Technical Paper | Electricity-specific emission factors for grid electricity

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Introduction

Corporate greenhouse gas accounting involves quantifying the greenhouse gas emissions associated with a business or organisation's activities, including the consumption of grid electricity. Electricity consumption is often one of the largest sources of emissions for reporting companies, and it is therefore important that the measurement of these emissions is as accurate as possible. However, for the majority of countries the best available factors for calculating emissions from electricity consumption are the composite electricity/heat emission factors published by the International Energy Agency (IEA 2010), which are also the basis for most of the grid electricity factors in the WRI tool for emissions from purchased electricity (WRI 2011), and Defra/DECC's factors for non-UK countries (Defra/DECC 2011a). Because these factors include the emissions from heat generation as well as electricity they may not be an accurate proxy for grid electricity emissions, i.e. the emissions from heat generation may skew the factor upwards or downwards. This paper presents a methodology and results for electricity-specific emission factors based on alternative data available from the IEA. The paper also provides a discussion of the reasons for the differences between the IEA composite electricity/heat factors and the new electricity-specific factors.

The new methodology for electricity-specific factors is also applied to address two further limitations with the composite factors published by the IEA: firstly the composite factors are only for CO_2 emissions, and do not cover the other relevant Kyoto gases; and secondly they are only for emissions per kWh generated, and do not provide factors for transmission and distribution (T&D) losses, or emissions per kWh of electricity consumed. Using the new electricity-specific methodology this paper provides factors for CO_2, CH_4 and N_2O, and emission factors for T&D losses and for "consumed" electricity[2].

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[2] A distinction can be made between three different emission factors for grid electricity: "generated"; "T&D losses"; and "consumed". The "generated" emission factor is for emissions per kWh of electricity generated within a country (i.e. total emissions divided by the total amount of electricity generated within a country); the

Background

There is growing interest in corporate GHG accounting, as evidenced by the number of companies reporting to the Carbon Disclosure Project (CDP) which increased from approximately 3,000 in 2010 to over 10,000 in 2011. In addition to the growing level of voluntary reporting there are moves to make GHG reporting mandatory, for instance the UK government is considering the introduction of mandatory reporting for all large companies in the UK (Defra 2011b).

Current best practice for corporate GHG accounting is the WBCSD/WRI *Greenhouse Gas Protocol* (WBCSD/WRI 2004), which categorises emissions into three scopes. Scope 1 emissions are from sources owned or operated by the reporting company; Scope 2 emissions are from the generation of electricity or steam imported by the reporting company; and Scope 3 emissions are all other indirect emissions associated with the company's activities. The *GHG Protocol* states that Scopes 1 and 2 should be reported as a minimum, and therefore electricity consumption is a key component of almost all corporate GHG inventories. In addition to Scope 2 emissions, the emissions associated with transmission and distribution losses from the electricity grid can be reported as Scope 3 emissions by the company which consumes grid electricity[3].

Emissions from electricity consumption are calculated by applying an "emission factor" to the quantity of electricity consumed by the reporting company. To give an example, the emission factor for UK grid electricity in 2009 is 0.48322 $kgCO_2$ per kWh generated (Defra 2011a), and so if a company uses 1,000 kWh of grid electricity the associated Scope 2 emissions are 483.22 $kgCO_2$.

Country-specific emission factors for grid electricity are published for some countries, for example Defra/DECC publish factors for the UK, and the Environmental Protection Agency publish factors for the US (EPA 2010). However, for most other countries the best available factors are the composite electricity/heat factors in *CO_2 Emissions from Fuel Combustion* published by the IEA (IEA 2010). As noted above, the use of composite electricity/heat factors as a proxy for grid electricity factors may not be accurate, e.g. if a country has low carbon electricity generation but high carbon heat generation then the composite electricity/heat factor will overestimate the emissions from electricity consumption. Similarly, if a country has relatively high carbon electricity generation and low carbon heat generation then using the composite factors will result in an underestimation of grid electricity emissions.

It is worth noting that the relative carbon intensity of electricity and heat generation is also determined by the relative efficiency of electricity and heat generation as well as the types of fuel or generation technologies used for each, i.e. even if both electricity and heat are generated from the

"T&D losses" factor shows the emissions associated with the electricity which is lost through the transmission and distribution grid per kWh of electricity consumed within the country (i.e. total kWhs of electricity lost in transmission and distribution multiplied by the "generated" factor, and the result is divided by the total amount of electricity consumed in the country); and the "consumed" factor gives the emissions per kWh of electricity consumed in the country (i.e. total emissions divided by total kWhs of electricity consumed, or alternatively it is the sum of the "generated" and "T&D loss" factors).

[3] The emissions from T&D losses are Scope 2 for the company which owns or operates the transmission and distribution grid.

same type of fuel the heat generated will tend to have a lower carbon intensity as the efficiency of heat generation tends to be higher.

Methodology

The methodology for electricity-specific emission factors involves calculating the total emissions from the generation of electricity within a country and dividing that figure by the total amount of electricity produced by the country. Data for the quantities of different fossil fuels combusted within dedicated electricity plants, and also within combined heat and power (CHP) plants were sourced from the IEA (2011a). Total emissions were calculated from these data by applying the appropriate default emission factors from the *Guidelines for National Greenhouse Gas Inventories* (IPCC 2006).

An additional calculation was needed in order to allocate a proportion of the emissions from CHP plants to the electricity produced. In order to make this allocation the efficiency method was used; this method uses the efficiencies of dedicated electricity and dedicated heat plants to derive a ratio for allocating emissions between the two outputs of the CHP. We assumed that the efficiency of a dedicated electricity plant is 35% and the efficiency of a dedicated heat plant is 80%, which is consistent with the figures used in WBCSD/WRI CHP tool (WBCSD/WRI 2006). The efficiency method also requires information on the outputs of electricity and heat from CHP plants, and in the absence of other data it is assumed that the electricity output is 0.35 kWh for every kWh input, and the heat output is 0.45 kWh per kWh input (with a total assumed efficiency of 80%). The calculation for the efficiency method is as follows:

Total emissions attributable to heat	=	(0.45/0.8) / ((0.45/0.80) + (0.35/0.35))
	=	36%
Total emissions attributable to electricity	=	64%

This allocation factor was applied to the total emissions from CHP plants in each country to give the total emissions attributable to the electricity generated by CHP.

Once the total emissions from both dedicated electricity generation and electricity from CHP were calculated the total was divided by the total amount of electricity generated. Data for the total amount of electricity generated by each country were also sourced from IEA statistics (IEA 2011b). In order to calculate CH_4 and N_2O emissions the same steps were followed, applying the appropriate emission factors for CH_4 and N_2O from the IPCC (2006).

