

Sustainability Performance Indicators

Corporate Statistics

Environment, Health and Safety Management Systems	2016	2015	2014
Facilities with ISO 14001 and/or OHSAS 18001-based management systems (percentage) ⁽¹⁾	97	97	98
Management system audits ⁽²⁾	35	23	26

Environmental Performance	2016	2015	2014
Resource or Energy Use⁽³⁾			
Coal combustion (tonnes) ✓	15,735,300	16,222,300	17,851,900
Natural gas combustion (GJ) ✓	62,490,800	63,411,200	58,273,000
Diesel combustion (L) ✓	43,824,800	22,557,000	261,400
Gasoline consumption: vehicle (L) ✓	1,487,200	1,376,300	1,474,100
Diesel consumption: vehicle (L) ✓	40,226,100	43,182,100	40,959,900
Propane consumption: vehicle (L) ✓	78,800	113,600	135,900
Electricity: building operations (MWh) ✓	359,300	220,800	244,800
Natural gas: building operations (GJ) ✓	58,300	58,500	72,400
Propane: building operations (L) ✓	127,500	102,700	63,600
Kerosene: building operations (L) ✓	56,500	60,100	54,800
Total resource or energy use (GJ) ✓	528,353,700	542,362,600	584,070,500
Greenhouse Gas Emissions⁽⁴⁾			
Carbon dioxide (tonnes CO ₂ e) ✓	30,375,900	31,902,700	34,724,400
Methane (tonnes CO ₂ e) ✓	114,200	112,600	119,200
Nitrous oxide (tonnes CO ₂ e) ✓	224,500	212,400	231,200
Sulphur hexafluoride (tonnes CO ₂ e)	20	20	10
Total greenhouse gas emissions (tonnes CO₂e)⁽⁵⁾ ✓	30,714,600	32,227,800	35,074,800
Greenhouse gas emission intensity (tonnes CO ₂ e/MWh) ⁽⁶⁾ ✓	0.84	0.87	0.88
Air Emissions⁽⁷⁾			
Total sulphur dioxide emissions (tonnes) ✓	39,600	41,800	47,600
Sulphur dioxide emission intensity (kg/MWh) ⁽⁸⁾ ✓	1.09	1.13	1.2
Total nitrogen oxide emissions (tonnes) ✓	48,400	48,000	52,900
Nitrogen oxide emission intensity (kg/MWh) ⁽⁸⁾ ✓	1.33	1.30	1.34
Total particulate matter emissions (tonnes) ✓	4,900	4,900	5,200
Particulate matter emission intensity (kg/MWh) ⁽⁸⁾ ✓	0.14	0.13	0.13
Total mercury emissions (kilograms) ✓	130	170	220
Mercury emission intensity (mg/MWh) ⁽⁸⁾ ✓	3.54	4.50	5.66
Water Management⁽⁹⁾			
Water intake (million m ³) ✓	247	272	243
Water discharge (million m ³) ✓	188	198	172
Water consumption (million m ³) ✓	59	74	71
Water intensity (m ³ /MWh) ⁽¹⁰⁾ ✓	2	2	2
Waste Management⁽¹¹⁾			
Non-Hazardous			
Landfill (tonnes) ✓	2,100	2,400	2,500
Landfill (L) ✓	518,400	131,200	42,300
Ash disposal: mine (tonnes) ⁽¹²⁾ ✓	1,315,000	1,346,900	1,636,200
Ash disposal: lagoon (tonnes) ⁽¹³⁾ ✓	527,700	501,600	532,800
Recycled (tonnes) ✓	18,000	151,100	89,000
Recycled (L) ✓	212,100	222,100	157,500
Reuse (tonnes) ✓	700,700	707,800	846,300
Storage (tonnes) ✓	8,300	14,800	33,600

