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## Protos The Plant-Oil Cooker: An Appropriate Solution to Complex Challenges

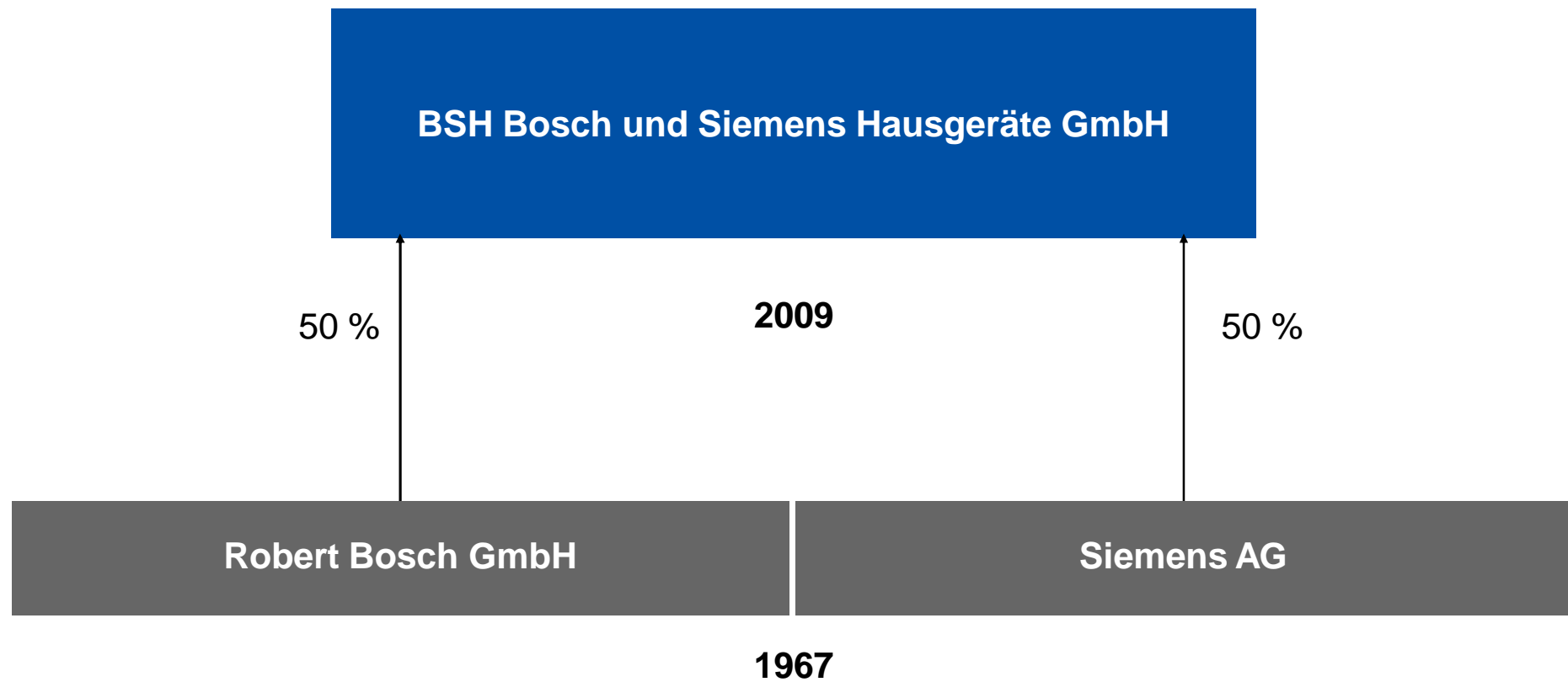
Samuel Shiroff  
Bonn, January 11, 2011



## Agenda

- **BSH Overview**
- **Protos: A more efficient way to cook**
- **Business Model and Economics**
- **Indonesia and Beyond**

## The BSH Shareholders





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## Traditional Cooking on Open Fires



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## Traditional Cooking on Open Fires



