Tacoma Power as a Balancing Authority

July 8, 2026 PUB Presentation

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Discussion Topics

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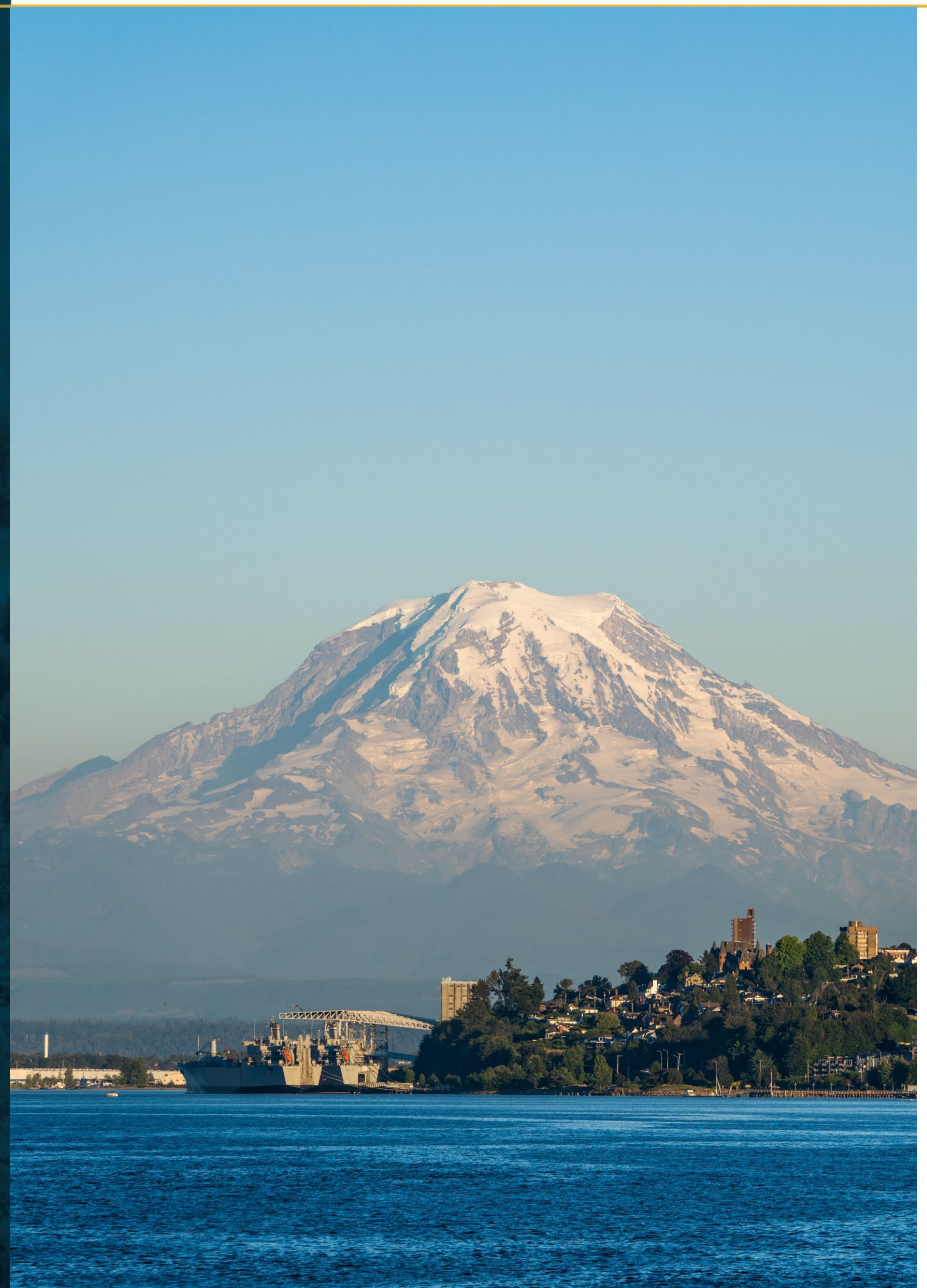

- History of what we do
- How Tacoma Power balances load and generation
- Benefits of being a Balancing Authority

History

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Balancing Authority Role

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What is the Balancing Authority role in grid reliability?

Maintains Balance

Ensures power system demand and supply are always balanced.

Prevents Collapse

If supply falls below demand, then the system frequency can drop and cause blackouts or equipment damage.

History of Regional Integration Efforts

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Formation of the Western Power Pool (WPP)

Key Milestones

1917 — **First** interconnection in the PNW between Pacific Power & Light Co. and Washington Water Power Co.

1941 — **Six regional** utilities formed the Northwest Power Pool (NWPP)

1942 — **Tacoma Public Utilities** joined the NWPP

1970 — **Reserve Sharing** was occurring on an informal basis among the members and was eventually formalized in 2002.

Source: WPP

History of Federal Requirements

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Key Milestones

1965 **Northeast Blackout** affecting 30 million people results in proposed legislation in 1967 and whlle not passed, an industry electric reliability council (NERC) is created

1977 **New York City Blackout** – federal legislation drives the adoption of voluntary industry standards.

1996 **West Coast Blackouts** – two major blackouts in western US prompts the formation of the predecessor to WECC, called the Western Systems Coordinating Council (WSCC).

2003 **Worst Blackout in US History** - 50 million people lose power in the Northeast and Midwest.

2005 **Energy Policy Act of 2005** creates FERC oversight of grid reliability and mandates creation of enforceable Reliability Standards.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

2007: Fully Enforceable - FERC approves 83 NERC Standards. These Standards become fully enforceable with penalties up to $1 million per day per violation.

2007: Tacoma Power registered as a Balancing Authority

Why are we registered as a Balancing Authority?

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Short answer: NERC requires entities to register for "Functions" based on the activities or services that a company performs.

NERC Standards are then applied only to entities that perform these specific "Functions".

