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BASQUE PLAN TO COMBAT CLIMATE CHANGE 2008-2012

GENERAL CONTENTS

1. PRESENTATION: A GLOBAL THREAT WITH REPERCUSSIONS IN THE BASQUE COUNTRY

1.1 A WORLDWIDE THREAT. A SHARED RESPONSIBILITY

Climate change is accelerating due to the production activities and consumption habits of developed and developing countries using carbon intensive technologies. Responsibility for this is collective, as must be the response by the international community. Inertia in climate change means that some consequences are already inevitable, so countries must implement initiatives both to reduce emissions and to adapt to expected changes.
The Basque Country advocates a comprehensive strategy based on technological innovation, integration of sectoral policies, engagement of the public and the authorities, implementation of effective solutions and continued encouragement for increasingly ambitious objectives, striving to attain a society that is less carbon-dependent and better prepared for climate change.

Of all the environmental problems facing our global society, climate change is probably the most significant, not just because of the great impact that scientific studies predict that it will have but also because of how widespread it is and how inextricably it is linked with our way of living and producing. We are not dealing here with an isolated phenomenon involving an anomaly located at a specific point in our production system, but with the result of a long process of economic growth based on an unsustainable model.

The scientific community, gathered together in the Intergovernmental Panel on Climate Change (IPCC)[1] is providing ever more forceful data. The proposals in its Fourth Report, published in 2007, are based on the premise that there is no longer time for delaying action. Indeed much more is needed than was agreed under the Kyoto Protocol, developed by the United Nations Framework Convention on Climate Change (UNFCCC), which set limits on emissions in industrialised countries and thus establish a major initial challenge for our economies.

Unfortunately, global warming is a long-term accumulative process. The climate inertia resulting from the accumulation of emissions throughout history means that some of the predicted effects on natural, social and economic systems are inevitable, so that emission reduction policies implemented from now on may mitigate the extent of change, but will not prevent it altogether. The first objective, therefore, is to stabilise the concentration of CO_2 in the atmosphere as soon as possible, so that further damage is arrested.

From the viewpoint of government responsibility, firm policies to reduce emissions must be accompanied by measures to adapt to climate change, since both these approaches can help Basque society to coexist with the phenomenon and to develop mechanisms for knowledge, awareness and

[1] The IPCC was set up by the UN and the World Meteorological Organisation in 1988 to assess relevant scientific, technical and socio-economic information and obtain a better understanding of the risks arising from human-induced climate change . Its assessments are based on publications and refereed literature.

innovation so that we can minimise negative impacts and make good use of any opportunities that may arise.

The size of the Basque Autonomous Community (BAC) means that its contribution to global climate change is small in quantitative terms[2]. However, the basic principle that governs international policies on emission reduction is one of common but differentiated responsibility throughout the international community, particularly among industrialised countries: there is no other way. A society such as that of the Basque Country which wishes to contribute to a more sustainable global future cannot stand aside from the struggle against climate change but rather must assume its share of responsibility on the basis of a profound, far-reaching commitment, particularly since average total GHG emissions per capita in the BAC are higher than the average figure for the EU 25[3].

For Basque society, climate change means shifting towards new economic structures: the Basque Country must learn to produce goods and provide services with lower emission levels. Technological advances provide scope for reducing emissions on various fronts. Encouraging new, environmentally advanced technologies also has a strategic dimension for the new Basque economy in that it provides an opportunity to raise the profile of the Basque Country in the global market for goods and services.

There are technological options, but an integrated, stable framework covering all the sectoral policies affected is needed to facilitate and drive the shift towards less carbon-intensive economies. Moreover, in areas such as transport and domestic consumption, the unconditional involvement of the public in the paradigm of sustainable development is required. There can be no integrated Basque policy on climate change without the firm engagement of the Basque public in the principles of sustainable development. If the as yet incipient struggle against climate change has demonstrated anything over the past decade it is that we must preach first to our own people. Tackling GHG emissions in the future means supporting an ethical commitment on the part of the public and other agents in the form of far-reaching changes in attitudes to consumption. The public authorities must set an example as leaders in this matter at all times.

This is also the first step on a long path on which Kyoto with its 2012 time-frame is only the first stop. Once the initial goals have been met on time, further measures will need to be taken to attain other, far more demanding goals so that emission levels can be stabilised and climate change can thus be held within tolerable limits. A new round of negotiations is about to begin at international level.

For that reason, the Basque Plan to Combat Climate Change (referred to here by its initials in Spanish PVLCC) is not merely a declaration of intent made up of empty words of praise for international solidarity. The measures proposed must be implemented effectively and efficiently to provide tangible solutions and achieve measurable progress on this pathway that we must travel together with co-ordination and solidarity. We must transform the struggle against climate change into an opportunity for our country.

[2] Scarcely 0.5% of total emissions by the EU25 in 2004.

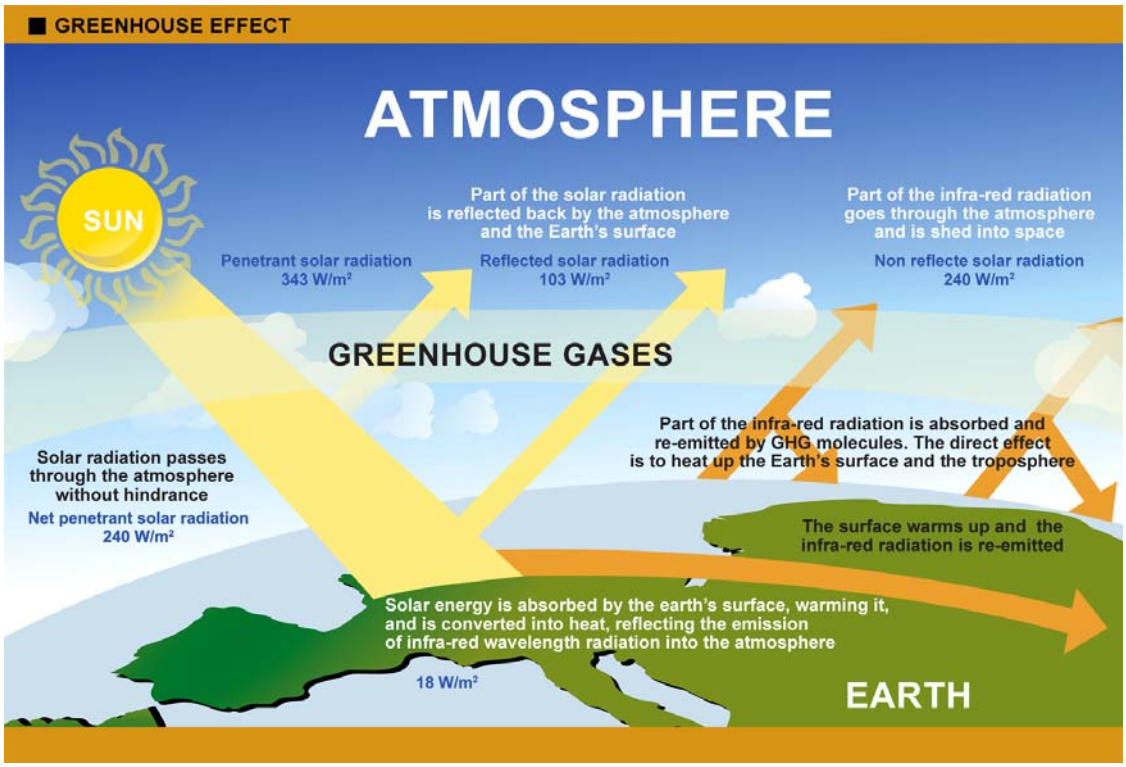
[3] Compared to an average of 10.8 t in the EU15, the 2006 inventory gives a figure of 11.9 t for per capita CO_2 emissions in the BAC, which is higher than the 9.8 t for Spain as a whole. 2006 data for BAC & Spain, 2005 for Europe. Nº of inhabitants as of January 1 in the target year. Sources: Eustat, Eurostat, Worldwatch

1.2 CLIMATE CHANGE: THE STATE OF THE ART

There is widespread consensus in the scientific community concerning the existence of global warming caused by human activity. This warming is having alarming effects, which can be expected to become stronger and stronger in the future[4]. The strong dependency of present-day societies on a model of production and consumption based on fossil fuels has led to a volume of emissions that upsets the planetary balance. Furthermore, it is not possible to shut the door on developing countries which also aspire to industrialisation, which, with current technologies, would mean greenhouse gas emissions continuing to increase, even while industrialised countries should reduce their contributions.

Infrared radiation from the sun is the main source of energy received by our planet. Once it reaches the Earth's surface it is redistributed by atmosphere and ocean circulation and subsequently radiated back off into space. The equilibrium between the radiation received and the radiation return maintains conditions suitable for life on earth. Increasing levels of GHGs hinder the irradiation of energy into space, causing the lower atmosphere and the Earth's surface to warm up.

Figure 1: The greenhouse effect



There are six greenhouse gases[5] covered by international regulations on climate change. CO_2 is the most significant of them, though methane and nitrous oxide also play major roles in less developed

[4] Section based on 4th Assessment Report of the IPCC (2007)

economies. Fluorinated gases are associated with new chemical industries, and their emissions are concentrated around their points of production and consumption. Different greenhouse gases have different capacities for absorbing infrared variation and different residence times in the atmosphere. To facilitate calculations, the CO_2 molecule is taken as the warming power unit. The figures for other gases are established by comparison with it (see Table 1: Main human-induced sources of GHGs considered in the Kyoto Protocol), using CO_2 equivalent (CO_2e) as the warming power unit.

Table 1: Main human-induced sources of GHGs considered in the Kyoto Protocol

Greenhouse gas (GHG)	*Main emission sources*	*Potential greenhouse effect*[6]
CO_2	• Use of fossil fuels • Changes in land use (mainly deforestation)	1
CH_4	• Arable & livestock farming • Use of fossil fuels • MSW dumping • Natural gas activities	25
N_2O	• Arable & livestock farming • Chemical industry	298
Hidrofluorocarbons, sulphur hexafluoride & perfluorocarbons	• Insulation in refrigerators • Chemical industry	Up to 10,300 (PFCs) UP to 14,800 (HFCs) 22,800 (SF6)

The Fourth Assessment Report published by the IPCC[7] reveals that the Earth's climate is changing at a faster rate than hitherto believed, and the report has determined with a likelihood of more than 90% that the cause of the changes lies in human activities.

The first group in the Fourth Assessment Report, presented in February 2007, reveals that GHG levels are increasing unusually in comparison to past figures. At the same time, temperature increases are being observed on the Earth's surface and in the oceans, the surface area covered by of glaciers and permanent snow cover is shrinking and variability in rainfall is on the increase, with longer droughts and more violent storms. The future scenarios worked out by the IPCC indicate that GHG emissions will very probably continue to increase, and that by the year 2100 CO_2 concentrations will be between 90 and 250% higher than in 1750, mainly because of the burning of fossil fuels.

So if a balance between incoming and outgoing energy is to be maintained on our planet, GHG emissions into the atmosphere must be reduced to below the current figures. There are two ways of doing this: reduce global emissions or wait for GHGs to disappear from the atmosphere. Unfortunately, GHG's tend to have very long residence times, which means that their effects are felt over long periods. To stabilise atmospheric CO_2 levels, global emissions therefore need to be

5 The principal GHGs included in the Kyoto Protocol are carbon dioxide (CO_2) – the main gas -, methane (CH_4), nitrous oxide (N_2O), HFCs, sulphur hexafluoride (SF_6) and PFCs

6 Residence time 100 years

7 More than 2500 scientists are working with the IPCC in three working groups and one special task force:
- Working Group I assesses the scientific aspects of the climate system and climate change.
- Working Group II assesses the vulnerability of socio-economic and natural systems to climate change, negative and positive consequences of climate change, and options for adapting to it.
- Working Group III assesses options for limiting greenhouse gas emissions and otherwise mitigating climate change.
- The Task Force is responsible for the IPCC National Greenhouse Gas Inventories Programme.

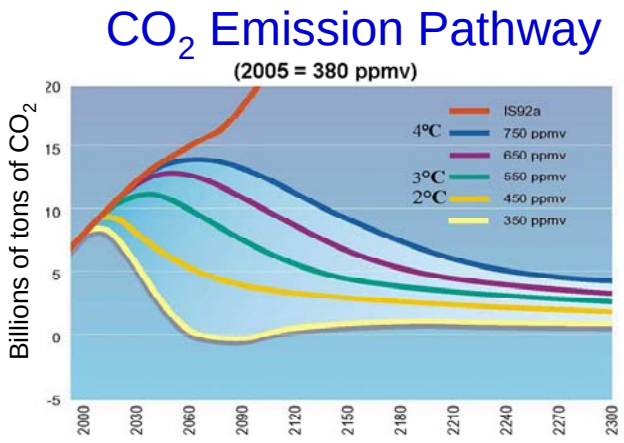
reduced to below 1990 levels within a short period of time, and further, continuous reductions need to be made subsequently.

On the other hand, the countries of the Third World need to expand their economies if they are to achieve decent standards of development for most of their populations. Growth in those countries will entail increases in emissions into the atmosphere, just as it has done in developed countries. Stabilisation should therefore apply differently in developed and developing countries: the most advanced countries must introduce greater reductions in their emissions so that less advanced countries can develop, while at the same time achieving the international objective of reducing overall emissions.

The current concentration of GHGs in the atmosphere is 455 ppm CO_2e[8] (of which 380 ppm is accounted for by CO_2) compared to 280 ppm CO_2e in pre-industrial times. If emissions continue to increase at the current rate the figure will reach 550 ppm CO_2e (twice the pre-industrial level) by 2050[9]. Depending on the climate models used, this translates into an overall increase in average temperatures of 2º-3ºC, which would bring about radical changes in conditions for life on our planet.

Increases in GHG levels in the atmosphere are not without consequences, and the later we react the more costly the recovery process will be[10]. If we are not to exceed 550 ppm CO_2e the volume of emissions will have to peak in the next 10 to 20 years, and then fall at a rate of between 1% and 3% per annum. This would mean that by 2050 emissions would be 25% lower than current levels (see Figure 2). Since the world economy will by then be three to four times larger than it is now, unit emissions would have to fall to a quarter of current levels.

Figure 2. Emission mitigation pathways



Source: Reproduced in the Stern Review from Meinshausen, M. (2006): What does a 2ºC target mean for greenhouse gas concentrations? A brief analysis based on multi-gas emission pathways and several climate sensitivity uncertainty estimates, *Avoiding dangerous climate change,* in H.J. Schellnhuber et al. (eds.), Cambridge: Cambridge University Press, pp. 265-280

[8] Data from the IPCC Fourth Assessment Report

[9] However, annual emissions are on the increase due to the effect of those countries which are undergoing rapid growth, so a level of 550 ppm of CO_2e can be expected to be attained by 2035

[10] See the Stern Review: *The Economics of Climate Change* (2006).

1.3 EXPECTED IMPACTS IN THE BAC. WHAT COULD CHANGE IN OUR ENVIRONMENT?

The first results from the models drawn up by the IPCC[11] estimate that climate change in the BAC will result in a reduction in annual rainfall of between 15 and 20%, with increases in winter and reductions in summer. By the end of the century, extreme maximum temperatures could have risen by between 1.5 and 3.5° C. and minimum temperatures could have risen by between one and 3° C. This temperature increase could be accompanied by greater evapotranspiration and increased risk of forest fires.

Significant rises in sea levels and wave power may also be expected which could result in the coastline receding in beach areas by between 11 and 13 m by the mid-21st-century, leading to the risk of flooding in estuaries.

Priority actions have been identified in line with expected impact on natural and economic systems and on human health. Although these impacts are not well known, and the research needs to be extended, with scenarios adjusted to the dimensions of the BAC being developed, the economic sense of taking early action is clear.

1.3.1 Physical Consequences

The first point that must be made is that no scenarios have been drawn up for territories of the size of the BAC and with such a wide diversity of climate, so current estimates are no more than a first approximation. The main climate variables that will be affected by climate change are temperature and rainfall. Global and more specific rainfall models[12] suggest that rainfall will decrease in the southern part of the BAC, and that overall annual rainfall will also decrease, with the reduction being particularly sharp during the summer months. The reduction in the case of the BAC is calculated at between 15 and 20% by the end of the 21st century.

There is no clear pattern as regards rainfall distribution over the year, which suggests a relatively low level of reliability of these forecasts. Rainfall is predicted to increase by between 5 and 20% in the winter months (December to February) and to fall by between 30 and 50% in the summer months (June to August) (see Table 2). The biggest change could be in the seasonal distribution of rainfall (with more variation in place and time) rather than in the percentage of reduction itself[13].

Forecasts for the end of the 21st century regarding temperatures in the Iberian Peninsula[14] indicate an increase in average temperature of as much as 5 - 7°C in the summer and 3 - 4°C in the winter, though the figures for coastal areas are 2ºC lower. An increase is expected in the number of days

[11] e.g. the projections simulated according to the model drawn up for the IPCC Third Assessment Report and confirmed in the Fourth Report. The atmosphere-ocean model known as HadCM3 divides the earth's surface into cells of various sizes, in which regional estimates are run. The resolution varies according to latitude. For latitudes of 45º (applicable to the BAC), the model has a resolution of almost 300 km (the associated cell measures 295 km by 278 km). With that resolution, various IPCC emission scenarios, known as IPCC SRES (Special Report on Emissions Scenarios) based on socio-economic data (population growth, economic development, etc.) are used to present projections to 2100 for temperature and rainfall.

[12] February 2007 saw the publication of *Generación de escenarios regionalizados de cambio climático para España* ["Generation of regionalised climate change scenarios for Spain"] with a resolution of close to 50 km.

[13] There are no significant differences between the various climate regions of the BAC, though the drop in rainfall could be felt more in the middle and southern regions than in the Atlantic coast region.

[14] Included in the ECCE project: Preliminary assessment of impacts in Spain due to the effect of climate change.

with extremely high maximum temperatures, and a decrease in the number with extremely low minimum temperatures.

In the specific case of the BAC[15] the last third of the 21st century is expected to bring with it an increase in extreme maximum temperatures[16] of 1.5°C on the coast and 3.5°C in the rest of the BAC. An increase in extreme minimum temperatures of between 1 and 1.5°C is expected on the coast, between 2 and 2.5°C in the rest of the Atlantic watershed area and between 2.5 and 3°C in the southern part of the BAC. These annual figures have been analysed season by season, and differences have been observed between the different climate regions of the BAC, as shown in Table 2.

Table 2: Seasonal distribution of temperature and rainfall variation forecast to the end of the 21st century for the climate regions of the BAC

	TEMPERATURE		RAINFALL	
	WINTER	SUMMER	WINTER	SUMMER
	1.5 to 2º C	4.5 to 5.5º C	+5% to +20%	-30% to -50%
	2 to 2.5º C	5. 5 to 7º C		

This temperature increase will result in more evapotranspiration[17] and an increased risk of forest fires. Other variables liable to change in the BAC are cloud cover, relative humidity and wind speed.

One of the biggest climate change problems for the BAC is the rise in sea level, with the consequent increase in wave power (higher waves and longer storms) and wave direction (shifting 2º westward). The most exhaustive report on effects on the Spanish coastline[18] estimates that sea levels could rise by 0.4 cm per year, which translates into a rise of around 40 cm by the end of the 21st century. It is estimated that this would cause the shoreline to recede by between 11 and 13 m in beach areas by the mid-21st century, causing changes in the shape of the shoreline and instability, and swallowing up coastal infrastructures and constructions (this can be offset by an increase in area of between 6 and 20%). In estuaries, the consequences of more irregular rainfall in terms of geography and timing are compounded by the risk of flooding of settlements (towns, farms and industrial facilities) near the coast, particularly major cities such as Bilbao and Donostia[19].

1.3.2 Impacts on Natural, Social & Economic Systems

Expected effects on human health include an increase in morbi-mortality[20] due to heat waves and heat islands[21] and an increase in episodes of acute respiratory problems, particularly allergies.

[15] Op. cit. *Generación de escenarios regionalizados de cambio climático para España*. See note 11

[16] Average for each month.

[17] 13 mm/decade per 0.10ºC/decade of rise in temperature, which would amount to between 130 and 910 mm by the end of the 21st century depending on whether the coastal region or the inland region is considered

[18] University of Cantabria, Dept. of Water & Environment Science & Techniques. *Impactos en los recursos costeros por efecto del cambio climático* ["Impacts of the climate change effect on coastal resources"], 2006.

[19] For more information see the Integrated Flood Prevention Plan (known by its Spanish initials PIPI).

[20] Rates of sickness & death in a population at a given place and time.

These episodes could become more intense as a result of longer pollination periods and a higher number of hot, dry days, which would increase the pollen load in the atmosphere (the southern part of the BAC will be hit hardest). The effects would be felt particularly strongly by the most sensitive sectors of the population, i.e. children and the elderly (by 2020, 25% of the population will be over 65). As a result of temperature increases, tropospheric ozone levels may also increase, particularly during the summer months, with the consequent decrease in air quality[22]. This would be exacerbated in anticyclonic conditions, in which high temperatures, low cloud cover and low wind speed prevail (and as a result of climate change such conditions are likely to occur more frequently).

The effects of climate change on animal and plant communities are expected to include earlier or later starts to migration and reproduction periods, changes in the distribution of land and marine species (changes in latitude and depth have already been observed in some marine species), changes in productivity, changes in invasive and parasitic species, increased vulnerability and population changes (rises and falls in the number of individuals of the species in question). The greatest vulnerability will be found in endemic, special-interest species (amphibians and reptiles). Losses of organic carbon from the soil would also result in lower fertility levels for trees and bushes.

In the primary sector, there could be changes in the production periods of forestry operations (with deciduous trees gaining ground on perennials), which may result in some species no longer being profitable. In farming,[23] beet crops may be expected to benefit while cereals will suffer. There may also be changes in sowing and harvesting times and in the duration of crops. It is also expected to become more difficult to overcome summer droughts. These changes in productivity will also affect the farming of livestock (which may suffer more from parasitic diseases).

The main expected impact of meteorological phenomena on transport infrastructures, energy infrastructures and the construction and services sector is an increased risk of weather damage. Other impacts include changes in energy demand and sources of supply.

In the tourist sector, changes in demand can be expected, with an increase in off-season tourism. This sector is also likely to be affected by the changes that may take place in coastal infrastructures and settlements (the BAC has 35 beaches).

The precise impacts and the various options for controlling and offsetting them have yet to be calculated. The various lines of research ongoing in the relevant fields need to be intensified and focused more sharply to obtain the necessary calculations. Studying vulnerability to risks enables us to delimit those risks and identify the most significant sectors and impacts. The possibilities for reacting and/or adapting to them can then be studied, enabling us to draw up a list of priorities for action in the form of measures to adapt to climate change.

[21] The accumulation of heat in cities during heat waves and the difficulty of dissipating that heat gives rise to heat islands, which exacerbate impacts on human health.

[22] There are significant links between the three main environmental problems, i.e. climate change, the ozone layer and air quality. On the one hand some GHGs such as nitrous oxide and CFCs can destroy the ozone layer once they reach the stratosphere. On the other hand changes in parameters such as temperature and rainfall as a result of climate change result in higher concentrations of particles (e.g. pollen) and tropospheric ozone, both of which can cause respiratory problems.

[23] 12% of the total surface area of the BAC

In any event, the cost in monetary terms of the impacts of climate change can be expected to be considerable. Two lessons that can be learned right now from internal and external reports are that:

a) early action for adaptation is more cost-effective, and
b) it costs less to mitigate emissions immediately than to deal in the future with the economic impact of climate change (Table 3).

As the first step towards learning the scale of direct economic repercussions, the Basque Government Department of Land Use and the Environment (referred to here by its initials in Spanish DMAOT) has developed a method for assessing the risk of flooding resulting from increased rainfall due to climate change. The method calculates the resources that need to be earmarked for policies and measures to adapt to climate change with a view to minimising the negative impact of that change and maximising potential benefits.

This method has been piloted in the city of Bilbao[24]. The results show that the potential costs arising from flooding in 2080 (damage to buildings and communication equipment, effects on the health of the population, etc) could be increased by as much as 56% of present costs due to climate change. This is equivalent to an additional loss of wealth of between 129 and 159 million[25].

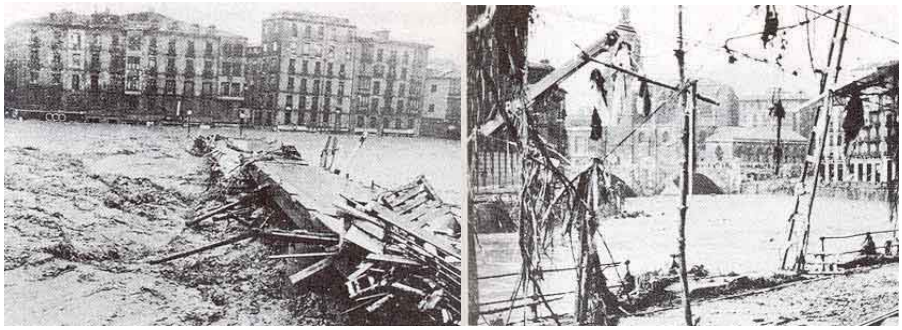


Table 3. Economic effects of climate change. The *Stern review: The Economics of Climate Change*

Do nothing	Stabilise CO_2 levels in the atmosphere at 500-550 ppm
The cost & risk will be equivalent to losing at least 5% per annum of global GDP from now on, and may even reach 20%.	If firm, immediate measures against climate change are taken, the cost per annum will be around 1% of global GDP
Tools for achieving stabilisation	
✓ **Reduction** of emissions based on: ➢ assigning a price to carbon via taxation, creating a carbon market or regulations ➢ a technology policy that increases incentives for developing new technologies ➢ encouraging a change in the attitude of our society towards a greater commitment to reducing emissions ✓ **Increased international co-operation** to improve dissemination of technologies and speed up innovation ✓ **Reduction of deforestation** as a cost-effective way of reducing emissions ✓ **Increased efforts** in the field of adaptation to climate change	

[24] Source: Basque Government Department of Land Use and the Environment. *Metodología para valorar los costes de los impactos del cambio climático en el País Vasco. El caso de Bilbao* ["Method for assessing the cost of the impact of climate change on the Basque Country. The case of Bilbao"].
[25] Annual average figures calculated at 2005 prices.

2. RESPONDING TO THE PROBLEM

2.1 INTERNATIONAL REACTION: THE KYOTO PROTOCOL

The 1992 UN Framework Convention on Climate Change was the first international response to the problem of climate change. It led to the Kyoto Protocol as an initial plan with a time-frame running to 2012 for the limitation of growth in emissions. At the same time it set up mechanisms to facilitate efficient compliance. A new scenario known as "Kyoto-plus" is currently being negotiated with a view to establishing undertakings beyond 2012.

"Business as usual is no longer an option". Ban Ki-moon (UN Secretary General, July 07).

The 1992 UN Framework Convention on Climate Change was the first international response to the problem of climate change. Negotiated between 1990 and 1992 on the basis of the First IPCC Assessment Report, it establishes the objectives, principles and institutional architecture on which international action on climate change is to be based in order to "*achieve […]stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*" (Art. 2).

The Convention recognises the principles of sustainable development, and highlights the following (Art. 3)[26]:

- The principle of precaution, under which the lack of total certainty should not be grounds for postponing measures to mitigate climate change when there is a serious threat. This translates into a series of commitments (Art. 4), including the regular preparation of GHG inventories, the drawing up and implementation of national programmes for mitigation and the reporting to the Conference of Parties of information relative to the application of the Convention.

- The principle of common but differentiated responsibilities of the parties, which takes the form of specific obligations established for all industrialised countries (the countries listed in Annex I to the Convention) and the remaining OECD countries (listed in Annex II to the Convention)[27], each according to the quota allocated to it.

Thanks to the work of the Convention, in 1997 the Kyoto protocol was adopted. This protocol came into force in 2005, and is subscribed by 189 countries. It constitutes the first organised response of the international community to mitigate climate change by setting GHG emission reduction targets for developed economies of 5.2% on 1990 levels for the period 2008 to 2012. This target was distributed differently between countries and "unions of countries" depending on the influence of the energy production, domestic and energy-intensive industrial sectors. Criteria were established for each sector to determine reasonable limits for emissions, taking into account the circumstances

[26] Other principles cited include the right to sustainable development of the parties and the protection of the climate system for the benefit of present and future generations.

