Capital Regional District

IRM Information Consolidation and IRM Project Criteria Development

Nov 8, 2017

Introduction

- Significant work completed over past few years investigating IRM

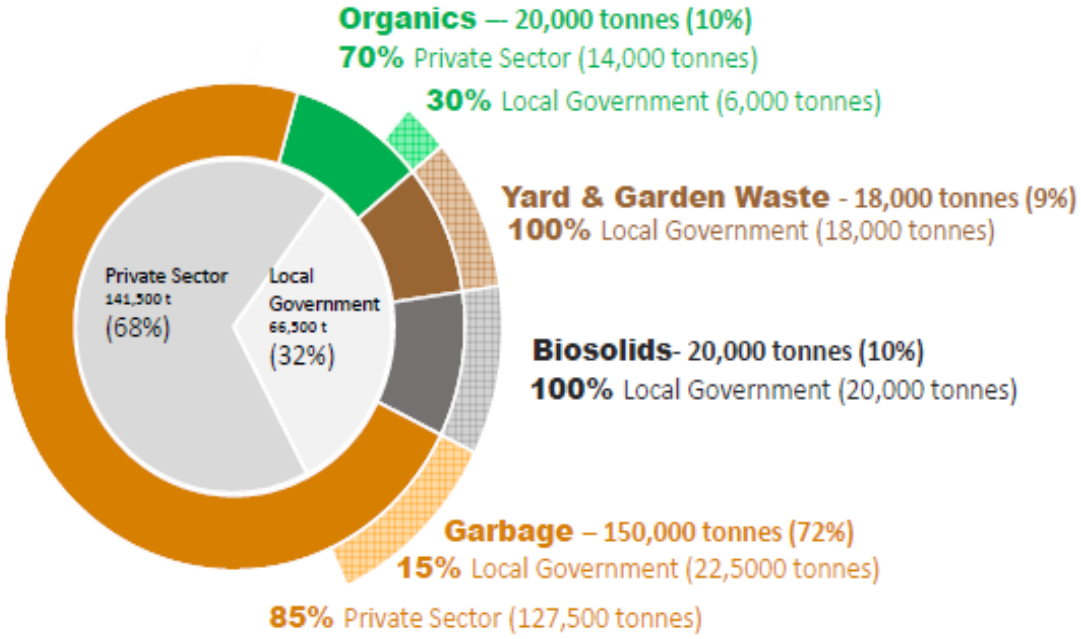
- Following September IRMAC meeting, motion passed
  - Consolidate the reports and information presented to-date
  - Bring forward criteria that would be used to advance the procurement process

- This Report
  - Consolidates the reports and information presented to-date
  - Provides case studies in-lieu of facility tour
  - Provides context for IRM procurement criteria, highlights key issues and decisions to be made
  - Foundation for IRM Procurement Workshop

