



Welcome!

Transmission Corridors Work Group

Meeting #5

Day 1: April 13, 2022; 9 AM – 12 PM

Observers: Please join the meeting via Livestream: www.rossstrategic.com/livestream
If you are having technical difficulties, please email Tess at twendel@rossstrategic.com

Public Participation

- Public observers, if you are currently in the Zoom meeting, please log off and listen/watch the meeting via livestream: www.rossstrategic.com/livestream
- If you wish to provide public comment, please join the Zoom meeting **tomorrow at 11:45 AM**.
- We will share Zoom info at that time (available through livestream)
- Written comments are always welcome via email: transmissioncorridors@rossstrategic.com



If you need technical assistance, please send a Zoom chat to **Tess Wendel** or twendel@rossstrategic.com.



Welcome and agenda review

Rob Willis, TCWG Facilitator, Ross Strategic
Kathleen Drew, EFSEC

Today's agenda – Day 1 (April 13)

Time	Topic
9:00 AM	Opening (agenda review, remarks, etc.)
9:10 AM	Deep Dive Presentations <ul style="list-style-type: none">• Benefits of Regional Transmission Coordination• Flow-Based Modeling• Analysis of East to West Transmission Conditions in Pacific Northwest
10:05 AM	Break
10:15 AM	Emerging Principles Breakout Groups <ul style="list-style-type: none">• Introduction to the revised Emerging Principles• Plenary to affirm Meeting 3 Emerging Principles• Breakout Groups to identify issues and concern with Meeting 4 Emerging Principles
11:55 AM	Day 1 Wrap-Up <ul style="list-style-type: none">• Look ahead to Day 2• Closing remarks
12:00 PM	Adjourn

Tomorrow's agenda – Day 2 (April 14)

Time	Topic
9:00 AM	Opening – recap, observations, reflections, questions from Day 1
9:10 AM	Overburdened and Communities, Mariel Thuraisingham- Front and Centered
9:50 AM	Emerging Principles Discussion Review <ul style="list-style-type: none">Review of breakout groups, reporting out on Day 1 emerging principles discussion
10:30 AM	Break
10:40 AM	Emerging Principles Discussion Review (continued)
11:20 AM	Round-Robin Check-in with TCWG members <ul style="list-style-type: none">TCWG members comments/observations
11:50 AM	Public Comment Opportunity
12:00 PM	Looking Forward and Wrap Up



Deep Dive Presentations

Perspectives shared today & tomorrow

Today (Day 1):

- Benefits of Regional Transmission Coordination (*Megan Decker, Oregon PUC*)
- Flow-Based Modeling (*Vic Howell, WECC*)
- Analysis of East to West Transmission Conditions in PNW (*Randy Hardy,)*

Tomorrow (Day 2):

- Overburdened Communities (*Mariel Thuraisingham, Front and Centered*)

The background of the slide features a photograph of several high-voltage electrical transmission towers and power lines. The towers are steel lattice structures, and the lines stretch across the sky. The image is partially obscured by a teal-colored rectangular box on the right side, which contains the title and author information.

Benefits of Regional Transmission Coordination

Megan Decker



Flow-Based Modeling

Vic Howell (WECC)



