

Environmental Public Sector Information – The present path to increasing transparency and democracy

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Abstract

This paper intends to provide insight in current political decisions and administrative requirements for production, processing and dissemination of environmental information. It should stimulate the discussion between the demand for exchange of environmental knowledge and some leading-edge experiences of ICT applications in the Environmental Informatics network.

It is demonstrated, that environmental informatics provides currently a substantial toolbox with eEnvironment services for information integration in a Shared Environmental Information System (SEIS) with ecologic and economic relevance within the Digital Agenda 2020. In the paper a sketch of a European environmental information production is given and conclusions are drawn for further research in the area of Environmental Informatics.

1. Transparency in environmental matters supported by ICT generated Environmental Information

Free access to environmental information increasingly converges to its implementation. Public Sector Information is fostered by national and EU's legislation, by the "eGovernment movement" and by environmental programmes like INSPIRE, GEO, GEOSS, Copernicus (past GMES), "Eye on Earth" etc. The European Research Area ERA and its successor Open Access in "Horizon 2020" pave the way to transparency and increasing access to environmental information.

Early steps in freedom of environmental information were initiated in the 1960ies in Japan (after pollution diseases e.g. the Minimata poisoning) and 1987 in the USA with the *Emergency Planning and Community Right-to-Know Act* and concluded by the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, usually known as the Aarhus Convention, was signed on June 25, 1998 in the Danish city of Aarhus. It entered into force on 30 October 2001. As of July 2013, it had been ratified by 45 states and the European Union (EU).

In the history of EU's legislative acts the Council Directive "Public access to Environmental Information" 90/313/EEC constituted the first time the common understanding for its important matter. In parallel the discussion of transparency, or sometimes called openness in English, involves the way through which public bodies make decisions understandable reasoned and open (Söderman 2001). In 2003 this early directive was repealed by 2003/4 EC on public access to environmental information, the basis of free access to non personalized information.

As an example towards a semantic web, the EU website <http://open-data.europa.eu/> comprises a beta version of an Open Data Portal with at present about 6.000 datasets, 95% from EUROSTAT, 2% environmental information from the European Environment Agency. Visual applications for access of data, technical information for application developers about Linked Data <http://open-data.europa.eu/en/linked-data> and some tutorials for RDF, semantic modeling and data querying are included <http://www.linkeddatatools.com/semantic-web-basics>. All data can be used free, can be reused, linked and redistributed for commercial or non-commercial purposes <http://open-data.europa.eu/en/>. A more extended

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definition of openness of data concerning availability, access, reuse, redistribution see e.g. <http://opendefinition.org/okd/>.

2. Environmental Information for Europe 2020

The neoliberal economic market model and the inflated financial sector guide nations in a serious economic financial crisis. Under this present situation and an advanced understanding of environmental matters e.g. the adverse climate change, a change of economic articles of faith and political culture can be observed. In Europe the Lisbon strategy was substituted by the Europe 2020 (2010) Strategy⁴ which comprises seven ‘flagship initiatives’. Environmentally relevant are the efforts in areas supporting the Europe 2020 priorities like sustainable growth, environmentally-friendly production, the Digital Agenda and the Resource efficient Europe. Fig. 1 depicts EU related development stages laid down in documents, relevant for environmental information in a wider sense.

