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**Direct Effects from the Implementation of the
EU Energy and Climate Package on
Cypriot Economic Sectors and Households**

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Executive Summary

This report is a unified version of deliverables D6.1 and D.8 of the research project entitled “Economic Impacts from the Implementation of the European Union’s Energy and Climate Change Legislation Package in Cyprus”, which is funded by the Research Promotion Foundation of Cyprus in the framework of ‘DESMI 2009-2010’, a programme co-funded by the Republic of Cyprus and the European Regional Development Fund (project number ΑΕΙΦΟΡΙΑ/ΚΟΙΑΦ/0609(BIE)/02).

The report delineates the EU Energy and Climate package and presents the assessment of the effects from the implementation of this legislation on the various sectors of the Cypriot economy. It is necessary to assess at this stage the effects from the implementation of the legislation, in order to identify those economic sectors that are particularly prone to changes in production costs and consumer prices. This will enable performing realistic simulations of economic impacts by sector in the subsequent work packages of the project.

The report summarises the provisions of the relevant EU legislation and provides an assessment of the direct economic effects by sector. These impacts have been assessed after extensive consultation with virtually all stakeholders from sectors of the economy of Cyprus that are expected to be affected by the energy and climate change legislation; details about the stakeholder consultation process are also provided.

CONTENTS

ΠΕΡΙΛΗΨΗ	VII
1. INTRODUCTION.....	1
2. OUTLINE OF THE EU 2020 CLIMATE AND ENERGY PACKAGE.....	1
2.1. Decisions	1
2.2. Regulations.....	3
2.3. Directives	4
3. EFFECTS OF THE ENERGY AND CLIMATE PACKAGE ON THE CYPRIOT ECONOMY	12
3.1. Effects due to the implementation of the Emissions Trading legislation	12
3.2. Effects due to the implementation of the commitment for 5% emissions reduction in non-ETS sectors.....	14
3.3. Effects on electricity generation costs and electricity prices due to the implementation of the Renewables legislation	15
3.4. Effects on automotive fuel prices due to the biofuel obligations	15
3.5. Effects due to the non-binding energy efficiency target	16
3.6. Effects on public spending.....	17
4. SUMMARY OF EFFECTS BY SECTOR.....	17
REFERENCES.....	20
APPENDIX: RESULTS OF STAKEHOLDER CONSULTATION	21

Άμεσες Επιπτώσεις στην Κυπριακή Οικονομία από την Εφαρμογή της Ευρωπαϊκής Νομοθεσίας για την Ενέργεια και την Κλιματική Αλλαγή

Θεόδωρος Ζαχαριάδης και Ελπίδα Σιούκρη

ΠΕΡΙΛΗΨΗ

Το παρόν Δοκίμιο συνοψίζει εργασία που διενεργείται στο πλαίσιο του έργου με αρ. πρωτοκόλλου ΑΕΙΦΟΡΙΑ/ΚΟΙΑΦ/0609(BIE)/02, το οποίο χρηματοδοτείται από το Ίδρυμα Προώθησης Έρευνας στο πλαίσιο της «Δέσμης Προγραμμάτων 2009-2010» που υποστηρίζεται χρηματικά από την Κυπριακή Δημοκρατία και το Ευρωπαϊκό Ταμείο Περιφερειακής Ανάπτυξης.

Το Δοκίμιο εξετάζει το πιθανό άμεσο κόστος στους τομείς της κυπριακής οικονομίας από την εφαρμογή της νομοθεσίας της Ευρωπαϊκής Ένωσης για την ενέργεια και την κλιματική αλλαγή, η οποία υιοθετήθηκε σε ευρωπαϊκό επίπεδο το 2009. Το ανωτέρω κόστος θα προέλθει κυρίως από την αύξηση των τιμών του ηλεκτρισμού και των καυσίμων κίνησης, λόγω συγκεκριμένων υποχρεώσεων της Κύπρου για χρήση ανανεώσιμων πηγών ενέργειας στην ηλεκτροπαραγωγή και στα καύσιμα των οχημάτων, όπως και της υποχρέωσης των εργοστασίων παραγωγής ηλεκτρισμού να αγοράζουν μέρος των δικαιωμάτων εκπομπών διοξειδίου του άνθρακα σε πλειστηριασμό. Οι εκτιμήσεις του κόστους αυτού θα χρησιμοποιηθούν σε κατοπινό στάδιο του ερευνητικού έργου για την προσομοίωση της επίπτωσης στο κόστος παραγωγής και στην απασχόληση ανά τομέα της οικονομίας, καθώς και της οικονομικής επίπτωσης στους τελικούς καταναλωτές.

Αρχικά παρουσιάζεται με συνοπτικό τρόπο η σχετική ευρωπαϊκή νομοθεσία, η οποία ενσωματώθηκε (ή βρίσκεται σε φάση ενσωμάτωσης) στο κυπριακό δίκαιο, και στη συνέχεια εξηγούνται οι αναμενόμενες άμεσες επιπτώσεις ανά τομέα της οικονομίας. Για τον σκοπό αυτό, έχουν ληφθεί υπόψη οι πληροφορίες και απόψεις όλων των εμπλεκόμενων φορέων – τόσο κυβερνητικών υπηρεσιών όσο και μη κυβερνητικών οργανώσεων καθώς και ιδιωτικών φορέων οι οποίοι εκπροσωπούν επιχειρήσεις που επηρεάζονται από τα ανωτέρω μέτρα. Λεπτομερής αναφορά στις συναντήσεις και επαφές που έγιναν από την ομάδα μελέτης με τους εμπλεκόμενους φορείς παρέχονται στο Παράρτημα του Δοκιμίου.

1. INTRODUCTION

This report is a unified version of deliverables D6.1 and D.8 of the research project entitled “Economic Impacts from the Implementation of the European Union’s Energy and Climate Change Legislation Package in Cyprus”, which is funded by the Research Promotion Foundation of Cyprus in the framework of ‘DESMI 2009-2010’, a programme co-funded by the Republic of Cyprus and the European Regional Development Fund (project number ΑΕΙΦΟΡΙΑ/ΚΟΙΑΦ/0609(BIE)/02).

The report delineates the EU Energy and Climate package and presents the assessment of the effects from the implementation of this legislation on the various sectors of the Cypriot economy. It is very important to diagnose and assess, at this early stage of the above mentioned project, the effects from the implementation of the legislation, in order to identify those economic sectors that are particularly prone to changes in production costs and consumer prices. This will enable performing realistic simulations of economic impacts by sector in the subsequent work packages of the project.

The report summarises the provisions of the relevant EU legislation in Section 2, provides an assessment of the direct economic effects in Section 3, and offers a summary of the expected impacts in Section 4. These impacts have been assessed after extensive consultation with virtually all stakeholders from sectors of the economy of Cyprus that are expected to be affected by the energy and climate change legislation; details about the stakeholder consultation process are provided in the Appendix.

2. OUTLINE OF THE EU 2020 CLIMATE AND ENERGY PACKAGE

The Climate and Energy Package seeks to ensure that the EU will achieve its targets by 2020: a 20% reduction in greenhouse gas emissions compared to 1990, a 20% improvement in energy efficiency, and a 20% share of renewable energy in energy consumption. The package comprises of the following legislation:

2.1. Decisions

2.1.1. Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community’s greenhouse gas emission reduction commitments up to 2020, (Effort Sharing Decision).

The "Effort Sharing Decision" on the reduction of greenhouse gases from sectors outside the Emissions Trading System (ETS), entered into force on the 25.6.2009 and establishes annual binding greenhouse gas emission targets for Member States. These targets concern the emissions in non-trading sectors (non-ETS), such as agriculture, transport, buildings and waste, and must be limited gradually according to annual emissions quotas in a linear manner from 2013 to 2020.

