Chugach Renewable Generation

Q2 Update of Renewable Energy Plan Activities

Chugach Operations Committee Meeting
July 12, 2023

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Presentation Take-Away Messages

1. Two big renewable projects will end study phase in September; if feasible, PPA negotiations in Q4
2. Regulating variable sources is critical
3. Community solar economic evaluation in September
4. Many other projects and policies are in development

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Renewable Energy Plan Progression

2020 Goal:

Add 100,000 MWh of renewable generation by March 31, 2025

2021 Renewable Energy Plan

The focus of this update

2023-2027 Strategic Plan Priority 6: Decarbonization

Reduction Goal: at least 35% by 2030
at least 50% by 2040
Using 2012 as baseline, and if no material impact to member rates

Renewable Energy Plan Focus Areas

1. Issue RFP: Issue a Request for Proposal (RFP) for the purchase of renewable energy generation

2. Develop Known Renewable Projects: Continue to pursue potential renewable energy projects

3. Create Policy Changes: Pursue regulation and legislative changes that remove regulatory barriers to the deployment of renewable generation

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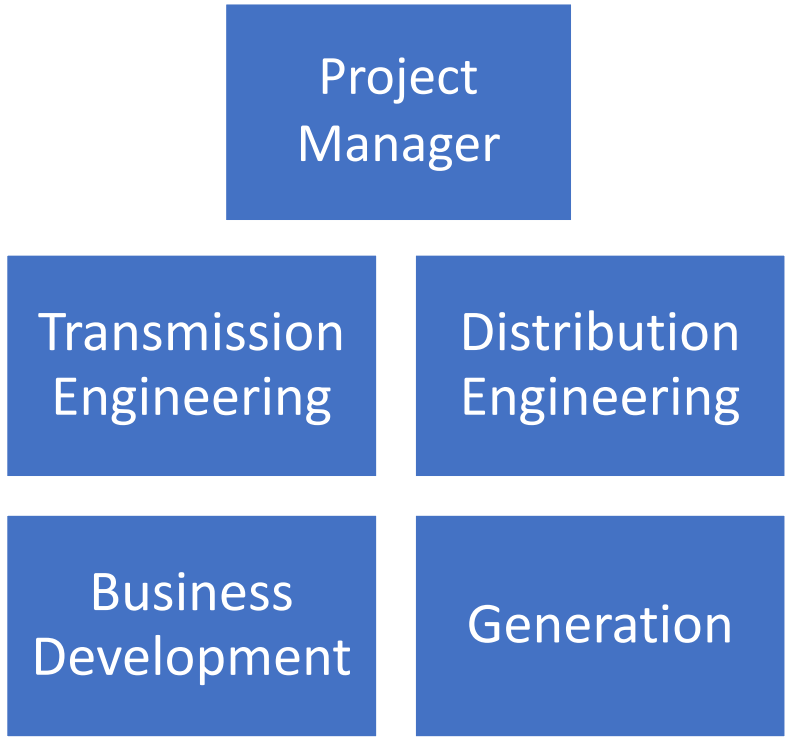
1. Issue RFP: Issue a Request for Proposal (RFP) for the purchase of renewable energy generation

