



Introducing Clean Cookstoves Across Pakistan

Health Impact Assessment Report

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Table of Contents

Executive Summary	4
Health Impact Assessment Report	7
Clean Cooking Technology	7
Go-to Market Strategy & Early Success in Demand Generation	8
Literature Review	9
Research Methodology	10
Survey Design	15
Household Air Pollution Intervention Tool (HAPIT) Results	18
Conclusion (from the RMAF lens)	19
Bibliography	21



Abstract

This report has been developed by Jaan Pak Enterprises Private Limited, primarily to quantify the health impact of its biomass fuel combustion technology - the Supreme Stove. In addition, and more importantly, the report also forms the basis for Jaan Pak's decision to scale its operations.

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Abbreviations

WHO - *World Health Organization*

HAP - *Household Air Pollution*

DALYs - *Disability Adjusted Life Years*

KPK - *Khyber Pakhtunkhwa*

AJK - *Azad Jammu and Kashmir*

HAPIT - *Household Air Pollution Intervention Tool*

GACC - *Global Alliance for Clean Cookstoves*

RSPN - *Rural Support Programmes Network*

PKR - *Pakistani Rupees*

PM 2.5 - *Particulate Matter with a Diameter of Less than 2.5 Microns*

COPD - *Chronic Obstructive Pulmonary Disease*

IHD - *Ischaemic Heart Disease*

ALRI - *Acute Lower Respiratory Infection*

IHME - *International Health Metrics Evaluation*

LPG - *Liquefied Petroleum Gas*

IWA - *International Workshop Agreement*

WBT - *Water Boiling Test*

ISO - *International Standardization Organization*



Executive Summary

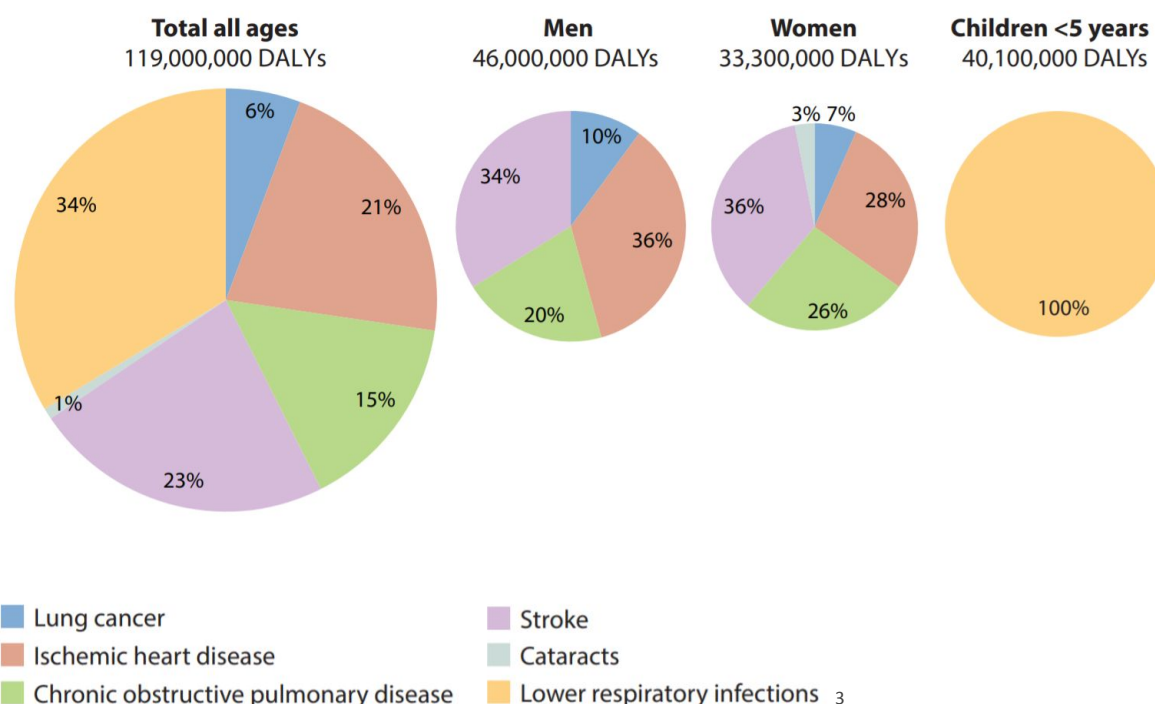
A Problem Transcending Cultures & Borders

Around 3 billion people around the globe cook food using traditional cookstoves that utilize fuels such as firewood, crop residue, dung cakes and charcoal¹. Solid fuel fumes, emanating from traditional cookstoves, result in 4.3 million premature deaths, every year - more than HIV, malaria and tuberculosis combined².