Each Member State will contribute to this reduction effort according to the principle of solidarity between Member States and the need for sustainable economic growth across the Community, taking into account its relative per capita GDP. Member States are obliged to limit emissions of sectors under the Effort Sharing Decision by defining and implementing policies and measures. At the Community level, this will deliver an approximately 10% emissions reduction from the related sectors, by 2020, in comparison with 2005 levels.

Cyprus greenhouse gas emission limit in 2020, compared to 2005 greenhouse gas emissions levels, is -5%. Therefore, as a member state with a negative limit under Annex II of this Decision, it must ensure that its greenhouse gas emissions in 2013 do not exceed its average annual greenhouse gas emissions during 2008, 2009 and 2010.

During the period 2013-2019, a Member State may carry forward from the following year a quantity of up to 5 % of its annual emission allocation. The unused part of the quota may be transferred to subsequent years. Article 3 provides the possibility, under certain conditions, to transfer a part of this allocation to other Member States. Additionally, a Member State may transfer the part of its annual emission allocation that exceeds its greenhouse gas emissions for that year to other Member States.

In order to implement their obligations under Article 3, Member States may use the following greenhouse gas emission reduction credits:

- (a) Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs), as set out in Directive 2003/87/EC,
- (b) CERs and ERUs issued in respect of emission reductions from 1 January 2013 from projects which were registered before 2013
- (c) CERs issued in respect of emission reductions achieved from projects implemented in least developed countries (LDCs) and
- (d) temporary CERs (tCERs) or long-term CERs (lCERs) from afforestation and reforestation projects

Since Cyprus has a negative limit of 5%, as set out in Annex II of this Decision, and is listed in Annex III of the Decision, in addition to credits used according to Article 5 provisions, it is allowed to use additional credits amounting to 1 % of its verified emissions in 2005 from projects in LDCs and small island developing States (SIDS), each year, subject to compliance with one of the following terms:

(a) the direct costs of the overall package exceed 0,70% of GDP according to the Commission's Impact Assessment accompanying the Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020;

(b) there is an increase of at least 0.1 % of GDP between the target actually adopted for the Member State concerned and the cost-effective scenario according to the Commission's Impact Assessment referred to in point (a);

(c) more than 50% of the total emissions covered by this Decision for the Member State concerned are accounted for by transport-related emissions;

If a Member State exceeds the emission allocations the following actions must be taken:

- a deduction from the Member State's emission allocation of the following year;
- the development of a corrective action plan;
- temporary suspension of the eligibility to transfer to another Member State part of its emission allocation and rights to use credits from project activities.

2.2. Regulations

2.2.1. Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce carbon dioxide (CO₂) emissions from light-duty vehicles.

Acknowledging that road transport is the second largest greenhouse-gas emitting sector in the EU, and its emissions still rise, this Regulation aims towards CO₂ reduction by setting emission performance standards for the new car fleet.

This Regulation establishes CO₂ emissions performance requirements for new passenger cars, which are registered in the Community for the first time, in order to achieve the overall objective of 120 g CO₂/km by 2012. At first, the Regulation sets the

average CO₂ emissions for new passenger cars at 130 g CO₂/km, by means of improvement in vehicle motor technology. A further reduction of 10 g CO₂/km must be delivered by other technological improvements and by an increased use of sustainable biofuels.

Furthermore a long term target for 2020 for the new car fleet is introduced, of average emissions of 95 g CO₂/km.

In order to assess compliance Member States must collect and report to the Commission data on registrations of new cars in the Community. If car manufacturers average emissions of CO₂ exceed the specific emission target set by the Regulation will have to pay excess emissions premiums.

2.3. Directives

2.3.1. Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

The Renewable Energy Directive, which came into force on 25 June 2009, creates a common framework for the development of renewable energy. It sets obligatory national targets for the overall share of energy from renewable sources expressed as a percentage of gross final consumption of energy and for the share of renewable energy in transport. It defines rules relating to statistical transfers among Member States, joint projects among Member States and with third countries, guarantees of origin, administrative procedures, information and training, and access to the electricity grid for energy from renewable sources. It sets sustainability criteria for biofuels and bioliquids. The promotion of energy from renewable sources must be connected to increased energy efficiency in order to effectively reduce greenhouse gas emission, bearing in mind that the higher the reduction in energy consumption, the less energy from renewable sources will be required to meet the target. Member States should establish a national renewable energy action plan.

The allocation of individual targets for each Member State takes into account their different starting points, the renewable energy potential, and the energy mix of each Member State and is weighted by their GDP. Member States in order to achieve the goals set by this Directive must apply proper support schemes, according to their different potentials, that grant benefits solely to energy from renewable sources. For

Cyprus, the share of energy from renewable sources in gross final consumption of energy in 2020 must amount to 13%.

Moreover, the Directive sets an EU wide target for the share of energy from renewable sources in all forms of transport in 2020 of at least 10% of the final consumption of energy in transport sector in every Member State. All Member States have to reach the same target in order to secure uniformity in transport fuel specifications and availability. The binding 10% target for transport is to be achieved from renewable sources as a whole, and not from biofuels alone.

In order to be taken into account, biofuels and bioliquids must contribute to a reduction of at least 35% of greenhouse gas emissions. From 1 January 2017, their share in emissions savings should be increased to 50%, and from 1 January 2018 it must amount to at least 60%. The production of biofuels and bioliquids used for compliance with the goal set in this Directive must fulfill certain sustainability criteria:

Biofuels and bioliquids shall not be produced from raw material obtained from land with high biodiversity value, i.e. primary forest and other wooded land, areas designated, highly biodiverse grassland, also shall not originate from land with high carbon stock, wetlands, continuously forested areas and peatlands. Moreover the criteria extend to the impact on social sustainability in the Community and in third countries, to the influence of Community biofuel policy on the availability of foodstuffs at affordable prices, in particular for people living in developing countries, and to wider development issues and address the respect of land-use rights.

Member States shall require from the economic operators verification of compliance with the sustainability criteria for biofuels and bioliquids. To benefit from financial support, biofuels and bioliquids must be qualified as sustainable in accordance with the set criteria.

Additionally, this Directive foresees a partial exemption for Member States which have a large share of aviation in their gross final consumption of energy, by acknowledging that the current technological and regulatory constraints hinder the commercial use of biofuels in aviation. The amount by which they exceed 1.5 times the Community average gross final consumption of energy in aviation in 2005, as assessed by Eurostat, i.e. 6.18%, is excluded from the calculation of their gross final consumption of energy in national air transport. As a result, for Cyprus the exemption should cover the amount by which it exceeds the Community average gross final consumption of energy in aviation in 2005; thus the overall renewables target, instead of 13%, is approximately 11.7%.

According to the Renewable Energy Action Plan submitted by the Republic of Cyprus to the European Commission in June 2009, the target set out by this Directive is expected to be met through a combination of increased renewable power generation (16% of total electricity production will be from RES in 2020) and increased use of renewables for heating and cooling purposes in the rest of the economy.

2.3.2. Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community.

This Directive, which entered into force on the 25/06/2009, constitutes a revision and strengthening of the greenhouse gas emission allowance trading scheme (ETS) of the Community, in order to achieve greater emissions reductions in energy-intensive sectors in a cost-effective way. The reviewed ETS will apply from the start of its third trading period on 01/01/2013. The Directive includes provision for its adaptation after an international agreement has been reached to combat climate change and for a subsequent move beyond the EU's overall 20% reduction target.

