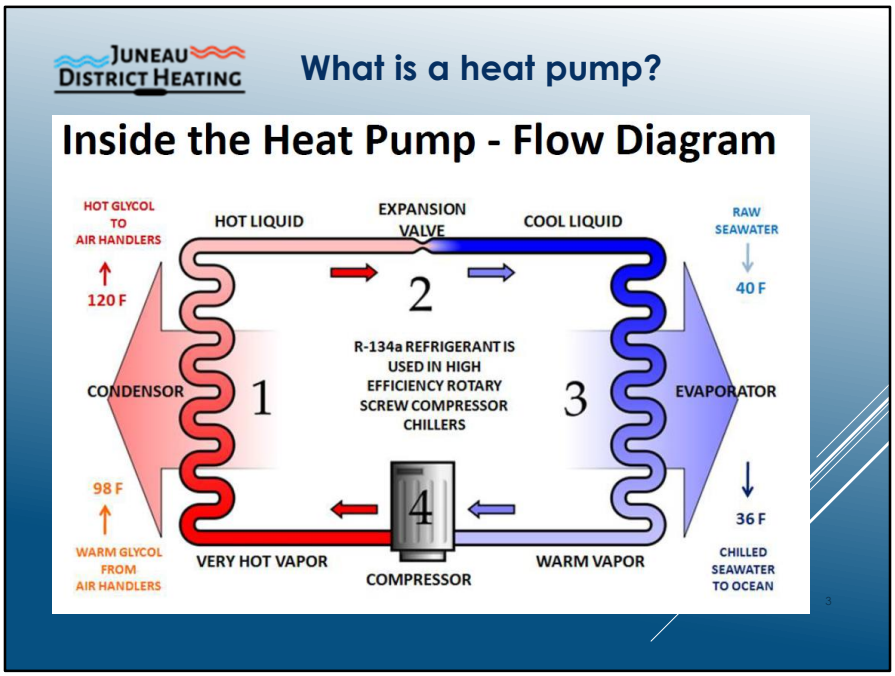
# AMERICAN WATER RESOURCES ASSOCIATION (AWRA) MEETING - ALASKA SECTION SEPTEMBER 17, 2019

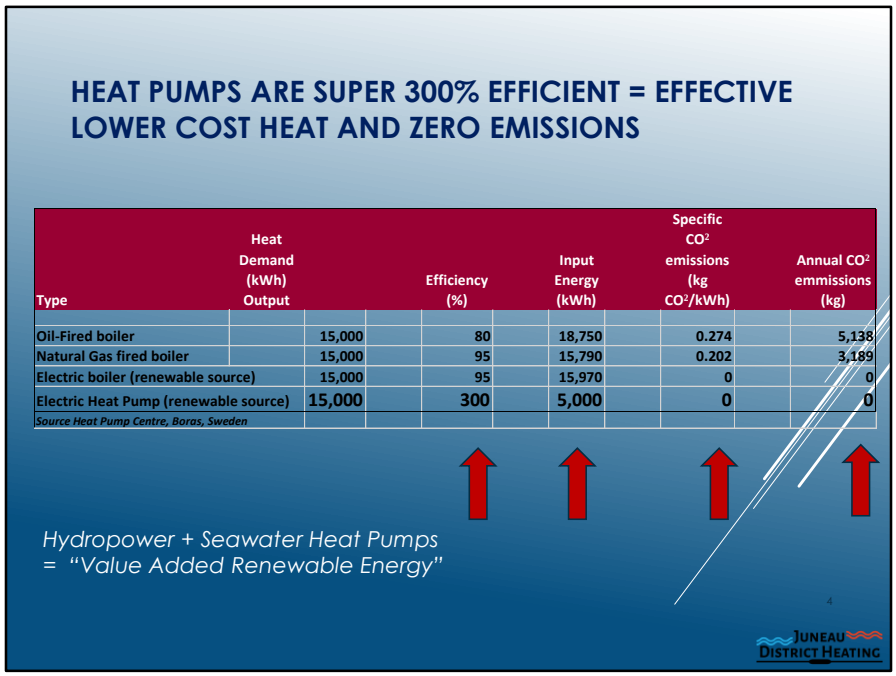
JUNEAU DISTRICT HEATING

Can anyone name something that has a reverse impact to ocean warming, ocean acidification, or sea level rise?


