

2015 Oregon Material Recovery and Waste Generation Rates Report

By:

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DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.



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This report provides one of the most complete and accurate collections of state-level disposal and recycling data in the country.

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.

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Executive Summary

The materials used by Oregonians create environmental impacts at every stage of their life cycles – from resource extraction and manufacturing to “end-of-life,” when materials enter the waste stream.

Environmental impacts might be reduced at any stage of the cycle, but this report focuses on what happens at end-of-life.

Once in the waste stream, materials are either disposed of or recovered.

- *Disposal* refers to all materials placed in landfills and many materials burned in incinerators.
- *Recovery* refers to materials being re-utilized via recycling, composting, and, in certain cases, burned in incinerators for energy production.
- *Recycling* is the most commonly used form of recovery.
- *Generation* is the sum of disposal and recovery and represents the total volume of the waste stream.
- The *recovery rate* is the percentage of generation recovered.



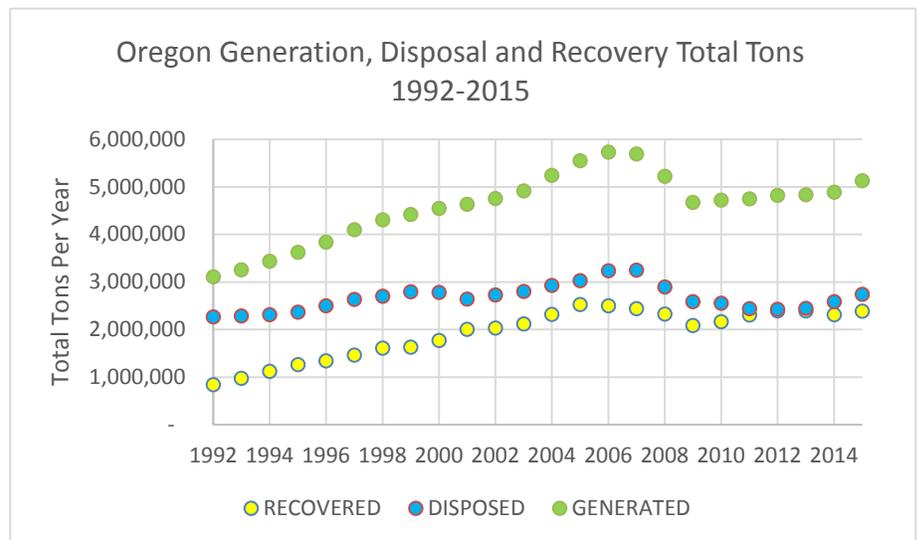
Oregon law has near- and long-term goals for reducing waste generation, and increasing recovery rates.

In 2015, Oregonians:

- Generated 5,122,673 tons of waste, up 4.8 percent from 2014
- Recovered 46.5 percent of the waste generated, before the application of recycling rate credits, an increase of 3.3 percent from 2014.
- Disposed of 2,739,555 tons into landfills and incinerators, up 6.2 percent from 2014.

The calculation of Oregon’s total recovery rate may be affected by 1997 legislation, which allowed for two percent credits for certain recovery-related activities by wastesheds.

When these credits are included, the recovery rate for 2015 was 50.3 percent, down 0.7 percent from the previous year. The survey year of 2015 is the last year recovery rate credits will be allowed by law.



Recovery via recycling and other means has environmental value. Compared to a scenario where economic demand for materials is satisfied through new production, recovery activities:

- Prevented the expenditure of 28 trillion BTUs of energy, equivalent to 2.8 percent of the state’s total energy use.
- Prevented the emission of 2.9 million metric tons of carbon dioxide or equivalents, equivalent to 4.6 percent of all greenhouse gas emissions statewide.

2015 Oregon Material Recovery and Waste Generation Rates Report

With the rise in waste generation and the fall in recovery rates, Oregon in 2015 has moved in directions opposite from its goals. In 2016, Oregonians will be challenged to increase their recovery rate to approach the 2020 goal without the use of recovery rate credits, and to reduce waste generation through actions earlier in the material life cycle.

Introduction and Purpose

This report describes results and methodology for Oregon’s 2015 Material Recovery Survey. “Material recovery” includes materials collected for recycling, for composting, and for materials meeting certain criteria, for energy recovery. Each year, the Oregon Department of Environmental Quality compiles data on municipal post-consumer waste recovery. DEQ sends a survey to all collection service providers and private recycling companies that handle materials for recycling, composting and energy recovery. Survey data is combined with data gathered from quarterly and annual disposal site reporting forms. Together, recovery and disposal numbers make up the amount of waste generated by Oregonians each year.

<p>Total Recovered 2,383,118 tons</p>	<p>= Recovery Rate</p>	
<hr style="width: 50%; margin: 0 auto;"/> <p>Total Generated (Total Recovered + Total Disposed) 5,122,673 tons</p>	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;"> <p>2015 OR Rate 46.5% without credits 50.3% with credits</p> </td> </tr> </table>	<p>2015 OR Rate 46.5% without credits 50.3% with credits</p>
<p>2015 OR Rate 46.5% without credits 50.3% with credits</p>		

DEQ uses this information to estimate energy savings and greenhouse gas reductions, two important environmental benefits from material recovery. DEQ also uses it to calculate material recovery rates and waste generation. The recovery rate is the percentage of the total waste generated in Oregon that is recycled, composted or recovered for energy. Waste generation is the amount of waste recovered plus the amount of waste disposed. Recovery, disposal and generation data, as well as recovery rates, are calculated both for the state and for each of Oregon’s 35 individual wastesheds.

Individual wastesheds also use this information to implement and improve their waste prevention and material recovery programs.

This is the 24th year that DEQ has used the survey to gather this data. The 1991 Oregon Legislature enacted requirements for this annual survey and set goals for state and local recovery rates. These recovery goals were amended by the Legislature in 2001, and then again in 2015 (effective 2016). This report covers the calendar year 2015, and the state goal in place in 2015 was 50 percent recovery of municipal solid waste generation by 2009 (and beyond). Goals for individual wastesheds for 2009 ranged from 10 percent for Lake County (Lake Wasteshed) to 64 percent for the Portland Metro area (Metro Wasteshed). In addition, the 2001 Oregon Legislature established the following waste generation goals for the state:

- For the calendar year 2005 and subsequent years, no annual increase in per-capita municipal solid waste generation; and
- For the calendar year 2009 and subsequent years, no annual increase in total municipal solid waste generation.