The definition of greenhouse gases should be in accordance with that applied in the UNFCCC, and greater clarity should be given on the setting and updating of global warming potentials for individual greenhouse gases. Member States may extend the emission allowance trading scheme to greenhouse gases which are not listed in Annex I of this Directive, taking into account all relevant criteria and provided that inclusion of these greenhouse gases is approved by the Commission.

A single Community-wide cap on emission allowances will apply from 2013 and will decrease annually, thereby reducing in a linear manner the number of allowances available to operators to 21% below the 2005 level in 2020. The quantity of allowances will be calculated from the mid-point of the period 2008-2012, ensuring that the ETS will ultimately deliver gradual and predictable emissions reductions. The annual decrease of allowances will amount to 1.74% of the allowances issued by Member States pursuant to Commission Decisions on Member States' national allocation plans for the period 2008-2012, aiming to achieving in a cost-effective way the Community's commitment for limiting emissions by 20% in 2020.

The Commission should adopt Community-wide and fully-harmonised implementing measures for the allocation of the allowances. The measures, to the extent feasible, should determine Community-wide ex-ante benchmarks so as to ensure that allocation takes place in a way that provides incentives for reductions in greenhouse gas emissions and for energy efficient techniques.

The free allocation of allowances will be progressively replaced by auctioning, and the sectors and gases covered by the system will be expanded. From 2013 onwards heavy industry will contribute significantly to Community's goal for limiting greenhouse gas emissions by 20%, compared to 1990 levels, by 2020. To encourage the adoption of clean technologies, the new ETS provides that greenhouse gas emissions permits will no longer be given to operators for free, but will be auctioned by Member States from 2013 onwards. Most ETS sectors must start purchasing a fraction of their emissions permits at auctions in 2013, and this fraction will gradually increase up to 2020.

The power sector is obliged to acquire all of their emissions allowances at auctions from 2013 onwards taking into account its ability to pass on the increased cost of CO₂. Derogation is available in order to facilitate the energy transition for states with high dependence on fossil fuel or insufficient connection to the European electricity network – Cyprus is one of these countries. Member States concerned must submit to the Commission a national plan that provides for investments in retrofitting and upgrading of the infrastructure and clean technologies. The national plan shall also provide for the diversification of their energy mix and sources of supply. In order to prevent market distortion, recipient power producers must invest in clean technology to the market value of the permits.

The Directive also provides for a mechanism aiming to support Member States with relatively lower income per capita, for their transition to a low-carbon economy. They will receive an increased amount of emissions permits to auction, namely 12% of the total quantity of allowances to be auctioned. This will offer them the opportunity to generate substantial revenues from selling allowances. Each Member State will determine the use of its revenues from auctioning the permits. It is appropriate that at least 50% of the proceeds should be used, amongst other actions, to reduce greenhouse gas emissions, to adapt to the impacts of climate change, to develop renewable energies and also to alleviate the social consequences of moving towards a low-carbon economy.

In the case that an international agreement on climate change is not concluded or delayed to be reached a number of sectors could be exposed to a risk of "carbon leakage", namely investments and production might move to third countries where industry would not be subject to comparable carbon constraints. The Directive provides for the possibility of reducing auctioning for a limited number of sectors. If an industry can demonstrate that purchasing permits significantly increases its costs (more than 5 % of its gross value added) and that it faces international competition, it can qualify for the free allocation of its allowances. Full free allocation will not exceed the level of a benchmark corresponding to the 10% cleanest technologies in the EU. If an installation emits more than that, it will need to acquire allowances up to the level of its actual

emissions. Substantial auctioning rates can therefore be expected even in excepted industry sectors.

Member States may also adopt financial measures in favour of sectors or subsectors determined to be exposed to a significant risk of carbon leakage due to costs relating to greenhouse gas emissions passed on in electricity prices, in order to compensate for those costs and where such financial measures are in accordance with state aid rules. Those measures shall be based on ex-ante benchmarks of the indirect emissions of CO₂ per unit of production. The ex-ante benchmarks shall be calculated for a given sector or subsector as the product of the electricity consumption per unit of production corresponding to the most efficient available technologies and of the CO₂ emissions of the relevant European electricity production mix.

The overall reduction of auctioning through these provisions could have an impact on the solidarity mechanism and reduce the redistribution in favour of less affluent Member States. Consequently, the "carbon leakage" derogation is subject to further review before the start of the third trading period in 2013.

2.3.3. Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC.

This Directive entered into force on 25/06/09 and sets environmental requirements for petrol and diesel fuel in order to reduce greenhouse gas released during the production and combustion of fuel. These requirements consist of technical specifications for fuel content and binding targets to reduce fuels' greenhouse gas emissions during their life cycle. The Directive advocates greater use of biofuels into petrol and diesel and in order to avoid negative consequences, sets sustainability criteria for biofuels.

The aims of this Directive will be achieved by:

- ✓ setting technical specifications for the content of fuels used in road vehicles and non-road mobile machinery (including inland waterway vessels), tractors and recreational craft.

- ✓ setting targets to reduce life cycle greenhouse gas emissions from fuel. Life cycle greenhouse gas emissions concern CO₂, methane (CH₄) and nitrous oxide (N₂O) emissions that can be assigned to fuel at all stages from extraction or cultivation to combustion including transport, distribution, processing and land-use changes.

The Directive sets targets to reduce fuel's life cycle greenhouse gas emissions. It places the responsibility of reducing greenhouse gas emissions during the life cycle of fuel on fuel suppliers.

- ✓ Fuel suppliers from 2011 and onwards must annually report to Member States on the life cycle greenhouse gas emissions per unit of fuel supplied.
- ✓ Suppliers have to progressively reduce fuel greenhouse gas emissions per unit of energy from fuel and energy supplied by up to 10% by 31 December 2020. This reduction shall consist of
 - 6% by 31 December 2020, setting intermediate reduction targets: 2% by 31 December 2014 and 4% by 31 December 2017. This can be reached in particular by mixing biofuels to petrol and diesel as well as by improving production technology in refineries.
 - An indicative additional target of 2% to be achieved by 31 December 2020 is introduced, by either supplying electric vehicles or using greenhouse gas reducing technologies.
 - Another indicative target of 2% by 2020 is to be achieved by the purchase of credits through the Clean Development Mechanism.

To enable these emissions cuts, petrol may have a higher biofuel content. From 2011, petrol may contain up to 10% (by volume) ethanol. In order to avoid damage to old vehicles, it is appropriate to ensure for a transitional period, whereas fuel with 5% (vol.) ethanol will continue to be available, with the possibility for member states to extend that period.

The Directive incorporates the same environmental and social sustainability criteria to be fulfilled by biofuels, as in the Renewables Directive (2009/29/EC). Economic operators must prove that sustainability criteria are met using a mass balance method of verifying compliance. The calculation of life cycle greenhouse gas emissions from biofuels will be calculated with default values for greenhouse gas emission savings. It imposes limits on the content of sulphur and metallic additives in engine fuel and sets the maximum vapour pressure of fuel in order to minimise emissions of volatile air

pollutants. The revised environmental quality standards as well as the sustainability criteria for biofuels apply from 2011. The Commission will report to the European Parliament and the Council on several aspects of the Directive, namely for the sustainability criteria and the calculation of greenhouse gas emissions savings.

2.3.4. Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide (amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006).

Carbon dioxide capture and geological storage (CCS) is a group of technologies that capture carbon dioxide emitted by industrial processes and store it in underground geological formations, where it cannot contribute to global warming. Each one of the different components of CCS, namely capture, transport and storage, has been the object of pilot projects on a smaller scale than that required for their industrial application. These components still need to be integrated into a complete CCS process, the technical and economic viability of its use as an integrated system has yet to be confirmed. It is important that Community efforts on CCS demonstration within an integrated policy framework start as soon as possible. The EU therefore plans to set up a network of CCS demonstration plants by 2015 to test its viability, with the aim of commercial update of CCS by around 2020.

