

Sustainability Performance Indicators

Corporate Statistics

Environment Health & Safety Management Systems	2018	2017	2016
Facilities with ISO 14001 and/or OHSAS 18001-based management systems (percentage) ⁽¹⁾	97	97	97
Management system audits ⁽²⁾	17	20	35

Environmental Performance	2018	2017	2016
Resource or energy use⁽³⁾			
Coal combustion (tonnes)	10,001,100	14,956,400	15,735,300
Natural gas combustion (GJ)	69,372,900	55,520,900	62,486,700
Diesel combustion (L)	9,544,200	4,384,700	46,179,400
Gasoline consumption: vehicle (L)	1,414,600	1,476,700	1,487,200
Diesel consumption: vehicle (L)	38,361,500	44,045,200	40,224,800
Propane consumption: vehicle (L)	75,100	112,000	78,800
Electricity: building operations (MWh)	279,800	290,100	359,300
Natural gas: building operations (GJ)	73,100	75,500	58,300
Propane: building operations (L)	154,300	125,800	127,500
Kerosene: building operations (L)	115,600	96,200	56,500
Total resource or energy use (GJ)⁽⁴⁾	358,477,500	496,910,700	528,442,800
Greenhouse gas emissions⁽⁵⁾			
Carbon dioxide (tonnes CO ₂ e) ✓	20,595,600	29,627,700	30,381,300
Methane (tonnes CO ₂ e) ✓	68,900	107,100	114,200
Nitrous oxide (tonnes CO ₂ e) ✓	115,400	185,100	224,600
Sulfur hexafluoride (tonnes CO ₂ e)	10	10	20
Total greenhouse gas emissions⁽⁶⁾ (tonnes CO₂e) ✓	20,779,900	29,919,900	30,720,100
<i>Greenhouse gas emission intensity⁽⁷⁾ (tonnes CO₂e / MWh) ✓</i>	<i>0.77</i>	<i>0.86</i>	<i>0.83</i>
Air emissions⁽⁸⁾			
Total sulphur dioxide emissions (tonnes) ✓	19,300	36,200	39,600
<i>Sulphur dioxide emission intensity⁽⁹⁾ (kg / MWh) ✓</i>	<i>0.73</i>	<i>1.05</i>	<i>1.08</i>
Total nitrogen oxide emissions (tonnes) ✓	28,000	44,400	48,400
<i>Nitrogen oxide emission intensity⁽⁹⁾ (kg / MWh) ✓</i>	<i>1.05</i>	<i>1.29</i>	<i>1.33</i>
Total particulate matter emissions (tonnes) ✓	7,800	14,500	13,800
<i>Particulate matter emission intensity⁽⁹⁾ (kg / MWh) ✓</i>	<i>0.29</i>	<i>0.42</i>	<i>0.38</i>
Total mercury emissions (kilograms) ✓	70	110	130
<i>Mercury emission intensity⁽⁹⁾ (mg / MWh) ✓</i>	<i>2.5</i>	<i>3.29</i>	<i>3.52</i>
Water management⁽¹⁰⁾			
Water intake (million m ³) ✓	245	213	239
Water discharge (million m ³) ✓	208	172	197
Water consumption (million m³) ✓	37	41	42
<i>Water intensity (m³/MWh)⁽¹¹⁾ ✓</i>	<i>1.4</i>	<i>1.18</i>	<i>1.63</i>

Waste management⁽¹²⁾			
Non-hazardous			
Landfill (tonnes) ✓	1,900	3,200	2,100
Landfill (L) ✓	68,100	63,500	518,400
Ash disposal: mine (tonnes) ⁽¹³⁾ ✓	461,200	1,338,600	1,315,000
Ash disposal: lagoon (tonnes) ⁽¹⁴⁾ ✓	276,900	485,500	527,700
Recycled (tonnes) ✓	1,800	1,400	18,000
Recycled (L) ✓	3,718,100	4,122,700	212,100
Reuse (tonnes) ✓	564,400	827,400	700,700
Storage (tonnes) ✓	–	–	8,300
Hazardous⁽¹⁵⁾			
Landfill (tonnes) ✓	40	40	40
Landfill (L) ✓	45,100	14,600	13,110
Recycled (tonnes) ✓	40	12,740	60
Recycled (L) ✓	16,255,300	20,140,400	17,209,600
Land use and reclamation⁽¹⁶⁾			
Land used in mining activities – disturbed (cumulative hectares) ✓	12,400	12,100	11,800
Land used in mining activities – reclaimed (cumulative hectares) ✓	4,700	4,600	4,600
Land reclamation⁽¹⁷⁾ (% of land disturbed) ✓	38	38	39
Land used in mining activities: disturbed minus reclaimed (hectares) ✓	7,700	7,400	7,200
Land used by plants, offices and equipment (hectares) ✓	3,900	3,900	2,700
Total land use (cumulative hectares) ✓	11,700	11,300	9,900
Environmental incidents			
Total environmental incidents⁽¹⁸⁾ ✓	7	5	16
Environmental enforcement actions ⁽¹⁹⁾	1	–	–
Environmental fines (\$ thousands)	6	–	–
Spills⁽²⁰⁾			
Volume of significant spills (m ³)	5	15	61

