

Guidance on Cradle to Cradle Certified Energy Template

Supplement to guide Renewable Energy and
Carbon Management aspects of the Cradle to
Cradle Certified Product Standard Version 3.0

Cradle to Cradle Products Innovation Institute

Instructions	Energy Inventory 	Alternate Energy Inventory 	Energy Strategy 	Nuclear Factors 	CO2 Emission Factors 	
Ready					Sum = 0	

The Energy Template for the C2C Certified Standard is divided into several worksheets:

1. The **Energy Inventory** is the primary worksheet, and should be used to report use of conventional and renewable electricity, as well as reporting of on-site emissions.
2. The **Alternative Energy Inventory** is OPTIONAL, and should be done only as an alternative to the Energy Inventory. The Alternative Energy Inventory quantifies all energy in terms of carbon impacts (including purchased electricity). Using the Alternative Energy Inventory, the entire requirement for the use of renewable electricity and management of carbon emissions may be managed by use of Carbon Offsets. **Only complete this sheet if the manufacturer chose to purchase carbon offsets to compensate purchased electricity consumption rather than Renewable Energy Certificates, or direct sourcing of renewable electricity.**
3. The **Energy Strategy** should be completed when applying for the Bronze Level of certification or higher. A separate document may be submitted to more completely outline an energy strategy
4. The **Nuclear Factors** pertain only to the 'Alternative Energy Strategy', for calculating emissions associated with purchased electricity, where nuclear energy is part of the grid mix.
5. The **CO2 Emissions Factors** are automatically incorporated into both Energy Inventory worksheets. A selection of common emissions factors have been collected from the World Resources Institute to facilitate emissions calculations.

Energy Inventory – Facility Information and Inventory Summary

Cradle to Cradle Certified(CM) Basic level and above

Energy Data Worksheet: Using On-site renewables, RECs, and Off-sets

Cradle to Cradle Certified(CM) Products Program

Fill in these tables when onsite renewables, Green power pricing, and/or Renewable Energy Certificates (RECs) are being used to cover purchased electricity, and/or offsets and/or renewable on-site generation is being used to cover other emissions. Note that RECs apply only to purchased electricity and do not count toward direct emissions reductions.

Facility Information

Manufacturing Facility Name: Sample Apparel Manufacturing Corp.
Address: 555 Sample St, Sampletown, San Francisco, CA 90108
Date range of data: 1 January 2013 through 31 December 2013

1

	Goal	Actual
Renewable energy goal (%):	50%	32.43%
Emissions offset goal (%):	50%	50.15%

2

3

Emissions
Offsets/Renewables

1. Please include the **name** and **location** of the facility relevant to the Energy Inventory, as well as the **date range** of the provided data
2. The **Goal** is the target level of use of renewable electricity, and offset of on-site emissions. Please fill this in with the goal relevant to the desired level of certification:
 - Silver – 5% renewable electricity and 5% emissions offset
 - Gold – 50% renewable electricity and 50% emissions offset
 - Platinum - 100% renewable electricity and 100% emissions offset
3. The **Actual** column provides a current estimate of your renewable electricity and emissions offset level, based on information entered in the worksheet. These values should meet or exceed the given goals, in order to attain the desired level of certification.

Energy Inventory – Table 1: Purchased electricity, onsite renewable electricity, and RECs

Table 1a: Annual purchased and onsite renewable electricity (including conventional and renewable electricity purchased through the utility, and renewable electricity produced on site)						
energy type	% of source considered renewable	total quantity of electricity use [annual use]	UNIT (please use kWh)	% allocated to product final manufacture ¹	final production electricity (kWh)	% renewable electricity in product, by source
Conventional purchased electricity - grid	0%	100000	kWh	20%	20000	0%
Green power purchased through utility	100%	6000	kWh	20%	1200	5%
Onsite renewable electricity ³	100%	5000	kWh	20%	1000	5% onsite wind turbine.
Total electricity use:		111000	kWh		22200	10%
Table 1b: Annual purchase of Renewable Energy Certificates (RECs)						
Purchased RECs	5000	kWh	100%	5000	100%	23% Green-e verified RECs purchased from SolarCorp, Intl. (See certificates)
						Total % product relevant renewable electricity: 32%

