

Presentation to the Board of Commissioners of Public Utilities

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Forecasting Oil Prices is Challenging:

		Implied Nalcor Forecast .7% CDN\$/bbl	NEB Forecast Crude Price (US\$ 2010)	Implied NEB Forecast Crude Price (CDN\$ 2010)	Difference (2010 CDN\$ /bbl)	Difference (2035 CDN\$ /bbl)	Difference %
2035	176.70	134.63	115.00	115.00	19.63	32.21	17.1%

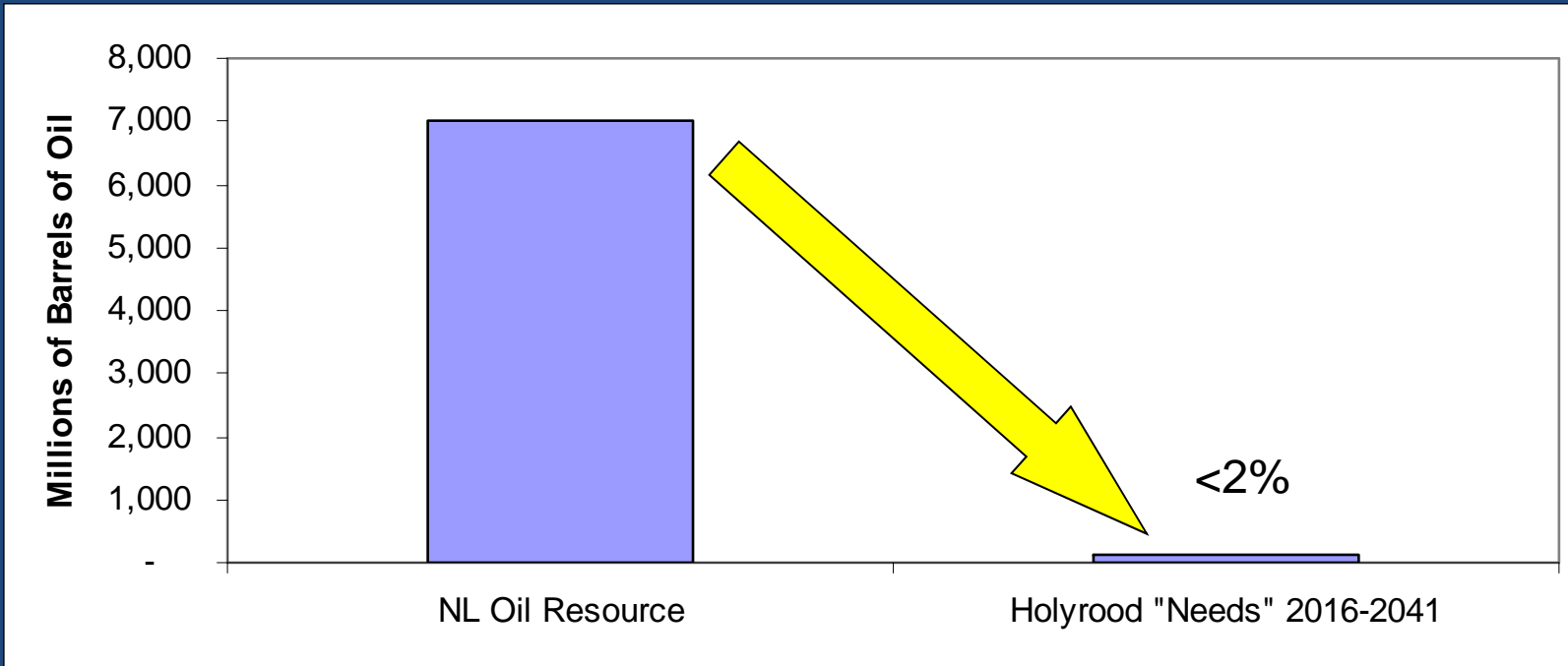
Nalcor's long-term oil price forecast is approximately 17% higher than that of the National Energy Board of Canada. They could both prove to be too high given recent developments in the USA shale oil sector. **Private sector investments now using long term oil prices at ~ \$90 to \$100 (2010 \$ US)**

But even if they turn out to be higher, perhaps we should not worry anyway ?

