

Greenland

Far from reaching The United Nations Millennium Development Goals

Why ?



*Kåre Hendriksen, Arctic Technology Centre
Technical University of Denmark*

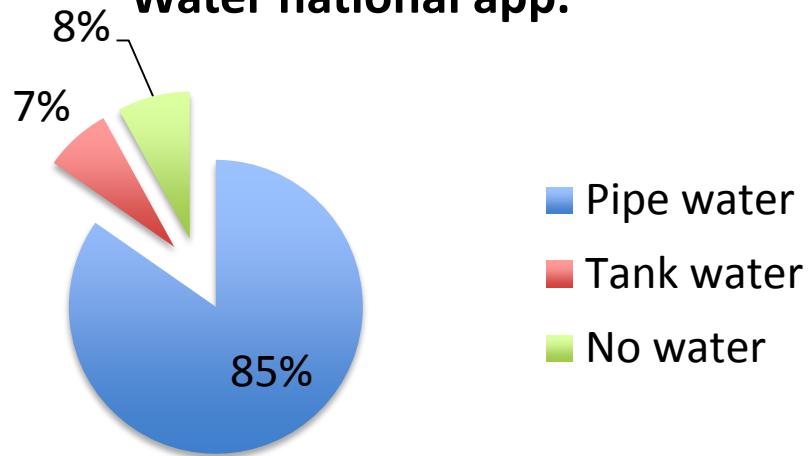


Sum up from yesterday's presentation

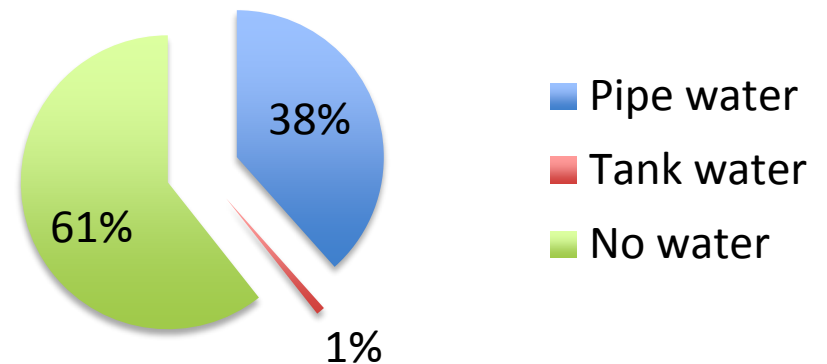


Water supply

Water national app.

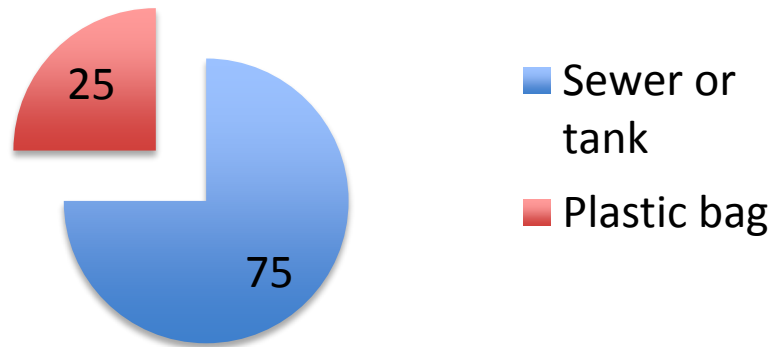


Water in settlements app.

