Ministry of environmental and nature protection

Regulatory Impact Assessment for Regulation on emission quotas of greenhouse gases and emission trading

[Zagreb, April 2012]

1. Problem

Problems:

• Air pollution, especially the increase of CO2 in the atmosphere compared to the pre-industrial period

Total emissions of greenhouse gases in 2010, except for removal by sinks, is 28 598 million. t CO2-eq emissions (equivalent CO2), which represents a 9.1 percent reduction in emissions compared to emissions of greenhouse gases in 1990. The main reasons of increasing greenhouse gases in the period 1995-2008 was Energy (Public electricity and heat production and transport), industrial processes (cement production, lime production, production of ammonia, nitric acid production and consumption of HFCs) and waste. Increasing public electricity and heat. Manufacturing sector was mainly due to higher consumption of liquid fuels (7.5%). In recent years, manufacturers of cement, lime, ammonia and nitric acid reached a maximum production capacity, which is reflected in the level of emissions Source: National Inventory Report of Greenhouse Gases in Croatia 2012):

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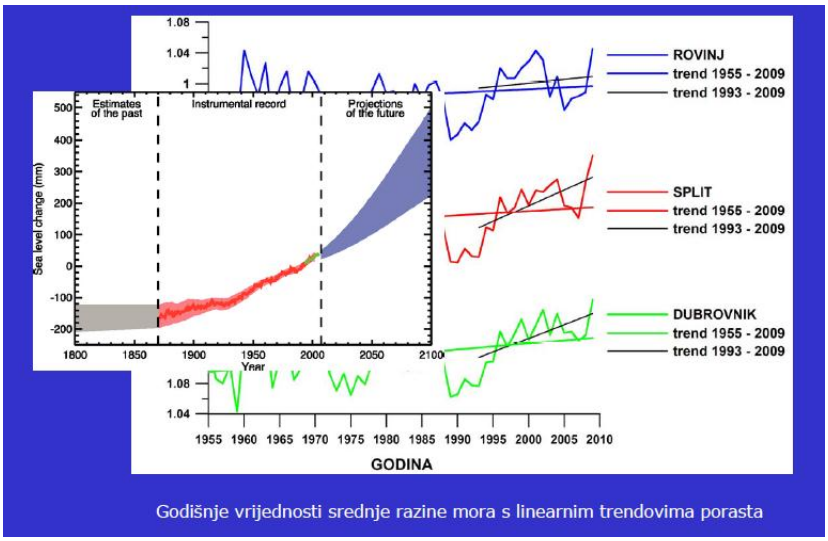
• climate change in terms of increasing temperature on Earth

Global warming is the increase in average temperature of Earth's atmosphere and oceans since the late 19th century and its planned sequel. Since the early 20 century, Earth's average surface temperature has increased about 0.8 ° C with about two-thirds increase occurring since 1980. Warming of the climate system is unequivocal, and scientists are more than 90% sure that most of them caused by increasing concentrations of greenhouse gases produced by human activities such as deforestation and burning fossil fuels. (From Wikipedia, the free encyclopedia: Global warming)

The increase in global temperature will cause sea levels to rise and will change the amount and pattern of rainfall and the likely expansion of subtropical deserts. Warming is expected to be strongest in the Arctic and will be linked with the continuing retreat of glaciers. Other possible effects of warming have increased incidence of extreme weather events including heat waves, droughts and heavy rainfall, species extinction due to shifting temperature regimes, and changes in yields of food. Warming and related changes will vary from region to region throughout the world. If global average temperatures to increase at 4 ° C above preindustrial levels, adjusting the boundaries of man will be exceeded in many parts of the world, while the limits for adaptation for natural systems generally will be exceeded in the whole world. Thus, the ecosystems that depend on human living conditions will be preserved. (From Wikipedia, the free encyclopedia: Global warming).

