

# Alaska Hydropower

Curtis W. Thayer  
Executive Director  
Alaska Energy Authority

Community and Regional  
Affairs Committee  
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# Who We Are



Created in 1976 by the Alaska Legislature, the [Alaska Energy Authority \(AEA\)](#) is a public corporation of the State of Alaska governed by a board of directors with the mission to “reduce the cost of energy in Alaska.” AEA is the state's energy office and lead agency for statewide energy policy and program development.



# What We Do



**Energy Planning** – In collaboration with local and regional partners, AEA provides critical economic and engineering analysis to plan the development of cost effective energy infrastructure.



**Grants and Loans** – AEA provides loans to local utilities, local governments, and independent power producers for the construction or upgrade of power generation and other energy facilities.



**Railbelt Energy** – AEA owns the Bradley Lake Hydroelectric Project and the Alaska Intertie. These assets benefit Railbelt consumers by reducing the cost of power.



**Renewable Energy** – AEA provides renewable energy and energy efficiency grants, analysis, and expertise to benefit Alaskans. These include hydro, biomass, wind, solar, and others.



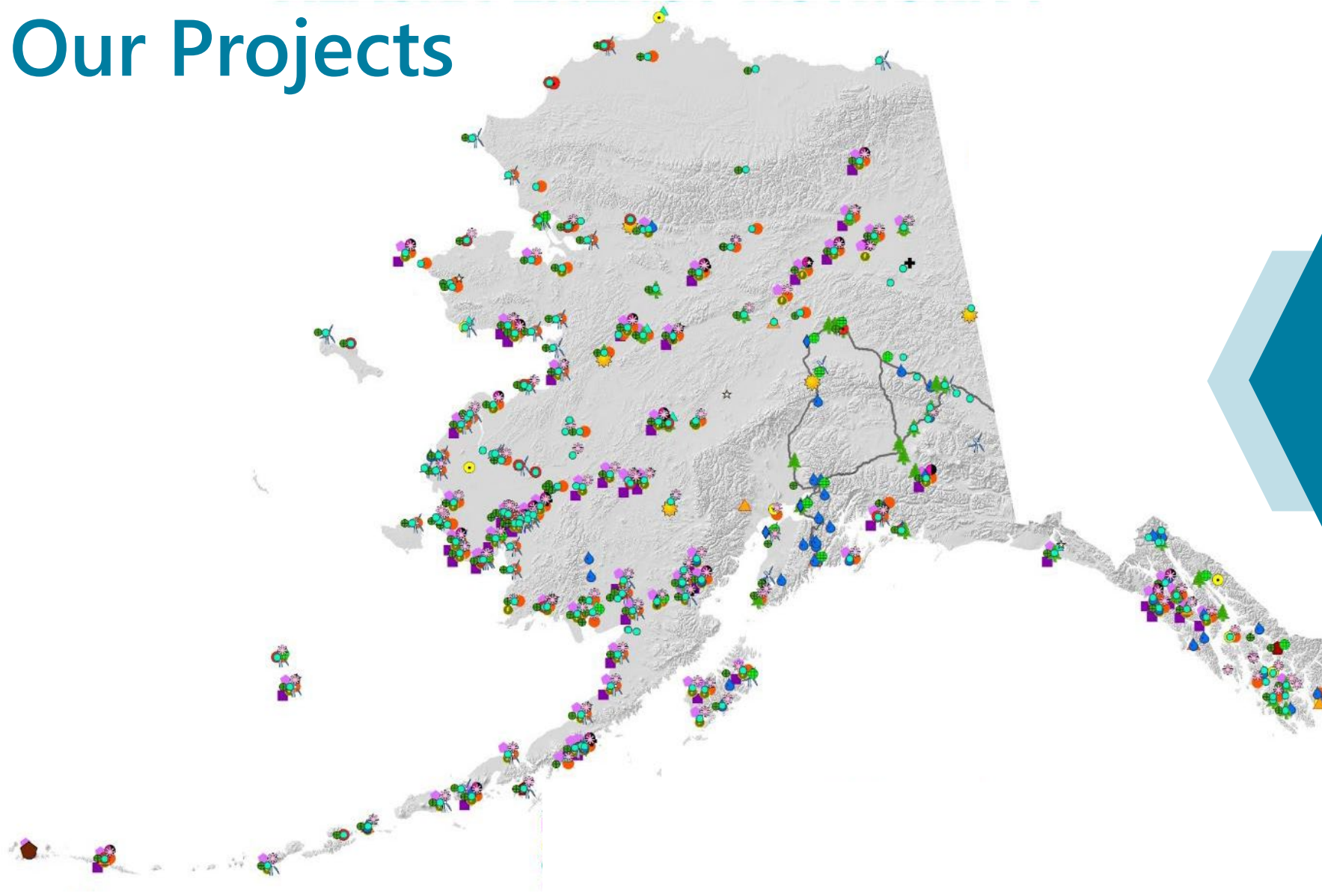
**Power Cost Equalization** – The Power Cost Equalization Program reduces the cost of electricity in rural Alaska for residential customers and community facilities.



**Rural Energy** – AEA constructs bulk fuel tank farms, diesel powerhouses, and electrical distribution grids in rural villages. AEA supports the operation of these facilities through circuit rider and emergency response programs.



# Our Projects



AEA works with its Alaska partners and stakeholders to provide reliable and affordable energy solutions.