[27] The main obligations of the 41 Annex I countries are: (1) initiative in the global mitigation of climate change; and (2) stabilise emissions at 1990 levels. Annex II countries must also (1) provide additional financial resources and appropriate technology to developing countries; and (2) help particularly vulnerable developing countries to meet adaptation costs.

of those sectors in each country so that the overall limit set for each country was obtained by adding together the limits for each sector. In the case of the European Union this gave rise to a collective emission reduction target of 8%, distributed differently among Member States.

To help meet this target, the Protocol and the subsequent Conferences of Parties[28] developed a number of flexible mechanisms for cost-efficient emission reduction, seeking to encourage technology transfers between countries, since the global dimension of the problem allows it to be corrected anywhere in the world with different marginal costs (Table 4). Among the measures adopted, the Protocol establishes the basis for an international market in carbon for Annex I states.

Table 4: Kyoto Protocol flexibility mechanisms

- The Joint Implementation Mechanism **(Art. 6)**, which consists of developing emission reduction projects in other Annex I countries, usually with economies in transition. This mechanism will be operational as from January 1, 2008.
- The Clean Development Mechanism **(Art. 12)**, which consists of developing emission reduction projects in non-Annex I countries, usually developing countries. This mechanism has been available since the year 2000.
- Emission Rights Trading **(Art. 17),** which consists of exchanging AAUs (Attributed Amount Units) between Annex I states. This mechanism will become operational in 2008.

On the technical front, flexibility mechanisms operate through a rigorous, technically complex system of national and international registers that permit the exchange of carbon assets between Annex I states.

For the next round of negotiations, the EU maintains a firm position that seeks to secure the objective of limiting climate change to a 2ºC mean expected temperature increase this century. Other signatories such as Canada are opposed to the setting of absolute limits, and still others such as Japan wish limits to be conditional on the inclusion in the agreement of large-scale emitters such as the USA, China, Brazil and India.

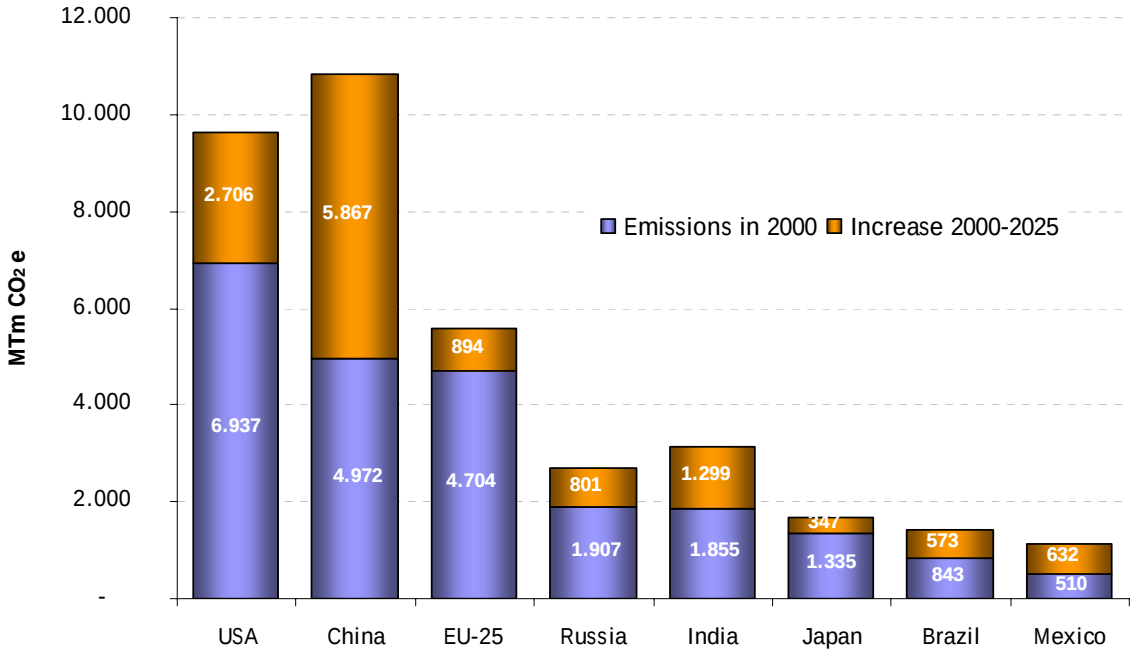
Current emissions and forecasts for the medium- and long-term provide revealing data for a better understanding of the negotiating positions of the different blocks. As can be seen in Figure 3, some developing economies are emerging as large scale emitters, while the relative weight of developed economies is falling. In this context of a sustained increase in energy demand, tension arises in interpreting the principle of common but differentiated responsibilities and specifying the different degrees of commitment in the mitigation of climate change.

The position of the US administration and its decision concerning the introduction of a system for limiting emissions in line with commitments assumed at international level is still to be determined. Some US states (e.g. California) are already taking steps to tackle emission reductions, and opinions favourable to policies to combat climate change are gaining ground in political circles.

[28] Several organisations have been set up to ensure fulfilment of the purposes of the Convention, including the following:

- The **Conference of Parties** (COP), the highest decision-making body of the Convention, comprising the states which are parties to the Convention. It regularly examines progress towards fulfilment of the objectives of the Convention (Art. 7).
- The **Secretariat** (Art. 8), whose job is to provide support for the Convention.
- The **Subsidiary Body on Scientific and Technological Advice** (SBSTA) (Art.9) and the **Subsidiary Body for Implementation** (SBI) (Art.10), which provide technical support for the COP.

Figure 3: World-wide distribution of GHG emissions[29]



Source: *"Climate Data: Insights and Observations" Pew Center, 2004.*

2.2 THE RESPONSE OF THE EUROPEAN UNION

The European Union is currently the most active agent in the development of policies to combat climate change, with the two successive editions of the European Climate Change Programme (ECCP). Chief among the measures implemented is the European Emission Trading Scheme. Forecasts indicate that the Kyoto objective for the EU 15 of reducing net emissions by 8% by 2010 as the average for the period 2008-2012 will be met. In March 2007, the Council of Europe agreed to reduce GHG emissions by 20% from 1990 levels by the year 2020.

The European Union is aware of the importance of climate change as an environmental problem, and has developed its policies on this matter since the year 2000 within the framework of the European Climate Change Programme (ECCP). This programme, implemented at different times and in different stages, and conceived as a participative programme directed by stakeholders from the different Member States, sectoral representatives, NGOs and academic experts, has served to develop technical and regulatory initiatives that helped to bring about reductions of hundreds of millions of tonnes of CO_2e in the EU during its first stage in 2000 – 2004.[30]

The first European Climate Change Programme (**ECCP1 2000-2004)** included numerous key instruments. Chief among them was the establishment of the first international emission rights

[29] This does not include CO_2 due to changes in land use

[30] In 2003 emissions from the 15 then Member States fell by 1.7% of the base year figures.

trading scheme through two regulations: Directive 2003/87/CE (which established a Community-wide emission rights trading scheme) and Directive 2004/101/CE, which allows credits from the flexible mechanisms to be used by facilities affected by European emission rights trading. The time-table for the first directive comprises two stages: the first, running from 2005 to 2007, has produced results that have enabled the system to be fine-tuned, and the second, running from 2008 to 2012, is a period of commitment under Kyoto in which the directive will be fully applicable.

Numerous criticisms may be levelled at emission trading, among them the fact that it only affects some sectors and leaves out others - such as transport - which contribute enormously to GHG emissions, and the fact that its effectiveness depends on the ability of the countries engaged in emission trading to fulfil the commitments that they acquire, but the basic idea of this economic mechanism as defined in Article 17 of the Kyoto Protocol is that if firms are permitted to distribute (trade) their emission rights freely with one another, that trade will bring down fulfilment costs.

Other noteworthy actions include the approval of Directive 2001/77/CEE on renewable energy sources, the directive on bio-fuels for transport, Directive 2004/8/CE on combined heat and power (CHP) and Directive 2002/9/CE on energy efficiency and savings in buildings. Between them they make up an ambitious package of measures to supplement the climate change policy of the EU which have gradually been transposed into law in its Member States.

An analysis of the effectiveness of the policies and measures included in ECCP1 estimates that their application could bring about reductions in GHGs of between 774 and 897 Mt CO_2e. Some of the policies and measures that have already been set in motion will, in the coming years, result in reductions of between 247 and 272 Mt CO_2e, as shown in Table 5.

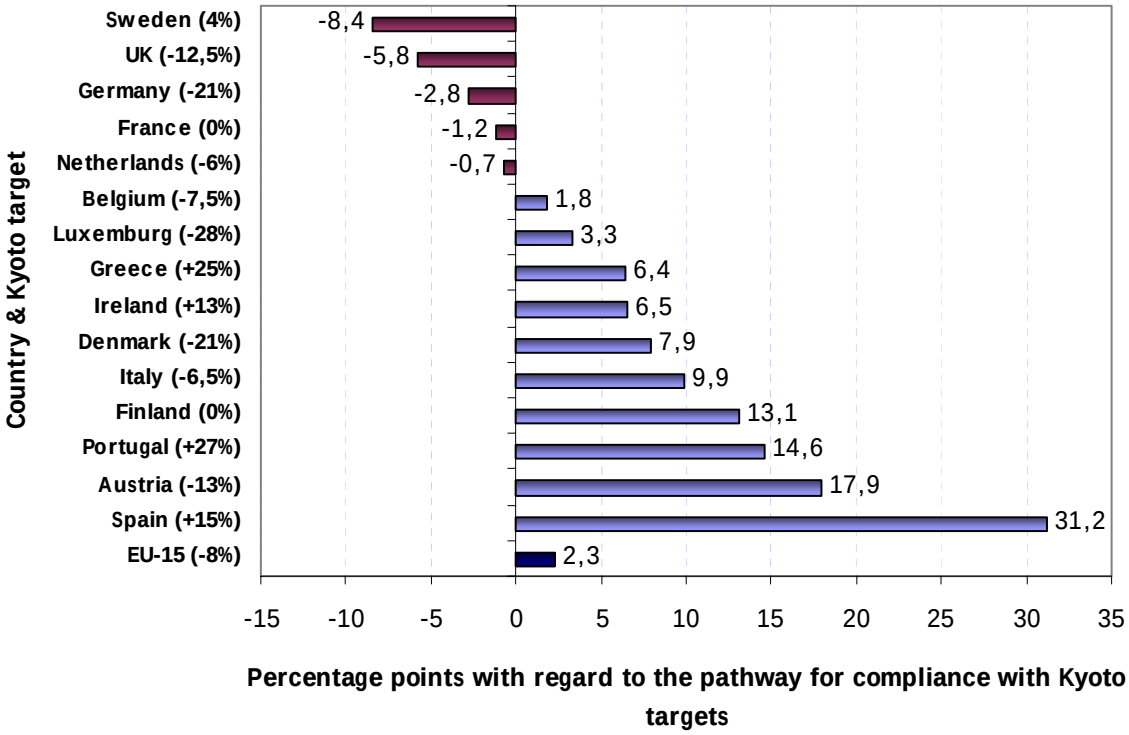
Table 5: Efficiency of the policies and measures of ECCP1

	Situation		
	EU-15: Estimated reduction potential of policies & measures (Mt CO_2 e)	**Reduction due to policies & measures fully applied (Mt CO_2 e)**	**EU-15: Estimated reduction potential of policies & measures (Mt CO_2 e)**
Energy supply	236-278	-	200-230
Energy demand	194-239	86 – 106	85-110
Transport	152-185	75-80	72-95
Gases other than CO_2	59-62	41	18-21
Farming & silviculture	133	45	0
TOTAL	**774-897**	**247-272**	**375-456**

Source: REPORT BY THE COMMISSION ON PROGRESS TOWARDS KYOTO TARGETS (as per Decision 280/2004/CE of the European Parliament and the Council on a mechanism for monitoring greenhouse gas emissions in the Community and applying the Kyoto Protocol)

In 2006 the European Environment Agency published data from 2004 on how far each country was from the hypothetical pathway for meeting emission targets for 2010 as the average of the period from 2008 to 2012, including the use of flexible mechanisms under the Kyoto Protocol. The results (Figure 4) show that the country furthest from meeting its target was Spain, while Sweden, the UK and Germany were already below the emission levels required in 2004 for their targets to be met.

Figure 4. Kyoto targets & distance in 2004 from pathway for fulfilment of Kyoto targets of EU15 Member States (including flexible mechanisms & carbon sinks)



The forecasts available indicate that in conjunction with the measures envisaged by each country, emissions in 2010 (as the average for 2008 - 2012) will fall to 6.8% below the base year level. The use of the flexible mechanisms would enable additional reductions to be achieved and the targets set would be met.

The Second European Climate Change Programme (**ECCP2 2005-2009)** was launched in October 2005 to assess the actions taken under the first programme and undertake new initiatives in timeframes extending beyond 2012, with the objective of reducing GHG emissions in a cost-efficient manner so as to assure economic growth and job creation.

ECCP2 is organised in working groups that tackle different areas affecting GHG emissions, such as the capture and geological storage of carbon, vehicle emissions, aircraft emissions and measures to adapt to climate change.

Preliminary results from the review of the first programme conducted under ECCP2 have informed the call by the European Commission for a bigger and better quantitative analysis of the data available. To study the potential for future reductions, the commission launched a study in June 2006 focused on the emission reduction potential of each sector. The conclusions of this study are expected by mid-2008.

The main objectives are to identify the least costly ways in which the various sectors and gases can contribute to the fulfilment of reduction undertakings by EU 25+[31] with a time-frame extending

[31] EU 25, Rumania, Bulgaria and, if possible, Croatia & Turkey

beyond 2012, and to determine the most cost-efficient package of policies and measures for meeting those undertakings. In short, the study seeks to become the basis for assessment of new policies and measures for meeting Kyoto-plus reduction targets.

In December 2006, the European Commission also commissioned a study on the effects of emission rights trading on international competitiveness, in the context of a review of the system. According to this study the future costs for European industry of emission rights trading based on the current scheme are very low in terms of competitiveness and delocation. In any event, this point should be given special attention in the review of the Directive beyond 2012.

Within ECCP2 a review is being conducted of the European emission rights trading scheme. This is being taken into consideration by the Seventh Framework Programme for Research (2007-2013), the main funding instrument for research in Europe, which specifically complements and reinforces actions against climate change.

Other actions by the EU include the approval in 2005 of Directive 2005/32/CE (the EuP - Energy Using Products - Directive). This directive establishes a framework for laying down environmental design requirements applicable to energy using products, excluding means of transport, with a view to increasing energy efficiency in their production but maintaining performance, without causing any further impact on the environment.

In the framework of ECCP2, the EU published a communication[32] in January 2007 in which it proposed limiting emissions to help prevent global temperature increases from exceeding 2ºC above the average temperature in pre-industrial times. To that end, it is promoting the adoption of a highly ambitious energy policy in regard to the use of renewable energy sources to tackle the problems of climate change. This direction can be observed in various agreements and documents, particularly the Green Paper *A European Strategy for Sustainable, Competitive and Secure Energy*[33], the report approved by the European Parliament in December[34] 2006 and the conclusions adopted by the Council of Europe in March 2007. All these documents advocate an energy policy that will enable a large proportion of energy to be obtained from carbon free sources or via technologies that limit GHG emissions by 2050.

In March 2007 the Council of Europe established a number of energy goals for reducing GHG emissions by 20% (30% if other countries all take on board the same goals) by 2020. In line with the proposals of the European Parliament, it proposes increasing renewable energy sources to 20%, improving energy efficiency to save 20% in energy consumption and making it compulsory for the transport sector to use 10% of bio-fuels by 2020.

[32] *Limiting Global Climate Change to 2 degrees Celsius: The way ahead for 2020 and beyond* COM/2007/0002 final

[33] Green paper – A European Strategy for Sustainable, Competitive and Secure Energy. Brussels, 8.3.2006 COM (2006)105 final.

[34] Resolution of the European Parliament on A European Strategy for Sustainable, Competitive and Secure Energy – Green Paper. European Parliament, Strasbourg 14.12.2006.

2.3 THE RESPONSE OF THE BASQUE AUTHORITIES

The entry into force of the Kyoto Protocol, the gradual confirmation of climate change as a political priority and the establishment of international carbon markets are examples of the new situation that is in place. An advanced, coherent response by the BAC is required to these developments. To provide that response, the Basque Climate Change Office was set up in January 2006, and a specific plan to combat climate change was drawn up, in line with the new Environmental Framework Programme for 2007-2010.

2.3.1 General Framework & Competences

In ratifying the Kyoto Protocol the EU undertook to emit 8% less GHGs in the period from 2008 to 2012 than it did in 1990. In line with the way in which this undertaking was distributed between the various countries, Spain undertook to emit no more than 15% more than in 1990. This undertaking is made at Member State level and is not binding at the regional level.

An examination of competences covering energy and the environment shows that the state continues to hold authority over basic legislation and the basis of the energy regime (regulations which have a great impact on emission reductions). The Basque government's capacity for action is conditioned and limited by this distribution of competences, but out of solidarity the BAC nevertheless assumes its share of international responsibility in the struggle against climate change.

The most significant landmarks - in that 43.1% of GHG emissions in the BAC are affected – are the implementation in January 2005 of the European emissions trading scheme and the publication of the second National Allocation Plan for emission rights covering the period from 2008 to 2012, which determines the distribution of carbon assets among the 69 verified industrial facilities existing in the BAC in 2007.

In spite of the actions already undertaken, Spain still needs to make a considerable domestic effort if it is to meet its commitments under the Kyoto Protocol. Much of that effort must be directed towards the search for additional measures over and above those already taken, and the regional autonomous communities have been allocated a highly important role in identifying and applying such measures in areas such as land use management, regional transport, trade and the residential sector. This means that regional and local authorities are in charge of the actions with the longest maturity periods and relatively low emission mitigation capabilities.

Central governments cannot stand alone in tackling the major changes that we face, and regional action is fundamental to the meeting of the targets set by the international community -- and particularly the European Union -- in matters of climate change. Mechanisms such as smooth, open communication, co-operation at different levels such as local authorities, research centres and regional autonomous governments, support for co-operation actions promoted by autonomous communities and directed at all agents operating within those communities and, in short, co-operation between regions are all essential if we are to combat climate change effectively.

2.3.2 Action by the Basque Authorities

Climate change is one of the core areas for action by the Basque government in environmental matters in the present legislature. A priority item within that area is the approval of this plan to combat climate change that can integrate and reinforce sectoral policies as a whole, particularly those in the transport, industry, energy, residential and agricultural sectors to contribute to the meeting of Kyoto Protocol undertakings. Climate change is acknowledged as an environmental, economic and social problem of the first order, to combat which a policy of action is called for.

Basque society has a moral obligation to take up this environmental challenge, which provides an opportunity to de-link development from carbon. With this in mind, in 2002 the Basque Environmental Strategy for Sustainable Development 2002-2020 (referred to here by its initials in Spanish EAVDS) made "limiting the influence of climate change" one of its five goals. This strategy establishes various general objectives to mitigate GHG emissions and encourage the removal of CO_2 via carbon sinks. The first Environmental Framework Programme (2002-2006) established a number of undertakings in regard to Goal 5 on climate change, from which actions were derived in four main areas: energy, transport, industry and the construction sector. In June 2007 this first programme was superseded by a new Environmental Framework Programme for 2007-2010 (see Figure 5)**,** which included commitments concerned with energy (Goal 2), forestry (Goal 3), transport and land use management (Goal 4) and specific commitments under Goal 5 "limiting the influence of climate change". This last goal sets two strategic objectives for limiting GHG emissions and managing adaptation to climate change, and those objectives break down in turn into three undertakings:

- Restricting GHG emissions so that they increase by no more than 14% on the figure for the base year
- Reducing the vulnerability of the BAC to climate change
- Preventing land development in areas where there is risk of flooding with a 100 year return period[35].

Other commitments made in the Environmental Framework Programme for 2007-2010 to back up the struggle against climate change in the BAC are: achieving energy savings of 975,000 toe by 2010[36], bringing the proportion of energy consumption generated by renewables and CHP to 29% of the total, achieving annual bio-fuel consumption figures of 177,000 toe in transport, attaining a 35% recycling rate for MSW and zero landfilling of untreated MSW, halting the loss of biodiversity (and to that end restoring 50 Ha of wetland, among other measures), increasing the surface area of woodland by 10,000 Ha on the figure for 2006 (and reducing the presence of exotic, invasive species) and redirecting the modal split of passenger transport towards public transport and that of freight transport towards railways.

[35] The flood return period is said to be 100 years when the average is more than once every 100 years.
[36] Tons of oil equivalent

Figure 5: Goals of the Basque Environmental Strategy for Sustainable Development 2002-2020

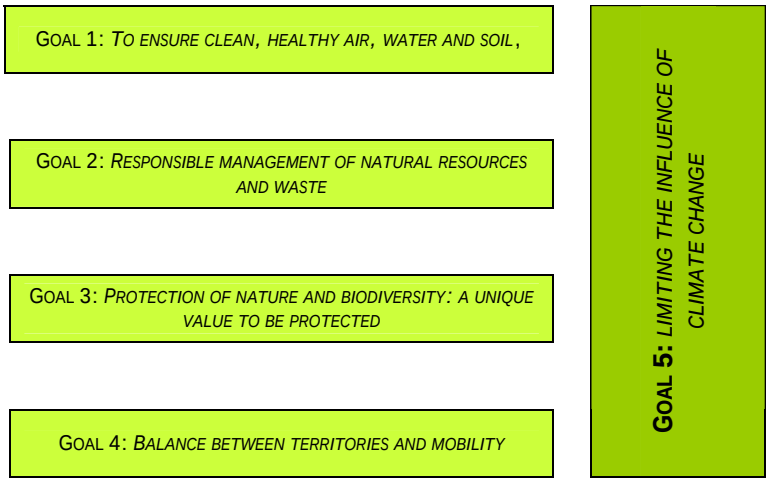


Table 6 lists the main actions taken by the BAC in each sector. The Basque Energy Strategy (2010) in particular is a fundamental element in the struggle against climate change. It sets objectives for 2010 and establishes lines for progress towards a less oil-dependent model of production, supply and consumption of energy. The BAC is moving to reinforce actions in the fields of energy saving and energy efficiency, and to make better use of resources and of renewables. All this is in line with European objectives, seeking to achieve additional savings of 15% in energy consumption (through energy efficiency programmes) and to bring the proportion of energy demand met by renewables up to 12% (so that 15% of electricity consumption in 2010 is from renewable sources). The rational use of energy, renewables and the introduction of combined cycles will all help to meet Kyoto targets and improve environmental quality by reducing GHG emissions.

Table 6. Main sectoral measures approved by the Basque authorities

SECTOR	PLANS	PURPOSE AND STATUS
General	• Programme of economic context & reforms for growth & social progress in the Basque Country 2006-2009	To define the economic, social & environmental strategy of the Basque government & the associated budget policy, specifying the conditions, legal limits, undertakings & priorities agreed
Environment & Land Use	• Basque Environmental Strategy for Sustainable Development 2002-2020 & 2nd Envir. Framework Programme 2007-2010	To define the environmental goals & objectives to be pursued in the BAC for progress towards sustainability.
	• Environmental Inspection & Control Plan	To protect the environment in the BAC by enforcing environmental regulations affecting activities to assure sustainable development"
	• Biodiversity Strategy	Now being drawn up
	• Contaminated Soil Plan (2007-2012)	Now being drawn up
	• Hazardous Waste Plan & Non-hazardous Waste Plan (2008-2010)	Now being drawn up (Departmental Plan)
	• DOT, PTP & PPS.[37]	9 PTSs already approved & 5 more being processed[38]. 7 PTPs with final approval & 7 being processed
Energy	• Basque Energy Strategy – 3E 2010	To make progress towards a less oil-dependent model of energy production, supply and demand with greater assurances of supply.
Transport	• Master Plan for Sustainable Transport 2002-2012	To take up the joint challenge with the EU of delinking demand for transport & economic growth
Residential	• Master Plan for Housing 2006-2009	To set strategic lines & objectives for action that integrate the environmental aspects associated with this sector
	• Basque Environmentally Sustainable Consumption Plan 2006-2010	To achieve a more sustainable level of consumption and more environmentally-friendly products by informing & enhancing awareness of agents
MSW	• Directives for planning & management of MSW in the BAC to 2010	Directives for the preparation of territorial plans for MSW management & co-ordination of policies on the matter
Agriculture	• Primary sector waste management plan	Now being drawn up
Industry	• Science, Technology & Innovation Plan 2007-2010	This plan covers 8 areas of work, including new manufacturing systems, alternative energy sources and environmental sustainability
	• Business Competitiveness & Social Innovation Plan 2006-2009	Initiatives & programmes in line with the ethos of innovation & growth in business
Interior	• Strategic Emergency Response Plan	

Other objectives incorporated into energy planning in the BAC include a greater guarantee of supply, improvements in the competitiveness and quality of the Basque energy system, promotion of the gradual shutdown of conventional coal-fired power stations and their replacement by energy efficient, environmentally friendly units and increased support for technological R&D in the fields of energy and energy efficiency.

The Programme of Economic Context and Reforms For Growth and Social Progress in the Basque Country 2006-2009 sets out the economic, environmental and social strategy of the Basque government for the current legislature, identifying 10 main lines of action. The sixth of those lines involves the drawing up of the Basque Plan to Combat Climate Change (PVLCC).

[37] Source: www.ingurumena.net

[38] Approved: Territorial Sectoral Plan (in Spanish PTS) for the structuring of river and stream banks, General Sectoral Plan for highways, sectoral plan for highways in Araba, sectoral plan for highways in Bizkaia, Wind Power Plan, PTS for the rail network in the BAC, PTS for establishing land for economic activities & commercial amenities, PTS for wetlands, PTS for structuring & protection of the shoreline.

The departments of Transport and Public Works, Housing and Social Affairs, Agriculture Fisheries and Food, Industry Trade and Tourism and Land Use and the Environment have developed plans that significantly influence the reduction of emissions and adaptation to climate change.

Other departments which must play an active role in adaptation include Interior and Health, particularly in emergency response and traffic related services, etc.

There are also other measures implemented by the Basque authorities which may not in themselves entail reductions in emissions but which nevertheless create the necessary framework for such reductions. Examples include the Programme for the Promotion of Eco-design 2004-2006, voluntary agreements signed with various sectors of industry and the Guide to Sustainable Building for Housing (see Table 7).

Table 7. Other measures approved by the Basque authorities

SECTOR	MEASURE	PURPOSE
Agriculture	• LULUFC Inventory • Inventory of organic carbon in the soil & biomass of the BAC • Inventory of Forest land in the BAC • Environmentally Friendly Food & Agriculture Act	To quantify carbon removals in the BAC in 1990 and in 2005. To quantify in theory the carbon retained, and to propose measures to foster increases in carbon absorption by the soil and by woodland To show a breakdown of land use and different woodland species by municipalities and to enable forestry and carbon sink management policy objectives to be developed. To encourage environmentally-friendly agriculture
Industry	• Programme for the promotion of Eco-design 2004-2006	To help Basque businesses factor environmental variables into product development
	• Integrated services for technical assistance in energy	To improve energy efficiency and savings, develop new technologies and reduce emissions of contaminants into the atmosphere
	• Basque List of Clean Technologies 2003-2006	To provide tax incentives for the use of clean technologies
	• Voluntary environmental agreements with various sectors of industry	To anticipate compliance with environmental regulations and strengthen the competitive position of businesses, e.g. on the entry into force of the European emission rights trading scheme
	• EMAS, ISO 14001 & Ekoscan certificates	To establish environmental management protocols at companies
Transport	• Urban & supramunicipal mobility plans	To reduce flows of motor vehicles by encouraging use of public transport
Education	• School Agenda 21	To include awareness of and training in the principles of sustainable development in the school curriculum
Housing	• Guide to Sustainable Building for Housing	To propose recommendations applicable to the building of housing throughout building life cycles, facilitating the application of the 2007 Technical Building Code.
Environment	• The Water Act (Act 1/2006 of June 23)	To establish the mechanisms required to implement European policies in the BAC and at the same time to establish a suitable regulatory framework for the intervention of the various administrative bodies involved.

