

Getting out of our comfort zones: understanding the food-energy-water (FEW) nexus in remote Alaska communities



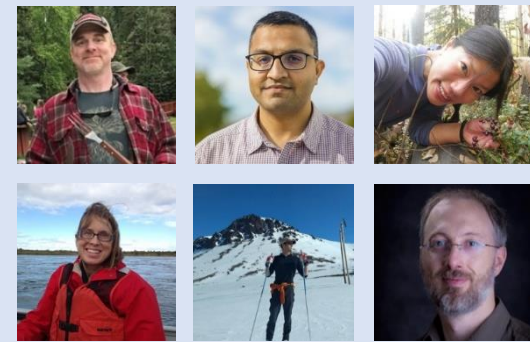
UAA



Graduate students



UAF



Huntington Consulting



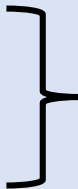
Communities of Kongiganak, Tanana, Cordova, and Igiugig


<http://ine.uaf.edu/microfews>

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Who is involved?

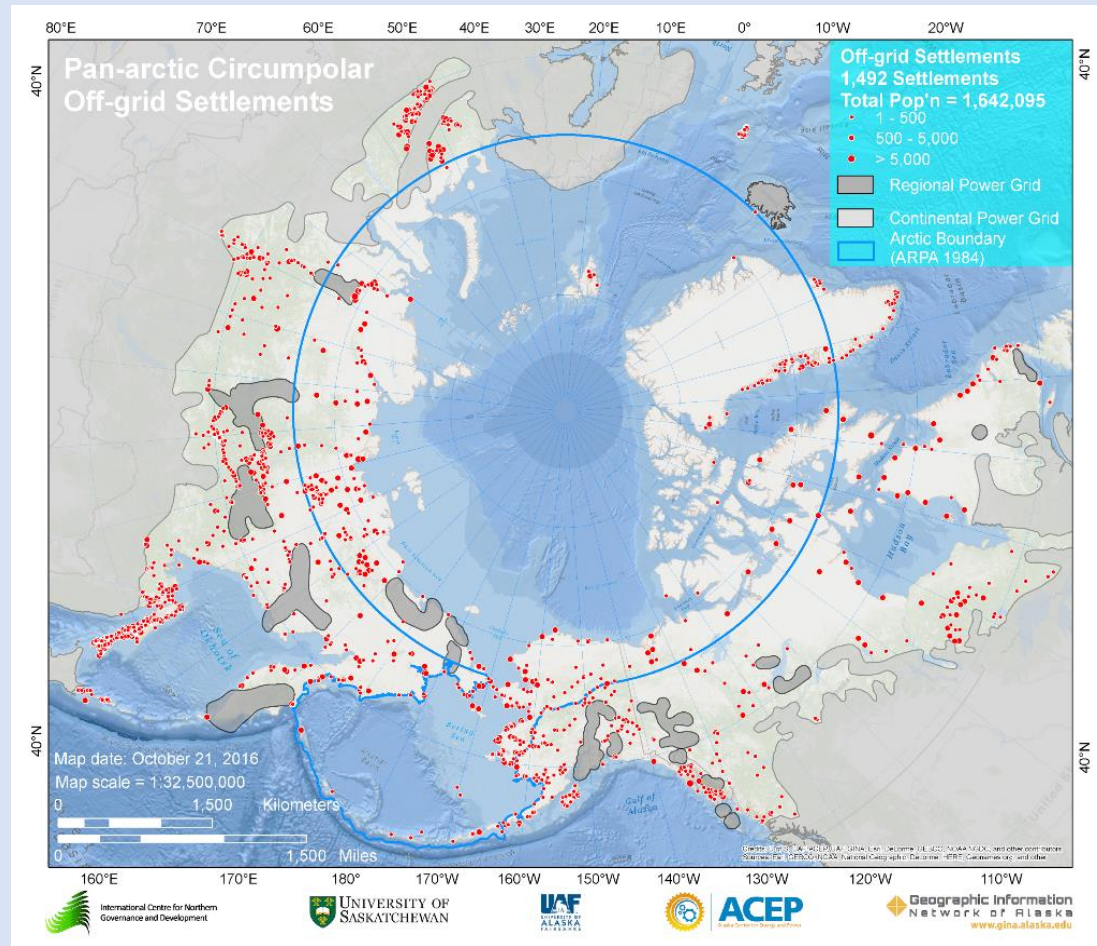
- Engineers
 - Mechanical
 - Electrical
 - Civil