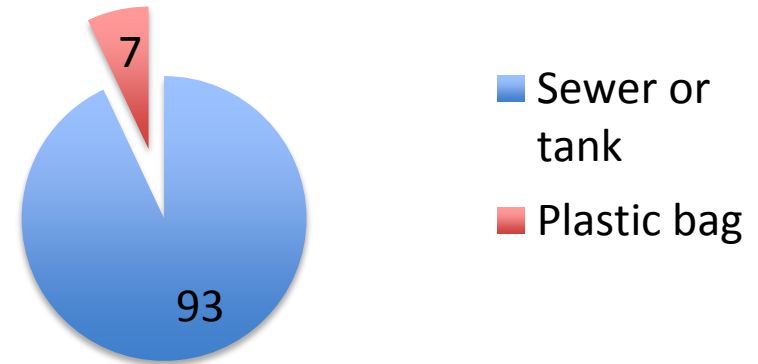


Black waste water

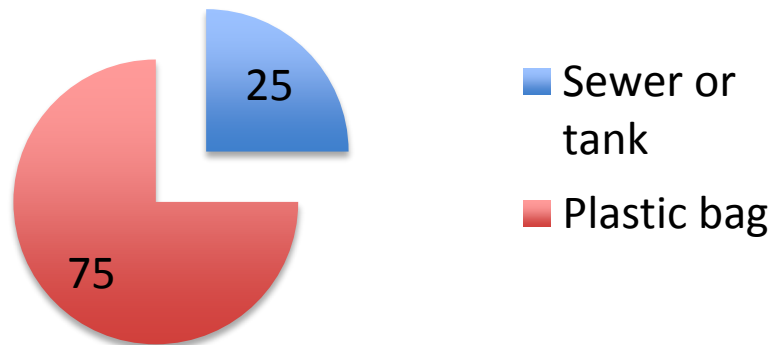
Greenland



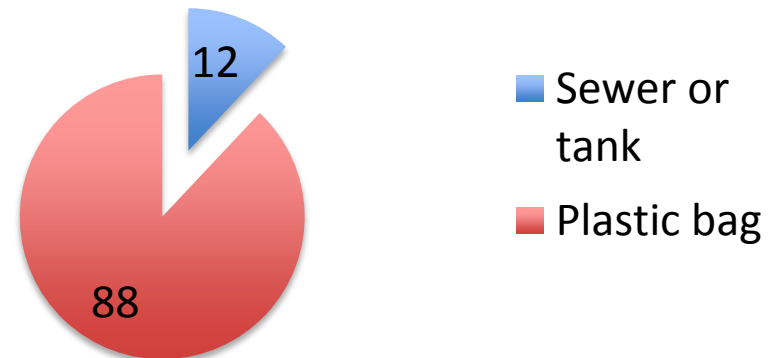
Towns > 500 households



Towns < 500 households



Settlements



Why do we see these big differences?

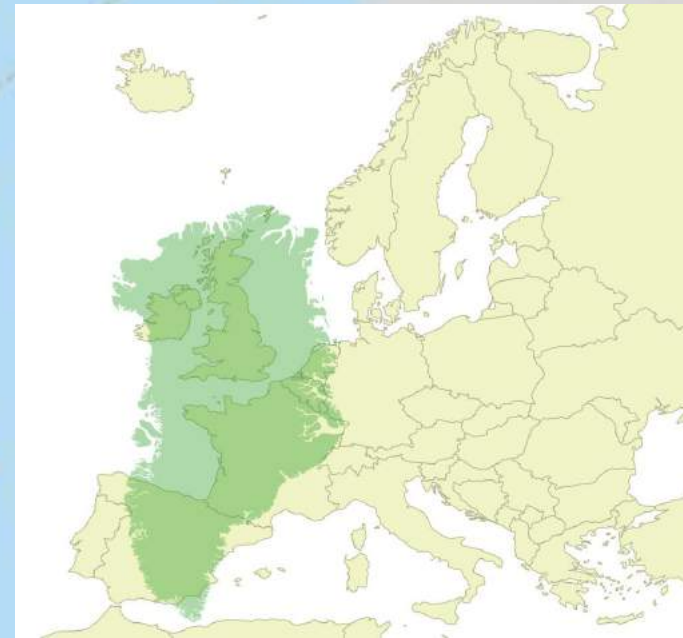


It is necessary to understand the local
and Greenlandic context



Greenland is a micro-state –
however, the largest in the
world

The 56.000 inhabitants are
dispersed across 17 “towns”
and 56 “settlements”



Greenland is part of the Danish Realm (Kingdom) with considerably Self Government

Denmark contributes with 50 % of the public budget

The main livelihood is the living resources of the sea

Shrimps and fish contribute with 90 % of the export income



Not one, but 73 island economies

A crucial characteristic of Greenland is that all settlements are isolated with their own infrastructures

- Island-operation of power, water, waste and sanitation
- No possibilities for commuting on a daily basis
- Limited and expensive transport infrastructure



The challenges of island-operation, extreme weather conditions, and the large distance to the international markets will inevitably result in additional costs



But a scattered settlement patterns is a prerequisites for sustainable use of the resource base

A look back ...