Senate Bill 263, passed in 2015, updates the state recovery goals, wasteshed goals, and waste generation goals beginning 2016. The new wasteshed goals now range from 15 percent (Lake Wasteshed) to 64 percent (Metro and Marion Wastesheds), but no longer include the option of two percent recovery credits each for 1) waste prevention programs, 2) reuse programs, and 3) home composting programs. This raises the effective rate needed to reach wasteshed goals by two percent each, or six percent total, for the larger communities that currently implement all three. The new statewide recovery goals are 52 percent recovery by 2020 and 55 percent recovery by 2025. These goals also do not include recovery credits, as they did before. The new waste generation goals are that the generation of solid waste in the years 2025 to 2049 shall be 15 percent below the amount of solid waste generated in 2012, and for 2050 and beyond, the generation goal is 40 percent less than the waste generated in 2012.

Requirement to Report

Oregon law requires that all publicly and privately operated recycling and material recovery operations complete a Material Recovery Survey form. This includes landfills, local recycling collectors, private recycling collection companies and depots, transfer stations, material recovery facilities, composters, local governments and any other operation that handles post-consumer recoverable materials. Because of the difficulty of separating post-consumer scrap metal from commercial and industrial scrap metal, those companies handling scrap metal are not required to report on privately obtained post-consumer scrap metal, but many do report on a voluntary basis.

The survey requires that companies report all recyclable materials they handle, including amount collected, county of origin, the company they received any transfers from, and where the materials were marketed.

Oregon law further requires DEQ to keep confidential the information reported by private recyclers. This includes customer lists and specific amounts and types of materials collected or marketed by individual companies. Only aggregated information may be released to the public.

Materials Included in the Analysis

Oregon's analysis of the environmental benefits from material recovery and the recovery rates includes only post-consumer materials generated in Oregon for recycling, composting or energy recovery. Waste from manufacturing and industrial processes (pre-consumer materials), reconditioned and reused materials, inert materials such as brick and concrete, and waste originating out of state (but handled in Oregon) are excluded. Some scrap metals, including discarded vehicles or parts of vehicles and metal derived from major demolition activities handled by scrap metal dealers, are also excluded. Scrap metal collected at disposal sites by collection service providers, at community recycling depots or through municipally sponsored collections events counts as recovered material.

The first Material Recovery Survey for the 1992 calendar year included 30 types of materials. Since then, some new materials have been added and other materials consolidated, so that the survey now contains 33 materials. The major materials for 2015 are:

- Cardboard
- Paper Fiber – Other paper fiber (combined high-grade paper, newsprint and mixed scrap paper) not including cardboard.
- Plastic – Rigid plastic containers, plastic film, other plastics and composite plastic (including carpet pad).
- Glass – Container glass and other glass such as windowpanes and ceramics.
- Electronics
- Metals – Tinned cans, aluminum and other scrap metals
- Wood Waste
- Yard Debris
- Food Waste – Residential and commercial food waste
- Other – Tires, used motor oil, antifreeze, used carpeting, batteries of all types, gypsum, asphalt roofing materials, textiles, paint, household hazardous waste/solvents, and animal waste.

Energy Savings and Greenhouse Gas Reduction

DEQ uses information from the Material Recovery Survey to estimate energy savings resulting from recycling and counting energy recovery, as well as reductions in greenhouse gases associated with recycling, composting and counting energy recovery.

Energy

When recycled materials replace virgin feedstock in manufacturing, energy savings are significant. Making aluminum from old beverage containers uses 93 percent less energy than making aluminum from bauxite. Newsprint made from old newspapers requires 46 percent less energy than making newsprint from wood. While the energy conservation benefits of recycling have long been recognized, quantifying these estimates can be difficult. The U.S. Environmental Protection Agency developed a [waste reduction model](#) to estimate the amount of per-ton energy savings for recycling for a wide variety of materials.^[1]

For 2015, DEQ applied the estimates from EPA's model to tons recycled and counting tons recovered for energy (composting is not included.) Material categories from Oregon's survey do not perfectly align with the material categories in EPA's model, so some assumptions were made in classifying materials. Additionally, EPA's model is based on national averages, which may not be representative of Oregon's recycling and energy recovery markets. Regardless, the use of EPA's model allows for a rough estimate of the energy saved from materials recycled and recovered for energy by Oregonians. Energy recovery includes the conversion of certain wastes to energy via processes such as thermal conversion to electricity, direct combustion for heat, and pyrolysis of waste plastics into synthetic fuels. DEQ estimates that recycling by Oregon households and businesses in 2015 (counting only wastes generated in Oregon, not those generated elsewhere and shipped to Oregon for recycling) led to energy savings of approximately 24.5 trillion British thermal units. The energy produced by energy recovery saved an estimated additional 3.3 trillion BTUs.

To put the energy savings number into context, based on U.S. energy information statistics, total energy use in Oregon across all sectors (transportation, electricity, heating, industry) in 2014 was 249 million BTUs per-capita. If per-capita use remained constant through 2015, then the energy savings from recycling and counting energy recovery equates to a 2.8 percent offset of total energy use. This can also be expressed as equivalent to approximately 222 million gallons of gasoline saved in 2015. These comparisons are not perfect. Many of Oregon's recyclable materials are exported to other states or countries, so the energy conservation benefits occur elsewhere. The actual energy saved by recycling includes a mix of not only gasoline and other liquid fossil fuels, but also coal, hydroelectric, nuclear and wood. Nonetheless, the energy savings from recycling and, to a lesser extent, energy recovery in Oregon, are significant.

