)



USD $1 = IDR 8,500

Fuel Cost based on Purchase Unit

Fuel	Purchase Unit	Usage	Cost
Wood	8-10kg	2 days	IDR 7,000 / USD 0.82
Charcoal	Small bag	2 days	IDR 2,000 / USD 0.24
Kerosene	1 liter	1+ day	IDR 9,000 / USD 1.06 IDR 2,500 / USD 0.3
LPG	3 kg	10 days	IDR 12,750 / USD 1.5

Fuel Usage

- The removal of kerosene subsidies from areas where subsidized 3kg LPG is available, is causing people to switch to LPG or back to firewood
- Many people are afraid to use LPG due to the incidence of LPG explosive accidents
- Of those using LPG, many use it outside of the house
- LPG and biogas use can be perceived as a status symbol
- People tend to cook with wood because it is less expensive or free
- Wood is generally collected; 10% of fuelwood users purchase wood from others
- Consumer demand exists for comfortable usage, cheap fuel and secure availability
- Many people prefer wood to gas due to fuel instability

- Implications -

Perceived instability of modern fuels despite lower long-run costs will require a holistic cookstove solution and awareness campaign

Note: Fuel cost calculations are for family of average size (4 persons), cooking average two meals a day, LPG prices are with current subsidies
Source: Interviews

Current Technology Landscape

When available cookstove technology was rated against high level parameters, LPG and efficient wood stoves stood out for households market

Rating:
- High - 4
- Medium - 3
- Low - 2
- Minimal - 1

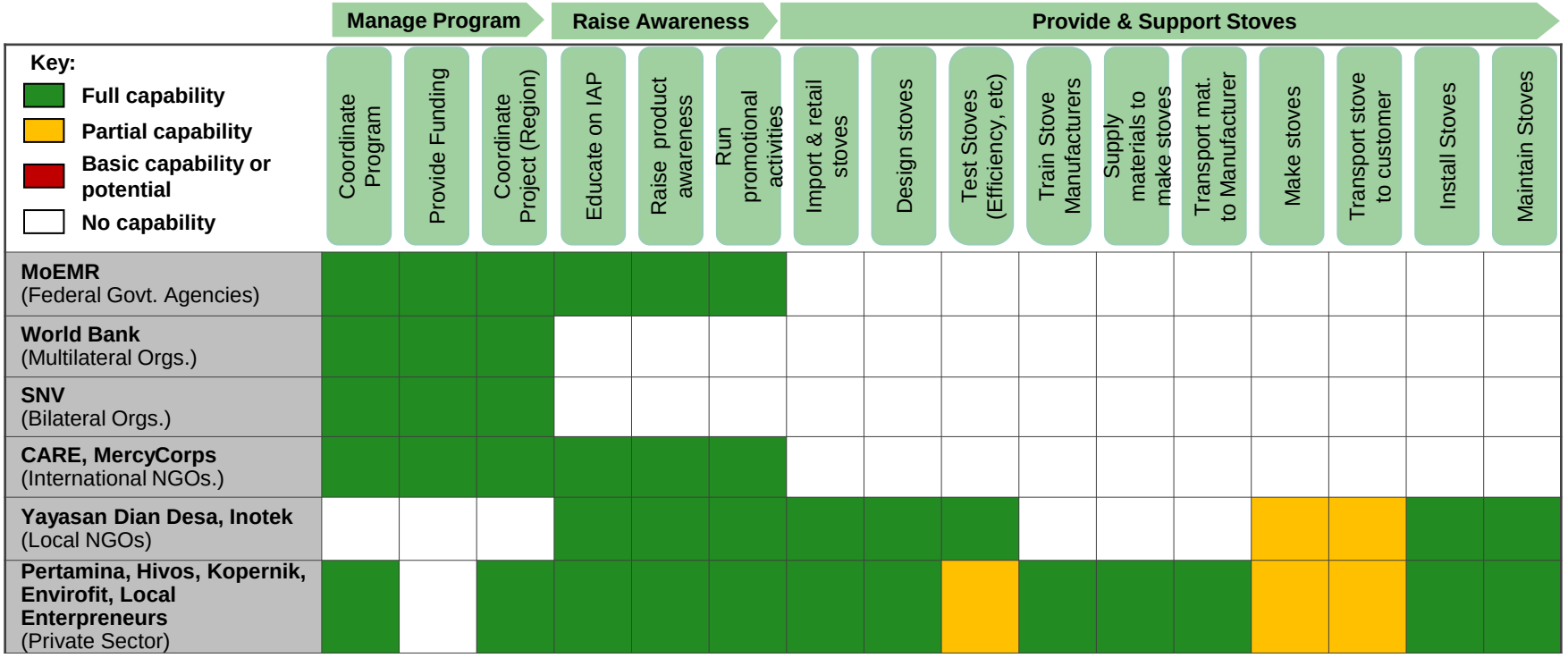
	Low Cost	Availability	Secondary Uses	Usability	Housing Structure	Aesthetics	Cleanness	Performance	Health Benefits	Safety
Basic Cookstove	4	4	1	4	2	1	1	1	1	2
Efficient Cookstove	3	2	1	3	2	3	3	3	3	2
Kerosene Cookstove	2	4	1	2	4	3	3	3	1	1
LPG Cookstove	2	3	1	2	4	4	4	4	4	4
Biogas Cookstove	1	2	1	2	3	4	4	4	4	4
Ethanol Cookstove	2	1	1	2	4	4	4	4	4	4
Plant Oil Cookstove	2	1	1	2	4	4	4	2	4	4

