

# Addressing Hidden Forms of Energy Poverty

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# Addressing hidden forms of energy poverty



- The Energy, Equity and Sustainability Group at Carnegie Mellon University
- Large scale data assessments using smart meter data
- Need scalable solutions to find households that under consume energy

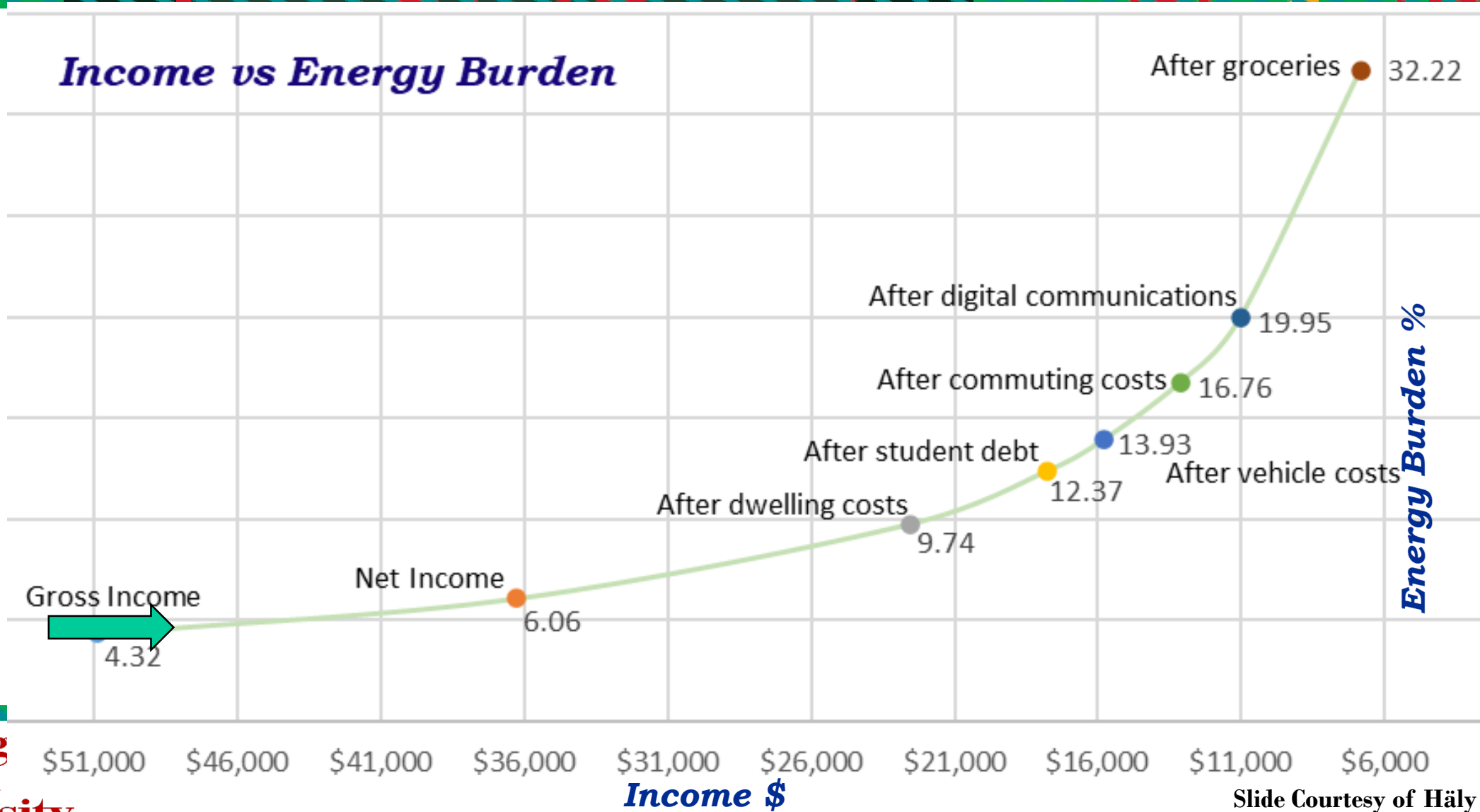


# Community Informed Research – My neighbor

- Older woman in her 80s with cancer. Windows always open during the pandemic. She fainted and had to go to the hospital.
  - Her energy burden is low
  - Not disconnected
  - Broken AC
  - Mold in house



