

Hydropower

Can We Power Alaska With Our
Rivers and Oceans?

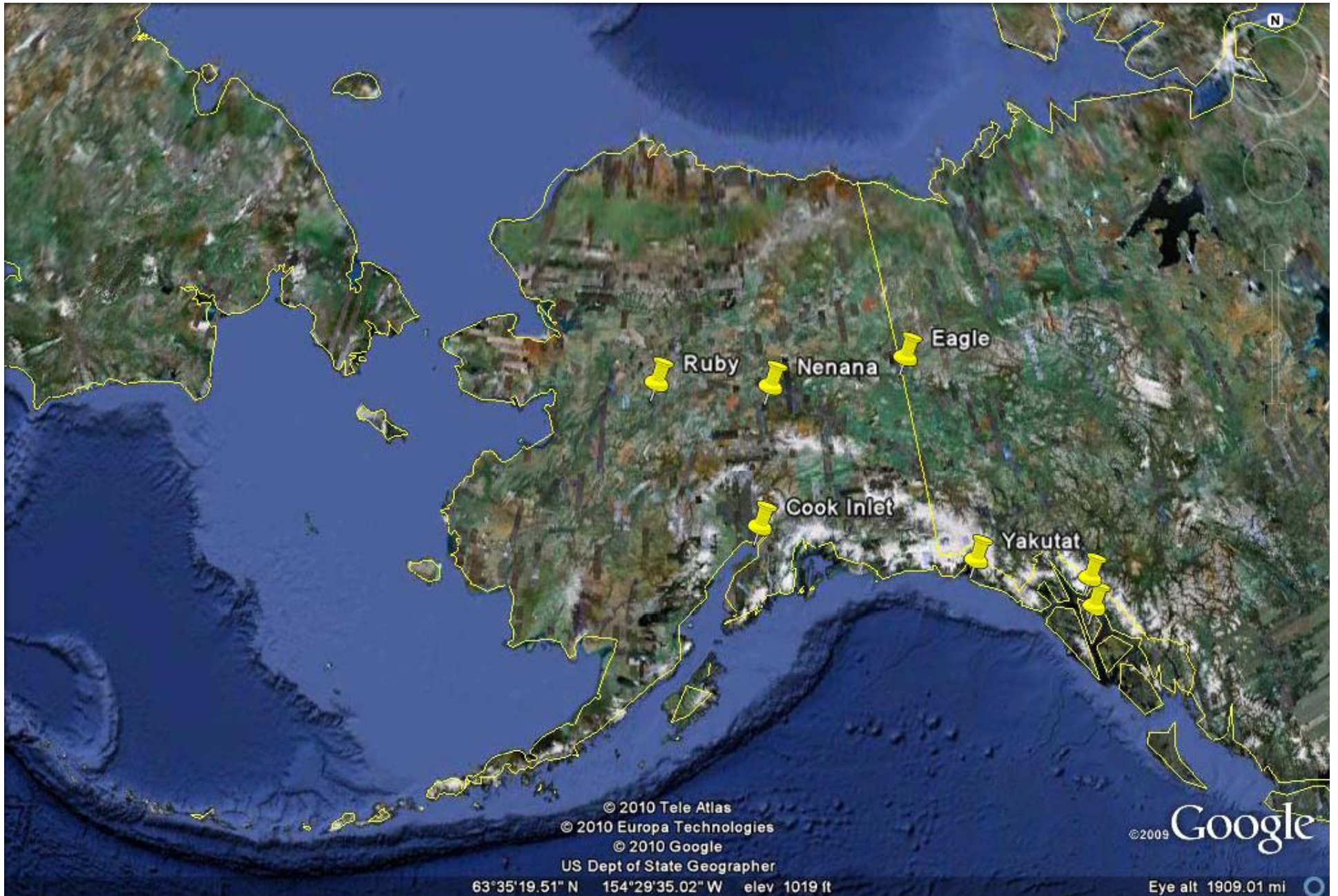


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“Alaska has significant potential for hydrokinetic development in both rivers and tidal basins. Most inland communities in Alaska are situated along navigable waterways that could host hydrokinetic installations, and Alaska, with 90% of the total U.S. tidal energy resource, is home to some of the best tidal energy resources in the world. These resources, along with the high cost of energy in many communities, positions Alaska as a potential leader in the development of hydrokinetic energy.”