Working in co-operation with the Basque Government Department of Land Use and the Environment and the provincial councils, Basque municipalities have drawn up actions to combat climate

change, which have been set down in their Local Agenda 21 action plans. 180 Basque municipalities currently have Local Agenda 21 schemes in place, covering more than 95% of the population.

Udalsarea 21, the Basque Network of Municipalities for Sustainability, is a forum for co-ordinating corporation between the various institutions that work for sustainable development at local level. It takes the form of a working group (*ekitalde* in Basque) made up of those municipalities that wish to play a leading role in the struggle against climate change at local level. This group currently includes more than 30 municipalities from all three provinces of the BAC, and enjoys the co-operation of various departments of the Basque government, including not only the Department of Land Use and the Environment but also the departments of Industry Trade and Tourism, Transport and Public Works, Housing and Social Affairs and Agriculture Fisheries and Food. The actions of the group are centred on providing training for (and increasing awareness at) the participating municipalities, identifying, disseminating and implementing best practices and drawing up shared instruments such as an inventory for calculating GHG emissions within a municipality and local ordinances to combat climate change.

In 2006, the Basque Government Department of Land Use and the Environment established a new line of aid for municipal councils to help them undertake actions to improve ambient air quality and combat climate change. The actions subsidised include extensions of municipal public transport services into newly developed areas as well as existing districts, the setting up of information and advisory services on sustainable mobility and energy efficiency for industrial firms and the planting of woodland in various municipalities. In 2007 this line of support for municipalities has been reinforced through an order to regulate the granting of some subsidies to municipal councils, supramunicipal councils and other local bodies that take action to promote sustainable development.

The Basque provincial councils also deal with climate change within the scope of their competences, covering highways, agriculture and support for municipal bodies in Local Agenda 21 processes, and they all make considerable contributions to the struggle against climate change in the BAC.

2.3.3 Climate Change Office

The importance of the problem and the fact that its effects are felt in many different areas of society led to the establishment of the Basque Climate Change Office (referred to here by its initials in Spanish: OVCC) to bring together the policies of the various Basque government departments in the struggle against climate change.

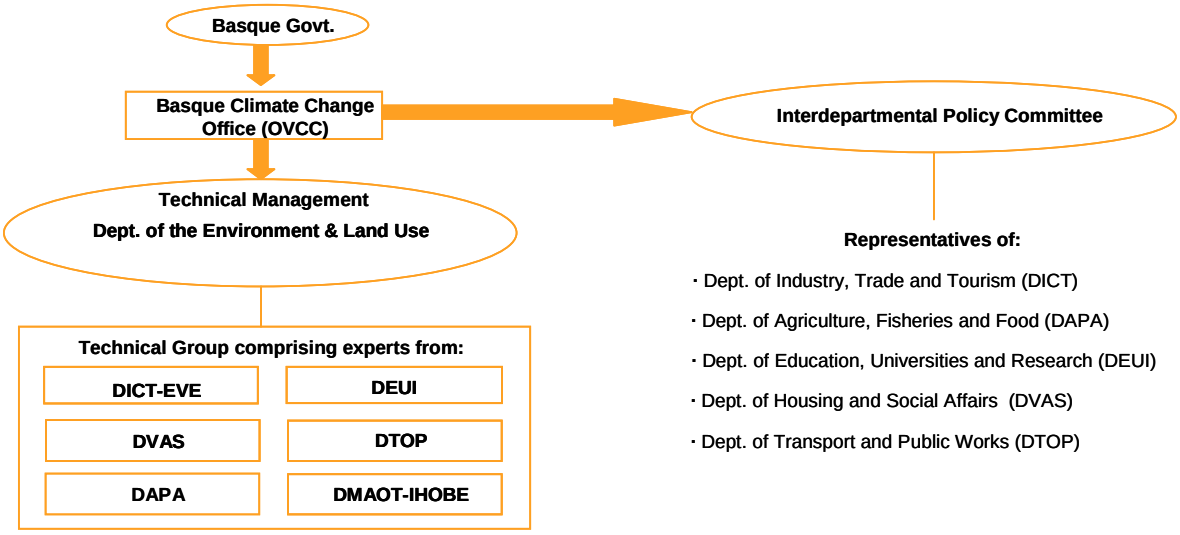
The OVCC was set up in January 2006, and comprises representatives of the departments of Land Use and the Environment (DMAOT), Industry, Trade and Tourism (DICT), Transport and Public Works (DTOP), Education, Universities and Research (DEUI), Agriculture, Fisheries and Food (DAPA) and Housing and Social Affairs (DVAS), all of which work in areas of vital importance.

The remit of the OVCC is two-fold: on the one hand it works to energise and co-ordinate public sector policies in the Basque Country aimed at reducing GHG emissions and meeting the targets set

in the Kyoto Protocol and in such other commitments as may be made after 2012. On the other hand it seeks to minimise the effects of climate change by involving all institutional, economic and social agents in the BAC on the basis of adapting to the consequences of climate change in terms of temperature increases, rises in sea level and changes in migration patterns of certain species and by reporting on climate change to Basque society.

With a view to fulfilling this remit the PVLCC has been drawn up to define the strategy, objectives and key lines of action to be followed in all sectors which share in responsibility for this matter.

Figure 6. Basque Climate Change Office



2.3.4 International Co-operation

Climate change is international in its scope, and a policy of international co-operation is a key element that can help meet Kyoto targets and also enable developing countries as a whole to introduce policies and mechanisms to make their economies more competitive and favour local job creation.

From this perspective, the BAC has taken up the challenge of investing in an climate change policy integrated into the principles of international co-operation. To that end it seeks to encourage projects based on the flexible mechanisms of the Kyoto Protocol which can help to introduce innovation and technology directly into the economic structure of developing countries and thus directly help to reduce GHG emissions from those countries.

The Basque Autonomous Community has been participating since 2002 in international networks such as the Network of Regional Governments for Sustainable Development (nrg4SD), in which regions work jointly to combat climate change from a regional perspective.

Through the nrg4SD, the Basque government is working to promote and share experiences in such areas as:

- adaptation
- improvements in environmental management

- transfer of non GHG-intensive technology
- promotion of renewable energy sources
- performance indicators for all emitting sectors
- dissemination of best practices
- carbon markets

The most active members of the network in this field are the regions of Sao Paulo (Brazil), the Azores (Portugal) and Flanders (Belgium), all of which have policies and projects ongoing in their respective regions, and all of which exchange information with the Basque government.

3. A NECESSARY PLAN

3.1 SITUATION & PROSPECTS FOR GHG's

GHG emissions in the BAC in 2006 totalled 25.5 Mt CO_2e, 21.9% more than in the base year. If the measures approved in the plans currently in force are implemented as expected, emissions will total around 26.1 Mt CO_2e in 2012 (24.9% up on the base year[39]). Further measures therefore need to be introduced and existing measures need to be reinforced if we are to meet the goals set by Kyoto and any new challenges set in the Kyoto plus time-frame.

3.1.1 Current Emissions

The method recommended by the IPCC establishes that emissions should be calculated at state level, excluding those resulting from electricity exports and imports. This is tantamount to saying that all the emission sources in a specific territory should be charged to the account of that country, without deducting emissions from electricity exports or adding those from imports. This method is recommended in order to keep the process of calculation simple, as it is assumed that imports and exports of electricity are relatively similar in most countries, and that when they are not similar the differences are usually small and stable over time, so that only a minimal error is introduced by failing to count them.

But this is not the case in the BAC. In 1990 the BAC depended heavily on electricity imports, with internal production accounting for only 4% of final electricity consumption. That figure has increased as new power stations, CHP plants and renewable energy sources have come on line, and by 2006 the BAC was producing 67% of the electricity that it consumed.

This trend in electricity imports means that data on emissions not counting imports are very different from the data on total emissions from socio-economic activities in the BAC (see Table 8).

Table 8: GHG emissions & electricity imports into the BAC in 1990 & 2006

	GHG emission index w/o electricity imports	Total GHG emission index	Electricity imports (%)*
Base Year	100	100	
1990	**97**	**98**	**96**
2006	**143.1**	**121.9**	**33**

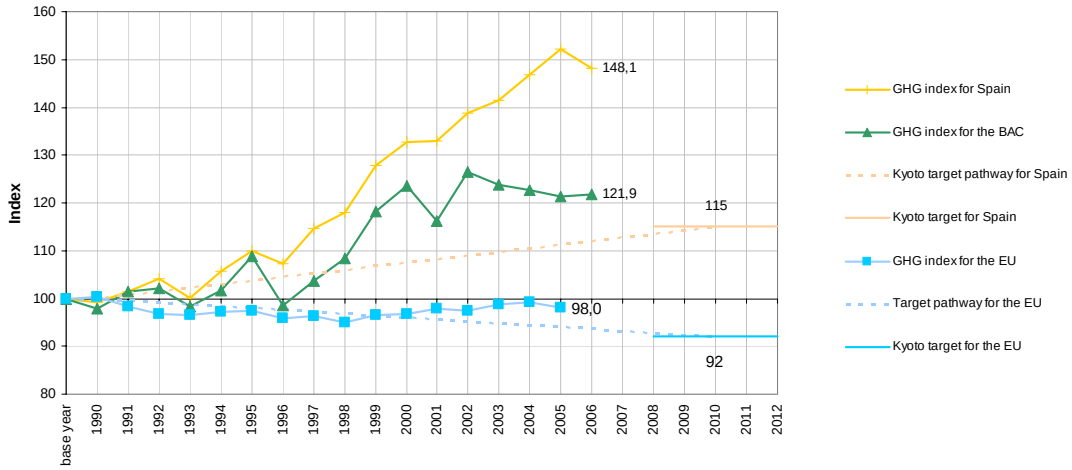
* % of final consumption

The PVLCC counts all emissions deriving from socio-economic activities in the BAC, regardless of where they are generated, since counting only internal emission sources could result in a paradox by which the Basque Country meets its emission targets by increasing electricity imports.

[39] Base year emissions are calculated on the basis of emissions of CO_2, CH_4 & N_2O in 1990 and emissions of HFC's, PFC's & SF_6 in 1995

GHG emissions attributable to socio-economic activities in the Basque Country in 2006 totalled 25.5 Mt CO_2e (Figure 7), an increase of 21.9% on emissions in the base year and a long way from meeting the proposed Kyoto commitment.

Figure 7: Trends in GHG emissions in the BAC, the EU & Spain 1990-2006

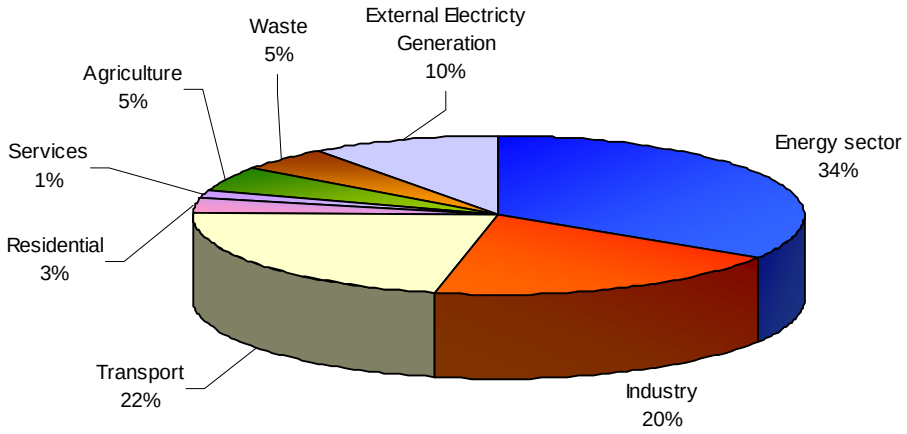


An examination of the variations in emissions by type of gas and by sector (see Table 9) reveals that the biggest variation in absolute terms from the base year to 2006 is in carbon dioxide (CO_2), which is up from 17.5 to 22.5 Mt, an increase of 28.6%. The sectors chiefly responsible for this increase in CO_2 emissions are energy (up from 2.90 to 8.67 Mt CO_2e) and transport (up from 2.72 to 5.67 Mt CO_2e), which account for 34% and 22% respectively of total emissions. The 10% of imported electricity must also be added. On the other hand, CO_2 emissions from industry are down by 32% from 1990 to 2006. The variations in methane (CH_4) and nitrous oxide (N_2O) over that time are smaller, and are accounted for by the trends in the agricultural and waste sectors. Fluorinated gas emissions are down by 0.42 Mt CO_2e, due mainly to the reduction in size of the industrial sector.

Table 9: Breakdown of emissions by types, gases & sectors. 1990-2006

	Base year emissions					Emissions in 2006				
	Mt CO_2e					Mt CO_2e				
Sectors	**Total**	**CO_2**	**CH_4**	**N_2O**	**Fluorinate gases**	**Total**	**CO_2**	**CH_4**	**N_2O**	**Fluorinate gases**
Energy	2.90	2.83	0.07	0.01	0.00	8.67	8.55	0.11	0.02	0.00
Industry	7.30	6.02	0.01	0.35	0.92	4.97	4.15	0.01	0.16	0.65
Transport	2.72	2.70	0.01	0.01	0.01	5.67	5.62	0.01	0.02	0.02
Residential	0.63	0.61	0.01	0.00	0.00	0.77	0.75	0.01	0.00	0.01
Services	0.20	0.20	0.00	0.00	0.00	0.35	0.31	0.00	0.00	0.04
Agriculture	1.11	0.28	0.47	0.36	0.00	1.23	0.52	0.37	0.34	0.00
Waste	1.18	0.00	1.18	0.00	0.00	1.30	0.08	1.21	0.00	0.00
External Electricity Generation	4.90	4.90				2.56				
TOTAL EMISSIONS	20.94	17.54	1.75	0.75	0.93	25.52	19.98	1.73	0.54	0.72

Figure 8. Breakdown by sectors of GHG emissions in the BAC (2006)



3.1.2 Current Situation of Carbon Sinks

There are two forms of accounting for carbon retention that must be taken into consideration. LULUCF inventories[40] estimate all emissions and removals that take place in land use, changes of land use and silviculture. But this does not mean that states can take into account all removals when they report on compliance with Kyoto targets. To assess whether carbon removals can be included in calculations on target fulfilment, the rules of the Kyoto Protocol and the Marrakech Agreements must be followed. These rules establish equivalence between absorption units (AU)[41] and a flexible mechanism similar to joint application, the clean development mechanism or international emission trading.

In regard to CO_2 removals by carbon sinks in the BAC, land use, changes in land use and silviculture between them provided a net carbon sink of 1.33 Mt CO_2 in 2005[42], which represents 6.35% of base year emissions (20.94 Mt CO_2e). The woodland of the BAC retained 1.9 Mt CO_2, while cultivated land, grazing land and settlements constituted a net source of emissions (see Table 10).

[40] The rules for inventorying GHG's are based on the UN Framework Convention on Climate Change (UNFCCC). In this case the inventory seeks to give a true picture of changes in carbon stocks year by year within a territory.

[41] The "Absorption Unit" (AU) is the accounting unit recognised in the Kyoto Protocol for the removal of carbon via carbon sinks. As Kyoto units, AU's have the same accounting value for states as the units attributed to states by the Protocol or as project based emission reduction credits (CER and ERU respectively)
The allocation of AUs is subject to the following limitations:
- limitation to human-induced activities;
- limitation to countable activities: afforestation-reforestation-deforestation, forest management, crop land management, grazing land management & revegetation;
- limitation to a time frame for increases of 2008 - 2012;
- setting of maximum amounts per state for allocation of AU's for improvement in forest.

[42] Data from the first LULUCF inventory for the BAC. On a methodological level, this work makes use of the latest IPCC directives for the drawing up of national inventories, dating from 2006. To date, it covers an estimation of net removals for 1990 and 2005, using Tier 1 precision.

These figures, in any event, are for removals in line with UN Framework Convention criteria. A pre-requisite in accounting for these removals is to identify the type of activity and the areas which are to suffer anthropic management, which enables AUs to be generated that can be used for the purposes of the Kyoto protocol in the 2008 - 2012 compliance period (See Chapter 6.2).

Table 10. Removal via carbon sinks in 2005

CATEGORY OF LAND USE	ARABA		BIZKAIA		GIPUZKOA		BAC	
	ha	tCO_2	ha	tCO_2	ha	tCO_2	ha	tCO_2
Forestry land	125,549.00	658,240.00	123,530.00	592,225.33	116,871.00	608,300.00	365,950.00	1,858,765.33
Farmland	89,415.00	-64.490.84	2,015.00	296.87	1,283.00	395.93	92,713.00	-63,798.04
Grazing land	72,548.00	-88.526.92	73,898.00	-169,853.60	65,636.00	-176,603.13	212,082.00	-434,983.66
Settlements	10,980.00	-8,740.09	17,406.00	-9,761.25	11,573.00	-11,707.08	39,959.00	-30,208.42
TOTAL		*496.482,14*		*412.907,35*		*420.385,72*		*1.329.775,21*

3.1.3 Forecasts

A knowledge of the expected trends in GHG emissions will enable us not only to anticipate any difficulties in meeting Kyoto targets but also to draw up a position for the BAC in regard to the essential subsequent targets at international level. To that end, the emissions pattern of the Basque economy has been modelled and forecast.

The model was drawn up by the Institute for Public Sector Economics at the University of the Basque Country (UPV-EHU) in the framework of relations between different activities in the Basque Country and CO_2 emissions. It calculates the effects of changes in economic activities on the volume of emissions in terms of both the driving forces behind them and the policies applied. The chief sources of information used are the input-output tables for the Basque economy for 2000, energy balances and GHG emission inventories up to 2006. To obtain a complete picture, forecasts for other GHGs (methane, fluorinated gases and nitrous oxide) were subsequently added. The model also estimates GHG emissions from electricity imports and exports (if any).

Three scenarios have been constructed, based on different assumptions regarding trends in energy demand (in line with improvements in energy efficiency and energy inputs or the energy mix used), electricity production (relative weight of coal-fired and combined-cycle power stations, CHP and renewable energy sources), mobility and transport.

The first scenario assumes that the patterns of behaviour observed to date will continue (this is known as the "no measures" scenario). The idea is to predict what would happen if no measures and no early action were taken under the plans currently in force.

The second scenario envisages the trend in emissions if there is reasonable compliance with the measures laid down in current programmes (known as the "with measures" scenario). Implementation rates and difficulties in the actions agreed are taken into account.

The third and final scenario (referred to as the "Plan scenario") envisages the fulfilment of the PVLCC, based on fulfilment of sectoral strategies, including the 3E2010 Energy Strategy, and also envisages a number of measures in addition to those already adopted, with a view to ensuring satisfactory fulfilment of Kyoto undertakings. These additional measures under the "Plan scenario" take into account the initial situation and the opportunities for improvement identified in each sector (see Chapter 6).

These scenarios also take into account two macroeconomic assumptions: a basic assumption of high economic growth for 2006-2008[43] followed by a downturn beginning in 2009 and lasting until 2012 (see Table 11). To provide a contrast, performance under all three scenarios is worked out again assuming lower economic growth and a recession linked to unfavourable trends in the oil market.

Table 11: Macro-economic base assumption 2005-2020. Basque Country

	1990-2005	2006-2008	2009-2012	2012-2020
GDP **basic assumption**	**62.1%**	**10.6%**	**7.7%**	**23.5%**

Source: Eustat (1990-2005), Basque Govt. Directorate for Studies (2006-2009) & own work based on data from CEPREDE (2005-2015)

The conclusions drawn from these simulations are shown in Table 12. They indicate that in the "with measures" scenario, emissions in the BAC will stabilise at an average of around 26.1 Mt CO_2e for 2008-2012 (24.4% above the base year figure). In the "no measures" scenario emissions continue to grow, reaching an average of almost 28.4 Mt for 2008-2012 (35.9% above the base year figure). The "Plan scenario" will be shown later, once the measures envisaged have been detailed. (see Table 12).

[43] Similar to that of 2000-2005.

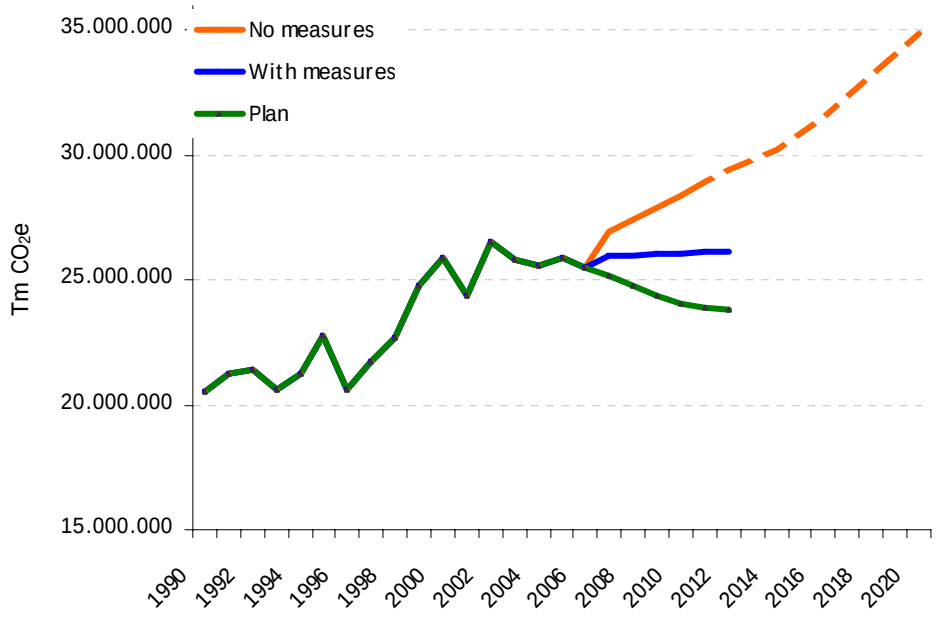
Table 12. Forecast results to 2012

	Actual		Forecast average for 2008-2012			
			No measures		Measures	
	Base year (Mt CO_2e)	*2006 (Mt CO_2e)*	*Mt CO_2*	*Variation on base year*	*Mt CO_2e/yr*	*Variation on base year*
CO_2 emissions	12.6	20.0	22.1	75.4%	22.3	77.0%
Emissions from electricity imports	4.9	2.6	3.5	-28.6%	1.1	-77.6%
TOTAL **CO_2**	17.5	22.6	25.6	46.3%	23.4	33.8%
CH_4 emissions	1.7	1.7	1.6	-5.9%	1.5	-11.8%
N_2O emissions	0.7	0.5	0.4	-42.9%	0.4	-42.9%
Fluorinated gas emissions	0.9	0.7	0.8	-11.7%	0.8	-11.1%
TOTAL OTHER GASES	3.4	3.0	2.8	-17.7%	2.7	-20.6%
TOTAL GHGs	**20.9**	**25.5**	**28.4**	**35.9%**	**26.1**	**24.9%**

This shows that the initiatives taken to date have been good, as are the envisaged effects of actions already planned and taken into account in the "with measures" scenario, but the results are still far from satisfactory.

The model enables longer term scenarios to be constructed, providing a forecast of trends to 2020. However, there is a high degree of uncertainty in this analysis so for purposes of the PVLCC it is regarded as useful for orientation only.

Figure 9: Forecast trend in CO_2e emissions



The most significant conclusion that can be drawn from the analysis to 2020 is that according to the forecasts the effects of some measures fade away after they have been introduced[44]. This means that to achieve additional reductions in emissions further measures must continue to be introduced in the future, over and above the existing ones. In the absence of more radical changes emissions will begin to climb again after 2012 (albeit from lower levels) in line with economic activity. The last few years to 2020 will see rapid acceleration of emissions in the "no measures" scenario as a new cycle of economic growth kicks in[45].

In the long term, the ideal scenario would entail a stabilisation in emissions by 2020 at the base year level (20.9 Mt CO_2e). However, even if the additional measures envisaged in the PVLCC to 2012 are taken into account, the "Plan scenario" for 2020 puts GHG emissions above that level. This means that the options for improvement must be rethought in forthcoming reviews of the plans currently in force.

This scenario thus anticipates the need to focus the delinking of economic growth from GHG emissions mainly on energy saving and on reducing dependence on fossil fuels. Otherwise the pressure to maintain growth rates will give rise to an increase in emissions and render unattainable the ultimate aim (which the BAC takes on board fully) of reducing levels of CO_2 in the atmosphere.

There are opportunities that, if seized, will enable the Basque Country to make this leap with the support of its accumulated know-how and ability. There are also limitations linked to the structure of production and inherited social habits which must be overcome. In our favour is the fact that we already have a diagnosis and a shared desire expressed in various social forums (see Chapter 7), because in the BAC climate change is perceived as a problem that actually affects us and an opportunity that we can all seize.

3.2 OPPORTUNITIES & PRIORITIES

If we are to go further we need a specific, systematic plan consistent with the Environmental Framework Programme 2007-2010 (PMA) that can provide solutions to two priority matters: (i) safeguarding the future, acting against climate change and preparing for its consequences; and (ii) innovating to make progress towards a sustainable Basque economy based on patterns of clean, non carbon-dependent production and consumption. The second matter is the key to resolving the first. Only thus can we attain the initial Kyoto target and the subsequent targets now being discussed at international level.

The BAC has a strong starting position, with institutional and social strengths that can provide clear opportunities for progress towards the goal of reducing the link between energy consumption and GHG emissions (see Table 13).

Indeed, the BAC already has a system of early co-operation with industry in place whose achievements include the incorporation of best practices in energy efficiency, the signing of

[44] e.g. replacing a conventional thermal power plant by a combined cycle plant reduces emissions only in the year in which the changeover is made.

[45] See **¡Error! No se encuentra el origen de la referencia.**. In line with economic forecasts, 2015 will mark the end of a five-.year period of very slow growth. Acceleration in the subsequent years will greatly increase output & energy consumption.

voluntary environmental agreements between firms and the authorities and the almost complete replacement of heavy fuel by natural gas in industry. There is also clear involvement on the part of municipal councils through their Local Agenda 21 schemes, which are a key element in engaging the public as a leading agent in the struggle against climate change. Furthermore, the BAC has a network of scientific and technological establishments with a high capability for innovation in qualitative and quantitative terms.

These capabilities and strengths must be exploited to take advantage of the opportunities that open up. On the one hand there is room for the development of various types of renewable energy sources through a well established industrial and research capability. Public transport has a clear opportunity to recover its position through a more environmentally friendly modal split, with more emphasis on rail and tram systems and non-motorised forms of transport. Urban regeneration and new land use planning can reinstate better integrated forms of development to reduce the demand for mobility, and particularly the need for private cars. There is still a long way to go in improving the results for industry, transport and the residential sector in terms of energy efficiency, and the benefits of changes in energy resources (e.g. biomass) need to be felt. These improvements can be enhanced by the implementation of a more all-round concept of design in manufactured products to factor all the environmental impacts caused over their lifetimes into their functions.

The public authorities also have the ability to innovate in the application of advanced instruments in support of policies against climate change. In that regard, emphasis can be placed on the deployment of green public procurement, support for scientific and technological innovation and the development of environmental taxation[46] to send a clear message to agents in regard to emission mitigation.

However, to make such progress we must overcome inherent weaknesses in our socio-economic system and the inherent limitations of our framework of competences and regulations. In spite of improvements in energy intensity and reductions in emissions from industry, the BAC must overcome the limitations of a production system that consumes a great deal of energy. Freight transport by road has an enormously high relative weight in emissions, and the modal split needs to be shifted towards less carbon-intensive modes of transport. Despite their clear environmental awareness, it is difficult to shift the public towards environmentally positive practices. Improvements in consumption of natural resources and recycling of domestic waste are not matched in the areas of private vehicle use and domestic energy consumption, where levels are not yet sustainable. The fact that basic regulations on energy use and the environment are drawn up at state level limits the potential for action within the BAC.

Another external risk to be considered is the as yet insufficient level of global commitment to progress towards a far less carbon-dependent lifestyle and production economy. This risk is currently at its greatest in some developed countries and in the emerging major powers in terms of consumption, which are struggling to industrialise and attain higher levels of economic and social development.