# Gross Income misses the big picture and true fraction

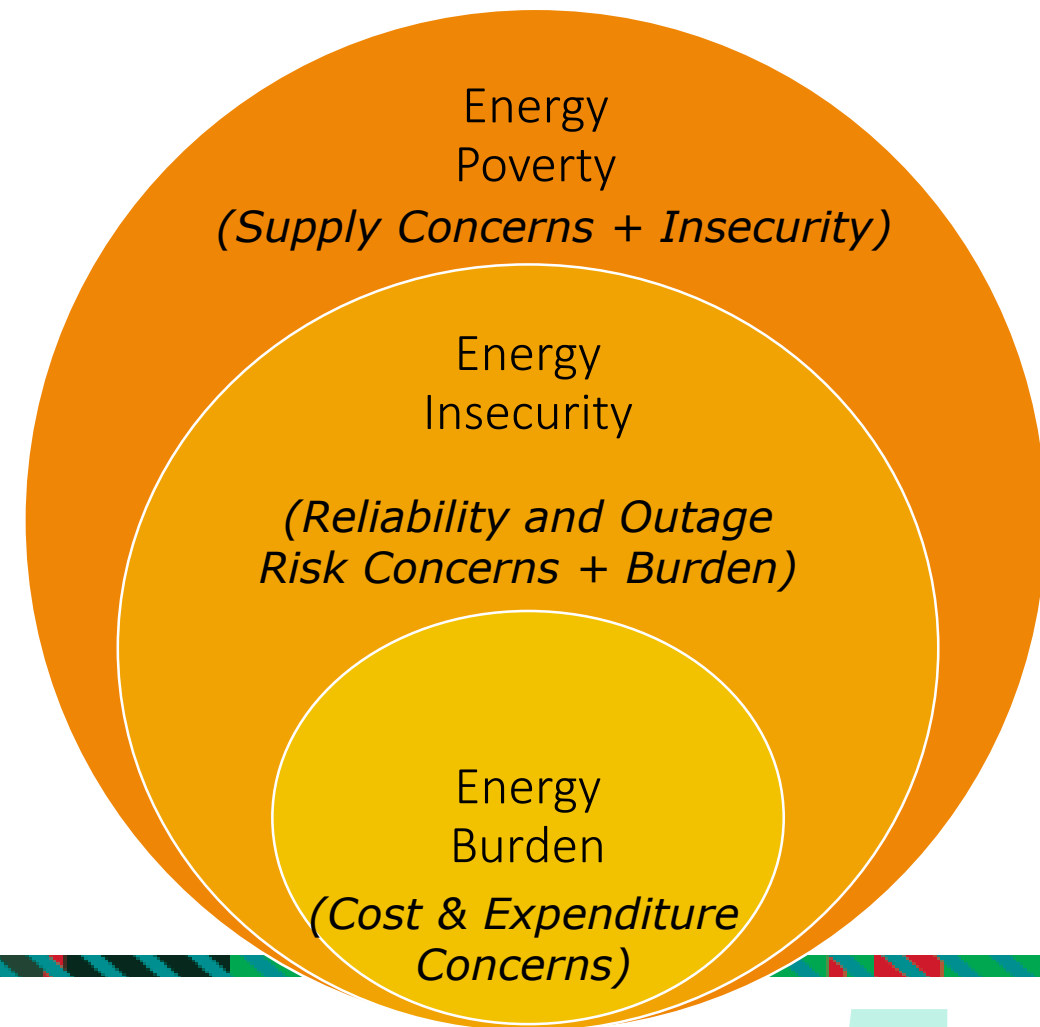


# Energy Burden Dominates Poverty Analysis

Maricopa County, Arizona

Between 2006 and 2016, **228 heat-related deaths occurred indoors** despite the presence of an AC.