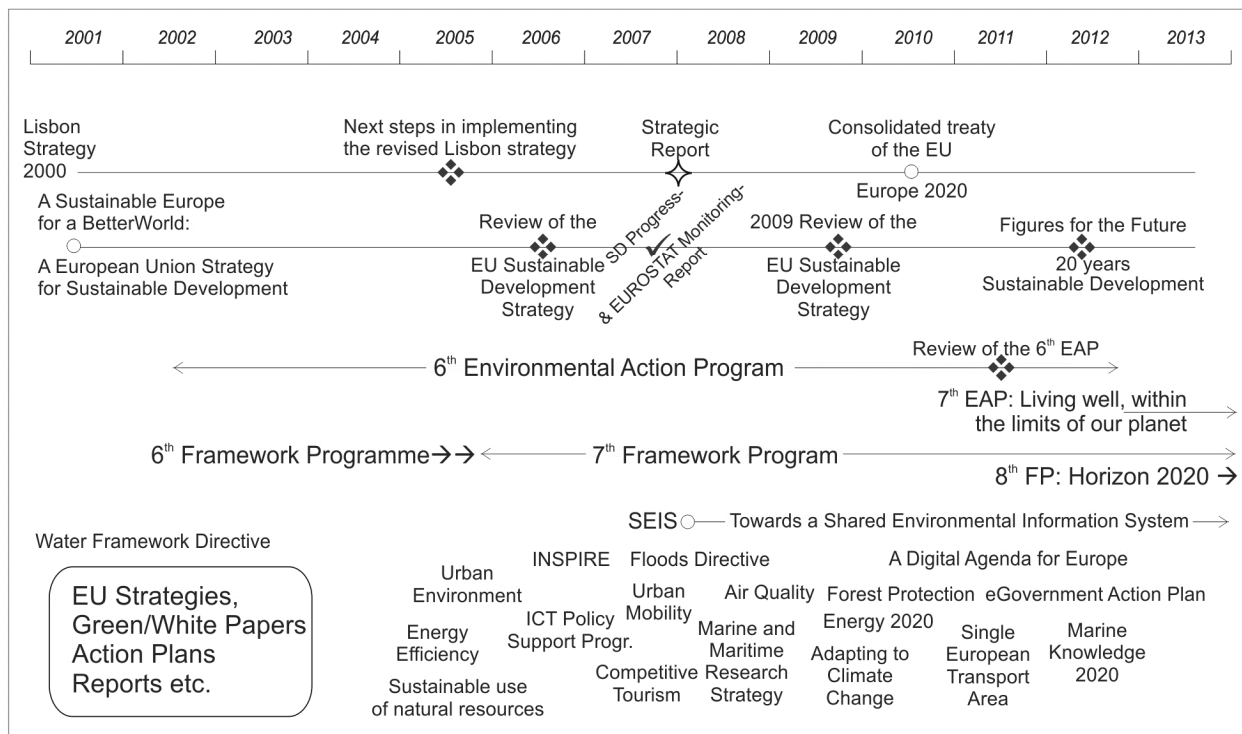


Figure 1: Timeline of EU legal, strategic and administrative development stages laid down in documents, differing in importance for environmental matters

2.1 Environmental topics in the „Digital Agenda for Europe“

The Digital Agenda 2020 (DA2020) comprises 101 actions in seven pillars⁵. This includes the establishment of a digital single market, interoperability, fastened internet access and the enhancement of digital literacy. Environmental relevant actions are Action 85: a review of the public access to environmental in-

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF>

⁵ <http://ec.europa.eu/digital-agenda/en/our-goals>

formation directive 2003/4/EC⁶ and the Action 86: the implementation of cross-border eEnvironment services⁷ e.g. eEnvironment advanced sensor network. The Digital Agenda build an important basis of "Open Government" and "Open Data" in the EU.

With respect to the environment in the DA2020 the intent is fixed to build an environmentally sustainable, low-carbon economy with smart technologies <https://ec.europa.eu/digital-agenda/en/environment>. Moreover the ICT sector itself can play a leading role in enabling energy efficiency under consideration of its own energy consumption. In this regard a multitude of scientific papers can be found in the EnviroInfo conference literature database <http://www.iai.kit.edu/ei-lit>.

An actual comprehensive overview of progress in the DA2010 can be found in the commission staff working document Digital Agenda Scoreboard (2013). An interesting visualisation tool for selected indicators of the Digital Agenda Scoreboard is available on <http://digital-agenda-data.eu/>. Thereby comparison of indicators between countries, time-line charts of indicators and country profiles can be studied.

2.2 Resource Efficient Europe, Energy and Sustainable Growth

In the Europe 2020 communication ambitious goals are formulated; amongst others, the shift towards a resource efficient, low-carbon, sustainable and competitive economy. Sub-goals like green technologies, CO₂ emission reduction, smart grids or fostering market-based instruments (e.g. emissions trading, revision of energy taxation, green public procurement) etc. needs ICT supported information generation, preventing environmental degradation, biodiversity loss and unsustainable use of resources. For trend-setting decisions in the energy sector, overwhelming systemic information is required e.g. resource input in investments, customer characteristics and consumption trends, supply security, secondary environmental effects and in general about an emerging European "Internal Energy Market".

In 2010 the European Commission has adopted the Communication "Energy 2020 - A strategy for competitive, sustainable and secure energy"⁸. Based on the Roadmap for moving to a competitive low carbon economy in 2050⁹, the green paper "A 2030 framework for climate and energy policies"¹⁰ summarizes the efforts done and combine this with the finalized public consultation: "Searching for a new competitive, sustainable and secure Energy Strategy".

