Presentation of findings

Municipal Industry Program Committee
Blue Box MRF Optimization Study

July 25, 2010

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Today's Objectives

- Review the background & rationale for the study
- Present the findings
- Discuss options to develop &/or use this tool
- Discuss utilization of CIF funds that were set aside pending the outcome of this study

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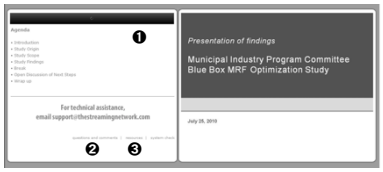
Housekeeping

~ 40 in room; expecting 40+ online

- For webcast viewers
  - ❶ Sound slider (hover over black bar)
  - ❷ Questions and Comments
  - ❸ Resources



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Today's Discussion

- Study Origin
- Study Scope
- Study Team/Study Findings
- Break
- Discussion of Next Steps
- Wrap up

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Study Origin

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Background & Study Rationale

- 2011 MIPC Steward's obligation negotiations were challenging
- MIPC faced a variety of issues
  - stewards concerned with rising programs costs
  - CIF had over $20M in funding requests with limited funds remaining
  - both parties were seeking more strategic approach to CIF
- MIPC agreed remaining funds needed to be prioritized Previous studies left knowledge gaps
- Municipal MIPC members wanted to demonstrate their commitment to improving the BB program on systemic level

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Background & Study Rationale

- Both parties agreed to:
  - assess Province on "waste shed basis," not municipal boundaries
  - explore what an optimized system might look like
  - freeze spending of $10M in CIF funds earmarked for new municipal projects until completion of the study
  - dedicate up to $8M remaining CIF funds towards system regionalization
- Study intent:
  - provide common perspective upon which to develop a sustainable program for stewards & municipalities
  - provide guidance to CIF on disbursement of dedicated funds
  - develop tool for municipalities to make better informed business decisions on infrastructure investments

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Study Scope

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Study Scope (1)

- Study scope required that the consultant:
  - model optimized (greenfield) system of MRFs & TS to handle a standard suite of materials
  - compare that to existing public & private infrastructure, & conditions & estimated costs
  - identify gaps in existing infrastructure
  - develop options to guide transition to an optimized system
    - taking into consideration costs, benefits & trade-offs
  - propose high-level transition plans
- Using CIF project learnings, this study:
  - sought to minimize transportation & transfer logistics
  - used more transfer stations & centralized MRFs
  - included municipal & private sector facilities
  - projected 2025 demands to test functionality of the options

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Study Scope (2)

- Study does not answer all questions; some limitations include:
  - about 20% of baseline costs were estimated costs
  - model has not been 'ground truthed'
  - it does not consider collection cost impacts, regional variances in costs or realities like winter hauling conditions
- This study is intended to be a guidance tool

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Study Team/Study Findings

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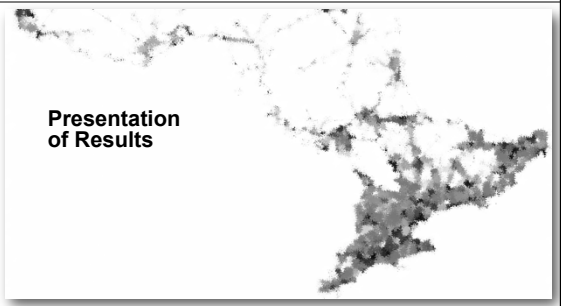
Study of Optimization of Blue Box Materials Processing System in Ontario

Presentation of Results



STEWARDEDGE

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Resource Recycling Systems

Presentation Topics

- Study objectives & scope
- Overview of model
- Current recycling system overview
- Regional analyses
- Study conclusions
- Consultation to date
- Summary of project output
- Next steps

Study Scope

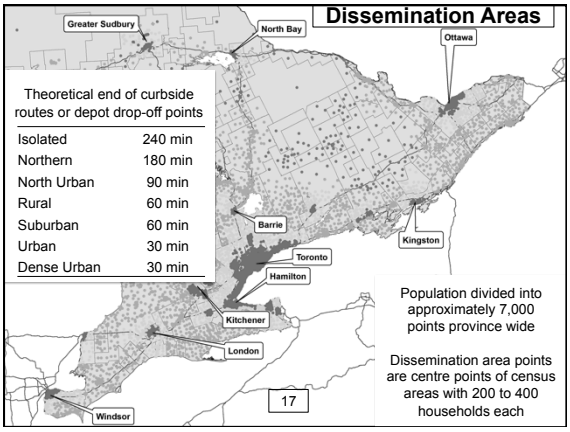
- Model an optimized (greenfield) system of material recovery facilities (MRFs) & transfer stations (TS) to handle a standard suite of materials
- Compare that to existing public & private infrastructure & conditions
- Identify gaps in existing infrastructure
- Develop options to guide transition to an optimized system
  - taking into consideration costs, benefits & trade-offs
- Propose high-level plan for the transition

MODEL OVERVIEW

Base Model Assumptions

- A standard list of materials accepted province wide
- A move toward single stream collection
  - high cost estimate for processing
  - some dual stream in far north
- Municipal boundaries removed from analysis
  - TS & MRFs placed according to location of material