Modeling
- Physical scientist/chemist
- Social scientists with expertise on
 - Socio-economics
 - Hunting and gathering
 - Social-ecological systems

Public

Background: Energy in rural Alaska

- Many communities are located off the roads system
- Microgrids supply isolated communities with their own power

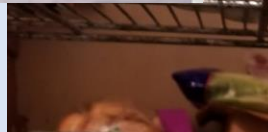
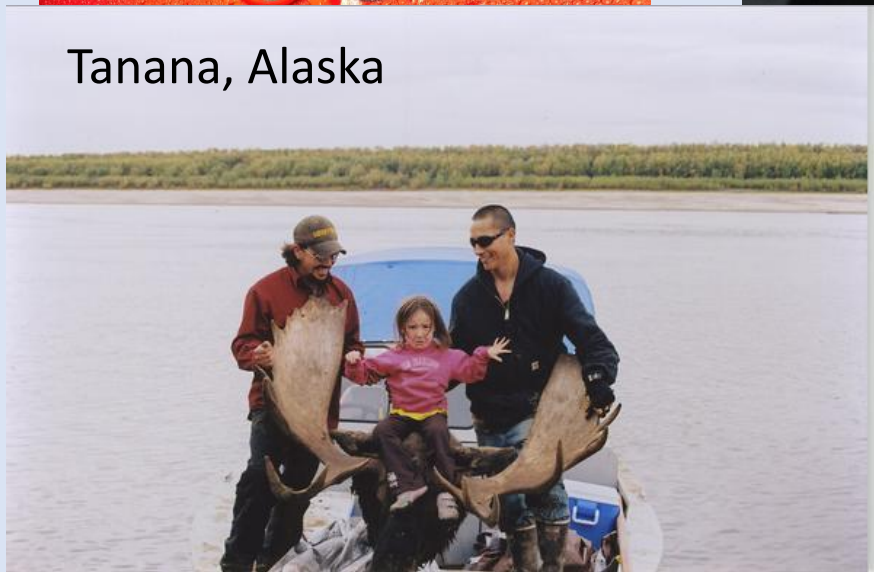


What is the issue?

- Food, Energy, and Water (FEW) prices in rural Alaska are very high
- Jobs are limited, income is low, mixed subsistence-cash economies
- Communities want to reduce their carbon footprint
- Diesel is expensive and prices are volatile