Focus Area 1

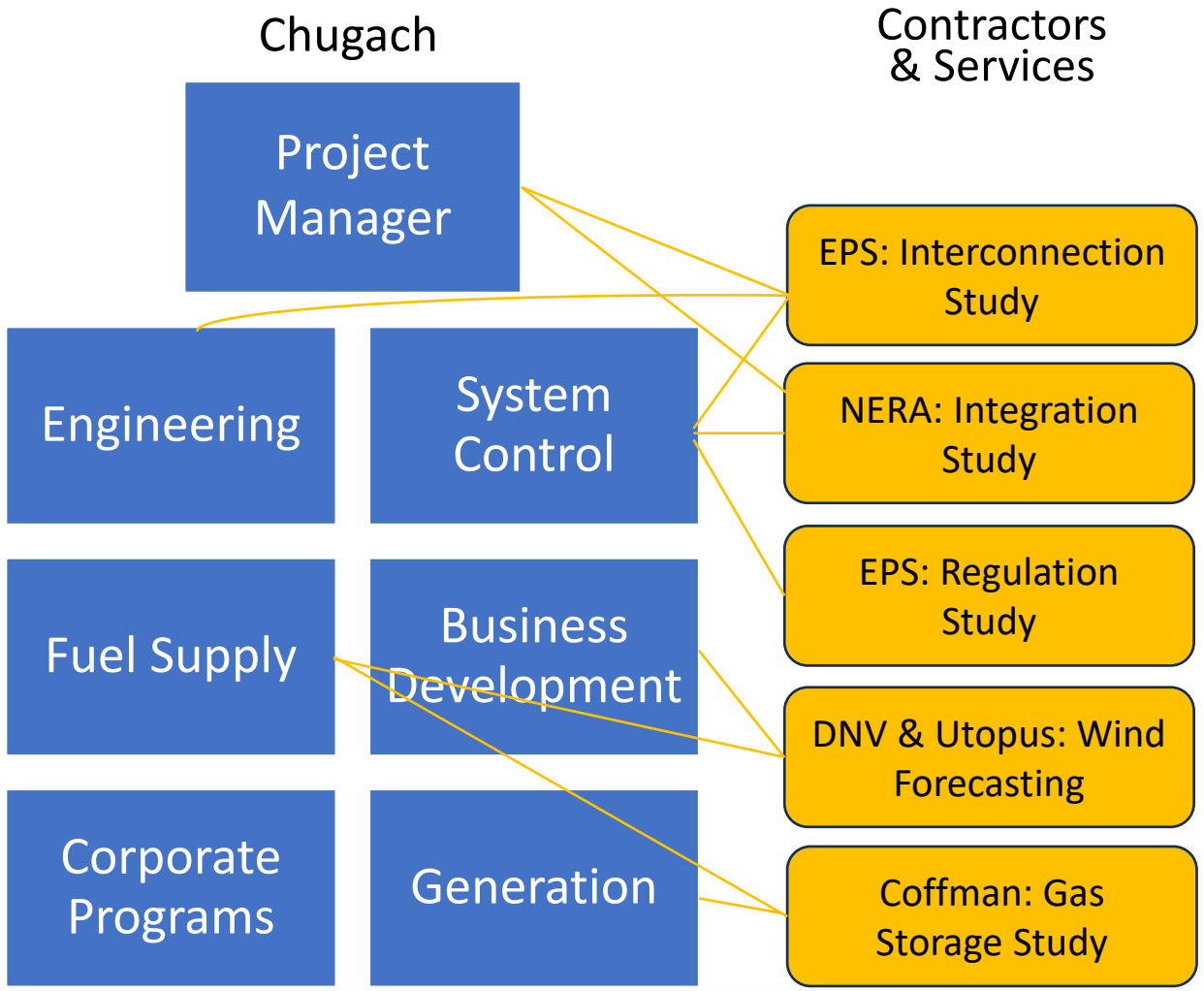
- Issue Request for Proposals
- Goal: Identify renewable projects that can meet or beat Chugach avoided cost. We requested best price, even if higher than avoided cost.

