

Evaluation of Biosolids Utilization Options for the Capital Regional District, Victoria, BC

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NBMA Annual Biosolids Management Conference
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The logo for the Capital Regional District (CRD) features the letters 'CRD' in a stylized, white, sans-serif font on a teal background.

Making a difference...together

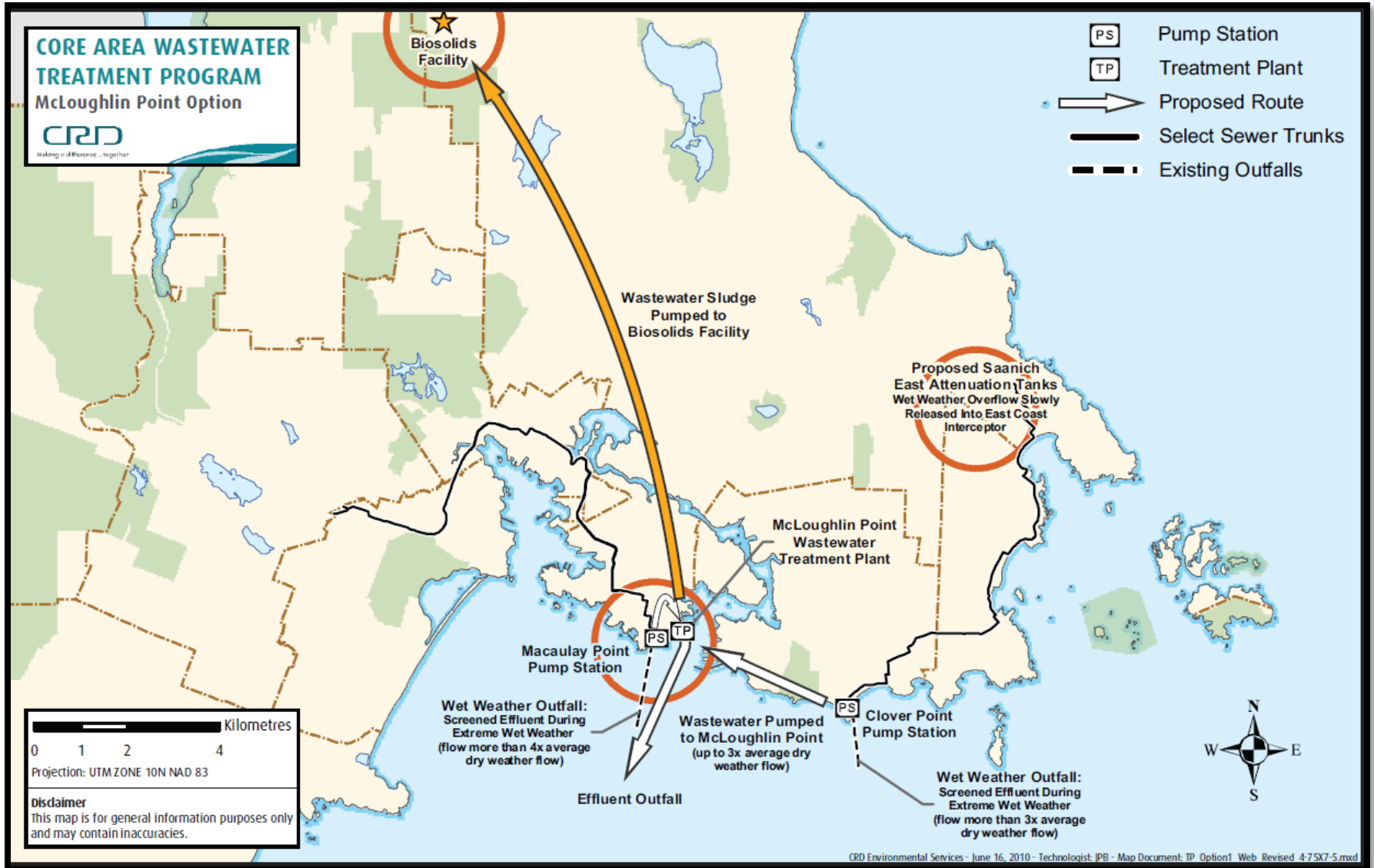


Presentation Outline

- Core Area Wastewater Treatment Program
- Evaluation Methodology
- Biosolids Alternatives Analysis
- Results
- Discussion



