



Renewable Energy
Alaska Project

PRESENTS

RAILBELT ENERGY

WHICH FUTURE? WHO DECIDES?

A FORUM MODERATED BY ELIZABETH ARNOLD

NOVEMBER 20, 2024
ANCHORAGE MUSEUM AUDITORIUM

Moderator

Elizabeth Arnold is a former National Public Radio Political Correspondent and current Professor of Journalism at the University of Alaska. For twenty plus years she was a familiar voice on NPR's *Morning Edition* and *All Things Considered* and a regular presence on PBS Washington Week, covering Congress, the White House, and the American West. Arnold has received numerous awards, including a duPont Columbia Silver Baton and the Dirksen Award for Distinguished Reporting of Congress. Over the last decade, she has reported on the ecological and human impacts of global warming from some of the most remote areas of the Arctic. A recent Fellow at Harvard's Shorenstein Center on Media, Politics and Public Policy, Arnold authored the paper "Gloom and Doom: The Role of the Media in the Public's Disengagement on Climate Change." <https://shorensteincenter.org/media-disengagement-climate-change/>

Panelists

Larry Persily has vacillated between reporting on public policy, writing his opinions on public policy and trying to make policy during his 48 years in Alaska. During that time, Larry has focused on oil and gas issues, resource development, taxes, and the state's unsolved fiscal problems, with diversions into municipal issues and even CARES Act grants. When not in government, Larry has owned three different weekly newspapers in Alaska and reported for the Anchorage Times, Anchorage Daily News, Associated Press, Juneau Empire and Petroleum News.

Antony Scott, PhD is REAP's Director of Economic and Regulatory Analysis. He came to Alaska in 2000 after receiving his PhD from the University of Wisconsin, Madison, with a focus in natural resource economics. He has been conducting economic and policy analysis of Alaska energy issues ever since. Antony has worked in government as Staff Economist at the Regulatory Commission of Alaska (RCA), Commercial Analyst and Petroleum Investment Manager at the Division of Oil and Gas in the Department of Natural Resources, and most recently, as a Commissioner at the RCA. He spent several years at the Alaska Center for Energy and Power and was Director of Policy and Programs at the former Anchorage Municipal Light and Power.

Marty Schwarz is an electrical engineer at the National Renewable Energy Laboratory (NREL), where he models utility-scale power grids to identify the impacts of electric sector decarbonization. This includes capacity expansion, production cost, power flow, and resource adequacy simulations. Marty's recent work has focused on least-cost pathways for the Alaskan Railbelt system. Before Marty joined NREL in 2019, he designed, built, and studied electric power grids of various sizes. From 2018-2019, he studied historical wind generation in India on a Fulbright Grant. Prior to India, he designing highly redundant microgrids for data center campuses at Morrison Herschfield in Baltimore. Before Baltimore, he worked as a maritime engineer, designing and running small, self-contained microgrids aboard large oceangoing vessels. Marty graduated from Carleton College with a Bachelors in Physics. In his free time Marty hones his ski alpinism skills, takes friends and family out sailing, and gets lost in the slickrock canyons of southern Utah.

WHY IS COOK INLET GAS IMPORTANT?



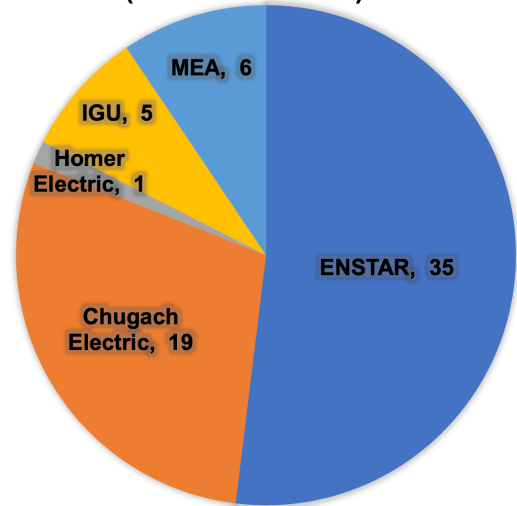
Natural Gas Utilities

- **Enstar** serves over 440,000 people and operates in over 25 communities throughout Southcentral Alaska
- **Interior Gas Utility (IGU)** serves over 2,400 people
 - IGU to take gas from Harvest LNG on the North Slope beginning 1Q 2025