Long answer: per the Federal Power Act, 18 CFR 39.2c:

"(c) *Each user, owner and operator of the Bulk-Power System within the United States (other than Alaska and Hawaii) shall* ***register*** *with the Electric Reliability Organization [NERC] and the Regional Entity for each region [WECC] within which it uses, owns or operates Bulk-Power System facilities, in such manner as prescribed in the Rules of the Electric Reliability Organization and each applicable Regional Entity*." (emphasis added)

What are the registered functions?

Tacoma Power is registered for 10 out of 14 functions

	Entities that Must Register	Entities that Need to be Certified
Reliability Coordinator (RC)	√	√
Transmission Operator (TOP)	√	√
Balancing Authority (BA)	√	√
Planning Authority/Planning Coordinator (PA/PC)	√	
Transmission Planner (TP)	√	
Transmission Service Provider (TSP)	√	
Transmission Owner (TO)	√	
Resource Planner (RP)	√	
Distribution Provider (DP)	√	
Generator Owner (GO)	√	
Generator Operator (GOP)	√	
Reserve Sharing Group (RSG)	√	
Frequency Response Sharing Group (FRSG)	√	
Regulation Reserve Sharing Group (RRSG)	√	

List of functions that entities are required to register are provided in the NERC Rules of Procedure, Appendix 5B, “Statement of Registration Criteria”

NERC Defined Responsibilities

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What is the Balancing Authority function?

- Definitions are provided in the NERC Rules of Procedure, Appendix 5B, "Statement of Registration Criteria"

BA **Balancing Authority**

The responsible entity that integrates resource plans ahead of time, maintains Load-interchange-generation balance within a Balancing Authority Area, and supports interconnection frequency in real-time.

Balancing Authorities in the West

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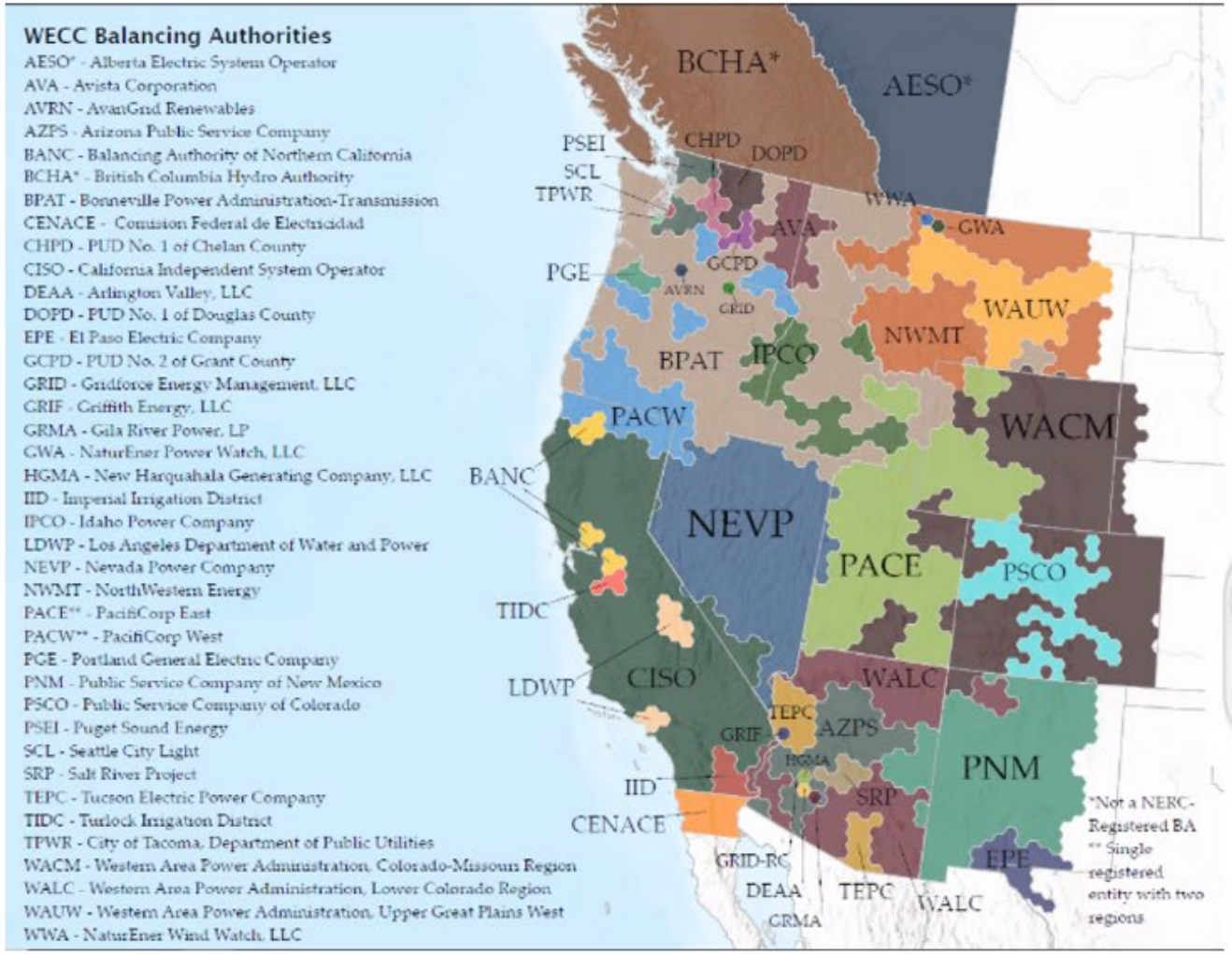
Western Interconnection at a Glance