Economic Hedge to Higher Oil Prices

- Newfoundland & Labrador naturally has an “economic hedge” to higher oil prices:
 - 2010 Holyrood consumption per Hydro = 1.4 million barrels
 - 2011 Offshore production per CNLOPB = 97.3 million barrels
- If Holyrood consumption increases 100% to 3.0 million barrels per year, then between 2016-2041 it will consume approximately 105 million barrels
 - This would be less than 2% of our province’s offshore oil resource.

Holyrood Fuel Oil Needs are Insignificant Relative to our Offshore Oil Resource base in the Jean d' Arc Basin alone



Newfoundland & Labrador is and will remain a major exporter of oil up to and beyond 2041 and the end of the proposed Muskrat Falls 50 year Take or Pay Contract

Oil Price Risk in the Thermal option

- High oil prices are not a risk to economic well being of this province (and its people) **prior to 2041.**
- **Low oil prices are...**
 - **Especially if** consumers have to pay rates based on a 50 year “Take or Pay” Contract for expensive Muskrat Falls with all costs including
 - **And a Provincial Government struggling under low oil revenues**

Essence of Risk in the Thermal option

- It has been said that the greatest risk in the Isolated Island Case is the unstable and possibly rising Price of Oil
- However, due to the “oil price hedge” described in the previous 2 slides there should be little if any actual oil price risk
- If we do have high oil prices, we will have high oil revenues and an ability to pay direct payments to citizens who need assistance due to high oil prices

The Essence of Risk with Muskrat Falls

- The **+50% to – 30% variation** associated with a Class 4 cost projection does NOT measure the cost risk associated with the Muskrat Falls project. **That spread is merely a reflection of how preliminary the DG2 cost projections are**
- If a DG3 cost analysis and budget is approved and the project sanctioned, then true “cost over runs” above the sanctioned budget will start to accumulate from that date.
- The largest true risk in the Muskrat Falls case is cost overruns
- Cost over runs on such large projects typically arise from changes during construction and owner’s inexperience

KEY ELEMENTS OF OIL PRICE RISK

- Oil Price Projections are based on complex assumptions and projections as to future events
- Geo-political spikes (though painful) are of relatively small overall impact on a 50 year time scale
- Key on Demand side : Economic rise of BRIC and similar economies (already in credible projections)
- **Key on the Supply side: Shale oil (& Shale gas)**