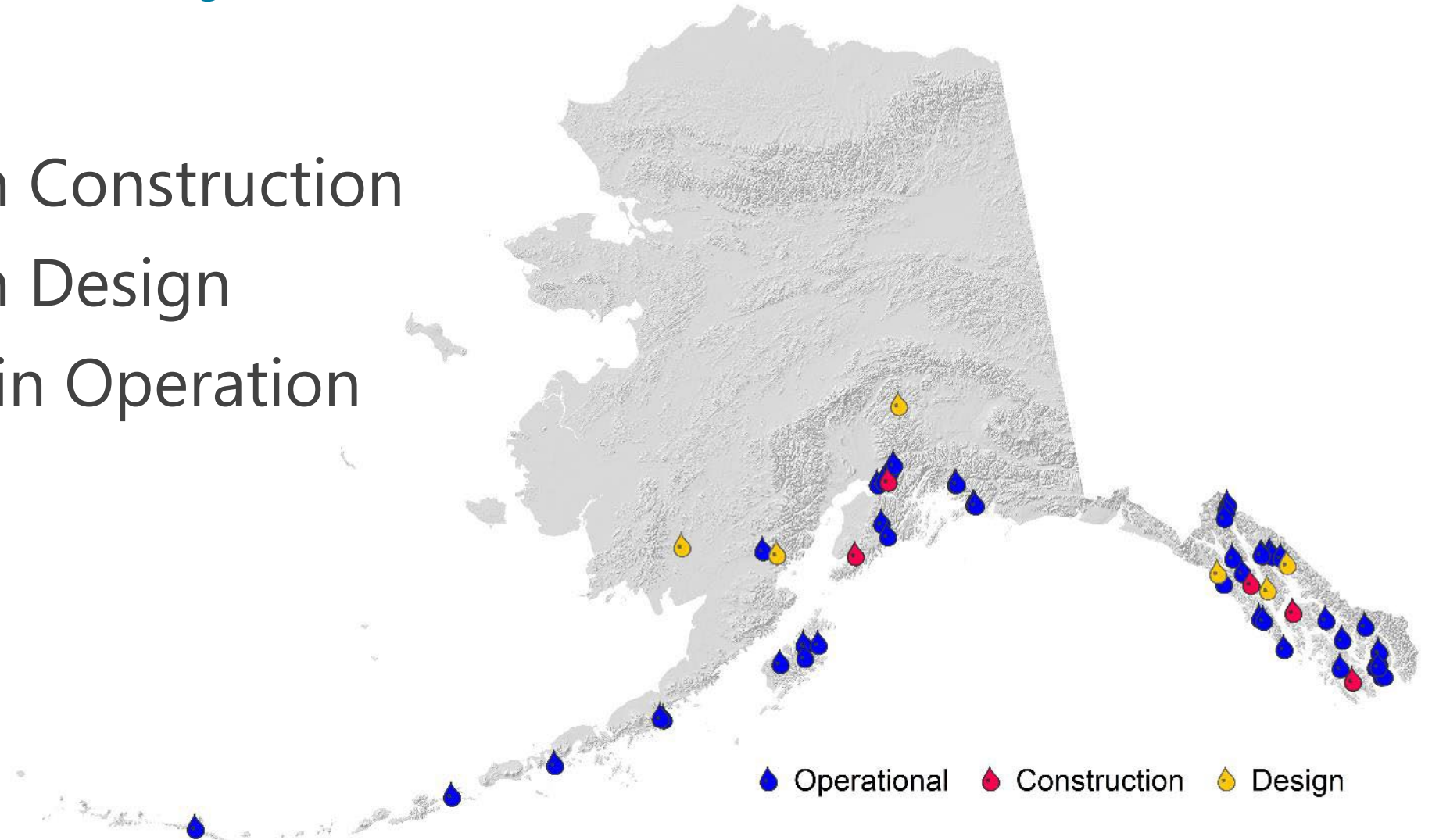
# Programs and Projects

- ▶ Bradley Lake Hydroelectric Project
- ▶ Alaska Intertie
- ▶ Bulk Fuel Upgrades
- ▶ Rural Power System Upgrades
- ▶ Rural Utility Assistance
- ▶ Power Cost Equalization
- ▶ Renewable Energy Fund Grants
- ▶ Power Project Fund Loans
- ▶ Alaska C-PACE
- ▶ Alternative Energy
- ▶ Energy Efficiency
- ▶ Energy Project Development



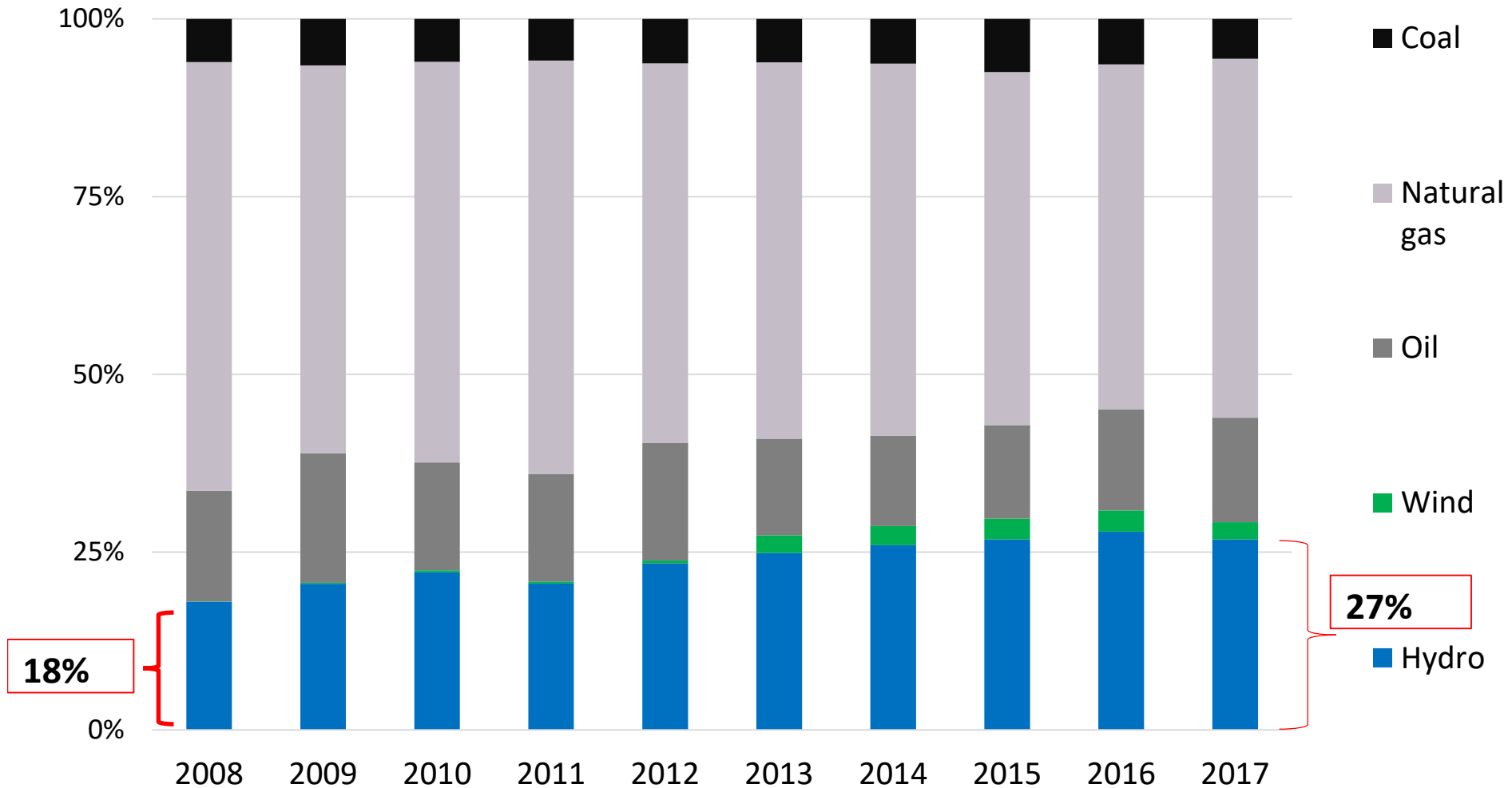
# Hydropower Projects in Alaska

- 🔴 3 Projects in Construction
- 🟡 6 Projects in Design
- 🟢 51 Projects in Operation