Well, one reverse impact is using long-standing heat pump technology to extract heat from the warming ocean for the purpose of heating or cooling buildings. This is a mini-scale ocean cooling, and if deployed in more coastal communities around the world, we can make a dent in cooling the ocean!




Juneau Waters are 38° to 54° F year round.
Heat pump is the only heating/cooling system that transfers heat from one place to another given small electric energy input to run the compressor. All other heating systems--oil, natural gas, biomass, and even electric resistance heating--convert one form energy into thermal energy—heat. Hence heat pump is the most efficient method of heating.

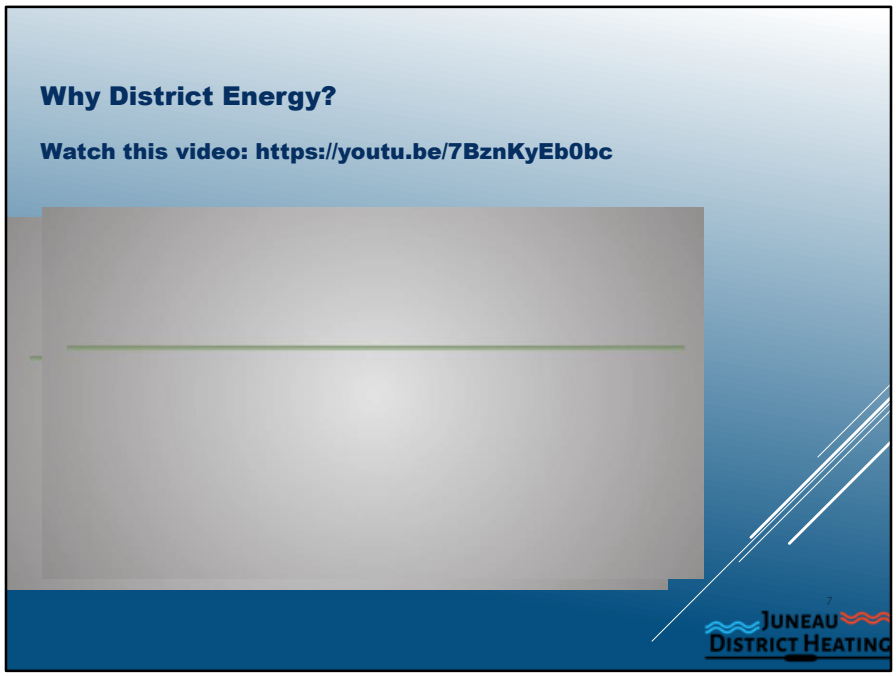



In the case of seawater heat pump, it is rated at 300% efficiency: each kWh electricity we put, we get 3 kWh equivalent heat energy. And another huge benefit is that heat pumps produce no emission while using electric energy super efficiently.


This is a zero emission heating because the plant will be powered by electricity from the new Sweetheart Lake hydroelectric facility (permitted and under construction).