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US Dept of State Geographer

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63°35'19.51" N 154°29'35.02" W elev 1019 ft

Eye alt 1909.01 mi

Ruby - YRITWC



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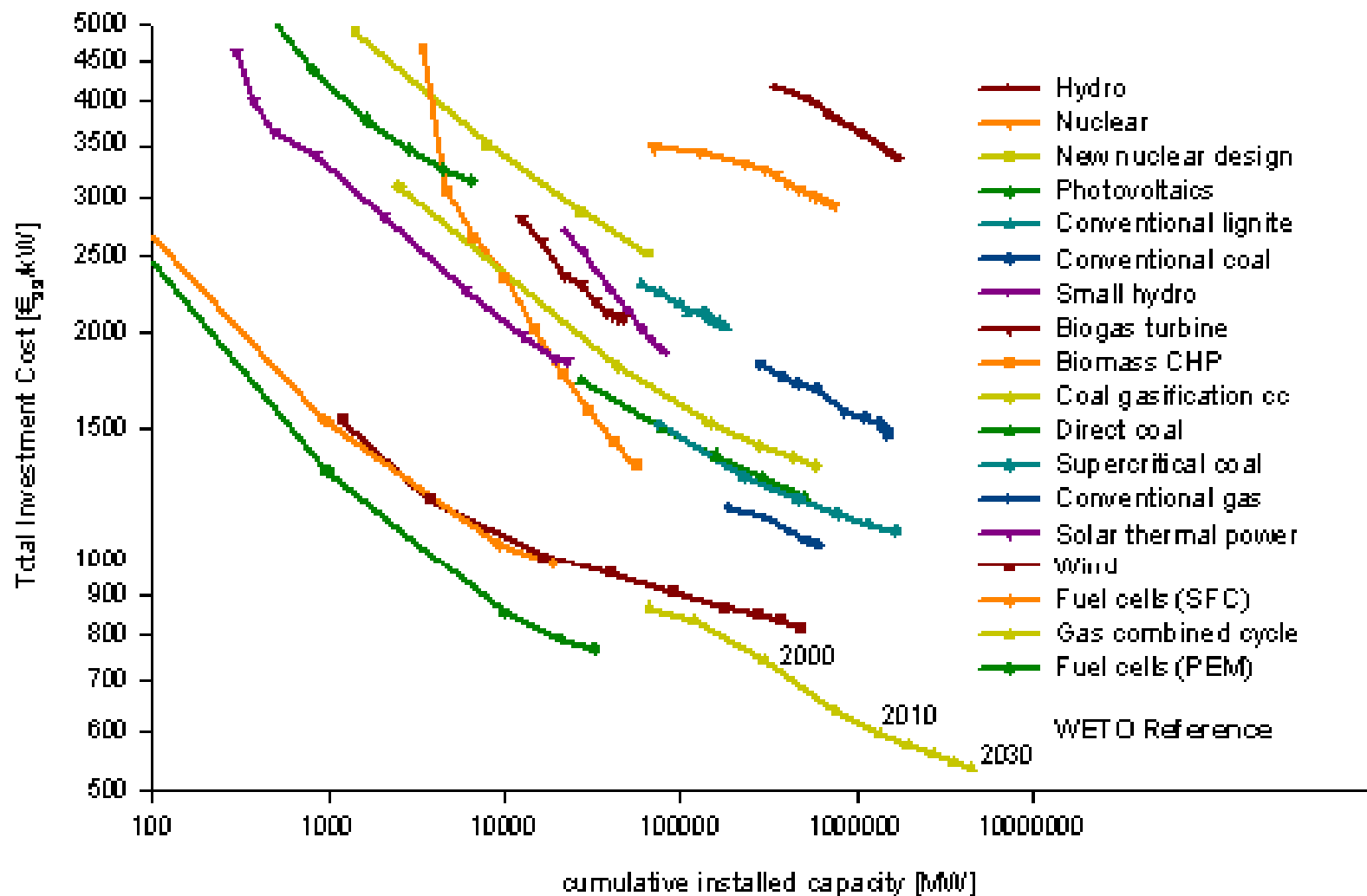