Around 60% of the developing world uses traditional cookstoves. In Pakistan, nearly half the population - 114 million people - live in off-grid areas and they use traditional cookstoves. This results in 115,000 premature deaths.

In the chart shown below, one can see that women and children account for 61% of the global burden of disease that is attributable to household air pollution (HAP).

a HAP DALYs



Disability Adjusted Life Years (DALYs) is a metric that is widely used internationally to quantify the impact of disability, disease and premature death. It is a single number that captures many aspects of the impact of a disease or disability. 1 DALY could represent 1 year

¹ <http://www.who.int/indoorair/en/>

² <https://openknowledge.worldbank.org/bitstream/handle/10986/21878/96499.pdf>

³

<http://www.kirksmith.org/publications/2014/03/24/millions-dead-how-do-we-know-and-what-does-it-mean-methods-used-in-the-comparative-risk-assessment-of-household-air-pollution>



of life lost (due to early death), 1.67 years spent with blindness, 5.24 significant malaria episodes, 41.67 years spent with intestinal obstruction due to ascariasis (a parasite), or many possible combinations of these and other symptoms.

Finding An Indigenous Solution

To address the issue of indoor air pollution, Jaan Pakistan imported and tested various solar thermal and fuel efficient biomass cookstoves across rural households in off-grid Kasur. The idea was to either eliminate, or at least significantly reduce carbon emissions.

To help achieve this, and to note more specifically, Jaan Pakistan tested two kinds of solar thermal cookstoves - a parabolic stove and an evacuated tube stove. Parabolic cookstoves work by concentrating the sunlight onto a cooking surface via a parabolic reflective dish. Evacuated tube cookstoves work by trapping the sun's energy in a heat collection tube - that essentially acts like a baking oven.

In addition to solar thermal technologies, Jaan Pakistan also tested a number of biomass cookstoves, such as Envirofit's Econofire and Biolite's Homestove.

None of the imported products were successful because cooking ergonomics were problematic; solar cooking took too long, whereas, biomass stoves could not effectively combust dung cakes. Furthermore, biomass stoves were not successful in preparing roti - a flat rotund bread, widely consumed in South Asia because the stove tops were too narrow and the heat rising from the combustion chamber was too concentrated.

Above all, the products were not affordable. This was partly due to the imposition of 20% customs tax duties on all imported technologies, even solar thermal technologies.

Learning from this, Jaan Pakistan designed its own minimal viable product.

The Jaan Pakistan Supreme Stove is made from mild steel sheet, a readily available robust and affordable stove material. The Supreme Stove can cook roti and can accommodate dung cakes and wood. The Supreme Stove top is 7 inches wide which means it is suitable for cooking large meals on large pots. Lastly - unlike the imported biomass cookstoves - the chimney design on the Supreme Stove nearly eliminates indoor household air pollution. The Supreme Stove costs the end customer USD 24 while less appropriate, imported stoves cost nearly twice as much.

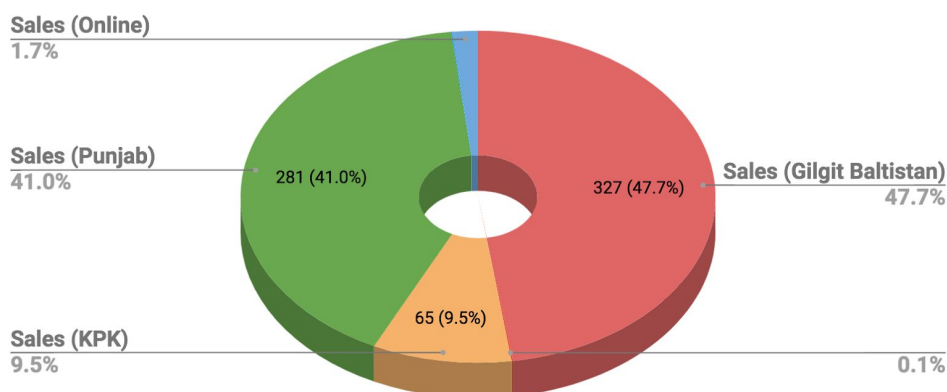
Jaan Pakistan's Customers

The Jaan Pakistan Supreme Stove has found traction and product demand in Gilgit Baltistan, followed by Punjab, KPK and AJK (in descending order). Our customers are households, both in urban and rural settings, that choose to burn biomass for the purpose of cooking meals and heating homes. A majority of our customers, however, are from rural backgrounds.

