



Comparing North American Fiscal Regimes

Evaluating Alberta's competitive position with the revised royalty rates.

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Evaluation Background

- A mid-sized North American E&P company has \$500 million to invest in shale gas between 2011 – 2013.
- **Where should they invest?**
- Since shale gas is a resource play, we can assume that similar shale plays occur across wide areas of North America.
- This presentation will compare the economic value of developing an identical field in 2 provinces and 3 states.

Comparison Methods

- Use Type Well Analysis
 - Depending on when the evaluation occurs, incentive may or may not exist in particular jurisdictions leading to erroneous conclusions.
- Evaluate Local Development Potential
 - This approach is justified for conventional oil and gas opportunities where drilling risk is the overriding deciding factor.

Resource Play

- Shale Gas as Resource Play
 - We can expect to find similar geological conditions across large areas of North America.
- What Matters?
 - In deciding where to develop, fiscal regimes, gas prices, capital expenditures and operating costs matter.
 - Drilling risk is much less important.

Shale Gas Development

Used Actual Multi-well Development

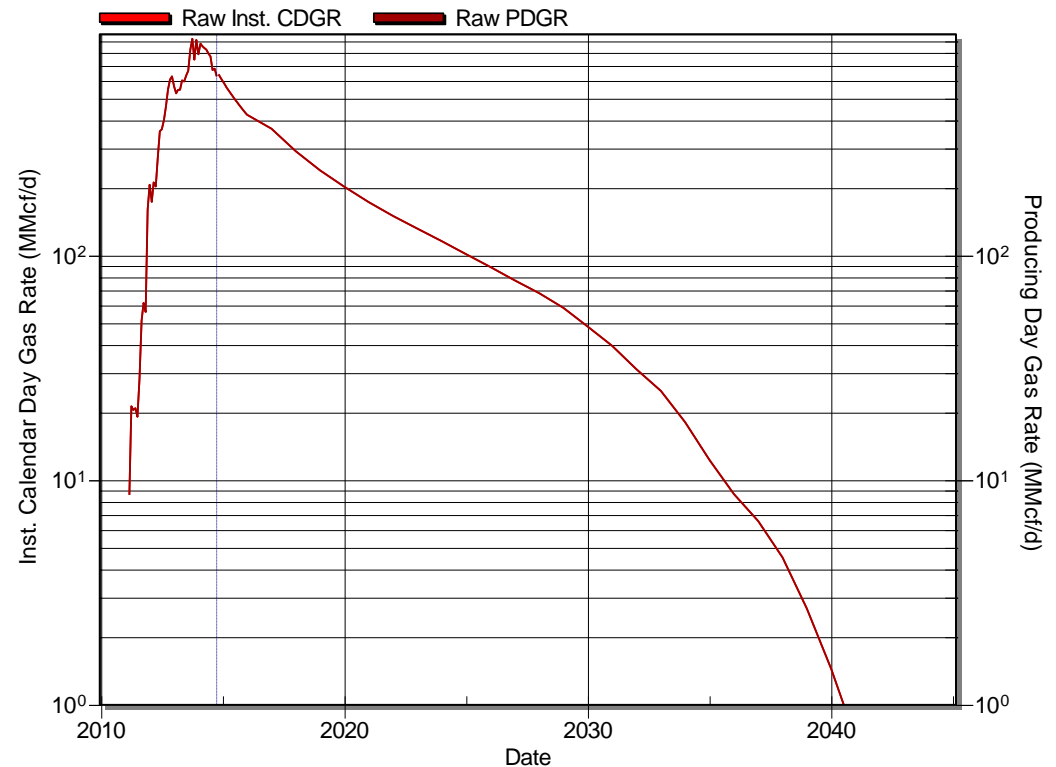
- Investigated shale gas development across North America and found many similar plays.
- Chose an actual 76 well development that occurred between 2006 and 2008.

