# Technical Appendix - Japan:

*Methods for estimating community-scale sectoral data from national and regional statistics for the purpose greenhouse gas accounting and climate action planning*

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## Building and Stationary Energy Sector

This document details the calculation approaches and data sources for producing community-level activity data and emission factors for the buildings and stationary energy sector. This sector contains the following subsectors:

| **Stationary Energy Sector** | |
|---|---|
| Residential | Estimated |
| Commercial | Estimated |
| Municipal | Not Currently Estimated |
| Industry | Not Currently Estimated |
| Agriculture, forestry and fisheries | Not Currently Estimated |
| Fugitive emissions | Not Currently Estimated |

# Residential Buildings

## Subsector Summary

The residential buildings subsector encompasses all GHG emitting activities from energy use in households[1] including heating, cooking, and lighting. The two primary categories of GHG emitting activities within the subsector are: scope 1) emissions from fuel combustion associated with residential buildings within the community boundary and scope 2) emissions from consumption of grid-supplied electricity (which may be generated outside the community boundary).

### Inclusions:

For Japan. based on data availability and country-specific relevance, estimates for the following activity data points are produced:

- **Natural gas** and **liquefied petroleum gas** used by households, based on annual fuel consumption by residential customers at national level.
- **Grid-supplied electricity** used by households, based on annual electricity consumed by residential customers at the national level.

### Exclusions:

Due to lack of data availability and country-specific relevance, estimates for the following activity data points are not produced:

- **Off-highway motor gasoline** consumption, e.g. for use in lawn and gardening equipment
- **District heating, cooling,** or other non-electricity grid-supplied energy

## Activity Data Coverage

The specific data points and energy sources covered by the methodology are outlined in the table below.

| **Fuels/Energy Source** | **GHGDP Definition** | Units | Scope |
|---|---|---|---|
| Liquefied Petroleum Gas (LPG) | All LPG consumption within community boundary for a single year for all households. | MJ | Scope 1 |
| Natural Gas | All Natural Gas consumption within community boundary for a single year for all households. | MJ | Scope 1 |
| Grid Electricity | All Electricity consumption within community boundary for a single year for all households. | MJ | Scope 2 |

# Calculations Methodologies

## Scope 1: Liquid Petroleum Gas

### *Methodology Notes*

Residential building LPG consumption is taken from Japan's Total Energy Statistics 2016 data. This initial input data is then allocated to communities based on the **number of households (by type)** in the municipality relative to state totals. Total count of households by prefecture and total households by municipality are sourced from the 2015 Census.

The following equation is utilized to estimate household LPG gas consumption.

*Equation 1: Community LPG consumption*

$$Community\ scale\ Household\ Consumption = Aggregate\ Fuel\ Sales_{\ Prefecture} \times \left(\frac{No.\ of\ Households_{Community}}{No.\ of\ Households_{Prefecture}}\right)$$

### *Equation Data Elements*

| Data element | Description | Source | Units |
|---|---|---|---|
| $Community\ scale\ Household\ Consumption$ | All LPG consumption within community boundary for a single year for all households. | Equation 1 | MJ |
| $Aggregate\ Fuel\ Sales_{\ Prefecture}$ | Amount of fuel distributed to residential customers within entire prefecture | Total Energy Statistics 2016 | MJ |
| $\left(\frac{No.\ of\ Households_{Community}}{No.\ of\ Households_{Prefecture}}\right)$ | Ratio representing the households within community over the number of households in the prefecture | Census 2015 | households |

*Methodology Assumptions*

- All households within a prefecture use the same quantity of LPG
- Energy Statistics totals are assumed to encompass all residential LPG consumption at a national level.

## Scope 1: Natural Gas

### *Methodology Notes*

Residential building NG consumption is taken from Japan's Energy Statistics 2016 data.
The below equation was used to estimate the final consumption value. This initial input data is then allocated to communities based on the **number of households** in the municipality relative to state totals. Total count of households by prefecture and total households by municipality are sourced from the 2015 Census.

The following equation is utilized to estimate household natural gas consumption.

