

Sustainability Performance Indicators

Corporate Statistics

Environment Health & Safety Management Systems	2019	2018	2017
Facilities with ISO 14001 and/or OHSAS 18001-based management systems (percentage) ⁽¹⁾	97	97	97
Management system audits ⁽²⁾	12	17	20

Environmental Performance	2019	2018	2017
Resource or energy use⁽³⁾			
Coal combustion (tonnes)	9,091,700	10,001,100	14,956,400
Natural gas combustion (GJ)	76,647,600	62,354,800	55,519,800
Diesel combustion (L)	10,173,900	9,552,800	4,384,700
Gasoline consumption: vehicle (L)	1,138,400	1,424,000	1,476,700
Diesel consumption: vehicle (L)	21,532,400	38,361,500	44,045,200
Propane consumption: vehicle (L)	95,900	75,100	112,000
Electricity: building operations (MWh)	211,100	279,800	290,100
Natural gas: building operations (GJ)	53,400	73,100	75,500
Propane: building operations (L)	169,400	154,300	125,800
Kerosene: building operations (L)	83,800	115,600	96,200
Total resource or energy use (GJ)⁽⁴⁾	345,198,900	358,460,000	496,909,620
Greenhouse gas emissions⁽⁵⁾			
Carbon dioxide (tonnes CO ₂ e) ✓	20,410,800	20,589,700	29,624,500
Methane (tonnes CO ₂ e) ✓	52,900	69,300	107,100
Nitrous oxide (tonnes CO ₂ e) ✓	110,600	115,500	185,100
Sulfur hexafluoride (tonnes CO ₂ e)	70	10	10
Total greenhouse gas emissions⁽⁶⁾ (tonnes CO₂e) ✓	20,574,400	20,774,600	29,916,700
Greenhouse gas emission intensity ⁽⁷⁾ (tonnes CO ₂ e / MWh) ✓	0.75	0.77	0.86
Scope 1 emissions (% of total GHG emissions)	99	99	99
Scope 2 emissions (% of total GHG emissions)	1	1	1
Scope 1 emissions reported to national regulatory bodies (%)	100	100	100
Air emissions⁽⁸⁾			
Total sulphur dioxide emissions (tonnes) ✓	15,900	19,300	36,200
Sulphur dioxide emission intensity ⁽⁹⁾ (kg / MWh) ✓	0.58	0.73	1.05
Total nitrogen oxide emissions (tonnes) ✓	25,800	28,000	44,400
Nitrogen oxide emission intensity ⁽⁹⁾ (kg / MWh) ✓	0.95	1.05	1.29
Total particulate matter emissions (tonnes) ✓	8,200	8,400	11,400
Particulate matter emission intensity ⁽⁹⁾ (kg / MWh) ✓	0.30	0.31	0.33
Total mercury emissions (kilograms) ✓	60	70	110
Mercury emission intensity ⁽⁹⁾ (mg / MWh) ✓	2.36	2.50	3.29
Water management⁽¹⁰⁾			
Water withdrawal - water utility/municipality/customer (million m ³)	2	1	1

