Suncor autonomous haul trucks in the oil sands

IMPLEMENTED 2018–2025 · MINING AND RESOURCES · CANADA · BAND C · CLAIMED ONLY
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In January 2018 Suncor said it would phase in more than 150 autonomous haul trucks at its Alberta oil sands mines, and that this would remove about 500 roles and add about 100. By mid-2025 it said all ore at its Base Plant was hauled by driverless trucks. Results on cost and jobs are largely not reported, and one mine returned temporarily to a staffed fleet in 2021.

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Facts and figures are as reported by the sources listed below, which may be incomplete, self-reported or out of date. Check the original source before relying on any figure.

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NOTICE WORDING LAST UPDATED 16 NOVEMBER 2026

AT A GLANCE

Frontier case: AI used for a scientific, medical or engineering breakthrough. MarLuc grades what has changed in practice so far.

AI and automation used: Autonomous haulage: perception, route planning and control software with a central command centre and collision and obstacle detection (Komatsu 980E trucks equipped with an autonomous haulage system). Mostly rule-based autonomy, with little modern machine learning described in the sources.

Implemented: 2018–2025. Grade: band C, Process change, Claimed only.

Headline result, as reported: All ore at Suncor's Base Plant is now hauled by autonomous trucks, almost 120 by mid-2025 and 140 expected by year end, by Suncor's account; in 2018 it said the plan meant a net loss of about 400 positions

1 · The case

The facts, as reported by the 5 sources listed at the end. Where a source is silent, the field says "Not reported".

Organisation

Suncor Energy. Canadian integrated energy company with oil sands mines near Fort McMurray, Alberta, including the Base Plant (Millennium and North Steepbank) and Fort Hills. Headcount is not stated in the sources opened. Canvas block: 4. Operations and process. Also 5. People and skills, 6. Data and technology.

Business challenge

The challenge. By Suncor's account in 2018, evaluations over four years showed autonomous trucks offer enhanced safety performance, better operating efficiency and lower operating costs compared with truck and shovel operations with drivers.

How it was addressed. Suncor announced a phased rollout in January 2018, starting at North Steepbank, and has since extended it to Fort Hills (2020) and the Millennium mine. Its chief operating officer said trucks reaching the end of their life would be replaced with new Komatsu trucks, and that existing newer trucks would be retrofitted. By July 2025 Suncor said all Base Plant ore was hauled by autonomous trucks. [1] [2] [3] [4] [5]

Who implemented it

Komatsu (Equipment or robot maker): Supplies the 400-tonne haul trucks used in the programme; by Suncor's chief operating officer in 2018, new trucks cost about $5 million each excluding autonomy equipment.
In-house (In-house): Suncor Energy: Plans and operates the deployment mine by mine, with deployment teams, field operators and dispatchers.
Rio Tinto's trucks are controlled from Perth; Suncor said in 2018 it would initially run its trucks from control rooms at each mine site, per CBC.

Technology (SEAM pillar E)

SEAM types: T9 AI in physical systems. Deployment: Mixture. Vendors and products: Komatsu, Komatsu 980E trucks equipped with an autonomous haulage system (AHS).

Where it was built in: Autonomous trucks are managed from an AHS command centre by control room operators, loaded by shovels, and monitored for real-time location and movement across the mine, by Suncor's account.

What changed

Before: drivers operated the haul trucks, and Suncor said in 2018 it had hired drivers on a temporary basis in preparation. After: central control room operators manage autonomous trucks at Base Plant, by Suncor's account. The actual workforce outcome against the 2018 plan is not reported. [1] [2] [3] [4] [5]

What it cost

Not reported in total. In 2018 Suncor's chief operating officer said new Komatsu trucks cost about $5 million each, not including the obstacle detection systems and computer gear needed for autonomy.

What it saved

Not reported. Suncor's chief executive said in 2025 that the technology makes it a better operator and improves efficiency, and its executive vice president said real-time visibility leads to lower maintenance costs and downtime, without figures. [1] [2] [3] [4] [5]

Governance and control

Suncor says route mapping, obstacle detection and real-time visibility are in place. In 2018 it said it would work with the union to minimise workforce impacts. No independent review of the system was found.

S2 · Accountable owner · Claimed
Suncor's chief executive and its executive vice president for oil sands speak publicly on the programme; a named programme owner is not reported. [5]

A1 · Safe use · Claimed
Suncor says the trucks use prescribed route mapping and obstacle detection and reduce interaction between people and equipment; it says this decreases incident rates. [1]

A2 · Human in the loop · Claimed
Suncor says control room operators optimise truck performance and that shovels still load the trucks; the share of staff in supervision is not reported. [5]

A3 · Monitoring and assurance · Claimed
Suncor says it has full visibility of all autonomous trucks in real time; no independent assurance or regulator review was found. [5]

A4 · Vendor AI · Claimed
Komatsu trucks carry the autonomous system; Suncor's assurance of the vendor is not reported. [2] [5]

A5 · Agent controls · Claimed
Suncor describes collision and obstacle detection and prescribed routes as safety features of the system. [1] [5]

A6 · Standards and regulation · Not reported
Standards and regulation applied to the autonomous fleet are not described in the sources opened.

