

ARCTIC RENEWABLE ENERGY GEOTHERMAL ENERGY

as a replacement for diesel



IN NORTH AMERICA'S ARCTIC DIESEL IS KING

Of **280** remote villages in ALASKA, **200** rely exclusively on diesel.



79 towns in the CANADIAN ARCTIC rely exclusively on diesel

and **67%** of all diesel fuel use in CANADA occurs in Yukon, Northwest Territories, and Nunavut.



THE IMPACT OF DIESEL



ENERGY MIGRANTS

The high cost of diesel fuel forces some American citizens to leave their ancestral homes.



BUDGET STRAIN

The Government of Nunavut spends 1/5 of its annual budget on energy, limiting other funds.



BLACK CARBON

Diesel generators create black carbon, which melts ice and snow, causing global warming.



AIR POLLUTION

Air pollution from diesel generators has been linked to higher rates of asthma and respiratory issues.



ALASKANS PAY NEARLY DOUBLE THE NATIONAL AVERAGE FOR ENERGY.

ONE DIESEL REPLACEMENT IS GEOTHERMAL ENERGY

heat energy generated and stored in the Earth

DIRECT USE

heating buildings and greenhouses with geothermal water from hot springs

GEOTHERMAL SPRINGS

water and steam pulled from the ground and used to drive electricity, returning as warm water



GROUND-SOURCE HEAT PUMPS

heating or cooling buildings through continuous pipe systems

Geothermal energy is found in the **ring of fire**. Much of Alaska and Western Canada fall in this arc.

IN ALASKA

More than **100 thermal springs and wells** have been identified.

There are over **130 volcanoes and volcanic fields** that have been active in the last two million years.

In 1982, the USGS identified **four major regions** that warranted further study for geothermic potential.

Chena power plant: the **lowest geothermal resource** for commercial power production worldwide.

IN CANADA

The only country on the Ring of Fire that **does not** currently produce any geothermal energy.

Yukon's geothermal potential is **18 times** the current energy supplied by Yukon's renewable energy system.

Researchers are looking at **36 potential sites** for geothermal generation in the Takhini Hot Springs.

HOW TO IMPROVE THE USE OF GEOTHERMAL ENERGY IN THE ARCTIC

PLANNING & POLICY

Create **sub-national** geothermal policies

Collaborate **between sectors**

Develop accurate **geological knowledge**

Incentivize through government grants



COMMUNITY ENGAGEMENT

Educate and include **Elders** early on

Engage residents through **social media**

Appoint a **community spokesperson**

Support **grassroots** engagement



MORE CAN BE DONE

to use geothermal energy as a renewable energy source



FINANCING & TECHNOLOGY

Consider **greenhouse gas reduction** in funding

Use simple and **direct geothermal heating**

Integrate development with spas & greenhouses

Share financial risks between public & private partners

BOTTOM LINE: WHAT IS NEEDED?

Estimate and report potential geothermal energy using **STANDARD PROTOCOL**.

Develop **TERRITORY AND STATE POLICIES** for geothermal development.

Provide private **CAPITAL** and public **GRANTS** for exploration, development, and construction.

Encourage geothermal energy by providing **GOVERNMENT INCENTIVES** for private investment.



THE ARCTIC INSTITUTE
CENTER FOR CIRCUMPOLAR SECURITY STUDIES

Art and Design by Davey Barnwell