<i>Water withdrawal - surface water (million m³)</i>	284	244	210
Water withdrawn - all sources (million m³) ✓	286	245	211
Water discharge - all sources (million m³) ✓	218	208	172
Water consumption (million m³) ✓	68	37	39
<i>Water intensity (m³/MWh)⁽¹¹⁾ ✓</i>	2.48	1.40	1.13
Waste management			
Non-hazardous⁽¹²⁾			
Landfill (tonnes) ✓	900	1,900	3,200
Landfill (L) ✓	34,700	68,100	63,500
Ash disposal: mine (tonnes) ⁽¹³⁾ ✓	641,400	715,100	1,338,600
Ash disposal: lagoon (tonnes) ⁽¹⁴⁾ ✓	117,400	276,900	485,500
Recycled (tonnes) ✓	3,100	1,800	1,400
Recycled (L) ✓	3,605,400	3,721,700	4,122,700
Reuse (tonnes) ✓	745,200	560,800	827,400
Storage (tonnes) ✓	—	—	—
Hazardous⁽¹⁵⁾			
Landfill (tonnes) ✓	60	10	40
Landfill (L) ✓	52,500	45,100	14,600
Recycled (tonnes) ✓	80	200	12,700
Recycled (L) ✓	18,945,300	16,255,300	20,140,400
Land use and reclamation			
Land used in mining activities – disturbed (cumulative hectares) ✓	12,600	12,400	12,100
Land used in mining activities – reclaimed (cumulative hectares) ✓	4,800	4,700	4,600
Land reclamation (% of land disturbed) ✓	38	38	38
Land used in mining activities: disturbed minus reclaimed (hectares) ✓	7,700	7,700	7,400
Land used by plants, offices and equipment (hectares) ✓	3,900	3,900	3,900
Total land use (cumulative hectares) ✓	11,700	11,700	11,300
Environmental incidents⁽¹⁶⁾			
Total environmental incidents ✓	9	7	5
Significant environmental incidents	3	1	2
Regulatory non-compliance environmental incidents	6	6	3
Environmental enforcement actions ⁽¹⁷⁾	1	1	—
Environmental fines (\$ thousands)	4	6	—
Spills⁽¹⁸⁾			
Volume of significant spills (m ³)	530	5	15

Social Performance	2019	2018	2017
Workplace practices			
Employees	1,543	1,883	2,228
Number of full-time employees	1,471	1,810	2,125
Number of part-time employees	18	22	24
Number of contingent employees	54	51	79
Employees represented by independent trade union organizations ⁽¹⁹⁾ (%)	45	50	57
Voluntary employee turnover rate ⁽²⁰⁾ (%)	13.59	20.22	10.65
Diversity			
Women in workforce (% of all employees)	20	20	19
Women in senior management (%)	50	50	26
Women on Board of Directors (%)	33	40	40
Health and safety			
Health and safety enforcement actions ⁽²¹⁾	3	—	4
Health and safety fines (\$ thousands)	—	—	—
Employee & contractor fatalities ✓	—	—	—
Lost-time incident (LTI) (absence from work) ⁽²²⁾ ✓	5	1	6
Medical aid (MA) incidents (no absence from work) ⁽²³⁾ ✓	7	12	15
First Aid (FA) incidents (no absence from work) ⁽²⁴⁾ ✓	8	23	67
Restricted Work Injuries (RWI) incidents (no absence from work) ⁽²⁵⁾ ✓	3	12	16
Total injuries to employees & contractors ✓	23	48	104
Total Injury Frequency (TIF) (employees and contractors) ⁽²⁶⁾ ✓	1.12	1.91	3.42
Total Recordable Injury Frequency (TRIF) (employees and contractors) ⁽²⁷⁾	0.73	1.00	1.22
Community relations			
Community investments (\$ millions) ⁽²⁸⁾	2.1	2.4	2.6

✓ 2019 Data has been third-party assured to a limited assurance level by Ernst & Young LLP. Please see "Discussion and Notes on Numbers" for footnote explanations.

Alignment of Sustainability Performance Indicators with Leading Environment, Social and Governance Frameworks