Contract Path versus Flow-based Method Concepts

April 13, 2022

Vic Howell
Director of Reliability Risk
Management

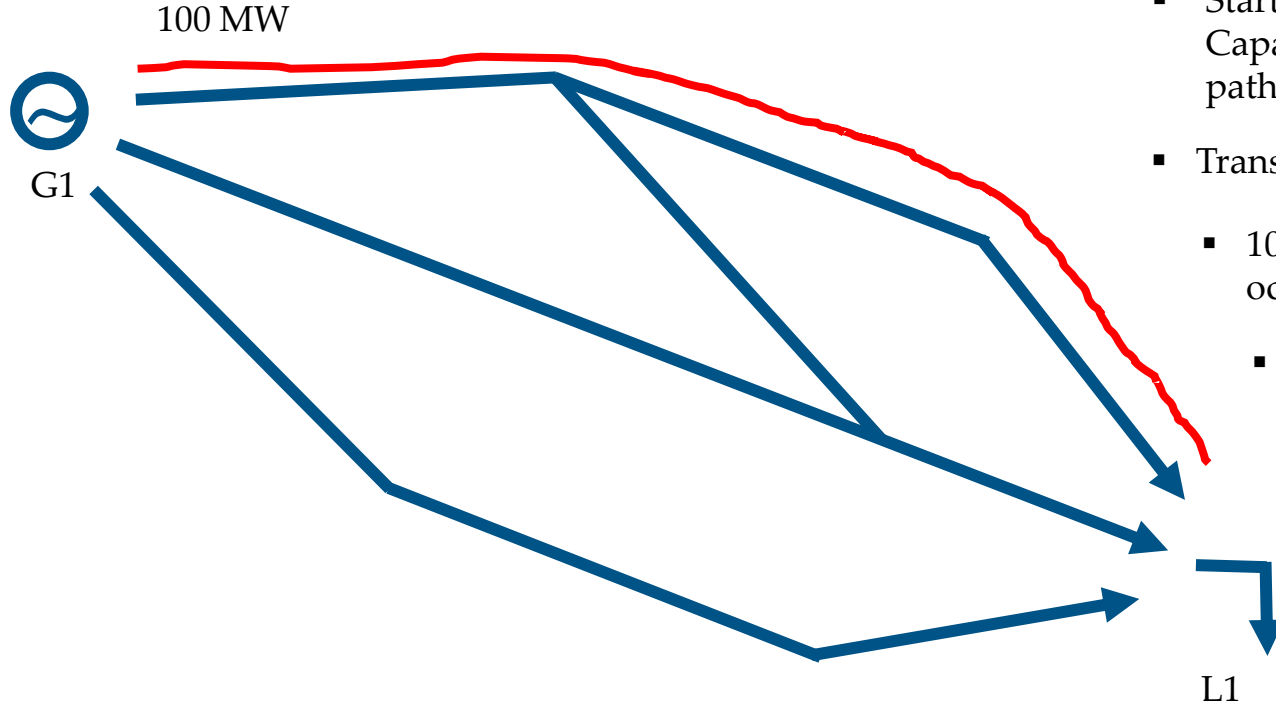
Two Approaches

- Objective—to determine how much power can be reliably transferred
- Two general approaches
 - Contract path method
 - Flow-based or flowgate method

Contract Path

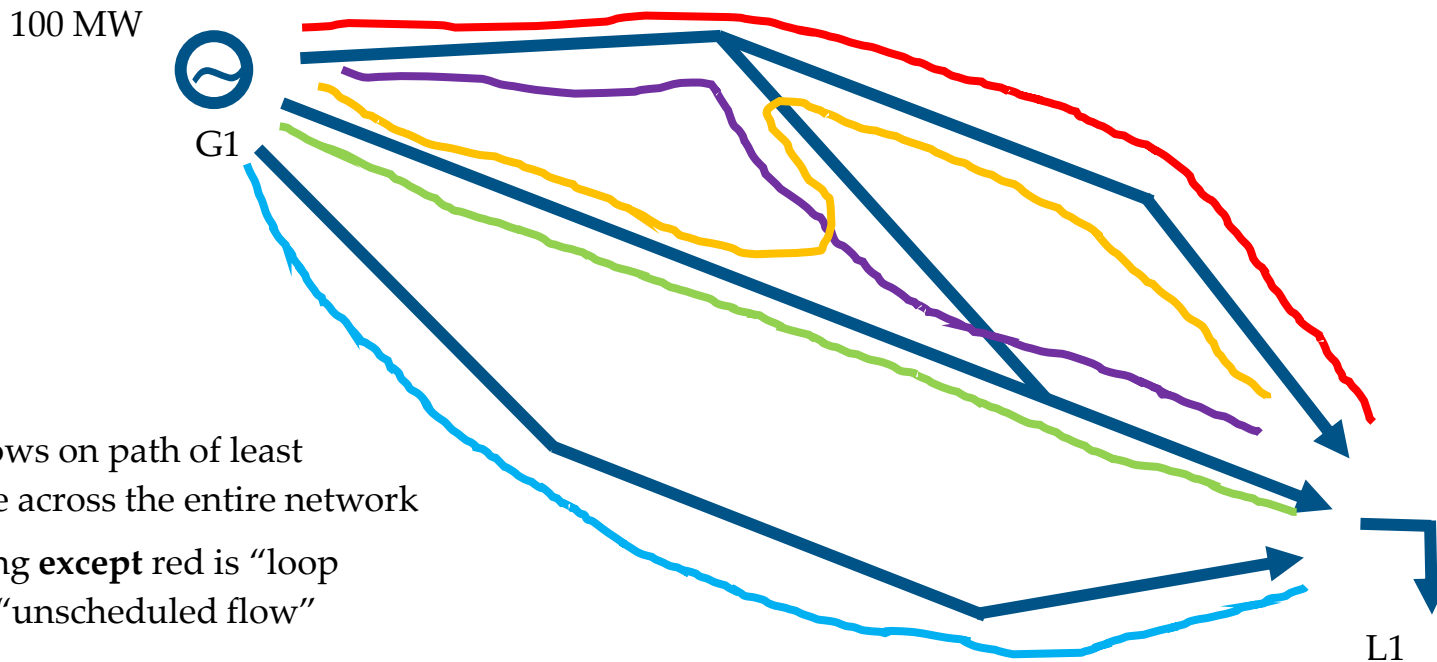
- What is a contract path?
“...a path that can be designated to form a single continuous electrical path between the parties to an agreement.” (FERC, Order 888, April 24, 1996)

