

Fueling Alberta's Next Economic Boom – Balancing Energy Development and Water Management



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Presentation Outline

- Are we heading for another boom?
- Factors affecting Alta economy
- Where will growth be focussed?
- Role of water in Alta economy
- Alta water regulatory framework
- Striking a balance (our future)
- Questions?

What is an Economic Boom?

- Economics 101 (supply & demand)
- Alta has what the world wants:
 - Abundant resources
 - Stable political system
 - Proximity to U.S.
 - Attractive return on investment 
- As such...

Is Alberta set for a Boom?

➤ Conference Board of Canada

- *“...demand for Canadian natural gas will double between 2012 and 2035, driven by production of LNG for Asian export markets...”, and “... to produce electricity and to produce bitumen in the oil sands. This ... demand will drive an estimated **\$386 billion** of (natural gas) investment. Over the next two decades, the investments in natural gas will exceed that of oil sands (**\$364 billion**)...”*



➤ RBC Economics

- *“...Despite facing challenges, Alberta's economy will continue its impressive boom through 2013 after leading the country's economic growth in 2012...” , “... Alberta will lead the country in economic growth of **4.2% in 2014**...”*



➤ ATB Financial

- Alberta will have “...moderate healthy level of growth of around **2.5 – 3.0 %**” in 2013, and “healthy moderate growth” for 2014”.

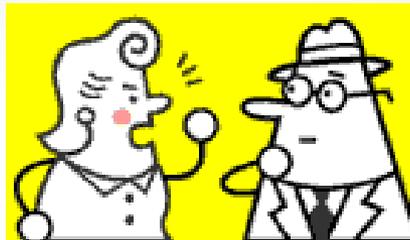


➤ Having said that...



Is Alberta set for a Boom?

- Economic growth will be tempered in recognition of stakeholder concerns WRT:
 - Oil sands developments (mining, in-situ)
 - New pipelines (spills, etc)
 - Multi-stage fracking (impacts to water resources)
 - Water use (to support O&G operations)
 - Cumulative impacts (play-wide vs. single well applications)



Is Alberta set for a Boom?

➤ Other considerations

- Rapidly expanding U.S. tight oil production (N. Dakota and Texas)
 - U.S. oil imports lowest in 20 yrs
- Competition for refineries/proximity to markets
 - N. Dakota lighter oil and easier (cheaper) to refine
 - Not all U.S. refineries can handle bitumen
 - Competition for U.S. Gulf refineries (Mexican/Venezuela heavy oil)
 - Costs more to transport and refine Alberta oil
 - **Differential** of Brent vs. WTI vs. WCS
 - WCS trades at **20-40%** discount on \$/bbl
 - Direct impact on Alberta provincial budget (surplus vs. **deficit**)



➤ Global investment markets (don't like uncertainty)



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Alberta's Oil & Gas Reserves

- Some potential for storm clouds , but our mapped O&G resources include ([OOIP](#), Alta. Gov.):
- Conventional
 - Oil & gas (~70 billion bbl)
 - Bitumen (clastics; ~1,850 billion bbl)
- Emerging
 - Bitumen (carbonates, ~450 billion bbl)
 - Tight gas and oil
 - See next slides



Emerging Trends (1)

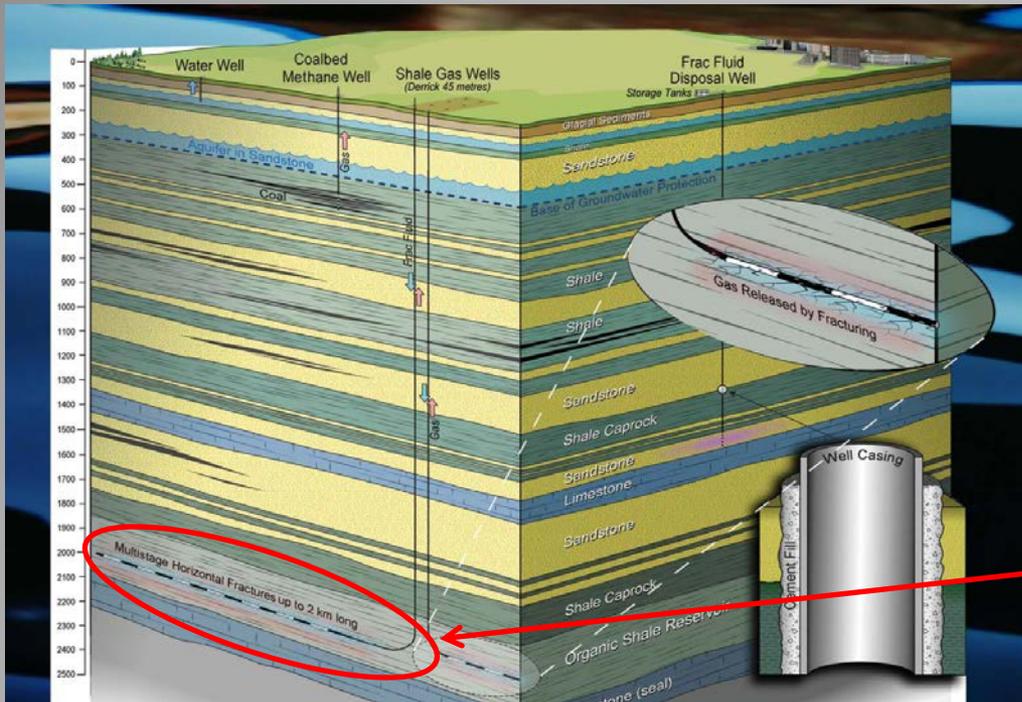
- Carbonate-hosted bitumen projects
 - Osum, Laricina, Husky, Sunshine, etc., will prove-up commercial recovery
 - Just like SAGD/CSS process did for bitumen recovery from clastics
 - Timing of pilot ' → recovery = “?” years