- 30 households - electricity disconnected
- 78 households turned off their working AC
- 120 households had a broken AC





# A hidden inequity

- Need to expand metrics.

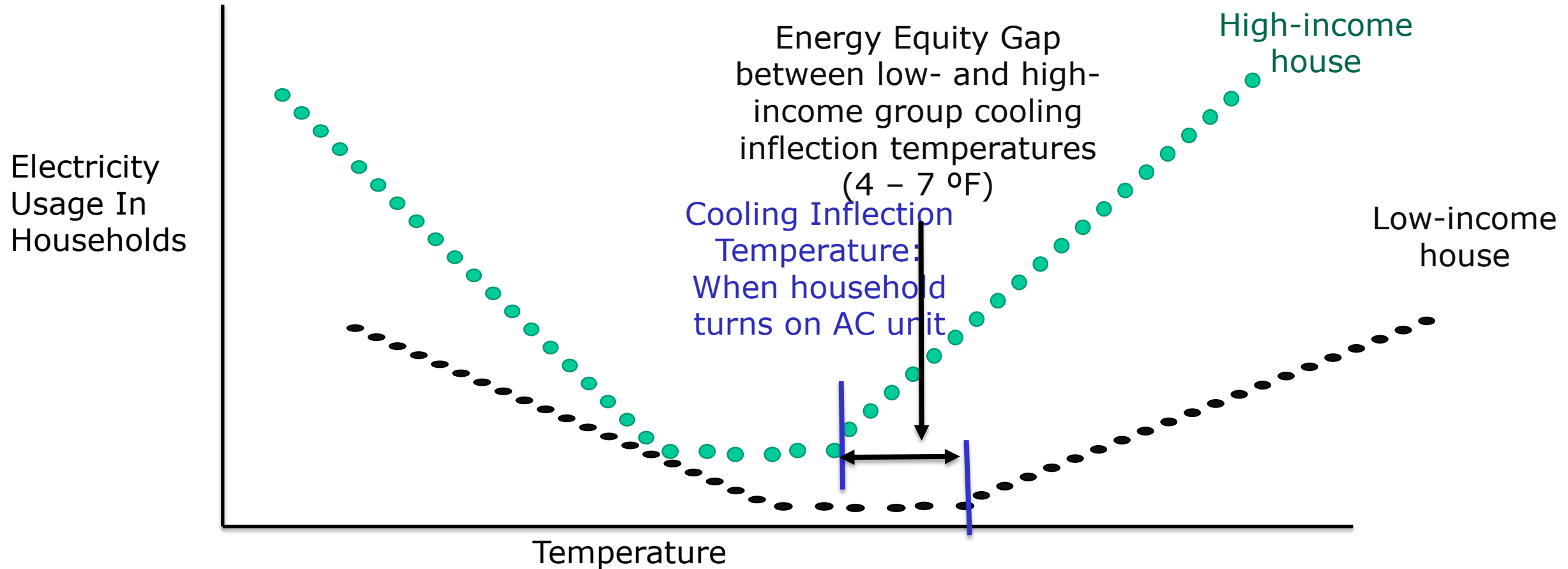
Able to satisfy  
all your  
demand but  
high cost.