Electric Utilities

- **Chugach Electric** serves over 302,000 people in Anchorage, Whittier, Girdwood, and Fairbanks
 - Hilcorp contracts expire March 2028
- **Matanuska Electric (MEA)** serves the Mat-Su Borough and Chugiak and Eagle River, over 180,000 people - Hilcorp contracts expire 2033
- **Homer Electric** serves nearly 36,000 people

2024 Cook Inlet Utility Gas Under Contract
(Firm and Option Contracts)
(billion cubic feet)



COOK INLET OVERVIEW



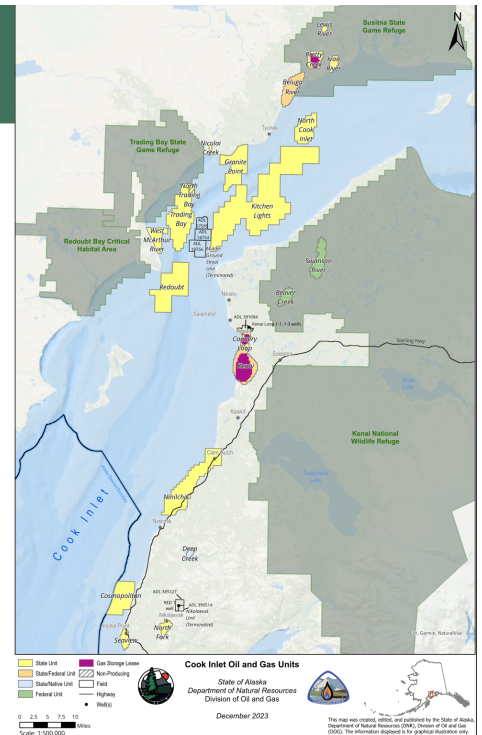
Cook Inlet is a large, mature oil and gas basin

- Has produced over 1.4 billion barrels of oil and 12 trillion cubic feet of gas since 1958
- 26 producing fields operated by 8 different companies
- There are over 200 oil and gas leases in Cook Inlet

Gas production has been declining since 1990

- Peak gas production in 1990 was over 850,000 thousand cubic feet per day
- Current production is just over 200,000 thousand cubic feet per day

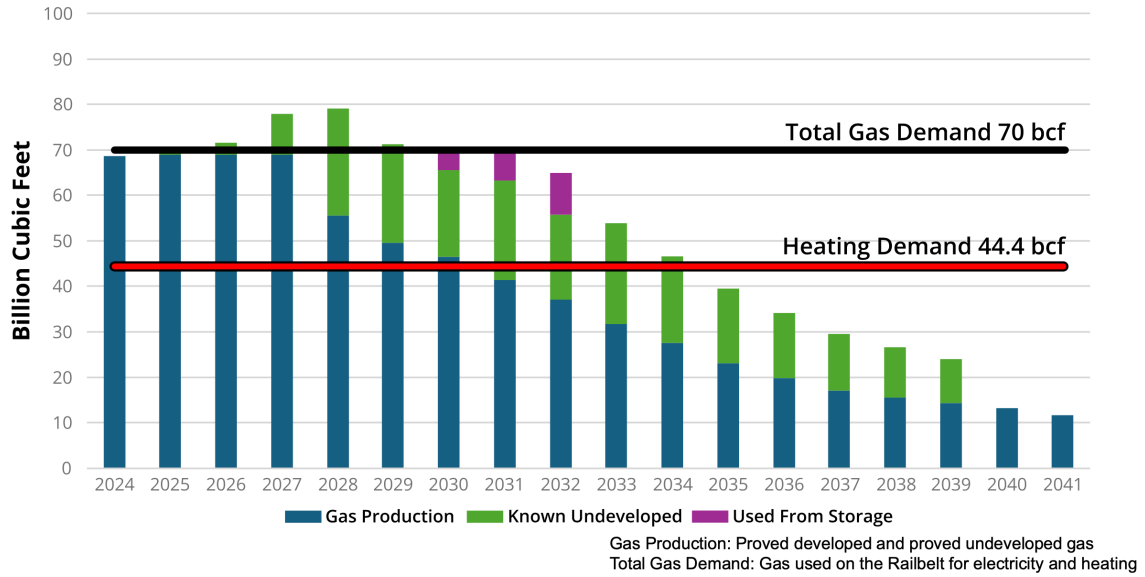
Cook Inlet gas provides heat and electricity to 70% of Alaskans