Greenhouse Gases

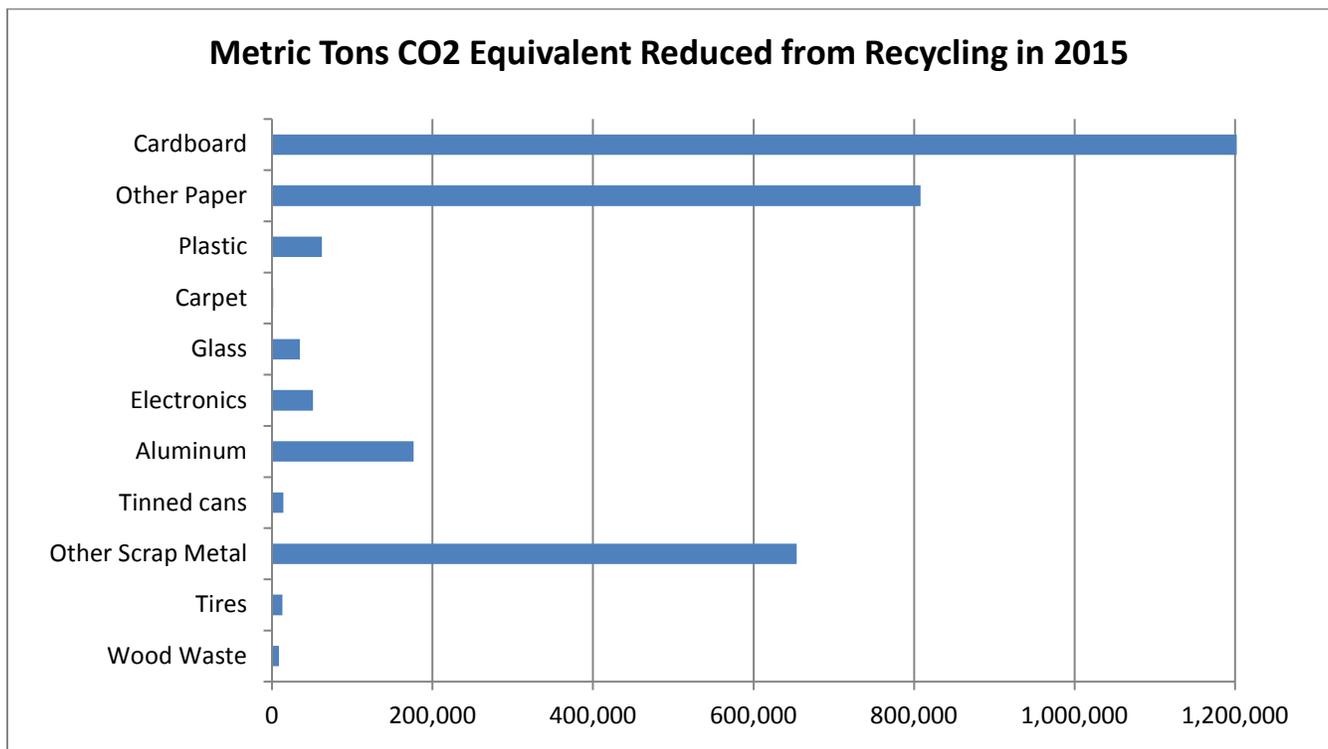
EPA also publishes greenhouse gas emission factors allowing for estimation of greenhouse gas benefits due to recycling, composting and counting energy recovery. The greenhouse gas benefits include a variety of emissions, carbon sinks and emission offsets, which vary by material, management method and the disposal site if the materials were not recovered. Major categories of sinks and offsets include increased carbon storage in forests

^[1] The methodology for obtaining these estimates has changed several times since 2005. Comparisons should not be made between the results for 2014 and previous years.

when recycled paper displaces wood fiber, reductions in fossil fuel use due to the energy savings of recycling, and reductions in methane emissions at landfills.

Net greenhouse gas reductions associated with materials recycled, composted and burned for energy in 2015 are estimated at 2.9 million metric tons of carbon dioxide equivalents. This includes only materials that are counted in the Material Recovery Survey and excludes any materials generated in other states and shipped to Oregon for handling. An interesting effect of using EPA’s published emission factors and Oregon landfill data for comparison is that composting yard debris is shown to add, rather than reduce, greenhouse gas emissions. This is a small amount, and other benefits of composting outweigh this shortfall. Further, EPA’s emission factors for yard debris composting vs. landfilling are believed to contain significant uncertainty, and are the topic of considerable discussion and research.

Net greenhouse gas emissions for Oregon in 2015 (based on an average of 2012 to 2014 per-capita emissions and applying that average to Oregon’s 2015 population), using the state’s “in-boundary” emissions inventory, are projected at 61.5 million metric tons of carbon dioxide equivalents. Thus, recycling, composting and counting energy recovery provide a greenhouse gas offset or “credit” corresponding to approximately 4.8 percent of net statewide emissions (from all sources). Most of the benefit is a result of recycling activities, as opposed to composting or energy recovery. In fact, composting and energy recovery, in total, are believed to slightly increase overall emissions of greenhouse gases.



Comparing recovery-related greenhouse gas reductions (2.9 million metric tons) with statewide emissions (61.5 million metric tons) is potentially misleading because the emission reductions from materials recycled and composted in 2015 occur over multiple years, while the estimated emissions of 61.5 million metric tons are “same-year” (2015) emissions. The reductions from recycling and composting are spread over multiple years because they include avoided methane emissions from slow decay in landfills, as well as an increase in long-term carbon sequestration in forests and agricultural soils treated with compost. However, just as some of the greenhouse gas benefit from recycling and composting in 2015 will actually occur in subsequent years, some of the greenhouse gas reduction counted for previous years actually occurred in 2015.

Another way to look at the greenhouse gas reductions is to express emission reductions in terms of average cars. Using data from the EPA, Oregon Department of Transportation and Oregon Department of Energy, DEQ estimates that 2.9 million metric tons of carbon dioxide equivalents is comparable to the greenhouse gas benefit of eliminating tailpipe emissions from approximately 670,000 “average” passenger cars (out of the state’s stock of approximately 3.4 million registered passenger vehicles). As with energy savings, the greenhouse gas benefit of recycling is significant. Not generating waste in the first place likely produces even greater greenhouse gas and energy benefits, but these benefits are not estimated here.

Recovery Rates

The recovery rate is the percentage of total waste generation that is recovered. DEQ calculates both the statewide recovery rate and a recovery rate for each of the 35 individual wastesheds in the state. We present these recovery rates both with and without recovery credits that are allowed by law, but that expired after 2015. Individual wasteshed recovery rates include credits wastesheds claim for certain waste prevention, reuse and home composting programs that would otherwise not be counted. Part of those credits, which amounts to nearly four percent and is explained below, is also factored into the state recovery rate.