Environment Health & Safety Management Systems	Global Reporting Index ("GRI")	Sustainability Accounting Standards Board ("SASB")
Facilities with ISO 14001 and/or OHSAS 18001-based management systems (percentage)		
Management system audits		
Environmental Performance	GRI	SASB
Resource or energy use	302-1	
Coal combustion (tonnes)	302-1	
Natural gas combustion (GJ)	302-1	
Diesel combustion (L)	302-1	
Gasoline consumption: vehicle (L)	302-1	
Diesel consumption: vehicle (L)	302-1	
Propane consumption: vehicle (L)	302-1	
Electricity: building operations (MWh)	302-1	
Natural gas: building operations (GJ)	302-1	
Propane: building operations (L)	302-1	
Kerosene: building operations (L)	302-1	
Total resource or energy use (GJ)	302-1	
Greenhouse gas emissions		
Carbon dioxide (tonnes CO ₂ e)	305-1, 305-2, 305-3	IF-EU-110a.1.
Methane (tonnes CO ₂ e)	305-1, 305-2, 305-3	IF-EU-110a.1.
Nitrous oxide (tonnes CO ₂ e)	305-1, 305-2, 305-3	IF-EU-110a.1.
Sulfur hexafluoride (tonnes CO ₂ e)	305-1, 305-2, 305-3	IF-EU-110a.1.
Total greenhouse gas emissions (tonnes CO₂e)	305-1, 305-2, 305-3	
<i>Greenhouse gas emission intensity (tonnes CO₂e / MWh)</i>	305-4	
Scope 1 emissions (% of total GHG emissions)	305-1	IF-EU-110a.1.
Scope 2 emissions (% of total GHG emissions)	305-2	
Scope 1 emissions reported to national regulatory bodies (%)		IF-EU-110a.1.
Air emissions		
Total sulphur dioxide emissions (tonnes)	305-7	IF-EU-120a.1.
<i>Sulphur dioxide emission intensity (kg / MWh)</i>		
Total nitrogen oxide emissions (tonnes)	305-7	IF-EU-120a.1.
<i>Nitrogen oxide emission intensity (kg / MWh)</i>		
Total particulate matter emissions (tonnes)	305-7	IF-EU-120a.1.
<i>Particulate matter emission intensity (kg / MWh)</i>		
Total mercury emissions (kilograms)	305-7	IF-EU-120a.1.
<i>Mercury emission intensity (mg / MWh)</i>		
Water management		
<i>Water withdrawal - water utility/municipality/customer (million m³)</i>	303-3	IF-EU-140a.1.

<i>Water withdrawal - surface water (million m³)</i>	303-3	IF-EU-140a.1.
Water withdrawn - all sources (million m³)	303-3	IF-EU-140a.1.
Water discharge - all sources (million m³)	303-4	
Water consumption (million m³)		IF-EU-140a.1.
<i>Water intensity (m³/MWh)</i>		
Waste management		
Non-hazardous		
Landfill (tonnes)	306-2	
Landfill (L)		
Ash disposal: mine (tonnes)	306-2	
Ash disposal: lagoon (tonnes)	306-2	
Recycled (tonnes)	306-2	
Recycled (L)		
Reuse (tonnes)	306-2	IF-EU-150a.1.
Storage (tonnes)	306-2	
Hazardous		
Landfill (tonnes)	306-2	
Landfill (L)		
Recycled (tonnes)	306-2	
Recycled (L)		
Land use and reclamation		
Land used in mining activities – disturbed (cumulative hectares)	304-1	
Land used in mining activities – reclaimed (cumulative hectares)	304-1	
Land reclamation (% of land disturbed)	304-3	
Land used in mining activities: disturbed minus reclaimed (hectares)	304-1	
Land used by plants, offices and equipment (hectares)	304-1	
Total land use (cumulative hectares)	304-1	
Environmental incidents		
Total environmental incidents	307-1	
Significant environmental incidents	307-1	
Regulatory non-compliance environmental incidents	307-1	
Environmental enforcement actions	307-1	
Environmental fines (\$ thousands)	307-1	
Spills		
Volume of significant spills (m ³)	306-3	

Social Performance	GRI	SASB
Workplace practices		
Employees	102-7	
<i>Number of full-time employees</i>		
<i>Number of part-time employees</i>		
<i>Number of contingent employees</i>		
Employees represented by independent trade union organizations (%)	102-41	
Voluntary employee turnover rate (%)		
Diversity		
Women in workforce (% of all employees)	405-1	
Women in senior management (%)	405-1	
Women on Board of Directors (%)	405-1	
Health and safety		
Health and safety enforcement actions		
Health and safety fines (\$ thousands)		
Employee & contractor fatalities	403-9	IF-EU-320a.1.
Lost-time incident (LTI) (absence from work)		IF-EU-320a.1.
Medical aid (MA) incidents (no absence from work)		IF-EU-320a.1.
First Aid (FA) incidents (no absence from work)		IF-EU-320a.1.
Restricted Work Injuries (RWI) incidents (no absence from work)		IF-EU-320a.1.
Total injuries to employees & contractors		IF-EU-320a.1.
Total Injury Frequency (TIF) (employees and contractors)		
Total Recordable Injury Frequency (TRIF) (employees and contractors)		IF-EU-320a.1.
Community relations		
Community investments (\$ millions)	201-1	