Social Performance	2018	2017	2016
Workplace practices			
Employees	1,883	2,228	2,341
Number of full-time employees	1,810	2,125	2,267
Number of part-time employees	22	24	26
Number of contingent employees	51	79	48
Employees represented by independent trade union organizations ⁽²¹⁾ (%)	50	57	53
Voluntary employee turnover rate ⁽²²⁾ (%)	20.22	10.65	6.71
Diversity			
Women in workforce (%)	20	19	18
Women in senior management (%)	50	26	26
Women on Board of Directors (%)	40	40	33
Health and safety			
Health and safety enforcement actions ⁽²³⁾	—	4	4
Health and safety fines (\$ thousands)	—	—	5.4
Employee & contractor fatalities ✓	—	—	—
Lost time incident (LTI) (absence from work) ⁽²⁴⁾ ✓	1	6	4
Medical aids (MA) (no absence from work) ⁽²⁵⁾ ✓	12	15	20
Total injuries to employees & contractors ✓	13	21	24
Total injury frequency rate (IFR) (employees and contractors)⁽²⁶⁾ ✓	0.54	0.72	0.85
Total incident frequency (TIF) (employees and contractors)⁽²⁷⁾	1.98	3.54	3.29
Community relations			
Community investments (\$ millions) ⁽²⁸⁾	2.4	2.6	2.5

✓ 2018 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.

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 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.
4. Our 2016 energy data was revised in 2017, due to changes in our 2016 diesel combustion at our Centralia facility and 2016 natural gas combustion and diesel combustion at our Sarnia facility. Centralia 2016 diesel combustion was misreported in 2016. Sarnia 2016 energy data was misreported due to IT system-related errors. Sarnia 2016 vehicle diesel usage was applied incorrectly. Diesel usage was for a diesel backup generator and volumes were applied to diesel combustion and not diesel consumption from vehicles.
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.
6. Gross GHG emissions or gross carbon dioxide equivalent (CO₂e) emissions is the sum of carbon dioxide, methane, nitrous oxide and sulfur hexafluoride. Coincidentally the sum of scope 1 and 2 emissions will equate to gross CO₂e emissions or gross GHG emissions. Our 2016 GHG data was revised in 2017, due to changes in our 2016 diesel combustion at our Centralia facility and 2016 natural gas combustion and diesel combustion at our Sarnia facility. Please see Note 3 for revision explanations.
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. Our 2017 nitrous oxide emissions were revised in 2018 to 185,100 tonnes CO₂e (previously reported as 190,900 tonnes CO₂e) as a result of double counting mobile combustion emissions at our Highvale mine. Our Australia 2016 production data was revised in 2017 due to metering issues in 2016. As a result our GHG intensity for 2016 dropped from 0.84 to 0.83 tonnes CO₂e/MWh.
8. Air emissions are reported from TransAlta-operated facilities, following the same approach we use for GHG reporting, which is the application of an Operational Control boundary. 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 2018 we revised our historical TPM emissions to include road dust total particulate matter emissions from our Highvale coal mine in Alberta. Our previous approach was to report on TPM stack emissions only, but as part of our continuous improvement process we have included road dust emissions. As a result, historical TPM volumes and emission intensities were adjusted to include TPM from Highvale mine road dust.
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.
10. Water usage is reported from TransAlta-operated facilities, following the same approach we use for GHG reporting, which is the application of an Operational Control boundary. Total water consumed is measured by total water intake minus water discharge. Water is used primarily for cooling by our thermal power plants. Evaporative losses from the cooling ponds and cooling towers account for 95 per cent of the consumptive loss. The water lost to evaporation is not returned directly to the water body, but the water remains in the hydrologic cycle. Sundance 2015 and 2016 historical water data was revised in 2017 due to misalignment in reporting between corporate and business unit data. Water volumes that are discharged to our cooling pond, adjacent to Wabamum Lake, were being applied as intake volumes. These volumes are discharge volumes and have been reallocated accordingly.
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. Due to a vendor issue at our Hydro business unit, hazardous waste to landfill was estimated in 2018 using the average of hazardous waste to landfill from 2015-2017.
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.
14. Ash disposal: lagoon is fly ash and bottom ash from Keephills coal production, which is treated and then sent to ash lagoons for disposal.
15. Hazardous wastes are substances going for disposal, which - either in the short or the long term - can be harmful to people, plants, animals or the environment.
16. Total land use is mining land use plus land used by plants, offices and equipment.
17. Disturbed land use Highvale mine volumes were reconciled in 2017 to match Alberta regulatory reporting data. Actual disturbed volumes in 2017 were 160 hectares and these volumes were reconciled with 80 hectares to ensure our total land disturbed volumes align. As a result our land reclamation percentage was down one per cent compared with 2016 data.
18. Environmental incidents are violations or non-compliance to regulations or exceedance of limits in company operating approvals that resulted in or had the potential to result in enforcement action.
19. Environmental enforcement actions are violations 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.
20. Spills volumes that require reporting to a regulatory agency or result in low level damage to ecosystem.
21. TransAlta has over 900 unionized workers working primarily at our operations.
22. 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.
23. Health and safety enforcement actions are those resulting in 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.
24. Lost-time injuries (LTIs) are injuries that resulted in the worker being away from work beyond the day of the injury.
25. Medical aids (MAs) are injuries that resulted in medical treatment beyond first aid.
26. The injury frequency rate (IFR) measures work-related medical aid and lost-time injuries per 200,000 hours worked. IFR is calculated using a combination of actual and estimated exposure hours.
27. Total incident frequency (TIF) tracks the total number of injuries (medical aids, lost-time injuries, restricted works and first aids) relative to employee 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, 2018.

- 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)
- 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)
- Total environmental incidents
- Lost-time incident for employees and contractors (LTI) (absence from work)
- Medical aids (MA) for employees and contractors (no absence from work)
- Total injuries to employees and contractors
- Employee and contractor total injury frequency rate (injuries/200,000 hours)
- Employee and contractor fatalities
- Water intake, discharge, consumption (million m³)
- Water intensity (m³/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)
- Land use - disturbed and reclaimed

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, who 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
Calgary, Canada

February 26, 2019