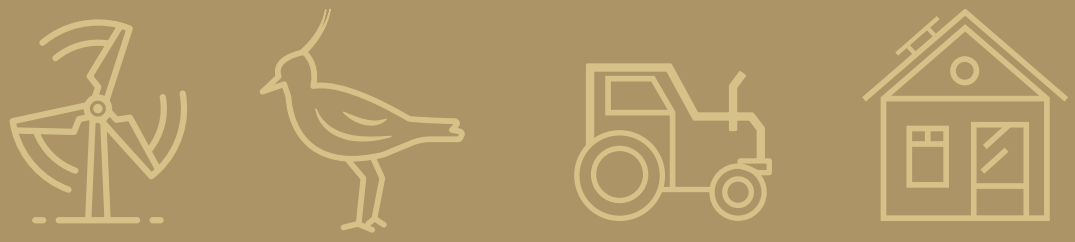
Rialtas na hÉireann
Government of Ireland

Land Use Review

National Land Use Policy

Review of International Best Practice 1



National Land Use Evidence Review Phase 1 Document 06

Report Title

National Land Use Policy – an International Review of Best Practice

Authors

Hendrik W van der Kamp, MScEng, FIPI, MIEI

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This is document number 06 in a series of 10 reports produced as part of the Evidence Review Phase 1.

Contents

1. Introduction

This report presents the results of a desk top study into National Land Use Policies or Strategies in other countries. It has been prepared in response to a study brief issued by the Environmental Protection Agency (EPA). This study brief arises from the obligation for the EPA to co-ordinate a national land use evidential review to deliver action #369 of the Government Climate Action Plan.[1] This action states the following: …"*Complete Phase 1 Evidential Review of the Land Use Review in line with the Programme for Government 2020*."

The purpose of the national land use evidential review is to prepare for a national land use policy. To inform this review, it is considered beneficial to assess other countries' approaches to national land use policy or strategy to see what approaches have been taken and what lessons could be learned.

The Land Use Review is referred to in the Climate Action Plan as follows: …"*A Land Use Review is underway led by the Department of the Environment, Climate and Communications and the Department of Agriculture, Food and the Marine (see Land Use Review section in the Chapter 17). Diversification reviews for income and land use for farmers, including areas such biomethane and energy production, agro-forestry and woodland creation, will be carried out following the publication of this review*."[2]

Further references in the Climate Action Plan are in relation to: the production of further levels of biomethane above 1.6 TWh (p. 162), the need to ensure that optimal land use options inform all relevant government decisions (p. 172), evaluation of the ecological characteristics of the land (p. 173), determine, the environmental, ecological, and socio-economic characteristics of land cover, land use and land-based activities across Ireland, including how they interact with each other (p. 173), examine the land availability and suitability for forestry as a land use change (p. 173).

Additional information in relation to the purpose of the land use review can be obtained from the Programme for Government which includes the following references[3]: including wetlands in the land use inventory notified under EU regulations (p. 33), rewarding farmers for sequestering carbon, restoring biodiversity, improving water and air quality, and producing clean energy (p. 63), offering alternative land use options for farmers (p. 66), ensuring that optimal land use options inform all relevant government decisions (p. 67), evaluating the ecological characteristics of the land (p. 67).

The approach that has been adopted in the study of best practice on national land use policy as reported here, has taken these references in both the Climate Action Plan and the Programme for Government as guiding principles.

The study has been carried out over an 18 week period and includes a questionnaire survey of planning practitioners in other countries. See appendix A.

1 *Climate Action Plan 2021 – Securing our Future*, Government of Ireland, 2021.
2 *Climate Action Plan 2021 – Securing our Future*, Government of Ireland, 2021, p. 161.
3 *Programme for Government – Our Shared Future*, June 2020.

2. Land Use Policy as a Concept

2.1 Spatial Planning and Land Use Planning

In order to examine 'national land use policies or strategies' in other countries it is important to understand what is meant by: a national land use policy. A straightforward interpretation is to assume that it represents a national *zoning* policy indicating the intended use of land nationwide. Such a policy is not unusual. The long established Danish national policy that divides the country into three zones or the Irish policy map dividing the country into three types of areas for rural housing[4], can be seen as examples of such national zoning policies. However, unlike a zoning policy for an urban development plan, in both cases these policies are specific to one type of development: housing. They can be seen as a partial (or sectoral) instead of a comprehensive land use policy. They can therefore not be interpreted as land use policies that identify the 'optimum' land use because they only consider a single or limited range of land use types.