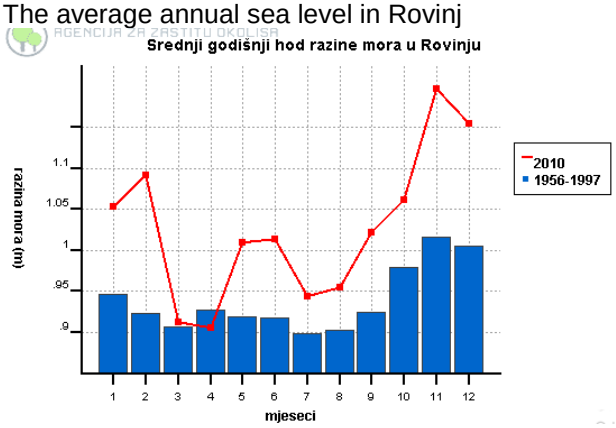


Trend of sea level on the Croatian Adriatic coast (Source: 5th Croatian Conference on Waters; 18-21 May, 2011)

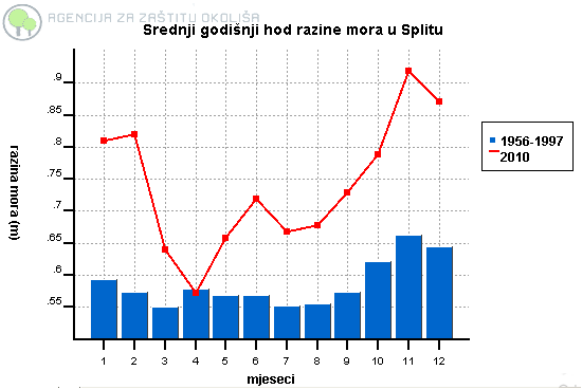
According to available data, sea level at Bakar since 1950 to 1970 on average increased by 30 millimeters. As for the measurement rađenih past 20 years, it now shows even twice the average sea level rise. It is, however, know that this change is not linear. However, several models show that the expected increase in world's oceans and the Adriatic Sea for about 34-100 centimeters by 2100 year, "says Professor Damir Viličić the Science Faculty. (Vjesnik.hr)

According to databases and indicators of the marine environment, fisheries and aquaculture (Croatian Environmental Agency), in 2010 the Adriatic sea level was unusually higher than average in January, February, November and December, from 15 cm to almost 30 cm. The cause of such high levels of the Adriatic is reduced air pressure and southerly winds blowing frequently during this period, as a result of unusually strong cyclone activity over the Mediterranean. During the rest of the Adriatic sea level was about ten inches higher than the climatological average for the period from 1956th to 1997th, which points to the fact that in the past few decades, the average sea level atmospheric activity increased by ten inches, due to climatic factors that cause an increase sea level at global and regional frameworks (expanding the column must be due to increased warming, ocean, and added weight because of melting ice sheets).

The average annual sea level in Rovinj



The average annual sea level in Rovinj



According to the report of the Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report eleven of the last twelve years (1996-2006) Rank among the twelve warmest years in the instrumental record of global surface temperature (since 1850). Centennial linear trend (1906 to 2005) of 0.74 [0.56 to 0.92] ° C higher than the corresponding trend of 0.6 [0.4 to 0.8] ° C (1901 to 2000) shown in the Third assessment Report (Third assessment Report, TAR). The temperature increase is widespread over the world and greater at higher northern latitudes. Land regions have warmed faster than the ocean. Rising sea level is consistent with warming. Global average sea level has risen since 1961. The elevator at an average rate of 1.8 [1.3 to 2.3] mm / yr. Since 1993 year at 3.1 [2.4 to 3.8] mm /yr, with contributions from thermal expansion, melting glaciers and polar ice caps and ice sheets. It is still unclear whether the faster rate reflects a sea level rise in the period since 1993 to 2003. The decades of variation or an increase in the longer term trend. Observed decreases in snow and ice are also consistent with warming. Satellite data since 1978. The show that annual average Arctic sea ice has shrunk by 2.7 [2.1 to 3.3] % per decade, with larger decreases in summer of 7.4 [5.0 to 9.8] % per decade. Mountain glaciers and snow cover on average have declined in both hemispheres.

Since 1900 to 2005 the precipitation increased significantly in eastern parts of North and South America, northern Europe and northern and central Asia but declined in the Sahel, the Mediterranean, southern Africa and parts of southern Asia. Globally, the area affected by drought has likely increased since the 1970. It is likely that over the past 50 years: cold days,

cold nights and frosts in most inland areas become smaller, and the hot days and hot nights have increased. It is likely that heat waves have become more frequent over most land areas, the frequency of heavy precipitation events has increased in most areas and that since 1975 The incidence of extreme high sea level has increased worldwide. There is observational evidence of an increase in intense tropical cyclones in the North Atlantic since about 1970 year, with limited evidence of increases elsewhere. There is no clear trend in the annual number of tropical cyclones. It is difficult to determine long term trends in cyclone activity, particularly prior to 1970 year.
Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the past 1300 years.