Field Summary

Wells:

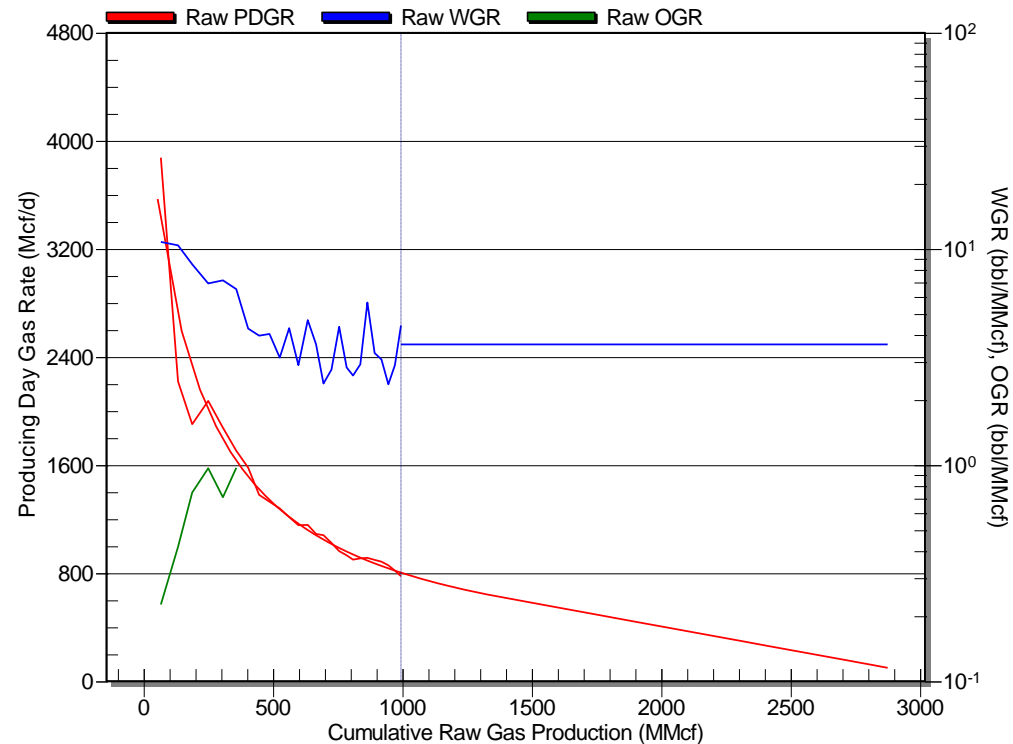
- Evaluated a field with 76 shale-gas wells drilled between 2006 and 2008
- Average maximum gas rate/well: 6.7 mmcf/d
- Average ultimate recovery/well: 3.7 bcf
- Average depth: 7900 feet
- Horizontal wells with multi-fracs.

Summary of all 76 Wells



Production Forecasts

- Wells (cont.):
 - Used decline analysis to forecast remaining life for all wells
 - Most wells exhibited hyperbolic declines
 - Switched to an exponential decline at an instantaneous decline rate of 12%
 - Allowed economic limit to determine ultimate recovery



Programs

- Well Assumptions (cont.):
 - Moved all 76 wells forward 5 years
 - 11 wells in 2011; 34 wells in 2012; 31 wells in 2013
 - Created 6 copies of original 76 wells
 - Evaluations were generated for the following areas:
 - Alberta 2009
 - Alberta 2011
 - BC Marginal Well Deep Gas (BC)
 - BC Net Profit Royalty (BC NPR)
 - Louisiana
 - Pennsylvania
 - Texas

Economic Assumptions

- Economic Assumptions:
 - All values are in Canadian dollars.
 - Capital cost to drill and equip Canadian wells estimated at \$5.5 million.
 - Capital cost to drill and equip US wells estimated at \$5.0 million.
 - Field tie-in and gathering costs of \$30 million in 2011 and \$30 million in 2012.
 - Applied \$1.00 price premium to TX and LA and \$1.50 to PA to account for differences in transportation costs.
 - Did **not include** any land acquisition costs.