Tanana, Alaska



Cordova, Alaska



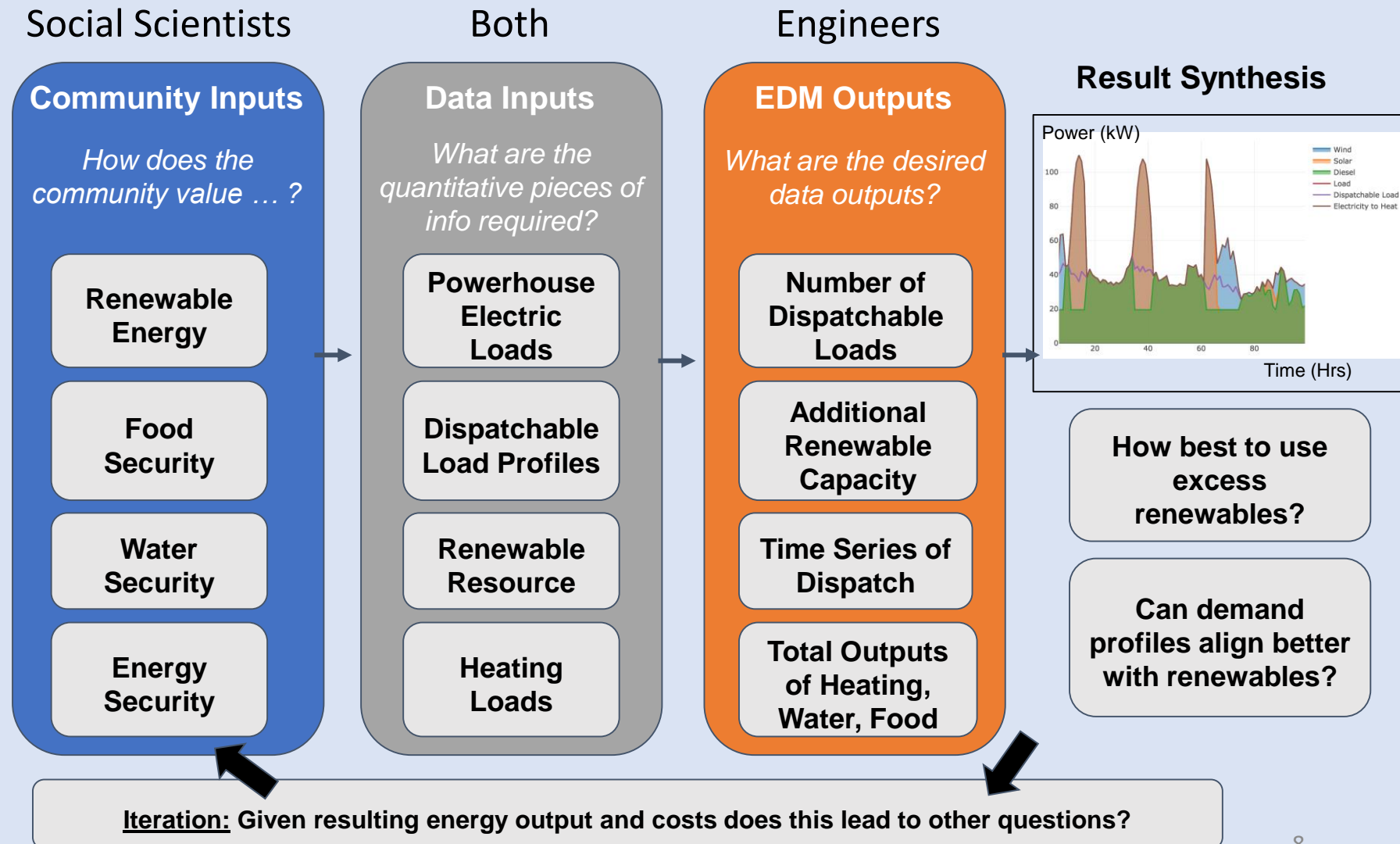
Renewable energy in Kongiganak, Alaska



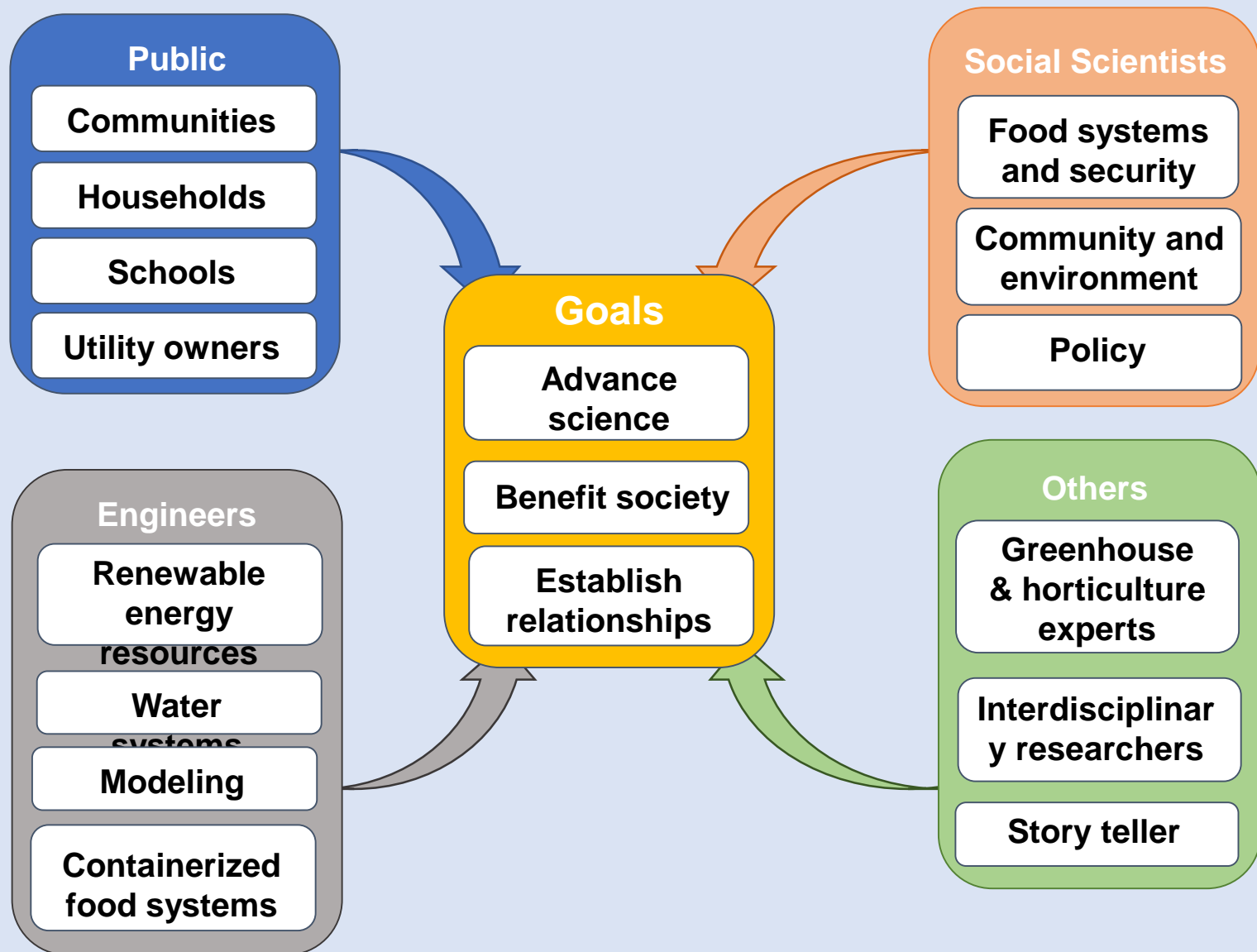
MicroFEWs Research goals

- Better understanding of FEW security
- Learn how renewable energy is being utilized by rural Alaska communities – Can it be improved?
- Need to find ways to optimize the use of excess energy produced by renewable energy projects

Overview of the MicroFEWs Process: Energy Distribution Model



What do we mean by convergent research?