Value and Importance of Multi-Disciplinary Teams

RFP Evaluation Team



Studies Team



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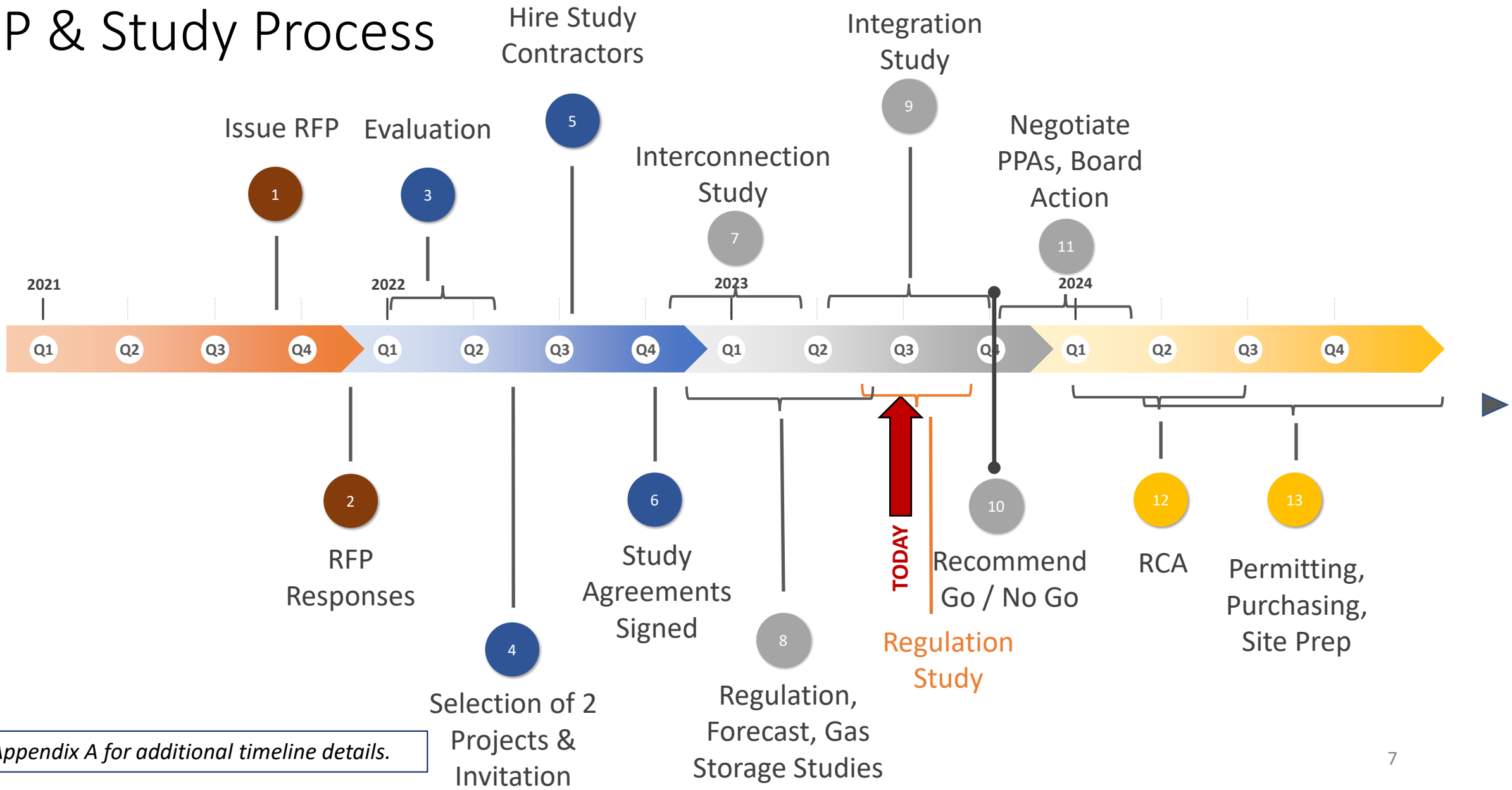
Focus Area 1: RFP for Renewable Energy