Dissemination Areas



Theoretical end of curbside routes or depot drop-off points

Isolated	240 min
Northern	180 min
North Urban	90 min
Rural	60 min
Suburban	60 min
Urban	30 min
Dense Urban	30 min

Population divided into approximately 7,000 points province wide

Dissemination area points are centre points of census areas with 200 to 400 households each

Current Material Generation

- Stewardship Ontario waste generation data used:
  - waste audits conducted 2005 to 2007
  - trends in stewards' sales from 2007 to 2010
- Dissemination areas classified to reflect different generation rates
- Material-specific generation rates (kg/hh/yr) multiplied by households in each dissemination area

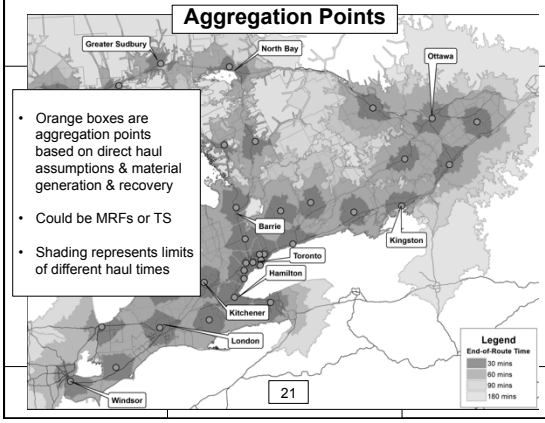
Material Generation Projections (2025)

- Attempt to account for probable changes to:
  - material composition
  - population
- Assumed:
  - household growth equal to Statistics Canada projections for population growth
  - changes to consumption of different materials
- Increase of about 15% over current generation
  - reflecting a different mix of materials

Material Recovery

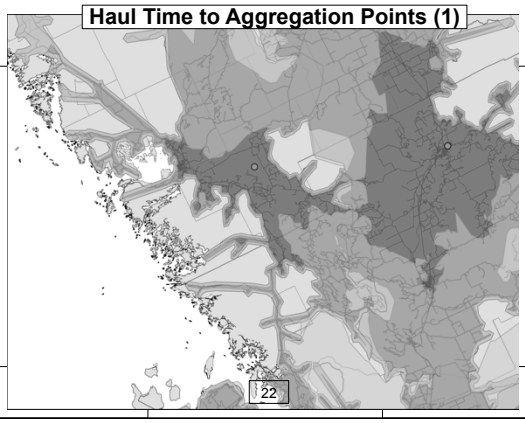
- **Current** recovery based on WDO Datacall
- **Projections for 2025**
  - two scenarios
    1) natural growth – trends continue, but no substantially different approaches or initiatives
    2) high growth – system is enhanced to:
       - collect consistent set of materials
       - promote them widely
       - best practices in collection; convenience & incentives
  - density (loose) ~30% less than current mix

Aggregation Points

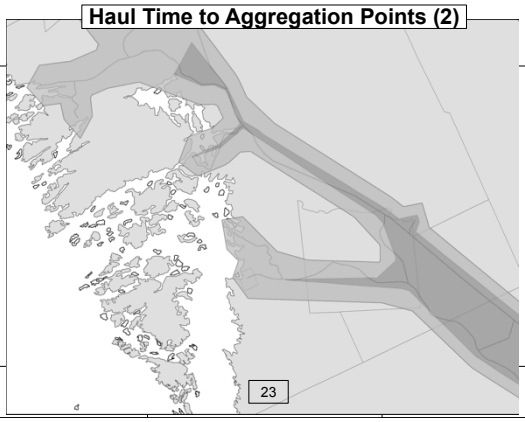


- Orange boxes are aggregation points based on direct haul assumptions & material generation & recovery
- Could be MRFs or TS
- Shading represents limits of different haul times

Haul Time to Aggregation Points (1)



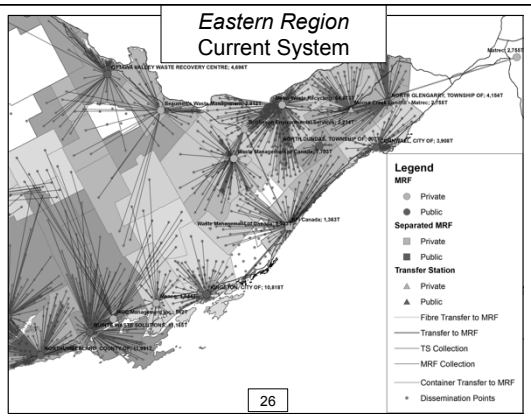
Haul Time to Aggregation Points (2)

