



High performance. Delivered.



Global Alliance for Clean Cookstoves

Bangladesh Market Assessment

Sector Mapping

Accenture Development Partnerships

April 2012

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.

Approach in Bangladesh

- This Market Assessment is unique amongst others completed by the Alliance in that it was developed working in close collaboration with USAID, an Alliance founding partner.
- USAID completed a detailed Bangladesh Cookstoves Market Assessment in Jan 2012; to avoid reinventing wheels the two organizations agreed to integrate their two market assessments and ensure they emphasized different areas of interest.
- The Alliance's Sector Mapping and Intervention Options papers should therefore be viewed in conjunction with USAID's Market Assessment.
- In particular, readers will see that the Intervention Options paper first lists the interventions identified in the USAID report, before contributing additional recommendations where applicable.



Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

Sector Mapping Summary

Appendix

Sector Mapping Summary (1/2)

With ~150 million people, Bangladesh is the 9th most populous country in the world and one of the most densely populated country in the world. Upwards of 70% of its population lives in rural areas while 50% of the entire country live below the international poverty line. In both urban and rural areas, more than 90% of households depend on biomass as a fuel source, leading to major health and environmental issues. An estimated 46,000+ people die from the effects of IAP every year while 3.5% of Bangladesh forests have been destroyed in the last 20 years.

Bangladesh has a large potential market for ICS, estimated at greater than 30 million households; however, only 510,000 stoves are thought to be in use, a penetration rate of less than 2%. To date, efforts in the sector have not yet succeeded in creating a sustainable market for stoves. Grameen Shakti and GIZ operate two of the largest ICS programs in the country and have projected further growth in the years to come. However, anecdotal evidence suggests that many other stove producers struggle to overcome limited consumer awareness and low demand for ICS amongst certain segments.

Bangladesh is home to some of the world's largest and most successful NGOs, with distribution networks reaching all across the country. In addition, many of these organizations have mature consumer finance capabilities given Bangladesh's position at the forefront of the modern micro-credit movement. This finance has been integral to the growth of both Solar Home Systems (SHS) and biogas plants. However, the low price of improved biomass stoves often sits just below the amount necessary to make these loans commercially feasible. Access to finance also appears to be an issue for many stove businesses due to the prohibitively expensive nature of commercial loans available in the market.

Past evidence suggests that market based approaches can be effective in Bangladesh as the 'Total Sanitation Campaign' and SHS program have proved. These programs were successful largely because they coupled innovative financing, government support, and sector wide collaboration to address the issue. The cookstove sector shows promise but appears to be lacking some of these vital ingredients to follow in their footsteps and grow at a similar pace.

Sector Mapping Summary (2/2)

	Findings
<i>Macro Environment</i>	Bangladesh is one of the most densely populated and poorest countries in the world, it is prone to severe ecological issues such as cyclones and flooding and experiences severe energy shortages across the country. The government is heavily focused on development, both socially and economically and is key to the support of the ICS sector.
<i>Social and Environmental Impact</i>	Cooking styles are similar across Bangladesh with women responsible for most of the cooking. Biomass use is more than 90% for the entire country while free fuel sources such as cow dung and rice husk are common in rural areas. Health affects of IAP are significant and women need to play an integral role in the sector particularly in community outreach and sales.
<i>Consumers</i>	The ‘villager’ segment (defined later), rural populations and those above the international poverty line appear to show the most promise for market based ICS approaches. Consumer research is limited but from what is known, awareness of IAP and the benefits of ICS appears to be low so consumer education is essential. Humanitarian efforts and financial assistance will be needed to address the more vulnerable, lower income segments.
<i>Cookstove Industry</i>	The Bangladesh market is dominated by the ‘Chulha’ stove design. The three largest programs (Grameen Shakti, GIZ and VERC) all utilize this design, although it is available in different sizes and materials. Basic capabilities exist across the value chain to support programs, but there appears to be a lack of product diversity, enterprise financing and larger private sector participation.
<i>Carbon Financing</i>	There is an established DNA, an existing PoA and different CDM registered cookstove projects in Bangladesh. However, the sector’s heavy reliance on carbon credits and rigorous M&E processes pose a risk to the growth of the market.

Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social and Environmental Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

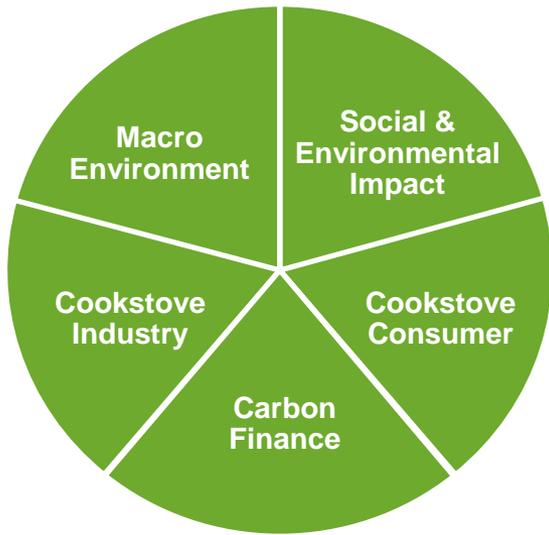
Sector Mapping Summary

Appendix

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 Relative Roadmap

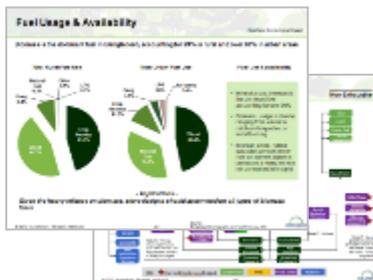
◀ Sector Mapping ▶



◀ Strategy Development ▶



Intervention Options & Relative Roadmap

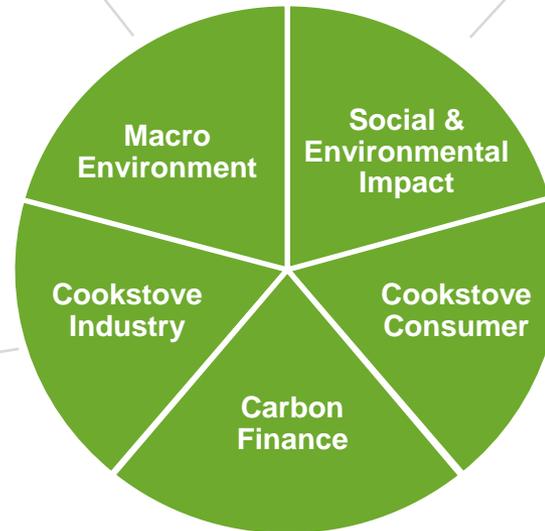


Sector Map

Sector Mapping Approach

Sector Mapping of the cookstove sector was conducted across five dimensions:

- *Social:* What is the country demographics & population distribution across regions?
- *Political:* How stable is government & what political risks will any program face?
- *Economic:* How much money do our potential customers have & what is the economic cycle?
- *Technological:* How sophisticated is the infrastructure & what is the plan for progress?
- *Environmental:* How do ecological conditions impact the success of cookstove programmes?
- *Gender:* How does gender play a role in clean cookstove use and purchase?



- How do people cook and what fuels are used in the region?
- What is the current IAP exposure profile of our target market? (Primary cause of IAP and size of problem)
- What are the other impacts caused by the use of traditional methods or poor cooking stoves?
- How does the impact of cookstoves stack up against other health & social priorities?

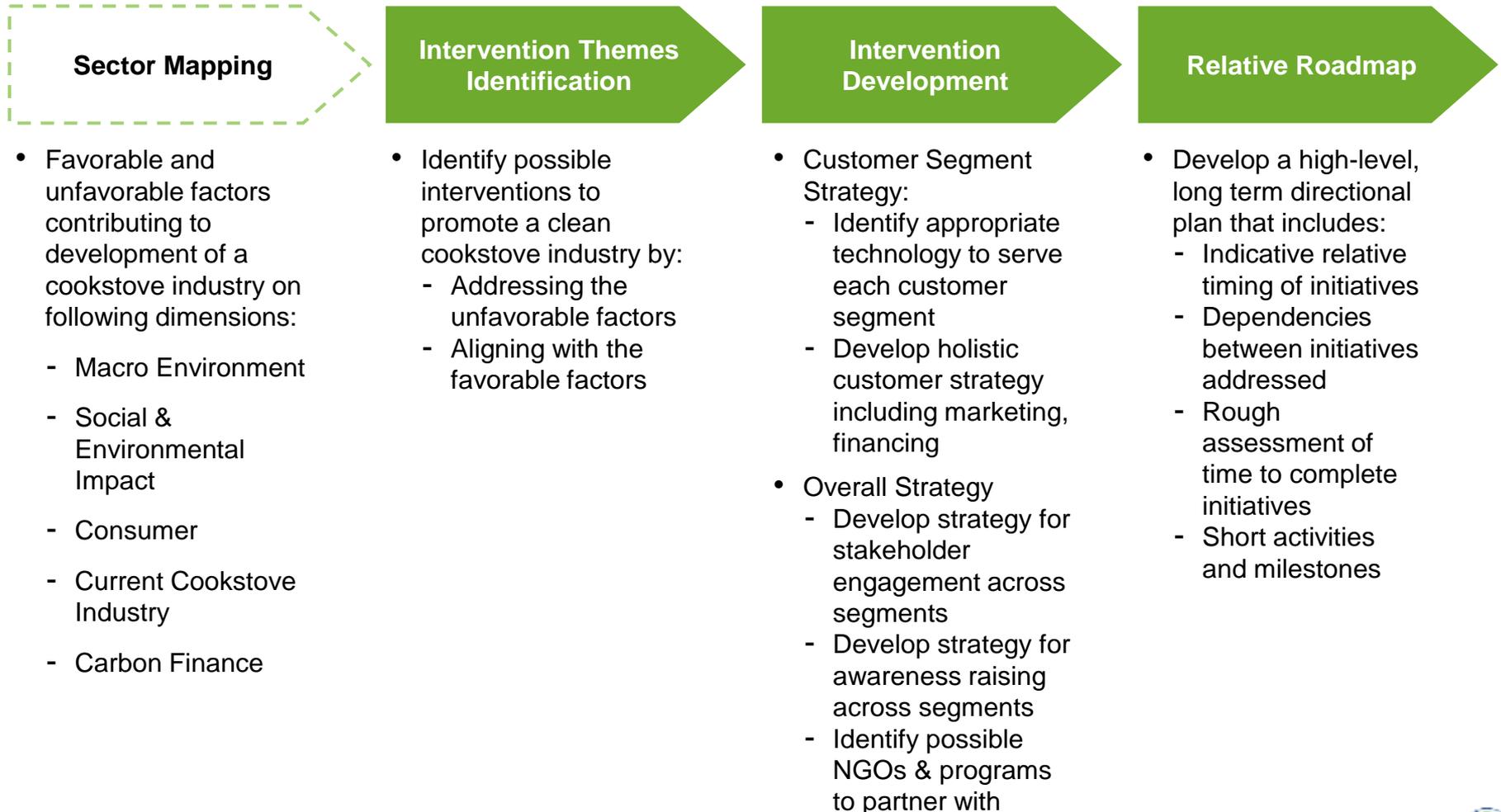
- What cooking devices are currently used within the region?
- Who are the main players active in the cookstove sector?
- What are the opportunities / threats for current & future cookstove programmes?
- How commercially attractive is the sector & what are likely to be some of the industry challenges?

- 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?

- What is the profile of the target population?
- 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?

Intervention Options Approach

Intervention development was conducted by using sector mapping as input to identify intervention areas, develop recommendations and develop a high level operational plan



Acknowledgements

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



Appropriate Rural
Technology
Institute (ARTI)



Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social & Environmental Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

Sector Mapping Summary

Appendix

Social Environment

Bangladesh is the 9th most populous country in the world with ~150 million people living in ~32 million households; 72% of the population lives in a rural areas and 50% lives below the poverty line



Context

- Formerly East Pakistan, Bangladesh seceded from its union with Pakistan in 1971
- Official Languages: Bengali and English
- Muslim 89.5%, Hindu 9.6%, other 0.9%
- About 1/3 of the country floods annually during the rainy season, which prevents economic development

Population Demographic	Bangladesh
Total Population (2010)	148,692,13
Population Growth Rate (CAGR)	1.566%
Rural/Urban Split (%)	72% / 28%
Rural Population	106,900,000
Total Households	32,067,700
Rural Households	25,012,806
Average Household Size	4.4
Literacy – Total (%)	47.9%
Literacy – Female (%)	41.4%
Life Expectancy (years)	69.75
Population below poverty line	50%

- Implications -

A cookstove intervention can serve a large market size in both rural and urban areas but many of those lie below the international poverty line

Political Environment

Bangladesh experiences a high degree of conflict between the two main political parties, but is highly committed to meeting the Millennium Development Goals



Administrative Map

- Country divided into 7 divisions, 64 districts and 493 sub district (upazilas)
- Dhaka, Chittagong and Khulna are most populated urban areas
- Chittagong, Dhaka and Sylhet are the most populous and prosperous divisions

Political Structure

- Parliamentary Democracy
- The President is the chief of state and appoints the Prime Minister who is the head of government
- Parliament elects the president for a 5 year term (eligible for a 2nd term), last election held in 2009

Current Government

- The Awami League (AL) is the dominant party with 76% of the legislative seats. Next is the Bangladesh National Party (BNP) with 10%
- Political conflict between these parties is very high

Working with the Government

- Current government heavily focused on reaching the Millennium Development Goals; increasing human rights, jobs, food security and investment in infrastructure, energy & education

- Implications -

A cookstove program can benefit from a supportive national government; government involvement in some form is key to growing the market

Economic Environment

Bangladesh ranks amongst the poorest countries in the world with \$1700 per capita GDP PPP; over half of the GDP is generated in services but 45% of the population works in the agriculture sector

Key Economic Indicators	
GDP (2010)	\$258,600,000,000
GDP Per Capita (PPP) (2010)	\$1700
Economic Growth Rate (2010 est.)	6%
Inflation Rate (Jan 2012)	13.16%
Unemployment	5.1%
Youth Unemployment (2005)	9.3%