RFP & Study Process

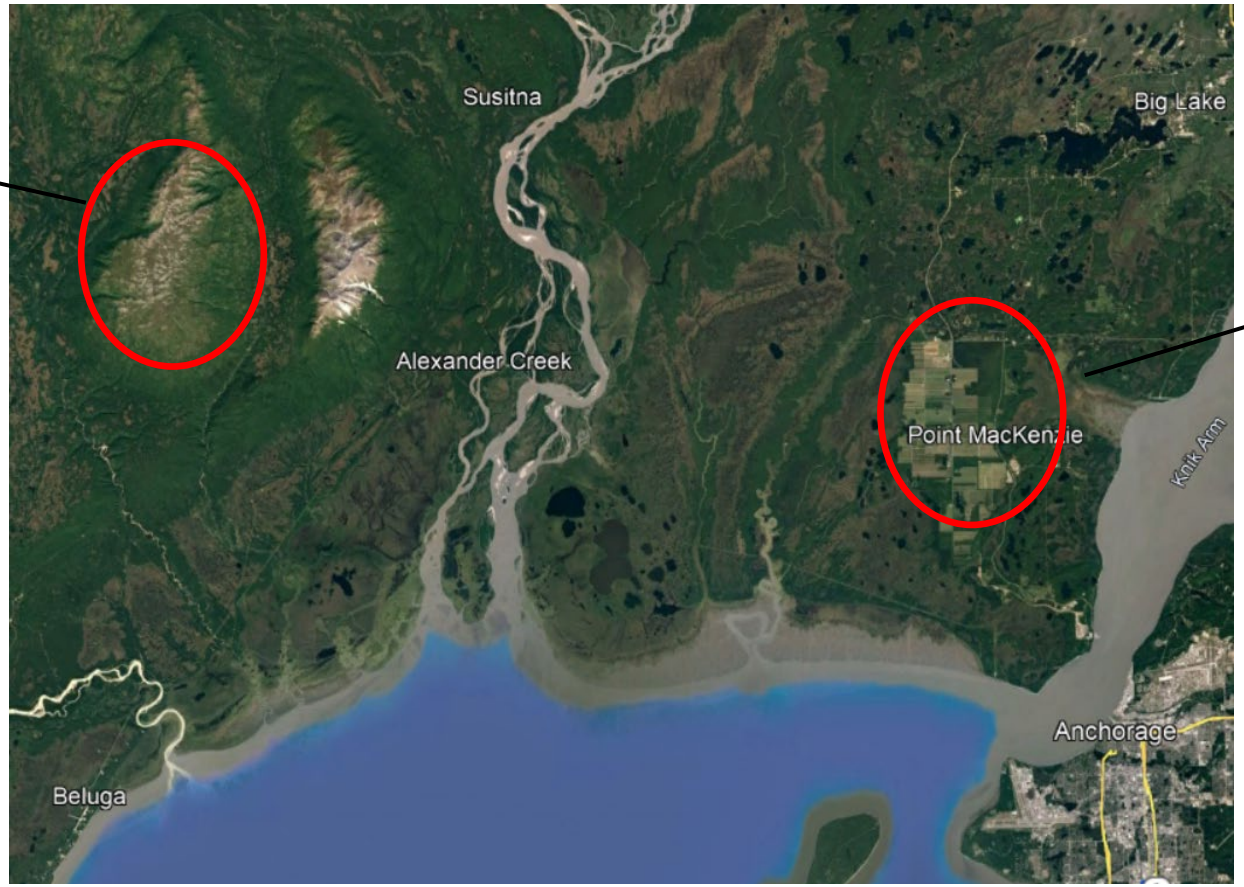


See Appendix A for additional timeline details.

Focus Area 1: RFP for Renewable Energy

A dozen proposals received for a wide variety of technologies.
Two proposals under detailed interconnection and integration studies:

Alaska Renewables
Little Mount Susitna Wind
122 MW
West of Mt. Susitna



Ranger Power
Midnight Solar
120 MW
Near Point MacKenzie

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Progress This Quarter: Studies Performed

- ✓ Interconnection Studies (technical feasibility)
  - ✓ LMS Wind Interconnection: **Completed**
    - ✓ Steady-state and dynamic stability assessed at 122 MW
    - ✓ Two transmission lines needed to avoid largest contingency
    - ✓ Ring bus at LMS substation needed
    - ✓ Beluga to Pt MacKenzie line has sufficient capacity
    - ✓ Transfer limits of south and north intertie are impacted
  - ✓ Midnight Solar Interconnection: **Completed**
    - ✓ Similar detail to LMS
  - Wind + Solar Interconnection: **Expected mid-July**
- ✓ Meteorological Stations
  - ✓ Lidar installed at LMS in June (Tower in Oct. '22)
  - ✓ Solar met station installed in June
- ✓ Natural Gas On-Site Storage FEED Study **Completed**
  - ✓ CNG is selected technology
  - ✓ Gas storage at Sullivan or SPP possible
  - ✓ Capacities studied: Enough to run 50 MW or 100 MW turbines; Storage volume for 6 to 24 hours
- Regulation Study
  - Work in progress, Complete by Aug. 31
- Wind Forecasting
  - ✓ Three forecast services established
  - Ongoing testing
- Integration Study (economic feasibility)
  - ✓ Base model prepared
  - ✓ Initial regulation process provided June 26
  - Scenario modeling by Sep. 29