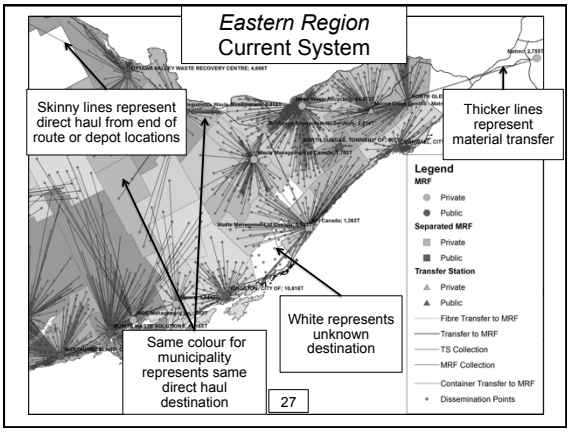


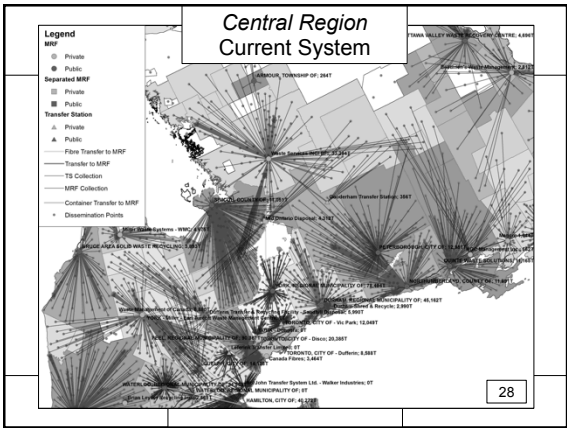
CURRENT SYSTEM OVERVIEW

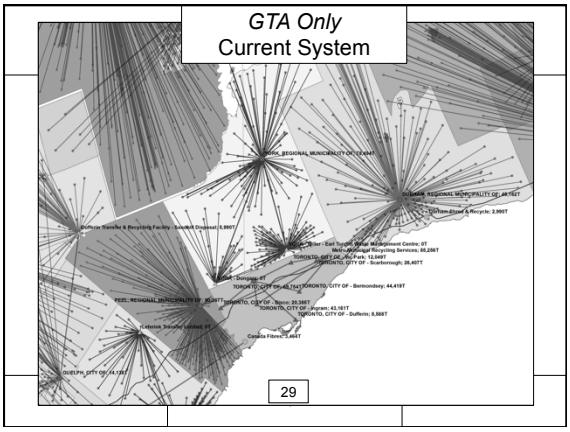
Current System Overview

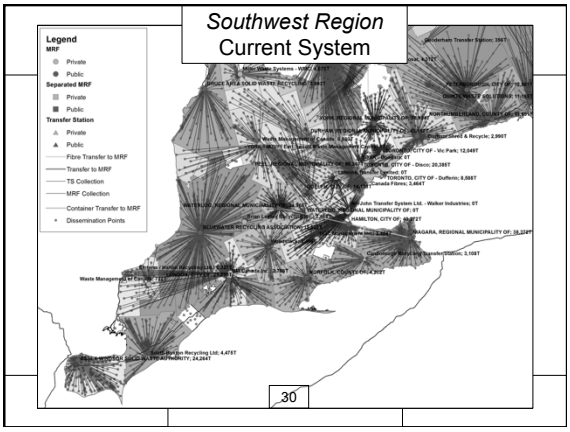
- Maps for existing transfer & processing system
  - present where material flowing
    - direct haul
    - transfer
    - processing
  - based on WDO, CIF & Stewardship Ontario data
  - no direct contact with municipalities to verify or gather information



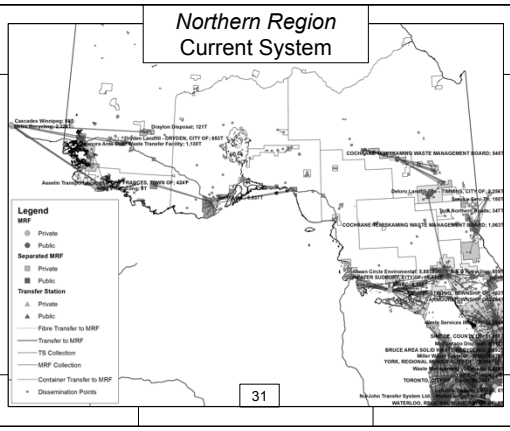








Northern Region Current System



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Approach to Existing System Cost - 2010

- Used WDO cost data for 2010
- Used data for programs which reported processing costs & revenue separately
  - represents the majority of the cost
- Many municipalities report combined data because of contract structure
  - used data from similar programs which reported processing costs & revenue separately

STEWARDEDGE 32 Resource Recycling Systems

2010 Existing System Cost

	Tonnes	Cost ($)
Actual Processing Cost Data		
32 of largest programs	767,914	$93,633,000
11 smaller programs	7,915	$1,508,000
Estimated Processing Cost		
3 of largest programs	38,689	$4,596,000
177 small programs	72,725	$13,860,000
Total Processing	**887,242**	**$113,596,000**
Estimated Transfer Cost		
Known transfer operations	284,363	$9,505,000
Programs with unknown material flows	3,487	$117,000
Total Transfer	**287,849**	**$9,622,000**
TOTALS	**887,242**	**$123,218,000**