# Traditional Cooking on Open Fires

Air pollution

Average level of small particles  $\mu\text{g}/\text{m}^3$

EU annual standard  
 $40 \mu\text{g}/\text{m}^3$

30

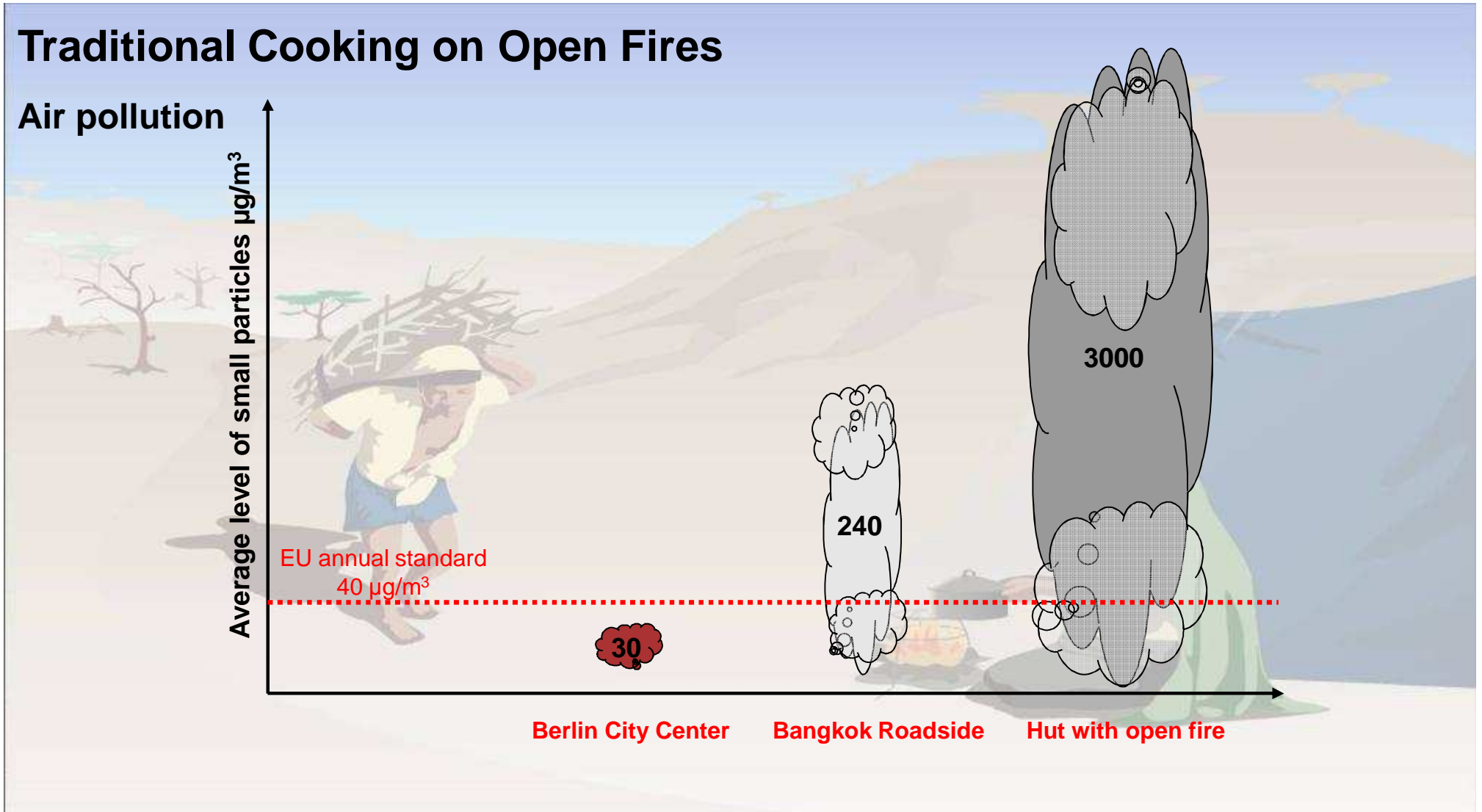
240

3000

Berlin City Center

Bangkok Roadside

Hut with open fire





## Protos – The World's First Plant Oil Stove

### • Facts and figures:

**Power range:** 2.0 – 2.5 kW

**Usage:** 2-4 liters oil per week for a family of 4-5  
→ 100 – 200 liters per year

**Fuel:** All plant oils, also used oils

**Efficiency:** 45 – 58 %

**Emissions:** Ten times lower than with kerosene

**CO2-balance:** Neutral

### Reason for introduction of Protos :

- Powerful stove
- Usage of renewable energies
- Environmentally friendly
- Healthy for the user
- Local economic added value & job creation





## Protos I vs Protos II – A Significant Improvement

### Facts and figures: Protos I

<b>Power range:</b>	😊	1.5 – 3.0 kW 3-6 liters oil per week
<b>Usage:</b>	😐	for a family of 4-5 → 150 – 300 liters per year
<b>Fuel:</b>	😊	All plant oils also used oils
<b>Efficiency:</b>	😐	30 – 40 %
<b>Emissions:</b>	😊	Ten times lower than with kerosene
<b>CO2-balance:</b>	😊	Neutral
<b>Noise:</b>	😞	83 Decibels
<b>Cost:</b>	😞	>\$60
<b>Cleaning</b>	🛑	sometimes impossible



### Protos II

<b>Power range:</b>	😐	2.0 – 2.5 kW 2-4 liters oil per week
<b>Usage:</b>	😊	for a family of 4-5 → 100 – 200 liters per year
<b>Fuel:</b>	😊	All plant oils also used oils
<b>Efficiency:</b>	😊	45 – 58 %
<b>Emissions:</b>	😊	Ten times lower than with kerosene
<b>CO2-balance:</b>	😊	Neutral
<b>Noise</b>	😊	63 Decibels
<b>Cost:</b>	😐	~\$50
<b>Cleaning</b>	😐	sometimes difficult