The division of product sales, by region, is as follows (these numbers are based on sales recorded by the end of November 2017). Last month, Jaan Pakistan experimented with online ads, and successfully tapped into a new segment of urban dwellers who often visit rural, off-grid Pakistan. These potential buyers are quick to understand the benefits of



our technology, and possess the technical prowess to make purchases online. In November 2017, when our online sales program started, within a month it contributed to 1.7% of overall sales to date.



User testimonials from Gilgit Baltistan, and some comments from the Jaan Pakistan team, showcasing our focus on developing women entrepreneurs, can be viewed here: <https://vimeo.com/229874039>

Assessing the Health Impact of Jaan Pakistan's Intervention

Using the latest studies on the health effects of indoor air pollution, this report will quantify the health impact of Jaan Pakistan's Supreme Stove by stating the number of lives saved as well as the number of DALYs (disability adjusted life years).

The most accurate method to measure the health impact of a clean cookstove intervention is to monitor PM 2.5 levels at an hourly rate for several households that use the clean cookstove and then compare them to control households that use traditional cookstoves. Doing so, however, isn't feasible without several costly indoor air quality monitors and it is much simpler to extrapolate PM 2.5 concentrations via known cookstove PM 2.5 emission rates. The resulting average annual concentration can then be used to quantify the health impact of a cookstove intervention using online softwares such as AirQ Plus and HAPIT (Household Air Pollution Intervention Tool). This report will utilize HAPIT since the software has been developed in collaboration with the Global Alliance for Clean Cookstoves (GACC), and because the software provides a number against the number of lives saved (a metric used by Grand Challenges Canada).

To date Jaan Pakistan has sold 715 cookstoves across the country. According to the Household Air Pollution Intervention Tool (HAPIT) this leads to preventing 21.5 premature deaths and averting 880 DALYs over the course of the lifetime of a cookstove. Given current growth rates, it is expected that Jaan Pakistan will have sold 15,000 cookstoves by late 2018 and this will result in saving 463 lives across the country and preventing 18,620 DALYs.



Clean Cooking Technology

The Jaan Pakistan Supreme stove performs better than a traditional biomass cookstove because its combustion chamber is closed. This allows the products of combustion to reach a higher temperature, allowing for a more efficient burning of fuel. In addition to this, the Supreme Stove is double walled to help provide insulation and to circulate the volatile products of biomass combustion, thereby increasing the likeliness of a complete reaction. Most importantly, however, the Supreme Stove is attached to an exhaust pipe, that nearly eliminates indoor household air pollution.

The cookstove itself is made of 16 gauge mild-steel sheet, it is 9 inches tall, 12 inches wide and has a stove top that is 7 inches in diameter. The estimated lifetime of the stove is 3-5 years and it is sold for an average price of USD 24. Please find an image of the cookstove below.





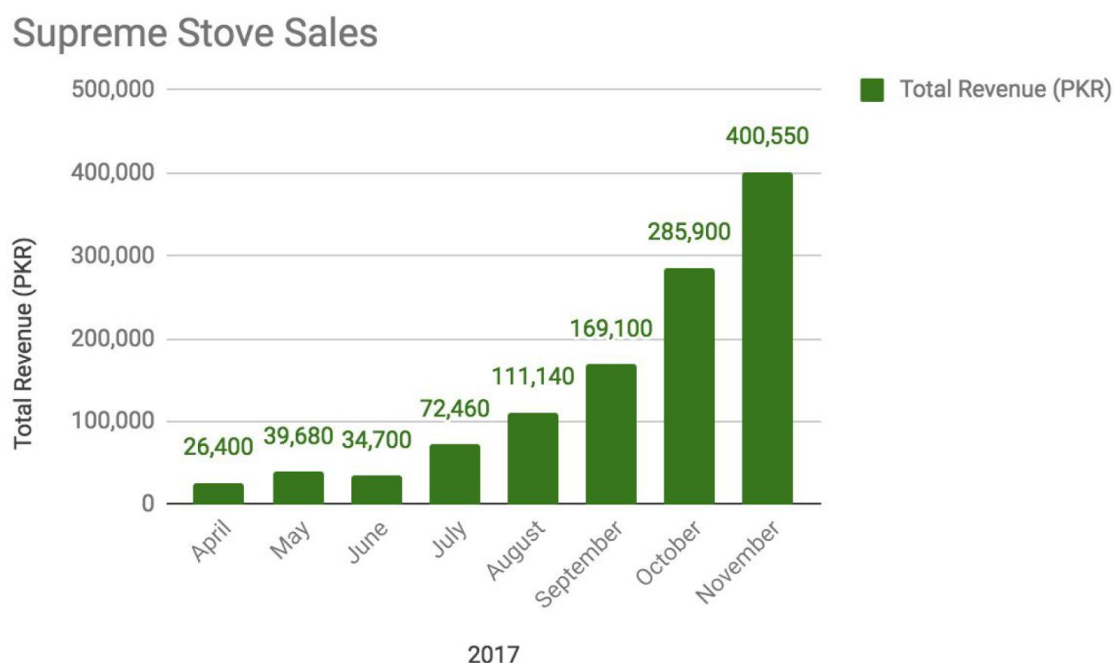
Go-to Market Strategy & Early Success in Demand Generation