This Directive should apply to the geological storage of CO₂ within the territory of the Member States, in their exclusive economic zones and on their continental shelves. Member States should retain the right to determine the areas within their territory from which storage sites may be selected. This includes the right of Member States not to allow any storage in parts or on the whole of their territory, or to give priority to any other use of the underground, such as exploration, production and storage of hydrocarbons or geothermal use of aquifers.

The suitability of a geological formation for use as a storage site shall be determined through a characterisation and assessment of the potential storage complex and surrounding. A geological formation shall only be selected as a storage site, if under the proposed conditions of use there is no significant risk of leakage, and if no significant environmental or health impacts are likely to occur. Storage sites should not be operated without a storage permit.

Two types of permits are foreseen: an exploration permit with two years duration, under which the permit holder may seek suitable geological formations in the permit

area; and a storage permit for the development and utilisation of geological formations as storage sites. The storage permit should be the core instrument to ensure that the substantial requirements of this Directive are met and that geological storage therefore takes place in an environmentally safe way. The Commission reviews and comments on each individual storage permit before it is awarded.

It is necessary to impose constraints on the composition of the CO₂ stream that are consistent with the primary purpose of geological storage, which is to isolate CO₂ emissions, and that are based on the risks that contamination may pose to the safety and security of the transport and storage, to the environment and human health. The composition of the CO₂ stream, which is the result of the processes at the capture installations, should be verified prior to injection and storage.

Monitoring is essential to assess whether injected CO₂ is behaving as expected, whether any migration or leakage occurs, and whether any identified leakage is damaging the environment or human health.

The CCS Directive includes provisions to impose liability for damage resulting from any failure of permanent containment of carbon dioxide, both in terms of damage to the local environment and damage to the climate. Liability for environmental damage (damage to protected species and natural habitats, water and land) is regulated by the Environmental Liability Directive (2004/35/EC) with regard to the prevention and remedying of any such damage by an operator. Liability for climate damage as a result of leakage will be covered by the ETS Directive, so that ETS allowances will need to be surrendered for leaked emissions.

Where the operator fails to take the necessary corrective measures, these measures should be taken by the competent authority, which should recover the costs from the operator. Liabilities other than those covered by this Directive, Directive 2003/87/EC and Directive 2004/35/EC, in particular concerning the injection phase, the closure of the storage site and the period after transfer of legal obligations to the competent authority, should be dealt with at national level. It is important to note that, as part of the permitting regime, Member States are permitted to require operators, financial security for probable liabilities.

The Directive also foresees for the removal of barriers on CCS which exist under current EU legislation. In particular, waste and ground water Directives will be amended to permit the injection of carbon dioxide into storage sites.

3. EFFECTS OF THE ENERGY AND CLIMATE PACKAGE ON THE CYPRIOT ECONOMY

Based on the description of the individual EU-wide legislative measures of Section 2, and taking into account that all these measures have become (or are currently becoming) part of national legislation in Cyprus, this Section provides an assessment of the immediate economic effects that these measures will have on the Cypriot economy.

3.1. Effects due to the implementation of the Emissions Trading legislation

3.1.1. Direct effects on industries participating in the Emissions Trading System

Installations participating in the EU ETS in Cyprus are the three power plants of the Electricity Authority of Cyprus (EAC), the cement plant and the ceramics and tiles plants. Moreover, the aviation sector will enter the ETS from 2013 onwards.

3.1.1.1. As regards EAC, the combination of the ETS legislation and the objective for 16% renewable electricity generation as explained in Section 2.3.1, is expected to lead to an increase in production costs because of:

- The requirement for EAC to purchase a part of its CO₂ emission allowances;
- The financial support of EAC to renewable power generators since EAC purchases renewable power from independent generators at relatively high prices in order to subsidise RES electricity generation;
- The need to keep standby power generating capacity in order to account for intermittency problems associated with renewable sources, i.e. to satisfy any electricity needs occurring when renewable sources cannot generate power.

These additional costs have been calculated in detail in the framework of studies carried out for the Cyprus Energy Regulatory Authority (e.g. CERA 2010), and were updated in June 2011 during an intergovernmental consultation process.

However, for the purpose of this project, it is assumed that all additional costs incurred by EAC will be fully passed through to final consumers of electricity (as if it were an exogenous tax imposed directly on final electricity use), so that the company itself will not need to adapt to these additional production costs. This has been the practice of the company so far.

3.1.1.2. As far as the cement company is concerned (which used to operate two old cement plants but is in the process of operating only one new plant in the Vasilikos

area before the end of 2011), the consultation of the project team with staff of the governmental Environment Department has led to the conclusion that cement production may incur very low additional costs, of the order of no more than 5%; this is due to both the design of the new cement plant, which incorporates several energy saving measures that help reduce greenhouse gas (GHG) emissions, and to the implementation of the ETS Directive for this type of installations.

3.1.1.3. Ceramic and tile companies are also expected to incur small additional production costs because of the ETS – of the order of 5%. The main economic burden to these companies comes from competition from low-cost companies in other countries regardless of environmental regulations, although the evolution of the ‘cap’ (i.e. the maximum EU-wide emissions allowed per ton of product) to be decided by the European Commission and implemented until the year 2020 may indeed put some additional pressure to these installations.

3.1.1.4. Finally, the national air carrier (Cyprus Airways) is expected to incur an additional cost due to the inclusion of aviation in the EU ETS from 2013 onwards and the obligation of European airlines to purchase 15% of their CO₂ allowances in auctions. After consultation with the governmental Environment Department, it was decided to assume a 5% increase in production costs for the simulations to be performed in this project.

3.1.2. Direct effects on end users

Section 3.1.1 outlined the assumptions about the direct economic effects of the energy and climate legislation on installations affected by the ETS. To what extent these additional production costs will be passed through to end users of the products of these companies (e.g. cement, tiles etc.) will be explored in the economic simulations to be carried out in the subsequent work packages of this project. However, as regards electricity generation and air travel, it is assumed, in line with current practice of these companies, that the additional costs will be fully passed through to consumers. Therefore:

- As regards **electricity**, in line with CERA (2010) and according to an intergovernmental consultation process that was finalised in June 2011, assuming the fraction of emission allowances that will be purchased in auctions will start at 30% in year 2013 and reach 100% in 2020 (which is the most likely decision to be taken by the Cyprus government as of 15 July 2011), final retail electricity prices are assumed to rise by 4.74% in year 2013 up to 8.43% in 2020. This price rise is only due to the additional costs incurred because of the requirement for EAC to purchase a part of its CO₂ emission allowances. If one includes the other additional

cost items outlined in Section 3.1.1.1, plus the increase in the renewable energy levy imposed on all electricity consumers in order to support financially the national grants for renewable energy and energy efficiency investments, there is an additional increase in electricity price of 4.16% in 2020¹. Therefore, the overall rise in electricity prices is assumed to start from 4.74% in 2013 and reach $(8.43+4.16=)$ 12.59% in year 2020.

- As regards **air travel** costs, it is assumed that the price of air tickets will increase by 4% in year 2013 up to 8% in year 2020.