Introduction: Key IRM Procurement Issues

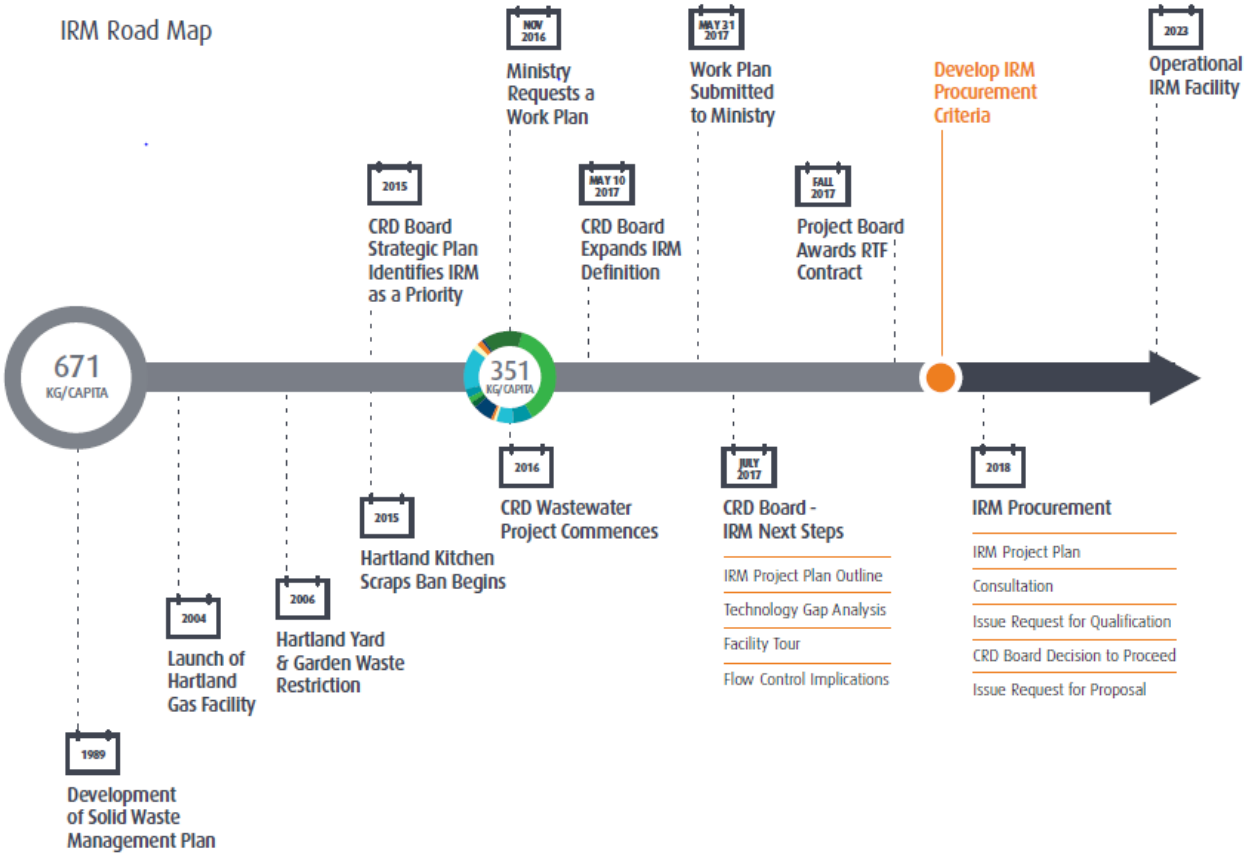
Project Element	Impact
Site	Critical Asset Critical Factor for Project Success
Waste Supply	Key to Financeable Project
Technology	Degree of Complexity affects Risk Posture
Ownership	Asset Control Risk Exposure
Deal Structure	Depends on level of technology risk and risk allocation
Financing/Funding	Ability to secure Financing Cost of Financing Additional sources of Funding (i.e. grants) if any
Markets	Market Access, security and value affecting financing and long-term viability
Residuals Management	Long term secure access to economically and environmentally sound residuals management capacity

Overview of Current CRD IRM System



Waste Stream Control
(Local Government, CRD and Municipalities

Overview of Information and Reports: IRM Roadmap



Overview of Information and Reports
Key CALWMP Information

- IRM supported by:
  - Project Board Goals
  - CRD Corporate Plan, integrated waste management strategic priorities
- Outcome of CALWMP provides Class A biosolids as key input to IRM
- RTF award late 2017 will define quantity and quality of biosolids
- Prohibition of land application of biosolids (with or without treatment) from CRD facilities affects markets/use of products derived from biosolids
- IRM solution, either single technology or group of approaches must include long-term solution to manage biosolids

Overview of Information and Reports
BC MOE Key Direction Documents

Provincial Direction – MOE Letter of Nov 18, 2016

- Sludge processing into Class A biosolids for beneficial use and possible IRM
- Beneficial reuse of biosolids (no multi-year storage of biosolids within a biocell)
- IRM Work Plan outline submitted May 31, 2017
- Definitive Plan due June 30, 2019
- Definitive plan for beneficial reuse of biosolids must be supported by an assessment of the full spectrum of beneficial uses and IRM options