What worked, what did not, what is unproven

WORKED

– Suncor says autonomous trucks now move all ore at its Base Plant, and the fleet grew from a target of 91 trucks at end 2024 to almost 120 by mid-2025.

– The union said it had worked with Suncor to ensure that no permanent, full-time employees would be laid off, per Global News in 2018.

– Suncor says it plans to use the technology at other mines.

DID NOT

– Fort Hills returned temporarily to a staffed fleet in 2021 to better manage congestion, per Suncor's annual information form.

– The union local initially criticised the plan because of job losses, per CBC; the union's national president called it a mistake to think experienced operators would not be needed.

UNPROVEN

– Cost, productivity and safety results: no figures were found in the sources opened.

– How many roles were removed or created against the 2018 plan, and how affected staff were redeployed: Not reported.

– Whether the programme changes the cost base of oil sands mining across the industry. The

Timeline

Jan 2018 Suncor announces phased autonomous haulage, starting at North Steepbank, with more than 150 trucks over six years [1]

Jan 2018 Chief operating officer says about 500 roles will be eliminated and about 100 added; the union criticises the plan [2]

2018 Autonomous trucks deployed at North Steepbank after a commercial scale evaluation [4]

2020 Autonomous trucks deployed at Fort Hills [4]

2021 Fort Hills temporarily returns to a staffed fleet to better manage congestion [4]

May 2024 Millennium mine rolls out 15 autonomous trucks; fleet target of 91 at Oil Sands Base by end 2024 [5]

Jul 2025 Suncor says all Base Plant ore is moved by autonomous trucks, almost 120 in service and 140 expected by year end [5]

2 · Grade and SEAM assessment

MarLuc's opinion, made on the evidence above. How cases are graded: marluc.co.uk/case-studies/how-we-rate

Level of change and impact

Claimed: Not applicable. Grade: C, Process change. Proof: Claimed only. Level of change: Process change.

Process change (Level 2, band C). Haulage is redesigned end to end at Base Plant, by Suncor's account. No measured cost or job result is reported, so the grade does not reach an operating model redesign.

Band C, Level 2. Suncor has rebuilt ore haulage at its Base Plant mines around autonomous trucks and says that is now complete there, which is a redesigned process end to end. The sources give no measured cost, productivity or safety result, and the planned job changes are not followed up. A temporary return to a staffed fleet at Fort Hills in 2021 shows the rollout did not run in a straight line. Band B might be argued from fleet scale and the stated job changes; the evidence for a changed cost base is not in the sources opened.

The SEAM view and lessons learnt

Suncor's account is consistent across eight years and the scale is large. What is missing is an outcome: the 2018 job estimate is not followed up in the sources, and no cost saving is stated. The 2021 return to a staffed fleet at Fort Hills shows mixed fleets and congestion can slow a rollout. A mid-sized or larger operator should set out the workforce plan and the measures of success before deployment, then report both.

1. State the workforce plan and agree it with the union before rollout.
2. Plan for mixed fleets and congestion during the transition.
3. Report cost and safety results against a baseline.

Evidence

Score 1 of 4. Self-reported: scale and plans come from Suncor and its executives; the union adds a view on jobs. No independent measurement of results.

Evaluation method. Company announcements, an executive interview and a securities filing, relayed by press, plus a union reaction; no independent evaluation or regulator finding.

Sources disagree. Jobs: Suncor's chief operating officer put the net change at about 400 positions, while the union said it had worked with Suncor so that no permanent, full-time employees would be laid off; the two statements can both hold, and the final outcome is not reported. Fleet size: the annual information form for 2023 targets 91 trucks at Oil Sands Base by the end of 2024, while International Mining in July 2025 reports almost 120 at Base Plant and 140 expected by the end of 2025.

Status. Ongoing: Suncor says it plans to extend autonomous haulage to other mines.

3 · Original sources

Read these in full. To challenge a fact or a grade, use the contact form at marluc.co.uk or the link on https://marluc.co.uk/case-studies/suncor-autonomous-haul-trucks

[1] MINING.COM: Suncor Energy implements first commercial fleet of autonomous haul trucks in the oil sands
https://www.mining.com/web/suncor-energy-implements-first-commercial-fleet-autonomous-haul-trucks-oil-sands/

[2] CBC News: Suncor driverless trucks will kill 400 net jobs, says company
https://www.cbc.ca/1.4512659

[3] Global News: Union outcry as automation eats up 400 oilsands jobs, and it's just the beginning
https://globalnews.ca/news/4000125/suncor-union-outcry-automation-oilsands-jobs

[4] Suncor Energy: Annual Information Form for the year ended 31 December 2023 (Form 40-F exhibit 99.1, SEC)
https://www.sec.gov/Archives/edgar/data/311337/000155837024003724/su-20231231xex99d1.htm

[5] International Mining: Suncor on its record autonomous ultraclass truck fleet
https://im-mining.com/2025/07/04/suncor-on-its-record-autonomous-ultraclass-truck-fleet/

Suncor Energy website: https://www.suncor.com

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