INSPIRE
Infrastructure for Spatial Information in Europe

Member State Report: Greece, 2009

Title	Member State Report: Greece, 2009
Creator	Pediaditi Kalliope (MEECC), Athanasiou Spiros (Prime Minister's Office) & Nedas Konstantinos A. (HEMCO)
Date	2010-05-15
Subject	INSPIRE Directive, Monitoring and Reporting, Member State Report: Greece, 2009
Status	Draft
Publisher	Hellenic Mapping and Cadastral Organization
Type	Text
Description	Progress report on the implementation of the INSPIRE Directive in Greece for the Monitoring and Reporting requirements of the Directive.
Contributor	Stefanakis Konstantinos (MEECC), Grigoriou Elena (HEMCO)
Format	application/pdf
Source	Not Applicable
Rights	Public
Identifier	MP_2009_v1.0.pdf
Language	eng
Relation	Not Applicable
Coverage	Not Applicable

These are Dublin Core metadata elements. See for more details and examples http://www.dublincore.org/

Version number	Date	Modified by	Comments
0.1	2010-05-05	Pediaditi Kalliope	First draft
0.2	2010-05-06	Athanasiou Spiros	Integration of technical sections
0.3	2010-05-07	Stefanakis Konstantinos	Additions to section 2.1.1
0.4	2010-05-10	Grigoriou Elena	Integration of section 8.1
0.5	2010-05-11	Nedas Konstantinos A.	Integration of several sections
0.6	2010-05-12	Nedas Konstantinos A.	Integration of figures, abbreviations, references and conclusions
0.8	2010-05-13	Pediaditi Kalliope	Integration of executive summary
0.9	2010-05-14	Athanasiou Spiros	Integration of several comments
1.0	2010-05-15	Nedas Konstantinos A.	General review, correction of all sections, consolidation, metadata and final changes

Table of Contents

Executive summary

This report consists of a provisional working document which is being submitted in conjunction with the National Transposition law for the INSPIRE Directive [1] entitled “National Infrastructure for Geospatial Information”. The aforementioned law is currently undergoing the consultation phase, rendering the content of this document non-binding and subject to change, in light of the outcomes of the consultation.

The rationale for submitting this draft report at this phase, apart from wishing to abide with the EC Decision’s deadline, is also to provide INSPIRE stakeholders and the public with the necessary background information and an overview of the status of Spatial Information in Greece, in order to understand the importance of this law. Therefore, the complexities and issues which were identified, following the consultation with national stakeholders and the survey of existing spatial datasets and services, are presented, in order to provide an adequate overview of the basis which was used to formulate the law.

This report contains a description of the work undertaken and of the methods used to fulfill the requirements of the EC Decision on monitoring and reporting. Briefly, this report summarizes work carried out by the Ministry of Environment, Energy and Climate Change (MEECC) between January and May 2010, which was coordinated by the Hellenic Mapping and Cadastral Organization (HEMCO) and supported by the Prime Minister’s Office in collaboration and with the input from all Ministries. In addition, where relevant, reference is made to a study conducted by HEMCO [2] in 2008 as well as to a study undertaken by the Technical Chamber of Greece in 2008 (TCG) [3] on its own initiative, in an attempt to offer guidance regarding the implementation of the INSPIRE Directive in Greece. These efforts complemented previous work, also conducted by HEMCO [4]. A National inventory of datasets and services was not feasible within the timeframe, nor considered appropriate during this time of administration reform. However, it is underway, following the provisions of the National Transposition law. Thus, the results presented herein are strictly provisional and non-binding.

In Section 2.1 of this report, a detailed description of the coordination and quality assurance provisions concerning the National Infrastructure for Spatial Information is presented. HEMCO, based on Decision No 168237/14-06-2007 of the Secretary General of MEECC has been appointed the official national contact point and is representing Greece in the INSPIRE Committee of article 22 of the Directive. The coordination structure foreseen in the new law involves the establishment of a National GeoInformation Committee (NGC) which will be amenable to the Prime Minister, chaired by the Minister of MEECC and whose members will include the General Secretaries of the most pertinent Ministries regarding the implementation of the Directive. The Committee’s role will be to formulate and monitor the *National Policy on GeoInformation* (NPG) as well as the National Interoperability *Framework for GeoInformation and Services* (NIFGIS). HEMCO, as the coordinating organization, will not only be responsible for the development and maintenance of the National Geoportal, through which it will exercise the quality assurance procedures, but will also assume the role of the national technical and coordinating body which will formulate the aforementioned policy and framework for the NGC. To support the coordination of HEMCO, it is foreseen that each public authority, within a month of the enforcement of the law, will establish a focal point and a supporting coordinating structure for the implementation of the law. As INSPIRE is dynamic and continually under development, it is envisioned that special interest groups will be formed to support the technical work, following the model and structure of the EU thematic and special interest groups. This approach is based on the principles of participation, openness and transparency. Moreover, considering the restrictive timeframes for the implementation of the Directive and of the Implementing Rules (IR), the voluntary collaboration and input of spatial data and service users, providers and owners is considered of paramount importance.

Section 2.2 provides a brief overview of the current issues which have arisen due to the lack of a quality assurance system to date, in conjunction with a description of the new quality assurance provisions of the law. All investigations carried out for the purpose of this report identified that despite the numerous service-related geospatial projects of the Public Sector in Greece, there is no way of assuring their quality with regard to the INSPIRE provisions. During consultations with the stakeholders and from the results of the surveys serious issues where identified, such as those of

unclear ownership, fragmentation, unknown quality, etc. Therefore, through the transposition law, HEMCO is established as the sole National Quality Assurance Body for spatial datasets and services. The Geoportal, which will be used to catalogue datasets and services, will set as a prerequisite for their inclusion their conformance with the National Interoperability Framework and INSPIRE IRs. It is also foreseen within the law that datasets and services financed through Public Sector and/or EU funds will receive payment, subsequent to the provision of HEMCO issuing a quality assurance certification.

Section 3 presents an overview of the foreseen function and coordination of the Spatial Infrastructure (Art 13). It is proposed that within six months of the enactment of the law. the National GeoInformation Council will issue the *National Policy on GeoInformation*, and within ten months the *National Interoperability Framework for Geospatial Information and Services*, through which the role and responsibilities of the different stakeholders will be specified, as well as the measures and rules to facilitate sharing. The Geoportal is envisioned to be in place by December 2010.

Regarding usage of the infrastructure for spatial information (Section 4) the investigation demonstrated that although the need for it is widely recognized, the lack of knowledge of the existence of the different datasets and services, in conjunction with their lack of interoperability, has greatly reduced their exploitation not only by the public, but also between public authorities. This has resulted in unnecessary duplication of effort and in ineffective decision-making for environmental protection.

Sharing arrangements in Greece are unclear apart from a few cases for which a legal framework exists (Section 5). This issue is dealt with through the law, which makes mandatory provisions for data sharing. The details of the data sharing provisions will be specified in the NPG document. Data sharing barriers are very real in Greece and have had serious negative impact on the country's development and environment. An indicative example provided by the Ministry of Civil Protection involves their lack of access to essential data, held by other government bodies, which during the devastating fires of 2007 resulted in the hindering of fire operations and the tragic loss of lives.

The vision is that the effective implementation of the INSPIRE Directive through the law will prove to be a significant step forward in overcoming these sharing barriers. The cost of implementing the Directive is considerable as access to GIS software and relevant equipment at all levels is limited, therefore, indicating the need to find cost-effective and technically-efficient solutions which will not burden the government budget during this time of financial crisis. The cost of data harmonization cannot even be estimated without completing the inventory of existing datasets and services at all levels of public administration. However, the medium to long term financial savings and benefits which will take place from improved governance undoubtedly surpass any immediate costs. Failure to effectively implement INSPIRE will undermine any attempt to effectively implement any EU or National policy or progress towards sustainable development. The cost-related issues are further elaborated upon in Section 6.

Abbreviations and acronyms

EIA	Environmental Impact Assessment
EU	European Union
HEMCO	Hellenic Mapping and Cadastral Organization
INSPIRE Directive	Directive 2007/2/EC
IR	Implementing Rule
MEECC	Ministry of Environment, Energy and Climate Change
MS	Member State
NCG	National GeoInformation Committee
NIFGIS	National Interoperability Framework for GeoSpatial Information and Services
NG	National Geoportal
NGO	Non-Governmental Organization
NPG	National Policy on GeoInformation
NSDI	National Spatial Data Infrastructure
SDI	Spatial Data Infrastructure
SEA	Strategic Environmental Assessment
TCG	Technical Chamber of Greece

1 Introduction

This report is a result of the collaborative effort conducted by all Ministries of the Hellenic Republic since December of 2009, under the coordination of MEECC, HEMCO and the Prime Minister's Office, to record existing spatial datasets and services held by each Ministry and its associated organizations, public companies etc.

The timing of the census of existing spatial datasets and services coincided with a fundamental reform of the Greek public sector, which not only entails the restructuring of ministry departments, merger and shutdown of many associated organizations and companies, but also the voting of the "Kallikratis" law, which introduces a radical reform, in a bid to reduce government costs and increase the productivity of the public sector. In particular, "Kallikratis" removes Prefectures and reduces the number of Municipalities from 1034 to 343. Consequently, many of the associated bodies and organizations are merged, moved or made redundant (Figures 1, 2). Apart from a reform of the governance structure, "Kallikratis" enables the decentralization of governance, devolving powers and responsibilities to the regions and municipalities. Within this reform, the ownership and responsibility for spatial data, its collection, sharing and updating, as well as the ownership of spatial data services is in turmoil, and will not be possible to determine prior to the enactment of the "Kallikratis" law. Moreover, the administrative boundaries themselves are being revised, thus posing technical barriers regarding the spatial dataset coverage and completeness. It was therefore deemed necessary, not to proceed with a full census of existing spatial datasets and services for all levels of public administration until the reform is complete, in order to ensure that information gathered will be usable for the implementation of the NSDI.

This decision was also supported by the outcomes of an earlier study conducted in 2008 by HEMCO [2] which attempted to record spatial datasets and services of all authorities on a voluntary basis (i.e. without a legally mandated requirement to do so) which resulted in an unsatisfactory response rate—especially from the lower tiers of public administration—rendering its outcomes unusable for the purpose of this. report. Based on this experience, the strategy employed was to establish an extensive network of stakeholders at ministry level, and record all existing datasets and services, identify gaps and issues, and collaboratively propose a coordination structure and necessary procedures to complete the census.

An overview of the methodology followed is provided below, in conjunction with an outline of the limitations and issues identified. It must be emphasized that the methodology, development, analysis of results and report -writing was conducted in house by HEMCO with the input of all ministries, headed by the MEECC.