STEWARDEDGE 33 Resource Recycling Systems

Approach to Existing System Cost - 2025

- To compare existing system to optimized system options for 2025
- Two key influences for future processing & transfer cost:
  - population growth & natural growth in recovery rates
  - lighter weight, more complex & in some cases lower value material
- Cost of existing system in 2025 is expressed as a range:
  - to account for using underutilized capacity
  - to account for higher cost materials in future
  - program processing & transfer $/tonne (+/-5%) multiplied by tonnes

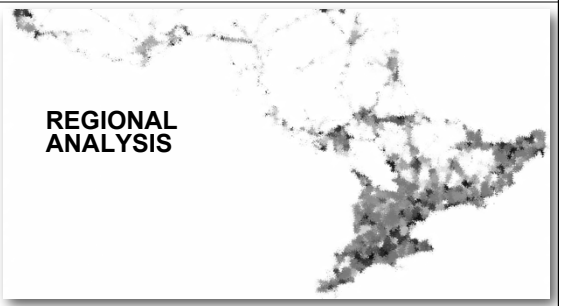
STEWARDEDGE 34 Resource Recycling Systems

Projected Existing System Cost to 2025

2025 Natural Growth	Tonnes	Annual Capital & Operating Cost ($)
Actual 2010 Processing Cost Data		
32 of largest 30 programs	901,067	$104,328,000 - $115,310,000
11 smaller programs	11,366	$2,131,000 - $2,355,000
Estimated 2010 Processing Cost Data		
3 of largest programs	45,955	$5,122,000 - $5,122,000
177 small programs	88,066	$15,944,000 - $17,623,000
Total Processing	**1,046,453**	**$127,524,000 - $140,409,000**
Estimated 2010 Transfer Cost Data		
Known transfer operations	351,235	$10,662,000 - $11,410,000
Programs with unknown material flows	4,207	$125,000 - $132,000
Total Transfer	**355,441**	**$10,787,000 - $11,542,000**
TOTALS	**1,046,453**	**$138,311,000 - $151,951,000**

STEWARDEDGE 35 Resource Recycling Systems

REGIONAL ANALYSIS



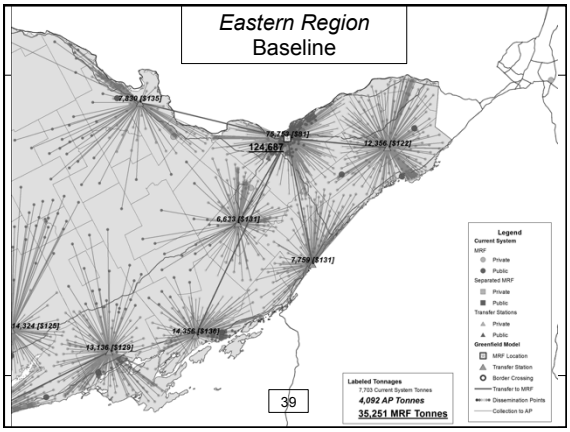
STEWARDEDGE 36 Resource Recycling Systems

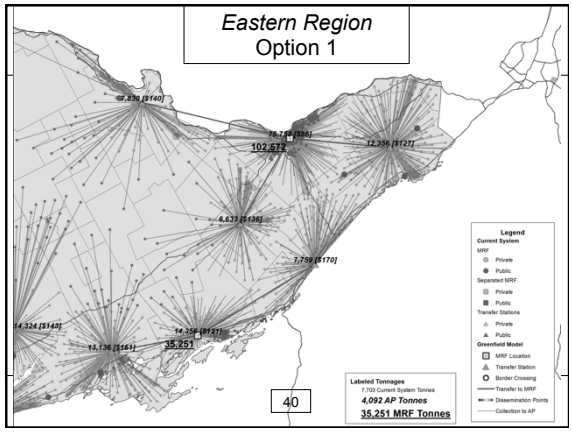
Range of Options Developed for Each Region

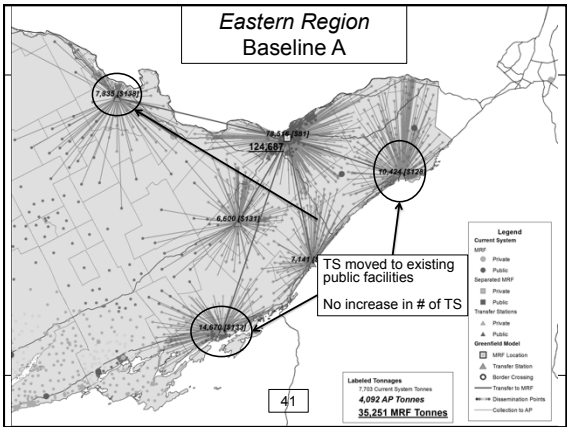
- **Baseline**
  - greenfield scenario with lowest # of MRFs
- **Regional Options**
  - increase # of MRFs or move MRF to different city
- **Variations**
  - move modeled location of MRFs & TS
  - utilize existing facilities, either upgrading MRFs or converting MRFs to TS