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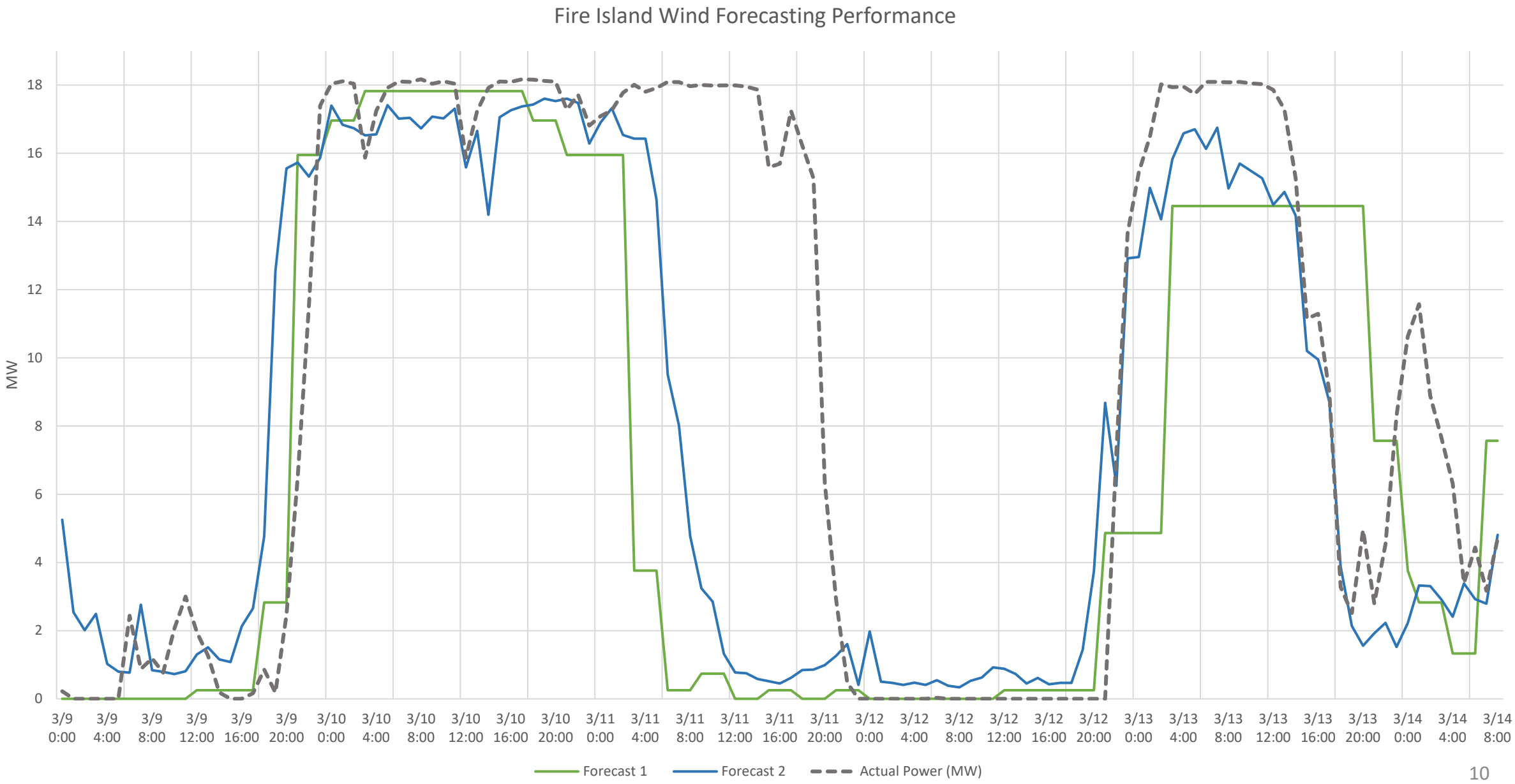
Regulation of Intermittent Resources is Critical - Wind Forecasting Example



