

Epic et al PTAC Proposal:  
Business Case for Increased Recovery of Conventional Oil and Gas Through  
Research and Technology Development, Demonstration and Commercialization

Background: PTAC Request for Proposal (RFP) RR 2004-01

In late 2003, PTAC released a report for the Alberta Energy Research Institute (AERI), in support of the development of the NGCOR EnergyINet Program, entitled “**Spudding Innovation**”. One of the key recommendations of this report was the creation of a detailed business case for increased oil and gas recovery for the Western Canadian Sedimentary Basin (WCSB), through research and technology development, demonstration and commercialization. The specific Alberta goals identified were additional recoverable reserves of 5 billion barrels of conventional oil and 25 TCF of conventional natural gas by 2015 attributable to new R&D.

This business case will be used to develop technology roadmaps, influence industry and government research and development (R&D), including but not limited to such initiatives as pilot projects and university research chairs, and also serve as a basis for developing the Energy Innovation Network (EnergyINet) Program in Natural Gas and Conventional Oil Recovery (NGCOR).

Also identified was the WCSB goal of recoverable reserves of 100 TCF of unconventional gas over the same time frame. This will be the subject of a separate initiative to follow.

The project performers should be experts in Western Canadian oil and gas reserve evaluation, reservoir and production optimization, new technology evaluation and application and business development with a comprehensive team and extensive industry track record.

Executive Summary of Epic et al Proposal

It is well known that only one-third of the original oil and less than 60% of original gas in place is currently recovered. But ‘**where is the remaining oil and gas in place located?**’ and ‘**how can we recover these volumes?**’ are critical questions that remain to be answered. Thus, it is essential to assess not only the initial reservoir conditions and production strategy (pressure, oil saturation, number of well bores, and infrastructure) but also the current conditions. Often low pressure or high water invasion or high gas saturations mean that the current conditions in fields are considerable obstacles for further development.

The next question that naturally follows is: **which field, which technology, which cost drivers or which enhanced recovery method** do we use to stimulate reserve growth? Epic’s experience is that the reasons for reserve growth are a combination of lower costs, reservoir studies, better utilization and further optimization of existing infrastructure and technology, such as waterflooding, and dramatic application of new technology such as screw pumps, horizontal wells, and 3D seismic. It should be noted

that many fields in today's environment, with today's technology, can have significant economic reserve growth.

The next supplementary question: *is it better to grow reserves* in a few top quality reservoirs, or is it better to target reserves in large fields but poor quality rocks/fluids, or a large number of small fields by reducing costs and existing technical risk? There are numerous examples in the WCSB, and in the US, where the latter is true.

Based on our experience working with industry players it is important to realize that even if the 'team'/government etc. identifies 'target areas', the key remaining obstacles to be overcome for acceptance from E&P companies depend upon:

- knowledge barriers, technical uncertainties, or gaps,
- acceptable royalty structure, oil price, and costs
- access to capital and prioritization of other opportunities (ie. an improved recovery project can't take half of the capital budget for a company)
- the front-end loaded nature of capital expenditures on improved recovery projects
- perceived risk, and
- realistic pilot testing.

In the past, studies have been so general and the screening criteria so liberal that the E&P industry has difficulty directly applying the recommendations to their target assets. In order to come up with a practical roadmap, we need a proper assessment of all risk factors and not just reservoir process risk factors and price. In any commercialization E&P process there are geophysical, petrophysical, geological, reservoir engineering, reservoir process, production engineering, operation, regulatory, price, and facility risk factors that need to be addressed. Often, all of these components form a complicated optimization problem whose best outcome is not obvious.

Thus, there are three principles underlying our proposal. We believe:

1. Region-specific (and wherever possible, pool and pool-type specific) recommendations are necessary to create a practical and detailed business case
2. Historical understanding of reserves growth and technology application is necessary to assess future potential
3. Proper identification and characterization of the resource potential (where is it and what is its nature) is necessary to provide useful results

As a group we strongly agree with not only the vision contained in the "Spudding Innovation" report, but also with the need to provide industry with a detailed 'technology roadmap' that aligns and focuses research efforts to develop and demonstrate technologies that yield increased recovery from conventional oil and gas deposits. The team believes that the target of 5 Bbbls incremental improvement in conventional oil reserves and 25 Tcf in conventional gas reserves is an achievable one.