- Implications -

There are diverse choices of improved cookstoves available in Indonesia; customers may be willing to adopt improved cookstoves if they are made available at a cost-effective price

Cookstove Industry Value Chain

Currently there are commercial cookstove production activities in Indonesia; key challenges faced are mainly related to production scale up and products distribution



- Implications -

There is a potential to expand the commercial cookstove industry in Indonesia by providing assistance in the areas of production scale up and product distribution

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Established Stove Industries

There is already a stove manufacturing and distribution network in Java, with whole communities dedicated to stove manufacture

Traditional Anglo Stove

- Household stove
- Traditional stove used across ~~in~~ Java (16% efficiency)
- People are accustomed to buying stoves at IDR 5,000
- Stove life is approximately one year
- 100-300 stoves per month

Thai Bucket Stove

- Large volume stove and household stove
- Improved charcoal fuel usage
- Costs 40,000 IDR for household model and 45,000 IDR for street vendor model

Kerosene Stove

- Prior to the conversion program kerosene stoves achieved widespread penetration
- High proportions of East Indonesia continue to use kerosene stoves
- Efficient stoves are being developed to mimic the kerosene stove appearance and usage

- Implications –

Case examples of successful stove industries demonstrate the market attractiveness for new producers, existing stove infrastructure can be utilized for cookstove dissemination