In order to calculate emission factors for transmission and distribution losses the T&D emission factors in the *Guidelines to Defra/DECC's GHG Conversion Factors for Company Reporting* (Defra/DECC 2011a) were used to derive T&D loss rates, i.e. T&D losses as a percentage of total generated electricity. The Defra/DECC guidelines only publish T&D loss emission factors for European countries and the UK's main trading partners, and therefore a "world average" T&D loss rate factor was derived from the countries for which factors were available, and was applied to all

other the countries in the world. The emission factors for consumed electricity (i.e. emissions per kWh consumed) were derived by summing the generated emission factor and the T&D loss factor[4].

Results

Table 1 below shows the results for CO_2 per kWh of electricity generated using the electricity-specific method, and the composite electricity/heat factors from the IEA. The difference between the two factors in gCO_2/kWh and the percentage difference are also shown. The full results for CO_2, CH_4, and N_2O for generated, T&D losses, and consumed electricity are presented in Appendix I.

Table 1. Results and comparison with IEA composite electricity/heat factors

	Electricity-specific factors ($kgCO_2$/kWh)	**IEA composite electricity/heat factors ($kgCO_2$/kWh)**	**Difference (gCO_2/kWh)**	**Difference (%)**
Africa	0.73576632	0.6192752	0.11649	18.8%
Albania	0.009130088	0.0138455	-0.00472	-34.1%
Algeria	0.66420926	0.5964572	0.06775	11.4%
Angola	0.037950113	0.0375851	0.00037	1.0%
Argentina	0.391932833	0.3659994	0.02593	7.1%
Armenia	0.128177031	0.1646095	-0.03643	-22.1%
Asia excluding China	0.928290633	-	-	-
Australia	0.991757127	0.883306	0.10845	12.3%
Austria	0.176796609	0.182756	-0.00596	-3.3%
Azerbaijan	0.391831037	0.4164636	-0.02463	-5.9%
Bahrain	0.726834092	0.6507411	0.07609	11.7%
Bangladesh	0.63714323	0.5737064	0.06344	11.1%
Belarus	0.610873739	0.3033955	0.30748	101.3%
Belgium	0.224767376	0.248975	-0.02421	-9.7%
Benin	0.700678676	0.6968456	0.00383	0.6%
Bolivia	0.534996875	0.4970934	0.03790	7.6%
Bosnia and Herzegovina	1.32624734	0.9282924	0.39795	42.9%
Botswana	1.825675055	1.7891616	0.03651	2.0%
Brazil	0.092643638	0.088854	0.00379	4.3%
Brunei Darussalam	0.819498808	0.7545034	0.06500	8.6%
Bulgaria	1.166008316	0.4888623	0.67715	138.5%
Cambodia	1.170839671	1.1597317	0.01111	1.0%
Cameroon	0.216568535	0.2302538	-0.01369	-5.9%
Canada	0.179763325	0.18058	-0.00082	-0.5%
Caspian Region	0.588934769	-	-	-
Central/Eastern Europe	0.822497149	-	-	-

[4] Factors for emissions per kWh "consumed" are useful for life cycle assessments as they show the total point-of-combustion emissions per kWh of electricity used.

	Electricity-specific factors ($kgCO_2/kWh$)	IEA composite electricity/heat factors ($kgCO_2/kWh$)	Difference (gCO_2/kWh)	Difference (%)
Chile	0.408614261	0.4115191	-0.00290	-0.7%
China (People's Republic of China and Hong Kong China)	0.972581723	-	-	-
China, People's Republic of	0.974624913	0.7448369	0.22979	30.9%
Chinese Taipei	0.578261935	-	-	-
Colombia	0.111425218	0.1070157	0.00441	4.1%
Congo	0.120109978	0.1075293	0.01258	11.7%
Congo, Democratic Republic of	0.004158606	0.0038943	0.00026	6.8%
Costa Rica	0.063756361	0.0634452	0.00031	0.5%
Cote d'Ivoire	0.501179338	0.4488374	0.05234	11.7%
Croatia	0.386458364	0.3414155	0.04504	13.2%
Cuba	0.938086187	0.9134552	0.02463	2.7%
Cyprus	0.771651255	0.7586603	0.01299	1.7%
Czech Republic	0.93846226	0.543894	0.39457	72.5%
Denmark	0.374745583	0.307755	0.06699	21.8%
Dominican Republic	0.641741728	0.6264611	0.01528	2.4%
Ecuador	0.269613843	0.2619708	0.00764	2.9%
Egypt	0.500886095	0.4597638	0.04112	8.9%
El Salvador	0.256072792	0.2521738	0.00390	1.5%
Eritrea	0.677991638	0.6691777	0.00881	1.3%
Estonia	1.906907035	0.7518614	1.15505	153.6%
Ethiopia	0.118948451	0.1185277	0.00042	0.4%
Finland	0.225457295	0.187118	0.03834	20.5%
Former USSR	0.537643872	-	-	-
France	0.070927465	0.082717	-0.01179	-14.3%
Gabon	0.425188882	0.4011059	0.02408	6.0%
Georgia	0.089456936	0.0807383	0.00872	10.8%
Germany	0.672220452	0.441181	0.23104	52.4%
Ghana	0.214767509	0.2143357	0.00043	0.2%
Gibraltar	0.772321446	0.7567048	0.01562	2.1%
Greece	1.921092777	0.731218	1.18987	162.7%
Guatemala	0.341534936	0.3357278	0.00581	1.7%
Haiti	0.483325309	0.4804733	0.00285	0.6%
Honduras	0.415487352	0.4092977	0.00619	1.5%
Hong Kong (China)	0.786680632	0.7574229	0.02926	3.9%
Hungary	0.589672564	0.330842	0.25883	78.2%
Iceland	0.000193484	0.000749	-0.00056	-74.2%
IEA Europe	0.453760609	-	-	-
IEA North America	0.499440779	-	-	-
IEA Total	0.488897248	-	-	-

