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## Abstract

In this report, methods and results of estimating the most important health risks caused by emissions of air pollutants from coal fired power plants in Europe are described. Based on data about emissions of air pollutants from coal fired power plants provided by GREENPEACE (Myllyvirta 2013), the resulting health risks are estimated. The air pollutants causing by far the highest health risks and thus considered in this analysis are fine dust (PM<sub>10</sub>, PM<sub>2.5</sub>) and the gaseous pollutants SO<sub>2</sub>, NO<sub>x</sub>, and NMVOC. The latter species SO<sub>2</sub>, NO<sub>x</sub> and NMVOC are transformed in the atmosphere into secondary inorganic aerosols and ozone. The method used to estimate the health risks, i.e. the impact pathway approach, has been developed by IER in cooperation with other European partners during a series of projects (the ExternE projects) funded by the European Union (European Commission 2005), (Friedrich and Preiss 2012), see also [www.ExternE.info](http://www.ExternE.info). This method is widely applied by the European Commission for carrying out integrated assessments for supporting environmental legislation and for transport project appraisal.

For each of the chosen coal fired power plants, which encompass as well plants in operation as in planning or under construction, the reduction in life expectancy caused by the annual emissions of the above mentioned pollutants is calculated and expressed as 'years of life lost (YOLL)' in the European population. Secondly the 'working days lost' due to morbidity caused by these emissions are estimated.

# 1 Methodology

The aim of this analysis is to estimate important health risks caused by the direct emissions of coal fired power plants in Europe. The environmental stressor causing the highest burden of disease, i.e. impact to human health in Europe is clearly fine particulate matter (HEIMTSA 2007-2011); (Hänninen, Knol, 2011); (Friedrich et al. 2011). If we then only consider outdoor air pollution, then the second largest health impact comes from ozone (HEIMTSA 2007-2011), however the burden of disease from ozone is about 50 times smaller than that of fine particles.

Thus, in this study, we concentrate the analysis on emissions of

- primary fine particles, distinguishing between primary particulate matter with a diameter  $< 2.5\mu\text{m}$  (PM<sub>2.5</sub>) and primary particulate matter with a diameter  $< 10\mu\text{m}$  (PM<sub>10</sub>), where PM<sub>2.5</sub> is a part of PM<sub>10</sub>,

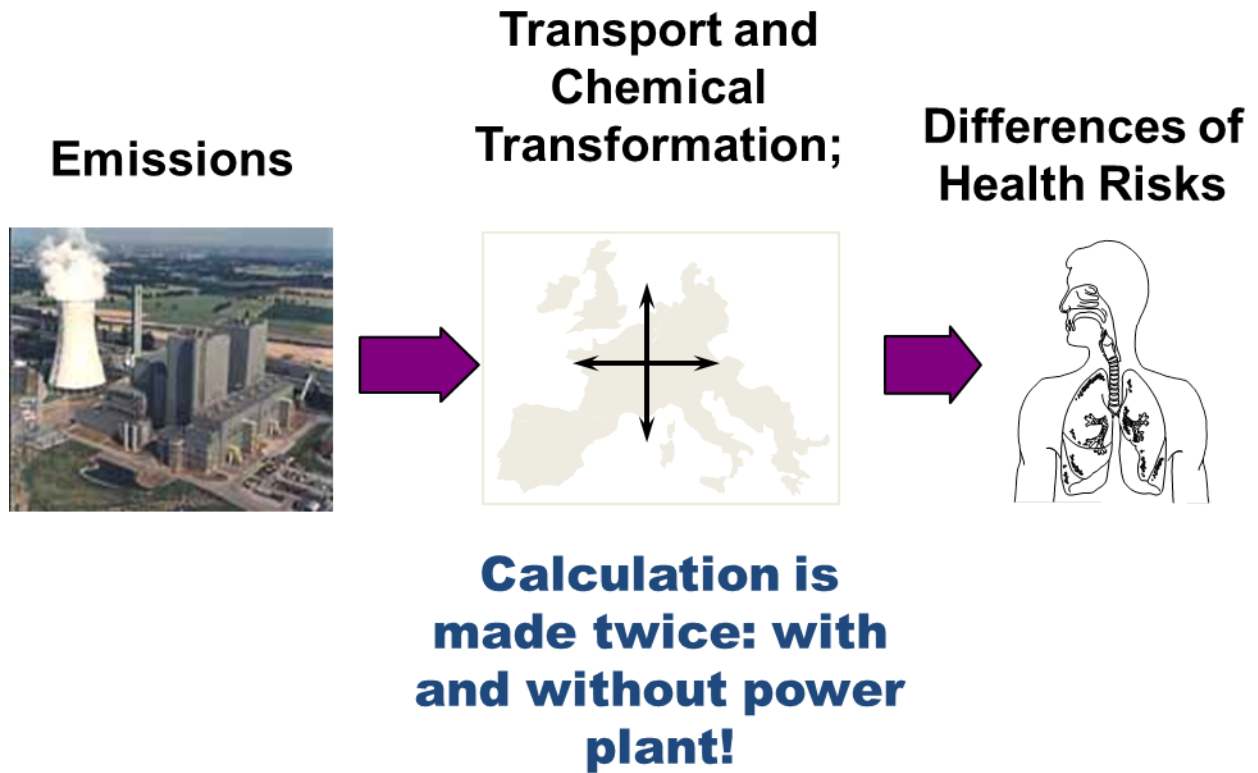
and on the emissions of precursors, that are converted in the atmosphere to secondary fine particles and ozone. For coal fired plants, the following precursors are relevant:

- Nitrogen dioxides - NO<sub>x</sub>
- Sulfur dioxide - SO<sub>2</sub>.

For coal fired plants, the emissions of precursors are more important for health effects than emissions of primary particles. The coal fired power plants in Europe (EU-27) in operation considered for this study emitted 3% of PM<sub>10</sub> emissions, 2% of PM<sub>2.5</sub> emissions, 11% of NO<sub>x</sub> emissions and 38% of the SO<sub>2</sub> emissions in Europe (EU-27) in 2010 (emissions of power plants taken from (Myllyvirta 2013), overall emissions from (EEA 2012)).

Annual emissions of the analysed power plants have been provided by GREENPEACE (Myllyvirta 2013). For 311 plants in operation, reported data corresponding to the year 2010 have been derived by GREENPEACE from the “European Pollutant Release and Transfer Register” (E-PRTR) database of the European Environmental Agency (<http://prtr.ec.europa.eu>). Moreover, GREENPEACE estimated emission data for 111 sites in Europe where power plants are under construction, approved, applying for approval or were connected to grid 2012 or later. The reported emissions for these plants occur after starting operation, i.e. in future years.

To calculate the health risks stemming from these emissions, the ‘impact pathway approach’ (Figure 1) was used, which was developed in a series of research projects funded by the European Commission, the ‘ExternE project series (see [www.ExternE.info](http://www.ExternE.info)).



**Figure 1: The impact pathway approach**

Starting with the emissions of the power plant, the transport and the chemical transformation of the pollutants in the atmosphere are calculated using a set of atmospheric models. For the local modelling the ISC (Industrial Source Complex) dispersion model of the US Environmental Protection Agency is used together with a pre-processor for providing meteorological data for the site (Douros, Tsegas and Naneris 2007). For the regional modelling, a parametrized version of a European-wide Eulerian model, the (Unified EMEP Model 2003) is applied. For the calculation of the chemical transformation of the gaseous substances into fine particles and ozone the concentration of all reagents of the chemical process has to be known, so all emissions of all sources, not only those of the analysed power plant, are needed as input. In fact, the calculation is made twice, first without and then with the emissions of the analysed power plant and the difference in the average annual concentration of fine particles and ozone is then used to estimate the additional health effect caused by the power plant.

This is done using concentration-response functions (CRFs) in Table 1 that relate changes in the annual average concentration of PM<sub>10</sub>, PM<sub>2.5</sub> or ozone to changes in health risks. These relationships are derived from analysing the results of epidemiological studies. Most morbidity risks occur shortly after inhalation. However, for chronic diseases, especially reduction of life expectancy and the occurrence of chronic bronchitis, this is different. After an exposure to fine particles for many years, a few of the exposed persons start to develop respiratory diseases and subsequently cardiovascular diseases that get chronic and - at the end of the life of the exposed person - lead to a premature death. Thus it is the life-long exposure to fine particles from many sources that at the end causes the reduction in life time.

**Table 1: Overview of the concentration-response-functions (CRF) for particulate matter (PM) and ozone based on (Torfs et al. 2007)**

<b>Pollutant and corresponding endpoint</b>	<b>Health risk per person per <math>\mu\text{g}</math> per <math>\text{m}^3</math> and year [<math>\text{x}/(\mu\text{g}/(\text{m}^3 * \text{a}))</math>]</b>	<b>Unit</b>
<b>Particulate Matter &lt; 2.5<math>\mu\text{m}</math>, i.e. PM2.5</b>		
Life expectancy reduction – years of life lost	$6.51 * 10^{-04}$	years
net restricted activity days (NetRAD)	$9.59 * 10^{-03}$	days
Work loss days (WLD)	$1.39 * 10^{-02}$	days
Minor restricted activity days (MRAD)	$3.69 * 10^{-02}$	days
<b>Particulate Matter &lt; 10 <math>\mu\text{m}</math>, i.e. PM10</b>		
Increased mortality risk (infants)	$6.84 * 10^{-08}$	cases
New cases of chronic bronchitis	$1.86 * 10^{-05}$	cases
Respiratory hospital admissions (RHA)	$7.03 * 10^{-06}$	cases
Cardiac hospital admissions (CHA)	$4.34 * 10^{-06}$	cases
Medication use / bronchodilator use (child)	$4.03 * 10^{-04}$	cases
Medication use / bronchodilator use (adult)	$3.27 * 10^{-03}$	cases
Lower respiratory symptoms (adult)	$3.24 * 10^{-02}$	days
Lower respiratory symptoms (child)	$2.08 * 10^{-02}$	days
<b>Average daily SOMO35: Indicator for ozone</b>		
Life expectancy reduction - years of life lost	$2.23 * 10^{-06}$	years
Respiratory hospital admissions (RHA)	$1.98 * 10^{-06}$	cases
Minor restricted activity days (MRAD)	$7.36 * 10^{-03}$	days
Medication use / bronchodilator use	$2.62 * 10^{-03}$	cases
Lower resp. symptoms (LRS) excluding cough	$1.79 * 10^{-03}$	days
Cough days	$1.04 * 10^{-02}$	days

Whereas:

*CRF: concentration-response function*

*YOLL: years of life lost*

*RAD: Restricted activity days*

*NetRAD: To avoid double counting, RAD is corrected according to (Torfs et al. 2007). "Since Work Loss Days (WLD), Minor Restricted Activity Days (MRAD and days in hospital because of cardiac hospital admissions CHA and Respiratory Hospital Admissions (RHA) are also RADs the net RADs are calculated as:*

*NetRAD (per  $\mu\text{g}/\text{m}^3$  PM2.5) = RAD – WLD – MRAD – (RHA and CHA due to PM10) \* 10 days"*

*WLD: Work loss days*

*MRAD: Minor restricted activity days*

*LRS: lower respiratory symptoms*

*Average daily SOMO35: for each day of the year, the maximum ozone concentration during any 8h-period of the day is determined. If this maximum exceeds 35 ppb (parts per billion), then the difference between the concentration and 35 ppb is determined. For each day with an exceedance these differences are added. The result is the indicator for ozone exposure SOMO35 (sum of means over 35 ppb). Dividing this value by 365 gives the average daily SOMO35 value.*

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(Torfs et al. 2007) provide the recommended state of the art set of concentration-response-functions regarding ambient air pollution of the air pollutants particulate matter and ozone in Europe (i.e. in the EU-27), that is used here. A detailed literature review, and the associated recommendations for CRFs and for background rates is also reported in (European Commission - CAFE 2005).

The toxicity of different kinds of particles may vary per unit mass PM<sub>2.5</sub> taken in (due to difference in shape, composition, etc.). However, the World Health Organisation states that based on current evidence, it is not possible to quantify reliably this difference, e.g. between secondary inorganic aerosols (sulfates and nitrates) and primary particulate matter (black carbon or ash). Hence, the only distinction made here is between very fine particulate PM<sub>2.5</sub> and PM<sub>coarse</sub> (i.e. the fraction particles with a size between 2.5µm and 10µm aerodynamic diameter), as there is proof, that the finer particles (<2.5) are the main cause of chronic mortality. However, if at some time in the future evidence emerges that the toxicity of secondary particles is different from those of primary particles, this would change the results of this analysis.

The CRFs are based on epidemiological studies, i.e. on studies finding a statistically significant relation between concentrations of pollutants and health effects. Most important is chronic mortality from particulates. This is derived from the so called In the “ACS study” (Pope et al. 2002). Here PM<sub>10</sub> was measured in different metropolitan areas across the US, with varying PM<sub>10</sub> concentrations and composition, and a sound linear correlation with life expectancy was found. According to the hypothesis, that PM<sub>2.5</sub> (and not the coarser part of PM<sub>10</sub>) is responsible for the health damage, the concentration-response function for PM<sub>10</sub> is converted into a function for PM<sub>2.5</sub>. The resulting concentration-response function “chronic mortality life expectancy reduction” due to PM<sub>2.5</sub> applied to the age group of people 30 years and above results in 651 (95% confidence interval 127 – 1194) YOLL per 10 µg/m<sup>3</sup> per 100,000 people (Torfs et al. 2007).

An uncertainty estimation that includes all parts of the impact pathway (Spadaro and Rabl 2007); (Spadaro and Rabl 2008) came to the conclusion, that the geometric deviation of damage estimates per emitted kg (62.5 CI) is approximately  $\sigma \approx 3$ , i.e. the 62.5% interval lies between three times and one third of the reported value.