Contract Path



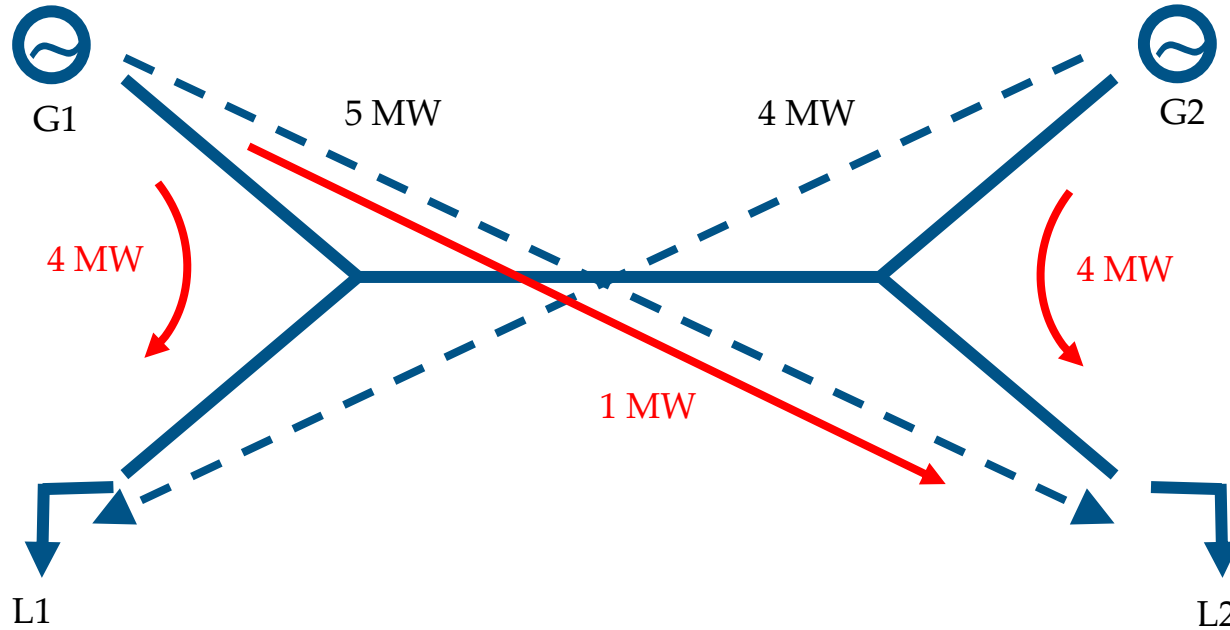
- Starts with Total Transfer Capability (TTC) of the contract path. TTC = 1,000 MW
- Transfer 100 MW
 - 100% of flow assumed to occur on the contract path
 - Available Transfer Capability (ATC) on this path reduced by 100 MW