The results of this effort were used to formulate the transposition law of the INSPIRE Directive, named "*National Infrastructure for Geospatial Information*", which is currently undergoing the public consultation phase. As such, until the law has been formally adopted, the contents of this report remain subject to change, and should be viewed as a provisional working document.

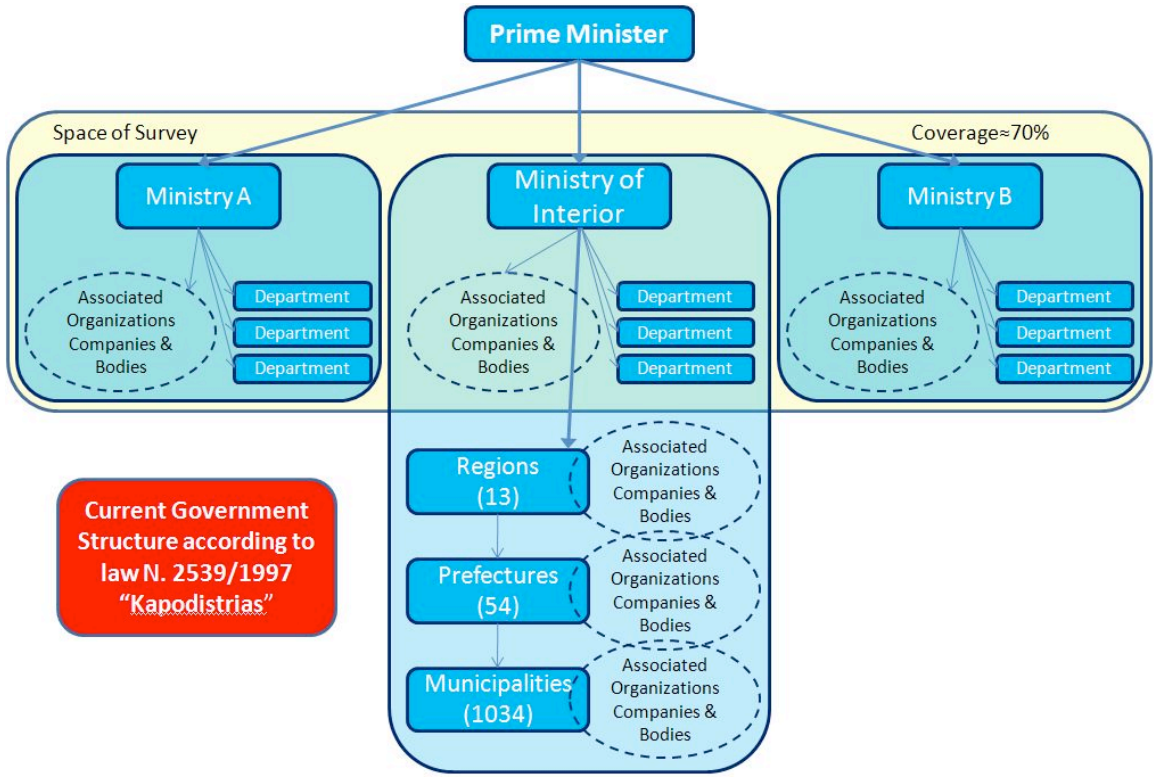

Figure 1: According to the current government structure each ministry has multiple departments, organizations, associated companies and bodies, whereas the ministry of interior administers 13 regions, 54 prefectures and 1034 municipalities, each of which has its own associated organizations, bodies and companies.

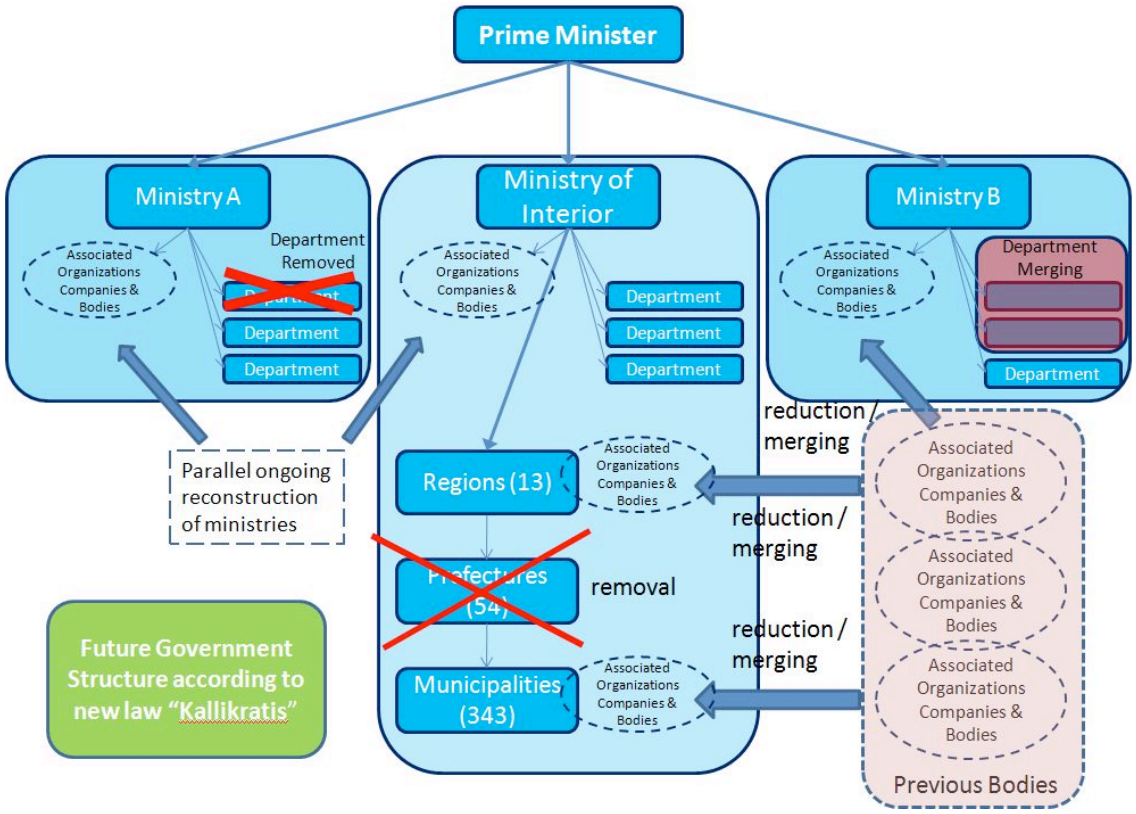

Figure 2: The new reduced and more versatile foreseen structure, resulting from a) the adoption of "Kallikratis" law and b) the parallel ongoing reconstruction of ministries, demonstrates why conducting a complete census with the current structure (Figure 1) would yield unusable results.

A literature review of all EU INSPIRE-related guideline documents was conducted, in conjunction with

the reports that HEMCO (2009) and the Technical Chamber of Greece (2008) had produced. A review of other member states NSDIs, legislation and practices was also conducted. The latter, helped formulate the approach, as well as the coordination structure both for the Greek NSDI and for the undertaking of the census of existing datasets and services.

The MEECC, having established HEMCO as the national contact point for INSPIRE, opted for a collaborative and open approach to the data collection process. Letters were sent from the Minister's office to all Directors of the MEECC asking them to establish a representative, who would undertake the task of recording existing spatial datasets and services. The minister, similarly, contacted all ministries with a request for their collaboration in establishing similar working groups and representatives within their ministries which would undertake the same tasks.

HEMCO established the data collection methodology, web-based survey forms, the relevant information and help material [5], [6] and on-line explanatory videos on how to complete the forms. Training workshops were carried out with all representatives, both jointly and individually. The first series of workshops focused on introducing the requirements of the INSPIRE Directive, and on explaining the meaning of crucial terms such as *metadata*, *relevant area*, *actual area*, *conformity* etc. A second series of workshops and meetings were carried out to help representatives determine the thematic category the spatial data belonged to, as well as their relevance for inclusion. All along the process, HEMCO also provided continuous support by web, email, and phone, helping stakeholders address problems and resolve ambiguities as they arose. In the final workshop, all representatives presented their results of the data collection, as well as their recommendations for the effective coordination and implementation of the Directive.

Regarding spatial datasets, an excel spreadsheet based on the template provided by the EU INSPIRE committee was created. An additional questionnaire, addressed other reporting requirements including spatial services. These templates were provided to all representatives and were collated by appointed coordinators in each ministry, enabling the collation of an official position from each Ministry.

All submitted datasets were then analyzed and checked thoroughly for errors and typos by HEMCO. Although the stakeholders were asked to classify all of the datasets they submitted within the INSPIRE annex themes, the analysis revealed that several data sets were outside INSPIRE's scope, whereas others were mapped erroneously.. To the extent possible—considering the degree of ambiguity and overlap that exists for several of INSPIRE's themes (especially in Annexes II and III)—these errors were detected and corrected. A final round of communications took place, with HEMCO contacting the stakeholders in order to resolve omissions and correct problems for which further input was required. Once complete, datasets were scored using template indicators and the final results are submitted in conjunction to this report.

2 Co-ordination and quality assurance (Art. 12)

To date, there is no established coordination and quality assurance mechanism for spatial information in Greece. Service and data quality specifications and sharing arrangements have been developed and implemented on an ad hoc basis, posing significant barriers to the effective implementation of the INSPIRE Directive, and underlining the pressing need to do so. The survey of existing spatial datasets and the consultation with INSPIRE stakeholders revealed the breadth of the implications and of the impact that the Directive's transposition will have on the existing information management structure and on the governance responsibilities. In Section 8.1, the wide range of stakeholders which are affected and which need to be involved is elaborated upon. In this Section we provide a description of the foreseen coordination structure for the implementation of the Directive in conjunction with an outline of the foreseen responsibilities and working practices that the different stakeholders will be obliged to follow. With regard to the quality assurance component of this report, as no such mechanism is currently established, an overview of the key issues and problems identified is presented along with the measures foreseen in the law to overcome them.

2.1 Coordination (Art. 12.1.)

2.1.1 Member State contact point & responsibilities

Although the responsibility for the coordination and management of spatial information in Greece to date is unclear and fragmented within different Ministries, Public Authorities and organizations, the MEECC has been charged with the overarching responsibility of the transposition of the INSPIRE Directive. Therefore, in accordance with Art 19.2 of the Directive, MEECC assigned HEMCO as the national contact point, whose responsibilities are detailed in the new law and described below (Section 2.1.2.2). In addition, HEMCO's responsibilities include the country's representation in the INSPIRE Committee of Art 22 of the Directive. HEMCO's purpose, as described in its founding law 1647/1986, is the creation, maintenance and update of a cadastre for Greece, the geodetic coverage and the mapping of the country, the assessment and mapping of the natural resources, and the creation of a land and environment database. As such, the appointment of HEMCO as Greece's contact point is explicit and based on its founding law followed by Ministerial Decision N^{o} 168237/14-6-2007 and amended with Ministerial Decision N^{o} 3176/29-3-2010.

