

Zephyr, Chinook and NorthernLights:

"How can we create the capability to rapidly increase transmission capacity from areas of large amounts of renewable resources?"

CREPC San Diego

Bill Hosie

Zephyr, Chinook and NorthernLights Projects

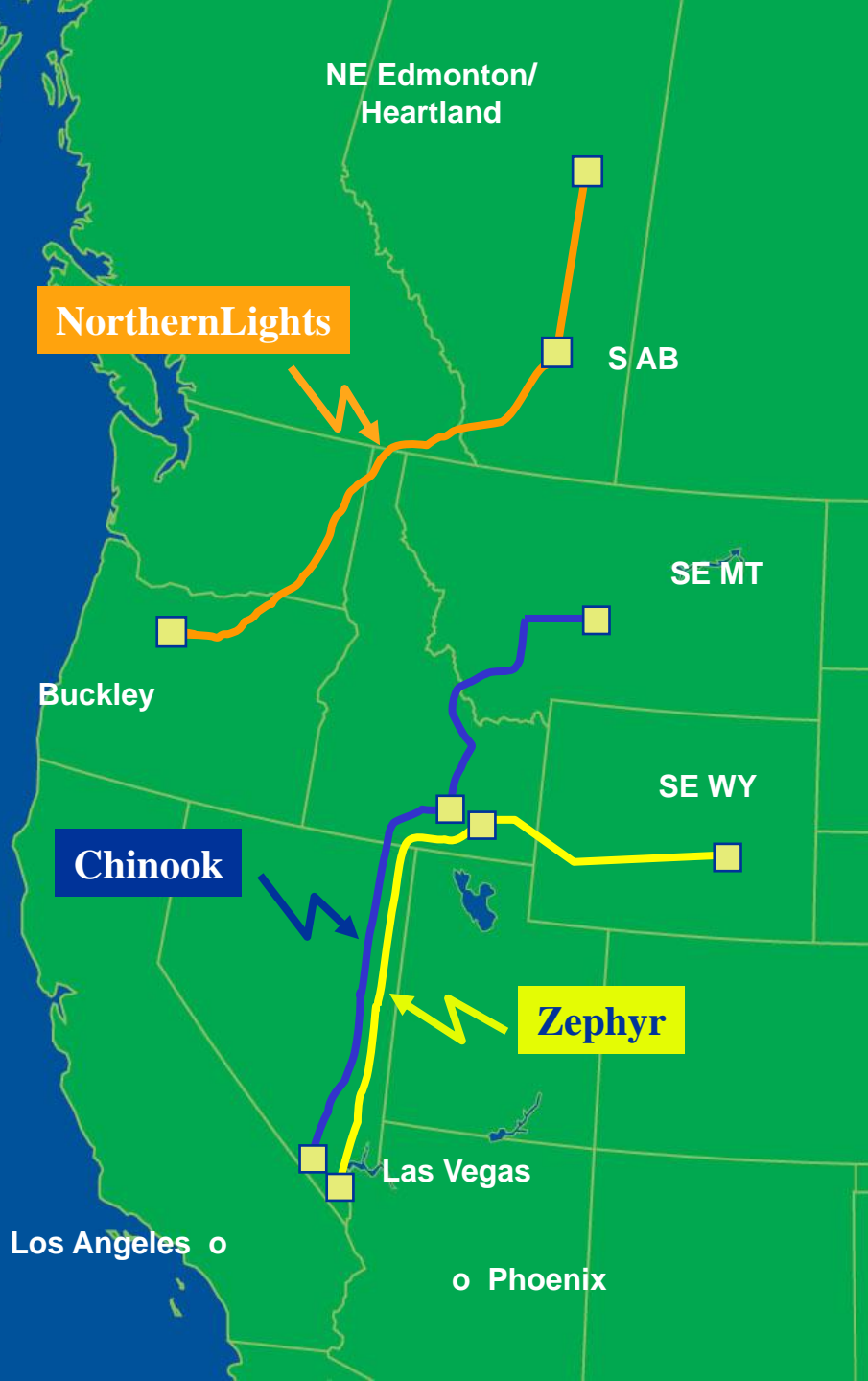
April 9th, 2009



TransCanada

In business to deliver

TransCanada's HVDC Projects



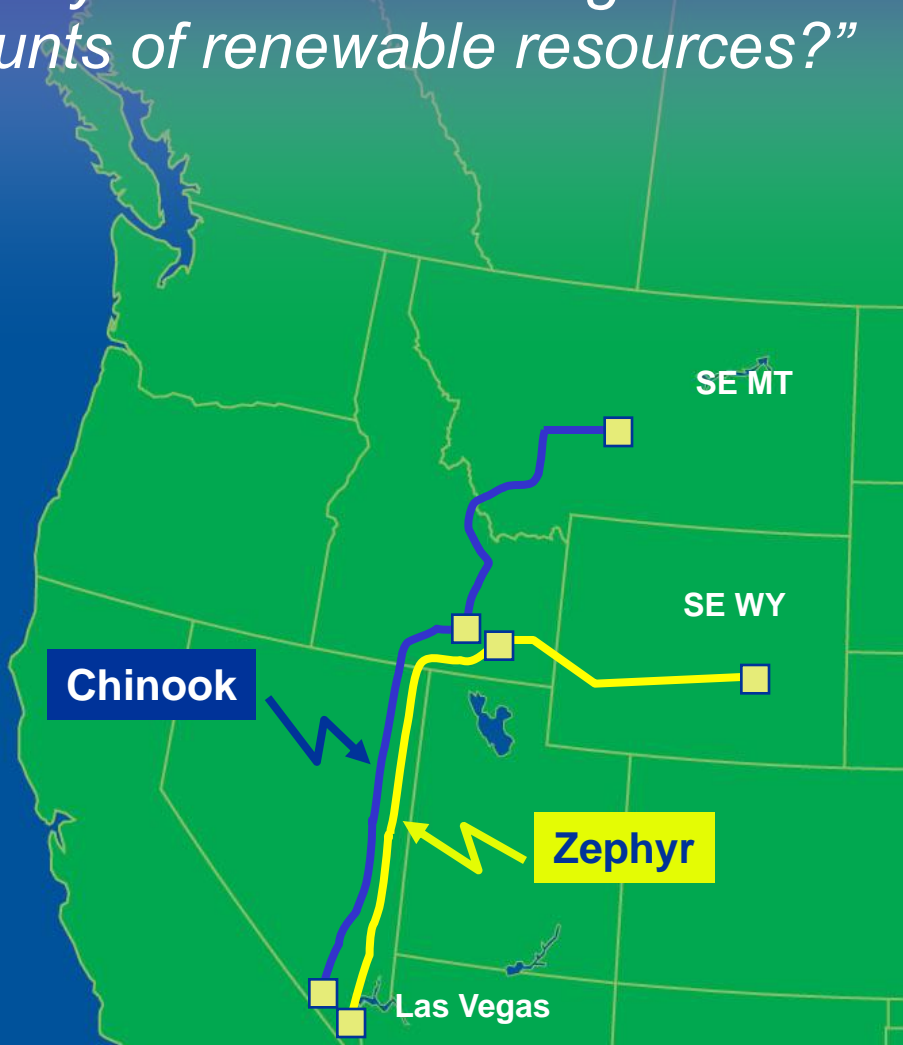
- HVDC is the choice for high capacity long distance transmission
- Helps fulfill state, provincial and federal renewable goals

NorthernLights

- 500 kV DC
- 3000 MW in Alberta
- 2000 MW bi-directional between Alberta and the PNW
- Completed WECC Regional Planning and Path Rating Phase 1
- ISD: 2015

“How can we create the capability to rapidly increase transmission capacity from areas of large amounts of renewable resources?”