The Jaan Pakistan Supreme Stove is sold primarily through a network of aspiring women entrepreneurs that have been identified by the organization's field team with the assistance of the Rural Support Programmes Network (RSPN) - the largest rural support network in Pakistan with access to over 44 million rural individuals. Cooking is best understood by women and therefore, aspiring women entrepreneurs are in the best position to market the benefits of clean cooking to other women. This insight into cooking makes women entrepreneurs the most effective in selling cookstoves amongst all of Jaan Pakistan's retail options.

The Supreme Stove is also sold through commercial retailers, online orders that are received through Facebook and various B2B partnerships. More detail on sale avenues, and strategic partnerships can be read in [Appendix I - Business Plan and Financial Model](#) and [Appendix IV - Smart Partnerships for Growth](#).

An introduction to our growing team of women entrepreneurs across Pakistan can be viewed here: <https://vimeo.com/229874039>

Month-wise growth analysis





Literature Review

Estimates for the global burden of disease due to indoor air pollution have been established using epidemiology studies that measure exposure to particulate matter that is less than 2.5 microns in diameter (PM 2.5). One of the most widely cited paper of such studies is “*Millions Dead: How Do We Know and What Does It Mean? Methods Used in the Comparative Risk Assessment of Household Air Pollution*”. The health effects of PM 2.5 are not fully understood and it is extremely likely that the burden of disease due to air pollution is vastly underestimated⁴. The crux of the above mentioned article is that chronic exposure to PM 2.5 causes ischaemic heart disease, chronic obstructive lung disease, lung cancer and stroke - the same diseases an active tobacco smoker is likely to develop. In addition to this, it is accepted that repeated exposure to PM 2.5 causes Acute Lower Respiratory Infection in children under the age of 5. The study uses data from the Global Burden of Disease 2010 and exposure data collected from 617 rural households in India to determine the extent to which air pollution, specifically PM 2.5, from traditional cookstoves, affects human health. This data allows us to associate a burden of disease, in terms of number of lives lost and DALYs, with a given average annual PM 2.5 concentration.

It should be noted that estimates for the health effects of indoor air pollution do not take the health effects of other common pollutants such as Carbon Monoxide, Nitrogen Dioxide or Sulfur Dioxide into consideration. This is because the epidemiological data on these other pollutants is still inconclusive⁵. While these pollutants almost certainly affect human health negatively, this relationship is yet to be quantified. Hence, it is safe to state that current estimates for the health effects of indoor air pollution are significantly understated.

Using data on exposure to ambient air pollution, second hand tobacco smoke, active tobacco smoke and household air pollution⁶, Smith et.al estimate that indoor air pollution causes 4 million deaths each year. This is the same figure that is quoted by the WHO on its website⁷.

⁴ <https://openknowledge.worldbank.org/bitstream/handle/10986/21878/96499.pdf>

⁵ <https://openknowledge.worldbank.org/bitstream/handle/10986/21878/96499.pdf>

⁶

<http://www.kirksmith.org/publications/2014/03/24/millions-dead-how-do-we-know-and-what-does-it-mean-methods-used-in-the-comparative-risk-assessment-of-household-air-pollution>

⁷ <http://www.who.int/mediacentre/factsheets/fs292/en/>



Research Methodology

The Household Air Pollution Intervention Tool

The health effects of the Supreme Stove have been estimated using the Household Air Pollution Intervention Tool (HAPIT). This software - developed by the Global Alliance For Clean Cookstoves (GACC) - bases its estimates on the Comparative Global Risk Assessment, a component of the IHME (International Health Metrics and Evaluation) Global Burden of Disease report. These estimates are the currently accepted global estimates for how indoor air pollution affects human health and are widely used by international organizations such as the United Nations, World Health Organization and Global Alliance for Clean Cookstoves. For more information please visit the websites in the footnotes⁸⁹.

In addition to this, HAPIT can be considered a credible software because it has been developed by the Berkeley Household Energy, Climate and Health Institute which is an authority on clean cookstoves.

The software gives results based on known background disease rates in specific developing countries. For example, the results that we have included in this report are based on the prevailing background disease rates for lung cancer, ischaemic heart disease, stroke and pulmonary chronic obstructive disease in Pakistan. The results also factor in known demographics for a country, such as average family sizes and age distribution.