Contract Path



- Power flows on path of least resistance across the entire network
- Everything **except** red is “loop flow” or “unscheduled flow”

Contract Path



Contract Path

- Starts with TTC
 - TTC calculation practices vary
 - TTC can be somewhat static, conservative value
- Scheduling based on a specific path
- Does not account for how power flows in the transmission system

Flow-based Method

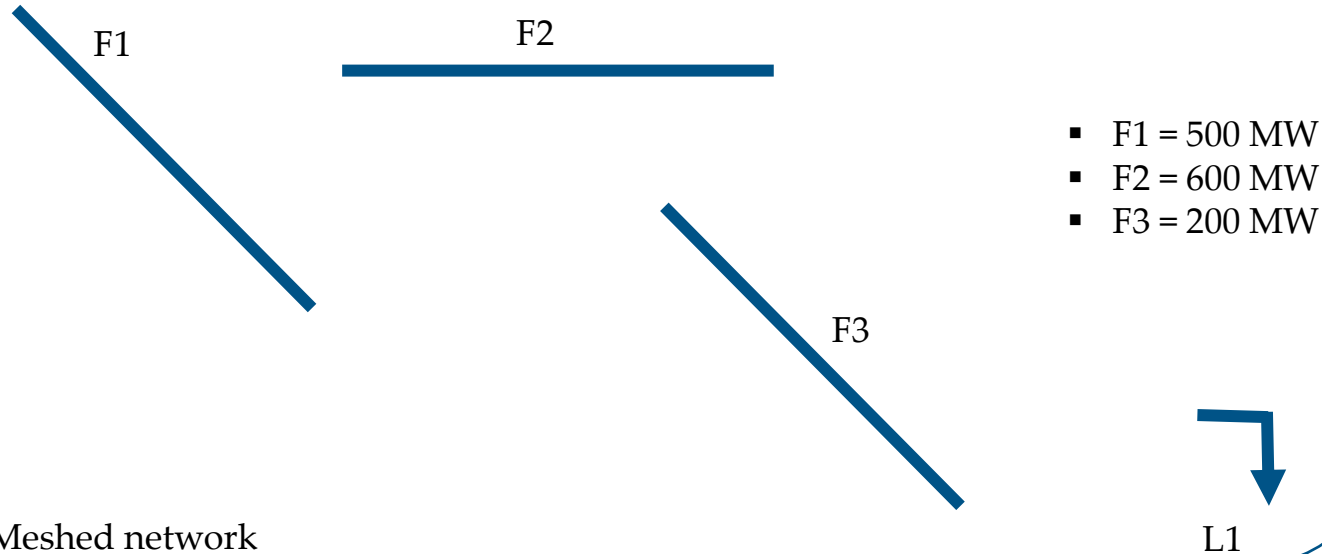
- Determines impacts on predefined **flowgates**
 - Transmission element such as a line or a transformer
 - Flowgates can account for contingencies
- Uses a power-flow model
 - Flowgate impact data
 - Loads
 - Generation
 - Committed transmission system reservations
 - Out-of-service system elements

Flow-based Method



G1

- When I transfer 100 MW from G1 to L1, how does it impact F1, F2, and F3?
- Uses distribution factors



