

6. ARCADIS Waste to Energy (WTE) Study

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King County

Department of
Natural Resources and Parks
Solid Waste Division

Waste
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Resource
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Waste
Disposal

Summary

- This presentation will provide a high level summary of the ARCADIS WTE Study including:
 - Background
 - Cost
 - Tonnage Forecast
 - GHG Impact
 - Implementation Schedule
 - Permitting

Background

- Per a 2019-2020 Budget Proviso, the Office of Performance, Strategy, and Budget was directed to lead a study that evaluates the feasibility of using WTE or Waste Export by Rail (WEBR) as the next long term disposal option.
- Input was provided by a team that included
 - SWD, Councilmember Lambert, and council staff

Background

- This study compared WTE to WEBR on various dimensions such as
 - costs
 - environmental impact
 - regulatory requirements
- The study was submitted to Council on October 4th, 2019.

WTE v. Waste Export Cost Comparison

- \$4.3B to \$7.3B less than waste export over 2028-2078 when:
 - Waste export averages \$215/ton
 - WTE averages \$112/ton



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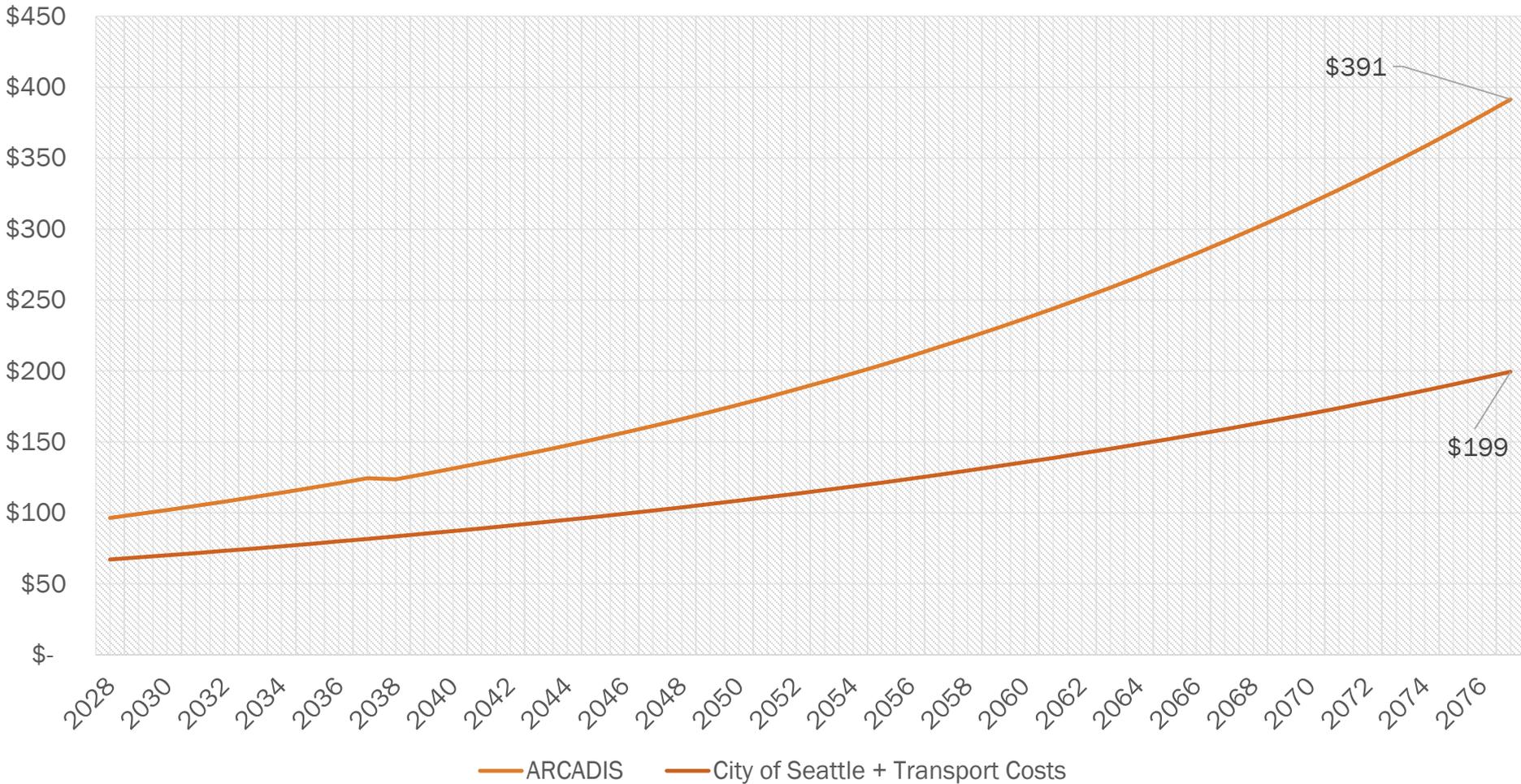
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ARCADIS WEBR Long Term Cost Much Too High



Different Assumptions

- Arcadis added additional costs for:
 - Building an Intermodal Facility
 - Hauling from the transfer station to the IMF;
 - Higher rail transport;
 - 3% escalation versus 80% of CPI.