The OECD report on Governance of Land Use uses the following distinction between spatial planning and land use planning:
…"*The term spatial planning is used in this report to connote more general strategic plans while the term land-use planning is used in this report to describe the more detailed process by which lands are evaluated and assessed to become a basis for decisions involving land disposition and utilisation. This includes studies on the environmental effects of land use and its impact on the community. Thus, spatial planning sets strategic directions for how land is used while land-use plans provide the details for specific plots of land.*"[5]

Because the details for specific lands are usually determined at local rather than national level, it is considered important to use a broader definition of land use planning for the purpose of this review of best practice abroad.

It is assumed that the purpose of a National Land Use Policy is to establish the *optimal* use of land as a scarce resource for society. For example, a policy that aims to locate solar farms on poor agricultural land and retain good quality agricultural land for food production. However, deciding the optimal use of land for society may lead to situations that are far from optimal for local communities. The NIMBY (Not In My Back Yard) factor must be considered here. Clearly, concentrated large scale wind farms and afforestation projects are likely to be optimally located in certain parts of the country where high wind speeds occur or suitable soil conditions occur for tree planting, but this may result in concentrations of land use in certain areas of the country that may be strongly resisted by local authorities. Controversial wind farms in Donegal and afforestation in Leitrim serve as real examples. Donegal County Council made a decision in 2014 to adopt a variation of the Donegal Development Plan 2012-2018 requiring a minimum set back distance of ten times the tip height of proposed turbines from residential properties and other centres of human habitation. This led to a draft direction by the Minister under Section 31 of the Planning and Development Act, 2000 (as amended) to delete this set back distance requirement. Although the direction was not pursued, the issue illustrated the strong level of opposition in the local council to the proliferation of wind farms in their

4 *Sustainable Rural Housing – Guidelines for Planning Authorities*, 2005, Map 1 – Indicative Outline of NSS Rural Area Types.
5 *The Governance of Land Use In OECD Countries: Policy Analysis and Recommendations*, OECD 2017, p. 42.

county. In the case of Leitrim, a training course for planners on Climate Action Policy in 2021, demonstrated the strong opposition to forest plantations in the county when the senior planner for Leitrim County Council outlined the difficulties to colleagues in other parts of the country. The issue of *equity* must therefore be considered in any national land use policy.

Increasingly *compatibility* of land use categories is a relevant consideration. To use land efficiently it is important to 'place the right use on the right land'. For example, avoiding the use of land that is liable to flood risk is important (particularly given climate change predictions), but the efficient use of land as a scarce resource must mean that in a national land use policy even flood plains should be used for beneficial purposes. This may mean land use that are compatible with occasional flooding (e.g. car parks, or recreational parks).

Taking this principle one step further, one can recognise the value of *synergies* between land uses. Where the location of two land uses in close proximity to another may actually be of benefit to society. Examples of this are increasingly relevant under climate action policy. For example, waste heat that is generated by power stations, industries or data centres, can be used for district heating but only if the houses are in close proximity to the heat producing facility. A national land use policy must recognise the value of these synergies and aim to maximise these also referred to as '*co-location*'. Part of the co-location of land use concept is also the idea of '*double land use*' (for example, green roofs on commercial buildings to improve green infrastructure networks).

To achieve a national land use policy, *spatial data* will be a core requirement. Table 1 illustrates this for three relevant areas under climate action (adaptation to increased flood risk, reduction in CO_2 emissions through increased renewable energy, and carbon sequestration to capture CO_2). Another important factor to consider is the question of the *characteristics* of the land as an input into the relevant area of concern. For example, in relation to wind energy or landscape protection, *land contours* may be very relevant while in relation to biofuels policy or forestation, the *soil characteristics* may be more relevant. By studying the different examples of sectoral land use policies in other countries more information on this topic has emerged.

Finally, it is important to note that a national land use policy can also be based on an *aggregation* of local land use policies. For example, most planning authorities have adopted a map based distinction of areas for wind energy ranging between 'no go areas' (where permission will normally be refused) to 'preferred areas' (where permission will normally be granted) and 'open for consideration' areas (where proposals may be considered on a case by case basis). By combining these county maps into a national patchwork of areas, a national land use policy map for wind energy could be made.

Table 1: Spatial Data and National Land Use Policy

Spatial Data	National Land Use Policy
Flood risk maps	Avoid development
Wind speed maps	Wind turbine development
Soil maps	Forestry planting

2.2 Spatial vs Sectoral Policies

As the climate action agenda is now a key consideration for all land use policies, climate action targets are likely to set the context for any national land use policy. Interestingly, this suggests an increase of importance of land use in the *rural area* over and above *urban areas*. This is the case because many elements of climate action will require a significant land resource: e.g. wind farms, solar parks, afforestation are some examples, but also carbon sequestration projects, off-shore wind turbines and biofuels are more relevant for rural than urban areas.