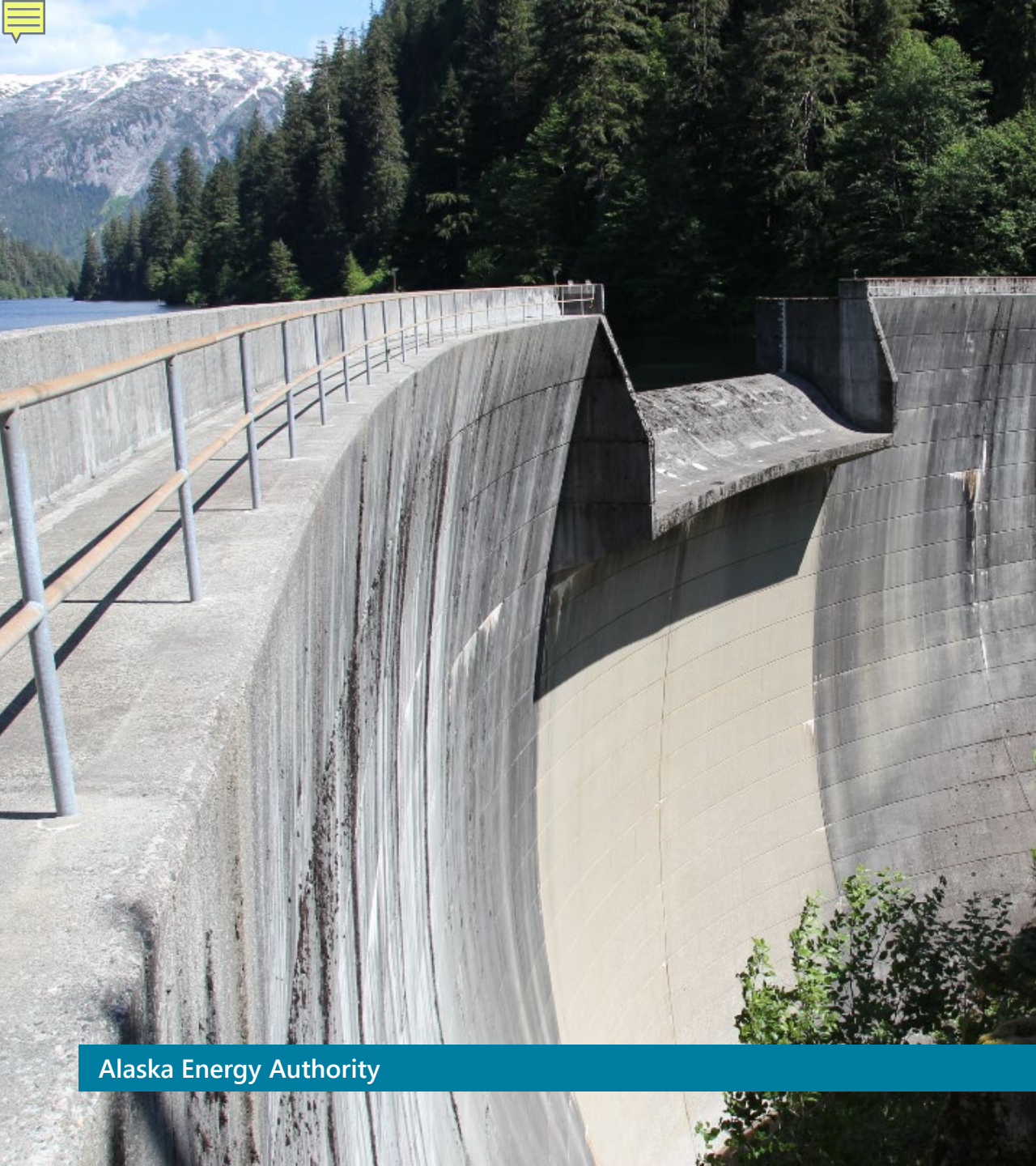
# Alaska Electric Energy Generation (2017)





# Two Types of Hydropower Projects



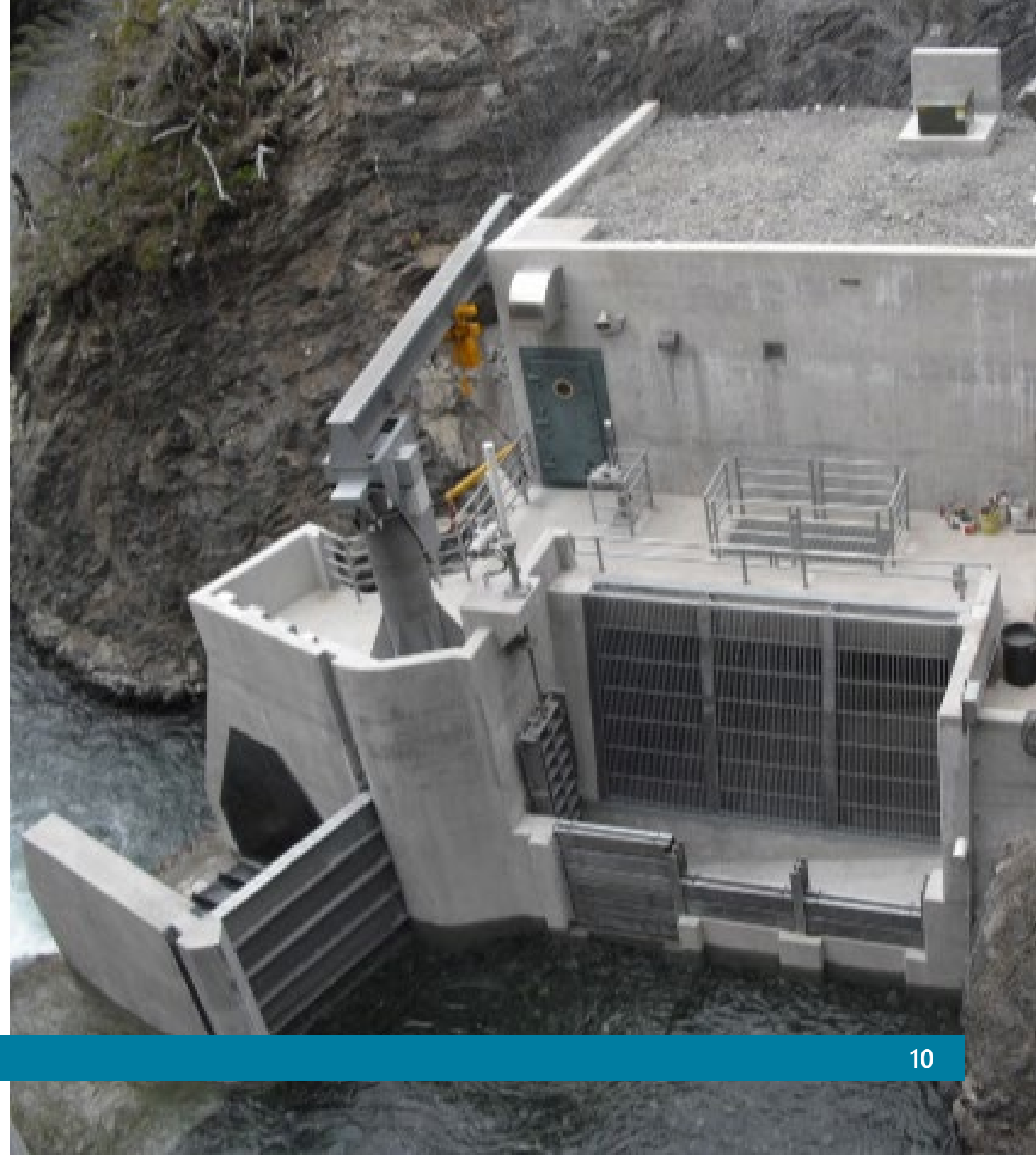


# Traditional Storage

- ▶ Traditional Storage projects tend to be more expensive, require terrain chokepoints, and require more time for permitting and construction.
  - ▷ Bradley Lake
  - ▷ Snettisham
  - ▷ Susitna-Watana
  - ▷ Swan Lake
  - ▷ Sweetheart Lake
  - ▷ Terror Lake