158,332 TOTAL
Miles of transmission lines

90+ MILLION
People living in the Western Interconnection

168.2 GW
Interconnection peak demand

448
Registered Entities

329
Generation Owners

52
Transmission Operators

37
Balancing Authorities

4
Reliability Coordinators

Responsibilities and How It Works

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Balancing Authority Role

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Balancing TPU

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
CAISO Load Forecast + CPs	441	423	415	411	419	448	498	544	570	580	589	592	594	594	592	595	616	649	647	633	616	591	554	506	13117
TPWR NEW INTERCHANGE	-123	-109	-99	-99	-110	-14	-51	-74	-92	-181	-179	-194	-186	-184	-188	-191	-207	-202	-169	-131	-96	-77	-91	-81	-3128
BPA Block	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	
RIGHT TO POWER - CURRENT	285	270	260	260	270	225	210	230	250	288	286	301	292	242	270	298	314	309	276	238	203	183	252	242	
Purchases/Sales						50	50	50	50					-50	-25										125
Position	-6	-2	-4	0	3	8	0	7	-2	7	-4	8	-2	-4	2	2	87	49	18	-6	-24	-18	-17	21	123.35
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	300
Generation	312	312	312	312	312	442	447	477	476	406	406	406	406	406	406	406	496	496	496	496	496	496	446	446	10112
Mossyrock51	0	0	0	0	0	➔130	➔135	✓165	✓160	➔120	➔120	➔120	➔120	➔120	➔120	➔120	✓180	✓180	✓180	✓180	✓180	✓180	➔130	➔130	2770
Mossyrock52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mayfield41	40	40	40	40	40	40	40	40	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	992
Mayfield42	40	40	40	40	40	40	40	40	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	992
Mayfield43	40	40	40	40	40	40	40	40	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	992
Mayfield44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cushman21	15	15	15	15	15	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15	325
Cushman22	15	15	15	15	15	15	15	15	15	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15	325
Cushman31	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	480
Cushman32	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	480
Cushman33	20	20	20	20	20	20	20	20	20	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20	340
Cushman34	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Cushman35	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Alder11	23	23	23	23	23	23	23	23	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	520
Alder12	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	408
LaGrande1-4	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	432
LaGrande5	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	840
Wynoochee	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	72
Priest Rapids	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Available Spin	48	48	48	48	48	82	77	47	54	94	94	94	94	94	94	94	34	34	34	34	34	34	84	84	
Required Spin	19	18	18	18	18	20	21	22	23	22	22	22	22	22	22	23	25	25	25	23	23	22	22	21	
Available Operating resvs	351	351	351	351	351	221	216	186	193	263	263	263	263	263	263	263	173	173	173	173	173	173	223	223	
Required Operating resvs	37	36	35	35	35	39	41	43	45	44	44	44	44	43	43	45	49	50	49	46	45	44	44	42	

A Deeper Look

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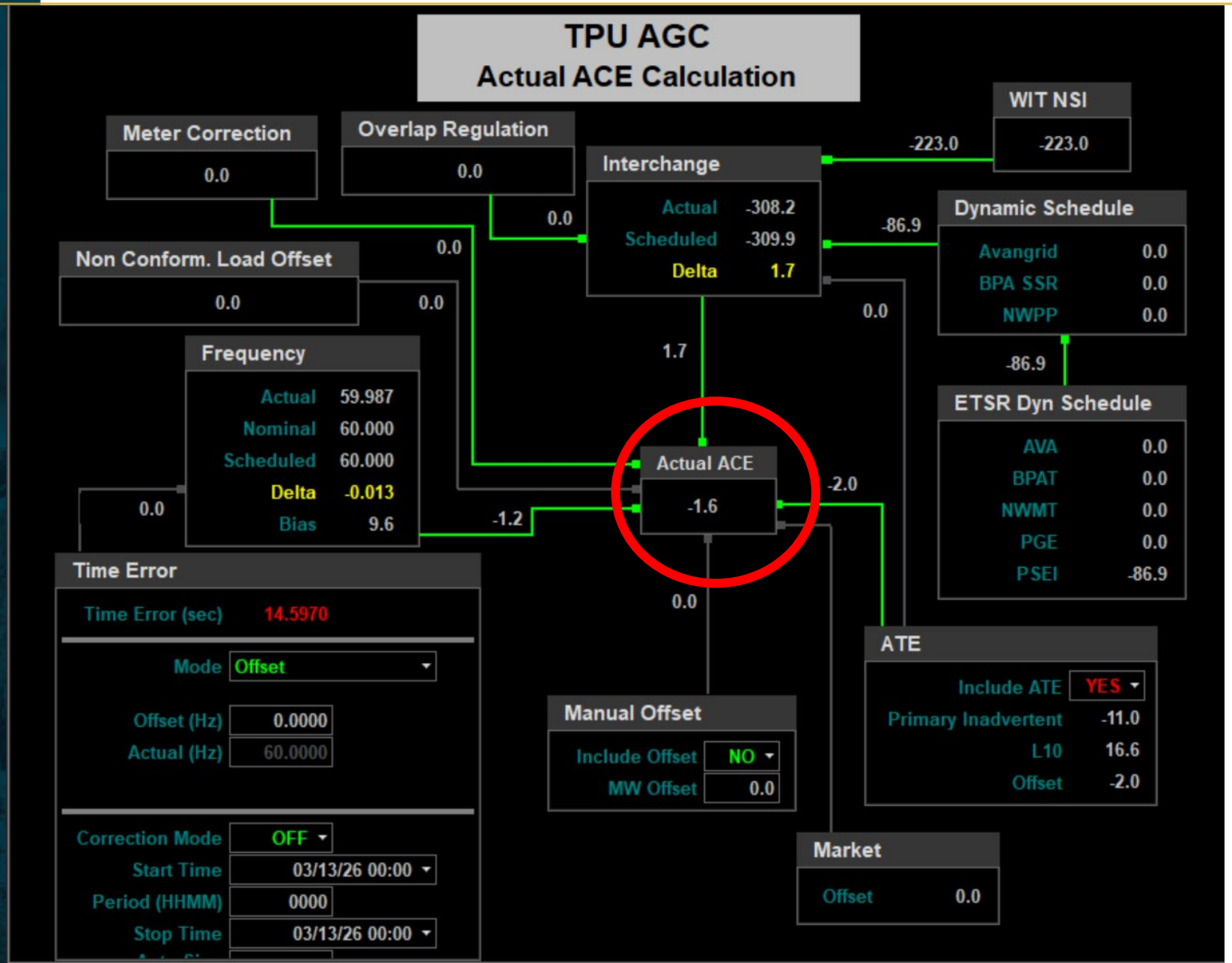