Key Economic Indicators	
Exports	-\$19.24 billion; commodities exports: garments, frozen fish and seafood, jute and jute goods, leather <i>Major markets:</i> United States, Germany, United Kingdom and France
Imports	-\$24.72 billion: machinery and equipment, chemicals, iron and steel, textiles, foodstuffs, petroleum products, & cement. <i>Major suppliers:</i> China, India, Singapore, Malaysia and Japan
GDP composition (2010):	agriculture: 18.6% (45% of labour force) industry: 28.5% (30% of labour force) services: 53% (25% of labour force)

- Implications -

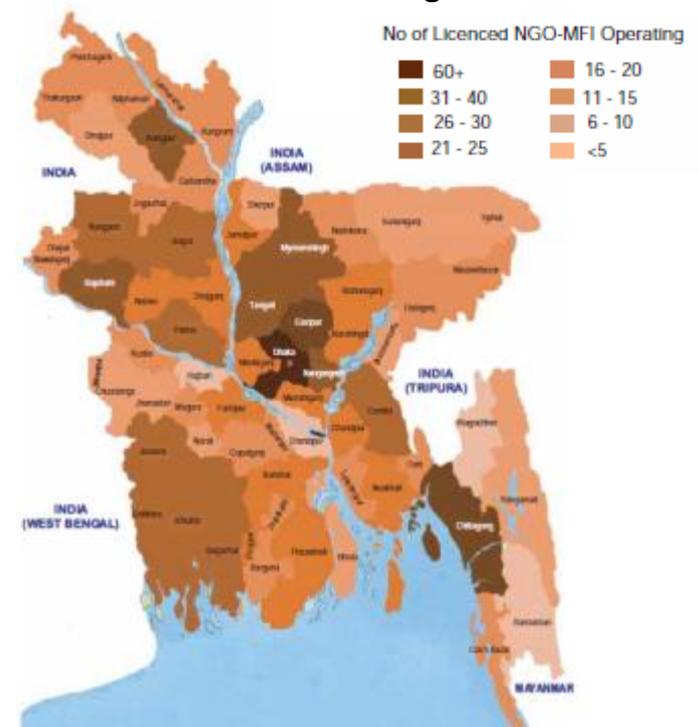
Promoting low-cost cookstove options will play a major role in growing the demand for cookstoves across Bangladesh

Bangladesh is commonly viewed as one of the pioneers of modern micro credit for consumers. Today, MFIs collectively have around 30 million borrowers, over 20% of the population

Micro finance in Bangladesh

- Grameen Bank was one of the first modern day organizations to offer micro credit to low income consumers followed closely by BRAC and ASA.
- Since then the microfinance sector has grown enormously with 516 licensed NGO-MFIs, numerous banks and government bodies active alongside Grameen Bank. Collectively, these 4 groups of providers are estimated to provide loans to approximately 30 million active borrowers.
- With Grameen Bank in particular, almost the entire portfolio of borrowers is female. In 2007, 97% of the their total borrowers (>7M) were women.
- The top 3 active MFIs ranked by active borrowers are Grameen Bank (8.3M), BRAC (4.96M) and ASA (4.3M)
- Recently, the MFI industry has faced greater scrutiny after questions were raised over unethical loans to over-indebted borrowers & unfair collection practices. This led to the formation of the Microcredit Regulatory Authority in 2006.

Concentration of licensed NGO-MFIs in Bangladesh



- Implications -

The maturity and reach of the Bangladesh microfinance industry presents a significant opportunity for the cookstove sector

There is an increasing move to empower women in Bangladesh; however, certain historical and cultural factors still prevent greater access to rights and opportunities for many

Policy & Employment

- The National Policy for the Advancement of Women aims to promote and protect women's rights across a number of areas such as health, employment & poverty reduction. The Ministry of Women and Children Affairs is responsible for the formation and implementation of this policy.
- Women's employment rates are very low at 26%, despite sharp growth in the last decade. Much of the formal employment is in health care, teaching & the garment sector.

Cultural Background

- The average age of women at marriage is 16 and most marriages are arranged
- Marital status often dictates their health care opportunities, ability to vote, & ability to move freely outside their homes
- About 30% of women have experienced spousal violence while less than 50% feel safe leaving their homes alone

Gender Equality Statistics

UNDP Gender Inequality Index	112 out of 146 countries (2011 Index)	
Adolescent fertility rate	78.9 births per 1,000 women aged 15-19 (4 th highest in Asia)	
	Male	Female
Primary school attendance	94%	89%
Secondary school attendance	45%	43%
Tertiary school attendance	24%	76%
Literacy	48.4%	58.2%
Representation in national government	87.5%	12.5%

- Implications -

Cookstove programs must be sensitive to the cultural factors around gender in order to effectively involve and empower women throughout the sector

Additional investment in healthcare, telecommunication, education and transportation are key to ensure Bangladesh meets the Millennium Development Goals by 2015

Current Situation

Healthcare

- 30% of population has access to healthcare services
- Infant mortality rate is 50 deaths / 1000 live births
- Only 52% of rural population has access to improved sanitation

Telecommunication

- Mobile use has grown dramatically in recent years to > 76Million users
- 3.7 internet users and 13.2 telephone lines per 100 people
- Adoption of radio, television & internet, is limited

Education

- 47.9% literacy rate
- Net enrollment in primary education is 82%
- Primary education completion rate is 80%

Transportation

- 80% of passenger traffic travels on the roads; only 30% of roads are paved
- 7% of passengers travel on the railways
- One of the world's largest inland water networks, connects almost all of the major cities, towns & commercial centre's

Government Priorities

- Prevention of and treatment for HIV/AIDS
- Maternal & infant health
- Access to clean water & food in rural or poor areas

- Expansion of Solar Homes Project will provide greater access to electricity
- Promote ICT's

- Ensure that everyone has access to primary education
- Increase literacy rates
- Decrease primary school drop-out rates

- Infrastructure investment key to laying a foundation for long term growth
- Port being installed to spur commerce in the region
- Padma Bridge project, largest river bridge

- Implications -

Although infrastructure requires further investment, the vast network of roads & waterways provides a broad distribution network for the cookstove market

Bangladesh's serious energy shortages have depleted foreign reserves, driven up consumer energy prices and discouraged foreign investment

Key Energy Indicators	
Gap between energy supply & demand (est. 2010)	1500 - 1800 MW
Energy generated from gas powered plants (%)	88%
Population with access to electricity (%) (2021 target = 100%)	41%

"Energy shortage is the most critical infrastructure constraint on Bangladesh's economic growth"

Priyantha Wijayatunga, Senior Energy Specialist, ADB's South Asia Department

"Unless the energy situation improves foreign investors would not feel encouraged to invest in Bangladesh. This warrants priority attention of the government..."

Syed Ershad Ahmed, President, Foreign Investors' Chamber of Commerce and Industry

Government has identified the following as key energy priorities that must be addressed:

- Inadequacy of supply of electricity compared to demand
- Dependency on single energy (gas) for electricity generation
- Limited use of renewable energy

- Implications -

The large biomass market is likely to exist for many years due to poor access to electricity & clean fuels. If gas supply or price becomes an issue, consumers may start reverting to biomass

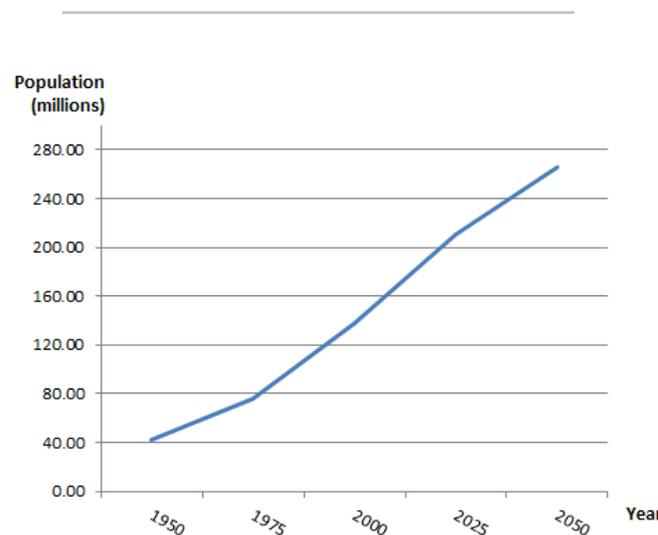
Environmental Issues

A number of environmental issues contribute to the numerous health, social and economic issues faced in Bangladesh

Overpopulation

- Bangladesh is the 6th most densely populated country in world, 1142 people per sq. km
- The government expects the population to grow another 78% by 2050 to approximately 265 million people.
- Urban slums are expected to see the greatest population growth

Bangladesh Population Projection



Water Contamination

- Salinity in ground and surface water, arsenic contamination of shallow aquifer, lack of aquifer and difficulties in extracting saline free water are the main causes of contamination
- 82% of the urban population has access to improved drinking water
- 78% of the rural population has access to improved drinking water

- Implications -

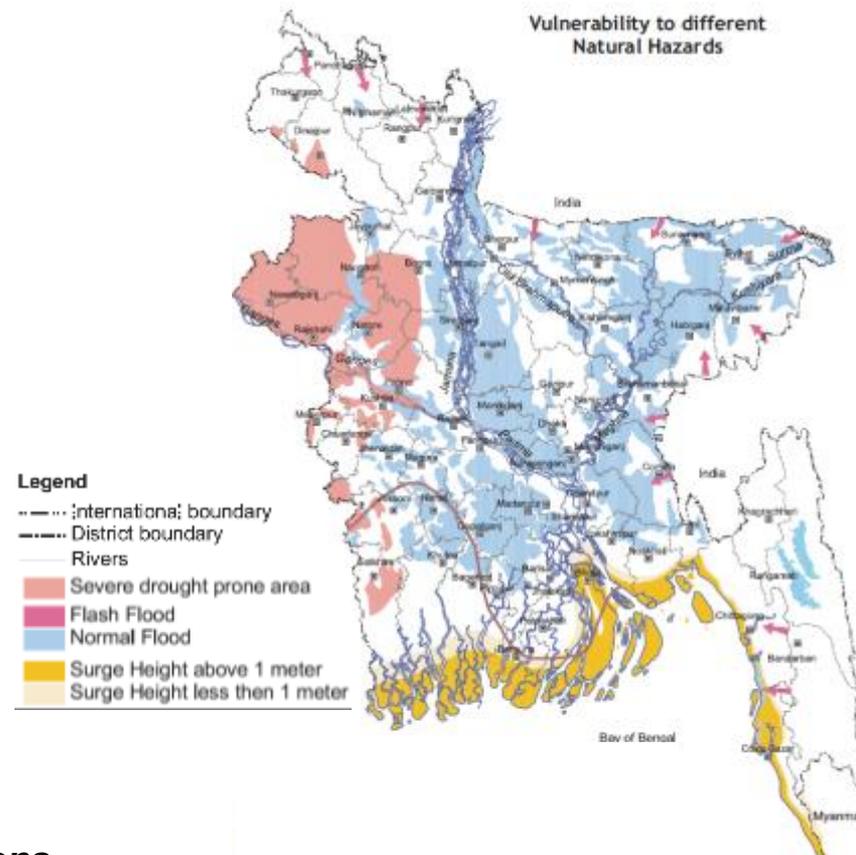
The rapid population growth is increasing the pressure on natural resources whilst also pushing poorer communities into more vulnerable parts of the country

Ecological Environment

Bangladesh is highly prone to a variety of environmental factors which cause humanitarian crises & inhibit economic growth; particularly flooding due to the prolonged monsoon season

Background on Ecological Environment

- Bangladesh has been ranked as the most vulnerable country in the world to tropical cyclones and the 6th most vulnerable to floods (UNDP, 2004).
- Many of the poorest income people live in remote or ecologically fragile parts of Bangladesh, such as river island (chars) and cyclone-prone coastal belts, which are especially vulnerable to natural disasters.
- Each year about 26,000 km² (~18%) of the country is flooded
- Major floods can cover up to 75% of the country and have occurred in 1966, 1987, 1988, 1998, 2004 and 2007
- Storms over the 15 years alone have been responsible for approximately 2,400 of deaths, ~\$6 billion of damage and millions of homes either damaged or destroyed.



- Implications -

The high risk of flood displacement in Bangladesh means that the cookstove sector must consider humanitarian interventions to support those most affected

Humanitarian Context

The portion of Bangladesh's overall aid dedicated to humanitarian issues remains consistently low. Furthermore, much of this aid is dedicated to disaster relief rather than prevention.

Humanitarian Aid as a proportion of total aid

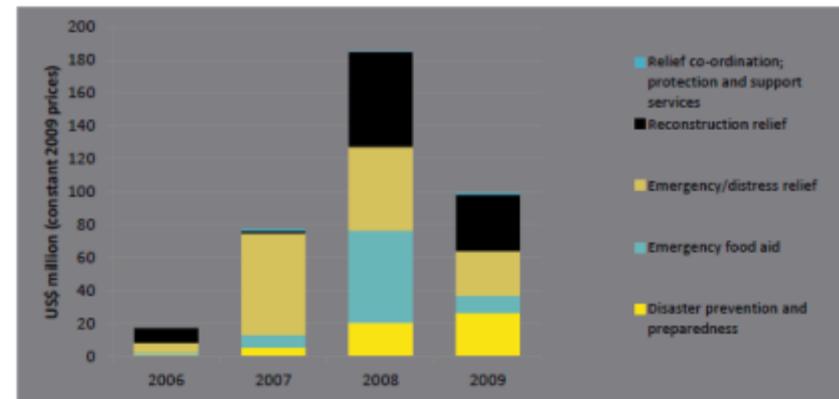
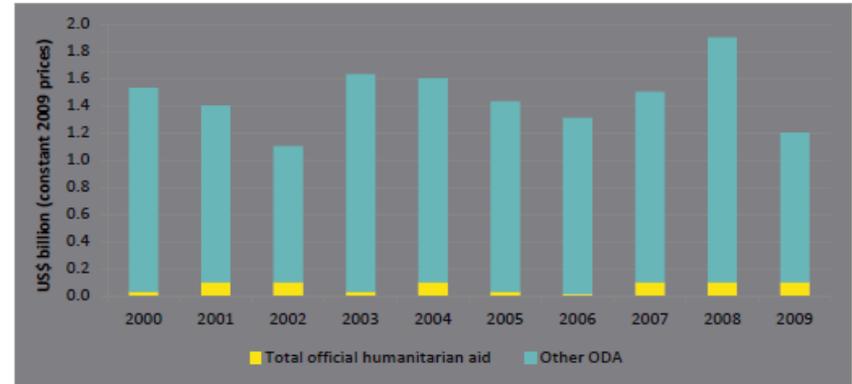
Despite the country's well known vulnerability to natural disasters, the percentage of total aid dedicated to humanitarian assistance has been consistently low over the past decade with peaks following serious natural disasters, such as the severe floods in 2004, Cyclone Sidr in 2007 & Cyclone Aila in 2009.