The actual application of the impact pathway approach is carried out using a web-based computer tool called ECOSENSE ([www.ExternE.info](http://www.ExternE.info)). This tool exists in two versions. The more complex version ‘EcoSenseWeb’ takes the concrete location of the power plant into account when applying the local atmospheric model. However, this version needs a certain amount of effort for preparation and computer time for running the model. Thus, to limit the effort, this model was not used for all power plants, but only for 80 plants, mostly newly planned plants chosen by GREENPEACE. For the other 344 power plants, a simplified version of the model called ECOSENSELE ([www.ExternE.info](http://www.ExternE.info)) is used.



This model only distinguishes between the region, where the power plant is located, but not the exact site. The difference between the estimations of the simplified and the complex model lies in most cases below 10%, which is small compared to the uncertainties mentioned above. Only for sites located directly at the coast, the difference might be larger.

## 2 Example of the spatial distribution of potential health impacts

In Table 2, detailed results for a power plant in the approval process located in Datteln, Germany (reference number “GPDE0010” in Chapter 3.1) are shown.

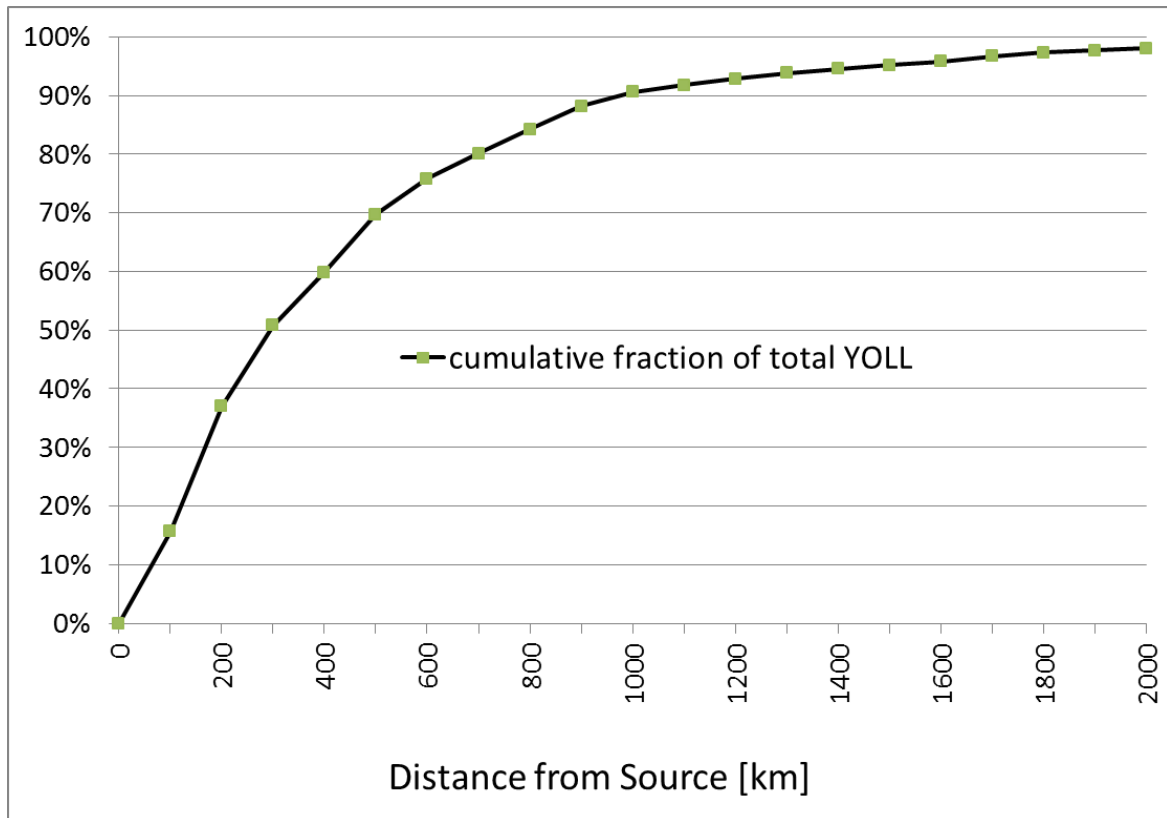
**Table 2: Detailed results of the calculation of morbidity and mortality for the power plant in construction located in Datteln, Germany (“GPDE0010”)**

Pollutant and corresponding endpoint		Unit
<b>health risks caused by particulate matter (PM2.5 and PM10)</b>		
Life expectancy reduction – years of life lost (chronic)	895	years/a
net restricted activity days	13 185	days/a
Work loss days	19 136	days/a
Increased mortality risk (infants)	0.1	cases/a
New cases of chronic bronchitis	28	cases/a
Cardiac hospital admissions	7	cases/a
Lower respiratory symptoms	82 150	days/a
<b>health risks caused by ozone</b>		
Life expectancy reduction	-1.8	years/a
Lower respiratory symptoms, excluding cough	-1 429	days/a
Cough days	-8 307	days/a
<b>health risks caused by particulate matter and ozone</b>		
Respiratory hospital admissions	9	cases/a
Minor restricted activity days	44 931	days/a
Medication use / bronchodilator use	3 547	cases/a

The health risks caused by ozone are negative; this indicates a (small) reduction of health risks. As emitted NO (nitrogen monoxide) reduces ozone (O<sub>3</sub>) to oxygen (O<sub>2</sub>), the ozone concentration – and thus the health impacts caused by ozone - near the power plant are decreasing, although farer away from the power plant an increase of ozone concentration might occur. It depends on the population distribution and the background concentrations of pollutants, whether the positive or the negative effect dominates. However, NO emissions have a much larger negative health impact due to the formation of secondary aerosols, thus overall the negative impacts of NO emissions prevail.

Figure 2 shows the cumulative fraction of total YOLL as a function of the radius around the source of emissions. As can be seen, only a relatively small share of the total YOLL occurs close to the power plant. 80 % of the YOLL occur within a distance of ca. 700 km. There are two reasons for the spatial distribution of impacts. The first reason is that most of the YOLL are caused by secondary aerosols. The formation of these secondary aerosols takes place in the atmosphere; the chemical reactions need ammonia as a reaction partner and they take some time. The pollutants are meanwhile transported with the wind away from the site. Secondly, the high stacks of the power plant causes the pollutants to reach the ground only some kilometers away from the site of the plant. So the highest health risks do occur in a distance between ca. 50 and 150 km away from the power plant site and not directly around the plant. The highest individual risk to lose a life year at the end of the

life amounts is around  $2 \cdot 10^{-5}$  YOLL/a or 10.5 minutes of life time per year of exposure. This is an average figure, i.e. it means, that a very small part of the population experiences a considerable loss of life time, e.g. of several years, whereas the vast majority of the exposed persons does not show any effect.



**Figure 2: Cumulative fraction of the total mortality risk, which occurs within a circle around the plant site caused by the power plant GPDE0010 (Datteln) depending on the radius of the circle, i.e. within a circle with x km radius around the plant y % of the health risks are occurring.**

Figure 3 shows the spatial distribution of the estimated mortality. The years of life lost per grid cell (ca. 50 km \* 50 km) are shown. The outer circle indicates the 700 km range. The high values in grid cells further away from the source indicate areas with a high population density such as the London or Paris region. Hence, although the concentration increment is lower in areas further away from the source, the product of the concentration increment times the number of people exposed can be relatively high.

The health risks caused by the power plant on a certain location are so small, that they cannot be observed or measured; the statistical variance of health impacts on any location is much higher than the additional health risks. However, epidemiological studies show, that an increase in PM2.5 concentrations cause an increase in life years lost, and that this relationship is linear. Thus this relationship can be used to estimate the health risks even caused by small increases in the concentration of fine dust. The overall health impacts of fine particles can be measured, and it is legitimate to allocate these risks to the sources according to their share on the exposure of the population, as the concentration-response relationship is linear.

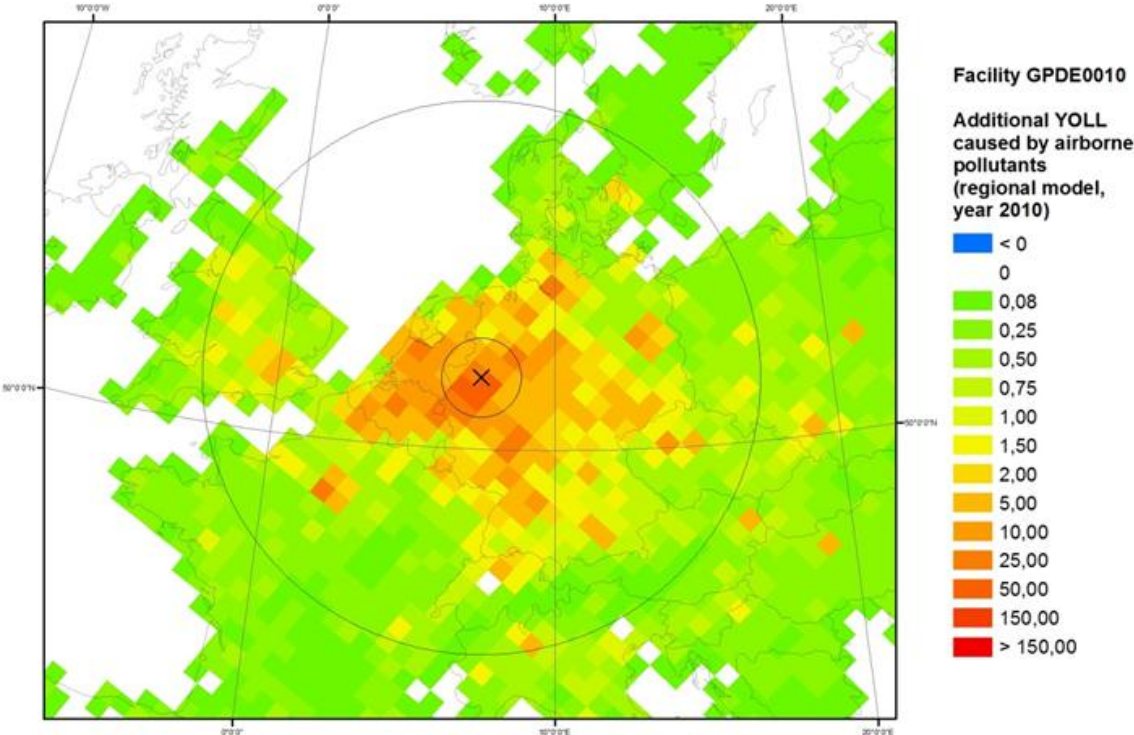


Figure 3: Spatial distribution of health risks (years of life lost) per grid cell of 50\*50 km<sup>2</sup>

### 3 Results

In the following the results of health risk estimation for the different power plants are presented.

In Chapter 3.1 the results for the 80 power plants are shown which were calculated with EcoSenseWeb (<http://ecosenseweb.ier.uni-stuttgart.de/>). Following the name of the power plant or the location there is an indication whether the status of the location is either

- in operation or
- not in operation, but e.g. in planning phase, applying for permission, announced to be build

In Chapter 3.2 the results of using the simplified approach are shown. Annual emissions of the analysed power plants have been provided by GREENPEACE (Myllyvirta 2013). For 311 plants in operation, reported data corresponding to the year 2010 has been derived by GREENPEACE from the “European Pollutant Release and Transfer Register” (E-PRTR) database of the European Environmental Agency (<http://prtr.ec.europa.eu>). Moreover, GREENPEACE estimated emission data for 111 sites in Europe where power plants are under construction, approved or applying for approval. The emission data corresponds to the assumed year of starting operation, i.e. 2012 and later.

The estimation of mortality (years of life lost -YOLL), based on damage factors per unit of emission of classical pollutants are shown. The impacts are expressed as years of life lost. The estimation is based on country average damage factors for the classical air pollutants.

Finally, in Chapter 3.3 the mortality impacts and the WLD for the assessed power plants are summed up for each country. The results are separated into coal fired power plants in operation and in the once in planning and construction phase.

#### 3.1 Results based on EcoSenseWeb for selected sites

In the following for each of the power plants that have been selected by GREENPEACE for the more detailed analysis with EcoSenseWeb, the resulting health risks are presented. The occurrence of negative values for health risks caused by ozone for some of the plants is explained in Chapter 2.

