



# Zephyr Power Transmission Project

Presentation to Wyoming Infrastructure Authority

January 25, 2010



# Presentation Outline



## 1. Obligatory commercial on TransCanada

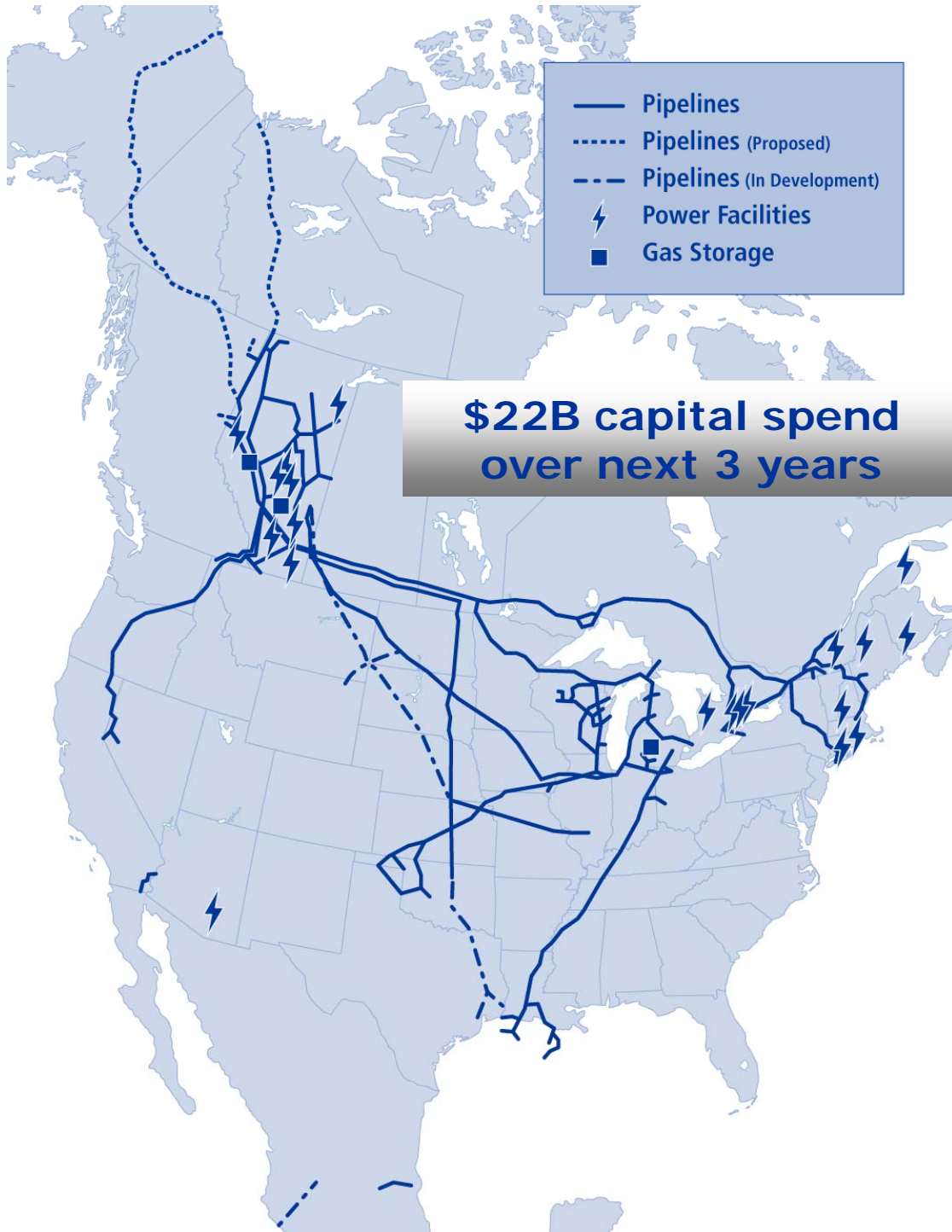
## 2. Zephyr Project Overview

- Project attributes
- Context: Transmission roles
- Wyoming project benefits

## 3. Project Update:

- Commercial Model
- Open Season update
- Timeline

## 4. Project Challenges



## TransCanada Corporation (TSX/NYSE: TRP)

### North America's Largest Natural Gas Pipeline Network

- 42,000 miles
- Average volume of 15 Bcf/d

### North America's 2nd Largest Natural Gas Storage Operator

- 370 Bcf of storage capacity

### Canada's Largest Private Sector Power Generator

- 20 power plants, 11,800 MW

### Premier North American Oil Pipeline Under Construction

- 1.1 million Bbl/d

### Footprint

- Facilities & employees in 34 states
- 50% of employees are in the US
- Relationships with over 60,000 landowners

# TransCanada: An Expanding Wyoming Footprint



- 302-mile natural gas pipeline
- Connecting Rockies supply to Northern Border Pipeline with access to Chicago and area markets
- 407 MMcf/d contracted
- Initial capacity 400 MMcf/d to 500 MMcf/d
- Future expansion up to 1.0 Bcf/d and extension potential
- Approximately US\$610 million
- Construction scheduled to commence May 2010
- Expected in-service date late 2010