Learning curve for power generation technologies

(IPTS Energy, Transport and Climate Change Group)



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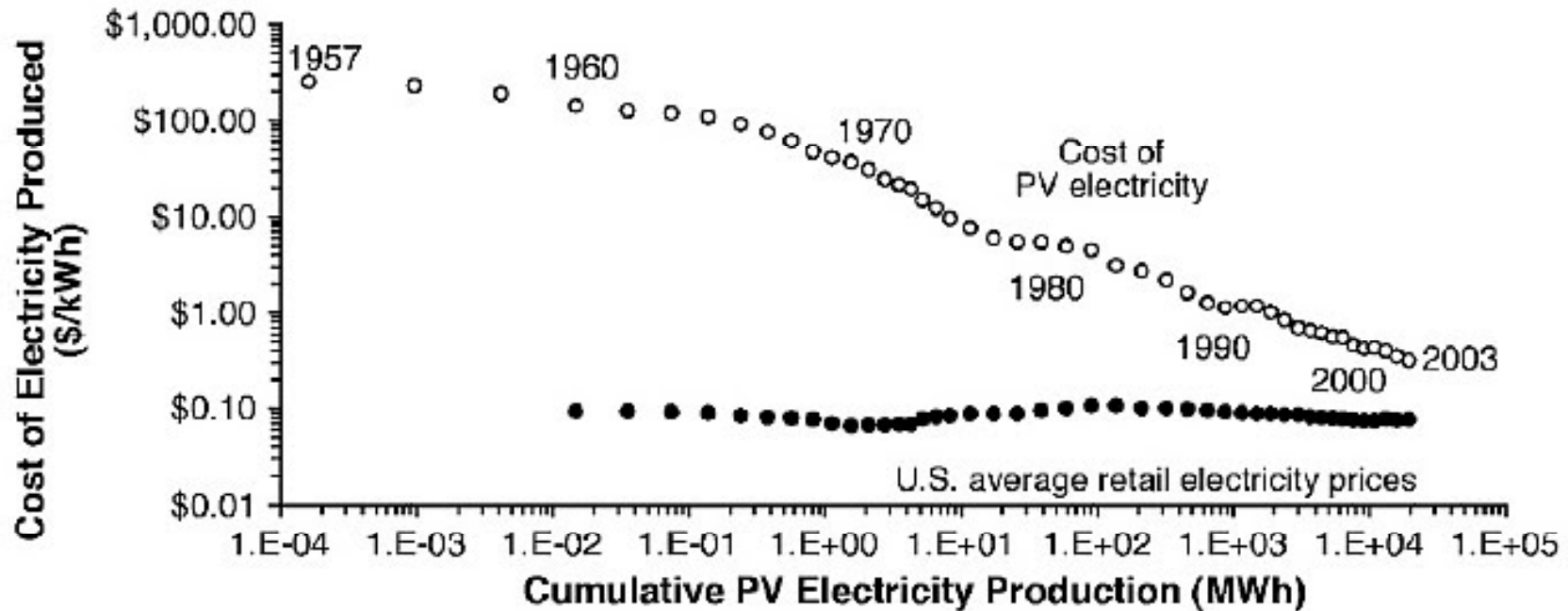




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Aggregate cost of electricity in the US, versus cost of PV electricity

