1. Introductions
2. Overview of planning process
3. 4th R – Resource Recovery
4. 5th R – Residual Waste Management
   • Landfills and transfer stations
5. Waste export, import and flow control
6. Questions and answers
Planning Process

1. Current System Review
2. Analysis and Evaluation of Waste Management Options
3. Plan Finalization and Consultation
4th and 5th Rs

Reduce

Reuse

Recycle

Recover

Residuals Mgmt.

4th R – Resource Recovery

5th R – Residuals Management
What’s in the garbage?

- Organics: 39%
- Textiles: 5%
- Paper: 7%
- Plastics: 13%
- Hygiene: 10%
- Yard waste: 2%
- Building Materials: 3%
- HHW: 1%
- Electronics, Small Appl, Lights: 1%
- Beverage Containers: 1%
- Metal: 3%
- Bulky Items: 1%
- Other: 13%
- Soil: 0%
Disposal and Diversion

- Total disposal = 122,300 tonnes
  - 26,400 – Curbside collection and 2 transfer stations
  - 11,400 – Self haul by residents
  - 51,000 – ICI sources
  - 33,500 – DLC sources
- Total diversion = 93,700 tonnes
- Total generation (disp. + div.) = 216,000 tonnes
- Diversion rate = 43%
Issues and Challenges

• Unlike many other regions – no landfill capacity issues (72-94 years remaining)
  • Others have spent planning time on new landfill options
• Potential need for more transfer stations
• Waste from Regional District of Kootenay Boundary (Big White)
• New landfill guidelines will impact the Glenmore Landfill
• Questions or comments?
• 4th R - Recovery of energy and materials after the first 3Rs, prior to disposal
Resource Recovery

• Recovery of energy embodied in the waste
  • Thermal energy (heat)
  • Biological energy (gas)
• Recovery of non-energy resources
  • Recyclables
  • Organics
Mixed Waste Materials Recovery Facility

- Mechanical equipment used for removing recyclables
- Proven technology
- Being considered in other regions (FVRD)
- Considerations: economy of scale, value of recyclables, existing programs

http://www.youtube.com/watch?v=wugmX85ipRU
Anaerobic Digestion

- Organic component of waste digested
- Biogas used to make electricity and heat, or fuel
- Proven technology
- Considerations: economy of scale, end-users, value of electricity / fuel

http://www.biocycle.net/2012/03/14/anaerobic-digestion-in-the-northwest/
Refuse Derived Fuel (RDF)

- Process waste into fuel for use by industry
- Proven technology
- Considerations: economy of scale, potential energy, end-markets
Bio-drying

- Variation on composting
- Compost technology used to dry waste
- Dried waste used as a fuel by industry
- Trials being undertaken at RMOW composter
- Considerations: cost-benefit, end-markets
Waste-to-energy (WTE)

- Conventional “mass burn” - produce electricity and heat - proven
- Advanced thermal technologies
  - Gasification
  - Pyrolysis
- Considerations: economy of scale, proven technology, value of energy

Landfill gas capture - energy

• LFG captured for energy or to reduce greenhouse gas emissions
• Proven technology
• Considerations: gas generation, cost-benefit, greenhouse gas emissions reductions

Source: Capital Regional District
Integrated Management System

Waste Generated → Source Separated Recyclables → Materials Recovery Facility → Residuals

Yard & Garden and/or Kitchen Organics → Anaerobic Digestion/Composting → Residuals

End Product: Compost or Biogas

Recyclables to Market → Metal Recovery → Unused Residuals

WTE / RDF → Residuals and Ash

Landfill Disposal

Landfill Gas Energy Recovery

Thermal Energy Recovery
Applications in Canada

- Two commercially operating anaerobic digestion systems – Toronto and Vancouver
  - Another being built in Surrey
- Many landfill gas to energy plants
- Waste-to-energy (WTE)
  - Burnaby – 200,000 tonnes per year
  - Quebec City – 280,000 tonnes per year
  - Algonquin Peel – 150,000 tonnes per year
  - Durham / York – 140,000 tonnes per year
- Three regions have recently pursued WTE
Applications in RDCO

- Landfill gas at the Glenmore Landfill is captured and sold to Fortis
- Gas is currently being flared but will be used as a fuel in the near future
- Some wood directed to Tolko Industries for use as a fuel (incineration)
Resource Recovery Summary

- Recovery of energy, recyclables or organics
- Technologies
  - Materials recovery facilities
  - Refuse derived fuel
  - Anaerobic digestion
  - Bio-drying
  - Waste-to-energy
  - Landfill gas capture / use
• Questions or comments?
Residual Waste Management