# TransCanada: A growing wind generator



## Cartier Wind

- 740-MW in aggregate
- In-service between 2006 and 2012
- 3 projects in-service (321 MW)
- Civil construction has begun on next two projects (270 MW)

## Kibby Wind

- 44 wind turbine generators
- 132 MW in aggregate
- First phase, 22 turbines placed in service Oct. 30, 2009
- Civil work on second phase nearing completion
- Second phase distribution system almost complete

# Zephyr: Project Description & Routing



## Connecting 3000 MW of Wyoming Wind Generation to California and the Desert SW

[www.transcanada.com/company/zephyr\\_chinook](http://www.transcanada.com/company/zephyr_chinook)



- 3000 MW 500 kV DC interstate merchant transmission project (1100 miles)
- “Bullet” line that allows customers to avoid paying pancaked utility rates and minimizes transmission losses
- 3000 MW converter station at Jim Bridger WY with AC to Medicine Bow WY
- 750 MW Intermediate converter station at Borah, Idaho to connect to Pac NW and Idaho
- 3000 MW converter station south of Las Vegas, Nevada connecting to California & Desert SW
- Estimated capital cost \$3B
- Commercial operation early 2015

## Zephyr: Project Attributes



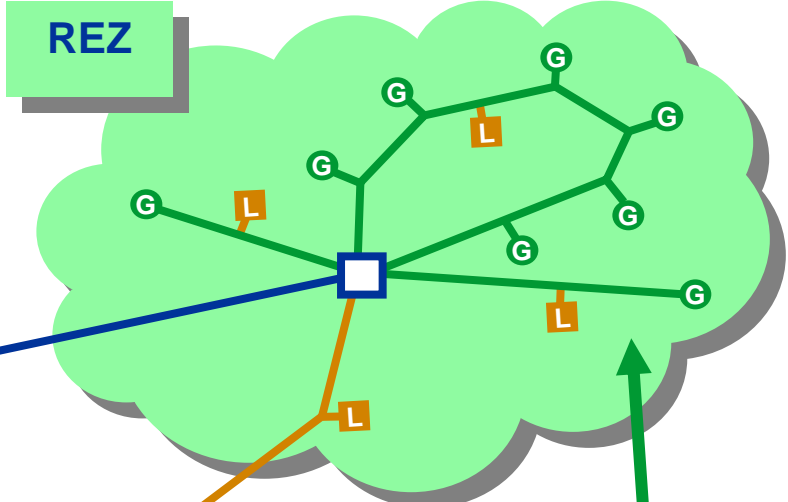
- **Zephyr will provide high-capacity electrical connections from renewable energy-rich Wyoming to load centers in California and the Desert SW**
- **HVDC**
  - Better suited to intermittent resources
  - Not common in the West but not unique
  - Smaller footprint and lower losses
  - Fewer interconnects (both a pro & a con)
- **With a converter station at Borah, Idaho southwest markets will be able to access hydro and base load units in the Northwest**

# Transmission Roles



**Interstate Bulk System**  
500 or 765 kV AC  
or  
500 or 800 kV DC

- High capacity
- Routed to avoid development
- Lowest cost technology
- High efficiency



**Collector System**  
115 to 500 kV AC

- No interstate capacity
- Limited interstate capacity
- Routed past loads and generation

**Networked System**  
230 or 500 kV AC



## Zephyr: Wyoming Project Benefits



- Wyoming wind will be required to satisfy existing and proposed state and national RES standards
- Zephyr would make a significant contribution to the Western states' economies, the environment, and the power industry by facilitating the development of Wyoming's renewable energy resources
- Substantial Wyoming employment opportunities in developing technologies with multiplier effects from this employment
- A growing Wyoming revenue base from property & sales taxes
- Approximately \$1.2B of estimated \$3B cost invested in Wyoming
- Enables over \$6B in wind developer investment
- Enabler for complementary gas-fired generation

# Zephyr Business Model



- **Generator-driven model—a supply push from Wyoming**
  - Commitment to 3 year Regulatory Phase to permit project
  - Stage gate approach: Once project is permitted and sanctioned, underpinned by >20 year transmission agreements
  - Project cost and risks are borne by TransCanada shareholders and Zephyr customers (not ratepayers):
    - TransCanada pays 50% of development costs
    - Generators pay 50% of the development costs
  - Generator development costs credited against project tolls
  - Expect capacity readjustment and assignment to loads over time
  - Zephyr expected to cost \$65 MM+ to permit

# Zephyr: Commercial Project Progress Update



- **“Open Season began October 13<sup>th</sup>, 2009**
  - Over 60 companies participated in Zephyr (and parallel Chinook) bid process
  - Strong participation by wind developers
- **Currently evaluating & reviewing bids**
- **Decision to proceed by end of Q1, 2010**

# Zephyr: Planning and Engineering Project Progress



- Preliminary line design, tower design, conductor selection, foundation design, cost estimates and risk estimates
- Technology assessment and reviews
- Commenced WECC regional planning & path rating process April, 2009 in Las Vegas
- WECC Regional Planning Report submitted in September 2009 with subsequent granting of Phase 1 status
- Initiated interconnection discussions
- Engaged Project Engineer