46 An example of this is the Basque List of Clean Technologies, which identifies priority technologies from an environmental viewpoint to provide guidelines for taxation policies in terms of providing tax incentives for the introduction of such technologies into corporate production processes in the form of provincial level aid and in terms of policies on expenditure.

Table 13: Internal & external diagnoses of climate change policy: limitations, risks, strengths & opportunities

OPPORTUNITIES	*STRENGTHS*
RESOURCES • Development of renewables • Encouragement for energy eco-efficiency • Product life-cycle perspective • Environmentally-friendly modes of transport & intermodality • Integrated urban planning designs • Minimisation, recycling & valorisation of waste • Encouragement of carbon sinks SOCIAL ASPECTS • Growing public awareness of climate change INSTRUMENTS • Emission rights trading & flexible mechanisms as per the Kyoto Protocol • Green public procurement • Application of green taxation. • R&D applied to new technologies	CAPABILITIES • Best practices in energy savings & efficiency in industry • Development of a renewable energy industry • Significant scientific & technological base INSTITUTIONAL FEATURES • Basque Climate Change Office • Widespread municipal & provincial council involvement in Local Agenda schemes • Aligned sectoral strategic plans SOCIAL ASPECTS/ ATTITUDES • Application of voluntary environmental agreements between firms & the authorities INSTRUMENTS • Tax deductions for clean technologies • Proven systems of incentives for energy saving & energy source replacement
RISKS	*LIMITATIONS*
• Global emission instruments due to growing energy consumption by major Asian countries now industrialising • Lack of support from the most highly-industrialised countries for the future Kyoto-plus framework • Rise in price of natural gas & possible use of other fossil fuels • Insufficient commitment to R&D required to develop new technologies • Emissions trading may cease to be an incentive to reduce emissions due to drops in prices of rights and/ or free, surplus allocations.	STRUCTURAL ELEMENTS • Energy-intensive industry. • Priority given to private cars & road freight • Pressure from international traffic in transit RESOURCES • Supply of water resources dependent on stable rainfall patterns SOCIAL ASPECTS • Low level of public awareness on matters of public transport & energy saving COMPETENCE-RELATED ASPECTS • Dispersal of competences means that basic legislation & basis of energy framework are handled at state level.

All this leads to the formulation of two priorities that contribute to the vision of the Plan**:**

✓ The first is to safeguard the future by acting against climate change and preparing for its consequences**.**

Acting against climate change means making an active, solidarity-based commitment to the reduction of net emission levels. That calls for the preparation of a consensus-based plan with broad public acceptance, and a number of measures to achieve this overall end, taking earlier, more ambitious action in terms of both form and substance out of an ethical commitment to future generations and developing countries in the knowledge that doing nothing is the costliest possible course of action.

Preparing for the consequences means being aware that even with the reductions achieved in the future, GHG levels in the atmosphere will remain high for a long time. Inertia means that past emissions are causing climate change in the present, and that present emissions will continue to have effects for a long time, producing more and more changes in natural habitats and ecosystems on the one hand and in our model of production, our towns and cities and our way of life on the other. We cannot prevent change, but we can reduce its

consequences via a consensus-based plan with broad public acceptance that includes adaptation measures.

- ✓ The second is innovation for progress towards a sustainable Basque economy based on clean, non carbon-dependent patterns of production and consumption.

  This second priority is clearly the key to solving the first: emissions can only be reduced without jeopardising our aspiration to conserve and develop our living standards if we can find forms of production and shift to mobility habits that are carbon-neutral.

  This constraint, however, provides a wonderful opportunity to introduce radical innovations into our technology and break into a global market that will require products and services in consonance with this new society. The firms and innovation systems of the Basque Country must take up the challenge of earning themselves a leading position in a global market that is calling for solutions to a serious problem that recognises no frontiers.

4. DRAWING UP THE PLAN: UNDERTAKINGS

4.1 A VISION OF THE BAC UP TO 2020

In line with the above analysis, the Basque government has formulated the following vision.

VISION

To strive to ensure that by 2020 the BAC will have taken irreversible steps towards consolidating a non carbon-dependent socio-economic model, thus minimising our vulnerability to climate change.

This vision entails a commitment on the one hand to the conservation of the natural environment and its functions, and on the other hand to maintaining the quality of life of the population out of solidarity with future generations and the international community. Achieving this vision poses a great challenge for the year 2020: to place the BAC at the forefront of scientific and technological development in all production sectors and in the analysis of consumption patterns so as to construct a society that is carbon-neutral, enabling economic development to be de-linked from GHG emissions and making us an example for effective action at international level.

The Basque public authorities cannot accomplish all this by themselves. The active, conscious participation of the public and of social and economic agents is essential. In the face of such an ambitious challenge only a committed, firm response by all agents will suffice. We who have contributed to creating the problem must also help to solve it.

The vision laid out in the Plan stresses the Basque government's determination to bring emissions from the BAC back down to base year levels by 2020. Such a reduction is comparable to the level of commitment (in percentage points of reduction for the period 2012-2020) assumed by the European Union for the same time frame[47].

The long-term outlook of the PVLCC is also reflected in its acceptance of the fact that international emission mitigation targets should be adopted according to the principle of common but differentiated responsibilities. The international community as a whole must sign up to the Kyoto-plus scenario if the struggle against climate change is to be effective and fairly distributed. Consequently, the moves made by the BAC in regard to climate change will be adjusted to the long-term objectives taken up at European and international levels.

The BAC is also determined to strive to achieve these objectives at a regional level. Regional governments must be given a voice, as they are closer to the problems, have more in-depth knowledge of the causes and are in a better position to implement solutions. Co-operation between regions is essential if the struggle against climate change is to be conducted effectively and globally: it enables regions to act as a platform for information sharing and best practices, and serves to promote and establish collaboration on matters of sustainable development.

47 The EU proposes the reduction of GHG emissions by 2020 to 20% below the base year figure. This target could be increased to a 30% reduction depending on the undertakings adopted by the international community.

In this vision the BAC is seen as part of the international community that has decided to make the struggle against climate change a priority. This requires ambitious measures to be implemented aimed at encouraging:

a. energy efficiency and savings and the use of renewable energy sources;
b. integrated management of demand for mobility and a more balanced modal split of transport;
c. more sustainable forms of production and more balanced forms of consumption on the part of the general public, with the public authorities setting an example and leading the way;
d. encouragement for social and technological innovation;
e. an increase in carbon sinks to offset GHG emissions; and
f. actions to deal with the consequences of climate change, which may be mitigated but is now inevitable

In a time-frame running to 2020, the BAC will work towards implementing a highly efficient energy model that is less dependent on fossil fuels, which in itself will enable GHG emissions to be reduced considerably.

The Basque Country will also have a transport policy that will have minimised negative externalities[48], and an orderly but ambitious transition will have taken place towards large-scale use of public transport and encouragement for the carrying of freight by means other than road haulage, e.g. by rail or sea.

Production and consumption habits will have shifted towards more sustainable models, taking advantage of the increasing environmental awareness of the public and the increasing eco-efficiency of our business fabric, with which we will be able to produce more and better goods using less natural resources (less energy, less water, less land, less raw materials).

The key to the second great social and economic transformation of the Basque Country will be innovation. New, cleaner technologies will enable growth in GDP to be de-linked from increases in GHG emissions. The environment will be an element of competitiveness for firms and a driving force for the creation of new products and services that will help to diversify the fabric of Basque production towards more technologically advanced, more knowledge-intensive sectors, and there will be a great leap forward in eco-efficiency. To that end, science and technology policies will promote research for the development of knowledge and the creation of a business fabric centred on the main areas of the environment (climate change, soil protection, biodiversity, etc.).

Measures to increase carbon sinks through human-induced activities will maintain an adequate balance between the agriculture, livestock and forestry sectors to produce benefits in the short term (increases in arboreal biomass) and in the long-term (greater stocks of organic carbon in the soil). The BAC will take advantage of the potential for increasing the carbon sink effect of the forestry sector (e.g. by increasing phosphorus fertilisation of existing woodland), the livestock sector (e.g. by

[48] See *Costes Externos del transporte en el País Vasco* ["External Transport Costs in the Basque Country"], Dept. of Transport & Public Works (Basque Govt., 2006)

adapting the diet of livestock) and the agricultural sector (e.g. by implementing conservation-based farming techniques). The BAC will incorporate measures with carbon sink absorption potential gradually in areas of land previously identified for that purpose, until an AU with an accounting value for Kyoto protocol purposes of 2% (420.000 Tm) of total base year emissions is achieved in the BAC in 2020[49].

In regard to adaptation, by 2020 the BAC will have made significant progress in identifying expected impacts through research policies that will culminate with the development and implementation of comprehensive impact monitoring and control networks. The public authorities will have developed a planning framework to ensure that all the different socio-economic elements can be brought together compatibly via preventive and corrective planning policies. There will also be a sufficient level of public awareness to ensure that people have taken on board their individual responsibilities in matters of health and safety, and that rapid action will be taken to deal with extreme situations such as flooding, heat waves, etc.

The long-term competitiveness of the BAC depends not only on the availability of certain resources and on excellence-based production methods and skills (which can easily be imitated), but also on "dynamic skills", i.e. the collective ability to tackle competitive challenges such as climate change by establishing one's own, specific path of development.

4.2 DIRECTIVES: THE 5 "I"s

The Basque Country has opted for a comprehensive strategy based on scientific and technological innovation, engaging the public, the integration of policies, the effective implementation of solutions and a continuous drive towards more ambitious targets.

The vision drawn up is inspired on the principles of sustainable development[50] and good governance[51] and translates into five directives to consolidate climate change policies in the BAC:

a) Technological and social **innovation** in forms of production and consumption.
b) Solidarity-based **involvement** of the public and of social and economic agents.
c) A common policy **integrated** into sectoral policies.
d) Effective **implementation.**
e) **Improvement** through the monitoring and setting of increasingly ambitious targets for the improvement of the Plan.

Present knowledge of the specific effects of climate change on the BAC is scant. It can be extended through various research and innovation schemes, the findings of which are more than likely to necessitate changes in the approach taken. For that reason the Plan is envisaged as being open in its

[49] Note that this objective is expressed in terms of Absorption Units generated, which limits the count of carbon sink effects to human-induced actions rather than including all variations in carbon levels as reflected in the inventory of GHGs & carbon sinks.

[50] Brussels, 25.5.2005 COM (2005) 218 final COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT. Draft Declaration on Guiding Principles for Sustainable Development

[51] Principles of good governance: openness, participation, responsibility, effectiveness & consistency. These principles are ultimately intended to generate, formulate and apply more efficient, more consistent policies that establish links between organisations in civil society and institutions

structure, as a continuous learning process with regular assessment and monitoring mechanisms to enable it to be continually reviewed and updated.

The driving force for change must be the solidarity-based engagement of the public (as the powerful executive arm of market forces) and the participation of all other social and economic agents. Information, education and awareness measures therefore have a major role to play in the implementation of the Plan. That engagement must take the form of social innovation in the ways in which people act, particularly as regards consumption and mobility.

The PVLCC is a plan that entails the integration of different sectors and co-ordination of different institutions. It also provides a way of factoring climate change policy into other plans and actions handled by the various departments of the Basque government and by provincial and local authorities. The PVLCC has been drawn up entirely by the Basque Climate Change Office, and the deployment of the relevant actions requires the various departments and authorities to factor these new challenges and values explicitly and firmly into their future plans and actions.

The Plan is not merely a declaration of principles: it strives for the effective implementation of actions. The need for immediate action has become increasingly clear from several studies and several agreed statements going back at last to the Johannesburg Summit on Sustainable Development. We need to move from words to deeds, and the public authorities must give clear signals to guide the market and promote innovation. Climate change must be a paradigm for the effective implementation of measures led by the public sector.

A key stage of the PVLCC is the monitoring of its management. On the basis of the knowledge obtained from the implementation of the measures envisaged and from the assessment of the results obtained, the Plan must not be seen as immovable but as a programme of work that can be reviewed and redirected according to a continuous assessment mechanism so that there is impetus for its improvement.

4.3 STRATEGIC OBJECTIVES TO 2012. THE URGENCY OF THE HERE AND NOW

The four strategic objectives (SOs) that underlie the PVLCC focus on reducing GHG emissions and adapting to the expected effects of climate change in the BAC:

SO1. Limit GHG emissions to no more than 14% above base year levels.

SO2. Increase the removal capability of carbon sinks to 1% of base year emissions.

SO3. Minimise risks to natural resources

SO4. Minimise risks to human health, to the quality of the urban environment and to socio-economic systems

The strategic objectives presented below in support of the vision can be grouped under two main headings: mitigation and adaptation. The first objective is to limit GHG emissions and establish an intermediate landmark in 2012 on the way to a socio-economic model that does not depend on carbon. There are two options: reducing GHG emissions and increasing the removal capability of

carbon sinks[52]. Secondly, we must seek to reduce vulnerability to climate change. This problem must also be tackled on two fronts: by minimising both risks regarding the availability and status of natural resources and risks to human health and social economic systems.

Top priority must now be given to mitigating climate change by reducing GHG emissions. The first strategic objective established under the PVLCC is to limit emissions from the BAC. This is not incompatible with the need to adapt to already inevitable impacts of climate change. Adapting quickly is ethically and financially preferable to not acting until later. But adapting does not mean that urgent action to reduce emissions is no longer necessary. Adaptation must not be a substitute but rather a companion for mitigation in any coherent, ambitious policy for dealing with climate change.

STRATEGIC OBJECTIVE 1.- *Limit GHG emissions to 14% more than base year levels*.

The method used to determine the emissions limit for the BAC is that used by the European Commission[53] in distributing the target of 8% for emission reductions said in the Kyoto protocol between its member countries. This method divides the economy of each country into three sectors: the electricity generation industry, energy-intensive industry and the rest (all the diffuse emissions sectors, known jointly as the domestic sector).

When the method is applied to the BAC, taking specific criteria into account, a figure for emissions from each of these sectors is obtained. For the electricity sector a reduction in emissions is established (based on maximum growth in electricity production, on the weight of renewables in the mix and on the energy mix as a whole), while for the energy intensive sector (based on maximum forecast growth, improvements in energy efficiency and the energy mix) and for the domestic sector (based on population growth trends and convergence towards average per capita emission levels for the EU as a whole) an increase is permitted.

Under this method the overall objective for the BAC is obtained by adding together the sectoral objectives and applying a correction factor equivalent to the figure obtained by Spain in negotiations with the European Commission. On this basis, the ultimate objective for the BAC is set at 14% above the base year figure as the average for the fulfilment period of 2008-2012 (See Table 14).

Table 14: Targets & guidelines for reduction: EU, Spain & the Basque Country

Situation & emission targets compared to base year		
	Situation	**Kyoto targets 2008-2012**
EU-15 (2005)	-2 %	-8 %

52 To comply with the emission reduction targets established in this international standard, states can resort to both internal measures and other options (basically the purchase of units from other states or carbon credits). The intention is to attain mitigation targets by applying measures that entail an effective reduction in emissions of GHGs in the BAC, with only supplementary recourse to the flexible mechanisms permitted by the international community.

53 See Blok, K. & G.J.M. Phylipsen, *Common European Community Policies and Measures for Greenhouse Gas Emission Limitation and Reduction*, 1996, and Blok, K., G.J.M. Phylipsen & J.W. Bode, *The Triptych Approach: Burden Differentiation of CO2 Emission Reductions among European Community Member States*, University of Utrecht, The Netherlands,. The application for the Basque Country has been drawn up by Metroeconómica Ltd. for the Basque Government.

SPAIN (2006)	48.1 %	+15 %
BASQUE COUNTRY (2006)	21.9 %	+ 14 %

Inventories reveal that emissions from the BAC in 2006 totalled 25.5 Mt, 21.9% higher than the base year figure, and that further increases can be expected in the coming years. To meet the strategic objective of not exceeding a 14% increase on the base year figure, the PVLCC establishes three lines of action involving specific measures in each sector: savings and efficiency, encouragement of renewables and the reduction of emissions not from energy production.

The PVLCC gives a major role to public involvement in order to heighten awareness in society as a whole of the effects of consumption-based patterns of behaviour on GHG emissions, and a specific objective is set in that regard. To meet this objective of mitigating emissions in the BAC, domestic emissions[54] should not exceed 2.6 t CO2e/per inhabitant per year averaged over the period 2008-2012[55].

STRATEGIC OBJECTIVE 2.- *Increase the removal capability of carbon sinks to 1% of base year emissions***.**

The first inventory of carbon sinks, conducted in 2005, revealed that in that year the BAC constituted a net carbon sink of 1.33 Mt CO_2, equivalent to 6.35% of base year emissions, which confirms the efforts being made by the Basque public authorities in this area and the importance of the carbon sinks already achieved in absolute terms.

However, as indicated above, not all removals count for the generation of AUs. In setting targets for removal by carbon sinks, the following activities were taken into account (apart from forestry reforestation and deforestation, which must be counted compulsorily):

a. **Forestry land management.** The potential for generating AUs was estimated on the basis of the new surface areas of forestry created since 1990 (whose contribution to the strategic objective is 53%), the expected effect of aid already approved for 2007-2013 for the sustainable fertilisation of forestry plantations (10% of the objective) and new measures which will help to increase the effect of carbon sinks in the silviculture sector (17% of the objective).
b. **Agricultural land management.** It is estimated that gradual improvements will be made on 40,000 ha (11% of the objective).
c. **Grazing land management** It is estimated that gradual improvements will be made on 30,000 ha (9% of the objective).

The AUs proposed in the objective will total 223,163 Tm CO_2, equivalent to 1.07% of base year emissions.

[54] The end consumer is indirectly responsible for emissions produced during the manufacture of products and the provision of services, and can thus be considered as ultimately responsible for all emissions. The indicator for "emissions per capita" reflects that responsibility. For the BAC the figure in 2006 was 11.9 t CO_2e per capita per annum. However, for practical purposes the "domestic emissions" indicator represents emissions from domestic consumption of electricity and fuel, private vehicle use and the production of MSW, making them the direct result of the behaviour of each individual.

[55] In 2003 domestic emissions totalled 2.45 t CO2e per capita per annum.

STRATEGIC OBJECTIVE 3.- Minimise risks to natural resources

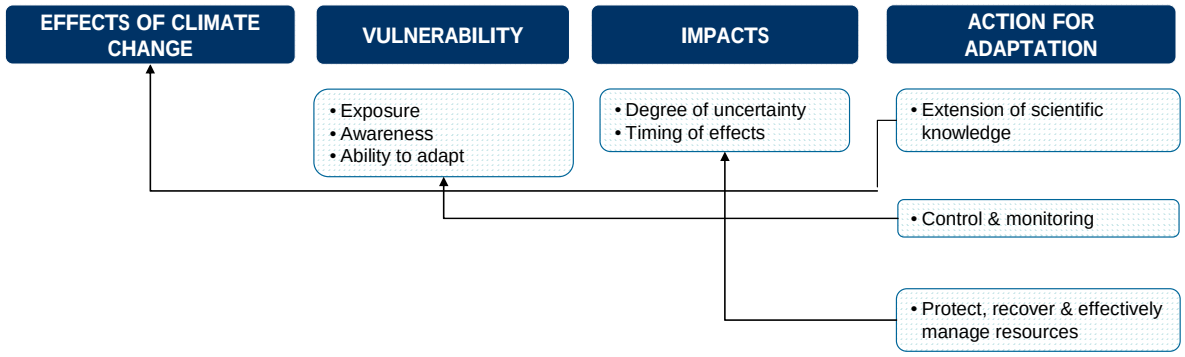
The climate change associated with GHGs emissions will inevitably affect natural systems and their associated resources in the BAC. The extent of that affect will be directly linked to how vulnerable they are and to the scale of the climate change involved.

To determine how vulnerable natural systems are to climate change, a working method has been developed based on prioritising impacts by applying expert filtering criteria based on the uncertainty and timing associated with its effects.

This prioritisation exercise reveals that the main impacts are likely to be associated with loss of biodiversity and health of ecosystems, and with a drop in the quality of water and soil resources (linked to erosion and to a loss of soil fertility and properties in line with carbon content). However, the information available is clearly not yet sufficient for it to play its role as a critical factor in correct decision-making.

Given that the overall objective for the BAC is to minimise all possible risks associated with natural systems, further action will be required on three fronts: identifying and predicting effects by extending scientific knowledge, intensifying control and monitoring to assess and determine vulnerability and risks, and finally preventing effects by taking specific protection and recovery actions and managing natural resources effectively.

Figure 10: Stages of implementation of actions to adapt to climate change



STRATEGIC OBJECTIVE 4.- Minimise Risks to human health, to the quality of the urban environment and to socio-economic systems

The method used to guarantee the adaptation of social and economic systems to the effects of climate change is the same one described above, based on identifying critical aspects from a prioritisation exercise that assesses the degree of uncertainty, the timing and the ability to act.

This analysis has given rise to a clear conclusion: our current territorial structure is vulnerable to climate change. Planning directives and the socio-economic agents associated with them must interpret the new scenario emerging from changes in climate conditions. The commitments that must be acquired by the public authorities and the various socio-economic sectors are established in such a way as to ensure the integrity of the various energy, coastal and transport infrastructures (affected by extreme weather such as increased flooding, wind and waves), the suitability of the

various health services (which will have to deal with more patients affected by heat waves, respiratory problems and emergencies), the maintenance or improvement of productivity in the primary sector and the development of new urban models compatible with the new climate situation.

Our society and our economy include a wide variety of elements and sectors, but our common aim is to ensure adaptation and minimise risks. As in the case of natural resources, if we are to achieve this then action must be taken on three major fronts: identifying and predicting effects by generating scientific & technical knowledge to assess and determine vulnerability and risks; preventing effects via adaptation of land use management and planning instruments; and early adoption of preventive and protective measures in regard to infrastructures and urban areas (particularly buildings).

4.4 PROGRAMMES & LINES OF ACTION

Attaining the strategic objectives established in the PVLCC requires an integrated, co-ordinated response on the part of all the public authorities and social agents involved in the struggle against climate change. To that end, the PVLCC centres on four programmes that provide an extensive, detailed, across-the-board strategy for tackling emission reduction and carbon removal, adaptation to the effects of climate change, the need to extend technical and scientific knowledge, and at the same time stresses the role of education and the need for the engagement of the public.

The vision and the strategic objectives set out in the Plan propose innovations in forms of production and consumption, the involvement of all public administrations, social and economic agents. To achieve this, an integrated plan is needed to bring together all the different actions that need to be taken by the different departments and sectors responsible. Effective collegiate management systems must be made available to enable effective action to be taken for the implementation of the Plan via a clearly defined and agreed route map.

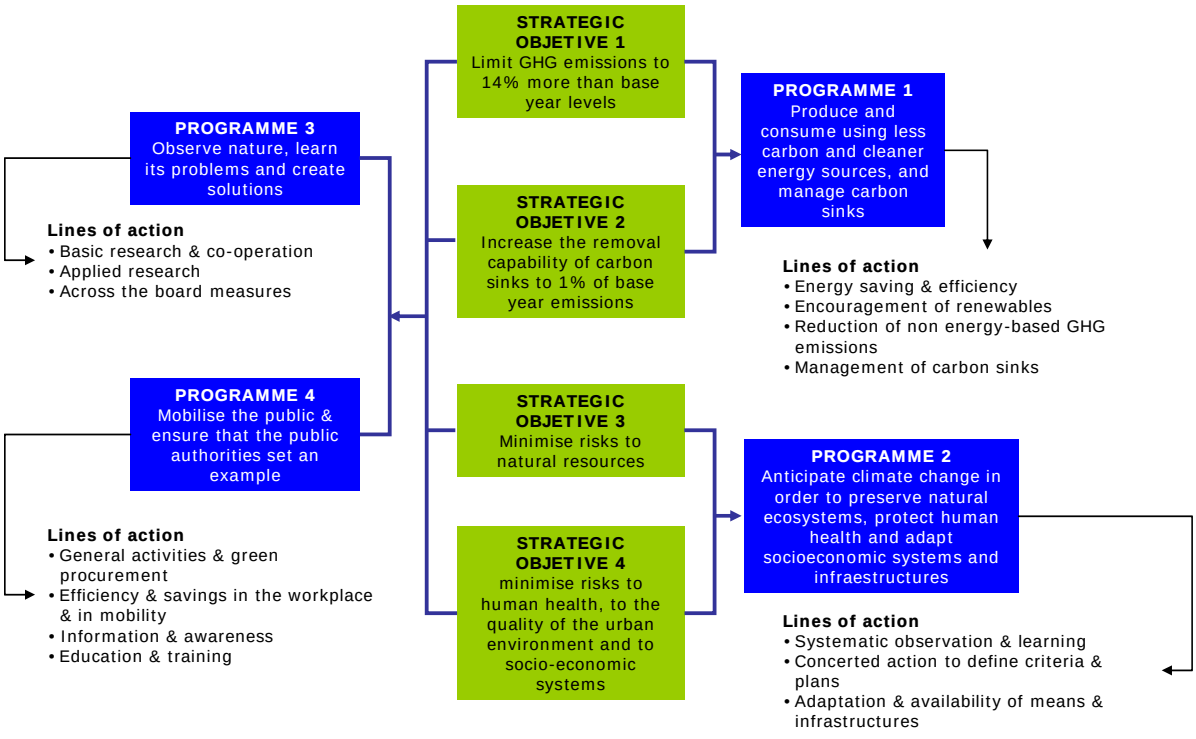
The Plan centres on four major programmes that set out and deploy its strategic objectives (see Figure 11). Each programme is structured along quantified, traceable lines of action to enable the Plan to be monitored and integrated into sectoral policies.

The four programmes of the PVLCC are:

- A sectoral programme intended to further emission reductions and carbon removal in order to produce and consume using less carbon and cleaner energy sources, and to manage carbon sinks. This programme is intended to deploy strategic objectives 1 and 2, and it centres on the sectors that cause emissions (energy: electricity generation and imports, industry, transport, residential and services, agriculture and forestry and waste management). The lines of action laid down include energy efficiency and savings, encouragement of renewables, reduction of non-energy-related emissions and the management of carbon sinks.

- A programme to anticipate climate change in order to preserve natural ecosystems, protect human health and adapt socioeconomic systems and infrastructures. This programme seeks to implement strategic objectives 3 and 4, and tackles the prevention of the impact of climate change from the sectoral perspectives of natural systems, human health, the urban environment and economic activities via three lines of action entailing observation and learning, with a view to joint action by public authorities to lay down criteria and plan the adaptation of means and infrastructures.
- A programme for the development of scientific, technical and social knowledge with a view to observing nature, learning its problems and creating solutions. If the strategic objectives are to be attained, we need a sound scientific and technological base from which innovation can be disseminated and transferred throughout the chain of production and into patterns of behaviour and consumption in society. The programme also seeks to further our knowledge of the scale and effects of climate change. The associated lines of action entail promotion of basic research, applied research and across-the-board aspects required to provide support for the programme.
- A programme for mobilising the public and ensuring that the public authorities set an example. This covers action aimed at the general public with a view to spurring them to action in those areas in which they are the direct or indirect cause of emissions. The Basque public authorities must be seen as leading by example in all this. The actions to be taken can be grouped under three headings: the Basque government, local authorities and the general public. Four lines of action are envisaged, centred on the actions of the public authorities in general and public procurement in particular, energy efficiency and savings, education and training and public awareness and information.

Figure 11: Strategic objectives, programmes & lines of action



5. IMPLEMENTATION OF THE PLAN: PROGRAMMES

Some of the actions deployed under the four programmes and the corresponding lines of action include milestones to be achieved on the way to 2012.

5.1 PROGRAMME 1: LESS CARBON. "PRODUCE AND CONSUME USING LESS CARBON AND CLEANER ENERGY SOURCES, AND MANAGE CARBON SINKS"

In line with strategic objectives 1 & 2 to reduce emissions and fix carbon, this programme involves action in six sectors: energy (electricity generation and imports); industry; transport; residential and services; agriculture and forestry; and waste. The actions proposed under the programme are grouped into four main lines to facilitate their management and ensure greater consistency. Those lines are: efficient energy generation, encouragement of renewables, reduction of non-energy-related GHG emissions and management of carbon sinks. The table below shows the lines of action and the sectors in which actions have been established. However, some actions in accordance with this table could fit into other lines which are not shown here for the sake of simplicity, e.g. action 8 could have formed part of the "renewables" line in industry, and action 37 in the agriculture sector could have been placed in a "savings and efficiency" line.