# Run of River

- ▶ Run of River projects are lower cost and tend to be permitted and constructed quicker.
  - ▷ Delta Creek
  - ▷ Five Mile Creek
  - ▷ Gartina Falls
  - ▷ Humpback Creek
  - ▷ Knutson Creek
  - ▷ Nuyakuk River
  - ▷ Thayer Creek



**1 watt =**



a single LED

**1 kilowatt =**  
(1,000 watts)



a toaster

**1 megawatt =**  
(1,000,000 watts)



1,000 houses

**1 gigawatt =**  
(1,000,000,000 watts)



1,000,000 houses

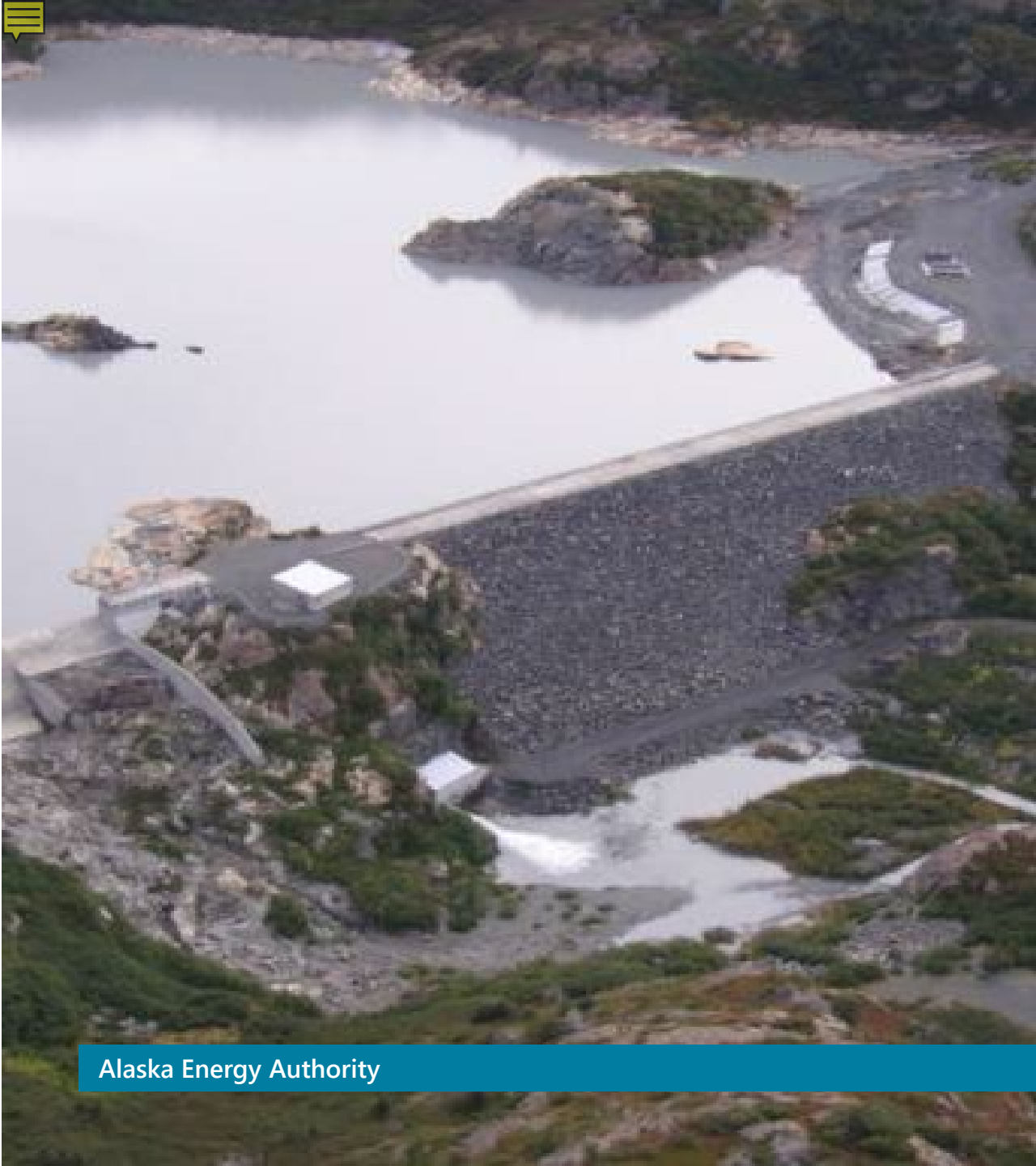
## Important Terms

- ▶ Capacity of a generator is measured in megawatts (MW) or kilowatts (kW) at a single point in time.
- ▶ Project Energy is power over time. Commonly measured as Megawatt -hours (MWh) or kilowatt-hours (kWh).
- ▶ House on the Alaska Railbelt may use 500-600 kWh per month energy.





# Alaska Hydropower Projects in Operation



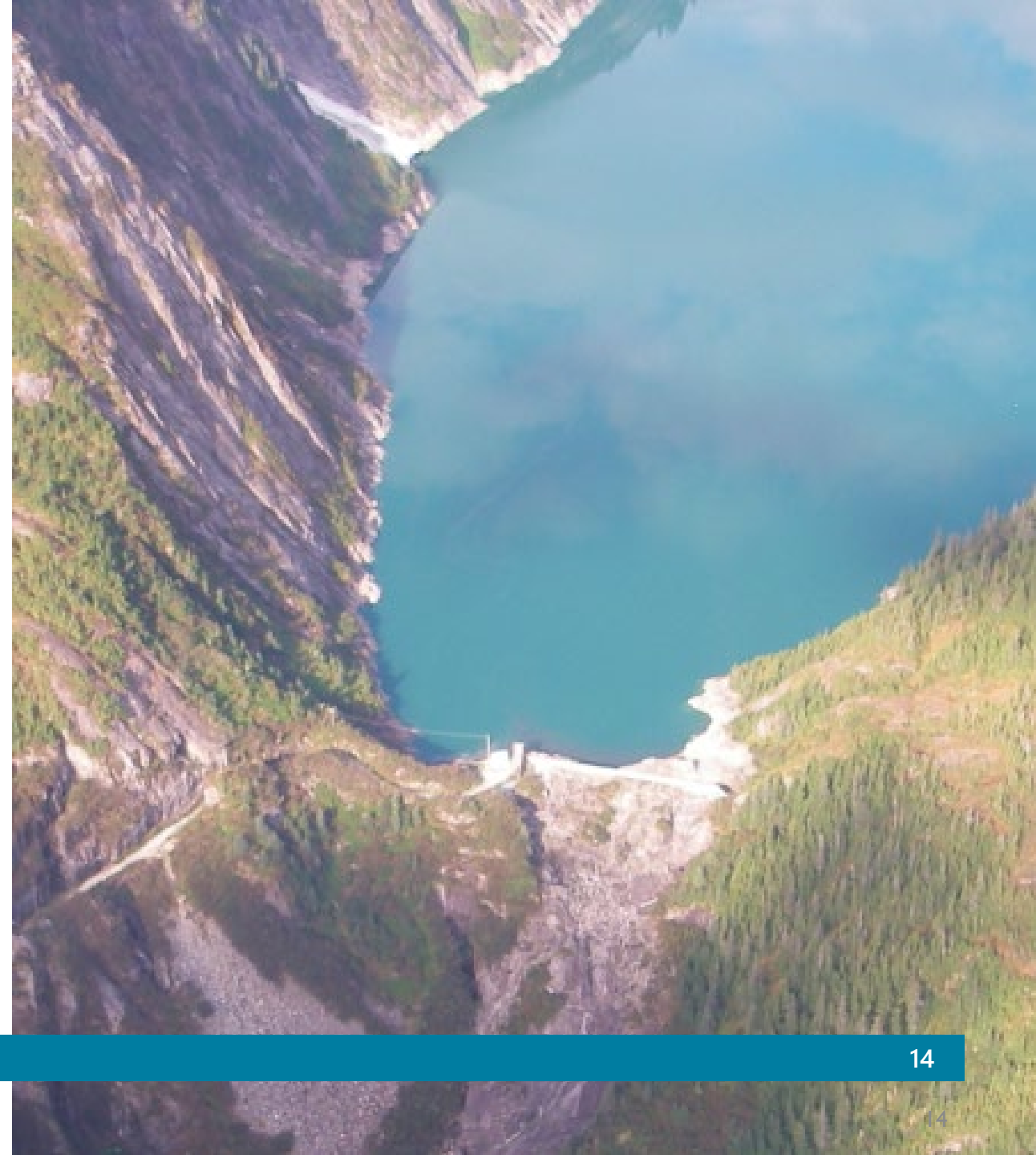
# Alaska Hydropower Projects in Operation