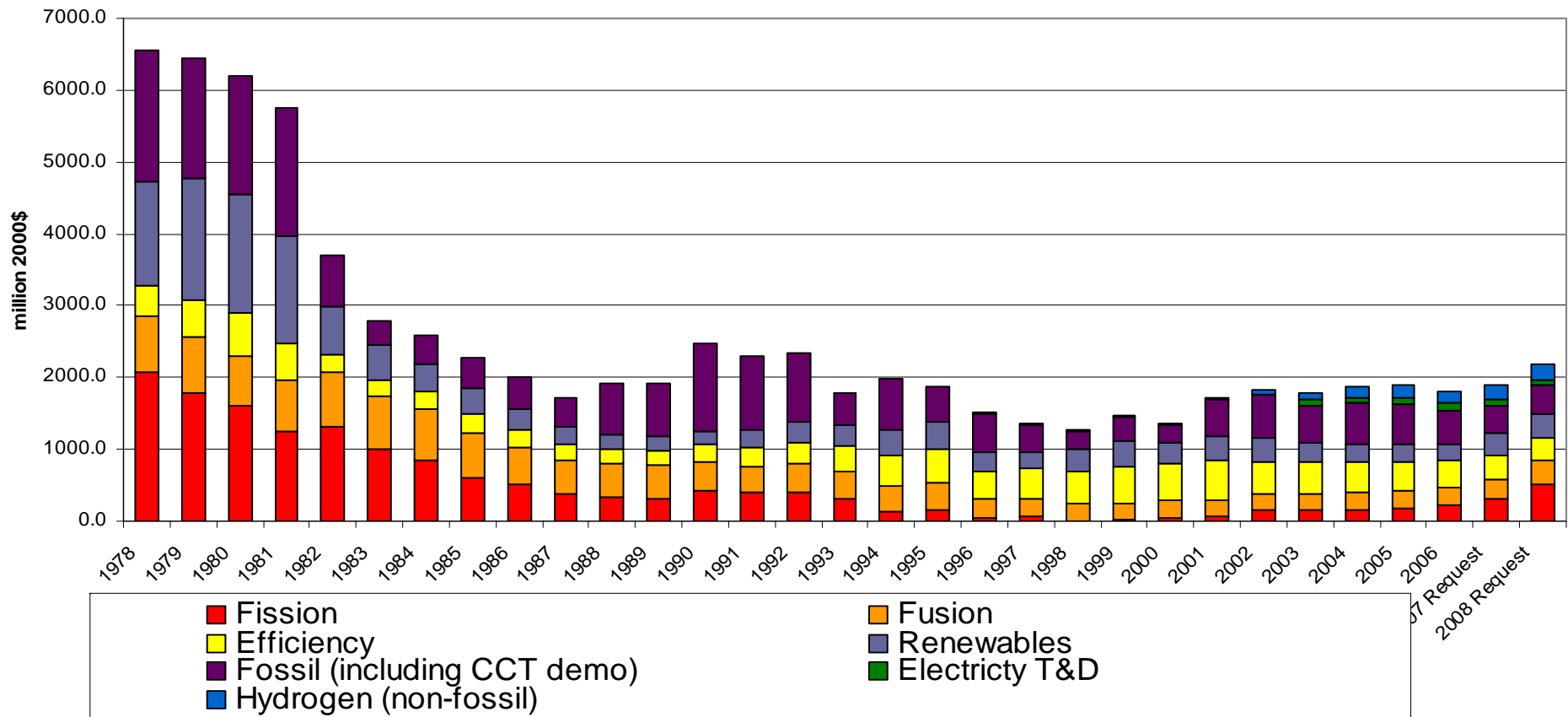
(<http://knol.google.com/k/solar-energy#>)





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US DOE Energy RD&D Spending (Kelly Gallagher, Kennedy School of Gov't, 2-13-07)