- 5th R - Final treatment or disposal of waste that cannot be managed by the other 4 Rs
Residuals Management - Landfills

How a Landfill Works

Source: Capital Regional District
Value of a Landfill

- Will always need some landfill capacity
- Regions that exhaust capacity
  - Difficulty siting a new landfill
  - May resort to waste export
  - Escalating costs
- Cost effective to maintain and extend life of current sites
- Airspace has value – optimize airspace
Preserving and Extending Life

- Landfill airspace – function of:
  - Landfill geometry
  - Footprint size
  - Potential soil or rock excavation

- Airspace consumption – function of:
  - Waste disposal rate
  - Types of waste
  - Compaction of waste
  - Volume and type of cover
  - Settlement
Updated Landfill Criteria

- 1993 Landfill Criteria being updated
- Changes will impact most landfills
  - Service life exceeds contaminating lifespan
  - Landfill liners and leachate collection
  - Determination of contaminating lifespan
  - Preparation of new studies, e.g. Landfill Criteria Upgrading Plan
• Operating landfills
  • Glenmore Landfill – approximately 122,000 tonnes per year
• Closed landfills
  • Westside Sanitary Landfill (RDCO) - closed in 2010
  • Bouleau Creek Landfill (RDCO, occupancy license) – closed in 1996
  • Peachland Landfill (Dist. Peachland) - closed in 1997
Life Cycle Assessment – Organics Management

Total Organic Waste Arisings
131,416 t/y, 100%

Capture and Diversion
Diverted Organics, 83,052 t/y, 63%

Organics in residual garbage stream, 48,364 t/y, 37%

Glenmore Landfill, 48,364 t/y

Glenmore Composting

Bylands Nursery Composting, 1600 t/y
Biosolid land app, 4200 t/y
Tolko Cogeneration, 7500 t/y

Biosolid composting, 19,800 t/y
MRF recycled, 9,119 t/y

Glenmore cover, 1950 t/y
Glenmore Composting, 38883 t/y

Total to Glenmore Site:
89,197 t/y, 68%
Life Cycle Assessment – Organics Management

• Determine the most sustainable way to manage organic waste within the region

• **Criteria:** Technical, Environmental, Social, Financial & Policy / Adaptability

• **Results:** Current management options represent a high level of sustainability compared to other alternative treatment methods
  • Source segregation of food waste may not be required
  • Gas from digestion of organics captured at the landfill
Landfill Summary

- One operating regional landfill – 72-94 years of capacity
- Landfills have value – preserve space
- Updated Landfill Criteria – will impact the Glenmore Landfill
- Life Cycle Assessment – organics to landfill sustainable
• Questions or comments?
Residual Waste Collection

- Residential Curbside Collection of Garbage
  - 55,375 dwellings
  - 120 L carts
- Multi-Family and ICI sector are responsible for hiring their own garbage collection services
Transfer Stations and Depots

• Traders Cover Transfer Station
  • Just north of Kelowna
  • Registered users – nearby residents
  • 86 tonnes garbage in 2014
• North Westside Transfer Station
  • 45 km north of Kelowna
  • Registered users – nearby residents
  • 230 tonnes garbage in 2014
• Westside Transfer Station
  • In West Kelowna
  • Residential drop off of garbage
Westside Transfer Station
• Residential Curbside Collection of Garbage
• Multi-Family and ICI sector are responsible for hiring their own garbage collection services
• Three transfer stations - garbage to Glenmore LF
Questions / comments

• Questions or comments?
Waste Export and Import

- Waste export – transportation of waste for disposal out-of-region
- Typically used when landfill capacity runs out
- Economics – transfer and disposal
- Waste import – allowing waste from out-of-region
  - Used to obtain tipping fee revenue
Waste Flow and Flow Control

- Waste flow – driven by disposal options and economics
- Metro Vancouver – losing $5 million to out-of-region facilities
  - Haulers bypassing disposal bans
  - Not paying fair share for system
  - Bylaw – all waste to Metro Vancouver facilities
- Other regions considering flow and flow control
- Note: tipping fees are higher north and south of RDCO
First Nations

• Responsible for their own waste management
  • Most communities self-haul to Glenmore LF
• Westbank First Nation
  • Private hauler provides curbside collection
  • Also use Westside Transfer Station – help with funding
Export, Flow Control and FN Summary

- Waste export – when landfill capacity runs out
- Waste import – for revenue
- Waste flow – economics
- Flow control – keep waste in region
- First Nations – responsible for their waste
• Questions or comments?
Thank You