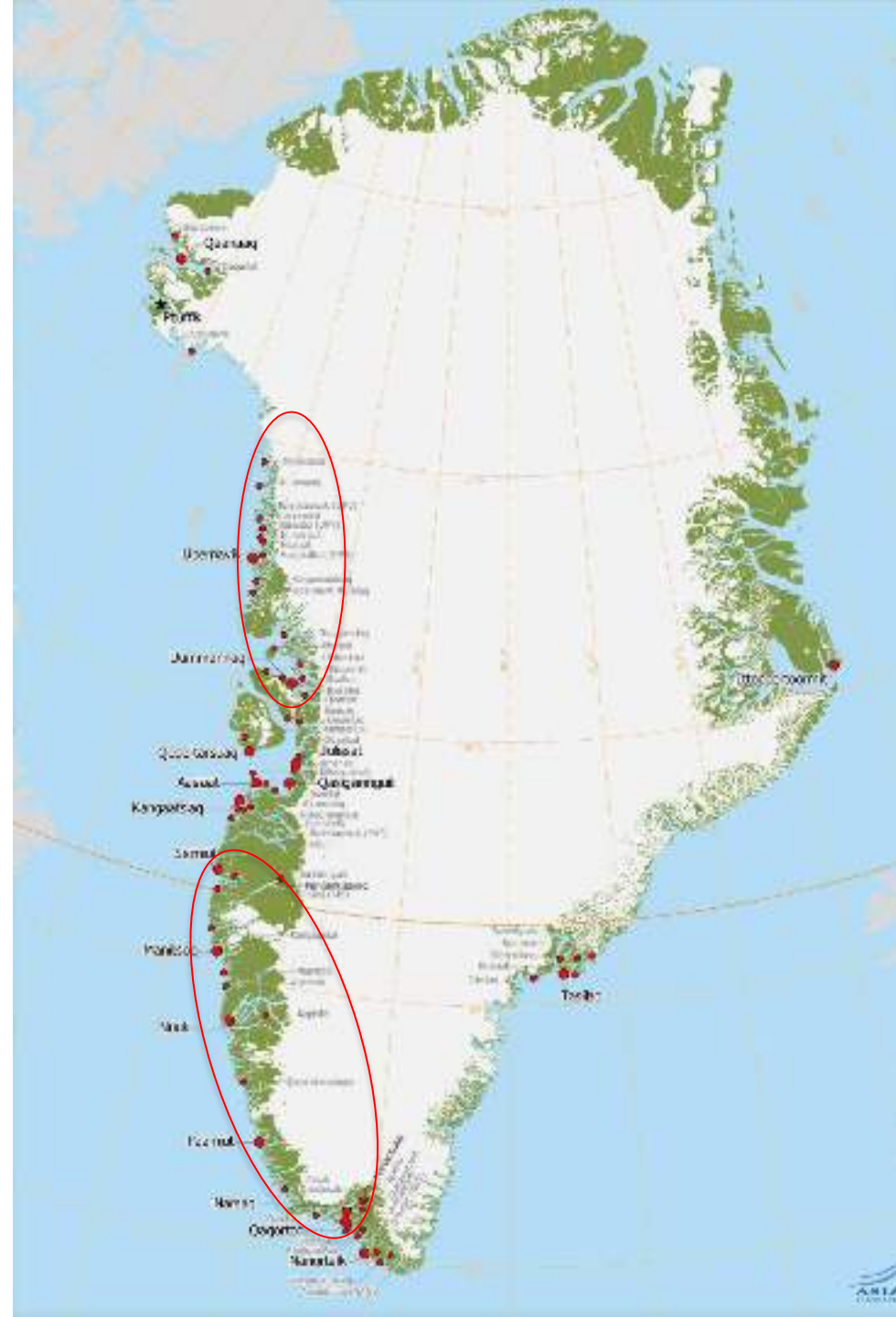
During the 1950s and 1960s the Danish government attempted to gather the populations in the “open water cities”

They had to fish for cod or work in fish factories

The investments was done in this cities

The number of settlements was halved

It was the intention to depopulate Upernavik and Uummannaq districts



But then the cod disappeared

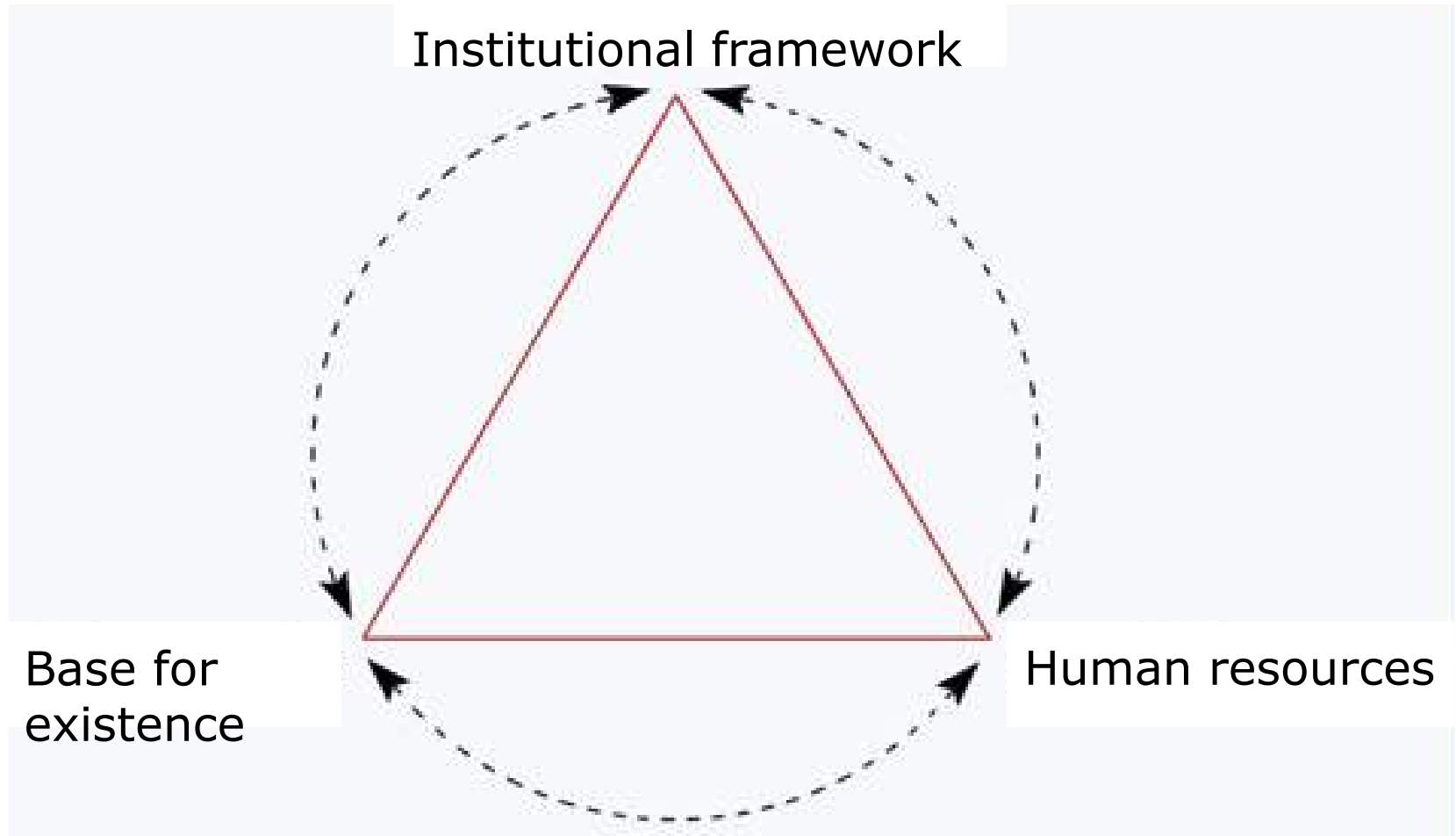
Most of these cities lost their livelihoods

