

The Social Impact of Highly Improved Stoves

Kyrgyzstan: Despatches from the front

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What is the project?

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There is a World Bank energy efficiency project in Kyrgyzstan aiming to reducing the fuel expenses in the poorest homes.

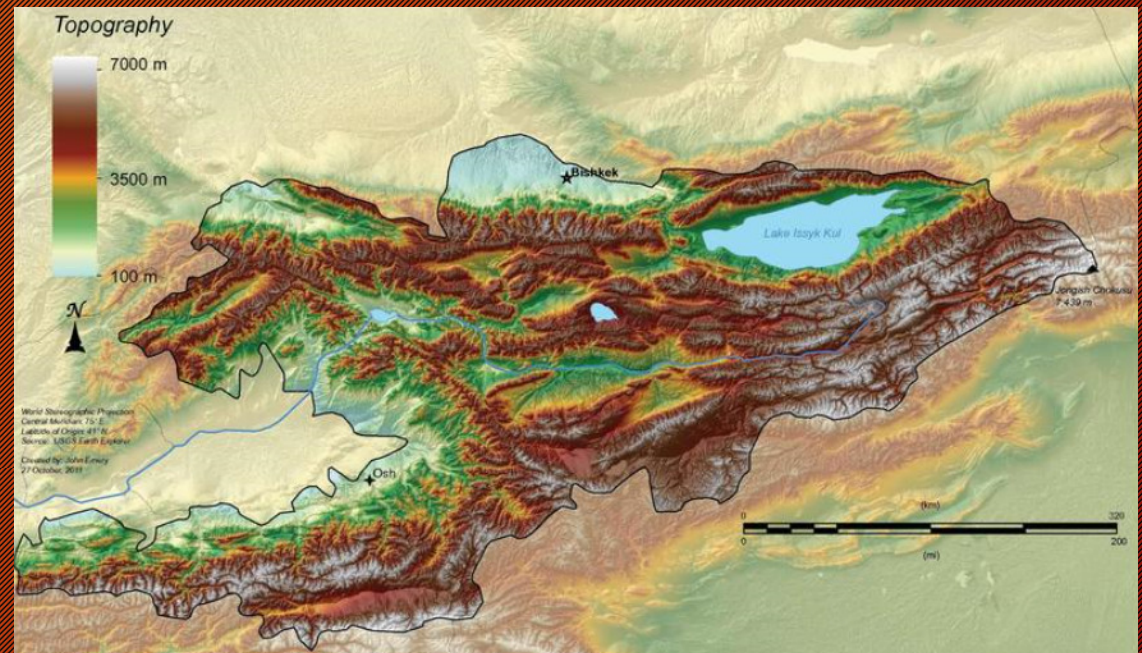
It began by piloting new stoves in 51 homes in Nov 2016.



Where is the project?

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- The country is very mountainous with many places reaching -35°C in winter.
- Houses are often poorly insulated and fuel is purchased out of necessity due to scarcity of biomass.



Highly Improved Stoves - what are they?

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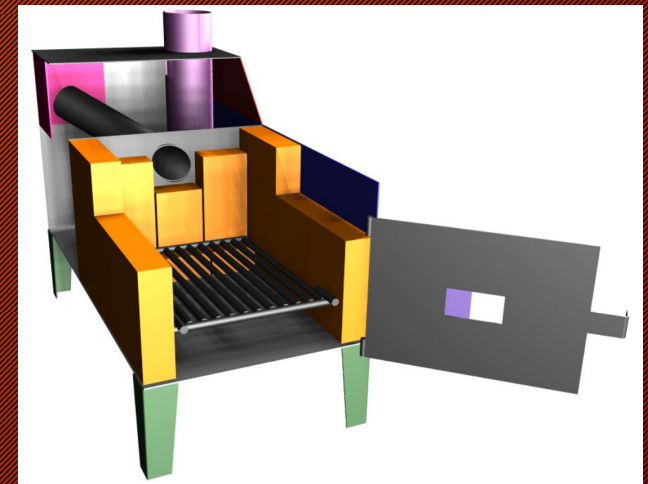
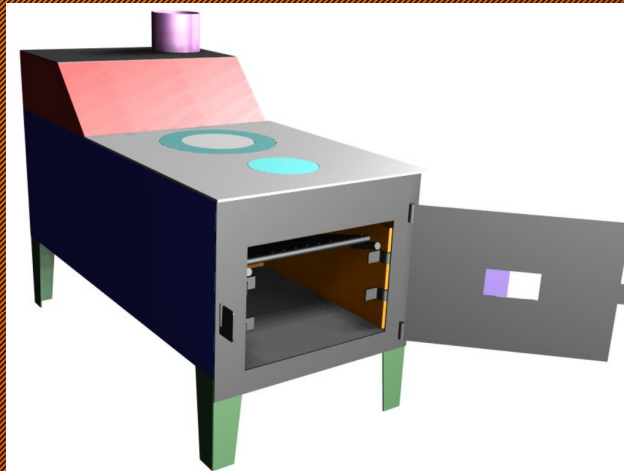
- Any space heating and cooking stove that can save $>1/2$ the fuel or reduces $PM_{2.5}$ $>90\%$ we consider 'highly improved'.
- In this project we introduced new stoves: a cross-draft coal gasifier and a dung-burning stove with a flame tube.
- The emissions of $PM_{2.5}$ from the coal-burning appliances is dramatically lower (99%).
- All the stoves have well-fitted chimneys.