While *spatial policies* will generally be covered by 'spatial planning' in the countries studied, *sectoral policies* may be outside the spatial planning system but are nonetheless relevant for the land use review. As a framework for examining international best practice, it is therefore suggested that national land use policies should include both Spatial and Sectoral policies. *Spatial policies* are defined as: policies which set out land use for specific areas whereas *Sectoral policies* set out written policies for specific sectors of land use (e.g. afforestation, agriculture) but with a clear spatial dimension.

While spatial policies do exist at local level in the form of Development Plan zoning maps or other designations, Ireland has little or no experience in such policy at national level. With the exception of limited examples of national zoning such as the already mentioned Rural Areas for Rural Housing, neither the National Spatial Strategy in 2002 nor the National Planning Framework in 2018 included maps that would suggest different land use types for different parts of the country.

Notwithstanding this limited degree of spatial policy at national level, specific implications for certain parts of the country are in place through the network of Natura 2000 sites. The presence of such sites can have profound implications for the acceptability of a development proposal in a particular part of the country and as such have the same effect as if the land might have been zoned for protection in a national Land Use policy document.

In addition to Spatial National Land Use Policy, we can distinguish Sectoral National Land Use Policy. For example, a national policy on renewable energy or afforestation, might well be seen as a form of a National Land Use Policy because 'land' is the main input for renewable energy or forest development. This is unlike for example a national policy on Aviation where, although sites may be needed for airports or airport expansion, the amount of land that is required in relation to the economic significance of the sector is limited. An example like national policy on education, or childcare provision would be similar in that the land use would be marginal.

Particularly in the context of the Land Use Review under the Climate Action Plan, the sectoral policies can be highly relevant. International examples therefore of policies in relation to: afforestation, nature protection and ecology, biodiversity, biofuels, wind and solar energy, and agriculture diversification, would all be relevant and have been examined.

This distinction between Spatial Policies and Sectoral Policies as a framework for this study is analogous to the distinction made in the OECD report on land use governance between public policies that are aimed at steering land use and public policies that are not targeted at land use. Both types of policies may have an impact on how land is used.[6]

6 *The Governance of Land Use In OECD Countries: Policy Analysis and Recommendations*, OECD 2017, p. 75.

2.3 Screening Criteria

In order to decide on the types of policies that will be included in the survey, a typology of *screening criteria* has been adopted. These screening criteria are listed in table 2. While the study is clearly focused on Land Use Policies at the National level, because Ireland is a relatively small country and the national scale would be equivalent to the regional level in many other countries, the regional level of a policy in another country is also accepted for inclusion.

Many national land use policies are likely to be focused on *urban* land use. For example: hierarchies of urban settlements or transport networks. Because the study is clearly focused on the Land Use Review in the Climate Action Plan, rural area policies are likely to be more relevant in most cases than urban areas. The screening criterion that the relevant national Land Use Policy must include rural areas (although it may include urban areas also) is therefore important.

The examples of national land use policy must be relevant to climate change policy in terms of either adaptation or mitigation. A list of *themes* has been included at the outset in order to determine that a policy is of relevance to the study. The screening criterion is that at least two themes of a list of themes must be covered in the relevant policy. These themes are: afforestation, wind or solar energy, flood risk, soil, green infrastructure, ecosystem services, carbon capture, agriculture, landscape, wetlands, biofuels, marine, coastal zone, nature protection.

Table 2: Screening Criteria

Screening Criterion	IN or OUT	Rationale
Regional or National	Regional level land use policies may be included.	Scale of countries will vary widely.
Built up or Rural area	Policies must relate to the rural area and may include the urban area of a country or region.	Main focus is on rural land uses.
Themes	The land use policy must relate to at least two topics or themes relevant to climate change mitigation or adaptation.	To ensure relevance of the best practice example
Spatial or Sectoral	Both Spatial and Sectoral policies may be included.	To ensure that relevant best practice examples are captured in the study.

2.4 Axes of Interest

From the information contained in the Programme for Government (PfG) and the Climate Action Plan (CAP), it would seem that the main axes of interest in relation to the land use review are related to: agriculture, biodiversity, energy, data modelling, forestry and water. This can be developed into a list of areas of interest or purposes of a national land use policy, as shown in Table 3.