People able to satisfy partial  
needs, but may be at risk

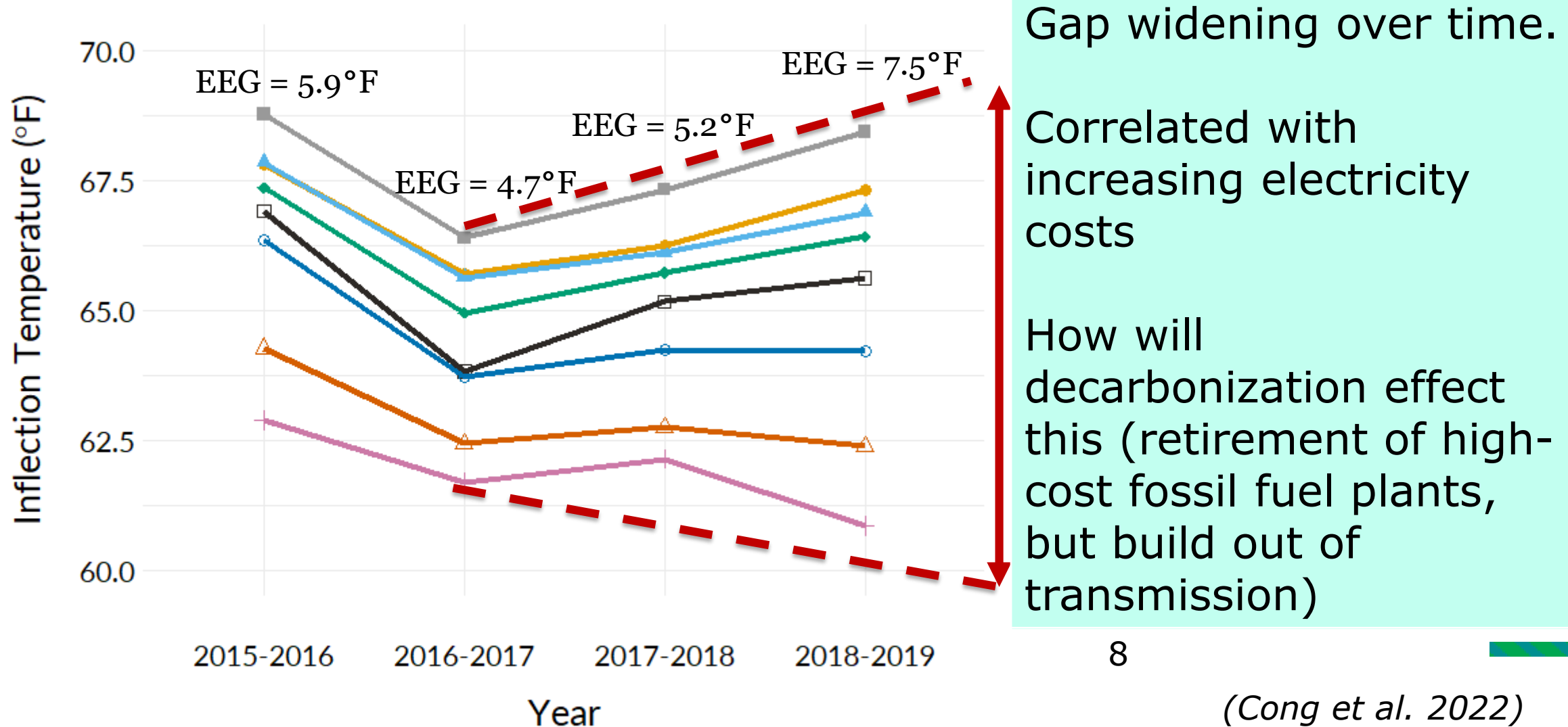
Unable to  
satisfy any of  
your demand  
(outage,  
disconnected)