Nuuk evolved into administration and education

An island operation society that loses its livelihood goes into crisis



Model for settlements' development dynamics



Hendriksen 2012

Paradoks

Some of the settlements that have resources and business potential are not supported at the institutional level

Upernavik district is an example



Upernavik district that Denmark wanted depopulated



From the late 1980s they began to catch halibut
Only 5% of Greenland's population lives in the district
60 % live in the small

settlements

The district contribute 9% of the total export income



Paradoxes

Innaarsuit has the largest catch of halibut per capita

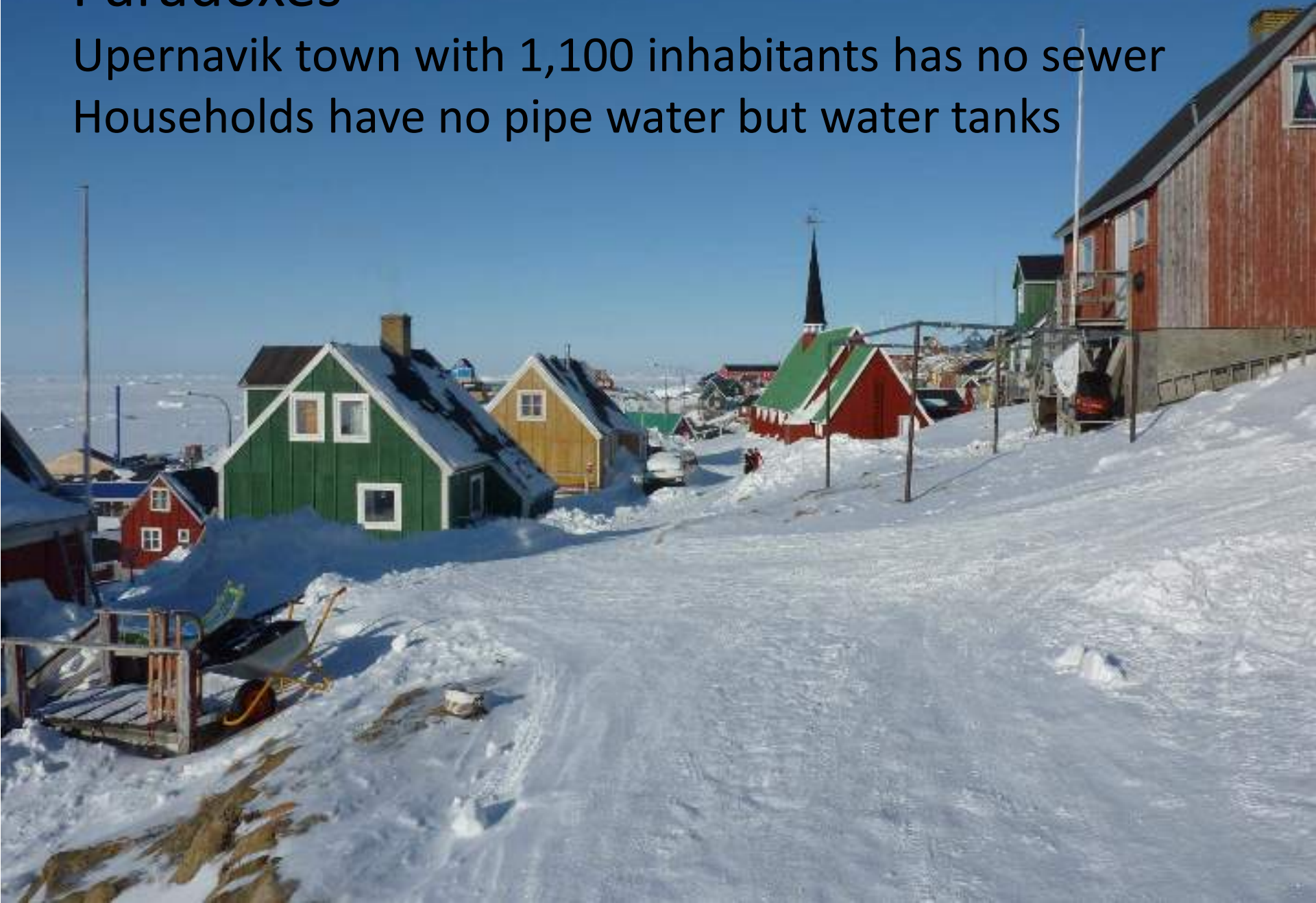
Thus, the largest contribution to export income