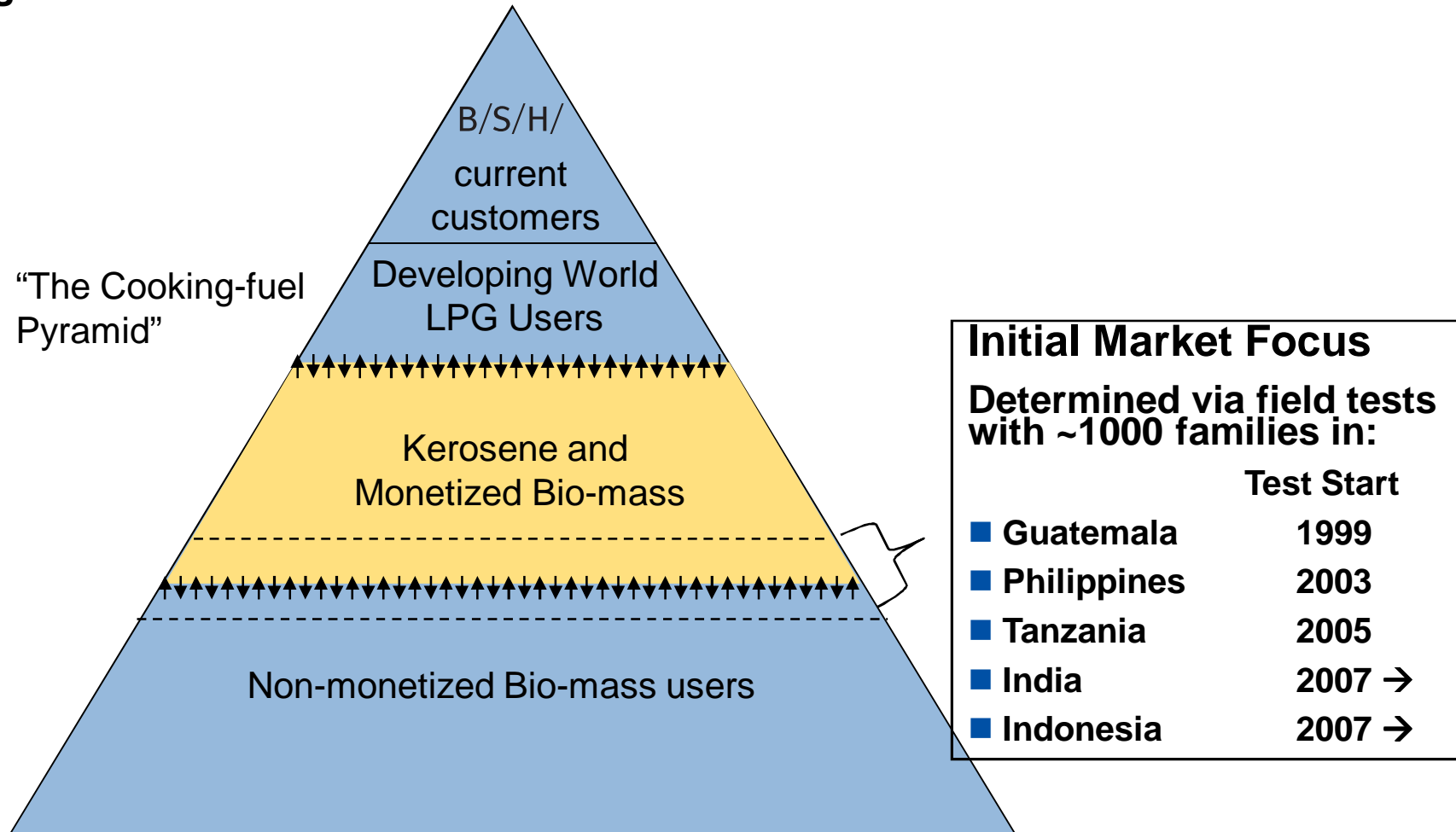


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## Establishing the Target Market

Target market: who and where are our users?



## On Target

Target Market will rarely be the Jatropha Farmers....



Jatropha Farmer



Oil Press & Filter



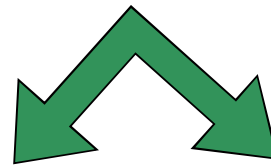
Town & City Residents



Cooking & Fertilizer with Press Cake



Press Cake



Plant Oil



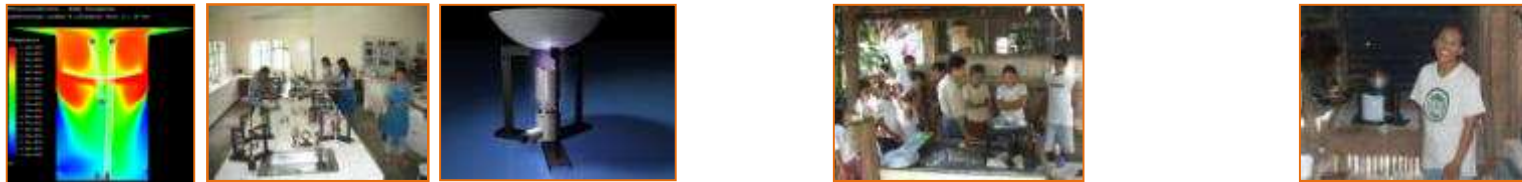
Buying Jatropha Oil for Cooking Fuel

## PROTOS: Ensuring a Sustainable Supply Chain

a sustainable system



stove



Raw Materials

Adaptation & Production

Marketing Sales

Service

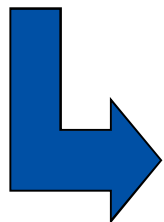
plant oil



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## Business Model: Cost of the Cooker

