What Does it Take to Support Gas Supply for Electric Generation?

Wyoming Infrastructure Authority
Jackson, WY
January 25, 2010

Brian Jeffries
Executive Director Wyoming Pipeline Authority

Firm pipeline transportation basics

- Service is point to point
- Flow is under positive control so no “loop flow”
- Firm capacity rights are a tradable commodity
- Capacity added when credit-worthy customers commit to new capacity
- Capacity charge is 99% in form of fixed fees
- Interruptible service offered when available
- Most gas movements are bought/sold/scheduled preceding business day
- Limited intra-day market
- FERC provides siting authority

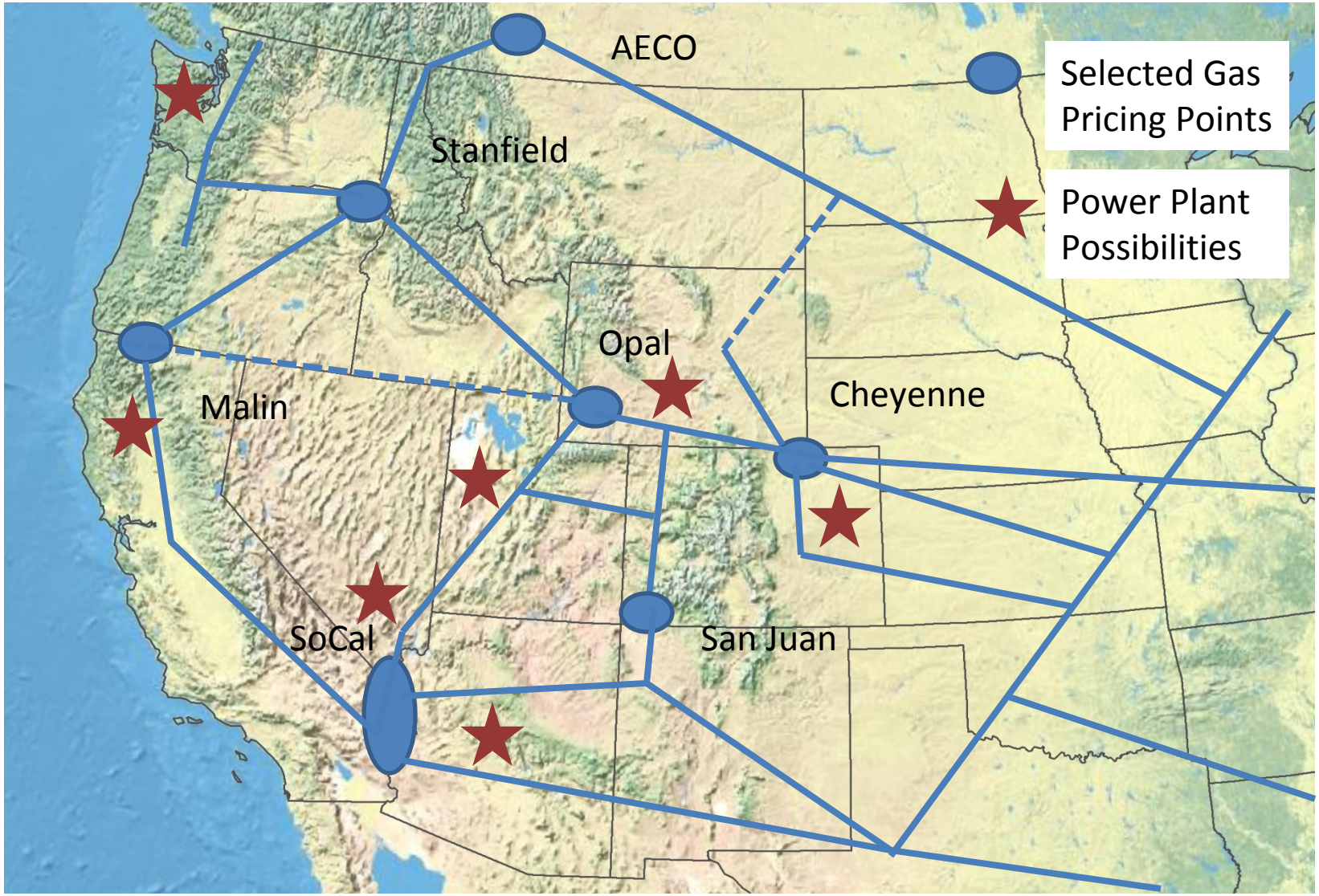
Nature of interstate pipeline service

- Generic firm transportation is equal hourly flow
- Upgraded service for gas distribution companies
- Load following service = No Notice Service (NNS)
- NNS relies on legacy storage assets
- NNS is premium priced to generic firm transportation
- NNS is sold out on existing infrastructure

Gas supply dynamics for power plants

- Gas fired power plants supporting wind need NNS for gas supply
- Incremental NNS service requires new storage
- Historical premium in NNS is not a guide to present costs
- Recent storage and pipeline expansions demonstrate that new NNS capability can be created if customers support – Front Range Colorado

Natural gas grid – simplified version



Storage and transport cost review

- New NNS requires new storage and a firm transportation agreement
- Cost of storage depends on field characteristics and location
- Cost of transportation depends on location and path
- Recently completed (‘09) gas storage facility provided guide for operating parameters

Transportation costs per MMBtu of Capacity

Gas purchase location	Wyoming , Utah or Colorado power plant location	Puget Sound area power plant	Northern California power plant	Nevada Arizona area power plant
Opal or Cheyenne	$0.20 - $0.40	$1.00 - $1.40	NA	$0.60 - $1.00
Malin	NA	$0.60 - $1.00	$0.40 - $0.60	NA
Stanfield	NA	$0.60 - $1.00	$0.40 - $0.60	NA
SoCal	NA	NA	NA	$0.20 - $0.60

Key question: where is storage location relative to power plant location?

Assumptions for rates

- 100 MW simple cycle power plant
- Heat rate – 10.45 MMBtu/MWH
- Intermediate operation/5 days week/16 hours/67% load factor
- Natural gas = $5.00 per MMBtu
- Storage field capacity = 35X max daily deliverability
- Storage field charge = $3.00 per year/MMBtu of capacity

Costs for gas storage and transportation

Gas purchase location	Storage costs plus $0.20 pipeline capacity	Storage costs plus $0.40 pipeline capacity	Storage costs plus $1.00 pipeline capacity
Annual Fixed Costs	$4.46 MM	$6.33 MM	$11.78 MM
Annual Generation (MWH)	279,486	279,486	279,486
Fixed Cost per MWH generated	$15.96	$22.65	$42.15
Fixed cost per MWH capacity (over 16 hours)	$10.09	$15.18	$28.24
Variable costs ($5.00 gas)	$15.67 MM	$15.67 MM	$15.67 MM

Wyoming Pipeline Authority
152 N. Durbin St. Suite 250
Casper, WY 82601
307.237.5009
www.wyopipeline.com

Brian Jeffries
Executive Director
303.619.3906 (cell)
B57.jeffries@comcast.net