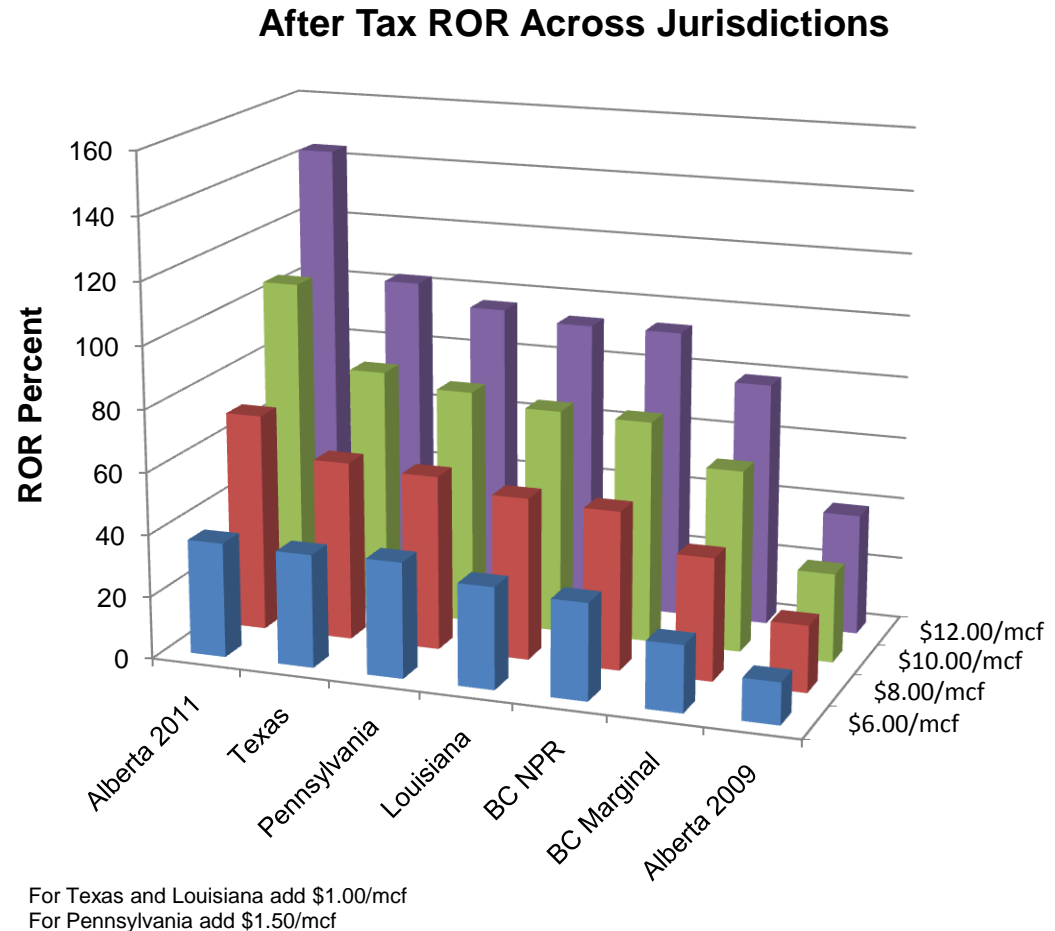
Economic Assumptions

- Economic Assumptions (cont.):
 - All appropriate royalties, incentives, severances, ad valorem and taxes were applied for each jurisdiction.
 - Used constant dollar gas prices of \$6/mcf, \$8/mcf, \$10/mcf and \$12/mcf
 - Operating costs for all wells are estimated at:
 - \$3,000/well/month
 - \$1.00/mcf
- Results Graph Layout:
 - All jurisdictions are present in either ascending or descending order of value.

Results

- Alberta 2011 is the best opportunity across all jurisdictions
- Texas just edges out Pennsylvania for top title in the US with Louisiana not far behind.