Environmental Performance <i>(continued)</i>	2016	2015	2014
Waste Management <i>(continued)</i>			
Hazardous ⁽¹⁴⁾			
Landfill (tonnes) ✓	40	40	10
Landfill (L) ✓	13,100	3,300	569,100
Recycled (tonnes) ✓	60	80	50
Recycled (L) ✓	17,209,600	536,100	352,400
Land Use and Reclamation ⁽¹⁵⁾			
Land used in mining activities: disturbed (cumulative hectares)	11,800	11,700	11,600
Land used in mining activities: reclaimed (cumulative hectares)	4,600	4,500	4,500
Land reclamation (% of land disturbed) ⁽¹⁶⁾	39	39	39
Land used in mining activities: disturbed minus reclaimed (hectares)	7,200	7,200	7,100
Land used by plants, offices, and equipment (hectares)	3,900	3,900	3,700
Total land use (cumulative hectares)	11,100	11,100	10,900
Environmental Incidents			
Total environmental incidents ⁽¹⁷⁾ ✓	16	12	15
Environmental enforcement actions	0	1	0
Environmental fines (\$ thousands)	0	2	0
Spills ⁽¹⁸⁾			
Volume of significant spills (m ³)	61	19	463
Volume of significant spills recovered (m ³)	47	19	446
% of spills recovered	78	99	96
Social Performance			
Workplace Practices			
Employees	2,341	2,380	2,786
Number of full-time employees	2,267	2,301	2,629
Number of part-time employees	26	26	79
Number of contingent employees	48	53	78
Employees represented by independent trade union organizations (%) ⁽¹⁹⁾	53	54	53
Voluntary employee turnover rate (%) ⁽²⁰⁾	6.71	5.22	6.97
Diversity			
Women in workforce (%)	18	18	19
Women in senior management (%)	26	25	35
Women on Board of Directors (%)	33	30	36
Health and Safety			
Health and safety enforcement actions ⁽²¹⁾	4	0	0
Health and safety fines (\$ thousands)	5	0	0
Employee & contractor fatalities ✓	0	0	0
Lost-time injury (absence from work) ✓	4	5	5
Medical aids (no absence from work) ✓	20	20	17
Total injuries to employees & contractors ✓	24	25	22
Total injury frequency rate (employees and contractors) ⁽²²⁾ ✓	0.85	0.75	0.86
Reportable vehicle incidents	33	28	37
Community Relations			
Community investments (\$ millions) ⁽²³⁾	2.5	3.5	3.6

✓ 2016 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 69 facilities.
- (2) Internal audits conducted against ISO management systems, regulatory frameworks, and against 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 reporting, which is application of an Operational Control boundary.
- (4) Greenhouse gas emissions (GHG) are calculated and reported from TransAlta-operated facilities in line with carbon regulation 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.
- (5) Gross GHG emissions or gross carbon dioxide equivalent (CO₂e) emissions is the sum of carbon dioxide, methane, nitrous oxide, and sulphur hexafluoride. Coincidentally, the sum of scope 1 and 2 emissions will equate to gross CO₂e emissions or gross GHG emissions.
- (6) GHG emission intensity is calculated by dividing total operational emissions by 100 per cent of production (MWh) from operated facilities, irrespective of financial ownership.
- (7) Air emissions are reported from TransAlta-operated facilities, following the same approach we use for GHG reporting, which is application of an Operational Control boundary. Air emissions are expressed in tonnes, except for mercury emissions, which are represented in kilograms. Particulate matter emissions include both PM2.5 and PM10.
- (8) Air emission intensities are calculated by dividing total operational emissions by 100 per cent of production (MWh) from operated facilities, irrespective of financial ownership.
- (9) Water usage is reported from TransAlta-operated facilities, following the same approach we use for GHG reporting, which is 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.
- (10) Water usage intensity is calculated by dividing total operational water consumption (m³) by 100 per cent of production (MWh) from operated facilities, irrespective of financial ownership.
- (11) Non-hazardous waste includes, but is not limited to, water treatment chemicals, coal refuse (including ash-byproducts), metals, paper, cardboard and building materials.
- (12) 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.
- (13) Ash disposal: lagoon is fly ash and bottom ash from Keephills coal production, which is treated and then sent to ash lagoons for disposal.
- (14) 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.
- (15) Total land use is mining land use plus land used by plants, offices, and equipment.
- (16) Disturbed land use and reclaimed volumes were restated in 2016 for 2014-2016, due to an internal reconciliation reporting error.
- (17) All environmental incidents are reported to an external regulatory agency, which may result in a fine, penalty, or corrective action.
- (18) Substances released to the environment include, but are not limited to ash, glycol, diesel, oils, and other chemicals.
- (19) TransAlta has over 1,200 unionized workers working primarily at our operations.
- (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 incidents are those resulting in a regulatory enforcement action. Enforcement actions could take the form of a warning letter, fine, or non-financial reprimand or restriction on operations. In 2016 we had four traffic enforcement actions that resulted in fines of C\$5,000.
- (22) 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. During the course of the year, all work-related safety incidents are investigated. These investigations may provide new information that would result in an incident being reclassified.
- (23) 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

EY responsibilities included providing limited assurance over a selection of performance indicators.

Subject Matter

We have performed limited assurance procedures for the following quantitative performance indicators (“Subject Matter”) for the year ending December 31, 2016.

- 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)
- Gross greenhouse gas emissions and emissions intensity (tonnes CO₂e, tonnes CO₂e/GWh)
- 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 recordable (LTI & MA) injury frequency rate (injuries / 200,000 hours)
- Employee and contractor fatalities

- Energy use: Coal combustion (tonnes)
- Energy use: Natural gas combustion (GJ)
- Energy use: Diesel combustion (L)
- Energy use: Gasoline combustion: vehicle (L)
- Energy use: Diesel combustion: vehicle (L)
- Energy use: Propane combustion: vehicle (L)
- Energy use: Electricity – building operations (MWh)
- Energy use: Natural gas – building operations (GJ)
- Energy use: Propane – building operations (L)
- Energy use: Kerosene – building operations (L)
- 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)

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 (“ISAE”) 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 (“IESBA”).

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

March 2, 2017