- ▶ 51 operational hydropower projects in Alaska
- ▶ Three projects under construction to increase Statewide capacity by 5.5 MW to be completed in 2020
- ▶ Projects in design/funding to increase capacity by nearly 491 MW

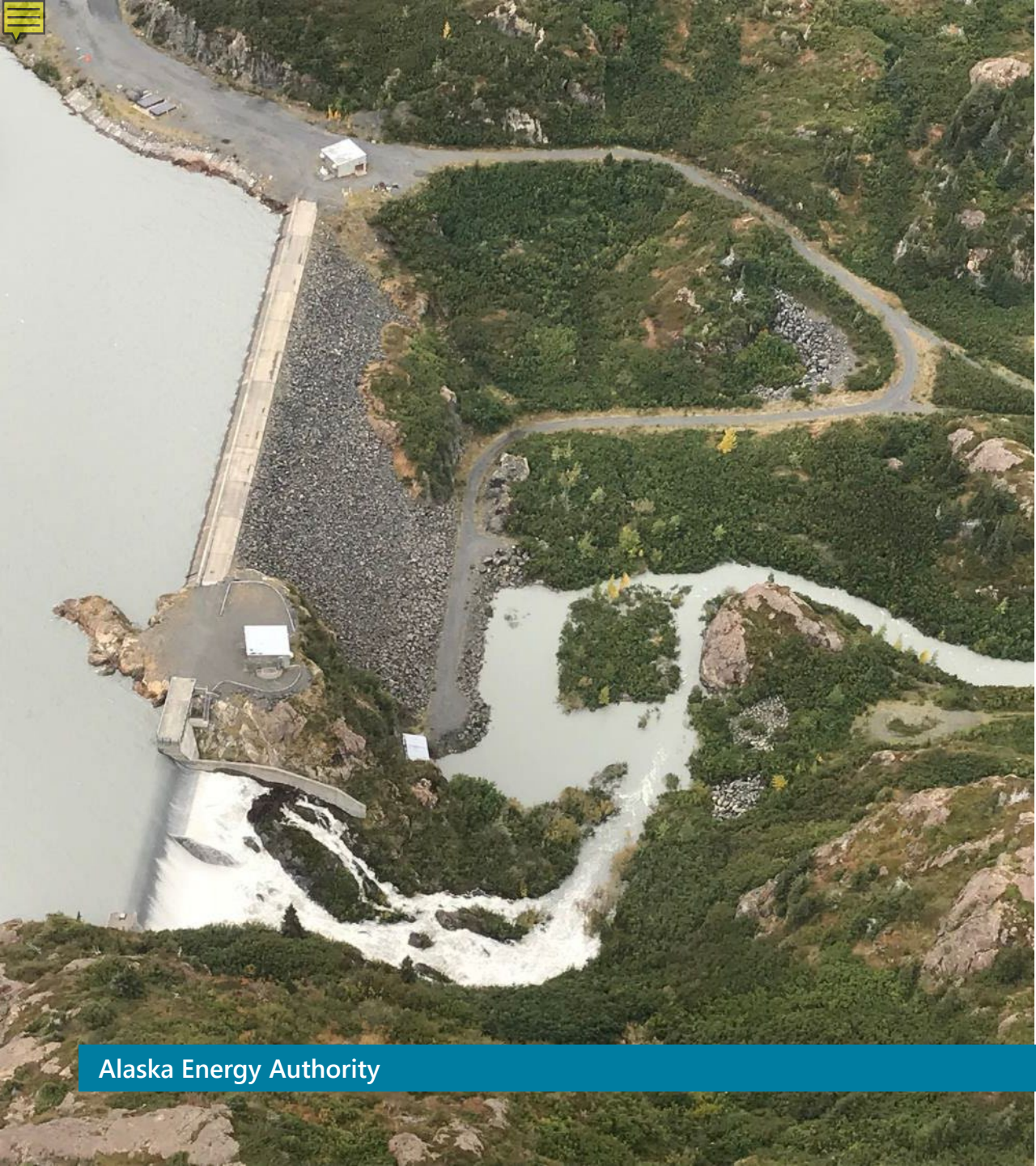


# State Involvement in Hydropower Projects

- ▶ State of Alaska owns over 40% of Statewide hydropower capacity
  - ▷ Bradley Lake (AEA)
  - ▷ Snettisham (AIDEA)
- ▶ State of Alaska through AEA/AIDEA has supported the development of more than two thirds of Statewide hydropower capacity







# Bradley Lake

- ▶ Located 25 miles northeast of Homer and serves Railbelt
- ▶ Capacity of 120 MW
- ▶ Completed in 1991
- ▶ Funding by State of Alaska and Railbelt utilities
- ▶ Owned by AEA and managed to maximum extent by Railbelt utilities



# Snettisham

- ▶ Located 30 miles southeast of Juneau and serves Juneau
- ▶ Capacity of 78 MW
- ▶ Initial completion of 1973
- ▶ Funded by Federal Government
- ▶ Owned by AIDEA, managed by AEA, and operated by Alaska Electric Light & Power





# Four Dam Pool Power Authority

- ▶ AEA sold to local utilities in 2002
  - ▷ Solomon Gulch
  - ▷ Swan Lake
  - ▷ Terror Lake
  - ▷ Tyee Lake
- ▶ Proceeds helped establish Power Cost Equalization Program Endowment





