The Reach of Arctic Research

What happens in the Arctic doesn't stay in the Arctic.

The Arctic Has Global Impact

THE ARCTIC ACTS AS A HEAT SINK FOR OTHER REGIONS OF THE GLOBE

- The Arctic loses more heat to the atmosphere due to low levels of sunlight and high reflection by snow and ice.
- Atmospheric circulation allows heat from tropical and temperate regions to move to polar regions, offsetting heat gain in sub polar areas.
- Climate change-related shifts in the way heat is lost or gained in the Arctic affects the way heat in other parts of the globe is distributed.
- Arctic research is needed to understand global patterns, and global research sheds light on what happens in the Arctic.

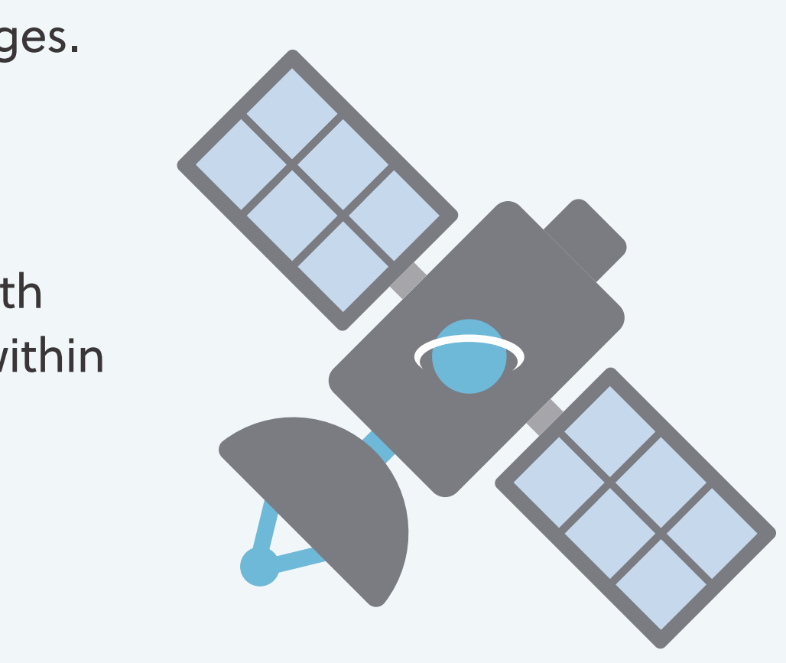
...and So Does Arctic Research

FORECASTING CLIMATE CHANGE

Studying ice cores from the depths of ice sheets and fossils provides indications of what Earth's climate was like millions of years ago. A clear and vast record of past climate history is vital to making better predictions for current climate changes.

Data collected by satellites with polar orbits are used to predict global weather and climate.

Understanding the impact of climate change on ecosystem services like commercial fishing is critical to both Arctic and global communities. As the climate warms and sea ice melts, environmental stress or changes within the food web and ecosystems could cause population decline in fish species.



