

Brief of 3R Synergie Inc.



Office of Public Hearings on the Environment

The inventory and management of ultimate residues

May 14, 2021

HISTORICAL CONTEXT

3R Synergie brings together a group of outstanding Quebec professionals working with the same objective is to: stop burying ultimate residual waste. We consider that in reality, it is a question of «residual raw materials» which can all be reused, if the right technology is used.

Also, following an exhaustive research that we have carried out worldwide to find alternative solutions to landfill, we have come to identify from 2004, the one which is, to this day, considered by independent experts, as the most efficient of all from an environmental standpoint. It's about technology of high temperature gasification developed by the company Thermoselect in the years 1992 to 1998.

It is currently used with success in Japan in seven (7) commercial plants who collectively treated more than 6.3 million tons of domestic and industrial wastes (as of October 2019).

It is the only technology that has demonstrated its ability to use a gasification process, in the waste management sector, while generating a purified synthesis gas. This is one of the unique features of this technology, in addition to the fact that it operates without emission, landfill and pollution, nor discharge to the sewer.

In the news, everybody talk of energy transition and GHG reduction everywhere on the planet. For example, the European countries have set themselves the objective to achieve Zero emission by 2050. A «mad» race to produce hydrogen was then triggered since without the addition of hydrogen (zero emission) to replace fossil fuels, this goal is impossible to achieve.

It is in this global context that the ability of Thermoselect technology to produce purified synthesis gas then becomes one of its most important assets and could greatly benefit Quebec if the government decides to ban landfill.

Indeed, its extensive use would make it possible to produce biofuels necessary to achieve the objectives of reducing GHG emissions and improving at the same time, Quebec's energy autonomy. All this is achievable, thanks to the possibility of transformation of the purified syngas either into: Hydrogen, ethanol, methanol, electricity, jet fuel... or in multiple green chemistry applications.

As proof, a calculation by a specialized independent firm made it possible to assess the impact of our project to treat 200,000 t / year of ultimate waste with Thermoselect technology on reducing Quebec's GHGs by producing ethanol. The results obtained are as follows a reduction of: 1,272,458 TeqCO₂ by 2030 and of 4,877 805 Teq.CO₂ by 2050 of Quebec's GHGs emissions.

This represents much the same total GHG reduction result of all circular economy projects in Quebec reunited!

So Quebec's potential for major GHG reductions becomes evident if the government

With seven plants operating, the Thermoselect technology is very successful in Japan. All together, 6,3 Million tons were processed as of October 2019.



KURASHIKI



MUTSU



TOKUSHIMA



YORII



NAGASAKI



OSAKA



CHIBA



decided to completely ban the landfill of 5.2 million tons of waste per year. Although it is quite feasible now, this option is never considered by independent experts who analyze the means to achieve the objectives for reducing GHGs and improving Quebec's energy autonomy.

Also, if the current government is really ready to meet the conditions allowing a ban of 50% of the landfill by 2025, this goal can be achieved. However, it is completely unrealistic to believe that the private sector will be able to do it alone and without the government breaking the yoke of the current landfill status quo and the MELCC (Ministry of Environment) fully collaborates with it.

Moreover, the mere fact that several «landfill companies» and managers of landfill of Regional County Municipality, have recently been quick to ask (and obtain, in some cases) very long extensions over several decades and extensions of their landfill site (s) as in Ste-Sophie (1 Million t / year), at Lachenaie (1.3 Million t / year), at St-Nicéphore (430,000 t / year) at Sherbrooke / Bury (around 95,000 t / year) representing some 50 to 60% of annual waste buried in Quebec, illustrates the problem that the government will have to solve ... if it really wants to achieve his goal.

YES, it has been shown, on a commercial scale, that the Thermoselect high temperature gasification process can replace the landfill of ultimate waste in Quebec, as it has been doing in Japan for 20 years. In addition, this includes unique advantages in terms of environmental performance: Zero pollution, Zero GHG emission, Zero environmental liabilities, 100% reuse, recycling and waste recovery to develop Quebec's local economy. All in all, the only realistic way to achieve «ZERO WASTE».