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Landfilling < Waste Export <= WTE

2028 Cost Comparison

	Landfilling Cedar Hills	Waste Export Seattle Contract	Waste Export Arcadis	WTE Normandeau	WTE Arcadis
\$/ton	\$41	\$55	\$74	\$126	\$72
\$/ton with transport	\$60	\$77	\$96	\$145	\$91



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GHG Comparison

- WARM Model is used to decide between disposal alternatives
- Models the life cycle analysis for GHG and Energy
- Very sensitive to waste composition.



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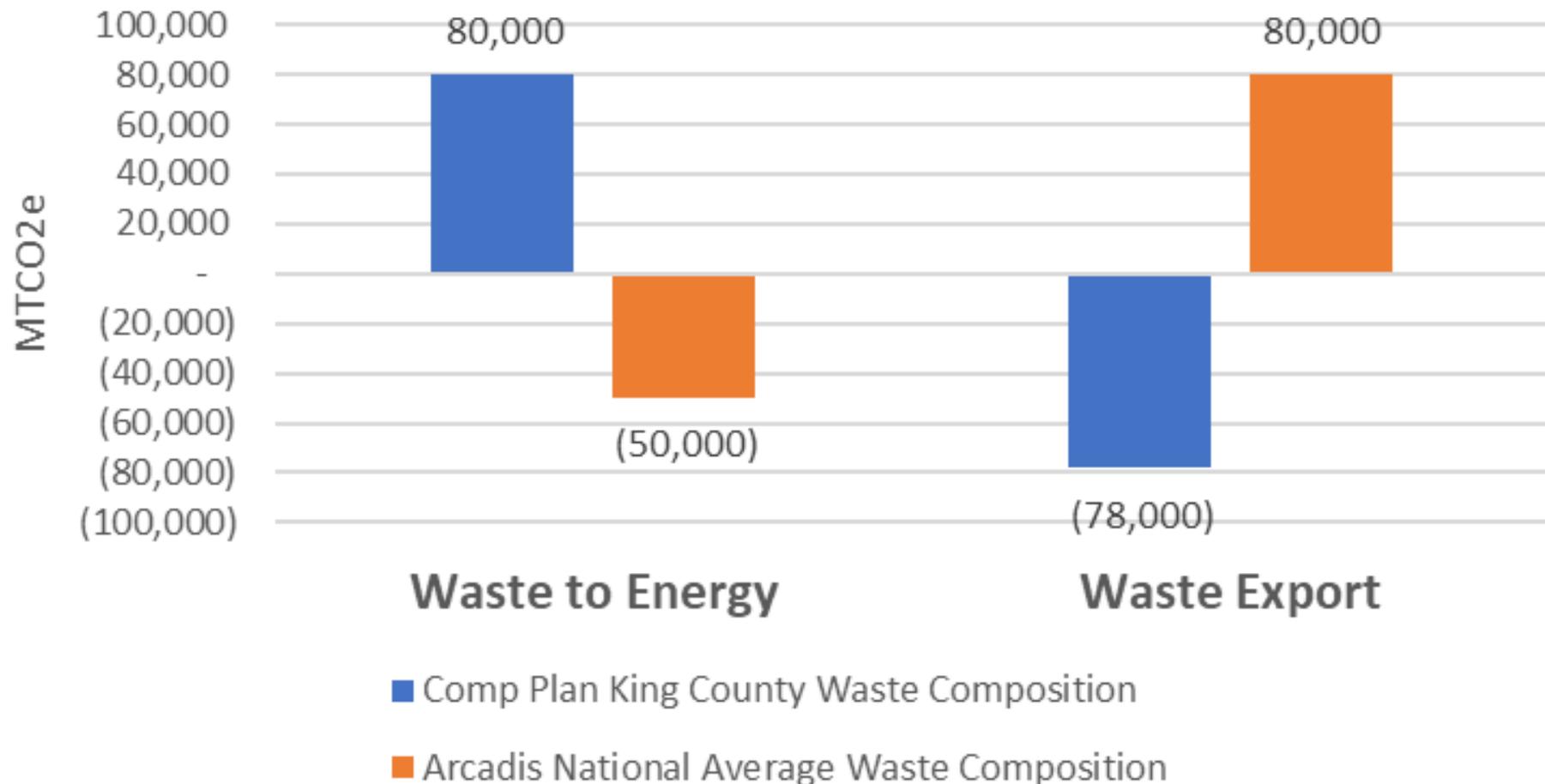
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Changing Waste Composition Flips the Results



Tonnage Forecast

- King County forecast is designed for near term
- Arcadis developed long term forecast using disposal per capita and population growth
- Arcadis forecast is relatively flat