##### **1298 - PGE Bełchatów (Operation)**

Bronchodilator usage	[cases] per [year]	78117
Chronic bronchitis	[cases] per [year]	336
Lower respiratory symptoms	[days] per [year]	970082
Cardiac hospital admissions	[cases] per [year]	79
Respiratory hospital admission	[cases] per [year]	136
Work loss days	[days] per [year]	227901
Minor RAD	[days] per [year]	637566
netRAD	[days] per [year]	157068
LRSwo cough	[cases] per [year]	7889
Cough	[days] per [year]	45860
Infant Mortality due to PM10	[cases] per [year]	1.24
YOLL due to PM2.5	[years] per [year]	10670
YOLL due to ozone	[years] per [year]	9.81

**7027 - ENEL Federico II (BR SUD) (Operation)**

Bronchodilator usage	[cases] per [year]	12335
Chronic bronchitis	[cases] per [year]	28
Lower respiratory symptoms	[days] per [year]	79733
Cardiac hospital admissions	[cases] per [year]	6
Respiratory hospital admission	[cases] per [year]	16
Work loss days	[days] per [year]	17629
Minor RAD	[days] per [year]	66079
netRAD	[days] per [year]	12156
LRSwo cough	[cases] per [year]	4691
Cough	[days] per [year]	27270
Infant Mortality due to PM10	[cases] per [year]	0.1
YOLL due to PM2.5	[years] per [year]	825
YOLL due to ozone	[years] per [year]	5.83

**14245 - PPC S.A. SES AGIOY DHMHTRIOY (Operation)**

Bronchodilator usage	[cases] per [year]	38393
Chronic bronchitis	[cases] per [year]	117
Lower respiratory symptoms	[days] per [year]	338556
Cardiac hospital admissions	[cases] per [year]	27
Respiratory hospital admission	[cases] per [year]	56
Work loss days	[days] per [year]	80423
Minor RAD	[days] per [year]	256042
netRAD	[days] per [year]	55422
LRSwo cough	[cases] per [year]	10370
Cough	[days] per [year]	60250
Infant Mortality due to PM10	[cases] per [year]	0.43
YOLL due to PM2.5	[years] per [year]	3764
YOLL due to ozone	[years] per [year]	12.88

**15819 - TETs "Enel Maritsa iztok 3" (Operation)**

Bronchodilator usage	[cases] per [year]	13603
Chronic bronchitis	[cases] per [year]	46
Lower respiratory symptoms	[days] per [year]	132078
Cardiac hospital admissions	[cases] per [year]	11
Respiratory hospital admission	[cases] per [year]	21
Work loss days	[days] per [year]	31984
Minor RAD	[days] per [year]	97636
netRAD	[days] per [year]	22040
LRSwo cough	[cases] per [year]	3102
Cough	[days] per [year]	18030
Infant Mortality due to PM10	[cases] per [year]	0.17
YOLL due to PM2.5	[years] per [year]	1496
YOLL due to ozone	[years] per [year]	3.86

**15875 - TETs Maritsa iztok 2 EAD (Operation)**

Bronchodilator usage	[cases] per [year]	79695
Chronic bronchitis	[cases] per [year]	345
Lower respiratory symptoms	[days] per [year]	995440
Cardiac hospital admissions	[cases] per [year]	81
Respiratory hospital admission	[cases] per [year]	139
Work loss days	[days] per [year]	248157
Minor RAD	[days] per [year]	690660
netRAD	[days] per [year]	171018
LRSwo cough	[cases] per [year]	7779
Cough	[days] per [year]	45220
Infant Mortality due to PM10	[cases] per [year]	1.27
YOLL due to PM2.5	[years] per [year]	11613
YOLL due to ozone	[years] per [year]	9.67

**46361 - Vattenfall Europe Generation AG Kraftwerk Jämschwalde (Operation)**

Bronchodilator usage	[cases] per [year]	34765
Chronic bronchitis	[cases] per [year]	124
Lower respiratory symptoms	[days] per [year]	357370
Cardiac hospital admissions	[cases] per [year]	29
Respiratory hospital admission	[cases] per [year]	55
Work loss days	[days] per [year]	84196
Minor RAD	[days] per [year]	252211
netRAD	[days] per [year]	58019
LRSwo cough	[cases] per [year]	7000
Cough	[days] per [year]	40690
Infant Mortality due to PM10	[cases] per [year]	0.46
YOLL due to PM2.5	[years] per [year]	3940
YOLL due to ozone	[years] per [year]	8.7

**157215 - SUCURSALA ELECTROCENTRALE ISALNITA (Operation)**

Bronchodilator usage	[cases] per [year]	12584
Chronic bronchitis	[cases] per [year]	62
Lower respiratory symptoms	[days] per [year]	178418
Cardiac hospital admissions	[cases] per [year]	14
Respiratory hospital admission	[cases] per [year]	24
Work loss days	[days] per [year]	44489
Minor RAD	[days] per [year]	119062
netRAD	[days] per [year]	30657
LRSwo cough	[cases] per [year]	236
Cough	[days] per [year]	1371
Infant Mortality due to PM10	[cases] per [year]	0.23
YOLL due to PM2.5	[years] per [year]	2082
YOLL due to ozone	[years] per [year]	0.29

**157216 - SUCURSALA ELECTROCENTRALE CRAIOVA II  
(Operation)**

Bronchodilator usage	[cases] per [year]	13524
Chronic bronchitis	[cases] per [year]	56
Lower respiratory symptoms	[days] per [year]	161953
Cardiac hospital admissions	[cases] per [year]	13
Respiratory hospital admission	[cases] per [year]	23
Work loss days	[days] per [year]	39852
Minor RAD	[days] per [year]	112522
netRAD	[days] per [year]	27463
LRSwo cough	[cases] per [year]	1646
Cough	[days] per [year]	9569
Infant Mortality due to PM10	[cases] per [year]	0.21
YOLL due to PM2.5	[years] per [year]	1865
YOLL due to ozone	[years] per [year]	2.05

**157218 - COMPLEXUL ENERGETIC TURCENI (Operation)**

Bronchodilator usage	[cases] per [year]	61390
Chronic bronchitis	[cases] per [year]	258
Lower respiratory symptoms	[days] per [year]	744303
Cardiac hospital admissions	[cases] per [year]	60
Respiratory hospital admission	[cases] per [year]	105
Work loss days	[days] per [year]	183452
Minor RAD	[days] per [year]	515854
netRAD	[days] per [year]	126421
LRSwo cough	[cases] per [year]	7039
Cough	[days] per [year]	40920
Infant Mortality due to PM10	[cases] per [year]	0.95
YOLL due to PM2.5	[years] per [year]	8584
YOLL due to ozone	[years] per [year]	8.75

**157219 - COMPLEXUL ENERGETIC ROVINARI (Operation)**

Bronchodilator usage	[cases] per [year]	44556
Chronic bronchitis	[cases] per [year]	182
Lower respiratory symptoms	[days] per [year]	524315
Cardiac hospital admissions	[cases] per [year]	42
Respiratory hospital admission	[cases] per [year]	75
Work loss days	[days] per [year]	128201
Minor RAD	[days] per [year]	364424
netRAD	[days] per [year]	88365
LRSwo cough	[cases] per [year]	5858
Cough	[days] per [year]	34050
Infant Mortality due to PM10	[cases] per [year]	0.67
YOLL due to PM2.5	[years] per [year]	6001
YOLL due to ozone	[years] per [year]	7.28



**GPBG0001 - Enemona Lom (Announced)**

Bronchodilator usage	[cases] per [year]	4605
Chronic bronchitis	[cases] per [year]	10
Lower respiratory symptoms	[days] per [year]	28306
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	6461
Minor RAD	[days] per [year]	24629
netRAD	[days] per [year]	4453
LRSwo cough	[cases] per [year]	1820
Cough	[days] per [year]	10580
Infant Mortality due to PM10	[cases] per [year]	0.04
YOLL due to PM2.5	[years] per [year]	302
YOLL due to ozone	[years] per [year]	2.26

**GPBG0002 - Energia MK Bobov Dol (Announced)**

Bronchodilator usage	[cases] per [year]	3450
Chronic bronchitis	[cases] per [year]	7
Lower respiratory symptoms	[days] per [year]	21256
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	4
Work loss days	[days] per [year]	4842
Minor RAD	[days] per [year]	18444
netRAD	[days] per [year]	3337
LRSwo cough	[cases] per [year]	1361
Cough	[days] per [year]	7912
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	227
YOLL due to ozone	[years] per [year]	1.69

**GPBG0003 - BEH Maritsa-Iztok-2 (Applying for permits)**

Bronchodilator usage	[cases] per [year]	4143
Chronic bronchitis	[cases] per [year]	9
Lower respiratory symptoms	[days] per [year]	25445
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	5
Work loss days	[days] per [year]	5812
Minor RAD	[days] per [year]	22156
netRAD	[days] per [year]	4006
LRSwo cough	[cases] per [year]	1638
Cough	[days] per [year]	9522
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	272
YOLL due to ozone	[years] per [year]	2.04

**GPBG0005 - RWE & MIM Maritsa Iztok-4 (Unclear)**

Bronchodilator usage	[cases] per [year]	7363
Chronic bronchitis	[cases] per [year]	16
Lower respiratory symptoms	[days] per [year]	45207
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	9
Work loss days	[days] per [year]	10328
Minor RAD	[days] per [year]	39382
netRAD	[days] per [year]	7118
LRSwo cough	[cases] per [year]	2912
Cough	[days] per [year]	16930
Infant Mortality due to PM10	[cases] per [year]	0.06
YOLL due to PM2.5	[years] per [year]	483
YOLL due to ozone	[years] per [year]	3.62

**GPCR0001 - HEP Plomin 'C' (Applying for permits)**

Bronchodilator usage	[cases] per [year]	2565
Chronic bronchitis	[cases] per [year]	7
Lower respiratory symptoms	[days] per [year]	20227
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	4
Work loss days	[days] per [year]	4697
Minor RAD	[days] per [year]	15778
netRAD	[days] per [year]	3238
LRSwo cough	[cases] per [year]	805
Cough	[days] per [year]	4676
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	220
YOLL due to ozone	[years] per [year]	1.00

**GPCZ0001 - CZ Coal Mostecka (Announced)**

Bronchodilator usage	[cases] per [year]	5765
Chronic bronchitis	[cases] per [year]	25
Lower respiratory symptoms	[days] per [year]	71474
Cardiac hospital admissions	[cases] per [year]	6
Respiratory hospital admission	[cases] per [year]	10
Work loss days	[days] per [year]	16409
Minor RAD	[days] per [year]	45976
netRAD	[days] per [year]	11311
LRSwo cough	[cases] per [year]	588
Cough	[days] per [year]	3419
Infant Mortality due to PM10	[cases] per [year]	0.09
YOLL due to PM2.5	[years] per [year]	768
YOLL due to ozone	[years] per [year]	0.73

**GPCZ0003 - CEZ Prunerov (Permitted)**

Bronchodilator usage	[cases] per [year]	5562
Chronic bronchitis	[cases] per [year]	24
Lower respiratory symptoms	[days] per [year]	68961
Cardiac hospital admissions	[cases] per [year]	6
Respiratory hospital admission	[cases] per [year]	10
Work loss days	[days] per [year]	15826
Minor RAD	[days] per [year]	44348
netRAD	[days] per [year]	10908
LRSwo cough	[cases] per [year]	567
Cough	[days] per [year]	3296
Infant Mortality due to PM10	[cases] per [year]	0.09
YOLL due to PM2.5	[years] per [year]	741
YOLL due to ozone	[years] per [year]	0.70

**GPCZ0004 - CEZ Ledvice (Under construction)**

Bronchodilator usage	[cases] per [year]	4531
Chronic bronchitis	[cases] per [year]	19
Lower respiratory symptoms	[days] per [year]	56177
Cardiac hospital admissions	[cases] per [year]	5
Respiratory hospital admission	[cases] per [year]	8
Work loss days	[days] per [year]	12880
Minor RAD	[days] per [year]	36102
netRAD	[days] per [year]	8880
LRSwo cough	[cases] per [year]	461
Cough	[days] per [year]	2682
Infant Mortality due to PM10	[cases] per [year]	0.07
YOLL due to PM2.5	[years] per [year]	603
YOLL due to ozone	[years] per [year]	0.57

**GPCZ0005 - Alpiq Kladno (Under construction)**

Bronchodilator usage	[cases] per [year]	1125
Chronic bronchitis	[cases] per [year]	5
Lower respiratory symptoms	[days] per [year]	13960
Cardiac hospital admissions	[cases] per [year]	1
Respiratory hospital admission	[cases] per [year]	2
Work loss days	[days] per [year]	3197
Minor RAD	[days] per [year]	8957
netRAD	[days] per [year]	2204
LRSwo cough	[cases] per [year]	114
Cough	[days] per [year]	665
Infant Mortality due to PM10	[cases] per [year]	0.02
YOLL due to PM2.5	[years] per [year]	150
YOLL due to ozone	[years] per [year]	0.14

**GPDE0001 - RWE Arneburg (Announced)**

Bronchodilator usage	[cases] per [year]	4954
Chronic bronchitis	[cases] per [year]	17
Lower respiratory symptoms	[days] per [year]	49317
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	8
Work loss days	[days] per [year]	11526
Minor RAD	[days] per [year]	35008
netRAD	[days] per [year]	7943
LRswo cough	[cases] per [year]	1073
Cough	[days] per [year]	6236
Infant Mortality due to PM10	[cases] per [year]	0.06
YOLL due to PM2.5	[years] per [year]	539
YOLL due to ozone	[years] per [year]	1.33

**GPDE0002 - Infracor Marl (Announced)**

Bronchodilator usage	[cases] per [year]	1735
Chronic bronchitis	[cases] per [year]	14
Lower respiratory symptoms	[days] per [year]	39468
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	4
Work loss days	[days] per [year]	9121
Minor RAD	[days] per [year]	21479
netRAD	[days] per [year]	6286
LRswo cough	[cases] per [year]	-665
Cough	[days] per [year]	-3867
Infant Mortality due to PM10	[cases] per [year]	0.05
YOLL due to PM2.5	[years] per [year]	427
YOLL due to ozone	[years] per [year]	-0.83

**GPDE0003 - RWE Niederaußem (Bergheim) (Applying for permits)**

Bronchodilator usage	[cases] per [year]	5217
Chronic bronchitis	[cases] per [year]	41
Lower respiratory symptoms	[days] per [year]	119151
Cardiac hospital admissions	[cases] per [year]	10
Respiratory hospital admission	[cases] per [year]	13
Work loss days	[days] per [year]	27638
Minor RAD	[days] per [year]	65053
netRAD	[days] per [year]	19049
LRswo cough	[cases] per [year]	-2024
Cough	[days] per [year]	-11760
Infant Mortality due to PM10	[cases] per [year]	0.15
YOLL due to PM2.5	[years] per [year]	1294
YOLL due to ozone	[years] per [year]	-2.52

**GPDE0004 - Mibrag Profen (Applying for permits)**

Bronchodilator usage	[cases] per [year]	1986
Chronic bronchitis	[cases] per [year]	7
Lower respiratory symptoms	[days] per [year]	19789
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	3
Work loss days	[days] per [year]	4616
Minor RAD	[days] per [year]	14021
netRAD	[days] per [year]	3181
LRSwo cough	[cases] per [year]	429
Cough	[days] per [year]	2493
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	216
YOLL due to ozone	[years] per [year]	0.53