# Alaska Hydropower Projects in Construction

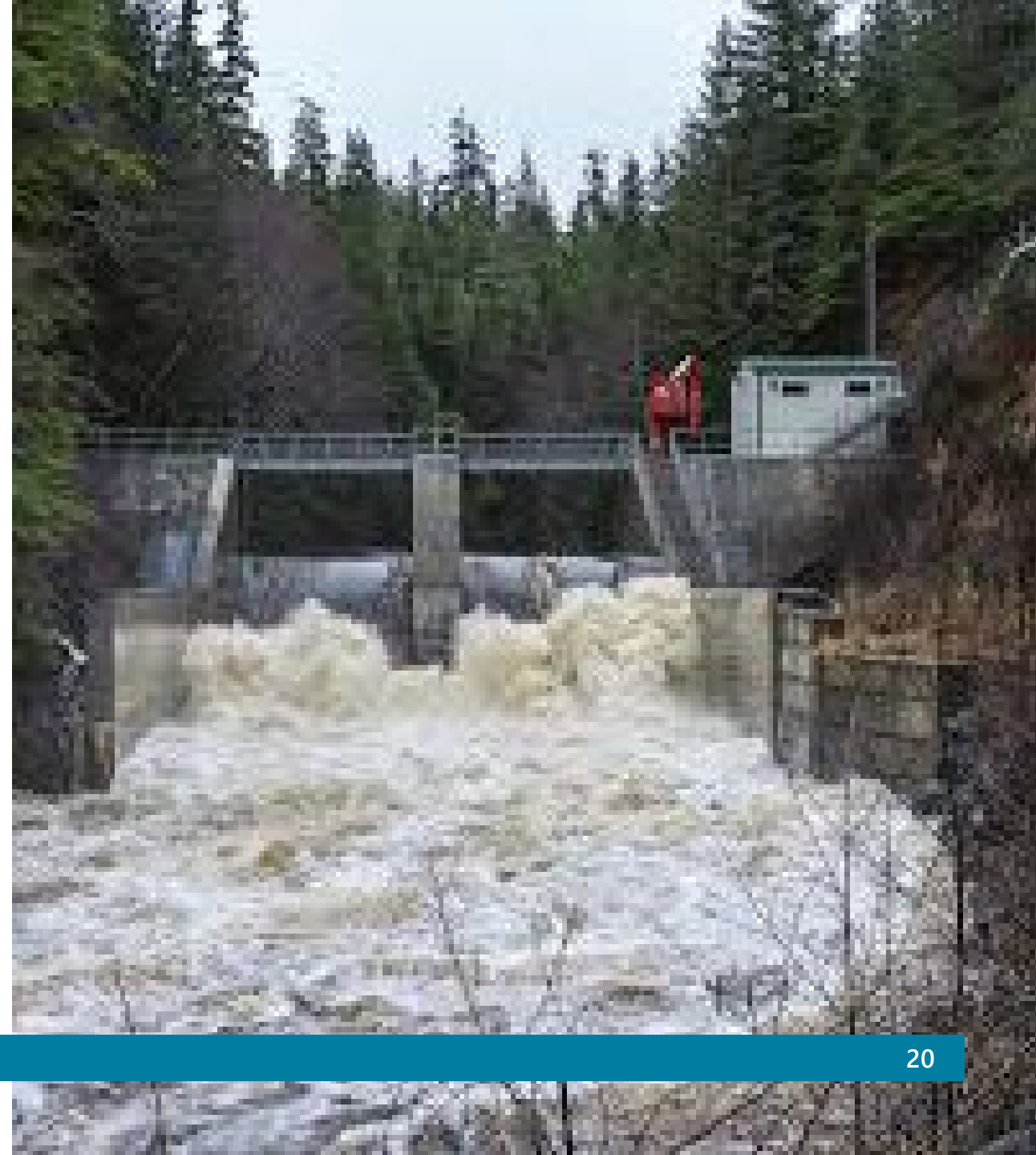


# Alaska Hydropower Projects in Construction

- ▶ Four projects under construction to increase Statewide energy by 5.5 MW to be completed in 2020.
  - ▷ Gunnuk Creek
  - ▷ Hidden Basin
  - ▷ Hiilangaay
  - ▷ West Fork Upper Battle Creek

# Gunnuk Creek

- ▶ Located in Kake, Alaska
- ▶ Capacity 0.5 MW
- ▶ Completion 2020
- ▶ Funded by AEA grant and Inside Passage Electric Cooperative financing
- ▶ Owned by Inside Passage Electric Coop





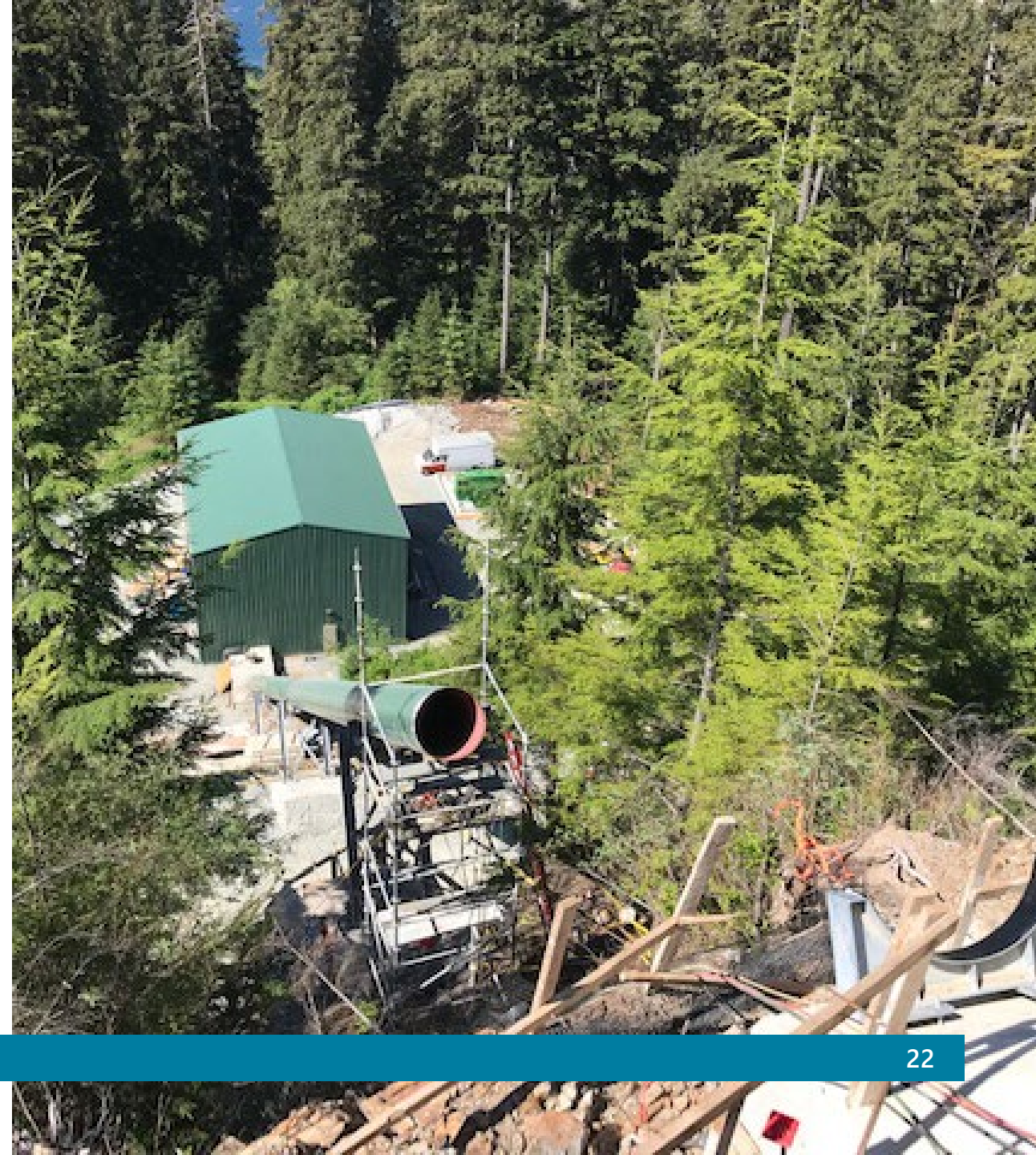


# Hidden Basin

- ▶ Located 22 miles southeast of Kodiak, and serves City of Kodiak and surrounding communities
- ▶ Capacity zero
- ▶ Completed December 2019
- ▶ Financed and owned by Kodiak Electric Association