Area Control Error

- This value is the primary measurement of balance
- We want this number close to zero
- Updated every four seconds

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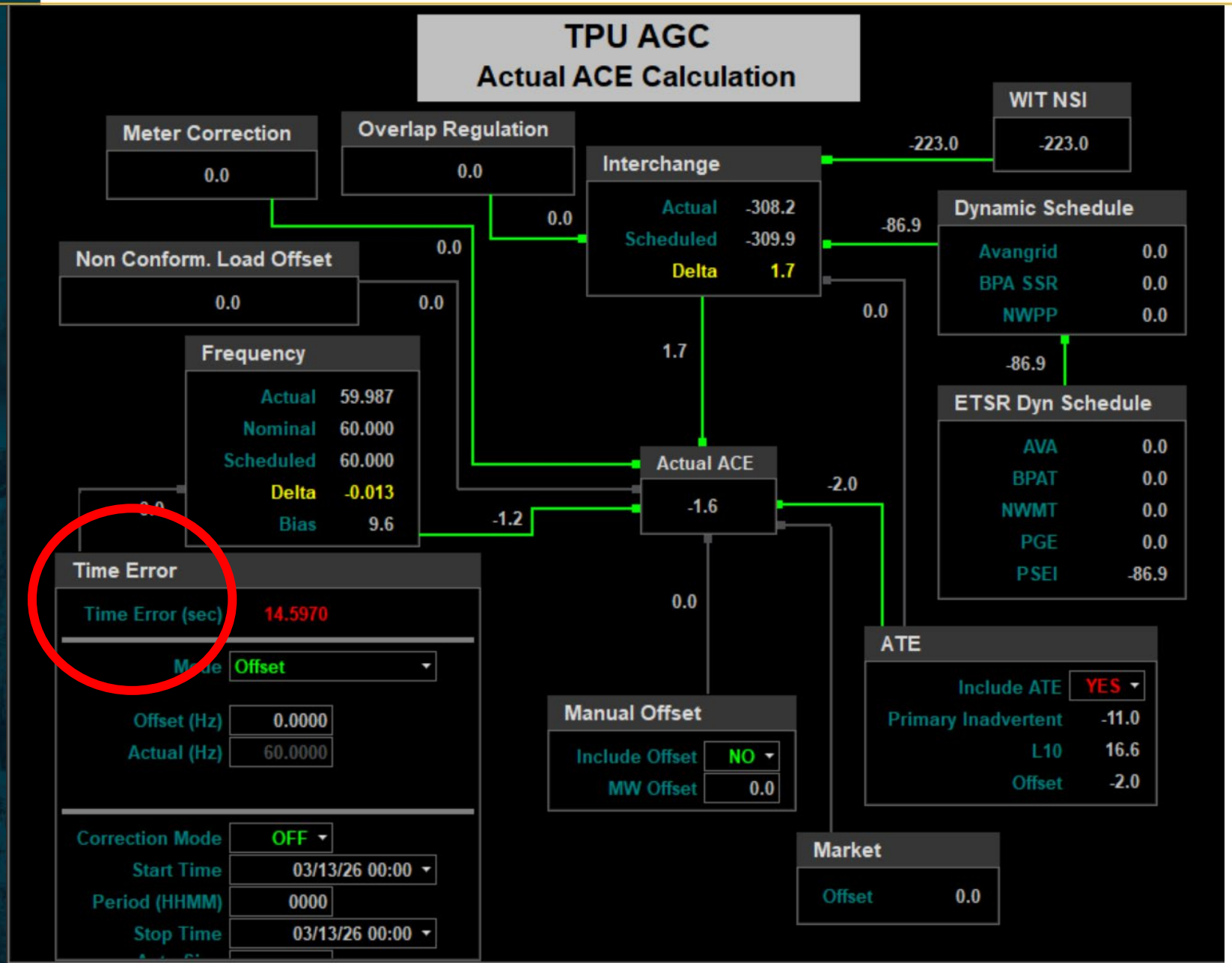

Time Error

- The power grid is used as a reference for time synchronization.
- A load and resource imbalance can impact this synchronization, it is known as "Time Error."
- Balancing Authorities coordinate to correct these errors continuously.