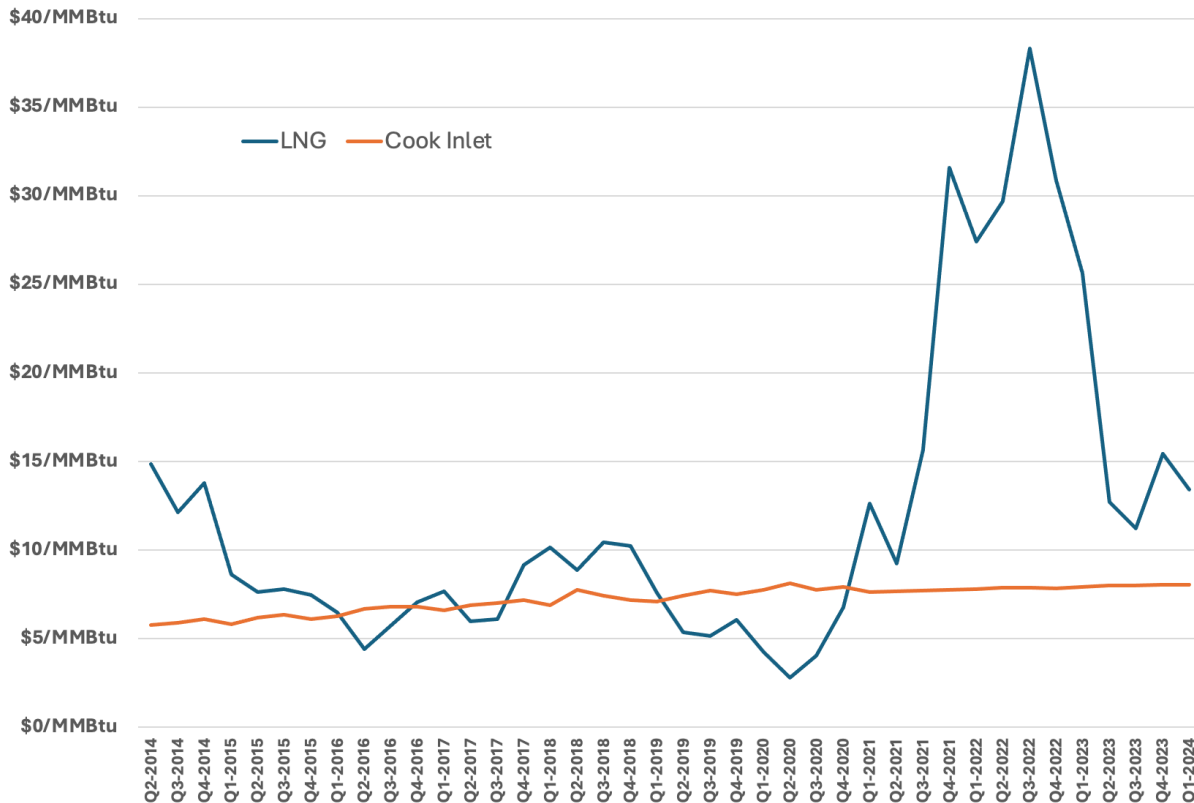
"RUNWAY" OF COOK INLET GAS



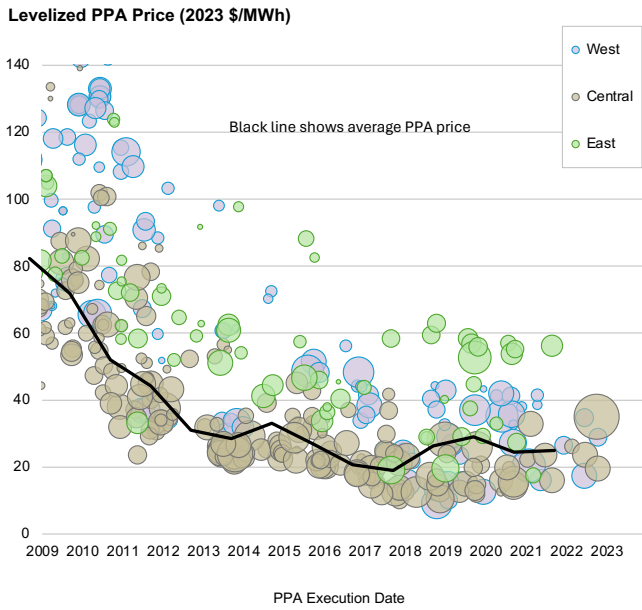
Cook Inlet Gas Production



