



Increasing Access to Clean Cooking: *Challenges and Prospects from the Philippine Perspective*

Dr. Kee-Yung Nam
Principal Energy Economist

Grace Yeneza
Consultant

Asian Development Bank





The Challenges

More than 2.5 billion people are without access to clean cooking worldwide; 1.5 billion live in Developing Asia, and 48 million in the Philippines. (IEA, 2022)

The Philippines is listed among the top 10 countries with the largest populations lacking access to clean cooking fuel and technologies.

The slow progress in deploying clean cooking solutions in the Philippines highlights the need for specific interventions to address the gaps at the country level.

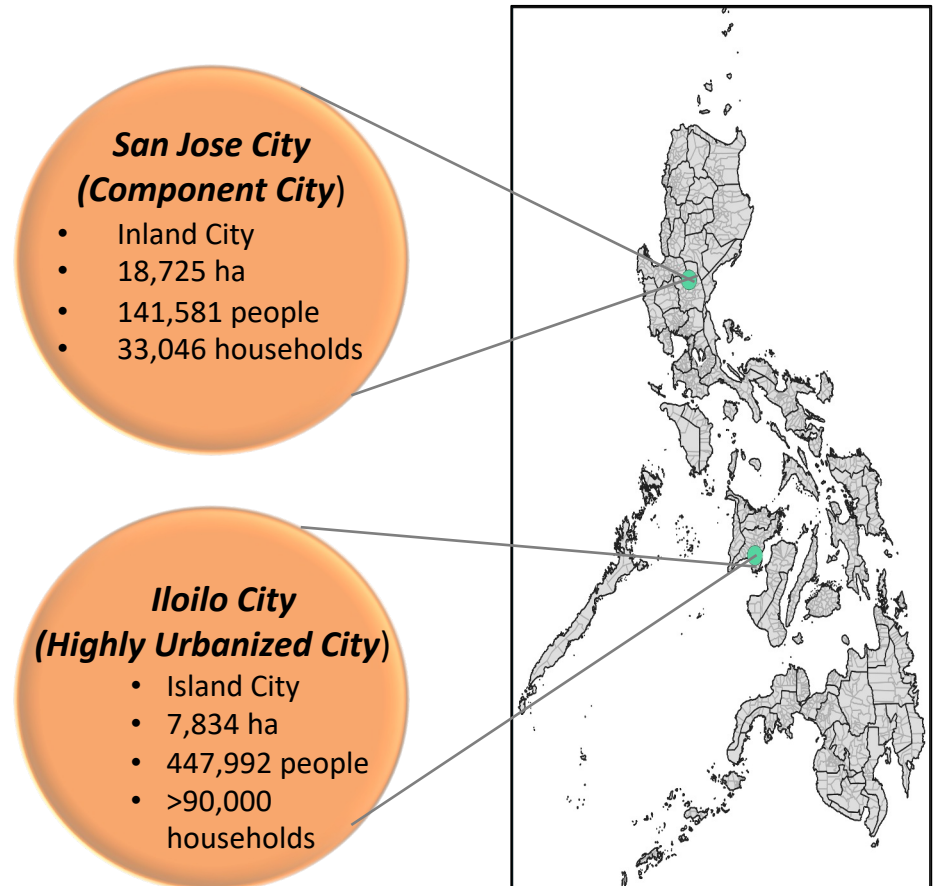


Purpose and Coverage of the Study

Study Objectives

- To determine the current fuel-technology combinations that households employ, their efficiency and the effect on indoor air quality;
- To identify the barriers to adoption of modern cooking fuels and technologies;
- To assess impact and costs to switching from traditional to clean cooking technologies and fuels; and
- To identify potential solutions to overcome the barriers.