Name and contact information

Member State Contact Point	
Name of the public authority	Hellenic Mapping and Cadastral Organization
Contact information:	
Mailing address	Timoleontos Vassou 11-13, 115 21, Athens, Greece
Telephone number	+30 210-6445401
Telefax number	+30 210-6437790
Email address	proedros@okxe.gr
Organization's website URL	http://www.okxe.gr
Contact person (if available)	Konstantinos A. Nedas
Telephone number	+30 210-6443583
Email address	knedas@okxe.gr
Contact person - substitute (if available)	Konstantinos Stefanakis
Telephone number	+30 210-8643783
Email address	k.stefanakis@dpers.minenv.gr

2.1.2 The coordination structure

The coordination structure proposed in the new law is based on: (a) an analysis of the existing governance structure and procedures regarding spatial information, (b) a review of the mechanisms

implemented by other member states and (c) the recommendations proposed from three separate studies conducted in Greece, including that of TCG [3]. Due to the complexity and the fragmentation of responsibilities regarding spatial information in Greece which are not compatible with the horizontal nature that INSPIRE requires, it became apparent that the preservation of the existing coordination structure would impede any effort by MEECC and its appointed contact point HEMCO to ensure the implementation of the Directive's IRs throughout the public sector alone, since many of the decisions involved extended beyond their legal jurisdiction and responsibilities. Moreover, the multidisciplinary nature of the annex themes, in conjunction with the complex and unclear ownership status of spatial datasets and services in Greece, indicated the need for the involvement of representatives from different Ministries and organizations. Based on this rationale, the coordination structure foreseen in the new law involves the establishment of a National GeoInformation Committee (NGC), which will be amenable to the Prime Minister, chaired by the Minister of MEECC, and whose members will include the General Secretaries of the most pertinent Ministries regarding the implementation of this Directive (See Detailed Description in Section 2.1.2.1). The Committee's role will be to formulate and monitor the *National Policy on GeoInformation* (NPG) as well as the *National Interoperability Framework for GeoInformation and Services* (NIFGIS). HEMCO, as the coordinating organization, will be responsible for the development and maintenance of the National Geoportal (NG), through which it will exercise the quality assurance procedures. HEMCO will also assume the role of the national technical and coordinating body that will formulate the aforementioned policy and framework for the Committee. To support the coordinating work of HEMCO, it is foreseen that each ministry, within a month of the enforcement of the law, will establish a focal point and a supporting coordinating structure for the implementation of the law. As INSPIRE is dynamic and continually under development, it is envisioned that special interest groups will be formed to support the technical work, following the model and structure of the EU thematic and special interest groups. This approach is based on the principles of participation, openness and transparency. Moreover, considering the restrictive timeframes for the implementation of the Directive and its Implementing rules, the voluntary collaboration and input of spatial data and service users, providers and owners is considered of paramount importance.

2.1.2.1 Role, responsibilities and foreseen procedures of the National GeoInformation Committee

The law foresees the establishment of a National GeoInformation Committee (NGC) chaired by the Minister of Environment Energy and Climate Change, yet placed under the jurisdiction of the Prime Minister (Figure 3).

The NGC will essentially assume the role of a high-level decision-making body which will be responsible for the establishment, monitoring and evaluation of a national policy and framework with regard to spatial data collection, management, availability, sharing and exploitation throughout the public sector. Among other responsibilities, its role will include the formulation of a strategy for the development and implementation of the NGSI as well as the legal approval of the following mandates to be provided by HEMCO:

a) The "*National Policy on GeoInformation*" (NPG) within 6 months of voting of the law. This policy will essentially establish the framework and rules regarding collection, production, procurement, management, pricing, sharing, reuse and availability of geospatial information for the public sector.

b) The "*National Interoperability Framework for GeoSpatial Information and Services*" (NIFGIS) within 6 months of enacting the law. This framework will essentially set out the technical measures and specifications necessary to ensure interoperability of datasets and services and to guarantee the effective implementation of existing Implementing Rules. The NIFGIS will amend and specialize the Greek e-Government Interoperability Framework (Greek e-GIF) in regard to geospatial information management.

The NGC will have additional responsibilities which involve coordination measures for the implementation of the law, the approval of relevant guidelines and technical specifications, as well as a decision-making role regarding sharing arrangements and dataset availability disputes. The NGC will be responsible for the review and approval of the annual monitoring and reporting provisions with regard to the Directive.

The composition of the NGC is detailed in the law and consists of General Secretaries from key ministries, as established through the survey and consultation process. The law foresees the capacity

for the ad hoc involvement of other ministries when decisions regarding datasets or services of their responsibility are being made. Scientific support of the committee on an ad hoc basis is also foreseen.

2.1.2.2 Role, responsibilities and foreseen procedures of HEMCO

HEMCO is established as the responsible body for the development and operation of the NSDI (Figure 3). HEMCO assumes a technical implementing and coordinating function, for which the establishment of a specific Directorate within the organization is foreseen. Within the law, the role and responsibilities of HEMCO are detailed. In brief, and for the purpose of obtaining an overview of the coordination mechanism, key responsibilities are mentioned here. These include the development, operation and supervision of the NSDI and the NG; the coordination and quality assurance of spatial datasets and services developed by or on behalf of the public sector; awareness raising and information provision campaigns with regard to the implementation of the Directive, coordination and write up of monitoring and reporting requirements, as well as collaboration with other MS contact points for the sharing of best practices. In order to ensure support, representativeness and input of the different stakeholders across the public sector, the law makes provisions for the establishment of voluntary working groups, whereby representatives of the different ministry focal points, representatives from other public bodies, as well as providers and end-users can participate. The law foresees the involvement of the wider public sector and the appointment of a single owner for each spatial dataset available in the public administration. Such appointments will be determined in the NPG, following the completion of the census of existing spatial datasets and services across the entire public sector, something not currently possible given the timeframe and ongoing administrative reform of “Kallikratis”. All public authorities appointed as owners for a specific dataset will—by law—be obliged to: (a) ensure the conformity of those datasets and services with the IRs and the NIFGIS and (b) list their presence on the NSDI.

2.1.2.3 Role, responsibilities and foreseen procedures of Focal Points

In order to ensure the swift and effective implementation of the Directive and to support the coordinating mechanism and role of HEMCO, the law foresees that within 1 month of its enactment, a focal point within each public body will be established, which will be responsible for the cataloguing, procurement, production, maintenance and update of all spatial data and services of the public body (Figure 3). The law also makes provision that within 3 months from their creation, focal points will provide HEMCO with the census of existing datasets and services for which they are responsible. The role of the focal points in implementing the Directive’s rules and requirements is fundamental.
It is important to highlight that the transposition of the INSPIRE Directive in the National law is widened, to include (a) all datasets of the public sector that contain geospatial information or have implicit geospatial reference even when the information is in a descriptive form (e.g. addresses) and (b) all spatial datasets, including those not directly relevant to the environment. These were conscious decisions of the administration, based on the findings of the aforementioned government-wide survey. In particular: (a) public bodies were forced to maintain spatial information in non-GIS environments (e.g. spreadsheets) due to the lack of GIS software and knowhow, and (b) the INSPIRE Directive transposition in the national law serves as a unique opportunity to establish a common policy on all issues relating to geospatial information in general, which are still treated on an ad hoc basis.

2.1.2.4 Organization chart

The aforementioned bodies and their main responsibilities and roles within in a wider administrative and operational context are expressed schematically in Figure 3.

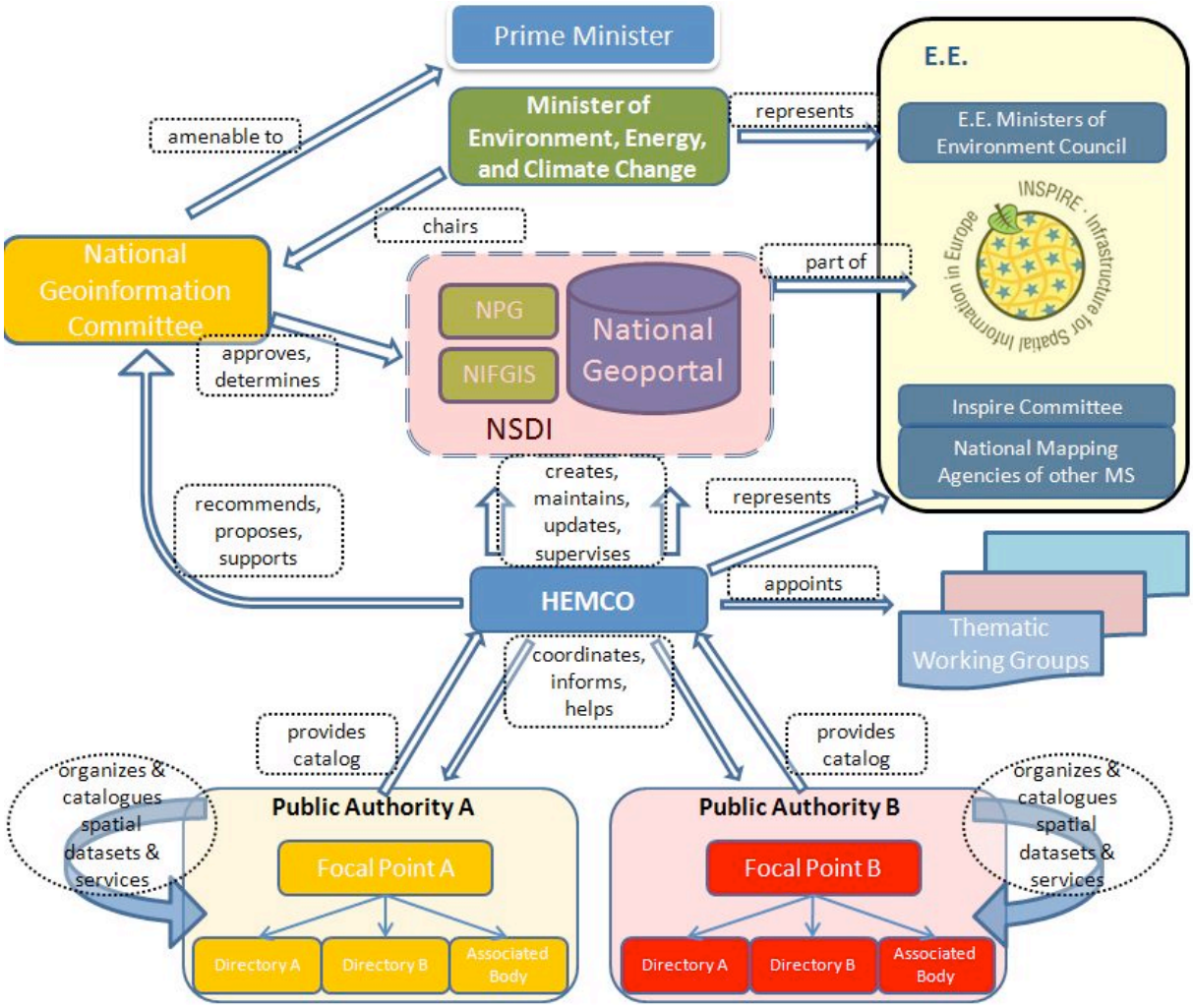

Figure 3: The administrative structure that the law foresees, showing the interrelations between the main bodies and actors involved in the NSDI.