THE CONNECTION BETWEEN THE SHALE OIL REVOLUTION AND OIL PRICES

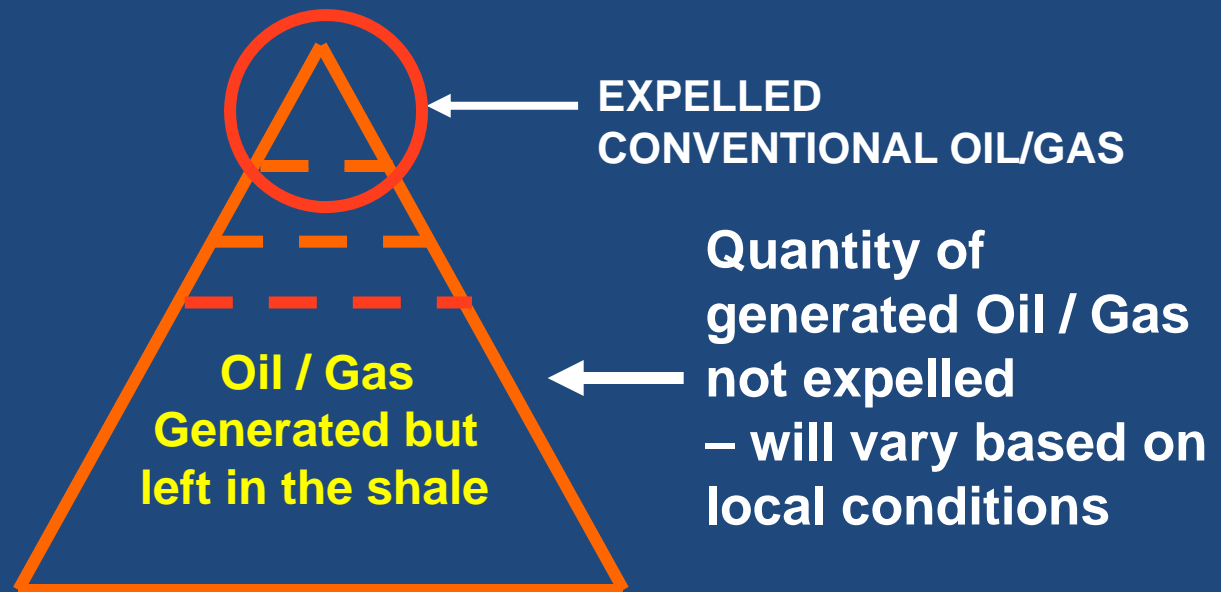
- Rising Shale oil production is already having a significant impact on crude oil prices in the central USA; **analysts are starting to study the wider and longer term implications of this trend**
- Investment and technology are flowing strongly into the shale oil sector which has the strong innovation and cost reduction character associated with a technology still in its early developmental stages
- Organic rich shales with Shale Oil potential are common throughout much of the world -- Chinese officials have stated that they are about 10 years or so behind the USA – a short period on a 50 year project like Muskrat Falls

The Shale Gale: It's all in the Geology

- Oil & Gas comes from organic rich rocks primarily “shales”
- Organic rich shales are one of the most common rocks worldwide
- As these organic rich rocks get buried they get heated by the weight of overlying rocks and their organic material is transformed to oil and/or gas
- Some of that oil and gas gets expelled from the shale but most stays in the shale which is very tight (ie no permeability)

The Total Hydrocarbon Triangle below represents all the oil & gas generated in the organic rich shales in a given basin