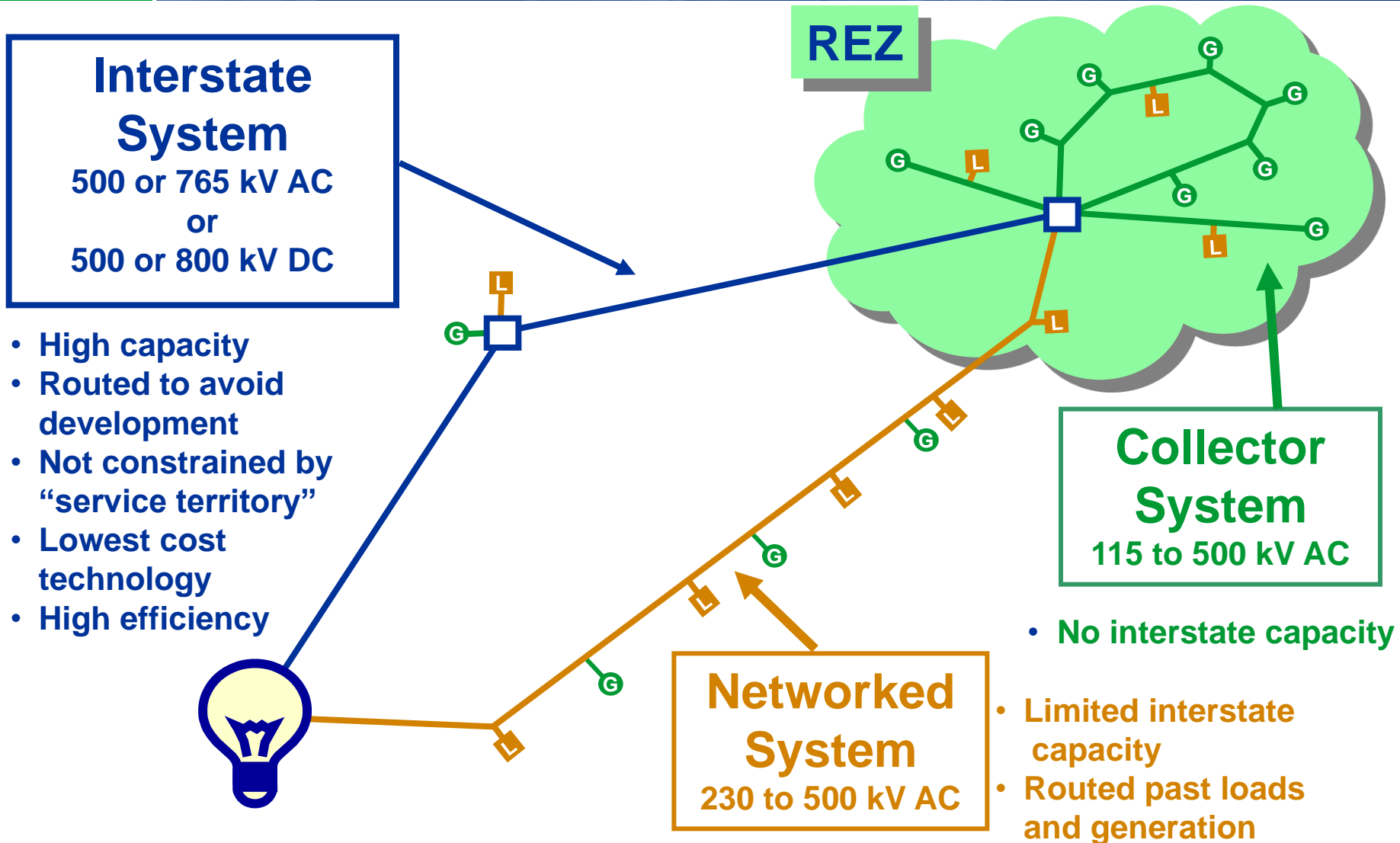
Zephyr and Chinook



- **Two, separate, but complementary, 3000 MW 500 kV DC lines**
- **Additional converter stations (750 MW) on each line at Borah, Idaho to connect to Pacific NW and Idaho wind resources**
- **Merchant lines: Precedent setting FERC approval**
 - **Negotiated rate authority**
 - **Anchor shipper concept**
 - **1500 MW pre-subscribed with wind on each line**
- **Cost borne by shippers**
- **Est. capital cost: \$3B/line**
- **Open Season: Spring / 09**
- **ISD: late 2014**