2.1.2.5 Relation with third parties

There is the ambition and vision to enable the use of the NSDI by third parties, aiding in the promotion of services, and capitalizing at the same time on the wealth of information which will be available and which may be of great value for the promotion of the country with regard to tourism, or for conservation purposes. For example, NGOs in Greece have been very active in the development of spatial datasets and services for nature conservation, as well as cultural and archeological heritage monuments. Thus, ensuring third-party access and use of the NSDI is foreseen within the law. However, compliance with the minimum requirements concerning the conformity of the datasets and services are also established as a prerequisite.

2.1.3 Comments on the monitoring and reporting process

The procedure, methodology and limitations of the monitoring and reporting process carried out for the purpose of this report, have already been described in detail in Section 1 and will, therefore, not be reiterated. However, provisions are made within the law establishing a permanent monitoring and reporting mechanism, following the completion of the census and cataloguing within 4 months of the passing of the law. The law foresees that monitoring will take place yearly and be coordinated by HEMCO. However, it is crucial to establish a solid governance structure, with (a) clearly defined responsibilities for the different public authorities regarding the different spatial datasets which will be included within the NSDI and (b) a feasible mechanism and procedure for the update, conformity and quality assurance of the spatial datasets. From a technical perspective, the National Geoportal by HEMCO, which will facilitate the ongoing cataloguing, and monitoring of spatial datasets and services, is a parallel activity, with measures for its development already in place.

2.2 Quality Assurance (Art. 12.2.)

2.2.1 Quality assurance procedures

To date there is no NSDI in place and no quality assurance procedures concerning public sector metadata, data and services. Different authorities have different specifications and systems in place regarding spatial datasets and services. In many cases, these are specified on a needs and project basis, or even completely ad hoc. The initiatives undertaken for the purpose of this report to catalogue and evaluate existing spatial information using the specified indicators, surfaced a number of significant issues outlined below (Section 2.2.2). In order to provide an overview of the present situation and the significant challenges relating to the effective implementation of the INSPIRE Directive in Greece, it is necessary to obtain an understanding of how spatial datasets and services are created and managed from public bodies.
Spatial datasets are created based on heterogeneous, yet legally mandated, specifications. In addition, certain laws and regulations are quite old, and thus do not require spatial information to be in electronic format and georeferenced. This is problematic, as it requires, in parallel to the transposition of the Directive, ,to conduct a review of all legally mandated specifications with regard to spatial data and to review them appropriately in order, to ensure their onwards conformity with INSPIRE Implementing Rules. This review is foreseen within the new law, however, the vastness of the task prohibits the immediate implementation of the legislation, without having undergone the aforementioned census and revisions.

2.2.2 Analysis of quality assurance problems

The survey of existing public sector datasets, even at the ministry level, demonstrated beyond doubt that it is not currently feasible to evaluate or assure existing spatial datasets and services because the majority has not been developed with INSPIRE provisions in mind. There is the need to first complete the census of existing datasets and services, determine ownerships, establish the Policy and Interoperability Framework, and then evaluate their quality, while assuring it and making it accessible through the Geoportal once complete.

The scope of the INSPIRE Directive, although broad with regard to the themes of spatial information included within the annexes, is limited to spatial information in electronic format. Unfortunately, although spatial information for all themes is available as identified through our studies, a significant amount of it is available only in hard paper copies due to the outdated practices of the public administration. This impediment requires for its resolution both the selective digitization of available spatial information and the legislative reform of procurement guideline and specifications in order to ensure that spatial data is from now own obtained in electronic format, and to stop the perpetuation of such problematic practices.. However, such a transformation cannot take place over night, since it requires the provision of the necessary technical infrastructure, in conjunction with a challenging program for public sector capacity-building for spatial information and service provision.

2.2.3 Measures taken to improve the quality assurance

In order to overcome the existing barriers, the law stipulates the enforcement of the NIFGIS, which will define the technical specifications and the standards of quality for spatial datasets and services . The NIFGIS will lay out the basis on which the quality assurance evaluation procedure will be structured.. The development of the NSDI will in turn enable the automation of the quality assurance procedure. Regarding the governance of this procedure, the law clearly allocates the responsibility of quality assurance to the established and lawful owners of the datasets and services, according to the NPG document.

2.2.4 Quality certification mechanisms

In order to ensure the effective implementation of the law, a certification mechanism is foreseen which will be executed by HEMCO. The law stipulates that any public authority commissioning a project involving the creation or update of spatial datasets or services will need to include the specifications of the NIFGIS for incorporation in the tendering procedures. Immediately after receiving a project's deliverables, a public authority must obtain a certificate of compliance (quality assurance) from HEMCO in order to legally proceed to the payment and obtainment of those. Moreover, the inclusion

of datasets and services within the NSDI by law prerequisites their compliance with the aforementioned specifications which again will be certified following testing by HEMCO.

3 Functioning and coordination of the infrastructure (Art.13)

As no NSDI has been established to date, this section is devoted to describing the foreseen function and coordination of the infrastructure, based on the provisions of the new law, as well as providing a rationale and justification, for the proposed infrastructure design. As this law is still undergoing consultation and has yet to be passed, all information contained herein may be subject to change.

3.1 General overview description of the SDI

The new law, states that the development of the SDI and the establishment of a complete, functional and effective distribution system of quality assured geospatial information within the public sector at all governance levels and for the public, will require:

a) the adaptation of the public sector to the revised procedures regarding the organization and sharing of geospatial information and services, foreseen within the law and
b) the establishment and effective implementation of a governance coordination mechanism between the various stakeholders, both of the public and private sector, responsible for the production, use and update of spatial information and services.

Due to the undergoing local-government decentralization reform “Kallikratis”, devolving among other things responsibilities about geospatial information management (see section 1), it is currently infeasible to specify in detail the procedures and role of the different stakeholders until this reform is complete. Furthermore, the results of the studies conducted for the purpose of this report identified a number of barriers to the effective and immediate implementation of the NSDI, requiring a number of parallel intermediate actions to be undertaken prior to the establishment of the NSDI and the role of different stakeholders.

Therefore, the law makes provisions for the establishment of two strategic documents within six months of its adoption (see section 2), allowing the time for the intermediate actions to be carried out--also foreseen within the same law--thus enabling the development of an effective SDI which is tailored to the particularities of Greece regarding geospatial information governance, quality and sharing provisions.

To avoid ambiguity, the law makes clear provisions regarding: (a) the principles underlying the SDI in full accordance to those of the INSPIRE Directive and the IRs, (b) a coordination mechanism, including the establishment of roles and obligations that once enacted the various stakeholders will have to fulfill and (c) the establishment of a Geoportal, which will be developed and managed by HEMCO.

Key principles specified within the new law, which constitute a **fundamental reform** of current practices, are the following.

a) The establishment of a single owner for each public dataset, who by law from here on will be solely responsible for its conformance with INSPIRE requirements and necessary updates.
b) The establishment of reference spatial datasets and services, which will assist in quality assurance and interoperability across all public body datasets and services.
c) The procurement, production and update of a spatial dataset from here onwards will only be allowed to be conducted by its owner.
d) Any public authority wishing to utilize a spatial dataset will have free access to it from the established owner. In case the dataset is not available, and only after HEMCO has certified that the dataset does not exist across all public bodies, the dataset may be purchased.
e) Owners of spatial datasets need to ensure conformance to INSPIRE specifications of datasets within 16 months of their designation as owners.
f) All INSPIRE stakeholders will have to participate to the NSDI and ensure conformity of their datasets and services to the specifications of the NIFGIS, including any third parties which wish to participate in the NSDI.

3.2 INSPIRE Stakeholders

According to the results of the studies conducted for the purpose of this report, it can be concluded that all stakeholders of the public and private sector are, or have the capacity to be INSPIRE stakeholders and are classified according to all typologies: users, data producers, service providers and coordinating bodies.

The review of existing datasets and services held at ministry level conducted in 2010, revealed that different public authorities had the capacity to assume all roles, regardless of dataset theme or service. Simply put, if authority *X* required a dataset *Y*, there were no provisions or capacity for it to establish whether this dataset already existed or who the owner was in order to request it.. This lack of an appropriate framework has resulted in a plethora of datasets and services being created according to the specifications of different authorities and coordination roles being assigned to owners of those. This same phenomenon applies to all levels of public administration.

Provisions to put a halt to this phenomenon have been made within the law as described above. However, it is also understandable that without a full census of the datasets and needs of all public authorities at the different administrative levels, including a definition and identification of their responsibilities for data collection and provision through a detailed analysis of the governance structure and responsibilities, a description within this report would be misleading. Provisions to undertake both are foreseen within the law, with a deadline for completion within four months of its adoption.
The investigation of existing datasets and services, does give a preliminary picture of the range of INSPIRE stakeholders at high government level. This information however is provided in section 8.1 and will therefore not be repeated here.

3.3 Role of the various stakeholders

As already mentioned, currently, various stakeholders can, and do assume all the different roles on an ad hoc and needs-derived basis. Provisions to change this situation have been made in the law, through the new coordination structure described in section 2.

The concept underlying the new proposed coordination structure is to provide a centralized quality-assurance and coordination system, while at the same time, delegating responsibility and accountability for data production and conformance at the point of production, and solely to authorities whose legal tasks result in the generation and management of the datasets. This coordination structure has the benefit that, once established, it will be able to ensure the provision of real time updated datasets, which have legal validity and can be used for authorization and official decision-making processes. Further, the centralized quality assurance mechanism (section 2) through HEMCO and the Geoportal will facilitate the correct implementation of the INSPIRE Directive and the IRs as well as ensure conformance to the NIFGIS standards.