A Deeper Look

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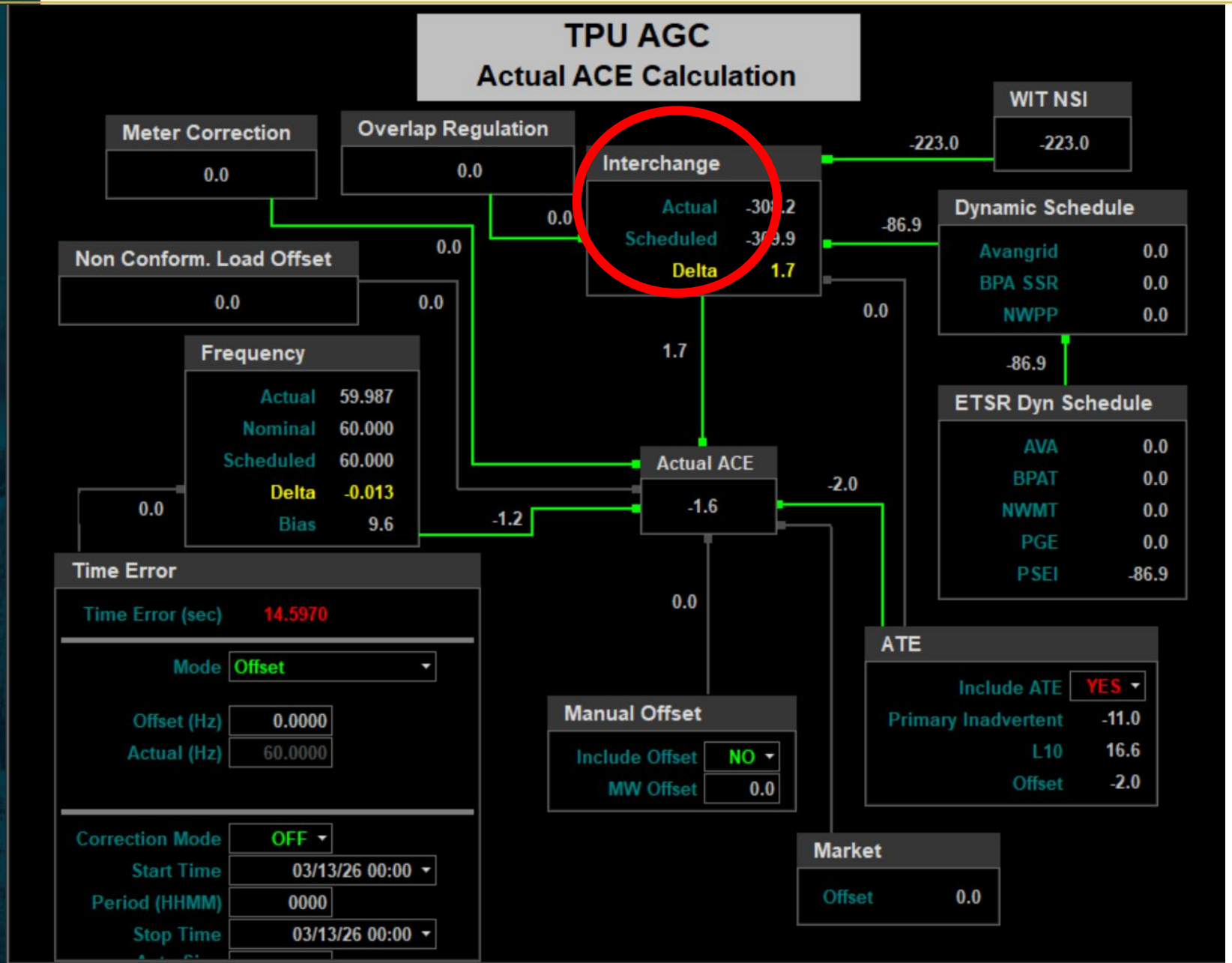

Interchange

- Interchange is the amount of energy we move across our tie-line with other utilities.
- We compare scheduled and actual interchange as a primary influencer on balance.

A Deeper Look

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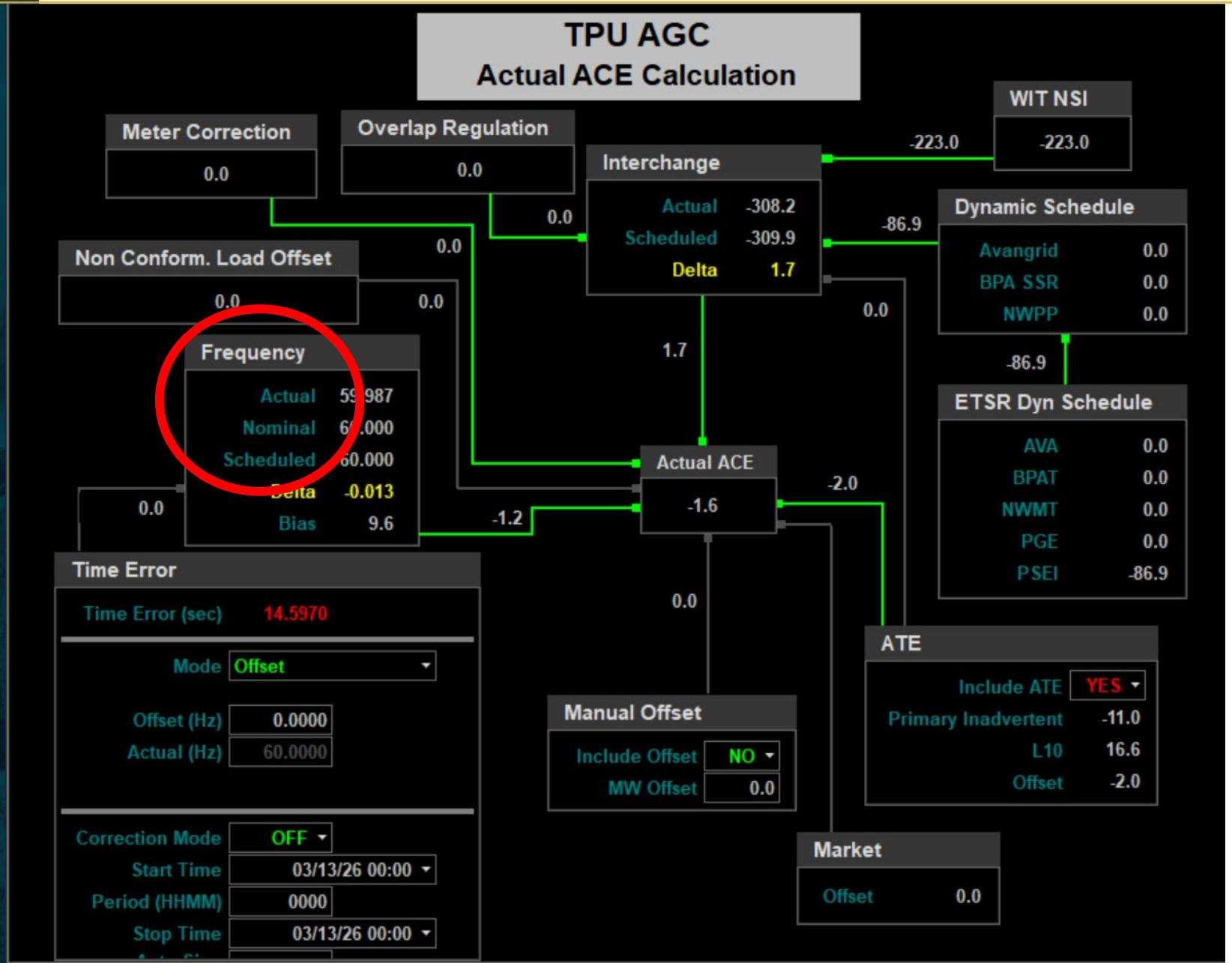