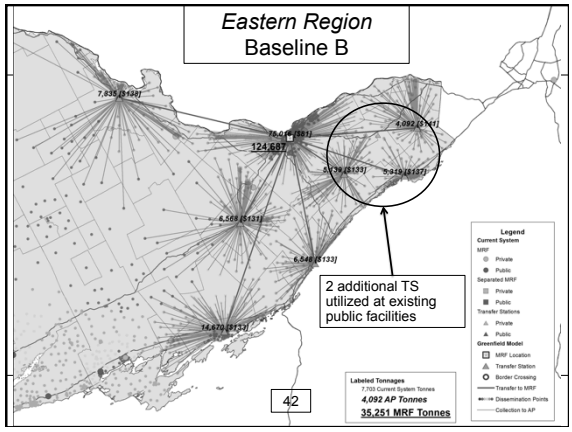
Eastern Region

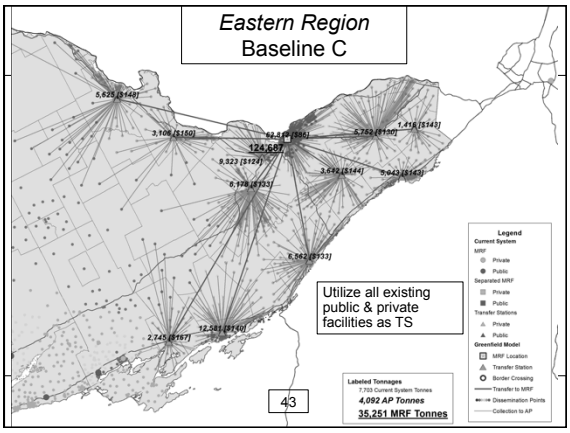
- Lowest cost option reduces # MRFs from 12 to 1
  - located in Ottawa
- 2nd MRF in Kingston increases costs by 10%
- Maximizing use of existing facilities as TS increases processing & transfer costs by 7%
  - may be offset by reductions in collection costs (not calculated in study)





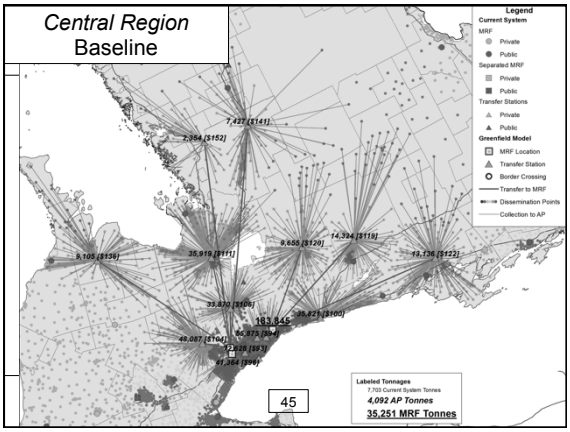


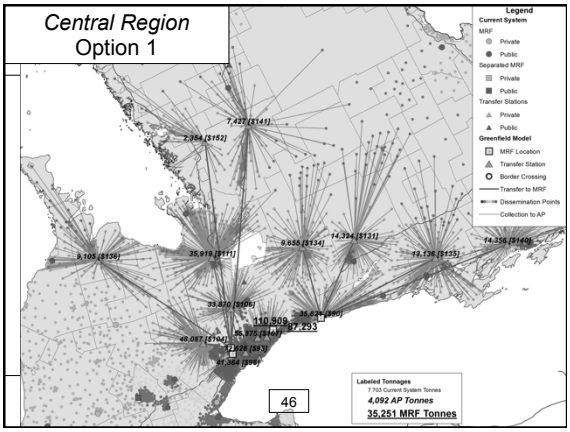


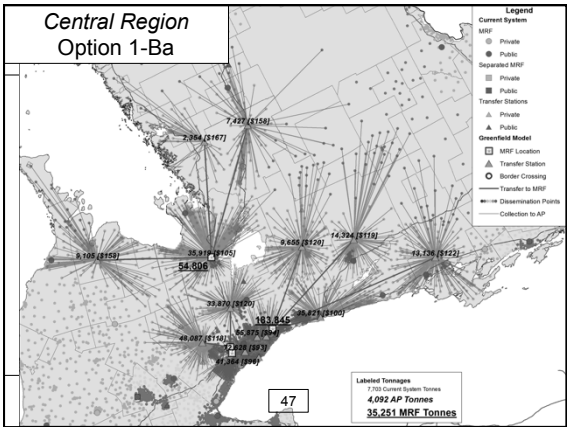


Central Region

- Lowest cost option reduces # of MRFs from 15 to 3
  - located in Toronto & Peel
- 4th MRF in Durham & 5th MRF in Barrie increase costs by 6%
  - still realize significant savings
- Maximizing use of existing facilities as TS increases operating costs by 5%
  - balance direct haul costs & TS network cost

