ESPON

EUROPEAN UNION

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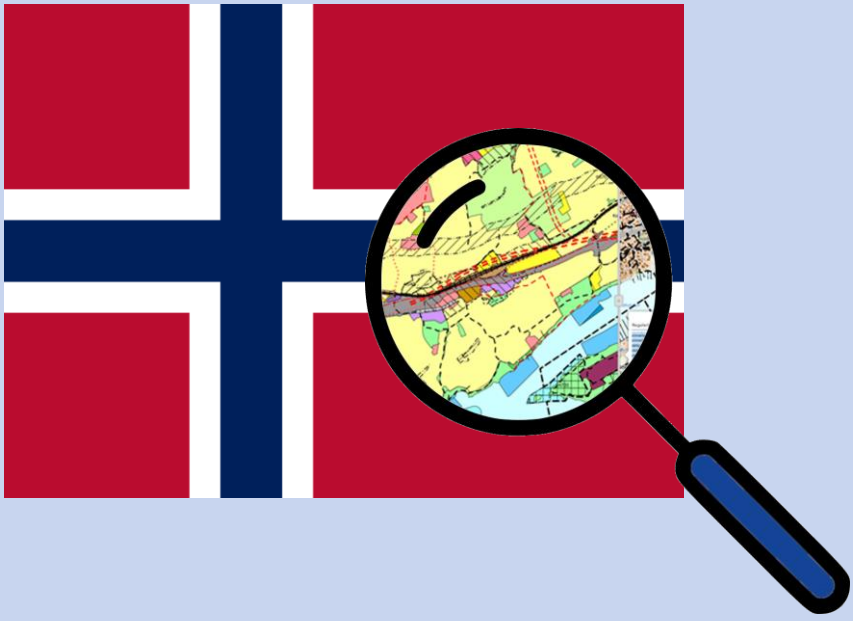
Inspire Policy Making with Territorial Evidence

TARGETED ANALYSIS //

DIGIPLAN – Digital plans and plan data in Norway

Annex 7 of final report

Final report // June 2021



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Coordination and Outreach
Christian Fertner, University of Copenhagen and Piera Petruzzi, ESPON EGTC

Authors
Norwegian University of Life Sciences (Norway): Marius Grønning, Bjørnar Rutledal

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Advisory group
Stakeholders: Ole Pagh Schlegel and Bent Lindhardt Andersen, Danish Housing and Planning Authority, DK | Hilde Johansen Bakken, Ministry of Local Government and Modernisation, NO | Silvia Jost, Yves Maurer and Marc Pfister, Swiss Federal Office of Spatial Development, CH

ESPON EGTC: Piera Petruzzi (Senior Project Expert), György Alföldy (Financial expert)

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Contact: info@espon.eu

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Abbreviations

DiBK	*Direktoratet for byggkvalitet* | The Directorate for Building Quality
DOK	*Det offentlige kartgrunnlaget* | The Public Map Basis
KMD	Kommunal- og moderniseringsdepartementet | Ministry of Local Governance and Modernisation
MPR	*Kart og planforskriften* | Map and planning regulation
NMA	*Kartverket* | Norwegian Map Authority
NPAD	*Nasjonal produktspesifikasjon of arealplan og digitalt planregister* | National product specification of land-use plans and digital plan register
NPG	*Statlige planretningslinjer* | National Planning Guidelines
PBA	*Plan- og bygningsloven* | The Planning and Building Act
SOSI	*Samordnet opplegg for stedfestet informasjon* | Coordinated scheme for spatial information

Foreword by the Norwegian stakeholder and the research team

The ESPON DIGIPLAN project has explored the development and state of digital plans and plan data in several European countries. It is the first project of its kind; no similar research has been conducted before and the topic of inquiry was spanning wide from the beginning. The project has therefore employed an explorative approach, in order to shed light on digitalisation processes and the emergence of new digital practices in different spatial planning contexts. As part of that exploration also presents an early systematisation of general concepts, key terms and approaches describing emerging digital plans and plan data and related practices.

This report is one out of six in-depth case studies, presenting findings from Norway. Exploring and comparing cases on a European scale we can see throughout the various studies that what takes place on a national level is heavily driven by the pan-European INSPIRE directive. In the case of Norway, however, we have observed that the process of digitalisation on a national level was well advanced before supra-national frames and guidelines existed, and that the process of the past decades is more a question of adaptation and harmonisation of agendas and frameworks, than a push to implement digital technology. More specifically, the report tries to give a precise description of how digital services are provided and how plan data is produced, in order to provide evidence for some emerging characteristics of the case. One of these characteristics is that the state is less concerned with issues of sovereignty in the provision of the data itself, but focuses its responsibility and resources on the provision and maintenance of the infrastructure related to geodata and plandata production and exchange. Another characteristic that comes with this approach is a strong concern with national standardisation of plan data, both in terms of the data itself and the symbology of maps and plans.

Some policy issues may be drawn out of the current state of the digitalisation process as it can observed and described at the time of the present study. One is how the development of digital plans and digital plan data is encompassed by a wider national digitalisation strategy, involving public administration and service production in general. At this point Norway seems to be striving towards a full digitalisation of the planning process, interested in the advantages that come along with digital technology such as automation and information flow in planning and building proceedings. Nonetheless, some actors argue, there needs to be a stronger focus on practical purposes of digital technology, such as decision-making support, implying a different kind of ambition, a specific purpose that articulates along different sectors and that involves a somewhat differently targeted resource allocation where the practices of planning and building may have specific needs and features. A second issue is related to the levels of governance in Norway, the planning practices that take place on each level, and the needs for data and data sharing in that specific model of organisation. Local government is particularly strong in Norway, where municipalities have close-to-monopoly on land-use authority, generating some ambiguities between national geoportals and local ones. The effect is also due to ambitions on the national level that may not always be in phase with the local state of the development, whether it is considered in terms of needs, resources or competencies. A third issue emerges from the widely network-based form of governance characterising planning activities in Norway. A considerable part of planning activities performed by developers and consultancies leads to close collaboration and interaction between private actors and different entities of public authority. These interactions generate a particular pattern of interaction between producers and consumers of plan data, where some are within a data sharing environment and others find themselves outside of a paywall. These are some issues that may be considered specific to the case, while others may be widely observed across the cases, but no less worthy of consideration.

Marius Grønning and Bjørnar Rutledal

Norwegian University of Life Sciences

Hilde Johansen Bakken

Ministry of Local Government and Modernisation, Norway

1 Introduction and data

ESPON DIGIPLAN provides an overview on digitalisation of plan data in 15 ESPON countries, insight information from case studies in 6 countries and five thematic practice papers, synthesizing the state of the art in topics related to digital plan data and digital plans. This Annex reports on Norway, one of the 6 in-depth case studies. The methodological framework for the case studies is described in Annex 1.

The main empirical material for the case study are information from the plan data portals, related documents and interviews with experts in the field. Seven interviews were conducted (Table 1.1). Information from interviews in the text are referenced by (NO01) to (NO07), referring to an internal interview reference table. All interviews were conducted in Norwegian. Citations are own translations based on transcription.

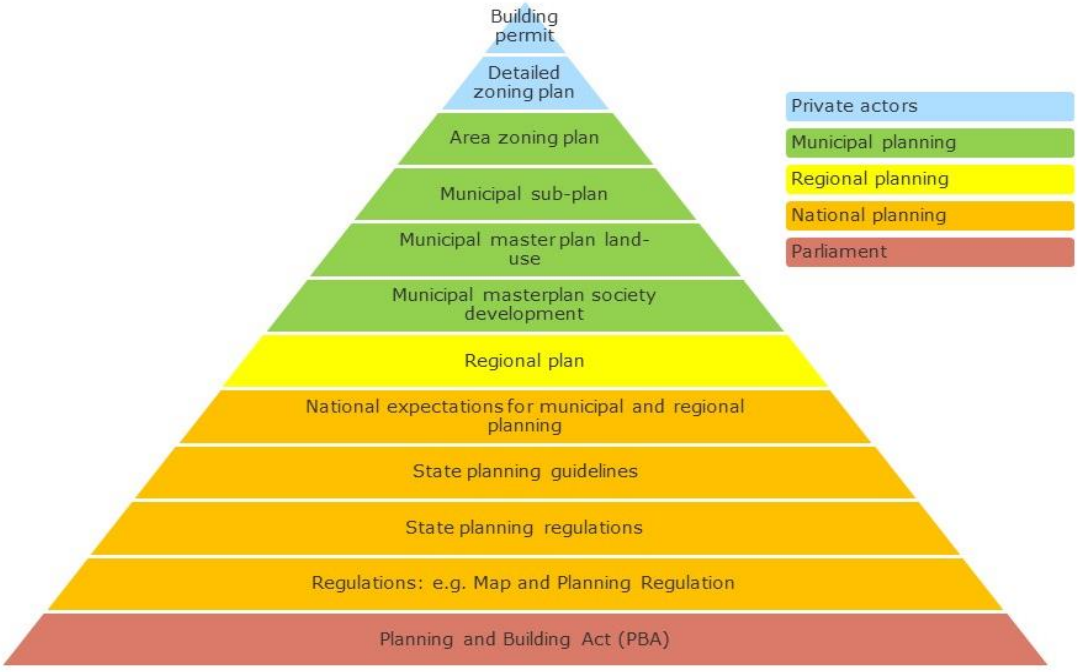
Table 1.1
Interviews held

Affiliation	Position	Theme
Ministry of Local Government and Modernization	Planning department, digitalisation	National role in the plan data field
Norwegian Map Authority	Responsibilities for the national geoportal	Management of the national infrastructure
Directorate for Bulding Quality (DiBK)	Senior Advisor	Projects for advancing digitalisation
Sandnes municipality	Planner	Drømmeplaner-project
Bærum municipality	Planner	Municipalities' role in digitalisation
Bærum municipality	GIS-engineer	Municipal role in the geodata infrastructure
Asplan Viak	Responsibilities for market and innovation, digital services	Role of planning consultancies in digitalisation