2015 Statewide Recovery Rate

In 2015, the state recovered 2,383,118 tons of material. This represented 46.5 percent of the municipal post-consumer waste stream. Including credits for home composting programs and for reuse programs (see below) increased the recovery rate to 50.3 percent, meeting the statewide goal of 50 percent recovery. Recovered tons increased 3.3 percent from the previous year surveyed, 2014.

From 1992 through 2005, tons of material recovered increased regularly each year. From 2006 through 2009, recovered tons declined even though recovery rates were fairly flat, as declining consumption of newspapers and magazines, followed by a general decline in consumption from the recession reduced the amount of material available to be recovered. Recovered tons decreased in 2014, and increased again in 2015; while the recovery rate continues to drop since its peak in 2012.

A total of 2,739,555 tons of municipal post-consumer waste from Oregon were disposed in 2015, up 6.1 percent from 2014. This is still well below the peak disposal tonnage in 2007. Per-capita disposal increased 4.8 percent to 1,365 pounds per person. This is 9.8 percent lower than the 1992 figure of 1,513 pounds per person.

Total tons disposed added to total tons recovered equaled 5,122,673 tons of total waste generated in 2015 (see Waste Generation). Total generation rose by 4.8 percent, with per-capita generation increasing by 3.5 percent from 2014 levels.

Waste recovery increased (+75,849 tons) while disposal increased at over double the rate (+158,622 tons), resulting in the increase in generation (+234,471 tons). Waste generation was 607,206 tons less in 2015 than it was at its peak in 2006. This is a drop of nearly 12 percent in waste generation between 2006 and 2015, or more than 21 percent if measured on a per-capita basis.

Oregon State Recovered Tons and Recovery Rates

Year	Tons Recovered	Tons Disposed	Calculated Rate	Total Rate*
1992	839,679	2,263,099	27.1	-
1993	974,685	2,280,513	29.9	-
1994	1,118,912	2,312,669	32.6	-
1995	1,257,204	2,362,146	34.7	-
1996	1,338,259	2,497,170	34.9	-
1997	1,462,114	2,633,017	35.7	-
1998	1,604,985	2,695,903	37.3	-
1999	1,626,271	2,788,699	36.8	-
2000	1,765,817	2,778,463	38.9	-
2001	1,999,085	2,635,072	43.1	46.8
2002	2,029,261	2,723,365	42.7	46.3
2003	2,116,880	2,796,787	43.1	46.8
2004	2,317,064 ¹	2,923,462	44.2	48.0
2005	2,523,367 ¹	3,026,457	45.5	49.2
2006	2,494,050 ¹	3,235,828	43.5	47.3
2007	2,437,569 ¹	3,248,126	42.9	46.6
2008	2,326,146 ¹	2,890,503	44.6	48.2
2009	2,082,631 ¹	2,586,721	44.6	48.3
2010	2,163,957 ¹	2,523,808	46.2	49.9
2011	2,306,124 ¹	2,437,767	48.6	52.3
2012	2,391,490 ¹	2,424,833	49.7	53.4
2013	2,391,714 ¹	2,437,700	49.5	53.3
2014	2,308,105 ¹	2,580,933 ¹	47.2	51.0
2015	2,383,118	2,739,555	46.5	50.3

* These rates are including the addition of credit allowances enacted by the 2001 Legislature.

¹ These tonnage figures are corrected from earlier published values.

How DEQ Calculates the Statewide Recovery Rate

DEQ combines information about quantities of material collected from privately-operated recycling and material recovery facilities with recovery information from collection service providers and disposal site collections. This determines the total weight of material recovered.

Next, it adds the total weight of material recovered to the total weight of material disposed, obtained from disposal site reports. This sum is the total weight of material generated. The total weight of material recovered is divided by the total weight generated. This results in the calculated recovery rate.

In 2001, the Oregon Legislature changed the method of calculating the total recovery rate for the state to include part of the two percent reuse and residential composting credits (but not waste prevention credits) earned by wastesheds. This statutory change requires a more complex series of calculations¹ to determine that part of the wasteshed credit amounts that are added to the calculated state recovery rate to obtain the total statewide recovery rate. Note that in 2015, the Oregon Legislature eliminated these credits from being included in the statewide and wasteshed recovery rates. This change takes effect in 2016, reflected in the 2016 report to be completed in 2017.

How DEQ Calculates Individual Wasteshed Recovery Rates

The total weight of material recovered is allocated to the wasteshed of origin. Direct collectors of materials are the primary and best information source for the collected materials' wasteshed of origin. When information from direct collectors is not available, or when a survey respondent does not know the wasteshed of origin for the collected materials, the markets' and end users' estimates are the secondary method used to allocate material back to wastesheds. Material is allocated back to wastesheds based on population in rare cases when survey respondents and market information is insufficient.

DEQ also allocates the total weight of material disposed to the wasteshed of origin. For each wasteshed, total weight of material disposed is added to total weight of materials recovered to ascertain the amount of waste generated in the wasteshed. The total weight of material recovered is divided by the total weight generated to determine the calculated recovery rate for each wasteshed.

Since 1997, individual wastesheds have been allowed to claim recovery credits for waste prevention, reuse and residential composting. Each wasteshed must apply for credits as part of its annual Opportunity to Recycle Report submitted to DEQ. DEQ reviews credit applications to determine whether credits qualify under statutory criteria. A wasteshed may claim up to three two percent recovery rate credits, one credit each for reuse, waste prevention and residential composting programs. These credits are added to the calculated recovery rate to obtain the total

¹ The statewide total recovery rate is derived by first estimating what is called “adjusted recovery” for each wasteshed. The calculation of adjusted recovery involves calculating the tonnage that would be recovered if the two percent credits earned for reuse and residential composting were included in each wasteshed’s calculated recovery rate, holding disposal tonnage as a constant. For wastesheds where no two percent credits were obtained, adjusted recovery is equal to calculated recovery. For wastesheds with recovery credits, adjusted recovery is higher than calculated recovery because adjusted recovery includes the tonnage attributed to reuse and residential backyard composting.

To obtain the statewide total recovery rate, the adjusted recoveries for all wastesheds are summed together to equal a statewide adjusted recovery amount. This is then added to the actual statewide disposal tonnage to get a new estimate of waste generation (adjusted generation). The statewide total recovery rate is then calculated by dividing the adjusted recovery by the adjusted generation.

recovery rate (for example, 40 percent calculated recovery rate + four percent credits = 44 percent total recovery rate)². DEQ uses the total recovery rate to determine whether a watershed is achieving its recovery goal.