Funding



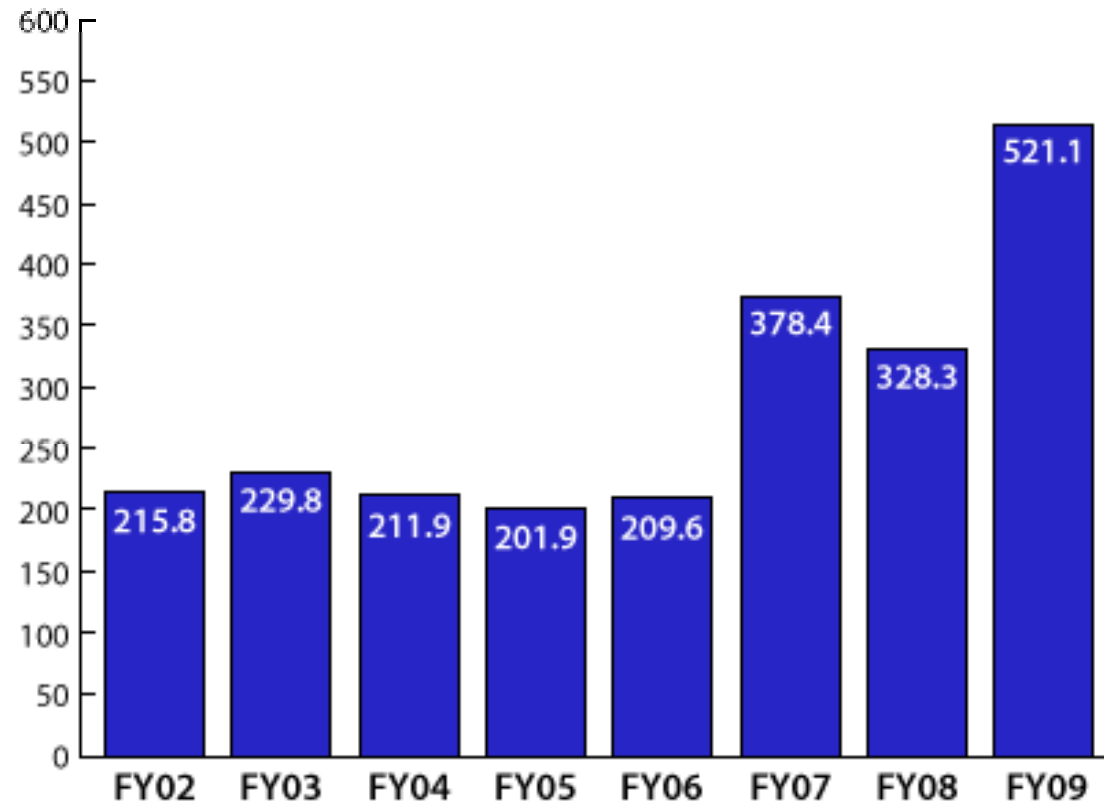
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- Research
 - Historic decline in applied technology funding
 - Death Valley
- Demonstration and Deployment
 - Commercialization hurdle
 - Lack of private funding



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NREL Annual Funding (in \$ Millions per fiscal year)
(www.nrel.gov)



Emerging Energy Technology Grant (EETG)



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- Denali Commission, June 2008
- \$4mill available
- Eligibility
 - Alternative or renewable energy
 - Demonstration phase
 - Viable in 5 years
 - AK applicant
 - Potential for both widespread deployment in AK and reduced energy costs

EETG: Results



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- 9 recipients out of 50 applications
- Academic entities, local governments, private investors, tribal groups, nonprofit organizations
- \$29.5 million in requests
 - Batteries and energy storage
 - Electric vehicles for rural areas
 - Hydrokinetic projects
 - Underground coal gasification
 - Seawater heat pumps
 - Controls, smart grids, and monitoring

Nenana - ORPC



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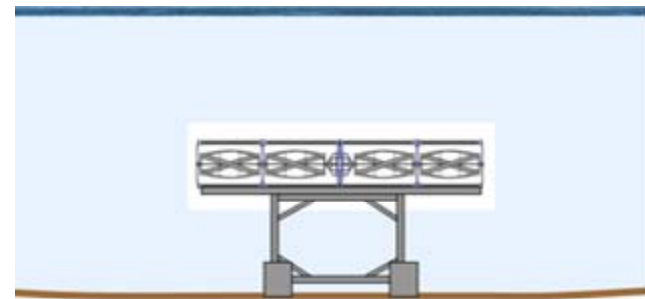