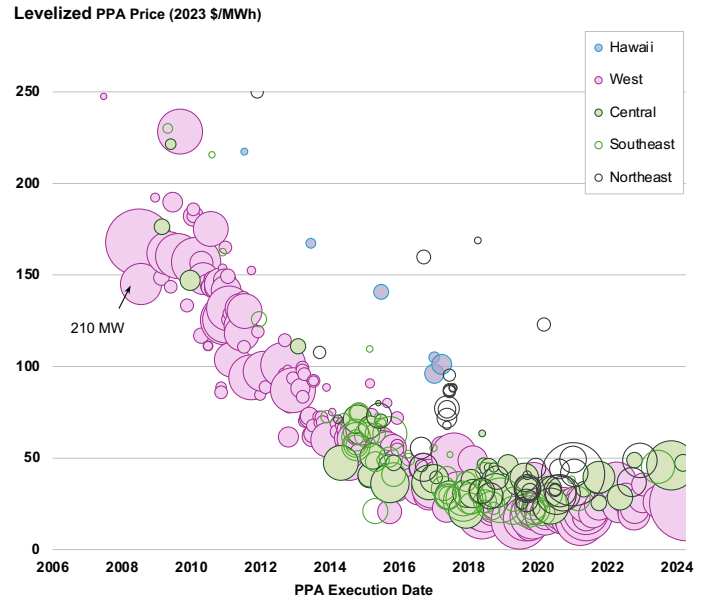
Historic Quarterly Natural Gas Prices Cook Inlet vs Japan spot, 2014-2024