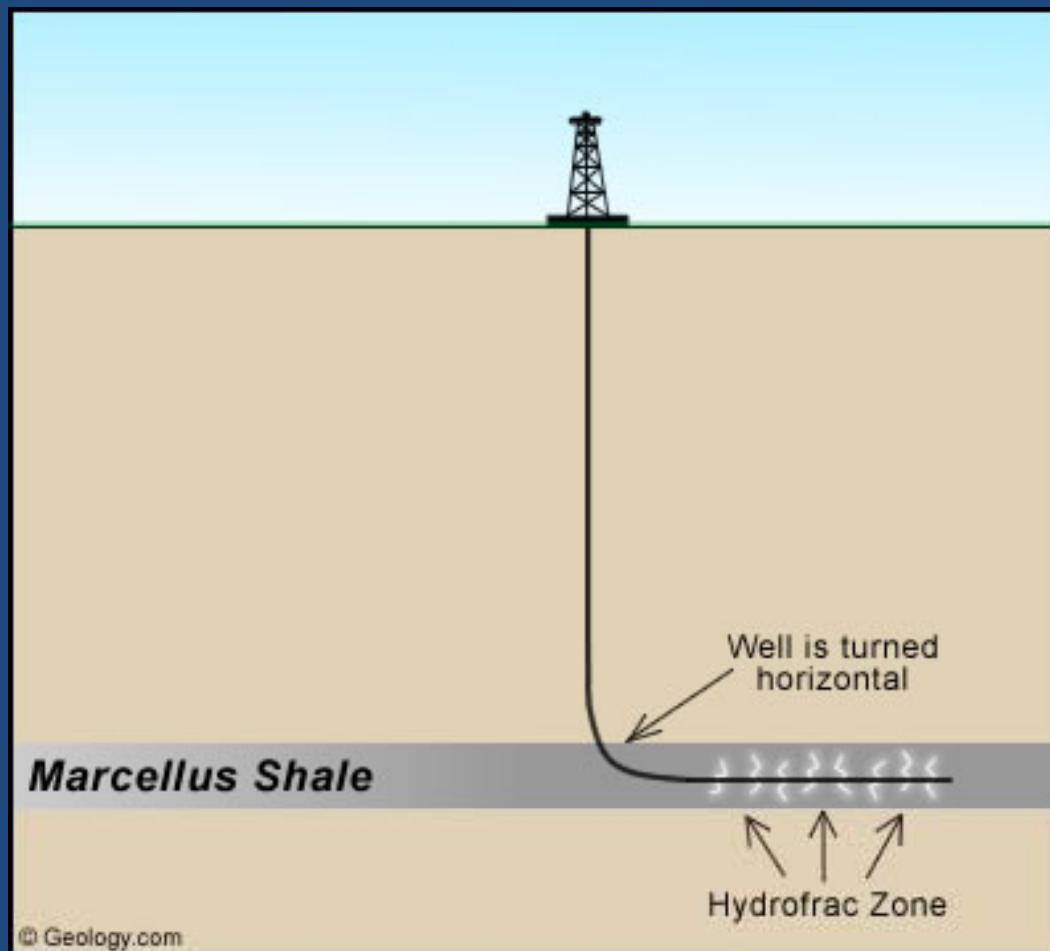
The small top triangle represents the oil & gas expelled from the shale and which constitutes the conventional oil & gas resource base



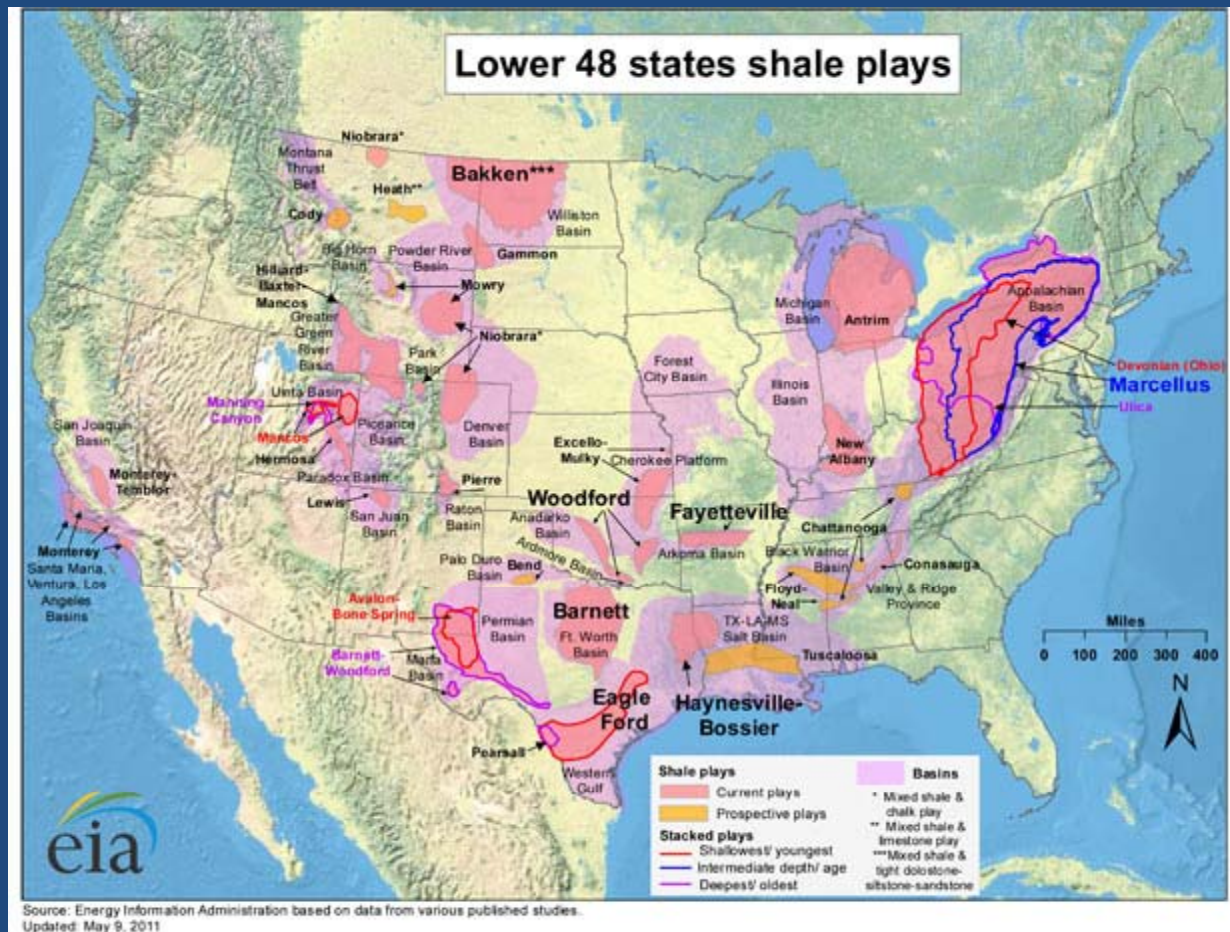
The large bottom part of the triangle represents the oil & gas not expelled and which is still in the shale and which constitutes the unconventional resource base