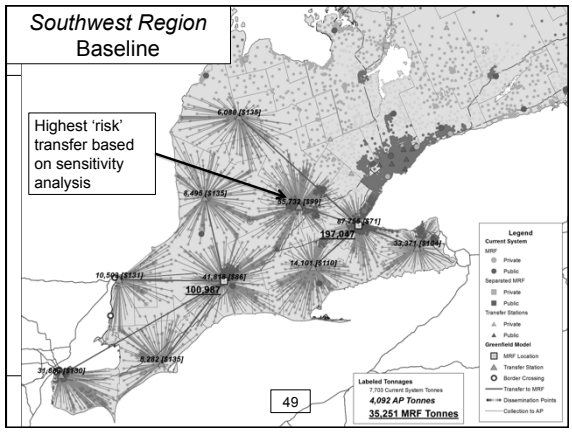


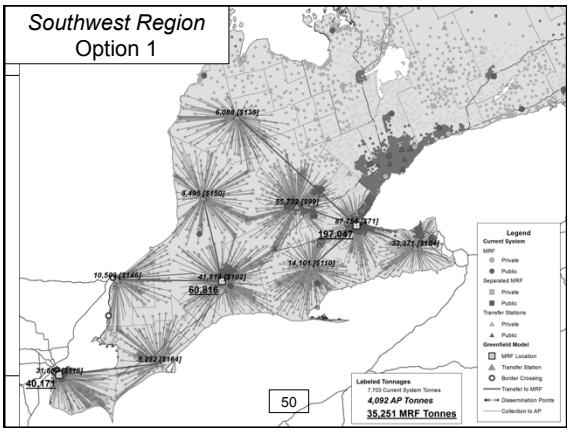


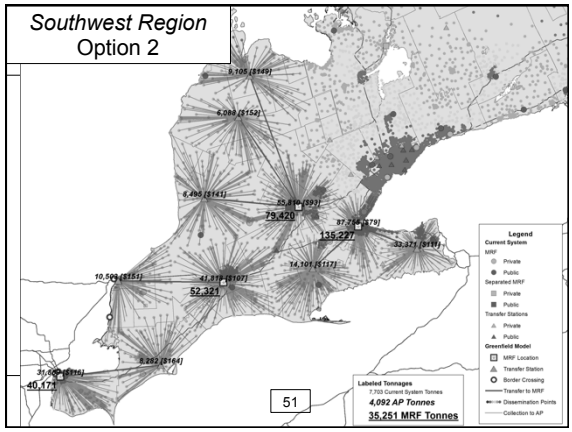


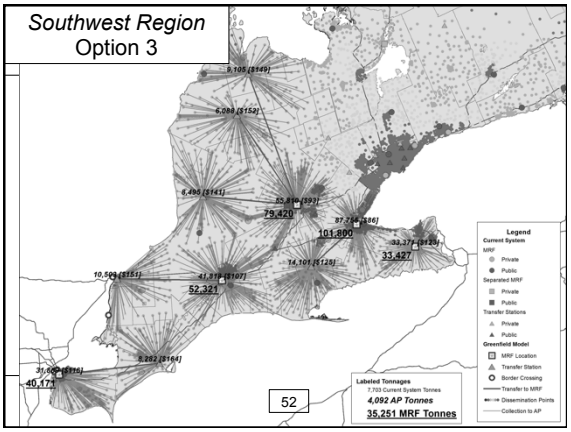
Southwest Region

- Lowest cost option reduces # of MRFs from 16 to 2
  - located in Hamilton & London
- MRF in Waterloo instead of London increases cost by 4% & replaces existing new asset
- Additional MRFs in Windsor, Waterloo & Niagara increases costs by 11%
  - reduces risk of Waterloo & Hamilton haul to escalated fuel cost
- Maximizing use of existing facilities as TS increases costs by 7%
  - may be offset by reductions in collection costs (not calculated in study)