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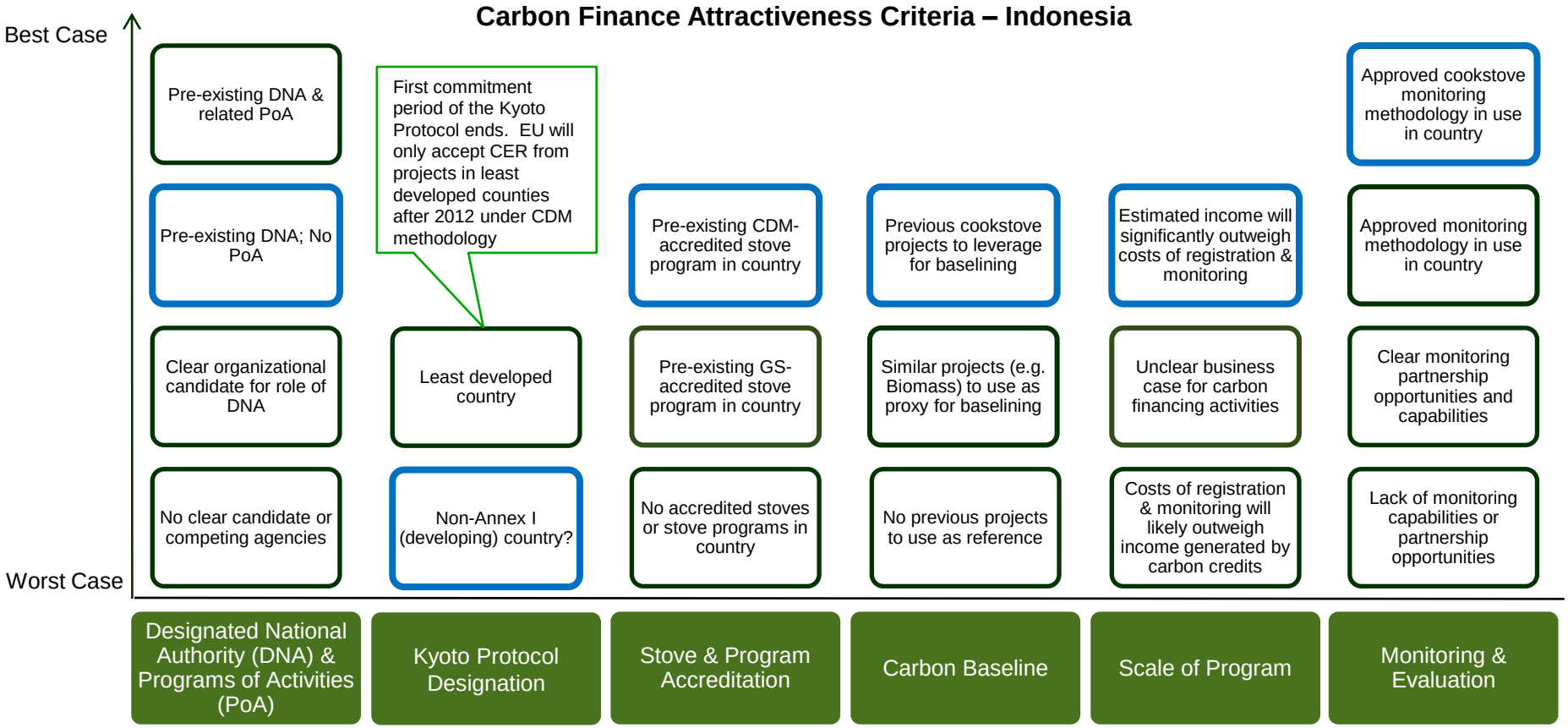
  - Sector Mapping Summary

Carbon Finance Market Attractiveness

Indonesia has one completed CDM-accredited stove program and others in the process, the impact of Kyoto Protocol is unclear, yet Gold standard carbon credits will remain a promising option



- Implications -

Indonesia ranks moderately high for market attractiveness to support a potential cookstove program with carbon financing revenues

Legend:

Indonesia

Note: Clean cookstove PoA currently in process of registration with expected approval end of 2011

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Carbon Finance Landscape

Pending Kyoto Protocol extension, Indonesia has the infrastructure for CDM projects, and a Gold Standard accredited cookstove program

Carbon Financing Landscape – Indonesia

Area	Data	Comments
Designated National Authority	Three components: National Commission, Technical Team, and Secretariat	DNA Secretariat based in National Council on Climate Change (NCCC)
CDM Projects Approved by DNA	133 approved projects	Of which 7 are biomass, 22 biogas, 5 other renewable, and 4 fuel switch
Registered CDM Projects	28 registered CDM projects	One of which is cookstove program
Gold Standard Projects	2 registered Gold Standard projects	Gold Standard used to certify some CDM projects
Accredited Cookstove Programs	Protos Plant Oil Cooker	Gold Standard accredited
Carbon Funds	World Wildlife Fund Indonesia, World Bank	WFF Indonesia is DNA Technical Team member
Other Mechanisms	None	