**GPDE0005 - Dow Chemical Stade (Applying for permits)**

Bronchodilator usage	[cases] per [year]	5979
Chronic bronchitis	[cases] per [year]	28
Lower respiratory symptoms	[days] per [year]	81287
Cardiac hospital admissions	[cases] per [year]	7
Respiratory hospital admission	[cases] per [year]	11
Work loss days	[days] per [year]	19021
Minor RAD	[days] per [year]	51623
netRAD	[days] per [year]	13112
LRSwo cough	[cases] per [year]	273
Cough	[days] per [year]	1588
Infant Mortality due to PM10	[cases] per [year]	0.1
YOLL due to PM2.5	[years] per [year]	890
YOLL due to ozone	[years] per [year]	0.34

**GPDE0006 - E.ON Staudinger (Cancelled)**

Bronchodilator usage	[cases] per [year]	4444
Chronic bronchitis	[cases] per [year]	16
Lower respiratory symptoms	[days] per [year]	44858
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	7
Work loss days	[days] per [year]	10485
Minor RAD	[days] per [year]	31661
netRAD	[days] per [year]	7223
LRSwo cough	[cases] per [year]	933
Cough	[days] per [year]	5424
Infant Mortality due to PM10	[cases] per [year]	0.06
YOLL due to PM2.5	[years] per [year]	491
YOLL due to ozone	[years] per [year]	1.16

**GPDE0010 - E.ON Datteln (Under construction)**

Bronchodilator usage	[cases] per [year]	3547
Chronic bronchitis	[cases] per [year]	28
Lower respiratory symptoms	[days] per [year]	82150
Cardiac hospital admissions	[cases] per [year]	7
Respiratory hospital admission	[cases] per [year]	9
Work loss days	[days] per [year]	19136
Minor RAD	[days] per [year]	44931
netRAD	[days] per [year]	13185
LRswo cough	[cases] per [year]	-1429
Cough	[days] per [year]	-8307
Infant Mortality due to PM10	[cases] per [year]	0.1
YOLL due to PM2.5	[years] per [year]	895
YOLL due to ozone	[years] per [year]	-1.78

**GPDE0011 - Trianel Power Lünen (Under construction)**

Bronchodilator usage	[cases] per [year]	3137
Chronic bronchitis	[cases] per [year]	25
Lower respiratory symptoms	[days] per [year]	71297
Cardiac hospital admissions	[cases] per [year]	6
Respiratory hospital admission	[cases] per [year]	8
Work loss days	[days] per [year]	16472
Minor RAD	[days] per [year]	38795
netRAD	[days] per [year]	11352
LRswo cough	[cases] per [year]	-1201
Cough	[days] per [year]	-6982
Infant Mortality due to PM10	[cases] per [year]	0.09
YOLL due to PM2.5	[years] per [year]	771
YOLL due to ozone	[years] per [year]	-1.49

**GPDE0012 - EnBW Karlsruhe-Rheinhafen (Under construction)**

Bronchodilator usage	[cases] per [year]	4058
Chronic bronchitis	[cases] per [year]	16
Lower respiratory symptoms	[days] per [year]	44794
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	7
Work loss days	[days] per [year]	10565
Minor RAD	[days] per [year]	30812
netRAD	[days] per [year]	7284
LRswo cough	[cases] per [year]	672
Cough	[days] per [year]	3905
Infant Mortality due to PM10	[cases] per [year]	0.06
YOLL due to PM2.5	[years] per [year]	495
YOLL due to ozone	[years] per [year]	0.84

**GPDE0013 - GDF Suez & BKW Energie Wilhelmshaven (Under construction)**

Bronchodilator usage	[cases] per [year]	1595
Chronic bronchitis	[cases] per [year]	7
Lower respiratory symptoms	[days] per [year]	21198
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	3
Work loss days	[days] per [year]	4931
Minor RAD	[days] per [year]	13485
netRAD	[days] per [year]	3398
LRSwo cough	[cases] per [year]	96
Cough	[days] per [year]	556
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	231
YOLL due to ozone	[years] per [year]	0.12

**GPDE0014 - RWE Hamm-Uentrop (Under construction)**

Bronchodilator usage	[cases] per [year]	5743
Chronic bronchitis	[cases] per [year]	45
Lower respiratory symptoms	[days] per [year]	130760
Cardiac hospital admissions	[cases] per [year]	11
Respiratory hospital admission	[cases] per [year]	15
Work loss days	[days] per [year]	30270
Minor RAD	[days] per [year]	71293
netRAD	[days] per [year]	20865
LRSwo cough	[cases] per [year]	-2209
Cough	[days] per [year]	-12840
Infant Mortality due to PM10	[cases] per [year]	0.17
YOLL due to PM2.5	[years] per [year]	1417
YOLL due to ozone	[years] per [year]	-2.75

**GPDE0015 - GKM AG Mannheim, Neckarau Block 9 (Under construction)**

Bronchodilator usage	[cases] per [year]	3986
Chronic bronchitis	[cases] per [year]	15
Lower respiratory symptoms	[days] per [year]	43021
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	10125
Minor RAD	[days] per [year]	29776
netRAD	[days] per [year]	6978
LRSwo cough	[cases] per [year]	706
Cough	[days] per [year]	4103
Infant Mortality due to PM10	[cases] per [year]	0.05
YOLL due to PM2.5	[years] per [year]	474
YOLL due to ozone	[years] per [year]	0.88

**GPDE0016 - Vattenfall Europe AG, Berlin Hamburg-Moorburg (Under construction)**

Bronchodilator usage	[cases] per [year]	1649
Chronic bronchitis	[cases] per [year]	8
Lower respiratory symptoms	[days] per [year]	23922
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	3
Work loss days	[days] per [year]	5618
Minor RAD	[days] per [year]	14937
netRAD	[days] per [year]	3872
LRSwo cough	[cases] per [year]	5
Cough	[days] per [year]	27
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	263
YOLL due to ozone	[years] per [year]	0.01

**GPGR0001 - PPC Agios Dimitrios 6/Ptolemais (Announced)**

Bronchodilator usage	[cases] per [year]	10604
Chronic bronchitis	[cases] per [year]	30
Lower respiratory symptoms	[days] per [year]	86769
Cardiac hospital admissions	[cases] per [year]	7
Respiratory hospital admission	[cases] per [year]	15
Work loss days	[days] per [year]	20285
Minor RAD	[days] per [year]	66888
netRAD	[days] per [year]	13982
LRSwo cough	[cases] per [year]	3178
Cough	[days] per [year]	18470
Infant Mortality due to PM10	[cases] per [year]	0.11
YOLL due to PM2.5	[years] per [year]	949
YOLL due to ozone	[years] per [year]	3.95

**GPGR0002 - PPC Meliti II, Florina (Applying for permits)**

Bronchodilator usage	[cases] per [year]	8520
Chronic bronchitis	[cases] per [year]	24
Lower respiratory symptoms	[days] per [year]	69895
Cardiac hospital admissions	[cases] per [year]	6
Respiratory hospital admission	[cases] per [year]	12
Work loss days	[days] per [year]	16340
Minor RAD	[days] per [year]	53840
netRAD	[days] per [year]	11261
LRSwo cough	[cases] per [year]	2545
Cough	[days] per [year]	14790
Infant Mortality due to PM10	[cases] per [year]	0.09
YOLL due to PM2.5	[years] per [year]	765
YOLL due to ozone	[years] per [year]	3.16



**GPGR0003 - PPC Ptolemaida V (Permitted)**

Bronchodilator usage	[cases] per [year]	11399
Chronic bronchitis	[cases] per [year]	32
Lower respiratory symptoms	[days] per [year]	93266
Cardiac hospital admissions	[cases] per [year]	8
Respiratory hospital admission	[cases] per [year]	16
Work loss days	[days] per [year]	21803
Minor RAD	[days] per [year]	71903
netRAD	[days] per [year]	15022
LRSwo cough	[cases] per [year]	3417
Cough	[days] per [year]	19860
Infant Mortality due to PM10	[cases] per [year]	0.12
YOLL due to PM2.5	[years] per [year]	1020
YOLL due to ozone	[years] per [year]	4.25

**GPBU0001 - Wildhorse Energy Mecsek Hills UCG (Applying for permits)**

Bronchodilator usage	[cases] per [year]	3235
Chronic bronchitis	[cases] per [year]	9
Lower respiratory symptoms	[days] per [year]	25055
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	4
Work loss days	[days] per [year]	5732
Minor RAD	[days] per [year]	19469
netRAD	[days] per [year]	3950
LRSwo cough	[cases] per [year]	1036
Cough	[days] per [year]	6020
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	268
YOLL due to ozone	[years] per [year]	1.29

**GPIT0001 - Enel Porto Tolle (Applying for permits)**

Bronchodilator usage	[cases] per [year]	7357
Chronic bronchitis	[cases] per [year]	30
Lower respiratory symptoms	[days] per [year]	86999
Cardiac hospital admissions	[cases] per [year]	7
Respiratory hospital admission	[cases] per [year]	12
Work loss days	[days] per [year]	20684
Minor RAD	[days] per [year]	58801
netRAD	[days] per [year]	14252
LRSwo cough	[cases] per [year]	947
Cough	[days] per [year]	5506
Infant Mortality due to PM10	[cases] per [year]	0.11
YOLL due to PM2.5	[years] per [year]	968
YOLL due to ozone	[years] per [year]	1.18

**GPIT0002 - Tirreno Power Vado Ligure (Applying for permits)**

Bronchodilator usage	[cases] per [year]	3322
Chronic bronchitis	[cases] per [year]	14
Lower respiratory symptoms	[days] per [year]	39198
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	9316
Minor RAD	[days] per [year]	26501
netRAD	[days] per [year]	6419
LRSwo cough	[cases] per [year]	432
Cough	[days] per [year]	2510
Infant Mortality due to PM10	[cases] per [year]	0.05
YOLL due to PM2.5	[years] per [year]	436
YOLL due to ozone	[years] per [year]	0.54

**GPIT0003 - Repower & Hera Saline Joniche (Applying for permits)**

Bronchodilator usage	[cases] per [year]	4237
Chronic bronchitis	[cases] per [year]	9
Lower respiratory symptoms	[days] per [year]	26735
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	5
Work loss days	[days] per [year]	5858
Minor RAD	[days] per [year]	22299
netRAD	[days] per [year]	4037
LRSwo cough	[cases] per [year]	1642
Cough	[days] per [year]	9545
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	274
YOLL due to ozone	[years] per [year]	2.04

**GPIT0004 - E.ON Fiume Santo (Permitted)**

Bronchodilator usage	[cases] per [year]	2085
Chronic bronchitis	[cases] per [year]	5
Lower respiratory symptoms	[days] per [year]	13796
Cardiac hospital admissions	[cases] per [year]	1
Respiratory hospital admission	[cases] per [year]	3
Work loss days	[days] per [year]	3064
Minor RAD	[days] per [year]	11331
netRAD	[days] per [year]	2112
LRSwo cough	[cases] per [year]	778
Cough	[days] per [year]	4522
Infant Mortality due to PM10	[cases] per [year]	0.02
YOLL due to PM2.5	[years] per [year]	143
YOLL due to ozone	[years] per [year]	0.97

**GPKO0001 - KEK Kosovo C (Announced)**

Bronchodilator usage	[cases] per [year]	4320
Chronic bronchitis	[cases] per [year]	12
Lower respiratory symptoms	[days] per [year]	34680
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	7858
Minor RAD	[days] per [year]	26304
netRAD	[days] per [year]	5415
LRswo cough	[cases] per [year]	1325
Cough	[days] per [year]	7703
Infant Mortality due to PM10	[cases] per [year]	0.04
YOLL due to PM2.5	[years] per [year]	368
YOLL due to ozone	[years] per [year]	1.65

**GPNL0001 - E.ON & GDF Suez Maasvlakte Port (Under construction)**

Bronchodilator usage	[cases] per [year]	565
Chronic bronchitis	[cases] per [year]	9
Lower respiratory symptoms	[days] per [year]	27369
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	3
Work loss days	[days] per [year]	6203
Minor RAD	[days] per [year]	12782
netRAD	[days] per [year]	4274
LRswo cough	[cases] per [year]	-897
Cough	[days] per [year]	-5216
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	290
YOLL due to ozone	[years] per [year]	-1.12

**GPNL0002 - GDF Suez Maasvlakte Port (Under construction)**

Bronchodilator usage	[cases] per [year]	403
Chronic bronchitis	[cases] per [year]	5
Lower respiratory symptoms	[days] per [year]	15703
Cardiac hospital admissions	[cases] per [year]	1
Respiratory hospital admission	[cases] per [year]	2
Work loss days	[days] per [year]	3570
Minor RAD	[days] per [year]	7583
netRAD	[days] per [year]	2460
LRswo cough	[cases] per [year]	-461
Cough	[days] per [year]	-2680
Infant Mortality due to PM10	[cases] per [year]	0.02
YOLL due to PM2.5	[years] per [year]	167
YOLL due to ozone	[years] per [year]	-0.57

**GPNL0003 - RWE & Essent Eemshaven (Under construction)**

Bronchodilator usage	[cases] per [year]	922
Chronic bronchitis	[cases] per [year]	14
Lower respiratory symptoms	[days] per [year]	39733
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	4
Work loss days	[days] per [year]	9046
Minor RAD	[days] per [year]	18948
netRAD	[days] per [year]	6234
LRSwo cough	[cases] per [year]	-1234
Cough	[days] per [year]	-7171
Infant Mortality due to PM10	[cases] per [year]	0.05
YOLL due to PM2.5	[years] per [year]	423
YOLL due to ozone	[years] per [year]	-1.53

**GPPL0001 - RWE & Kompania Weglowa Wola (Silesia) (Announced)**

Bronchodilator usage	[cases] per [year]	2926
Chronic bronchitis	[cases] per [year]	16
Lower respiratory symptoms	[days] per [year]	45704
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	10329
Minor RAD	[days] per [year]	26817
netRAD	[days] per [year]	7116
LRSwo cough	[cases] per [year]	-144
Cough	[days] per [year]	-839
Infant Mortality due to PM10	[cases] per [year]	0.06
YOLL due to PM2.5	[years] per [year]	483
YOLL due to ozone	[years] per [year]	-0.18