Wind Power Purchase Agreements, price/kWh

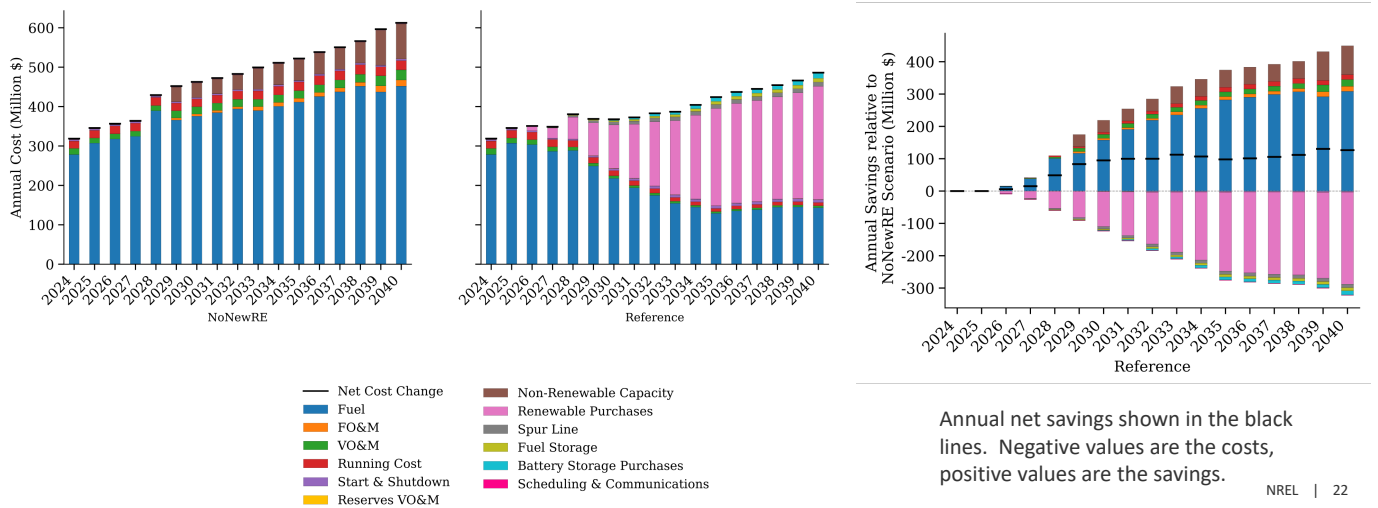


Solar Power Purchase Agreements, price/kWh



Annual Costs of No New RE and Reference Scenarios

Net savings reach about \$100M/yr by the mid 2030s



Annual net savings shown in the black lines. Negative values are the costs, positive values are the savings.

RAILBELT ENERGY GLOSSARY

AEA: Alaska Energy Authority. Alaska's state energy office.

AIPPA: Alaska Independent Power Producers Association. A non-profit entity representing the interests of IPPs in Alaska.

AKR: Alaska Renewables. An Independent Power Producer operating in the Railbelt.

ARTEC: Alaska Railbelt Cooperative Transmission and Electric Company.

Balancing Authority: A entity that ensures that power system demand and supply are always balanced in a specific region, which maintains safe and reliable operation of the power system. Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) are examples of balancing authorities.

Bcf: Billion cubic feet. Natural gas is often measured by volume in Mcf (thousand cubic feet).

Btu: British Thermal Unit. A measure of energy. A kWh is equivalent to 3,412 Btus.

Bulk Power System: A bulk power system (BPS) is a network of electrical generation and transmission facilities that delivers electricity from power plants to consumers.

Capacity: Refers to the maximum amount of power, usually expressed in megawatts (MWs), that a given generation plant is capable of providing.

Capacity Factor: Refers to the proportion of electricity actually produced by a given generation plant during the year, relative to the amount of electricity that would be produced if the plant were running at its maximum capacity during every hour of the 8,760 hours in the year.

CCUS: Carbon capture, utilization, and storage. CCUS is a set of technologies that capture and manage carbon dioxide (CO₂) emissions from large sources, like power plants and refineries

CIRI: Cook Inlet Regional, Inc. An Independent Power Producer in Southcentral Alaska.

Clean Energy: Typically, used to refer to the electricity that is generated by facilities that do not directly emit greenhouse gases such as carbon dioxide during the generating process. Clean energy includes renewable energy sources, nuclear power and sources where the carbon emissions are captured and stored.

Cooperative (Co-op): An electric utility owned by its member-customers. There are four electric co-ops in the Railbelt.

GVEA Golden Valley Electric Association serves customers from Healy to Fairbanks.

MEA Matanuska Electric Association serves customers from Eagle River to Talkeetna.

HEA Homer Electric Association serves customers on the Kenai Peninsula.

CEA Chugach Electric Association serves Anchorage and Girdwood.

ENSTAR: A heating utility in Southcentral Alaska providing natural gas to its customers.

ERO: Electric Reliability Organization. A general term for an entity responsible for the security and reliability of a power system. In the Railbelt, the Railbelt Reliability Council (RRC) fills this role.

IPP: Independent Power Producer. An IPP is a private entity that owns and operates facilities to generate electricity for sale to end users and utilities. IPPs are also known as non-utility generators (NUGs).