Frequency

- Frequency is often considered the heartbeat of the system.
- We target a stable frequency of 60.0hz.
- High or low frequency is a strong indicator of load and resource imbalance.

Benefits of Being a Balancing Authority

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Benefits of Being Balancing Authority

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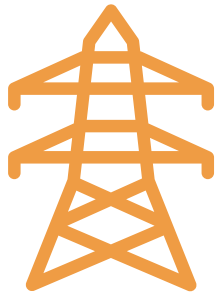
More agile to respond to changing conditions

Enables faster operational adjustments and improved reliability during dynamic system events.

Ability to prioritize City of Tacoma needs

Ensures local priorities drive decision-making and resource allocation.



Direct control of our generation

Strengthens operational independence and enhances strategic use of Tacoma Power assets

Increased access to reserve sharing

Improves system flexibility and resiliency through broader regional reserve support.

Benefits of Being Balancing Authority

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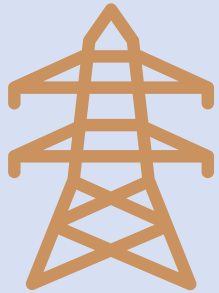

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Strengthens operational independence and enhances strategic use of Tacoma Power assets

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Improves system flexibility and resiliency through broader regional reserve support.

January 2024 Weather Event

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Analysis of the January 2024 Winter Weather Event

Challenge

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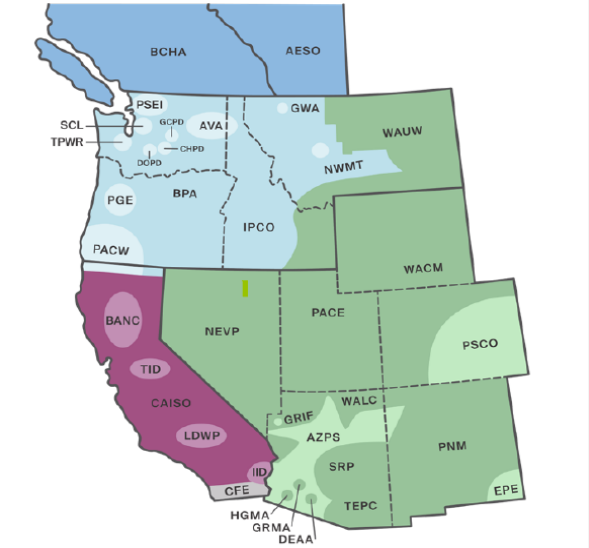
- From January 11th to 17th, 2024, British Columbia, Alberta and the U.S. Northwest region experienced a multi-day cold weather event resulting in high levels of electricity demand.

- In the U.S. Northwest region, wholesale market prices were elevated throughout the period and multiple entities experienced reliability challenges, leading to the declaration of a number of energy emergencies on multiple days.

ENTITY	NUMBER OF EEA EVENTS	NUMBER OF HOURS
Northwest BAA1	1	8
Northwest BAA2	3	13
Northwest BAA3	2	45
Northwest BAA4	2	6
AESO	4	22



TPWR Response

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The Tacoma Power Energy Emergency Response Team includes representatives from T&D Planning, T&D System Operations, Power Management, Generation, TPU Customer Services, and Community Media Services. Current members include:

POWER MANAGEMENT

Todd Lloyd

Assistant Section Manager, Resource Operations & Trading

Casey Rood

Real Time Technical Lead, Real-Time Energy Trading

T&D PLANNING

John Nierenberg

Assistant Section Manager, System Operations and Planning

EMERGENCY MANAGEMENT

Jayson Lelli

Emergency Management Officer

GENERATION

Ozan Ferrin

Assistant Section Manager, Power Generation Engineering

COMMUNITY MEDIA SERVICES

Erin Babbo

Communications & Marketing, Senior Manager

CUSTOMER SERVICES

Dave Rosholm

Account Executive

T&D SYSTEM OPERATIONS

Harley Johnson

Manager

Cullen Ritchie

Chief Dispatcher - Reliability

Mike Grohoski

Chief Dispatcher - Distribution

TPWR Response

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Emergency Management
Activates ICS/EOC → establishes objectives & IAP cadence

System Operations
Assesses grid status; sets switching strategy and priorities

Transmission & Distribution
Executes field isolation/repair; reports damage assessments to Planning

Generation
Adjusts output and coordinates unit start/stop to stabilize the system

Power Management
Models restoration scenarios, constraints, and ETAs

Resource Operations & Trading
Manages market positions consistent with system conditions and limits

Communications
Publishes outage maps, safety messages, press/media updates

Customer Service
Scales call center, pushes proactive notifications to impacted customers