Emerging Trends (2)

- Tight oil & gas plays combine:
 - Horizontal directional drilling (HDD)
 - Multi-stage fracking (MSF)
- **One** HDD/MSF replaces **~10** vertical wells
- Rapidly developing market (how does it work?)

Emerging Trends (2) (HDD and MSF)



Ref: Alta. Govnt.

MSF of HDD
Gas Well

MSF pioneered by Packers Plus (Alberta firm) within last decade.
Technology now used around the world.

Alta Tight Oil/Gas Estimates

Formation (P50 Value)*	Natural Gas (Tcf)	NGLs (billion bbl)	Oil (billion bbl)
Duvernay	443	11.3	61.7
Muskwa	419	14.8	115.1
Montney	2133	28.9	136.3
Banff/Exshaw**	35	0.1	24.8

*P50 denotes median estimate (ERCB/AGS Oct/12)

** Also referred to as Alberta Bakken

Excludes Nordegg and Wilrich

So how does water factor into this?

- Approximately **75%** of Alberta's oil production is water-assisted (CAPP)
 - Conventional
 - Mining
 - In-situ
- It is all about water (based of **current** technology)



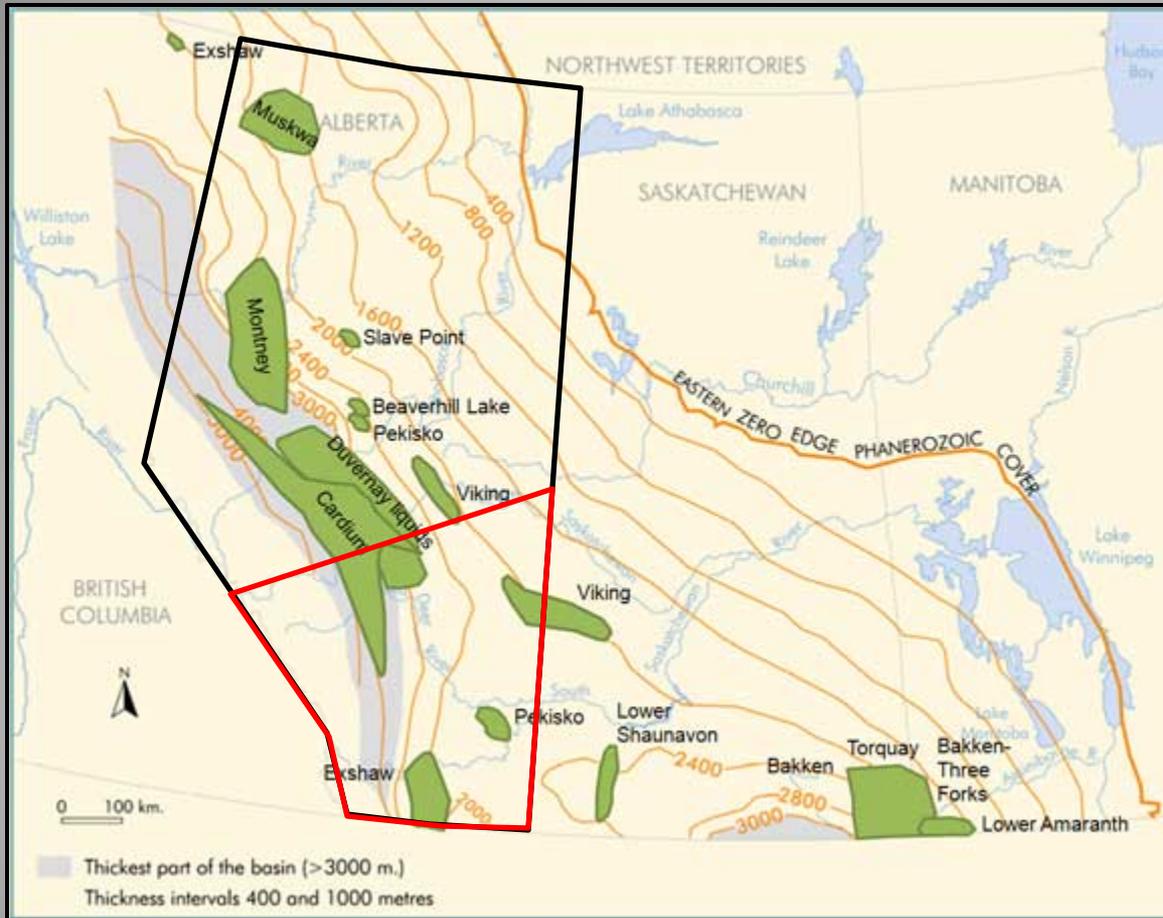
All about water (1)