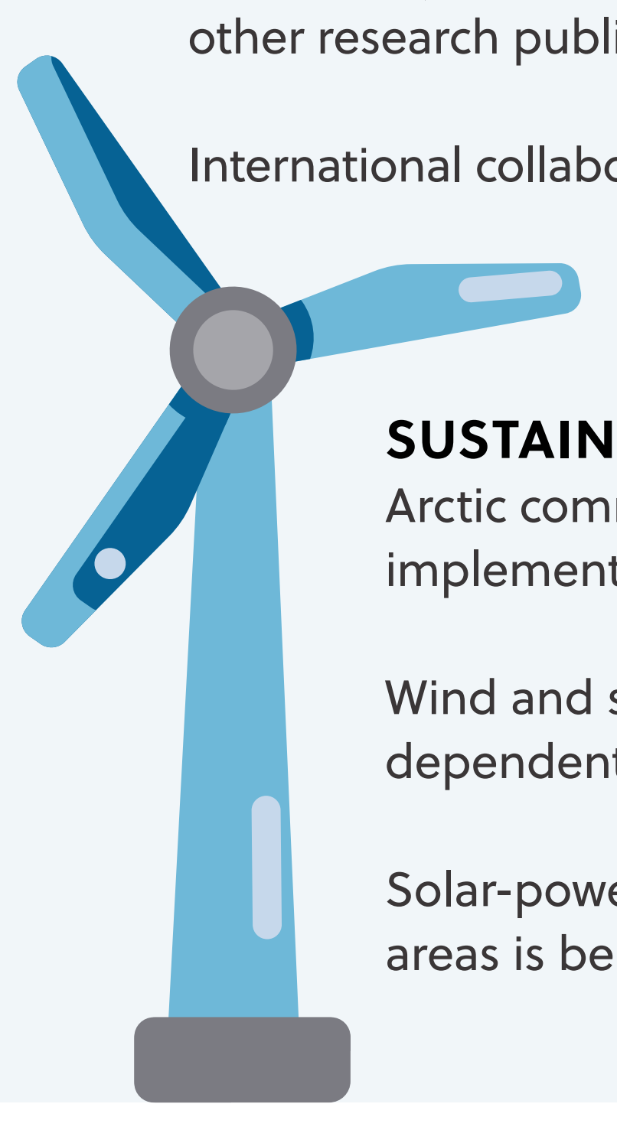
INCREASED COLLABORATION

The success of Arctic research relies on the collaboration between countries and with Indigenous communities.

Local knowledge of the environment informs research in many ways. In turn, access to scientific environmental data is equally important to Indigenous communities because climate change has made the behavior of Arctic weather and animals less predictable.

Between 2011-2015, the Russian Academy of Sciences (RAS) produced the highest volume of Arctic-related publications at over 3000, followed by the University of Alaska Fairbanks (UAF) at over 1800. Between 2011-2013, UAF Arctic publications were cited by over 1800 other research publications, indicating the influence of Arctic research across the globe.

International collaboration is higher in Arctic-related research (>30%) than in all research fields combined (<20%), based on 2015 data.