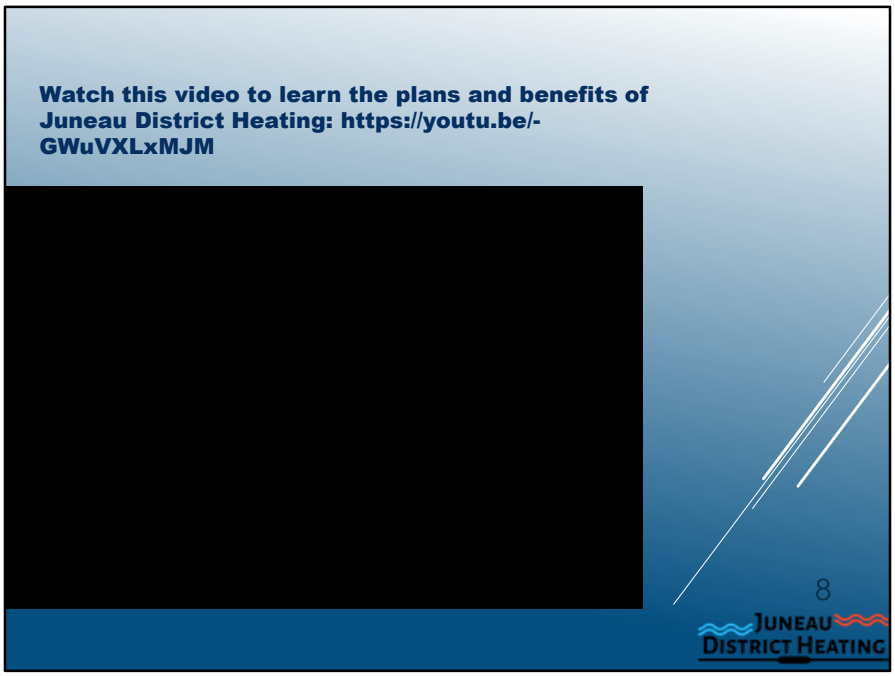

In addition, it prevents environmental contaminations from oil spill and mitigates fire hazards.

It was very challenging to put a legend without blocking contamination sites. Just so you know, this legend is blocking two contamination sites by Juneau-Douglas bridge.




**https://youtu.be/7BznKyEb0bc**

City and Borough of Juneau (CBJ) is a member of ICLEI - International Council for Local Environmental Initiatives which is an international organization for local governments and sustainability.