	Electricity-specific factors ($kgCO_2/kWh$)	IEA composite electricity/heat factors ($kgCO_2/kWh$)	Difference (gCO_2/kWh)	Difference (%)
India	1.333174843	0.9682265	0.36495	37.7%
Indonesia	0.684693977	0.726138	-0.04144	-5.7%
Iran, Islamic Republic of	0.631113877	-	-	-
Iraq	0.820614626	0.812045	0.00857	1.1%
Ireland	0.521193132	0.486205	0.03499	7.2%
Israel	0.740303524	0.6932951	0.04701	6.8%
Italy	0.410898038	0.398464	0.01243	3.1%
Jamaica	0.796106233	0.7846682	0.01144	1.5%
Japan	0.443356848	0.436453	0.00690	1.6%
Jordan	0.643924449	0.5889758	0.05495	9.3%
Kazakhstan	0.923181405	0.4388794	0.48430	110.3%
Kenya	0.332297783	0.3285304	0.00377	1.1%
Korea, Democratic People's Republic of	0.494658925	0.4813564	0.01330	2.8%
Korea, Republic of	0.504377662	0.459235	0.04514	9.8%
Kuwait	0.637316929	0.6136518	0.02367	3.9%
Kyrgyzstan	0.091404273	0.0937565	-0.00235	-2.5%
Latin America	0.209693364	0.2018896	0.00780	3.9%
Latvia	0.192071871	0.1622356	0.02984	18.4%
Lebanon	0.694755686	0.7052286	-0.01047	-1.5%
Libyan Arab Jamahiriya	0.919629046	0.885374	0.03426	3.9%
Lithuania	0.115934959	0.1144369	0.00150	1.3%
Luxembourg	0.276002537	0.314782	-0.03878	-12.3%
Macedonia, The Former Yugoslav Republic of	1.9406436	-	-	-
Malaysia	0.74884244	0.6559169	0.09293	14.2%
Malta	0.866166929	0.848708	0.01746	2.1%
Mexico	0.452483345	0.439963	0.01252	2.8%
Middle East	0.734833867	0.6870654	0.04777	7.0%
Moldova, Republic of	0.637194856	0.4676805	0.16951	36.2%
Mongolia	2.310868705	0.5392671	1.77160	328.5%
Morocco	0.731211458	0.7178061	0.01341	1.9%
Mozambique	0.000445032	0.0003984	0.00005	11.7%
Myanmar	0.315665174	0.2852407	0.03042	10.7%
Namibia	0.489803834	0.4238569	0.06595	15.6%
Nepal	0.00304179	0.0033067	-0.00026	-8.0%
Netherlands	0.413302564	0.392079	0.02122	5.4%
Netherlands Antilles	0.71753913	0.7065435	0.01100	1.6%
New Zealand	0.197695588	0.213515	-0.01582	-7.4%
Nicaragua	0.472119274	0.4772342	-0.00511	-1.1%
Nigeria	0.43963136	0.4034043	0.03623	9.0%

	Electricity-specific factors ($kgCO_2/kWh$)	IEA composite electricity/heat factors ($kgCO_2/kWh$)	Difference (gCO_2/kWh)	Difference (%)
Non-OECD Europe	1.111009897	0.509238	0.60177	118.2%
Non-OECD Total	0.777401484	0.5668028	0.21060	37.2%
Norway	0.002240278	0.005238	-0.00300	-57.2%
OECD Europe	0.451706369	0.335223	0.11648	34.7%
OECD North America	0.497137859	0.487216	0.00992	2.0%
OECD Pacific	0.529481475	0.498293	0.03119	6.3%
Oman	0.93649203	0.8576931	0.07880	9.2%
Pakistan	0.473378547	0.4511194	0.02226	4.9%
Panama	0.276797888	0.2732275	0.00357	1.3%
Paraguay	0	0	0.00000	NA
Peru	0.237721212	0.2250121	0.01271	5.6%
Philippines	0.52673385	0.4867668	0.03997	8.2%
Poland	1.196125502	0.65344	0.54269	83.1%
Portugal	0.400151316	0.383544	0.01661	4.3%
Qatar	0.596345388	0.533875	0.06247	11.7%
Romania	1.069422796	0.4166456	0.65278	156.7%
Russian Federation	0.513180381	0.3255125	0.18767	57.7%
Saudi Arabia	0.795591395	0.7541919	0.04140	5.5%
Senegal	0.5982594	0.5625632	0.03570	6.3%
Serbia	1.548567819	0.6708746	0.87769	130.8%
Singapore	0.57904595	0.5310437	0.04800	9.0%
Slovak Republic	0.282995496	0.217154	0.06584	30.3%
Slovenia	0.578399475	0.3288321	0.24957	75.9%
South Africa	1.069026617	0.8349481	0.23408	28.0%
South Asia	1.213800412	-	-	-
Southeast Asia/ASEAN	0.627076088	-	-	-
Spain	0.34287509	0.325878	0.01700	5.2%
Sri Lanka	0.417247633	0.4204963	-0.00325	-0.8%
Sudan	0.614906086	0.6090862	0.00582	1.0%
Sweden	0.023033883	0.039939	-0.01691	-42.3%
Switzerland	0.003177437	0.027385	-0.02421	-88.4%
Syrian Arab Republic	0.639109712	-	-	-
Tajikistan	0.023245211	0.0306259	-0.00738	-24.1%
Tanzania, United Republic of	0.26675705	0.2421504	0.02461	10.2%
Thailand	0.626742612	0.5291102	0.09763	18.5%
Togo	0.207239024	0.2064878	0.00075	0.4%
Trinidad and Tobago	0.766677522	0.6867318	0.07995	11.6%
Tunisia	0.572169413	0.5220711	0.05010	9.6%
Turkey	0.865664547	0.495279	0.37039	74.8%
Turkmenistan	0.644672553	0.7951471	-0.15047	-18.9%

	Electricity-specific factors ($kgCO_2/kWh$)	IEA composite electricity/heat factors ($kgCO_2/kWh$)	Difference (gCO_2/kWh)	Difference (%)
Ukraine	0.56313293	0.3861146	0.17702	45.8%
United Arab Emirates	0.938297499	0.8420557	0.09624	11.4%
United Kingdom	0.508501975	0.486949	0.02155	4.4%
United States	0.547096737	0.535031	0.01207	2.3%
Uruguay	0.303713979	0.3067745	-0.00306	-1.0%
Uzbekistan	0.567432849	0.4438443	0.12359	27.8%
Venezuela	0.208069719	0.2025534	0.00552	2.7%
Vietnam	0.466848028	0.4130283	0.05382	13.0%
World	0.623537453	0.5023264	0.12121	24.1%
Yemen	0.644106104	0.6361625	0.00794	1.2%
Zambia	0.003197305	0.0031282	0.00007	2.2%
Zimbabwe	0.600377947	0.6187319	-0.01835	-3.0%

Discussion

As can be seen from Table 1 the difference between the electricity-specific factors and the composite electricity/heat factors varies by country, with very small differences for some countries and very large differences for others. This variation in the difference between the two factors is to be expected for a number of reasons. Firstly the types of fossil fuels used to generate electricity and those used to generate heat may be largely the same in some countries, and therefore the composite and electricity-specific factors will be similar[5], but in other countries there may be large differences between the fuels and technologies used to generate electricity and heat, and in such cases the composite and electricity-specific factors will diverge.

A second reason why the difference between the composite and electricity-specific factors varies by country is that different countries have different levels of heat generation, and for some countries total emissions from heat generation will be too small to skew the composite emission factor whereas for other countries total emissions from heat generation may have a large impact on average emissions from electricity and heat generation. The former situation is the case for countries such as Cuba, Costa Rica, Haiti and Angola which have low or no main heat generation (IEA 2011b), and therefore the composite and electricity-specific factors are very close. In such cases the composite electricity/heat factors may be used as a good proxy for electricity-specific factors.