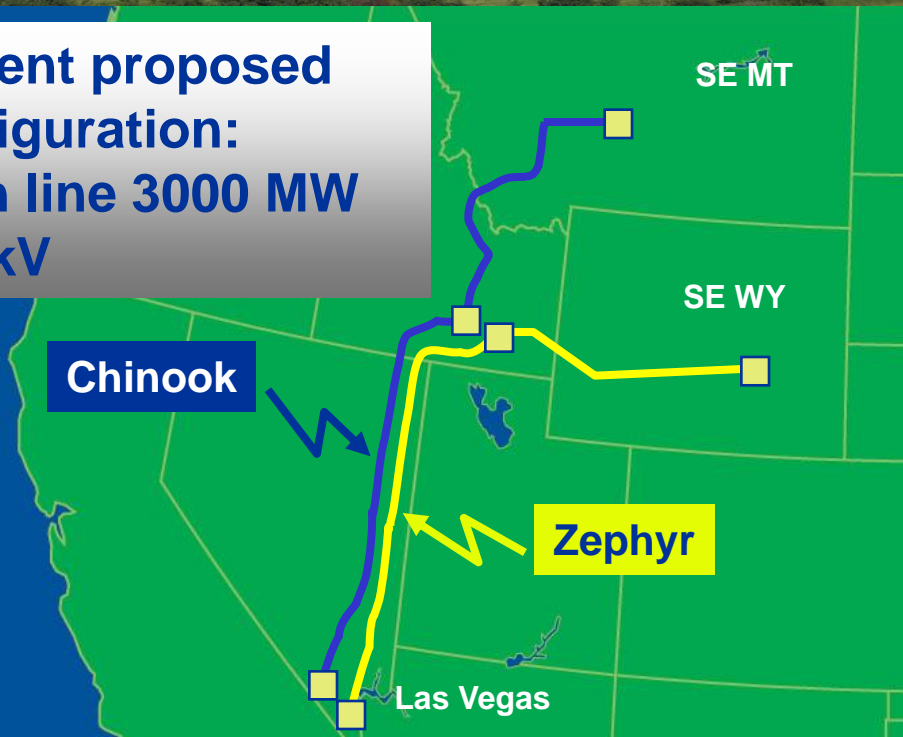
Connecting wind resources in WY & MT to the desert SW and CA

Transmission Roles



“How can we create the capability to rapidly increase transmission capacity from areas of large amounts of renewable resources?”

**Current proposed configuration:
Each line 3000 MW
500 kV**



Chinook

Zephyr

These projects are, more often, complementary, than competitive

Zephyr and Chinook

Why do developers of parallel projects coordinate, or not?

- These projects will be coordinated through the interconnection process
- Merchant projects serve a different role than most utility projects
- Different projects are focused on different objectives:
 - Collector system
 - e.g. NorthWestern
 - Networked system
 - e.g. Gateway West/South
 - Interstate system
 - E.g. Zephyr, Chinook and NorthernLights
- HVDC is the choice for long distance transmission and is ideally suited for intermittent wind

NorthernLights

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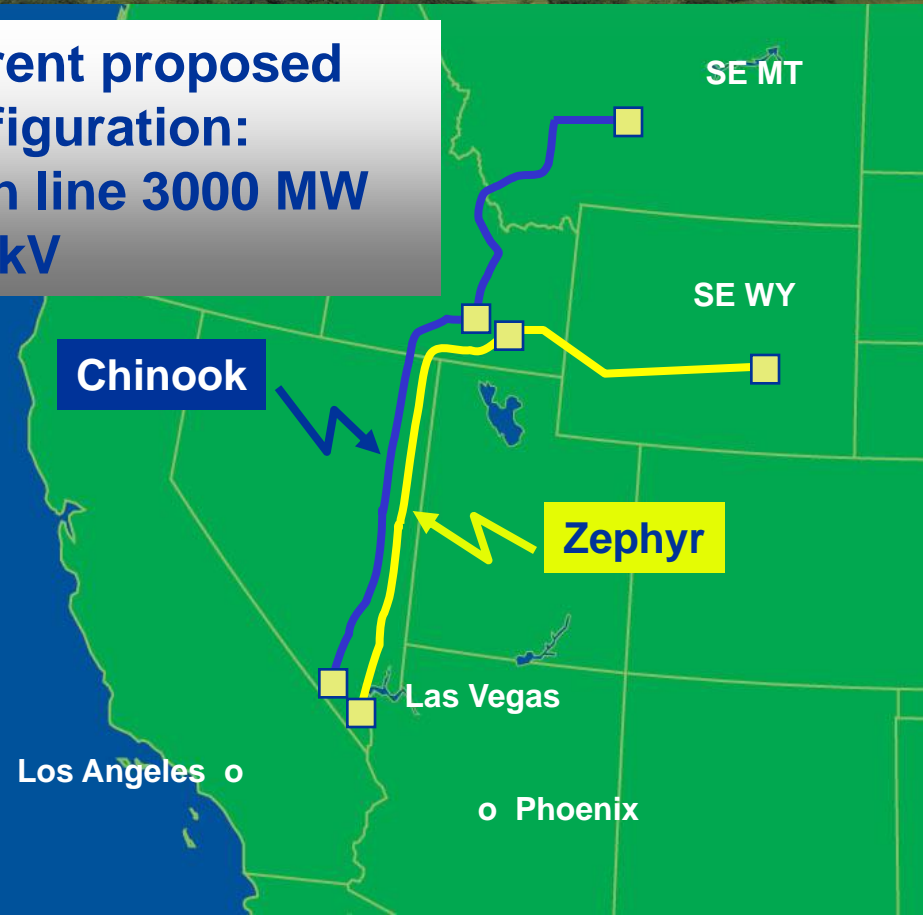
- NTAC Study 2004 to 2006
 - About 20 alternatives studies in offices across the West
 - TransCanada played a central role in initiating and participating
 - Chinook was included
 - See NWPP.org NTAC page
 - NEO station coordination
- TCWG - 8 projects coordinated Regional Planning and Phase 1 Path Rating
- All moving into coordinated Phase 2 rating
- Merchants have played an important role