Scenario	Post Intervention Exposure	Targeted Households	Fraction Using Intervention	Useful Intervention Life	Cost per Intervention (USD)	Maintenance/ Fuel Cost (USD/yr/HH)
LPG	277	25000	0.6	3	85	240
Chimney	1385	25000	0.6	2	20	5
Rocket	1108	25000	0.6	2	30	2.5
Advanced Fan	80	25000	0.6	2	75	7.5

⁸

<http://cleancookstoves.org/about/news/08-28-2014-hapit-household-air-pollution-intervention-tool-for-comparing-health-impacts-of-cooking-technologies.html>

⁹ <http://www.healthdata.org/>



Select a Country ?
 Pakistan ▼

Select a Counterfactual Exposure ?
 7 ▼

Select the Pre-Intervention Exposure
 1975

User modifiable scenarios. The table below is modifiable. Click on any cell and change values as needed. It is currently not possible to rename scenarios, however.

Custom 1	1	19	25000	0.6	5	24	125
Custom 2	2	19	25000	0.6	3	30	250

To provide the health effects of using various cookstoves, HAPIT requires a pre-intervention PM 2.5 concentration level and a post-intervention exposure level. In other words, the software requires annual PM 2.5 concentrations for kitchens that use traditional cookstoves (locally know as *chuhlas*) as well as kitchens that use the Supreme Stove. To calculate this value, one has to acquire the PM 2.5 emission rates for each cookstove.

Pre-intervention and Post-intervention PM 2.5 concentrations:

To determine the PM 2.5 emissions rate for the Supreme Stove, the cookstove was sent to the Center for Rural Technology in Nepal - a lab approved by the GACC - and evaluated using the Water Boiling Test. During this lab test, the stove was used to boil a given amount of water using a standardized amount of fuel to determine its PM 2.5 emissions, efficiency and power. A detailed protocol for this test can be found through a link in the footnotes¹⁰.

The results of the Water Boiling Test are reported in terms of IWA (International Workshop Agreement) tiers that rank a cookstove's performance in terms of fuel use, emissions and total emissions. The IWA tiers range from 0 to 4 (0 being the worst and 4 being the best). The range for these tiers have been developed by the ISO (International Standardization Organization) and the Global Alliance for Clean Cookstoves. For more information on the standardization of cookstoves performance tiers please visit the link in the footnotes¹¹.

¹⁰ <http://cleancookstoves.org/binary-data/DOCUMENT/file/000/000/399-1.pdf>

¹¹ <http://cleancookstoves.org/binary-data/DOCUMENT/file/000/000/6-1.pdf>



The tiers themselves don't reflect the health, environmental or economic impact of a cookstove, rather they rate a cookstove's performance in a format that is easy for a lay person to understand. It is also important to note that a tier 0 metric doesn't correspond to a typical traditional cookstove. More details about the IWA tiers can be found in the footnote here¹².

A summary of the results of the **Supreme Stove** can be seen below:

IWA PERFORMANCE TIERS	Tier
High Power Thermal Efficiency	1
Low Power Specific Fuel Consumption	1
High Power CO	1
Low Power CO	1
High Power PM	1
Low Power PM	0
Indoor CO Emissions	4
Indoor PM Emissions	2

A detailed description for each tier, in each testing category, follows:

Emissions CO Sub-tiers		
	High power CO (g/MJ _d)*	Low power CO (g/min/L)
Tier 0	>16	>0.20
Tier 1	≤16	≤0.20
Tier 2	≤11	≤0.13
Tier 3	≤9	≤0.10
Tier 4	≤8	≤0.09
* grams per megajoule delivered to the pot		

Emissions PM2.5 Sub-tiers		
	High power PM2.5 (mg/MJ _d)*	Low power PM2.5 (mg/min/L)
Tier 0	>979	>8
Tier 1	≤979	≤8
Tier 2	≤386	≤4
Tier 3	≤168	≤2
Tier 4	≤41	≤1
* milligrams per megajoule delivered to the pot		

¹² <http://cleancookstoves.org/technology-and-fuels/standards/iwa-tiers-of-performance.html>.