Disaster Risk Reduction aid

From 2000 – 2009, Bangladesh received US\$371.4 million for disaster risk reduction (DRR) which made it the 4th largest recipient after Pakistan, Indonesia and India. However, this is still thought to be low given the Bangladesh's extreme exposure to natural disasters.

Humanitarian Assistance: Proactive vs. Reactive

Much of the humanitarian assistance to Bangladesh appears to be reactive with 73% of it spent on emergency and reconstruction relief. Investments in disaster prevention and preparedness have been low, averaging 13% between 2006 and 2009.



- Implications -

Bangladesh's humanitarian aid appears low given its exposure to natural disasters. Given this, ICS relief efforts may struggle to access additional resources.

Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social and Environmental Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

Sector Mapping Summary

Appendix

Cooking Habits

Although regional & income differences exist, cooking habits across Bangladesh are similar with rice at the heart of many meals, women responsible for cooking & traditional stoves common

Type of Food



- Rice is the mainstay of Bangladesh but various kinds of lentil (locally known as daal), wheat, meat, vegetable, fruit, eggs and milk are also common. However, there are also noticeable regional differences:
- *South* – being close to the sea, tend to have a larger use of fish in their dishes
- *West and North-west* - Vegetable curries are prominent
- *Dhaka/Central* - Dishes involving spiced rice and a lot of meat are common
- *North-east* – the large number of lakes around Sylhet encourages greater use of fish

Cooking Habits



- Most cooks are women, and the majority cook indoors
- Many families prefer traditional stoves due to ease of use & habit
- Fixed traditional stoves are the standard, and often placed in a semi enclosed annex to shelter it from rain & sunlight
- Biomass use is incredibly diverse with families using whatever they can collect
- In certain households, it is not uncommon to have a 'backup' stove choice where gas supply is unreliable or product quality is questionable

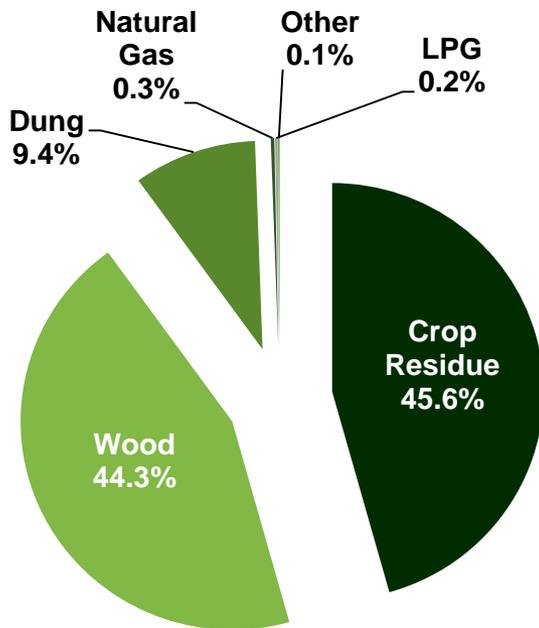
- Implications -

As is often the case, the cultural & historical attachment to traditional stoves will be challenging to overcome. Any new stove design should fit with existing cooking habits

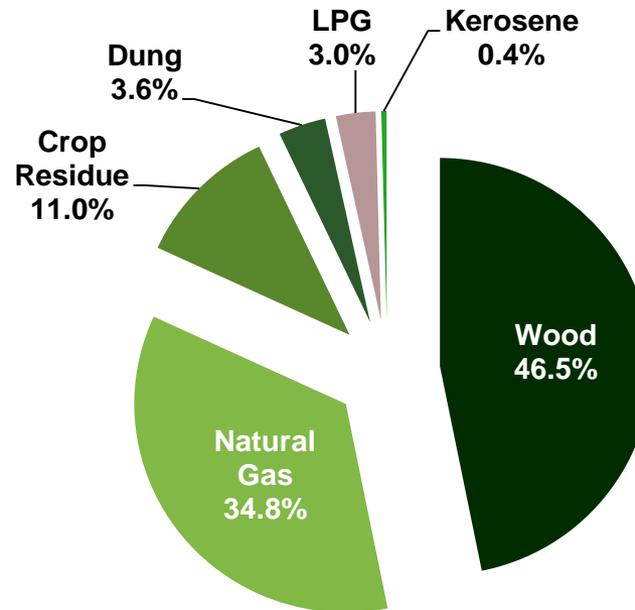
Fuel Usage & Availability

Biomass is the dominant fuel in Bangladesh, accounting for 99% in rural and over 60% in urban areas

Total Rural Fuel Use



Total Urban Fuel Use



Fuel use & availability

- In rural areas, biomass is the dominant fuel accounting for over 99%
- Biomass usage is diverse ranging from leaves to risk husk briquettes, or wood to dung
- In urban areas, natural gas plays a much larger role but current supply is unreliable & many are still not connected to the grid

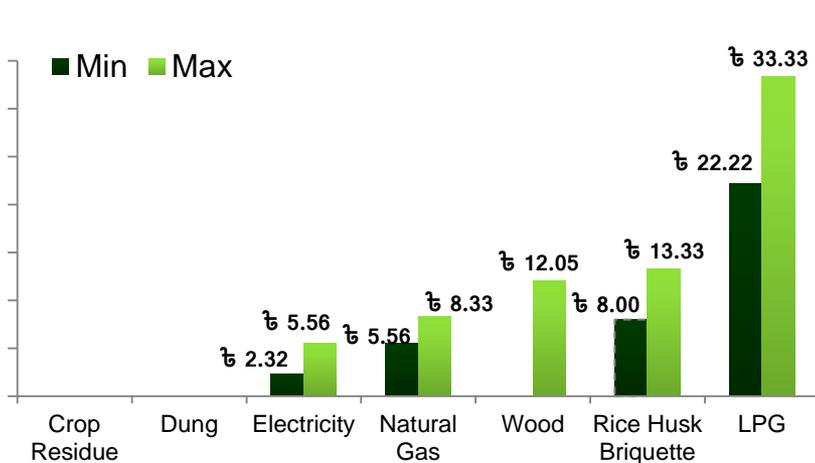
- Implications -

Given the heavy reliance on biomass, stove designs should accommodate all types of biomass fuels

Available Fuel Cost

Natural gas & electricity prices are competitive versus biomass but access is limited and supply uncertain. The abundant supply of free or low cost biomass partly explains its dominance

Fuel Cost per Average Meal



Assumptions

- LPG estimated to cost 4 times that of Natural Gas
- Wood estimates based on family of 4 eating 3 meals per day
- Rice Husk Briquette calorific value is ~75% of wood
- Range of 0.5 – 1.2 KWh per meal for electric stoves

Fuel	Unit Price	Fuel	Unit Price
Wood	Tk 0 – 10 / kg	Natural Gas	Tk 500 / month
Crop Residue / Dung	Free (no evidence of market price)	LPG	Tk 1,550 / 12kg cylinder
Rice Husk Briquette	Tk 6 – 10 / kg	Electricity	Tk 4.63 / KWh

Pricing and Supply Observations

- The price of electricity was recently increased by 21% as the Government looks to cut the losses of the state-run power generating firm
- Despite a cut in government duties, LPG prices have increased ~30% in the past year
- The price of wood varies dramatically depending on whether it's collected
- Less than 10 % of people in Bangladesh have access to modern fuels
- Supply of natural gas is unreliable due to shortages

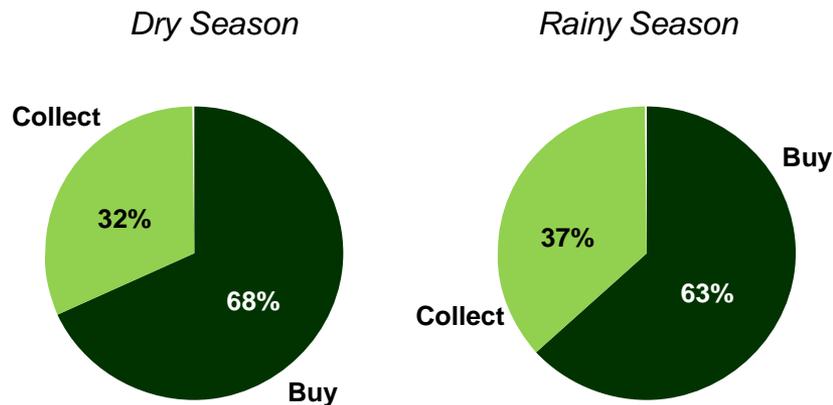
- Implications -

The free supply of biomass suggests that not all cookstove initiatives can focus on the economic benefits

60+% of rural households purchase firewood and women spend approximately 1/3 of their day focused on cooking and preparation of food.

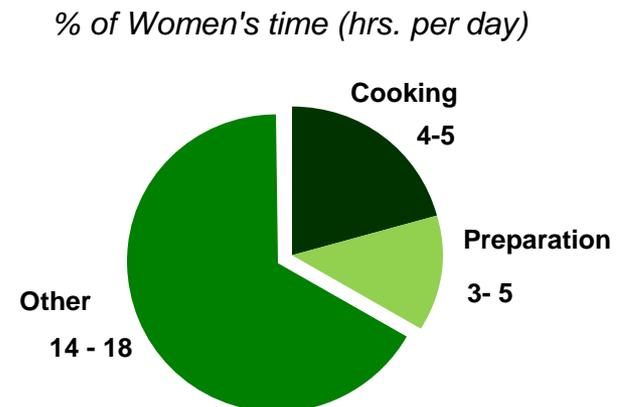
Share of rural households spending money on fuel

- About 68% of consumers pay for biomass fuel in the dry season compared to 63% in the rainy season in rural areas
- The average money paid for biomass fuel was ~76 Tk in the dry season and ~98 Tk in the rainy season



Time spent on cooking

- Women are primarily (and almost exclusively) the cooks in both urban and rural areas
- Women spend on average 4-5 hours a day on cooking alone, 6-8 hours a day is spent in the kitchen
- The longest cooking episode is typically lunch which take around 3-5 hours to prepare



- Implications -

Promotion of efficient cookstoves can save women time and households money spent on biomass fuels

Indoor Air Pollution (IAP) in Bangladesh

With more than 90% of the total population using biomass fuel for cooking, the health burden of IAP exposure is one of the largest in the world

	Population (Households)	% Using Biomass	Total exposed to IAP
Rural (72% of total pop.)	24,331,439 →	99.37% →	24,183,017
Urban (28% of total pop.)	9,462,226 →	61% →	5,814,538
		Total →	29,997,556 (89% of total population)



Health Impact

- 46,000 deaths attributable to solid fuel use
- Of which, 32,330 are ALRI deaths and 13,620 are COPD deaths
- A total number of 1,316,400 DALYs attributable to solid fuel use

- Implications -

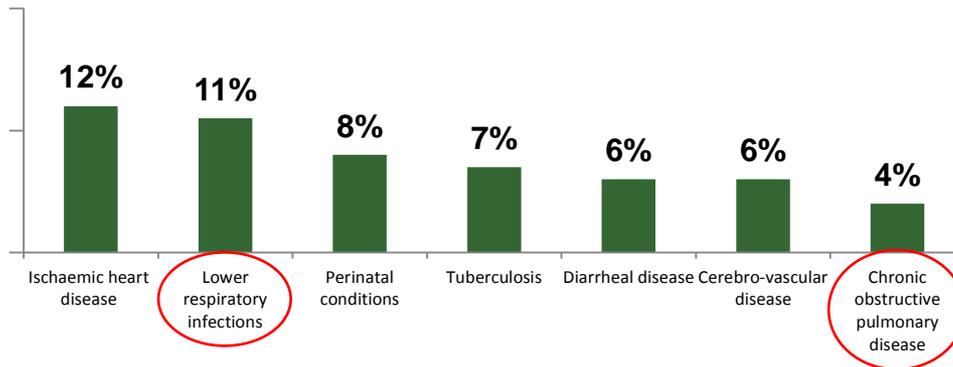
The extremely high number of DALYs and deaths attributable to IAP presents a strong case for cookstove interventions in Bangladesh

Indoor Air Pollution vs Other Health Priorities

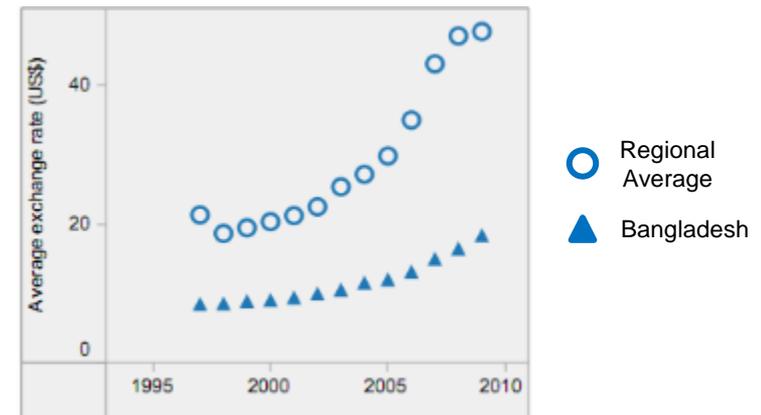
Social and Environmental Impact

Although access to clean water and sanitation are top priorities of both government and civil service, indoor air pollution is still recognized as an important environmental health issue

Burden of disease in Bangladesh



Per Capita Health Spending



*“More efforts to ensure safe drinking water together with improved sanitation will help reduce the burden of diarrhoeal disease. Other important environmental health issues include **indoor air pollution**, food safety and climate change.”*

- WHO

- Implications -

IAP is recognized as an important health issue but low per capita health spending and other pressing priorities, mean large scale government intervention based on health is unlikely

Environmental Impact of Stoves

Deforestation has largely been reversed through concerted action by the government and its development partners. However, anecdotal evidence suggests that localized pressures remain

Deforestation

- Only 11.1% of Bangladesh is covered in forest, according to environmental science 25% should be covered for a balanced ecology
- Bangladesh's forests have decreased by 50% since 1970, however, this appears to have been addressed in recent years. Natural forest cover has even increased .07% over the past 5 years

Historic causes of Deforestation

- Historically, cooking fuel use was recognized as a major contribution to deforestation throughout Bangladesh. However, the brick kiln industry is now believed to put far more pressure on fuelwood resources than cooking.
- With demand for bricks growing at 10% annually for the past two decades and many of the kilns operating at relatively low levels of efficiency, the pressure on forest resources is great.
- Furthermore, the Bangladesh Brick Manufacturing Owners Association (BBMOA) estimated in 2005 that 25% of the fuel used in kilns is still from wood.