1.1 The Norwegian planning system

The Norwegian spatial governance system is structured by two main regulatory principles: frame management, where one level of governance sets the frames for lower levels, and subsidiarity, with a strong delegation of strategic and regulatory authority to municipalities. This makes the municipalities the main planning authority, with substantial authority on land-use, while the national level has a guiding, legislative and overseeing role. The regional level also plays a part in providing regional plans that play a guiding and coordinating role for the municipalities. The Planning and Building Act regulates the Norwegian planning system. This means that many of the digital services are at the municipal level, while the infrastructure and metadata is at the national level.

Figure 1.1
Planning instruments in the Norwegian planning system



An overview of the Norwegian planning system with the different planning instruments and their respective authority. For building permits and detailed zoning plans, the municipality is the authority, but processes are mostly initiated by private actors (Ridderström, 2018)

The Planning and Building Act gives substantial land-use authority to the municipalities by placing the responsibility for municipal master plans (kommuneplan) and detailed zoning plans (reguleringsplan) on this level (Plan- og bygningsloven, 2008, § 3-3). The regional level has responsibilities for developing regional plan strategies, regional plans or regional planning regulations, in addition to guidiance of municipalities and others (Plan- og bygningsloven, 2008, § 3-4). The national level has a responsibility to ensure that national interests are taken into consideration in regional and municipal planning (Plan- og bygningsloven, 2008, § 3-5). This entails establishing planning instruments such as National expectations for regional and municipal planning, state planning guidelines and state land-use plan. State land-use plans are defined as a planning instrument but does not define a superior scale. They refer to the state as planning authority in specific cases, as opposed to the municipalities. This must not be understood as a national land-use plan. Regional plans are so far rarely land-use plans, in some cases mostly indicative.

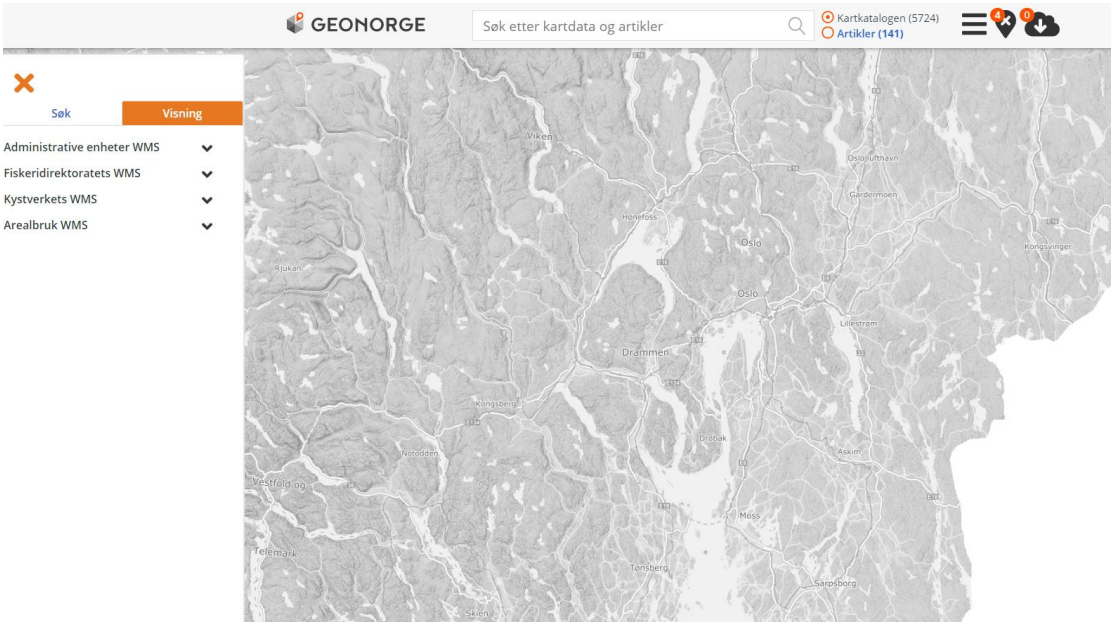
2 Scope of digital plan data

2.1 The current state of digital plan data in Norway

Geonorge (national portal)

Geonorge is the national website for map data and other geographic information in Norway (Geonorge, n.d.). Geonorge is a part of the Norway Digital cooperation and is developed and run by the Norwegian Map Authority. The purpose of this portal is to document available data in different sectors and make it available for viewing and downloading (NO02). The portal contains a map viewer, but this is designed so as to view some of the different data sets contained on the portal. It is not meant for end-users in a planning- or building permit process (NO02).

Figure 2.1
Geonorge's map portal



Active data sets can be seen in the menu to the left. Data sets can be added and removed from this list from the available data sets on Geonorge. Not all data sets are available to view in this map (Geonorge, n.d.)

Figure 2.2 illustrates that the national geographic infrastructure in Norway is decentralized. Many authorities produce geodata and make it available on Geonorge. Not necessarily physically, but as a link to their own portals (NO02). In this way Geonorge functions more like a register which shows available data and where to find it. The slogan for Geonorge is “Everything in one place” (NO2). The idea behind this infrastructure, the portal and its standards, is in part to follow international standards, which means that the data should be able to be read by simple off-the-shelf (NO:hyllevare) software. Geonorge supports many APIs which makes it possible to use the data contained in Geonorge without physically visiting the website and downloading data. This means that many different tailored end-user solutions can be developed on top of this (see section 4.1).

Figure 2.2
Metadata on Geonorge

The example shows a data set that is not available for download or viewing on Geonorge, but are available either through another portal/viewer or through contacting the data-owner (Geonorge, n.d.). Metadata, product description and product spesifications are also available from this page.

Public Map Basis (NO: DOK)

Public geodata adapted for the municipalities' responsibilities within planning and building permits under the Planning and Building Act (Kartverket, 2020). The Ministry of Local Government and Modernization decides which data should be on the national DOK-list, and this list is revised on a yearly basis. There are currently 147 datasets, of which 5 are new of 2020 (Kommunal- og moderniseringsdepartementet, 2020). The ministry has the responsibility for the list of data sets, but it is the Norwegian Map Authority who formally approves the datasets (Kartverket, 2020). Approved datasets are included on the national geoportal Geonorge.no. The purpose of this list is to secure an improved knowledge base in the execution of authority under the Planning and Building Act, to ensure equal treatment and more efficient processes (Kartverket, 2019).

Figure 2.3
The purpose of DOK

Source: Adapted from Kartverket (2019)

Spesification/creteria for DOK: There is a set of criteria which determine weather a data set can be included on this list (Kartverket, 2020). These are split in two categories. Firstly there are three criteria for determining if a dataset should be included on the DOK-list. These considerations are done by the Ministry:

- The dataset is relevant for tasks under the PBA. Considered on the basis of information provided by the authority suggesting the dataset.
- The dataset covers a large area of the country. Nation-wide or significant areas where the georeferenced phenomenon exists.

The dataset is updated by a responsible national authority. Either the authority produces the data itself, or it supervises the municipalities or others which produce the data. There is a clear management structure for datasets including national data in place. Data delivered by municipalities or regional authorities can be delivered in a national solution.

When a dataset is in accordance with the criteria above, the dataset can be included on the list. To be finally approved there are criteria regarding 7 technical aspects which needs to be fulfilled. These are considered by the Norwegian Map Authority (Kartverket, 2020):

- Metadata – Metadata included on Geonorge.
- Product description – each dataset needs a product description with information on how to use the dataset.
- Rules for presentations – Each dataset must have rules for how the data is to be presented. Both in text or in digital format (SLD).
- Product specification – Each dataset must have a product specification in the SOSI-format.
- Data according to specification – Datasets must be in accordance with both SOSI and GML specifications.
- Viewing service – The datasets must have at least one web-based viewing service where the dataset can be viewed.
- Downloading – Datasets must be in the correct format for downloading from Geonorge.no.

Furthermore a map needs to be provided, showing how complete the dataset is. However, this requirement does not apply until 1.1.2022. The DOK-data sets are available on Geonorge and their status in this process of approval can be seen here, as either approved, in process or candidate (Geonorge, 2020).

Figure 2.4
Example of DOK-data sets in Geonorge

DOK-data sets' status of approval for different criteria. The most left criteria is the status. Fully green is approved, while partly grey are in process (Geonorge, 2020).