GENERAL RULE – Unconventional equals ~ 10 times Conventional

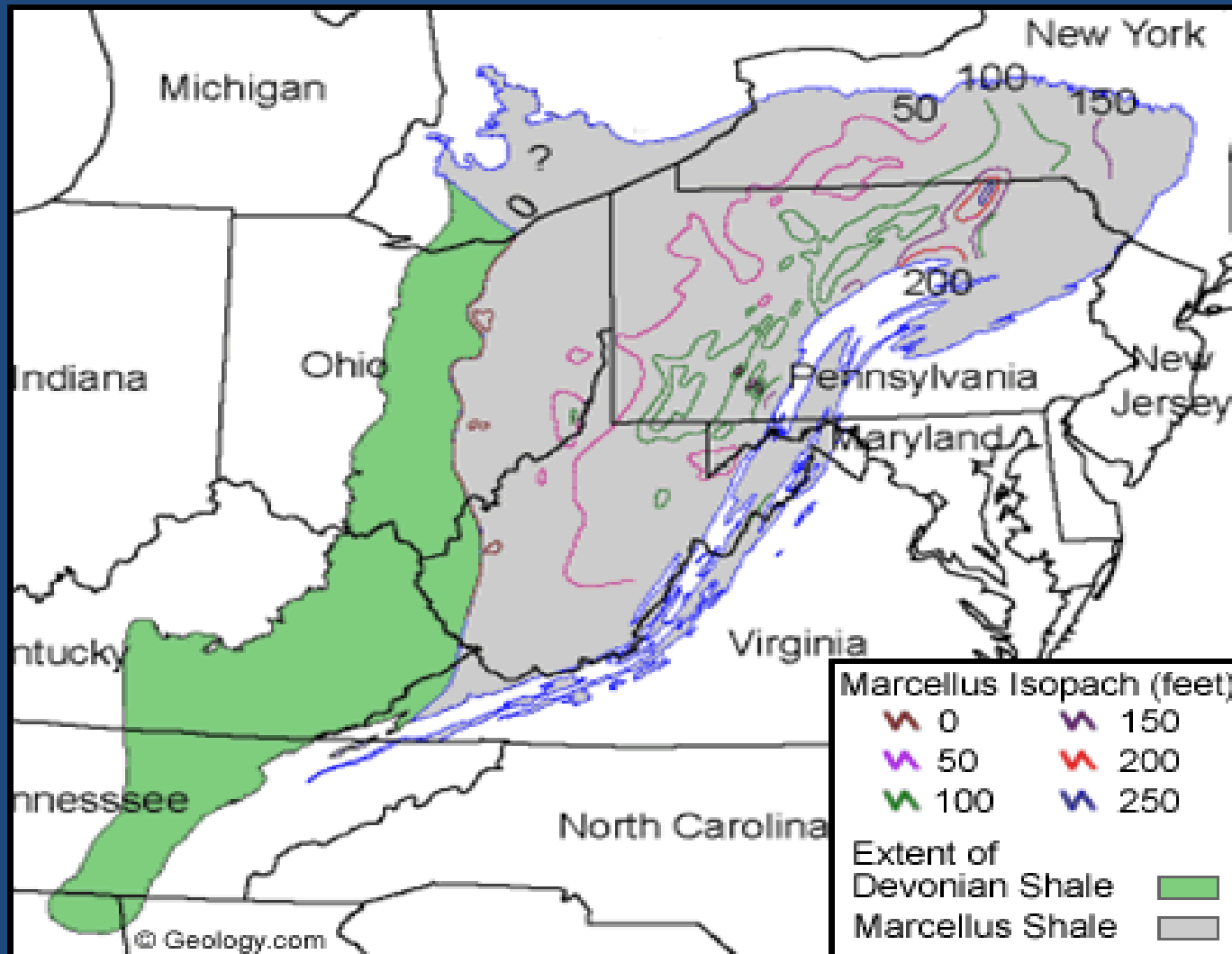