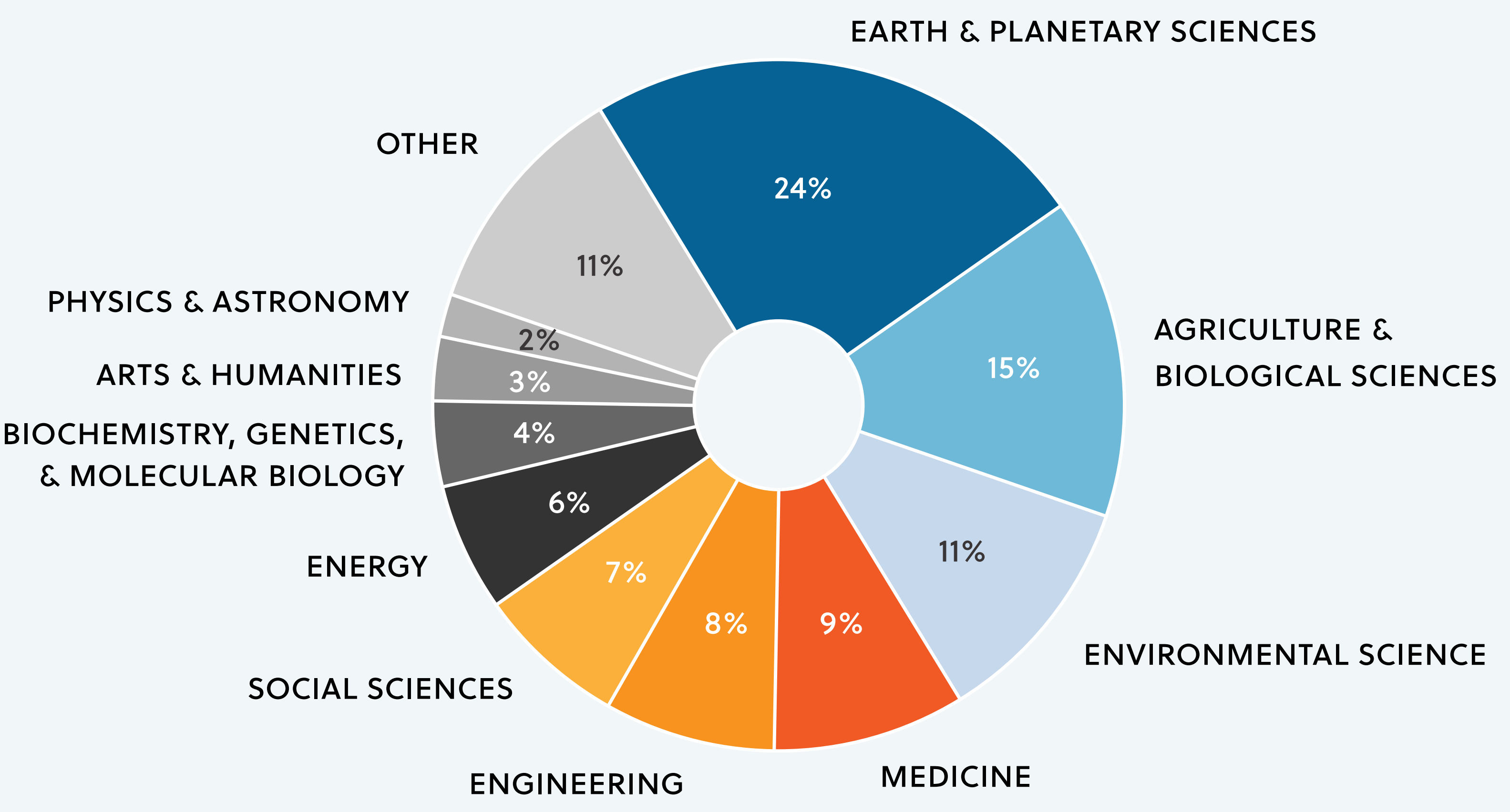
SUSTAINABLE INNOVATION

Arctic communities are leading the way in sustainable development. Greenhouse and hydroponic farming methods are being implemented in Indigenous communities and remote locations where plants normally wouldn't grow.

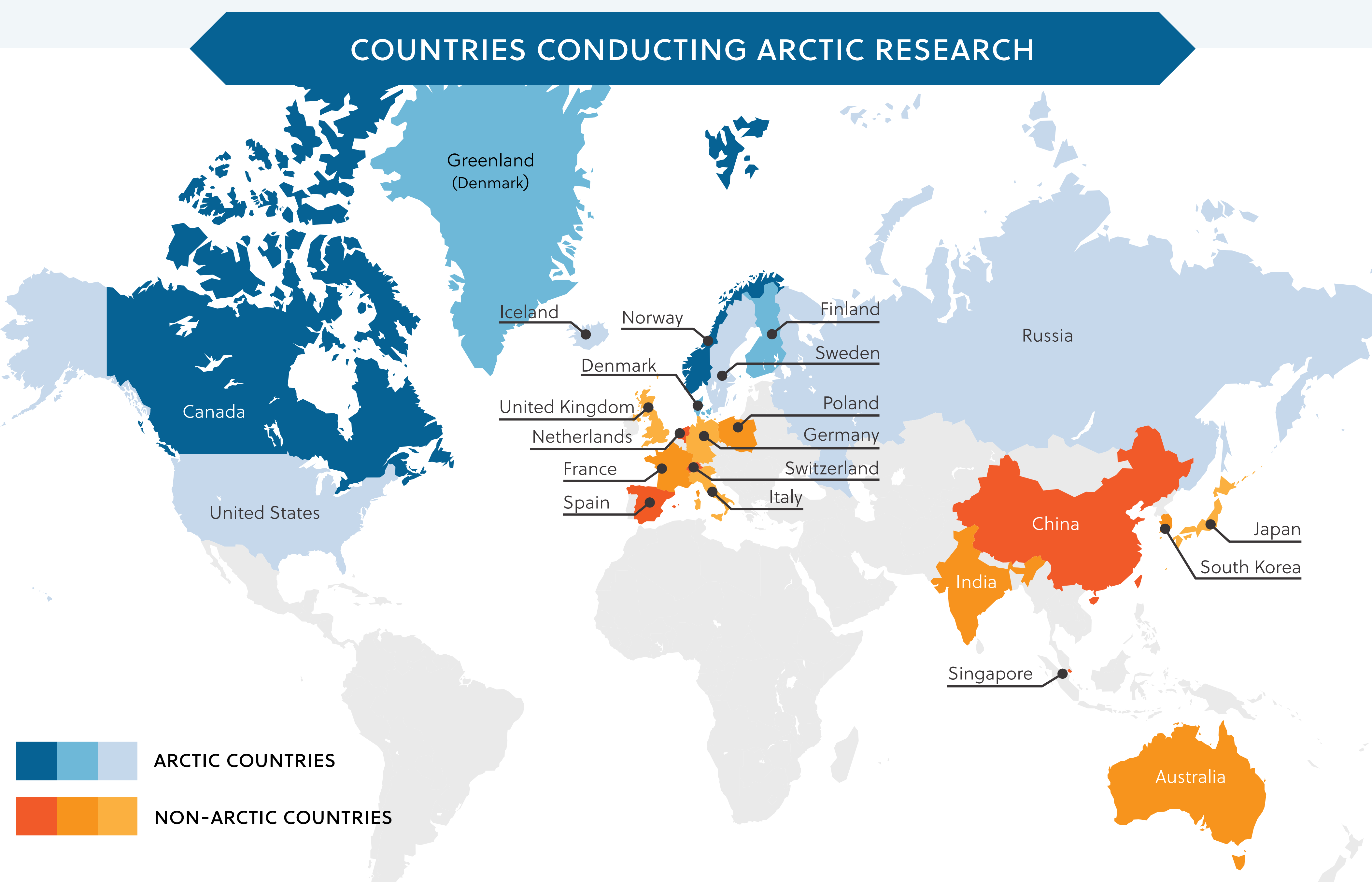
Wind and solar energy sources are being developed to replace diesel powered solutions. If the Arctic can replace oil-and-gas dependent technology with wind and solar solutions, then these solutions can be implemented globally.