Table 3: Axes of Interest

Purpose	Sector	Ref. + Page no	Policy Example	Aspect
Diversification of land use for farmers	Agriculture	PfG 66	New products, business models	Agriculture
Diversification of land use for farmers	Energy	PfG 63	Renewable energy	Energy
Evaluation of ecological characteristics of the land	Biodiversity	CAP 173	Protection of high value areas	Ecosystem Services Green Infrastructure
Production of biomethane	Energy	CAP 162	Renewable energy	Biofuels
Characteristics of land cover	Data Modelling	CAP 173	Systems analysis of land uses	Landscape Protection Modelling
Availability of suitable land for forestry	Forestry	CAP 173	Forest management plans	Forestry
Scope for wetlands enhancement	Water	PfG 33	Flood risk management	Coastal area

Purpose	Sector	Ref. + Page no	Policy Example	Aspect
Optimal Land Use Options	Greenhouse Gas Reduction	CAP 172 PfG 67	Carbon capture potential: location and capacity	Marine
Optimal Land Use Options	Land Use & Infrastructure	CAP 172 PfG 67	National Spatial Policy	National Spatial Policy Marine National Policy Statements
Optimal Land Use Options	Legislation	CAP 172	Resource Management Act	Legislation

3. Selection of Countries

3.1 Potential Longlist of Countries

The EPA brief for the study states that the desktop study should result in a list of some countries that have implemented a national land use plan or strategy. The OECD review of land use governance should be referenced. This initial list of countries is referred to here as the 'longlist'. This longlist has been prepared by using three different sources of information.

The first is an internet search of land use policy at national level. This has resulted in a number of countries with evidence of national land use policies meeting the screening criteria. The second source of information is the Espon study on Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe (Compass Study)[7]. This study investigated the degree to which sectoral policies at national level are 'integrated, coordinated or informed' by spatial planning in the respective country. It might be expected that countries where sectoral policies are strongly related to spatial planning, the likelihood of a national land use policy is greater than in countries were such a relationship is absent or weak. The Compass Study concludes for example that …"*spatial planning plays a strong role at the national policy level in many sectoral policies in Switzerland and Bulgaria. On the other hand, spatial planning is considered to have weak influence on many sectoral policies in Germany and Austria*."[8] On that basis one might decide to include Switzerland and Bulgaria in the longlist.

A third source of information that has been used is a questionnaire survey of national delegates of member associations of the European Council of Spatial Planners. These delegates are all practitioners in spatial planning in their respective country. See appendix B.

The longlist resulting from these three sources of information is presented in table 4.

3.2 Criteria of Relevance

In order to determine the potential relevance of international examples, it is considered that criteria should be applied to the longlist of countries for selection on the shortlist. The case study proposal suggests: …"*The criteria could include similar land use profiles, similar land ownership profiles, similar legislative or planning approaches or similar social, economic or environmental challenges*."[9] The criteria are considered here resulting in a conclusion of a list of criteria that will be applied to the longlist.

Similar land use profiles

Certain countries that appear on the longlist, may have land use profiles that are very different from Ireland. Examples may be: concentration of heavy polluting industries, or a high degree of urbanisation resulting in small areas comprising rural areas. It is considered for a country to be of potential interest for comparison, it should have significant rural areas. However, the type of land cover is less important. For example, a country comprising many lakes or much forest cover, can still be relevant as a comparator. It is therefore concluded that in order to be included in the longlist the country must have sizeable rural areas.

7 *Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe*, Final Report, Espon 2018.
8 *Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe*, Final Report, Espon 2018, p. 34.
9 *Case Study Outline*, EPA, November 2021.

Table 4: Longlist of Countries

Country	Country Abbreviation	European Union
Denmark	DK	Yes
China	CN	No
Croatia	HR	Yes
Netherlands	NL	Yes
UK – Scotland	UK	No
New Zealand	NZ	No
Germany	DE	Yes
Slovakia	SK	Yes
Sweden	SE	Yes
Switzerland	CH	No
USA	US	No
Bulgaria	BG	Yes
Belgium	BE	Yes
Finland	FI	Yes
Iceland10	IS	No
Romania	RO	Yes
Norway	NO	No
Hungary	HU	Yes
Luxembourg	LU	Yes
Portugal	PT	Yes
Czechia	CZ	Yes

Similar land ownership profiles

As most of the land in rural areas in Ireland is in private ownership, it would seem that countries where this is not the case or where all land is state owned, are less relevant. It is therefore concluded that in order to be included in the longlist the country must have mostly private land ownership.

Similar legislative or planning approaches

This criterion seems less relevant. It is acknowledged that many countries have a wide range of types of planning systems and local government. The degree that governance is centralised or whether a planning system is 'plan led or project led' is not of primary interest as interesting examples of national land use policy may well occur in countries that have different regulatory systems.

Similar social, economic or environmental challenges

This criterion seems also less relevant, although it is to some extent reflected in the criterion of size considered below. As the climate change challenges faces all developed countries, there is no need to select on the basis of this criterion.

Size of the Country

Size of the country in terms of population or geographical area does seem a relevant criterion. For example, countries such as Canada, USA or China are difficult to compare because of the sheer size difference. It is therefore concluded that in order to be included in the longlist the country must have a population or geographical area that is no more than five times or less than one fifth of that of Ireland. One exception to this is Malta. This country has been included because of the examples of policies found.

The final list together with the reason for inclusion is shown in table 5. This results in 17 countries to be shortlisted.