Ministry Letter, July 7, 2017

- IRM Work Plan exceeds Minister's requirement
- MOE distinguishes CALWMP and IRM as two distinct projects
- IRM facility initiative is longer term project not dependent on CALWMP timelines

Overview of Information and Reports
IRMAC Supporting Information

- CRD IRM Task Force Report
- Gasification Technologies – Characterization of Waste Resources in the Capital
- Gasification Technologies Information – City of Sydney Australia

Findings / Context for IRM Procurement:

- Interested technology providers
- Energy value in solid waste stream
- Risks (technology, nature of waste source, public perception)
- Manage Risks (pre-feasibility, business case, multi-step procurement process)
- Regional partnering to reach viable levels of waste

Overview of Information and Reports
IRM RFEOI and Reports

Findings/Context for IRM procurement:

- Broad spectrum of technologies
- Most processed biosolids and/or sewage sludge separately as blend with some other materials but not altogether by one technology/facility
- Not a lot of preference on contract terms or deal structure
- Most prefer CRD provides site
- Many prefer CRD owns IRM facility
- Many noted difficulty in identifying IRM solutions for feedstock not controlled by CRD
- Many types of products
- Many products including biosolids focused on use as nutrient for soil amendment

Overview of Information and Reports
IRM Reports September 2017

- Facilities Tour Plan
- IRM Project Plan Outline
- IRM RFQ Draft Outline
- IRM Technology Gap Analysis – Preliminary
- Beneficial Reuse of Biosolids – Jurisdictional Review
- Waste Flow Policy Backgrounder

- Findings / Context for IRM Procurement
  - Small minority of IRM facilities process range of CRD materials, few co-process biosolids
  - Ability to ‘guarantee’ IRM feedstock types and quantities will likely affect procurement (and responses)
  - Need to complete risk assessment in order to identify service delivery model
  - No one single technology found that manages full range of CRM IRM feedstock
  - Majority of technologies generate beneficial use product eventually applied to land

Overview of Case Studies

- Evaluated wide variety of IRM Case Studies:
  - Reference facilities from RFEOI submissions plus others
  - Similar feedstock to CRD IRM
  - Integrated processing (single or multiple facilities)
  - Varying technology types: thermal, biological, mechanical

- Key facility information: feedstock & control, management of biosolids, site, technology, products & markets, cost & financing, procurement/contract structure, residuals

- Applicability to the CRD / Context for IRM Procurement Criteria

Overview of Case Studies
AVR Rozenburg Facility, Rotterdam, Netherlands

- Processes 1.2 M tpy including: residual domestic waste, pulp residue, industrial wastewater, waste wood, commercial waste
- Multiple technologies (WTE, Composting)

Findings / Procurement Context:

- Long term contracts for waste supply
- Largely conventional technologies
- Exploring emerging technologies, partnering to spread risk
- Range of solid products
- Recovered heat and energy sales (district heating, energy)

Overview of Case Studies
UTE TEM, Mataro

- Integrated waste management facility including:
  - 190,000 tpy MBT plant
  - 35,000 tpy AD facility
  - 41,000 tpy composting facility
  - 160,000 tpy waste to energy plant

Findings / Procurement Context

- Municipal consortium financed & owns facility
- Municipal flow control
- Conventional technologies
- DBOM procurement model & long term contract to minimize risk

Overview of Case Studies
Lahti Energia Kylmijarvi II, Finland

- Gasifies 250,000 tonnes of SRF (‘energy waste’) to produce 50 MW electricity & 90 MW of district heat

Findings / Procurement Context:

- Contracts to purchase SRF
- ‘Municipally’ Owned (Lahti Energia is owned by the City of Lahti)
- Operator is also local electricity and district heating supplier
- Minimized technology risk (gasification) through operating experience of using similar fuels at other generating facility & contract with technology supplier