Nineteen Watersheds Receiving Recovery Credits in 2015							
Baker	2%	Jackson	6%	Marion	6%	Tillamook	4%
Benton	6%	Josephine	6%	Metro	6%	Union	6%
Deschutes	6%	Lane	6%	Morrow	2%	Wasco	6%
Douglas	4%	Lincoln	2%	Polk	2%	Yamhill	4%
Hood River	6%	Linn	6%	Sherman	6%		

Marion County Adjustment

As home to the state’s only municipal waste-to-energy incinerator, Marion County’s recovery and disposal tonnages are revised each year to include certain wastes burned for energy as recovered, as directed by the 2001 Legislature. For 2015, the five materials that could be counted toward the recovery rate when burned for energy were wood, yard debris, used motor oil, fuels and plastics. In 2015, 12,624 tons of these materials burned for energy in the county’s incinerator were counted as recovered instead of disposed. DEQ obtained this tonnage by multiplying the quantity of non-industrial, in-county, counting solid waste processed at the facility by the percentage that those five materials make up of Marion County's municipal solid waste disposal stream³. Marion County also recovered 9,261 tons of scrap metal from the incinerator ash. DEQ subtracted the scrap metal tonnage from the Marion County disposed tons so that the same tons would not be counted as being both disposed and recycled.

Watershed Recovery Rates

Oregon has 35 individual watersheds, each with its own recovery rate and goal. Eleven watersheds increased their recovery rates in 2015, and rates in 23 watersheds remained above their 2009 recovery rate goals.

The Survey Report Tables listed on page 19 of this report show 2015 recovery rates for each watershed (Table 1), tons of materials recovered in 2015 by watershed (Table 2), and tons of solid waste disposed by watershed in 2015 (Table 3).

For a historical look at recovery, disposal and generation data in Oregon, see Survey Report Tables 4, 5, 6 and 7, which provide the recovery rates, recovered material tons, disposal tons, and tons of solid waste generated each year since the Material Recovery Survey began in 1992.

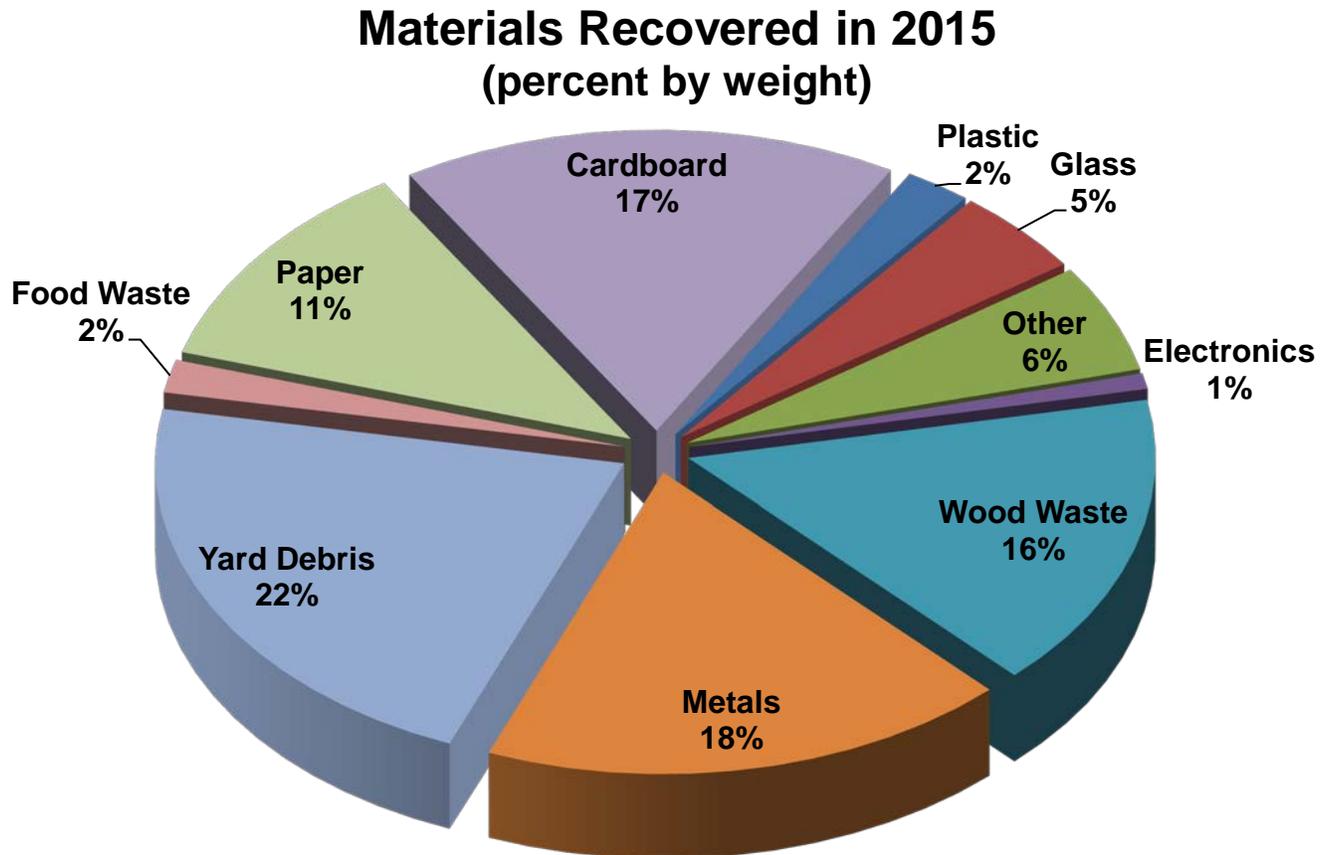
² Recovery rate credits for individual watersheds are handled differently in determining the statewide recovery rate. (See Footnote 4.)

³ The percentages are from the 2009-10 Marion County waste composition study.

Materials Recovered

Oregon’s material recovery rate for 2015 includes materials that were recycled, composted (including yard debris, food waste and some wood waste), and burned for energy (including tires, fuels, oil-based paint, used oil, wood waste and some yard debris). Sixty-one percent of the material recovered was recycled, 21 percent was composted and 18 percent was burned for energy.