PROGRAMME 1						
SECTOR / LINE	ENERGY	INDUSTRY	TRANSPORT	RESIDENTIAL SERVICES	AGRICULTURE	WASTE
Savings & efficiency						
Renewables						
Non energy emissions						
Carbon sinks						

ENERGY (INTERNAL & EXTERNAL ELECTRICITY GENERATION)

This sector includes emissions arising from electricity generation, which account for around 70% of the total, but also emissions from refineries and coke plants in the BAC. These latter emissions have shown improvements over the period in question, so the efforts of this Plan in regard to the energy sector are concentrated on the electricity generation subsector.

The demand for electricity in the BAC increased by 65% from 1990 to 2006. Emissions from electricity production, including those from electricity imports, increased by 47% over the same period. This means that carbon intensity in electricity generation has improved, but not enough to bring about a reduction of emissions in absolute terms.

Energy	Base year	2006	Trend
Emissions from the energy sector (Mt CO_2e)	2.9	8.7	+198%
Emissions from electricity imports (Mt CO_2e)	4.9	2.6	-48%
Total emissions from energy	7.8	11.2	+44%
% of total emissions	37%	44%	

Lines of Action

Efficient energy generation

The goal is for all the thermal electricity output of the BAC to be produced by natural-gas-fired combined cycle plants. The energy from these plants replaces that generated by other plants outside the BAC, so losses in transit are avoided. It is also proposed that 14% of electricity should be supplied via combined heat and power (CHP) plants.

Encouragement of renewables

in 2006 renewable sources provided 4.5% of the BAC's electricity output. The goal is to meet 15% of electricity demand via such sources by 2010. Efforts are to be based fundamentally on wind power, in which a five-fold increase in installed capacity is envisaged. Energy from biomass also has a significant role to play, as do solar power and other energy sources still under development.

Action Nº	LINE: ENERGY SAVINGS & EFFICIENCY
1.	Develop instruments to encourage CHP until the capacity installed reaches 514 MW
2.	Promote more efficient electricity generation with lower emissions by replacing conventional thermal electricity generation by gas-fired combined cycle plants
Action Nº	**LINE: ENCOURAGEMENT OF RENEWABLES**
3.	Develop the BAC's wind power potential to an installed capacity of at least 625 MW
4.	Develop the biomass energy potential of the BAC as far as possible[56] up to an electricity output of at least 190 MW
5.	Strengthen support for solar power as a source of electricity production until installed capacity reaches at least 10.7 MW
6.	Support hydro-electric power to achieve an installed capacity of at least 175 MW
7.	Promote the development of new technologies involving renewables & assess potential (offshore wind farms, geothermal energy, etc.). Achieve an installed capacity of at least 5 MW from wave power

Basque Govt. departments & local authorities involved : DAPA & DICT

[56] See Programme 1. Farming & Forestry Sector

INDUSTRY

In 2006 industry accounted for 19% of the GHG emissions from the BAC. This figure is 32% below the base year emission level.

Industry	Base year	2006	Trend
Emission (Mt CO_2e)	7.3	5.0	-32%
% of total emissions	35%	20%	

GHG emissions from industry can originate in two ways: from combustion processes and from production processes that use raw materials containing carbon, nitrogen or fluorine. This sector is also a major electricity consumer, though the emissions from that consumption are already accounted for under the energy sector, so the latter will therefore also benefit from measures to improve energy efficiency in industry.

Lines of Action

Energy savings & efficiency

This strategic line seeks to achieve savings by 2010 of 583 ktoe on 2001 figures for industry, by encouraging schemes to promote energy efficiency and alternative energy sources such as biomass, by establishing an industrial GHG register, etc.

Reduction of non energy-related GHG emissions

The measures under this strategic line are aimed at reducing GHG emissions associated with industrial production processes, in which fluorinated gases play a significant part. The goal is to achieve reductions in industry by 2012 totalling 89% of 2005 emission levels.

Action Nº	LINE: SAVINGS & EFFICIENCY IN PROCESSES
8.	Reinforce measures to encourage energy efficiency in industry via programmes of technical assistance, training & awareness, dissemination, promotion of investments & use of renewables
9.	Foster the effective implementation of the technologies on the Basque List of Clean Technologies.
10.	Facilitate the implementation of the future demands of the EuP Directive in affected product groups that consume energy in industry. Have 50% of Basque companies that make products affected by the Directive certified under the UNE 150301 eco-design standard
11.	Encourage the use of alternative fuels in industrial processes
12.	Create & operate a system or tool to allow the registration & reduction of GHG emissions from industry.

Action Nº	LINE: REDUCTION OF NON ENERGY-RELATED GHG EMISSIONS
13.	Strengthen measures to reduce emissions of fluorinated gases via regulatory measures & support for investment to achieve an 89% reduction in emissions on 2005 levels.
14.	Promote a voluntary agreement to eliminate SF_6 emissions from electricity transformer stations.
15.	Encourage the replacement of raw materials by low-carbon secondary raw materials. Increase the use of white slag as a raw material by 36% on 2005 levels[57]

Basque Govt. departments & local authorities involved : DICT & DMAOT

TRANSPORT

Emissions from the transport sector are up by 109% on the base year. In 2006 this sector accounted for 22% of total GHG emissions, making it the second biggest contributor in the BAC.

Transport	Base year	2006	Trend
Emission (Mt CO_2e)	2.7	5.6	+109%
% of total emissions	13%	22%	

It is therefore a strategic sector for the struggle against climate change, as the trend in its emissions is one of sustained growth.

The key determinant factors in emissions from this sector are:

- the need to transport people and freight (500,575 passengers and 585,717 t of freight per day are carried in the BAC);
- the means of transport chosen (there are 889,109 cars, 174,891 lorries and vans and 2,809 buses registered in the BAC);
- vehicle efficiency (the average emission level from vehicles in the BAC in 2005 was 170.31 g CO_2/km.)[58];
- distance, vehicle occupation and through traffic.

Lines of Action

Energy savings & efficiency

This line features actions aimed at improving transport efficiency in terms of CO_2 emissions by 21% on 2005 figures by 2012. To that end, intermodal transport must be encouraged, with a higher profile for public transport (rail) and encouragement for means of transport that do not emit CO2, such as bicycles, and a reduction of individual mobility needs through land use management instruments. Rail infrastructures will need to be adapted and extended.

Encouragement of renewables

Bio-fuels provide a clear means of reducing emissions from this sector. The availability of such fuels must be increased so that by 2012 consumption is 177 ktoe. Regulatory instruments also need to be developed that can gradually send signals to the market. This strategy of using bio-fuel should be based mainly on the growing of energy crops in the BAC.

[57] Increasing from the 77,000 t of 2005 to 105,000 t in 2012

[58] La European Automobile Association signed a voluntary agreement under which CO_2 are to be reduced by 2008 to 140g CO_2/km. This agreement will be hard to fulfil, as emissions in 1995 totalled 186 g CO_2/km and in 2004 they had dropped only to 163 g CO_2/km

Action Nº	LINE: SAVINGS & EFFICIENCY IN MEANS & USE OF TRANSPORT

16. Review PTPs & PTSs including criteria and standards:
    - for the encouragement of non-motorised mobility and public transport (promotion, drawing up and processing of PTSs for cycle paths as a means of transport to reduce CO2 emissions over and above leisure use)
    - that are compulsory for the departments involved in transport and encourage emission reductions
    - that are compulsory for municipal planning departments and help them adapt to climate change by enabling a more sustainable culture of mobility to be implemented in our territory
17. Issue land use planning directives whose criteria encourage:
    - "concentrated, resource-diverse" urban planning models less dependent on the use of transport for mobility.
    - territorial balance between residential uses and economic activities as a factor for reducing mobility and thus reducing emissions
18. Optimise the supply and management of public and private collective transport systems for freight and passengers:
    - Optimise the use of means of transport in general
19. Create infrastructures for the use of public transport:
    - create and/or extend tramway/metro networks
    - extend public transport lines
    - subsidise short sea shipping
    - promote measures such as "Eusko Car Sharing"
20. Plan and develop tools as follows:
    - presentation by the transport authorities to look into methods for calculating the contribution to transport sustainability of transport planning instruments and land use management affecting transport
    - development of a master plan for cycle paths in the BAC.
    - development of mobility regulations
21. Encourage traffic charges in cities via prior agreements with interested municipal councils.
22. Develop and implement traffic management plans (to be implemented by the CGTE - Basque Traffic Management Centre) to reduce tailbacks and hold-ups and thus reduce emissions from vehicles.

Action Nº	LINE: ENCOURAGEMENT OF RENEWABLES (BIO-FUELS)

23. Encourage the use of bio diesel and other bio-fuels through voluntary development agreements with manufacturers and distributors of bio-fuel to facilitate access for users
24. Use legislation and taxation measures to encourage the use of bio-fuels.

Basque Govt. departments & local authorities involved : DICT, provincial councils, DMAOT, DTOP & municipal councils

RESIDENTIAL & SERVICES

Emissions from the residential sector have increased by 24% since 1990 and those from services have increased by 74%, although their overall share of annual emissions has remained the same at around 4% of the total. The increase in emissions recorded is due largely to higher natural gas consumption and to increased use of fluorinated gases in refrigerators, air-conditioning units and fire extinguishers.

Residential & services	Base year	2006	Trend
Emissions from residential sector (Mt CO_2)	0.6	0.8	+24%
Emissions from service sector (Mt CO_2)	0.2	0.4	+74%
% of total emissions	4%	4%	

Lines of Action

Energy savings & efficiency

The main purpose of this line up to 2010 is to obtain a reduction of 58 ktoe on 2001 figures for the residential and services sectors. To achieve this, sustainable building criteria need to be applied in new housing through the implementation of best practices and certification systems and by factoring climate change criteria into renovation work on existing buildings, e.g. improvements in installations. The use of climate control systems in housing and other buildings needs to be optimised, and consumption of electricity and fuel needs to be minimised.

Encouragement of renewables

Renewable energy sources such as solar and biomass power are to be encouraged in housing and other buildings. Specifically, the target set for 2010 is to install 152,000 m^2 of solar heating panels.

Action Nº	LINE: SAVINGS & EFFICIENCY
25.	Develop promotion and monitoring measures in the BAC in line with the Technical Building Code
26.	Implement a certification scheme for housing: • develop regulations for sustainability certification • develop existing legislation in the BAC on energy efficiency certification and apply it to housing • energy certification of all new housing (new energy certificate) • promotion of the use of new materials (including secondary raw materials and the proactive application of regulations on construction and demolition waste) and design of buildings from the viewpoint of energy (improvements in walls, insulation, reduction of losses in distribution)
27.	Support solar heating energy to install at least 152,000 m^2 of panels.
28.	Promote and provide financial support for: • the application of the "Guide to Sustainability for Housing" • the construction of residential buildings that generate energy or feature very low energy consumption. • Category A energy-certified new housing • rehabilitation of housing with large-scale energy reductions, renovations in buildings that result in greater energy savings, rehabilitation of the heat insulation shell of existing buildings and improve energy efficiency in heating installations
29.	Encourage the use of more energy-efficient equipment at domestic level by providing subsidies for the replacement of domestic appliances, lamps and heat generating equipment by units with higher performance or higher-category energy certificates that use fuels that emit less CO_2
30.	Promote voluntary agreements between agents in the sector for the effective implementation of construction with low CO2 emissions throughout building life cycles.
31.	Provide lines for the application of UNE standard 150.301 on eco-design in new-built housing to reduce residential energy consumption – (Eraikal programme)
32.	Plan and draw up tools: • to factor in high energy efficiency criteria based on performing, analysing and monitoring pilot schemes • to draw up cost/efficiency analyses of building rehabilitation measures for inclusion in housing rehabilitation orders
Action Nº	**LINE: ENCOURAGEMENT OF RENEWABLES**
33.	Include the fostering of renewables (solar heating panels, heat accumulation systems, etc.) for generating energy in buildings themselves.

Basque Govt. departments & local authorities involved: DICT, DMAOT & DVAS,

AGRICULTURE & FORESTRY

Agriculture	Base year	2006	Trend
Emissions (Mt CO_2e)	1.1	1.2	+11%
% of total emissions	5%	5%	

The agricultural sector (which breaks down into the subsectors of livestock, farming and forestry) acts on the one hand as an emitter of CO_2, CH_4 and N_2O but on the other hand as a carbon sink in terms of both biomass and soil. The trend in emissions from this sector is upward, though the figures have changed very little in recent years.

In terms of GHG emissions, the agriculture sector acted as a carbon sink for a net amount of 1.33 Mt CO_2 in 2005.

Lines of Action

Encouragement of renewables

This line envisages actions to encourage the use of agricultural and forestry biomass as fuel to generate heat and electricity and the production of bio-fuels to help achieve the targets set for the energy and transport sectors.

Reduction of non energy-related GHG emissions

This line of action seeks to reduce methane emissions from intensive livestock farming by 120,000 t per annum by using the gas to produce energy in waste management plants.

Management of carbon sinks

This line seeks to maintain existing carbon sinks and increase carbon absorption in the different subsectors (forestry, farming and grazing land) to the equivalent of 1% of base year emissions.

Action Nº	LINE: ENCOURAGEMENT OF RENEWABLES
34.	Make use of biomass from wood processing (pellets) • Extend lines of subsidy for installation of boilers that can use pellets as fuel • Support the creation of medium-to-large pellet production plants • Support the establishment of a logistical system for pellet transportation • Encourage agreements by governing boards of natural parks for the use of pellets as renewable energy sources • Analyse the technical & financial viability of providing small towns & villages with centralised heating & hot water networks fuelled by pellets & biomass
35.	Make use of biomass[59]: • Promote and subsidise the creation of a biomass plant based on products of agricultural origin • Analyse the viability of a biomass plant based on forestry waste: - Disseminate and promote the participation of the forestry sector. - Establish management models and financial support instruments for such projects. - Draw up a manual of best practices
36.	Support and promote the planting of beet in Araba as a source of bio-fuel and in support of the construction of a plant to produce concentrates for the production of bio-ethanol
37.	Draw up energy efficiency plans and subsidy lines aimed at the fishing fleet and at farmers

[59] See Energy Sector

Action Nº	LINE: REDUCTION OF NON ENERGY-RELATED GHG EMISSIONS

38. Improve the management and use for energy purposes of liquid manures:
    - promote and support the construction of a liquid manure management plant in the Karranza Valley (reduction of GHGs to the tune of 90,000 t of $C0_2e$ per annum)
    - draw up a liquid manure management model for Gipuzkoa and provide encouragement and support for the establishment of an anaerobic digestion plant.
    - draw up a liquid manure management model for Araba and provide encouragement and support for the establishment of an anaerobic digestion plant
    - promote the joint management of liquid manures and other organic materials of rural and urban origin

Action Nº	LINE: MANAGEMENT OF CARBON SINKS

39. Promote afforestation actions to create a further 2000 ha of woodland by 2012.

40. Monitor trends in organic carbon present in the soil.

41. Promote construction based on greater use of renewable materials such as wood:
    - draw up a study of renewable construction materials
    - stage a communication campaign

42. Improve fire prevention programmes, including application of administrative regulations for sanctions.

43. Update planning instruments so as to:
    - incorporate guidelines for protection and afforestation in areas classed as open spaces on the different scales into PTPs ("Partial Territorial Plans") and municipal planning
    - promote, draw up and process an agriculture and forestry PTS envisaging the construction of facilities to make use of forestry, livestock and agricultural waste and areas for afforestation
    - incorporate guidelines for the protection of soft surface areas within towns and villages in line with their environmental value and for adaptation to climate change

44. Draw up new lines of subsidies for actions to increase carbon absorption:
    - farmland and grazing land (improve organic carbon levels in the soil on at least 30,000 ha of grazing land and 40,000 ha of agricultural land compared to 1990 figures)
    - in the field of forestry management, increase the surface area of wood land sustainably fertilised by 40,000 ha and replant 5,000 ha without machines.

Basque Govt. departments & local authorities involved : DAPA, DICT, provincial councils & DMAOT

WASTE MANAGEMENT

Waste	Base year	2006	Trend
Emissions (Mt CO_2e)	1.2	1.3	+10%
% of total emissions	6%	5%	

Emissions from the waste sector accounted for 5% of the total in the BAC in 2006, amounting to 1.3 Mt CO_2e. Only a slight increase on the figures for the base year is observed in emissions from this sector, in spite of a larger increase in the quantity of MSW produced (+24.5%). This follows a drop in methane emissions thanks to increased recycling, energy valorisation and landfill gas recovery.

Management of MSW covers all activities concerned with the collection, treatment and safe disposal of urban waste, and all the technologies and instruments applied to that end.

The main source of GHG emissions from this sector is the disposal of biodegradable MSW in landfills and the incineration of plastic waste. The critical factors that condition trends are the amount of refuse generated, its composition and the policies adopted for its recovery and valorisation.

Reducing emissions from this sector therefore depends on finding the optimum combination of different management options for waste streams, and on promoting policies to prevent waste from being produced.

Lines of Action

Reduction of non-energy GHG emissions

this line of action seeks to stabilise per capita MSW generation at 539 kg per annum by 2012 and to design programmes to encourage the minimisation, reuse and recycling of waste so that less than 40% of MSW is landfilled. At the same time encouragement will be given for the setting up of infrastructures for recycling and improving the use of biogas from landfills.

Action Nº	LINE: REDUCTION OF NON ENERGY-RELATED GHG EMISSIONS
45.	Promote planning actions: • plans for general planning compatibility that regulate the implementation of MSW collection systems, grouping together neighbouring municipalities which lack sufficient means due to their small size or population
46.	Draw up a co-ordinated awareness strategy for the BAC, particularly as regards the collection of organic refuse and plastic packaging.
47.	Design and implement a joint programme for prevention in the BAC that includes: • the use of waste prevention and minimisation criteria in public sector contracts • the setting of minimum targets for packaging waste prevention.
48.	Use instruments and/or agreements with those sectors of the private market that have a major influence on MSW production so as to reduce production and optimise management.
49.	Promote treatment infrastructures in accordance with prevention and valorisation policies. Reduce the amount of biodegradable waste landfilled to 40% of the total biodegradable MSW produced in 1995.
50.	Guarantee maximum collection for energy purposes of biogas from waste in landfills, and burning off as a last resort.

Departments & authorities involved: municipal councils, DICT, provincial councils & DMAOT

5.2 PROGRAMME 2: ANTICIPATION. "ANTICIPATING CLIMATE CHANGE IN ORDER TO PRESERVE NATURAL ECOSYSTEMS, PROTECT HUMAN HEALTH AND ADAPT SOCIO-ECONOMIC INFRASTRUCTURES AND SYSTEMS"

The adaptation measures required in the BAC are based on an analysis of impacts expected to arise from climate change on variables such as rainfall, temperature and marine parameters (rising sea level, wave force, wave direction, etc.).

Table 15 shows the priority areas for adaptation in the BAC from the twofold perspective of significant impact (according to the degree of certainty and proximity[60]) and capability for action[61] to optimise the available human and financial resources. Leaving aside coastal areas, where the

[60] Estimated by selecting the most significant sectoral impacts. Each one was then assessed in terms of the associated degree of uncertainty (high, medium or low) and the time-frame of the effect (long-term, medium-term or immediate).

[61] All those sectors and impacts that may be priority matters from the viewpoint of vulnerability but offer no real opportunities for adaptation through human intervention are implicitly relegated to a secondary level.

main impacts result from a rise in sea level and increased wave force, most of the impacts identified are directly linked to changes in temperature and rainfall.

Table 15. PRIORITY SYSTEMS AND AREAS FOR ACTION ACCORDING TO IMPACTS ENVISAGED BY 2050[62]

SECTOR	SIGNIFICANT IMPACTS	DEGREE OF UNCERTAINTY [HIGH (A), MEDIUM (M), LOW (B)]	WHEN EFFECTS ARE FELT [LONG TERM (L), MEDIUM TERM (M), IMMEDIATELY (I)]	CAPABILITY FOR ACTION [HIGH (A), MEDIUM (M), LOW (B)]
Water resources	Worsening of water balance (more evapotranspiration)	B	M	M
Agriculture (farming & livestock)	More water required to maintain yields	B	M	A
Coastal areas[63]	Rise in flood levels of 20-25 cm	B	M	M
	Receding of coastline (11-13 m) & change in flow directions (further 0-20 m)	B	M	M
	Loss of beaches due to sea-level rise (confined beaches) & changes in transport (open beaches, though there are few)	B	M	M
	Waves reaching beyond seaside constructions (100-200% increase)	B	M	A
	Reduced stability of sea-walls	B	M	A
Marine ecosystems & fisheries sector	Appearance of tropical & subtropical species due to shifts in bio-geographical limits	M	I	B
Mountain areas & soil resources	More breakdown of organic carbon by microbial action & carbon loss (> 20 kgC/m^2)	B	M	M
Human health	More acute respiratory episodes (associated with greater atmospheric pollution & hay fever)	B	M	M
Urban planning & construction	Danger to infrastructures & buildings in areas at risk from floods, landslides & forest fires	M	I	A
Energy	Changes in energy demand	B	I	A

The programme responds to the need for an in-depth analysis of how to prevent the impacts of climate change in three sectoral areas - natural systems, human health and socioeconomic systems - seeking to minimise the risks associated with their vulnerability. The first sector includes actions concerned with water and soil resources and ecosystems in terms of both diversity and health. The second is concerned with protecting human health and the physical integrity of people by safeguarding their habitat, the urban environment. The third sector covers actions to prevent climate change from affecting economic activities, particularly in the primary sector.

The response envisaged in all cases involves minimising the uncertainty associated with impacts and assuring planning that includes and protects the future management of natural resources, infrastructures and services against a backdrop of climate change. In all three sectors, common lines of action are proposed: systematic observation & learning, concerted action to lay down criteria and plans and adaptation & availability of means and infrastructures.

[62] The priority sectors in terms of vulnerability are considered to be those in which the following conditions are all met: low or medium uncertainty and immediate or medium-term time-frame of the effect (estimates obtained from criteria derived from an expert working group)
[63] Impacts envisaged by 2050.

PROGRAMME 2			
SECTOR / LINE	NATURAL SYSTEMS	HEALTH & URBAN ENVIR.	ECONOMIC ACTIVITIES
Observation & learning			
Planning			
Adaptation			

NATURAL SYSTEMS

In regard to water resources, total demand for consumption in 2001 was 382.27 Hm^3, of which 34.94 Hm^3 was for agricultural use and 91.08 Hm^3 for industrial use. At 65% of the total, urban consumption thus clearly accounts for the bulk of demand.

The two baseline scenarios examined put increases in water demand at between 6.01% and 18.74%. For the upper limit of that spread to be reached, all planned industrial estates would have to be fully occupied and all the irrigation schemes included in the most ambitious plans would have to go ahead. Other equally significant impacts include greater variability of water resources and greater difficulty in dealing with periods of prolonged drought, potential drops in the quality of resources (as flow rates drop, so contaminant loads increase) and increases in water demand.

The most likely impact associated with soil resources is the loss of organic carbon (6-7% on average for each degree Celsius of temperature increase), and thus of soil fertility and macro-nutrient availability.

In regard to biodiversity and ecosystems, 20.31% of the total surface area of the BAC is included in the Natura 2000 network, with 52 areas classed as Sites of Community Importance (SCIs), 5 as Special Protection Areas (SPAs) and 1 as a Special Area of Conservation (SAC). 10% of the total surface area forms part of the Network of Special Protected Areas, and there are 9 natural parks and 5 protected biotopes. The authorities are aware of the natural and environmental value of wetlands, and have made great efforts to protect and maintain them and to recover wetlands that had been lost. The BAC currently has six areas of wetland on the RAMSAR list: Urdaibai and Txingudi (on the coast) and Lagunas de Laguardia, Colas del embalse de Ullibarri-Gamboa, Salburua and Salinas de Añana-Lago de Caicedo (inland).

The main expected impacts on ecosystems are changes in migration and breeding times, extensions of the bio-geographical limits of species, greater vulnerability to adverse conditions, changes in population, increased risk of fire, changes in the altitude at which species are found, particularly great vulnerability among species associated with wet environments such as amphibians and water insects, effects on wetlands (with coastal wetlands such as Urdaibai and Txingudi being particularly sensitive), changes in the distribution of fish populations (shifting northward or to greater depths), increases in the biomass of certain species of algae due to higher water temperatures and wave force, etc.

The lines of action proposed in this area are the following:

Lines of Action

Systematic observation & learning

This line involves observing the effects of climate change on various natural systems and following mayor ongoing research in this area. It entails monitoring and co-ordination actions to ensure that species which can be used as indicators of climate change and the extent of its effects are identified and watched.

Definition of criteria & planning

This line seeks to take into account future impacts through proper planning and management. To that end it is intended to update planning directives involving natural resources and the instruments for managing them so as to factor in climate change adaptation considerations.

Adaptation & availability of means

The purpose of this line of action is to strengthen the various elements that make up natural systems. It will therefore include actions to mitigate the effects of climate change on the most vulnerable ecosystems in the BAC.

Action Nº	LINE: OBSERVATION & LEARNING
51.	Develop lines of work aimed at extending knowledge: • effects of climate change on ecosystems and on animal and plant species, prioritising those whose location, sensitivity or conservation status places them at most risk • ecosystems and species whose location, sensitivity or conservation status lead to them being considered as particularly vulnerable, with assessment of their potential for use as indicators of the effects of climate change • methods for the proper assessment of the impact of climate change on biodiversity and on the goods and services generated by ecosystems
52.	Review, identify and compile existing documentation on ecosystems and indicator species (research projects and technical studies) to provide the basis for a system to monitor and determine vulnerability and adaptability
53.	Assess the current networks of protected natural areas, including Natura 2000 (in terms of design, connectivity, reservation areas, etc) in the light of the different climate change scenarios envisaged.
54.	Consolidate environmental monitoring networks and establish long-term monitoring programmes for: • identification of biological indicators and preparation of measurement protocols to make up a monitoring and early warning system • systems dominated by pioneering, colonising species • species of animals present in the BAC (e.g. amphibians) which are being affected by climate change • phenology of migration and breeding in species considered as indicators • introduction and spread of exotic, invader species, including an assessment of the extent to which they affect biodiversity in the BAC • state of the waters and aquatic ecosystems of the BAC and links with climate change
55.	Improve the network of mareographic and oceanographic stations on the coast (collecting data on sea level, temperature, wave force & direction, wind, etc.) with encouragement & support for observation & monitoring systems to make observation more systematic.
56.	Develop and assess: • systems to indicate microbial activity and biodiversity in the soil (trends in quality and soil fertility), and observation and monitoring of soil loss associated with erosion. • systems to identify biological indicators of the impact of climate change and draw up monitoring and early warning protocols.
57.	Determine the habitats of key species on different time scales • reconstruction of populations in relation to climate change via analysis of historical data and

Action Nº	LINE: OBSERVATION & LEARNING
	paleostudies. • comparative study of population changes via repetition of specific studies • development of habitat models to enable future scenarios to be drawn up

Action Nº	LINE: DEFINITION OF CRITERIA & PLANNING
58.	Develop and establish directives on: • management, conservation and restoration of ecosystems, factoring in climate change as a variable in environmental restoration processes • planning and management of protected areas. • encouragement for an ecosystem-based approach to forestry management that stresses the environmental and social goods and services provided by woodland, fostering environmental restoration and conservation of natural woodlands.
59.	Include natural environmental management actions linked to the mitigation of the effects of climate change in land use management instruments (physical environment directives of DOT, PTPs & PTSs) and sectoral policies (PTSs of agriculture and forestry and the natural environment, network of ecological corridors, linear infrastructures, etc).

Action Nº	LINE: ADAPTATION & AVAILABILITY OF MEANS
60.	Establish a framework for decision-making that enables measures to adapt to climate change to be combined with conservation of biodiversity and the social and economic benefits of managing natural resources.
61.	Strengthen actions to restore and conserve ecosystems, focusing on those considered most vulnerable and on the establishment of buffer areas and corridors to facilitate migration of species.

