

**PRIX POUR L'INTÉGRATION ÉOLIENNE
DANS CERTAINES JURIDICTIONS NORD-AMÉRICAINES –
BALISAGE EXTERNE DE LA FIRME THE BRATTLE GROUP**

Wind Integration Services

SUMMARY OF WIND INTEGRATION RATES IN THE U.S.

PREPARED FOR
Hydro Québec Distribution

PRESENTED BY
Metin Celebi

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THE **Brattle** GROUP

Overview

The mandate given by Hydro Québec Distribution (HQD) to The Brattle Group (Metin Celebi):

- Review and summarize wind integration service rates in the U.S. by Balancing Authorities (BAs) outside Regional Transmission Organization (RTO) regions.

The Brattle Group has comprehensively researched wind integration rates currently charged in the U.S. non-RTO regions.

- Updated the wind integration rates for the BAs reported in Phil Hanser's 2013/2016 testimony (BPA, PSE, Northwestern, Idaho Power)
- Included four additional BAs (Avista, PacifiCorp, WACM, and PSCo) that charge wind integration service rates.

In the U.S., the approved rates for wind integration are limited to the services required for intra-hour variability in wind production (e.g., regulation and frequency response).

- These rates vary in a wide range of \$0.16-\$1.92/kW-month (\$0.63-\$7.51/MWh at 35% capacity factor) depending on the types of wind generation schedules and overall penetration of wind.

Approved Wind Integration Rates in U.S. non-RTO Regions

Overview of Approved Wind Integration Rates

	Year of Rate	Services included in rate	Published Rate (\$/kW-month)	MW Installed Capacity	Published Capacity Factor	Rate in \$/MWh (for published capacity factor)	Rate in \$/MWh (reference capacity factor of 35%)
			[1]	[2]	[3]	[4]	[5]
BPA	2020						
30/15 [30 min signal for each 15 min period]	[a]	Regulation, Following and Imbalance Reserves	\$0.63	2,764	25%	\$3.51	\$2.47
30/60 [30 min signal for each 60 min period]	[b]	Regulation, Following and Imbalance Reserves	\$0.93	2,764	25%	\$5.19	\$3.64
Uncommitted Scheduling	[c]	Regulation, Following and Imbalance Reserves	\$1.09	2,764	25%	\$6.08	\$4.27
PSE	2019						
25/15 [25 min signal for each 15 min period]	[d]	Regulation and Frequency Response Service	\$0.78	772	70%	\$1.51	\$3.03
30/30 [30 min signal for each 30 min period]	[e]	Regulation and Frequency Response Service	\$1.09	772	70%	\$2.11	\$4.25
Uncommitted Scheduling	[f]	Regulation and Frequency Response Service	\$1.55	772	70%	\$3.02	\$6.07
NorthWestern	2019						
Charges to QF Wind	[g]	Regulation Reserves, Imbalance Service and Scheduling	\$0.16 - \$1.92	352	38%	\$0.58 - \$6.92	\$0.63 - \$7.51
Charges to Any Wind	[h]	Regulation and Frequency Response Service	\$1.42	538	38%	\$5.10	\$5.54
Idaho Power	2018						
Low Wind Buildout	[i]	Regulation Reserves	\$0.94	727	29%	\$4.52	\$3.69
Medium Wind Buildout	[j]	Regulation Reserves	\$1.01	800	28%	\$4.88	\$3.97
High Wind Buildout	[k]	Regulation Reserves	\$1.15	900	28%	\$5.56	\$4.50
Avista - Idaho	2020						
Estimated 2020 Charge	[l]	Unspecified	\$1.17	105	37%	\$4.34	\$4.59
Maximum Charge	[m]	Unspecified	\$1.76	105	37%	\$6.50	\$6.87
PacifiCorp	2020						
Committed Schedule	[n]	Regulation and Frequency Response Service	\$0.47	2,773	23%	\$2.75	\$1.84
Uncommitted Schedule	[o]	Regulation and Frequency Response Service	\$0.55	2,773	23%	\$3.22	\$2.15
Western Area Colorado Missouri (WACM)	[p]	2019 Regulation Reserves	\$0.32	295	44%	\$0.99	\$1.25
PSCo	[q]	2020 Regulation and Frequency Response Service	\$0.84	3,424	33%	\$3.51	\$3.30

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