Highly Improved Stoves

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- Model 2.5 Dung burning stove

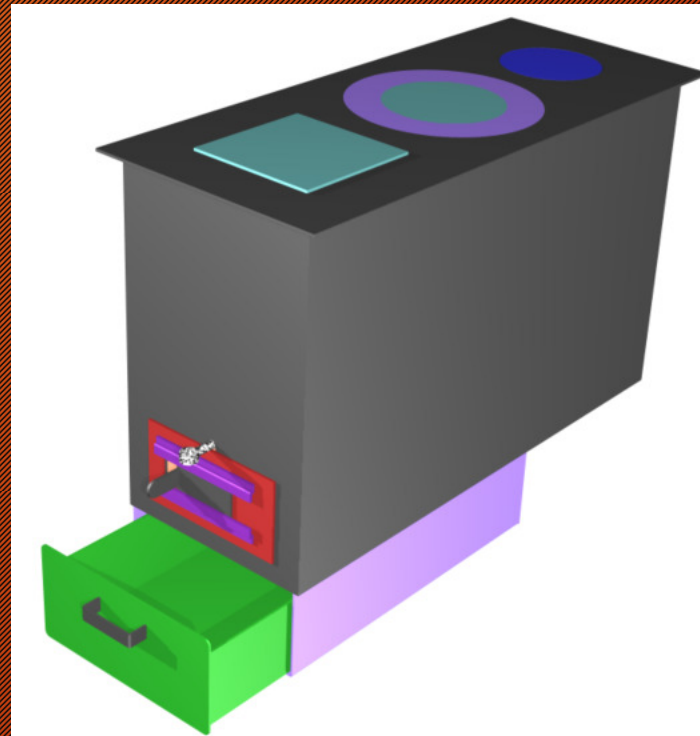
Efficiency $\approx 85\%$



Highly Improved Stoves

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- Model 4.2 Coal stove



What happens when they are put into homes?

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Model 4.2 installed outside Osh, KG.



The meter reader

8



The meter readers (multiple cases)

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Meter Reader's Logic: No smoke coming from the chimney

→ The fire is out. They must have run out of fuel.

The house is warm

→ Electricity must be the heat source

Electricity meter counter has not moved

→ The meter has been bypassed!

→ The householder should be arrested!

The child abuser

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Neighbours observe:

There are children living in the house

No smoke from the chimney for several days

Electricity is not affordable to that family

- Extreme measures are being taken: save money by saving fuel
- The children are being living without any heat at all
- The householder should be arrested for child abuse!

The dung burner

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The stove holds 5 kg of dung

It was ignited and the air controller set

The householder left to attend to errands

And returned after 4 hours to see no smoke coming from the chimney

→ The fire is out

However there are heat retaining bricks in the stove so he placed his hand on the stove to see how warm it was.

The fire was not out, at all!

→ He burned his hand!



The tea maker

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The tea maker

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The stove Model 4 stove is always on
Multiple cases: lit in early November 2016 and not re-lit since
Pots and kettles are always on the stove.

“There is always hot water.”

A knock at the door, “Won’t you come in for tea?”

Either: “It will just take 30 minutes to boil some water...”

Or: “The kettle has just boiled.”

→ Social status gained: hospitality can be offered and accepted

The tea drinker

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A knock at the door, “My sheep is missing.”

“I will look for it. Won’t you come in for tea?”

Either: “I really have to go now, thank you, perhaps next time. [Thinks: It will take 30 minutes to boil the water.]”

Or: “Thank you, just one cup.” [Thinks: The water is already hot.]

→ Social status raised: hospitality offer could be accepted

The kitchen sauna

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It was -30° outside.

In the little kitchen the Model 4 was cooking away at full power and had been for some hours.

The temperature in the kitchen was 40°C .

“No one else in this village has a 40° degree kitchen when it is -30° outside!”

- Social status gained because the house is easily heated with the new stove.
- A warm house is a sign of wealth



The cats

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It was noticed that under nearly every stove there was a sleeping cat.

In order to keep the cats happy, it is important that the legs be long enough to have sufficient space for the family cat to lie down.

→ Family-pet relationships are improved: The cats feel better cared for by the new stoves.