Focus Area 1: RFP Next Steps for Renewable Energy

Next Steps

- Complete interconnection studies - July 14, 2023
- Finalize regulation study and ramp rate requirements - August 31, 2023
- Integration studies - September 2023

- If feasible and cost-effective, negotiate power purchase agreements – October - December 2023
- Board action on PPA - January 2024
- Submit agreements to Regulatory Commission of Alaska - February 2024
- Permitting, purchasing, site preparation, construction - 2024 to 2025
- Project commissioning and operation - 2025 to 2026

2. Develop Known Renewable Projects: Continue to pursue potential renewable energy projects

Focus Area 2

- Develop Known Renewable Projects

Focus Area 2:

DEVELOP KNOWN RENEWABLE PROJECTS

COMPLETED

- Two AWWU PRV to hydro, 28 kW and 45 kW
- Heat Pump Program Initiated Feb. 1, 2023

ACTIVE EVALUATION

- Community solar
- Solar on building C
- Two hydro projects
- CNG storage
- Railbelt wind studies
- Two tidal projects
- MOA waste to energy

CONCEPTS

- PRV to hydro #3
- Community Heat Pump
- Refurbish wind
- H2 or solar at Beluga
- Solar at SPP
- Landfill methane
- Pt. Mac Sub solar
- Others under NDA