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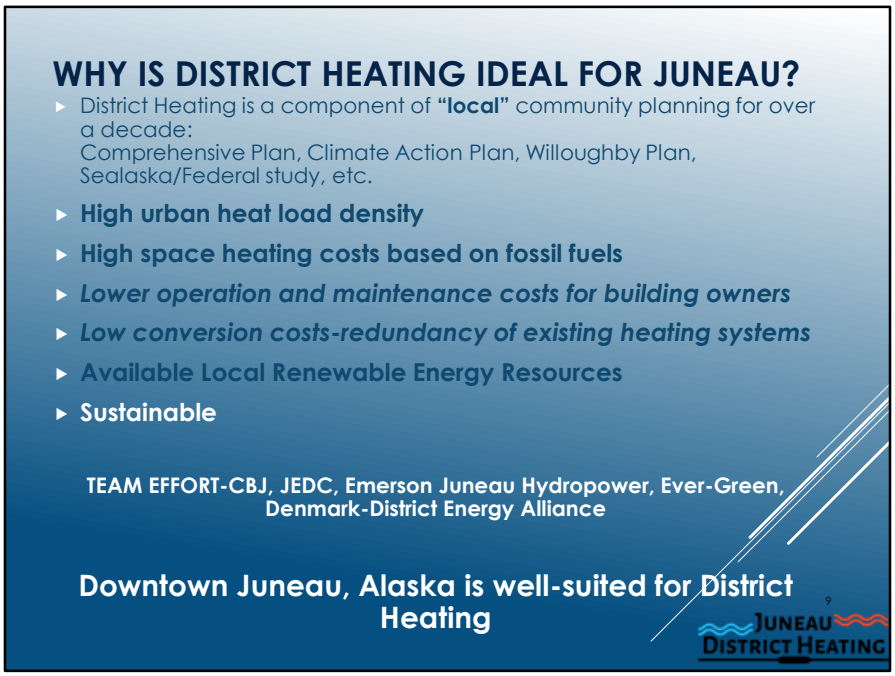
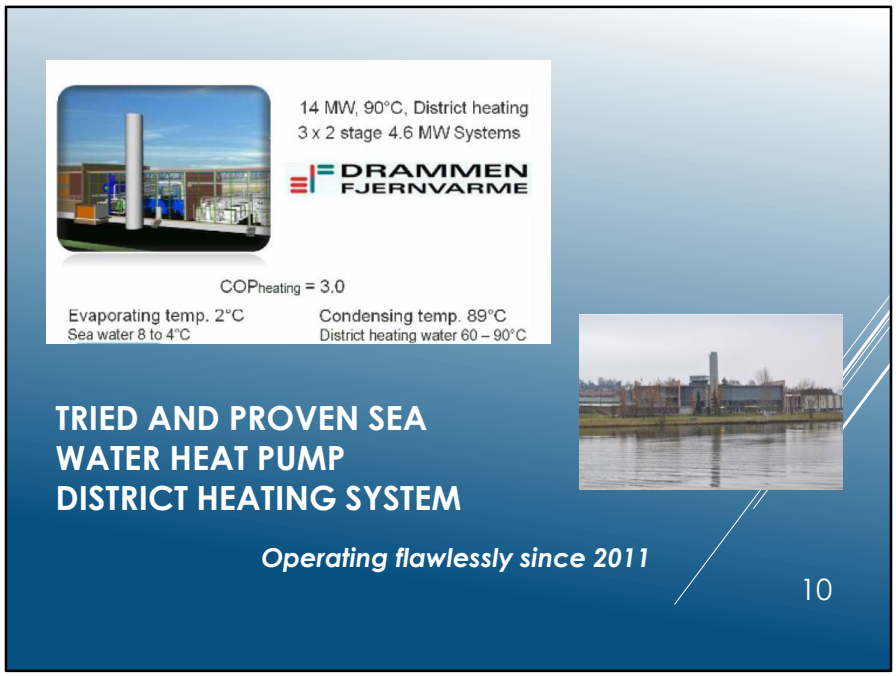
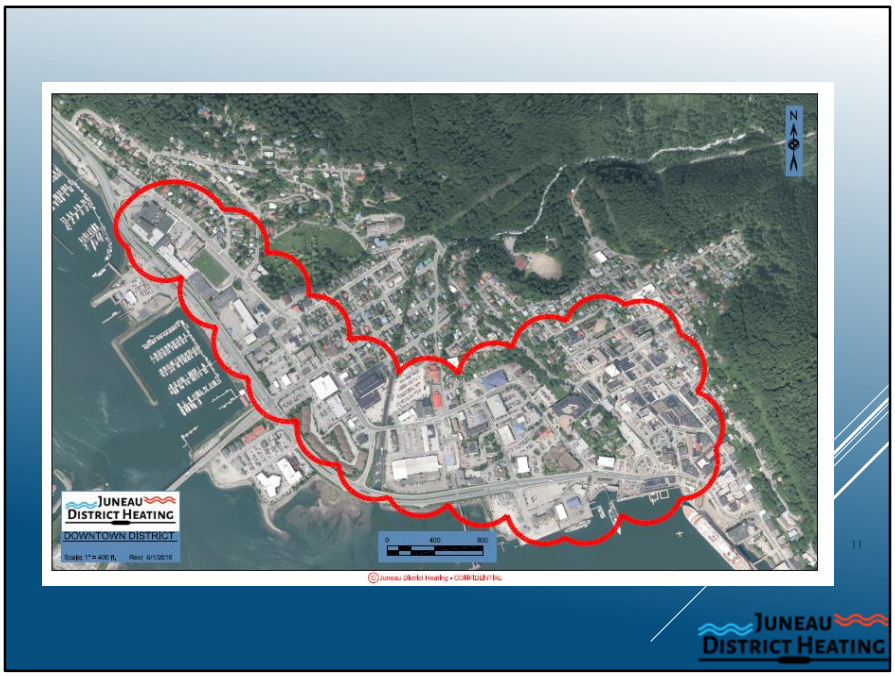



Low conversion cost because it doesn't require a new heat distribution system. Hot water from the distribution pipes will NOT enter the buildings, rather only the heat from the water will be transferred via a heat transfer station and will be distributed in the buildings with existing hydronic systems.




Drammen, Norway is at higher latitude than Juneau with three times more population. We are working with people and companies who worked on Drammen project, so we have their lessons learned.