As noted earlier the composite and electricity-specific factors are expected to be different if a country has low carbon electricity generation but high carbon heat generation, or high carbon

[5] In actual fact the circumstances in which the carbon intensity of electricity and heat will be similar are slightly more complicated than this due to the difference in the efficiency of electricity and heat generation. The heat generation would have to be more carbon intensive than the electricity generation by the same amount that the efficiency of the heat generation exceeds that of the electricity generation.

electricity generation and low carbon heat generation. This explanation is supported by the results for a number of countries. For example, in France ~76% of electricity is from nuclear generation and 12% from hydro, whereas 100% of heat generation is from fossil fuels or waste combustion (IEA 2011b). It is therefore expected that the electricity-specific factor would be lower than the composite electricity/heat factor, and this is borne out in the results which show the electricity-specific factor to be 14.3% lower than the composite factor.

Similarly, for Estonia ~91% of electricity generation is from coal (IEA 2011b) which is highly carbon intensive (between 87,300 and 115,000 $kgCO_2/TJ$), whereas the majority of heat generation is from natural gas which has a lower carbon intensity (between 56,100 and 58,300 $kgCO_2/TJ$) (IPCC 2006). It is therefore expected that the electricity-specific factor would be higher than the composite factor, and the results bear this out with the electricity-specific factor being 153.6% higher than the composite factor.

However, the difference of 153.6% is very large and is beyond the magnitude of difference expected from the carbon intensity of the fuels used, and the lower efficiency of electricity generation. A number of other countries have very large differences between the composite and electricity-specific factors, such as Greece, Belarus, Bulgaria, Kazakstan, Mongolia, Romania, and Serbia, and this may be because of errors in the underlying data sets used for deriving the composite or electricity-specific factors.

Conclusions

As expected, for many countries there is a significant difference between the composite electricity/heat factors published by the IEA and the electricity-specific factors. This shows the importance of improving the electricity factors which are available so that the emissions from electricity are not over or under-estimated within corporate GHG accounts. Greenhouse gas reporting can also be improved by including the CH_4 and N_2O emissions associated with grid electricity generation, and these factors can also be derived using the method presented in this paper. All the factors derived using the electricity-specific methodology are provided in Appendix I.

If using the factors presented in this paper please cite:

Ecometrica (2011). Electricity-specific emission factors for grid electricity.

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Appendix I

Emissions per kWh of electricity generated			
	$kgCO_2$/kWh	**$kgCH_4$/kWh**	**kgN_2O/kWh**
Africa	0.73576632	0.00001173634	0.00000857091
Albania	0.009130088	0.00000036964	0.00000007393
Algeria	0.66420926	0.00001224888	0.00000129799
Angola	0.037950113	0.00000150263	0.00000030053
Argentina	0.391932833	0.00000854291	0.00000136560
Armenia	0.128177031	0.00000228480	0.00000022848
Asia excluding China	0.928290633	0.00001271445	0.00001220912
Australia	0.991757127	0.00001100373	0.00001378366
Austria	0.176796609	0.00000221471	0.00000113728
Azerbaijan	0.391831037	0.00000779454	0.00000092935
Bahrain	0.726834092	0.00001296702	0.00000129873
Bangladesh	0.63714323	0.00001236287	0.00000191260
Belarus	0.610873739	0.00001129777	0.00000123000
Belgium	0.224767376	0.00000286310	0.00000111360
Benin	0.700678676	0.00002816912	0.00000563382
Bolivia	0.534996875	0.00001359792	0.00000208542
Bosnia and Herzegovina	1.32624734	0.00001404847	0.00002021378
Botswana	1.825675055	0.00001929889	0.00002894834
Brazil	0.092643638	0.00000178354	0.00000054043
Brunei Darussalam	0.819498808	0.00001477657	0.00000150781
Bulgaria	1.166008316	0.00001208887	0.00001724012
Cambodia	1.170839671	0.00004638275	0.00000927655
Cameroon	0.216568535	0.00000647952	0.00000111887
Canada	0.179763325	0.00000224792	0.00000237433
Caspian Region	0.588934769	0.00000834282	0.00000605837
Central/Eastern Europe	0.822497149	0.00000970106	0.00001077974
Chile	0.408614261	0.00000874334	0.00000506661
China (People's Republic of China and Hong Kong China)	0.972581723	0.00001045906	0.00001515452
China, People's Republic of	0.974624913	0.00001046892	0.00001520897
Chinese Taipei	0.578261935	0.00000783802	0.00000737691
Colombia	0.111425218	0.00000159354	0.00000090820
Congo	0.120109978	0.00000214100	0.00000021410
Congo, Democratic Republic of	0.004158606	0.00000011248	0.00000001810
Costa Rica	0.063756361	0.00000256870	0.00000051374
Cote d'Ivoire	0.501179338	0.00000896986	0.00000090352
Croatia	0.386458364	0.00000783985	0.00000392156
Cuba	0.938086187	0.00003744566	0.00000748913

Emissions per kWh of electricity generated			
	$kgCO_2$/kWh	**$kgCH_4$/kWh**	**kgN_2O/kWh**
Cyprus	0.771651255	0.00002993387	0.00000598677
Czech Republic	0.93846226	0.00000957659	0.00001376475
Denmark	0.374745583	0.00000489961	0.00000478713
Dominican Republic	0.641741728	0.00002006643	0.00000560281
Ecuador	0.269613843	0.00000958927	0.00000182831
Egypt	0.500886095	0.00001158184	0.00000164902
El Salvador	0.256072792	0.00000992899	0.00000198580
Eritrea	0.677991638	0.00002650871	0.00000530174
Estonia	1.906907035	0.00001958828	0.00002841613
Ethiopia	0.118948451	0.00000481573	0.00000096315
Finland	0.225457295	0.00000260698	0.00000243179
Former USSR	0.537643872	0.00000751704	0.00000483930
France	0.070927465	0.00000101029	0.00000064904
Gabon	0.425188882	0.00001219725	0.00000205043
Georgia	0.089456936	0.00000159460	0.00000015946
Germany	0.672220452	0.00000721994	0.00000909965
Ghana	0.214767509	0.00000878994	0.00000175799
Gibraltar	0.772321446	0.00002993494	0.00000598699
Greece	1.921092777	0.00002327097	0.00002689972
Guatemala	0.341534936	0.00000968074	0.00000367144
Haiti	0.483325309	0.00001940123	0.00000388025
Honduras	0.415487352	0.00001613024	0.00000322605
Hong Kong (China)	0.786680632	0.00000956214	0.00001020016
Hungary	0.589672564	0.00000739971	0.00000630232
Iceland	0.000193484	0.00000000783	0.00000000157
IEA Europe	0.453760609	0.00000569547	0.00000530833
IEA North America	0.499440779	0.00000599475	0.00000660995
IEA Total	0.488897248	0.00000612879	0.00000602145
India	1.333174843	0.00001552287	0.00002010920
Indonesia	0.684693977	0.00001409674	0.00000775254
Iran, Islamic Republic of	0.631113877	0.00001497566	0.00000219612
Iraq	0.820614626	0.00003228380	0.00000645676
Ireland	0.521193132	0.00000818450	0.00000441372
Israel	0.740303524	0.00001076819	0.00000966067
Italy	0.410898038	0.00000707784	0.00000280634
Jamaica	0.796106233	0.00003096851	0.00000619370
Japan	0.443356848	0.00000709862	0.00000396430
Jordan	0.643924449	0.00001420454	0.00000192480
Kazakhstan	0.923181405	0.00001074725	0.00001382052
Kenya	0.332297783	0.00001307388	0.00000261478
Korea, Democratic People's Republic of	0.494658925	0.00000654965	0.00000744810
Korea, Republic of	0.504377662	0.00000631975	0.00000614340
Kuwait	0.637316929	0.00002139713	0.00000398217
Kyrgyzstan	0.091404273	0.00000131732	0.00000076819
Latin America	0.209693364	0.00000542780	0.00000134413