Overview of Case Studies
Durham York Energy Centre

- Municipal consortium owns/financed facility
- 140,000 tonne per year EfW

Findings / Procurement Context

- Integrated with existing municipal systems
- Municipal waste flow control
- Strong leadership from elected officials
- Extensive consultation
- Provided site
- DBOM contact to minimize technology risk

Overview of Case Studies
Edmonton Waste Management Centre, Alberta

- Integrated facility, multiple components (IPTF, Biosolids Management, composting, waste to biofuels, C&D processing, WEE processing, MRF, proposed AD)

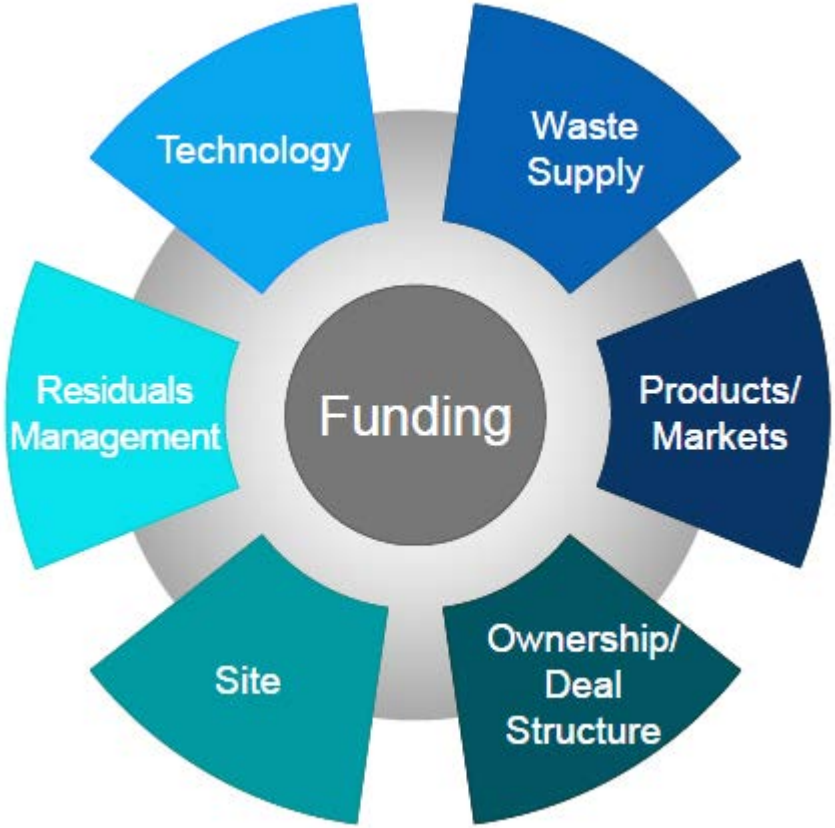
Findings / Procurement Context

- City control of residential waste and biosolids
- Separate facilities co-located on a single site operated by different entities, developed sequentially over time
- Majority are conventional technologies
- Technology risks addressed through DBOM and DBOOM contracts
- System funded through waste management fee ($44.90/month) in utility bill

Summary of Findings

- Basis for development of IRM risk matrix
- Foundation for IRM procurement workshop in December
- Provides the context for key decisions to support development of the IRM procurement criteria.

Summary of Findings
Key Elements of a Successful Project



Summary of Findings
Site

- Significant risk item
- Majority of IRM RFEOI respondents prefer CRD provides site
- Suitability of Hartland site, size and location

Key Decisions:

- Will CRD provide site?
- Can CRD provide more area at Hartland?
- If siting process is required, who would be responsible?

Summary of Findings
Waste Supply

- Secure supply key to financial sustainability
- Options include long term supply agreements
- RFEOI respondents noted difficulty identifying IRM solutions for feedstock not controlled by CRD

Key Decisions

- What specific material streams will the CRD guarantee?
- What options would CRD pursue to secure additional materials?
- How much risk for waste supply would be passed to respondents?