Three general **energy types** are provided, including :

1. **Conventional purchased electricity** – Include only electricity which is purchased from an outside provider, that is not specifically sold as ‘green energy’
2. **Green electricity purchased through utility** – Count here any electricity that is sold through the utility as a renewable electricity product (note ‘green gas’ should not be counted here).
3. **Onsite renewable electricity** – Any eligible renewable electricity produced on-site that is not produced through combustion (e.g. solar, wind, geothermal, hydro)
4. **Purchased RECs** – Include Renewable Energy Credits that are purchased separately from the actual electricity, as claims to renewable electricity use (includes RECs and Guarantees of Origin)

Energy Inventory – Table 1: Purchased electricity, onsite renewable electricity, and RECs

Table 1a: Annual purchased and onsite renewable electricity use, including conventional and renewable electricity purchased through the utility, and renewable electricity produced on site)						
1 energy type	2 % of source considered renewable	3 total quantity of electricity use (annual use)	4 UNIT (please use kWh)	5 % allocated to product final manufacture ¹	final production electricity (kWh)	% renewable electricity in product, by source
Conventional purchased electricity - grid	0%	100000	kWh	20%	20000	0% See provided EnergyCorp, Inc annual energy summary
Green power purchased through utility	100%	6000	kWh	20%	1200	5% Purchase of green electricity through EnergyCorp Inc. GreenPower plan (see utility statement provided)
Onsite renewable electricity ²	100%	5000	kWh	20%	1000	5% 2500 kWh comes from onsite PV array, and 2500 kWh is from an onsite wind turbine.
Total electricity use:		111000	kWh		22200	10%
Table 1b: Annual purchase of Renewable Energy Certificates (RECs)						
Purchased RECs	5000	kWh	100%	5000	100%	23% Green-e verified RECs purchased from SolarCorp, Intl. (See certificates)
						Total % product relevant renewable electricity: 32%

1. Start first by reporting the total use of electricity in each category on an **annual facility level** basis.
2. The **percent of source considered renewable** for conventional purchased electricity may reflect renewable electricity in the utility mix ONLY if the applicant may claim that renewable electricity without it being double-counted elsewhere in the system. Specifically, if the utility offers multiple electricity products, the reported percent renewable must pertain to the electricity product the applicant purchases, rather than the average percent renewable electricity in the utility's mix.
3. All electricity use quantities should be converted and reported in kilowatt hours.
4. Next, report an **allocation** of the total facility electricity to the product(s) under assessment. Generally, the allocation will be equal across all sources. In cases where renewable electricity is disproportionately allocated to the manufacture of a product, care must be taken to ensure that this electricity is not claimed towards other products manufactured at the facility.
5. **Always provide comments** to indicate the sources of information provided.

Energy Inventory – Table 2: Emissions from on-site combustion

Table 2: Annual GHG emissions - Direct onsite emissions from stationary combustion and other sources

source/fuel (fossil; non-biomass waste-to-energy; non-renewable; other GHG discharges)	total quantity	UNIT (select)	emission factor (tCO2e/[unit of fuel or mass of direct emission]) ⁴	emissions (tCO2e)	% allocated to product final manufacture	product final manufacture emissions (tCO2e)	comment (Please include comment regarding: allocation assumptions, fuel use data sources, other on-site emissions assumptions, and list any provided documentation.)
natural gas	3000	mcf	5.34E-02	160.3	10%	16.03	See provided EnergyCorp, In energy statement
liquefied petroleum distillates (LPG) including propane	0	liter	1.61E-03				
motor gasoline	200	gallon	8.63E-03	1.7	10%	0.17	
diesel	0	gallon	1.02E-02				
[list all other sources]							
plastic production waste	50	metric tons	3.14E+00		10%	15.70	Em. Factor derived from Climate Registry 2013 default factor for plastics at http://www.theclimateregistry.org/downloads/2013/01/2013-Climate-Registry-Default-Emissions-Factors.pdf
CH4 emissions from water treatment pond	0.12	metric tons	7.20E+01	8.6	10%	0.86	
			Direct on-site emissions (fossil; non-renewable):	327.7	10%	32.8	
source/fuel (renewable; biomass)	total quantity	UNIT (select)	emission factor (tCO2e/unit of fuel)	emissions (tCO2e)	% allocated to product final manufacture	product final manufacture emissions (tCO2e)	comment (Please include comment regarding: allocation assumptions, fuel use data sources, other on-site emissions assumptions, and list any provided documentation.)
biomass: wood	5000	kg	1.78E-03	8.9	5%	0.44	See company fuel use summary
[list all other sources]							
			Direct on-site emissions (renewable; biomass):	8.9	5%	0.44	