# The Energy Equity Gap (Lessons from our study in AZ)

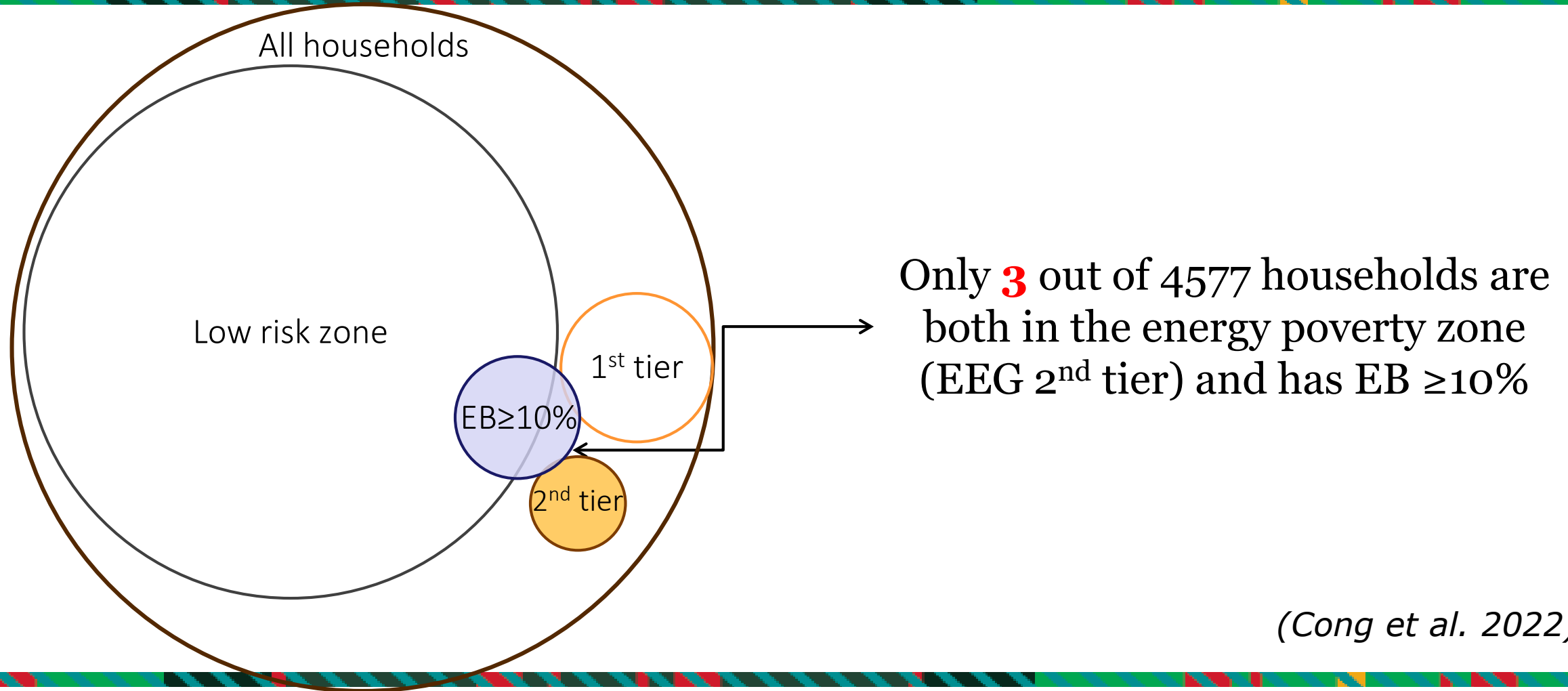


# The energy equity gap (EEG) (2015-2019)



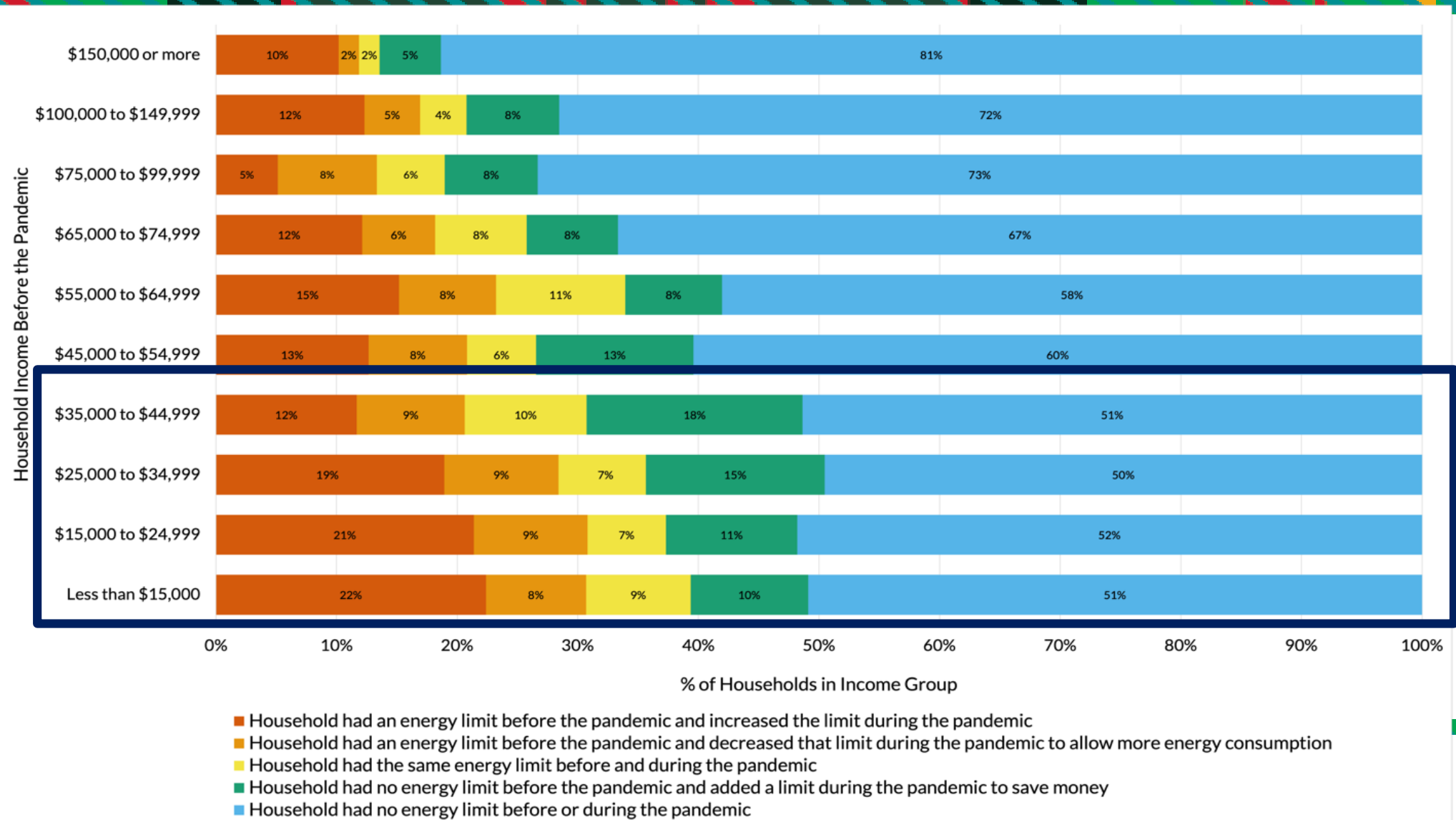


# Energy equity gap (EEG) vs. Energy burden (EB): Who has been left out?



*(Cong et al. 2022)*

# Energy limiting behavior increased during pandemic



~ **50%** of low income households report that they are actively limiting their consumption

# Impact of Energy Limiting Behavior

- Need multiple measure to identify energy poverty and insecurity
- Need to think critically about who qualifies for energy assistance, and how we evaluate program success.
- Smart meter data provides avenue for scalable energy limiting behavior assessment

# Final Thoughts

- Need deployment of tech **and critical look at energy usage** following deployment.
- Energy limiting behavior in low-income groups is hidden poverty



VS

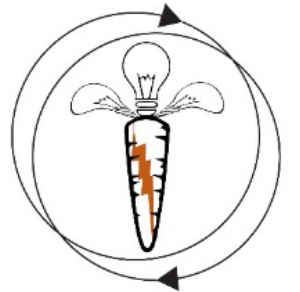




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ENERGY, EQUITY  
& SUSTAINABILITY

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## Acknowledgments and References

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- Cong, S., Nock, D., Qiu, Y. L., & Xing, B. (2022). The energy equity gap: unveiling hidden energy poverty. *Nature Communications*.