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Zephyr and Chinook

Does the WECC path rating process evaluate the interaction between proposed projects?

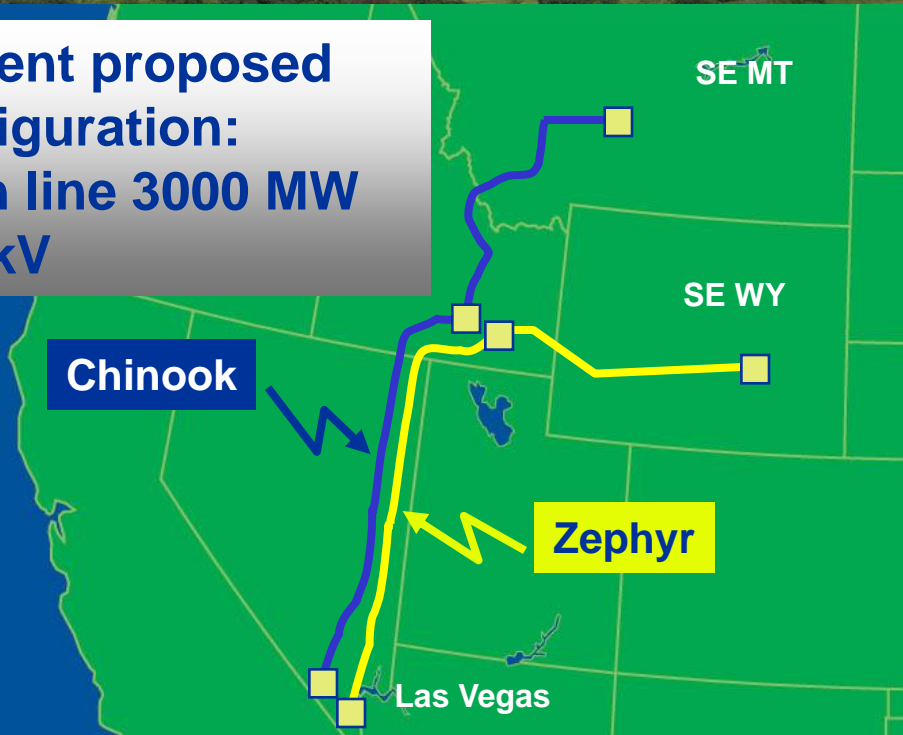
- Yes - from a capacity and reliability perspective
- “First come – first served” WECC philosophy is blind to commercial realities
- Does not attempt to evaluate which project(s) are “best”
- Regional planning kick-off meeting:
 - April 22, 2009 in Las Vegas

There is no perfect project

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We are cooperating with other projects and will explore synergies

Zephyr and Chinook

Will the system fail because key decisions (e.g. duplicative lines) are not resolved until the permitting stage?

- Few, if any, proposed projects are duplicative – they are often complementary
- Not all proposed projects will get built.
- No commercial support = no project.
- Future rationalization of projects inevitable
- While the current system can be improved, we can progress our projects under the current framework.

TransCanada's HVDC Projects

Thank You!

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