Convergent research in action



Tanana,
Alaska

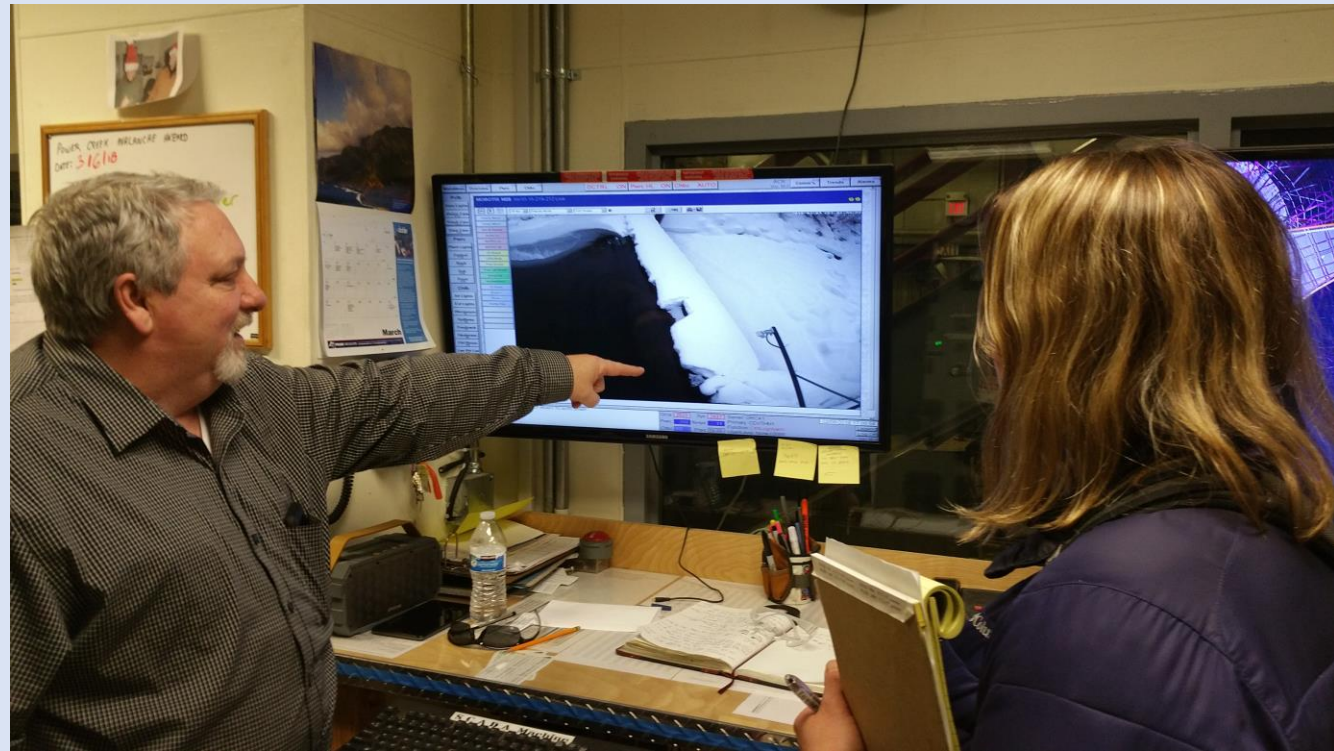




Engaging with communities

Cordova,
Alaska

Regardless
of your
discipline



Overlapping and related ongoing projects= amplified convergence



Biomass &
Subsistence

- Travel is expensive and researchers' time is limited
 - Combine resources



Water use systems
in rural Alaska



Solar installations



- Facilitate awareness
 - Of our work by community members
 - Communities needs

Personal interactions = amplified convergence



Convergence within the team

- Communication and terminology
 - Within the team
 - **Hold fortnightly meetings**
 - **Feeling comfortable enough to be honest**
 - **Team members on call when in communities**



AP

Photovoltaic Resistive Load Inverter Type:

DC max. input voltage: 55V

Power factor: >0.99

AC max. cont. output power: 450W

AC output current range: 1A - 5A

DC max. input current: 10 5A x 2

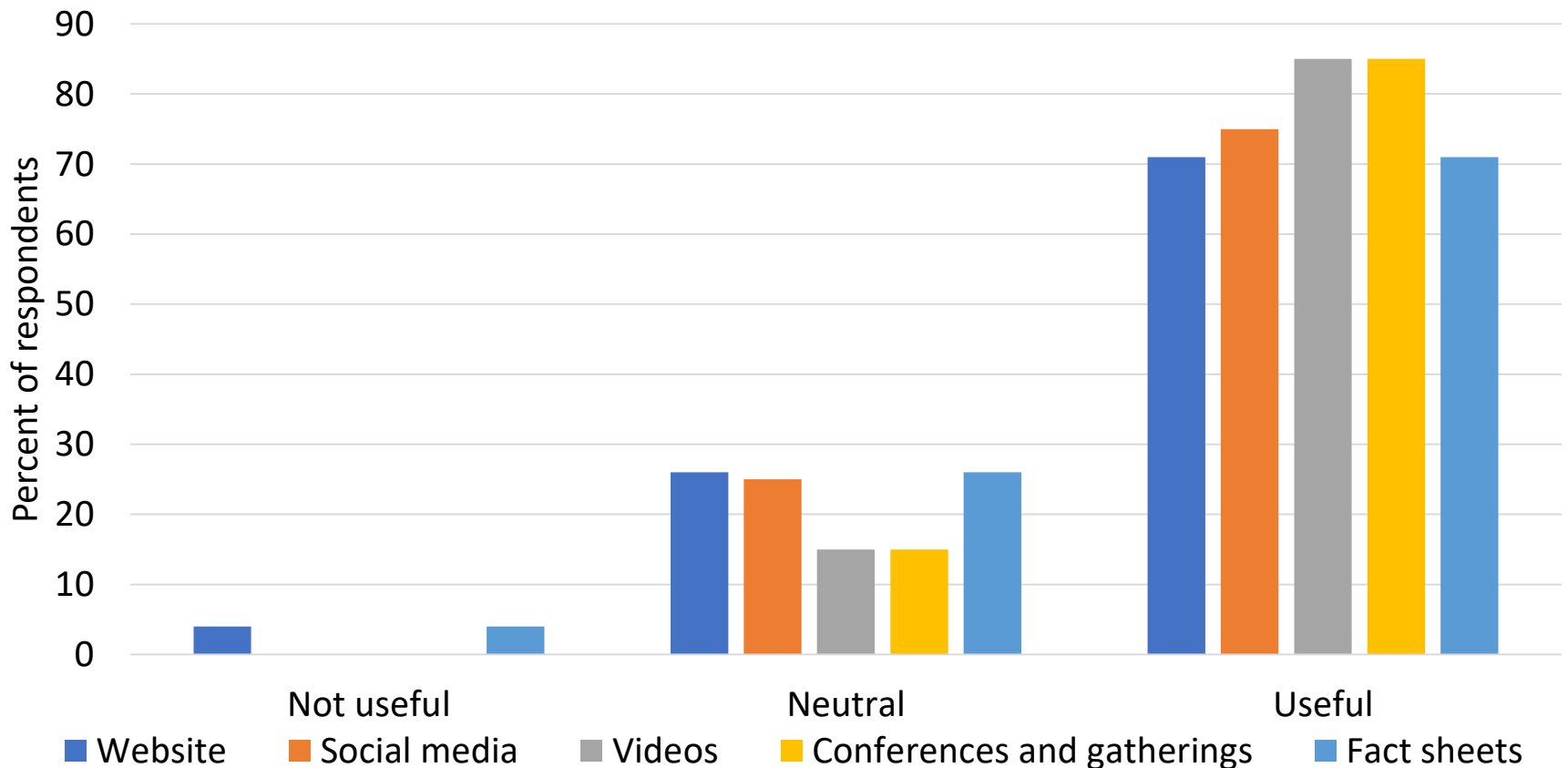
Hot surfaces. To reduce touch.

Risk of electric shock. sources are terminated. Each circuit must be

Convergence with the public

- Terminology and communication
 - Social scientists help translate technical terms into terms used by community members
 - Actively seek out input from the public – conferences aimed not at academics but the public
- Incorporating public feedback
 - Give talks at conferences NOT aimed at academics – solicit input

How do we make this information accessible to communities?



Ongoing struggles with convergent research

- Limited time frame and rigidity
 - Feedback from community members and stakeholders is often slower than expected
 - Ask for an extension from NSF
 - Try to capitalize on meetings that bring community members into town
 - Work with other projects doing research either on these topics or in the communities
 - The need to have a flushed-out plan for funders = Tunnel vision
 - This one is hard and is compounded by the short duration of projects
- Managing expectations
 - Social science can be messy and engineering solutions can too grandiose - talk about it and push each others comfort zones

Conclusions

- Convergence research takes persistence and time
- Having frequent communication and overlapping projects helps – be honest with each other
- Still no good solution for balancing flexibility to incorporate feedback and changing directions mid flow
- BUT....Convergent research is worth it for science and society

Acknowledgements



- Website
 - <http://ine.uaf.edu/microfews>
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