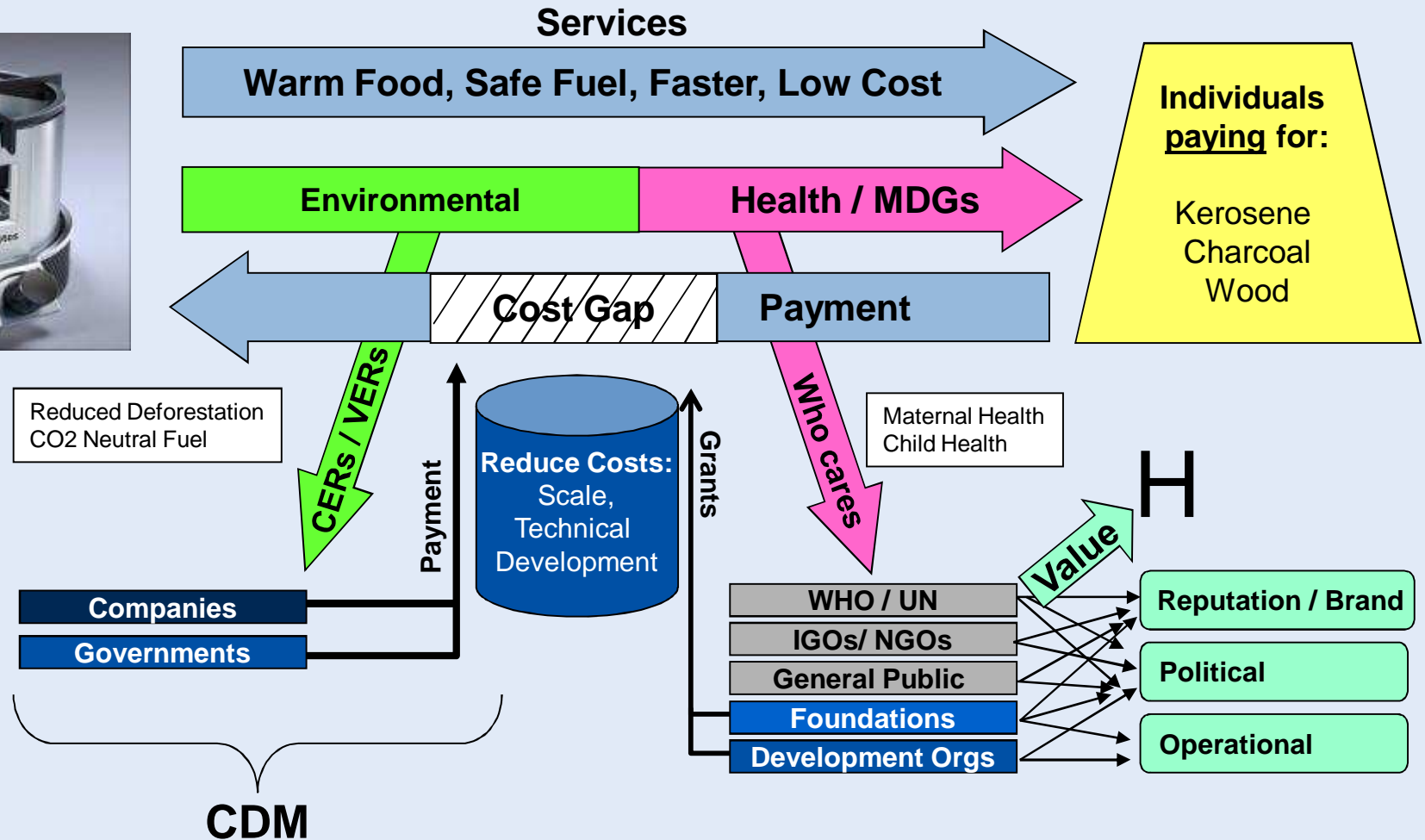
- Production Cost ~ \$50 (includes tank)
- Sales Cost ~ \$20
- Cost gap ~ \$30 per unit



**Question: To whom does the cooker bring added value?**

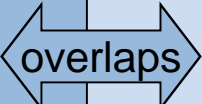


# Protos: Innovative Business Models



## Three Possible Business Models

<u>Traditional</u>	<u>Builder Model</u>	<u>CO2 Model</u>
<ul style="list-style-type: none"> <li>■ Cooker Price ~\$50 ExW</li> <li>■ Warranty Deducted</li> <li>■ Spare Parts <u>Optional % of purchase</u></li> </ul>	<ul style="list-style-type: none"> <li>■ Cooker Price ~\$50 ExW +</li> <li>■ Warranty 1-year ~\$?? +</li> <li>■ Service ~\$?? +</li> <li>■ Builder Subsidy - \$xx</li> </ul>	<ul style="list-style-type: none"> <li>■ Cooker Price ~\$50 ExW+</li> <li>■ Warranty 7-year ~\$?? +</li> <li>■ Service ~\$?? +</li> <li>■ CO2 Project Cost \$xx</li> <li>■ CO2 Revenue - \$yy</li> </ul>
<ul style="list-style-type: none"> <li>■ Total User Cost: <b>\$55++++</b> Cooker + Transport + Training + Profit margin + Warranty</li> </ul>	<ul style="list-style-type: none"> <li>■ Total User Cost: <b>&lt;55</b> Cooker + Transport + Training</li> </ul>	<ul style="list-style-type: none"> <li>■ Total User Cost: <b>&lt;&lt;55</b> Cooker + Transport + Training</li> </ul>
<ul style="list-style-type: none"> <li>■ Customers           <ul style="list-style-type: none"> <li>■ Businesses in regions where user can pay</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ Customers           <ul style="list-style-type: none"> <li>■ Government</li> <li>■ Plantations</li> <li>■ Charitable Organizations</li> <li>■ CSR</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ Customers           <ul style="list-style-type: none"> <li>■ CO2 Project Developers</li> <li>■ CSR</li> <li>■ Energy Companies</li> </ul> </li> </ul>



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## Key Market Factor: Plant Oil

### Plant Oils Triple Bottom Line

- **Socially**
  - Edible vs. non-edible oils
  - Exploitation of farmers
  - Local job creation
- **Economically**
  - Profit for local distributors
  - Work within existing distribution channels
  - Creation of local added-value where possible
- **Environment**
  - Biodiversity
  - Monocultures
  - Water Usage



↳ Requires Cooperation with International Environmental NGOs and Local CSOs / Farmers Cooperatives