Nenana - ORPC

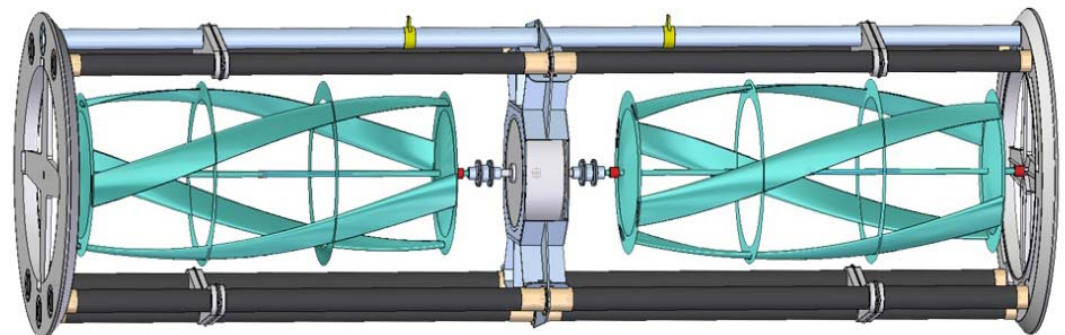
- Partnership with AHERC
- Foundation Issues
- Debris
- Resource Research
- Environmental Research



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30 kW Rivgen™ TGU unit

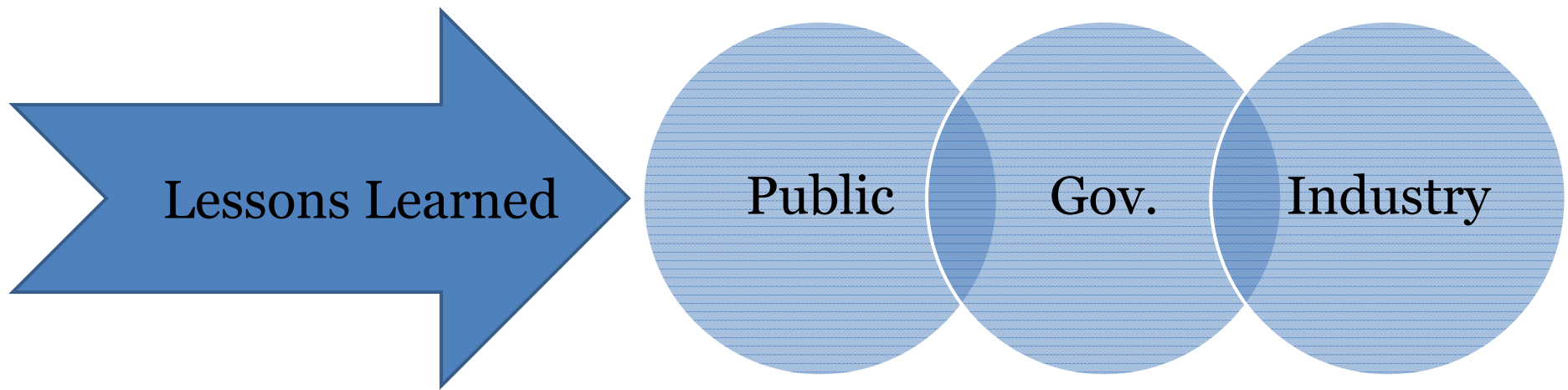


Lessons Learned



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“A critical element of funding emerging energy technology projects is the inclusion of a robust data collection and analysis component.”



Nenana - ORPC



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- Spring 2010 – Resource assessment and design
- Summer 2010 – Testing in Maine
- Winter 2010/11 – Design and development
- Summer 2011 – Deployment in Nenana
- Fall 2011 – Testing
- Winter 2011 - Reporting