# Zephyr: Permitting and Siting Project Progress

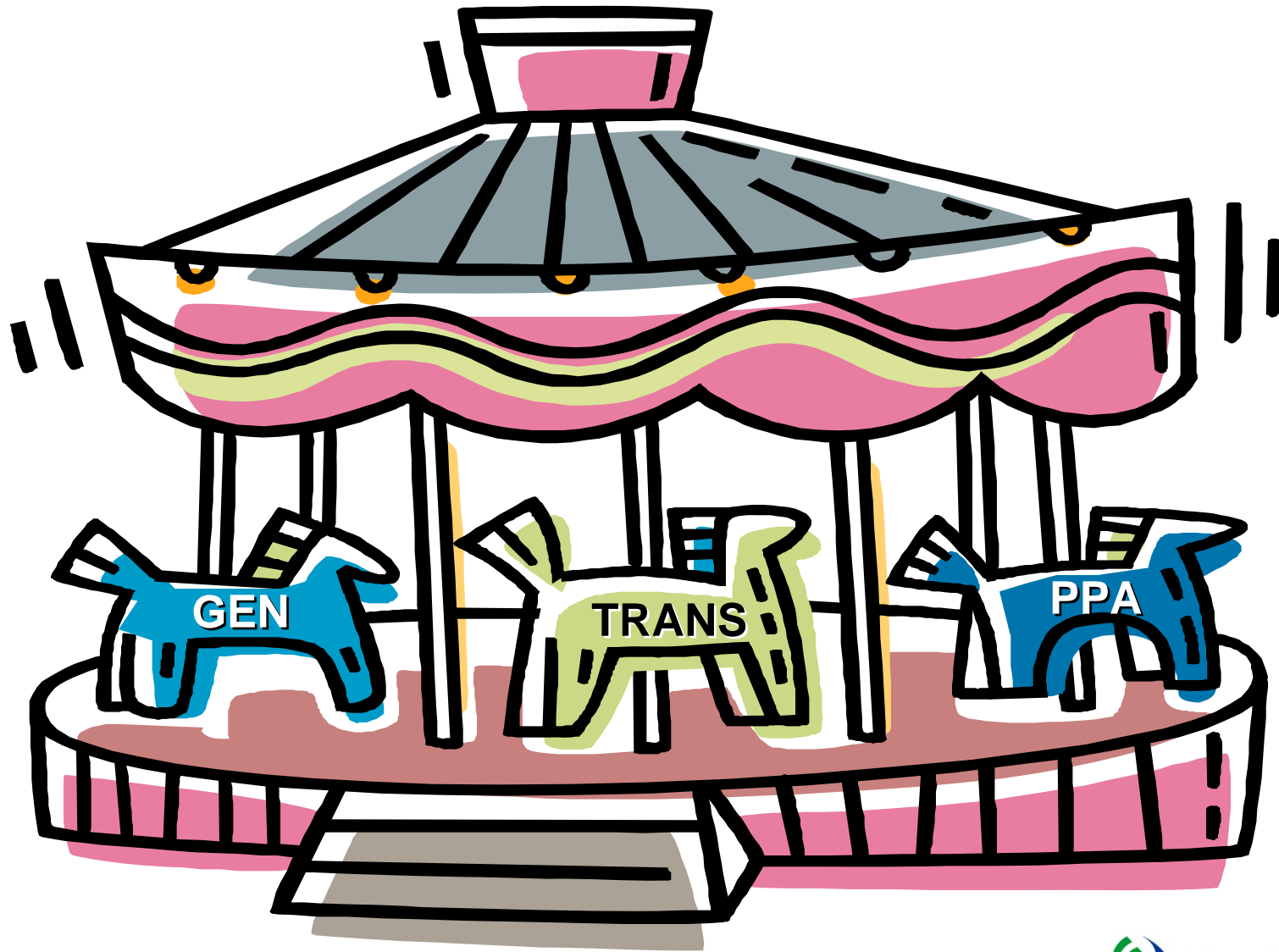


- Preliminary Section 299 Right-of-Way application submitted to BLM in 2006
- Preliminary route selected and reviewed with state and federal agencies
- Existing corridors utilized on Federal lands or new corridors added to land use plans
- Met with counties along route
- Federal corridor submission, coordinating with Section 368 Programmatic Environmental Impact Statement (PEIS)
- Amended Section 299 Right-of-Way application submitted to BLM in September 2009
- Engaged NRG as Project environmental consultant

# Zephyr: Project Timeline & Key Activities



# Challenges for Zephyr



# Challenges for Zephyr



- **Recent transmission development has been mostly organic and/or incremental**
  - Shift to much larger contribution from renewables will require a paradigm shift in the industry
- **Balkanization & “protectionism”**
- **Environmental issues**
  - Sage grouse
- **Permitting**
  - Federal permitting versus multi-state
  - Development & permitting is risky & expensive
  - Competition for limited utility corridors
  - Federal/public lands versus private lands
- **Federal incentive programs (ARRA)**
  - “shovel-ready” timeline too short