

**March 7, 2019**

**From:** Tom Rand, (P.Eng., Ph.D.), Managing Partner, ArcTern Ventures<sup>1</sup>

T: 647-302-1255 E: [tom@arcternventures.com](mailto:tom@arcternventures.com)

**Re:** Comments on *Increasing renewable content in fuels; ERO 013-4598*

Act: Environmental Protection Act R.S.O. 1990

*We applaud the Ontario government's efforts to provide for cost-effective, economically viable ghg reductions in transport fuels. To that end, we recommend policy changes which provide for greater reduction in consumer costs at the pump, while establishing strong economic potential for Ontario industry.*

**Overview:** Current corn-based ethanol production, originally intended as an octane-boost for gasoline (to replace MTBE), provides for modest reductions in ghg's (34%, on average). Next-generation cellulosic ethanol (NGCE) provides up to 92% reduction in ghg's, while Ontario's leading production method<sup>2</sup> also brings significant cost reduction. We recommend the Ontario government:

- 1) Re-inforce incentives for ultra-low ghg NGCE in the form of a 2.5:1 credit on the compliance formula fuel blending
- 2) Reduce large CAPEX production facility construction risk in the form of:
  - a) favoured tax treatment (accelerated capital depreciation)
  - b) and/or loan guarantees on initial commercial production facilities.

**The policy benefits of establishing a targeted 5-10% ultra-low ghg NGCE are three-fold:**

- Greater ghg reduction (up to 92%<sup>3</sup>) per litre of fuel, resulting in total emission reductions of 2.4 M<sup>4</sup>T (rather than targeted 1.2 MT)
- A lower cost to consumers of minimal compliance (up to 4.5c/litre<sup>5</sup>)
- Long-term reduction in consumer cost of up to 7.5c/litre<sup>6</sup>

---

<sup>1</sup> ArcTern Ventures is privately-backed venture fund focussed on building global clean energy champions. We have approx \$160mm under management, with lead investors in Fund II of OMERS and Equinor (formerly Statoil).

<sup>2</sup> Woodland Biofuels has established production costs of 30c/litre in their Sarnia demonstration facility, validated by a number of large, global fuels providers. We are able to provide diligence materials to that effect.

<sup>3</sup> Third-party validated lifecycle emissions by Federal Government.

<sup>4</sup> Method 1: Assume 5% NGCE blend: from the policy guidelines "If Ontario were to increase and implement the renewable content in regular grade gasoline from 10% to 15% in 2025, it could result in 1.2 megatonnes of greenhouse gas emission reductions."; NCGE brings a two-fold increase in ghg reduction (from 45% to 90%).

<sup>5</sup> Method 2: Assume 2% NGCE compliance contributes the 5% mandated ethanol increase on a 2.5:1 compliance credit basis; Assume \$1/litre gasoline and traditional ethanol costs, 5% compliance baseline cost (5c), NGCE cost (2c replacement @ 2.5:1 compliance factor \* 25% production cost = 0.5c; net savings 4.5c/litre)

<sup>6</sup> Method 3: Assume 10% eventual NGCE blend; 10c baseline cost \* 25% production cost = 7.5c/litre savings.

Achieving levels of NGCE production associated with real drops in price at the pump will require significant private sector investment in production facilities. Additional economic upside is available in leveraging Ontario's existing global lead in NGCE production (in which the Ontario government has an existing investment). Predicated on a strong domestic market Ontario stands a good chance to dominate the global market for next-generation biofuels, a market in the tens of billions. Note that US efforts to ignite their NGCE industry through demand incentives alone proved inadequate to get fuels providers to participate in commercial plant construction (hence #2 above).

**Demand Requirements are not enough:** While a 2.5:1 multiplier is a commendable effort to accelerate demand for NGCE into market by recognizing its lower ghg profile, we believe it is not sufficient to encourage construction and finance of large-scale first-of-a-kind commercial production facilities. We note the failure of similar incentives in the United States to result in commercial plant construction. While some of that failure can be attributed to the state of technology at that time (which has since improved) most can be attributed to the lack of support (technical or financial) of the large traditional fuels producers. While the US incentive was designed to provide enough demand pull to prod large fuels providers into supporting construction of large next-gen fuels production facilities, it merely allowed them to point to extant lack of supply as an excuse to not comply with the intended ethanol requirements.

**Establishing an Economic Advantage:** While many jurisdictions – including the United States – continue to support the demand side of clean fuels, that demand remains unmet. Companies that provide economically viable solutions at scale will face enormous international demand, in addition to fulfilling Ontario's mandated targets. Ontario has a small number of globally competitive next-gen fuel companies well-positioned to take advantage of that potential market. A history of US failures in the next-generation fuels segment (Range, Coskata, KiOR, etc), while not indicative of other emerging technologies potential going forward, have resulted in a lack of investor interest in the sector. Those financial headwinds provide an opportunity for Ontario companies with demonstrated technical capacity to succeed where those companies have failed. However, the market gap in financing must be met.

**The answer:** *Ontario government to provide a backstop to encourage private sector construction of next-gen cellulosic ethanol production facilities.* This does not imply public funds to directly finance commercial facilities, but rather to guarantee private funds for construction and/or provide for accelerated tax treatment. This will *encourage large fuels providers to build first-of-a-kind facilities, using their balance sheet and access to capital, by providing a guarantee on those funds through to production.* To the public, this backstop is a 'contingent liability' (a small fraction of the CAPEX of the facility). Targeting those companies with credible Tier 1 EPC firms as construction partners would serve to reduce risk.

***By establishing an initial backbone of NGE production in Ontario, the Province would not only be providing consumers with significant reductions at the pump, but also be well-situated to build a long-term globally competitive industry capable of supplying a large market that remains unmet to this day.***