- Implications -

Deforestation appears to be under control as focus has moved towards ecological disaster preparedness and climate change mitigation.

The Role of Gender

Despite some cultural and safety barriers, women play an integral role in the cookstove sector, particularly around community outreach and ICS sales.

Role of Gender in the Household

- Women are far more likely to be exposed to IAP in their role as primary cook
- Women are said to be involved in major household purchasing decisions but the man often has a greater say
- Around 85% of households are male headed and 15% female headed (almost exclusively male-absent)

Role of Women in the Cookstove Sector

- VERC train local female entrepreneurs to build & sell in their local communities
- Some GIZ partners employ women in their door to door selling activities
- Women are commonly seen as integral to any consumer awareness or education campaigns

Barriers to further involvement

- Safety has been cited as an important reason for not involving women in the sales & distribution of ICS
- The cultural limitations around the mobility of women can be a serious restriction on their ability to participate in the sector

- Implications -

Although improvements are required, the strong involvement of women in the sector improves its ability to connect with end consumers and increases its potential for growth

Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social and Environmental Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

Sector Mapping Summary

Appendix

The customer segmentation in this section is an illustrative example of how the Bangladesh market could be grouped. They are based on the following assumptions:

- The customer segmentation is designed to provide a high-level view of the market and strengthen the understanding of the customer base in Bangladesh.
- The customer segmentation is based on a preliminary market assessment and has used a combination of both primary and secondary research. Further refinement of customer segmentation and customer profiles may be required for specific programmes and regions.
- The high-level customer segmentation calculations were derived based on the following mathematical assumptions:
 1. National averages being consistent across segment criteria (e.g. fuel distribution across income level and income level by ecological factor)
 2. Gas and kerosene are not affordable for the population living below the international poverty line
- For the consumer segmentation available data was compiled from the World Bank, Reuters and UNICEF. For the institutional segmentation data was taken from the USAID report.

Consumer Landscape in Bangladesh

Consumer Assessment

To understand and derive insight on the consumer landscape in Bangladesh the population can be segmented based on four key areas

Market
(Rural / Urban / Institutional)

Household Fuel Type
(Biomass / LPG & Gas)

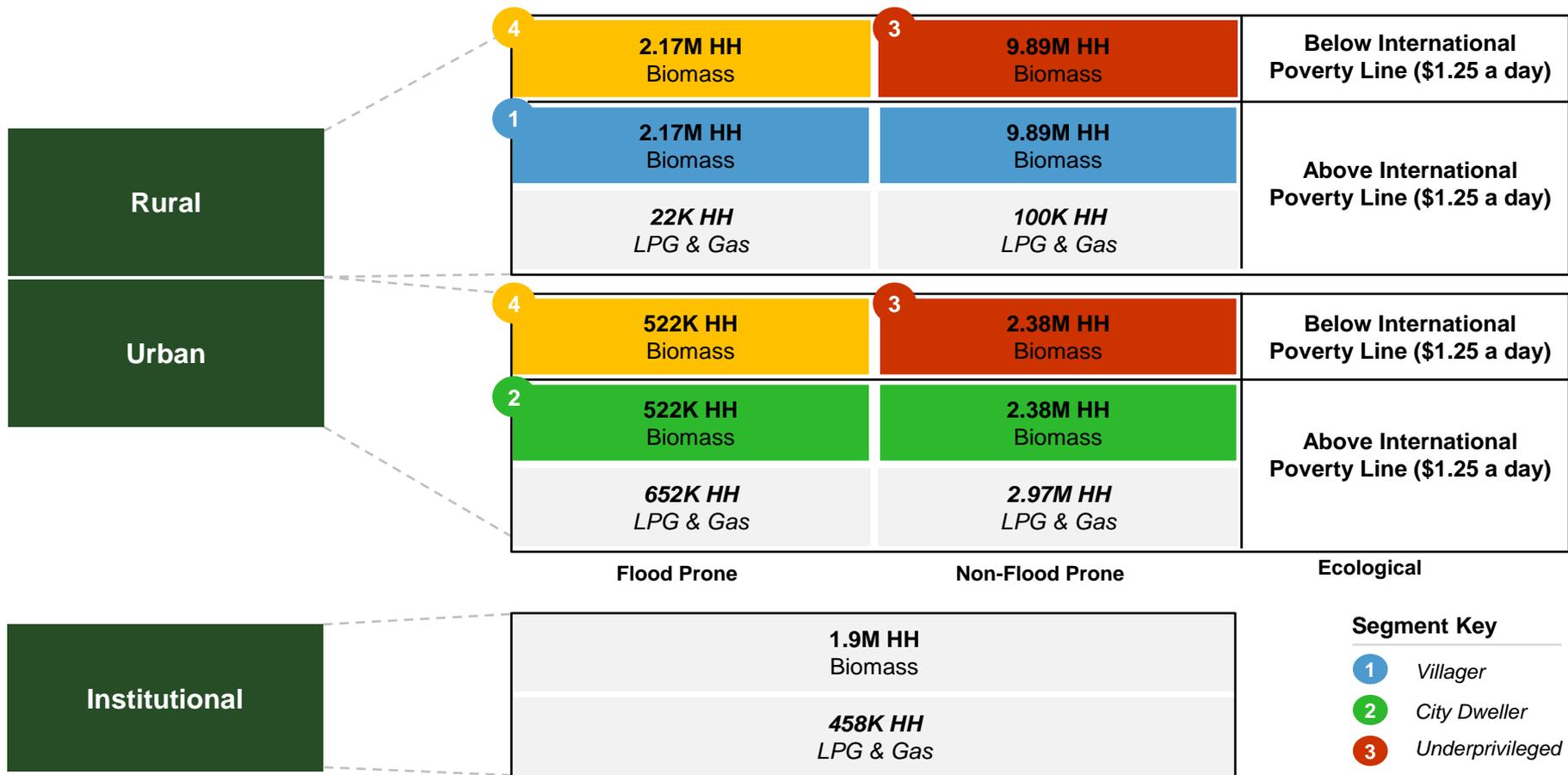
Income Level
(Above / Below International Poverty Line)

Ecological Factors
(Flood Prone / Non-Flood Prone)

Note: The attributes of the segmentation are illustrative based on only initial research.

Target Market Identification

The largest customer segments are in rural areas and cook using biomass fuel sources



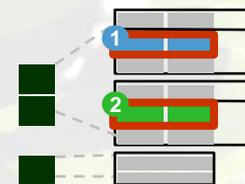
- Segment Key**
- 1 Villager
 - 2 City Dweller
 - 3 Underprivileged
 - 4 Flood Prone Disadvantaged

Note: Institutional stoves market size pulled from USAID report

- Implications -

The potential market for a cookstove intervention in Bangladesh is approx. 30 million households

Segment Profiles



Consumer Assessment

The targeted population can be segmented into four groups: 1) people living in rural areas above the poverty line & 2) people living in urban areas above the poverty line



Villager

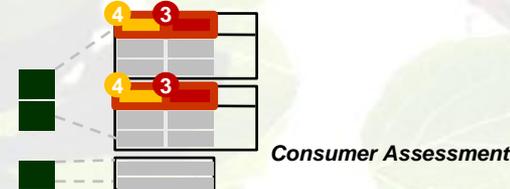


City Dwellers

Size in Households	• 12.1 M (36% of population)	• 2.9 M (9% of population)
Profession	• Farmers, fisherman, garment workers	• Domestic workers
Household Income	• Greater than Tk 100 a day (\$1.25 a day)	• Greater than Tk 100 a day (\$1.25)
Cooking Device & Fuel	• Traditional self-made mud stove • Fuel: firewood, sticks and cow dung	• Traditional, Gas and Electric Stoves • Fuel: Firewood, Kerosene and Electricity
Cooking Location	• Outdoors during dry season • Indoors during monsoon season	• Indoors
Cooking Frequency	• Two to three meals per day	• Two to three meals per day
IAP Exposure	• High	• Med
IAP Awareness	• Low	• Low
Environment Impact	• Med	• Low
Barriers to Switch	• Awareness & realized value proposition	• Awareness & realized value proposition
Willingness to Pay	• High, can afford to pay for ICS out of pocket	• High, can afford to pay for ICS out of pocket
Purchase Drivers	• Fuel costs, ease of use & perception	• Fuel costs, ease of use & perception

Note: These segment characteristics are illustrative and based on a limited selection of consumer research and interviews. Comprehensive consumer data is needed to improve the accuracy of these profiles – this appears to be extremely limited in Bangladesh.

Segment Profiles



...3) people below the poverty line and prone to flooding & 4) people below the poverty line and not prone to flooding



Underprivileged



Flood Prone Disadvantaged

Size in Households	<ul style="list-style-type: none"> 12.3 M (36% of population) 	<ul style="list-style-type: none"> 2.7 M (8% of population)
Profession	<ul style="list-style-type: none"> Field workers, Farmers, laborers 	<ul style="list-style-type: none"> Field workers, Farmers and laborers
Household Income	<ul style="list-style-type: none"> Less than Tk 100 a day (\$1.25) 	<ul style="list-style-type: none"> Less than Tk 100 a day (\$1.25)
Cooking Device & Fuel	<ul style="list-style-type: none"> Traditional self-made mud stove Fuel: Cow dung, crop residue, sticks and leaves 	<ul style="list-style-type: none"> Traditional self-made mud stove Fuel: Cow dung, crop residue, sticks and leaves
Cooking Location	<ul style="list-style-type: none"> Outdoors during dry season Indoors during monsoon season 	<ul style="list-style-type: none"> Outdoors during dry season Indoors during monsoon season
Cooking Frequency	<ul style="list-style-type: none"> One to two meals per day 	<ul style="list-style-type: none"> One to two meals per day
IAP Exposure	<ul style="list-style-type: none"> High 	<ul style="list-style-type: none"> High
IAP Awareness	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> Low
Environment Impact	<ul style="list-style-type: none"> High 	<ul style="list-style-type: none"> Med
Barriers to Switch	<ul style="list-style-type: none"> Affordability, access to financing & awareness 	<ul style="list-style-type: none"> Affordability, access to financing & awareness
Willingness to Pay	<ul style="list-style-type: none"> Low – med, some can afford ICS while others will require financing or heavy subsidies 	<ul style="list-style-type: none"> Low, due to displacement costs from flooding
Purchase Drivers	<ul style="list-style-type: none"> Fuel costs, ease of use & perception 	<ul style="list-style-type: none"> Fuel costs, ease of use & perception

Note: These segment characteristics are illustrative and based on a limited selection of consumer research and interviews. Comprehensive consumer data is needed to improve the accuracy of these profiles – this appears to be extremely limited in Bangladesh.

Customer Segmentation Summary

The Villager and City Dweller segments could be more easily targeted with a cookstove programme as they have a greater ability and willingness to pay. Bangladesh's large NGO network is also well situated to provide distribution access to these key customer segments

Customer Segment Characteristics

Segment	Size	IAP Exposure	IAP Awareness	Affordability	Willingness to Pay	Alternative Use	Distribution Access
1) Villager	High	High	Medium-High	High	Medium	Medium-High	High
2) City Dweller	Medium	Medium	Medium-High	High	Medium	Medium-High	High
3) Underprivileged	High	High	Minimal	Medium-High	Medium	Medium-High	Medium-High
4) Flood Prone Disadvantaged	Medium-High	Medium	Minimal	Medium-High	Minimal	Medium-High	Medium

Consumer education around IAP is essential here

Financial constraints are a main barrier to adoption of ICS

Humanitarian efforts are needed to reach the poor population prone to flooding

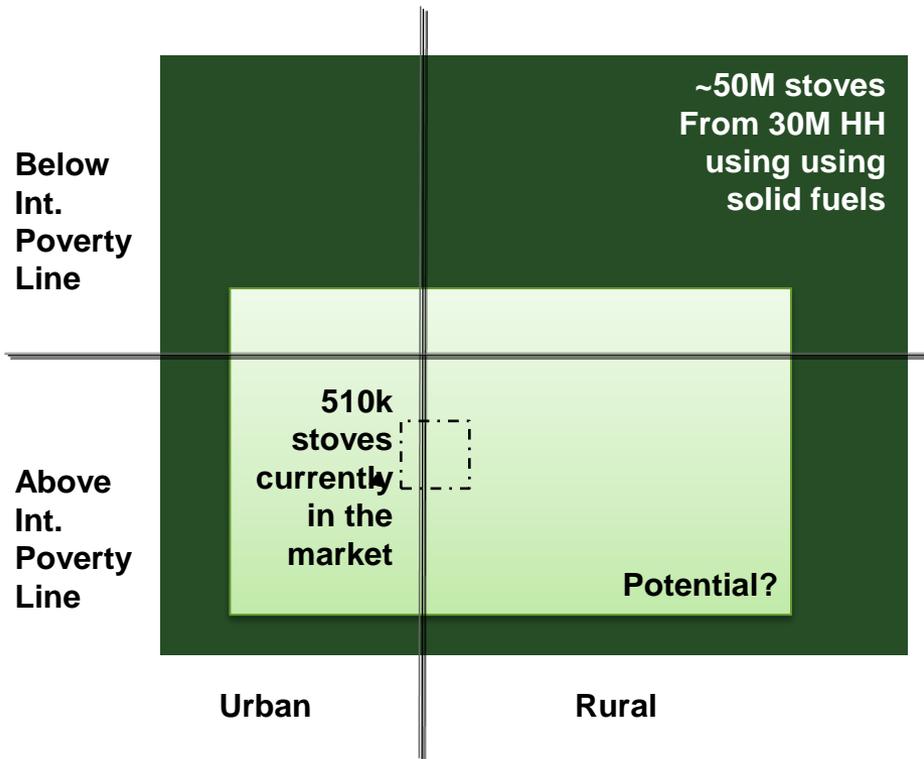
Bangladesh's large NGO network is well situated to provide access to ICS for key customer segments

- Implications -

A cookstove solution should be tailored to the needs of each segment on variables such as size, IAP exposure, safety risks, price and consumer messaging

Market Size

Current evidence suggests there are only 510k stoves in the market today, a penetration rate of <2%. The habit of using more than one stove suggests the market is even larger than previously thought



Evidence of Demand: Sizing the Market

- 30M households use biomass as the primary fuel but 67% use more than one stove. Assuming that these people only own 2 stoves, this could potentially increase the total market size to over 50M stoves
- Sales of both GIZ and Grameen Shakti programs are increasing rapidly with further growth projected
- The number of rural households buying fuelwood is increasing, from 40% in 2004 (World Bank) to 63 – 68% in 2011 (BRAC). This further strengthens the economic case for ICS ownership

- Implications -

There appears to be significant room for growth in the market if businesses and NGO programs can target the relevant consumer segments effectively.

Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social and Environmental Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

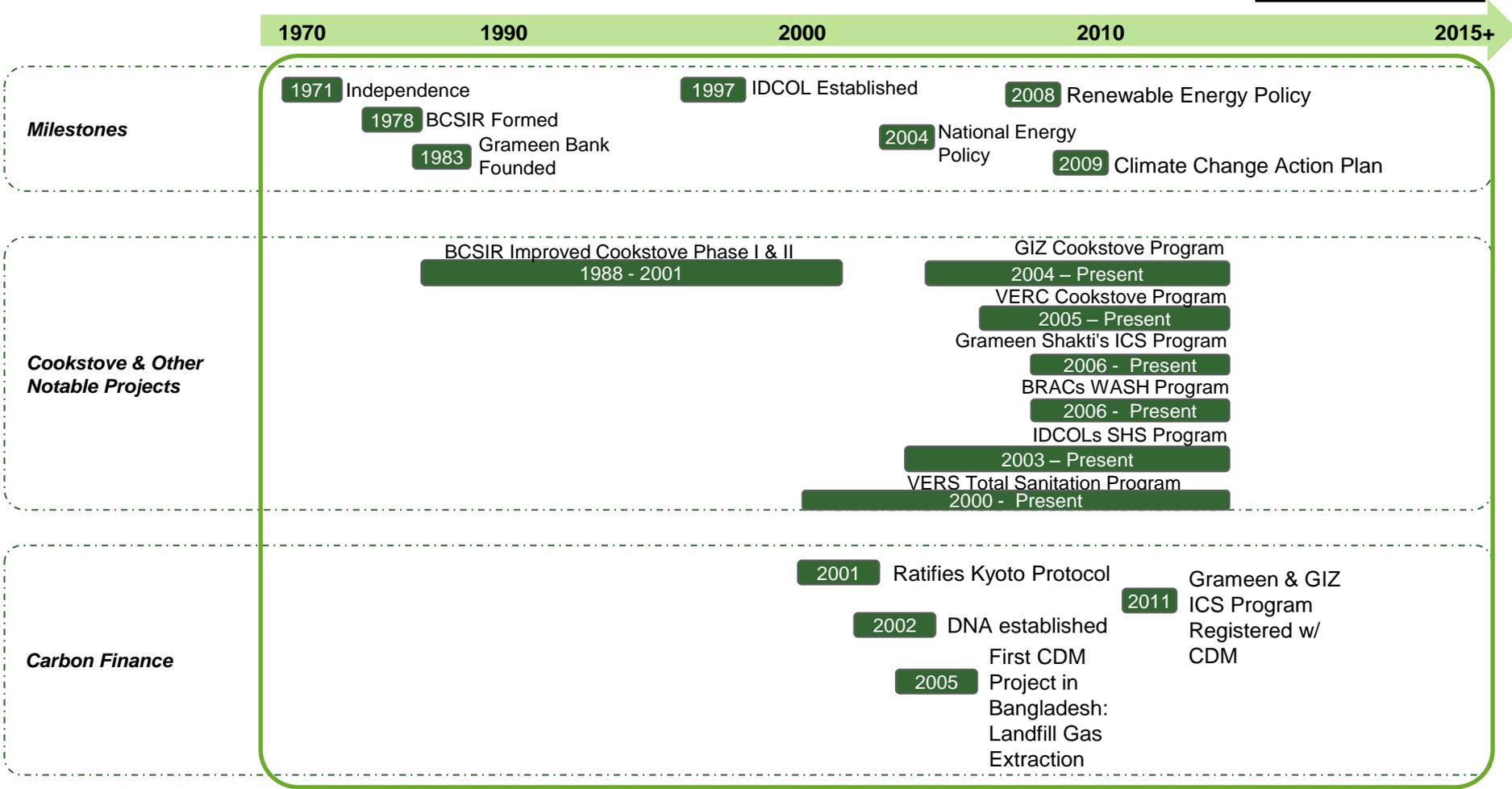
Sector Mapping Summary

Appendix

History of Cookstoves in Bangladesh

ICS programs have been in existence since the 1980's, but have recently taken off due to the opportunities related to carbon finance

Non-Exhaustive



Selection of Government Policies & Strategies

Government policy and strategies related to cookstoves largely centers around renewable energy and climate change

Policy / Strategy	Relevance to cookstove sector
<i>Renewable Energy Policy (Ministry of Power, Energy and Mineral Resources, 2008)</i>	Outlines the context for the establishment of a Sustainable Energy Development Agency (SEDA – discussed further on following page). Also outlines the aims of the government in creating an enabling environment and legal support to encourage the use of renewable energy.
<i>National Energy Policy (Ministry of Power, Energy and Mineral Resources, 2004)</i>	This policy provides a comprehensive outline of the energy issues in Bangladesh, some development options and the policies recommended to address them. This sets the scene for all other energy related policies.
<i>National Women Development Policy (Ministry of Women and Children Affairs, 2011)</i>	This policy outlines the GOB intention to improve women’s rights within Bangladesh. It states its aim to, “Provide women with full control over their right to land, earned property, health, education, training, information, inheritance, credit, technology and opportunity to earn... And enact necessary new laws to put these rights into practice.”
<i>Bangladesh Climate Change Strategy and Action Plan (Ministry of Environment and Forest, 2009)</i>	This impressive strategy document was endorsed by Prime Minister Hasina and describes Bangladesh’s plans for the adaption and mitigation of climate change. It offers a wide-ranging overview of the environmental challenges facing Bangladesh and also outlines the initial six pillars of interventions that have been identified.

This list was compiled from research and interviews with stakeholders in Bangladesh. It is by no means exhaustive

Note: The Ministry of Power, Energy and Mineral Resources is currently preparing a draft of the Energy Conservation Act

Sustainable Energy Development Agency (SEDA)

The Renewable Energy Act (2008) calls for an independent institution, the Sustainable Energy Development Agency (SEDA), to serve as the focal point for sustainable energy development and promotion in Bangladesh

Overview

- SEDA Board will comprise of representatives of stakeholders including business community, academics and/or representative from Bangladesh Solar Energy Society, NGOs, financial institutions and implementing agencies.
- Until SEDA is formed, the Power Division of the MPEMR or its assignee will facilitate the development of renewable energy

Note: SEDA is in the process of being set up and is not currently established yet

Objectives

- 1) Coordinate sustainable energy planning and link together industry actors
- 2) Promote awareness of renewable and clean energy technologies
- 3) Support demonstration of new technologies and new business models
- 4) Support renewable energy SMEs
- 5) Enable systematic development through energy audits
- 6) Create market opportunities and start up business models for sustainable energy technologies
- 7) Develop financing mechanisms and facilities for public and private investments in sustainable energy
- 8) Collect data and assess the renewable energy resource base
- 9) Provide funds for the development of standardized renewable energy configurations to meet common energy and power applications
- 10) Create enabling environment and legal support to encourage use of energy
- 11) Promote development of local technology
- 12) Promote clean energy for CDM
- 13) Set policy targets to meet 5% of total power demand by 2015 and 10% by 2020

- Implications -

Government renewable energy initiatives are likely to be channelled through this new body in the future. The cookstove sector must work closely with the GOB to align their plans

Taxes, Tariffs and Subsidies

The current taxes & tariffs do not appear to favor energy efficient products although plans are in place to address this. Government fuel subsidies face significant pressure due to the widening trade deficit

Background

- There is a perception that the current import policy is not supportive to energy efficient devices. The 1995 National Energy Policy suggested that “Incentives for fuefficiency for all categories of end-uses may be given” but no law has been enacted to promote this.
- In some cases, highly efficient products such as compact fluorescent bulbs were viewed as luxury items and taxed at 60% compared to the 15% enjoyed by their highly inefficient counterparts.
- With fuel, the government subsidizes all fuels except coal but has recently had to raise prices as the national trade deficit rose to 23% (\$1.81 billion)

*“We’d like to import our stoves to Bangladesh but the **import tariffs are just too high** for us to remain competitive”*
– Indian Stove Producer

Future Plans

- The Renewable Energy Policy (2008) has several provisions around financial incentives for energy efficient products. These include:
 - Providing customs and VAT exemptions for import and domestic manufacture of sustainable energy equipment
 - SEDA will consider providing subsidies to utilities for installation of solar, wind, biomass or any other renewable/clean energy projects
 - Renewable energy project investors in public and private sectors shall be exempted from corporate income tax for a period of 15 years

- Implications -

The cookstove sector should work closely with the government to build on the Renewable Energy Policy and create a more supportive policy and taxation environment for the market.

BCSIR had a research and testing center devoted to stoves, but there is currently limited funding for them to pursue this. There is no recognized national testing facility so standards and testing are limited to the work done by individual organizations

Testing

- BCSIR developed stove designs in the 1990s in partnership with Eindhoven University, but little ICS work has been conducted into the design of stoves over the past decade.
- In 2011, VERC and Aprovecho conducted a workshop in Bangladesh to train stakeholders across the industry on performing Water Boiling Tests, Controlled Cooking Tests and Kitchen Performance Tests.
- Grameen, GIZ, and VERC all do performance testing, but there is no independent testing facility

“Since we have been installing these systems the number of SHS has increased steadily over the years. The reason for that is unless you create a program with monitoring and quality control, it will not continue to be sustainable”
– CEO of IDCOL

Standards

- There are currently no national standards for stoves and/or fuels in Bangladesh.
- The most relevant standards program is IDCOL's Technical Committee for Solar Homes Systems. The technical committee determines technical standards, reviews product credentials and approves eligible equipment. It consists of government organizations, academic institutions and IDCOL.

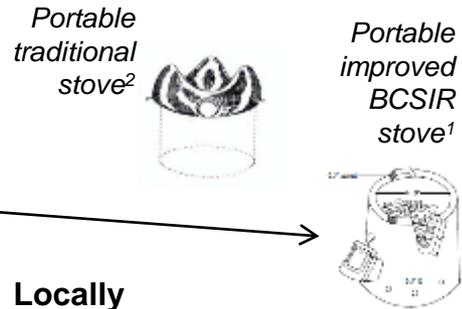
- Implications -

The lack of a well resourced and recognized standards and testing body means there is no one to address concerns around the durability or performance of stoves in the market

Overview of the Bangladesh Cookstove Landscape

The diversity of products in the market is limited, with fixed Chulha models dominating. Penetration of portable stoves appears low while there are no imported biomass stoves in the market.

¹ No program appears to be promoting this portable stove (originally designed by BCSIR). There is also little evidence to suggest this stove being sold/disseminated at all.



Locally manufactured

Portable

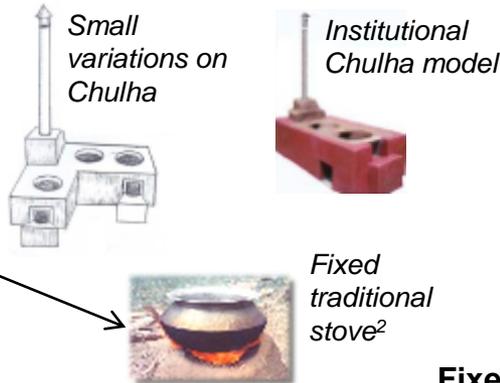


Note³

³ All biomass ICS are manufactured locally. There are no imported ICS currently in the market. Anecdotal evidence suggests that this may be due to prohibitively high import tariffs.

Imported

² Studies have estimated that 99% of people in Bangladesh use a traditional stove (either fixed or portable)



Fixed

No fixed imported stoves found in the market

- Implications -

There may be an untapped opportunity for portable stoves but this would need to be validated with consumer research. High import tariffs appear to restrict competition in the market.

Characteristics of the Chulha Stove

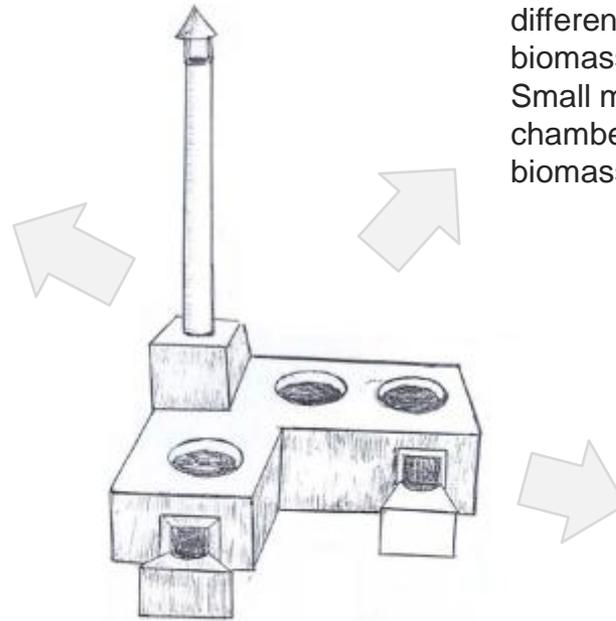
The Chulha model appears to be the dominant stove in the market today. Based on the original BCSIR designs, variations have emerged that illustrate the adaptability of this design.

Material: Clay vs Concrete

BCSIR originally designed the Chulha to be manufactured out of clay, which is easy to source locally across the country.