Capital Regional District: Core Area Wastewater Treatment Program



Treatment Plant Design Criteria



Service Population ~ 350,000

Treatment plants, pump stations and a centralized biosolids treatment

Online by 2016 – planning through 2030/2065

Design Flow (2030): 108 ML/day (~29 mgd)

Solids Handling: 5800 DT/yr

Victoria Biosolids Planning Objectives From Core Values

- Potential to utilize all biosolids loads through 2030
- **Use technologies that support product utilization**
- Implement within the required schedule (2016)
- **Provide maximum resource recovery**
- **Minimize GHG emissions**
- **Integrate with solid waste management**
- Provide end-use reliability: primary and backup alternatives
- **Utilize technologies with an acceptable life-cycle cost**
- Provide process reliability: proven technology
- Meet all regulatory requirements

Initial Biosolids Alternative Screening

Primary Alternative Candidates	Promotes Maximum Resource Recovery	Reduces GHG Emissions	Promotes Integration with Solid Waste	Uses Proven Technology
Dried fertilizer product	Pass	Pass	Pass	Pass
Top soil blend	Pass	Pass	Pass	Pass
Land application	Pass	Pass	Pass	Pass
Mine reclamation	Pass	Pass	Pass	Pass
Lime-pasteurized product	Fail	Fail	Fail	Pass
Biomass production	Pass	Pass	Pass	Pass
Compost product: raw biosolids	Fail	Pass	Pass	Pass
Compost product: digested biosolids	Pass	Pass	Pass	Pass
Biocells	Pass	Pass	Pass	Fail
Cement kiln fuel	Pass	Pass	Pass	Pass
WTE fuel	Pass	Pass	Pass	Pass
Thermal processing to gas or solid fuel	Pass	Pass	Fail	Fail

Biosolids Utilization Alternatives

Biosolids Utilization

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graph TD; A[Biosolids Utilization] --> B[Fertilizer]; A --> C[Soil Amendment]; A --> D[Energy Recovery];
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Fertilizer

- Compost
- Topsoil blend
- Thermally dried product

Soil Amendment

- Land application
- Mine reclamation
- Biomass production

Energy Recovery

- Cement kiln
- WTE mass burn:
Raw sludge & digested solids
- WTE fluidized bed:
Raw sludge & digested solids

Soil Amendment

Land Application:



Mine Reclamation:



Biomass Production:



Fertilizer:

Compost:



Topsoil Blend:



We planted pumpkins, beans, squash and corn in May. Each garden received seeds from the same pack. By June there was already a significant difference between plants growing in the topsoil mix and those growing in the SkyRocket soil mix. Photos taken June 7, 2007 at the Comox Strathcona Regional District Compost Demonstration Gardens, Courtenay, BC.



Dried Product:



Energy Recovery:

Waste to Energy:



Cement Kiln:

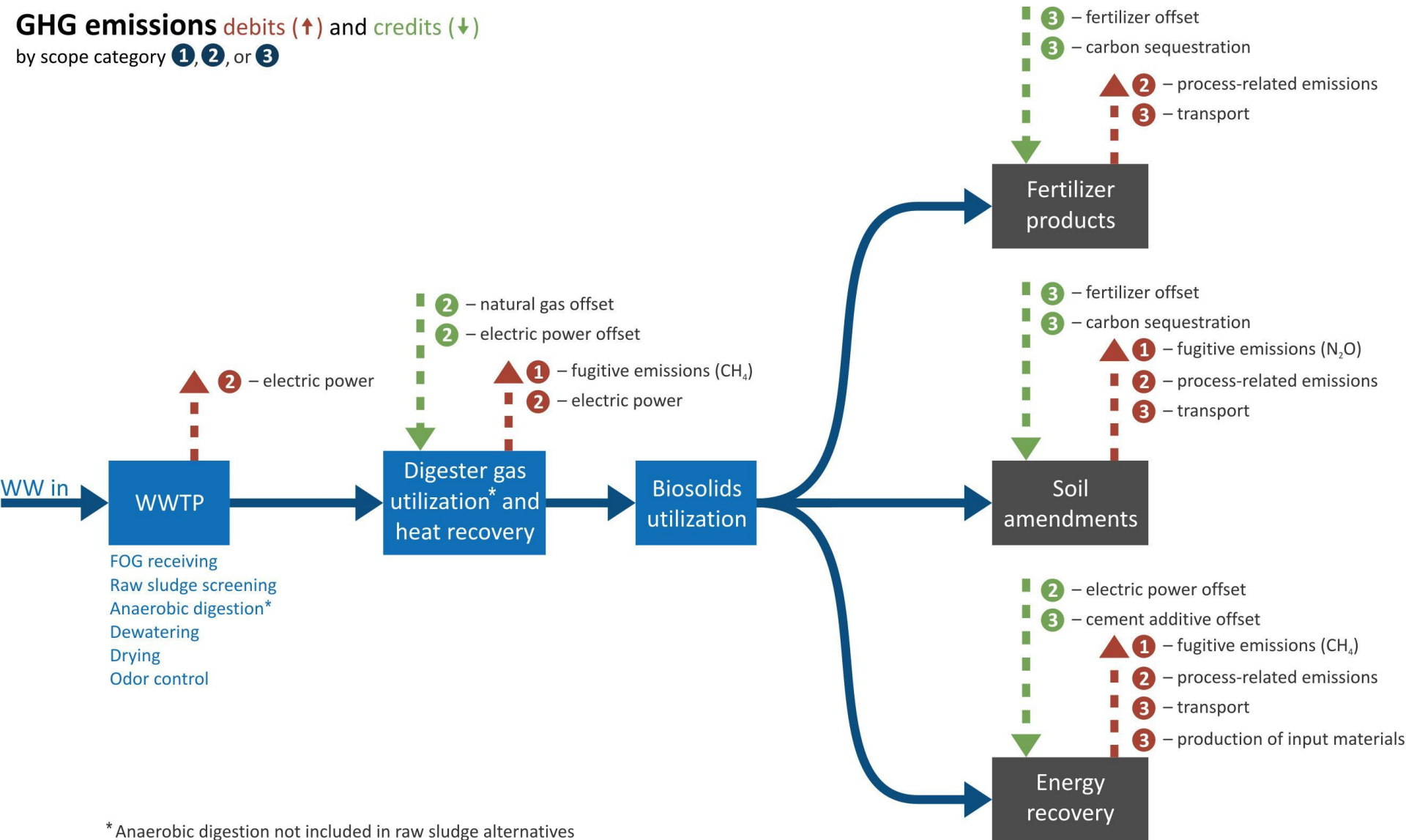


Economic Evaluation – Capital, O&M and Revenue

	Co-Digestion							Waste-to-Energy	
	Compost products	Top Soil Blend	Dried Fuel Product	Biomass Production	Thermally Dried Product	Land App.	Mine Rec.	Raw Sludge	Digested Sludge
Capital Costs:	(In million dollars)								
Present Value of Capital Costs	\$282	\$278	\$274	\$281	\$274	\$274	\$274	\$289	\$313
O&M Costs:									
Present Value of O&M Cost	\$263	\$252	\$233	\$259	\$233	\$243	\$243	\$262	\$253
Revenue:									
Present Value of Revenue	\$138	\$137	\$132	\$128	\$132	\$126,	\$126	\$18	\$130
Total Net Present Value	\$407	\$393	\$374	\$412	\$374	\$391	\$391	\$533	\$437