Discussion and Notes on Numbers

TransAlta continually strives to improve the accuracy and coverage of our sustainability performance reporting to stakeholders. We review our processes and controls relating to the measurement and calculation of key sustainability data annually. Several footnotes appear throughout the statistical summary and are intended to provide clarity on specific boundary conditions, changes in methodology and definitions. For questions or clarity on any key performance indicators, please contact us at sustainability@transalta.com.

1. ISO 14001 and ISO 18001 are the world's most recognized standards for Environmental Management and Health and Safety Management systems. TransAlta has ownership in 73 facilities.
2. Internal audits are conducted against ISO management systems, regulatory frameworks and the Alberta Certificate of Recognition standard.
3. Energy use is calculated and reported from TransAlta-operated facilities, following the same approach we use for greenhouse gas (GHG) emissions reporting, which is the application of an 'Operational Control' boundary as per guidance from the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.
4. A number of 2017 and 2018 historical energy use volumes from our natural gas business unit were revised in 2019. Minor adjustments to gas, diesel and oils volumes from 2017 and 2018 at Fort Saskatchewan, Ottawa and Windsor were made. These changes were due to data system errors.
5. GHG emissions are calculated and reported from TransAlta-operated facilities in line with carbon regulations where the facility is located and with The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (specifically 'Setting Organizational Boundaries: Operational Control' methodology). As per the operational control methodology, TransAlta reports 100 per cent of GHG emissions from facilities at which we are the operator. GHG emissions include emissions from stationary combustion, transportation use, building use and fugitive emissions. We report both scope 1 and scope 2 emissions. An estimate of our scope 3 emissions can be found in our 2019 MD&A and our 2019 CDP climate change report.
6. Gross GHG emissions or gross carbon dioxide equivalent (CO₂e) emissions is the sum of carbon dioxide, methane, nitrous oxide and sulfur hexafluoride. Consequently, the sum of scope 1 and 2 emissions will equate to gross CO₂e emissions or gross GHG emissions. Minor adjustments were made to historical 2017 and 2018 GHG emissions data from our natural gas business units as a result of adjusted historical energy use volumes.
7. GHG emission intensity is calculated by dividing total operational emissions by 100 per cent of production (MWh) from operated facilities, irrespective of financial ownership.
8. Air emissions are calculated and reported from TransAlta-operated facilities, following the same approach we use for greenhouse gas (GHG) emissions reporting, which is the application of an 'Operational Control' boundary as per guidance from the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Air emissions are expressed in tonnes, except for mercury emissions, which are represented in kilograms. Total particulate matter emissions (TPM) include both PM_{2.5} and PM₁₀. In 2019, we revised our historical TPM emissions to reflect our road dust emissions reported to the National Pollutant Release Inventory in 2018. 2018 marked our first year estimating and reporting road dust TPM emissions from our Highvale coal mine in Alberta. We have applied road dust TPM estimates to 2017 and 2019, which are based on our 2018 reported road dust TPM emissions.
9. Air emission intensities are calculated by dividing total operational emissions by 100 per cent of production (MWh) from operated facilities, irrespective of financial ownership. Historical adjustments to 2017 and 2018 TPM emissions (see Note 8) also resulted in adjustments to TPM emission intensity data.
10. Water use is calculated and reported from TransAlta-operated facilities, following the same approach we use for greenhouse gas (GHG) emissions reporting, which is the application of an 'Operational Control' boundary as per guidance from the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Total water consumed is measured by total water withdrawal minus water discharge. Water is used primarily for cooling by our thermal power plants. Evaporative losses from cooling ponds and cooling towers account for the majority of consumptive loss. The water lost to evaporation is not returned directly to the water body, but the water remains in the hydrologic cycle. Historical 2017 Australia natural gas fleet water volumes were adjusted in 2019 to reflect miscalculation by the business unit (rounding errors).