The chart below shows major categories of materials recovered in 2015 and the percentage of total recovery (by weight) for each category. Specific materials included in these categories are listed on page 7.



The following describes changes in amounts of materials recovered in 2015 as compared to 2014:

Metals. The total amount of recovered metals decreased by four percent in 2015, following a 12 percent decrease the previous year. This may be due to scrap metal prices continuing to drop in 2015.

Paper (including cardboard). In 2015, paper fibers increased by four percent in recovered tons from 2014, after having decreased by one percent the previous year.

Plastic. Total plastics recycling decreased by more than 11 percent in 2015 as compared to 2014. The bulk of the decrease was in “rigid plastic containers.”

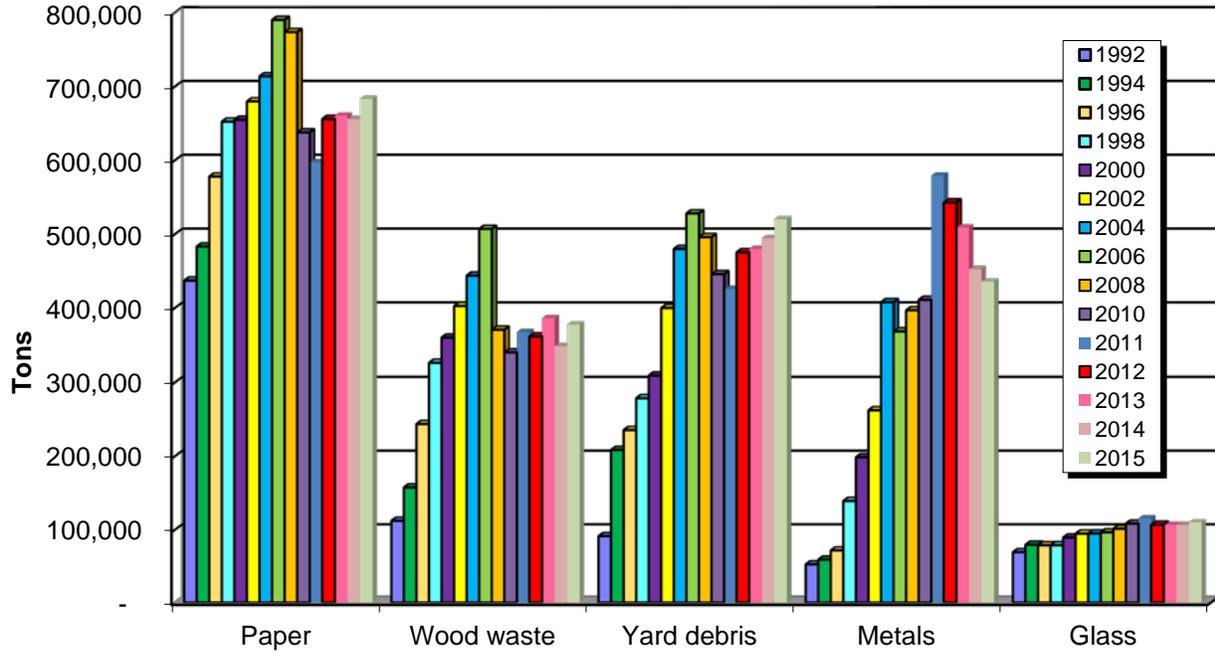
Glass. Glass increased a little more than three percent in 2015 as compared to 2014.

Electronics. Electronics recovery showed a decrease of nearly 11 percent in 2015 as compared to 2014.

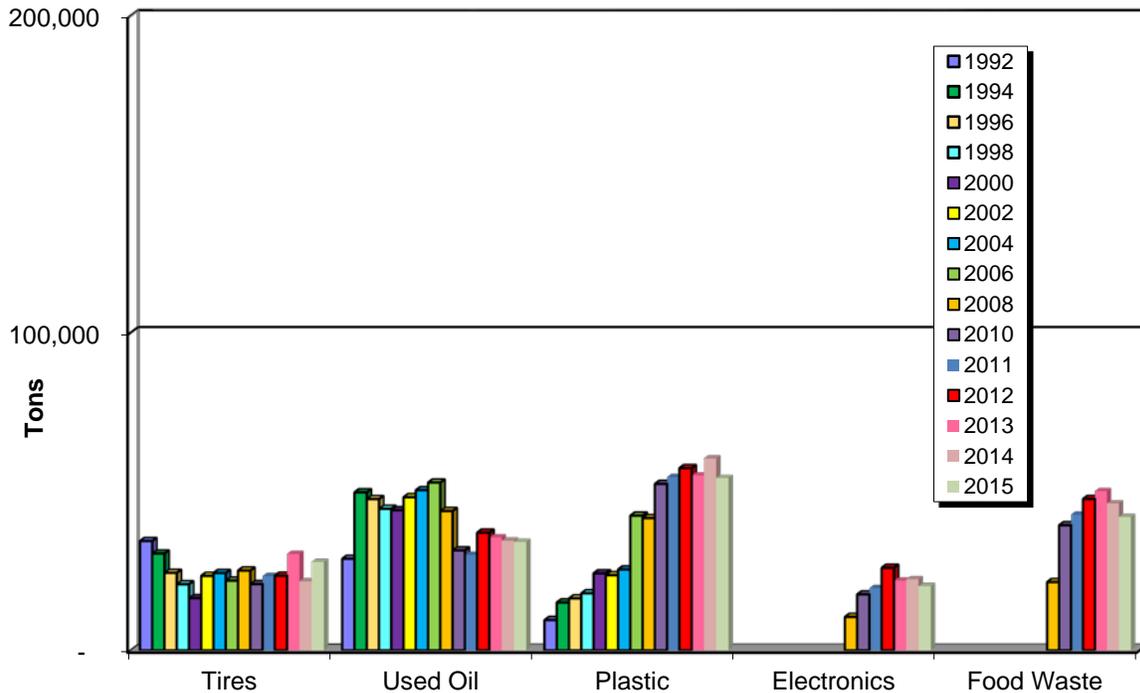
Organics. Total recovery of organics (which includes wood waste, yard debris, food waste and animal waste/grease) increased by more than five percent in 2015; even with a ten percent decrease in food waste recovery.