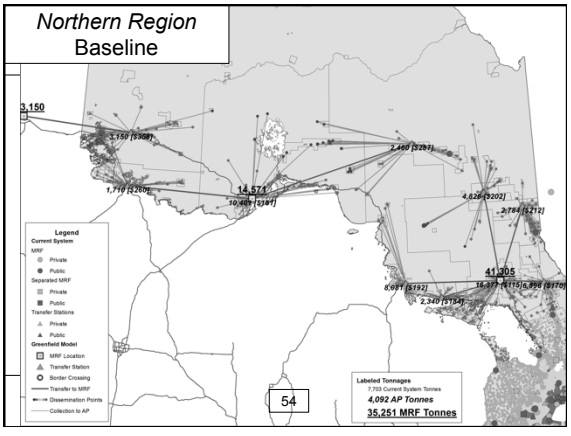


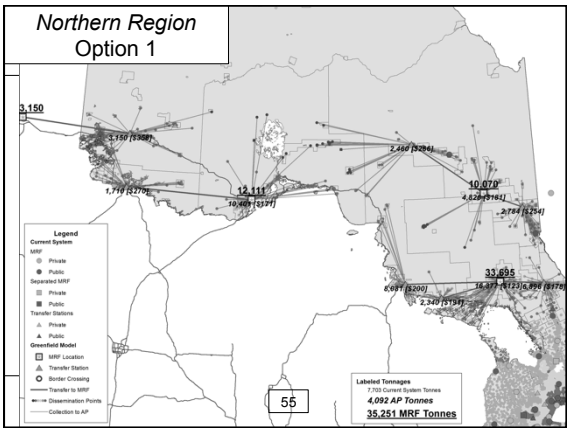


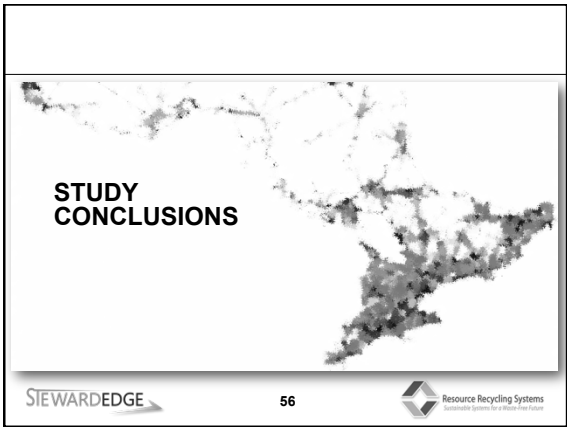
Northern Region

- Lowest cost option reduces # of MRFs from 14 to 3
  - located in Sudbury, Thunder Bay & Winnipeg
- 4th MRF in Timmins reduces costs by 6%
- Maximizing use of existing facilities as TS does not have significant effect on cost
  - because of low volumes, lack of existing facilities & long haul distances
  - TS should be located primarily based on direct haul considerations

STEWARDEDGE 53 Resource Recycling Systems







❶Reducing # of MRFs Reduces Overall Cost

Savings through optimizing with fewer MRFs range from 14% to 26% below current system costs

Sample Natural Growth Options	Total Annual Cost	Savings Over Existing System	
		Low	High
Lowest cost	$ 112,535,200	19%	26%
Increased redundancy in Central Region	$ 113,878,400	18%	25%
Increased redundancy in SW,C,N Regions	$ 117,955,900	15%	22%
Lowest cost with no impact on collection	$ 118,825,900	14%	22%

STEWARDEDGE 57 Resource Recycling Systems

❷Regional Dynamics Will Dictate # of MRFs

- Regional dynamics affect the potential savings
- Savings depend on:
  - characteristics of material generation - density & geography
  - location, capability & condition of existing infrastructure
  - current contracts

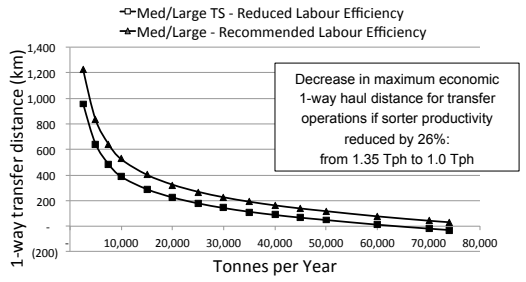
STEWARDEDGE 58 Resource Recycling Systems

❸Large, Efficient MRFs Key to System

- Efficiencies primarily due to larger "hub" MRFs in system
  - state-of-the-art technology
  - best operating & management systems & practices
  - capacity of 100k to 200k tpy
  - supply of material from less dense areas
  - processing is 77% of total transfer & processing cost (even in scenario with fewest MRFs)

STEWARDEDGE 59 Resource Recycling Systems

Sorter Productivity Sensitivity

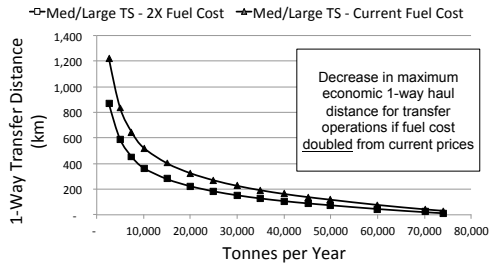


STEWARDEDGE 60 Resource Recycling Systems

❹Long Transfer Distances are Economical

- Economic transfer distance increases with fewer tonnes available at transfer point & larger destination MRF
- Optimized system not significantly affected by escalating fuel costs
  - all but longest proposed transfers significantly shorter than maximum economic transfer distance
  - even under doubling of fuel cost
  - exception is Waterloo to Hamilton due to high volume

Fuel Cost Sensitivity



❺Collection Costs Need to be Analyzed

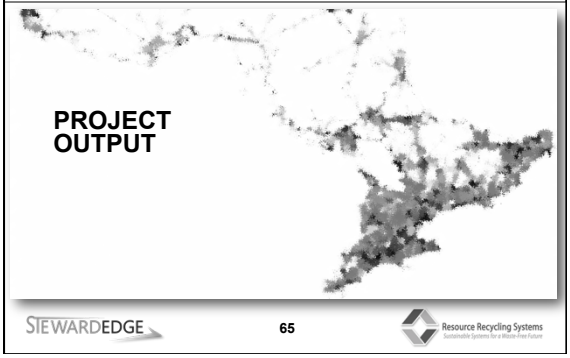
- To fully understand potential savings in any region or local authority
  - need to balance benefits of consolidated transfer network & direct haul cost
- Scenarios using all locations in current system still show savings of 15% to 22% over existing system
- Varying location of transfer facilities has no significant effect on annual cost
  - less than 1.5% difference between the cost if use nearby existing facilities instead of greenfield TS