1. Several common **conventional fuel sources** are provided. These are fixed, but the quantity may be adjusted to zero if these fuels are not relevant. Emissions are automatically calculated for the listed fuel types.
2. Several rows are provided for additional fuel types and other sources of GHG Emissions. For non-combustible sources, provide the estimated output of the source, and use a Global Warming Potential factor in place of emissions factor. Cite the source of source estimates and conversion factors in the comments.
3. **Renewable fuels that are combusted on-site** are listed separately. If these sources are considered eligible renewable fuels, they must still be counted, but the resulting emissions will be exempt from the final emissions offset requirement. Only fuels that can be shown to have a net zero, or net positive emissions benefit may be considered eligible renewable fuels. See the Green-E national standard for a thorough definition of eligible renewable fuel sources.

Energy Inventory – Table 2: Emissions from on-site combustion

Table 2: Annual GHG emissions - Direct onsite emissions from stationary sources	1	2	3	4	5		
source/fuel (fossil; non-biomass waste-to-energy; non-renewable; other GHG discharges)	total quantity	UNIT (select)	emission factor (tCO2e/[unit of fuel or mass of direct emission]) ⁴	emissions (tCO2e)	% allocated to product final manufacture	product final manufacture emissions (tCO2e)	comment (Please include comment regarding: allocation assumptions, fuel use data sources, other on-site emissions assumptions, and list any provided documentation.)
natural gas	3000	mcf	5.34E-02	160.3	10%	16.03	See provided EnergyCorp, In energy statement
liquefied petroleum distillates (LPG) including propane	0	liter	1.61E-03				
motor gasoline	200	gallon	8.63E-03	1.7	10%	0.17	
diesel	0	gallon	1.02E-02				
[list all other sources]							
plastic production waste	50	metric tons	3.14E+00		10%	15.70	Em. Factor derived from Climate Registry 2013 default factor for plastics at http://www.theclimateregistry.org/downloads/2013/01/2013-Climate-Registry-Default-Emissions-Factors.pdf
CH4 emissions from water treatment pond	0.12	metric tons	7.20E+01	8.6	10%	0.86	
				157.0			
			Direct on-site emissions (fossil; non-renewable):	327.7	10%	32.8	
source/fuel (renewable; biomass)	total quantity	UNIT (select)	emission factor (tCO2e/unit of fuel)	emissions (tCO2e)	% allocated to product final manufacture	product final manufacture emissions (tCO2e)	comment (Please include comment regarding: allocation assumptions, fuel use data sources, other on-site emissions assumptions, and list any provided documentation.)
biomass: wood	5000	kg	1.78E-03	8.9	5%	0.44	See company fuel use summary
[list all other sources]							
			Direct on-site emissions (renewable; biomass):	8.9	5%	0.44	

1. Enter the **quantity of fuel** consumed at the facility (not the resulting energy).
2. **Fuel quantities must be converted to a supported unit**, select the unit via the pick-list)
3. Emissions factors are generated automatically based on the information in the “Emissions Factors” tab. These are derived from information from the World Resources Institute, and are updated from time to time.
4. Provide an **allocation** of the approximate proportion of the given fuel used in the actual production of the product(s) under assessment.
5. Note allocation methods, as well as information sources in the comments section. When rows are added for additional fuels, also note source of emissions factor.

