

## CRITICAL MINERALS AND OIL SANDS

Critical minerals are present in the vast deposits in Canada's Athabasca oil sands, with occurrence in almost every geologic horizon. The potential resource available in oil sands mining leases may approach 122 million tonnes, rivaling globally significant reserves in China, South Africa, Vietnam, Brazil, Russia, and Australia.

## CVW™ SUSTAINABLE CRITICAL MINERALS PRODUCTION AND HYDROCARBON RECOVERY

Oil sands mining operations concentrate valuable critical minerals into froth treatment tailings (FTT). These minerals have been deemed critical to Canada and Alberta due to their importance in the low carbon economy and securing geopolitically stable domestic supply.<sup>1</sup>

Creating Value from Waste™ (CVW™) is a commercially ready (TRL 8) technology to produce critical minerals and recover hydrocarbons through reprocessing FTT. After CVW™ recovers high-quality hydrocarbons from FTT, critical minerals are produced using conventional mineral separation techniques.

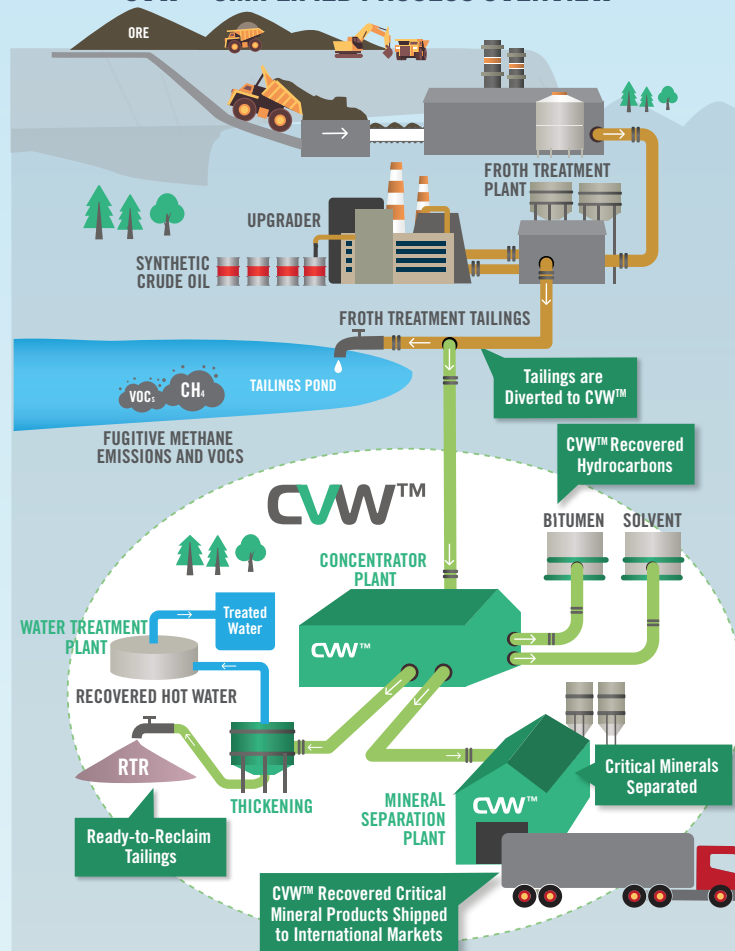
## ABILITY TO PRODUCE VALUABLE CRITICAL MINERALS WITH CVW™

CVW™ could produce:

- Chloride ilmenite comprised of **titanium minerals**.
- **Zircon concentrate** comprised of zircon silicate.
- **Monazite concentrate** comprised of monazite featuring rare earth oxides (REO) including neodymium, cerium, lanthanum, and praseodymium.<sup>2</sup>

Critical Mineral	Single CVW™ Deployment	Industry Wide CVW™ Deployment
Tonnes per year		
Chloride Ilmenite	170,500	1,023,200
Zircon Concentrate	72,000	432,000
Monazite (Potential)	8,500	51,000
Neodymium	1,100	6,300
Cerium	2,500	15,800
Lanthanum	1,200	7,000
Praseodymium	300	1,900
Other REO	600	3,700
Other Mineral Elements	2,800	16,300
<b>Total</b>	<b>251,000</b>	<b>1,506,200</b>