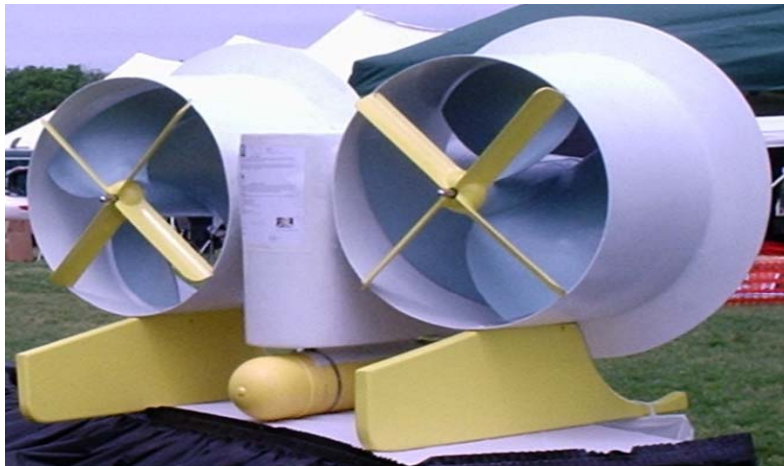
Eagle - APT



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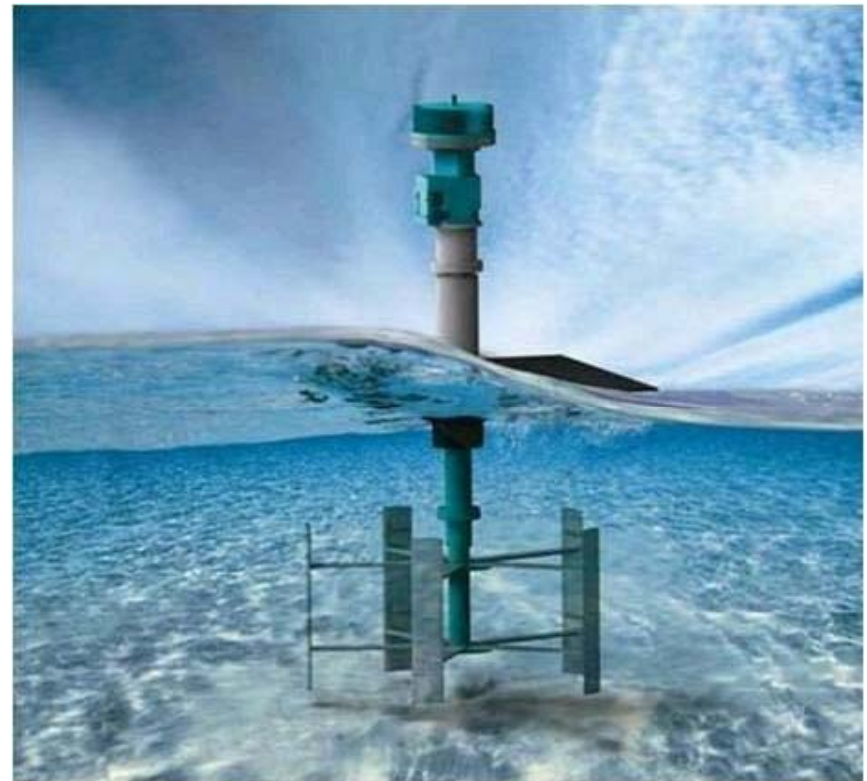


Then



Now

- New Energy Corporation
- ABS Alaska
- 25 kW Encurrent Turbine





Eagle - APT



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- Summer 2009 – Technology RFP
- Winter 2009/10 – Design and Preparation
- Summer 2010 – Deployment
- Summer 2011 – Deployment
- Summer 2012 – Deployment
- 2010-2012 – Project Analysis and Reporting
- Fall 2012 – Final Reporting