*Equation 2: Household NG Consumption*

$$Community\ scale\ Household\ Consumption = Aggregate\ Fuel\ Sales_{Prefecture} \times \left(\frac{No.\ of\ Households_{Community}}{No.\ of\ Households_{Prefecture}}\right)$$

***Equation Data Elements***

| Data element | Description | Source | Units |
|---|---|---|---|
| $Community\ scale\ Household\ Consumption$ | All NG consumption within community boundary for a single year for all households. | Equation 2 | MJ |
| $Aggregate\ Fuel\ Sales_{Prefecture}$ | Amount of fuel distributed to residential customers within entire prefecture | Total Energy Statistics 2016 | MJ |
| $\left(\frac{No.\ of\ Households_{Community}}{No.\ of\ Households_{Prefecture}}\right)$ | Ratio representing the households within community over the number of households in the prefecture | Census 2015 | households |

*Methodology Assumptions*

- All households within a prefecture use the same quantity of NG
- Energy Statistics totals are assumed to encompass all NG national residential consumption.

## Scope 2: Electricity

### *Methodology Notes*

Residential building electricity consumption is taken from Japan's Energy Statistics 2016 data. This initial input data is allocated to communities based on the **number of households** in the municipality relative to state totals. Total count of households by prefecture and total households by municipality are sourced from the 2015 Census.

The following equation is utilized to estimate household electricity consumption.

*Equation 3: Community Electricity Consumption*

$$\begin{aligned} &Community\ scale\ household\ Consumption \\ &\quad = Aggregate\ Electricity\ Consumption_{Prefecture} \\ &\quad \times \left(\frac{No.\ of\ Households_{Community}}{No.\ of\ Households_{Prefecture}}\right) \end{aligned}$$

### *Equation Data Elements*

| Data element | Description | Source | Units |
|---|---|---|---|
| $Community\ scale\ Household\ Consumption$ | All electricity consumption within community boundary for a single year for all households. | Equation 3 | MJ |
| $Aggregate\ Electricity\ Consumption_{Prefecture}$ | Amount of electricity distributed to residential customers within entire prefecture | Total Energy Statistics 2016 | MJ |
| $\left(\frac{No.\ of\ Households_{Community}}{No.\ of\ Households_{Prefecture}}\right)$ | Ratio representing the households within community over the number of households in the prefecture | Census 2015 | households |

### *Methodology Assumptions*

- All households within a prefecture use the same quantity of electricity
- Energy Statistics totals are assumed to encompass all electricity national residential consumption.

## Emission Factors

The following table provides IPCC 2006 emission factor values for the list of fuels used in the buildings and stationary sector methodology for Japan.

| Fuel type | Carbon Dioxide (CO2) kg/GJ | Methane (CH4) kg/GJ | Nitrous Oxide (N2O) kg/GJ | Heating Value Mass GJ/ton | Heating Value Liquid Volume GJ/liter | Heating Value Gaseous Volume GJ/m3 |
|---|---|---|---|---|---|---|
| **Fossil** | | | | | | |
| Natural Gas | 56.1 | 0.005 | 0.0001 | | | 0.0336 |
| Kerosene | 71.9 | 0.01 | 0.0006 | | 0.035 | |
| Liquified Petroleum Gas (LPG) | 63.1 | 0.005 | 0.0001 | 47.3 | 0.0255 | 0.0336 |

***Emission Factor Data Elements***



## References

Census 2015. System of Social and Demographic Statistics of Japan, Ministry of Internal Affairs and Communications.

https://www.e-stat.go.jp/en/stat-search/files?page=1&layout=datalist&toukei=00200502&tstat=000001130275&cycle=0&year=20190&month=0&tclass1=000001130276

*Provides Total Population by Municipalities in Japan for the year 2015*

Total Energy Statistics 2016, Agency for Natural Resources and Energy Secretariat General Affairs Division Strategic Planning Office.

https://www.e-stat.go.jp/stat-search/files?page=1&layout=datalist&toukei=00551010&kikan=00551&tstat=000001024835&cycle=7&year=20070&month=0&tclass1=000001024837&stat_infid=000002488430&result_back=1

*Energy Balance Table by Sector by Prefecture for the year 2016*

# Commercial Buildings

## Subsector Summary

The commercial buildings subsector encompasses all GHG emitting activities from energy use in commercial buildings, including heating, cooling, and lighting. The two primary categories of GHG emitting activities within the subsector are: scope 1 emissions from fuel combustion associated with commercial buildings within the community boundary and scope 2 emissions from consumption of grid-supplied electricity.