3.4 Measures taken to facilitate sharing

In Section 5, an analysis of the series of existing barriers to sharing is provided. The studies undertaken indicate that although significant effort has been made over the last years to create web services by various public authorities, data sharing is fragmented, ad hoc, and without quality assurance, limiting the beneficial outcomes of these efforts. The new legislation will overcome existing sharing barriers and issues by establishing homogeneous and compulsory data sharing practices across all public bodies. These measures are legislative, governance and technical in their nature.

Legislative measures most importantly consist of the clauses within the law, which mandate the obligatory free sharing of spatial data and services within the public sector, as well as to the public, for non-commercial uses. This provision is as radical as it is necessary in order to overcome the range of sharing barriers elaborated upon in section 5.

The establishment of the catalogue of existing datasets and services and their metadata within the NG, following the determination of focal points and establishment of datasets owners, will provide the necessary technical and governance supportive measures, which will enable the effective implementation of the legislation.

However, provisions for capacity building of INSPIRE stakeholders, to enable them to produce compliant, appropriately geo-referenced digital datasets and their accompanying services and to align these with the respective IRs, are as much necessary as they are challenging considering the devolved coordination structure.

An information provision and education campaign regarding the existence of the Geoportal and provisions of the legislation, in conjunction with a description of the impact that the legislation will have on existing operations and works, will be required at all levels.

3.5 Stakeholder cooperation

The results of the studies conducted for this report and the consultation procedure pointed out that stakeholder cooperation is perceived as the key ingredient to the successful development and implementation of the NSDI in Greece. As it has already been expanded upon, stakeholder cooperation is presently conducted on an ad hoc basis, and is very much reliant on individual public servant willingness to collaborate and share. Therefore, in order to strengthen stakeholder cooperation various provisions are made in the law, including:

a) explicit rules stipulating cooperation and coordination
b) establishment of voluntary working groups, to provide input on the development of the the NIFGIS, the NPG, and the specifications of the different annex themes
c) HEMCO, as a technical coordinating body, has been assigned responsibilities for informing the different stakeholders of ongoing developments
d) Establishment of the NG within 12 months of the passing of the law, which will provide the necessary technical platform for stakeholder cooperation and will facilitate the operation of the voluntary and thematic working groups through relevant forums or through other means.

3.6 Access to services through the INSPIRE Geoportal

Currently, there has been no effort on a technical level to provide metadata, data and services to the Inspire Geoportal. However, this situation is subject to change rapidly, within a carefully planned technical agenda, fully supported by the law concerning the establishment of a National Spatial Data Infrastructure.

4 Usage of the infrastructure for spatial information (Art.14)

As mentioned from the onset of this report, to date there has yet to be developed a national infrastructure for spatial information, as defined in the INSPIRE Directive. However, spatial data services and datasets have been created on an ad hoc basis, to fulfill differing needs of the public sector, as well as to comply with different EU Environmental Directive requirements. Information regarding usage does not exist, since the NSDI itself is not in place yet, however, in the following sections an overview of the expected usage of existing spatial services and spatial datasets, as recorded from the survey conducted at ministry level, is presented.

4.1 Use of spatial data services in the SDI

The number of recorded data services is quite smaller than that of the recorded datasets. The vast majority of the data services are *view services*, implemented separately from various stakeholders, either on own initiative, in order to fulfil their needs and support their infrastructure and working processes, or in order to comply with the requirements of several environmental programs of the EU. The fragmentary efforts have resulted in heterogeneous view services of different technical specifications and, consequently, of varying degrees of quality. The same holds for download and discovery services, albeit their number is considerably smaller than that of the view services. The corresponding indicators for the spatial data services and the network services reveal an almost complete lack of conformity to INSPIRE IRs for network services. Although currently no transformation services exist, the large degree of heterogeneity suggests that they will be heavily used in the NSDI in order to ensure interoperability among the existing datasets and services. Download services are expected to be more popular for professionals and public authorities that need to download and process data, whereas view services are expected to have more appeal to the general public.

4.2 Use of the spatial datasets

The conducted survey revealed that a large number of spatial datasets is available within the public sector. Many are still in analog format because of old technical specifications that are still in effect and determine their terms of procurement. Others are in digital—yet not suitable spatial—format that prohibits their immediate inclusion in the NSDI (i.e., excel sheets, alphanumeric relational databases). From the total number of datasets that were catalogued, the subset that was in suitable electronic format—whether conformant to the INSPIRE Directive Implementing Rules or not—was recorded in the excel sheet for monitoring. Hence, reference to individual datasets in this section would be redundant, however, it is worthwhile highlighting a few key indicators such as the existence of metadata for 55% of the datasets, the quite small percentage of conformant metadata for only 8% of the datasets and the mere 4% for datasets which, in addition to conformant metadata, also were conformat with regard to the IRs for data specifications. The latter result, however, is not particularly surprising, considering that the IRs for Data Specifications for Annexes II and II have not yet been finalized, whereas the IRs for Annex I have only recently been established (i.e., March 2010). In contrast to the conformity indicators, the extent of the datasets is as high as 97%, indicating that most datasets cover their entire relevant area.

Judging from the number of datasets in each theme, the conversations we conducted with each stakeholder during the meetings, and the stakeholders' written assessments for the situation within their organizations and their needs in spatial data and software, it is easily inferred that there is a widespread need and demand for datasets falling under themes such as *orthoimagery*, *digital elevation models*, *administrative boundaries*, *road networks* and *geographical grid systems*. This result is not unusual, considering that such datasets commonly constitute base maps on which other thematic or spatial data is superimposed. The lack of coordination and of a specific legal framework until now, has prevented the sharing of such common reference datasets leading different stakeholders to the acquisition of separate base maps, which, when the need arises to be combined (i.e., joint efforts), do not align well with one another. It is thus expected that such datasets will be in great demand and will be used very frequently after their inclusion in the NSDI.

4.3 Use of the SDI by the general public

A plethora of websites have been established by the public sector over the last decade. The services provided to the public mainly consist of viewing services of spatial data, with fewer examples of services enabling download etc. The extent of use by the public of these services is unknown. However, provisions have been made, to monitor usage of different datasets and services through the NG once established.

4.4 Cross-border usage

Cross-border usage of spatial datasets corresponding to the themes listed in Annexes I, II, and III of the Directive, to date remains unknown. Greece has ratified the ESPOO convention, and legislation regarding transboundary environmental protection and management, and as part of that intends to undertake necessary measures to ensure that protection for what concerns cross border spatial information. However, it needs to be taken into account that Greece borders with countries which are not all MS of the EU. It is foreseen that this issue will require further investigation and analysis, with the Ministry of Foreign Affairs assuming a pivotal role.

4.5 Use of transformation services

Since the NSDI is not operational yet, there are no transformation services to be used. However, as stated in Section 4.1, their role will be crucial in alleviating the numerous heterogeneity problems that were mentioned in earlier sections of this report.

5 Data sharing arrangements (Art.15)

The consultation conducted for the purpose of this report, in conjunction with the results of the three studies carried out, concluded that the issue of data sharing arrangements is problematic, underlying the need for it to be addressed directly within the new law. Indicatively, in Section 5.1, existing data sharing arrangement and barriers identified are either pragmatic, meaning legally mandated barriers, or plasmatic, referring to established poor practice and non-collaborative, bureaucratic approaches. In Section 5.2 indicative examples of data sharing arrangements which exist with community bodies are presented, however, a complete census of these was not feasible within the timeframe available. Most importantly in Section 5.3 proposed actions to overcome these barriers are described including legal provisions, as well as technical and governance measures.

5.1 Data sharing arrangements and barriers between public authorities

During the studies conducted for the purpose of establishing existing datasets and services, authorities were questioned with regard to the nature and existence of data sharing arrangements. What became obvious from the responses was the complexity of this issue, as data sharing arrangements differ between authorities, and even for specific datasets or services. In many cases, no such arrangements have been established. Overall, a review of the responses provided by the different Ministries to date indicates a lack of willingness to share data, even in the absence of agreements prohibiting a public body ability to do so. Below, the main laws which specify data sharing arrangements, or restrictions to do so are outlined:

The main laws regulating and facilitating access to the information maintained by the Public Sector are:

1. Law 2690/1999 "*Hellenic Code for Administrative Procedure*" (especially article 5) which replaced law 1599/1986 "*State–Citizen Relations*". It is a freedom of information act that provides citizens the right of access to the administrative documents of the public agencies and bodies.
2. Law 3448/2006 "*Reuse of public Sector Information, Local authorities Affairs etc*" through which PSI Directive 2003/1998 was transposed to national law.
3. The Common Ministerial Decision No 11764/653, of the Minister of Interior, Public Administration and Decentralization, the Minister of Economy and Finance, the Minister of Environment, Physical Planning and public Works and the Minister of Justice, through which the European Directive 2003/4/EC concerning the access to environmental information was transposed into national law.

Article 13 of the INSPIRE Directive states that "*Member States may limit public access to spatial datasets and services through the services referred to in point (a) of article 11(1) where such access would adversely affect international relations, public security or national defense*". However, the studies and consultation carried out for the purpose of this report showed that the restrictions on the access to spatial information lying under the scope of the Directive are due to several reasons other than international relations, public security and national defense referred to in the INSPIRE Directive. These consisted of intellectual property rights, protection of privacy, public security, confidentiality of statistical information, competition, the official approval process, or the lack of a specified information policy regarding sharing of spatial data.

National defence
Restrictions to the access to spatial datasets and services due to National Defense are set, for example, by the Hellenic Military Geographical Service for classified areas, the Hydrographic Service of the Hellenic Navy for bathymetric data, while the Service is using an encryption system for access to the Electronic Nautical Charts. More specifically, law 3257/2004 "*Regulation of the Armed Forces Staff Affairs*" and especially article 11, which amended article 13 of the Legislative Decree 1013/1971, refers to the protection of intellectual property rights of the Hellenic Military Geographical Service in cases of use by the public or private sector of the geographical data produced and maintained by this Service, while an approval by the same Service is required before any production, dissemination or

circulation of high resolution (i.e., higher than 1 meter) geographical data or imagery acquired from any source. With regard to the protection of national defense within the NGC, it has been foreseen that high-level representation of the Ministry of Defense will ensure that, for what concerns policy on spatial information sharing arrangements, decisions will not compromise national security. With regard to international relations, it is foreseen that the Ministry of Foreign Affairs will have a pivotal role in collaboration with the ministry of Defense.

Intellectual property rights & protection of privacy
A number of Public authorities and bodies, when questioned about existing sharing arrangements made reference to the protection of intellectual property rights for the spatial data they produce and maintain themselves (e.g., the Hellenic Military Geographical Service).