Cook Inlet - ORPC



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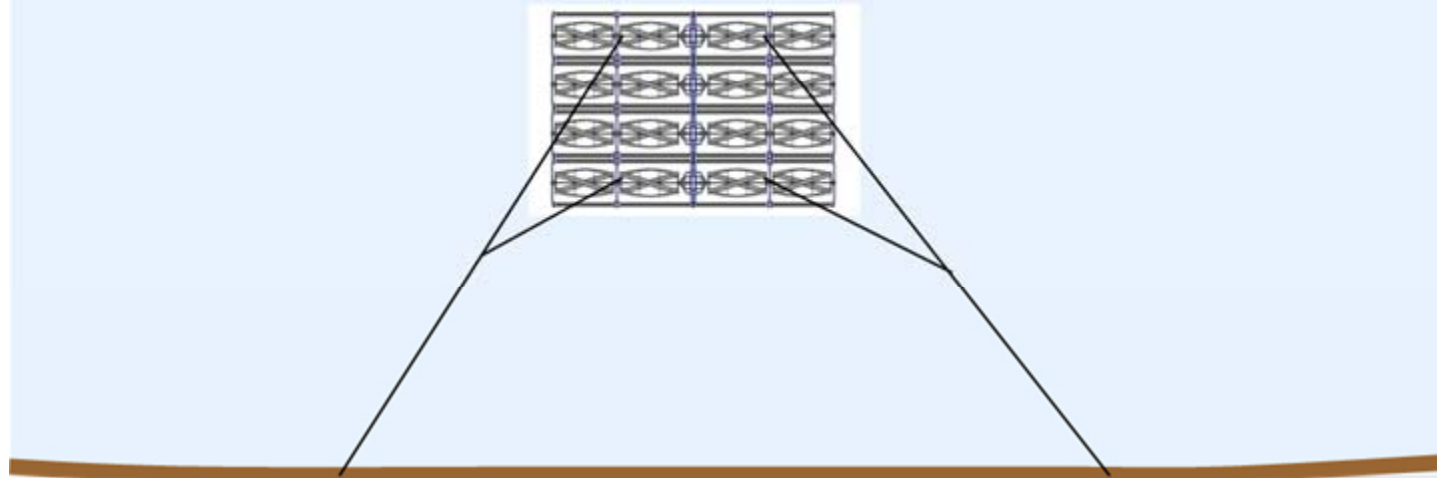


Cook Inlet - ORPC



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“The project should be in the water by 2011, with fishery and beluga whale impact assessments beginning in Summer 2009. The site could ultimately yield an estimated 17 MW of power, enough to power 17,000 homes.”



A single moored OCGen™ Module made of four TGUs
1,000 kW peak production in 6 knot current

Other Projects and Proposals



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- The FERC permitting process has begun for a demonstration project in Gastineau Channel, which could ultimately provide up to 24 MW of electricity generation to supplement Juneau's already existing hydropower sources.
- FERC permitting process has begun for a demonstration project in Kootznahoo Inlet that could ultimately generate up to 7.5 MW of power for sale to Angoon electrical facilities and other parts of the state.
- The community of Yakutat is considering wave energy.
- The City of Homer and the communities of Port Graham and Seldovia are investigating the potential for tidal energy development in Kachemak Bay.
- The community of Whitestone on the Tanana River near Delta Junction is interested in in-river hydro and has been the subject of an EPRI study.
- Igiugig is a small community in southwestern Alaska that may be ideally suited to hydrokinetic power. It is the subject of one of the case studies.
- The Bristol Bay campus is assessing resource potential in Nushagak Bay.
- Interest in review of tidal potential for the entrance to Grantley Harbor.

Feasibility and Assessment



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- AEA Hydrokinetic Resource Assessment
- Multi-site hydrokinetic study
- 2009 - 17 potential sites for turbines on the Yukon and Kuskokwim rivers
- Prof. Tom Ravens, UAA Civil Engineering

EETG: Future



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- SB220
 - SB150 genesis
 - 1/19 – referred to Resources
 - Hearings on 2/17, 2/18
- Federal, Stimulus opportunities
- Uncertainty of Denali Commission funds
- Importance of partnerships, leveraging mutual funding

Questions?

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www.uaf.edu/acep

www.energy-alaska.com

www.akenergynetwork.com

<http://www.lbl.gov/Education/ELSI/research-main.html>

US Energy Information Administration

<http://www.eia.doe.gov/emeu/international/energyconsumption.html>

USDOE, EERE

http://apps1.eere.energy.gov/states/economic_indicators.cfm/state=AK