3.2. Effects due to the implementation of the commitment for 5% emissions reduction in non-ETS sectors

There is very little knowledge about the impacts of the non-ETS emissions reduction obligation of Cyprus. The main reason for this is that it is unclear how this national target can be achieved. Apart from some energy saving measures in the buildings and industrial sectors, which will be mentioned in the energy efficiency section of this report, a large part of emission reductions must come from the transport sector since it is responsible for the largest share of non-electricity energy consumption in the non-ETS sectors. The main measure that has been implemented in transportation so far is the introduction of a new public transport system (through the introduction of new buses) in both urban and intercity transport. Governmental authorities estimate that this measure will cost about 75 million Euros per year, for the period 2013-2020, due to subsidies provided by the government to the newly established public bus companies. However, this measure is clearly not sufficient to meet the emission reduction target; in fact it seems to be having only a marginal effect on total public transport use. In July 2011 the governmental Environment Department initiated a consultation process for the preparation of a law on limiting the emissions of non-ETS sectors; it will take some time before a concrete legislative proposal is published.

In the absence of more information on upcoming measures in order for the country to comply with the -5% mandatory target, and since the relevant national legislation is still under preparation, for the model simulations to be performed later in this project it will be assumed that the country will only be able to meet this target by purchasing the required emission allowances from the carbon market. This will imply increased public expenditures, ranging from 24.2 million Euros in year 2013 up to 26.3 million Euros in year 2020; the assumed path of public expenditures per year is shown in Table 1,

¹ Personal communication with Dr. Andreas Poullikkas of the Electricity Authority of Cyprus, 14 July 2011.

based on information available from the Cyprus Environment Department (2011). Note that the assumed carbon price per year is the same with the carbon price assumed in the case of ETS installations mentioned in previous sections.

Table 1: Projected GHG emissions from non-ETS sectors in years 2013-2020 and required expenditures to purchase emission allowances per year.

	<i>GHG emissions 'with existing measures' (mio t CO₂ eq)*</i>	<i>GHG emissions target (mio t CO₂ eq)</i>	<i>Assumed EUA price (Euros/t)</i>	<i>Costs of purchasing EUAs (mio Euros)</i>
2013	5.567	4.141	17.00	24.242
2014	5.595	4.161	17.90	25.665
2015	5.623	4.181	19.08	27.505
2016	5.582	4.202	20.27	27.979
2017	5.531	4.222	21.45	28.080
2018	5.474	4.242	22.63	27.877
2019	5.408	4.262	23.82	27.289
2020	5.333	4.283	25.00	26.260

* Source: Cyprus Environment Department (2011)

3.3. Effects on electricity generation costs and electricity prices due to the implementation of the Renewables legislation

These effects have already been included in the assumptions of Section 3.1.1.1.

3.4. Effects on automotive fuel prices due to the biofuel obligations

There is still large uncertainty worldwide concerning the future costs of biofuels, particularly second-generation biofuels that are expected to be used by the end of this decade (see e.g. Ajanovic and Haas 2010, Carriquiry et al. 2011, Timilsina and Shrestha 2011). In line with information provided by local representatives of petroleum companies and biofuel importers (included in project deliverable D6.1), it was decided to assume that retail automotive diesel prices will be 3% higher in 2013 compared to the no-biofuels case, and this price differential will reach 8% in year 2020 as the mandated fraction of biofuels will increase. For gasoline, it was assumed that no price

increase will happen until 2015 as no bioethanol is expected to be used up to that year, whereas afterwards there will be a price differential starting with 2% (in 2016) and reaching 6% (in 2020).

3.5. Effects due to the non-binding energy efficiency target

The EU energy and climate package includes an EU-wide energy efficiency target: that national energy consumption in each Member State should decrease by 20% in year 2020 compared to what it would have been under a 'business as usual' scenario. This objective is not mandatory as of the time of this writing (July 2011), and Member States are free to calculate energy savings in any total energy quantity they prefer (e.g. in total final energy consumption or in total primary energy consumption). Despite the non-binding nature of this target, several EU regulatory initiatives (e.g. Directives on the energy performance of buildings) which are formally not part of the EU energy and climate package are being transposed to national legislation and hence affect the economy of each country.

In the case of Cyprus, mandatory energy performance standards for buildings have recently been adopted and will be strengthened in this decade in view of the upcoming more stringent EU Buildings Directive and the EU objective of moving towards nearly zero energy buildings before 2020. After a consultation with staff of the Cyprus Employers & Industrialists Federation, the association that represents land developers of the country (see Deliverable D6.1 of the project), it was found that stricter requirements for thermal insulation of buildings must have added 5-10% to the average construction costs. Therefore, we will assume in the subsequent simulations that the construction sector will incur additional operating costs that range from 5% in year 2013 to 10% in 2020. The real estate sector, to which land developing activities belonged according to the NACE rev. 1 and rev. 1.1 classifications that will be used in this project, will be assumed to incur a smaller extra cost as that sector contains also other economic activities that are not related to increased construction costs. To what extent these extra costs will be passed through to consumers purchasing these new buildings is a matter to be determined by the economic model to be developed in work package 4 of the project.

3.6. Effects on public spending

As already mentioned in Section 3.2, public spending will have to increase in order to attain the 5% emission reduction in non-ETS sectors for the following reasons:

- Purchase of EU allowances may reach 24.2-28.1 MEuros per year as shown in Table 1;
- The promotion of public transport will cost about 75 million Euros per year for the period 2013-2020.

Other public expenditures, e.g. for continuing subsidies of energy efficiency and renewable energy investments, will primarily be financed by consumers since such a levy is included in their electricity bills, and the required increase in this levy has been accounted for in the estimated electricity price increases – see Section 3.1.2. Evidently, the public sector will also be affected by increases in retail prices of electricity and automotive fuels as explained in Sections 3.1.2 and 3.4 respectively.

4. SUMMARY OF EFFECTS BY SECTOR

Table 2 provides a summary of the direct economic effects from the implementation of EU's energy and climate change package, by sector. All monetary amounts are expressed in nominal terms.

In order to enable the exploration of a worse scenario, assuming higher costs because of uncertain future events (e.g. due to an increase in EU ETS allowance prices because of the shutdown of nuclear power plants in Germany and elsewhere), Table 3 presents the relevant assumptions, which may also be simulated in subsequent work packages of this project.

Table 2: Assumed direct effects from the implementation of EU's energy and climate change package in Cyprus, by economic sector, in years 2013 and 2020. **Baseline scenario.**

Year 2013	<i>Change in price of electricity</i>	<i>Change in prices of automotive petrol</i>	<i>Change in prices of automotive diesel</i>	<i>Change in production costs*</i>
<i>Sector</i>				
Agriculture, hunting and forestry	4.74%	0%	3%	
Fishing	4.74%	0%	3%	
Mining and quarrying	4.74%	0%	3%	
Electricity supply		0%	3%	
Water supply	4.74%	0%	3%	
Manufacturing, of which:	4.74%	0%	3%	
<i>Cement</i>	4.74%	0%	3%	2%
<i>Other non-metallic minerals</i>	4.74%	0%	3%	2%
<i>All other manufacturing</i>	4.74%	0%	3%	
Construction	4.74%	0%	3%	5%
Services, of which:	4.74%	0%	3%	
<i>Real estate etc.</i>	4.74%	0%	3%	2%
<i>Public administration & defense</i>	4.74%	0%	3%	99.2 M€
<i>All other services</i>	4.74%	0%	3%	
Households	4.74%	0%	3%	4% (air travel)

Year 2020	<i>Change in price of electricity</i>	<i>Change in prices of automotive petrol</i>	<i>Change in prices of automotive diesel</i>	<i>Change in production costs*</i>
<i>Sector</i>				
Agriculture, hunting and forestry	12.59%	6%	8%	
Fishing	12.59%	6%	8%	
Mining and quarrying	12.59%	6%	8%	
Electricity supply		6%	8%	
Water supply	12.59%	6%	8%	
Manufacturing, of which:	12.59%	6%	8%	
<i>Cement</i>	12.59%	6%	8%	5%
<i>Other non-metallic minerals</i>	12.59%	6%	8%	5%
<i>All other manufacturing</i>	12.59%	6%	8%	
Construction	12.59%	6%	8%	10%
Services, of which:	12.59%	6%	8%	
<i>Real estate etc.</i>	12.59%	6%	8%	5%
<i>Public administration & defense</i>	12.59%	6%	8%	101.3 M€
<i>All other services</i>	12.59%	6%	8%	
Households	12.59%	6%	8%	8% (air travel)

* due to other reasons, not directly related to changes in energy prices

Table 3: Assumed direct effects from the implementation of EU's energy and climate change package in Cyprus, by economic sector, in years 2013 and 2020. High impacts scenario.