### Inclusions:

For Japan, based on data availability and occurrence in-country, estimates for the following activity data points are produced:

- **Natural gas** and **liquefied petroleum gas** used by commercial buildings, based on annual fuel consumption by customers at national level.
- **Grid-supplied electricity** used by commercial businesses, based on annual electricity consumed by commercial customers at the national level.

### Exclusions:

Due to lack of data availability or occurrence in-country, estimates for the following activity data points are not produced:

- **Off-highway motor gasoline** consumption, e.g. for use in landscaping equipment
- **District heating, cooling,** or other non-electricity grid-supplied energy

### *Activity Data Coverage*

| **Fuels/Energy Source** | **GHGDP Definition** | **Corresponding contextual Data** | **Scope** |
|---|---|---|---|
| Natural Gas | Natural gas consumption within community boundary for a single year for all commercial buildings | MJ | Scope 1 |
| Liquid Petroleum Gas (LPG) | LPG Consumption within community boundary for a single year for all commercial buildings | MJ | Scope 1 |
| Grid Electricity | Electricity consumption within community boundary for a single year for all commercial buildings | MJ | Scope 2 |

## Calculation Methodologies:

### Scope 1: Natural Gas (NG)

*Methodology Notes*

Commercial building NG consumption is taken from Japan's Energy Statistics 2016 data. This initial input data is allocated to communities based on the **proportion of employees** in the community relative to the prefecture totals. Total counts of employees, by community, are sourced from the Census 2015 data.

The following equation is utilized to estimate commercial sector natural gas consumption.

*Equation 4: Community NG Consumption*

$$Community\ scale\ Commercial\ \ Consumption = Aggregate\ Fuel\ Sales_{Prefecture} \times \left(\frac{Sector\ Employees_{Community}}{Sector\ Employees_{Prefecture}}\right)$$

***Equation Data Elements***

| Data element | Description | Source | Units |
|---|---|---|---|
| $Community\ scale\ Commercial\ Natural\ Gas\ Consumption$ | Natural gas consumption within community boundary for a single year for all commercial buildings | Equation 4 | MJ |
| $Aggregate\ Fuel\ Sales_{Prefecture}$ | Amount of fuel distributed to commercial customers within entire prefecture | Total Energy Statistics 2016 | MJ |
| $\left(\frac{Sector\ Employees_{Community}}{Sector\ Employees_{Prefecture}}\right)$ | Calculated ratio representing the estimated number of commercial sector employees within the community over the estimated prefecture total | Census 2015 | employees |

*Methodology Assumptions*

- Number of commercial sector employees is proportionally related to the size of a commercial facility which is in turn proportionally related to the amount of NG consumed.
- Energy Statistics totals are assumed to encompass all NG national commercial consumption.
- All natural gas sold to commercial customers is consumed within the year it is delivered

## Scope 1: Liquid Petroleum Gas (LPG)

### *Methodology Notes*

Commercial building LPG consumption is taken from Japan's Energy Statistics 2016 data. This initial input data is allocated to communities based on the **proportion of employees** in the community relative to the prefecture totals. Total counts of employees, by community, are sourced from the Census 2015 data.

The following equation is utilized to estimate commercial sector liquid petroleum gas consumption.

*Equation 5: Community LPG Consumption*

$$Community\ scale\ Commercial\ Consumption = Aggregate\ Fuel\ \ Sales_{Prefecture} \times \left(\frac{Sector\ Employees_{Community}}{Sector\ Employees_{Prefecture}}\right)$$

### *Equation Data Elements*

| Data element | Description | Source | Units |
|---|---|---|---|
| $Community\ scale\ Commercial\ Consumption$ | LPG consumption within community boundary for a single year for all commercial buildings | Equation 5 | MJ |
| $Aggregate\ Fuel\ \ Sales_{Prefecture}$ | Amount of LPG fuel distributed to commercial customers within entire prefecture | Total Energy Statistics 2016 | MJ |

| | | | |
|---|---|---|---|
| $\left(\frac{Sector\ Employees_{Community}}{Sector\ Employees_{Prefecture}}\right)$ | Calculated ratio representing the estimated number of commercial sector employees within the community over the estimated prefecture total | Census 2015 | employees |

*Methodology Assumptions*

- Number of commercial sector employees is proportionally related to the size of a commercial facility which is in turn proportionally related to the amount of LPG consumed.
- Energy Statistics totals are assumed to encompass all LPG national commercial consumption.
- All LPG sold to commercial customers is consumed within the year it is delivered

## Scope 2: Electricity

### *Methodology Notes*

Commercial building electricity consumption is taken from Japan's Energy Statistics data for the year 2016. This initial input data is allocated to communities based on the **proportion of employees** in the community relative to the prefecture totals. Total count of employees in each community to estimate the building electricity consumption by each community.