Emissions per kWh of electricity generated			
	$kgCO_2$/kWh	**$kgCH_4$/kWh**	**kgN_2O/kWh**
Latvia	0.192071871	0.00000343768	0.00000040372
Lebanon	0.694755686	0.00002758069	0.00000551614
Libyan Arab Jamahiriya	0.919629046	0.00003055807	0.00000562627
Lithuania	0.115934959	0.00000240346	0.00000030342
Luxembourg	0.276002537	0.00000491983	0.00000049198
Macedonia, The Former Yugoslav Republic of	1.9406436	0.00002036386	0.00002911807
Malaysia	0.74884244	0.00001099853	0.00000675290
Malta	0.866166929	0.00003375078	0.00000675016
Mexico	0.452483345	0.00001025206	0.00000265293
Middle East	0.734833867	0.00001902493	0.00000364425
Moldova, Republic of	0.637194856	0.00001173875	0.00000124212
Mongolia	2.310868705	0.00002450233	0.00003464121
Morocco	0.731211458	0.00001301900	0.00000945179
Mozambique	0.000445032	0.00000000793	0.00000000079
Myanmar	0.315665174	0.00000622419	0.00000072998
Namibia	0.489803834	0.00000545036	0.00000769571
Nepal	0.00304179	0.00000011790	0.00000002358
Netherlands	0.413302564	0.00000553629	0.00000286965
Netherlands Antilles	0.71753913	0.00002781159	0.00000556232
New Zealand	0.197695588	0.00000276291	0.00000148264
Nicaragua	0.472119274	0.00001833847	0.00000366769
Nigeria	0.43963136	0.00001008827	0.00000141881
Non-OECD Europe	1.111009897	0.00001274601	0.00001592938
Non-OECD Total	0.777401484	0.00001068936	0.00001004702
Norway	0.002240278	0.00000002687	0.00000000643
OECD Europe	0.451706369	0.00000566971	0.00000528429
OECD North America	0.497137859	0.00000620354	0.00000641589
OECD Pacific	0.529481475	0.00000735393	0.00000581740
Oman	0.93649203	0.00002101508	0.00000287365
Pakistan	0.473378547	0.00001383671	0.00000243096
Panama	0.276797888	0.00001082697	0.00000216539
Paraguay	0	0.00000000000	0.00000000000
Peru	0.237721212	0.00000540039	0.00000118796
Philippines	0.52673385	0.00000809639	0.00000616390
Poland	1.196125502	0.00001252130	0.00001800626
Portugal	0.400151316	0.00000669523	0.00000404396
Qatar	0.596345388	0.00001063004	0.00000106300
Romania	1.069422796	0.00001171119	0.00001480791
Russian Federation	0.513180381	0.00000740420	0.00000412694
Saudi Arabia	0.795591395	0.00002375473	0.00000409623
Senegal	0.5982594	0.00002318009	0.00000461815
Serbia	1.548567819	0.00001574361	0.00002330385
Singapore	0.57904595	0.00001328426	0.00000187695
Slovak Republic	0.282995496	0.00000322152	0.00000377266
Slovenia	0.578399475	0.00000593888	0.00000862028

Emissions per kWh of electricity generated			
	$kgCO_2/kWh$	**$kgCH_4/kWh$**	**kgN_2O/kWh**
South Africa	1.069026617	0.00001131304	0.00001694748
South Asia	1.213800412	0.00001520917	0.00001755688
Southeast Asia/ASEAN	0.627076088	0.00001079622	0.00000567292
Spain	0.34287509	0.00000553451	0.00000307467
Sri Lanka	0.417247633	0.00001644053	0.00000328811
Sudan	0.614906086	0.00002436143	0.00000487229
Sweden	0.023033883	0.00000025655	0.00000013911
Switzerland	0.003177437	0.00000007019	0.00000000947
Syrian Arab Republic	0.639109712	0.00002084042	0.00000382947
Tajikistan	0.023245211	0.00000041435	0.00000004144
Tanzania, United Republic of	0.26675705	0.00000471237	0.00000095425
Thailand	0.626742612	0.00000934176	0.00000473446
Togo	0.207239024	0.00000839024	0.00000167805
Trinidad and Tobago	0.766677522	0.00001374861	0.00000138957
Tunisia	0.572169413	0.00001209311	0.00000155998
Turkey	0.865664547	0.00001107312	0.00000991016
Turkmenistan	0.644672553	0.00001149149	0.00000114915
Ukraine	0.56313293	0.00000627280	0.00000723106
United Arab Emirates	0.938297499	0.00001718581	0.00000180104
United Kingdom	0.508501975	0.00000675405	0.00000512153
United States	0.547096737	0.00000655331	0.00000724137
Uruguay	0.303713979	0.00001207864	0.00000241499
Uzbekistan	0.567432849	0.00000988103	0.00000233810
Venezuela	0.208069719	0.00000602568	0.00000102259
Vietnam	0.466848028	0.00000705321	0.00000420297
World	0.623537453	0.00000831849	0.00000786421
Yemen	0.644106104	0.00002524766	0.00000504953
Zambia	0.003197305	0.00000012280	0.00000002802
Zimbabwe	0.600377947	0.00000644193	0.00000949498