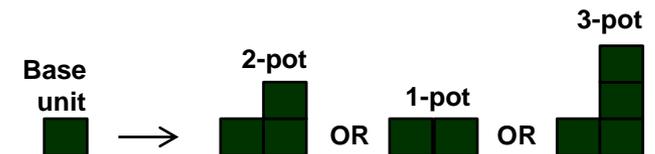
However, GIZ and Grameen recently moved to a concrete model, produced using defined dies. This aimed to reduce the variance of production quality in turn support their carbon finance requirements.

Other organizations, such as VERC, still train people to build clay versions. Questions remain around the durability and efficiency of stoves build with these two materials.



Fuel: Adapting to Biomass type

New variations of the Chulha have emerged to address different fuel types. It was originally designed to use all biomass but does not always perform optimally for each. Small modifications can be made to the combustion chamber to improve the efficiency with different forms of biomass. GIZ have already put this process into practice.



Modular: 1 die, several stoves

For certain GIZ concrete Chulhas, they are built with a modular approach in mind. This simplifies production to only one base unit that can later be joined together to produce stoves of any pot size.

- Implications -

The dominance of such a flexible model presents an a focal point to stimulate product development and improve the Chulha's performance even further

Selection of the Technology Landscape

The vast majority of people still use traditional stoves with improved clay & concrete stove usage far behind

Traditional Stove



- Used extensively by most people using biomass (~28 – 29M HH)
- Performs very badly at efficient burning – i.e. doesn't conserve fuel well or remove any particulate matter
- Materials always available and simple to construct
- Any biomass fuel can be used

- Use ●
- Availability ●

Clay Chulha



- Based on early BCSIR models with built in chimney
- Hand made from clay
- Comes in 1, 2 and 3 pot sizes
- Durability issues with chimney when it is not cleaned frequently
- Takes 5 – 7 days to build & install
- Any biomass fuel can be used

- Use ◐
- Availability ◐

Concrete Chulha



- Chimney design also based on BCSIR model,
- Manufactured from concrete
- Durability issues when material quality not maintained
- Flexible design & construction
- Easily installed in 1-2 hours
- Any biomass fuel can be used

- Use ◐
- Availability ●

Key | ○ Minimal ◐ Low ◑ Medium ◒ Medium-High ● High

Selection of the Technology Landscape

In urban areas, LPG/Natural gas and electricity are not uncommon. Biogas stoves are also present in relatively small numbers

Gas Stove



- Useful for people with access to LPG or natural gas
- High efficiency and zero emissions associated with gas stoves
- Very expensive compared to biomass, ranging from between 3 – 10 times the price

- Use
- Availability

Electric



- Historically not common but increasing use in urban areas due to gas shortages and unpredictability of supply
- Obviously no emissions but only available for those with access to electricity and very expensive for those that do

- Use
- Availability

Biogas



- These are in limited use due to the vast investment needed for the biogas digester
- Requires anywhere from 40 - 130kg of cow dung depending on the size of the plant
- Typically comes with maintenance guarantees and warranty

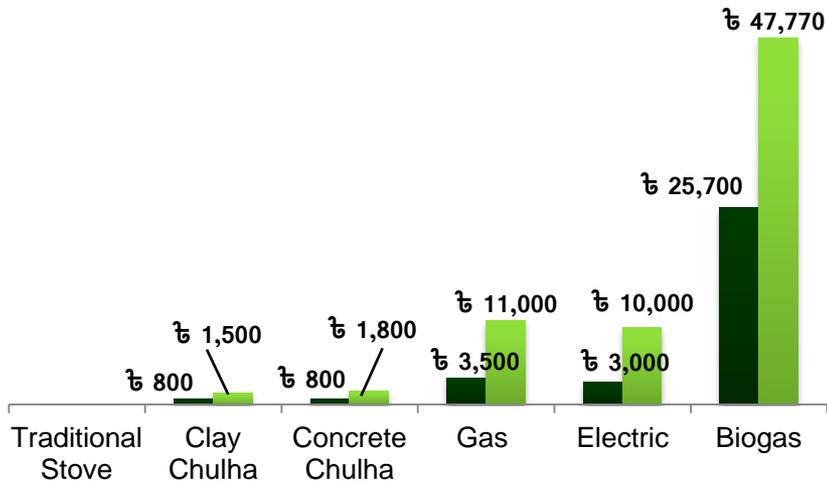
- Use
- Availability

Key | Minimal | Low | Medium | Medium-High | High

Available Cookstove Cost

Biomass ICS prices range between Tk 800 – 1800 (\$10 - 22) depending on the business, material & model size. Clean fuel burning stoves are much more expensive

Upfront Cost by Product



All prices are in Taka.

Observations

- Improved Biomass Stoves (IBS) are all around initially priced Tk 1000
- These prices will vary from area to area as GIZ and VERC adopt a market based approach that allows the local entrepreneurs and businesses to set their own prices
- Questions still remain around durability but initial consumer research suggests 5+ years for clay and 3+ years for concrete. These figures are still debated vigorously
- Biomass stoves are priced just below the typical lower threshold for MFI (\$15) so payment for stoves is almost always in a cash lump sum
- The improved stoves have an impressive payback period of only 2-3 months due to fuel savings

- Implications -

There appears to be little 'wholesale' price variation amongst biomass stoves but further research is needed to test price sensitivity and consumers' willingness to pay

Overview of Major Cookstove Initiatives in Bangladesh

Non-Exhaustive

Cookstove Industry

Large NGOs operate all across Bangladesh, but have not yet penetrated the market at great scale



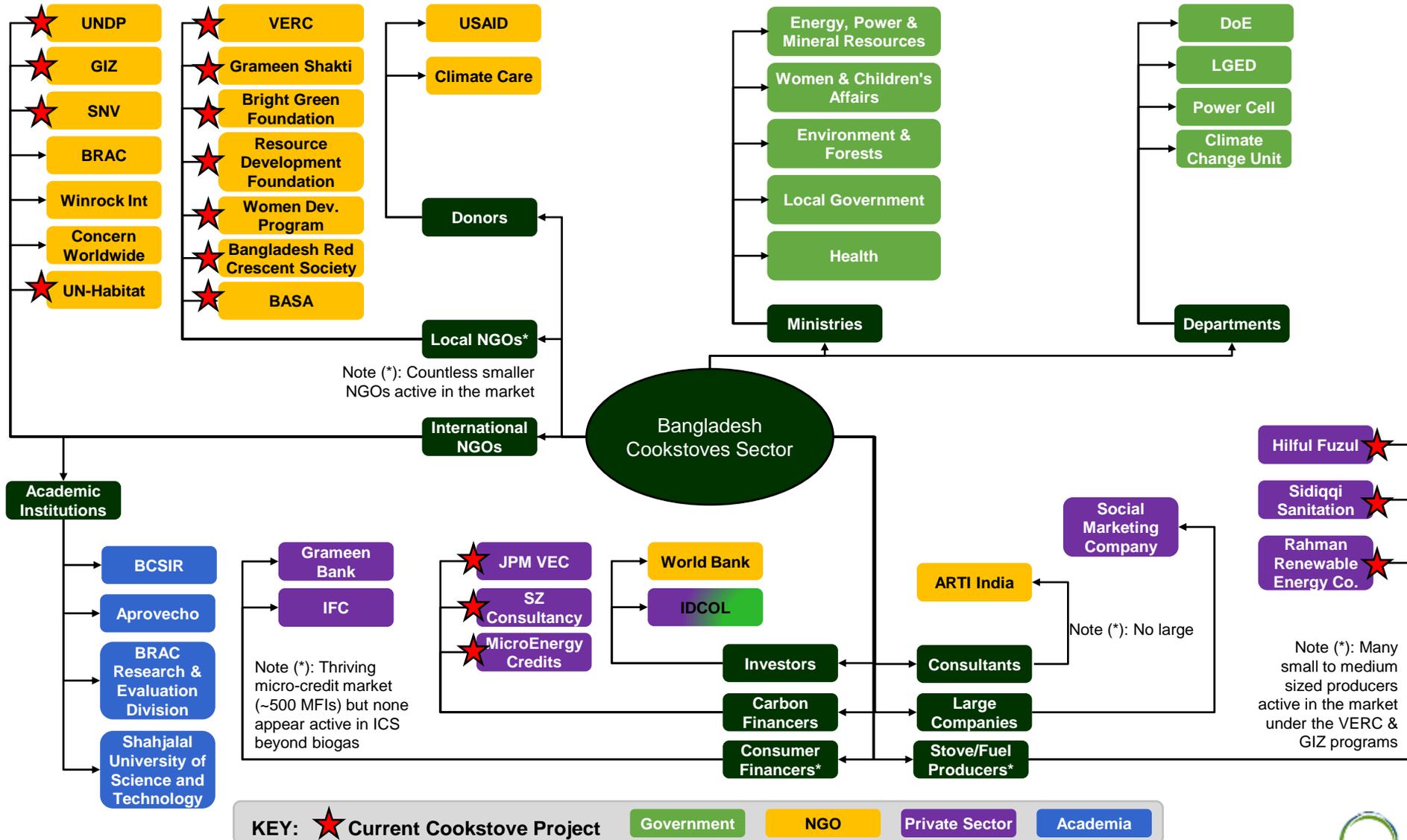
- Implications -

The lack of academia and large private sector organizations suggests there is an opportunity to bring in outside institutions to encourage growth and innovation

Bangladesh Stakeholder Mind Map

Non-Exhaustive

Cookstove Industry



Humanitarian Programs

UNDP & UN Habitat are leading the humanitarian focused dissemination of ICS across Bangladesh. They have already distributed over 42,000 stoves and are preparing to increase this to 400,000.

Humanitarian ICS Programs in Bangladesh

- The US\$120 million Urban Partnerships for Poverty Reduction (UPPR) program is the largest urban poverty reduction initiative in Bangladesh, and reportedly one of the largest in the world. Its goal is “To reduce urban poverty in Bangladesh” and its purpose is “To improve the livelihoods and living conditions of three million urban poor and extremely poor people, especially women and girls”.
- UNDP and UN-Habitat are lead NGOs with implementation support from the LGED, under the Ministry of Local Government, and various local municipalities.
- Part of its program is to provide access to improved stoves to help mitigate the health impact of IAP and conserve fuel use. As of December 2011, they disseminated 42305 stoves in the areas shown on the map (see right).
- Unlike other countries, anecdotal evidence suggests that these subsidized stoves are not distorting the market for other local ICS producers as they are clearly targeting “ultra poor” communities that are unable to purchase stoves through the market.



- Implications -

With over half the population living in poverty, humanitarian based ICS programs appear to be an essential factor in supporting the millions for whom the market is out of reach.

Cookstove Initiatives in Bangladesh

– NGOs

Numerous NGOs are distributing stoves but a selection of the major players are highlighted below

	VERC	GIZ	Grameen Shakti	BRAC
Who	Medium sized NGO founded in the 1970s. Has offices across over 40 districts and has run ICS programmes since 1987.	GIZ is the sustainable development implementation partner for the German government. Their ICS programme has run since 2004.	Grameen Shakti is the renewable energy, non-profit arm of the Grameen Group of organisations. Has huge reach across all of Bangladesh and run ICS programmes since 2006.	World's largest NGO, founded in 1972 and look to address poverty through variety of programmes. Established climate change & health programmes. Now potentially interested in ICS distribution.
What	Disseminates primarily clay 1, 2 & 3 pot stoves. They now run only one ICS programme which is Carbon Finance driven. Their approach is to recruit, train and support local female entrepreneurs in each community.	Their current model focuses on supporting 200+ partner organisations (PO) to manufacture & sell stoves. These POs are trained & supported by GIZ. They are using a concrete version of the BCSIR model.	Design, manufacture and sell these stoves themselves through their vast network. They use the same concrete design as GIZ but have since terminated their partnership with them. They are seeking CF accreditation.	Their research division performed some initial customer research with valuable results. Still deciding on the correct approach before piloting and testing it. Any 'scaling up' will only occur after that process.
Challenges	Scaling up their programme from ~7500 stoves so far to their 5 year target of 500,000 while still maintaining top quality M&E for the CDM process.	Durability of concrete stoves still questioned. Original use of sanitary shops for distribution is promising but scalability still uncertain. M&E process for CF may prove difficult to manage.	They are currently investing resources to help support marketing & sales. Still working hard to develop a sustainable business model.	Choosing the right approach to their ICS programme and fine tuning it to ensure it is effective.
Partners	BCSIR, Winrock International, Nexus, Eco Securities Past: USAID, Concern Worldwide.	200+ POs & over 1000 sanitary shops, close links with Power Division & Dept. of Environment.	Informally – GIZ	None as yet.