Table 5: Potential Shortlist of Countries

Country	Reason for Inclusion	Population in million people (Ireland: 4.9 million)	Area in million sq km (Ireland: 0.069 million sq km)
Belgium	Flood Risk Management	8.7	0.04
Bulgaria	High Sectoral and Spatial Policy Integration	7.0	0.111
Croatia	Forest Management System at national level	4.1	0.056
Czechia	High Sectoral and Spatial Policy Integration	10.7	0.077
Denmark	National plan of land use zones	5.8	0.042
Finland	High Sectoral and Spatial Policy Integration	5.54	0.305
Hungary	High Sectoral and Spatial Policy Integration	9.66	0.092
Netherlands	Several examples of national land use planning	17.1	0.031

Country	Reason for Inclusion	Population in million people (Ireland: 4.9 million)	Area in million sq km (Ireland: 0.069 million sq km)
New Zealand	National Policy Statements	4.8	0.27
Norway	High Sectoral and Spatial Policy Integration	5.42	0.307
Portugal	High Sectoral and Spatial Policy Integration	10.2	0.092
Romania	High Sectoral and Spatial Policy Integration	19.2	0.230
Scotland (UK)	Landscape Policy	5.5	0.078
Slovakia	National Parks Policy	5.5	0.049
Switzerland	High Sectoral and Spatial Policy Integration	8.7	0.04
Austria	Questionnaire Survey results	9.0	0.083
Malta	*Questionnaire Survey results*	*0.4*	*0.0003*

3.3 Selected Countries

The study brief suggests that the study should identify ..."*a short list of five to ten case candidates to examine in more depth*."[10] Table 6 presents the final proposed shortlist of countries. The top three countries that are considered relevant to be included in the shortlist are: Scotland, Netherlands and New Zealand. Scotland because of its explicit reference to a national land use policy. The Netherlands because of the tradition of spatially explicit sectoral policies and relatively detailed spatial planning at national level. New Zealand because of the focus on resource management in its national planning system.

10 *Case Study Outline*, EPA, November 2021.

After these countries a number of other countries could be considered for various reasons although not as compelling as the countries mentioned as the top three. These countries are: Austria, Czechia, France, Malta, Norway, Portugal, UK. In all cases, valuable responses were received from practicing planners in the relevant countries with weblinks to documents. See appendix B.

Table 6: Final Shortlist of Countries

Country	Population (mill)	Area (mill sq km)	EU	Abbreviation
Belgium	8.7	0.04	Yes	BE
Austria	9.0	0.083	Yes	AT
Czechia	10.7	0.077	Yes	CZ
Denmark	5.8	0.042	Yes	DK
Netherlands	17.1	0.031	Yes	NL
New Zealand	4.8	0.27	No	NZ
Norway	5.42	0.307	No	NO
Scotland (UK)	5.5	0.078	No	UK
Malta	0.4	0.0003	Yes	MT
Switzerland	8.7	0.04	No	CH

3.4 Country Descriptions[11]

Austria

In Austria, spatial planning is a competence of the federal states and there are nine instances of legislation at the state level although these are generally similar. The federal level is responsible for some sectoral planning competences that influence the spatial structure of the country, such as water, forests, railways, federal roads, mining and energy. The Austrian spatial planning system has three main levels: the federal government is responsible for sectoral planning, each state is responsible for regional spatial planning, while municipalities are responsible for local spatial planning. Some states have also added a regional planning level between the federal state level and the municipalities which varies considerably from state to

11 Source: https://www.arl-international.com/knowledge/country-profiles

state. The relationship between different planning levels is generally hierarchical. State development strategies are therefore binding for municipalities. The Austrian Conference on Spatial Planning (ÖROK) is a permanent body to enable cooperation among all relevant territorial authorities.

Belgium

In Belgium spatial planning instruments are separate for the regions of Flanders, Wallonia and Brussels. No spatial plan exists at the national level in Belgium. Regional Zoning Plans provide binding land-use regulations for most of the territories in all three regions. When responsibilities for land-use planning were transferred to regions, the existing plans were incorporated into the new regional planning systems. In addition to the old Regional Zoning Plans, all three regions use Regional Spatial Development Plans. They contain strategies for the spatial development of the regions and provide strategic guidelines for land-use policies. All Regional Spatial Development Plans provide a frame with which lower levels of plan must comply. In 1962, the Belgian Act established a national system of spatial planning that assigned significant responsibilities to the national government. In 1980, a major reform transferred them to the regions and since then the system has been undergoing further decentralisation.