The cause of the problem:
• Use of high amounts of fossil fuels in industry due to the development of industry
• Increasing population - Over the past 50 years, life expectancy at birth in the EU27 increased by about 10 years for women and men to 82.4 years for women and 76.4 years for men in 2008 (Source: Wikipedia, the free encyclopedia).

The population of the European Union; lack of incentives to use alternative energy sources and advanced technologies that could be used for use other than fossil fuels. The plant operators are not motivated to invest in clean technology.

Groups that will be affected by this change are:
a) In the Republic of Croatia to the 73 installations included in the emissions trading system from activities in the energy sector, plants for combustion in thermal power input exceeding 20 MW, oil refineries, petrochemical industry, coke ovens, installations for the production or processing of iron and steel, treatment plant or sintering iron ore, pig iron or steel, installations for the production of minerals, cement clinker, glass, ceramic products, in particular roofing tiles, bricks, refractory bricks, tiles, pottery or porcelain, wood pulp or other fibrous materials, paper and cardboard, airline operators with flights from landing in and taking off from airports located in the territory of Croatia.

b.) other companies and individuals who use the products produced by industrial companies - through the prices of products which will be higher.

c) Ministry of:
MINISTRY OF ENVIRONMENT AND NATURE
ENVIRONMENTAL PROTECTION AGENCY
CENTRAL BUREAU OF STATISTICS
MINISTRY OF ECONOMY
MINISTRY OF FINANCE
Economic and Social Council
Environmental Protection and Energy Efficiency Fond

c). service industry : development of tourism as significant activity of Croatian BDP through costs associated with finding pollution
Service prices will increase due to price increases, electricity and other products whose production is included in the ETS

d) trade
Croatian Chamber of Economy
Croatian Forests doo
Croatian water d.o.o.
Croatian Air Traffic Control d.o.o.
Croatia cement d.o.o.

small businesses

e) citizens of the Republic of Croatia
Due to price increases, electricity and other products whose production is included in the ETS, the cost of ETS will be transferred to the final consumer, which weakens the purchasing power of citizens.

2. Objectives

Problems:
• Air pollution, especially the increase of CO2 in the atmosphere compared to the pre-industrial period particularly in the ETS sector in the Republic of Croatia have a current average emissions around 980 kt of CO2, while the second is the petrochemical industry with the average emissions (2005-2010) of approximately 500 kt of CO2, then the production of oil from the average emissions (2005-2010) of around 225 kt of CO2 followed by cement manufacturers to average emissions (2005-2010) of about 120 k t of CO2.

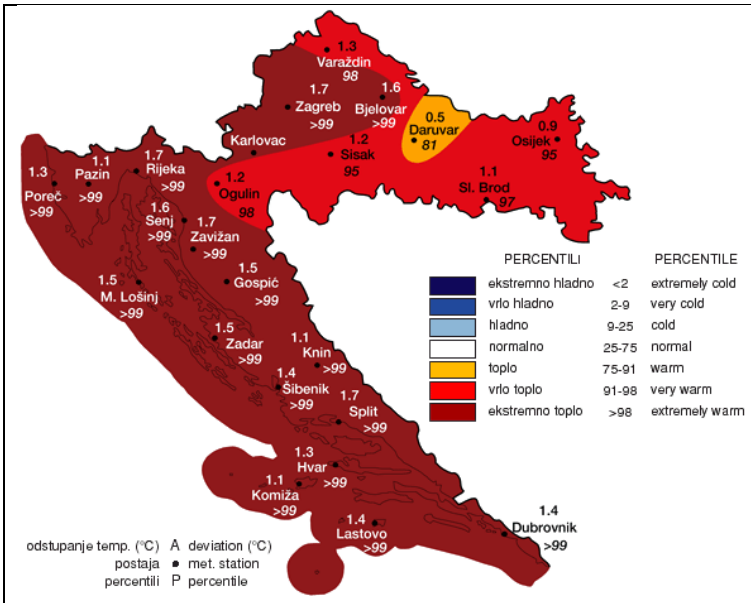
• climate change in terms of increasing temperatures on Earth, according to the Republic of Croatia in temperature changes are listed in the table below (source: Crometeo)