No sewer or in house pipe water



Paradoxes

Upernavik town with 1,100 inhabitants has no sewer
Households have no pipe water but water tanks



Upernavik is located on a small island in the high Arctic desert



Limited water resources

No possibility for:

- Fish processing
- Flush toilets

- Neighbouring island has plenty of water
- 1 km wide and 400 meters deep sound
- Drifting icebergs and sea ice

An engineering challenge



Investments continue to take place in major cities



What is most important - sewer and water supply in Upernavik or cultural center and swimming pool in Nuuk ?

No simple answers



Sectorialisation as a challenge

The former national technical organization has been divided into a number of Government owned companies



Sectorialisation

Qaasuitsup Municipality

Housing

Retail

Royal Greenland

Tele Greenland

Electricity and water

Air Greenland

Airports

Royal Arctic Line

Selv-Government businesses sub optimize in order to create profits and economic balance.

- An international trend to optimize and liberalize the public sector

Does not account for the
Greenland island operation
challenges



Lack of cooperation



Lack of cooperation

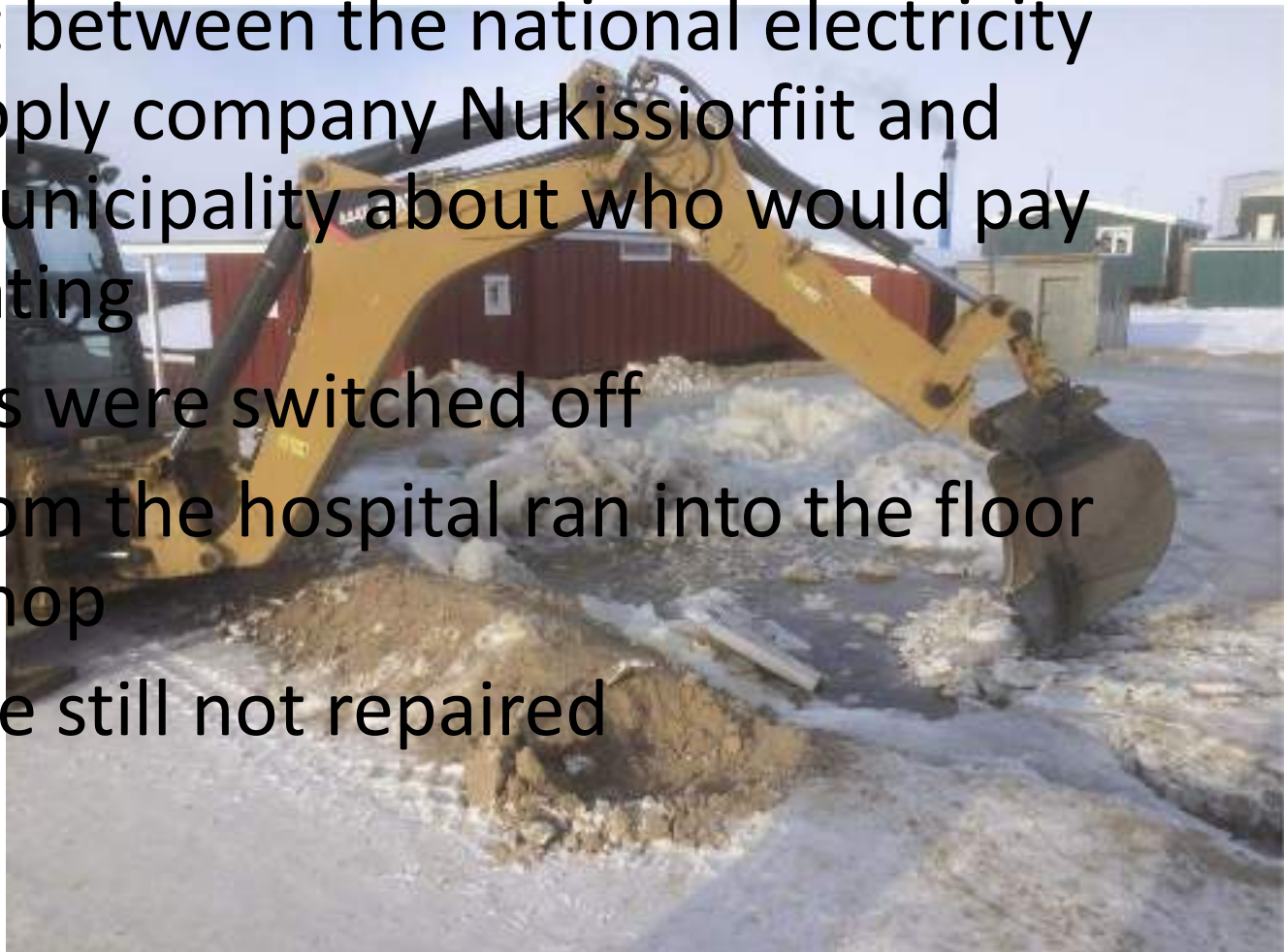
In the winter 2015 grey water sewers in Qaanaaq base froze and collapsed