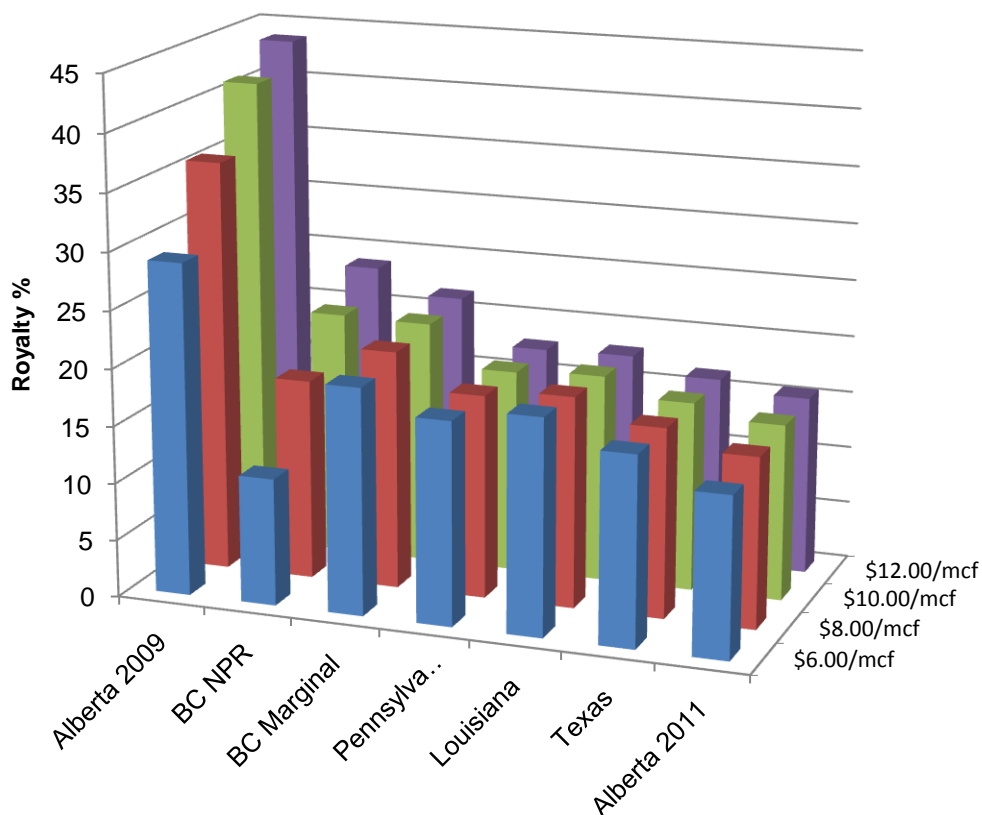
Note: land prices not included in evaluation



Results

- Alberta 2011 royalties are the best for values greater than \$6/mcf gas
- 2009 Alberta royalties approach 45% for \$12 gas.
- At \$6 gas BC NPR has significantly lower royalty take than all other jurisdictions.
- US burdens are similar in all three states.