It was established and confirmed during the consultation process that the premise of intellectual property rights protection (including those of third parties) is constituting a major barrier to the access and sharing of spatial datasets and services held by public authorities.

However, the Greek Constitution, in article 5a paragraph 2, explicitly refers to that "*each individual has the right to join Information Society. Facilitating the access to the electronically disseminated information as well as its production, exchange and diffusion constitutes an obligation of the State*". During the last decade, Greece harmonized its legislation to the one in force in the European Union by introducing modern laws for the protection of intellectual property and of privacy.

More specifically:

1. Law 2121/1993: "*Intellectual Property and Related Rights*". It is the Greek Copyright Act that was a landmark in the legal history of copyright in Greece.
2. Law 2472/1997: "*Protection of the Individual from the Processing of Personal Data*" that follows the provisions of European Directive 95/46/EC concerning the protection of personal data.
3. Law 2819/2000, article 7: "*Harmonization with Directive 96/9/EC of the European Parliament and the Council of 11-3-1996 concerning the Legal Protection of Databases and other Regulations*".
4. Law 2915/2001 and especially article 34: "*Amendment of Law 2472/1997 Protection of the Individual from the Processing of Personal Data*"
5. Law 3057/2002 and especially article 81: "*Harmonization with Directive 2001/29/EC of the European Parliament and the Council of 29-5-2001 for the Harmonization of Certain Aspects of the Creator and of Related Rights to the Information Society and other Regulations*".
6. The Presidential Decree No 131/2003: "*Adaptation to Directive 2000/31/EC of the European Parliament and the Council concerning Certain Legal Aspects of the Information Society Services, especially Electronic Commerce, in the Internal Market*".
7. Law 3471/2006: "*Protection of Personal Data and of Private Life in the Electronic Communications Sector and Amendments to Law 2472/1997*" through which Directive 2002/58/EC of the European Parliament and the Council of 12-7-2002 on privacy and electronic communications has been transposed into Greek law.

Intellectual property rights with regard to public authority data sharing do constitute an issue. An example of the practical problems that occur concerns the use and reproduction of Hellenic Military Geographical Service maps within the public sector.

Map production in Greece is considered as *work*, that is, original intellectual scientific creation related to geography, surveying, architecture and science in general. As *work*, it is protected by Greek legislation and especially law 2121/1993 "*About Intellectual Property and Related Rights*". Typically, the Hellenic Military Service is the Greek authority that produces and provides topographic maps in Greece. These maps are used as reference base maps by most public authorities. However, the data sharing arrangements and intellectual property right restrictions for the use and reproduction of these maps has posed significant barriers, both economic and practical, with regard to the development and data sharing of spatial information generated from the use of those, such as geological maps. Although, theoretically, sharing arrangements can be established on a needs basis, the administrational procedure in itself is perceived as a barrier, posing significant time delays and bureaucracy as well as limiting sharing potential to the public.

Indicatively, it was established from the survey conducted that the vast majority of public authorities has purchased individually for exclusive use the Hellenic Military Service maps or parts of those maps on an ad hoc basis, resulting in a phenomenon of money being transferred from one public authority to another, while at the same time being constrained by the usage and reproduction terms of reference. Another such example was identified regarding the purchase and production of satellite images, whereby a phenomenon of single-user licence procurement practice was noted, limiting again the capacity of sharing.

To overcome such issues, while also following the recommendations of the majority of public authorities consulted, a political decision–to be enacted upon through the new law–is the establishment of a common policy regarding data sharing arrangements within and for the public sector. Among other things, this policy will foresee the obtainment of maps and needed satellite images by one body for the entire public sector. Such a method of obtainment will essentially, minimize the cost and administration overhead created by multiple procurements and will ensure that an official common base maps used for the country. This measure will also have the added benefit of being able to facilitate the quality assurance procedure.

During the surveys and consultation, a number of public authorities indicated potential restrictions to the access to spatial datasets and services, posing the issue of compromising sensitive personal information. However, the potential to investigate the use of this data following necessary measures to protect personal information (e.g. aggregation, anonymity) was also presented, in order to facilitate policy and decision making processes.

Public security
During the studies and consultation, with regard to existing sharing arrangements and restrictions, a number of public authorities, or state-owned companies, presented the issue of restricting access in light of public security. Such reasoning was provided, for example, by utility network owners, who mentioned data such as power line locations, etc. These can be considered legitimate arguments; however, there is a need to examine sharing arrangements case by case, when such issues are presented, and in light of different rights of access and use within the public sector. As the census of existing datasets and services is not complete, ownership and sensitivity of data remains to be established. It is proposed within the law that, in general, all datasets and services should be open for public sector use, yet provisions are made for the NGC to examine specific cases when they arise.

Confidentiality of statistical information
The National Statistical Service of Greece sets restrictions to the access of its spatial and other data (i.e., the statistical units), due to the confidentiality of statistical information.

The legislation protecting the confidentiality of statistical data includes:

1. Law 2392/1996: "*Access by the National Statistical Service of Greece to Administrative Sources and Archives, Committee for Statistical Confidentiality, Regulation of other Affairs of the National Statistical Service of Greece*"
2. European Regulation 322/1997 of the Council of 17-2-1997 concerning European statistics.

In light of the INSPIRE Directive the need to carefully review these restrictions and compatibility with INSPIRE requirements becomes evident. This is an issue which will have to be dealt with in the NPG document, following extensive consultation with affected parties.

Competition
In the survey conducted by HEMCO in 2008 [2], various agencies or state companies commented on how they are restricting access to their spatial datasets and services due to competition. Examples include the Public Power Corporation S.A, the Public Power Corporation–Renewable Sources, the Hellenic Post etc. As these are state companies, the validity of these arguments remains to be investigated following consultation.

Official approval process & unspecified data sharing policy
The majority of public authorities and public bodies do not have a defined data sharing policy, yet practice the procedure of formal application for request of access to spatial data, followed by an

evaluation and official approval process in a case by case basis. Many of the authorities stated that they provide their data following the approval of a written justified request. The issues raised here, are: (a) on what basis is a request evaluated as *justified*, warranting rejection in light of the absence of a clear sharing policy and (b) what is the administrative burden posed by this procedure. It is foreseen that such barriers will be eradicated through the implementation of the INSPIRE Directive, resulting in considerable benefits for the effectiveness and efficiency of the public sector. Moreover, it is envisioned that through the NPG document, which will be established within six months of the passing of the law, a common platform regarding data sharing for the public sector will be enforced, overcoming any ambiguity barriers which have been hindering sharing until now.

Licensing and pricing policy
A clear and harmonized licensing and pricing policy concerning spatial datasets and services, either among public authorities or for public access, does not exist to date at a national level. There are wide variations in the pricing schemes among government departments and also within the private sector. Each agency calculates the pricing on the basis of its own criteria and in its own way and there is no homogeneous method for determining the price of various forms of spatial data. There is no overall official policy on the commercialization of public sector information. This has posed barriers regarding data sharing, and is, therefore, dealt with in the new law. To facilitate sharing and the work of the public sector, it is foreseen that spatial data will be provided for free by designated owners through the Geoportal, for public sector use. Moreover, a common national pricing policy regarding public sector spatial data for the public and commercial sector use will be formulated and included within the aforementioned national policy.

5.2 Data sharing arrangements between public authorities and Community institutions and bodies

From the study conducted, it was established that different sharing arrangements exist between different public authorities and community institutions and bodies. Overall, the different authorities provide data upon request, and in fulfilment of various reporting requirements to the European Community, Eurostat, etc. Other authorities provide viewing access to their spatial data through their websites. An example of data sharing arrangements between public authorities and community institutions is the *National Network on Environmental Information* (www.e-per.gr), which is the central web-based center for environmental information sharing of MEECC, as well as part of the EIONET network.

5.3 Proposed actions to overcome data sharing barriers

In section 5.1 and 5.2 the barriers to the sharing of spatial datasets and services between public authorities were elaborated as were the measures proposed to overcome them (Section 3.4) and will, therefore, not be reiterated.

6 Cost / Benefit aspects (Art.16)

6.1 Costs resulting from implementing INSPIRE Directive

A precise estimate of the costs resulting from the implementation of the INSPIRE Directive according to the categories proposed within the template report is not feasible at this point in time. **Cost estimates and their timing will continue to be uncertain until there is clarity around the Implementing rules which have yet to be tabled, negotiated and agreed**. There is first a need to establish the reference datasets, their quality and conformity in conjunction with the network services, which will be developed or maintained, prior to any cost estimate being possible.

However, as studies regarding the technical specifications of the NG are underway, it is foreseen that a considerable budget for its development will be required within the range of 7 to 8 million euros.

Metadata will have to be created for a significant proportion of the available datasets; however, without having an estimate of the number of those, a cost estimate is not feasible.

Regarding data harmonization, it is assumed that a considerable preliminary investment may be required, particularly on what concerns *reference* datasets, which fall under the different annex themes, and are only currently available in hard copies. Due to their significance in environmental policy development and impact assessment, their digitization and harmonization, despite the initial cost, will be of paramount importance.

Monitoring and reporting will be carried out on an annual basis, and coordinated by HEMCO. Although this work will be conducted internally by HEMCO, the mobilization of the entire public sector in conducting the preliminary census will have a cost in terms of staff and time resources.

For the coordination and horizontal measures, it is envisioned that the creation of focal points resources in terms of staff allocation and capacity building will be required at all levels. Moreover, it is possible, considering the devolved coordination structure proposed, that startup funds will be required for the provision of hardware and software to ensure that all focal points have the necessary means to carry out their tasks for the implementation and update of the spatial datasets and services. However, means of reducing these costs, in particular the running costs, are being examined; for example the use of open source GIS software for simple users in public administrations, limiting long term licensing operational costs.

It is therefore proposed that in conjunction with the census of existing datasets and services of the entire public sector, a parallel study to estimate the costs and benefits using the data collected from the census should be carried out.

6.2 Foreseen benefits

The foreseen benefits from the implementation of the INSPIRE Directive and IRs are numerous and of great importance.

1. Long-term, direct government savings

a) Avoidance of duplication of data collection
By establishing the Geoportal and catalogue of existing services and datasets, in conjunction with the free access policy within the public sector, significant long term savings will be achieved by reducing the duplication of effort and expenditure caused by the accidental creation of similar datasets and services. Charging for datasets within the public sector is essentially a redistribution of government funds; however, this practice poses restrictions to public authorities which haven't accounted for such expenditures.

b) Reduced expenditure for data collection for government project EIAs and SEAs

Although this cost has not yet to date been calculated for Greece, the effective implementation of the SEA Directive in Greece for all policies, programs and plans could result in a huge unaccounted for expenditure. In the case of subcontracting such reports externally, the cost could be significantly minimized by providing access to the necessary data. In the case where SEAs are conducted in house, the savings will be considerable, minimizing the costs down to staff time expenditure.