DOK-tilleggsdata: In addition to the national list the municipalities can define additional datasets as part of their own local DOK (Kartverket, 2019). This is called DOK-additional data (NO:DOK-tilleggsdata). This is datasets that are produced and/or owned by municipalities, regional or national authorities. The reasons for adding datasets to the national list can be that the dataset is more detailed or it shows an important local phenomenon. DOK-additional data does not have the same requirements as the national DOK-list. There are three requirements (Kartverket, 2018):

1. Relevance – the dataset must be relevant for tasks under the Planning and Building Act.
2. Metadata – Metadata for the dataset must be included in Geonorge.
3. Downloadable – the dataset must be available for downloading

In addition to these, there are also recommendations regarding the management of the datasets, product description, cartography, SOSI, viewing service and product specifications (Kartverket, 2018). These are

similar to the requirements for the national data sets, but as for DOK-additional data they are not requirements, but recommendations that can be followed if relevant.

2.2 Historical background

What we mean by "digital plan data" may vary between countries, as we refer to a function which is intrinsic to institutional frameworks of spatial planning. In order to get a picture of the functionalities that are sought to be developed by means of digital plan data, one therefore needs to take into consideration not only the digital technology available, but also the institutional context within which it is meant to operate. The present situation in Norway can be explained by observing how geographic information has been associated with plans over time. By the time Norway establishes a national strategy for digital governance, three main structuring steps may be pointed out: 1) the association of geographic information with spatial plans, 2) procedural integration of decision making with spatial data collection, and 3) the introduction of digital governance.

Geodata and plans

The notion of "base map" reflects the adaptation of geographic information (GI) to particular purposes such as planning and building activities. Today it seems inseparable from the planning system, but it cannot be traced back to its origin, and we may therefore question what were the needs at the time base maps were formalised in planning. Norwegian legislation in the fields of planning and building has had requirements for spatial information since the first nation-wide building act of 1924 (Rutledal, 2017), which provides a national legal basis for making city plans, restricted to urban municipalities. The early legislation is concerned with built up environments, requiring information city structure such as buildings, urban blocks, street network and so forth. Spatial information in planning is prescribed according to engineering and architectonic criteria, as blueprints of built up form. This logic is disrupted in 1965 when a new building act generalises the legal basis for planning, expanding planning requirements from urban to rural municipalities. Planning is no longer just urban, but spatial, since any municipality, urban or rural, is required to make statutory plans, and regional and municipal plans cover the whole territory, with its built up, rural, and natural spaces. These changes led to formal requirements for basis maps in planning. As the scope of the legislation was expanded, its prescriptions for spatial information became more general, removing the requirements for detailed description of built up structure. On the other hand physical development needed to be seen in relation to contextual information about the environment, requiring a formal association of geographic information with instruments of land use control. This was structured by a national building norms in 1969 (Byggeforskrift 1969), which reintroduced technical requirements for spatial representation in plans. The Map Norm of 1979 is the first element of a systematic integration of geographic infrastructure with spatial planning and may be seen as the predecessor of the current standard Production of Base Geodata (N: Produksjon av basis geodata) from 2015 (Kartverket, n.d.).

Procedural integration

The conditions of the 1980s lead to a cultural and institutional changes. A vast amount of private initiatives, coupled with processes of deindustrialisation and urban renewal contribute to a shift in terms of governance and a redistribution of roles among actors in planning processes. Spatial structure is to a larger extent shaped by single projects without strictly obeying to a pre-established comprehensive plan. And thus the role of municipalities is oriented towards case processing and a logic of service provision that responds to a market driven spatial development. Another response to the more incremental, project based planning is the emerging assessment regime of the 1980s and '90s, following a more fragmented development pattern. These changes lead to a need to keep geographic information immediately accessible, allowing to assess social and environmental impacts and risks wherever a planning or building initiative is presented to public land use authorities. The changes also triggered a need to exchange data, and thus a need for standards and harmonisation of information originating from different providers and types of processes. This was also the early days of digital processing within the field of planning and building. As the planning and building act of 1985 introduced a new legal framework for spatial planning, the first national standard for GI-data exchange was established the same year, the SOSI-format. Its main intent was to ease coordination and efficiency in the production and use of geodata (Bie & Stormark, 1980). From the second half of the 1980's many municipalities started to engage in strategies and take digital technologies in use to improve the

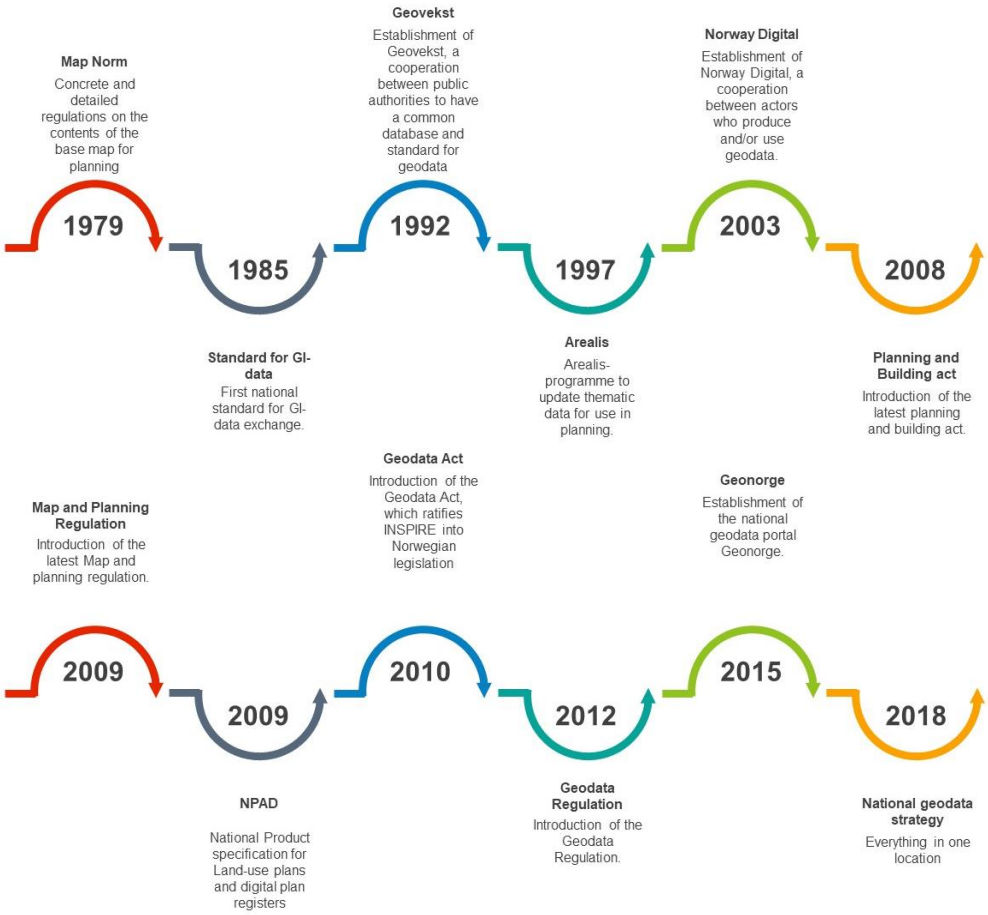
knowledge basis for local authorities in planning and decision making on spatial development, pointing towards central authorities to develop geographic infrastructure. In 1992 the Geovekst was establishet (literally "Geogrowth"), a cooperating partnership of several public authorities who use and produce geodata. The aim of the partnership was to establish and update a single national database of geodata, with one standard, in order to facilitate efficient and cost-effective use of geodata (Kartverket, 1992).

Digital governance and spatial planning

Within the field of spatial planning, a decisive step towards digitalisation was the Arealis-programme from 1997 to 2001, established by the Ministry of the Environment (Miljøverndepartementet, 2003). It was a co-operation between municipalities, counties and state agencies around accessibility of information on land-use, asset values, the environment and natural resources. At this stage, there was no national overview of the number of plans or which land-use regulations existed around the country, and the programme's main purpose was to support and streamline planning processes and planning and building proceedings. Through Arealis one could start gathering thematic data for spatial planning in a systematic manner, also looking into digitizing plans (NO02). In 2003, the Government presented the *Norge Digitalt* organisation (Norway Digital), a network of producers and consumers of geodata, which was finally established in 2005 (NO02). These institutional milestones of digitalisation and organisation represent a national approach to the production and distribution of geodata, as the Norwegian Mapping Authority was given the operational responsibility for managing the network. Municipalities and other institutional actors within the network were now given access to a common pool of geodata through formalised cooperation. The current Planning and Building Act from 2008 (PBA2008) provides a planning framework for what the previous decades had built up in terms of digital technology, reflected in its requirements for plan data, such as the creation of a municipal plan register.