11. Water intensity is calculated by dividing total operational water consumption (m³) by 100 per cent of production (MWh) from operated facilities, irrespective of financial ownership.
12. Non-hazardous waste includes, but is not limited to, the disposal of water treatment chemicals, coal refuse (including ash byproducts), metals, paper, cardboard and building materials. Minor adjustments were made to historical 2018 non-hazardous waste volumes to reflect incorporation of missing waste vendor information from 2018.
13. Ash disposal: mine is fly ash and bottom ash from coal production, which is treated and then returned to its original source, the mine, for landfill/disposal. Historical 2018 volumes were adjusted in 2019 to reflect misreported volumes from 2018.
14. Ash disposal: lagoon is fly ash and bottom ash from Keepphills coal production, which is treated and then sent to ash lagoons for disposal.
15. Hazardous wastes can be harmful to people, plants, animals or the environment, either in the short or the long term, and TransAlta is required in all of its operating jurisdictions to follow proper procedures for landfill/recycling of these materials.
16. Our environmental incident reporting was revised in 2019. Environmental incidents are now separated into two categories: significant environmental incidents and regulatory non-compliance environmental incidents. We define regulatory non-compliance environmental incidents as events that involved a non-compliance event but did not have an impact on the environment. For example, a technical issue with a computer system for gathering real-time data could cause us to be out of compliance with local regulation or our EMS, but there is no direct consequence for the physical environment. All other events are captured as significant environmental incidents and these are where we deem there to be a material impact to the environment.
17. Environmental enforcement actions are a violation or non-compliance to regulations or exceedance of limits in company operating approvals that result in enforcement action including stop work orders, fines or suspension of operating approvals.
18. Spills generally happen in low environmental impact areas and are almost always contained and fully recovered. It is extremely rare that we experience large spills, which would adversely impact the environment and the Corporation.
19. TransAlta has approximately 700 unionized workers working primarily in our operational business units.
20. Voluntary turnover is aligned with our Human Resources voluntary turnover reporting methodology. As per this methodology, voluntary turnover is any full-time, part-time or contingent employee initiated exit, excluding retirement. Summer students and temporary workers are not considered within voluntary turnover.
21. Health and safety enforcement actions are a violation or non-compliance to regulations or exceedance of limits in company operating approvals that result in enforcement action including stop work orders, fines or suspension of operating approvals.
22. Lost-time injuries (LTIs) are injuries that resulted in the worker being away from work beyond the day of the injury.
23. Medical aids (MAs) are injuries that resulted in medical treatment beyond first aid.
24. First Aids (FAs) are an injury that is limited to treatment of minor scratches, cut, scrapes, burns, splinters, etc. which does not require further medical treatment.
25. Restricted work injuries (RWIs) are injuries that resulted in the worker being unable to perform all normally scheduled and assigned work activities.
26. Total Injury Frequency (TIF) tracks the total number of injuries (medical aids, lost-time injuries, restricted works and first aids).
27. Total Recordable Injury Frequency (TRIF) measures restricted work, medical aid and lost time injuries per 200,000 hours worked.
28. Cumulative of donations and sponsorship totals in the respective calendar year. This investment figure does not include donations from our employees.

Independent Sustainability Assurance Statement

To the Board of Directors and Management of TransAlta Corporation (“TransAlta”).

Scope of Ernst & Young LLP (“EY”) Engagement

Our responsibilities included providing limited assurance over a selection of performance indicators as presented in the Addendum to this statement.