Year 2013	<i>Change in price of electricity</i>	<i>Change in prices of automotive petrol</i>	<i>Change in prices of automotive diesel</i>	<i>Change in production costs*</i>
<i>Sector</i>				
Agriculture, hunting and forestry	10%	3%	6%	
Fishing	10%	3%	6%	
Mining and quarrying	10%	3%	6%	
Electricity supply		3%	6%	
Water supply	10%	3%	6%	
Manufacturing, of which:	10%	3%	6%	
<i>Cement</i>	10%	3%	6%	5%
<i>Other non-metallic minerals</i>	10%	3%	6%	5%
<i>All other manufacturing</i>	10%	3%	6%	
Construction	10%	3%	6%	10%
Services, of which:	10%	3%	6%	
<i>Real estate etc.</i>	10%	3%	6%	5%
<i>Public administration & defense</i>	10%	3%	6%	120 M€
<i>All other services</i>	10%	3%	6%	
Households	10%	3%	6%	10% (air travel)

Year 2020	<i>Change in price of electricity</i>	<i>Change in prices of automotive petrol</i>	<i>Change in prices of automotive diesel</i>	<i>Change in production costs*</i>
<i>Sector</i>				
Agriculture, hunting and forestry	20%	10%	15%	
Fishing	20%	10%	15%	
Mining and quarrying	20%	10%	15%	
Electricity supply		10%	15%	
Water supply	20%	10%	15%	
Manufacturing, of which:	20%	10%	15%	
<i>Cement</i>	20%	10%	15%	10%
<i>Other non-metallic minerals</i>	20%	10%	15%	10%
<i>All other manufacturing</i>	20%	10%	15%	
Construction	20%	10%	15%	15%
Services, of which:	20%	10%	15%	
<i>Real estate etc.</i>	20%	10%	15%	7%
<i>Public administration & defense</i>	20%	10%	15%	150 M€
<i>All other services</i>	20%	10%	15%	
Households	20%	10%	15%	15% (air travel)

* due to other reasons, not directly related to changes in energy prices

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APPENDIX: RESULTS OF STAKEHOLDER CONSULTATION

A.1. Introduction

This brief Appendix to the report summarises the results of the consultation with representatives of public authorities, the private sector, private company associations and NGOs, during the period January-May 2011. The findings have been taken into account for the quantification of the economic effects of the EU energy and climate legislation, which is presented in Sections 3 and 4 of this report.

A.2. Results of the meetings with representatives of public authorities

A.2.1. Meeting with the Environment Department, Ministry of Agriculture, Natural Resources and Environment

Date: January 13th 2011

Present:

Name	Title	Sector	e-mail address/tel.
Theodoulos Mesimeris	Environment Officer A,	Climate Action	tmesimeris@environment.moa.gov.cy 22408948
Nikoletta Kythreotou	Environment Officer	Climate Action	nkythreotou@environment.moa.gov.cy 22408947
Theodoros Zachariadis	Ass. Prof. Project Coordinator	Cyprus University of Technology	t.zachariadis@cut.ac.cy 25002304
Elpida Shoukri	Research Fellow	Cyprus University of Technology	elpida.shoukri@cut.ac.cy 25002304

The Environment Department is responsible for:

- **REGULATION (EC) No 443/2009** setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO2 emissions from light-duty vehicles.
- **DIRECTIVE 2009/31/EC** on the geological storage of carbon dioxide (amending Council Directive 85/337/EEC, European Parliament and Council Directives

2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006).

- **DECISION No 406/2009/EC** on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.
- **DIRECTIVE 2009/29/EC** amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community.

Key issues:

- There is no study on climate change impacts in Cyprus.
- Strategy plan for adapting to climate change and mitigating the adverse effects to be carried out upon completion of the study on climate change impacts.
- Strategy plan on emissions reduction will be prepared in the frame of Commission Decision 406/2009/EC
- Annual reports to EU on greenhouse gas emissions will be submitted as foreseen by the relevant Directives/regulations.
- A brief document submitted by the Environment Department to The House of Parliament on climate change summarizes:
 - Expected climate change impacts in Cyprus.
 - Actions held by now:
 - ✓ Cyprus Action Plan to combat desertification, 2008. A proposal is under way to be submitted to the Council of Ministers.
 - ✓ Study on the future of the agriculture in Cyprus, 2010. As part of the study the impacts of climate change on agriculture have been assessed.
 - ✓ Study on the estimation of climate change impacts on Cyprus forests. Forestry department.
 - ✓ Planning and plan implementation on decoupling from rainfall in order to cover potable water supply needs. Water Development Department.
 - Future actions:
 - Development of Adaptation Action Plan, to be implemented in 2 phases:
 - a) Preliminary phase – preparation of complete adaptation strategic.
 - b) Implementation of the strategic plan, starting in 2013.

- Experimental assessment of the impacts of irrigation reduction, sunlight and temperature increase on selected crops, to be conducted by the Agricultural Research Institute.

- The EU Emissions Trading Scheme (ETS) has been thoroughly explained, in relation to local conditions and the obligations of the Republic of Cyprus. As things currently stand, it seems that:
 - The cement industry will not be faced with additional costs from the obligation to purchase emission allowances because it has already factored in these costs in the construction of a new cement plant.
 - The tiles and bricks industries are already under serious economic pressure, and purchasing emission allowances will be an additional burden to their competitiveness.
 - The Electricity Authority of Cyprus (EAC) will face an additional cost from its ETS obligations, to be passed through to final consumers by an increase in retail electricity prices. The government of Cyprus is considering making use of a derogation granted by the European Commission, so that 70% of total emission permits will be handed out for free to EAC in year 2013, and this fraction will gradually decline so that in 2020 all permits will have to be purchased in auctions. Applying this derogation will enable avoiding increases in electricity tariffs but will deprive the government of Cyprus from public revenues. The government has not yet decided how to deal with this issue.
- The inclusion of aviation in the ETS has been explained and potential impacts on the airlines of Cyprus have been outlined.
- The Non-ETS emission reduction requirements for Cyprus have been explained. GHG emissions from non-ETS sectors have to be reduced by 5% in 2020 compared to the levels of year 2005. No concrete emission reduction measures have been implemented so far, and there is a serious risk that Cyprus will greatly exceed this target and will hence have to purchase a large number of emission allowances from the carbon market, which may cost tens of millions of Euros in 2020. It was then discussed whether the introduction of a carbon tax can contribute towards meeting the non-ETS GHG target.

An additional meeting was held on 14 June 2011 between Mr. Mesimeris, Ms. Kythreotou and Mr. Zachariadis, where recent developments as regards the implementation of the ETS were clarified.