Study Sites





Household Cookstove and Fuel Use Preference

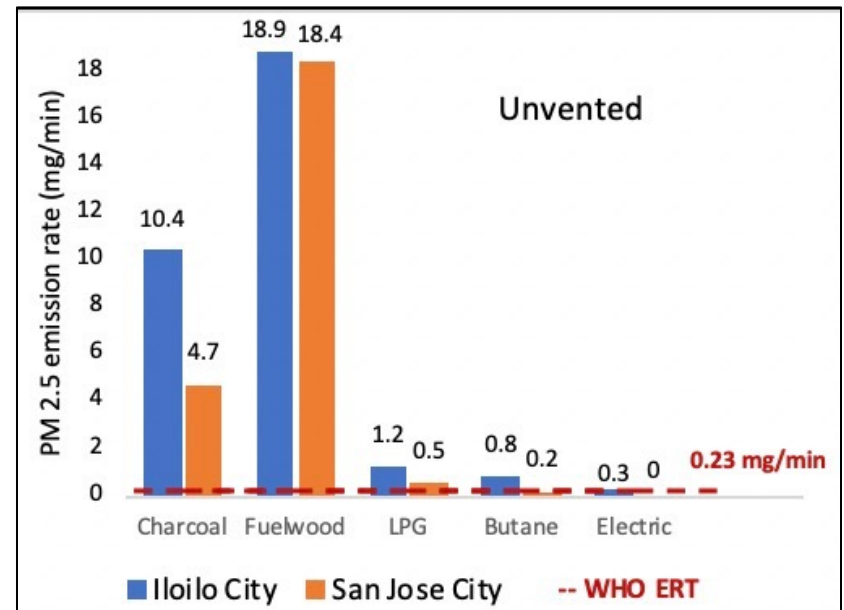
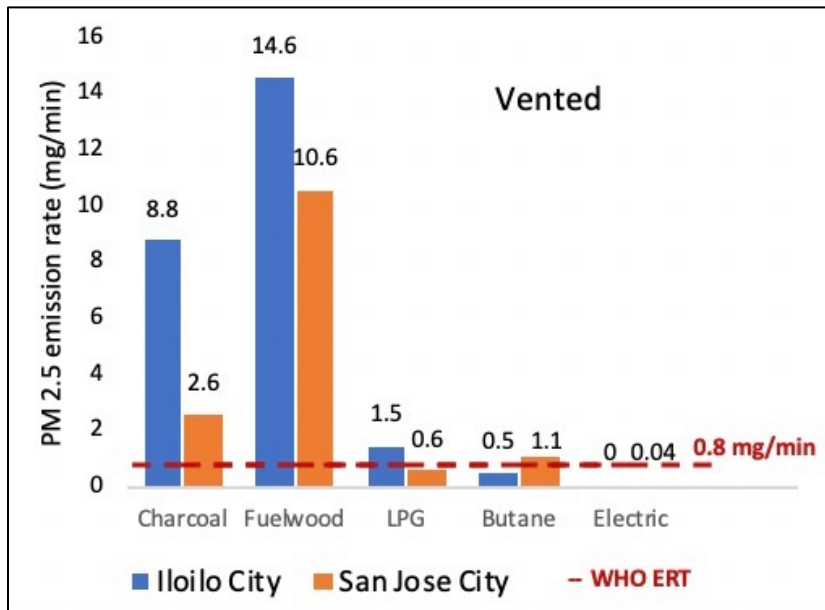
- Iloilo City: **46% exclusively use traditional cookstoves**, with 38.3% using charcoal as fuel.
- San Jose City: 16% exclusively use traditional cookstoves; **26% use LPG.**
- Fuel stacking is a common practice** by 25.4% in Iloilo City and 55% of households in San Jose City; 36.5% of those primarily using gas stoves also use traditional cookstoves.
- Only a very small percentage use electricity for cooking** (1% in Iloilo City and 0.5% in San Jose City).

Cookstove Preference	Iloilo City (%)	San Jose City (%)
Exclusive Traditional	46.8	16.0
Charcoal	38.3	3.0
Fuelwood	4.0	6.5
Both	4.5	6.5
Exclusive Modern	25.4	27.5
LPG	18.9	26.0
Butane	5.5	1.0
Electricity	1.0	0.5
Practicing Fuel Stacking	25.4	55.5
Primary Traditional	9.9	19.0
Secondary Gas	9.4	19.0
Secondary Electric	0.5	0
Primary Gas Stove	13.9	36.5
Secondary Traditional	13.9	36.5
Secondary Electric	0	0
Primary Electric	1.5	0
Secondary Traditional	1.5	0
Secondary Gas	0	0
No Answer/ Erroneous data	2.5	1.0
TOTAL	100	100



PM_{2.5} Emission Rates and Impact on Health

Charcoal and fuelwood show very high PM_{2.5} emissions rates when compared with WHO Emission Reduction Target (ERT) Values in both vented and unvented kitchens.



Results in very poor indoor air quality



Thermal Efficiency Comparison

- Charcoal stove is least efficient.
- Electric stove has highest efficiency rate.
- ICS leads to better efficiencies.