Measurement deviation 1995-2004

	Temp zraka (° C)
OSIJEK	+0.6 °C
ZAGREB	+1.13°C
ZAVIŽAN	+0.5 °C
RIJEKA	+0.77°C
SPLIT	+0.61°C
DUBROVNIK	+0.51°C

The mean annual air temperature in 2011 year on the Croatian territory was higher than the multiannual average (1961st to 1990th). Anomalies of mean annual air temperatures were in the range of 0.5 ° C (Daruvar) to 1.7 ° C (Rijeka, Split-Marjan, the Zagreb-Grič and Zavizan).

By percentage, thermal conditions in Croatia for 2011. year are described in the following categories: extremely hot (including the entire Adriatic hinterland, ie the Dalmatian Zagora, Lika and Gorski Kotar, and much of the central Croatian), very warm (Banovina and Slavonia) and warm (around Daruvar)
(Source:Meteorological and hydrological service, Croatia)



Cause of problems:

• use of increased amounts of fossil fuels in industry due to the development of industry

The fuel consumed in industrial cogeneration and heating plants is divided by industrial subsectors for the period 2001-2010. The largest contributor to emissions is fuel combustion in industry of construction materials and petrochemical production + followed by chemical industry, food processing, industry, paper industry, iron and steel industry and non-ferrous metal industry. (Source: National Inventory Report of Greenhouse Gases in Croatia 2012):

Table A2-7: The GHG emissions from Manufacturing Industries and Construction – liquid fuels

	1990	2000	2005	2006	2007	2008	2009	2010
Fuel consumption								
Gasoline (1000 t)	0.2	7.6	6.9	7.3	7.6	7.9	7.0	5.1
NCV for gasoline (MJ/kg)	44.6	44.6	44.6	44.6	44.6	44.6	44.6	44.6
Petroleum (1000 t)	0.1							
NCV for petroleum (MJ/kg)	44.0							
Gas/diesel oil (1000 t)	246.5	130.8	161.6	164.8	177.4	194.3	145.4	130.2
NCV for gas/diesel o.(MJ/kg)	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
Fuel oil (1000 t)	419.2	302.2	198.6	206.8	141.8	124.3	90.7	56.3
NCV for fuel oil (MJ/kg)	40.2	40.2	40.2	40.2	40.2	40.2	40.2	40.2
LPG (1000 t)	17.5	21.0	22.8	29.4	28.2	30.4	20.1	16.2
NCV for LPG (MJ/kg)	46.9	46.9	46.9	46.9	46.9	46.9	46.9	46.9
Lubricants (1000 t)	8.6							
NCV for lubricants (MJ/kg)	33.6							
Petroleum coke (1000 t)	0.0		172.3	215.0	200.4	191.6	140.4	116.0
NCV for petroleum coke (MJ/kg)	29.3		31.0	31.0	31.0	31.0	31.0	31.0
Total fuel consumpt. (TJ)	28498	19056	21602	23719	21151	21012	15462	12407

Source: National Inventory Report of Greenhouse Gases in Croatia 2012:

Desired results and objectives:

Trading in greenhouse gas emission allowances, which limits the amount gradually, will reduce emissions of greenhouse gases and thus the cost-effective way to contribute to mitigating climate change.

Reducing greenhouse gas emissions for the period 2013 to 2020 at the EU level is determined by the quota for each plant included in the trading system that is 21% lower than the amount of verified emissions that these plants had 2005 year.

The objective is to

- decrease GHG emissions by 21% by 2020 (compared to the level of 2005)
- ensuring fairness between covered installations,
- and the efficient use of public resources

3. Available Options

3.1. Option 1 - do nothing (not normative solution)
If the problem is not tackled then the changes in the environment will continue – the GHG emissions will probably increase and the average temperatures will also continue to increase.
It will also influence on trend of rising the sea level on the Croatian Adriatic coast.

3.2. Option 2: - System monitoring decreasing greenhouse gas emissions within the Croatian who would develop its own system in a way
The option would include setting a limit for emissions for each industry sector and company. If the company emits more than the limit, then the company must pay a penalty.