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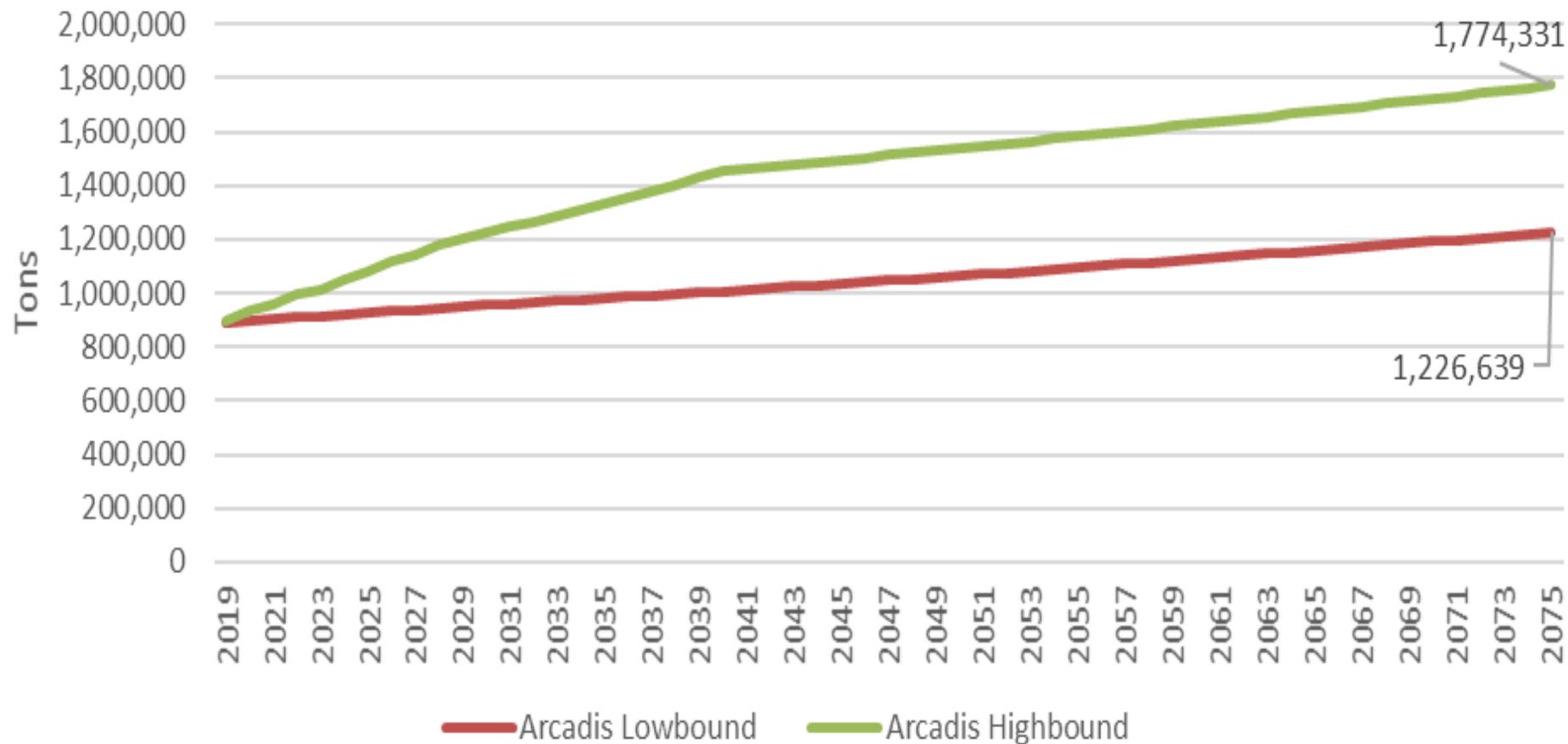
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Arcadis Tonnage Forecast is not conservative



Implementation Schedule

- Arcadis estimated 11 years for WTE and 4 years for Waste Export by Rail
- The SWD would assume 2 additional years for ILA and Comp Plan work
- Arcadis assumed a start date of Jan 1, 2020
- All options could be available by 2035-2038



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Implementation Schedule

Phase	Waste to Energy (yrs)		Waste Export (yrs)	
	Arcadis	SWD	Arcadis	SWD
Extend ILAs and Update Comp Plan	2	4	2	4
Siting, Planning, Permitting	5	5	2	2
Procurement ¹	2	2	2	2
Design and Construction	4	4	0	0
Total	11	13	4	6
Completed on Date	2031	2033	2024	2026

Permitting and Regulatory Environment

- The Clean Energy Transformation Act signed by the governor in 2019 dictates to utilities that:
 - All retail sales must be carbon neutral by 2030
 - Requires a change to WA State Law to make WTE renewable
 - Electricity be obtained from 100% non-emitting by 2045.
 - WTE plants emit CO2 due to combustion. No commercially available or proven technology at this scale currently exists to suck CO2 out of a WTE process stack.



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Other Areas of Concern

- 2019 Clean Energy Transformation Act could eliminate WTE energy revenue by 2045, potentially increasing the cost per ton by at least \$30 per ton per year.
- Suggestion of placing WTE and ash mono-fill at Cedar Hills;
- Major cost and waste composition assumption differences from Normandeau means conclusions don't match the Comp Plan.



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Questions



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