Summary of Findings
Ownership

- Central to deal structure, financing and allocation of risk
- Majority of case studies, municipal authority owned facility
- Ownership often linked to conventional technologies

Key Decisions:

- Preferred ownership arrangement?
- Need for public ownership?
- Preferred risk posture?

Summary of Findings
Procurement and Contract Structure

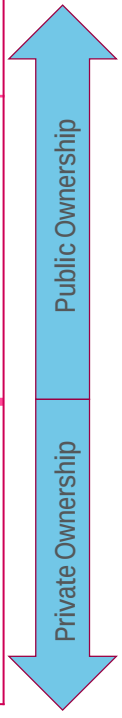
- Decision linked to ownership, allocation of risk
- When respondent providing proprietary technology some form of public/private partnership usually used
- Procurement approach reflects contract structure

Key Decisions:

- Is preferred model some form of public/private partnership?
- What are the preferred approach(es) for the contract structure?

SUMMARY OF FINDINGS
PROCUREMENT AND CONTRACT STRUCTURE

Delivery Model	Type
Design-Bid-Build (DBB)	Traditional
Fixed Price Design-Build (DB) or (“DBF”)	P3 Models
Design-Build-Operate/Maintain (DBO/M)	
Design-Build-Finance-Operate-Maintain (DBFOM)	
Dedicated Private Facility	Private Models
Long-term Service Contract	
Merchant Facility(ies)	



Summary of Findings
Financing / Funding

- Financing correlated with:
  - Commitment for waste supply
  - Ownership / deal structure

Key Decisions:

- Availability of Public Funding?
- Preferred financing approach?
- Which material streams would be guaranteed to secure project financing?

Summary of Findings
Technology Risk

- Technology risks affect:
  - Facility process guarantee (quantity, quality)
  - Performance, material and/or energy recovery rates
  - Environmental Performance
- Conventional technologies = Less risky so easier for public to assume project funding role and less need for complex DB procurement and contractual structures.
- Emerging technologies = More risk so less inviting for public role and therefore more reliance on private contractual structures.

Summary of Findings
Technology Risk

Key Decisions:

- What material streams will be provided/guaranteed?
- What degree of technology risk will the CRD accept?
- What minimum reference, project & team experience will the CRD require?

Summary of Findings Markets

- Viability also reflects range of products and markets
- Respondents to RFEOI had varying feedback on who should bear energy/commodity price risk

Key Decisions

- CRD preference for
  - Responsibility for material and/or energy offtake agreements?
  - Responsibility for marketing of recovered products/energy?

Summary of Findings Markets

Product/Market trends

- Economic drivers vary (energy markets, recycling markets, compost/digestate markets)
- Highest economic value to offset tip fees (e.g. from CHP to RNG or CNG low carbon intensity fuels)
- Consider ‘Conventional’ vs ‘Emerging’ technology product guarantees

SUMMARY OF FINDINGS RESIDUALS MANAGEMENT

- Also critical to financing the Project.
- Most RFEOI respondents expect CRD to provide this.
- Case studies show responsibility for residuals management in most instances rests with the owner.

Key Decisions:

- CRD Willingness to provide residuals management capability throughout term of the agreement?
- Or What would the respondents be required to do?

SUMMARY OF FINDINGS
ALTERNATIVES APPROACHES/ CONCEPTS

- Consortium (municipal and/or private) to reduce the technical risk assumed by the partners in pursuing advanced technologies
- Municipalities partnering to address the requirements for feedstock flow control, economies of scale and financial risks
- Municipal coalitions / consortiums / agreements to resolve broader IRM issues associated with biosolids and solid waste management including waste supply and economies of scale

NEXT STEPS

IRM Procurement Workshop – December 2017

- Exploration of IRM Project Risks and Issues through Risk Management Matrices
- Support Key Decisions required to frame the IRM Procurement (what the project is, roles and responsibilities) and to develop selection criteria
- Select criteria to advance the IRM procurement (experience, financial, technical)

QUESTIONS / DISCUSSION