The period since the current Planning and Building Act of 2008 was introduced is characterised by the harmonisation of the planning system with the national geographic infrastructure. They are now consolidated through further norms and regulations, experimentation and implementation of new technologies, and support systems for planning, taking digital plan data further into practice. In 2009 the Map and Plan Regulation (MPR2009) was updated accordingly, giving detailed description of requirements for public maps, geodata, plan data and municipal plan registers. Also in 2009, national product specifications for land-use plans and digital plan registers (NPAD) were introduced. This is currently the most important standard for plan data, and it is rooted in the Planning and Building Act (with its land-use categories and types of zoning) as well as the Map and Plan Regulation. Specifications include in depth information on how land-use plans are to be produced, based on drafting conventions with a finite set of symbols providing standardised legends for plans. They concretise the general requirements in the PBA2008 and the MPR2009, including drafting standards for plan maps, with SOSI specification, as well as specifications for municipal plan registers. All this was in place in 2010 when the INSPIRE-directive was implemented in Norwegian law. The Geodata Act of 2012 reflects this adaptation, providing new legal requirements for a national infrastructure for geographic information. The act is reinforced by The Geodata Regulation which concretises the requirements, among other things by mandating the creation and management of a national geoportal. In 2015 Geonorge was established as national geoportal, in accordance with the law and regulations. Aligned with the evolutions within the Norwegian governance system, it had, however, been in development since before the new legislation (NO02).

Figure 2.5
Milestones in the Norwegian geodata infrastructure development



Source: Authors

3 Organisation of digital plan data

3.1 Organisation

The Planning and Building Act

The Planning and Building Act of 2008 became an opportunity to implement digitalisation into planning legislation. The PBA introduced a comprehensive planning system with a layered planning system in which legally binding information at one level are transferred to legally binding information in a different plan. This makes standardization necessary in order to make different planning instruments look similar. As a result of this standardization fully digital planning processes is made possible.

The Planning and Building act requires the municipality to ensure that an up-to-date public base map is available for purposes under the law (planning and building permits) (Plan- og bygningsloven, 2008, § 2-1). It also requires state, regional and municipal authorities to make geographic information available for use in planning- and building permit processes.

This paragraph also makes it possible for the municipality to require all planning proposals and applications for building permits are delivered in digital form, and the municipality can also demand that the initiator of planning- or building permit processes makes maps if this is deemed necessary (Plan- og bygningsloven, 2008, § 2-1).

Furthermore the law requires all municipalities to have a plan register that contains information on current land-use plans and other regulations which determines land-use (Plan- og bygningsloven, 2008, § 2-2).

PBA chapter 2 acts as part of the legal basis for the Map and Planning Regulation.

PBA §§ 11-7 and 12-5 determines the different land-use categories available for plans. This represents the legal basis for the definition of the drawing regulations found in the Map- and Planning Regulation (MPR) and the national product specification for land-use plans and municipal plan registers (NPAD).

Map and Planning Regulation (NO: Kart- og planforskriften)

The purpose of the regulation is to facilitate for easy access to reliable geographic information. This information shall give a comprehensive overview of planned and determined land-use in Norway, under the Planning and Building Act (Kart- og planforskriften, 2009, § 1).

The regulation also represents the legal foundation for the establishment of the DOK-concept (Kart- og planforskriften, 2009, §2). The regulation gives the municipalities the authority to demand the initiators of plans to procure geodata when this is deemed necessary (Kart- og planforskriften, 2009, § 6). It also allows the municipality to demand that planning proposals are to be delivered in digital format (Kart- og planforskriften, 2009, § 7).

§2 defines plan data as geodata in digital land-use plan, which has been subject to approval under the Planning and Building Act (Kart- og planforskriften, 2009, §2).

§ 9 contains the technical and legal requirements for the content of a plan (Kart- og planforskriften, 2009, § 9). It states that a plan consists of a map, regulations and the plan description. In addition to this a plan must have a name and a unique national land-use plan ID. The plan ID shall be determined as soon as the plan is taken under deliberation, which is as soon as an initiative is received, at the start-up meeting at the latest.

§ 10 contains specific requirements for digital land-use plans (Kart- og planforskriften, 2009, § 10). Digital land-use plans must contain necessary information in order to process and use the plan electronically. The plan data must be coded in accordance with the national product specification (NPAD). The regulation also allows for a digital plan to have a digital signature, which means that there is a possibility for a Norwegian planning process to be fully digital (Kart- og planforskriften, 2009, § 11).

INSPIRE and the Norwegian geographic infrastructure

The INSPIRE-directive is implemented in Norwegian legislation through the **Geodata Act** of 2010 and further concretizised through the **Geodata Regulation** of 2012 (NO-2, 2020). The Geodata Act is not a full copy of the INSPIRE-directive, but it includes the main elements.

Among other things it defines the role of **National Geodata Coordinator**, who's task it is to coordinate the national geographic infrastructure, including the sharing of geodata between participating authorities (Geodataloven, 2010, § 3). The Geodata Regulation gives this role to the Norwegian Map Authority (Geodataforskriften, 2012, § 4).

The Geodata Act further requires national, regional and municipal authorities as well as sector authories to participate in the national geographic infrastructure as long as they produce, use or manage geodata (Geodataloven, 2010, § 4).

This legislation further mandates the operation of a common network of public services for searching, viewing and downloading geodata, which shall be available to the public for free (Geodataloven, 2010, § 5) (Geodataforskriften, 2012, § 7).

The Geodata Regulation also mandates the creation of a national geodata portal (Geodataforskriften, 2012, § 8). The regulation states that the Norwegian Map Authority shall be responsible for this portal.

Access to searching- and viewing services shall be available for the public free of charge (Geodataforskriften, 2012, § 9).

3.2 Financing

The infrastructure is funded through the Norway Digital network. The participants in the network fund it based on the different actors' use and contribution of data (Norge Digitalt, 2020). As participants in the network, the actors all have access to the data produced within the organization. For some datasets an access fee is charged for by actors outside this network. It is up to the data owner to decide whether to charge and how much. Norway Digital is the strategic network, which manage this over time, and the national geodata coordinator (Norwegian Map Authority) develops the national geodata strategy, which sets out goals and actions for the further development of the national geographic infrastructure.

The municipalities can charge for the downloading of plan data if they wish. Many do this, and this is a way to fund the municipalities use and production of geodata and plan data.

3.3 Actors

Ministry of Local Government and Modernization (MLGM)

The Ministry of Local Government and Modernization has the overarching responsibility for the enforcement of the Geodata Act and the Norway Digital network (Norge Digitalt, 2020). The Ministry has responsibilities such as residential policies, planning and building permits, sustainability, municipal economy, local government, IT, electronic communications, regional- and district policy and state building- and property management (Regjeringen, n.d.). The planning department of the Ministry has responsibilities regarding management and development of the fields of planning and environmental impact assessments, and the national map- and geodata policies (Regjeringen, n.d.). The NMA is a subordinate agency under the direction of the planning department of the Ministry.

The ministry also has a department on IT and digitalisation, which was established in 2020 (Regjeringen, n.d.). This department has responsibilities regarding digitalisation and innovation in the public sector and has the subordinate Norwegian Digitalisation Agency. This agency is the government's foremost tool for digitalisation of the public sector (Regjeringen, n.d.). The agency operates and develops important national solutions and ensures the strategic coordination of digitalisation.

Norwegian Map Authority (NMA)

The Norwegian Map Authority is a technical agency (NO: teknisk etat) under the Ministry of Local Government and Modernization, established in 1773 (Kartverket, n.d.). In accordance with the Geodata Regulation, the Norwegian Map Authority has the role of **National Geodata Coordinator**. The main task of the geodata coordinator is the coordination of data sharing between the 592 partners (2019) in the **Norway Digital** network (Geonorge, n.d.). This entails developing common solutions, organizing arenas for meeting, managing agreements etc. This also includes the operation and development of the national geoportal Geonorge. Through this role, the Norwegian Map Authority also hosts the Secretariate of the Norway Digital network (Kartverket, n.d.). In addition to this, the NMA is the national agency (NO: fagorgan) for regulations, standardization, technological development, administration and guidance within the geodata field (Norge Digitalt, 2020). The NMA is also a partner in the Norway Digital network, as well as in **Geovekst**, due to its role in producing geodata.

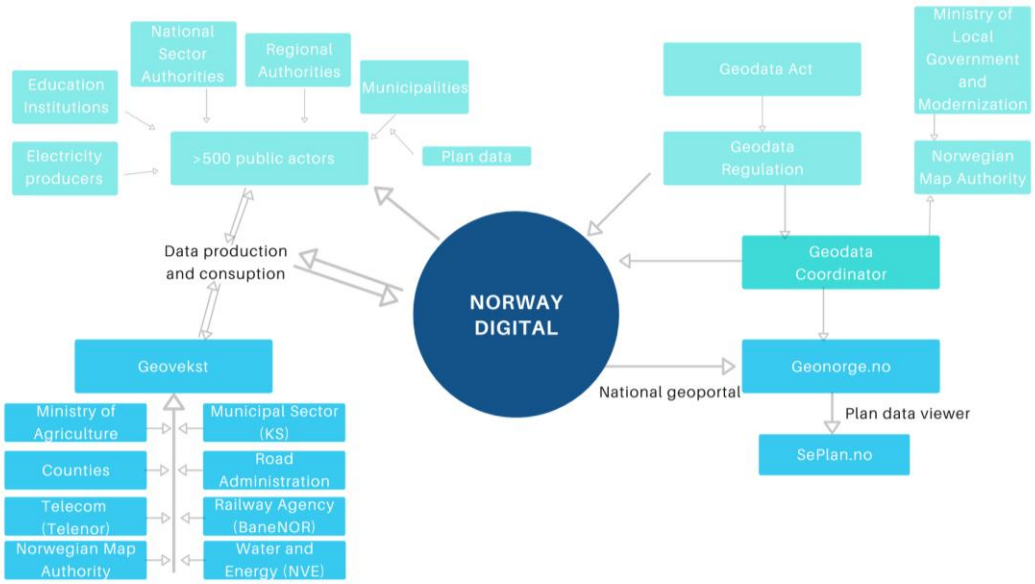
Geovekst

Geovekst is a cooperation between the Norwegian Map Authority, municipalities, the Norwegian Road Administration, counties, Energi Norge, the Ministry of Agriculture, Bane NOR, Telenor and The Norwegian Water Resources and Energy Directorate (N: NVE, Norges vassdrags- og energidirektorat) (Kartverket, n.d.). The participants are all either producers or users of geodata in large quantities. The cooperation was established in 1992, and its purpose is to facilitate and finance the production of geographic information (Miljøverndepartementet, 2003).