LACK OF PROCESS CONSISTENCY

- We cannot ignore the fact that the Prime Minister did the announcement of a 50% reduction target for landfill by 2025, even before to receive your recommendations ...
- That nearly 50 to 60% of the current volume of tons of ultimate waste will be able to still be buried for several decades, all crystallized during the work of your commission, by MELCC (Ministry of environment) officials. A moratorium on this issue would have been quite desirable and easily achievable.
- We have raised awareness among the last four Quebec governments, since 2004, who were informed of the existence of the solution and who did nothing concrete to date.
- Even though a visit to Japan in June 2008 brought 23 representatives of the Montreal Metropolitan Community (CMM), including senior executives from MELCC (Ministry of Environment and MEI (Ministry of economic and innovation development), to see the Thermoselect technology in operation, no action has been taken or been undertaken. And this, despite the enthusiasm of the mayors who attended and reports support from the engineering firms that joined the group.
- Another worrying fact is that 3R Synergie was not invited by your organization (why?) to make an exhaustive presentation, as a Quebec specialist of the question, while we are the only ones, since 2004, to really present a viable and original alternative going directly in the direction of your mandate. However, over the past 17 years, we have made dozens of presentations to civil servants in the ministries concerned and to municipalities alone and their group and associations, (MRC, UMQ and FQM) included.
- While the MERNQ (Ministry of Natural resources and Energy) has objectives related to Quebec's energy transition, these objectives are in no way supported by the MELCC (Ministry of Environment) which taxes the new emerging solutions for the production of biofuels from ultimate waste; this further complicates the financing of these projects. However, these technologies could greatly participate in achieving the goals of transition and autonomy energy in Quebec and therefore have a very positive influence on the trade balance of Quebec from an energy point of view. Should we remember that this trade balance is in deficit and send some \$ 10 to \$ 15 billion in funds outside the circuit economy of Quebec annually? Moreover, made even more incomprehensible among all, these technologies could allow this same MELCC (Ministry of Environment) to improve greatly its results in order to achieve these emission reduction target. One should remember here, that all experts recognize that Quebec's GHG target are out of reach with the current plan of the MELCC (Ministry of Environment)!

3R Synergie solution VS Landfill

200 000 tons per year of "ultimate waste "

Subject	3R Synergie solution Valorisation/ Recycling	Landfill Storage
A- Reuse / recovery of ultimate residual materials		
Recovery of the energy contained in the waste	100%	« max 70%»
Inert materials (e.g. waste used for covering landfill)	100%	Zero
Metal recycling	100%	Zero
Plastics recycling: all types and all mixtures	100%	Zero
Organic matter (not biomethanation, not compostable Ex: Plywood)	100%	Zero
Household organic matter not separated by citizens	100%	Partial: energy production
Treatment of industrial and domestic waste such as landfill : "as is"	YES / 100%	Zero treatment *
B- Financial considerations: Impact on the economy		
Economic benefits for processing 200,000 tonnes / year:	\$299 Millions/10 years	\$10 Millions/10 years
Collective environmental liability (or Deficit):	0 \$/t	(175 \$/t)
	\$/ y : 200 000 t/y	0 \$
	\$/10 years	0 \$
Net Benefit (Loss) to our economy:	\$299 Millions	(350 Millions)
Comparative economic deficit of the current situation and 3R solution: Gap		\$ 639 Millions
Net loss \$ / ton for our COUNTRY to bury waste instead of treating it:	Average \$/t / 10 years	\$639 Millions / 2 000 000 tons = (320 \$/t)
Creation of permanent full-time jobs:	300	20 à 30 on site
Quebec's energy transition and autonomy	YES	not at present time
C- Real cost of the option chosen according to a "Life Cycle Analysis" perspective *:		
Cost at the gatehouse (200,000 t / year; a higher volume would lead to economy of scale for 3R Solution)	120 \$/t	90 \$ à 140 \$/t
Deferred treatment costs (temporary storage)	0 \$/t	175 \$/t
Actual net costs in today's \$:	120 \$/t	265 \$/t à 315 \$/t
D- Environmental impact		
1) Capture of GHG emissions from waste	100%	« max 70%»
Impact on Quebec's GHG emission level	Major reduction	Increase
	Total up to 2030: 1,272 458 tÉq.CO2	30% of GHG emission
	Total up to 2050: 4,877,806 tÉq.CO2	are not captured
2) Social acceptability	YES No negative impact on quality of life of citizens nor on the environment	« Not In My Back Yard » Ex: City of Drummondville democratic refusal by population pool
3) Respect for the principles of sustainable development	YES / 100%	NO
4) Compliance with Ministry of Environment (MELCC) regulations	YES	YES
E- Availability	The 3R Synergie's commercial solution is available now. High temperature gasification technology is a reliable treatment and has been used successfully for over 20 years, in 7 plants, in Japan. Domestic and industrial waste are treated separately or together and fully recycled / reused. Soon, this service will be available in Quebec. Japan adopted a law to ban 100% of landfill many years ago and has a high level of recycling.	
* Based on the idea that in fact, the landfill of waste is not a treatment but a regulatory storage of waste, which will inevitably be temporary. It is plausible that Quebec society will have to pay one day to actually treat them, especially in a context of "pandemic climate change" where almost all landfill sites in Quebec were established without taking into account climate change, then unknown. Old landfill cells closed are not protected. They emit 77% of GHG emissions linked to waste management in Quebec, according to the Institute for Research in Contemporary Economics of Quebec (IREQ).		