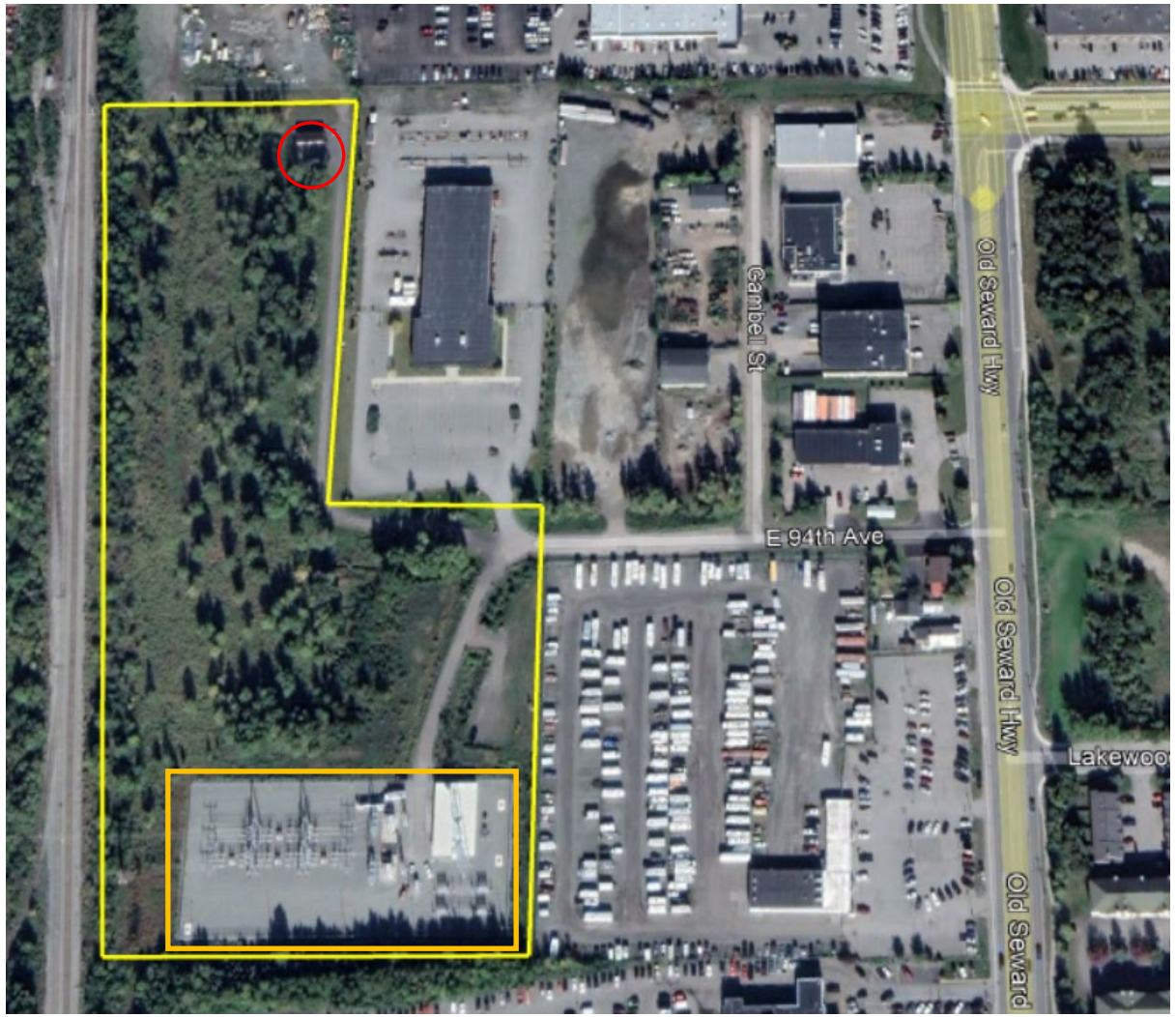
STOPPED

- Five+ solar projects at distribution system scale

See Appendix B for additional detail.

Focus Area 2: Community Solar Location

- Chugach owned Retherford Substation Property
- 800 E 94th near Old Seward Hwy
- 13.6 acres total
- 500 kW solar
- Little shading
- Interconnect to substation (35kV) or feeder on Old Seward (15kV)



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Focus Area 2: Community Solar Update

Coffman Engineering contracted for Front End Engineering and Design

- ✓ Conceptual array design
- ✓ Site design and permitting
  - Geotechnical engineering (Shannon & Wilson)
  - Site survey (Farpoint Land Services)
  - Permitting (Solstice Alaska Consulting)
- Electrical Interconnection Design (7/14)
- Economic Analysis (7/21)
  - Chugach Evaluation of Results
- RFP development for PV Installation (8/11)

Economic evaluation to be completed in September.

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3. Create Policy Changes: Pursue regulation and legislative changes that remove regulatory barriers to the deployment of renewable generation

Focus Area 3

- Create Policy Changes

Focus Area 3: Address from Policy Perspective

Policy Initiatives

- Chugach and Railbelt utilities are working on recommendations for legislation for renewables and clean energy.

- Chugach is prepared to work with a legislative committee or participate in hearings ahead of the 2024 legislative session.

- Chugach is researching legislative bills and industry best practices involving net metering and community solar.

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Questions?

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Appendix A

RFP and Study Process Details

RFP Key Process Steps

1	RFP written, issued, distributed widely	Sep. 2021
	Pre-proposal videoconference	Nov. 2021
2	Proposal deadline	Dec. 17, 2021
3	Form review team:	Dec. 2021
	Chugach economic & technical 4-stage review	Jan. 2 to Feb. 22, 2022
	Economic screening and notification of proposers	Feb. 22, 2022
	Technical scoring and additional questions for leading proposers	Mar. to Apr. 12, 2022
4	Decision and notification	Mar. 25, 2022
5	Develop interconnection study scope, schedule, budget	Apr. 2022
	Develop integration study scope, schedule, budget	Apr. 2022
	Invitation to enter study agreement, delivery of study agreement	May 18, 2022
6	Acceptance of study agreement & pre-payment	Sep. 16, 2022 & Nov. 7, 2022
7&8	Study kick-off meetings	Oct. 2022 & Nov. 2022
	Data gathering, model inputs, site control	Oct. 2022 to May 2023

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Interconnection Study Timeline Examples

- Proposer providing data, modeling, one-line development, PSS/E model development - Oct. 2022 to May 2023
- Scoping & methodology decisions - Oct. 2022
- Railbelt PSS/E model updating - Oct. 2022
- Base case transfer limits, contingency review - Nov. 2022
- Initial modeling new facilities, begin dynamic modeling - Dec. 2022
- Beluga transfer limit - Jan. 2023
- PSCAD modeling, EMT modeling - Feb. 2023
- Modeling and modeling reviews - Apr. 2023
- Multiple interconnection configurations, report writing - May 2023
- Reporting, Chugach review, finalization - Jun. 2023

PSS/E: Power System Simulator for Engineering
PSCAD: Power Systems Computer Aided Design
EMT: Electromagnetic Transient Modeling

Appendix B

Focus Area 2 Project Updates

Focus Area 2: Projects Completed

Project	Capacity & Type	Status
AWWU Energy Recovery 1	45 kW Hydro	Completed, operational
AWWU Energy Recovery 2	28 kW Hydro	Completed, operational
Heat Pump Program **	N/A Geo/Air	Feasibility study completed; Heat Pump Incentive Program designed in 2022, implemented 2023.

