Question 1. Annex of your doctorate thesis, explaining how these data have been calculated.

The maximum sustainable level: $\phi_{max} = k * c_{max} * V$

When rate of decay (or absorption) and volume of air (or water) are known, how determine emission rate and concentration of the pollutant? Do you determine these numbers use Laws of The Netherlands?

Answer 1.

In the Netherlands we do it “the other way around”: we measure Ø and we measure c, resulting in k*V. C_{max} is determined by scientists (see for instance the site of the World Health Organisation), but some say that it is influenced by politics as well.

When C_{actual} is e.g. 200% of C_{max}, Ø must be reduced bij a factor 2 (since Ø/c = k*V = constant).

Politics comes into the evaluation as follows:

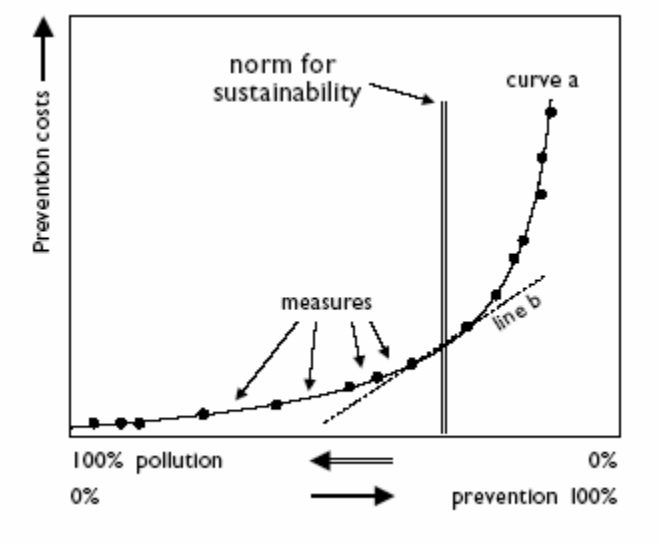
Many pollutants are local or regional (except from e.g. CO2). And some are even only in a certain period of time (like smog forming pollutants). Politicians decide then in what areas of The Netherlands what level of C will be allowed for what period of time. That gives then the C_{max}. Prevention measures must be taken then to reduce the actual C to the C_{max}. So the percentage of reduction of Ø is known then for that region.

In our Western society we don´t like to implement local or regional laws for reduction of emission, because it effects our free market economy (industries and governments like to have “ level playing fields”, that means that they like to implement prevention laws it total industrial sectors over Europe and preferably the whole World). This has also the advantage that clean areas of The Netherlands and Europe stay clean. To the norm for the worst areas become the norm for The Netherlands and Europe. Most of the legislation comes now at the European level.

When you realise that a lot of the prevention measures have already been taken by industry, and a lot of the remaining pollution is coming from cars, you understand the above philosophy even better, since cars drive around all over Europe.

Because China is so big, with so many different areas, the same line of reasoning might be applied to China.

Question 2.



At a certain point of the curve, the ‘norm for sustainability’ is reached. The marginal prevention costs are defined by the costs per kg reduction of the ‘last’ measure, depicted as line b. But there are many measures in curve. How about the all measures to be get? I mean, how do you determine every point (measures) in curve when the ‘prevention costs at the norm’ are proposed? Are there database about prevention measures in Netherlands and Europe?

Answer 2.

There are databases for The Netherlands. Table 2.2 of my thesis is an example. The line of the Figure above is typical for each region. Even the list for CO2 is typical for a region (in some regions is much wind, in others much sun, effecting the costs of energy from windmills and solar power).

In the European Union, there is a tendency to take a certain cost level (line b) as the political norm, and implement BATNEC (best available technology, not exceeding a certain cost level) and implement a system for tradable emission rights See Chapter 9.5 of my thesis. This is in line with the aforementioned policy of “level playing field” for the industry and the idea that the cheapest solutions must be implemented first.

In fact, prevention curves and damage curves have been calculated for the different countries, and based on that the maximum cost level for prevention is chosen.

By the way: the political situation in Europe is totally different from the US. In Europe, politicians do not like to be accused of irresponsible behaviour, so they tend to be on the safe side, and tend to follow the scientific calculations.

In the US. the Bush administration tends to follow the lobby from industry: denying that there is a problem, so they tend to do nothing (saving money in the short term and denying that that will cost much more money in the long term).

Hence the clash in the negotiations on CO2.

Question 3.

Table 2.1 Characterisation factors, mass based (Goedkoop, 1995).

Substance		Weighing factor	Substance		Weighing factor
Global warming			Carciogenics		
CO2	Air	1	PAH	Air	In summer smog
N2O	Air	270	Benzo[a]pyrene	Air	1
Dichlcromethane	Air	15	As	Air	0.044
HFD-125	Air	3400	CxHy aromatic	Air	0.000011
HFC-134a	Air	1200	Benzene	Air	In summer smog
HFC-143a	Air	3800	Fluoranthene	Air	1
HFC-152a	Air	150	Ni	Air	0.44
Methane	Air	In summer smog	Cr (6+)	Air	0.44
Trichlcromethane	Air	25	Tar	Air	0.000011
Acidification			ethylbenzene	Air	0.000011

Why weighing factor is in summer smog? What kind of determinant factors did affect this result if you considered problem of double calculation?

Answer 3.

I am not sure that I understand your question.

First the issue of double counting:

In damage based models, one pollutant can cause two (or more) effects. An example is CH4: it adds to the Greenhouse Effect as well as to the Summer Smog. In prevention, however, you have only to pay once to prevent pollution. So methane must be counted in either of the two.

Then the choice I made:

It is an arbitrary choice, so you may reverse the choice (I took the most expensive of the two).

Note: In the mean time I included Methane in Global warming and excluded it in Summer smog. The reason I did that is the relative high impact Methane on Global Warming.