Basque Govt. departments & local authorities involved : DMAOT & DTOP

HUMAN HEALTH & THE URBAN ENVIRONMENT

The salient features of the health system in the BAC are the high average age of the population (by 2020, 25% will be over 65) and increasing demand for emergency and specialist health care services over the past 15 years. The health care services provided can be considered as good, and the whole population has access to the public health system.

The main impacts expected in this area are increases in acute respiratory problems such as impairment of pulmonary functions and more serious asthma attacks (associated with air quality and increased pollen levels), more frequent problems of illness due to heat waves, changes in infectious diseases due to temperature and humidity variations, and modifications in conditions of comfort and well-being.

It must also be taken into account that some measures to reduce GHG emissions also influence air quality, but not always positively in terms of effects on human health. Climate change and air quality are two problems that need to be considered jointly when drawing up measures so as to avoid crossover effects.

shows some examples of the link between climate change and air quality for a number of measures.

Table 16. Interconnection between measures affecting climate change and air quality

MEASURE	EFFECT	CLIMATE CHANGE	AIR QUALITY
Replacement of coal by natural gas in electricity plants	Reduction of emissions of CO_2/KW. Reduction of SO_2 & NOx	☺	☺
New transport technologies (hybrid vehicles, hydrogen, etc.)	Reduction of emissions of CO_2/km. Reduction of NOx & particles	☺	☺
Greater efficiency of domestic & industrial equipment	Overall emission reduction	☺	☺
Building insulation	Overall emission reduction	☺	☺
Improvements in public transport & discouragement of private vehicles	Overall emission reduction	☺	☺
Replacement of petrol by diesel	Reduction of emissions of CO_2 & increase of particles & NOx	☺	😐
Use of bio-fuels	Reduction of emissions of CO_2 & increase of NH_3, N_2O & VOCs	☺	😐
Incineration of waste	Reduction of emissions of CH_4 & CO_2. Increases in other pollutants	☺	😐
Desulphurising in electricity plants	Reduction of emissions of SO_2 & increase of CO_2	😐	☺
NOx reducer intakes on diesel vehicles	Reduction of emissions of NOx & increase of N_2O	😐	☺
Particle filters on diesel vehicles	Reduction of particles & increase of CO_2	😐	☺
3-way catalytic converters on petrol-engined cars	Reduction of emissions of NOx, CO & VOCs & increase of CO_2	😐	☺
Elimination of sulphur from fuel	& increase of CO_2 & reduction of SO_2	😐	☺

Source: "Air Quality and Climate Change: a UK Perspective Summary". DEFRA. 2007.

The key factors in determining the degree of adaptation in health matters are the suitability of health services and infrastructures and the crisis response speed.

The link between damage from flooding and the location of urban areas means that floodabilty criteria must be continually updated in territorial and urban planning instruments as more becomes known about the different climate change scenarios. This will help to facilitate the effective expansion and development of urban areas and amenities, particularly in regard to linear equipment such as sewers, water conduits, telecommunications networks and gas pipelines in areas where the risk of flooding is particularly great, ensuring insofar as is possible that economic and transport flows are compatible with river networks. The BAC has 252 km of coastline, 35 beaches and 700 km of rivers, close to which areas at risk of flooding have gradually been occupied. Thus, the PTS on Management of Riverside Land in the BAC has factored in this problem on the basis of current meteorology. Furthermore, the PIPI (Integrated Flood Prevention Plan) that has been approved identifies and assesses those areas of the BAC which are at risk from flooding, and proposes options for protecting them through measures at different levels, such as "soft" measures for land use management and structural measures for correcting and adapting river courses. It also establishes what areas can be suitably occupied and to what extent, thus striking a balance between the gains obtained from using areas at risk and the losses resulting from flooding of urban areas and the consequent effects on infrastructures.

Current infrastructures include almost 1700 km of roads, more than 450 of which are motorways and dual carriageways, one broad-gauge and two narrow-gauge railway networks, two metro lines, one operational tramline and another under construction, 3 funicular railways, 15 fishing ports and marinas, 3 commercial airports and two large seaports. Energy infrastructures in the BAC include a 3700 km gas transport and distribution network, a 486 km electricity distribution network, 103 mini hydraulic plants, 2 large hydraulic plants, 2 conventional coal-fired power stations, 3 combined cycle plants, 4 major wind farms and a large number of smaller wind power facilities.

The main impacts on infrastructures that can be expected are an increase in transport accident rates associated with adverse phenomena, risks for the structural integrity of infrastructures, upsets in the production and processing of energy (possible negative effects for hydroelectric plants), changes in energy demand (lower consumption in winter and peaks of consumption associated with heat waves), changes in habitability conditions in buildings, increased vulnerability to flooding, risks for the structural integrity of certain buildings (fires, flooding, landslides) and the need for a new urban planning model.

Lines of Action

Systematic observation & learning

This line seeks to observe and learn the effects of climate change on human health so that uncertainties can be minimised and actions to anticipate problems can be taken. It includes actions to model and monitor data with a view to protecting trends in climate and extreme weather episodes, and mitigating their consequences.

Definition of criteria & planning

This line seeks to integrate the climate as a variable in planning directives for the health system and in civil defence measures, and to update general land use management and municipal planning instruments.

Adaptation & availability of means & infrastructures

This line seeks to ensure the integrity of the infrastructures that make up the urban environment and ensure that suitable means are available for preventing, minimising and correcting the potential impacts of climate change. To that end, it envisages actions for the continual updating of public services (health and civil defence), urban infrastructures and management models in terms of climate change.

Action Nº	LINE: OBSERVATION & LEARNING
62.	Ensure co-ordinated monitoring of climate data via: • selection, installation and monitoring of highly representative weather stations to obtain long-run climate data and oceanic and meteorological data in coastal areas. • homogenising of datasets and high-definition numerical outputs to allow the comparison of current and historical data • establishment of a system for modelling climate and oceanographic data on the scale of the BAC
63.	Conduct economic impact studies and propose alternatives for preventing the effects of climate change in municipalities highly vulnerable to flooding. Development of tools for investment appraisal that are sensitive to future climate impacts.
64.	Extend atmospheric pollution monitoring systems in cities with more sampling points and/or

	additional parameters concerned with climate change
Action Nº	**LINE: DEFINITION OF CRITERIA & PLANNING**
65.	Include the effects and variables associated with climate change in: • reinforcing land management directives to restrict construction of residential and industrial developments in particularly vulnerable areas (e.g. flood-prone areas such as riverbanks and coastlines) • future reviews of flood prevention plans (PIPI) • drawing up the plan for the demarcation of internal river basins in the BAC and other planning documents • factoring variables and criteria for adaptation in coastal areas into PTSs for marinas
Action Nº	**LINE: ADAPTATION & AVAILABILITY OF MEANS**
66.	Consider the rise in sea level and changes in rainfall patterns in: • future studies of vulnerability to flooding • future sewerage and treatment works
67.	Adapt: • health services to new needs (higher incidence of respiratory problems and allergies and increased in effects of heat waves) • health-related infrastructures/buildings
68.	Prevent and manage the effects of adverse weather episodes via: • adaptation and continuous improvement of the system to prepare for extreme episodes (persistent high temperatures, torrential rain, etc) • continuous improvements in emergency warning protocols for extreme weather phenomena such as flooding, strong winds, persistent high temperatures, etc.

Basque Govt. departments & local authorities involved : DMAOT, DS, DAPA, DTOP & DI

ECONOMIC ACTIVITIES

The BAC has 390,000 Ha of forestry land with tree cover and 87,000 Ha without tree cover[64]. The main crops grown are beet, rapeseed and sunflowers, cereals, grapes, potatoes, forage and horticultural produce. In 2004 the Basque fishing fleet comprised 270 inshore vessels, 51 deep sea vessels, 8 cod-fishing and 23 freezer vessels for tuna fishing, providing a total of 4080 jobs[65].

The most likely impacts in this sector are changes in production periods (favourable to deciduous species and unfavourable to perennials), a higher risk of forest fires, lower yields from fast-growing species, higher productivity from beet crops and lower profitability from cereals, changes in sowing and harvesting times, the appearance of new crops, increased water demand, flooding of arable land, downturns in animal productivity, greater susceptibility of animals to parasitic diseases and changes in recruitment among marine species (which may negatively affect anchovy, octopus and mackerel stocks), etc.

The key factors for the adaptation of the primary sector to climate change are arable and livestock farming practices, crop varieties and the suitability of livestock facilities.

[64] 54% & 12% of the total surface area of the BAC, respectively
[65] 2004. Source: EUSTAT

The degree to which the sector is affected by climate change will depend chiefly on proper planning and sufficient awareness of the true magnitude of the changes.

Lines of Action

Systematic observation & learning

This line seeks to ensure the monitoring and determination of conservation measures for key species in the various production areas of the primary sector (arable and livestock farming, forestry, fishing, hunting, etc).

Definition of criteria & planning

This line seeks to minimise risks for socioeconomic sectors. To that end the target is set of gradually updating planning instruments, particularly those concerned with the primary sector, to factor in climate variables and their potential effects.

Adaptation & availability of means & infrastructures

The objective here is to start actions to prevent and minimise potential future impacts on the forestry sector from the viewpoint of managing carbon sinks and protecting ecosystems.

Action Nº	LINE: OBSERVATION & LEARNING
69.	Draw up studies on the primary sector: • extent to which farming, forestry and livestock are affected by increases in temperature and evapotranspiration • models to enable scenarios to be established and assessed concerning the effect of changes in marine conditions (temperature, sea level, turbulence, etc) on fisheries resources • effects of climate change on species hunted and fished (migration, population increase/decrease, residence time) • identification and dissemination of farming methods adapted to maintain soil fertility & organic carbon content in the soil and save water (irrigation systems, fertilisation, crop varieties, etc)
70.	Draw up studies on the tourism sector: • impacts associated with tourism and opportunities for adaptation in line with the general scenario of impacts identified for the BAC.
Action Nº	**LINE: DEFINITION OF CRITERIA & PLANNING**
71.	Develop criteria and directives for land use (farming, urbanisation, infrastructures, etc), changes in land use and forestry activities based on an ecosystemic approach, seeking a balance between adaptation to climate change, biodiversity and social objectives.
Action Nº	**LINE: ADAPTATION & AVAILABILITY OF MEANS**
72.	Promote balanced dialogue in the forestry sector on the processes of change in land use and forestry activities in an effort to establish measures to adapt ecosystems to climate change.
73.	Promote changes in the current system of forestry management to reward the conservation of land as a major carbon sink, encouraging silviculture based on the recovery of natural ecosystems.

Basque Govt. departments & local authorities involved : DAPA, DICT & provincial councils

5.3 PROGRAMME 3: KNOWLEDGE. "OBSERVE NATURE, LEARN WHAT THE PROBLEMS ARE AND CREATE SOLUTIONS"

Through this programme, the PVLCC seeks to foster scientific and technical knowledge of the consequences of climate change and of alternative ways of reducing emissions.

To solve the climate change problem drastic changes will need to be made in models of production and consumption. Production may also be conditioned by demand (and therefore by the consumption patterns created) and needs new technologies to produce more energy efficient, more competitive goods and services that are less dependent on fossil fuels and therefore more sustainable in terms of GHG emissions.

There is no option but to live with the changes that are going to take place in the parameters that determine our climate and with their effects on our economic and social structures and on the natural environment. More information needs to be obtained and interpreted and innovative mechanisms must be developed to adapt to climate change.

The few lines of research on climate change conducted to date have been scattered and unconnected. From now on, scientific and technical development is classed as an essential element in the PVLCC. Climate change provides the BAC with a unique opportunity to reinforce its overall objectives in terms of competitiveness and innovation.

In 2005 the BAC was near the top of the ranking of countries by private-sector spending on R&D (1.14% of GDP), though efforts to innovate continue to be highly fragmented and the percentage of spending on R&D per company is relatively low[66].

The number of Basque companies present in recent EU framework programmes for R&D has dropped gradually to 37% in FP6 (2002-2006). There is also little tradition of participation in European programmes on the part of universities. As a result, with the new 7th EU Framework Programme for Research, Technological Development and Demonstration 2007-2013 (FP7-RTD) and the Competitiveness and Innovation Framework Programme (CIP)[67] now being prepared, preliminary planning needs to be established for Basque participation, in line with the viewpoints of all the agents involved in R&D&i and in the PVLCC.

The lines of scientific and technical research set out in this programme under the PVLCC are concerned basically with three agents: the Basque Science, Technology and Innovation Network, private companies and the Basque government.

Scientific research under the PVLCC is to be conducted via universities, which must lead the way in this transformation of Basque society and its economy, by co-operative research centres (referred to here by their Spanish acronym CIC) and by basic excellence research centres (BERCs)[68].

[66] In the public sector the administration funded R&D to the tune of 0.32% of GDP, which is below the average for the EU. However, under the new Science, Technology & Innovation Plan for 2010 spending is to be increased to 0.51% of GDP.

[67] The Competitiveness and Innovation Framework Programme (CIP) is the additional response provided by the Directorate General for Enterprise of the European Commission in the field of innovation, to provide more consistency and synergies between Community programmes and the main instruments of the Lisbon strategy.

[68] The following CIC's and BERC's are currently operating or being set up:

CIC	BERC

CICs and BERCs form part of the efforts under Basque science and technology policy to set up co-ordinated instruments that can become international benchmarks in specific knowledge areas. Their mission is to carry out basic research oriented towards disciplines in which key knowledge can be obtained, to improve quality of life and to generate economic activity.

The PVLCC sees internationalisation as another key element of scientific and technological research into climate change, and to that end encourages participation in international research projects in specific areas of interest to agents as a whole.

Within the macro-programme of co-operation under FP7-RTD there is a line of work on the environment that includes climate change (largely from the perspective of adaptation). This line complements the lines on energy, transport, food and other sectors, which tackle climate change through R&D in clean energy sources and energy efficiency, more environmentally-friendly means of transport, sustainable production of bio-resources and adaptation to climate change in the primary sector, all of which points are also covered by the PVLCC.

Within FP7-RTD, the ERA-NET scheme is to continue as a key instrument for co-ordinating national and regional programmes with a new ERA-NET PLUS scheme.

Three lines of action are proposed under this programme, with climate change as their common denominator, with a view to making the BAC more competitive and more sustainable and providing better quality of life.

PROGRAMME 3	
SECTOR / LINE	KNOWLEDGE OF CLIMATE CHANGE
Basic research	
Applied research	
Across-the-board elements	

DEVELOPMENT OF KNOWLEDGE OF CLIMATE CHANGE

Basque science and technology policy in general, as applied in the PVLCC, seeks to improve the competitiveness of the current fabric of production, diversify and broaden horizons in the medium and long term by moving into new sectors at the forefront of knowledge, offer products and services that make use of the challenges presented by the environment (in terms of regulations and the market) as a vector for innovation and use the human factor as a driving force for the creation and use of knowledge in the development of new applications.

Biogune (genomics, proteonics, etc)
Biomagune (biomaterials & engineering)
Microgune (micro-science)
Margune (high-performance manufacturing)
Tourgune (tourism)
Nanogune (nano-science)
Energygune (renewable energy sources)
Donosti International Physics Center (basic physics)
Fundación Biofísica Bizkaia (biological membranes, etc.)

In this context, support is envisaged for research aimed at making businesses more competitive, with climate change incorporated as a substantial element in sectoral programmes under the science and technology policy (tourism, trade, energy, food, etc), since companies are increasingly aware that they cannot be competitive without integrating social factors and environmental improvements.

The move towards diversification in the future as regards climate change will be led by research into alternative energy sources (tide power, second-generation bio-fuels, fuel cells, hydrogen and solar power) and the application of new technologies in smart transport.

Research in which climate change is a fundamental variable makes sense on the one hand in the study of climatology to discover knowledge useful for strategic decision-making and for controlling extreme climate episodes, and on the other hand in areas linked to the goals of the Environmental Framework Programme 2007-2010 (See Table 17).

Table 17: Goals of the PMA & lines of research

GOALS OF ENVIRONMENTAL FRAMEWORK PROGRAMME 2007-2010	RESEARCH LINES
Guarantee clean air, water & soil	Treatment & efficient management of water/ soil decontamination
Responsible management of natural resources & waste	LCA / completing material cycles / valorisation of waste
Protection of nature & biodiversity	Gene bank of species & breeds / Monitoring & valorisation of biodiversity
Balance between territory & mobility	Sustainable consumption / Environmental economy / Landscape restoration
Limiting the influence of climate change	Carbon removal / Distributed energy

Source: Science, Technology & Innovation Plan (2007-2010)

Lines of Action

Basic research & co-operation

The goal here is to achieve a critical mass of 150 researchers working on projects related to climate change. To that end, a BERC on climate change is to be established, and Etortek projects are to be conducted on adaptation to climate change, meteorology and climatology. CICs are also to conduct work concerned with "smart transport", i.e. the incorporation of new technologies into transport management systems.

Applied research

The main objective of this line is to involve private enterprise through 25 research projects on climate change by 2012. To that end, the intention is to set up Gaitek/Innotek projects on product innovation in accordance with the EuP directive, construction materials with lower carbon emissions throughout their life cycle, carbon removal, distributed energy and secondary raw materials to reduce process emissions.

Across-the-board elements

A number of across-the-board measures have been developed to foster the participation of the Basque Technology Network and Basque companies in at least eight international research projects on climate change by 2012.

Action Nº	LINE: BASIC RESEARCH & CO-OPERATION
74.	Create, launch & manage a Basic Excellence Research Center (BERC) on climate change.
75.	Develop & fund Etortek projects on: • adaptation to climate change. • meteorology & climatology.
76.	Set up a Co-operative Research Centre (CIC) on smart transport.
Action Nº	**LINE: APPLIED RESEARCH**
77.	Support Gaitek/ Innotek projects on: • product innovation as per the EuP Directive. • construction materials with lower carbon emissions over their life cycle. • carbon removal. • secondary raw materials to reduce process emissions.
78.	Develop research lines aimed at increasing knowledge of habitats & ecosystems with a view to mitigating the effect on them of climate change.
Action Nº	**LINE: ACROSS-THE-BOARD ELEMENTS**
79.	Draw up a study of the viability in terms of soil and climate (incorporating climate forecasts associated with climate change) of introducing energy crops to produce bio-fuels, & analyse their energy balance & life cycle
80.	Take part in international projects under the EU's 7th Framework Programme for R&D.
81.	Establish a new postgraduate master's diploma in climate change.
82.	Set up a postgraduate master's diploma in sustainability in the construction sector.
83.	Work on experience-sharing programmes developed by schools and universities concerned with climate change and sustainable development.

Basque Govt. departments & local authorities involved : DEUI, DMAOT & DICT

5.4 PROGRAMME 4: THE PUBLIC AND THE AUTHORITIES. "MOBILISING THE PUBLIC BY LEADERSHIP AND EXEMPLARY ACTION ON THE PART OF THE AUTHORITIES"

Climate change has opened up a far-reaching debate that affects our way of life and consumer habits, and has ethical implications for future generations as well as our own. GHG commissions affect the very structure of our culture, and tackling them efficiently will require a great effort of will and self-criticism.

If policies for dealing with climate change are to be really effective, firm action on the part of the various public authorities and the private sector must be supplemented by the direct, active engagement of the public. This can only be achieved if the public take on board new values, patterns of behaviour and consumer habits, such as the importance of saving energy. This will require the establishment by the public authorities of a strategy for education and public awareness covering the whole of society.

For the public to be able to respond proactively they need knowledge of climate change and tools for making informed, solidarity-based decisions. They must be prepared to make commitments in terms of individual behaviour, and sustained actions are needed to enhance long-term public awareness. From the earliest stages of education, people must be taught how to see the problem

correctly, and made aware of advances in scientific knowledge and the expected consequences revealed by studies.

It is therefore necessary to provide education for future generations based on the principles of responsibility and solidarity, so that they can make individual decisions that foster responsible consumption rather than squandering, and prudence in accordance with the principle of precaution. The struggle against climate change requires a commitment to ensuring that both formal and informal education take into account the need to transmit the proper perception of the problem, so that society as a whole realises that there is an urgent need to change behaviour patterns and attitudes, to foster acceptance of the principle of precaution.

In the construction of this scenario as the basis for a shift towards more sustainable individual habits, the Basque authorities have a responsibility to lead the debate and direct strategies and actions to combat climate change. But they also have an obligation to set an example in their day-to-day work, so as to send out clear signals to the public and to social and economic agents and provide a driving force for change in society in the direction advocated by the Plan.

The Plan envisages actions by Basque government departments, provincial councils and municipal councils. Local authorities in particular have a significant role to play through their own actions and their closer proximity to the public. These actions also need to be carried out in a co-ordinated fashion so as to maximise efficiency and synergies.

The programme envisages actions on three levels: the Basque government, local authorities and the general public. Four lines of action are proposed in those areas where actions are likely to be most effective: general activities and green procurement, energy efficiency and savings in the workplace, mobility, information and awareness, and education and training.

PROGRAMME 4			
SECTOR / LINE	BASQUE GOVT.	LOCAL AUTHORITIES	MOBILISATION OF THE PUBLIC
General activities & green procurement			
Energy efficiency & savings			
Education & training			
Information & awareness			

INTRODUCTION OF EXEMPLARY MEASURES AT THE BASQUE GOVERNMENT

The PVLCC sees exemplary action on the part of the Basque government as a fundamental requirement.

One of the Basque government's biggest contributions to climate change is travel by its employees between their homes and their workplaces and on work-related trips.

It is estimated that Basque government journeys and vehicle use in 2006 gave rise to GHG emissions equivalent to 23,000 t of CO2e[69].

[69] The Department of Land Use and the Environment and the Green Belt Movement in Africa have signed an agreement to offset CO_2 emissions from Basque government activities by planting trees in Kenya.

To minimise the environmental impact of its activities, the Basque government has taken a number of decisions aimed at minimising the impact of its activities.

An environmental improvement plan (Ekoscan) has been drawn up for the government offices in all three provincial capitals, and numerous energy-efficiency measures have been taken. The improvement plans have identified and set in motion a number of actions to reduce CO_2 emissions in all three buildings by a total of over 4900 t CO_2e per annum. In the coming years, the Basque government is set to lead the way in CO2 reduction schemes at Basque public authorities

The Basque Government Department of Land Use and the Environment has published an order requiring environmental criteria to be factored into its procurement of goods and services, in an effort to send a clear signal to its suppliers and encourage them systematically to offer increasingly sustainable products and services.

Other actions have included the use of renewable energy sources and experiments with sustainable buildings. The main actions in these areas are the following:

- The setting up of 5 kW photo-voltaic power installations at 175 high-schools.
- Construction of bioclimatic housing in Bermeo.
- Drawing up of environmental sustainability criteria at the Samaniego school in Tolosa.
- Construction of an "eco-city" in Andonegi.

The Basque government is in a privileged position to introduce design changes and encourage the use of new products and services through procurement criteria, and public sector procurement is indeed seen as a highly important line of action in the PVLCC.

Lines of Action

General activities & green procurement

This line pursues two goals: to increase to 30% the percentage of supplies, work and services procured by the Basque government that factor in environmental criteria (specifically climate change criteria) and to learn the economic and social impact of climate change in the BAC through *ad hoc* studies.

Energy efficiency & savings in the workplace & in mobility.

Action under this line seeks to achieve a 20% reduction on 2008 GHG emissions from Basque government activities by 2012. The measures are centred on energy saving and efficiency at Basque government buildings, encouragement for the use of bio-fuels, selective refuse collection and reductions in mobility.

Education & training.

This line seeks to ensure that 30% of Basque government employees receive training on best practices in GHG emission reduction.

This agreement takes the form of reforestation projects (up to 232,000 trees planted) to offset CO_2 emissions caused by the Basque Government in 2006-2008 due to the use of its own vehicle feet and to air travel, etc.
The Green Belt Movement has to date planted more than 20 million trees in an attempt to stave off deforestation and desertification in Africa. The project also strengthens local communications in Kenya, and in particular promotes women's rights.

Action Nº	LINE: GENERAL ACTIVITIES & GREEN PROCUREMENT
84.	Set up a Basque Register of GHG Emissions as the basis for a voluntary system of emission reductions in the public, private and domestic sectors.
85.	Fund actions by local authorities via: • development of tools through an Ekitalde working group (Udalsarea 21) • establishment of a voluntary emission reduction system • subsidies for actions to reduce GHG emissions from municipal buildings & services; installation of more environmentally-friendly street-lighting (EuP Directive & Light Pollution Act) • other lines of innovation, communication, etc.
86.	Fund actions by firms via: • establishment of a voluntary emission reduction system
87.	Draw up & maintain a Basque government emissions register & prepare an in-house programme to reduce emissions linked to the implementation of ISO-14001 in government buildings
88.	Seek international co-operation: • offsetting of emissions by the Basque government via the Green Belt Movement • launching of benchmarking projects on administrative tools for dealing with climate change (e.g. via the Network of Regional Government for Sustainable Development (nrg4SD)) • Other projects, e.g. via the Basque Govt. Fund for Co-operation & Development Aid (FOCAD).
89.	Draw up a study into the economic impact of climate change in the BAC
90.	Include climate change as a topic in Social, Municipal and School Eco-barometer Studies (in co-operation with ISEI-IVEI)
91.	Promote green public procurement: • include energy efficiency & saving criteria in contracts for work & services and purchases of products, vehicles & equipment for Basque government headquarters • include & integrate green public procurement criteria into purchasing processes at schools & universities
92.	Obtain Ekoscan CO_2 sustainability certificates for government-owned buildings, industrial estates, office buildings, schools & health centres
93.	Promote selective refuse collection, including organic fractions, at all Basque government buildings
Action Nº	**LINE: ENERGY EFFICIENCY & SAVINGS IN THE WORKPLACE & IN MOBILITY**
94.	Develop & implement a road-safety education plan at schools as part of the Strategic Plan for Road Safety from the viewpoint of safe, sustainable mobility, encouraging students and teachers to travel by bike and linking schools to cycle path networks • Extend the use of ICTs at meetings of the Education Department and between schools so as to curtail unnecessary travel
95.	Implement mobility plans at government buildings
96.	Implement measures to save energy & foster the use of renewables in public buildings: • regulation of air conditioning • automatic disconnection systems • installation of solar panels on public buildings
97.	Establish financial aid for the use of bio-fuel powered vehicles for group transportation of Basque government personnel & the use of public transport.
98.	Promote selective refuse collection, including organic fractions, at all Basque government-owned buildings, especially schools.
Action Nº	**LINE: EDUCATION & TRAINING**
99.	Train Basque government technical staff in best practices for emission reduction.
100.	Give courses in efficient driving for Basque government employees.

Basque Govt. departments & local authorities involved : DHAP, DICT, DMAOT & remaining departments.

LOCAL AUTHORITIES

The actions of the Basque government on climate change are co-ordinated with those of provincial and local authorities through Udalsarea 21, the Basque Network of Municipalities for Sustainability.

Through the network the Basque government, the provincial councils, local authorities and Eudel are fostering the adoption of sustainability policies through local action plans derived from Local Agenda 21 schemes

As a result, an Ekitalde[70] on "Municipalities & Climate" has been set up that includes more than 30 municipalities in the BAC. Its objective is to promote and facilitate the responsibility of local authorities in the adoption of measures to reduce emissions and adapt to climate change.

The main results obtained to date include training and awareness programmes for the participating municipalities, sharing of experiences and the design of common tools. The most significant of those tools is a compilation of local best practices including an assessment of the CO_2e reductions that can be expected if those practices are implemented, and the design of methods for the drawing up of an inventory of GHG emissions at municipal level. This scheme has been piloted in two municipalities in the BAC.

The Dept. of Industry, Energy & Tourism has also signed agreements with 127 municipalities for the fostering of energy efficiency and renewables. Through these agreements, photo-voltaic and thermal solar power and CHP plants have been set up efficiency studies have been conducted in municipally-owned buildings, sports centres, etc. and lighting systems have been renovated.