The following charts compare the materials recovered by year over the past 23 years.

**Materials Recovered in Oregon
1992 - 2015**



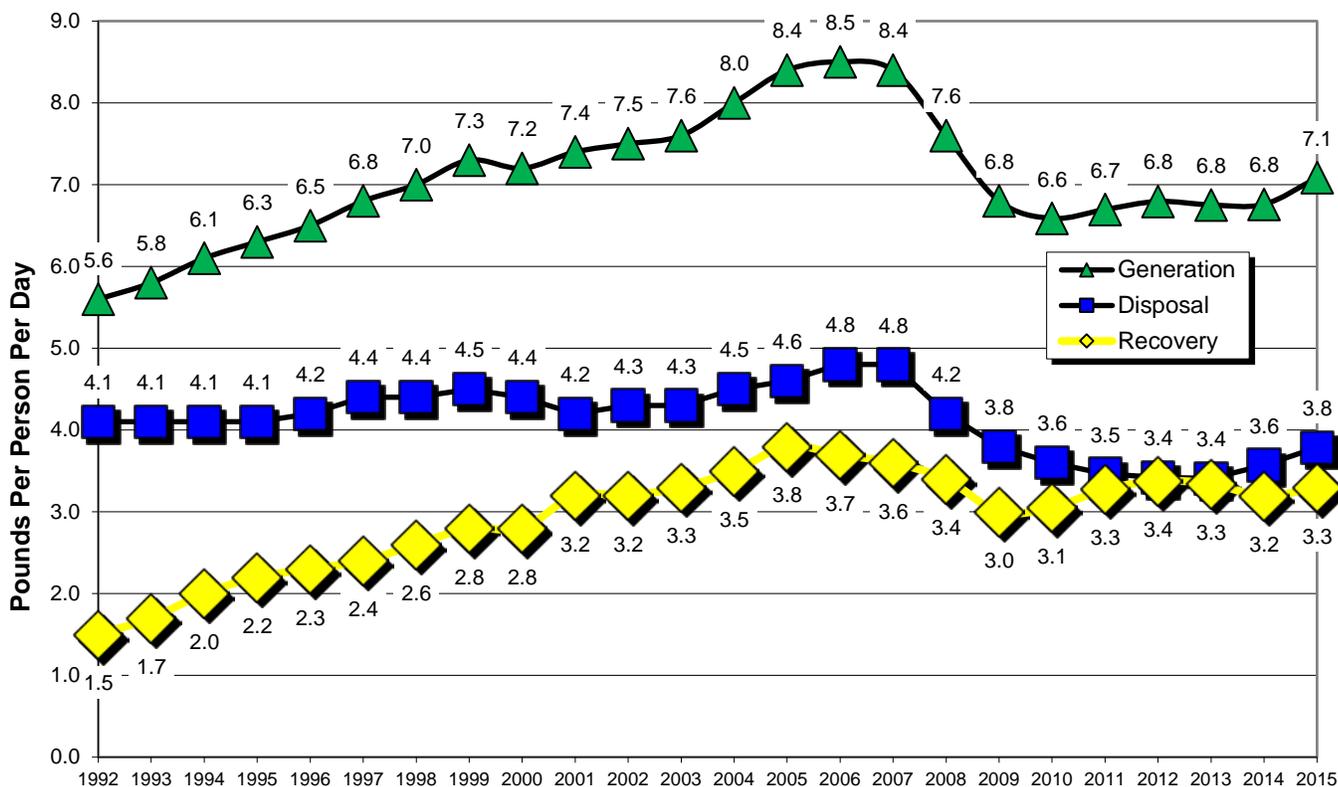
**Materials Recovered in Oregon
1992 - 2015**



Waste Generation

Changes in the total amount of municipal solid waste generated (materials recovered plus waste disposed) in Oregon over time tell an interesting story. From 1992 to 2006, total waste generation increased every year, often steeply. Waste generation then declined slightly in 2007 and sharply in both 2008 and 2009, coinciding with the economic recession. Between 2009 and 2014, waste generation started growing again, but at a very slow pace, averaging less than one percent increase per year. But in 2015 Oregon generated 5,122,673 tons of municipal solid waste, an increase of nearly five percent over 2014. This equates to per-capita generation of 2,553 pounds per person (7.1 pounds per day), a 3.4 percent increase from 2,467 pounds per person (6.8 pounds per day) in 2014. In 2015, the state missed both its goals for no increase in per-capita and total waste generation. Still, total waste generation in 2015 was well below (607,206 tons less) its peak in 2006. This is a drop of 10.6 percent in total waste generation between 2006 and 2015, or nearly an 18 percent drop in the per-capita amount.

**Oregon Generation, Disposal and Recovery Per Capita
1992 - 2015**



Generation is a crude measure of consumption, and for many materials, the environmental impacts of production (the corollary of consumption) are many times higher than the impacts of disposal. For example, EPA has estimated that roughly 40 percent of the country’s greenhouse gas emissions are associated with the production and transportation of goods. The leveling off of waste generation in 2006, the sharp decline in 2007 through 2009, and lack of restoration to pre-recession levels since then suggests that some of the changes in waste generation that occurred during the last recession may be long-lasting, and that the reduction in use of materials is not temporary. Reduction in materials use would, in turn, likely result in a reduction of greenhouse gas emissions associated with all stages of the life cycle of materials. Many other adverse environmental impacts associated with materials likely also decreased.

The following table shows the disposition of the municipal solid waste generated in Oregon in 2015. See Table 9 for individual wasteshed dispositions.

Disposition of Waste Generated in Oregon in 2015	
Disposition	Percent by weight
Disposed*	53.5
Recycled	28.2
Composted	9.7
Recovered for Energy*	8.6

*For the Marion County’s waste-to-energy facility only the portion of waste that counts toward the county’s and state’s recovery rates is included here in “recovered for energy” (see Marion County Adjustments on page 13). Other wastes burned at the facility are counted here as disposed.

Conclusion

The energy savings and greenhouse gas reductions from materials recovered for recycling, composting and energy recovery in 2015 were significant. Energy savings were comparable to 222 million gallons of gasoline or roughly 2.7 percent of Oregon's total 2015 energy use. Reductions in greenhouse gas emissions were estimated at 2.9 million metric tons of CO₂ equivalents or 4.8 percent of net statewide emissions from all sources in 2015. Recycling produced most of these benefits.