The average cost of EIA in Greece has not yet been established, but varies significantly depending on project category. The quality of EIAs in Greece, however, has been determined to be of poor quality [7] with no significant improvement noted between 1993 and 2003. One of the criticisms has been the absence of reliable data and the majority of licensing procedure focusing on the conformity with formal requirements, rather than the prediction of impacts. Despite the limited scope of current EIS reviews and licensing procedure, it is still estimated to last 2 years—on average—for large projects. It therefore raises the question of the potential delays which could take place should EIAs be conducted according to best practice recommendations, and how much of that time would be allocated to data collection and authorization.

The establishment of the Geoportal and of the reference datasets and services would facilitate access to official environmental information that is necessary in order to conduct the EIAs, would reduce the cost and would minimize the time required to conduct and obtain approval for the studies. Such benefits are important both for the public and the private sector.

c) Reduced cost for compliance with EU environmental monitoring and reporting requirements

Greece, as a member state of the EU, is committed to conducting various environmental monitoring and reporting activities as part of its adoption of the different environmental directives (e.g. the Water Framework Directive, Waste Directives, etc). To certain extent, the monitoring and reporting requirements have been fulfilled through the contracting of projects and studies to obtain data and produce reports. By effectively implementing the INSPIRE Directive, opportunities to reuse existing data for different purposes and predictions, will help minimize the cost of the monitoring and reporting, by rationalizing and optimizing data collection procedures.

2. Improved public sector efficiency

a) Improved transparency and efficiency to the planning and development procedure

Greek public administration is characterized for its slow-moving bureaucracy, and limited transparency regarding land restrictions, policies and zoning management regulations. To a certain extent this bureaucracy can be attributed to the lack of a one-stop shop, or electronic access to all characterizations and restrictions attributed to any given piece of land. As a result, anyone wishing to ascertain planning permission must physically visit all the relevant authorities and obtain certificates of the different land status in hard copies, e.g. whether it is a forest or not, whether it is within the town plan or not etc. As this spatial information is predominantly available in hard copy, thus limiting access, and transparency, a knock on effect of the INSPIRE directive, could be to:

- reduce the time of the planning application procedure
- increase transparency, reducing illegal building activities through greater involvement of the public in development control reporting
- increase trust and foreign investment by providing remote access to information regarding development opportunities and restrictions (e.g. potential for remote suitability appraisal of a given site for renewable energy installation investment.)

b) Improved policy development and development of program funding allocation

By providing policy makers with free and easy access to data on important topics covered by themes such as demographics, buildings, protected areas, resources etc, spatial and economic investment-planning and decision-making will be improved and the time required to develop the relevant policies and strategies will be greatly reduced. In a time of limited available economic funds, access to these datasets will help prioritize funding to areas most in need and increase the transparency of the evaluation procedures.

c) Improved delivery of risk prevention and management measures

One of the most important benefits which will result from the effective implementation of the INSPIRE directive, yet cannot be calculated in monetary value terms, is the improvement in the delivery of risk prevention and management measures.

A review of the fire-fighting operations of the tragic events of 2007, which resulted in the loss of many innocent lives including fire fighters, and the destruction of thousands of hectares of forests and protected areas, identified as a contributing factor the serious deficiencies in access to essential spatial datasets needed by the Fire Service to plan operations.

Free access within the public sector to all government spatial datasets, will enable the drafting of risk prevention and management plans with regard to different risks such as flooding, fire, or even industrial accident as well as enhance capacity to act promptly and effectively in case of an event.

7 Conclusions

The survey conducted at the ministry level of the public administration revealed a number of severe structural problems in what regards spatial data coordination, quality-assurance, sharing and reuse. These problems can be roughly reduced to three fundamental issues: (1) lack of a coordinating structure that would dictate spatial data stakeholders roles and obligations, (2) lack of a universally-accepted technical framework that would enumerate the data and service specifications that spatial data providers and producers should follow, and (3) lack of a coherent and inclusive legal framework that would treat—without omissions—all aspects of spatial data sharing and reuse. The new law attempts to address all three issues by (a) establishing a new coordinating structure with wide participation from all involved stakeholders, where responsibilities and obligations are clearly defined and the procedures followed are open and transparent, (b) setting out basic rules for data specifications that the new—to be provided—and the already available—to be transformed—spatial data and services must adhere to, while at the same time, stipulating a reliable quality-assurance mechanism that will secure the compliance and conformance of the data and services with the technical specifications and the IRs and (c) stating a core set of basic principles that promote the free, open and transparent sharing and reuse of the data, thus securing public interest and promoting growth and development. The details on data policy and on data and service specifications, will be elaborated upon in two documents that will follow shortly within the next few months, namely, the *National Policy on GeoInformation* and the *National Interoperability Framework for GeoSpatial Information and Services*, respectively. The valuable results that were obtained from the wide survey that was conducted by HEMCO and the MEECC, along with the provisions that the new law makes, provide a solid basis for implementing a functional and viable National Geoportal, which is the next major step in implementing the Greek NSDI.

8 Annexes

8.1 List of organizations – names and contact details

Hellenic Statistical Authority

Department	Contact Name	Contact information
Directory of Statistical Information and Publishing	P. Karaiskos P. Tzortzi	karaiskp@statistics.gr +30-2131352326 tzortzip@statistics.gr +30-2131352024
Directory of Informatics	S. Kourelakos	stakour@statistics.gr +30-2131352185
Directory of Organization, Methodology, and International Relations	G. Nikolaidis	giannikol@statistics.gr +30-2131352195
Directory of Statistics of Primary Domain	L. Dionysopoulou	lemdiony@statistics.gr +30-2104852052

Ministry of Citizen Protection

Department	Contact Name	Contact information
Minister's Office	R. Lava	rivalava@hotmail.com +30-2106988233
General Secretariat for Civil Protection	A. Antonakos	aantonakos@gscp.gr +30-2103359070
Directory of Fire Fighting-Fire Fighter's Corps Headquarters	N. Stergiou	nister@psnet.gr +30-2131603951
Directory of Informatics of the Headquartes of the Hellenic Police Force (GIS Office)	L. Dellaportas I. Papakonstantinou	ldellaportas@yptp.gr +30-2106988411 i.papakonstantinou@yptp.gr +30-2106988411
Directory of Informatics and New Technologies of the Headquarters of the Port Corps	S. Gekas K. Papalexandri	gkekas@yen.gr +30-2104064319 papalexandri@yen.gr +30-2104064319

Ministry of Culture and Tourism

Department	Contact Name	Contact information
Minister's Office	E. Antoniou	iliasad@yahoo.com
General Directory of Antiquities and Cultural Heritage	A. Klonizaki	aklonizaki@culture.gr +30-2108201264
General Secretariat of Sports	I. Detsis	iadetsis@gga.gov.gr +30-2106472001
General Secretariat of Culture	G. Kolobotsios	gkolompotsios@culture.gr +30-2108201447
General Secretariat of Olympic Utilization	L. Koraki	korakiliana@yahoo.gr

Ministry of Economy, Competitiveness and Maritime

Department	Contact Name	Contact information
Minister's Office	K. Parliaros	parliaros55@gmail.com +30-2103846038
General Secretariat of Industry	P. Koutsolouka K. Stathaki	Koutsolouka_p@ypan.gr +30-2106969579 stathakis@ypan.gr +30-2106969116
General Secretariat of Consumer Affairs	D. Kyriakopoulou	kyriako@gge.gr +30-2103837982
General Secretariat of Investments and Development	H. Hajidakis A. Lagia	hhajidakis@mnec.gr +30-2103319236 alagia@mnec.gr +30-2103726039
General Secretariat of Maritime Policy	D. Papaioannou E. Sideris	dipi@otenet.gr +30-2104191242 sideris@yen.gr +30-2104191064

Ministry of Education, Lifelong Learning and Religious Affairs

Department	Contact Name	Contact information
General Secretariat of Research and Technology	E. Gousia	egou@gsrt.gr +30-2107458078
Foundation for Research and Technology-Institute of Applied and Computational Mathematics	E. Katsouli	ekat@admin.forth.gr +30-2810391500
Greek Atomic Energy Commission		+30-2106506803
Hellenic Center for Marine Research	K. Grammatikatkis	lenia@ath.hcmr.gr +30-2291076462
National Center of Research of Natural Sciences	Z. Floratou	florzo1@demokritos.gr +30-2106503002
National Center of Social Research	I. Ifantopoulos	president@ekke.gr +30-2107491678
National Institution of Research	D. Kiriakidis	Kyr@eie.gr +30-2107273500
National Center of Innovation on Information, Communication and Knowledge Technology	G. Karayiannis	gcara@athena-innovation.gr +30-2106875304
National Center of Research and Technological Development	K. Kiparisidis	certh@certh.gr +30-2310498210
National Observatory of Athens	H. Zerefos	secretary@admin.noa.gr +30-2103490104

Ministry of Environment, Energy and Climate Change

Department	Contact Name	Contact information
Central Water Agency	E. Tiligadas	e.tiligadas@kyy.minenv.gr +30-2106931288
Center for Renewable Energy Sources and Saving	A. Rigopoulos	arigo@cres.gr +30-2106303300
Directory of Atmospheric Pollution and Noise Control	A. Adamopoulos	air_quality@dearth.minenv.gr +30-2108650076
Directory of Environmental Planning	K. Stefanakis	k.stefanakis@dpers.minenv.gr +30-2108643786
Directory of Regional Planning	A. Mourmouri	a.mourmouri@dxor.minenv.gr +30-2131515369