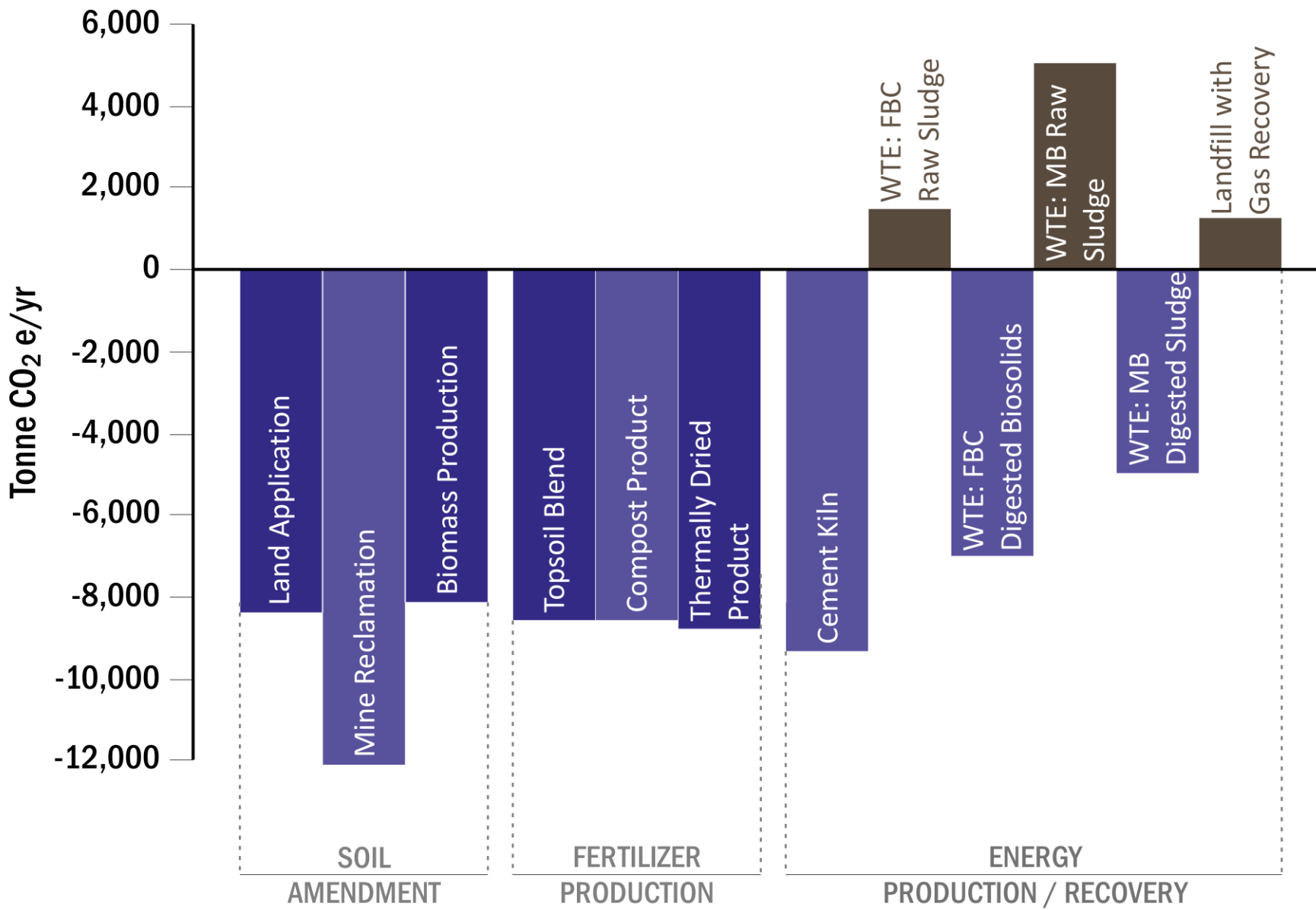
Carbon Footprint Analysis

GHG emissions debits (↑) and credits (↓)
by scope category ①, ②, or ③



* Anaerobic digestion not included in raw sludge alternatives

Carbon Footprint Analysis - Results



Biosolids Evaluation - Monetized Triple Bottom

Line



Economic



Environmental



Social

Criteria Group	No.	Criteria Categories	Measure Description
Economic	EC-01	Capital Costs	Construction cost and markup
	EC-02	Present Worth of O&M costs	O&M costs
	EC-03	Flexibility to Accommodate Future Regulations	Additional space needed versus available
Environmental	EN-01	Carbon Footprint	Tons of eCO2 created
	EN-02	Power (energy) usage	Kilowatt hours per year consumed
	EN-03	Pollution Discharge	Air emissions discharged from dryer
	EN-04	Non-renewable Resource Use	Gallons of diesel consumed per year
	EN-05	Non-renewable Resource Generated	Biosolids production
	EN-06	Flexibility for Future Resource Recovery	Additional space needed to add 100% additional resource recovery
Social	SO-01	Operations Traffic in Sensitive Areas	Cost of traffic inconvenience
	SO-02	Odor Potential	Cost of odor issues