**GPPL0002 - PGE Gubin (Announced)**

Bronchodilator usage	[cases] per [year]	12613
Chronic bronchitis	[cases] per [year]	49
Lower respiratory symptoms	[days] per [year]	142639
Cardiac hospital admissions	[cases] per [year]	12
Respiratory hospital admission	[cases] per [year]	21
Work loss days	[days] per [year]	32557
Minor RAD	[days] per [year]	94344
netRAD	[days] per [year]	22441
LRSwo cough	[cases] per [year]	1928
Cough	[days] per [year]	11213
Infant Mortality due to PM10	[cases] per [year]	0.18
YOLL due to PM2.5	[years] per [year]	1523
YOLL due to ozone	[years] per [year]	2.40

**GPPL0003 - Fortum Zabrze CHP (Announced)**

Bronchodilator usage	[cases] per [year]	1522
Chronic bronchitis	[cases] per [year]	8
Lower respiratory symptoms	[days] per [year]	23781
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	3
Work loss days	[days] per [year]	5368
Minor RAD	[days] per [year]	13943
netRAD	[days] per [year]	3700
LRSwo cough	[cases] per [year]	-75
Cough	[days] per [year]	-435
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	251
YOLL due to ozone	[years] per [year]	-0.09

**GPPL0004 - PGE Opole 5 & 6 (Applying for permits)**

Bronchodilator usage	[cases] per [year]	4135
Chronic bronchitis	[cases] per [year]	22
Lower respiratory symptoms	[days] per [year]	64602
Cardiac hospital admissions	[cases] per [year]	5
Respiratory hospital admission	[cases] per [year]	8
Work loss days	[days] per [year]	14631
Minor RAD	[days] per [year]	38006
netRAD	[days] per [year]	10084
LRSwo cough	[cases] per [year]	-204
Cough	[days] per [year]	-1186
Infant Mortality due to PM10	[cases] per [year]	0.08
YOLL due to PM2.5	[years] per [year]	685
YOLL due to ozone	[years] per [year]	-0.25

**GPPL0005 - PGE Turow (Applying for permits)**

Bronchodilator usage	[cases] per [year]	1611
Chronic bronchitis	[cases] per [year]	9
Lower respiratory symptoms	[days] per [year]	25158
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	3
Work loss days	[days] per [year]	5615
Minor RAD	[days] per [year]	14581
netRAD	[days] per [year]	3869
LRSwo cough	[cases] per [year]	-79
Cough	[days] per [year]	-458
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	263
YOLL due to ozone	[years] per [year]	-0.10

**GPPL0006 - Tauron Tychy (Applying for permits)**

Bronchodilator usage	[cases] per [year]	401
Chronic bronchitis	[cases] per [year]	2
Lower respiratory symptoms	[days] per [year]	6254
Cardiac hospital admissions	[cases] per [year]	1
Respiratory hospital admission	[cases] per [year]	1
Work loss days	[days] per [year]	1396
Minor RAD	[days] per [year]	3626
netRAD	[days] per [year]	962
LRswo cough	[cases] per [year]	-19
Cough	[days] per [year]	-112
Infant Mortality due to PM10	[cases] per [year]	0.01
YOLL due to PM2.5	[years] per [year]	65
YOLL due to ozone	[years] per [year]	-0.02

**GPPL0007 - GDF Suez łączna (Stara Wieś-Stasin) (Applying for permits)**

Bronchodilator usage	[cases] per [year]	5580
Chronic bronchitis	[cases] per [year]	19
Lower respiratory symptoms	[days] per [year]	53932
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	8
Work loss days	[days] per [year]	12368
Minor RAD	[days] per [year]	38107
netRAD	[days] per [year]	8525
LRswo cough	[cases] per [year]	1284
Cough	[days] per [year]	7462
Infant Mortality due to PM10	[cases] per [year]	0.07
YOLL due to PM2.5	[years] per [year]	579
YOLL due to ozone	[years] per [year]	1.60

**GPPL0008 - Kulczyk Investments Polnoc (Applying for permits)**

Bronchodilator usage	[cases] per [year]	5320
Chronic bronchitis	[cases] per [year]	18
Lower respiratory symptoms	[days] per [year]	51067
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	8
Work loss days	[days] per [year]	11741
Minor RAD	[days] per [year]	36265
netRAD	[days] per [year]	8094
LRswo cough	[cases] per [year]	1240
Cough	[days] per [year]	7208
Infant Mortality due to PM10	[cases] per [year]	0.07
YOLL due to PM2.5	[years] per [year]	549
YOLL due to ozone	[years] per [year]	1.54

**GPPL0009 - PGE Belchatow (Operation; Commissioned after 2010)**

Bronchodilator usage	[cases] per [year]	5349
Chronic bronchitis	[cases] per [year]	21
Lower respiratory symptoms	[days] per [year]	60522
Cardiac hospital admissions	[cases] per [year]	5
Respiratory hospital admission	[cases] per [year]	9
Work loss days	[days] per [year]	13793
Minor RAD	[days] per [year]	39982
netRAD	[days] per [year]	9509
LRSwo cough	[cases] per [year]	817
Cough	[days] per [year]	4750
Infant Mortality due to PM10	[cases] per [year]	0.08
YOLL due to PM2.5	[years] per [year]	646
YOLL due to ozone	[years] per [year]	1.02

**GPPL0010 - ENEA Kozenice (Permitted)**

Bronchodilator usage	[cases] per [year]	7379
Chronic bronchitis	[cases] per [year]	25
Lower respiratory symptoms	[days] per [year]	71317
Cardiac hospital admissions	[cases] per [year]	6
Respiratory hospital admission	[cases] per [year]	11
Work loss days	[days] per [year]	16352
Minor RAD	[days] per [year]	50391
netRAD	[days] per [year]	11270
LRSwo cough	[cases] per [year]	1698
Cough	[days] per [year]	9872
Infant Mortality due to PM10	[cases] per [year]	0.09
YOLL due to PM2.5	[years] per [year]	765
YOLL due to ozone	[years] per [year]	2.11

**GPPL0011 - Kogeneracja S.A. Siechnice (Permitted)**

Bronchodilator usage	[cases] per [year]	527
Chronic bronchitis	[cases] per [year]	3
Lower respiratory symptoms	[days] per [year]	8226
Cardiac hospital admissions	[cases] per [year]	1
Respiratory hospital admission	[cases] per [year]	1
Work loss days	[days] per [year]	1852
Minor RAD	[days] per [year]	4809
netRAD	[days] per [year]	1275
LRSwo cough	[cases] per [year]	-26
Cough	[days] per [year]	-149
Infant Mortality due to PM10	[cases] per [year]	0.01
YOLL due to PM2.5	[years] per [year]	87
YOLL due to ozone	[years] per [year]	-0.03

**GPPL0012 - Energa Ostroleka Ostroleka (Permitted)**

Bronchodilator usage	[cases] per [year]	6883
Chronic bronchitis	[cases] per [year]	24
Lower respiratory symptoms	[days] per [year]	68044
Cardiac hospital admissions	[cases] per [year]	6
Respiratory hospital admission	[cases] per [year]	11
Work loss days	[days] per [year]	15648
Minor RAD	[days] per [year]	47769
netRAD	[days] per [year]	10788
LRSwo cough	[cases] per [year]	1513
Cough	[days] per [year]	8794
Infant Mortality due to PM10	[cases] per [year]	0.09
YOLL due to PM2.5	[years] per [year]	733
YOLL due to ozone	[years] per [year]	1.88

**GPPL0013 - Tauron Jaworzno 3 (Permitted)**

Bronchodilator usage	[cases] per [year]	3187
Chronic bronchitis	[cases] per [year]	17
Lower respiratory symptoms	[days] per [year]	49852
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	11302
Minor RAD	[days] per [year]	29355
netRAD	[days] per [year]	7790
LRSwo cough	[cases] per [year]	-160
Cough	[days] per [year]	-931
Infant Mortality due to PM10	[cases] per [year]	0.06
YOLL due to PM2.5	[years] per [year]	529
YOLL due to ozone	[years] per [year]	-0.20

**GPPL0014 - EDF Rybnik (Under construction)**

Bronchodilator usage	[cases] per [year]	5458
Chronic bronchitis	[cases] per [year]	29
Lower respiratory symptoms	[days] per [year]	85119
Cardiac hospital admissions	[cases] per [year]	7
Respiratory hospital admission	[cases] per [year]	11
Work loss days	[days] per [year]	19193
Minor RAD	[days] per [year]	49868
netRAD	[days] per [year]	13225
LRSwo cough	[cases] per [year]	-262
Cough	[days] per [year]	-1524
Infant Mortality due to PM10	[cases] per [year]	0.11
YOLL due to PM2.5	[years] per [year]	898
YOLL due to ozone	[years] per [year]	-0.33



**GPRO0001 - SC Electrocentrale DEVA SA Electrocentrale Deva (Announced)**

Bronchodilator usage	[cases] per [year]	3637
Chronic bronchitis	[cases] per [year]	10
Lower respiratory symptoms	[days] per [year]	28668
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	5
Work loss days	[days] per [year]	6616
Minor RAD	[days] per [year]	22251
netRAD	[days] per [year]	4559
LRSwo cough	[cases] per [year]	1142
Cough	[days] per [year]	6637
Infant Mortality due to PM10	[cases] per [year]	0.04
YOLL due to PM2.5	[years] per [year]	310
YOLL due to ozone	[years] per [year]	1.42

**GPRO0002 - SC Doicesti & China Huadian Engineering Co. Doicesti (Announced)**

Bronchodilator usage	[cases] per [year]	4323
Chronic bronchitis	[cases] per [year]	12
Lower respiratory symptoms	[days] per [year]	34077
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	7861
Minor RAD	[days] per [year]	26442
netRAD	[days] per [year]	5418
LRSwo cough	[cases] per [year]	1357
Cough	[days] per [year]	7889
Infant Mortality due to PM10	[cases] per [year]	0.04
YOLL due to PM2.5	[years] per [year]	368
YOLL due to ozone	[years] per [year]	1.69

**GPRO0003 - Braila Power (Announced)**

Bronchodilator usage	[cases] per [year]	6466
Chronic bronchitis	[cases] per [year]	18
Lower respiratory symptoms	[days] per [year]	50941
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	9
Work loss days	[days] per [year]	11764
Minor RAD	[days] per [year]	39555
netRAD	[days] per [year]	8105
LRSwo cough	[cases] per [year]	2030
Cough	[days] per [year]	11800
Infant Mortality due to PM10	[cases] per [year]	0.07
YOLL due to PM2.5	[years] per [year]	550
YOLL due to ozone	[years] per [year]	2.52

**GPRO0004 - Rovinari (Announced)**

Bronchodilator usage	[cases] per [year]	4323
Chronic bronchitis	[cases] per [year]	12
Lower respiratory symptoms	[days] per [year]	34069
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	7862
Minor RAD	[days] per [year]	26446
netRAD	[days] per [year]	5419
LRswo cough	[cases] per [year]	1357
Cough	[days] per [year]	7889
Infant Mortality due to PM10	[cases] per [year]	0.04
YOLL due to PM2.5	[years] per [year]	368
YOLL due to ozone	[years] per [year]	1.69

**GPRO0005 - Craiova II/Isalnita (Announced)**

Bronchodilator usage	[cases] per [year]	4322
Chronic bronchitis	[cases] per [year]	12
Lower respiratory symptoms	[days] per [year]	34055
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	6
Work loss days	[days] per [year]	7860
Minor RAD	[days] per [year]	26441
netRAD	[days] per [year]	5418
LRswo cough	[cases] per [year]	1357
Cough	[days] per [year]	7889
Infant Mortality due to PM10	[cases] per [year]	0.04
YOLL due to PM2.5	[years] per [year]	368
YOLL due to ozone	[years] per [year]	1.69

**GPRO0006 - RAAN Halanga, Dr. Turnu Severin (Announced)**

Bronchodilator usage	[cases] per [year]	3457
Chronic bronchitis	[cases] per [year]	9
Lower respiratory symptoms	[days] per [year]	27241
Cardiac hospital admissions	[cases] per [year]	2
Respiratory hospital admission	[cases] per [year]	5
Work loss days	[days] per [year]	6290
Minor RAD	[days] per [year]	21158
netRAD	[days] per [year]	4334
LRswo cough	[cases] per [year]	1086
Cough	[days] per [year]	6311
Infant Mortality due to PM10	[cases] per [year]	0.03
YOLL due to PM2.5	[years] per [year]	294
YOLL due to ozone	[years] per [year]	1.35

**GPRO0007 - Electrocentrale SA Paroseni (Announced )**

Bronchodilator usage	[cases] per [year]	1730
Chronic bronchitis	[cases] per [year]	5
Lower respiratory symptoms	[days] per [year]	13632
Cardiac hospital admissions	[cases] per [year]	1
Respiratory hospital admission	[cases] per [year]	2
Work loss days	[days] per [year]	3145
Minor RAD	[days] per [year]	10582
netRAD	[days] per [year]	2168
LRSwo cough	[cases] per [year]	543
Cough	[days] per [year]	3155
Infant Mortality due to PM10	[cases] per [year]	0.02
YOLL due to PM2.5	[years] per [year]	147
YOLL due to ozone	[years] per [year]	0.67

**GPRO0008 - Enel Galati (Applying for permits)**

Bronchodilator usage	[cases] per [year]	5204
Chronic bronchitis	[cases] per [year]	14
Lower respiratory symptoms	[days] per [year]	40743
Cardiac hospital admissions	[cases] per [year]	3
Respiratory hospital admission	[cases] per [year]	7
Work loss days	[days] per [year]	9433
Minor RAD	[days] per [year]	31802
netRAD	[days] per [year]	6500
LRSwo cough	[cases] per [year]	1646
Cough	[days] per [year]	9569
Infant Mortality due to PM10	[cases] per [year]	0.05
YOLL due to PM2.5	[years] per [year]	441
YOLL due to ozone	[years] per [year]	2.05

**GPSI0001 - TES (HSE) Sostanj-6 (Under construction)**

Bronchodilator usage	[cases] per [year]	5908
Chronic bronchitis	[cases] per [year]	15
Lower respiratory symptoms	[days] per [year]	43764
Cardiac hospital admissions	[cases] per [year]	4
Respiratory hospital admission	[cases] per [year]	8
Work loss days	[days] per [year]	10000
Minor RAD	[days] per [year]	34706
netRAD	[days] per [year]	6892
LRSwo cough	[cases] per [year]	1986
Cough	[days] per [year]	11540
Infant Mortality due to PM10	[cases] per [year]	0.06
YOLL due to PM2.5	[years] per [year]	468
YOLL due to ozone	[years] per [year]	2.47

### 3.2 Results for the major public coal fired power plants in Europe - based on the simplified approach

The following results have been calculated using country specific “YOLL per tonne” and “WLD per tonne” of emission values, for each of the considered pollutants and the corresponding source region.