F- EXTRAPOLATION:

Quebec generates each year, more than 26 times the amount of ultimate waste used in the previous calculations. The financial benefit of a 100% ban from burying then becomes extremely obvious from all points of view. In summary, this represents a source of major and sustainable economic development since it is based on a «public utility» comparable to Hydro-Quebec. Very important fact please note, our solution is free of any environmental liability.

G- CONDITIONS:

The current MELCC (Ministry of Environment) regulations do not in any way favor the arrival of a solution replacement in landfill. For example, it sees gasification as identical to incineration from a regulatory point of view by affixing the label «**elimination**» of Waste, which, subject to paying an environmental fee of 23,75\$/year which represent a total cost of 4 750 000 \$/y right now.. The reality, however, is quite different in the facts. The Ther-moselect high temperature gasification process does not eliminate any ultimate waste but rather **transform** and reuse them completely without any combustion; it is, technically speaking, a thermo-chemical transformation of the waste to separate its energy fraction of inert and metallic components. Then the high temperature gasification process allows all components to be reused and recycled. Energy (syngas), for example, can thus be used to promote Quebec's energy transition and autonomy. It is important to know that the Ther-moselect process does not use a chimney unlike incineration therefore does not emit GHGs. In addition, it reuses all waste 100% which is not the case of incineration. The MELCC (Ministry of Environment) regulations and their application should therefore be more inclusive and remove the environmental fee to be paid. In addition, one more times, because this needs to be re-emphasized, in doing so, the MELCC would contribute in at the same time to a major reduction in GHG emissions in accordance with its own current plan and objectives which, without major changes, will not be achieved, according to all expert who spoke on the subject.

We believe that using landfill in our context is totally devoid of common sense when a viable alternative can put an end to it at once. In addition, Quebec society runs financial risks of a very large scale to continue to put its head in the sand. There is definitely a misperception about the cost of burying from MELCC and municipal managers, in our opinion. Also talk to those who live near a landfill site and then you will have a better overview of the reality, of the nuisances that this entails on the ground; this is our case.

CONCLUSION

Despite the above context, we have decided to participate in your work and, without claim, to make our contribution to the excellence of your work. We are aware that several decisions are made in the organization of an investigation, such as yours and not all of them are brought to your attention.

So we hope that our very brief presentation will still be able to influence what your report will mean by **the alternative to landfill does exist**, but for all kinds of reasons, it could not to emerge again in the Quebec and Canadian context.

So far, we can say that the Quebec «environment» has not been there favorable at all. Hopefully our third participation in a Public Hearing (BAPE) will make this time, a difference. It is really the wish that has driven us since 2004 to resolve this issue. This is why we have undertaken to inform the various stakeholders in the existence of this solution.

As Quebecers, we have accumulated a higher collective environmental liability to 200 million tonnes of landfilled / stored wastes. It is totally illusory to believe that one day we won't have to actually deal with them. This reality is revived by the impacts of the «climate pandemic» which we only see emerging that the first repercussions currently. In fact, landfills are simply not prepared for it when the vast majority have been designed and implemented before this phenomenon is known. This reality therefore represents a major «environmental liability” which we estimate at over \$ 30 billion, in today's dollars.

Don't you think it's high time that this stopped and our generation take finally his responsibilities and the means to resolve this problematic situation, rather than to bequeath it to the next generations?

Especially since paying to bury ultimate raw materials in 2021 is a aberration while they have the potential to be a major permanent collective enrichment, using the technological solution we offer. It requires openness and a desire to change mentalities on the part of all the parties involved.



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