The following equation is utilized to estimate commercial sector electricity consumption.

*Equation 6: Community Electricity Consumption*

$$Community\ scale\ Commercial\ Consumption = Aggregate\ Electricity\ Sales_{Prefecture} \times \left(\frac{Sector\ Employees_{Community}}{Sector\ Employees_{Prefecture}}\right)$$

### *Equation Data Elements*

| Data element | Description | Source | Units |
|---|---|---|---|
| $Community\ scale\ Commercial\ Consumption$ | Electricity consumption within community boundary for a single year for all commercial buildings | Equation 6 | MJ |
| $Aggregate\ Electricity\ Sales_{Prefecture}$ | Amount of fuel distributed to commercial customers within entire prefecture | Total Energy Statistics 2016 | MJ |

| | | | |
|---|---|---|---|
| $\left(\frac{Sector\ Employees_{Community}}{Sector\ Employees_{Prefecture}}\right)$ | Calculated ratio representing the estimated number of commercial sector employees within the community over the estimated prefecture total | Census 2015 | employees |

*Methodology Assumptions*

- Number of commercial sector employees is proportionally related to the size of a commercial facility which is in turn proportionally related to the amount of NG consumed.
- Energy Statistics totals are assumed to encompass all electricity national commercial consumption.
- All electricity sold to commercial customers is consumed within the year it is delivered

## Emission Factors

The following table provides IPCC 2006 emission factor values for the list of fuels used in the buildings and stationary sector methodology for Japan.

***Emission Factor Data Elements***

| Fuel type | Carbon Dioxide (CO2) kg/GJ | Methane (CH4) kg/GJ | Nitrous Oxide (N2O) kg/GJ | Heating Value Mass GJ/ton | Heating Value Liquid Volume GJ/liter | Heating Value Gaseous Volume GJ/m3 |
|---|---|---|---|---|---|---|
| **Fossil** | | | | | | |
| Natural Gas | 56.1 | 0.005 | 0.0001 | | | 0.0336 |
| Distillate Fuel Oil | 74.1 | 0.01 | 0.0006 | | 0.0361 | |
| Liquified Petroleum Gas (LPG) | 63.1 | 0.005 | 0.0001 | 47.3 | 0.0255 | 0.0336 |

## References

Census 2015. System of Social and Demographic Statistics of Japan, Ministry of Internal Affairs and Communications.

https://www.e-stat.go.jp/en/stat-search/files?page=1&layout=datalist&toukei=00200502&tstat=000001130275&cycle=0&year=20190&month=0&tclass1=000001130276

*Provides Total Population by Municipalities in Japan for the year 2015*

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https://www.e-stat.go.jp/stat-search/files?page=1&layout=datalist&toukei=00551010&kikan=00551&tstat=000001024835&cycle=7&year=20070&month=0&tclass1=000001024837&stat_infid=000002488430&result_back=1

*Energy Balance Table by Sector by Prefecture for the year 2016*

# Appendix
## Waste Sector

| Waste Sector | |
|---|---|
| Solid waste | Estimated |
| Biological waste | Not Currently Estimated |
| Incinerated and burned waste | Not Currently Estimated |
| Wastewater | Not Currently Estimated |

# Solid Waste

## Subsector Overview

This section covers the activity data and emission factors needed for communities in Mexico to estimate emissions from the disposal of municipal solid waste (MSW). While other gases are also emitted through the collecting, sorting, and transporting of solid waste to treatment facilities—namely biogenic carbon dioxide, non-methane volatile organic compounds, and nitrous oxide—this methodology focuses on estimating values related to MSW treated at landfill facilities or open dumps only. If desired, communities may consult international resources such as the IPCC guidelines for national reporting or local guidance documents, if available, to estimate non-methane GHG emissions from solid waste disposal. Hence, emissions under this sub-sector are influenced by the following five factors:

1) The mass of community-generated waste disposed in landfills or open dumps;
2) The methane generation potential
3) The methane correction factors; influenced by waste composition
4) The oxidation factors
5) The amount of methane recovered (for facilities with existing technology to do so).

