The beginning

Ilulissat Climate Days 2015
International workshops on
Changes of the Greenland Cryosphere
and
Stability and Variations of Arctic Land Ice
Ilulissat, Greenland
June 2-4 and 4-9, 2015

Organized by
Technical University of Denmark (DTU)
Geological Survey of Denmark and Greenland (GEUS)
Danish Meteorological Institute (DMI)
Niels Bohr Institute, Copenhagen University
Greenland Climate Research Centre
Greenland Survey – ASIAQ

in cooperation with
Nordisk - SVALi (Stability and Variations of Arctic Land Ice)
European Space Agency Climate Initiative (ESA)
Qaanaaq
(Greenlandic pronunciation: [qa:naːq])
Energy central to Qaanaaq’s many challenges
Fishing & Hunting

Nascent, rapidly changing, and fossil-fuel based
Greenland: An Export Economy Based on Fishing
Fresh Water

Little water in summer, none in winter, and fossil-fuel based
IIES grant: June 2019 trip to Qaanaaq

Goal: learn about the citizens’ energy needs and their hopes for their future

Joshua Elliott, Lene Kielsen-Holm, Kim Peterson, Toku Oshima, Mary Albert, Hunter Snyder
Houses in Qaanaaq

Most were built from kits produced in Denmark. The designs are not practical for life in the harsh climate of northern Greenland.
Houses in Qaanaaq

Many of the homes are old, have inadequate insulation, are in poor shape, and should be replaced
Housing and Energy

Qaanaaq’s housing troubles are not unique among villages in Greenland, but is exacerbated by the more extreme climate, 1.5 times the heating load as Nuuk, twice the heating load as Hanover, NH.
Housing and Energy

The constant thaw and refreeze of the permafrost under buildings exacerbates the lack of maintenance
People’s homes are not only ill suited to the climate, but also to their lifestyles.
Housing and Energy

Solving Qaanaaq’s housing problems don’t generally need high-tech solutions, the main challenge is being affordable and appropriate.
Resilient attitudes
Needs involve short-term and long-term projects
Energy

All power and heat comes from diesel.

Abundant sun in the summer, heat pumps, and some wind may reduce dependence on diesel.
Water

How long will their glacial-fed stream last?
Solar powered meat caves
Cold weather batteries
Sanitation

Grey water from sinks drains outside onto the yard.

Black water is collected in plastic bags that are transported to the town dump.
Big picture research challenge
Solve system of engineering-environment-policy problems to empower the people for their sustainable future.
Next steps:

Energy, Environment, and Empowerment in Northern Greenland

New NSF-funded project, 4 years starting April 2020

Dartmouth faculty: M. Albert, C. Polashenski, W. Li, S. Doig

Dartmouth post-doc: H. Snyder

3 Dartmouth grad students

2 Dartmouth undergrads

Practitioner: T. McBride (Norwich Tech solar)

Translators & local experts (from Greenland)
Stakeholder-driven engineering & science: Values and needs of the people drive research goals
Collaborative problem-solving and co-production of knowledge may lead to solutions that will be planned, tested, and improved.
An iterative process

Results will be evaluated and refined, or additional needs identified

Energy is one example issue

Solutions will be designed then tested in the community

Values of the people & community needs drive research goals

Both short-term and long-term goals are being identified

Collaborative problem solving and co-production of knowledge lead to possible solutions
This IIES project provided helpful travel funding

• We found ways we can help in the near-term, and ways that will take longer-term work, both in infrastructure and in policy.

• The people were very welcoming; we made many friends and we look forward to long-term relationships.

• New four-year NSF project funding for research in Qaanaaq will start in April.
Thank you for your attention!
Questions?