Royalty/Burdens/Severance/Ad Valorem

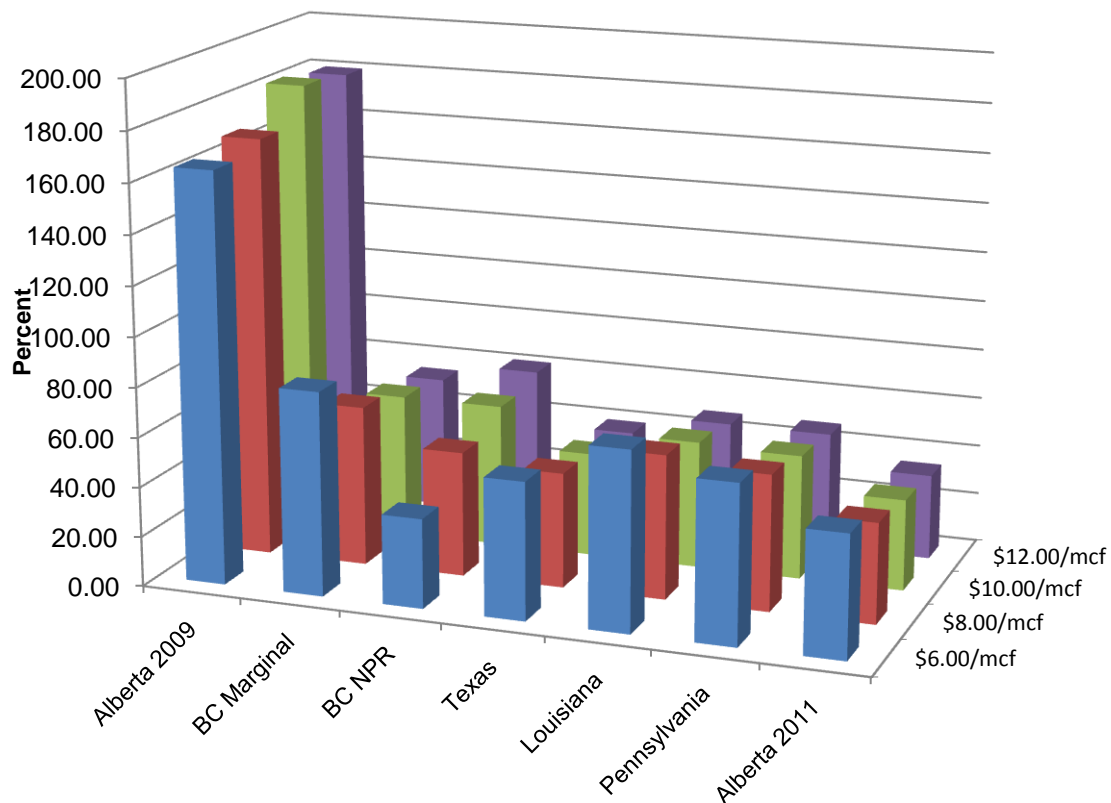


For Texas and Louisiana add \$1.00/mcf
 For Pennsylvania add \$1.50/mcf

Results

- Alberta's 2011 royalty percent are best at all gas prices above \$6
- BC's Marginal take similar to Louisiana and Pennsylvania at high gas prices.
- At \$6 gas, BC leads the pack.