Emissions associated with T&D losses per kWh of electricity consumed			
	$kgCO_2/kWh$	$kgCH_4/kWh$	kgN_2O/kWh
Africa	0.105221501	0.0000016784	0.0000012257
Albania	0.000968738	0.0000000392	0.0000000078
Algeria	0.070475198	0.0000012997	0.0000001377
Angola	0.004026655	0.0000001594	0.0000000319
Argentina	0.041585605	0.0000009064	0.0000001449
Armenia	0.013600084	0.0000002424	0.0000000242
Asia excluding China	0.098495263	0.0000013491	0.0000012954
Australia	0.084129695	0.0000009334	0.0000011693
Austria	0.011479745	0.0000001438	0.0000000738
Azerbaijan	0.041574804	0.0000008270	0.0000000986
Bahrain	0.077119937	0.0000013759	0.0000001378
Bangladesh	0.067603386	0.0000013117	0.0000002029
Belarus	0.064816091	0.0000011987	0.0000001305
Belgium	0.011486151	0.0000001463	0.0000000569
Benin	0.074344745	0.0000029889	0.0000005978
Bolivia	0.056765259	0.0000014428	0.0000002213
Bosnia and Herzegovina	0.140720025	0.0000014906	0.0000021448
Botswana	0.193711257	0.0000020477	0.0000030715
Brazil	0.017263768	0.0000003324	0.0000001007
Brunei Darussalam	0.086952026	0.0000015679	0.0000001600
Bulgaria	0.202590985	0.0000021004	0.0000029954
Cambodia	0.124230664	0.0000049214	0.0000009843
Cameroon	0.022978768	0.0000006875	0.0000001187
Canada	0.016695864	0.0000002088	0.0000002205
Caspian Region	0.06248828	0.0000008852	0.0000006428
Central/Eastern Europe	0.087270161	0.0000010293	0.0000011438
Chile	0.04335557	0.0000009277	0.0000005376
China (People's Republic of China and Hong Kong China)	0.103194721	0.0000011097	0.0000016080
China, People's Republic of	0.062862027	0.0000006752	0.0000009810
Chinese Taipei	0.02502815	0.0000003392	0.0000003193
Colombia	0.011822651	0.0000001691	0.0000000964
Congo	0.012744138	0.0000002272	0.0000000227
Congo, Democratic Republic of	0.000441244	0.0000000119	0.0000000019
Costa Rica	0.006764799	0.0000002725	0.0000000545
Cote d'Ivoire	0.053177086	0.0000009517	0.0000000959
Croatia	0.053456273	0.0000010844	0.0000005424

Emissions associated with T&D losses per kWh of electricity consumed			
	$kgCO_2$/kWh	**$kgCH_4$/kWh**	**kgN_2O/kWh**
Cuba	0.09953461	0.0000039731	0.0000007946
Cyprus	0.035946862	0.0000013944	0.0000002789
Czech Republic	0.113352208	0.0000011567	0.0000016626
Denmark	0.050470667	0.0000006599	0.0000006447
Dominican Republic	0.068091305	0.0000021291	0.0000005945
Ecuador	0.028607082	0.0000010175	0.0000001940
Egypt	0.072539086	0.0000016773	0.0000002388
El Salvador	0.027170324	0.0000010535	0.0000002107
Eritrea	0.071937562	0.0000028127	0.0000005625
Estonia	0.340678741	0.0000034995	0.0000050767
Ethiopia	0.012620895	0.0000005110	0.0000001022
Finland	0.010440489	0.0000001207	0.0000001126
Former USSR	0.057046116	0.0000007976	0.0000005135
France	0.004765747	0.0000000679	0.0000000436
Gabon	0.045114202	0.0000012942	0.0000002176
Georgia	0.009491731	0.0000001692	0.0000000169
Germany	0.042417139	0.0000004556	0.0000005742
Ghana	0.022787672	0.0000009326	0.0000001865
Gibraltar	0	0.0000000000	0.0000000000
Greece	0.186003677	0.0000022531	0.0000026045
Guatemala	0.036238191	0.0000010272	0.0000003896
Haiti	0.051282704	0.0000020585	0.0000004117
Honduras	0.044084832	0.0000017115	0.0000003423
Hong Kong (China)	0.093909404	0.0000011415	0.0000012176
Hungary	0.047530917	0.0000005965	0.0000005080
Iceland	1.25639E-05	0.0000000005	0.0000000001
IEA Europe	0.048145774	0.0000006043	0.0000005632
IEA North America	0.052992618	0.0000006361	0.0000007013
IEA Total	0.051873908	0.0000006503	0.0000006389
India	0.46763058	0.0000054449	0.0000070536
Indonesia	0.089694921	0.0000018467	0.0000010156
Iran, Islamic Republic of	0.066963648	0.0000015890	0.0000002330
Iraq	0.087070418	0.0000034254	0.0000006851
Ireland	0.044878691	0.0000007047	0.0000003801
Israel	0.022650681	0.0000003295	0.0000002956
Italy	0.024367877	0.0000004197	0.0000001664
Jamaica	0.084469982	0.0000032859	0.0000006572
Japan	0.02259463	0.0000003618	0.0000002020
Jordan	0.0683229	0.0000015072	0.0000002042
Kazakhstan	0.097953154	0.0000011403	0.0000014664
Kenya	0.035258093	0.0000013872	0.0000002774
Korea, Democratic People's Republic of	0.052485245	0.0000006949	0.0000007903
Korea, Republic of	0.018498171	0.0000002318	0.0000002253
Kuwait	0.067621817	0.0000022703	0.0000004225

Emissions associated with T&D losses per kWh of electricity consumed			
	kgCO_2/kWh	**kgCH_4/kWh**	**kgN_2O/kWh**
Kyrgyzstan	0.009698351	0.0000001398	0.0000000815
Latin America	0.041466503	0.0000010733	0.0000002658
Latvia	0.031770408	0.0000005686	0.0000000668
Lebanon	0.073716293	0.0000029264	0.0000005853
Libyan Arab Jamahiriya	0.097576235	0.0000032423	0.0000005970
Lithuania	0.018987582	0.0000003936	0.0000000497
Luxembourg	0.004223924	0.0000000753	0.0000000075
Macedonia, The Former Yugoslav Republic of	0.205909869	0.0000021607	0.0000030895
Malaysia	0.021858667	0.0000003210	0.0000001971
Malta	0.136849458	0.0000053324	0.0000010665
Mexico	0.096042928	0.0000021761	0.0000005631
Middle East	0.077968745	0.0000020186	0.0000003867
Moldova, Republic of	0.067608864	0.0000012455	0.0000001318
Mongolia	0.245192199	0.0000025998	0.0000036756
Morocco	0.077584393	0.0000013814	0.0000010029
Mozambique	4.72196E-05	0.0000000008	0.0000000001
Myanmar	0.033493308	0.0000006604	0.0000000775
Namibia	0.051970101	0.0000005783	0.0000008165
Nepal	0.000322746	0.0000000125	0.0000000025
Netherlands	0.031151244	0.0000004173	0.0000002163
Netherlands Antilles	0.076133706	0.0000029509	0.0000005902
New Zealand	0.016304312	0.0000002279	0.0000001223
Nicaragua	0.0500937	0.0000019458	0.0000003892
Nigeria	0.046646605	0.0000010704	0.0000001505
Non-OECD Europe	0.202752021	0.0000023261	0.0000029070
Non-OECD Total	0.082485335	0.0000011342	0.0000010660
Norway	0.000215011	0.0000000026	0.0000000006
OECD Europe	0.047927811	0.0000006016	0.0000005607
OECD North America	0.052748269	0.0000006582	0.0000006808
OECD Pacific	0.056180053	0.0000007803	0.0000006172
Oman	0.099365464	0.0000022298	0.0000003049
Pakistan	0.141996448	0.0000041505	0.0000007292
Panama	0.029369338	0.0000011488	0.0000002298
Paraguay	0	0.0000000000	0.0000000000
Peru	0.025223149	0.0000005730	0.0000001260
Philippines	0.082167759	0.0000012630	0.0000009615
Poland	0.083640199	0.0000008756	0.0000012591
Portugal	0.030553541	0.0000005112	0.0000003088
Qatar	0.063274576	0.0000011279	0.0000001128
Romania	0.216433833	0.0000023702	0.0000029969
Russian Federation	0.049452903	0.0000007135	0.0000003977
Saudi Arabia	0.081775089	0.0000024416	0.0000004210