Czech Republic

The first national Act on Territorial Planning in Czechoslovakia was enacted in 1948. It distinguished regional and local tiers of planning. Today, the central government sets national priorities and development objectives in the Spatial Development Policy which is binding for all lower levels of spatial planning. On the regional level regional councils approve the principles of regional planning as a binding document which specifies development areas and axes, indicates the hierarchy of centres and defines areas and corridors for infrastructure development projects of national or regional importance. For environmental aspects (nature, soil, forest, minerals, air, noise protection) as well as for the conservation of monuments, water management and infrastructures, spatial planning has legal partners defined by the applicable law in state agencies. No plan can be approved without the prior consent of these partners. This makes environmental and resource protection sometimes controversial to spatial planning which is in practice rather development oriented.

Denmark

Denmark has a long tradition of spatial planning which has developed since the second half of the nineteenth century. The Danish planning system is rooted in three core principles: framework control, decentralisation and public participation. The principle of framework control ensures that planning decisions made at higher levels are not contradicted by plans and decisions made at lower levels. This principle is applied through dialogue between authorities and the possibility to object to planning proposals. National Planning directives set out legal provisions on specific matters of national interest, with which municipal plans should comply. A new Planning Act was passed by the Parliament in 2017. The National Planning Report is the Government's political statement setting out the overall objectives for spatial planning. Regional strategies are assembled by each administrative region while municipal plans form the main political instrument for development control. Local plans are legally binding on landowners, determine development possibilities and influence property values.

Malta

The Maltese islands consist of an archipelago of three Mediterranean islands: Malta, Gozo and Comino and a number of minor islets. The Development Planning Act of 2016 regulates land-use planning on the Maltese islands. The most important strategic policy framework in force is the Strategic Plan for Environment and Development which provides a long-term spatial strategy for the Maltese islands in line with the government's policy aims and objectives. It is consistent with national policies, integrates the government's social, economic and environmental objectives and guides the spatial aspect of the government's sectoral policies, plans and programmes. There is only one level of decision-making in terms of planning, that of the national level where the Planning Authority is the only entity and there are no sub-levels at the regional or local levels. The Planning Authority is responsible for spatial planning and the management of the development planning application process.

Netherlands

There is a long tradition of spatial planning in the Netherlands. The State Agency for the National Plan was created in 1941 and tasked with developing a national spatial plan, supervising regional plans and local land use plans. This marked the beginning of spatial planning at the national level. The adoption of a fifth national spatial plan was halted after a change in government in 2002 and since then planning was liberalised resulting in decentralisation and restricting of responsibilities between the different levels of administration. In 2016, a new Environment and Planning Act was published. Its coming into force has been deferred a number of times and is now expected to take place on 1/1/23. This act represents a radical revision of legislation since it replaces 15 existing laws including those concerned with environmental protection, nature conservation, protection of cultural heritage and water management as well as spatial planning.

New Zealand

New Zealand is an island nation with a population of just over five million and a land area of 268,000 square kilometres. About a third of its population lives in or near Auckland, its economically dominant urban centre. The country's spatial and environmental objectives are implemented through the Resource Management Act 1991 (RMA). Its functions are administered primarily through local government. Its two-tier local government system consists of 16 regional and 61 territorial councils. Some district and city councils also have the powers of regional councils, these are referred to as unitary authorities. The disparity in the size of councils, coupled with large variety of environmental issues means that the connect and effectiveness of planning policy and plan rules approaches vary significantly across the country, as do their approaches and effectiveness of monitoring and enforcement.[12] National direction on how councils must implement the objectives of the RMA are set by National Policy Statements (NPS's).

Norway

Norway is a unitary state with three levels of government. The first nation-wide planning system was established in 1965. In 1985, the system was transformed into a comprehensive planning system. The most recent major reform occurred in 2014. The national government has few direct responsibilities related to land use planning. No national spatial plan exists in Norway. At the county level, two types of plans exist. Regional Planning Strategies

12 https://environment.govt.nz/assets/Publications/Files/compliance-monitoring-and-enforcement-report.pdf

are regional development strategies that are typically prepared at the beginning of each legislative period. They describe socio-economic trends and policy objectives for the county. Regional Plans are non-statutory plans. They are prepared as required by Regional Planning Strategies and contain a mix of general guidelines, strategic plans and detailed zoning plans. Typically, Regional Plans play only a minor role in the policy-making process and receive little attention unless they concern a subject of national importance. However, they can provide guidelines for regional and local planning and can contain formal objections to local plans.

United Kingdom

Like in the case of Belgium, for the UK spatial planning instruments must be considered separately for England, Northern Ireland, Scotland and Wales. The British "development control" system differs starkly from continental European planning systems as development control is discretionary rather than rule based similar to the Irish system of planning. This means that every single planning application is subject to review. There is no national spatial plan for England. Regarding national land use policy, the main policies are contained in the National Planning Policy Framework (NPPF) which is updated quite regularly. There are some national designations for national parks, areas of outstanding natural beauty. There is a general 'rural restraint' policy that rural areas will be protected from development. There is no specific mention that they will be used for agriculture, but this is implicit in the NPPF, where there is a general presumption against building in the countryside, not permitting building unless for valid, proven reasons for agriculture, forestry and other named uses.