IRP: Integrated Resource Plan. IRP planning is used by electric utilities to identify and evaluate the most cost-effective mix of energy resources (both supply-side generation and demand-side management) to meet future electricity needs for their customers, considering factors like reliability, environmental impact, and cost, while engaging with stakeholders throughout the planning process to create a roadmap for meeting future energy demands in a balanced and cost-efficient way. The RRC is charged with developing an IRP for the Railbelt region.

ISO: Independent System Operator. A type of balancing authority. Typically a non-profit, non-asset owning entity that oversees generation and transmission planning for a region and sets protocols for competition within the system. System operators assert operational control over generation assets to assure merit-order, "economic dispatch" of electricity across a region.

kW: kilowatt. The amount of instantaneous power equivalent to one thousand watts.

kWh: kilowatt-hour. The amount of electricity delivered by a kilowatt of power for one hour. In the Railbelt, the average home uses about 600 kWhs each month.

LBA: Load balancing area. An area where supply and demand of electricity are balanced to maintain safe and reliable operation of the power system.

LNG: Liquefied Natural Gas. Liquefied natural gas (LNG) is natural gas that has been cooled to a liquid state, at about -260° Fahrenheit, for shipping and storage. The volume of natural gas in its liquid state is about 600 times smaller than its volume in its gaseous state. This process makes it possible to transport natural gas to places pipelines do not reach.

Mcf: Thousand cubic feet. Natural gas is often measured by volume in Mcf.

MMBtu: (Million Btu) LNG and natural gas are often measured in energy units of MMBtu. 1 ton of LNG, by weight, contains roughly 53.3 MMBtu. In Cook Inlet, 1 Mcf of natural gas contains roughly 1 MMBtu.

MW: Megawatt. The amount of instantaneous power equivalent to one million watts.

MWh: Megawatt-hour. The amount of electricity delivered by a megawatt of power for one hour. The total Railbelt electricity consumption during 2022 was 4,685,898 MWhs.

Municipal Utility: A public utility owned by a local government. There is one municipal utility in the Railbelt.

SES Seward Electric System

PPA: Power Purchase Agreement. The contract between an Independent Power Producer and an off-take buyer, typically a utility.

Reliability Standard: An electric reliability standard. Reliability standards are requirements that ensure the safe and reliable operation of the electric grid. They include requirements for grid operators to communicate and receive training; requirements for grid operators to have plans in case of emergencies and; requirements to protect the bulk power system from cyber threats. The North American Electric Reliability Corporation (NERC) develops and enforces reliability standards for the bulk power system in North America.

Renewable Energy: Energy derived from inexhaustible sources such as wind, solar, geothermal and water (rivers, tides and waves).

Renewable IPP: An IPP operating in the Railbelt.

RCA: Regulatory Commission of Alaska. The public utility commission for the state of Alaska. All tariffs, including any change to a utility's tariff, must be approved by the RCA.

RCC: Regulatory Cost Charge. The charge on customer's bills to pay for the RCA.

RRC: Railbelt Reliability Council. The entity which fulfills the role of an ERO in Alaska. The RRC is also charged with developing IRPs for the Railbelt region.

RTO: Regional Transmission Organization. Generally, an RTO is a type of balancing authority. It is an electric power transmission system operator (TSO) that coordinates, controls, and monitors a multi-state electric grid.

RTO: Railbelt Transmission Organization. An organization created in House Bill 307 to develop and propose a transmission cost recovery tariff for the Railbelt transmission system.

RPS: Renewable Portfolio Standard. A state policy that requires utilities to generate a certain percentage of electricity with renewable sources by a date certain or face non-compliance penalties.

Transco: A transmission company. A transmission-only utility. Typically a for-profit entity.

USO: Unified System Operator. A regional system operator that manages a specific area of an electric grid. USOs are also known as independent system operators (ISOs). Their responsibilities include scheduling and dispatching power plants, operating the transmission system, facilitating wholesale markets and setting market prices.