Norway Digital (NO: Norge Digitalt)

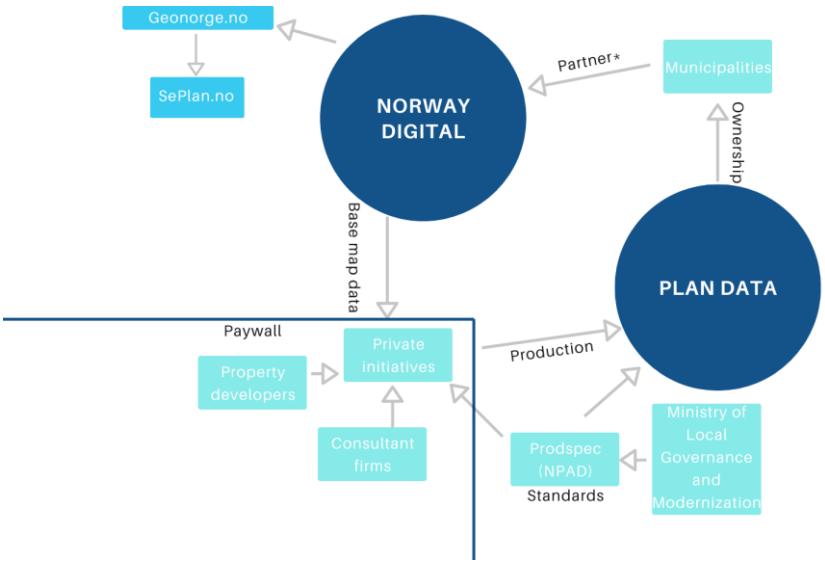
Norway Digital is a network of actors who are responsible for the creation of geographic data or who are substantial users of such data (Kartverket, n.d.). The network is mandated by the Geodata Act and Geodata Regulation, and is administered by the Norwegian Map Authority (Geonorge, n.d.). As of 2019, there is 592 partners in the Norway Digital network, consisting of 421 municipalities, 17 counties, 47 national sector authorities and 107 utility companies (Norge Digitalt, 2020). There are no private parties involved in this organization.

Figure 3.1
Norwegian geodata infrastructure



Source: Authors

Figure 3.2
Plan data and the Norwegian geodata infrastructure



* Even though all municipalities are part of Norway Digital, not all municipalities share plan data through the network.
Source: Authors

3.4 Relation within different levels of government

In Norway statutory land use planning is by and large in the hands of municipal land-use authority. This also makes the municipality a gravitational point for digital plan data. In the early and mid-phases of the planning process there is not much concern for circulating plan data between the municipality and other levels of government. Public sector authorities engaging in planning and building initiatives refer to the municipality as land-use and planning authority, as do private actors and developers. It is in the end phase of the process, when a plan proposal is ready of final proceedings, that various sector authorities are informed about the consequences of the plan, and are given an overview through hearing procedures that allow them to react and give feedback. In the case of private proposals plan data is thus in the hands of the actor who proposes the plan, handing them in to the municipality for administrative and political proceedings. And in cases of municipal planning, plan data is entirely in the hands of the municipality throughout the process until the hearing, where it is mainly exposed to other actors for feedback. This procedural pattern of Norwegian spatial planning generates little need for circulation of plan data in the plan making process. It can be explained by considering the types of relations that are structured between levels.

National planning instruments

National expectations for regional and municipal planning is a political, not-legally binding document created by the Government every four years, setting goals and strategies which regional and municipal planning authorities should follow (Regjeringen, 2019). The purpose is to ensure better interaction and cooperation between the planning levels. These documents are text-based and does not contain geodata. Therefore, they are not available on Geonorge.no.

National planning guidelines (NPG) are a collective term for several political documents, which concretize the expectations from the national government for planning within a certain topic (Regjeringen, 2019). As of 2020 there are five guidelines. These include *NPG for climate- and energy planning and climate adaption*, *NPG for coordinated residential, land-use and transport planning*, *NPG for differentiated governing of coastal areas*, *NPG for strengthening children and youths interests in planning* and *NPG for protected waterways*. Most of these are written documents, but two relates to geodata, NPG for differentiated land-use management of coastal areas and NPG for protected waterways. These are available on Geonorge, whilst the rest are not. They are not available on most municipal portals.

Regional planning instruments

Regional plans are produced by the counties (Regjeringen, u.d.). Most of these are written documents stating goals and strategies for regional development, but it is also possible to set forth regional land-use plans. These are not widely used, and there are no regional land-use plans on Geonorge.no as of 2020.

Municipal planning instruments

The local-level planning instruments are overall municipal land-use plans, area regulations and detailed regulations or development plans. These all consist of a zoning map and a different sets of other documents, mostly text. Plan data that form the map of all these instruments are most often made available on Geonorge, if the municipality participates in the infrastructure. The municipal portals make all documents available, both plan data and related documents, while only some data, such as plan outlines, land-use plan ID and land-use plan name is contained on Geonorge. For this reason, the municipal portals are much more used in most processes where plan data is needed. As seen above, planning processes for all the municipal planning instruments have the option to be fully digital. Most processes still fall short however, seeing as the option for digital signatures is seldom used.

Table 3.1
Planning instruments available in digital portals

Level	Planning instruments	Included in Geonorge	Included in municipal portal(s)
National	National expectations for regional and municipal planning	No	No
	National planning guidelines	Yes*	No
Regional	Regional plan (goals and strategies)	No	No
	Regional land-use plans	No	No
Local	Municipal land-use plan	Yes**	Yes
	Area regulation (zoning)	Yes**	Yes
	Detailed regulation (zoning) / development plan	Yes**	Yes

*Most state planning guidelines are written documents. Those who do contain geodata are available on the portal.
**Not all municipalities have all plan data available on Geonorge, some have none.

4 Use of digital plan data

4.1 Accessibility

Portal vs. viewer

There is a difference between portals and viewers. Portals contain collections of data with the purpose to distribute and show data, while viewers are the many different end-user solutions that exist, which are specifically tailored to show a certain data set for the use in different processes, including planning (NO-2, 2020). Viewers are commonly connected to a portal containing data through an API, which makes it possible for end-users to access and view data without physically going to Geonorge to download it. **API** is a digital interface which allows two programmes or pieces of software to communicate (NO-2, 2020).

Municipal digital plan register

Municipal plan registers are required by the PBA (Plan- og bygningsloven, 2008, § 2-2), and further detailed in the Map and Planning Regulation (Kart- og planforskriften, 2009, §§ 12-15).

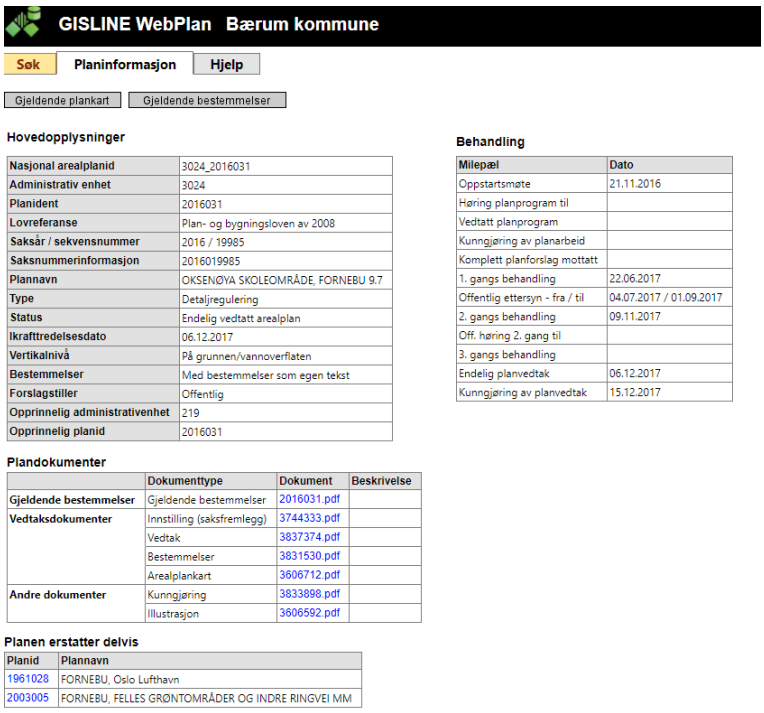
There are two types of plan registers (Kartverket, 2020):

- **Plan register with plan overview**. A simple document overview (list) of adopted land-use plans in document-form.
- **Digital plan registers**. A database with complete and systematic information on adopted land-use plans.