Switzerland

Switzerland is a landlocked country where about half of the country's surface is over 1000 m above sea level. It is a three-tier country consisting of the Confederation, 26 cantons and many municipalities. Public policies that are not explicitly assigned to the Confederation by the Constitution, are conducted by the cantons. Spatial planning is closely connected to the overall goal of preventing land take in order to protect agricultural land. The Federal Spatial Planning Act came into force in 1980 laying down the principles of planning to the present day. A reinforced version of the Act came into force in 2014. On a national level, planning is administered by the Federal Office for Spatial Development. This office is responsible for the legal supervision of planning conducted on cantonal level. In 2012, the Office presented the first ever spatial plan for the entire country. Although developed by a federal institution, the spatial plan was signed by the 26 cantons and serves as an overall orientation framework in policy and across the planning actors.

4. Study Results

4.1 Case Studies

Based on the axes of interest as shown in table 3, case studies that have been sourced for this study have been grouped in four groups as follows:

- *Group One – Diversification of Land Use for Farmers*
- *Group Two – Land Cover and Ecological Characteristics of the Land*
- *Group Three – Forestry, Wetlands and Biofuels*
- *Group Four – Optimal Land Use Options*

A detailed overview of each of the case studies is given in Appendix A of this report but a concise description of the case studies under each of the four groups, follows below.

Group One – Diversification of Land Use for Farmers

This group of case studies approaches national land use policy from the angle that most of the land outside urban settlements is owned and used by farmers. With increased emphasis on climate change adaptation and mitigation measures, it is likely that a gradual change of land use is going to happen. This may not disadvantage existing landowners as alternative uses may generate income streams.

The first case study is that of regional energy strategies in the Netherlands.[13] Regional Energy Strategies are prepared by and for 30 regions in the country. The strategies seek to define search areas for renewable energy (both wind and solar) that must then be considered by municipalities in their zoning policies. Notwithstanding the adoption of wind energy mapping in county development plans in Ireland, spatial identification of suitable land for solar farms is generally lacking. The case study demonstrates how it is possible to adopt a plan led approach to the planning of wind farms and solar parks but in particular maximise the scope for combining wind and solar projects in a densely populated country. As the 'low hanging fruit' tends to run out in terms of suitable land in Ireland for wind and solar and as community objections continue, a plan led approach and minimisation of total land take seems essential. The case study may provide useful guidance.

The case studies of Wind Energy Zoning from Austria[14] and Solar Farm policy from Malta[15] follow a similar vein, i.e. clear policy guidance on where and how wind and solar energy projects can be built, generally but not exclusively on farming land. The case study from *Austria* shows a system of priority, suitable and excluded areas similar to that adopted by local authorities in Ireland. While the use of wind energy mapping is now well established in county development plans in Ireland, the maps are generally indicative and may lack spatial detail to identify precise boundaries on the ground. In contrast, the Austrian case study shows a high level of precision of boundary definition. The *Solar Farm Policy* of *Malta* is a case study of defining criteria for the location of solar farms. The policy gives clear indications as to which locations are preferred by stating a hierarchy of preference (e.g. building roof in favour of land based). The case study illustrates that in the absence of a zoning policy for solar farms, it is possible through national guidelines to indicate where a specific land use (in this case solar farms) should be located.

13 See case study no. 1.
14 See case study no. 4.
15 See case study no. 5.

However, farming is not only replaced by other land uses but is also itself likely to change. The case study from Switzerland[16] shows how a proactive policy at national level to link direct payments to farmers to the type of business practice that is compatible with climate action policy, can be applied. The *Three Tier Sustainable Agriculture Policy* in *Switzerland* is a system of direct payments with a basic payment based on the land area and a sum for grazing animals with additional sums for areas in difficult conditions, such as in upland and mountain areas or for certain environmentally friendly farming practices. The case study is of interest because it provides evidence of a working system of recognising the public good value of the farmer as a custodian of the landscape which includes eco-system services beyond the pure production of food. It also has built in incentives to achieve CO_2 reduction and biodiversity enhancement (both key objectives in climate action policy) by changes in farming practices without forcing the farmers to engage in this.