Basque municipalities are engaged in local level actions to highlight priority areas and tools for intervention. In the field of urban planning and mobility, park and ride schemes have been constructed along with pedestrian access routes linking different areas, accessibility/sustainability criteria have been factored into the construction of new residential estates and/or districts, municipal bicycle loan schemes have been set up and public transport routes within municipalities have been established. As these practices become more widespread, more significant GHG reductions will be achieved. To that end, special emphasis must be placed on the aid programmes available from the Basque Government Department of Land Use and the Environment (DMAOT), which feature funding lines to encourage the introduction of innovative measures, participation in a voluntary emission reduction scheme and the factoring of climate change into local ordinances.

[70] A working group within Udalsarea 21 that has objectives, undertakings and schedules for tackling specific actions such as green procurement and local GHG inventories. The "Municipality & Climate" Ekitalde works on tools such as GHG emission inventory methods, climate change structure models, definition of adaptation criteria, best practices for mitigation including planning practices, green procurement criteria, etc.

Lines of Action

General activities & green procurement.

As well as implementing green public procurement at local scale, this line establishes actions to integrate climate change criteria firmly and permanently into the day-to-day work of local authorities. With that in mind, the target set is for all municipalities with more than 20,000 inhabitants to establish GHG emission reduction programmes.

Energy efficiency & savings in the workplace & in mobility.

This line of action seeks to reduce GHG emissions from municipal activities by 10% on 2008 levels by 2012 in 10 municipalities. Mobility plans are proposed, along with the implementation of tax measures to promote the use of means of transport other than private cars.

Education & training.

The objective here is to train 20% of municipal technical staff and other local authority employees in best practices for GHG emission reduction by 2012.

Action Nº	LINE: GENERAL ACTIVITIES & GREEN PROCUREMENT
101.	Promote the following through planning: • incorporation of compulsory standards and criteria for municipal planning bodies to favour adaptation to and mitigation of climate change and to design compact city models while respecting the natural environment • rehabilitation, regeneration & maintenance of existing cities rather than new urban development as a key factor for adaptation and emission reduction.
102.	Incorporate climate change criteria into the ordinances of 10 municipal councils in the BAC
103.	Draw up GHG inventories for municipalities with more than 10,000 inhabitants in the BAC
104.	Design & implement local programmes for dealing with climate change within Local Agenda 21 schemes at municipalities with more than 20,000 inhabitants.
105.	Incorporate GHG reduction criteria into the purchasing & hiring of municipal vehicle fleets & the subcontracting of services in municipalities with more than 20,000 inhabitants and promote carbon-neutral municipal activities
106.	Have anti-climate change ordinances approved at 5 municipalities.
Action Nº	**LINE: ENERGY EFFICIENCY & SAVINGS IN THE WORKPLACE & IN MOBILITY**
107.	Encourage measures for energy efficiency & savings at municipal offices
108.	Incorporate safe, sustainable mobility plans at local and supra-municipal level (over 5,000 inhabitants) taking GHG reduction into account.
109.	Analyse the potential for changing municipal motor vehicle taxation so that it is proportional to GHG emissions per km travelled in municipalities with more than 20,000 inhabitants.
Action Nº	**LINE: EDUCATION & TRAINING**
110.	Develop Local Agenda 21 and School Agenda 21 schemes in co-operation with social agents and the relevant departments and authorities, and establish protocols for action and reporting to the public.
111.	Train local authority technical staff in best practices for emission reduction.

Basque Govt. departments & local authorities involved : DICT, DMAOT & municipal councils

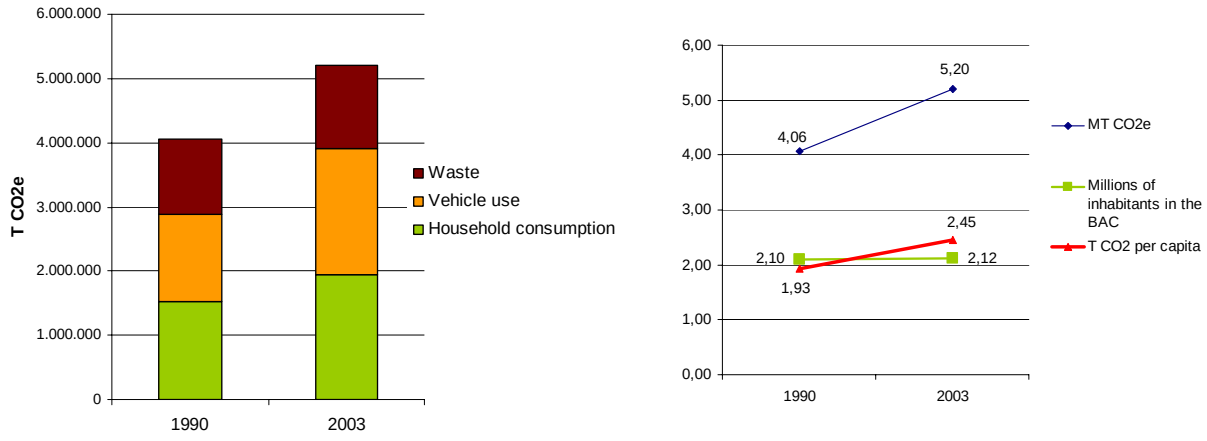
ENGAGEMENT OF THE PUBLIC

Actions to engage the public are essential, as they have a fundamental role to play in the success of numerous schemes that affect their sphere of decision-making, both at home and in terms of consumption and mobility patterns. Awareness in itself is often not enough to produce results, so additional measures are needed. On the other hand, schemes to encourage energy-saving, green procurement and sustainable mobility cannot be effective without the firm engagement of the general public.

GHG emissions originating from the general public in the BAC are directly related to consumer habits (in the home, in the use of private cars and in purchasing). They account for 20% of total emissions from the BAC. From 1990 to 2003[71] (the last year for which data are available) emissions from this sector increased by 28% to 5.2 Mt CO_2e even though the population remained at around the 1990 level. The biggest increase was in emissions from vehicles, which rose by 44%.

As a result of their living habits, the Basque public are therefore directly responsible for the emission of 2.45 t CO_2e per capita per annum[72] (see Figure 12).

Figure 12: GHG emissions by the general public



Engaging the public in emission reductions is a priority area for action in the coming years. The data provided by the latest social eco-barometer survey reveals that climate change is an emerging cause for concern among the population of the BAC, though the level of concern expressed is slightly below the average for the EU-15. Most people believe that human activity in general and individual actions in particular have effects on the environment, but at the same time no significant changes are observed towards more environmentally-friendly behaviour (e.g. the

[71] Information on emissions from private vehicles is obtained from the inventory of acidifiers and tropospheric ozone precursors, which was last updated in 2003.

[72] This indicator must list the following as emissions for which the responsibility lies with the general public:

- ✓ Emissions from combustion in private transport
- ✓ Emissions from domestic combustion (basically natural gas for heating & other uses).
- ✓ Emissions from electricity consumption in the residential sector.
- ✓ Emissions associated with MSW management.

Fluorinated gas emissions from air conditioning units do not currently depend on informed purchasing decisions by the public. In the future they will be regulated by Community regulations which have already been approved, so they must be controlled via a system of quotas levied on manufacturers.

percentage of the population that use their car every day). We must take this opportunity to transform that belief into reality.

The general public as consumers have enormous potential as a driving force for the economy as a whole, though many barriers need to be overcome if that force is to be applied effectively. We have here the setting for an unprecedented social experiment. We know that we must change and we are reasonably sure of how we must go about it, but we need to find a way of turning the concern for climate change expressed by Basque people in surveys into action in their day-to-day decisions.

The actions envisaged under this programme seek to provide information and training and heighten the awareness of the public so that they take on board the values of climate change and sustainability in their own lifestyles and modify their patterns of consumption accordingly.

The changes intended to engage the public are structured into lines of action concerned with day-to-day decision-making by individuals in terms of mobility, energy-saving in the home and purchasing. There is also a need for an across-the-board line of action to inform and heighten the awareness of the public concerning climate change, seeking to spur them into action to reduce emissions.

Finally, this process should lead to a real reduction in emissions originating from the general public.

Lines of Action

Information & awareness

Activities concerned with the general public are aimed at increasing their level of knowledge and awareness of climate change and its effects through energy labelling, reduction of emissions from transport, energy efficiency and savings in the home and a move towards increased waste recycling. The target is to limit per capita emissions from the general public in these areas to no more than 2.6 t CO_2e per annum by 2012.

Education & training

This line is directed at teachers and students, and seeks to ensure that all schools that receive public funds have developed information campaigns and other actions (training, pedagogical research, etc.) concerned with climate change.

Action Nº	LINE: INFORMATION & AWARENESS
112.	Promote information & awareness of the effects of climate change: • Information campaigns by government departments, provincial & municipal councils • System for offsetting emissions at individual level such as Ekopass or similar
113.	Take action to increase public knowledge & awareness of the effects of climate change on biodiversity and the weather, actions for adaptation, etc. Along these lines, public perception of the implicit and explicit risks of climate change will be conducted so that teaching and information strategies can be drawn up
114.	Take action to help the public reduce emissions from transport: • Analyse the feasibility of integration of fares • Communication campaigns on the impact of transport on emissions, on alternative means of public transport, on energy-efficient driving, encouragement for intermodal transport, bio-fuels, etc.

115. Set up public awareness campaigns in the broadcast media, on-line and in publications on ways of saving energy in the home and on purchasing energy-labelled products.

Action Nº	LINE: EDUCATION & TRAINING

116. Encourage & set up research programmes at schools & colleges to foster the teaching of environmental matters from an early age within schemes such as the international GLOBE programme.

117. Provide funding for information & publicity campaigns at schools in the fields of climate change & sustainable development.
    - Establish & implement programmes that enable students to calculate the GHG emissions from their activities in and outside school
    - Draw up and distribute teaching material for schools (interactive games, exercise books, teaching guides).

118. Factor sustainability into the priority lines of the Department of Education for school syllabuses

119. Draw up & implement training courses & programmes for teaching staff at schools to include aspects related to climate change in the curriculum.

120. Include climate change and sustainable development as topics in GARATU individual training programmes and at training centres. Encourage experience-sharing via teaching activities to round off annual projects for schools.

Basque Govt. departments & local authorities involved : All Basque Govt. departments

6. EFFORTS & RESULTS EXPECTED

The reducing of emissions as part of the struggle against climate change is directly linked to quantitative commitments. Worldwide objectives for limiting emissions have been drawn up on the basis that every tonne emitted anywhere counts. Efforts must therefore be quantified in terms of fulfilment of the Kyoto Protocol

Although it is not a party directly bound by the Kyoto Protocol, the BAC considers that the emission reduction commitments made must be linked to the fulfilment of absolute limits[73] under that Protocol, in accordance with the international principle of common but differentiated responsibilities. The strategic objectives of limiting GHG emissions to no more than 14% above base year figures and increasing carbon sink absorption capacity to 1% of base year emissions are linked to the accounting framework and technical architecture of the Kyoto Protocol. Under this approach, objectives must be assessed at the end of the term of the PVLCC, which coincides with the term of the Kyoto Protocol set at international level.

From this it can be deduced that the actions set out in the programme to "produce and consume using less carbon and cleaner energy sources, and to manage carbon sinks" should suffice to ensure compliance with strategic objectives to reduce emissions and remove carbon. The potential for GHG reduction and carbon absorption associated with each line of action under the programme has been determined. Given the close links of GHG emissions with economic activity as a whole, the measures proposed are those deemed to be most cost efficient in terms of reducing the number of units of CO_2.

In regard to the strategic objective of limiting emissions to 14% above the base year level, it must be realised that emissions from the BAC originate from a large number of sources subject to different regulations, some of them located in geographical and administrative areas outside the BAC. Co-operation between institutions is therefore essential to facilitate communication and consistency in methods and working programmes aimed at achieving this objective. In any event, to ensure that objectives will be met – and exceeded if possible – the PVLCC reserves the possibility of resorting in addition to some of the elements and mechanisms envisaged in the Kyoto protocol. The decision as to what specific additional actions are required will have to be made in the future, but the PVLCC sets out an initial outline for such actions, referred to as a "reinforcement package". Close monitoring and continuous assessment of the progress of the PVLCC are the main mechanisms that will determine what additional actions need to be implemented, and when.

[73] It must be taken into account that the international configuration of emission limitation is based on absolute limitation, linked to flexibility mechanisms

6.1 IMPACT OF LINES OF ACTION ON EMISSION REDUCTION

The emission reduction measures envisaged in the PVLCC will prevent the emission into the atmosphere of 4.3 Mt CO_2e in 2012 under the expected scenario. Efforts will focus mainly on increasing efficiency in the use of fossil fuels, encouraging the use of renewables, promoting energy efficiency and savings in industrial processes and reducing non-energy emissions from industry. The PVLCC also envisages a number of additional measures aimed chiefly at offsetting emissions which can be implemented if necessary.

The line of action in the programme laid out in this plan that reduces GHGs by producing and consuming using less carbon and using cleaner energy sources should, according to a study drawn up, enable emissions to be reduced by 4.36 Mt CO2e in 2008-2012, a full percentage point less than the target figure of a 14% reduction relative to the base year level. That point is gained via the carbon sink measures described in subsection 6.2 below.

The chief contributions to fulfilment of the strategic objective lie in increased efficiency in the use of fossil fuels, energy savings and efficiency in industrial processes and the reduction of non-energy emissions from industry. Less important in terms of the quantity of emissions reduced, but equally necessary to attain the 14% objective, are the actions envisaged in the transport sector (encouragement for the use of bio-fuels, energy savings and efficiency in means and uses of transport), reductions in non-energy emissions from agriculture and forestry, encouragement for CHP and measures to promote savings in the residential and services sectors.

Figure 13 shows the contribution of each line of action to emission reductions. Based on the "no-measures" scenario modelled by the University of the Basque Country, under which emissions average 28.39 Mt CO_2e for 2008-2012, the effect of each line of action has been deduced. The result is an envisaged average figure of 24.09 Mt CO_2e for that period. Table 18 breaks down the estimated GHG reductions per line of action and shows the overall reduction to be achieved by the end of the fulfilment period in 2012.

However, as indicated above, GHG emissions are subject to numerous variables in each emitting sector which are difficult to control.

Figure 13: Contribution of each line of action to the strategic objective of emission reduction

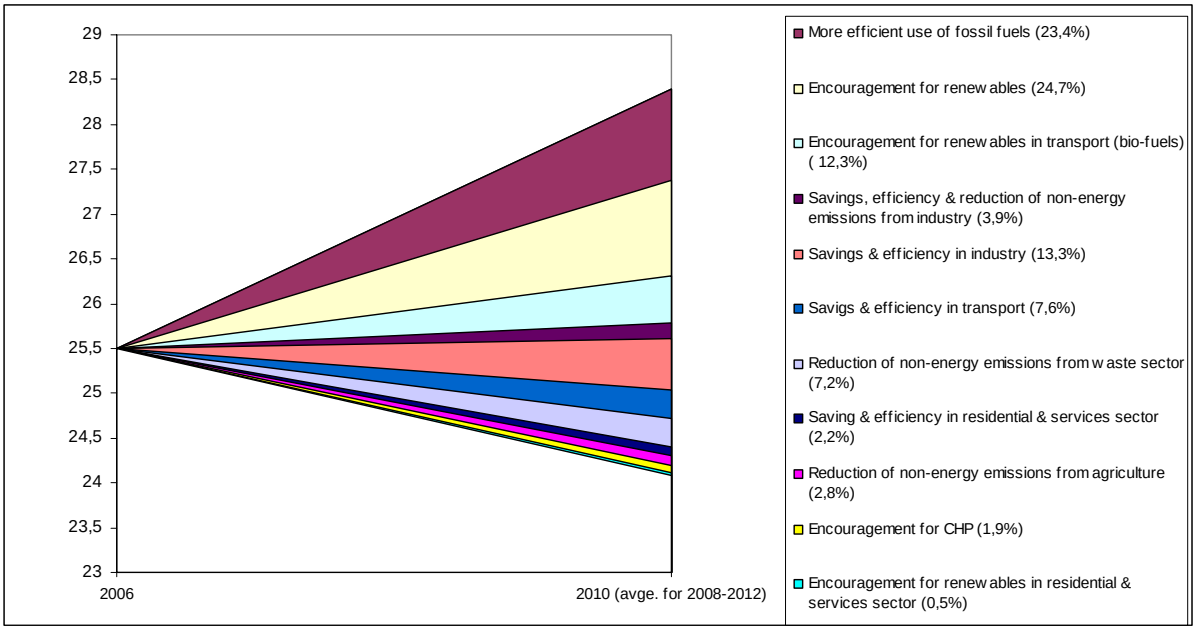


Table 18: Contribution of each line of action to the objective of emission reduction

LINES OF ACTION	Reduction target for 2010 (average for 2008-2012 (Mt CO_2e)	Measures to 2012[74]
ENERGY EFFICIENCY & SAVINGS		
More efficient use of fossil fuels	1.01	All thermal electricity generated by combined cycle natural gas plants.
Savings & efficiency in industry	0.57	Improvements in energy efficiency for a saving of 583 Ktoe on 2001 figures by 2010
Savings & efficiency in means & use of transport	0.33	21% improvement in efficiency in transport in terms of CO_2 emissions
Savings & efficiency in residential & service sectors	0.09	Improvements in energy efficiency for a saving of 58 Ktoe on 2001 figures by 2010
Encouragement for CHP	0.08	600 MW of installed capacity from CHP.
ENCOURAGEMENT OF RENEWABLES		
Encouragement of renewables	1.06	Production from renewables to meet 15% of electricity demand
Encouragement of renewables (bio-fuels) in transport	0.53	177 ktoe of consumption requirements met by renewables
Encouragement of renewables in the residential & service sectors	0.02	152,000 m2 of solar power used for heating
REDUCTION OF NON-ENERGY EMISSIONS		
Reduction of non-energy GHG emissions from industry	0.31	89% drop in fluorinated gas emissions on 1995 levels by 2012.
Reduction of non-energy GHG emissions in the waste sector	0.17	Less than 40% of MSW landfilled
Reduction of non-energy GHG emissions from agriculture & forestry	0.12	Construction of 3 livestock waste treatment plants
Total	**4.30**	

Taking this into account, a "reinforcement package" has been drawn up of reduction measures that could be implemented through additional efforts by the authorities if the list of proposed measures cooks like falling short of their targets.

[74] The energy measures indicated refer to 2010, as envisaged under the Basque Energy Strategy 3E2010

In any event, the Basque government is committed to implementing additional measures to the extent required to reach the strategic objective for emission reductions, and will resort eventually if necessary to the acquisition of units recognized under the Kyoto Protocol (see Table 19).

Table 19: "Reinforcement package" of additional measures for reduction not included in the lines of action of the PVLCC

ALTERNATIVE	ASSOCIATED REDUCTION PER ANNUM (Mt CO_2e)	TARGET
Line of incentives for domestic offset projects [75]	0.20	10 projects in the period from 2008 to 2012
Offsetting of emissions[76] via certified reductions	0.30	Use of CERs, ERUs, tCERs, lCERs
Direct purchase of Kyoto units	To be determined	To be determined

6.2 MITIGATION VIA CARBON REMOVAL

Measures intended to foster carbon absorption via carbon sinks in the BAC are expected to generate 223,163 AUs, equivalent to just over 1% of base year emissions.

The emission reduction measures indicated in Table 18 are insufficient to attain the proposed strategic objective of no more than +14%. Taking on board that the alternative measures for reduction listed in Table 19 are a "reinforcement package" and not an essential part of the pathway to fulfilment of the objectives, other measures must be resorted to.

Actions to increase the carbon sink effect of the BAC not only help to attain the second strategic objective of increasing carbon sink absorption capacity to 1% of base year emissions but can also enable us to reach a scenario in which the BAC emits just 14% more than in the base year. To that end, the options available in the BAC to increase carbon sink effects have been analysed in accordance with the accounting established under the regulations for the implementation of the Kyoto Protocol. Trends and the effects of measures approved and implemented since 1990 have been examined, along with further measures that could potentially be set in motion.

The three major lines of action in this field cover forestry management, agricultural land management and grazing land management. The first of these lines has the greatest carbon absorption potential in terms of both actions already taken (whose effects will be felt in the period from 2008 to 2012) and further actions envisaged for the future. 53% of that potential corresponds to new plantings completed between 1990 and 2005.

[75] This refers to the establishing of incentives to promote emission reduction projects in the BAC along the lines of those in place on the international carbon market, and may also include double reduction systems (incentives for reduction projects in the BAC through the delivery of units from certified reductions)

[76] This measure refers to the offsetting of emissions arranged by the Basque Government via Kyoto Units, i.e. carbon assets with an accountable value for the Kyoto Protocol. All these units have the same value, as they correspond to the emission of a ton of carbon dioxide equivalent. CERs are units from the Clean Development Mechanism (CDM), ERUs come from Joint Application and tCER and lCER are units of time obtained from CDM projects for afforestation and reforestation.

Table 20: Potential for absorption by carbon sinks to 2010 ("Kyoto accounting")

Human activity fostering carbon absorption	*AUs generated (2010)*	*% of base year emissions*
Afforestation & reforestation	117,014	0.56%
Forest management	63,164	0.30%
Cultivated land management	23,341	0.11%
Grazing land management	19,644	0.09%
Total AUs[77]	**223,163**	**1.07%**
Base year emissions (t CO_2e)	20,939,000.00	

However, the AUs generated can be increased by implementing additional measures not envisaged in current plans, as shown in

[77] The "Absorption Unit" (AU) is the accounting unit recognised in the Kyoto Protocol for the removal of carbon via carbon sinks. As Kyoto units, AU's have the same accounting value for states as the units attributed to states by the Protocol or as project based emission reduction credits (CER and ERU respectively)
The allocation of AUs is subject to the following limitations:
- limitation to human-induced activities;
- limitation to countable activities: afforestation-reforestation-deforestation, forest management, crop land management, grazing land management & revegetation;
- limitation to a time frame for increases of 2008 - 2012;
- setting of maximum amounts per state for allocation of AU's for improvement in forest management

Under the provisions of Art. 3.3. of the Kyoto Protocol, human activities in afforestation & reforestation must be counted. Optionally, states can choose additional human activities related to land use, changes in land use and silviculture (referred to as "3.4 activities"). Under Decision 16/CMP.1, these activities are: forest management, crop land management, grazing land management and revegetation. Spain has elected only the first two additional activities, but in the case of the BAC it is considered advisable also to include grazing land management.

Table 20, including further afforestation and reforestation (an increase of 3% over and above the growth of existing plantations), and the promotion of actions to increase carbon stocks through improved management of forestry land, cultivated land and grazing land. The actions with the greatest potential are those that are cheapest to implement, e.g. more sustainable forestry management.

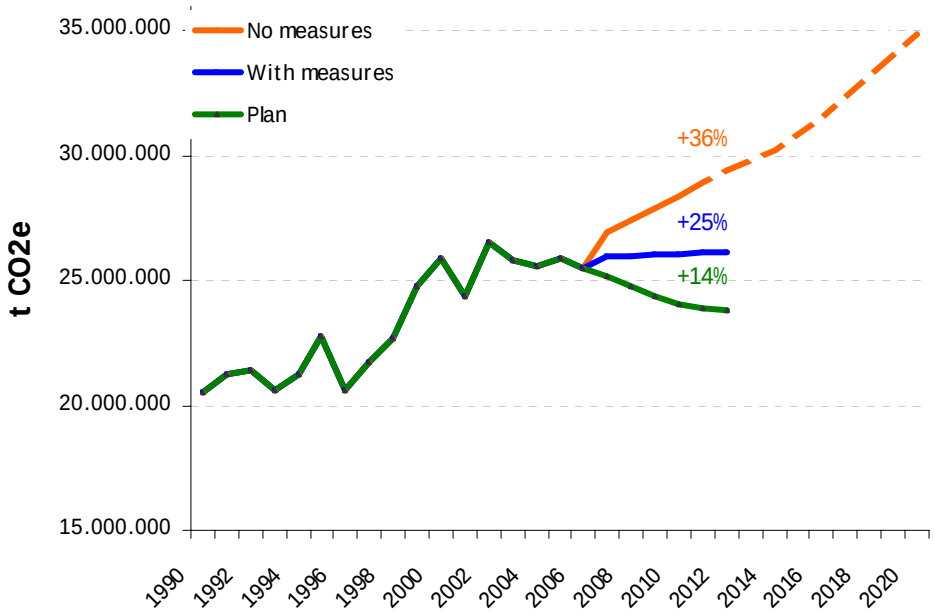
In addition to CO_2 removal actions in line with the Kyoto rules encouragement will also be given for actions to remove/ reduce emissions through the use of products harvested from wood.

6.3 RESULTS EXPECTED IN THE PLAN SCENARIO

The "Plan scenario" is established with the measures under the programmes "Less carbon. Produce and consume using less carbon and cleaner energy sources, and manage carbon sinks" and "Anticipation. Anticipating climate change in order to preserve natural ecosystems, protect human health and adapt socio-economic infrastructures and systems". It will enable emission levels of 23.87 Mt CO_2e to be achieved by 2010 as the average for 2008-2012, limiting emissions to no more than 14% above the base year level.

The "Plan scenario" is based on the application of the measures and lines of action described in the two areas of reductions in emissions and reinforcement of carbon sink effects. This scenario limits net emissions[78] to 23.87 Mt CO_2 as the average for 2008-2012 (see Figure 15), thus meeting the strategic objectives for emission reductions and carbon sink management and not exceeding base year emissions by more than 14%.

Figure 14 Trend in emissions under the scenarios of the Plan

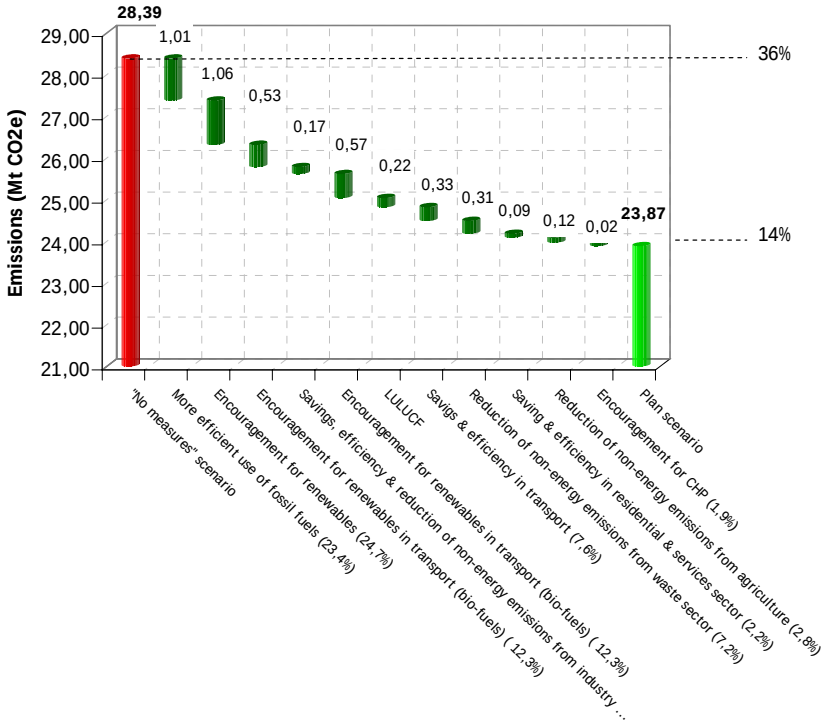


This plan to combat climate change will enable the BAC to progress from a forecast position in 2012 of 36% over the base year figure (if no reduction measures are implemented) to +14% if the

[78] Discounting removals via carbon sinks from the gross emissions of the BAC.

measures in the PVLCC are implemented. This means making reductions in GHGs of more than 4 Mt CO_2e in five years.

Figure 15. Contribution of each line of action to the overall objective of the programme



The purpose of the lines of action indicated for each sector is twofold: to reinforce actions already implemented by the authorities, and to develop new areas of action where existing actions prove insufficient. In 2008 specific actions will be deployed in each sector, enabling the various government departments involved to determine the best way of achieving their respective production objectives in their specific areas of action.

The sectoral distribution of emissions under the Plan scenario (with the application of the reduction measures indicated above) envisages major growth in the transport sector in spite of all efforts. The energy sector[79] is also expected to grow, but emissions from electricity imports will therefore fall (see Table 21).