Energy Inventory – Table 3: Purchased carbon offsets

Table 3: Purchased carbon offsets								
1	2	3	4	5	6	7	8	9
offset project name	project type	offset registry	project location	purchase date	total offsets purchase (tCO2e)	% allocated to product final manufacture	product relevant offsets (tCO2e)	comment (Provide receipt of purchase for offsets including amount purchased, seller name, project type, etc. as indicated in supporting guidance)
Mad'Eole 1.2 MW Wind Energy Plant in Northern Madagascar	Wind	CDM Gold Standard	Madagascar	11/12/13	16.0	100%	16.00	See Offset purchase receipt
					16.0		16.0	

1. **Carbon offsets** are appropriate for compensating for emissions generated by on-site combustion that cannot otherwise be avoided.
2. Carefully record all relevant information about the purchased offset, including the registry it was purchased from, type of project, location of project, purchase date, and total purchase quantity.
3. If only a portion of the total offset purchase is being attributed to the product(s) under assessment, provide an allocation amount for the product.
4. Provide additional comments, as necessary

Energy Inventory – Table 4: Worksheet summary and totals

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Table 4a: Renewable energy - Product totals	
Purchased Electricity	
Product relevant electricity use (kWh)	22200
Renewable electricity through utility (Green power pricing) (kWh)	1200
On-site renewable electricity (kWh)	1000
Purchased RECS (kWh)	5000
Total Renewable electricity (kWh)	7200
% Renewable energy	32.43%

Table 4b: GHG emissions - Product totals, adjustments and offset purchase requirements

On-site Emissions	
Direct emissions (fossil; non-renewable) (tCO2e)	32.8
Direct emissions (biomass; renewable) (tCO2e) - Exempt from offset requirement	0.44
Emissions to be offset (tCO2e)	32.8
Carbon offsets purchased	16.00
% direct emissions offset/avoided	48.83%

1. At the bottom of the Energy Inventory worksheet, a table, summarizing the results of the inventory is provided.
2. Table 4a shows the total percentage of the product relevant purchased electricity and on-site renewable electricity is considered to be renewable, based on the information provided.
3. Table 4b shows the total percentage of the product relevant on-site emissions that have been offset by carbon offset projects. Note that a summary of on-site combusted renewable fuels is provided, but these are not counted in the total emissions required to be offset.

OPTIONAL: Alternate Energy Inventory – Facility information and goals

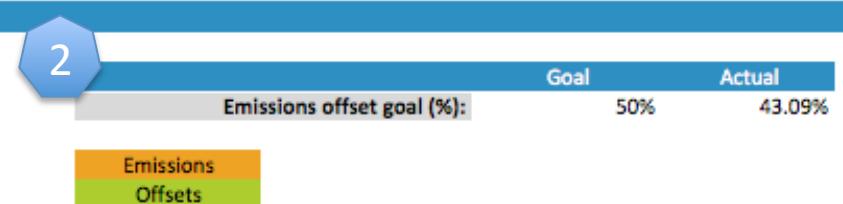
Energy Data Worksheet: Alternate Inventory Option - Using only carbon off-sets

Cradle to Cradle Certificate

Fill in these tables when only carbon offsets will be employed. If Renewable Energy Certificates (RECs) and/or on-site renewables are in use, please fill in the 'Energy Inventory' sheet

Facility information

1	Facility name: Sample Manufacturing Corp.
	Address: 555 Sample St, Sampletown, San Francisco, CA 90108
	Country: United States
	US eGRID region: WECC California
	Date range of data: 1 January 2013 through 31 December 2013



An **Alternate Energy Inventory** is provided, for use ONLY if all energy (purchased electricity included) will be converted to emissions, and offset using carbon offsets. If the Energy Inventory has been completed, disregard this page of the workbook.

1. Please fill in information about the facility, including location information. Choose a country from the Pick List, and for facilities located in the US, select the US eGRID region (To find your eGRID region, visit: <http://www.epa.gov/cleanenergy/energy-and-you/how-clean.html>). Country and eGRID information will provide grid based emissions factors for Table
2. Choose a goal for percentage of emissions to offset, based on the desired level of certification.
 - Silver –5% emissions offset
 - Gold – 50% emissions offset
 - Platinum - 100% emissions offset
3. The **Actual** column provides a current estimate of your emissions offset level, based on information entered in the worksheet. This value should meet or exceed the given goals, in order to attain the desired level of certification.