	SO-03	Visual Impacts	Perceived value of lost view
	SO-04	Public and Stakeholder Acceptability	Lost time due to public disapproval

Monetized TBL Results



	Alternative Monetized TBL Results, million dollars								
	Dried Fertilizer	Top Soil Blend	Mine Reclamation	Land Application	Biomass Production	Compost Product	Cement Kiln Fuel	WTE - A	WTE - B
Economic	\$513	\$537	\$523	\$523	\$546	\$551	\$511	\$583	\$572
Environmental	-\$119	-\$125	-\$108	-\$110	-\$106	-\$125	-\$121	-\$54	-\$129
Social	\$75	\$76	\$68	\$84	\$85	\$77	\$67	\$86	\$90
	\$469	\$488	\$483	\$497	\$525	\$503	\$458	\$614	\$533

Recommended Biosolids Process Train

- Anaerobic digestion (thermophilic)
- Co-digestion with food waste/FOG
- Sludge drying (extracted heat or WTE)
- Gas scrubbing and sale (natural gas offset)
- Nutrient recovery (struvite)
- Future integration with solid waste WTE

Recommended Biosolids Utilization Portfolio

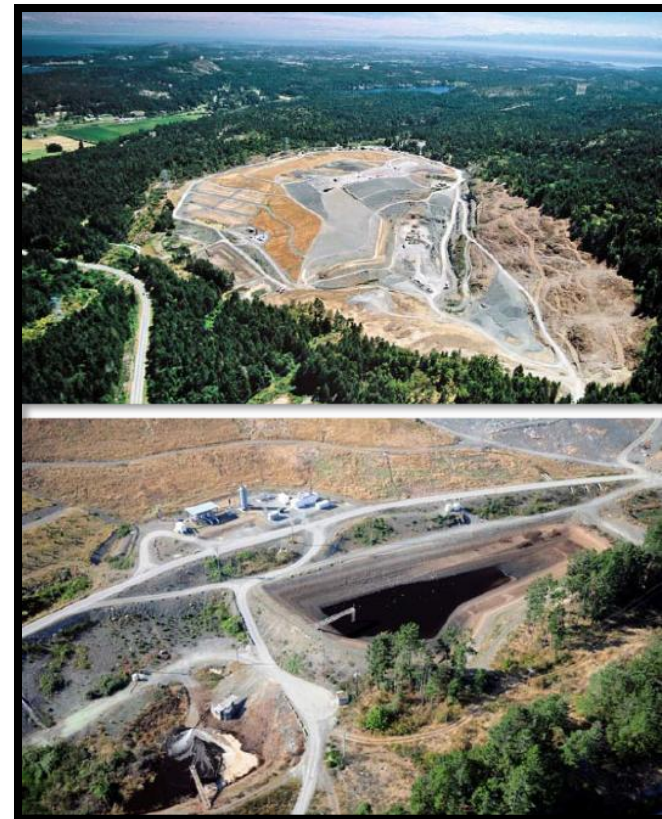
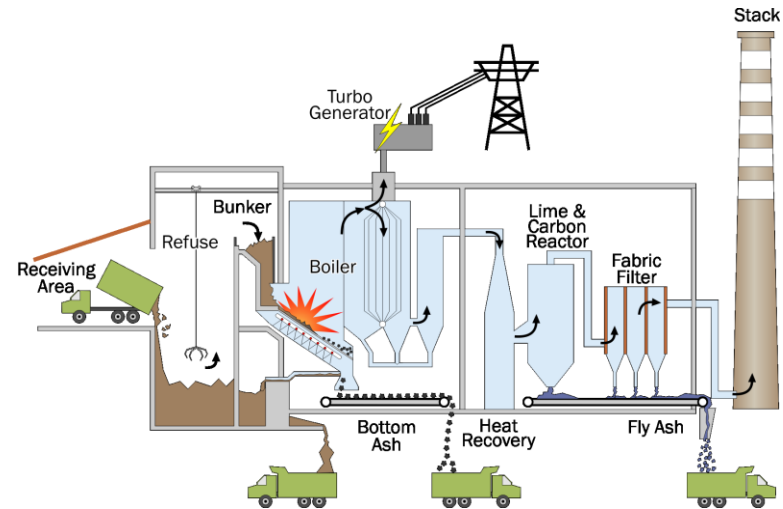
- Primary market: Cement kiln fuel
- Secondary markets:
 - Mine reclamation
 - Thermally Dried product for topsoil production