## CVW™ SIMPLIFIED PROCESS OVERVIEW



## CRITICAL MINERALS GLOBAL DEMAND

### Single Site CVW™ Deployment

Potential to fulfill US demand by:



TITANIUM  
13%

ZIRCON  
54%

RARE EARTH OXIDES  
70%

### Industry Wide CVW™ Deployment

Potential to fulfill global demand by:



TITANIUM  
9%

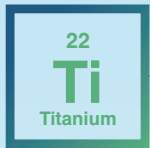
ZIRCON  
20%

RARE EARTH OXIDES  
16%

1. Information within this factsheet is sourced primarily from the United States Geological Survey (2025), the Rare Earth Industry Association (2025), the CVW™ Process and Technology Overview, and other publicly available sources. The CVW™ Process and Technology Overview is available on SEDAR+.

2. CVW™'s monazite circuit is currently under development, in coordination with the University of Alberta. For additional details see CVW CleanTech's press release dated July 3, 2024.

## CRITICAL MINERALS USES INCLUDE:



Within the aerospace and military industries, and as lithium-battery anode material



As a refractory material in nuclear applications, and cladding for fuel rods



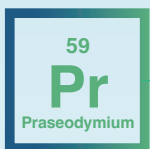
Within permanent magnets, lasers, ceramic capacitors, and electric motors



As a component in catalysts, and within emissions control technologies



Hydrogen storage, battery electrodes, catalysts

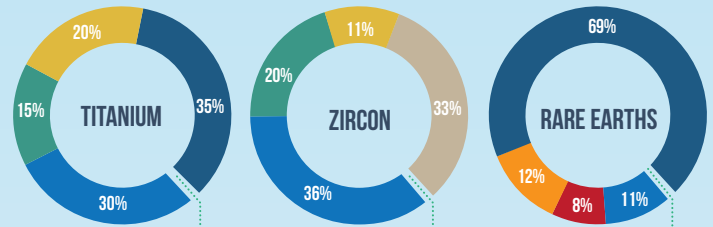


Within permanent magnets and lasers

## CRITICAL MINERALS GLOBAL PRODUCTION BY COUNTRY

Australia Mozambique South Africa  
China Myanmar United States  
Other

Critical minerals readily available in the Athabasca region are currently being produced primarily in challenging jurisdictions including China, South Africa, and Mozambique.



CVW™ WOULD INCREASE CANADA'S PRODUCTION TO MORE THAN:

12%

22%

10%



CVW™ COULD MAKE CANADA:

4<sup>TH</sup> In global production of TITANIUM

2<sup>ND</sup> In global production of ZIRCON

3<sup>RD</sup> In global production of RARE EARTHS

## SIGNIFICANT ENVIRONMENTAL BENEFITS, SUPPORTING THE PRODUCTION OF LOW-CARBON CRITICAL MINERALS AND OIL



### RECOVER LOW-CARBON BITUMEN

Removes ~11 million barrels of bitumen from FTT, recovering it for further upgrading and future sale representing significant incremental income for the energy industry.



### REDUCE FRESH WATER DRAW

Produces 84 million cubic meters of treated water which is fit-for-reuse in low-grade utility applications, decreasing industry-wide fresh water use, and cutting water-use intensity by over 15%.



### MITIGATE NAPHTHENIC ACIDS

Prevents over 80% of the current naphthenic acids deposition in tailings ponds. This reduction is crucial as naphthenic acids are one of the main challenging substances in tailings ponds.



### REDUCE METHANE AND VOCs

Reduces GHG emissions in mineable oil sands by up to 3 million tonnes per year, primarily in the form of methane. Can also reduce critical air contaminants, including volatile organic compounds, by approximately 24 thousand tonnes per year.

## ECONOMIC OPPORTUNITY & MEETING CANADA'S CLIMATE GOALS

Industry-wide deployment of CVW™ technology has the potential to directly support Canada's economic, climate, and environmental targets by:

Boosting Canada's GDP by up to \$47.4 billion

Contributing between \$960 million and \$1.6 billion in annual after-tax free cash flow

Creating over 144,000 person-years of employment in Canada

Contributing to the global objective of reaching net-zero by 2050