Cookstove Initiatives in Bangladesh – NGOs (continued)

Numerous NGOs are distributing stoves but a selection of the major players are highlighted below

	Bright Green Foundation	SNV	UNDP - UN-Habitat	Other NGOs
Who	Relatively small NGO with a growing interest in cookstoves. Founded & run by Dipal Barua, ex MD Grameen Shakti, & primarily focused on Solar Home Systems (SHS).	Founding partner of the Alliance and active across much of South Asia. Focus in Bangladesh has so far been on biogas but they are now interested in expanding into cookstoves.	UNDP has focused on providing improved cookstoves to the ultra-poor populations which are most vulnerable to natural disasters such as cyclones and floods.	Outside of the main players mentioned here, there are countless other NGOs active in the cookstove sector.
What	Partner of GIZ who are aiming to distribute 10,000 stoves in 2012. Their influential connections and valuable experience in SHS make them a smaller but important and growing player in the sector.	Through SNV's advisory services over 17,000 biogas plants have been installed across Bangladesh by 30 partner organisations up to February 2011. More than 80% of these biogas plants have been constructed using credit schemes.	They have partnered with GIZ and fully subsidised the stoves. Despite that, little market distortion has been found. Over 42,000 subsidized stoves installed & UN Habitat is preparing a follow on program for another 400,000 stoves.	Many have partnered with GIZ and are now manufacturing & selling the Concrete Chulhas. Others have partnered with the large NGOs to undertake community education and awareness campaigns.
Challenges	Much of their success will rely on the success of the GIZ approach and their own ability to bundle or sell ICS directly to the communities in which they operate.	Their biogas programme is well established and impressive but as they look to expand into ICS, they will need implementation partners to distribute stoves & manage the programmes	Unknown	The challenges vary depending on organisation. However, as a general note, technical expertise, demand creation and other marketing have all emerged as themes in this area.
Partners	GIZ, IDCOL, UNDP	IDCOL, + ~30 other partner organisations	Bright Green Foundation, GIZ	-

Cookstove Initiatives in Bangladesh

– NGOs (continued)

Numerous NGOs are distributing stoves but a selection of the major players are highlighted below

	Bangladesh Red Crescent Society (BDRCS)	Bangladesh Association for Social Advancement (BASA)
Who	BDRCS is part of the International Federation of Red Cross and Red Crescent Societies (IFRC). Focused on disaster management, disaster preparedness and health & care interventions for vulnerable communities	BASA is a NGO devoted to promoting the socio-economic conditions of the poorer section of the community in Bangladesh. It's major focus areas of work include microfinance, water and sanitation, renewable energy, carbon reduction and generation of green energy.
What	Trained 40 community Volunteers in the Kushtia district to install and maintain "low cost mud" stoves. They installed 100 in December 2011 and also plan to start installing biogas plants. Little is known about their future plans.	BASA is implementing several projects in various districts of Bangladesh, and as of December, 2011, BASA installed 6673 domestic ICS and 27 commercial ICS. A special feature of their program is that operates among some tribal communities in the country.
Challenges	Unknown	Overcoming the social and cultural barriers around the use of traditional stoves. Operating a market based approach in very poor communities
Partners	Unknown	Unknown

Cookstove Initiatives in Bangladesh

– Government

Several government ministries and agencies are interested in cookstoves. This cross cutting issue means that many stakeholders must be considered

	Power Division, Ministry of Energy, Power & Mineral Resources (MEPMR)	Department of Environment (DoE)	Local Government Engineering Department (LGED)	Bangladesh Council of Scientific and Industrial Research (BCSIR)
Who	Power Division is responsible for all sustainable and renewable energy endeavours of the GOB. Already recognises ICS as a potential opportunity for Bangladesh.	Administers the Climate Change Trust Fund that subsidises additional stoves through BCSIR. They also monitor outdoor air pollution, so could extend to IAP.	Local Government Engineering Department (LGED) is entrusted for planning and implementation of local level rural, urban and small scale infrastructure development programs.	Government institution that performs important R&D. Early pioneers of ICS in Bangladesh from 1970s & 80s. All current ICS products remain based on BCSIR's original designs.
What	Setting up new Sustainable Energy Development Authority (SEDA) to implement their new Renewable Energy Policy. This policy has included provisions for stimulating market development for ICS.	No direct involvement but keen to be part of the conversations and perhaps even lead the GOB engagement with any national ICS programme.	No active ICS programme right now but previously implemented 1 ICS programme in 2005, Currently focused on Solar Home Systems and Biogas.	No active ICS programme right now but still retain their ICS lab space. Their former ICS director has since joined Grameen Shakti as a consultant. Keen to play a large role testing and monitoring quality.
Challenges	SEDA will take approx. 12 months to mobilise & at which point, no clear guidance as to the priority ICS programmes will have. Programme funding may also be challenging.	Unknown	No funding or partner organization to support the current involvement in ICS programmes.	No funding to maintain involvement in ICS. Their testing facilities are limited and require investment to update and meet market demand.
Partners	BCSIR, GIZ	N/A	UNDP, GIZ	Past: VERC, Government of Bangladesh

Cookstove Initiatives in Bangladesh

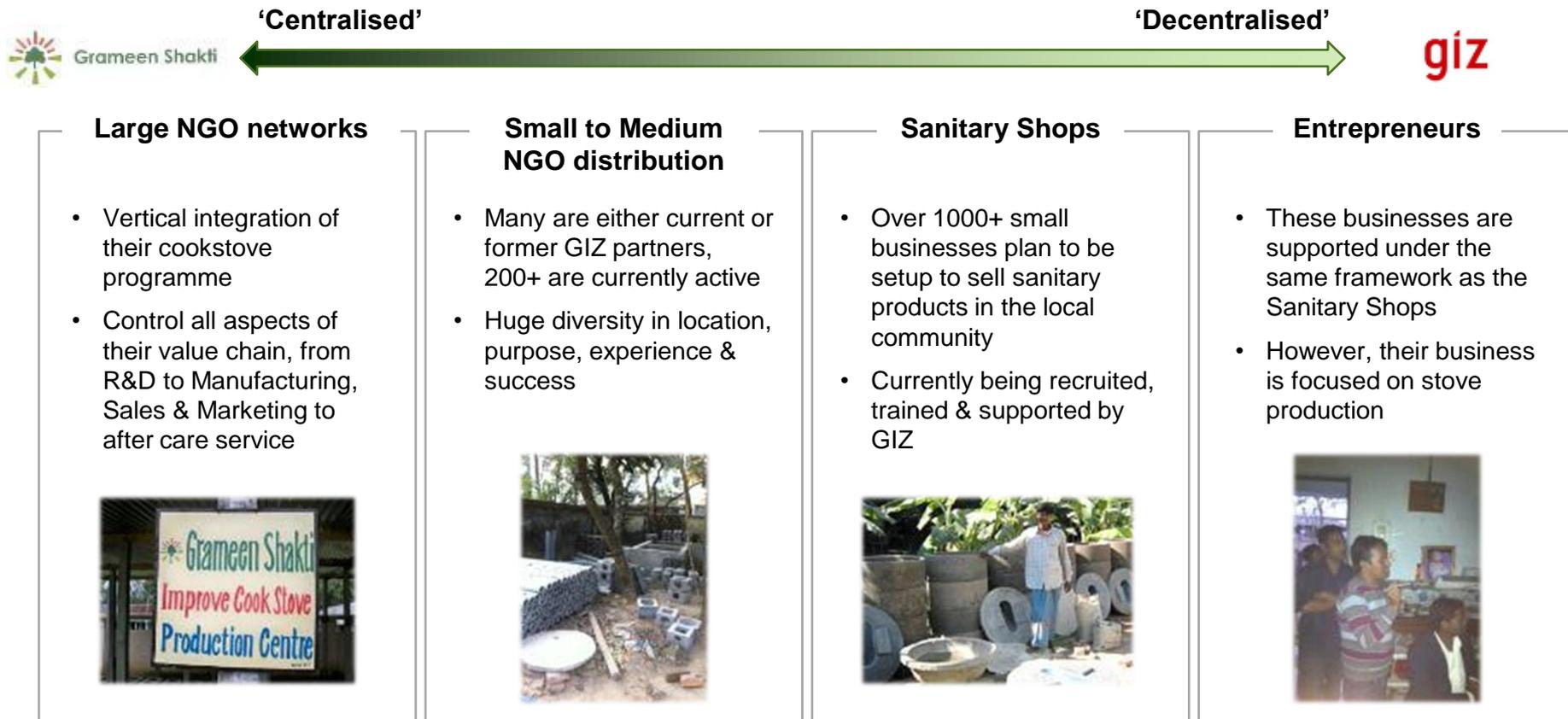
– Private Sector

The private sector is dominated by smaller players, with no larger organisation importing or manufacturing stoves at scale

	Sanitary Shops	Local Entrepreneurs
Who	Small shops dispersed all across Bangladesh that manufacture and sell sanitation products. GIZ has recently started partnering with these shops to add cookstoves to their production selection.	Individual local entrepreneurs who sell and build clay stoves in their local communities. These people are predominantly female and responsible for the entire life of the stoves.
What	GIZ provide their shops with training and sales & marketing support. The training centres around stove manufacturing while the sales & marketing support helps to build demand in their local market. They also use the concrete versions of the BCSIR design.	VERC trains and supports these entrepreneurs in building & maintaining clay stoves, marketing to local people and monitoring standards. Once again, the stove is almost exactly the same as the BCSIR model.
Challenges	Maintaining high manufacturing standards to support the CF programme. Selling the stoves in volume with minimal marketing investment.	Scaling up this operation from a number of thousands to tens and hundreds of thousands will be challenging. Clay stoves still take 5-7 days to build.
Partners	GIZ	VERC

Existing Markets for Cookstoves and Fuels

The organisations distributing ICS can be broadly categorised into the following 4 groups:



- Implications -

Outside of Grameen, cookstove distribution is dominated by SMEs (both NGO & Private Sector). No one has yet to manufacture at scale or establish a robust, sustainable business model

Cookstove Industry Value Chain

Bangladesh has basic capabilities across the value chain; however, there is a lack of product diversity, reliable enterprise financing and larger private sector participation

Key:	Manage Program		Raise Awareness			Provide & Support Stoves											
	Coordinate Program	Provide Funding	Coordinate Project (Region)	Centralize Act. (Mktg, Ops, Fin)	Educate on IAP	Raise product awareness	Run Promo Activities	Import & retail stoves	Design stoves	Train Stove Manufacturers	Test stoves	Supply Materials	Transport mat. to Manufacturer	Make stoves	Transport stove to customer	Sell and install Stoves	Maintain Stoves
Multilaterals/Donors	Basic	Full	Basic	Basic		Basic											
Government	Basic	Basic	Partial	Partial	Partial	Partial	Partial				Basic						
Bank/Financial Institution		Partial	Basic	Partial		Partial											
NGOS and iNGOs	Full	Partial	Full	Full	Full	Full	Full	Partial	Basic	Partial	Basic	Full		Full	Partial	Partial	
Local Manufacturers					Basic	Partial	Partial	Basic				Partial	Partial	Partial	Full	Full	Partial
Local Entrepreneurs					Basic	Partial	Partial	Basic				Partial	Partial	Partial	Full	Full	Partial
International Manufacturers																	

- Implications -

The full vertical integration & vast reach of NGOs is a huge advantage for the sector that presents an ideal environment for ICS distribution & consumer education

Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

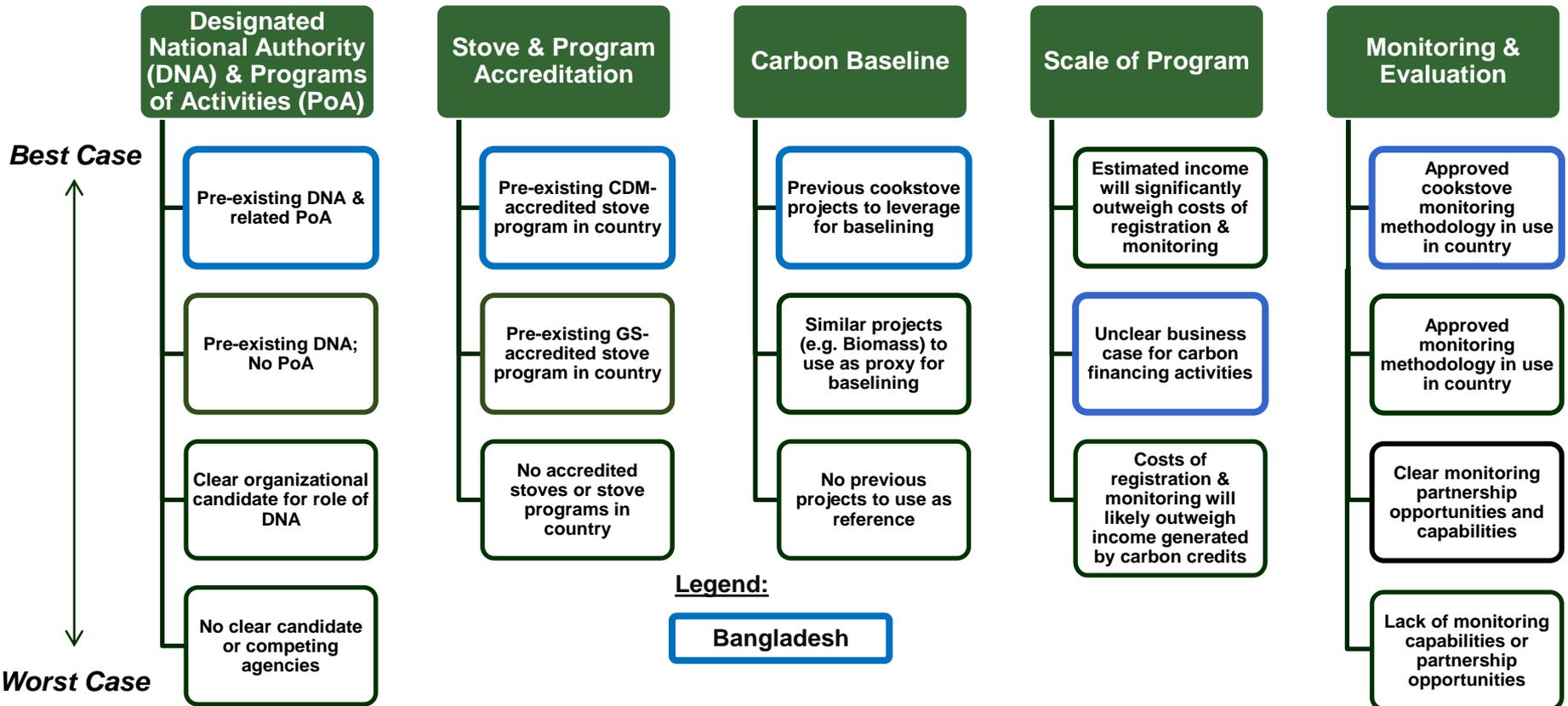
Sector Mapping Summary

Appendix

Carbon Finance Market Attractiveness

Bangladesh already has CDM-accredited stove programs and a PoA for clean cookstoves

Carbon Finance Attractiveness Criteria – Bangladesh



- Implications -

Bangladesh ranks very highly on the high-level market attractiveness criteria to support a potential cookstove program; however, carbon market volatility is a high risk as current programs are heavily reliant on carbon finances revenues to achieve scale

Carbon Finance Landscape

Bangladesh has a Designated National Authority, a Program of Activities and projects which are currently receiving CDM CER's

Carbon Financing Landscape – Bangladesh

Area	Data	Comments
Designated National Authority	Department of the Environment	Contact Name: Dr. Fazle Rabbi Sadeque Ahmed
CDM Projects	3 registered CDM projects: 1. Grameen Shakti 2. SZ Consultancy Services 3. VERC	All are cookstove programs
Gold Standard Projects	No registered Gold Standard projects	- VERC currently applying for GS approval
CDM Program of Activities	1 Small Scale CDM-PoA: Improved Cooking Stoves in Bangladesh	
Accredited Cookstove Programs	Yes	CDM accredited
Carbon Funds	CDM CER's	- Grameen and SZ Consultancy Services backed by JP Morgan Ventures Energy Corporation - VERC backed by EcoSecurities
Other Mechanisms	None	-