** Chugach-led initiative * Chugach-involved initiative Others are third-party initiatives

Focus Area 2: Projects Under Active Evaluation 1

Project	Capacity & Type	Status
Community Solar **	500 kW Solar	Chugach hired Coffman Engineers to conduct FEED study to examine the feasibility of locating community solar at Retherford substation near 94th and Old Seward.
Solar on Building C Expansion **	170 kW Solar	Preliminary design complete, out to bid.
Dixon Diversion *	~40% more hydro energy from Bradley	Chugach awarded $1M grant from Alaska Renewable Energy Fund on behalf of BPMC; economic feasibility currently under study.
Utility scale hydro **	Hydro	Chugach installed stream gauging to measure water flows. Applied for Renewable Energy Fund Round 15: recommended but not funded.
Natural Gas Storage for regulating renewables **	50-100 MW Storage (for 6-24 hours)	FEED study conducted. Results being considered in economic evaluation of alternatives.
Railbelt wind study *	N/A	Coordinated Railbelt utility study of best possible wind locations and meterological tower installation

Excludes projects from RFP process

** Chugach-led initiative * Chugach-involved initiative Others are third-party initiatives

Focus Area 2: Projects Under Active Evaluation 2

Project	Capacity & Type	Status
Turnagain Arm Tidal	1 MW Tidal	Chugach is supporting all tidal energy development in Cook Inlet and will sign a letter of support for the Turnagain Arm Tidal Electricity Generation project's DOE funding application.
Hilcorp Tidal	TBD Tidal	Hilcorp, Chugach and ACEP examining options; Hilcorp expected to make idle platforms available
Anchorage Waste to Energy Project	20-30 MW Biomass	After project dormancy, a project proponent is actively promoting the project again, met with Chugach in June 2023.

Excludes projects from RFP process

** Chugach-led initiative * Chugach-involved initiative Others are third-party initiatives

Focus Area 2: Concepts Under Consideration

Project	Capacity & Type	Status
AWWU Energy Recovery 3	250 kW Hydro	AWWU awaiting results of prior projects
Seward Ground Source Heat Pump	N/A Geothermal	City seeking other funding sources
AVTEC Wind	100 kW Wind	Recommissioning and commercial arrangement needed
Hydrogen or Solar at Beluga **	TBD	Examined the potential to install solar to replace Unit 7, and the possibility of using unscheduled renewables to produce hydrogen to burn at Beluga
Solar on SPP **	100 kW Solar	Chugach hiring decarbonization contractors then implementing this project in order of priority/availability
Landfill Excess Methane *	Unknown	New concept to consider
Point MacKenzie Substation Solar	5 MW	Adjacent landowner pursuing options to develop solar and interconnect at transmission substation. Very expensive due to high voltage interconnection.
Other options under NDA	>100 MW	

** Chugach-led initiative * Chugach-involved initiative Others are third-party initiatives

Focus Area 2: Projects Stopped or Paused

Project	Capacity & Type	Status
Renewable IPP	6 MW Solar	Multiple locations investigated for distribution-connected solar. IPP ended projects due to poor project economics from high land values and/or citing permitting challenges.
JBER Solar	4.5 MW Solar	JBER paused the project in 2021
3rd Avenue Solar	50 kW Solar	No known activity by organizer
Solar/EV Charging Demo	20 kW Solar	Third-party decided not to pursue the project
Commercial/Industrial Solar	200 kW Solar (est.)	Third-party found the land unsuitable for solar

** Chugach-led initiative * Chugach-involved initiative Others are third-party initiatives