3.3. Option 3: - to ensure that states provide various incentives through the use of cleaner production technologies, the use of alternative fuels that reduce greenhouse gases - (normative solution). The state subsidizes the purchase of new technologies which enable the reduction of GHG.

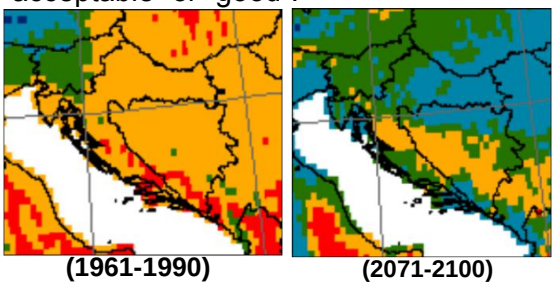
3.4. Option 4: - Establishing a legal framework and transposition of EU directives regulating greenhouse gas emissions trading - (normative solution). In terms of incentive, it is clear that the ETS in itself provides incentives to reduce greenhouse gases, independently of the allocation methods, via the mechanism of the carbon price that is determined through the overall emissions cap and the scarcity created through this limited supply.
As a consequence, also the economic, social and environmental impacts are predetermined to some extent. Nevertheless, the allocation of allowances undeniably also has an impact on behaviour of operators, since in case of full allocation or even over-allocation,the pressure to take action and reduce emissions will be rather limited. Inversely, pressure to reduce emissions will be stronger in case a company is faced with the need to buy a significant share of allowances to cover its emissions. The incentive effect is even more evident for new installations, since the allocation methodology could impact on how a new installation is designed.

4. Comparison of options

Options	**Benefits**	**Costs**
Option 1 - do not take anything (not normative solution)	Benefits only for companies due to the fact that they will not be force to invest in cleaner production.	• Continue air pollution, especially the increase of CO2 in the atmosphere will rise in relation to the industrial period and will continue to grow. • Cost for state for noncompliance with international agreement and obligations. • Continue to increase the temperature of the Earth, which will affect air quality, human health, quality of life, agriculture and increase dependence on fossil fuels if we do not allow the development of modern technologies and use other forms of energy. • Cost of treatment because of air pollution • The costs of healthcare • Lower profits from tourism; If other countries in the region that have developed tourism take care of the

environment and greenhouse gas emissions will be before the tourists will choose for that country and thus the income from tourism in Croatia may be reduced

This map shows the “Tourism Climate Index” for Croatia which measures how pleasant a climate is for tourists, is expected to get worse in Croatia during the summer. The climate on the coast and inland areas are expected to go from being “Very good” for tourists to being either “acceptable” or “good”.



(1961-1990) **(2071-2100)**

Excellent

very good

well

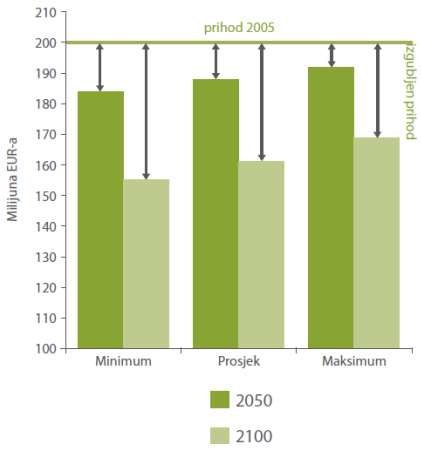
acceptable

undesirable

This map shows the “Tourism Climate Index” for Croatia which measures how pleasant a climate is for tourists, is expected to get worse in Croatia during the summer. The climate on the coast and inland areas are expected to go from being “Very good” for tourists to being either “acceptable” or “good”.

• first flooding can be expected in shallow bays, but also in coastal areas that are under agricultural crops. The Neretva River estuary will occur salinity of agricultural land where is large proportion of agriculture area in Croatia and a drought may in Slavonia, (also agriculture area), completely destroy agriculture. Additionally, climate variability has had severe effects on agriculture. In the period from 2000-2007, the average amount of damage claimed in agriculture was 176 million Euros per year – which is more than the entire amount of subsidies in the sector.

- Looking at the likely impacts on maize alone, the lost revenue due to climate change is expected to be EUR 6-16 million in 2050 and EUR 31-43 million in 2100. However, there are is little information – such as crop models or agricultural sector economic models – that would help the sector understand current or future vulnerability due to climate change.