Indoor emissions Sub-tiers		
	Indoor emissions CO (g/min)	Indoor emissions PM2.5 (mg/min)
Tier 0	>0.97	>40
Tier 1	≤0.97	≤40
Tier 2	≤0.62	≤17
Tier 3	≤0.49	≤8
Tier 4	≤0.42	≤2

Efficiency/fuel use Sub-tiers		
	High power thermal efficiency (%)	Low power specific consumption (MJ/min/L)
Tier 0	<15	>0.050
Tier 1	≥15	≤0.050
Tier 2	≥25	≤0.039
Tier 3	≥35	≤0.028
Tier 4	≥45	≤0.017

For the purpose of this health impact report, the most important metrics are the indoor emissions i.e, the lower two rows of the chart shown above. To extrapolate the annual concentration of PM 2.5 in a kitchen that uses the Supreme Stove, this report has used a Monte Carlo Box model simulation. Using the PM 2.5 emissions for the Supreme Stove, the Monte Carlo Box model produces an average value for the PM 2.5 concentration in a kitchen that uses that Supreme Stove. This report uses values that have been calculated for a stove with similar performance metrics - the Envirofit G3300¹³. Like the Supreme Stove, the Envirofit G3300 is a tier 4 and tier 2 stove with regards to indoor CO and indoor PM emissions respectively.

The Monte Carlo Box Model allows for a fair comparison between different cookstoves because it derives its results from the emission rates obtained from the Water Boiling Test. The WBT is a highly standardized protocol for gauging cookstove performance metrics, so all cookstoves are tested in identically controlled conditions. For this reason, this report uses the simulation results from the Envirofit G3300 WBT results - since its indoor emissions performance is nearly identical to the Supreme Stove. Please see the table below for more information.

¹³ <http://catalog.cleancookstoves.org/stoves/33>



	Traditional chulha (wood)	G3300 field inputs (wood)	G3300 WBT inputs (wood)	LPG
<i>Particulate matter model output</i>				
Mean ($\mu\text{g m}^{-3}$)	1975	1266	328	15
Median ($\mu\text{g m}^{-3}$)	1320	831	197	10
10th percentile ($\mu\text{g m}^{-3}$)	429	258	55	3
90th percentile ($\mu\text{g m}^{-3}$)	4107	2718	717	33
<i>Percent of simulations meeting WHO $\text{PM}_{2.5}$ guidelines</i>				
24-h Int 1 ($75 \mu\text{g m}^{-3}$)	0%	0%	17%	98%
24-h Final ($25 \mu\text{g m}^{-3}$)	0%	0%	2%	84%
Annual Int 1 ($35 \mu\text{g m}^{-3}$)	0%	0%	4%	91%
Annual Final ($10 \mu\text{g m}^{-3}$)	0%	0%	0%	52%
<i>Carbon monoxide model output</i>				
Mean (mg m^{-3})	25	12	7	1
Median (mg m^{-3})	16	8	4	0
10th percentile (mg m^{-3})	5	2	1	0
90th percentile (mg m^{-3})	51	26	14	1
<i>Percent of simulations meeting WHO carbon monoxide guidelines</i>				
24 h (7 mg m^{-3})	17%	46%	69%	100%
8 h (10 mg m^{-3})	9%	33%	56%	100%
60 min (30 mg m^{-3})	12%	33%	56%	100%
30 min (60 mg m^{-3})	31%	58%	80%	100%
15 min (100 mg m^{-3})	53%	80%	93%	100%

As one can see from the table, the indoor annual concentration of PM 2.5 for the Supreme Stove comes out to 328 mcg/M3 and that for a traditional cookstove comes out to 1975 mcg/M3. These two numbers are the pre-intervention and post-intervention concentrations of PM 2.5 respectively.



Survey Design

In order to fully determine the health benefits of using the Supreme Stove, this report also relies on a customer survey for data on stove usage.

The survey asks questions about family sizes, children, indoor vs outdoor use of the stove and reliance on chimneys. A total of 30 people were surveyed, which is 4.5 % percent of the total number of customers that Jaan Pakistan has thus far. 12 people were selected from off-grid Kasur and 18 individuals were selected from the mountainous regions where Jaan Pakistan has its operations. These numbers are in proportion with the amount of sales in each respective region - 41% in the plains and 59% in the mountains. The questions and associated answers from the survey are listed below.