## Ensuring Sustainability: Plant Oil Comparisons

Type of Plant Oil	Liters /ha/yr	Land required for 100l/yr	Comments
Used Oil	n/a	n/a	Filter and burn - low cost
Cotton Seed	325	3077 m <sup>2</sup>	By product of cotton
Castor	1413	707 m <sup>2</sup>	Crop every 5 months
Jatropha	1892	528 m <sup>2</sup>	Grows on marginal land
Coconut	2689	372 m <sup>2</sup>	Only when distance to markets too great
Palm oil	5950	168 m <sup>2</sup>	<u>Not currently used in Protos</u>



### BSH Focus:

#### Non-edible Oils

Jatropha oil  
Castor oil  
Babassu oil  
Neem oil

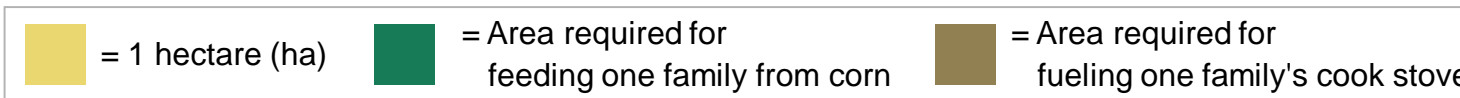
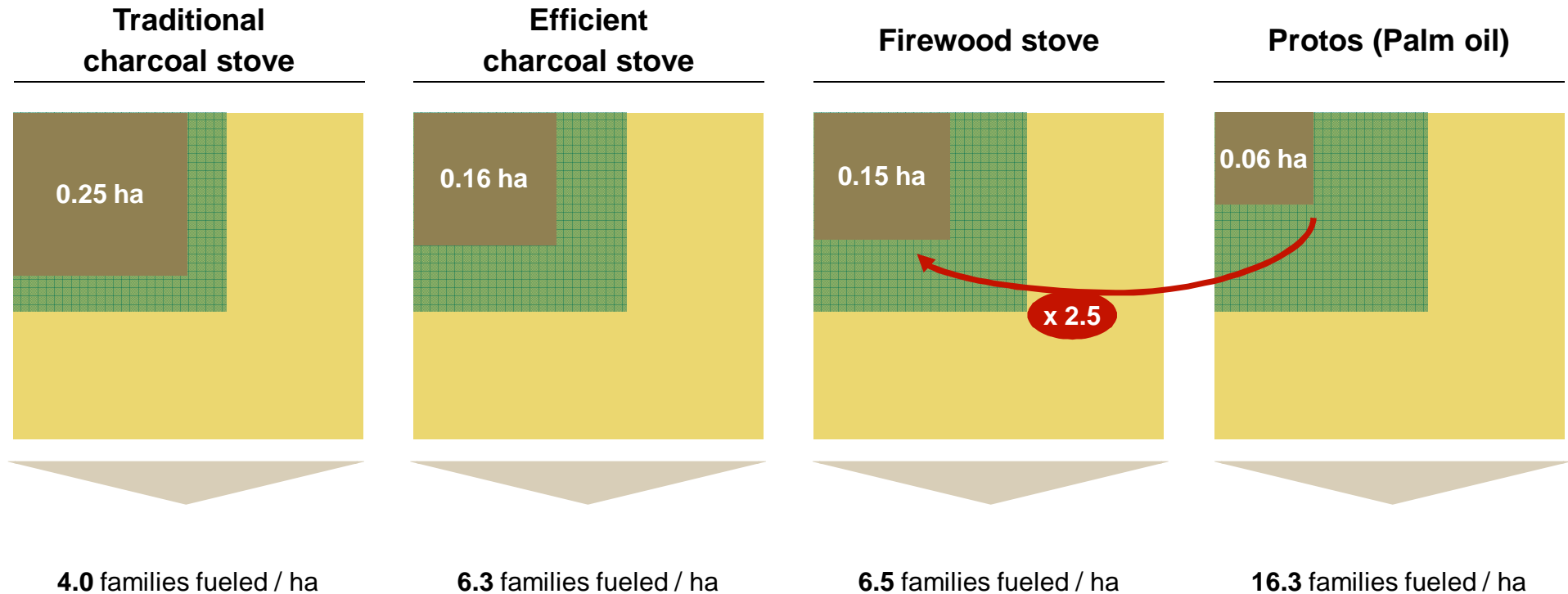
#### Used oils

Mc Donalds  
Hotel Chains  
Small business

#### By-Products

Cotton seed oil  
Kapok seed oil

→ **No competition to food production!**



Assumptions for nutrition performance: (2,500 cal per capita per day) x (average family size of 4.3) x (365) / (3,600 cal / kg of corn) / (corn yield of 3 tons / hectare / year) = 0.4 hectares / family

Assumption for all wood-based fuels is sustainable forestry

Plant oil vs. firewood



25 Liter  
23 kg

1,5 Cubic meter  
230 kg

Plant oil vs. charcoal



25 Liter  
23 kg

270 Liter  
90 kg

Note: All fuel quantities shown deliver the same amount of energy to the pot

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## Top Markets Identified

### Indonesia



- Largest potential market
- 3-5 million units
- Adequate plant oil
- Massive Kerosene use for cooking
- Govt. desire to phase out subsidies

### India



- Huge but complex market
- Widespread kerosene use
- Access to plant oil major hurdle
- Identification of pilot region underway

### Southern Africa



- Widespread kerosene use
- Supply chain establishment major hurdle
- Huge potential market for 1 million +