Of these two types, the Norwegian Map Authority recommends that municipalities establishes a digital plan register, due to its advantages regarding efficiency and accessibility (Kartverket, 2020). Digital plan registers must be in accordance with the National Product specification for Land-use plans and Digital plan registers (NPAD) (Kommunal- og Moderniseringsdepartementet, 2018). There are no requirements that older land-use plans adopted before 2010 (implementation of the Map- and Planning Regulation), should be digitalized and included in the digital plan register (Kartverket, 2020).

The digital plan register must contain information on adopted land-use plans and other regulations that has an impact on allowed land-use (Kartverket, 2012). This means that also dispensations from land-use plans need to be included. The plan register must show the plan situation for individual properties and contain land-use map, regulations, decisions and other information regarding the use of a property.

Figure 4.1
Digital plan register



GISLINE WebPlan Bærum kommune

Søk | Planinformasjon | Hjelp

Gjeldende plankart | Gjeldende bestemmelser

Hovedopplysninger

Nasjonal arealplanid	3024_2016031
Administrativ enhet	3024
Planident	2016031
Lovreferanse	Plan- og bygningsloven av 2008
Saksår / sekvensnummer	2016 / 19985
Saksnummerinformasjon	2016019985
Plannavn	OKSENØYA SKOLEOMRÅDE, FORNEBU 9.7
Type	Detaljregulering
Status	Endelig vedtatt arealplan
Ikrafttredelsesdato	06.12.2017
Vertikalnivå	På grunnen/vannoverflaten
Bestemmelser	Med bestemmelser som egen tekst
Forslagstiller	Offentlig
Opprinnelig administrativenhet	219
Opprinnelig planid	2016031

Behandling

Milepæl	Dato
Oppstartsmøte	21.11.2016
Høring planprogram til	
Vedtatt planprogram	
Kunngjøring av planarbeid	
Komplett planforslag mottatt	
1. gangs behandling	22.06.2017
Offentlig ettersyn - fra / til	04.07.2017 / 01.09.2017
2. gangs behandling	09.11.2017
Off. høring 2. gang til	
3. gangs behandling	
Endelig planvedtak	06.12.2017
Kunngjøring av planvedtak	15.12.2017

Plandokumenter

	Dokumenttype	Dokument	Beskrivelse
Gjeldende bestemmelser	Gjeldende bestemmelser	2016031.pdf	
Vedtaksdokumenter	Innstilling (saksfremlegg)	3744333.pdf	
	Vedtak	3837374.pdf	
	Bestemmelser	3831530.pdf	
	Arealplankart	3606712.pdf	
Andre dokumenter	Kunngjøring	3833898.pdf	
	Illustrasjon	3606592.pdf	

Planen erstatter delvis

Planid	Plannavn
1961028	FORNEBU, Oslo Lufthavn
2003005	FORNEBU, FELLES GRØNTOMRÅDER OG INDRE RINGVEI MM

Figure 4.1: Screenshot from Bærum municipality's digital plan register (Bærum kommune, n.d.).

Seplan.no

Geonorge has a map viewer with copies of data from the municipal digital plan registers (Geonorge, n.d.). The content on this viewer is dependent on the municipalities making their data available in the national geographic infrastructure (Geonorge). Most municipalities make some plan data available, such as plan outline, plan type, date of adoption, plan ID and name. This goes for both zoning plans and municipal master plans, although available data differs from municipality to municipality. Often it also includes a link to the municipal plan register for more information, which highlights the role of municipal plan registers as the main platform for plan data in Norway.

Figure 4.2
National plan viewer

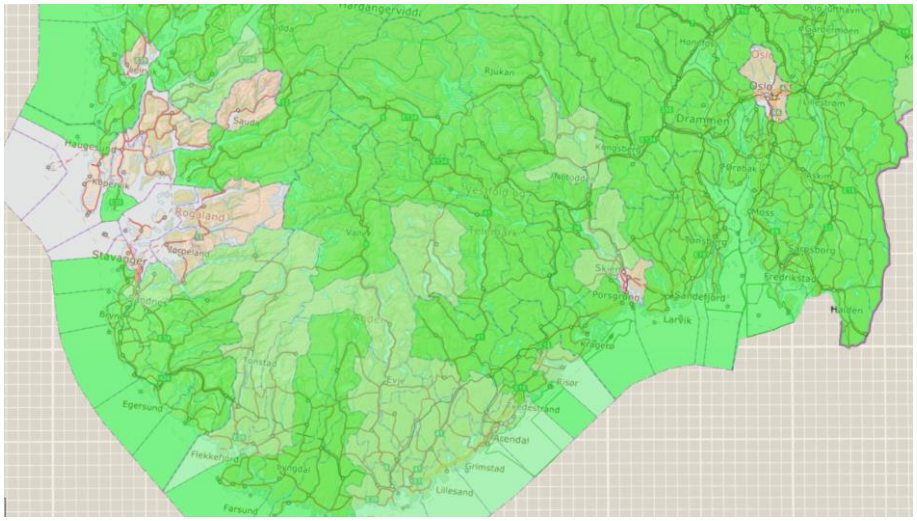


Figure 4.2: Screenshot from SePlan.no. This is Geonorges map viewer for plan data (Geonorge, n.d.). The map shows municipalities who have made plan data for the municipal master plan available or not. Municipalities in green have complete data available, while for municipalities in lighter green only have the plan outlines available. Municipalities with no colour haven't made any plan data available in the national infrastructure. Note that the City of Oslo has not made its plan data available (upper right cor-ner).

Figure 4.3
National plan viewer and local plan data

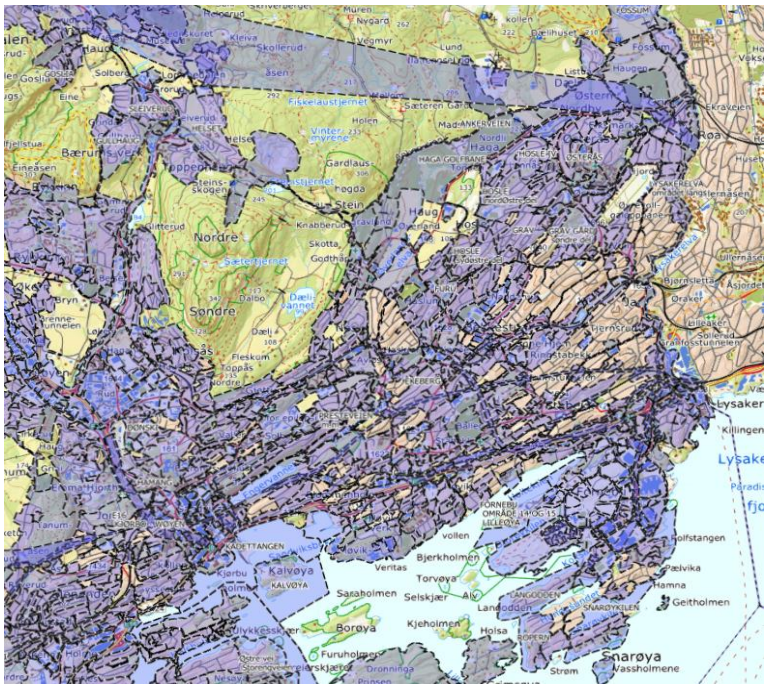


Figure 4.3: Screenshot from SePlan.no. This page shows available zoning plans for Bærum municipality. Note that the viewer does not show land-use, only plan outline (Geonorge, n.d.)

Figure 4.4
Metadata in the national plan viewer

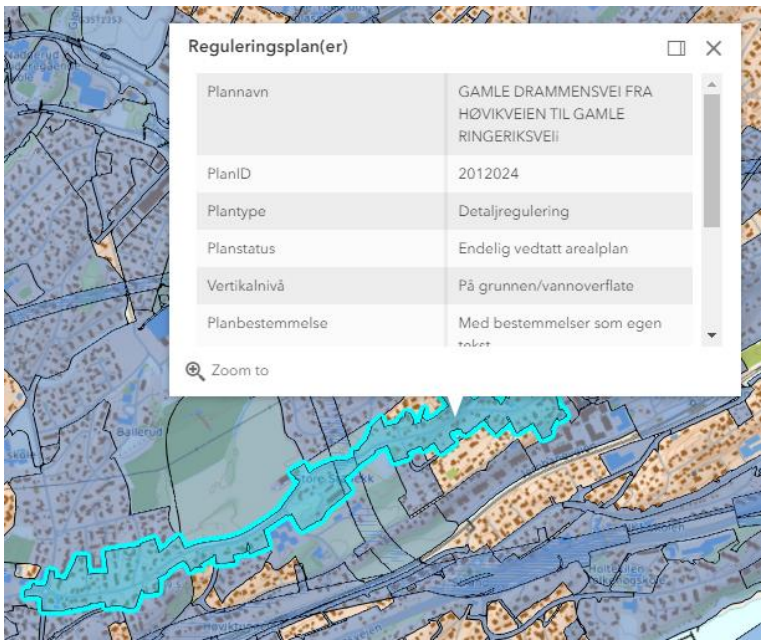


Figure 4.4: Screenshot from SePlan.no. With a click on a specific plan outline in the viewer, users can get some more information about the plan, like planID, plan type, plan status, name, date of implementation and a link to the municipal map portal (Geonorge, n.d.)