Annual emissions of the analysed power plants have been provided by GREENPEACE (Myllyvirta 2013). For 311 plants in operation, reported data corresponding to the year 2010 has been derived by GREENPEACE from the “European Pollutant Release and Transfer Register” (E-PRTR) database of the European Environmental Agency (<http://prtr.ec.europa.eu>). Moreover, GREENPEACE estimated emission data for 111 sites in Europe where power plants are under construction, approved, applying for approval or were connected to grid 2012 or later. The emission data corresponds to the expected year of starting operation, i.e. 2013 and later.

The 80 power plants locations which have been assessed with the EcoSenseWeb model are part of the above mentioned 422 sites and they have also been assessed by this approach. Since the generic approach is less site specific the results differ slightly. For most of the 80 locations the difference is below ca. +/- 10%. For a few locations the difference is higher, e.g. for “GPDE0016 Hamburg - Vattenfall Europe AG, Berlin Hamburg-Moorburg” where the actual location is close to the sea and therefore, a large share of emissions will increase pollutant concentration in areas where there is actually no population. In this specific case the generic approach leads to a ca. 2 times higher result regarding the YOLL. For those plants, where the risks have been calculated with the detailed approach, the YOLL resulting from applying the detailed approach are shown in the following in parenthesis, to be able to compare the results.

The “status” indicates again, whether the power plant is actually in operation or not.

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
ELECTRABEL - CENTRALE RUIEN	Operation	Belgium	Kluisbergen	218	4634
ELECTRABEL CENTRALE MOL	Operation	Belgium	Mol	128	2716
E.ON Genk	Operation	Belgium	Genk	227	4819
RWE & MIM Maritsa Iztok-4	Unclear	Bulgaria		492 (487)	10319 (10328)
TETs Varna	Operation	Bulgaria	Ezerovo	3404	71684
TETs "Maritsa" AD Dimitrovgrad	Operation	Bulgaria	Dimitrovgrad	1635	34616
TETs "Bobov dol"	Operation	Bulgaria	Golemo selo	3571	75504
TETs "Enel Maritsa iztok 3"	Operation	Bulgaria	Mednikarovo	1515 (1500)	31982 (31984)
TETS SVILOZA	Operation	Bulgaria	Svishtov	1328	28043
TOPLOFIKATSIA-PERNIK "Republika"	Operation	Bulgaria	Pernik	1001	21176
BRIKEL Galabovo	Operation	Bulgaria	Galabovo	4535	96013
TETs Maritsa iztok 2 EAD	Operation	Bulgaria	Kovachevo	11733 (11622)	248116 (248157)
AES Maritsa Iztok-1	Operation; Commissioned after 2010	Bulgaria		412	8642
BEH Maritsa-Iztok-2	Applying for permits	Bulgaria		277 (274)	5805 (5812)
Energia MK Bobov Dol	Announced	Bulgaria		230 (228)	4823 (4842)
Enemona Lom	Announced	Bulgaria		307 (305)	6450 (6461)
HEP Plomin 'C'	Applying for permits	Croatia		209 (221)	4409 (4697)
CEZ Ledvice	Under construction	Czech Republic		609 (604)	12866 (12880)
Alpiq Kladno	Under construction	Czech Republic		151 (150)	3189 (3197)
CEZ Prunerov	Permitted	Czech Republic		674 (741)	14231 (15826)
Elektrárna Opatovice	Operation	Czech Republic	Opatovice nad Labem	820	17349
ČEZ Poříčí	Operation	Czech Republic	Trutnov	220	4648

Name of plant	Status	Country	Municipality	YOLL	WLD
ČEZ Mělník	Operation	Czech Republic	Horní Počaply	960	20263
ČEZ Vítkovice	Operation	Czech Republic	Ostrava	218	4614
Alpiq Kladno	Operation	Czech Republic	Kladno	531	11221
Elektrárna Třebovice	Operation	Czech Republic	Ostrava	716	15128
ACTHERM, spol. s r.o., odštěpný závod Chomutov	Operation	Czech Republic	Chomutov	132	2789
ČEZ Tisová	Operation	Czech Republic	Březová	657	13899
Teplárna Trmice	Operation	Czech Republic	Trmice	346	7311
Elektrárna Mělník I - EMĚ I	Operation	Czech Republic	Horní Počaply	499	10548
ČEZ Tušimice	Operation	Czech Republic	Kadaň	200	4225
Elektrárna Chvaletice	Operation	Czech Republic	Chvaletice	862	18210
ČEZ Dětmarovice	Operation	Czech Republic	Dětmarovice	550	11615
ČEZ Dvůr Králové	Operation	Czech Republic	Dvůr Králové nad Labem	49	1038
Mondi Štětí	Operation	Czech Republic	Štětí	108	2285
Sokolovská uhelná, právní nástupce, a.s.	Operation	Czech Republic	Chodov u Karlových Var	816	17234
ČEZ Ledvice	Operation	Czech Republic	Bílina	1510	31942
Teplárna Komořany	Operation	Czech Republic	Most	547	11585
ČEZ Prunéřov	Operation	Czech Republic	Kadaň	3659	77317
ČEZ Hodonín	Operation	Czech Republic	Hodonín	207	4372
ČEZ Počeradý	Operation	Czech Republic	Počeradý	2189	46221
Plzeňská teplárenská, a.s.	Operation	Czech Republic	Plzeň	490	10367
ENERGETIKA TŘINEC, a.s.	Operation	Czech Republic	Třinec	256	5414
AES Bohemia	Operation	Czech Republic	Planá Nad Lužnicí	310	6549
ArcelorMittal Energy Ostrava s.r.o.	Operation	Czech Republic	Ostrava-Kunčice	674	14239
CEZ Tusimice II	Operation; Commissioned after 2010	Czech Republic		562	11869
CZ Coal Mostecka	Announced	Czech Republic		776 (769)	16401 (16409)

Name of plant	Status	Country	Municipality	YOLL	WLD
DONG Energy A/S - Enstedværket	Operation	Denmark	Aabenraa	56	1176
DONG ENERGY POWER A/S, Avedøreværket	Operation	Denmark	Hvidovre	68	1430
Nordjyllandsværket	Operation	Denmark	Vodskov	46	981
VATTENFALL A/S, Amagerværket	Operation	Denmark	København S	20	421
Helsingin Energia, Salmisaaren voimalaitokset	Operation	Finland	HELEN	61	1292
Helsingin Energia, Hanasaari B -voimalaitos	Operation	Finland	HELSINKI	83	1744
FORTUM POWER AND HEAT OY, INKOO VOIMALAITOS	Operation	Finland	INKOO	86	1810
KAINUUN VOIMA OY, Kajaanin Höyryvoimalaitos	Operation	Finland	KAJAANI	7	151
Vapo Oy, Salon voimalaitos	Operation	Finland	SALO	15	321
PVO-Lämpövoima Oy, Kristiinan voimalaitos	Operation	Finland	KRISTIINANKAUPUNKI	39	822
Fortum Power and Heat Oy, JOENSUUN VOIMALAITOS	Operation	Finland	JOENSUU	38	800
Jyväskylän Energiantuotanto Oy, Rauhalahden voimalaitos	Operation	Finland	JYVÄSKYLÄ	49	1044
KANTELEEN VOIMA OY, Haapaveden voimalaitos	Operation	Finland	HAAPAVESI	80	1694
Fortum Power and Heat Oy, Naantalin voimalaitos	Operation	Finland	NAANTALI	138	2896
OULUN ENERGIA, Toppilan voimalaitokset, Oulu	Operation	Finland	OULU	53	1125
PVO Lämpövoima Oy, Tahkoluodon voimalaitos	Operation	Finland	PORI	42	889
Pori Energia Oy, Aittaluodon voimalaitos	Operation	Finland	PORI	16	328
Fortum Power and Heat Oy, Meri-Porin voimalaitos	Operation	Finland	PORI	72	1511
Vaskiluodon Voima Oy, Seinäjoen turvevoimalaitos	Operation	Finland	SEINÄJOKI	48	1018
Oy Alholmens Kraft Ab	Operation	Finland	PIETARSAARI	41	872
Vaskiluodon Voima Oy	Operation	Finland	VAASA	45	934

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
LAHTI ENERGIA OY, KYMIJÄRVEN VOIMALAITOS	Operation	Finland	LAHTI	81	1705
Mäntän Energia Oy, Voimalaitos	Operation	Finland	MÄNTTÄ	11	234
Stora Enso Oyj, Veitsiluodon voimalaitos	Operation	Finland	KEMI	34	713
KUOPION ENERGIA OY HAAPANIEMEN VOIMALAITOS	Operation	Finland	KUOPIO	85	1804
Porin Prosessivoima Oy	Operation	Finland	PORI	24	513
LAANILAN VOIMA OY, Kemiran tehtaiden voimalaitos	Operation	Finland	OULU	12	261
Jyväskylän Voima Oy, Keljonlahden voimalaitos	Operation	Finland	JYVÄSKYLÄ	25	518
EDF BOUCHAIN	Operation	France	BOUCHAIN	472	9984
E.ON - Centrale d'HORNAING	Operation	France	HORNAING	195	4124
EDF BLENOD	Operation	France	PONT-A-MOUSSON	2668	56429
E.ON Emile HUCHET	Operation	France	SAINT-AVOLD	744	15720
EdF VITRY-SUR-SEINE	Operation	France	VITRY-SUR-SEINE	633	13402
E.ON - Centrale de LUCY	Operation	France	MONTCEAU-LES-MINES	184	3894
EDF LE HAVRE	Operation	France	HAVRE	1919	40612
E.ON MEYREUIL	Operation	France	MEYREUIL	518	10908
EDF LA MAXE	Operation	France	WOIPPY	1320	27925
EdF Cordemais	Operation	France	CORDEMAIS	1265	26729
BAYER AG Lanxess AG	Operation	Germany	Krefeld	146	3100
Braunschweiger Versorgungs AG, Heizkraftwerk Mitte	Operation	Germany	Braunschweig	81	1713
CURRENTA GmbH & Co. OHG (CHEMPARK)	Operation	Germany	Leverkusen	223	4723
E.ON KRAFTWERK SCHOLVEN	Operation	Germany	Gelsenkirchen	1378	29202
E.ON Kraftwerk Staudinger	Operation	Germany	Großkrotzenburg	511	10766



<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
E.ON Kraftwerke GmbH	Operation	Germany	Wilhelmshaven	365	7706
E.ON Kraftwerke GmbH	Operation	Germany	Datteln	267	5656
E.ON Kraftwerke GmbH - Kraftwerk Schkopau	Operation	Germany	Korbetha	817	17253
E.ON Kraftwerke GmbH Kraftwerk Buschhaus	Operation	Germany	Helmstedt	313	6616
E.ON Kraftwerke GmbH Kraftwerk Heyden	Operation	Germany	Petershagen	432	9120
E.ON Kraftwerke GmbH Kraftwerk Knepper	Operation	Germany	Dortmund	150	3181
EnBW Altbach	Operation	Germany	Altbach	330	6963
EnBW Bexbach	Operation	Germany	Bexbach	242	5119
EnBW Heilbronn	Operation	Germany	Heilbronn	559	11802
EnBW Karlsruhe	Operation	Germany	Karlsruhe	325	6870
EnBW Walheim	Operation	Germany	Walheim	58	1232
EVO-Heizkraftwerk, Offenbach	Operation	Germany	Offenbach a. M., St.	44	924
Evonik Fenne	Operation	Germany	Völklingen	447	9425
Evonik Steag AG Kraftwerk West	Operation	Germany	Voerde	310	6562
Evonik Steag GmbH Heizkraftwerk Herne	Operation	Germany	Herne	366	7755
Evonik Steag GmbH Heizkraftwerk Walsum	Operation	Germany	Duisburg	312	6622
Evonik Steag GmbH KW Lünen	Operation	Germany	Lünen	250	5302
Evonik Weiher	Operation	Germany	Quierschied	260	5492
GDF SUEZ Kraftwerk Farge GmbH	Operation	Germany	Bremen	113	2397
GDF SUEZ Kraftwerk Zolling GmbH	Operation	Germany	Zolling	292	6157
Gemeinschaftskraftwerk Kiel GmbH GKK	Operation	Germany	Kiel	158	3333
Gemeinschaftskraftwerk Veltheim GmbH	Operation	Germany	Porta Westfalica	171	3611
GKH Gemeinschaftskraftwerk Hannover	Operation	Germany	Hannover	215	4544
Großkraftwerk Mannheim AG / Elektrizitätswerk	Operation	Germany	Mannheim	759	15996
Heizkraftwerk Nord II	Operation	Germany	Chemnitz	166	3513
Infracor GmbH	Operation	Germany	Marl	304	6453
KNG Kraftwerks- und Netzgesellschaft mbH Kraftwerk Rostock	Operation	Germany	Rostock	210	4410
Kraftwerk Boxberg	Operation	Germany	Boxberg/O.L.	1756	37018