- Already, climate is integrally linked to human development in Croatia. Severe weather events such as heat waves and droughts have already shown that Croatia is vulnerable to what we call “climate variability” Extreme weather events – especially droughts and heat waves - have resulted in average losses of EUR 176 million per year during 2000-2007 – 0.6% of national GDP, and almost 10% of the value generated by the agricultural, forestry and fisheries sector.
- In the same year, because of drought, hydro-electric production was reduced. Estimates using the relative costs of electricity show that this probably cost Croatia an extra 40 million Euros to compensate for the lost electricity produced. More was lost due to the drought in 2007.

- Volume status of surface water-water balance (Croatian Waters)

From the data presented in figure reveals that the amount of surface water in the last decade (1999-2008), compared to a multi-year trend, the water area of the Danube River shows no significant deviations, while the water in the Adriatic area of pronounced downward trend in the flow.

- Health: in August of 2003, a heat wave – which was

		exceptionally strong throughout Europe – is estimated to have increased mortality in Croatia by 4%. (Source: UNDP, 2008 Human Development Report for Croatia – A Climate for Change: The Socio-economic impacts of climate change in Croatia)
Option 2: - A limit for emissions + penalties if not followed.	Reduction in GHG emissions – according to the set limit; Positive effect on climate	• Cost of identifying the correct limit for each company – for the government (ministry of environment); • Cost for monitoring GHG emissions • Costs borne by the companies when going over the limit; • Cost of collecting the penalties – enforcement costs borne by the government.
Option 3: - state subsidies to companies for purchasing cleaner technologies	- Reduction in GHG emissions – due to cleaner technologies; - Positive effect on climate, tourism, healthcare (less costs on healthcare) - The opening of new businesses that develop new technologies and thus employ new people (*social impact)*	• Subsidies to the companies – cost to the government • The purely financial costs of innovative, small scale technological developments have proportionally higher investment costs than mature, large scale technologies. Being at an early point on their technology learning curve means that the above cost-related market imperfections have a disproportionate effect on innovative and developing technologies and businesses. This is particularly true for nascent renewable cooling technologies. • Technological uncertainties combined with questions of integrating decentralised energy into the centralised grid infrastructure, all adds to the risks faced in the development of new technologies and the cautious perception, of consumers, developers and investors.
Option 4: - Establishing a legal framework and transposition of EU directives regulating greenhouse gas emissions trading - (normative solution)	Reduction in GHG emissions – due to the financial incentive to emit less; -Positive effect on climate, tourism, healthcare (less costs on healthcare) -Revenue from the sale of quotas – to the government and to the companies who sell;	- Costs for operators for creating reports, verification reports, the purchase of emission allowances that are missing - Administrative expenses of the Ministry and Croatian Environmental Agency, environmental inspections - Due to price increases, electricity and other products whose production is included in the ETS, the cost of ETS will be transferred to the final consumer, which weakens the purchasing power of citizens. Full auctioning of allowances imposes an additional financial cost on firms, in particular energy-intensive ones if these are unable to pass through the cost of allowances due to exposure to intense competition from outside the EU This option may lead to increased research and innovation cost in the field of biomass use. ***Example of costs:*** Companies A and B both emit 100 000 tonnes of CO2