Disagreement between the national electricity and water supply company Nukissiorfiit and Qaasuitsup municipality about who would pay power for heating

Heating cables were switched off

Grey water from the hospital ran into the floor of the retail shop

The sewers are still not repaired



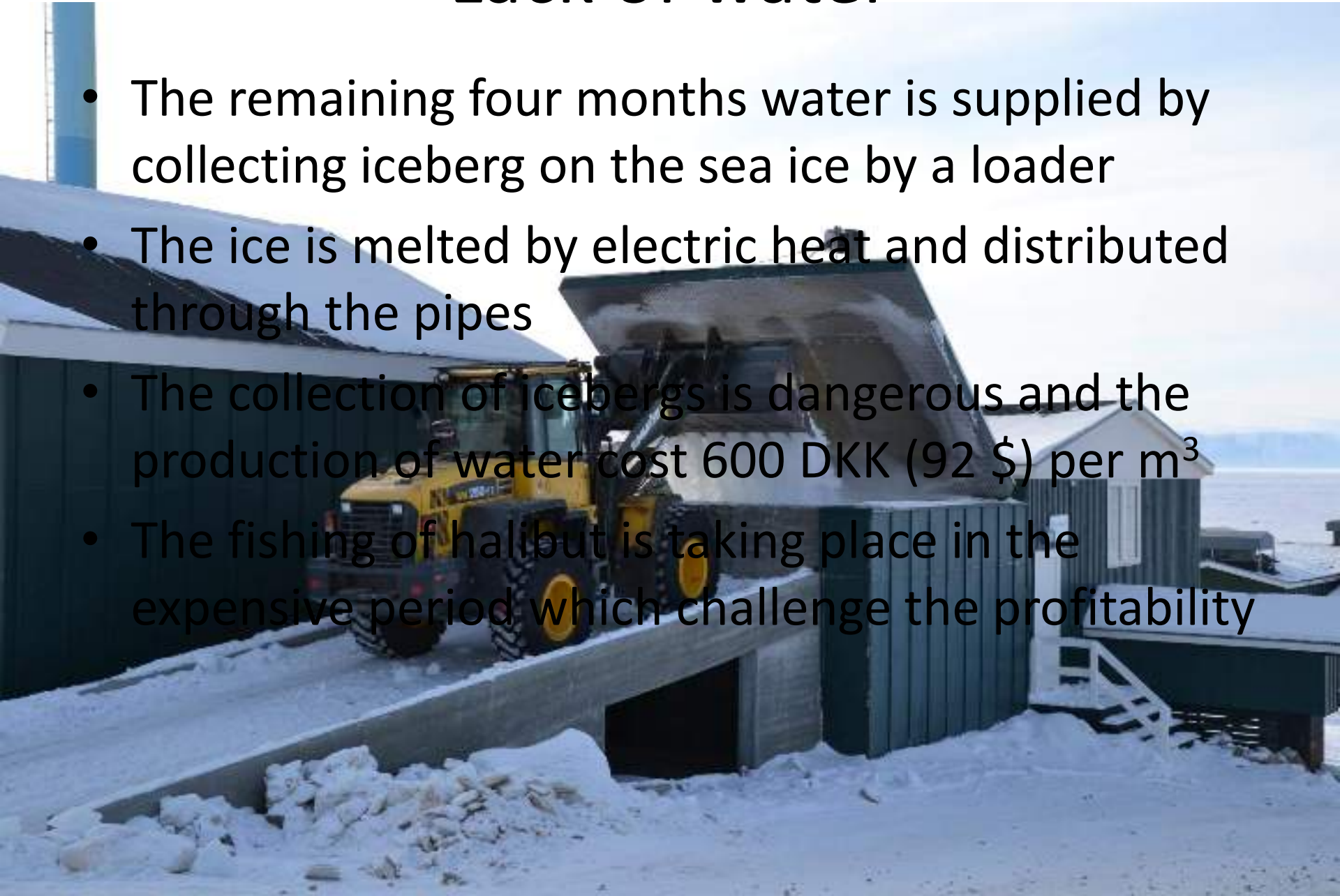
Qaanaaq - lack of water

- The river is running four months and supply the town with fresh water
- The two large tanks are filled and can supply the town the coming four months



Lack of water

- The remaining four months water is supplied by collecting iceberg on the sea ice by a loader
- The ice is melted by electric heat and distributed through the pipes