Table 21: Trend in GHG emission sectors in the BAC under the scenario of fulfilment of the objectives of the Plan

[79] Emissions from the energy sector include not only those from electricity generation itself but also those from other forms of energy generation, which in total exceed 2 million tons CO2 e.

		1990 emissions	2010 emissions (avge. for 2008-2012)		Increase 1990/2010 (avge. 2008-2012)	
		T CO_2e	T CO_2e	% importancia del sector	T CO_2e	Increase
CO_2 e emissions	*Energy*	2.905.111	7.851.137	33%	4.946.026	170%
	Industry	7.302.072	5.921.277	25%	- 1.380.795	-19%
	Transport	2.716.736	5.447.650	23%	2.730.914	101%
	Residential	627.181	1.052.636	4%	425.455	68%
	Services	202.333	426.520	2%	224.187	111%
	Agriculture	1.110.367	1.276.456	5%	166.089	15%
	Waste	1.176.090	943.467	4%	- 232.623	-20%
	External Electricity Generation	*4.899.130*	*1.174.503*	*5%*	- *3.724.627*	*-76%*
	Total BAC	*20.939.020*	*24.093.646*		*3.154.626*	
Removals			- *223.163*		- *223.163*	
TOTAL BAC		20.939.020	**23.870.483**		2.931.463	**14%**

Table 22: Average forecast results for 2008-2012 per type of GHG emissions

	Actual		Average forecast for 2008-2012			
			No measures		*Plan*	
	Base year (Mt CO_2e)	*2006 (Mt CO_2e)*	*Mt CO_2*	*Variation on base year*	*Mt CO_2e/year*	*Variation on base year*
CO_2 emissions	12.6	19.9	22.1	75.4%	20.75	64.7%
Emissions from external electricity generation	4.9	2.6	3.5	-28.6%	1.17	-76%
TOTAL **CO_2**	17.5	22.6	25.6	46.3%	21.92	25.3%
CH_4 emissions	1.7	1.7	1.6	-5.9%	1.46	-14.1%
N_2O emissions	0.7	0.5	0.4	-42.9%	0.40	-42.9%
Fluorinated gas emissions	0.9	0.7	0.8	-11.7%	0.31	-65.6%
TOTAL OTHER GASES	3.4	3.0	2.8	-17.7%	2.17	-36.2%
TOTAL GHGs	**20.9**	**25.5**	**28.4**	**35.9%**	24.09	15.3%

7. IMPLEMENTATION & MANAGEMENT OF THE PLAN

7.1 MOBILISING RESOURCES & FUNDING

The implementation of the PVLCC 2008-2012 in the terms set out in this document entails the application of funds already earmarked and additional funding to work for fulfilment of the 4 strategic objectives and the 4 programmes, 14 lines of action and 120 specific actions into which those objectives are broken down.

Total public funding affecting the PVLCC 2008-2012 is 630.6 M Euros, of which 79.5 M comprises additional resources required over and above the general budget of the Basque government from tax year 2008 onwards.

The main criteria used to quantify the funding requirements of the PVLCC for 2008-2012 are described below:

- **Financial valuation of actions, lines of action & programmes:**

As has been made clear in this report, the PVLCC is an across-the-board plan covering almost all sectoral policies and tiers of administration. This means that it is sometimes difficult to establish a clear demarcation between those public sector actions relevant to climate change policy which are covered by the Plan and other measures which are not included in this document but may also help to fulfil strategic objectives on climate change. The PVLCC brings together only the most significant measures identified together with other departments of the government and provincial and local authorities in the course of the process of drawing it up.

Moreover, many of the measures and actions set out have been designed by the relevant departments themselves in the framework of their sectoral policy objectives. This reinforces one of the main aspirations of the Basque Environmental Strategy for Sustainable Development 2002-2020, which is also one of the five necessary conditions for the fulfilment of the objectives of the Environmental Framework Programme (2007-2010): to factor environmental objectives into sectoral policies. Specifically, the Environmental Framework Programme 2007-2010 prioritises the integration of environmental variables into strategic objectives on the production and consumption of energy and on mobility management. This sectoral integration of the struggle against climate change shows that the two approaches and visions are not only compatible but actually provide a clear opportunity for progress towards sustainable development. In short, numerous measures (and their corresponding budget allocations) not initially aimed at combating climate change in fact have a positive and decisive effect on the fulfilment of the objectives set out in the PVLCC. The setting up of tramway networks in the provincial capitals of the BAC is a case in point.

Finally, it is difficult to put an individual financial value on each measure, as numerous departments or administrations may be involved.

As a result the funding earmarked by Basque government departments for the lines of action under this Plan is approximate. As indicated in Chapter 1 above, there is currently such a flurry of

political and legislative activity at European and international levels that the calculations made in this document will probably have to be substantially modified.

- **Scope of valuation**

The figures given in this chapter are for the actions envisaged by the Basque government and do not include the funding requirements of provincial and municipal councils or the private sector. Provincial and municipal councils draw up their own policies or frameworks for tackling climate change with their own budget allocations through Territorial Sustainable Development Strategies and local action plans under Agenda 21 and by co-ordinating and aligning local sectoral policies with the policies for the whole of the BAC.

- **Planned & additional actions**

As indicated in subsection 2.1. "Action by the Basque Authorities", the Basque government has drawn up measures for early action through current planning instruments with a view to reducing GHG emissions in the framework of environmental and energy policies and in other sectoral frameworks. There is a commitment to these measures (and funding has been earmarked for them) in the plans currently in place, by contrast with other measures which have been identified for the first time in the PVLCC and will be implemented once it is approved.

- **Cost effectiveness**

The policies and measures that will be used to achieve the targets will be subject to an assessment of their cost effectiveness – i.e. how much do they reduce GHGs per euro that is spent. This is important to ensure that the money allocated to the programs is well spent. If some policies are found to have a poor cost effectiveness they will be modified or abandoned and new ones instituted. It is important to allow for learning as we go along on this hitherto unchartered path.

7.2 FINANCIAL BREAKDOWN

Total funding of 630.6 M euros has been earmarked for actions under the programmes described over the term of the PVLCC, i.e. 2008-2012. This represents approximately 7% of the general budget of the Basque government for 2007. Of that total, 79.5 M euros is funding for new measures not included in plans already in place but which may prove necessary to attain the objectives and commitments of the PVLCC.

7.3 MANAGEMENT SYSTEM

The body ultimately responsible for directing the PVLCC is the DMAOT, the OVCC is to co-ordinate the member departments responsible for managing and implementing actions, and "project promotion groups" will act as ancillary bodies to provide a broader spectrum of participation and specialisation for tackling those aspects of the PVLCC that require such management.

The PVLCC is consolidating itself as one of the chief instruments of environmental policy in the BAC. If it is to operate properly it must be provided with assessment and monitoring mechanisms to enable the progress of the various actions and objectives proposed to be observed.

7.3.1 Management Bodies

There has been rapid development in the field of climate change in recent years, and sufficient elements exist to provide the PVLCC with monitoring, control and review mechanisms to suit the technical, regulatory and social circumstances of any given time. Those mechanisms must be co-ordinated directly with each of the monitoring and control mechanisms identified in sectoral plans that influence climate change.

To implement and support actions under the PVLCC, the three-tier management model detailed below has been designed.

- The Plan will be directed by the **DMAOT** as its top management body, responsible for guaranteeing its implementation. As such, its main functions are:

    - to direct the Basque Climate Change Office (OVCC), together with the other OVCC member departments;
    - to co-ordinate the active monitoring of the actions and activities of the various departments and administrations involved **;**
    - to co-ordinate action under the Plan with other member departments of the OVCC and other government bodies in relation to climate change policy;
    - to encourage and assess the measures carried out in accordance with the PVLCC and those conducted by the various departments with authority in the matter;
    - to update the Plan and carry out all actions required to renew it; and
    - to handle the administrative procedures involved in obtaining Basque government approval for the PVLCC and updating it.

- The day-to-day management of the Plan is entrusted to the OVCC, which will oversee the implementation of a co-ordinated policy on climate change that unifies criteria and includes measures aimed at all social and economic agents in the BAC. Its functions are:

    - to co-ordinate and promote the implementation of the programmes of action of the PVLCC, maximising the effect of the actions implemented in Basque society and the economy as a whole;

- to monitor the Plan continually and formally, and to prepare technical material on its status, progress, monitoring and actions for inclusion in annual monitoring reports;

- to act as the basic social reference point for all public and private-sector agents by disseminating and providing information to all involved and by managing communications aimed at society as a whole;

- to carry out consultative actions aimed at updating and adapting the PVLCC to variations in the prevailing situation, and to act in order to obtain the engagement of agents and enable them to express opinions and share experiences, even at international level;

- to identify areas where research is necessary and promote research through the Basque Science and Technology Network and through businesses in the BAC; and

- to co-ordinate with other offices to share best practices.

– Specialist contributions to the work of the OVCC will be made by "project promotion groups" comprising specialists in different fields. Such groups will be set up for those programmes carried out under the Plan for which they are considered necessary. Their functions will be:

    - to act as consultants to the OVCC in the various actions under each programme envisaged in the Plan;

    - to propose consistent methods to ensure suitable progress of the Plan and to review it;

    - to act as a platform for communication between the OVCC and specialised agents concerning technical developments resulting from the Plan;

    - to act as a network for collecting and interpreting technological advances and international best practices in the areas of interest of each programme;

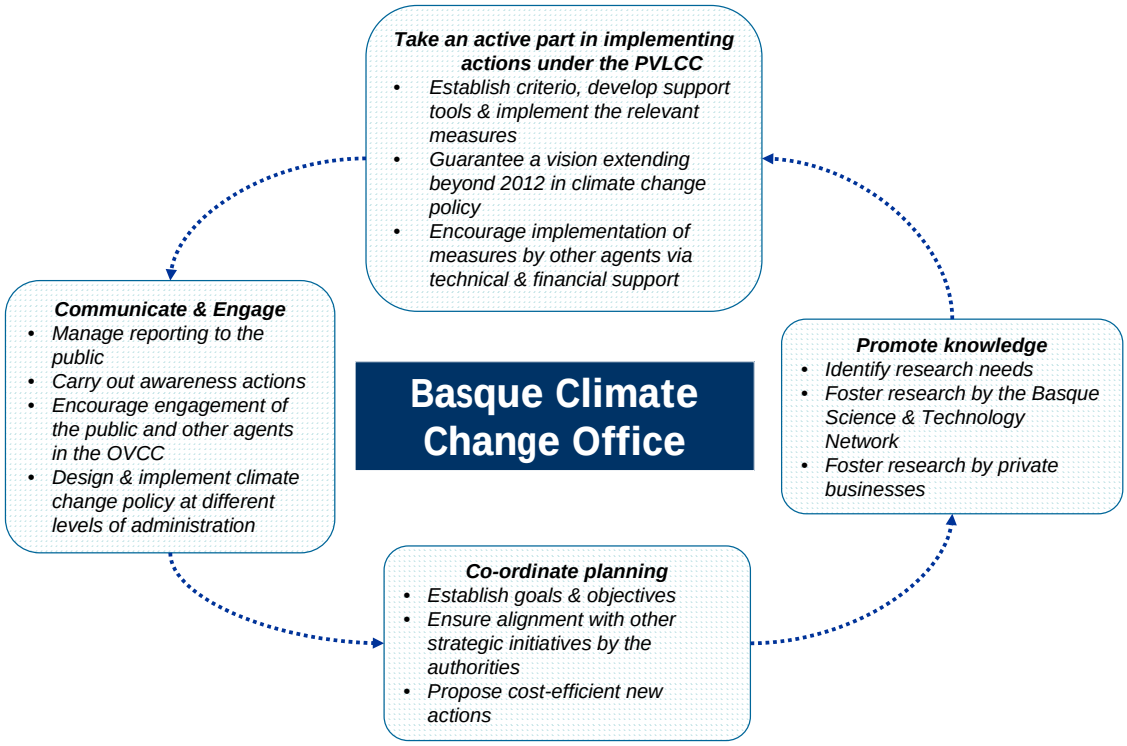
    - to detect and interpret changes in international regulations that may affect the programmes carried out; and

    - to issue annual technical assessment reports on the development of the programmes and proposals for the subsequent year's management plan.

The OVCC will be responsible for promoting the development of climate change policy in the BAC beyond 2012.

Figure 16 shows the functions of the OVCC in the struggle against climate change. To encourage future developments in this policy, the OVCC will keep up-to-date with the latest advances in regard to the causes and effects of increasing GHG concentrations in the atmosphere, will draw up reports on the repercussions of this problem and its effects on the economy, on quality of life and on ecosystems in the Basque country, and will promote the implementation and development of those advances and reports in the framework of Basque environmental policy during the Kyoto+ scenario.

Figure 16: Functions of the Basque Climate Change Office



– Project promotion groups will be set up as required throughout the term of the Plan. They will act as consultants in the support and monitoring of lines of action and specific actions under the programme for which they are formed. Thus, each project promotion group may comprise a group leader from the OVCC and group members from government departments, publicly owned companies or private organisations affected by or responsible for the actions to be taken. Promotion groups may be set up under programmes (e.g. adaptation to climate change) or under specific lines of action (e.g. renewables).

7.3.2 PVLCC Balanced Scorecard

Annual assessment is essential if the Plan is to be implemented efficiently, to reveal the extent to which the various actions taken are fulfilled and to assess results.

The OVCC will arrange six-monthly monitoring meetings to review progress on measures and policies concerned with adaptation and with reduction of GHG emissions. This will reveal any need to introduce additional actions to help fulfil objectives and co-ordinate efforts in regard to the measures identified. Once a year, the OVCC will compile and discuss the data provided by the various organisations as a whole with a view to drawing up an annual assessment report based on the indicators included on the PVLCC balanced scorecard.

Along with the annual report which presents the balanced scorecard, the advisability will be considered of drawing up an interim review report to assess achievements up to 2009 and identify any measures required to tackle new situations.

Table 23. Balanced scorecard for the Plan. Programme 1

Programme 1: LESS CARBON. PRODUCE & CONSUME USING LESS CARBON & CLEANER ENERGY SOURCES, AND MANAGE CARBON SINKS	**Programme goal for 2012:** - **Limit emissions to +14%** - **Increase carbon sink capacity to 1%**		
LINE OF ACTION	**Goal for 2012[80]**	**Indicator**	**Organisation responsible (source of indicator)**
Savings & efficiency :			
- in industrial processes	- Reduction of 0.57 Mt of CO_2 by saving 583 ktoe from 2001 to 2010	Ktoe saved	DICT/EVE
- in the residential sector	- Savings of 0.09 Mt by saving 58 ktoe from 2001 to 2010	Ktoe saved	DICT/EVE
- optimisation in means & use of transport	- Savings of 0.33 Mt of CO_2 by improving efficiency in transport by 21% in terms of emissions	% improvement in transport efficiency	OTEUS
- more efficient use of fossil fuels	- Savings of 1.01 Mt of CO2 by having all thermal electricity produced via combined cycle natural gas plants	% of thermo-electricity production from combined cycle plants	DICT/EVE
- encouragement for CHP	- Savings of 0.08 Mt of CO2 via 514 MW installed by 2010	MW of installed capacity	DICT/EVE
Encouragement of renewables :			DICT/EVE
- electricity generation	- Savings of 1.06 Mt of CO_2 by meeting 15 % of electricity demand via generation from renewables	% of energy demand	
- bio-fuel consumption	- Savings of 0.53 Mt of CO_2 by using 177 ktoe of bio-fuels from 2001 to 2010	Ktoe of bio-fuel	
- in the residential & service sector	- Savings of 0.02 Mt of CO_2 by installing 152,000 m^2 of solar panels for heating	m^2 of solar panels in use	
Non-energy GHG emissions:			
- in agriculture & forestry	- Reduction of 0.12 Mt of CO_2 by installing 3 livestock waste treatment plants	MW of installed capacity	DAPA
- in the waste sector	- Savings of 0.17 Mt of CO_2 by having <40% of MSW landfilled, with a per capita MSW production of 539 kg per annum	- % MSW landfilled - Per capital production of MSW per annum	DMAOT-IHOBE
- in industry	- Savings of 0.31 Mt of CO_2 by reducing fluorinated gas emissions. 89% reduction in emissions on 2005	- % reduction in fluorinated gases	DMAOT-DICT
Management of carbon sinks:			
- Management of carbon sinks	- Maintenance of existing carbon sinks & increase to 1%	- Absorption units (AUs)	DAPA

[80] Goals for CO_2 reduction related to energy measures are for a 2010 time-frame, in line with the 3E2010 energy strategy, taking this as the average for 2008-2012

Programme 1: LESS CARBON. PRODUCE & CONSUME USING LESS CARBON & CLEANER ENERGY SOURCES, AND MANAGE CARBON SINKS	**Programme goal for 2012:** - **Limit emissions to +14%** - **Increase carbon sink capacity to 1%**		
LINE OF ACTION	**Goal for 2012[80]**	**Indicator**	**Organisation responsible (source of indicator)**
	of base year emissions		

Table 24. Balanced scorecard for the Plan. Programme 2

Programme 2: ANTICIPATION. ANTICIPATING CLIMATE CHANGE IN ORDER TO PRESERVE NATURAL ECOSYSTEMS, PROTECT HUMAN HEALTH & ADAPT SOCIO-ECONOMIC INFRASTRUCTURES & SYSTEMS	**Programme goal for 2012:** - **100% of Basque Govt. Depts. to have analysed the effects of climate change on their sectoral policies**		
LINE OF ACTION	**Goal for 2012**	**Indicator**	**Organisation responsible (source of indicator)**
Observation & learning	100% of priority areas[81] to have monitored effects	% priority areas with monitoring network	DMAOT
Definition of criteria & planning	100% of plans to factor environmental variables into planning instruments	% planning instruments[82] with climate change criteria	DMAOT
Adaptation	100% of depts. to take adaptation to climate change into account	% new plans & projects factoring in climate variables	DMAOT & DI

Table 25. Balanced scorecard for the Plan. Programme 3

Programme 3: SCIENTIFIC & TECHNICAL DEVELOPMENT	**Programme goal for 2012:** - **R&D&i spending on climate change to reach 4% of total spending under the Plan**		
LINE OF ACTION	**Goal for 2012**	**Indicator**	**Organisation responsible (source of indicator)**
Basic research & co-operation	150 researchers	Nº researchers	DICT /DEUI
Applied research	25 research projects	Nº projects approved	DICT/ DMAOT
Across-the-board elements	8 international projects	Nº projects approved	

[81] See Table 15
[82] See Table 6

Table 26. Balanced scorecard for the Plan. Programme 4

Programme 4: THE PUBLIC AND THE AUTHORITIES. MOBILISING THE PUBLIC BY LEADERSHIP AND EXEMPLARY ACTION ON THE PART OF THE AUTHORITIES	**Programme goal for 2012:** - **Reduce emissions from Basque govt. by 20% on 2006 levels** - **Reach 2.6 t CO2e per capita per annum**		
LINE OF ACTION	**Goal for 2012**	**Indicator**	**Organisation responsible (source of indicator)**
General activities & green procurement:			
Basque govt.	30% of Basque govt. procurement to use environmental criteria	% of procurement using environmental criteria	DHAP
Local authorities	20% reduction in emissions on 2008 levels	% reduction in emissions	Udalsarea 21
Energy efficiency & savings			
Savings & efficiency in the workplace & during government travel	20% reduction in emissions on 2008 levels	% reduction in emissions	GHG inventory Basque govt. (DMAOT, DHAP)
Savings & efficiency in the workplace & during travel by local authorities	10% reduction in emissions on 2008 levels in municipalities with >20,000 inhabitants	% reduction in emissions	Udalsarea 21
Education & training:			
Training for Basque govt. technical staff	30% of staff	% of Basque govt. staff trained	DHAP
Training for local authority technical staff	20% of staff at municipal level	% municipal authority staff trained	Udalsarea 21
Training & awareness of students	100% of schools to have information campaigns	% of schools that have conducted campaigns	DEUI
Training & awareness of teaching staff	40% of teaching staff trained	% of teaching staff trained	DEUI
Information & awareness :			
Public information	30% of population expressing level of concern as “high”	% of population informed	DMAOT/IHOBE
Public awareness	20% of population taking action to reduce emissions	% of population aware	

7.3.3 Assessment of the PVLCC

Numerous milestones and associated documents are envisaged for assessing and monitoring the Plan. The OVCC will prepare a monitoring report each year which will include the indicators on the balanced scorecard, qualitative progress in actions under each programme and documents resulting from the work of the forums of agents and forums of project promotion groups.

There will be a three-yearly check on progress in public behaviour in terms of commitment to climate change matters through the Social Eco-barometer survey.

The results of the annual monitoring of the PVLCC will be included in the annual BAC Environmental Sustainability Report submitted for approval by the cabinet of the Basque government at its meeting on Environment Day.

Mid-way through the term of the Plan assessment reports will be issued evidencing an in-depth review of the Plan and its setting to determine whether its final objectives need to be modified or adapted in line with the progress made and with new planning instruments on energy, sustainable consumption, waste, etc.

Finally, at the end of the term of the Plan a final report will be issued to sum up its achievements, detail the efforts made and the results obtained and determine what should be done in the future.

Table 27: Monitoring of the PVLCC

Assessment	Frequency	Body responsible	Channels for engagement & improvement
PVLCC annual monitoring report: – Indicators: balanced scorecard – Qualitative progress of the Plan – Conclusions of forums of agents & project promotion groups	Annual	OVCC	– Forums of agents – Forum for co-ordination between regions – Forum for co-ordination between institutions – LA21 forums – www.ingurumena.net – Awareness campaigns
Social eco-barometer survey	Three-yearly	DMAOT	
BAC environmental sustainability report	Annual	DMAOT	
PVLCC progress & interim review report	One-off	OVCC	
Final report summing up the PVLCC	One-off	OVCC	

7.4 PARTICIPATIVE STRUCTURE OF THE PLAN

The participation of all the agents involved is essential if the Plan is to be managed consistently on a consensus basis and co-ordinated, effective implementation is to be ensured with a view to attaining the objectives set. That must include public authorities and public institutions, leading social, economic and scientific/technical groups and the general public. Only by engaging each and every one of them in the preparation and implementation of the PVLCC can they be made to take on board the full scale of the problem and assimilate the individual responsibilities that they acquire.

The preparation of the PVLCC has involved major efforts on the part of the Basque government departments belonging to the OVCC and experts from public institutions, universities, the world of economics and society under the leadership of the Basque Government Department of Land Use and the Environment (DMAOT).

7.4.1 What actions were taken to draw up the Plan?

The following tools, forums and frameworks were used to draw up the PVLCC:

- The GHG inventory of the BAC, first published in 2001 and based on detailed energy balances drawn up by the Basque government, facilitated decision-making by providing data on the trends of the various GHGs and the sectoral breakdown of emissions in recent years.

- An econometric model for the construction of scenarios developed by the University of the Basque Country provided us for the first time with a forecasting tool based on variations in demand and the links between one sector of the economy and another and between the economy and the environment.

- The objectives and undertakings regarding climate change set down in goals 2, 3 and particularly 5 of the Environmental Framework Programme for 2007-2010 served as a jumping-off point for the preparation of the Plan.

- The plans and activities already drawn up by the relevant Basque government departments, provincial and municipal councils and those being drawn up currently and for the term of the Plan were taken into account in formulating objectives and actions.

- The Basque Climate Change Office acted as a co-ordinating body and a driving force for all actions and is responsible for monitoring, reviewing and improving the Plan.

- The participation process for the preparation and development of the Plan brings together all the public-sector, economic and social agents of the BAC.

The PVLCC incorporates contributions by social and business agents in the Business & Social Forums on Climate Change. Two specific sessions were held in 2006 and an *ad hoc* group of experts was set up. These sessions discussed possible emission reduction measures in various sectors including energy and industry, transport and mobility, construction and agriculture/ forestry, along with possible adaptation measures.

An International Conference on Climate Change was held in Bilbao in April 2007 as a one-off event to publicise the problems of climate change and share experiences with other countries that are further advanced in this matter. Over the two days of the event, the essential principles of climate change, the policy for combating it in the BAC and experiences in other countries were presented, from the viewpoints of reducing emissions and adaptation on the one hand and heightening general awareness on the other.

Working sessions were staged with the participation of international experts present at the conference. These sessions identified key aspects arising from experiences in other countries (difficulties, failures, successes, participative processes carried out, key tools and instruments, etc.), which were taken into account in the preparation of the Plan.

To check out the scientific data available, contacts and meetings were held with experts in several scientific fields, including biodiversity, climatology/ meteorology, water resources, forestry and agriculture, fisheries, geology, etc.

Udalsarea, the Basque Network of Municipalities for Sustainability, also participated actively in the preparation of the Plan. An example of its efforts is the session of its Technical Committee in March 2007 that discussed how municipalities could contribute to the Plan.

The Basque Government Department of Land Use and the Environment (DMAOT) considers that a well-informed, committed public can make a valuable contribution to the process of preparing the Plan. To guarantee public access to information and provide a forum for contribution, the DMAOT set up a website on which information was posted concerning Basque climate change policies, the Plan in particular (fundamental aspects, timing, stages and contents), sectoral initiatives on climate change and a range of relevant documentation. The website also features a suggestion box through which the general public can submit contributions.

7.4.2 What participative structure is proposed for the future?

The success of the PVLCC will depend largely on the extent to which the public authorities, businesses and the general public commit themselves to achieving its objectives. Co-ordinated, ongoing participation of all agents is required to encourage co-ordination between the agents involved so that efforts can be optimised, to establish and promote specific measures, to optimise the monitoring of the Plan and adjust its objectives if necessary, to encourage the public to act in ways favourable to the objectives of the Plan and to report on progress to the various agents involved.

The participative structure of the Plan provides the various agents involved with appropriate ways of playing their roles and assuming their various responsibilities. Public participation is associated with communication, which must be two-way so that the public can both make suggestions and receive information. The participation of agents from the production sector is focused mainly on information, communication and assessment: they will not only issue and receive information but also analyse difficulties and objections concerned with sectoral policies applicable to them. Finally, the role of the public authorities is to inform about, monitor, review and modify the PVLCC.

Numerous participative instruments will be drawn up to assure the attainment of the goals sought through the participation of the different agents. The co-ordination and combination of these instruments will ensure that participation will be dynamic, effective and representative, and will assure the engagement of the whole of society.

- *Forums of agents*: The main objective of these forums will be to report to the various sectors of society and the economy on the progress made under the Plan towards its initial objectives, and to compile further proposals and contributions. The forums will be held annually, but two milestones are particularly important: the mid-point in the term of the Plan (2010) and the period running up to the end of that term. On each of these occasions the forums will comprise different meetings for different agents: associations representing the general public (social forum), industry and business (business forum) and universities & research centres (scientific/ technical forum).

- *Forums for co-ordination between institutions*: These forums set out to analyse the actions of the various public authorities, incorporating local-level experiences and progress. They will

meet annually on a technical level, and will comprise representatives of all the Basque public authorities, i.e. the Basque government (via the OVCC) and the provincial & municipal councils (via EUDEL). These forums may be held at the same time as the forums of agents.

- *Forums for co-ordination between regions*: These forums will promote co-operation between regions to combat climate change effectively and globally. They act as a platform for sharing information and best practices, and for promoting and establishing co-operation between regions on sustainable development through NRG4SD and through the network of Atlantic Rim regions.

- *Public communication channels*: Along with the public information instruments already identified (participation forums and, indirectly, co-ordination forums) there are various other channels for ensuring active public participation in the process of preparing and implementing the Plan. They include:

  - *Information & awareness campaigns* by government departments and the OVCC on the Plan and its objectives.
  - *Websites* set up by the DMAOT such as www.ingurumena.net.
  - *Local Agenda 21 forums*: the main instrument for local-level participation. These forums promote active engagement on a local level by receiving suggestions, complaints and queries.
  - *Training for action* provided to school-children in the BAC, to factor climate change into school syllabuses.

As a result of the assessment of the Plan, a range of documents will be produced. The contents of these documents will be reported to agents and to the public through the channels envisaged, in line with the desire to ensure a smooth information flow and communicate with agents and thus provide a basis for agents and the public alike to make the best possible contributions to the PVLCC.