2.4 Building a Shared Environmental Information Space (SEIS)

In the papers "Information Sources for a European Integrated Environmental Information Space" (Pillmann, Hřebíček 2009) and "eEnvironment and the Single Information Space in Europe for the Environment" (Hřebíček, Pillmann 2010) the authors identify the preconditions for building a Single European Information Space and associated projects in the field of sustainable growth. With a look of at the legal background an overview of the former status of a Shared Environmental Information Space (SEIS) is given.

In the long-term perspective, SEIS might provide a strategic direction towards an information system of reporting/monitoring of Member States, (partly) driven by the reduction of their administrative burden that modern information and communication technology facilitates. This statement is included in the highly topical discussion paper of the SEIS state of the art and development in the "EU Shared Environmental

⁶ <http://ec.europa.eu/digital-agenda/en/pillar-vii-ict-enabled-benefits-eu-society/action-85-review-public-access-environmental-information>

⁷ <http://ec.europa.eu/digital-agenda/en/pillar-vii-ict-enabled-benefits-eu-society/action-86-implement-cross-border-eeenvironment-services>

⁸ COM(2010) 639 final <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0639:EN:HTML:NOT>

⁹ COM(2011) 885 final <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0885:EN:NOT>

¹⁰ COM(2013) 169 final <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0639:EN:HTML:NOT>

Information System Implementation Outlook”, where also recommendations for implementation were listed.¹¹

It is worth pointing out that the EU project “Information and Communication Technologies for Environmental Sustainability Research” ICT-ENSURE include the screening of initiatives for setting up an environmental information space, as well as assessment examples of existing implementations. Furthermore, a rough concept for an integrated Single Information Space in Europe based on analysis of existing national and supranational ICT solutions is drawn up in ICT-ENSURE <http://www.ict-ensure.eu>.

3. eGovernment

With the Ministerial Declaration on eGovernment (2009) the EU Member States declares the willing, to open governmental data sources for the public use for cross-border interoperability. Formulating the ‘The European eGovernment Action Plan 2011-2015’ (eGov AP) the *European Economic and Social Committee* EESC might pave the way towards a largely free access to governmental information resources.

eGovernment is very prominent in the priority area of the Digital Agenda “Unleash the potential of ICT to benefit society”. But in the eGov AP the actions referring to a review of the Public access to Environmental Information Directive, and the implementation of cross-border eEnvironment services have not been taken into consideration.

In a broader view, Open Government Data (OGD) initiatives, and in particular the development of OGD portals, proliferates since the mid-2000s both central and local government levels. The current OECD paper Ubaldi (2013) highlights the main principles, concepts and criteria framing open government data. The analysis of key concepts and issues aims to pave the way for an empirical analysis of OGD initiatives. The paper suggests a methodology, comprising an analytical framework for OGD initiatives ... and lead to mapping initiatives across OECD.

Factsheets of 34 Member States describing state and progress of eGovernment and eInclusion are located on the epractice.eu server <http://www.epractice.eu/en/factsheets>. eInclusion focuses in this context on participation of all individuals and communities in all aspects of the ICT supported information society.

eGovernment and Environmental Information Directive: the Example of Austria

Each Member State is committed to transpose the Aarhus Convention based EI Directive 2003/4/EC into national law. In Austria the resulting Environmental Information Act 2004 (EIAUIG) promotes a new level of cooperation between the federal government, provinces and municipalities, resulting in an improved transparency and brings environmental administration closer to Austrians citizen. It is worth mentioning that the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (1998) is supported by the OSCE Economic and Environmental Forum, which founded 10 years ago the Aarhus Centres <http://www.osce.org/eea/103279>. The conference which complements the EIAUIG documented this year’s meeting of Aarhus involved experts and organisations on <http://www.osce.org/eea/102666>.

The Umweltbundesamt Austria manages the “Coordination Centre for Environmental Information” (KUI), which assists in the exchange of information between above mentioned parties. Within the eGovernment Working Group an Environmental Information Portal is established as one-stop-shop. It is in line with the intentions of the Austrian eGovernment Program as well as with the European Commission SEIS framework. This central electronic environmental information service may help to relieve Austrians information providing bodies from the burden to deal with individual information requests.