Carbon Finance Programs

The Chulha stove design is currently being distributed under the Improved Cooking Stoves in Bangladesh PoA via three programs with carbon financing components



**SZ Consultancy
Services Ltd.**



Focus

- Improved cookstove program
- Improved cookstove program
- Improved cookstove program

Participants

- Grameen Shakti (Implementer)
- Grameen Shakti (Distributors)
- CDM (Certification)
- Mud Chulha 1, 2 and 3 pot with grate and chimney (Design)
- SZ Consultancy Services (Implementer)
- Partner Organizations (Distributors)
- CDM (Certification)
- Concrete Chulha 1,2 and 3 pot with grate and chimney (Design)
- VERC (Implementer)
- VERC (Distributor)
- CDM (Certification)
- Mud 1,2 and 3 pot with chimney (Design)

Description

- Began in 2009
- Goal is to distribute 5M ICS by 2015
- Monitoring includes:
 - Stove installation record (Serial #)
 - Site visits
 - Electronic files
- Began in 2008
- Goal is to facilitate CDM project formulation and implementation across partner organizations
- Monitoring includes:
 - Stove installation record (Serial #)
 - Site visits
 - Electronic files
- Began in 2008
- Goal is to distribute 500,000 ICS over the next 5 years
- Monitoring includes:
 - Stove installation record (GPS coordinate)
 - Site visits
 - Paper files

Overall CF Market Attractiveness

Bangladesh has a unique opportunity to leverage existing carbon financing activities to support clean cookstove programs; however, there are a few risks

Highlighted Market Criteria

Existing Designation National Authority

Existing CDM-Accredited Cookstove Programs

Existing Cookstove CDM Programs of Activities

Ideal Market Conditions for Cookstove Program Carbon Financing in Bangladesh

Potential Risks

- Reliance on laborious monitoring and evaluation (M&E) processes
- Chula design may not be appropriate to all regions and consumer segments
- Stringent efficiency requirements for inclusion in CDM Program of Activities may restrict stove options
- PoA managing entities may limit the solutions allowed into their PoA, reducing competition

- Implications -

The heavy reliance on carbon finance revenue and burden of rigorous M&E are two major risks to the long term success of the Bangladesh market

Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social and Environmental Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

Sector Mapping Summary

Appendix

Cookstove Industry Summary

The Bangladesh cookstove sector has huge potential with a number of established industry players, huge target market and general acknowledgement of the benefits of ICS

Macro	Social and Environmental Impact	Consumer	Cookstove Industry	Carbon Finance
<ul style="list-style-type: none"> + Large potential market + Government recognises the broad benefits of ICS - Political instability makes government ownership particularly challenging - National energy shortages have dominated much of the Government's focus - Human displacement from flooding occurs annually across the country 	<ul style="list-style-type: none"> + Number of IAP related deaths creates a strong case for change + Huge reliance on biomass fuel presents a huge potential market + Compelling economic benefits for ICS for many parts of the country 	<ul style="list-style-type: none"> + Huge population presents a diverse range of segments favourable for ICS + Extremely large institutional stove market - Very low affordability amongst those with the greatest need - Lack of awareness still exists in many communities 	<ul style="list-style-type: none"> + Strong and diverse cookstove sector (both NGO & SME) + Entrepreneurial culture with abundance of active community orgs. - Supply issues limits access to clean fuels - Lack of product diversity may inhibit growth - Questions remain around product durability 	<ul style="list-style-type: none"> + Very attractive CF market characteristics + Three programmes already established and seeking Carbon Funding - Sector business models rely heavily on carbon credits - Burden of vast M&E is a risk to future growth
Moderately Favourable	Favourable	Moderately Favourable	Moderately Favourable	Moderately Favourable

- Implications -

There is impressive potential for market growth if consumer awareness can be increased, the main players strengthened and political instability navigated successfully

Implications for Intervention Options

1. A cookstove intervention can serve a large market size in both rural and urban areas but many of those lie below the international poverty line
2. The extremely high number of DALYs and deaths attributable to IAP presents a strong case for cookstove interventions in Bangladesh
3. IAP is recognized as an important health issue but low per capita health spending and other pressing priorities, mean large scale government intervention based on health is unlikely
4. The large biomass market is likely to exist for many years due to poor access to electricity & clean fuels. If gas supply or price becomes an issue, consumers may start reverting to biomass
5. As is often the case, the cultural & historical attachment to traditional stoves will be challenging to overcome. Any new stove design should fit with existing cooking habits
6. The potential target market for a cookstove intervention in Bangladesh is approximately 30 million households
7. Given the heavy reliance on biomass, stove designs should accommodate all types of biomass fuels
8. Although improvements are required, the strong involvement of women in the sector improves its ability to connect with end consumers and increases its potential for growth

Implications for Intervention Options

9. The free supply of biomass means that not all cookstove initiatives can focus on the economic benefits
10. There appears to be little 'wholesale' price variation amongst biomass stoves but further research is needed to test price sensitivity and consumers' willingness to pay
11. The Chulha model is the only ICS addressing the vast biomass market. This suggests there may be an opportunity to introduce other ICS designs to the market
12. The lack of academia and large private sector organizations suggests there is an opportunity to bring in outside institutions to encourage growth and innovation
13. No institution is currently responsible for promoting research, testing and standards for cookstoves
14. The full vertical integration & vast reach of NGOs is a huge advantage for the sector that presents an ideal environment for ICS distribution & consumer education
15. Bangladesh ranks very highly on the high-level market attractiveness criteria to support a potential cookstove program; however, carbon market volatility is a high risk as current programs are heavily reliant on carbon finances revenues to achieve scale
16. The heavy reliance on carbon finance revenue and burden of rigorous M&E are two major risks to the long term success of the Bangladesh market

Content

Executive Summary

Project Approach

Sector Mapping

Macro Environment Assessment

Social and Environmental Impact Assessment

Consumer Assessment

Cookstove Industry Assessment

Carbon Financing

Sector Mapping Summary

Appendix

Glossary of Terms

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

AIDS	Acquired Immunodeficiency Syndrome	NGO	Non-Governmental Organization
ALRI	Acute Lower Respiratory Infection	SEDA	Sustainable Energy Development Authority
BCSIR	Bangladesh Council of Scientific and Industrial Research	SME	Small to Medium Sized Enterprise
CDM	Kyoto Clean Development Mechanism	UN	United Nations
CF	Carbon Finance	UNDP	United Nations Development Program
COPD	Chronic Obstructive Pulmonary Disease	USAID	United States Agency for International Development
GDP	Gross Domestic Product	USD	US Dollars
GJ	Gigajoule	Tk	Bangladesh Taka
GIZ	Gesellschaft für Internationale Zusammenarbeit	UPPR	Urban Partnerships for Poverty Reduction
HH	Household(s)	VERC	Village Education Resource Centre
HIV	Human Immunodeficiency Virus	WB	The World Bank
IAP	Indoor Air Pollution	WHO	World Health Organisation
ICS	Improved Cookstove		
ICT	Information and Communication Technologies		
iNGO	International Non-Governmental Organization		
LPG	Liquid Petroleum Gas		
MFI	Microfinance Institution		

Case Study A: Total Sanitation Campaign

- **Organizations:** Central Government (institutions), World Bank, BRAC, VERC, various donors and other NGOs
- **Region:** Nationwide
- **Products:** At least 32 different latrine designs were available
- **Price:** Cost of different models Tk 350–3,500
- **Latrines Distributed:** Sanitation coverage was increased from 29% to 88% over 5 years, from 2003 to 2008.
- **Best Practices:**
 - ✓ The key difference from previous attempts was the change in consumer messaging moving from provision of product (latrines) to the vision for the community (open defecation-free environment)
 - ✓ A successful VERC community-led pilot project was eventually (after 1 year of advocacy) adopted across the sector to great effect
 - ✓ Over time, the government laid greater emphasis on the adoption of national policy and role creation for the local government bodies & NGOs
 - ✓ Commitment & ownership by the government was critical to the campaign's success – which was achieved by well-planned advocacy work
 - ✓ Empowering the local government allows for greater community-level participation and accountability for local adoption levels
 - ✓ Moving from a top down to an integrated participatory approach was hugely successful



Case Study B: Grameen Shakti

- **Organizations:** *Grameen Shakti, SZ Consultancy, JPM VEC*
- **Region:** Nationwide
- **Stove:** Concrete Chulha (1, 2 and 3 pot) and biogas plants (various sizes)
- **Price:** Tk 800 – 1400 (ICS), Tk 18,000–35,000 (biogas)
- **Funding:**
 - ✓ Finance provided by JPM VEC as part of the carbon finance agreement
- **Stoves Distributed:** 423,729 stoves distributed in total, 360,000 planned for 2012 (as of Dec 2011) . 20,942 biogas plants sold, 8,600 planned for 2012.
- **Best Practices:**
 - ✓ With offices in every district of Bangladesh, Grameen uses its local staff to identify potential sales opportunities and monitor stove performance
 - ✓ Staff are incentivized to sell more stoves as they receive monthly targets and disseminate information about cookstoves, primarily through door-to-door marketing and distribution of leaflets and posters
 - ✓ Grameen takes advantage of its vast micro-credit facilities that have been built on the back of the Solar Home System (SHS) and biogas plant sales. Due to the low amounts required for ICS, they offer those loans in two instalments to reduce the burden of collection.
 - ✓ Grameen have a track record of training local technicians to install their renewable energy systems and provide aftercare service. This approach has been applied to SHS, biogas and ICS, helping with their carbon finance commitments.



Case Study C: VERC

- **Organizations:** VERC
- **Region:** Active in 20 of the 64 districts
- **Stove:** Clay/Mud Chulha (1, 2 and 3 pot)
- **Price:** Around Tk 800 – 1400 (ICS) – varies locally
- **Stoves Distributed:** Disseminated a total of 53,716 stoves over the past 10 years, although only 7,618 through their current ICS program. Their 5 year target is 500,000 stoves
- **Best Practices:**
 - ✓ VERC has employed innovative social marketing including the use of a 'motivational film' that demystifies and promotes the use of ICS. It also addresses the potential gender conflicts that can occur between a husband and wife.
 - ✓ To meet their carbon finance requirements, they have employed a rigorous monitoring and evaluation process which they see as key to their success
 - ✓ VERC believe community involvement is imperative to promoting ICS adoption. They invest a significant amount of time and effort to stimulate behavioural change through community awareness campaigns
 - ✓ VERC's participatory approach to community interventions was a pioneer for the highly successful 'Total Sanitation Campaign'. With stoves, they are now promoting an approach based on the Methodology for Participatory Assessment (MPA), which has achieved impressive results.



Case Study D: Solar Home System Program

- **Organizations:** *IDCOL, donors, GOB and numerous NGO partners*
- **Region:** Nationwide
- **Product:** Solar Home Systems (SHS) between 10 and 130 watt-peak
- **Price:** \$131 – \$956
- **Funding:**
 - ✓ Finance provided the World Bank, GTZ and KfW
 - ✓ Additional funding just secured from the Asian Development Bank (ADB) and the Global Partnership on Output Based Aid (GPOBA)
- **Stoves Distributed:** over 1 Million SHS's distributed
- **Best Practices:**
 - ✓ The position of IDCOL within the SHS sector has allowed donors to channel resources into the sector with confidence and security due to its high standard of transparency and compliance
 - ✓ IDCOL successful business model, commitment and support of the government has allowed it to access and distribute funds successfully from bi-lateral and multilateral organizations to the implementers in Bangladesh
 - ✓ A key difference in the successful monitoring & evaluation processes of SHS and biogas programmes is that IDCOL as a financing body governs the standards and competence of the programmes
 - ✓ IDCOL supports institutional development of partners by providing technical, logistical, and promotional training assistance through its Technical Standards and Operations Committees.



Case Study E: GIZ

- **Organizations:** *GOB, 200+ Partner Organizations (PO) and now numerous private stove producers (e.g. sanitation shops)*
- **Region:** Nationwide
- **Product:** Concrete Chulha (1, 2 and 3 pot)
- **Price:** Around Tk 800 – 1400 (ICS) – varies locally
- **Funding:**
 - ✓ GTZ receives financial and policy support from the German Federal Ministry for Economic Cooperation and Development and the Government of Bangladesh (Ministry of Power, Energy and Mineral Resources)
- **Stoves Distributed:** 175,000 stoves between 2004 – 2011 (through POs)
- **Best Practices:**
 - ✓ By providing business development, training start up grants, GIZ is building the capacity of hundreds of organizations across Bangladesh
 - ✓ As with Grameen, the use of concrete dies for the stoves allows greater control of the stove quality and performance
 - ✓ GIZ appears to have strong links to various levels of government and numerous players (large and small) from across the sector.
 - ✓ Outsourced its carbon finance M&E to a private company, SZ Consultancy, to ensure that is independent and allow GIZ to focus on growing its program
 - ✓ Recently expanded their partner network to include sanitation shops. With a nationwide network of ~2000 shops, this new distribution channel appears to have real potential



Case Study F: Grameen Bank

- **Organizations:** *Grameen Bank, IFAD, Ford Foundation, Governments of Bangladesh, Norway, and the Netherlands*
- **Region:** Nationwide
- **Product:** Microcredit for consumers. Initially financed activities such as rice husking, bamboo weaving
- **Price:** Around Tk 800 – 1400 (ICS) – varies locally
- **Funding:**
 - ✓ Initially raised funds through bonds issued to commercial banks, borrowed from Central Bank and foreign governments at subsidized interest rates. It also got funds from international agencies like the World Bank and the Ford Foundation.
- **Best Practices:**
 - ✓ Grameen Bank pioneered modern microcredit for consumers. It operated on the principles of mutual trust, supervision, accountability and member participation. Unlike commercial banks, which granted credit on the basis of collateral security, Grameen did not demand any security for extending credit.
 - ✓ The group lending methodology was crucial to the successful initial growth of Grameen and led to a repayment rate of 95%. This approach instilled a sense of joint responsibility: if a member defaulted all members would have had to pay for her or else the entire group excluded from future loans.
 - ✓ The highly decentralized Grameen model helped to improve community engagement, social marketing and collection rates.