Shale Oil : The basic Concept



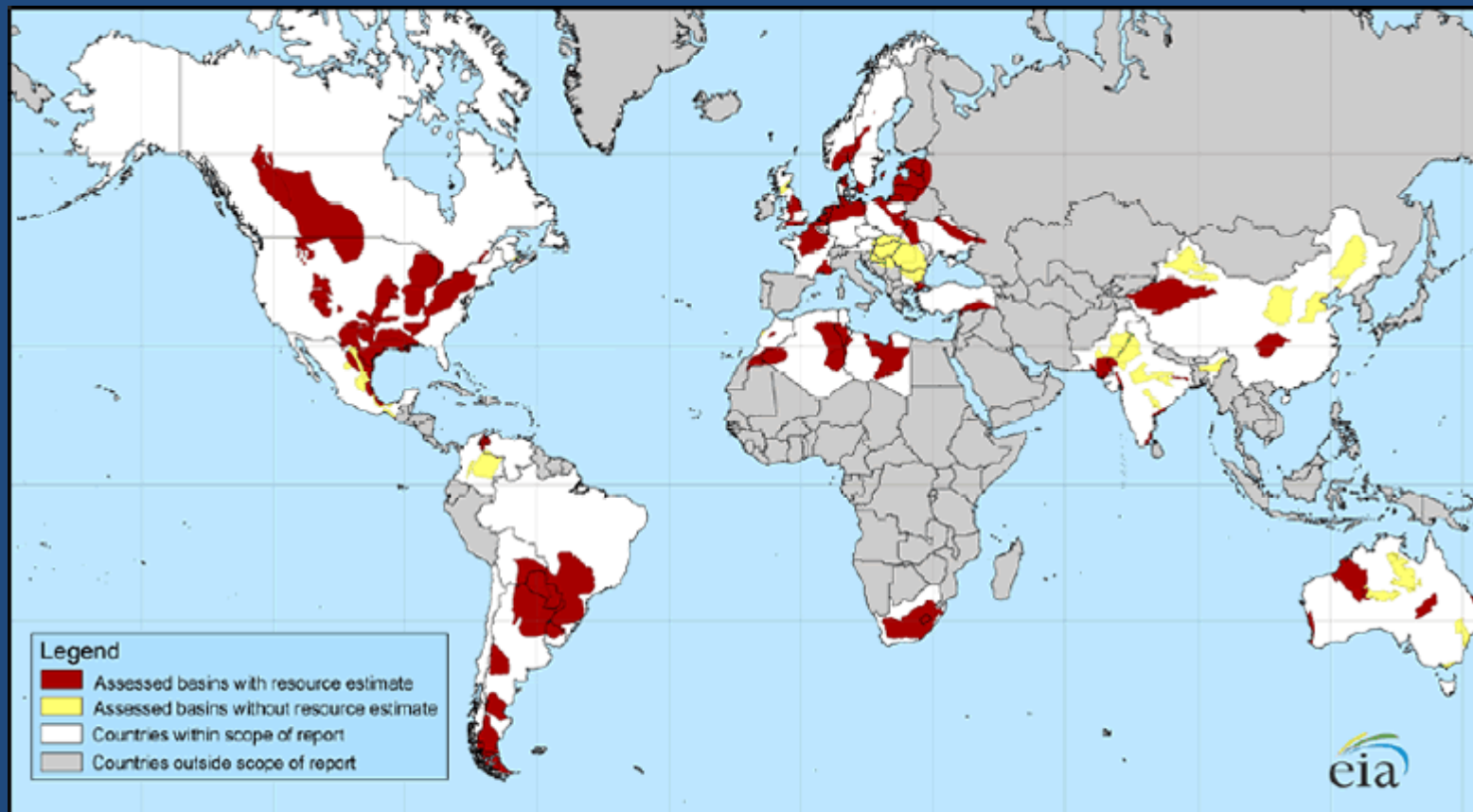
The USA : Shale Oil Plays are everywhere