Methane ($CH_4$) is the main gas emitted during the MSW treatment processes. The following section discusses methods for estimating the mass of waste, methane correction factor, oxidation factor and methane recovery fraction—where applicable—at a community level. All of these variables impact the final total of methane emissions reported in Japan.

### Inclusions

For Japan, based on available data, this methodology provides estimates on:

- Community-specific **mass of waste landfilled at managed landfill facilities**
- **Methane Correction Factor** based on historical landfill management characteristics such as managed, unmanaged deep, unmanaged shallow, and uncategorized landfills.
- **Methane Generation Potential ($L_0$)** based on degradable organic carbon, landfill management type and fraction of methane in landfill gas nationally.
- **Oxidation Factors (OX)** based on waste disposal management practice.

### Exclusions

Due to the unavailability of data, the methods exclude:

- Community-specific **mass of industrial, sludge, clinical, and fossil liquid waste.**
- **Landfill methane recovery fraction** at landfill facilities with recovery systems in place.

- The combustion, or flaring, of landfill gas for non-energy purposes[2]
- The combustion of solid waste for non-energy purposes[3]

## Activity Data Coverage

**Table 1: Activity data, units, and scope covered under solid waste disposal**

| Activity Data | Definition | Units | Gas Reported | Emissions Scope |
|---|---|---|---|---|
| Mass of Waste | The mass of waste generated within a community boundary but diverted to an external landfill or open dump for disposal | Tonnes | CH4 | Scope 3 |

## Calculations methodologies

### Activity Data – Mass of Waste (Sanitary Landfills)

Municipal solid waste data at a province level is obtained from Ministry of Environment for the year 2017. The community population from the Census data is obtained for the year 2015. The community-specific mass of waste is calculated as per the following equation.

Equation 1

$$Landfilled\ Waste_{Community} = Landfilled\ Waste_{Prefecture} \times \left(Community\ Population / Prefecture\ Population\right)$$

| Data Element | Definition | Units | Data Source |
|---|---|---|---|
| $Landfilled\ Waste_{Community}$ | Mass of community -generated organic waste going to landfills | Tonnes | Equation 1 |

[2] While the flaring of landfill gas is typically reported under the waste sector, to burning of landfill gas for energy purposes is reported under the stationary energy sector

[3] Similar to above, the burning of waste for non-energy purposes falls under the waste sector, whereas any waste burned for energy (e.g. heat or electricity generation) falls under the stationary energy sector

| | | | |
|---|---|---|---|
| $Landfilled\ Waste_{Prefecture}$ | Mass of state - generated organic waste going to landfills | Tonnes | Ministry of Environment, Japan |
| $Community\ Population$ | Total number of residents living within community boundary | People | Japan Census 2015 |
| $Prefecture\ Population$ | Total number of persons living in the Prefecture | People | Japan Census 2015 |

### Methane Correction Factor (MCF)

Since $CH_4$ generation rates are dependent on landfill management practices, this methodology uses the IPCC (2006) default landfill management types to determine an appropriate community-specific methane correction factor. IPCC (2006) assigns a unitless MCF value of 1 for managed landfills.

### Methane Generation Potential ($L_0$)

Methane generation potential ($L_0$) is itself a combination of several components: The Methane Correction Factor (MCF); Degradable Organic Carbon (DOC), weighted by waste stream type (discussed below); the fraction of waste degraded anaerobically ($DOC_f$); the fraction of landfill gas that is methane (F); and the methane to carbon ratio. In the absence of facility-specific data, each of these values is derived from IPCC 2006 list of default values. This methodology calculates the methane generation potential of landfilled waste in Japan using equation below:

Equation 2

$$L_0 = MCF * DOC * DOC_F * F * {}^{16}/_{12}$$

**Table 3: Data elements and sources**

| Data Element | Definition | Units | Data Source |
|---|---|---|---|
| MCF | Methane Correction Factor (based on management type) – part of the landfilled | Unitless | IPCC (2006) |

| | | | |
|---|---|---|---|
| | materials that is left to degrade anaerobically. | | |
| DOC | Degradable organic carbon – the portion of the waste stream that can decompose under aerobic conditions | Tonnes C/tonne waste | IPCC (2006) |
| $DOC_F$ | The fraction of DOC ultimately degraded anaerobically | Unitless | IPCC (2006) |
| F | The fraction of methane in landfill gas | Unitless | IPCC (2006) |
| 16/12 | Methane to carbon ratio | Unitless | IPCC (2006) |

### Degradable Organic Carbon (DOC)

Degradable Organic Carbon represents the amount of organic carbon in the waste that can be degraded. The final DOC value is calculated using the fraction of the total mass of the waste and multiplying it with the DOC fractions.

**Equation 3**

$$DOC = (0.15 * A) + (0.2 * B) + (0.4 * C) + (0.43 * D) + (0.24 * E) + (0.15 * F)$$

**Table 4: Data elements and sources**

| Metric | Definition |
|---|---|
| A | Mass of food waste |
| *B* | Mass of garden and plant debris |
| C | Mass of paper |
| D | Mass of wood |
| E | Mass of textiles |
| F | Mass of Industrial waste |

**Table 5: IPCC Defaults for East Asia**

| ***IPCC Defaults*** | Food waste | Paper/cardboard | Wood | Textiles | Rubber/leather | Plastic | Metal | Glass | Other |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ***Waste Fractions*** | 26.2 | 18.8 | 3.5 | 3.5 | 1.0 | 14.3 | 2.7 | 3.1 | 7.4 |
| ***DOC*** | 15 | 40 | 43 | 24 | - | - | - | - | - |

### Emission Factors

Under this method the solid waste disposal emission factor (EF) is a combination of two factors, the methane generation potential ($L_0$) and the oxidation factor (OX). In the absence of data on facility-specific emission factors, this methodology relies on the default factor for OX derived from IPCC (2006).

**Equation 4**

$$EF = L_o * (1 - OX)$$

**Table 6: Data elements and sources**

| Data Element | Definition | Units | Data Source |
|---|---|---|---|
| $L_O$ | Methane Generation Potential – the amount of methane generated per tonne of waste | Tonnes $CH_4$/tonne waste | Equation 2 |
| OX | Oxidation factor (Methane Oxidized in top layer) | Unitless | IPCC (2006) |

## General Assumptions & Limitations

### Mass of Waste

- Mass of waste generated, measured as the amount of waste disposed in managed landfills in Japan is proportionally related to population
- The estimated waste numbers are accounted for in scope 3 since there is no data to estimate scope 1 emissions

### Emission Factors

- The IPCC (2006) *IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5: Waste, Chapter 3: Solid Waste Disposal* provides national waste composition estimates for East Asia. In the absence of national or community-specific datasets on industrial, clinical, sludge, and fossil liquid waste this methodology is unable to determine a community-specific DOC estimate for these waste streams.

### Methane Correction Factor

- Landfill sites assumed to fall under managed anaerobic IPCC landfill characteristic are assigned an MCF of 1.0

### Methane Recovery

- Ministry of Environment does not provide information for methane recovered therefore methane recovery is not reported.

## Citations

Census 2015. System of Social and Demographic Statistics of Japan, Ministry of Internal Affairs and Communications.

https://www.e-stat.go.jp/en/stat-search/files?page=1&layout=datalist&toukei=00200502&tstat=000001130275&cycle=0&year=20190&month=0&tclass1=000001130276

*Provides Total Population by Municipalities in Japan for the year 2015*

IPCC (2006). IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5: Waste, Chapter 3: Solid Waste Disposal, The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, H.S. Eggleston, L. Buendia, K. Miwa, T. Ngara, and K. Tanabe (eds.). Hayama, Kanagawa, Japan.

http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf

*Provides default values for the fraction of degradable organic content present in waste stream.*

IPCC (2006). IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5: Waste, Chapter 2: Waste Generation, Composition and Management Data, The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, Riitta Pipatti (Finland), Chhemendra Sharma (India), Masato Yamada (Japan)

https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf

*Provides default values for the different waste fractions for East Asia*