Emissions associated with T&D losses per kWh of electricity consumed			
	$kgCO_2$/kWh	**$kgCH_4$/kWh**	**kgN_2O/kWh**
Senegal	0.06347766	0.0000024595	0.0000004900
Serbia	0.164309097	0.0000016705	0.0000024726
Singapore	0.035497536	0.0000008144	0.0000001151
Slovak Republic	0.02481196	0.0000002825	0.0000003308
Slovenia	0.047701504	0.0000004898	0.0000007109
South Africa	0.113909672	0.0000012055	0.0000018058
South Asia	0.128788967	0.0000016138	0.0000018629
Southeast Asia/ASEAN	0.066535223	0.0000011455	0.0000006019
Spain	0.026365791	0.0000004256	0.0000002364
Sri Lanka	0.044271604	0.0000017444	0.0000003489
Sudan	0.065243938	0.0000025848	0.0000005170
Sweden	0.001647491	0.0000000183	0.0000000099
Switzerland	0.000238171	0.0000000053	0.0000000007
Syrian Arab Republic	0.067812038	0.0000022112	0.0000004063
Tajikistan	0.002466408	0.0000000440	0.0000000044
Tanzania, United Republic of	0.028303965	0.0000005000	0.0000001013
Thailand	0.049908552	0.0000007439	0.0000003770
Togo	0.02198887	0.0000008902	0.0000001780
Trinidad and Tobago	0.081347481	0.0000014588	0.0000001474
Tunisia	0.06070941	0.0000012831	0.0000001655
Turkey	0.144085694	0.0000018431	0.0000016495
Turkmenistan	0.068402277	0.0000012193	0.0000001219
Ukraine	0.144708491	0.0000016119	0.0000018582
United Arab Emirates	0.099557031	0.0000018235	0.0000001911
United Kingdom	0.03990034	0.0000005300	0.0000004019
United States	0.039569765	0.0000004740	0.0000005237
Uruguay	0.03222524	0.0000012816	0.0000002562
Uzbekistan	0.060206842	0.0000010484	0.0000002481
Venezuela	0.02207701	0.0000006393	0.0000001085
Vietnam	0.0495344	0.0000007484	0.0000004460
World	0.06615976	0.0000008826	0.0000008344
Yemen	0.068342175	0.0000026789	0.0000005358
Zambia	0.000339247	0.0000000130	0.0000000030
Zimbabwe	0.063702446	0.0000006835	0.0000010075

Emissions per kWh of electricity consumed			
	kgCO_2/kWh	**kgCH_4/kWh**	**kgN_2O/kWh**
Africa	0.840987822	0.00001341475	0.00000979663
Albania	0.010098826	0.00000040886	0.00000008177
Algeria	0.734684458	0.00001354854	0.00000143571
Angola	0.041976768	0.00000166207	0.00000033241
Argentina	0.433518438	0.00000944934	0.00000151049
Armenia	0.141777115	0.00000252722	0.00000025272
Asia excluding China	1.026785897	0.00001406350	0.00001350455
Australia	1.075886822	0.00001193717	0.00001495291
Austria	0.188276354	0.00000235852	0.00000121113
Azerbaijan	0.433405841	0.00000862157	0.00000102796
Bahrain	0.803954029	0.00001434287	0.00000143653
Bangladesh	0.704746617	0.00001367462	0.00000211553
Belarus	0.67568983	0.00001249651	0.00000136051
Belgium	0.236253528	0.00000300941	0.00000117051
Benin	0.775023422	0.00003115797	0.00000623159
Bolivia	0.591762134	0.00001504071	0.00000230669
Bosnia and Herzegovina	1.466967365	0.00001553907	0.00002235854
Botswana	2.019386313	0.00002134658	0.00003201987
Brazil	0.109907407	0.00000211589	0.00000064114
Brunei Darussalam	0.906450834	0.00001634442	0.00000166779
Bulgaria	1.368599301	0.00001418928	0.00002023555
Cambodia	1.295070336	0.00005130414	0.00001026083
Cameroon	0.239547303	0.00000716702	0.00000123759
Canada	0.196459189	0.00000245670	0.00000259486
Caspian Region	0.65142305	0.00000922803	0.00000670119
Central/Eastern Europe	0.90976731	0.00001073038	0.00001192352
Chile	0.451969831	0.00000967105	0.00000560420
China (People's Republic of China and Hong Kong China)	1.075776444	0.00001156881	0.00001676247
China, People's Republic of	1.03748694	0.00001114415	0.00001618993
Chinese Taipei	0.603290085	0.00000817726	0.00000769620
Colombia	0.123247869	0.00000176262	0.00000100456
Congo	0.132854116	0.00000236817	0.00000023682
Congo, Democratic Republic of	0.00459985	0.00000012442	0.00000002002
Costa Rica	0.07052116	0.00000284125	0.00000056825
Cote d'Ivoire	0.554356424	0.00000992160	0.00000099939
Croatia	0.439914637	0.00000892429	0.00000446401
Cuba	1.037620796	0.00004141879	0.00000828376
Cyprus	0.807598117	0.00003132832	0.00000626566
Czech Republic	1.051814468	0.00001073330	0.00001542733
Denmark	0.42521625	0.00000555948	0.00000543186
Dominican Republic	0.709833033	0.00002219556	0.00000619729
Ecuador	0.298220926	0.00001060673	0.00000202231