Directory of Surveying Applications	Z. Tomprou	z_tomprou@hotmail.com +30-2131515217
General Directory for the Development and Protection of Forests and Physical Environment	T. Daskalakis	+30-2102128064
Public Power Corporation S.A	A. Vlachos	avlachos@dsm.dei.gr +30-2103492150
Hellenic Gas Transmission System Operator S.A	I. Aggelothanasis	+30-2106501353
Hellenic Mapping and Cadastral Organization	K. Nedas	knedas@okxe.gr +30-2106443583
Institute of Geology and Mineral Exploration	K. Nikolakopoulos	knikolakopoulos@igme.gr +30-2102413191
Ktimatologio S.A.	A. Katsina	akatsina@ktimatologio.gr +30-2106505682
Organization for the Master Plan and Protection of the Environment of Athens	I. Drouga	idrouga@gmail.gr +30-210 6468684
Organization for the Master Plan and Protection of the Environment of Thessaloniki	N. Nikiforidis	nikosnik@orth.gr +30-2310886043
Public Gas Corporation S.A	A. Sgourakis	+30-210 2701196
Regulatory Authority for Energy	Y. Charalampidis	jchara@rae.gr
Directory of Monitoring and Management of Petroleum Products	D. Antonopoulos D. Kouris	+30-2106969352 +30-2106969455
Directory of Petroleum Products Installation	M. Dara	ntaram@ypan.gr +30-2106969412
Hellenic Transmission System Operator S.A.	M. Kamilaki	mkamilaki@desmie.gr +30-2109466914
Directory of Energy Policy	G. Choundris	choundrisg@ypan.gr +30-2106969176
Directory of Water Potential and Natural Wealth	M. Gini	+30-2106931293
Directory of Building Regulations	P. Papadopoulou	p.papadopoulou@dokk.minenv.gr +30-2106911507
Directory of Building Policy	C. Chronopoulos	c.chronopoulos@dopk.minenv.gr +30-2106914275
Special Agency of Inspectors of the Environment	P. Fotaki	p.fotaki@eyep.minenv.gr +30-2108701800
National Center for the Environment and Sustainable Development	S. Dimitroulopoulou	S.Dimitroulopoulou@ekpaa.minenv.gr +30-2108089271

Ministry of Health and Social Solidarity

Department	**Contact Name**	**Contact information**
Minister's Office	D. Vasileiou V. Atsali	dilenitamou@gmail.com +30-2105235955 vatsali@yyka.gov.gr +30-2105235955
Directory of Social Perception and Solidarity	G. Sarantopoulou	dkaa@yyka.gov.gr +30-2108224865
National Center for Immediate Help	G. Trakadas	host@ekab.gr
Center for Control and Prevention of Disease	Logothetis	logothetis@keelpno.gr
National Center of Social Solidarity	E. Pappa	dsxeseis1@ekka.org.gr
Directory of Organization,	A. Boubaki	minaboubaki@yahoo.gr

Simplification of Procedures and Informatics		+30-2108220032
National Center of Social Solidarity	E. Pappa	dsxeseis1@ekka.org.gr
Directory of Health Units Development	V. Tsionaki	+30-2105231107
Greek Organization Against Drugs	C. Danopoulos	cdanopoulos@okana.gr +30-2108898251

Ministry of Infrastructure, Transport and Networks

Department	Contact Name	Contact information
Minister's Office	P. Vasileiou	secpw2@otenet.gr +30-210 54 50741
General Secretary's Office–General Secretariat of Communications	G. Terzi	g.terzi@yme.gov.gr +30-2106508021
General Secretary's Office–General Secretariat of Infrastructure, Transport and Networks	G. Skoumpouris	grafeas@gmail.com +30-2106508057
Center for Traffic Management	T. Vorvolakos	tkt@otenet.gr +30-2108211712
Special Agency for the Operation and Maintain of Concession Works	K. Drakoulognona	eydesera@tee.gr +30-2106999416
Directory of Surveying and Expropriation	I. Sarantinos	ggded12@otenet.gr +30-2109094000
Directory for the Management and Control of Spectrum of Radiofrequencies	O. Karagianni	o.karagianni@yme.gov.gr +30-2106508548
Directory of Informatics	G. Louverdis	g.louverdis@yme.gov.gr +30-2106508204
OSE Group	A. Asimakopoulou	a.asimakopoulou@osenet.gr +30-6947771419
ETHEL S.A. – Directory of Computerization	Chrisochoidou	ethwoman@ethel.gr +30-2104270796
Attiko Metro S.A.	D. Panagiotakopoulos	dpanayotakopoulos@ametro.gr +30-2106792054
Directory of Road Works	A. Romaidou S. Mentos	kromaidou@dmeo.gr +30-2106450762 smentos@dmeo.gr +30-2106449886
Egnatia Odos S.A.	V. Fourkas	vfourkas@egnatia.gr +30-2310470362
Directory of Telecommunications and Postal Services	G. Georgopoulos	g.georgopoulos@yme.gov.gr +30-2106508595

Ministry of Interior, Decentralization and Electronic Government

Department	Contact Name	Contact information
General Secretariat of Public Administration and Electronic Government–Informatics Development Service	K. Aggeletopoulou	k.ageleto@ypes.gov.gr +30-2131313443

Department of Developmental Programmes–Directory of Developmental Programs and International Organizations	P. Samartzis N. Bila V. Asprogerakas V. Lamprakakis	psamartzis@ypes.gr +30-2103744917 tap2.apdo@ypes.gr +30-2103744515 tap11.apdo@ypes.gr +30-2103744513 tap5.apdo@ypes.gr +30-2103744723
Directory of Economics of the Municipalities	A. Latsinos K. Rigas	latsiani@yahoo.gr +30-21037744823 tpe.oikonomika.ota@ypes.gr +30-21037744983
Directory of Elections	Ch. Sotiropoulou E. Koutouki	ekloges@ypes.gr +30-2103744139 te.ekloges@ypes.gr +30-2103741132
Directory of Immigration policy	A. Limperi	tada4.metanastefsi@ypes.gr +30-2103741273
Directory of Technical Services	G. Perdikakis	geniko.dty@ypes.gr +30-2103741024
Directory of Computerization	N. Drosos	n.drosos@ypes.gr
Directory of Organizations and Operation of Municipalities	A. Papazoglou	a.papazoglou@ypes.gr +30-2131364342
Agency for the Development of Information Technology	K. Ageletopoulou	k.ageleto@ypes.gov.gr +30-2131313443
Department of Accessibility–General Secretariat of Public Administration and Electronic Government	Ch. Rizos	c.rizos@ypes.gov.gr +30-2131313057
National Center of Public Administration and Local Government	M. Dandoulaki	mdandoulaki@ekdd.gr +30-2132306252
PETA S.A.	Ch. Protogeros D. Pavlopoulos	protogeros@info-peta.gr +30-2132155627 dpavlopoulos@info-peta.gr
EETAA S.A.	M. Skolarikos M. Tzeveleki	msko@eetaa.gr +30-2131320710 mtze@eetaa.g +30-2131320713
Special Secretariat “Administrative Reform”	P. Rizomiliotis	prizomil@aegean.gr +30-2131313626
Hellenic Union of Prefecture Administration	K. Tatsis M. Chatziapostolidis	secretary@nestos.gr +30-2541350701 mxapostolidis@nestos.gr +30-2541350725
Central Union of Local Administrative Units	G. Kougianos	kougianos@kedke.gr +30-2132157509
General Secretariat of the Prefecture of Macedonia and Thrace	F. Gouskouris	fogkou@mathra.gr +30-2310379342

Ministry of Justice, Transparency and Human Rights

Department	**Contact Name**	**Contact information**
Minister’s Office	S. Gletzi	+30-2107767508
Directory of Economics	A. Iakovidis	+30-2107767141
Directory of Technical Services	A. Vakali	+30-2131307110
Juridical Building Financing Fund	E. Stavropoulou	+30-2107767297

President of the Hellenic Union of Land - Registries	Ch. Christopoulos	+30-2105321340
Themis Kataskeuastiki S.A.	V. Thanos K. Anestakos E. Flouda	+30-2107728214 +30-2107728226 +30-2107728161

Ministry of Labour and Social Security

Department	Contact Name	Contact information
Minister's Office	A. Kotsopoulos	thakot@otenet.gr +30-2103368196
General Secretariat of Social Security	E. Gianopoulou	staff@ggka.gr +30-2103368326
General Secretariat of Community and Other Resources Management	D. Mpetoura	despmpet@mou.g +30-2105271507
Body of Work Inspection	M. Zigouri E. Alogogianni S. Chalatsis D. Souliotis T. Chionidis	+30-2103748823 +30-2103748742 +30-2103748724 +30-2103748758 +30-2103748757
Observatory of Employment–PAEP S.A.	E. Pournara	epournara@paep.org.gr +30-2102120712
Professional Training S.A.	A. Mavronasiou - Papakosta	n.papakosta@ep-katartisi.gr +30-2106245328
National Center of Professional Orientation	F. Vlachaki D. Gaitanis	fotinivlachaki@ekep.gr +30-2108233669 dimitrisgaitanis@ekep.gr +30-2108233669
Agricultural Insurance Organization	D. Sourgias K. Vellis	d.sourgias@oga.gr +30-2103845193 infogib1@otenet.gr +30-2103322258
Workforce Employment Organization	D. Pasouris K. Dafermos	dpassouris@gmail.com +30-2109989719 +30-2109989774
Social Security Institution	V. Stravomiti A. Matsi	bstravomit@modernikamng.gr +30-2103891056 mataggel@otenet.gr +30-210521539
Directory of Informatics	T. Stinis	edp-stin@yeka.gr +30-210-5295328

Ministry of National Defence

Department	Contact Name	Contact information
Department of Infrastrusture	G. Drosos	+30-210659 8555
Directory of National Defence Policy	G. Mposmalis	+30-210659 8154
General Military Hospital	D. Mpakopoulos	+30-210659 8279
General Air Staff	A. Delichatsiou	+30-2106593526
Hellenic Military Geographical Service	V. Antoniou	+30-2108206704
Hellenic Navy Hydrographic Service	E. Karatapanis	+30-2106551755
National Meteorological Service	T. Kolidas	+30-2109699050

Ministry of Rural Development and Food

Department	Contact Name	Contact information
Agrogi S.A.	V. Papanastasiou N. Starras	+30-2103488622 +30-2103488639
Directory for Registry Management	G. Levakos	+30-2105271601
Directory of Design for Land Reclamation Works and Utilization of Soil/Water Resources	E. Stavrinos	+30-2108399780
Directory of Surveying	M. Sechioti	+30-2102125834
National Agricultural Research Foundation	S. Theocharopoulos	+30-2102819059
General Secretariat of Agricultural Policy and International Relations	I. Fermantzis	ifermantzis@hq.minagric.gr +30-2102124318
OPEKEPE	G. Navrazoglou	

8.2 List of references for the compilation of the report

1. Directive 2007/2/EK (INSPIRE)
2. Inventory of Map Archives of Agencies and Bodies of the Public Sector, HEMCO, 2008.
3. Report on Monitoring the INSPIRE Directive: Proposal for the Implementation and Management of the INSPIRE Directive in Greece, Technical Chamber of Greece, 2008
4. National Geographical Data Infrastructure, Technical Report, HEMCO, 1999
5. D2.3 Definition of Annex Themes and scope v.3.0
6. European Regulation for Metadata 1205/2008
7. Evaluation of the EIA system performance in. Greece, using quality indicators, Androulidakis, I. and Karakassis, I. (2006), Environmental Impact Assessment Review 26:(3) pp.242-256