## Business Case Indonesia

### ■ Market Size

- 240 million population
- At least 100 million people cook with kerosene
- Household Kerosene use 200 – 400 liters/annum  
(0.5 - 1 tons /CO<sub>2</sub> per year)
- 5 people per family = ~ 30 million families



10% market share means  
**2 million potential protos users (up to 4 million burners).**

(would require ~200,000 tons Plant Oil)

## Protos vs. Kerosene Cooker

Kerosene



Protos



- Fuel: Imported Fossil Fuel
- Smoke: High CO & Other Carcinogens
- Power: .5 – 2 kwh
- Emissions: 1000 liters kerosene = 2.5 tons CO<sub>2</sub>
- Efficiency: ~35%
- Consumption: 1 liter = 2-3 hours

- Fuel: Local plant oils
- Smoke: 10x lower than kerosene
- Power: 2 – 2.5 kwh
- Emissions: Carbon Neutral
- Efficiency: ~55%
- Consumption: 1 liter = 4-5 hours

**1 Liter Plant Oil = 1.25 – 2.5 Liters kerosene**

## Business Case Indonesia

### ■ Fuel Switch

#### ■ Efficiency advantage for households

- 4 liters kerosene per week = IDR 18,000
- 2 liters plant-oil per week = IDR 13,000
- Preheating fluid = IDR 2,800
- Savings = 14%



**Total annual savings = IDR 114,400**

#### ■ Subsidy advantage for govt.

- Kerosene subsidy = IDR 2500 (\* 4 liters)
- Plant Oil subsidy = IDR 0
- ↳ Govt. savings per week = IDR 10000

Govt. savings per year = IDR 520,000



**Total Annual Savings Potential = approx. IDR 634,000\*\* (€54)**

<u>KEROSENE</u>	
Market Price	= IDR 6000
Household	= IDR 4500 (wholesale 3500)
Household use	= 3 – 4 liters / week
National Subsidy	= IDR 5 trillion+ /year

<u>PLANT OIL</u>	
Market Price	= IDR 6500*
Household	= IDR 6500 (est. )
Household use	= 3 – 5 liters / week
National Subsidy	= none

\*Based on BSH negotiated prices for Jatropha

\*\* Does not include small businesses which may also benefit from protos

## Research Conclusion

- The Economics appear to fit
- Research indicates that social factors are appropriate
- Infrastructure allows for the establishment of necessary supply chains
- There are no apparent political hurdles



**Key Question Remaining: Will the users accept the product?**

## Field Tests Begin with The Training of Trainers



**South – South Dialogue  
Trainers from the Philippines in  
Indonesia**



## Training the Users and Monitoring the Users



### Field Tests

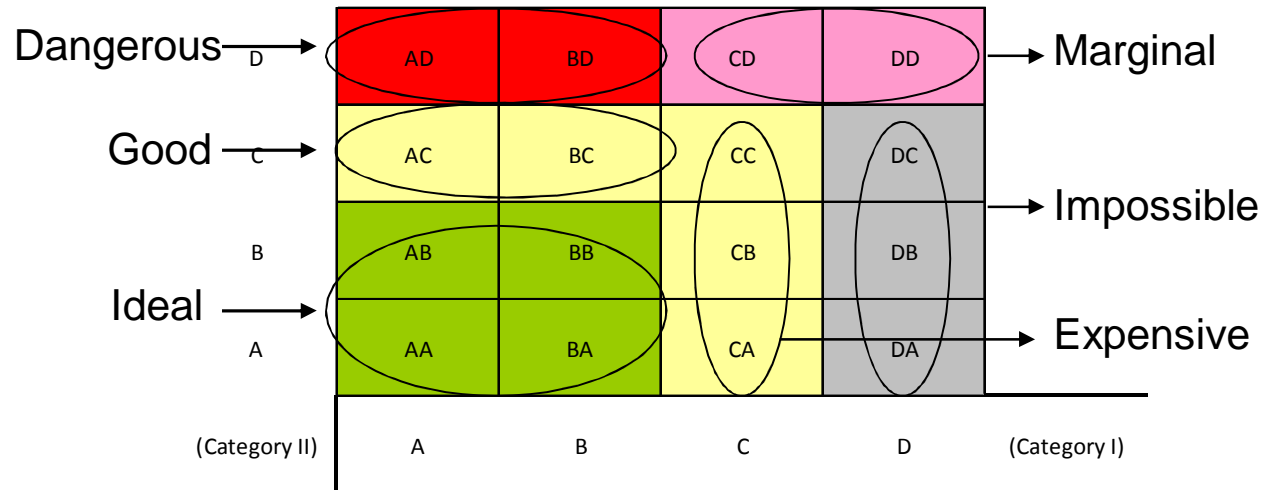
- 30 – 50 selected users (Alpha Frauen)
- 4-6 weeks
- Results determine next step