Note: Protos Plant Oil Cooker is pending CDM approval

Carbon Finance Programs

Several programs with carbon financing components have begun in Indonesia including a Save80 CDM-accredited POA and the Plant Oil Cookstove gold standard initiative

	CLIMATE MANAGEMENT LTD CDM - RENEWABLE ENERGY - PLANTATIONS	B/S/H/ protos	think • go climate conscious atmosfair GLOBAL BDA business development agency
Focus	• Improved Cook Stove program	• Plant Oil Cooker Project • Semarang and Lombok Pilots	• CDM Program~~me~~ of Activities for fuel efficient cook stoves in Indonesia
Participants	• PT Petromat Agrotech	• Tjokro Group • The Bellagio Forum for Sustainable Development • Waterland • Fauna Flora International • New World Energy	• Atmosfair • PT Enerxi • Atmosfair
Description	• Duties exempted because it was post-tsunami, 150 CDM, also a little work in Yogya • 1,000 stoves pilot (at one point Aceh wanted 400,000 stoves but couldn't get approval for the budget) • Just stopped monitoring last week	• Initial development in 2003 • Launched serial production in 2010 in Jakarta • Pending UNFCCC and Gold Standard approval • Estimate potential market in Indonesia is 1.5 million stoves (5% share) • Profits to be put back into the business to lower the price of the stoves	• To use CDM funding for the purchase and distribution of fuel efficient stoves to households from 2012 • To distribute 300,000 stoves free of charge • Save80 stove model prefabricated in Germany to be locally assembled • Pending validation ,expected registration by Q2 2012

The Save80 Improved Cookstove

As the only CDM-accredited improved cookstove in the world, the Save80 is uniquely positioned to reduce biomass consumption in Indonesia; although upfront cost is still a concern

The Save80 Improved Cookstove

Efficiency: **(above 3-stone fire)**	**80%**
Capacity:	**8 Liters**
Retail Cost: **(with CDM)**	**TBD**

The Save80 at a Glance

- High quality, high cost improved cookstove
- Sourced from Climate InterChange AG in Germany, shipped in parts and assembled in-country
- Reduces fuel consumption by 80%
- Can use heat retention container, called the 'Wonderbox', to further increase efficiency
- High quality assurance requirements limit ability to produce locally
- Pending registration and Program of Activities

Kyoto CDM and the Save80 Stove

- The Save80 cookstove is the only CDM-accredited improved cookstove in the world
- Sale of CDM CER's can potentially reduce upfront cost of stove to consumers
- Proposed CDM projects pending validation and registration

- Implications -

A cookstove program should consider the Save80 as an efficient and high quality solution for Indonesian firewood users with high purchasing power

The Protos Plant Oil Cookstove

The Protos Plant Oil Cookstove is pending CDM-accreditation and can use local resources to reduce biomass consumption in Indonesia at a substantially reduced cost

Protos Plant Oil Cookstove

Efficiency: (above 3-stone fire)	**55%**
Usage:	**2-4 liters per week**
Retail Cost: (with CDM)	**USD $25**

Protos Plant Oil Cookstove at a Glance

- Powerful , moderate cost stove uses renewable plant oil energy
- Local production and job creation
- Oil plants have large and small scale potential for plantations, marginal lands and degraded soils
- Plant oils are a sustainable supply, locally produced, and CO2 neutral
- Emissions are 10 times lower than kerosene
- Currently being used in Semarang and Lombok pilots

Gold Standard and Protos Plant Oil Cooker

- Sale of Gold Standard carbon credits may offset the price of the stove to consumers
- CDM-accreditation is a potential long term option given market attractiveness