The Shale Revolution comes east of the Mississippi



Organic Rich Shales Worldwide



Final Thoughts on the Shale Oil Revolution

- **Fracture Enhanced Hydrocarbon production** is revolutionizing energy supply worldwide – the amount to be available will be several times larger than traditional conventional oil & gas reserves - over the next 50 years **both natural gas and oil prices may well trend downward**
- United States will retain its current dominant technological position in the Horizontal Drilling / Fracing area for the foreseeable future
- **We cannot afford to remain “isolated” from this technological and energy revolution**

Need for an Adjusted Process

- **THE INFORMATION AT DG2 WAS ONLY AT A CLASS 4 (FEASIBILITY) LEVEL AND NALCOR HAD TO DEFER ANSWERING MANY QUESTIONS AT THESE HEARINGS UNTIL MORE ACCURATE DG3 STUDIES WERE DONE**
- **HOWEVER , AS MATTERS NOW STAND , THE PUB IS SUPOSED TO BASE ITS ANALYSIS ON THESE LOWER ACCURACY STUDIES WHICH ARE BEING REWORKED BY NALCOR AND ITS FINANCIAL AND ENGINEERING ADVISORS**
- **THE PUB SHOULD REST THEIR CONCLUSIONS ON THE SAME FACTS AND CALCULATIONS THAT CABINET WILL BE MAKING ITS DECISION ON (OTHERWISE THE PUB'S ADVICE ON THE REFERENCE QUESTION WILL NOT BE INFORMED)**
- **THE PUB SHOULD AJOURN UNTIL NALCOR HAS FINISHED ITS DG3 STUDIES AND HAS MADE A FORMAL DG3 RECOMMENATION TO GOVERNMENT**
- **THE PUB SHOULD THEN HAVE A SECOND ROUND OF HEARINGS ON THE FINAL DG3 INFORMATION BEFORE ADVISING GOVERNMENT**

THANK YOU
FOR YOUR ATTENTION