Meshed network

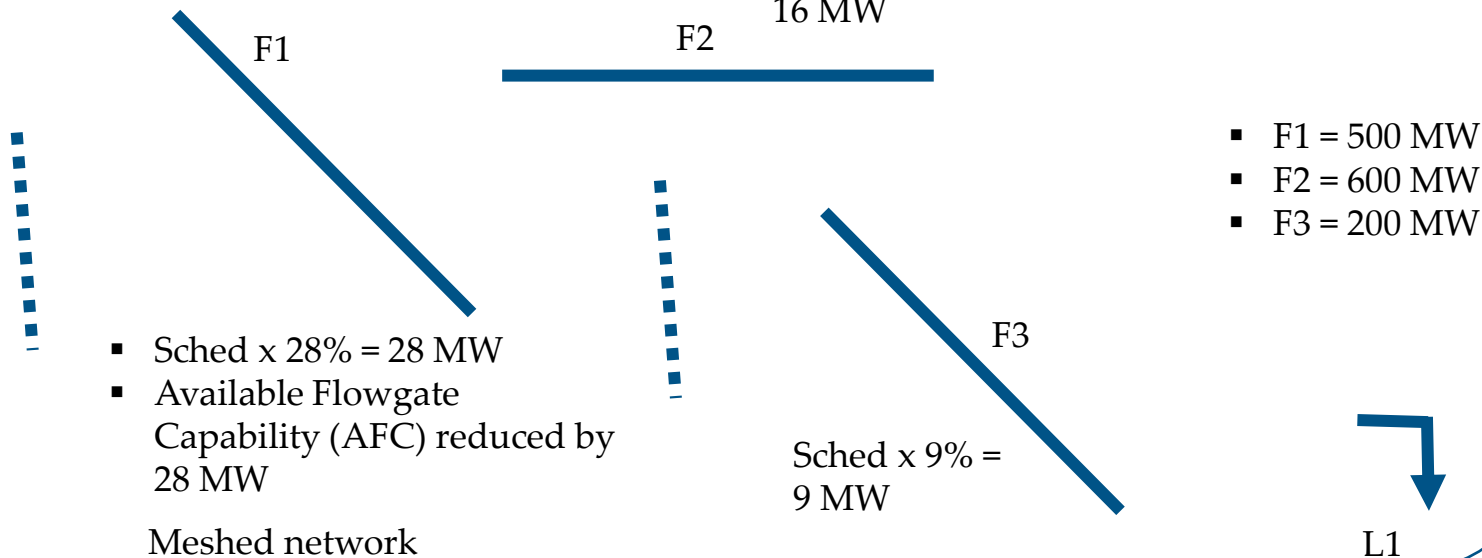
L1

Flow-based Method



G1

- Distribution Factors calculated for flowgates for the given topology
- 100 MW transfer from G1 to L1



Flow-based Method

- Starts with Total Flowgate Capabilities (TFC)
 - TFC determined based on Facility Rating
- Calculates impacts on predetermined flowgates
- Scheduling based on source and sink and impacts on flowgates—
not a specific path
- Accounts for how power flows in the transmission system



Contact:

Vic Howell

Director of Reliability Risk Management

vhowell@wecc.org



Analysis of East to West Transmission Conditions in PNW

Randall Hardy

PNW Tx Needs

Randall W. Hardy

First Revision

April 7, 2022

I. Current Situation

(1) WA/OR legislation requires IOUs to reach 80% clean energy by 2030

(2) Current Status

- PSE = 35% clean energy
- PGE = 40 - 50% clean energy

(3) PSE/PGE Non-Distributed Resource Needs

- PSE = 1,500 MWa energy (2031)
1,850 MW capacity (2027)
- PGE = 1,500 – 2,00 MWa energy (2030)
800 MW capacity (2030)

(4) Major Potential Problems

- East to West Long Term Firm (LTF) Tx to wheel wind/solar to Seattle/Portland
 - CCN from Mid C to Seattle
 - CCS from Mid C to Portland

II. BPA 2021 Tx Cluster Study (CS)

- (1) Released in June 2021
- (2) Analyzed 5,842 MW of TSRs
- (3) 1,400 MW of TSRs could only reach PGE with a \$750 million upgrade to Raver-Paul 500 kV line
 - All these TSRs withdrawn
- (4) Most likely tx upgrades
 - Schultz-Raver SCPs
 - 72 TSRs for 2,264 MW
 - Increases CCN ATC by 500 MW
 - BPA decision to proceed: summer 2022
 - Energization: fall 2025
 - Portland area 230 kV upgrade
 - 48 TSRs for 934 MW
 - Increases CCS ATC by 500 MW
 - BPA decision to proceed: late 2023
 - Energization: fall 2026

III. Current Tx Status/Trends

- (1) TSRs remaining in BPA queue (as of 12/7/21)
 - 4,800 – 5,000 MW
 - Probably 3,000 – 3,500 MW need CCN or CCS

- (2) Amount of TSRs steadily increasing
 - 2020 CS = 4 GW
 - 2021 CS = 6 GW
 - 2022 CS = 11 GW

- (3) PSE dual fuel CT(s)
 - located on Westside
 - could lessen PSE E-W tx needs for RA capacity