Planning and Positioning

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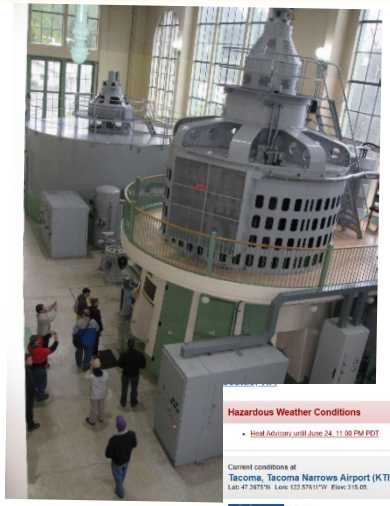

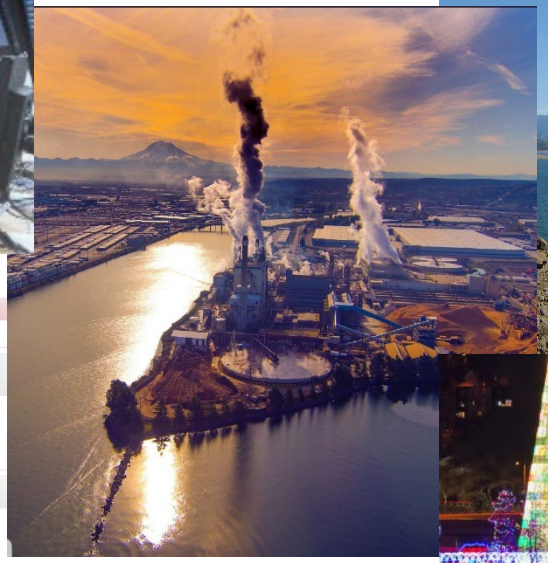

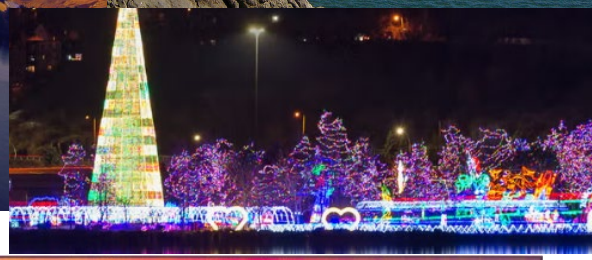

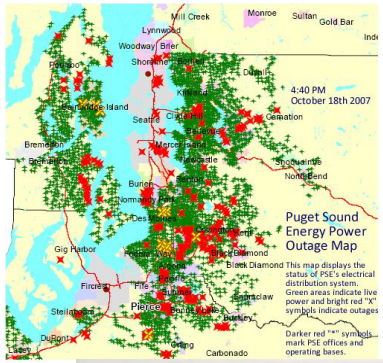

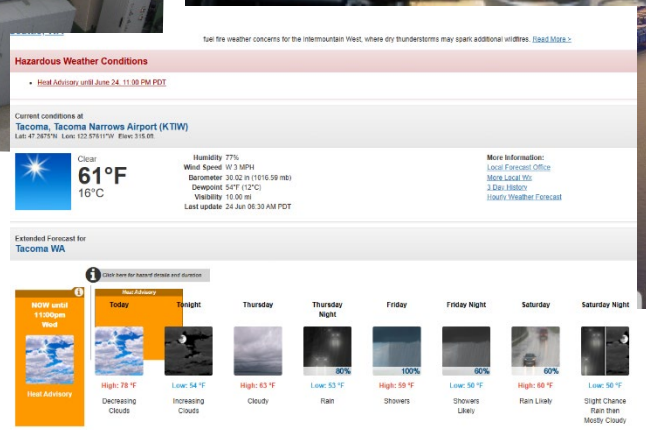

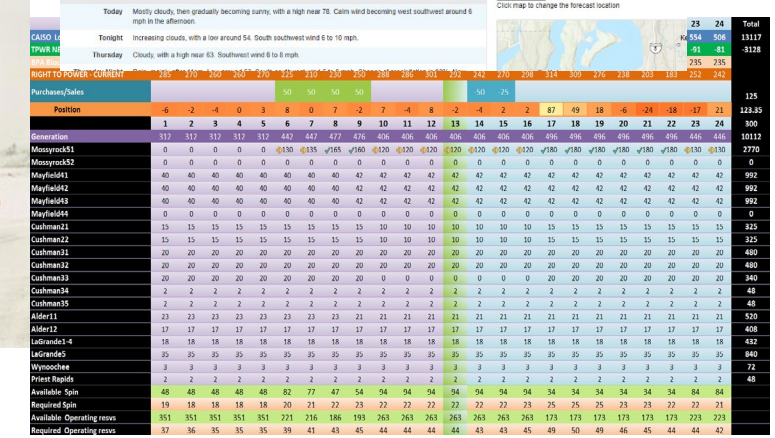

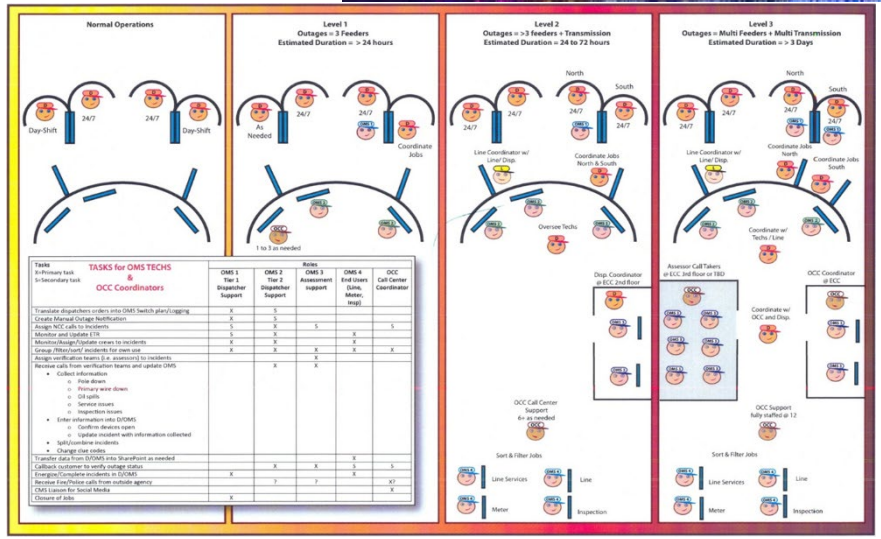

Results

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Tacoma Power met all load and Reserve obligations