Adopted Approach: Energy Centre

Biosolids Digestion Facility
located at the current
landfill

Production of anaerobically
digested, thermally dried
product

Ship to cement kiln or WTE at
the landfill



Political Pressure Influences Biosolids Utilization

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CRD prohibits farmers from using biosolids on their land

BY KIM WESTAD, TIMES COLONIST JULY 17, 2011



The Capital Regional District has banned the use of biosolids on farmland.

Victoria Coun. Philippe Lucas, who made the motion, said the ban will protect food security in the region.

Using biosolids - the fancy name for the sludge left over after sewage goes through secondary treatment - as fertilizer is controversial. Some countries have banned its use, but others have not. There is concern over products left in the biosolids, such as pharmaceuticals, medications, health and beauty products and chemical house cleaning products.


"[Sludge] has been deemed too toxic to continue to distribute into the oceans, yet a possible disposal method being considered is to take concentrated waste and use it on farmland," said Ruby Commandeur, who runs an organic farm in North Saanich. "Are we doing this to benefit farming or to have a cheaper disposal method for sludge?"

The board voted in favour of banning the use of biosolids immediately.

The Saanich Peninsula Wastewater Commission had planned a pilot

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Land-based Biosolids Utilization or Disposal Banned

- Governing Committee embraces WTE and rejects any land-based utilization or disposal
- Decisions heavily influenced by internet “references”
- Facility planning driven toward integration with solid waste WTE in spite of funding uncertainties
- Ban includes landfill disposal as backup

Internet Resources are a Powerful Influence

Wikipedia:

- “One of the main concerns in treated sludge is the concentrated metals content; certain metals are regulated while others are not.”
- Referring to the study by Harrison and Oaks...”until investigations are carried out that answer these questions, land application of Class B sludges should be viewed as a practice that subjects neighbors and workers to substantial risk of disease”



Local Regs Continue to be Unpredictable

The Wahkiakum County Eagle

2-1: Only Class A biosolids in county

http://www.waheagle.com/news/article.exm/2011-04-28_2_1_only_class_a_biosolids_in_county

The Daily News

County, State and Farmer Involved in Wastewater Dispute

http://tdn.com/news/local/article_97c3960c-7140-11e0-9bb4-001cc4c002e0.html

Commissioners Congratulated by Activist

“Congratulations to Wahkiakum County commissioners for banning the landspreading of toxic, pathogenic Class B sewage sludge “biosolids” from urban and industrial sources. Federal sludge laws have always authorized local communities to enact sludge control ordinances more stringent than federal rules:

See the text of federal laws which are applicable to local control at Atty Chris Nidel’s Website:

<http://www.nidellaw.com/blog/?p=17>

For more information on local control of sludge:

<http://sludgevictims.com/local-determination.html>”

Helane Shields, Alton, NH hshields@tds.net

<http://www.sludgevictims.com>

Questions?