# Hiilangaay

- ▶ Located 8 miles East of Hydaburg and serve Prince of Wales Island
- ▶ Capacity 5 MW
- ▶ Completion 2020
- ▶ Funded by AEA, grants, loans and Alaska Power & Telephone
- ▶ Owned by Haida Energy







# West Fork Upper Battle Creek

- ▶ Located 2 miles southwest of Bradley Lake dam
- ▶ Capacity zero
- ▶ Completion 2020
- ▶ Funded by AEA grant and Railbelt utilities
- ▶ Owned by AEA



# Alaska Hydropower Projects in Design



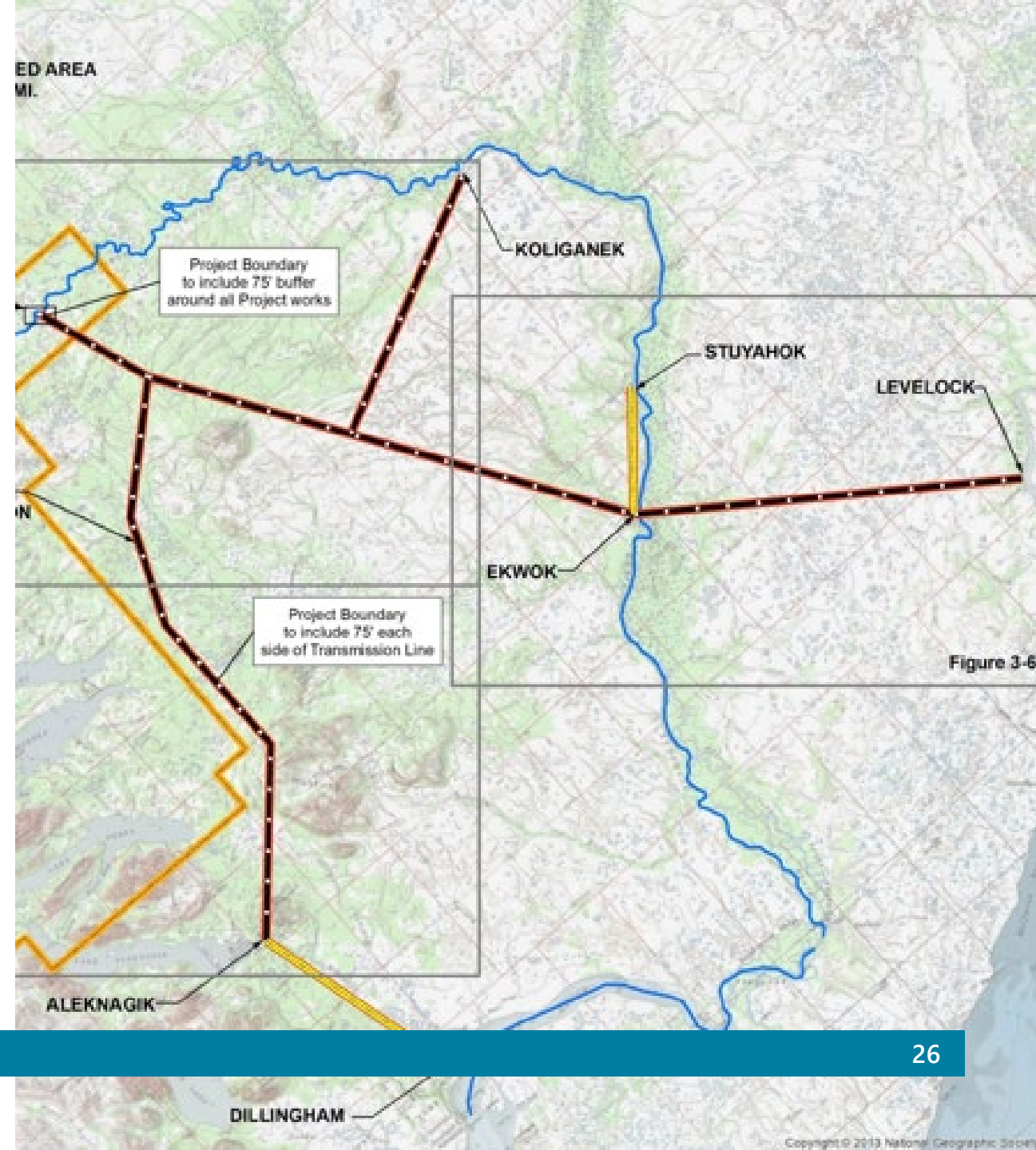


# Alaska Hydropower Projects in Design

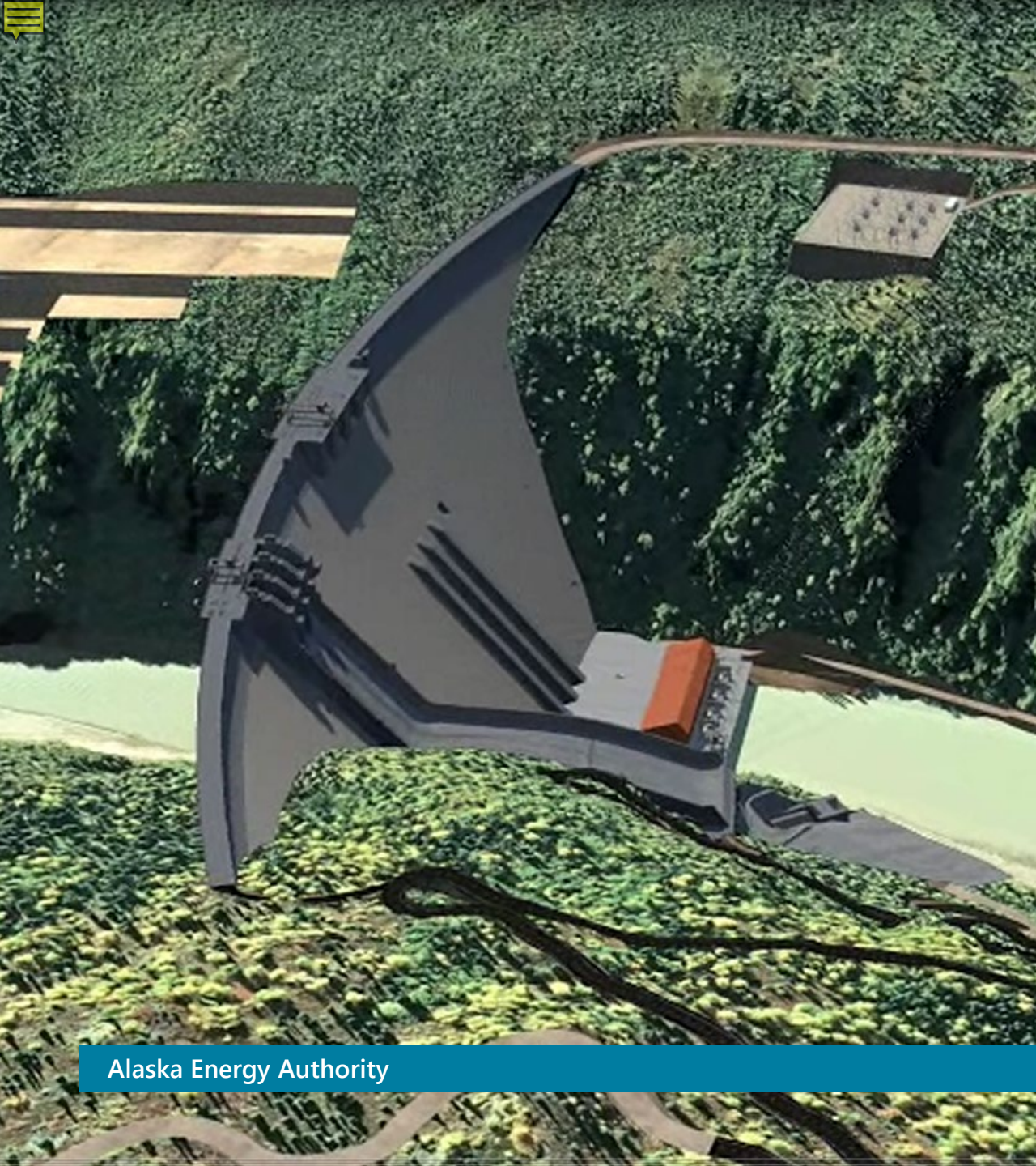
- ▶ Projects in design/funding to increase Statewide energy by greater than 491 MW hours
  - ▷ Nuyakuk River
  - ▷ Susitna-Watana
  - ▷ Sweetheart Lake
  - ▷ Thayer Creek