Cookstoves primarily used ^a			Improved Cookstoves (Locally Developed) ^b			
						
Cement (charcoal/fuelwood)	Gas stove (LPG)	Portable Gas stove (butane)	Mabaga Kalan	Wonder Kalan	Papa Brik Stove	Biolexis gasifier

Stove	Traditional ^a		Improved (Local) ^b			Modern ^a	
	Cement Stove	Cement Stove	Biolexis (Gasifier stove)	Wonder Kalan	Mabaga Kalan (Rocket stove)	Gas Stove ^c	Electric (Coil) Stove ^c
Cooking Fuel	Fuelwood	Charcoal	Rice Hull	Charcoal	Charcoal	LPG	Electric
Thermal Efficiency (%)	10.4	5.2	16	13	27	26.5	33.4
Total Operating Time (minutes)	43.3	43.3	32	28.2	28.2	23.4	18

LPG = liquefied petroleum gas.

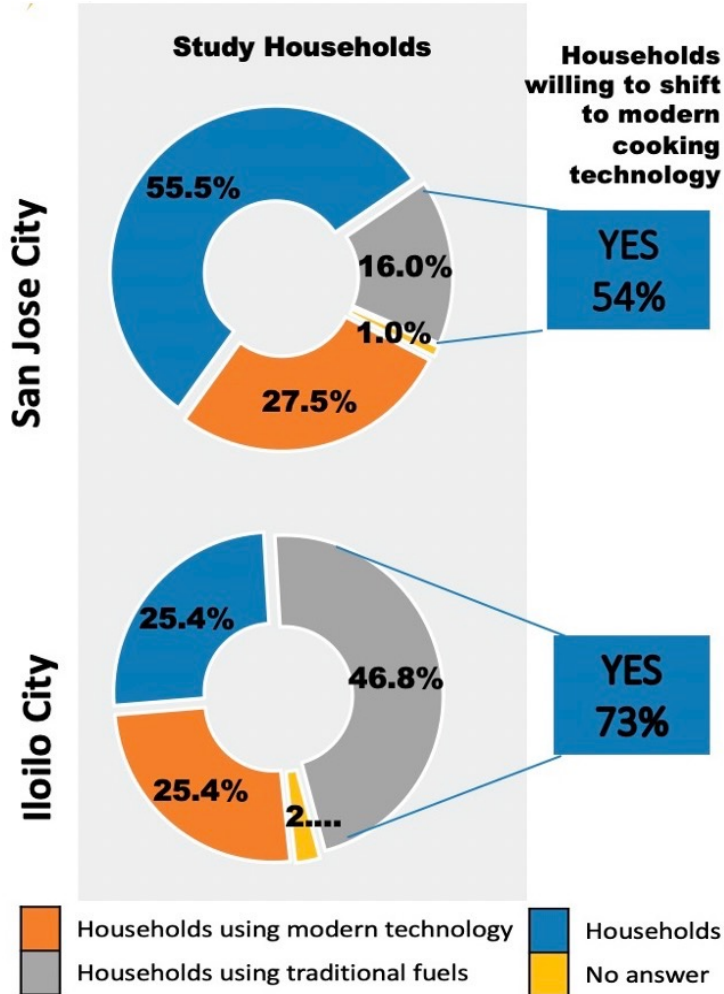
^a Source of data for traditional and modern stoves ADB. 2015. [Promoting Sustainable Energy for All in Asia and the Pacific - Energy Access for Urban Poor](#). TA 8946. *Laboratory testing data*. 2018.

^b Source of data: Stove+ Academy, 2017, (a single water boiling test was done as an exercise for the participants, not done in a controlled environment or a laboratory. The results should be viewed in this context.)

^c The laboratory test used the Super Kalan gas stove, which is attached to a 2.7- kilogram LPG tank. For electric stoves, the laboratory test used a 1,200-watt single-coil electric stove.