	Social impacts While on the one hand climate change mitigation offers many employment opportunities, the transformation to a low carbon economy may on the other hand also imply certain structural changes. However, due to the low (or in case of application of the cross-sectoral correction factor almost not existing) economic impacts, the choice of period for historic production dana is not expected to have a discernible impact on the level of employment and labour market situation in general. ***Enviromental impacts*** The EU ETS has put a price on carbon emissions and shown that it is possible to trade in greenhouse gas emissions. Emissions from installations in the scheme are falling as intended. The changes to be introduced in	per year. Let us say their governments give each of them emission allowances for 95 000 tonnes, leaving them to find ways to cover the shortfall of 5 000 allowances. This gives them a choice between reducing their emissions by 5 000 tonnes, purchasing 5 000 allowances in the market or taking a position somewhere in between. Before deciding which option to pursue they compare the costs of each. Let us imagine that the market price of an allowance at that moment is € 20 per tonne of CO2. Company A calculates that cutting its emissions will cost it € 10 per tonne, so it decides to do this because it is cheaper than buying the necessary allowances. Company A even decides to take the opportunity to reduce its emissions not by 5 000 tonnes but by 10 000. Company B is so it decides to buy allowances instead of reducing emissions. Company A spends € 100 000 on cutting its emissions by 10 000 tonnes at a cost of € 10 per tonne, but then receives € 100 000 from selling the 5 000 allowances it no longer needs at the market price of € 20 each. This means it fully offsets its emission reduction costs by selling allowances, whereas without the emissions trading scheme it would have had a net cost of € 50 000 to bear (assuming that it cut emissions by only the 5 000 tonnes necessary). Company B spends € 100 000 on buying 5 000 allowances at a price of € 20 each. In the absence of the flexibility provided by the ETS, it would have had to cut its emissions by 5 000 tonnes at a cost of € 150 000. Emissions trading thus brings a total cost-saving of € 100 000 for the companies in this example. Since Company A chooses to cut its emissions (because this is the cheaper option in its case), the allowances that Company B buys represent a real emissions reduction even if Company B did not reduce its own emissions.

		2013, notably a progressive move towards auctioning of allowances, will further enhance its effectiveness. The objective to decrease GHG emissions by 21% by 2020 (compared to the level of 2005 will be reached.	

NOTE: This part of the statement to be completed in updating the Draft statements and after the consultation and updated again after the public hearing of the proposal has shown.

5 consultation
Counseling is conducted on the text of the Draft Regulation, provided that the consultation on the ordinance went before the statement due to internal deadlines, lack of human resources, due to the adoption of EU legislation, etc. Counseling is conducted in a manner that the text of the Draft Regulation published 30 days on the website of the Ministry of Environment and Nature Protection on 16 March 2012 up to 16 April 2012. The Ministry received comments from 7 stakeholders on the Draft Regulation on the emission trading greenhouse gas emissions: Croatian Chamber of Economy, operators of installations and avio-operators (NEXE group, Croatian Power Utility dd, Croatia Airlines), Directorate for Environmental Inspection, Croatian Environmental Agency, individual firms (Ekonerg). The most of the comments are accepted or if not comments are accepted the comments are sent back to organizations. In the chapter 8. Attachments we put the table with comments on the Draft Regulation on the emission trading greenhouse gas emissions that we received during public consultation.

6. Monitoring and evaluation
While emissions trading has the potential to involve many economic sectors and greenhouse gases, the focus of the EU ETS is on emissions which can be measured, reported and verified with a high level of accuracy. Operators must report their emissions of the greenhouse gases covered by the EU ETS after each calendar year. The European Commission has issued a set of monitoring and reporting guidelines to be followed. The reports have to be checked by an independent verifier on the basis of criteria set out in theETS legislation, and are made public. Operators whose emission reports for the previous year are not verified as satisfactory are not allowed to sell allowances until a revised report is approved by a verifier.

After each calendar year, installations must surrender a number of allowances equivalent to their verified CO2 emissions in that year which they oblige to monitor. These allowances are then cancelled so they cannot be used again. Those installations with allowances left over can sell them or save them for future use. Installations that do not surrender enough allowances to cover their emissions in the previous year are penalised. They have to obtain additional allowances to make up the shortfall in the following year, are 'named and shamed' by having their names published, and must pay a dissuasive fine for each excess tonne of CO2 100 € per tonne.

7. recommendation

Option 4: - Establishing a legal framework and transposition of EU directives regulating greenhouse gas emissions trading - (normative solution) is the best option because:

- provides the reductions of greenhouse gas emissions to be increased so as to contribute to the levels of reductions that are considered scientifically necessary to avoid dangerous effetcs of climate change in future.
- encouraging the use of more energy-efficient technologies, including combined heat and power technology, producing less emissions per unit of output.
- reduction in GHG emissions – due to the financial incentive to emit less;
- positive effect on climate, tourism, healthcare (less costs on healthcare)
- revenue from the sale of quotas

Penalties are established for non-compliance with certain provisions of Regulation.

8. attachments (in the table specify the name of the attachments)

1. Draft Regulation on the emission trading greenhouse gas emissions
2. Comments on the Draft Regulation on the emission trading greenhouse gas emissions after public consultation
3. Comments of Ministries on the Draft Regulation on the emission trading greenhouse gas emissions