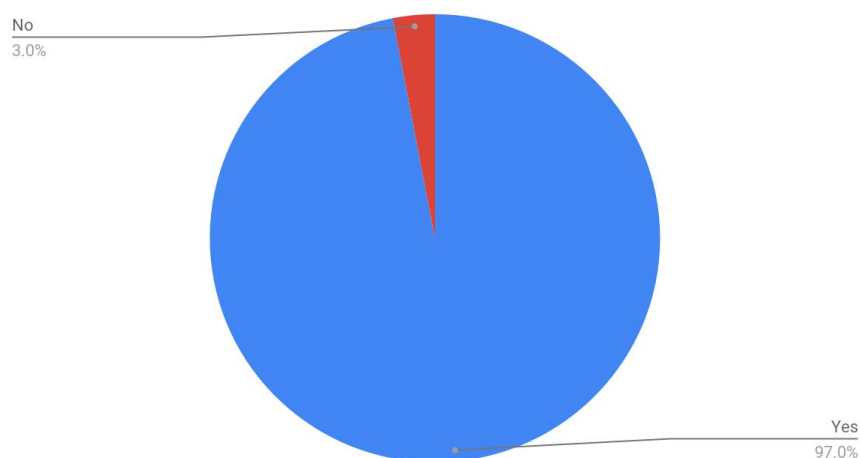
1. *Who cooks food in your household?*

100% of all those who use the Supreme Stove claimed that food was prepared by a female (daughter, mother or daughter-in-law).

2. *Is the cookstove in your use?*

97% of those were asked said that the cookstove was in their use.

Percentage of Customers Currently Using the Stove



a. If not, why not?

The one person who said “No” claimed that the stove didn’t save any firewood and was too small.



b. If yes, how many times is the stove typically used in a day?

40% said they use it continuously (for heating in the winter), the rest use it an average of 2.4 times a day

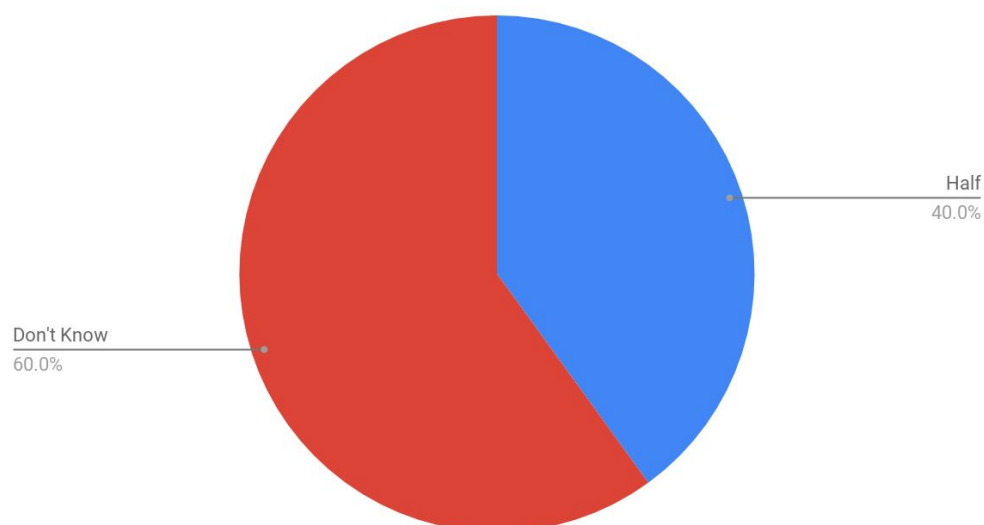
3. Do you think the Jaan Pakistan Supreme Stove saves you fuel?

97% claimed that the Supreme Stove Saves Fuel

4. If yes, can you quantify the amount? (how much were you using previously on a monthly basis and how much fuel are you using now?)

78% of those who said “yes” to question 4 said half. 22% said “we don’t know”

How Much Fuel Does the Supreme Stove Save?



5. If not, please indicate if your fuel use is unchanged or greater than before.

6.6% claimed that fuel usage was unchanged

6. Has there been any accident in your experience of using the stove?

100% claimed that there hadn't been an accident because of the stove.

7. Do you cook indoors or outdoors?

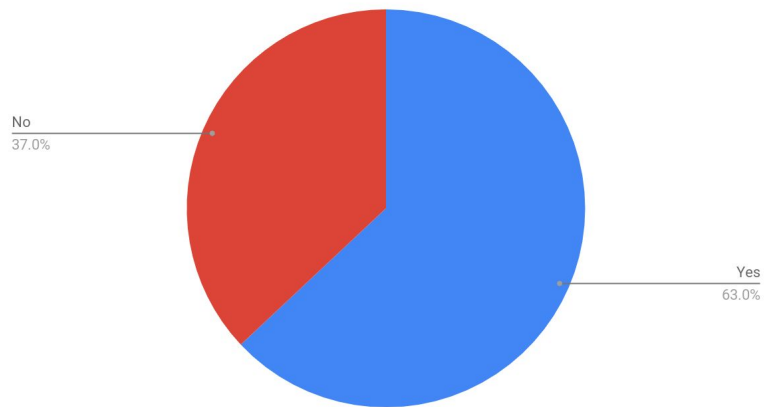
(This question was only asked of individuals from the plains - households in the mountainous regions of the country invariably cook indoors)

100% of those living on flat land claimed that they cook indoors during the winter and outdoors during the summer



8. Are you satisfied with the chimneys performance?

Points scored





Household Air Pollution Intervention Tool (HAPIT)

Results

HAPIT provides comparative data for various cookstoves. It has default settings for LPG Stoves, Chimney Stoves and Advanced/Fan based cookstoves. Key figures regarding the health impact of the Supreme Stove can be seen below against the row titled “Custom 1”. Figures for traditional cookstoves can be seen against the row titled “Custom 2”.