❻ Using Existing Facilities Can Reduce Investment Costs

Capital investment in Million $

Natural Growth	New MRFs	Upgrades to Existing MRFs	New TS	Conversions of MRF to TS & Upgrades to Existing TS	Total
Lowest Cost Scenario	$201.94	$0	$42.27	$0	**$244.21**
Increased redundancy in Central	$201.29	$0	$40.18	$0	**$241.47**
Increased redundancy in SW,C,N	$246.42	$0	$33.91	$0	**$280.33**
Lowest Cost No Collection Impact	$113.4	$37.06	$5.73	$25.7	**$181.89**
Lowest Cost Scenario Utilize Existing Facilities	$113.4	$37.07	$15.09	$10.59	**$176.15**

Lower capital cost by using existing facilities



Study Output 1 - A Tool to Test Scenarios

- A robust & detailed dynamic model
  - built on detailed & updatable demographic data
  - ability to test different scenarios
  - can be updated regularly as system evolves:
    - decisions taken
    - new infrastructure developed
    - contracts negotiated

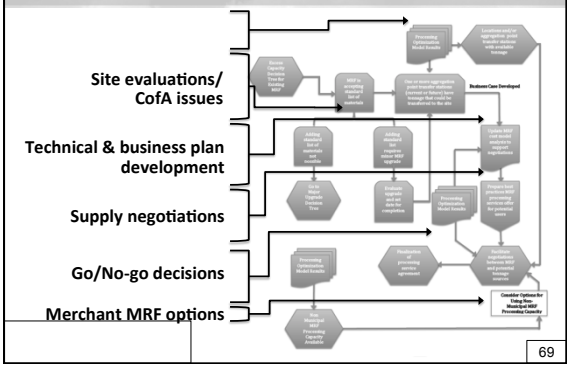
Study Output 2 - Options for Optimized System

- Options for each region addressing criteria, e.g.,
  - # of MRFs for redundancy & competition
  - use of existing facilities to minimize:
    - impact on collection costs
    - initial capital investments
- Supported by:
  - maps & tables summarizing capital & operating costs & required infrastructure
  - detailed report summarizing analysis & assumptions

Study Output 3 – Transition Guidance

- Guidance documents walk through key decisions
- Decisions trees cover different municipal situations
  - MRF or TS in optimized system
  - MRF that could be converted & used as TS
  - facility that should be re-purposed or shutdown
  - supplier to other facilities in optimized system
- Reference tables identify appropriate decision trees
- Information required during planning, e.g., CofA

Key Stages in Transition Plans



Study Report

Ten volumes posted on CIF website:

1. Executive summary
2. Methodology & Model
3. Cost Modelling

4-7. Regional Analyses

8. Transition Plans & Decision Trees
9. Consultation Report
10. Province-wide Summary & Study Conclusions

What Is Required to Achieve Benefits

- Information & support to municipal staff & decision-makers at regional & local level to evaluate options
  - potential savings
  - analysis of capital investment requirements
  - collection analysis
  - planning guidance depending on situation
- Commitment & process to share benefits & allocate costs equitably among all stakeholders

Questions?

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Break

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Welcome Back

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Next Steps (1)

DISCUSSION

- MIPC's study has provided a possible road map
- Study provides a tool to help evaluate possible program changes
- At MIPC's direction, CIF has allocated up to $8M for system rationalization, based on study findings
  - How do we spend these remaining funds wisely?
- MIPC has asked CIF staff to provide recommendations by the fall

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Next Steps (2)

DISCUSSION

- The CIF board has suggested staff host meetings across the Province to present findings & explore interest in acting on study results
  - Is this the right next step?
- Other possibilities
  - Model beyond study scope (e.g., look at collection impacts)
  - Set aside funds to support municipalities that want to act on the findings
  - Recommend other approaches to achieve the same objective

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Discussion Process

DISCUSSION

- Discuss these & other options you might suggest
- We will follow up with additional questions & ask you to prioritize options in a follow up survey
- We will consider all comments that address:
  - Usage of the study & further development of the model
  - Disbursement of funds to support system rationalization

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Question 1

DISCUSSION

- Are there ways you can see this study being used?
  - Are there elements of the system that warrant further study?
  - Alternatives?

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Question 2

DISCUSSION

- Should funds be put aside to help municipalities work together to develop hub & spoke systems?
- Should funds be provided to municipalities that want to voluntarily change their program in a manner that's consistent with the findings?

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Question 3

DISCUSSION

- Should we fund improvements to the study's preferred infrastructure preferentially over other projects?
- Are there other ways of reducing transfer & processing costs that should be considered?

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The Follow up Survey

- What portion of the $8M should be spent on infrastructure rationalization & why?

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Thank you!

COMING UP…

- We value your efforts & input to this process
- On behalf of the team, the CIF will issue a survey next week
  - please review the reports
  - webcast archive will be posted
  - survey closes within 1 week
- Your input & involvement is essential
  - stay tuned to Connections & CIF notices

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For more information

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