Solar-powered drones are now being used to reach previously unaccessible remote areas. The data collected from these remote areas is being used to gain a more comprehensive understanding of Arctic ecology, as well as potentially aid in search and rescue.

DISTRIBUTION FOR FIELDS OF STUDY IN ARCTIC RESEARCH*



COUNTRIES CONDUCTING ARCTIC RESEARCH



INSTITUTIONS OF ARCTIC RESEARCH & EDUCATION

TOP 10 ARCTIC RESEARCH INSTITUTIONS

(Largest amount of publications from 2011-2015)

1. Russian Academy of Sciences (RAS), Moscow (HQ), Russia
2. University of Alaska Fairbanks, Fairbanks, Alaska, USA
3. University of Iceland, Reykjavik, Iceland
4. National Oceanic & Atmospheric Administration (NOAA), Silver Spring (HQ), Maryland, USA
5. US Geological Survey, Reston (HQ), Virginia, USA
6. University of Copenhagen, Copenhagen, Denmark
7. University of Washington, Seattle, Washington, USA
8. University of Tromsø, Tromsø, Norway
9. RAS-Siberian Branch, Novosibirsk, Russia
10. Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

UArctic is a global cooperative network of educational and research institutions that emphasize the Arctic region and its peoples. Its list of 200 member institutions can be found here: https://www.uarctic.org/about-uarctic/members-list/

RESEARCH PERFORMED BY ARCTIC & NON-ARCTIC COUNTRIES**

70%	ARCTIC COUNTRIES
30%	NON-ARCTIC COUNTRIES

Your Input & Impact

Participate in public discourse

Support scientific research

References & Further Information

ARCUS Directory of Arctic Researchers: https://www.arcus.org/researchers
British Antarctic Survey: https://www.bas.ac.uk
Fisheries and Oceans Canada: https://www.dfo-mpo.gc.ca/stats/commercial/land-debarq/wh-cm/wrld1114-eng.htm
Icelandic Haddock Commercial Fishery: https://responsiblefisheries.is
International Arctic Research Center: https://uaf-iarc.org
National Science Foundation: https://nsf.gov/news/overviews/arcticantarctic/index.jsp
NOAA: https://www.fisheries.noaa.gov/feature-story/fisheries-united-states-2016
NOAA Arctic Program: https://arctic.noaa.gov/
UAF Arctic Report: https://www.alaska.edu/files/bor/Feb2014/140220Add02_UAF_Arctic_Report.pdf
US Arctic Research Commission: https://www.arctic.gov/arewg/index.html
Aksnes, D., Osipov, I., Moskaleva, O., & Kullerud, L. (2016). Arctic research publication trends: a pilot study
Csank, Adam Z., et al. "Estimates of Arctic land surface temperatures during the early Pliocene from two novel proxies." Earth and Planetary Science Letters 304.3-4 (2011): 291-299
Kim, Sora L., et al. "Evidence from shark teeth for a brackish Arctic Ocean in the Eocene greenhouse." Geology 42.8 (2014): 695-698

*Based on 2011-2015 data

**Based on 2001-2015 data

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THE ARCTIC INSTITUTE