Real-Time Event Analysis

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Thursday, March 5th 2026

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- At 8:24 am in response to an event in the Wyoming area, Block and Slice Tags north of Portland were cut
- Tacoma Power's ACE instantly dropped to -248MW
- Western Power Pool ACE dropped to -2855MW (remember we want to be close to zero)
- Frequency dropped to 59.91hz **
- Tacoma Power lost connectivity to the Western Power Pool Reserve Sharing Group systems and the market

TPWR Response/Recovery

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- **Tacoma Power started all offline generation, including Mossyrock Units 51/52.**
  - Largest single shaft hydro generators West of the Mississippi.
  - Provided ACE recovery for Tacoma Power
  - Provided stabilizing inertia for the Western Interconnection
- **Tacoma Power changed our Automatic Generation Control Mode to Constant Frequency.**
  - Allowed all generation to target a stabilizing 60.0Hz
- **Neither of these actions would have been allowed if we were not a Balancing Authority.**

System Response

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Results

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No Tacoma Load Lost

More agile to respond to changing conditions

Enables faster operational adjustments and improved reliability during dynamic system events.

Improved collaboration and input to compliance

Strengthens communication due to vertical integration of compliance functions (i.e. all in-house)

Direct control of our generation

Strengthens operational independence and enhances strategic use of Tacoma Power assets

Ability to prioritize City of Tacoma needs

Ensures local priorities drive decision-making and resource allocation.

Increased access to reserve sharing

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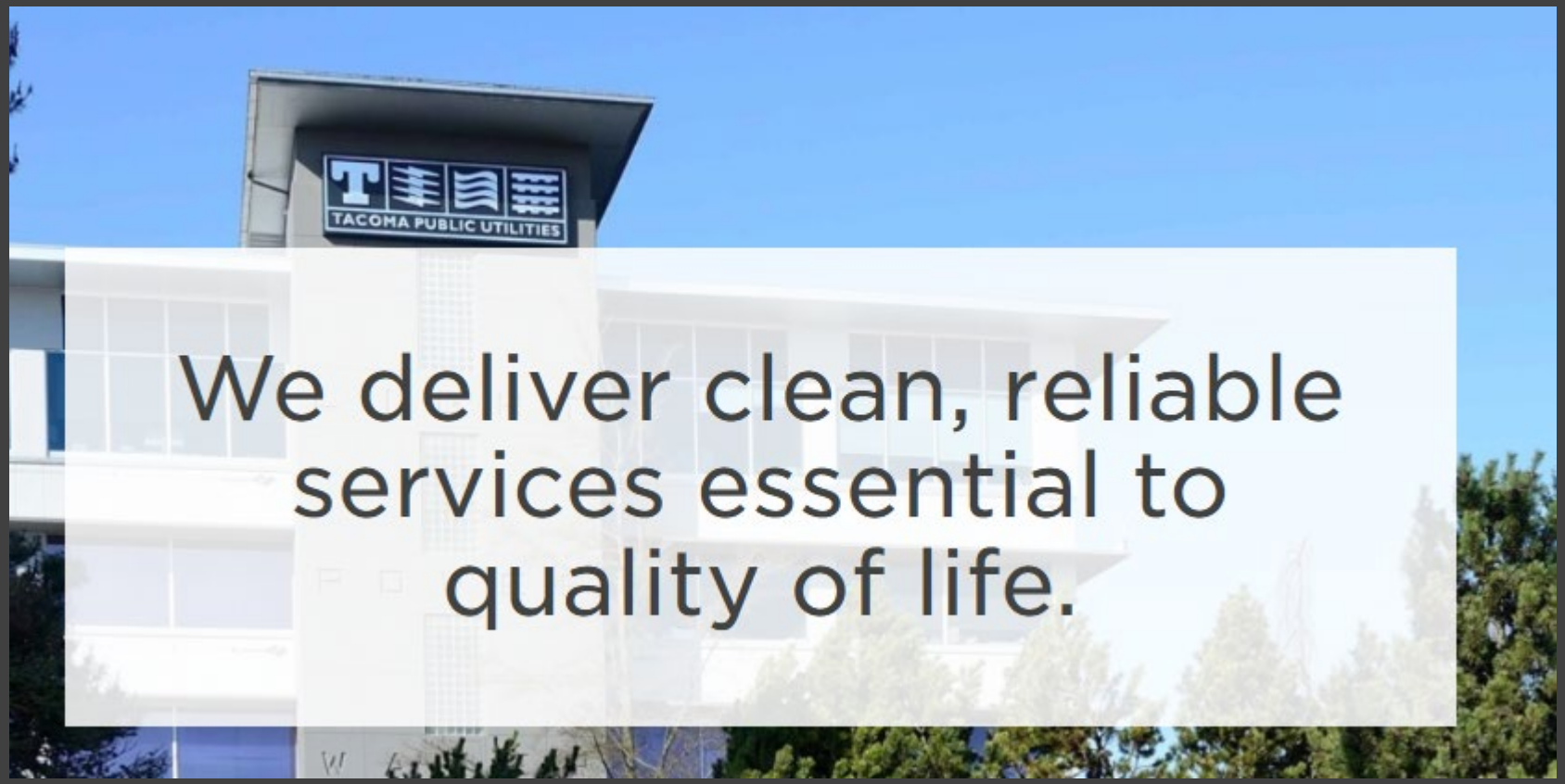

Open Forum

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