¹¹ SWD(2013) 18 final http://ec.europa.eu/environment/seis/pdf/seis_implementation_en.pdf

Within the joint effort for developing eGovernment services in Austria, a specialised working group assure free access to environmental information within the definition of the Austrian Environmental Information Act. The Austrian e-Gov reference server includes information from this working group and is accessible on <https://www.ref.gv.at/Working-Group-in-English.1107.0.html>.

4. European Public Sector Information and their Re-use

The two essential EU directives Public Access to Environmental Information 2003/4/EC and the Directive 2003/98/EC on the re-use of public sector information pave the way to a consistently available information space with non personal public data. Both directives contributes to more awareness of environmental matters, more participation of the public in environmental decision-making, and therefore to a better knowledge of the environmental sector.

Application of 2003/4 EC

Looking at the *Report from the Commission to the Council and the European Parliament on the experience gained in the application of the Directive 2003/4/EC on public access to environmental information*, (Experience 2003/4 EC report, 2012), the Directive can be regarded as the most extensive individual EU legislation on active dissemination of environmental information¹². Especially the articles 7 “Dissemination of environmental information” and article 8 “Quality of environmental information” are of interest for the revision of the directive in future. The 27 detailed country reports can be found on http://ec.europa.eu/environment/aarhus/reports_ms.htm. For the application of the directive, the Commission will seek to help Member States to structure information in better “Structured Implementation and Information Frameworks” (SIIFs). This can be perceived as task for environmental informatics experts in cooperation with country representatives.

However, other acts such as INSPIRE¹³ and the PSI Directive¹⁴ and initiatives such as SEIS¹⁵ also provide wide electronic access to certain information held by public bodies. Together with the 2003/4 directive, they make up a framework for sharing environmental information, with data obtained from monitoring activities, scientific projects in conjunction with geographic information.

Development of the PSI Directive

In 2008 all 27 EU Member States had fully implemented the PSI directive. In 2011 the Commission proposed a revision, which is accomplished with 2013/37/EU, “amending Directive 2003/98/EC on the re-use of public sector information” (2013). Together with the fast developing information in INSPIRE, the “Infrastructure for Spatial Information” facilitate the sharing of environmental information between public authorities. The PSI Directive is a building block of crucial importance for the much-needed overall coherence of the forthcoming Shared Environmental Information System SEIS¹⁶.

4.1 Examples of ongoing Transparency Revolution in Administration

After half a century of efforts to inform citizens about their environment, significant progress can be found in legal measures, in democratic discussions and in ICT methods, tools and applications. A comprehensive

¹² COM(2012) 774 final <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0774:FIN:EN:PDF>

¹³ Directive 2007/2/EC <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:108:0001:0014:en:PDF>

¹⁴ Directive 2003/98/EC Re-use of public sector information
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:345:0090:0096:EN:PDF>

¹⁵ COM(2008) 46 final Towards a Shared Environmental Information System (SEIS)
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008DC0046:EN:NOT>

¹⁶ SEC(2011) 1552 final <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2011:1552:FIN:EN:PDF>

insight in the current development and state of the art of open data, linked open data and semantic web application can be found in the EnviroInfo Literature-Database <http://www.iai.kit.edu/ei-lit>. Below some randomly selected examples comprising administrative approaches to improve communication with citizens and fostering businesses for using data.

Austria eGovernment Reference Server

Immediately after the 1990 EU directive enter into force, the Environmental Ministry Austria set up the Meta-Informationssystem “Environmental Data Catalogue” Between 1995 and 1998 the International Society for Environmental Protection (ISEP, Vienna) has become the Technical Secretariat of the European Topic Centre on Catalogue of Data Sources (ETC/CDS), a project initiated by the European Environment Agency (EEA), and directed by the Ministry of Environment of Lower Saxony, Germany.

An important objective of the eGovernment working group on environmental information coordinated at the Umweltbundesamt Vienna, is the establishment of a central environmental information portal as one-stop shop <http://www.data.gv.at/>. This approach is in line with the intentions of the Austrian government program, as well as with the initiatives of the EU Commission within the SEIS framework (Legat, Krammer, Meyer, 2009); (Vogel, Mayer, Krammer et al. 2013).