OPTIONAL - Alternate Energy Inventory – Table 5: GHG Emissions from purchased electricity

Table 5: Annual GHG emissions - Purchased electricity and heat									
1 purchased source	2 total quantity	UNIT	3 % allocation to final manufacture of product ¹	product electricity-final manufacturing (assuming same units)	4 emission factor (tCO2e/MWh)	product emissions - final manufacturing stage (tCO2e)	nuclear factor (multiplier) Assumes electricity is in units of MWh	purchased electricity and heat - adjusted product emissions (tCO2e)	Comment ²
purchased electricity - grid	111	mWh	10%	11.1	0.30	3.3	0.1711	5.2	See EnergyCorp Inc annual energy statement summary
purchased heat	0	mmBtu	0%						
						3.3	Total:	5.2	

1. Emissions associated with purchased electricity is automatically calculated based on the country and/or eGRID region specified in the facility information. Emissions factors associated with purchased heat will be based on the specific heat generation source.
2. Provide a facility level total annual electricity and purchased heat total. Electricity must be in Megawatt Hours, purchased heat may be given in unit of choice, depending on available emissions factors.
3. Determine the portion of the facility level energy dedicated to the production of the product(s) under assessment.
4. Regional emissions factors for most countries and US eGRID regions are calculated automatically, based on emissions factors from the World Resources Institute
5. A nuclear factor is automatically generated based on the region the facility is located in, and is based on information from <http://world-nuclear.org/>

OPTIONAL - Alternate Energy Inventory – Tables 6 and 7 direct emissions sources and offsets

Table 6: Annual GHG emissions - Direct onsite emissions from stationary combustion and other sources

direct source	total quantity	UNIT	emission factor (tCO2e/[unit of fuel or mass of direct emission]) ⁴	total emissions (tCO2e)	% allocation to final manufacture of product ¹	direct product emissions - final manufacture stage (tCO2e)	Comment ²
natural gas	3000	mcf	5.34E-02	160.3	10%	16.03	See EnergyCorp Inc annual energy statement summary
liquefied petroleum distillates (LPG) including propane	0	liter	1.61E-03				
motor gasoline	200	gallon	8.63E-03	1.7	10%	0.17	Based on internal inventory of on site vehicle use
diesel	0	gallon	1.02E-02				
{list all other sources}							
plastic production waste - Waste to Energy combustion							Em. Factor derived from Climate Registry 2013 default factor for plastics at http://www.theclimateregistry.org/downloads/2013/01/2013-Climate-Registry-Default-Emissions-Factors.pdf
	50	metric tons	3.14E+00	157.0	10%	15.70	
CH4 emissions from water treatment pond	0.12	metric tons	7.20E+01	8.6	10%	0.86	
			Total:	327.7	10%	32.77	

Table 7: Purchased Carbon Offsets

offset Project Name	project Type	offset Registry	project Location	purchase Date	total offsets purchase (tCO2e)	% allocated to product final manufacture	Product relevant offsets (tCO2e)	Comment
Mad'Eole 1.2 MW Wind Energy Plant in Northern Madagascar	Wind	CDM Gold Standard	Madagascar	11/12/13	16.00	100%	16.00	See offset purchase receipt
					16.0	Total:	16.0	

Tables 6 and 7 are consistent with tables 2 and 3 of the standard Energy Inventory. See pages 6 -8 of this guide for guidance

OPTIONAL - Alternate Energy Inventory – Tables 8 overview and summary

Table 8: GHG emissions - Product Totals

purchased electricity and heat GHG emissions (tCO2e)	5.2
on site GHG emissions from conventional sources, and non-fuel (tCO2e)	31.90
on site emissions from renewable sources (tCO2e) - Exempt from offset requirement	0.44
GHG emissions total from non-exempt sources (tCO2e)	37.1
quantity of carbon offsets purchased (tCO2e) ⁴	16.0
adjusted total after offset purchase (tCO2e)	21.1
% GHG emissions offset	43.09%

1. At the bottom of the Alternative Energy Inventory worksheet, a table, summarizing the results of the inventory is provided.
2. Table 8 shows the emissions totals from each source, as well as the total percentage considered offset by offset purchases.