A.2.2. Meeting with the Energy Service, Ministry of Commerce, Industry and Tourism

Date: January 13th 2011

Present:

Name	Title	Sector	e-mail address/tel.
Ioannis Chryssis	Senior Officer	RES	ich.cie@cytanet.com.cy 22409384
Hadjinikolaou Nikos	Officer	Energy efficiency in buildings	nhadjinikolaou@ets.mcit.gov.cy 22409396
Lizides Andreas	Officer	RES	alizides@mcit.gov.cy 22409386
Piripitsi Katerina	Officer	Energy conservation	kkp.cie@cytanet.com.cy 22409344
Karapitta – Zachariadou Christina	Officer	Petroleum/Biofuels	ckarapitta@mcit.gov.cy 22409388
Topouzi Eleni	Officer	Industry and Environment	elt.cie@cytanet.com.cy 22409340
Theodoros Zachariadis	Ass. Prof. Project Coordinator	Cyprus University of Technology	t.zachariadis@cut.ac.cy 25002304
Elpida Shoukri	Research Fellow	Cyprus University of Technology	elpida.shoukri@cut.ac.cy 25002304

The Energy Service is responsible for:

- **DIRECTIVE 2009/28/EC** on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.
- **DIRECTIVE 2009/30/EC** amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC.
- **DIRECTIVE 2010/31/EC** on the energy performance of buildings.
- **DIRECTIVE 2010/30/EC** on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products.

Although the latter two Directives do not belong formally to the EU's Energy and Climate Package, they are of related content and will contribute towards the achievement of the objectives of the Package.

Key issues:

- The Cyprus energy policy is shaped by the Ministry of Commerce, Industry and Tourism in collaboration with all involved institutions and approved by the Council of Ministers of the government of Cyprus.
- The National Renewable Energy Action Plan for Cyprus has been adopted as required under article 4 of Directive 2009/28/EC and was submitted to the European Commission in summer 2010. The Action Plan is setting out the targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020. Target: 16% of electricity to be produced by RES by 2020. Increased use of RES in heating and cooling and transportation will contribute to an overall fraction of 13% RES in gross final energy consumption, as foreseen for Cyprus by the Directive.
- Regarding energy efficiency the 20% by 2020 goal (as stated in the EU Energy and Climate Package) is not mandatory, but specific targets for reducing energy consumption, especially in energy-intensive sectors such as construction/buildings are obligatory as a result of other legislation such as the above mentioned Directives 2010/30 EC and 2010/31/EC.
- In a development that is related to national energy and climate policy, the Energy Service has presented a proposal to the Government of Cyprus on the advantages for Cyprus of not becoming an Annex 1 country to UNFCCC and continuing to invest in projects to be financed through the Kypoto Protocol's Clean Development Mechanism. The proposal will be commented by the Environment Department and may be submitted to the EU.
- The targets for RES have been set. The subsidies/grants and the expected prices are to be estimated.

- Important aspects: the purchase price by Electricity Authority of Cyprus (EAC) for energy produced from RES by private investors, the EAC back-up cost (in relation to intermittent RES sources such as wind farms), CO₂ avoidance cost of EAC, expenditures and potentially public revenues - from the purchase of tradable pollution rights.
- The common fund that finances private investments in both RES and energy efficiency measures may be split in two separate funds. This is still under examination by the government of Cyprus.
- The new Directive 2010/31/EC, a recast of the Directive on energy performance of buildings (2002/91/EC) is setting mandatory provisions to achieve energy performance in buildings. Under this Directive, the Member States must apply minimum requirements as regards the energy performance of new and existing buildings, ensure the certification of their energy performance and require the regular inspection of boilers and air conditioning systems in buildings. Moreover, Energy Performance Certificates are requested according to the provisions of this Directive.
- An action plan is scheduled regarding buildings with nearly zero-energy consumption, which will include certain percentage of RES use.
- Cogeneration could contribute to energy savings in cement plants, hotels, shopping malls, etc. The required grants and subsidies must be examined. Most probably the scheme will be similar to the existing one for RES investments. Cogeneration has been assessed as financially and technically feasible.
- Provisions on biofuels are set in Directives 2009/28/EC and 2009/20/EC. The goal is twofold: a) 6% reduction target for the well-to-wheel greenhouse gas emissions of transport fuels for the year 2020 and b) 10% share of RES in transport energy use – most of which is expected to be covered by biofuels.
- Cyprus imports fuel mixtures which contain a percentage of biofuels, particularly biodiesel.
- Biofuels are tax free.
- EU's decision implies the set up of certification schemes for all types of biofuels, including those imported into the EU. The schemes must be recognised by the Commission and sustainability criteria must be satisfied. Guidelines for certification schemes are set in the Directive 2009/28/EC.

As a follow-up of this meeting, the Energy Service provided the study team with the following documentation:

- An assessment of costs for extending the current scheme of subsidies for RES & energy efficiency investments up to the year 2020 in order to comply with the provisions of Directive 2009/28/EC;
- An evaluation of the energy savings achieved during the period 2004-2010 due to the implementation of the above mentioned Directives and the RES & energy efficiency subsidies;

- A projection of potential energy savings up to the year 2020 from the extension of the implementation of RES & energy efficiency subsidies and the further application of the relevant Directives.
- The strategic environmental impact assessment study of the National Renewable Energy Action Plan of Cyprus.

A.2.3. Meeting with the Ministry of Finance

Date: January 18th 2011

Present:

Name	Title	Sector	e-mail address/tel.
Andreas Charalambous	Director of Finance	Directorate of Economic Research and EU Affairs	acharalambous@mof.gov.cy 22601192
Catsounotou Melina	Senior Financial Officer	Directorate of Economic Research and EU Affairs, Better Regulation Unit	mcatsounotou@mof.gov.cy 22601123
Karaolis Andreas	Senior Financial Officer	Directorate of Economic Research and EU Affairs, Better Regulation Unit	akaraolis@mof.gov.cy 22601125
Bakalouris Loukia	Planning Officer	Planning Bureau	lbakalouris@planning.gov.cy 22602936
Theodoros Zachariadis	Ass. Prof. Project Coordinator	Cyprus University of Technology	t.zachariadis@cut.ac.cy 25002304
Elpida Shoukri	Research Fellow	Cyprus University of Technology	elpida.shoukri@cut.ac.cy 25002304

A Powerpoint presentation has been given, pointing out:

1. The aims of the project and the timetable.
2. Detailed information about the requirements of the EU climate and energy package.

3. Key issues from international reports (Climate change impacts in Europe-Final report of the PESETA research project. Future Impacts of Climate Change across Europe-Center for European Policy Studies. IPCC Synthesis Report. The Stern Review on the Economics of Climate Change).
4. Main points of studies on climate change impacts regionally-focused to Cyprus and the Cyprus Action Plan to combat desertification.
5. Seven main sectors have been addressed: water resources, natural ecosystems/ biodiversity, energy, agriculture, coastal areas, human health, and tourism. Mentioning projected impacts based on SRES scenarios and projections and whereas possible economic impacts have been roughly presented in terms of GDP or welfare changes.

After the presentation a discussion followed and the following issues were raised:

- Both adaptation and mitigation measures must be planned and applied. It has been emphasized that more effective mitigation measures should be applied in order to reduce the climate change impacts and therefore the cost for adaptation.
- The need of local research on RES and mitigation measures.
- The carbon tax must be examined, and the importance of energy efficiency/saving must be promoted in policies and measures.

A.2.4. Other brief contacts with governmental authorities:

Date: February 1st 2011

Contact with: Dr. Andreas Poulikkas, Deputy Director of Electricity Authority of Cyprus.

Dr. Poulikkas was the leader of a study carried out on behalf of the Energy Regulatory Authority of Cyprus, which assessed the impact of the EU Energy and Climate Package on power generation costs and retail electricity prices in Cyprus. He provided the study team with the relevant report and explained the different scenarios that he examined, and which one seems to be the most realistic one for the purpose of this study. He also noted that the Energy Regulatory Authority of Cyprus does not possess any other relevant estimates, nor will it carry out any other related study until early 2012.