Emissions per kWh of electricity consumed			
	$kgCO_2$/kWh	**$kgCH_4$/kWh**	**kgN_2O/kWh**
Egypt	0.573425181	0.00001325914	0.00000188783
El Salvador	0.283243116	0.00001098250	0.00000219650
Eritrea	0.7499292	0.00002932139	0.00000586428
Estonia	2.247585776	0.00002308782	0.00003349282
Ethiopia	0.131569347	0.00000532669	0.00000106534
Finland	0.235897784	0.00000272770	0.00000254441
Former USSR	0.594689987	0.00000831463	0.00000535277
France	0.075693212	0.00000107817	0.00000069265
Gabon	0.470303084	0.00001349143	0.00000226799
Georgia	0.098948667	0.00000176379	0.00000017638
Germany	0.714637591	0.00000767552	0.00000967384
Ghana	0.237555181	0.00000972259	0.00000194452
Gibraltar	0.772321446	0.00002993494	0.00000598699
Greece	2.107096454	0.00002552411	0.00002950420
Guatemala	0.377773128	0.00001070790	0.00000406099
Haiti	0.534608012	0.00002145978	0.00000429196
Honduras	0.459572184	0.00001784173	0.00000356835
Hong Kong (China)	0.880590036	0.00001070361	0.00001141780
Hungary	0.637203481	0.00000799617	0.00000681032
Iceland	0.000206048	0.00000000834	0.00000000167
IEA Europe	0.501906383	0.00000629978	0.00000587156
IEA North America	0.552433397	0.00000663082	0.00000731129
IEA Total	0.540771157	0.00000677908	0.00000666035
India	1.800805423	0.00002096774	0.00002716280
Indonesia	0.774388897	0.00001594341	0.00000876813
Iran, Islamic Republic of	0.698077525	0.00001656463	0.00000242914
Iraq	0.907685045	0.00003570923	0.00000714185
Ireland	0.566071822	0.00000888925	0.00000479378
Israel	0.762954205	0.00001109766	0.00000995626
Italy	0.435265915	0.00000749759	0.00000297276
Jamaica	0.880576215	0.00003425439	0.00000685088
Japan	0.465951477	0.00000746038	0.00000416633
Jordan	0.712247349	0.00001571170	0.00000212903
Kazakhstan	1.02113456	0.00001188757	0.00001528693
Kenya	0.367555876	0.00001446107	0.00000289221
Korea, Democratic People's Republic of	0.54714417	0.00000724459	0.00000823837
Korea, Republic of	0.522875834	0.00000655153	0.00000636871
Kuwait	0.704938746	0.00002366745	0.00000440469
Kyrgyzstan	0.101102624	0.00000145709	0.00000084970
Latin America	0.251159867	0.00000650114	0.00000160993
Latvia	0.223842279	0.00000400630	0.00000047050
Lebanon	0.768471979	0.00003050711	0.00000610142
Libyan Arab Jamahiriya	1.017205281	0.00003380040	0.00000622323
Lithuania	0.134922542	0.00000279709	0.00000035311
Luxembourg	0.280226461	0.00000499512	0.00000049951
Macedonia, The Former Yugoslav	2.146553469	0.00002252455	0.00003220761

Emissions per kWh of electricity consumed			
	$kgCO_2$/kWh	**$kgCH_4$/kWh**	**kgN_2O/kWh**
Republic of			
Malaysia	0.770701108	0.00001131957	0.00000695002
Malta	1.003016387	0.00003908321	0.00000781664
Mexico	0.548526273	0.00001242814	0.00000321603
Middle East	0.812802612	0.00002104355	0.00000403092
Moldova, Republic of	0.704803721	0.00001298428	0.00000137392
Mongolia	2.556060904	0.00002710213	0.00003831677
Morocco	0.80879585	0.00001440036	0.00001045466
Mozambique	0.000492252	0.00000000877	0.00000000088
Myanmar	0.349158482	0.00000688460	0.00000080743
Namibia	0.541773935	0.00000602866	0.00000851225
Nepal	0.003364536	0.00000013041	0.00000002608
Netherlands	0.444453808	0.00000595357	0.00000308594
Netherlands Antilles	0.793672836	0.00003076251	0.00000615250
New Zealand	0.2139999	0.00000299077	0.00000160492
Nicaragua	0.522212974	0.00002028425	0.00000405685
Nigeria	0.486277966	0.00001115868	0.00000156935
Non-OECD Europe	1.313761919	0.00001507207	0.00001883639
Non-OECD Total	0.859886819	0.00001182355	0.00001111305
Norway	0.002455289	0.00000002945	0.00000000705
OECD Europe	0.49963418	0.00000627129	0.00000584498
OECD North America	0.549886128	0.00000686176	0.00000709664
OECD Pacific	0.585661528	0.00000813421	0.00000643464
Oman	1.035857493	0.00002324486	0.00000317856
Pakistan	0.615374995	0.00001798722	0.00000316016
Panama	0.306167226	0.00001197575	0.00000239515
Paraguay	0	0.00000000000	0.00000000000
Peru	0.262944361	0.00000597340	0.00000131400
Philippines	0.60890161	0.00000935938	0.00000712544
Poland	1.279765701	0.00001339686	0.00001926536
Portugal	0.430704857	0.00000720645	0.00000435274
Qatar	0.659619964	0.00001175793	0.00000117579
Romania	1.285856628	0.00001408135	0.00001780479
Russian Federation	0.562633284	0.00000811770	0.00000452463
Saudi Arabia	0.877366485	0.00002619636	0.00000451727
Senegal	0.66173706	0.00002563959	0.00000510815
Serbia	1.712876916	0.00001741407	0.00002577648
Singapore	0.614543486	0.00001409863	0.00000199201
Slovak Republic	0.307807456	0.00000350397	0.00000410343
Slovenia	0.626100978	0.00000642866	0.00000933121
South Africa	1.182936289	0.00001251850	0.00001875332
South Asia	1.342589378	0.00001682292	0.00001941973
Southeast Asia/ASEAN	0.693611311	0.00001194174	0.00000627484
Spain	0.369240882	0.00000596009	0.00000331110
Sri Lanka	0.461519237	0.00001818494	0.00000363699
Sudan	0.680150024	0.00002694628	0.00000538926
Sweden	0.024681374	0.00000027490	0.00000014906
Switzerland	0.003415607	0.00000007545	0.00000001018

Emissions per kWh of electricity consumed			
	kgCO_2/kWh	**kgCH_4/kWh**	**kgN_2O/kWh**
Syrian Arab Republic	0.70692175	0.00002305167	0.00000423579
Tajikistan	0.025711618	0.00000045832	0.00000004583
Tanzania, United Republic of	0.295061016	0.00000521237	0.00000105550
Thailand	0.676651164	0.00001008566	0.00000511147
Togo	0.229227895	0.00000928048	0.00000185610
Trinidad and Tobago	0.848025002	0.00001520739	0.00000153701
Tunisia	0.632878823	0.00001337624	0.00000172550
Turkey	1.009750241	0.00001291619	0.00001155965
Turkmenistan	0.71307483	0.00001271078	0.00000127108
Ukraine	0.70784142	0.00000788473	0.00000908922
United Arab Emirates	1.03785453	0.00001900929	0.00000199214
United Kingdom	0.548402315	0.00000728401	0.00000552340
United States	0.586666503	0.00000702729	0.00000776512
Uruguay	0.335939219	0.00001336023	0.00000267123
Uzbekistan	0.627639691	0.00001092944	0.00000258618
Venezuela	0.23014673	0.00000666502	0.00000113109
Vietnam	0.516382428	0.00000780158	0.00000464892
World	0.689697213	0.00000920111	0.00000869864
Yemen	0.712448279	0.00002792654	0.00000558531
Zambia	0.003536552	0.00000013583	0.00000003099
Zimbabwe	0.664080394	0.00000712544	0.00001050244