- Oil sands
 - Significant water volumes used in mining and in-situ operations
 - Industry has made significant strides to reduce non-saline make-up water needs
 - Water recycling/reuse:
 - Well understood/managed (e.g., 90% + recycle)
 - Learnings will be transferred to carbonates

All about Water (2)

- Tight oil & gas (HDD with MSF)
 - May use <10,000 to 50,000 m³/well
 - Get 10-50% flow-back (available for reuse)
 - Cumulative water needs can be significant
 - In Horn River, BC - rely on SW (and GW)
 - In Alta - rely on SW and GW, but limited tight gas/oil HDDs to date (4,200 wells since 2008, and 2/3 are for oil) (Alta Gov)
- Where are the WCSB target formations?

Alta Shale/Tight Oil Fms



 Water short or potentially water short area (Alta. Gov.)

Bedrock Fm Mapping (NEB, 2012)

All about Water (3)

- Tight gas/oil developments
 - Emerging, but rapidly developing market
 - May be assessed by proponent on a play-wide basis...,
... but applied for on a per well basis
 - Concerns raised re: cumulative impacts on water resources and other receptors as market rapidly develops
 - Some tight oil/gas development areas identified as water short (or potentially water short) areas
 - Projects currently exempt from large-scale EAs or EIAs, but regulatory framework expected to change...

Alta Current Water Regulations

- Alberta water resources are well managed under a number of documents, including:
 - Acts, guidelines, directives, etc.
 - *Water Act* ✓
 - *GW/SW, non-saline/saline water, licensing, etc.*
 - *Oilfield Injection Guideline* ✓
 - *AENV Guide GW Authorization* ✓



Alta Evolving Water Management

➤ Alberta Energy Regulator (upstream)

➤ Merge of ERCB and AESRD

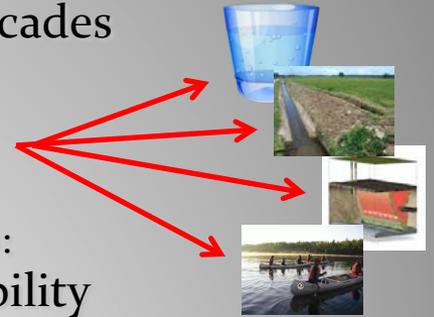
- One-stop shopping to facilitate approvals
- Continuity of key senior staff
- **Review of EIAs?**
- Regulatory oversight of existing/new markets
- Requirement for play-based applications for tight O&G?
- Cumulative assessment approach to better understand the resource (facilitate discussions with stakeholders)



Alta Summary – Striking a Balance

- What does it all mean to Albertans/Canadians?
 - Greater development of Alta resources
 - This growth will fuel the Canadian economy for decades
 - All sectors of Alta economy require water
 - Drinking water, irrigation, oil&gas, recreation, etc.
 - But water resources not abundant in many areas
 - Need a paradigm shift in our thinking (*Water for Life*):
 - Water resources management is a shared responsibility
 - **More water professionals needed**
 - We will be judged by future generations
 - **How will we score?**

- Remember – *all that we all have goes away without water*



Closure

Thank you
Questions?



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