CRD

Making a difference...together

Brown AND Caldwell

CRD prohibits farmers from using biosolids on their land

By Kim Westad, Times Colonist July 17, 2011

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The board voted in favour of banning the use of biosolids immediately.

The Saanich Peninsula Wastewater Commission had planned a pilot project to use biosolids on agricultural land. However, that has been put on hold.

"This has been a very difficult issue for us as a commission," said North Saanich

Resident questions use of sewage sludge

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Published: **August 08, 2011 1:00 AM**

To the editor:

Interesting letter the week of July 11/2011, from the TNRD. It would appear that the TNRD is being paid by the Greater Vancouver Regional District (GVRD) to accept Vancouver's sewage sludge.

As in my previous letter of June 27, 2011, I repeat - the facts are as follows:

1. "Sewage sludge" is the legal term. The term "Bio-solids" was coined to increase public acceptance.
2. Returning composted human and animal manure to the land has been an accepted agricultural practice for hundreds of years. But present-day sewage sludge is wicked stuff - not only human biological wastes, but an accumulation of everything flushed down toilets or poured into the drains of a modern city. Sewage sludge contains toxins. All sewage sludge. Solvents, industrial wastes, various chemicals, expired prescriptions - you name it. And only the biological pathogens are destroyed through heating and composting.
3. The accumulation of sewage sludge has become a problem of gargantuan proportions in the lower mainland. Ocean dumping - the previous method of getting rid of the stuff - has now been outlawed.
4. Lower mainland sludge is now commonly being used throughout B.C. to 'reclaim' remote sites after logging & mining. Drive the Merritt - Kelowna connector some day and have a look at the hundreds of acres of 'reclaimed' Brenda Mines site. The resulting lush growth always impresses folks. No matter our wildlife may be accumulating toxins from eating this lush growth.
5. Almost no research has been done on the long term cumulative effects of toxins when sludge is applied to the land. IF the stuff has been tested for chemical contaminants, (which the stuff being delivered to Barriere has not) 'acceptable levels' apply only to that batch, and do not consider the cumulative effect.

These toxins do not dissipate. They don't break down and they don't disappear. Like the DDT fiasco of a past generation, these toxins will accumulate in soils and in the food chain.

6. When I phoned the TNRD Environmental Services department last year, the fellow vehemently denied that the "compost" being delivered to Barriere landfill site contained any sewage sludge. This year they have devised a miraculous way of using sludge to make methane disappear, and are boasting about receiving an award for this benevolent practice! (Although they neglected to mention how frequently carbon dioxide is converted BACK to methane, or that both methane and carbon dioxide are 'greenhouse' gasses.)
7. The composted sludge that is being delivered to Barriere and elsewhere, according to the lower mainland lab that is doing the tests for the composting company, is NOT being tested for heavy metals or other industrial contaminants. Only the 'basic compost package' testing is being done. I phoned the lab and talked to them about it.

Perhaps this is why the TNRD was not initially admitting to the sewage component.

8. The (U.S.) EPA (Environmental Protection Agency) Office of the Inspector General (OIG) completed two assessments in 2000 and 2002 of the EPA sewage sludge program. The follow-up report in 2002 documented that "the EPA cannot assure the public that current land application practices are protective of human health and the environment."

The Capitol Regional District (Victoria) has recently banned land application of sewage sludge. I believe similar regulations exist throughout the province of Newfoundland.

Why is Barriere allowing this?

The TNRD has promised they will not again be applying Vancouver sludge (perhaps they plan to import other sludge?) anywhere within our district. Let's make sure we hold them to it. We do not currently have nearly enough information on the long term effects of this practice.

The TNRD has worked hard with the help of many dedicated people to make the North Thompson an attractive place to live in so many ways. But they are way off base with this one. We don't need Vancouver money THAT badly!

Bev Henry

Barriere

- <http://www.bclocalnews.com/opinion/letters/126864408.html>