Breathing indoor air

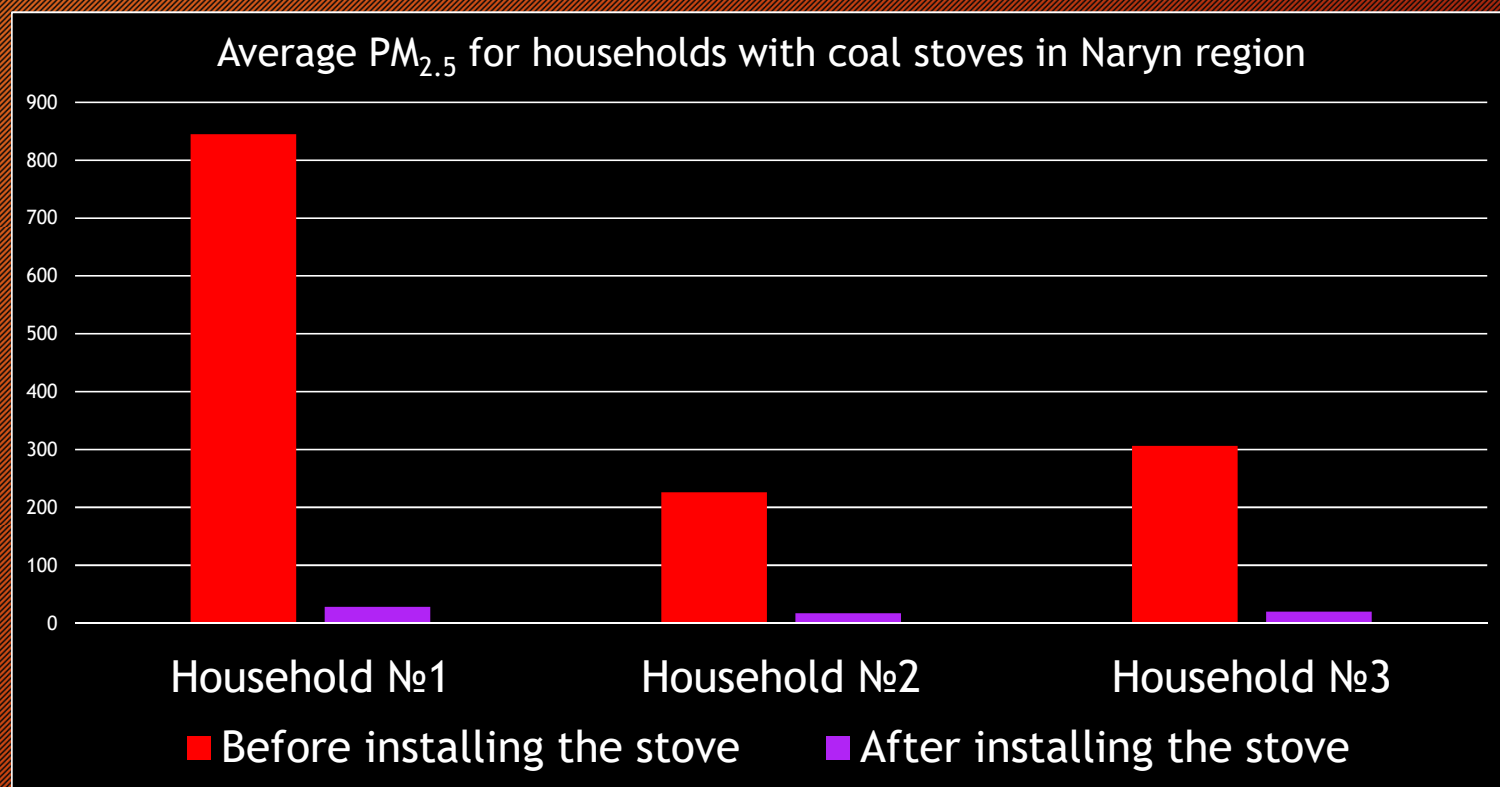
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The indoor air quality improved significantly.

People in the home can now see each other better.

And of course the feel much better.

They talked a lot about the positive health impacts.



Feeling better Non-respiratory symptoms in adults, Naryn region

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Symptoms	Before installing the stove	After installation of stoves, 2 nd month
Headache	65%	0%
Irritated eyes	70%	0%
Ear infections	0%	0%
Irritated throat	72%	3%
Chest tightness	16%	0%
Nausea	8%	0%
Fatigue	66%	0%
Dizziness	11%	0%
Irritability	58%	0%

Feeling better Respiratory symptoms in adults, Naryn region

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Symptoms	Before installing the stove	After installation of stoves, 2 nd month
Cough	73%	18%
Wheeze	33%	6%
Nasal congestion	63%	0%
Running nose	55%	0%
Bronchitis	33%	0%

Thank you!

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Stove designs

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Drawings and photos

www.newdawnengineering.com

/Library/Kyrgyzstan/<model>

Health impact data

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