Geosynchronisation

The plan data available on SePlan.no is dependent on the municipalities making their plan data available in the national geographic infrastructure (Geonorge, n.d.). Many municipalities use geosyncrhonization in order to automatically update their plan data on Geonorge with the information in their respective municipal digital plan registers. The data is updated daily for the municipalities that synchronize. For the other municipalities the data is updated 1-2 times a year.

Figure 4.5
Municipal and national geosynchronisation

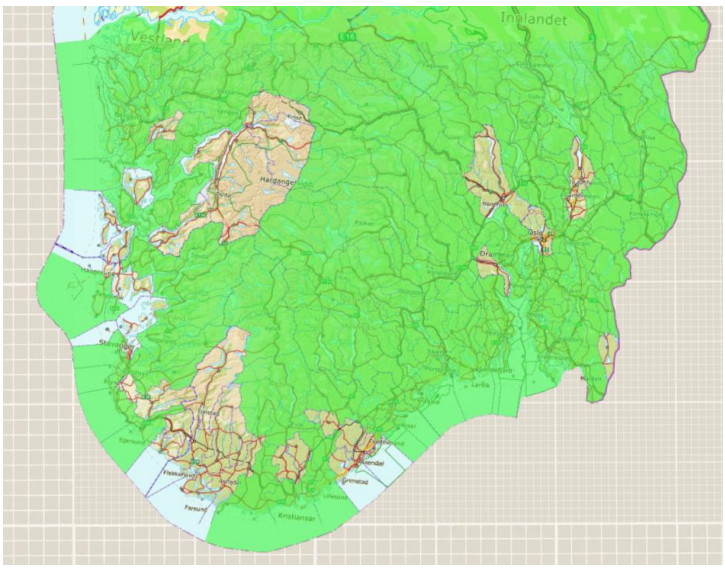


Figure 4.5: Screenshot from SePlan.no. The map shows municipalities that geosynchronise daily (green) and those who don't (Geonorge, n.d.)

4.2 Purpose and added value

Digitalisation strategy of Norway

The aim of the Government through the National Digitalisation Strategy of 2019 is to push for increased digitalisation in the public sector (Kommunal- og Moderniseringsdepartementet, 2019). The strategy seeks to ease day-to-day life of inhabitants and businesses through better services, efficient resource management and facilitating productivity in society. The strategy requires significant change in some agencies to further the quality of services, as experienced by the end-users.

4.3 Digital and analogue

National land-use plan ID

All plans are identified by a unique national land-use plan ID (Kommunal- og Moderniseringsdepartementet, 2018). The Map and Planning Regulation mandates that this ID shall be given to a plan as soon as the plan is under advisement at the municipality (Kart- og planforskriften, 2009, § 9). This means as soon as the plan is initiated by a private actor, the national land-use plan ID must be set and the proposed plan outline must be included in the municipal plan register (Kart- og planforskriften, 2009, § 12). National land-use plan ID must also be given regional and state plans if these are to be included in the municipal plan register.

Legal status

Digital plan data may be given a legally binding status. However it is up to the planning authority whether this status is given to a digital or an analogue document. What determines the legal status of digital plan data is the procedure of approval, where current regulations open the possibility for a fully digital planning process. According to the Map and Plan Regulation (2009) a statutory land-use plan is given a name and a unique national land-use-plan-ID at the initiation of the process. In order to keep a fully digital track, two requirements must be met: 1) the plan must be in an approved digital archive format (PDF, SOSI, JPEG etc.); 2) the plan must be approved with digital signature according to national standards. These are formal requirements for digital plan data to be legally binding. However, we see that in practice most municipalities do not use this fully digital process. This means that it is still mostly the analogue documents processed in

the adoption process, that are legally binding. There is also a concern among municipalities that making digital plan data legally binding and then making it available for the public, it can be susceptible to tampering (NO-1, 2020).

National standard for digital archive format:

For digital plan data to be legally binding they need to be in accordance with the nationally approved archive format (Kart- og planforskriften, 2009, § 11). SOSI is one of these formats. In addition there is also other known formats on this list such as PDF, JPEG, XML, HTML etc. (Digitaliseringsdirektoratet, n.d.).

Figure 4.6
Digital plan data and the format of the plan

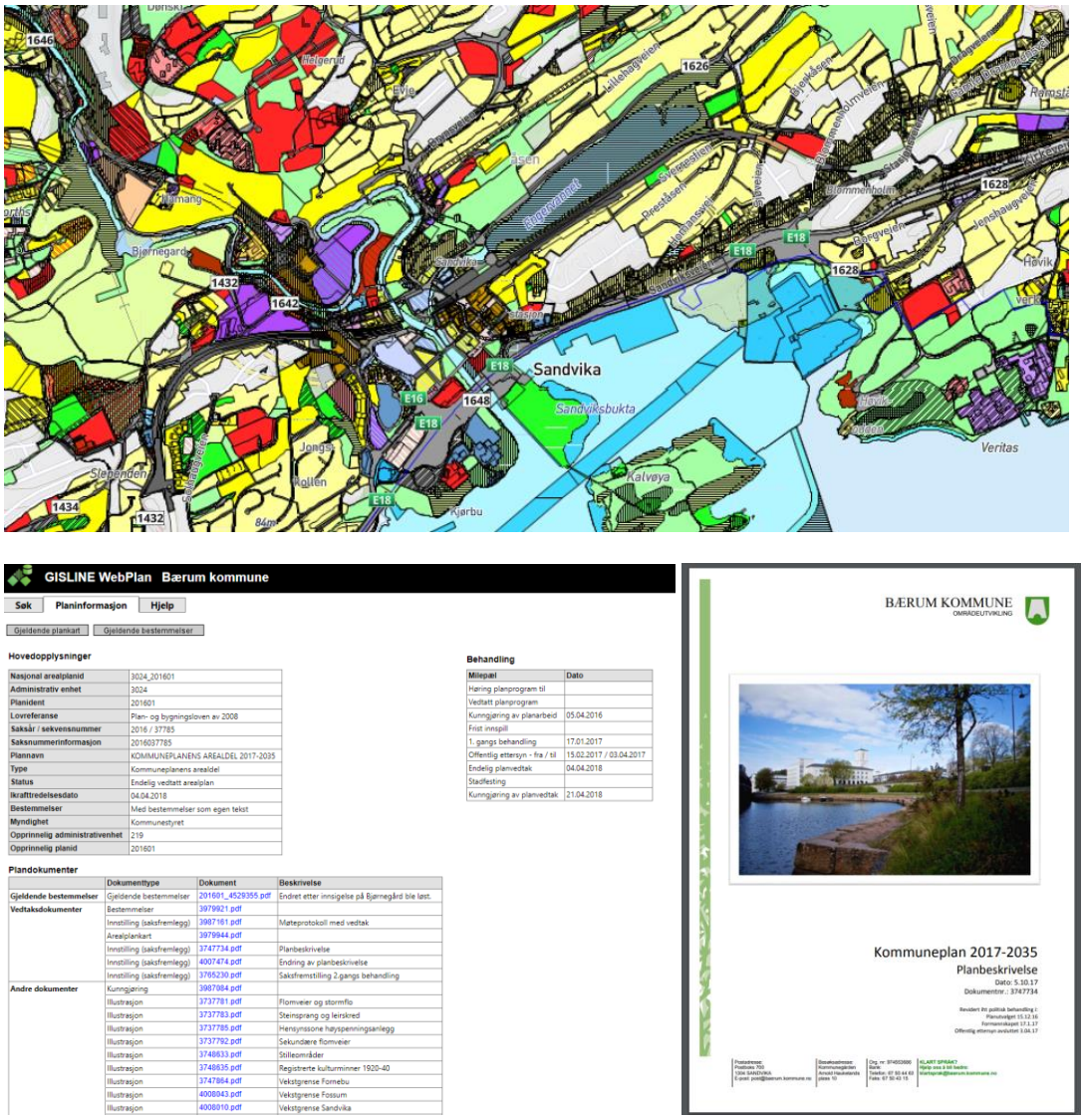


Figure 4.6: Screenshots of plan data from the current municipal land-use plan of Bærum municipality: (top) plan data at the municipal map portal (Bærum kommune, n.d.); (bottom left) the municipal plan reg-ister showing the main components of the plan document as well as milestones in the process of ap-proval, available as pdf-s (Bærum kommune, n.d.); frontpage of the overall municipal land-use plan doc-ument (Bærum kommune, 2017).