Subject Matter

We have performed limited assurance procedures for the following quantitative performance indicators (“Subject Matter”) for the year ending December 31, 2019:

- Carbon dioxide emissions (tonnes CO₂e)
- Methane emissions (tonnes CO₂e)
- Nitrous oxide emissions (tonnes CO₂e)
- Total greenhouse gas emissions and emissions intensity (tonnes CO₂e, tonnes CO₂e/MWh)
- Sulphur dioxide emissions and emission intensity (tonnes, kg/MWh)
- Nitrogen oxide emissions and emission intensity (tonnes, kg/MWh)
- Particulate matter emissions and emission intensity (tonnes, kg/MWh)
- Mercury emissions and emission intensity (kg, mg/MWh)
- Waste Management – Non-hazardous
- Landfill (tonnes, L)
- Ash Disposal: mine, lagoon (tonnes)
- Recycled (tonnes, L)
- Reuse (tonnes)
- Storage (tonnes)
- Waste Management – Hazardous
- Landfill (tonnes, L)
- Recycled (tonnes, L)
- Water Withdrawal (million m³)
- Water Discharge (million m³)
- Water Consumption and consumption intensity (million m³, m³/MWh)
- Mining land use – disturbed (Ha)
- Mining land use – reclaimed (Ha)
- Mining land use - % of land disturbed
- Mining land use – disturbed minus reclaimed (Ha)
- Plants, offices and equipment land use (Ha)
- Total land use (Ha)
- Employee and contractor fatalities
- Lost time incidents for employees and contractors
- Medical aids for employees and contractors
- Restricted work injuries for employees and contractors
- First aids for employees and contractors
- Total TIF injuries to employees and contractors
- Total incident frequency for employees and contractors (incidents/200,000 hours)
- Total environmental incident

Criteria

TransAlta has prepared its specified performance information in accordance with industry standards and, where relevant, internally developed criteria.

TransAlta Management Responsibilities

The Subject Matter was prepared by the management of TransAlta, which is responsible for the assertions, statements and claims made therein including the assertions we have been engaged to provide limited assurance over, collection, quantification and presentation of the performance indicators and the criteria used in determining that the information is appropriate for the purpose of disclosure in this Report (“the Report”). In addition, management is responsible for maintaining adequate records and internal controls that are designed to support the reporting process.

EY Responsibilities

Our limited assurance procedures have been planned and performed in accordance with the International Standard on Assurance Engagements 3000 Assurance Engagements other than Audits or Reviews of Historical Financial Information.

Our procedures were designed to obtain a limited level of assurance on which to base our conclusion. The procedures conducted do not provide all the evidence that would be required in a reasonable assurance engagement and, accordingly, we do not express a reasonable level of assurance. While we considered the effectiveness of management's internal controls when determining the nature and extent of our procedures, our assurance engagement was not designed to provide assurance on internal controls and, accordingly, we express no conclusions thereon.

This assurance statement has been prepared for TransAlta for the purpose of assisting management in determining whether the Subject Matter is in accordance with the criteria and for no other purpose. Our assurance statement is made solely to TransAlta in accordance with the terms of our engagement. We do not accept or assume responsibility to anyone other than TransAlta for our work, or for the conclusions we have reached in this assurance statement.

Assurance Procedures

We planned and performed our work to obtain all the evidence, information and explanations considered necessary in relation to the above scope. Our assurance procedures included but were not limited to:

- Interviewing relevant personnel at the head office and at various sites to understand data management processes related to the selected performance indicators.
- Checking the accuracy of calculations performed - on a test basis - primarily through inquiry, variance analysis and performance of re-calculations.
- Assessing risk of material misstatement due to fraud or errors relating to the selected performance indicators.
- Evaluating the overall presentation of the Report, including the consistency of the Subject Matter.

Limitations of EY Work Performed

Our scope of work did not include expressing conclusions in relation to:

- The materiality, completeness or accuracy of data sets or information relating to areas other than the selected performance data and any site-specific information.
- Management's forward-looking statements.
- Any comparisons made by TransAlta against historical data.
- The appropriateness of definitions for internally developed criteria.

Independence and Competency Statement

In conducting our engagement, we have complied with the applicable requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants.

EY Conclusion

Based on our procedures for this limited assurance engagement described in this statement, nothing has come to our attention that causes us to believe that the Subject Matter is not, in all material respects, reported in accordance with the relevant criteria.

Ernst + Young LLP

Chartered Professional Accountants
Calgary, Canada
Mar. 3, 2020