UK DEFRA Open Data Strategy 2012-2014

With Linked Data real-world things are given addresses on the web <http://data.gov.uk>, with unified resource identifier (URIs), and data are published about them in machine-readable formats. Across government there evolve an increasing linked data set for exposing, sharing, and connecting information¹⁷

Germany Linked Environment Data; Transparency act Hamburg

The Umweltbundesamt Germany, now has launched a research & development project on Linked Environment Data (LED). This project will set up a core cloud of environment data with a well-elaborated domain terminology as its semantic backbone. Data will be taken from the “Environmental Specimen Bank”, the “German Metadata Portal on Soil” and further databases such as the “Joint Substance Data Pool of the German Federal Government and the German Federal States” as well as the environmental library and research databases. All the work will be fully Semantic Web compliant, based on vocabularies such as SKOS, SCOVO or Data Cubes, and Dublin Core (Fock, Bandholtz 2012). Insight in efforts towards Open Data in the Umweltbundesamt presented Hübener (2012).

On the basis of the legal act ‘Information freedom’ Hamburg (Germany) turn away from the „official secrecy“ towards an Open Government Data principle. The *Hamburgisches Transparenzgesetz* (HmbTG) – documented in <http://www.transparenzgesetz.de/english/> - establishes the obligation to build up an information register. Results see e.g. on <https://fragdenstaat.de/hamburg/>

USA Open Data Policy

In May 2013 US president Barack Obama decrees the executive order “Making Open and Machine Readable the New Default for Government Information”¹⁸. On the basis of openness in government on the basis of a Open Data Policy, he states a strengthening of democracy, efficient and effective services to the public, improvement of economic growth and fuelling entrepreneurship, innovation, and scientific discovery (Obama 2013).

¹⁷ <http://data.gov.uk/sites/default/files/Defra%20Open%20Data%20Strategy.pdf>

¹⁸ <http://www.whitehouse.gov/the-press-office/2013/05/09/executive-order-making-open-and-machine-readable-new-default-government->

4.2 Open Access in Horizon 2020

In foresight to Horizon 2020 the EU promoted an obligation to provide Open Access in all funded areas e.g. peer-reviewed publications and research results. In an online public consultation on scientific information in the digital age the EU find agreement for Open Access in an opinion poll from 100% of governments and research funding organization, from more than 90% in libraries and the scientific community and find 67% disagreement of publishers for Open Access¹⁹.

In this context, the Deutsche Digitale Bibliothek (DDB) offers till the end of 2012 unrestricted access to Germany's cultural and scientific heritage with 5,5 mio. Objects. Starting in the summer of 2007, the Federal Government has contributed € 8 million to the development of infrastructure for the Deutsche Digitale Bibliothek, while federal, state and local authorities have guaranteed an annual operational budget of € 2,6 mio. for five years, starting in 2011²⁰.

On a European level, the project "Open Access Infrastructure for Research in Europe (OpenAIRE)²¹ has developed a pilot to explore ways to make research data available from EU projects funded under the Horizon 2020 framework. Since the proposed pilot aims to facilitate research data exchange and re-use, this might be a prospective vehicle of communication in environmental research.

5. Summary and Outlook

Environmental relevant programs and documents in the Europe 2020 and the EU sustainability strategy are compiled and analyzed in this paper. It is demonstrated, that the EU environment policy is accompanied and guided by green- and white papers, the Research Framework Programmes (FP), the Environment Action Programs etc. The new 8th FP Horizon 2020 and the newly proposed "Environment Action Program to 2020" draws on a number of recent strategic initiatives in the field of environment, including the Resource Efficiency Roadmap²², the 2020 Biodiversity Strategy²³ and the Low Carbon Economy Roadmap²⁴. While many EU Member States contend with the economic crisis, these existing and new programmes, projects, initiatives, organisations and networks might broaden the horizon for moving towards a more environmental sustainable future.

With respect to the work of the Technical Committee Environmental Informatics, the Environment Commissioners Janez Potočnik addresses in a video message for the conference opening, EnviroInfo enlarge and strengthen the European network of expert in ICT for environmental sustainability research. "With Horizon 2020 and the Digital Agenda for Europe, the potential of digital connected Europe can be maximized, generating eGovernment and eEnvironment services, making environmental information available across administrative and national boundaries. That is why events such as EnviroInfo are so important. They help to build sustainability using new media both by providing good and timely information to European citizens on the state of environment and by engaging them in helping to maintain and improve it"²⁵.

