

What Can the Wood Heating and Cooking Sectors Learn From Each Other?

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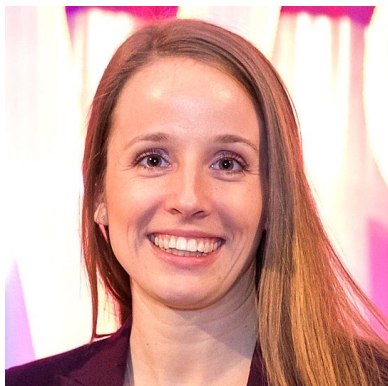
Acknowledgements



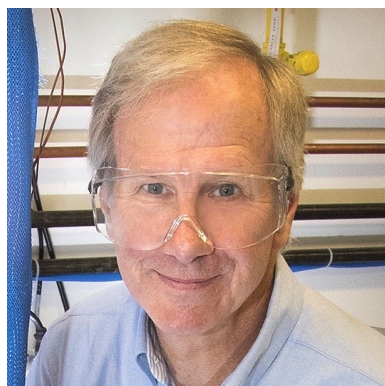
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Sound familiar?

- Laboratory test protocols do not represent actual use
- Performance in laboratory does not match performance in the field
- Users contribute greatly to variance in performance and emissions
- More field data is needed to validate performance and understand impact on HAP/IAQ
- More monitoring data is needed to understand user behavior

Cookstoves community expertise can help fill in gaps

- Sensors to measure:
 - field performance
 - user operation/behavior
 - impact on indoor/outdoor air quality
- Development of reliable field-testing protocols and equipment
- Designing, executing, and conducting field tests with limited resources
- Characterizing particulate emissions (composition, size distribution, etc.)



Some consideration when testing wood heaters in the field

- Large emissions concentrations will damage instruments
- Up to 30 kW heat out for room heaters
- Difficult to replicate the dilution tunnel in the field
- How can we accurately measure fuel burn rate?
- How do we accurately determine thermal efficiency in homes?!



Indirect Thermal Efficiency

Calculated using:

- fuel mass and properties
- flue temperature and gas concentrations
- ambient air temperature



Energy Conservation:

$$E_{in} = E_{out} + E_{loss}$$

Thermal Efficiency:

$$\eta = 100 \times \frac{E_{out}}{E_{in}} = 100 \times \frac{(E_{in} - E_{loss})}{E_{in}}$$

Energy Loss Mechanisms:

$$E_{loss} = E_{chemical} + E_{sensible} + E_{latent}$$