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
Kraftwerk Mehrum GmbH	Operation	Germany	Hohenhameln	372	7861
Kraftwerk Schwarze Pumpe	Operation	Germany	Spremberg	1175	24817
Mainova, HKW West	Operation	Germany	Frankfurt am Main, St.	182	3837
Mark-E Aktiengesellschaft	Operation	Germany	Werdohl	283	5993
MIBRAG Deuben	Operation	Germany	Deuben	239	5053
MIBRAG Mumsdorf	Operation	Germany	Elsteraue	227	4802
MIBRAG Währlitz	Operation	Germany	Währlitz	43	906
RWE Power AG Kraftwerk Frimmersdorf	Operation	Germany	Grevenbroich	1754	37182
RWE Power AG Kraftwerk Goldenberg	Operation	Germany	Hürth	188	3982
RWE Power AG Kraftwerk Ibbenbüren	Operation	Germany	Ibbenbüren	442	9340
RWE Power AG Kraftwerk Neurath	Operation	Germany	Grevenbroich	1712	36291
RWE Power AG Kraftwerk Niederaußem	Operation	Germany	Bergheim	2881	61075
RWE Power AG Kraftwerk Weisweiler	Operation	Germany	Eschweiler	1844	39091
RWE Power AG Kraftwerk Werne	Operation	Germany	Werne	355	7528
RWE Power AG Kraftwerk Westfalen	Operation	Germany	Hamm	281	5957
RWE Power AG Kraftwerke Region West	Operation	Germany	Duisburg	147	3115
RWE Power AG Kraftwerke Region West	Operation	Germany	Duisburg	171	3620
Stadtwerke Duisburg AG Heizkraftwerk I	Operation	Germany	Duisburg	40	856
Stadtwerke Flensburg GmbH	Operation	Germany	Flensburg	68	1440
STEAG und RWE Power GW Bergkamen A oHG	Operation	Germany	Bergkamen	491	10402
swb Erzeugung GmbH & Co KG / Heizkraftwerk Hafen	Operation	Germany	Bremen	229	4834
swb Erzeugung GmbH & Co KG / Heizkraftwerk Hastedt	Operation	Germany	Bremen	76	1612
SWM Heizkraftwerk Nord	Operation	Germany	Unterföhring	266	5607
TWK Technische Werke Kaiserslautern Versorgungs-AG	Operation	Germany	Kaiserslautern	60	1263
Vattenfall Europe Generation AG Kraftwerk Jänschwalde	Operation	Germany	Peitz	3986 (3949)	84149 (84196)

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
Vattenfall Europe Generation AG Kraftwerk Lippendorf	Operation	Germany	Böhlen	2272	47995
Vattenfall Europe Wärme HKW Klingenberg	Operation	Germany	Berlin	176	3711
Vattenfall Europe Wärme AG Kraftwerk Tiefstack	Operation	Germany	Hamburg	99	2089
Vattenfall Europe Wärme HKW Moabit	Operation	Germany	Berlin	60	1270
Vattenfall Europe Wärme HKW Reuter-West	Operation	Germany	Berlin	302	6347
Vattenfall Wedel	Operation	Germany	Wedel	138	2913
Volkswagen AG	Operation	Germany	Wolfsburg	344	7241
VSE Kraftwerk Ens Dorf	Operation	Germany	Ens Dorf	179	3788
Wuppertaler Stadtwerke AG - HKW Elberfeld	Operation	Germany	Wuppertal	61	1300
E.ON Datteln	Construction	Germany	Datteln	989 (894)	20965 (19136)
EnBW Karlsruhe-Rheinhafen	Construction	Germany	Karlsruhe	536 (495)	11322 (10565)
Evonik STEAG GmbH Duisburg-Walsum (Block 10)	Construction	Germany	Duisburg	752	15929
GDF Suez & BKW Energie Wilhelmshaven	Construction	Germany	Wilhelmshaven	251 (231)	5305 (4931)
GKM AG Mannheim, Neckarau Block 9	Construction	Germany	Mannheim	512 (475)	10817 (10125)
RWE Hamm-Uentrop	Construction	Germany	Hamm	1527 (1414)	32349 (30270)
Trianel Power Lünen	Construction	Germany	Lünen	771 (769)	16332 (16472)
Vattenfall Europe AG, Berlin Hamburg-Moorburg	Construction	Germany	Hamburg	583 (263)	12324 (5618)
RWE Neurath	Connected to grid	Germany		2290	48531
Vattenfall Boxberg	Connected to grid	Germany	Boxberg/Oberlausitz	565	11922
Dow Chemical Stade	Applying for permission	Germany	Stade	798 (891)	16880 (19021)
Mibrag Profen	Applying for permission	Germany	Elsteraue	279 (217)	5894 (4616)
RWE Niederaußem (Bergheim)	Applying for permission	Germany	Bergheim	996 (1291)	21100 (27638)
Infracor Marl	Announced	Germany	Marl	419 (426)	8876 (9121)
RWE Arneburg	Announced	Germany	Arneburg	592 (541)	12485 (11526)
PPC Ptolemaida V	Permitted	Greece		1149 (1024)	24213 (21803)

Name of plant	Status	Country	Municipality	YOLL	WLD
PPC S.A. SES PTOLEMAIDAS	Operation	Greece	PTOLEMAIDA	713	15004
PPC S.A. SES KARDIAS	Operation	Greece	KARDIA, YPSILANTIS	850	17731
PPC S.A. SES LIPTOL	Operation	Greece	PTOLEMAIDA	23	489
PPC S.A. SES AMYNTAIOY	Operation	Greece	AMYNTAIO	2887	61093
PPC S.A. SES MELITIS	Operation	Greece	FLORINA	173	3649
PPC S.A. SES MEGALOPOLIS B'	Operation	Greece	MEGALOPOLIS	210	4420
PPC S.A. SES MEGALOPOLIS A'	Operation	Greece	MEGALOPOLI	3627	76803
PPC S.A. SES AGIOY DHMHTRIOY	Operation	Greece	AGIOS DIMITRIOS, ELLISPONTOS	3812 (3777)	80372 (80423)
PPC Meliti II, Florina	Applying for permits	Greece		862 (768)	18150 (16340)
PPC Agios Dimitrios 6/Ptolemais	Announced	Greece		1149 (953)	24213 (20285)
Vértesi Erőmű Zrt. Oroszlány	Operation	Hungary	Oroszlány	280	5899
RWE AG Mátrai Erőmű Zrt.	Operation	Hungary	Visonta	1232	25901
Wildhorse Energy Mecsek Hills UCG	Applying for permits	Hungary		272 (270)	5723 (5732)
Electricity Supply Board (Moneypoint)	Operation	Ireland	County Clare	680	14339
Edenderry Power Limited	Operation	Ireland	County Offaly	122	2582
E.ON Fiume Santo	Permitted	Italy		146 (144)	3059 (3064)
A2A S.p.A. MONFALCONE	Operation	Italy	MONFALCONE	490	10330
Tirreno Vado Ligure	Operation	Italy	QUILIANO	1304	27585
ENEL Genova	Operation	Italy	GENOVA	316	6678
ENEL LA SPEZIA	Operation	Italy	LA SPEZIA	785	16585
Unità di Bussines Bastardo - Centrale Pietro Vannucci	Operation	Italy	GUALDO CATTANEO	80	1684
Enel Produzione SpA - Centrale di Torrevaldaliga	Operation	Italy	CIVITAVECCHIA	154	3218

Name of plant	Status	Country	Municipality	YOLL	WLD
Nord					
ENEL Federico II (BR SUD)	Operation	Italy	BRINDISI	839 (831)	17624 (17629)
EDIPOWER Brindisi	Operation	Italy	BRINDISI	107	2259
E.ON FIUME SANTO	Operation	Italy	SASSARI	510	10745
Enel Produzione SpA – Centrale Sulcis (Grazia Deledda)	Operation	Italy	PORTOSCUSO	277	5850
A2A CTEC LAMARMORA	Operation	Italy	BRESCIA	92	1953
ENEL Fusina	Operation	Italy	VENEZIA	416	8777
Enel Porto Tolle	Applying for permits	Italy		908 (969)	19181 (20684)
Tirreno Power Vado Ligure	Applying for permits	Italy		440 (436)	9305 (9316)
Repower & Hera Saline Joniche	Applying for permits	Italy		289 (276)	6066 (5858)
KEK Kosovo C	Announced	Kosovo		372 (369)	7838 (7858)
EPCG Pljevlja II	Unclear	Montenegro		160	3371
“Maoce	Announced	Montenegro		348	7328
E.ON & GDF Suez Maasvlakte Port	Under construction	Netherlands		268 (289)	5682 (6203)
GDF Suez Maasvlakte Port	Under construction	Netherlands		147 (167)	3129 (3570)
RWE & Essent Eemshaven	Under construction	Netherlands		388 (422)	8244 (9046)
Essent Energie Productie BV (Amer)	Operation	Netherlands	Geertruidenberg	453	9629
EPZ NV Borssele	Operation	Netherlands	Borssele	201	4263
Nuon Power Generation BV (Buggenum)	Operation	Netherlands	Haalen	47	1008
Electrabel Nederland NV (Gelderland)	Operation	Netherlands	Nijmegen	243	5154
E.On Benelux NV (Maasvlakte)	Operation	Netherlands	Maasvlakte Rotterdam	419	8892
Nuon Power Generation BV (Hemweg)	Operation	Netherlands	Amsterdam	113	2391

Name of plant	Status	Country	Municipality	YOLL	WLD
EDF Rybnik	Under construction	Poland		854 (898)	18057 (19193)
ENEA Koźlenice	Permitted	Poland		754 (768)	15906 (16352)
Kogeneracja S.A. Siechnice	Permitted	Poland		87 (87)	1837 (1852)
Energa Ostrołęka Ostrołęka	Permitted	Poland		799 (734)	16849 (15648)
Tauron Jaworzno 3	Permitted	Poland		501 (529)	10593 (11302)
PGE Turow	Operation	Poland	Bogatynia	5899	124837
Zespół Wrocław	Operation	Poland	Wrocław	605	12787
PGE Wrotków	Operation	Poland	Lublin	84	1775
PGE Bełchatów	Operation	Poland	Rogowiec	10782 (10680)	227881 (227901)
SFW Energia Sp. z o.o. Zduńska Wola	Operation	Poland	Zduńska Wola	47	990
Dalkia Łódź S.A. Elektrociepłownia nr 3	Operation	Poland	Łódź	590	12470
Dalkia Łódź S.A. Elektrociepłownia nr 2	Operation	Poland	Łódź	312	6589
Dalkia Łódź S.A. Elektrociepłownia nr 4	Operation	Poland	Łódź	578	12218
Elektrociepłownia "KRAKÓW" S.A.	Operation	Poland	Kraków	970	20516
Elektrownia Skawina S.A.	Operation	Poland	Skawina	689	14572
Południowy Koncern Energetyczny S.A., Elektrownia Siersza w Trzebini	Operation	Poland	Trzebinia	1023	21657
Elektrownia "KOZIENICE" S.A.	Operation	Poland	Świerże Górne	5178	109326
Vattenfall Siekierki	Operation	Poland	Warszawa	2208	46649
Vattenfall Żerań	Operation	Poland	Warszawa	940	19844
ENERGA Elektrownie Ostrołęka S.A.	Operation	Poland	Ostrołęka	1371	28964
PGE Elektrownia Opole S.A.	Operation	Poland	Brzezie	1175	24844
Elektrociepłownia Mielec Sp. z o.o.	Operation	Poland	Mielec	113	2394
Elektrownia "Stalowa Wola" S.A.	Operation	Poland	Stalowa Wola	727	15364
Elektrociepłownia Białystok S.A., Elektrociepłownia	Operation	Poland	Białystok	240	5069
Elektrociepłownia "Będzin" S.A.	Operation	Poland	Będzin	397	8391

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
Elektrociepłownia Chorzów "ELCHO" Sp. z o.o.	Operation	Poland	Chorzów	207	4375
Elektrownia "RYBNIK" S.A.	Operation	Poland	Rybnik	3882	82137
TAURON Halemba	Operation	Poland	Ruda Śląska	271	5727
TAURON Łagisza Będzin	Operation	Poland	Będzin	1463	30941
TAURON Jaworzno III - Elektrownia II	Operation	Poland	Jaworzno	310	6569
TAURON Łaziska Górne	Operation	Poland	Łaziska Górne	1453	30732
TAURON Bielsko-Biała EC1	Operation	Poland	Bielsko-Biała	223	4725
TAURON Bielsko-Północ EC2	Operation	Poland	Czechowice-Dziedzice	163	3447
TAURON Elektrownia Jaworzno III - Elektrownia III	Operation	Poland	Jaworzno	1454	30758
TAURON Katowice	Operation	Poland	Katowice	264	5580
Przedsiębiorstwo Energetyczne "Megawat" Sp. z o.o., Zakład Z-2 "Knurów"	Operation	Poland	Knurów	76	1618
Spółka Energetyczna "Jastrzębie" S.A., Elektrociepłownia "Zofiówka"	Operation	Poland	Jastrzębie Zdrój	202	4271
Spółka Energetyczna "Jastrzębie" S.A., Elektrociepłownia "Moszczenica"	Operation	Poland	Jastrzębie Zdrój	95	2006
Zakład Elektroenergetyczny H.CZ. "ELSEN" S.A.	Operation	Poland	Częstochowa	74	1559
Zakłady Energetyki Ciepłej S.A., Wydział 5 "Wieczorek"	Operation	Poland	Katowice	52	1107
Fortum Bytom S..A., Elektrociepłownia Miechowice	Operation	Poland	Bytom	272	5757
Elektrownia Połaniec Spółka Akcyjna - Grupa GDF SUEZ Energia Polska	Operation	Poland	Zawada	1959	41307
Dalkia Poznań Zespół Elektrociepłowni S.A., Elektrociepłownia EC II Karolin	Operation	Poland	Poznań	582	12290
Zespół Adamów	Operation	Poland	Turek	1950	41205
Zespół Konin	Operation	Poland	Konin	272	5756
Miejska Energetyka Ciepła Spółka z o.o., Ciepłownia DPM	Operation	Poland	Koszalin	33	701
Miejska Energetyka Ciepła Spółka z o.o.,	Operation	Poland	Koszalin	18	391