Initial Phase Project Area

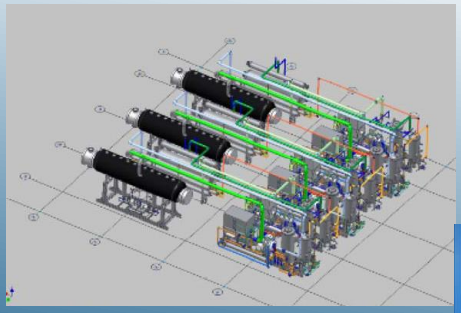

# JUNEAU DISTRICT HEATING INTAKE

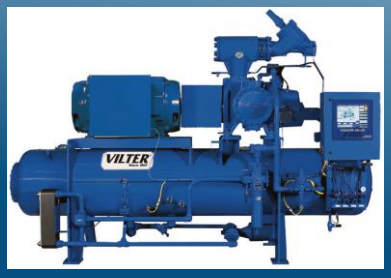



JUNEAU DISTRICT HEATING


The plant is designed with wide big glass walls so that the tourists can see how we heat our buildings.

## Heat Pump Units



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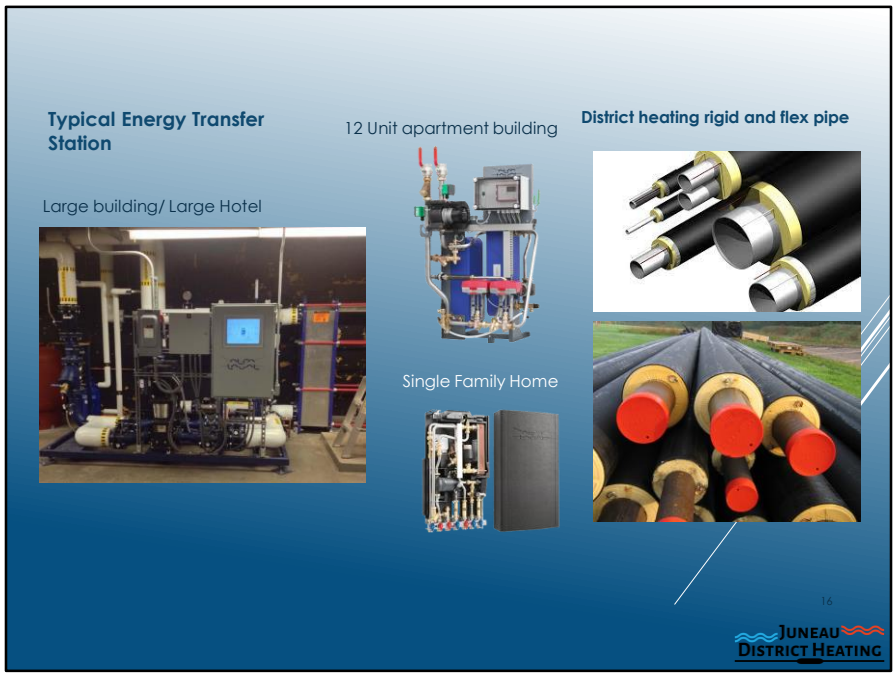


Energy Transfer Stations extract heat from the district energy system to the building heating system.


Pipes in Drammen, Norway. Stakeholders of Juneau District Heating, including project leaders, local assembly members, and investors visited Drammen, Norway and took these pictures.


What happens if there is a leak in the pipes? Just water

- 78% OF JUNEAU IS HEATED BY FUEL OIL
- 90% OF TARGET DOWNTOWN IS HEATED BY FUEL OIL
- FUEL OIL VOLATILITY
- Heating Costs are a large governmental and business property operating $$ expense (7842 Heating Degree Days)

**JUNEAU HAS THE RESOURCES TO HEAT ITSELF SUSTAINABLY…FOREVER**

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# JUNEAU DISTRICT HEATING UPDATE

- Juneau District Heating Facility property secured on Egan Drive
- Received ADEC approval for pipe distribution system
- Working with CBJ Engineering, Lands and Community Development for easements and right of ways
- CBJ Ordinance introduced to establish Juneau District Heating as a CBJ franchised Utility.
- Feasibility, Pre-construction Engineering, and initial financing complete
- Working Relationship with Emerson, US DOE, Royal Danish Government.