Scenario	Pre-Intervention	Post-Intervention	Total DALYs	Total Deaths
Custom 1	1975	328	18620.0	459.000
Custom 2	1975	1975	0.0	0.000
LPG*	1975	277	6347.0	139.200
Chimney*	1975	1385	322.7	8.972
Rocket*	1975	1108	540.1	14.450
Advanced/Fan*	1975	80	8270.0	139.300

Note: Custom 1 - Supreme Stove projections are based on a 5 year useful life timeline

The above figures have been generated with the assumption that approximately 15,000 households are using each type of cookstove. As one can see from the table, if the Supreme Stove is adopted by 15,000 households, it will result in averting 459 deaths across the country.

So far, Jaan Pakistan has sold 711 cookstoves so the impact of that intervention can be seen below. Again, the numbers pertaining to the Supreme Stove can be seen against the row titled “Custom 1” and the numbers associated with traditional biomass cookstoves can be seen in the row titled “Custom 2”.

Scenario	Pre-Intervention	Post-Intervention	Total DALYs	Total Deaths
Custom 1	1975	328	880.0	21.590
Custom 2	1975	1975	0.0	0.000



Conclusion (from the RMAF lens)

Initially, Jaan Pakistan planned to quantify the health impact of the Supreme Stove by conducting in-field measurements of indoor air pollution in households that were using the organization’s cookstove and comparing them to air pollution levels in households that were using traditional cookstoves.

Upon further research it was determined that to establish the health impact of a cookstove intervention, one needs average annual concentrations of PM 2.5 for several kitchens using that cookstove. This would entail installing an indoor air quality monitor along with a data logger to record the PM 2.5 levels in several kitchens (around 60) for an entire year.

A simpler method, however, was to allow a third party to test the Supreme Stove for its IWA performance metrics. Not only would this allow Jaan Pakistan to compare its cookstove to other stoves available on the market, it would also introduce greater objectivity to the organization’s health impact report. Thus Jaan Pakistan has opted to use the testing report from the Centre for Rural Technology in Nepal for these results.

The HAPIT results for the health impact of the Supreme Stove on children below 5 years old can be seen below against the row “Custom 1”.

Scenario	Pre-Intervention	Post-Intervention	ALRI DALYs <5	ALRI Deaths <5
Custom 1	1975	328	310	3.60
Custom 2	1975	1975	0	0.00

The health impact on adults can be seen here:

Scenario	Pre-Intervention	Post-Intervention	COPD DALYs	COPD Deaths	IHD DALYs	IHD Deaths
Custom 1	1975	328	360	9.3	100	4.1
Custom 2	1975	1975	0	0.0	0	0.0

Scenario	Pre-Intervention	Post-Intervention	Lung Cancer DALYs	Lung Cancer Deaths	Stroke DALYs	Stroke Deaths
Custom 1	1975	328	100	4.1	10.0	0.490
Custom 2	1975	1975	0	0.0	0.0	0.000

*ALRI - Acute Lower Respiratory Infection *COPD - Chronic Obstructive Pulmonary Disease

*IHD - Ischaemic Heart Disease

The impact in terms of the RMAF table can be seen below. The number of lives saved for newborns and children have been distributed according to the percentage of each demographic in Pakistan¹⁴. For adults, the number of lives saved is weighted in favor of women since it is their responsibility to cook.

¹⁴

http://www.pbs.gov.pk/sites/default/files/Labour%20Force/publications/lfs_Annual_2012_13/t01-pak.pdf



Demographic	Female	Male	Total
Newborns (under 1 month)	1	1	2
Children (1 month - 4 months)	2	1	2
Children and Adolescents (5 - 14 years)	5	1	6
Adults (15-49)	5	1	6
Adults (50+)	6	0	6

The number of lives improved section of the RMAF table can be seen here:

Demographic	Female	Male	Total
Newborns (under 1 month)	2	2	4
Children (1 month - 4 months)	5	5	10
Children and Adolescents (5 - 14 years)	971	199	1170
Adults (15-49)	1706	350	2056
Adults (50+)	386	80	466

Again, the number of lives improved have been weighted in favor of female adults, whereas the numbers for newborns and children reflect the relative percentage of each demographic in Pakistan.



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