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
Ciepłownia FUB					
Szczecińska Energetyka Ciepła Sp. z o.o., Ciepłownia Rejonowa Dąbska	Operation	Poland	Szczecin	44	924
PGE Szczecin	Operation	Poland	Szczecin	140	2960
EdF Gdańsk	Operation	Poland	Gdańsk	687	14510
EdF Gdynia	Operation	Poland	Gdynia	324	6833
KGHM Legnica	Operation	Poland	Legnica	19	393
Przedsiębiorstwo Energetyki Ciepłej - Gliwice Sp. z o.o.	Operation	Poland	Gliwice	206	4358
PGE BYDGOSZCZ II	Operation	Poland	BYDGOSZCZ	891	18842
Zespół Pątnów	Operation	Poland	Konin	1093	23088
PGE Pomorzany	Operation	Poland	Szczecin	365	7725
PGE Dolna Odra	Operation	Poland	Nowe Czarnowo	2075	43822
Toruńska Energetyka Cergia SA – EC1	Operation	Poland	Toruń	116	2464
Elektrownia Pątnów II Sp.z o.o.	Operation	Poland	Konin	224	4734
PGE Górnictwo i Energetyka Konwencjonalna S.A., Oddział Elektrociepłownia Gorzów	Operation	Poland	Gorzów Wlkp.	127	2687
EC Nowa Dąbrowa Górnicza	Operation	Poland	Dąbrowa Górnicza	544	11516
PGE Belchatow	Operation; Commissioned after 2010	Poland		653 (647)	13783 (13793)
PGE Opole 5 & 6	Applying for permits	Poland		645 (684)	13652 (14631)
PGE Turow	Applying for permits	Poland		278 (263)	5883 (5615)
Tauron Tychy	Applying for permits	Poland		65 (65)	1378 (1396)
GDF Suez Łączna (Stara Wieś-Stasin)	Applying for permits	Poland		602 (580)	12689 (12368)
Kulczyk Investments Polnoc	Applying for permits	Poland		556 (551)	11724 (11741)
RWE & Kompania Węglowa Wola (Silesia)	Announced	Poland		488 (483)	10333 (10329)
PGE Gubin	Announced	Poland		1541 (1526)	32530 (32557)
Fortum Zabrze CHP	Announced	Poland		253 (251)	5358 (5368)



Name of plant	Status	Country	Municipality	YOLL	WLD
Central Termoelétrica Sines	Operation	Portugal	SINES	169	3525
Central Termoelétrica do Pego	Operation	Portugal	ABRANTES	38	796
SC CET ARAD SA	Operation	Romania	ARAD	817	17289
SC CET GOVORA SA	Operation	Romania	RAMNICU VALCEA	2420	51169
Sucursala Romag Termo	Operation	Romania	DROBETA TURNU SEVERIN	3397	71877
COMPLEXUL ENERGETIC TURCENI	Operation	Romania	TURCENI	8670 (8593)	183310 (183452)
COMPLEXUL ENERGETIC ROVINARI	Operation	Romania	ROVINARI	6063 (6008)	128157 (128201)
SC ELECTROCENTRALE DEVA SA Mintia	Operation	Romania	MINTIA	2436	51412
S.C. LUKOIL ENERGY&GAS ROMANIA S.R.L.	Operation	Romania	PLOIESTI	65	1367
SC ELECTROCENTRALE ORADEA SA	Operation	Romania	ORADEA	2186	46232
SC CET SA BACAU I	Operation	Romania	BACAU	290	6122
CET TIMISOARA SUD	Operation	Romania	TIMISOARA	166	3507
PAROSENII	Operation	Romania	VULCAN	1131	23932
SC TERMICA SA SUCEAVA	Operation	Romania	SUCEAVA	105	2214
SC CET IASI SA CET 2 HOLBOCA	Operation	Romania	HOLBOCA	139	2938
SUCURSALA ELECTROCENTRALE ISALNITA	Operation	Romania	ISALNITA	2101 (2082)	44465 (44489)
SUCURSALA ELECTROCENTRALE CRAIOVA II	Operation	Romania	CRAIOVA	1884 (1867)	39828 (39852)
Enel Galati	Applying for permits	Romania		439 (443)	9251 (9433)
Electrocentrale SA Paroseni	Announced	Romania		149 (148)	3140 (3145)
RAAN Halanga, Dr. Turnu Severin	Announced	Romania		298 (296)	6280 (6290)
SC Doicesti & China Huadian Engineering Co. Doicesti	Announced	Romania		373 (370)	7850 (7861)
Braila Power	Announced	Romania		558 (553)	11742 (11764)
Rovinari	Announced	Romania		373 (370)	7850 (7862)
Craiova II/Isalnita	Announced	Romania		373 (370)	7850 (7860)

Name of plant	Status	Country	Municipality	YOLL	WLD
SC Electrocentrale DEVA SA Electrocentrale Deva	Announced	Romania		314 (311)	6605 (6616)
Slovenské elektrárne a.s. - Elektrárna Vojany, závod	Operation	Slovakia	Vojany	145	3043
CM European Power Slovakia s.r.o.	Operation	Slovakia	Bratislava	1072	22649
BUKÓZA ENERGO a.s. - Uhoľný kotol	Operation	Slovakia	Hencovce	213	4493
Slovenské elektrárne a.s. - Elektrárne Nováky, závod	Operation	Slovakia	Zemianske Kostolany	4208	89044
Tepláreň Košice a.s.	Operation	Slovakia	Košice	269	5649
TES (HSE) Sostanj-6	Under construction	Slovenia		505 (471)	10623 (10000)
Termoelektrarna Šoštanj d.o.o.	Operation	Slovenia	Šoštanj	1231	25879
Termoelektrarna Toplarna Ljubljana, d.o.o.	Operation	Slovenia	Ljubljana	174	3649
Termoelektrarna Trbovlje, d.o.o.	Operation	Slovenia	Trbovlje	250	5276
CENTRAL TÉRMICA DE LA PEREDA	Operation	Spain	PEREDA (LA)	44	923
CENTRAL TÉRMICA ALCÚDIA	Operation	Spain	ALCUDIA	728	15300
C.D.E. EIVISSA	Operation	Spain	EIVISSA	643	13295
E.ON ESCUCHA	Operation	Spain	ESCUCHA	575	12181
CENTRAL TÉRMICA DE SOTO DE RIBERA	Operation	Spain	SOTO DE RIBERA	167	3509
E.ON PUENTE NUEVO	Operation	Spain	ESPIEL	97	2033
E.ON CERCS	Operation	Spain	CERCS	394	8286
E.ON PUERTOLLANO	Operation	Spain	PUERTOLLANO	88	1843
CENTRAL TÉRMICA DE ABOÑO	Operation	Spain	GIJON	427	9000
ENDESA ANDORRA	Operation	Spain	ANDORRA	1103	23278
CENTRAL TERMICA DE MEIRAMA	Operation	Spain	MESON DO VENTO	127	2685
E.ON LOS BARRIOS	Operation	Spain	BARRIOS (LOS)	145	2992

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
ENDESA COMPOSTILLA	Operation	Spain	CUBILLOS DEL SIL	470	9850
ENDESA AS PONTES	Operation	Spain	PONTES DE GARCIA RODRIGUEZ (AS)	415	8710
ENDESA LITORAL DE ALMERÍA	Operation	Spain	CARBONERAS	776	16298
IBERDROLA DE LADA	Operation	Spain	LANGREO/LLANGRÉU	69	1446
IBERDROLA PASAIA	Operation	Spain	PASAIA	113	2372
Fortum VÄRTAVERKET	Operation	Sweden	STOCKHOLM	32	679
Vattenfall Uppsala	Operation	Sweden	UPPSALA	27	582
Kraftvärmeverket i Linköping	Operation	Sweden	LINKÖPING	21	449

Name of plant	Status	Country	Municipality	YOLL	WLD
EDF Energy (West Burton Power) Ltd, West Burton Power Station	Operation	United Kingdom	RETFORD	975	20698
Drax Power Limited, Drax Power Ltd	Operation	United Kingdom	SELBY	4449	94399
Kilroot Power Ltd	Operation	United Kingdom	Carrickfergus	262	5513
Scottish Power Plc Cockenzie Power Station	Operation	United Kingdom	Cockenzie and Port Seton	1486	31376
E.ON UK PLC, Ironbridge Power Station	Operation	United Kingdom	TELFORD	474	10046

<b>Name of plant</b>	<b>Status</b>	<b>Country</b>	<b>Municipality</b>	<b>YOLL</b>	<b>WLD</b>
E.ON UK plc, Ratcliffe-on-Soar Power Station	Operation	United Kingdom	NOTTINGHAM	1552	32940
EDF Energy (Cottam Power) Ltd, Cottam Power Station	Operation	United Kingdom	Retford	1570	33319
Keadby Generations LTD, FIDDLERS FERRY POWER STATION	Operation	United Kingdom	WARRINGTON	1361	28868
Rugeley Power Limited, Rugeley Power Station	Operation	United Kingdom	Rugeley	510	10833
RWE Aberthaw Power Station	Operation	United Kingdom	Barry	1412	29990
RWE npower plc, Didcot A Power Station	Operation	United Kingdom	DIDCOT	1110	23538
RWE npower plc, TILBURY POWER STATION	Operation	United Kingdom	TILBURY	1047	22193
Sembcorp Utilities (UK) Ltd, Wilton 10 Power Station	Operation	United Kingdom	Redcar	80	1693
Uskmouth Power Co Ltd, Uskmouth Power Plant	Operation	United Kingdom	Newport	89	1885
Scottish Power Generation Ltd Longannet Power Station	Operation	United Kingdom	Kincardine	4210	89109
Eggborough Power Ltd, Eggborough Power Station	Operation	United Kingdom	Goole	930	19734
E.On UK Plc, Kingsnorth Power Station	Operation	United Kingdom	ROCHESTER	1118	23710

### 3.3 Results – Summarized for Europe

In the following the mortality risks and the work loss days estimated in chapter 3.2 are summed up. The annual emissions of the analysed power plants have been provided by GREENPEACE (Myllyvirta 2013). For 311 plants in operation, reported data corresponding to the year 2010 has been derived by GREENPEACE from the “European Pollutant Release and Transfer Register” (E-PRTR) database of the European Environmental Agency (<http://prtr.ec.europa.eu>). Moreover, GREENPEACE estimated emission data for 111 sites in Europe where power plants are under construction, approved, applying for approval or were connected to grid 2012 or later. The emission data corresponds to the assumed year of starting operation, i.e. 2013 and later.

The following table shows the results for EU-27 countries. The values in parenthesis describe the results that occur, if for those power plants, where the detailed methodology has been applied, the data resulting from the simpler approach is replaced by the result for the detailed approach.

<b>Belgium</b>	<b>YOLL</b>	<b>WLD</b>
Operation	574	12169
<b>Bulgaria</b>		
Operation	29134 (29008)	615777 (615819)
Under construction & planned	1305 (1294)	27397 (27443)
<b>Czech Republic</b>		
Operation	18087	382254
Under construction & planned	2210 (2263)	46688 (48312)
<b>Denmark</b>		
Operation	190	4008
<b>Finland</b>		
Operation	1187	24998
<b>France</b>		
Operation	9918	209726
<b>Germany</b>		
Operation	33471 (33434)	707801 (707848)
Under construction & planned	11859 (11513)	251032 (245422)
<b>Greece</b>		
Operation	12296 (12261)	259561 (259612)
Under construction & planned	3160 (2745)	66576 (58428)
<b>Hungary</b>		
Operation	1512	31800
Under construction & planned	272	5723
<b>Ireland</b>		
Operation	802	16921
<b>Italy</b>		
Operation	5371 (5362)	113288 (113293)
Under construction & planned	1783 (1826)	37611 (38922)
<b>Netherlands</b>		
Operation	1476	31337
Under construction & planned	804 (877)	17055 (18819)
<b>Poland</b>		
Operation	56711 (56604)	1198739 (1198769)

Under construction & planned	7423 (7419)	156789 (158350)
<b>Portugal</b>		
Operation	207	4321
<b>Romania</b>		
Operation	31870 (31701)	673819 (674053)
Under construction & planned	2877 (2860)	60570 (60831)
<b>Slovakia</b>		
Operation	5907	124877
<b>Slovenia</b>		
Operation	1655	34804
Under construction & planned	505 (471)	10623 (10000)
<b>Spain</b>		
Operation	6382	133998
<b>Sweden</b>		
Operation	81	1711
<b>United Kingdom</b>		
Operation	22635	479842

Sum for EU-27 by power plant status

<b>Status</b>	<b>YOLL</b>	<b>WLD</b>
Operation	239467 (238984)	5061751 (5062161)
Under construction & planned	32197 (31538)	680063 (672258)

## **4 Summary and Conclusions**

The coal fired power plants in Europe provide ca. 20 % of the yearly electricity production in Europe but they also cause a considerable amount of health impacts. The results of this report show a quantitative estimate of these health impacts with regard to reduced life time expectancy of the population in Europe caused by the emission of air pollutants (mainly SO<sub>2</sub>, NO<sub>x</sub>, and fine particles, i.e. PM<sub>2.5</sub> and PM<sub>10</sub>) by coal fired power plants in Europe. These health risks should be taken into account when making decisions about the electricity generating system. Such decisions should consider as well the impacts to human health estimated here as other criteria like greenhouse gas emissions, resource costs and availability, supply security, technological development and the current and future electricity generation cost.



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