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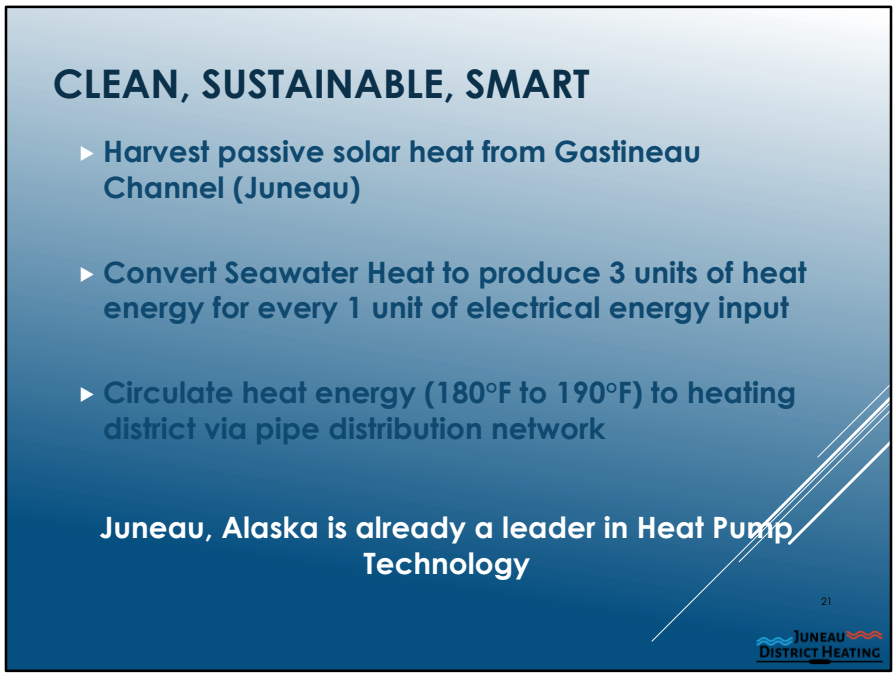
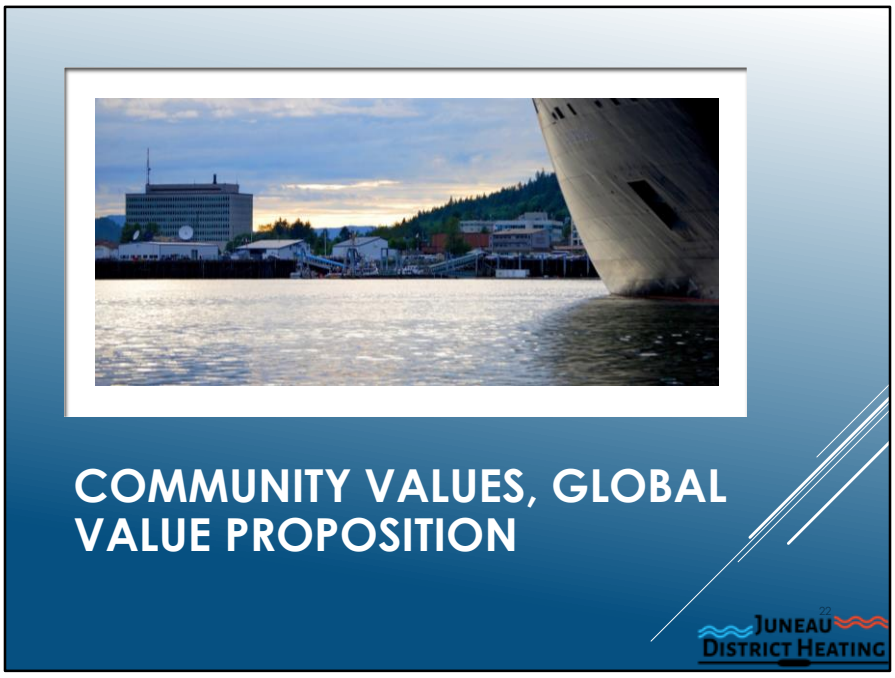
JUNEAU DISTRICT HEATING




Juneau is a community that is successfully utilizing ground source heat pumps for some of our schools and airport
NOAA Ted Stevens Marine Research Facility Complex successfully uses a low temperature seawater heat pump heating system.




This is our way of Thinking Globally and Acting Locally!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