- The collection of icebergs is dangerous and the production of water cost 600 DKK (92 \$) per m³
- The fishing of halibut is taking place in the expensive period which challenge the profitability



Social consequences

Average household income for:

- Settlements in southernmost Greenland 30,000 \$
- Sisimiut 63,000 \$
- Nuuk 77,000 \$

Water per m³ in:

- Settlements 5 \$
- Sisimiut 3 \$
- Nuuk 3.80 \$



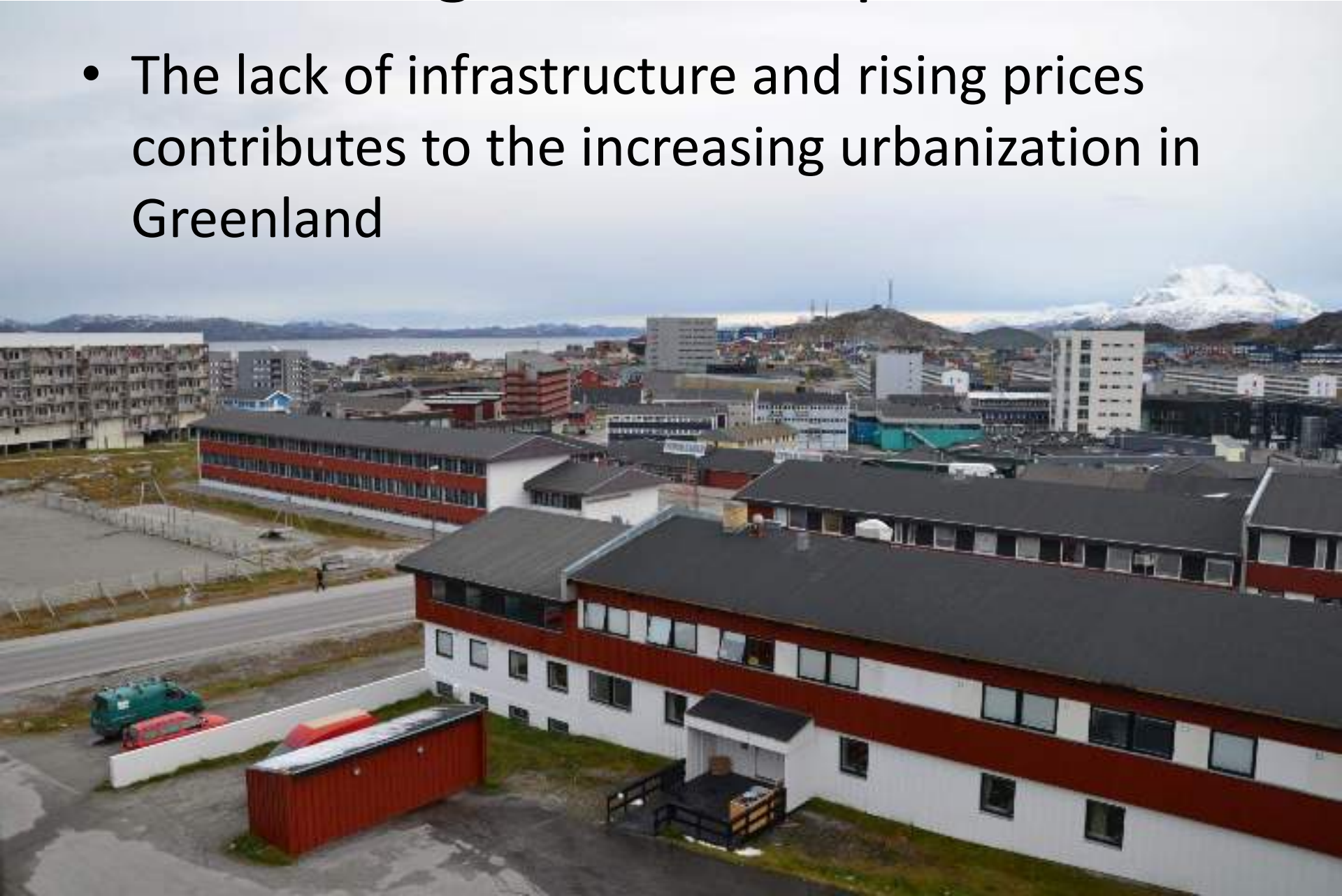
Social consequences

- Sewers financed by municipal taxes and free for users
- Households with bag or tank solution pays for emptying - the municipality contributes to the cost of bags
- Contributes to social inequality