## User Categorization

Protos Category Overview

### Customer Matrix

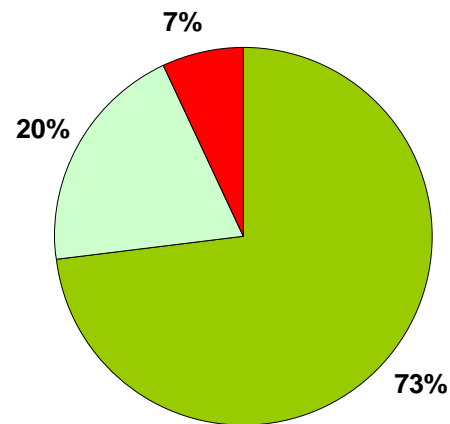


Category	Category	A	B	C	D
Category I	Understanding of training material	User can operate protos properly	User faced problems during 1st week	User faced problems during 1st and 2nd week	User cannot operate protos he/she did not understand training material
		No difficulty faced in operating	Problems solved during 2nd week of monitoring	Problems no longer found during third week of monitoring	Problems throughout monitoring of 4 weeks
Category II	Protos Acceptance Level	Daily usage	Not used daily	Not used daily	Protos not used
		Usage frequency $\geq 7$ times a week	Usage frequency 4-6 time per week	Usage frequency 1-3 times per week	Not used
		Stove used only protos	Protos as main stove previous stove as complimentary stove	Previous stove as main stove, protos as complimentary stove	Previous stove as only stove

## Two Key Tests in 2010

### Lombok

#### User- Acceptance

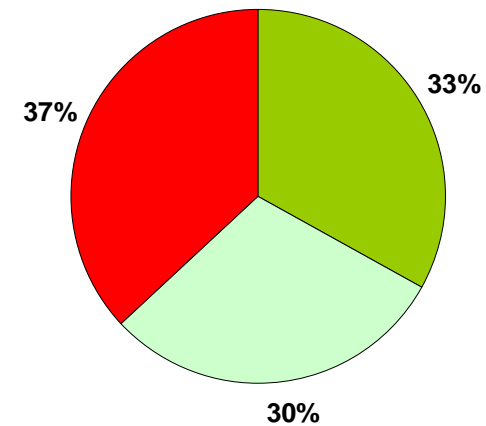


■ gut/Aufwand gering ■ gut/Aufwand hoch ■ keine

Category	%
AA, AB, BA, BB	73,00%
AC, CA, BC, CB, CC	20,00%
AD, DA, BD, DB	7,00%

### OKU Timur

#### User Acceptance



■ gut/Aufwand gering ■ gut/Aufwand hoch ■ keine

Category	%
AA, AB, BA, BB	33,00%
AC, CA, BC, CB, CC	30,00%
AD, DA, BD, DB	37,00%

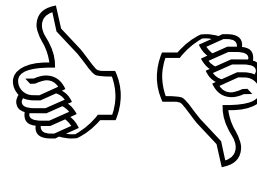


## Success with Protos: A Holistic System



pieces need to

Lombok



OKU Timur



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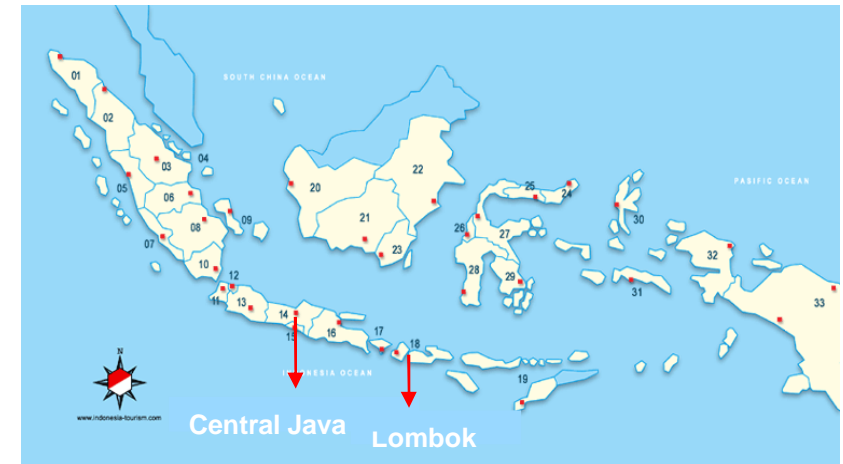
## Pilot Projects in Indonesia



## First 1000 Units: Projects, Partners and Potential

### Project 1: Lombok 2010 = 400 Units

- Partner: New World Energy, a Jatropha plantation developer and management company
- Oil: Jatropha
- Total Potential: 600 - 800



### Project 2: Lombok 2010 = 200+ Units

- Partners: a consortium between Fauna Flora International, British American Tobacco, Sustainable Trade and Consulting, Advance Consulting BV, UNRAM, Lumbung & Konsep
- Oil: Jatropha & Castor Oil
- Total Potential: 3000+ Units

### Project 3: Semarang 2010 = 400+ Units

- Partner: Jatro Waterland, a German based fully integrated renewable energy enterprise with large Jatropha plantations throughout Indonesia
- Oil: Jatropha
- Total Potential: 2500+ Units

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## Where BSH Needs

- Identification of Markets with Appropriate Conditions
- Plant Oil Supply Chain
  - Production and Distribution
  - Criteria and Assurances of Sustainability
- User-training
- Microfinance and Access to Customers
- Cost-Gap Coverage



[www.plantoilcooker.com](http://www.plantoilcooker.com)

## What we learned: some conclusions

- Technical development of a new technology differs little between developed or developing country
- BoP Market segments have similar needs and requirements as - others just with a different cash flow
- Business model developing, marketing and distribution issues are where the greatest differences emerge
- Protos has and continues to be a positive experience for BSH



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Thank You



## Distribution and Promotional Points

### Store Selling Protos



### Small Restaurant Cooking with Protos



## Local Marketing: Advertisements for Distribution Points

The banner features a woman in a hijab (Bu Mia) pointing towards a Protos stove. The text includes the Protos logo, a short description of the stove, the name of the persona, and three key benefits: Affordable, Economical, and Safe. Numbered callouts 1-8 point to specific elements on the banner.