Date: February 11th 2011

Contact with: Mr. Michalis Lambrinos, Head of the Public Transportation Promotion Unit, Ministry of Communications and Works

Mr. Lambrinos informed the study team about the expected costs to the government of Cyprus from the promotion of public transport modes (purchase of new buses, subsidies to public transport authorities etc.). As a follow-up he also offered some estimates regarding the broader costs from the promotion of sustainable mobility in Cyprus.

Date: February 23rd 2011

Contact with: Mr. Ioannis Economides, Head of Industrial Pollution Unit, Energy Service

Mr. Economides mentioned that he does not possess specific information as regards the costs of compliance with the EU Energy and Climate Package, but he believes that these costs have been underestimated by the European Commission in the case of Cyprus. In his opinion, economies of scale for the deployment of RES, which may exist in large EU countries with indigenous RES industry, are not applicable in Cyprus, therefore investment costs for RES and other CO₂-reducing investments are higher in Cyprus.

Date: February 2011

Contacts with: Dr. Marinos Markou, Assistant Director and Dr. Polycarpou Polycarpou, Senior Agricultural Research Officer, Agricultural Research Institute (ARI)

Dr. Markou has provided the study team with a copy of the study "Consequences of Cyprus EU Accession and the Future of the Cypriot Agricultural Sector", the findings of which could be of use in other work packages of this project. Dr. Polycarpou explained that ARI has no data in relation to the project, but useful information could be found in the study "Defining Energy Crops Potential in Cyprus". The study aims to determine which energy crops can be cultivated in Cyprus and to estimate the available quantities of biomass, in order to examine the possibility of creation one or two central units for production of solid and liquid biofuels.

A.3. Results of the consultation with the private sector and private company associations

Dates: April-May 2011

Contacts with: Representatives of petroleum companies in Cyprus:

- a) Mr. Antonis Semelides (Hellenic Petroleum),
- b) Mr. Christos Christophi (ExxonMobil) and
- c) Mr. Evangelos Grigoriou (Lukoil)

All three representatives of fuel importing companies provided similar information on the current cost of imports of conventional fuels and biofuels (primarily biodiesel as bioethanol is not yet used in Cyprus). Biodiesel currently costs 300-600 US\$ per tonne more than conventional diesel fuel, a price difference of 30-40%. As a result, automotive diesel price is slightly higher than the price that would prevail without any biofuel blends; however, as biofuels are currently exempt from excise taxes, retail fuel prices are not affected very much. It is unknown whether Cyprus (along with other EU countries) will continue to offer this tax exemption. All three company representatives share the view that biofuel costs will continue to be high because of:

- 1) gradually increasing blending obligations in EU countries
- 2) increasing global demand for biofuels
- 3) more stringent sustainability criteria for second generation biofuels and stringent related certification procedures, which are likely to increase production costs
- 4) the eventual abolition of excise tax exemptions for biofuels

Therefore, they all agreed that it is very unlikely for the price differential between conventional diesel and biodiesel to decrease in the future.

Currently, with 5-7% biodiesel blended with diesel fuel and at a cost differential of 30-40%, pre-tax diesel costs are 1.5% to 3% higher than in conventional diesel fuel. However, because of the excise tax exemption, retail diesel prices are approx. only 1% higher than in the case of conventional diesel fuel. Gasoline fuel is not affected yet. At a current annual diesel consumption of approx. 360 kilotonnes (i.e. 18 kilotonnes biodiesel), there is an additional annual expenditure of about \$9 million (6-7 million Euros) for biofuel imports. Out of these, about one third is paid by consumers because it is passed through to retail diesel price, and two thirds are paid by the government (in order to enable the excise tax exemption mentioned above).

Date: May 3rd 2011

Contact with: Mr. Dimitris Miskourides, Plant Director of Ambrosia Oils (1976) Ltd (the only company selling biodiesel in Cyprus)

Mr. Miskourides provided information and estimates on current and future costs of biodiesel. In his opinion, the Republic of Cyprus is likely to abolish the biofuel tax exemption, so that all additional biofuel costs will be passed through to final consumers. If this happens (probably within the year 2011), the retail price of automotive diesel is expected to increase by 2-3 Eurocents per litre, and there may be a further increase if a higher fraction of biodiesel is blended with conventional diesel oil later in this decade. He believes that second generation biofuels may be less costly to produce, therefore he is not sure whether the price differential between conventional diesel and biodiesel will remain equally large in the future. Finally, Mr. Miskourides could not offer any estimate on costs of bioethanol production (to be blended with gasoline fuel) as there is no such experience in Cyprus so far.

Date: May 5th 2011

Contact with: Mr. Marios Tsiakkis, Director, Industry Department, Cyprus Chamber of Commerce and Industry (CCCI)

Mr. Tsiakkis mentioned that he does not possess detailed data on the costs to enterprises due to the implementation of the EU energy and climate legislation; he only has general information on the topic and is aware of the fact that the legislation is already causing higher production costs to member companies of CCCI.

Date: May 30th 2011

Meeting with: Mr. Kyriakos Angelides, Industry & Services Officer, and Mr. Antonis Frangoudis, Senior Industry & Services Officer, Cyprus Employers & Industrialists Federation (OEB).

Mr. Angelides and Mr. Frangoudis presented the information and viewpoints of the Cyprus Employers & Industrialists Federation about the costs of energy and climate related legislation on industrial enterprises of the country. Although they did not possess detailed quantitative data, they underlined two points:

- The price of electricity is crucial for production costs in the whole industrial sector of Cyprus.
- According to the association of land developers of Cyprus, which is a member of OEB, costs of new buildings (both residential and commercial) have increased by 5-10% in recent years as a result of requirements for improved energy efficiency of buildings. This is a figure that the study team will use in its simulations.

A.4. Outcome of the consultation with NGOs

Date: March 2nd 2011

Contact with: Ms Anthi Charalambous, Director, Cyprus Energy Agency (CEA), a public interest non-profit organisation that mainly promotes the use of renewable energy sources, energy efficiency and sustainable transport. Ms Charalambous explained the two main projects that CEA participates: a) the ISLE-PACT project that is committed to developing Local Sustainable Energy Action Plans and a pipeline of bankable projects with the aim of meeting or exceeding the EU sustainability target of reducing CO₂ emissions by at least 20% by the year 2020.

b) the Covenant of Mayors, an ambitious initiative commenced by the European Commission, that endorses the local authorities' commitment in the implementation of sustainable energy policies. The signatories aim to achieve and exceed the EU 20% CO₂ reduction objective through increased energy efficiency and development of renewable energy sources.

Ms Charalambous recommended the project team to visit CEA website where relevant information to the project could be found. The study team gathered some data related to RES which will be taken into consideration in WP4 and 5.

Date: May 4th 2011

Contact with: Mr Petros Markou, President, Cyprus Consumers Association. Mr Petrou highlighted that the Association does not have any data related to the project, due to lack of resources to undertake primary research. He expressed his will to help with WP2 (Dissemination of Results).

Date: May 9th 2011

Contact with: Dr. Loukas Aristodemou, President, Cyprus Consumers Union and Quality of Life. Dr. Aristodemou expressed his worries about the delays in implementing the climate package and to meet reduction or renewable investment targets leading to additional costs placed upon consumers. The Union possesses no data related to the project, but only general information.

Date: May 10th 2011

Contact with: Mr. Christos Maxoulis, Scientific officer, Cyprus Scientific and Technical Chamber (ETEK). Mr. Maxoulis clarified that ETEK didn't accomplish any primary research in the field and does not possess any tangible data in relation to this project. Nevertheless, he provided related information and a white paper stating ETEKs' positions regarding energy issues in Cyprus.

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