Considerations for Shifting



Barriers to Shifting

Perceived Costs of Shifting to Modern Cooking Technologies

- upfront cost of modern stoves
- additional cost for fuel purchase/electricity

Perceived Advantages of Using Traditional Cookstoves

- More convenient
- Safer/ not prone to exploding
- Taste preference
- Specialized cooking needs

Lack of Enabling Environment

- Lack of strategic institutional and policy support for clean cooking
- No incentives to encourage ICS developers, financial sector, stakeholders to promote increased use of clean cooking
- Lack of awareness programs to address perception issues



Outlook on Shifting to Modern Cooking Technology

Shifting to modern fuel substantially reduces PM_{2.5} Concentration

*Particulate Matter Emission Concentration Reductions
for Different Fuel–Technology Switching Combinations (%)*

Traditional Fuel	Modern Fuel	Iloilo City		San Jose City	
		Vented (%)	Unvented (%)	Vented (%)	Unvented (%)
Charcoal	LPG	89.33	85.04	86.09	91.20
	Butane	92.19	83.36	60.04	95.47
	Electric	No samples	93.92	99.32	No samples
Fuelwood	LPG	92.75	91.52	94.56	96.40
	Butane	94.69	90.57	84.38	98.15
	Electric	No samples	96.55	99.74	No samples

Reduction in PM _{2.5} Concentration		
Fuel Switch	San Jose City (Vented Kitchen)	Iloilo City (Unvented Kitchen)
Charcoal to Butane	60.04 %	83.36%
Fuelwood to Electric	99.74 %	99.55%



Shifting Options: Savings and Payback

Shifting from charcoal stove to single coil electric stove gives the highest savings and quickest payback

Cookstove–Fuel Combinations With Savings	Iloilo City			San Jose City		
	Cost of stove	Average Annual Savings from Shifting	Payback period (months)	Cost of stove	Average Annual Savings from Shifting	Payback period (months)
Charcoal to Super Kalan (2.7kg LPG tank)	₱1,700.00	₱13,737.29	1.49	₱1,700.00	₱11,080.03	1.84
	(\$31.96)	(\$258.24)		(\$31.96)	(\$208.29)	
Charcoal to Single Burner Gas Stove (11-kg LPG tank)	₱3,429.75	₱11,382.92	3.62	₱3,429.75	₱10,991.98	3.74
	(\$64.47)	(\$213.98)		(\$64.47)	(\$206.63)	
Charcoal to Double Burner Stove (11-kg LPG tank)	₱4,579.86	₱11,306.25	4.86	₱4,325.00	₱10,932.30	4.75
	(\$86.10)	(\$212.54)		(\$81.30)	(\$205.51)	
Charcoal to Single Coil Electric Stove	₱983.33	₱14,535.75	0.81	₱1,225.00	₱12,556.56	1.17
	(\$18.49)	(\$273.25)		(\$23.03)	(\$236.05)	

Note: Conversion of Philippine peso to US dollar is ₱53.1953: \$1.00; USD in brackets

Source: Computed using upfront cost of cookstoves (without fuel) and average annual savings incurred by households for switching. Only switches that resulted in savings were included.



Key Takeaways

- **Shifting to modern cookstoves is essential.**
 - **Large portion of the population still rely on traditional fuels for cooking** (46% in Iloilo and 42% of 114 million total population)
 - **Shifting to modern cooking technology leads to better indoor air quality** for households
 - **Shifting from charcoal to electricity** allows significant annual cost reduction
 - **Improved cookstoves is a lower cost option** to increase efficiencies
 - **High interest** to shift to modern cooking technologies
 - Iloilo – 73%
 - San Jose City – 54%



Key Takeaways

□ **Barriers to clean cooking market development are mainly the result of consumer perception.**

- **Low awareness** of the high costs of traditional fuel use (including negative impact on health) and benefits of switching to clean cooking technologies
- **Behavioral/cultural** preferences and practices
- **Fuel stacking**
- **Non-inclusion of clean cooking in National Energy Plan**
Implies that clean cooking is not a priority



Key Takeaways

□ Overcoming the barriers

- **Integrate clean cooking in the country's National Energy Plan** to show Government's intentional support to clean cooking access.
- **Generate information. Ground-truthing is essential for enabling market development and expansion.** Ensure that policy development and delivery mechanisms are designed to address local market gaps:
 - Not all superior technologies will fit all the time, Flexibility. e.g., eCooking, LPG?
 - Develop effective and sustainable **market-based business models**
 - **User-centric strategies** will likely generate behavioral change
- **Increase public awareness to promote shifting to modern cookstoves.**
 - Health implications and value of shifting to modern cookstoves
 - Benefits in terms of costs, efficiencies, convenience, safety, etc.
 - Environmental and climate change impacts
- **Encourage local governments to act and address local Issues.**
 - Promotion, incentives to ICS developers, low-cost financing, etc.



Thank you.

ADB. 2021. Increasing Access to Clean Cooking in the Philippine: Challenges and Prospects
<https://www.adb.org/publications/increasing-access-clean-cooking-philippine-perspective>