**Product benefits banner**

- 1 BSH
- 2 The Protos logo
- 3 Short description of The plant oil stove, German technology
- 4 Name of the persona Mother Mia
- 5 Figure of the persona
- 6 “Affordable, Economical, Safe”
- 7 The Stove
- 8 Detail of the benefits •  
Affordable, Economical, and Safe

The banner features Bu Mia with her arms crossed, next to a Protos stove. It includes a visual comparison: a stove icon followed by an equals sign and a vegetable icon multiplied by 35. The text emphasizes the low cost of the stove relative to buying vegetables for soup 35 times. Numbered callouts 1-3 point to specific elements.

**Product price banner**

1. Illustration of the product price in comparison to known quantity  
buying 1 Protos just like buying vegetables for soup 35 times.
2. Reminder to purchase the cooking fuel
3. Don't forget; buy the oil at the cooperative!



## Informational Events

Flyer Announcing Event



Cooking Bicycle\*



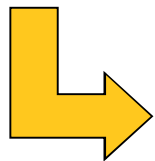
Protos Truck from Philippines\*



\*Examples from the Philippines (Protos I), but not yet used in Indonesia

## Tapping the „Environmental Markets“: CO2

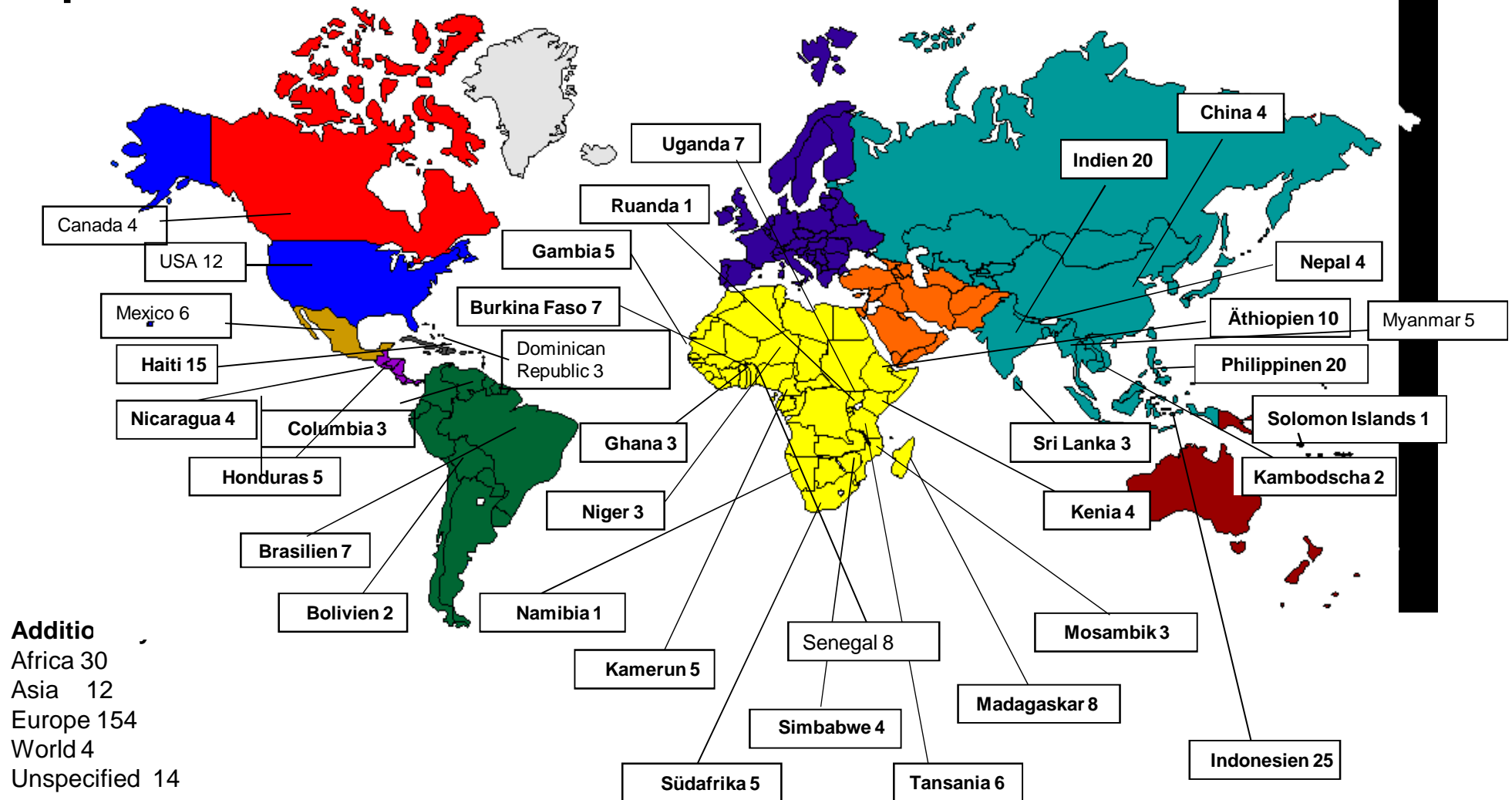
- Methodology Submitted to UNFCCC: NM005
  - Not yet approved due to plant oil controversy
  - Additionality concept is accepted
- Goldstandard VER: Approved
- BSH internal Carbon Purchases



Adequate to cover cost gap\* & management costs

\*minimum of 5000 cookers required for viability

# Requests for cooperation from around the world



## Protos Business Model Challenges

### Local Added Value With Sustainability Checks