- (4) BPA Near Term CCN/CCS Tx upgrades
 - help meet E-W tx needs 2022-26
 - unlikely to help meet 2026-30 E-W tx deficit

IV. Other Coping Strategies

- (1) Repurposing tx previously used for thermal resources to wheel wind/solar (e.g. Coalstrip 3 & 4 tx)
 - Possible but complicated
 - Likely need to provide more VAR support and accommodate different generation patterns.
- (2) Co-locating wind/solar near existing thermal resources (to use their tx). Needs to comply with more recent FERC reliability requirements
- (3) As a result, both strategies may require additional tx measures/constraints
- (4) Such changes illustrate the uncertainty involved with determining whether BPA/PNW needs additional E-W tx (and, if so, how much) to meet WA/OR 2030 clean energy goals

V. Implications / Needed Actions

- (1) Unclear whether PSE or PGE likely have sufficient LTF to meet 2030 clean energy goals
- (2) BPA needs to proceed with Schultz-Raver SCPs and Portland 230 kV upgrades
- (3) BPA needs to identify additional likely needed E-W Tx upgrades ASAP
 - However, given workload and other priorities, not likely until late 2024/early 2025
- (4) Additional E-W tx measures could involve new 230/500 kV lines for CCN/CCS
 - New tx lines typically take 10-15 years to permit/build
 - If such a major build required, it will not be completed until well after 2030.
- (5) PAC/IPC need to complete B2H and Gateway West

VI. Interim Measures

(1) BPA liberalize terms of its conditional firm reassessment tx product

- Increase term from 2 years to 5/6 years
- Vary number of curtailable hours

(2) Work with vendors to evaluate use of power flow control devices

- Reduce overloaded lines
- Short installation times and lower costs

(3) Such measures not substitutes for new tx, but could provide interim relief

VII. Conclusions

- (1) Lack of E-W tx on CCN/CCS is a major challenge, especially 2026 - 2030.
- (2) Need to identify likely E-W tx scenarios/additions by late 2022 to enable possible energization by 2030.
- (3) If not timely addressed, this issue will seriously limit effectiveness of WA/OR clean energy effort
 - PNW BAs will be unable to access full range of regional resource diversity benefits, either for decarbonization or Resource Adequacy.



Brief Q&A



Break

Please return at 10:45 AM




Emerging Principles



Emerging Principles In Breakout Groups

Please rejoin us at 11:55am for the final wrap up of Day 1.



Day 1 Wrap Up Day 2 Preview



Closing remarks

The background of the slide features a network of high-voltage power lines and lattice towers, rendered in a light, semi-transparent style against a pale, hazy sky. The lines crisscross the frame, creating a sense of depth and infrastructure. The towers are positioned at various points, with one particularly prominent in the lower-left foreground.

Adjourn

Thank you – see you 9:00 AM tomorrow
for Day 2!



Welcome!

Transmission Corridors Work Group

Meeting #5

Day 2: April 14, 2022, 9 AM -12 PM

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Welcome and Day 2 agenda

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Kathleen Drew, EFSEC

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Opening Remarks

Kathleen Drew, EFSEC, TCWG Chair



Overburdened Communities

Marisol Thuraisingham: Front and Centered



Emerging Principles: Discussion Review



Break

Return at 10:45 AM

For those wishing to provide public comment at 11:50 AM:

- Log into the Zoom meeting at 11:45 AM by typing this address into your browser:
<https://www.zoomgov.com/j/1604913492>
- You can also join by phone:
Phone number: (669) 254 5252
Meeting ID: 160 491 3492



Emerging Principles for Expediting Environmental Review:

Facilitated discussion

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Round Robin

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Public Comment Opportunity will start at 11:50 AM



Public Comment Opportunity

Public Comment Opportunity

- Each commentor has up to 2 minutes to provide comment.
- The facilitation team will call on commenters when it is their turn to speak. You will be muted until your turn.
- Commenters may also email comments to transmissioncorridors@rossstrategic.com



Looking Forward and Wrap Up



Looking Forward and Wrap Up

- Action items/next steps
- Meeting #6 currently scheduled for June 8 & 9, 2022



Closing remarks



Thank you!

Please direct group member questions and public comments to:

transmissioncorridors@rossstrategic.com