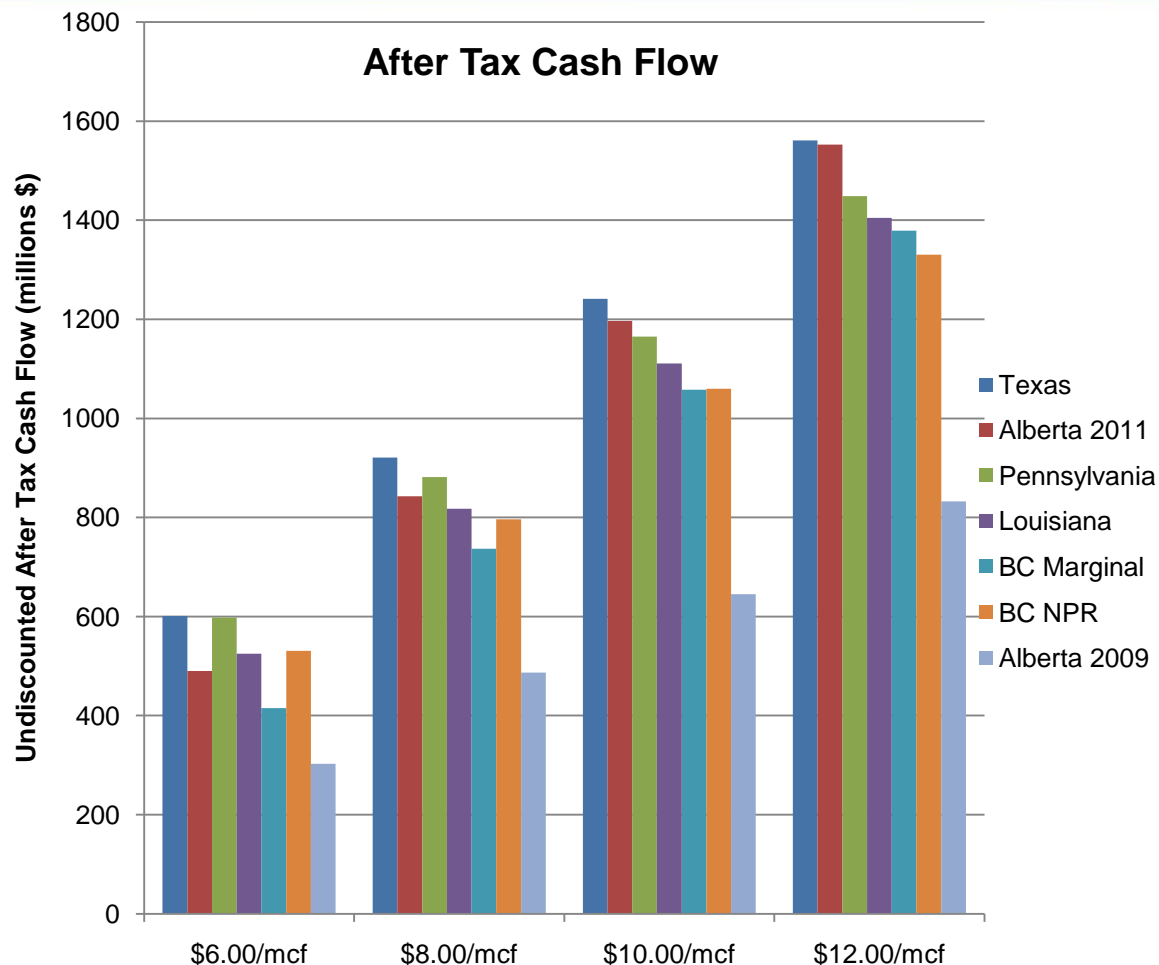
Royalty as % of After Tax Cash Flow



For Texas and Louisiana add \$1.00/mcf
 For Pennsylvania add \$1.50/mcf

Results

- ATCF in Texas and Alberta 2011 is similar above \$6 gas price.
- At \$12 gas price, the ATCF in Texas and Alberta 2011 are nearly identical.

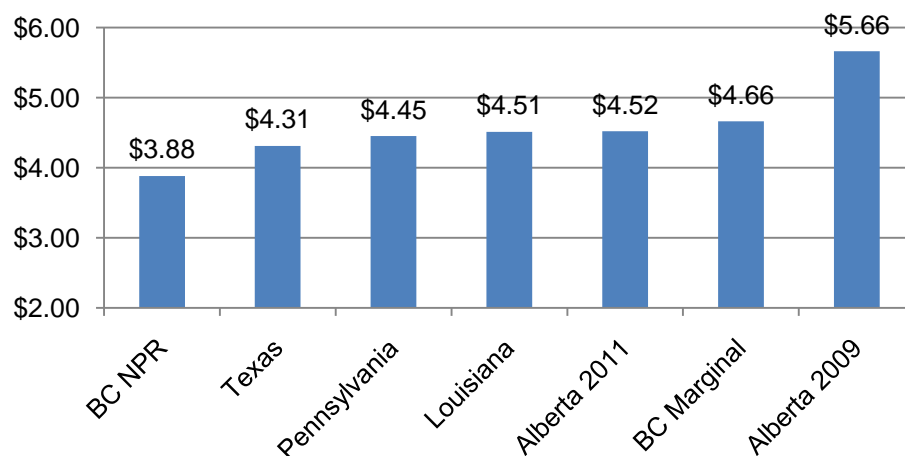


For Texas and Louisiana add \$1.00/mcf
For Pennsylvania add \$1.50/mcf

Results

- The average 2009 Alberta Spot Price was approximately \$4.00 making shale gas development marginally economic in BC during this low gas price period.
- With \$1.00/\$1.50 premiums in TX, LA and PA US shale gas remained viable.

Supply Cost, \$/mcf



Note: supply cost is also called break-even cost

CONCLUSIONS

- The Alberta 2011 royalty structure addresses the competitive concerns for shale gas development.
- The US states are quite competitive with each other, with very similar burdens.
- At low gas prices, BC NRF is the most competitive regime.
- Alberta is most competitive at higher gas prices.

INFORMATION

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