- Implications -

A cookstove program should consider the Protos Plant Oil Cookstove as an efficient and high quality solution for Indonesian firewood users in areas rich in plant resources with low purchasing power

Source: BSH, Interviews

Overall CF Market Attractiveness

As a result of these conditions, the country represents an attractive opportunity for potential carbon financing activities to support a clean cookstove program

Highlighted Market Criteria

- **Existing Designation National Authority**
- **Existing Cookstove Projects for Baselines**
- **Large Scale Project and PoA Potential**
- **Carbon Funds Established or Being Established**

Attractive Market Conditions for Cookstove Program Carbon Financing in Indonesia

Potential Risks

- **Low revenue** for cookstoves projects in remote areas
- **High level of risk** and associated upfront costs
- **Kyoto Protocol ineligibility** may prevent future CDM projects
- **Bureaucracy and delays** at Government level

Agenda

- Executive Summary
- Project Approach
- Sector Mapping
  - Macro Environment Assessment
  - Indoor Air Pollution Assessment
  - Consumer Assessment
  - Cookstove Industry Assessment
  - Carbon Financing
  - **Sector Mapping Summary**

Sector Mapping Summary

Indonesia's high prevalence of IAP can potentially be impacted with a cookstove solution that leverages the existing stove industry; although distribution and low consumer price points will be a challenge

MACRO ENVIRONMENT
+ Large population creates a large market
+ Reduced deforestation and land management efforts provides Government support
+ Government steps to promote business
- Bureaucratic and slow Government
- Poor energy infrastructure

IAP
+ Very high percentage of population use wood
+ No cultural attachment to smoke
+ Federal Government programs focused on reducing deforestation and land degradation
+ Favorable NGO and humanitarian awareness
+ Existing programs specific to tackling IAP

CONSUMER
+ People are used to purchasing stoves
+ Consumers complain of breathing and eye discomfort
+ LPG and biogas status perception
- Low level of IAP awareness
- Fear of LPG explosion
- High switching cost in rural areas as fuelwood collected at zero cost

COOKSTOVE INDUSTRY
+ Huge existing stove manufacturing capacity
+ Government subsidy reducing price of LPG
+ Potential alternate fuel options
+ Emerging private sector participation
- High variability in modern fuel prices
- High import duties and delays
- Island geography creates barriers to low cost distribution

Favorable

Moderately favorable

Unfavorable

Clean Cookstove Industry

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Appendix

Glossary of Terms

Below is a list of commonly used acronyms used throughout the report and presentation:

ALRI – Acute Lower Respiratory Infection

CDM – Clean Development Mechanism

CER – Certified Emission Reduction (from CDM project)

CF – Carbon Finance

COPD – Chronic Obstructive Pulmonary Disease

CPA – CDM Program Activity

CPA-DD – CDM Program Activity Design Document

DALY – Disability Adjusted Life Year

DNA – Designated National Authority

DOE – Designated Operational Entity

EB – Executive Board

ER – Emission Reductions

EU-ETS – European Emission Trading Scheme

FAO – Food and Agriculture Organisation

GACC – Global Alliance for Clean Cookstoves

GS – Gold Standard

GS TAC – Gold Standard Technical Advisory Committee

GWP – Global Warming Potential

HH – Household(s)

IAP – Indoor Air Pollution

ICS – Improved Cookstove

LPG – Liquid Petroleum Gas

MFI – Microfinance Institution

NGO – Non-Governmental Organization

NRB – Non-Renewable Biomass

PDD – Project Design Document

PIN – Project Idea Note

PoA – Program of Activities

PoA-DD – Program of Activities Design Document

SFU – Solid Fuel Use

SME – Small and Medium Enterprise

SNV – Netherlands Development Corporation

UNFCCC – United Nations Framework Convention on Climate Change

USAID – United States Agency for International Development

USD – US Dollars

VER – Verified Emission Reduction (voluntary market)

WHO – World Health Organization