4.4 Future use scenarios

DiBK (Directorate for Building Quality) has initiated three projects with financing from one of the Goverments funding schemes to combat the corona virus' impact on the economy (Digitaliseringsdirektoratet, 2020). The

goal of these projects are to make plan- and building permit processes easier and more understandable for the end-users (NO-4, 2020).

Common planning services – fellestjenester plan

Fellestjenester plan (Common Services Planning) is a project which aims to facilitate automatization of building permit processes through increasing the quality of plan data (Digitaliseringsdirektoratet, 2020). The intention is to establish validation services which automatically checks planning proposals against the national standards before planning proposals are delivered to the municipalities. This will make the processing of planning proposals much more efficient in the municipalities, and at the same time facilitate automatization in subsequent building permit processes.

The digitalisation and automatization of building permits has come farther than the planning field in Norway (NO-4, 2020). The main obstacle for the automatization of bulding permits, however, is the quality of plan data. There are no national standards for how legal provisions are written. There is an attempt to approach this through a new national template, but varieties in local approaches, formulations, academic backgrounds, regional dialects – culture and human factors in planning – make it hard to identify vectoral information with standard formulations in the provisions. This has made it difficult to establish a way to read these digitally. The project seeks to increase the machine-readability of plan data, both map and regulations (NO-4, 2020).

An extension of this is the Bygg-lett application which is in development and seeks to automize simple bulding applications.

Figure 4.7
Plan data, BIM, and automatisation of building permits

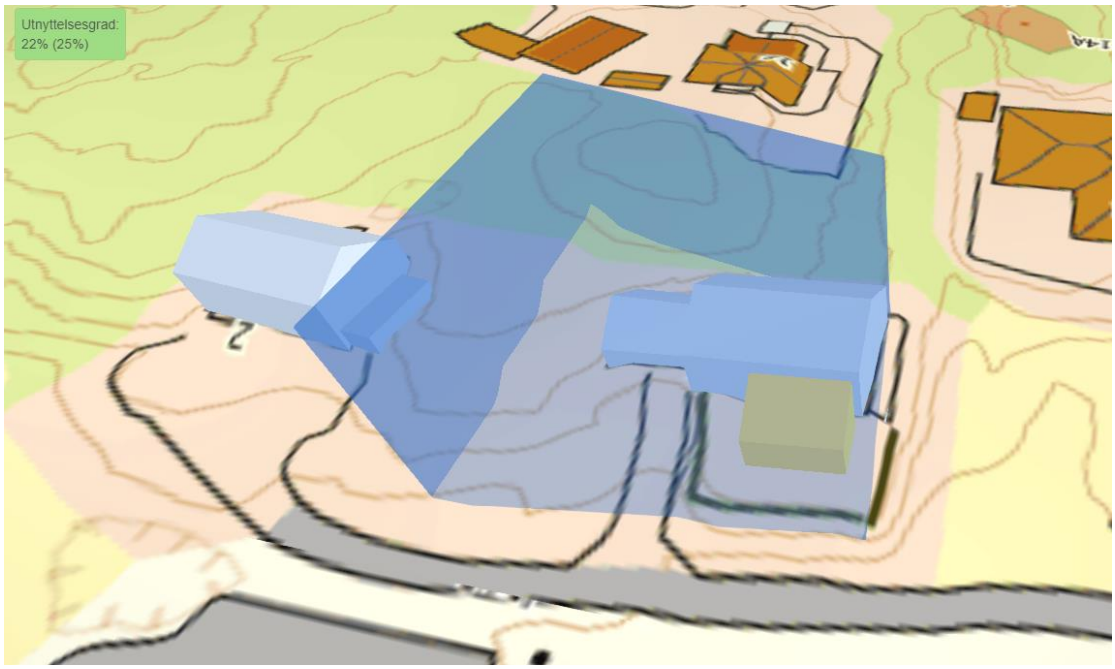


Figure 4.7: Screenshot from Bygglett.catenda.com. The application in development for automatic building permits.

Building information modelling and built-up fabric – BIM i eksisterende bygg

BIM-technology is widely used in new buildings and in the design process of new buildings. This project seeks to increase interest in this technology for use in existing buldings as well. The goal is to increase supply and demand for building owners to map out their bulding so the data can be used in bulding management, as well as public registers (NO-4, 2020). This will generate potential for increased efficiency and automatization in building permit processes.

"Dreem plans" – Drømmeplaner

This project is focused on older plans (NO-2, 2020). The aim is to make plans readable and usable from the comfort of your own home as an end-user. The project has a potential to minimize the time spent for the municipalities to guide and inform end-users in building permit processes.

5 Synthesis and recommendation

How does the availability of digital plan data empower different actors?

The introduction of digital plan data into the practice of spatial planning has made information more accessible, allowing stakeholders and citizens to get larger amounts of information about their environment, foreseeable changes, and opportunities for initiatives and development. At the same time, production of digital plan data requires resources, instruments and competences that has a certain threshold. Consequently, the actor or the person who use the tools acquires considerable influence over the process.

How does the availability of digital plan data change collaboration within the administration and between administration and stakeholders?

Many characteristics of recent evolutions of digital plan data and services that are based on it reflect an expectancy: that geodata, plan data and building data may be able to flow seamlessly between producers and consumers, automatically building up an constantly updated bank of data that can be used for planning purposes. The experience of municipalities who treat incoming plan data and building information cannot confirm that this is yet the case; in some cases quite the contrary. For plan data to be reliable, it often has to be reconstructed from a proposal, even when standards are followed, to the standards the municipality needs in order to use them for its own purposes. This problem of transference is demanding in terms of resources and competence, and it is costly. There is also a difference between actors who may share data, as the ones that are part of the Norway Digital network, and end users who may find themselves outside of a paywall, but who might rely on the availability of digital plan data to exercise their tasks. The reverse problem can also be reported, that consultancies provide resource and competence demanding data, which is uploaded to an authority in public proceedings, losing control as data owner over further editing and commercial uses.

How does the driver (e.g. efficiency, need for transparency, need for control) and funding source of digital plan data affect planning practice?

Equal treatment from one municipality is certainly been improved since standards and availability of digital plan data is implemented by all municipalities. In addition, the principle of knowledge-based management is strengthened by today's dataflow in the field of spatial planning: more spatial and environmental information is available, and it is more precise and more frequently updated. The fact that it requires specific expertise has changed the types of competences required for a planning consultancy or authority to function, and the academic composition and work cultures of professional environments. Data engineers may be involved in the construction of plans as a distinct competence, a newcomer in professional planning environments, generating new barriers of information, at least for a period until these professionals acquire more knowledge about other aspects of practical spatial planning that well be new to them for the time being. Different competencies have distinct concerns, demanding great efforts from each other for collaboration to function well.

Patterns

Norway has a network-based model of digitalisation. The initiative comes as much from local authorities, demanding collaboration and infrastructure that may improve their need for a sound knowledge based management, and a state that does not claim authority and sovereignty geodata related to its territory – on the data itself –, but on the geographic infrastructure, with its standards and procedures of production and exchange. The result is a strongly standardised model, where the main concern is not so much how space is represented through maps and plans, but how to overcome problems that appear in the interface between systems of data production, consumption, exchange and sharing.

Policy recommendations

Address future decision making relevance

So far digital plan data is strongly formatted by the SOSI code and the need for harmonization of regulatory planning instruments with the DOK geodata concept. By now this system is well developed and a future challenge may be how to address a number of other issues of relevance for decision making based on spatial planning. At stake here is the scope of digitalisation, whether "everything" needs to be digital, or whether one should focus on a production and exchange of more targeted and relevant data according to the topic of a decision. This may reduce the amount of information needed, and the costs related to its production and consumption.

Enhance the user experience of plan data portals

In line with the national strategy for digital governance, one might reconsider what aspects of the geo-data/plan data infrastructure should be visible to various users, and what should be kept to the Norway Digital network alone. As of today the national geoportal seems to adress both users and partners, resulting in overlapping ambitions to make plan data available both through national and local portals. This double set of portals makes the plan data infrastructure seem more complex and intracate than necessary, and may not be sustainable over time. The importance of local portals has proven to be an important feature of the Norwegian planning system, at its current state of digitalisation. Further development might destinguish more clairly between the availability and coordination of metadata and the availability of specific plan data. The answer might be to further differentiate the purpose of the national portal from the local ones.

Address a double circuit of data production and sharing

Plan data is produced and consumed according to two coexisting logics: that of a collaborating network (Norway Digital) and that of a market of data supply and demand. As of today, once the plan data crosses the paywall separating the sharing network from the market, it shifts from being a commodity to being a common good, or the other way around. Important data producers may loose control over their own product, and thus also the access to it, once it has been shared with public authority through a planning or building proposal. For instance, a major consultancy involved in various projects may build up a more comprehensive data base and take plan data out of it for a praticular project. By consequence it also cedes the right to use its own product, while planning and building data they have produced and financed may be used by others. There may be future issues related to a further uncritical development of this data production structure, issues related to ownership and copyright. Norway Digital should adress the fact that the partners involved in the network are not alone in data production and sharing and relate in a clairer manner to this category of actors.

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ESPON EGTC
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Grand Duchy of Luxembourg
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