# Nuyakuk River

- ▶ Located 50 miles north of Dillingham and would serve regional communities
- ▶ Capacity ~12 MW
- ▶ Completion date: TBD
- ▶ Funding: TBD
- ▶ Owned by Nushagak Electric & Telephone Cooperative
- ▶ 2019 Senate Bill 91 passed and allows for the development and operation of a hydro facility in the State Park







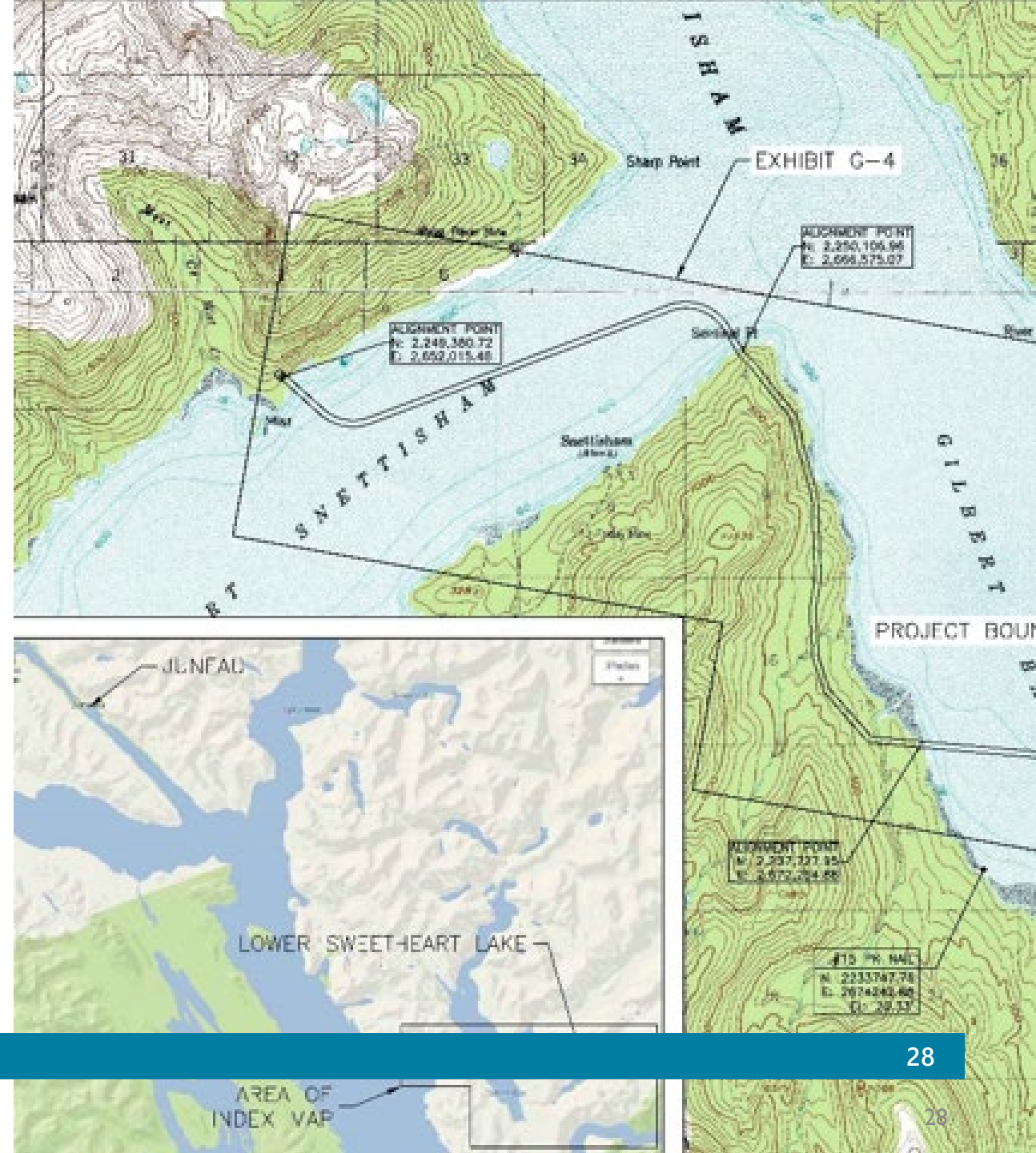
# Susitna-Watana

- ▶ Located ~125 miles northeast of Anchorage and serve Railbelt
- ▶ Average capacity 459 MW  
Average annual energy 2,800,000 MWh
- ▶ Completion Date: TBD
- ▶ Funding: TBD
- ▶ Owned by: TBD



# Sweetheart Lake

- ▶ Located 33 miles southeast of Juneau and serve region
- ▶ Capacity 19.9 MW
- ▶ Completion Date: TBD
- ▶ Funding: TBD
- ▶ Juneau Hydropower Inc.



A photograph of a waterfall cascading over rocks in a forested area. The water is white and frothy as it falls, surrounded by lush green trees and foliage. The scene is captured from a low angle, emphasizing the height of the falls.

# Thayer Creek

- ▶ Located 6 miles north of Angoon and serve Angoon
- ▶ Capacity 0.85 MW
- ▶ Completion Date: TBD
- ▶ Funding by AEA, Kootznoowoo Inc. and Inside Passage Electric Cooperative
- ▶ Owned by Kootznoowoo Inc.





AEA provides **energy solutions** to meet the unique needs and opportunities of Alaska's rural and urban communities.





## ALASKA ENERGY AUTHORITY

813 West Northern Lights Blvd.  
Anchorage, Alaska 99503  
Phone: (907) 771-3000  
Fax: (907) 771-3044  
Toll Free (888) 300-8534

[akenergyauthority.org](http://akenergyauthority.org)

For more information, please contact AEA Executive Director Curtis W. Thayer