Reducing the generation of waste in the first place can achieve even greater greenhouse gas and energy benefits than material recovery. Reduction in waste generation likely indicates a reduction in production and use of materials, and a corresponding reduction in emissions associated with all stages of a material's life cycle.

Oregon recovered 2,383,118 tons of material for recycling, composting and energy recovery, achieving a 50.3 percent recovery rate including credits (46.5 percent without credits) in 2015. This is the fifth straight year Oregon met its 50 percent recovery goal.

A total of 2,739,555 tons of municipal post-consumer waste from Oregon was disposed in 2015, up 6.1 percent from 2014. Per-capita disposal also increased, but is still lower than it was in 1992 by 9.8 percent.

Total tons disposed added to total tons recovered equaled 5,122,673 tons of total waste generated in Oregon in 2015. Total generation increased by nearly five percent, while per-capita generation increased by 3.5 percent; missing the state goals of no increase in total generation and no increase in per-capita generation. Still, the amount of waste generated in 2015 was more than 607,000 tons or almost 12 percent less than the waste generated in the peak year of 2006.

Adjustments to Reports from Previous Years

DEQ continues to review and use survey data even after publishing the final report each year. Occasionally, we encounter and correct errors in previously reported results. Thus, tonnages published in this report for previous years may not match the tonnages originally reported for that year.

DEQ made the following adjustments for the 2015 report:

- A correction to recovered tonnage of wood waste in two wastesheds was made to survey years 2014 and 2013, as some tonnage was determined to be pre-consumer material.
- Adjustments were made to 2014 and 2013 animal waste/grease collection amounts, as well as correctly identifying wastesheds of origin, based on revised reporting by an end-user.
- Disposal tonnage was reported for the wrong wasteshed. This adjustment increased disposal tonnage for 2014 for one wasteshed; which changed the wasteshed rate of the two wastesheds involved. This did not affect the state's recovery rate.

DEQ corrected data in previous years, for the following reasons:

- An error in reporting was discovered by one of the recycling processors; a large amount of newspaper was double counted in the previously published 2004 results. The paper was counted both at the processing facility and at the paper mill.
- An enforcement action carried out by Metro showed that most of the brick reported as being recycled by one facility was falsely reported. DEQ subsequently decided that brick more closely resembled other inert materials such as cement and asphalt. Since these are not counted toward the recovery rate, brick was removed from all previous recovery tonnages.
- New information showed that corrections needed to be made to tonnages for roofing and non-container glass in 2003 and 2004, as well as other minor adjustments in other categories.
- Field visits showed that some plastic for 2005 had been reported as 'Plastic Other' and that this material was actually 'Rigid Plastic Containers.' The 2005 numbers have been adjusted for this change, along with a few other minor adjustments.
- Field visits and continued investigation showed that previously reported 'Wood Waste' collections for 2006 were actually collected in three years – 2004, 2005 and 2006. These years are now correct.
- The 2006 and 2007 plastics numbers were adjusted between grades of "Rigid Plastic Containers," "Plastic Other," and "Plastic Film." This may have led to small changes in the recovered tonnages for these materials.
- Investigation of disposal numbers at two landfills led to deductions in the amount of SW disposed – these were really Industrial Waste, non-counting for the purposes of this survey.
- Some changes were made in 2006 and 2007 to disposition of materials. Changes were made to composted, burned for energy recovery and disposed amounts.
- Adjustments were made to the 2007 collection amounts, correctly identifying the wasteshed of origin.
- For 2006 and 2007, some non-counting slaughterhouse material was deleted from the recovered tonnage.
- Sawdust material from manufacturing was deleted for 2006 and 2007.
- Beginning with 2006, material previously identified as "CD – Construction and Demolition" was separated out into individual materials.
- Textiles previously counted were determined to be re-used, which does not count for recovery. 2006, 2007, 2010 and 2011 recovered tonnage was decreased.

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- Some gypsum sent for disposal was included in the 2006 and 2007 tonnage – this was removed.
- Bottle bill materials, container glass and aluminum had better reporting for 2009, and DEQ made some adjustments to those materials for 2008.
- Municipal solid wastes from another landfill were determined to be industrial and were deleted from the 2007 and 2008 counting tonnages.
- Minor disposal adjustments were made to two wastesheds for 2006 data with incorrectly reported county of origin.
- Yard debris numbers contained a large double counting for the Metro region – the correction caused a decrease in recovered tons
- Some roofing material was deleted - it was determined to be industrial material
- Added in disposal tonnages for 2009 and 2010 for material sent out of state for disposal.
- Corrected the disposition methods for food waste and yard debris in 2011.
- Fixed the disposal tonnages originally recorded for the incorrect wasteshed in 2011.
- An error in food waste reporting discovered by DEQ showed a large amount of food waste was double counted in the 2011 and 2012 reports. The food waste was counted both by the composting facility and by the recycling collectors.
- More accurate reporting identified corrections needed in tonnages for used oil, antifreeze, solvents and used oil filters in 2011 and 2012.
- Adjustments were made to 2013 and 2012 collection amounts, as well as correctly identifying wastesheds of origin.
- Municipal solid waste from one landfill was reported incorrectly as out-of-state waste, this adjustment increased the “counting” disposal tonnage for 2013. This in turn adjusted the state recovery rate from 54 percent for 2013 to 53.4 percent.

2015 Survey Report Tables

Links to the data tables one through nine used for this report.

[Table 1: Wasteshed Recovery Rates, 2015](#)

[Table 2: Amount Recovered in 2015 by Wasteshed](#)

[Table 3: Solid Waste Disposed in 2015 by Wasteshed](#)

[Table 4: Oregon Calculated Recovery Rates by Wasteshed, 1992-2015](#)

[Table 5: Oregon Amount Recovered by Wasteshed, 1992-2015](#)

[Table 6: Oregon Solid Waste Disposed by Wasteshed, 1992-2015](#)

[Table 7: Oregon Solid Waste Generated by Wasteshed, 1992-2015](#)

[Table 8: Oregon Materials Recovered, 1992-2015](#)

[Table 9: Disposition of Recovered Materials, 2015](#)