Demografic consequences

- The lack of infrastructure and rising prices contributes to the increasing urbanization in Greenland



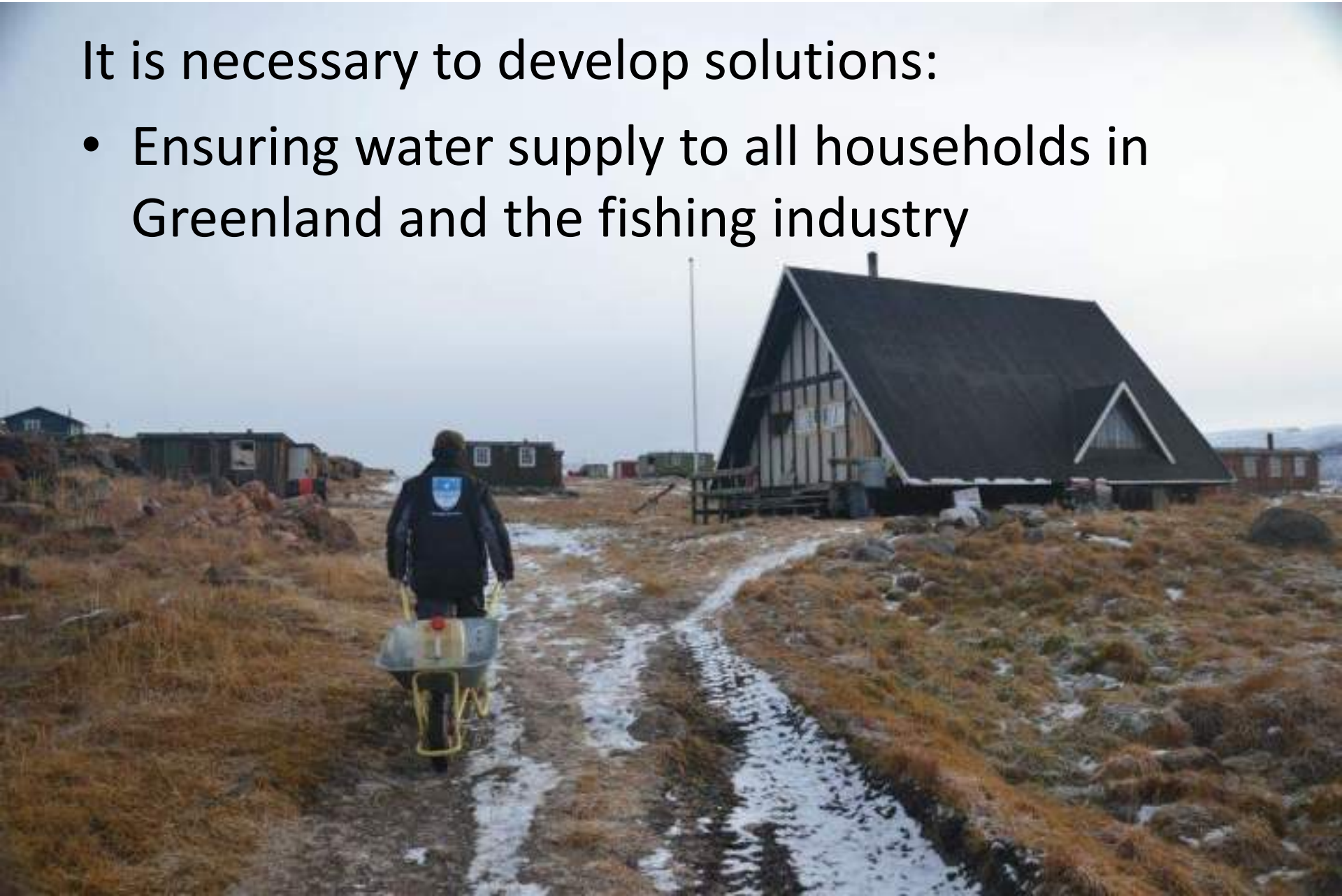
Demografic consequences

- The lack of infrastructure and rising prices contributes to the increasing urbanization in Greenland
- A development that challenge the sustainable use of the country's resources and thus economic development

Conclusion

It is necessary to develop solutions:

- Ensuring water supply to all households in Greenland and the fishing industry



Conclusion

It is necessary to develop solutions:

- Ensuring water supply to all households in Greenland and the fishing industry
- Cheap, simple and healthy sound management of waste water

An important part of our research

Qujanaq

Thank you

krhe@byg.dtu.dk