¹⁹ http://www.scienceurope.org/uploads/GRC/Open%20Access/2_Daniel%20Spichtinger.pdf

²⁰ <http://www.deutsche-digitale-bibliothek.de/>

²¹ <http://www.openaire.eu/>

²² COM(2011) 571 final: Roadmap to a Resource Efficient Europe
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:DKEY=615217:EN:NOT>

²³ COM(2011) 244 final Our life insurance, our natural capital: an EU biodiversity strategy to 2020
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0244:EN:NOT>

²⁴ COM(2011) 112 final, SEC(2011) 288 final: A Roadmap for moving to a competitive low carbon economy in 2050
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011SC0288:EN:NOT>

²⁵ http://c14005-o.l.core.cdn.streamfarm.net/findmedia/12/080612/LR_I080612EN1W.mp4 (also in MP2 format as .mpg)

6. Bibliography (Web access July 2013)

Papers from EnviroInfo conferences see <http://www.iai.kit.edu/ei-lit>

- Directive 2013/37/EU (2013): Directive 2013/37/EU (2013) amending Directive 2003/98/EC on the re-use of public sector information
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:175:0001:0008:EN:PDF>
- Digital Agenda Scoreboard (2013): Commission staff working document SWD(2013) 217 final
<https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/DAE%20SCOREBOARD%202013%20-%20SWD%202013%20217%20FINAL.pdf>
- eGov AP: The European eGovernment Action Plan 2011-2015 - Harnessing ICT to promote smart, sustainable & innovative Government'. COM(2010) 743 final. EESC 2011
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0743:FIN:EN:PDF>
including the Commission Staff Working Document SEC(2010) 1539 final
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2010:1539:FIN:EN:PDF>
- eGovernment (2009): Ministerial Declaration on eGovernment, Malmö
<http://www.government.se/content/1/c6/13/56/67/f5ac8e34.pdf>
- Europe 2020 (2010): - Europe 2020 -A strategy for smart, sustainable and inclusive growth. COM(2010) 2020 final. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF> p.14-15
- European Report on Development (2013), Post-2015: Global Action for an Inclusive and Sustainable Future, Overseas Development Institute (ODI), German Development Institute/Deutsches Institut für Entwicklungspolitik (DIE), European Centre for Development Policy Management (ECDPM), Brussels, 2013. http://www.erd-report.eu/erd/report_2012/documents/FullReportEN.pdf
- Experience 2003/4 EC report (2012): Report from the commission to the council and the European parliament on the experience gained in the application of directive 2003/4/EC on public access to environmental information <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0774:FIN:EN:PDF>
- Fock J., Bandholtz Th. (2012): Linked Environment Data - Getting Things Connected. Proceedings EnviroInfo Dessau 2012, Part 2, p. 445-451. Shaker Verlag
- Hřebíček J., Pillmann W. (2010): eEnvironment and the Single Information Space in Europe for the Environment. Proceedings EnviroInfo 2010 (Cologne/Bonn). Shaker Verlag
- Hübener J (2012): Open Data! Proceedings EnviroInfo Dessau, part II, p. 425-433, 2012 Shaker Verlag
- Legat R., Krammer H.-J., Mayer J. (2009): Austria on the way to a European «Shared Environmental Information System». eGov Präsenz 1/2009 Fachzeitschrift für E-Government der Schweiz.
http://www.wirtschaft.bfh.ch/uploads/tx_frppublikationen/eGov_Praesenz_090609_web.pdf
- Obama B. (2013): Memorandum “Transparency and Open Government”
http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment
- Pillmann W., Hřebíček J. (2009): Information Sources for a European Integrated Environmental Information Space. Proceedings EnviroInfo conference September 9.-11.2009 Berlin. Wohlgemuth V., Page B., Voigt K. (eds.), Shaker Verlag Aachen
- Söderman J. (2001): Transparency as a Fundamental Principle of the European Union
<http://www.whi-berlin.eu/documents/soederman.pdf>
- Vogel W., Mayer J., Krammer H.-J., Nagy M., Legat R. et.al (2013): The theory and practice of obtaining and applying environmental information within the interaction of governmental agencies
https://www.ref.gv.at/uploads/media/TAIEX_Pristina_2013_Legat_presentation1_final_01.pdf
- Ubaldi B. (2013): Open Government Data: Towards Empirical Analysis of Open Government Data Initiatives. Working Papers on Public Governance No. 22, OECD Publishing.
<http://dx.doi.org/10.1787/5k46bj4f03s7-en>