Finally, the last case study in this group considers the principle of positive zoning for agricultural land. The *River Corridor Zoning* example in *Austria*[17] is a zoning policy of the area on both sides of a major river. The approach demonstrates a 'river catchment' approach to land use policy that is centred around agriculture as the main but not only land use. Although the river catchment incorporates both urban settlements as well as rural areas, the rural area dominates. In Ireland, most county development plans don't include a zoning map for agriculture or rural land use. Instead, the zoning objectives maps generally concentrate on zoning objectives for urban settlements. The case study is relevant because it shows that positive zoning for agriculture can be achieved. This means that agricultural land use is seen as an objective to be achieved rather than an existing land use to be recognised and accepted but otherwise ignored in terms of land use planning. The case study demonstrates the use of priority zoning for good agricultural land that might prevent fragmentation or intrusion of urban activities.

Group Two – Land Cover and Ecological Characteristics of the Land

This group of case studies addresses the emphasis in both the PfG and the CAP to improve biodiversity and know more about actual land use and land cover. The role of ecosystem services, green infrastructure, landscape protection and actual data re land use and land cover come under this group.

The *Nature Network Netherlands*[18] is an example of an ecoyhlogical network defined at national level. The network has been used as a basis for land acquisition for nature protection. The case study comes closest to the definition of a 'national land use policy' since it dictates at national level which areas in the country should be protected for nature conservation and biodiversity enhancement. It is a prime example of a spatial network where at times small areas are considered important to link nature areas together justifying detailed spatial planning policies that include buying out businesses, reintroducing nature on land that has been previously used for urban development and adopt management plans for Natura 2000 sites.

16 See case study no. 2.
17 See case study no. 3.
18 See case study no. 6.

A somewhat similar approach of defining ecological networks of green infrastructure at national level is found in the *Territorial System of Ecological Stability* case study from Czechia[19] which forms part of national legislation in relation to green infrastructure and ecological networks while the Consolidated Layer of Ecosystems in Czechia was created as a map resource for an assessment of ecosystem services that was developed for a national/regional level of assessment. The use of ecosystem services approach in the planning of land use and spatial planning in general, is relatively undeveloped in Ireland (and elsewhere). In the context of national land use policy, it is however highly relevant because the ecosystem services concept acknowledges the holistic value of the natural environment, not just for biodiversity but also to achieve economic and social objectives. The methodology that has been adopted here may be an example for use in Ireland which can then serve as an input into a national land use policy. In combination with the statutory system of identifying elements that form part of an ecological network through the TSES, ecosystem services can form an important input into determining land use policy at local and national levels.

The *Natura 2000 Management Plans* case study from Malta[20] is an example of not only protection of Natura 2000 sites but developing individual management plans for each of these. This case study is of interest in view of the general lack of such management plans in Ireland. Ireland has few management plans for its network of sites that form part of the Natura 2000 network. A more proactive and positive policy as distinct from mere protection and conservation through appropriate assessment procedures, would be of benefit. The case study illustrates how this can be done nationwide and how it can feed into a national land use policy.

In the same group of case studies three case studies illustrate the improvement of systematic analysis of land cover information at national level. The *Land Cover ecosystem accounts* for the United Kingdom (UK)[21] have been carried out to enable a comparison between 1998 and 2007. Land use accounts such as this one may assist in setting benchmark and target figures for a national land use policy. In addition, the case study shows the benefit of such accounts for the measurement and assessment of the value of ecosystem services to achieve society's objectives on biodiversity and other climate action policies.

The *Modelling Using CLUE* case study[22] examines the value of using a land use modelling approach to test scenarios of future land use change. This was done in a study for a Swiss region where a scenario of reduced agricultural production was tested in this way by using the CLUE model (Conversion of Land Use and its Effects). In Ireland significant changes in land use are happening in the rural area. These include continued urban sprawl (notwithstanding policy to curb this), generally ad hoc solar farm developments, wind farms, forest plantations. These changes are generally managed through the planning system but can create significant community opposition. It would be good if future land use patterns under different policy scenarios can be tested to assist public debate as part of the preparation of a national land use policy. The case study shows how modelling of land use change can assist in this.

19 See case study no. 9.
20 See case study no. 10.
21 See case study no. 7.
22 See case study no. 8.

Finally in this group of case studies, a national report for the Flanders region in Belgium[23] presents a spatial analysis of the country by using four key statistics (land use, settlement area, sealed area and the footprint area of buildings) in order to assess how spatial patterns have developed. The approach that is adopted in this case study can be useful to measure trends in sealing of soil and fragmentation of open areas, both important issues in climate adaptation and biodiversity improvement. By adopting a systematic approach, achievements can be made visible and negative trends can be spotted.

Group Three – Forestry, Wetlands and Biofuels

This group of case studies approaches the topic of land use policy from the aspect of climate adaptation and mitigation and the changes in land use that may result from this.

The *Forest Habitat Inventory* of *Norway*[24] is an example of combining biodiversity policy with forest management. The inventory generates comparable data on important habitats for biodiversity in forests. This information is used when making forestry plans. Afforestation policy in Ireland has to date concentrated on fast growing and monoculture plantations. While there are clear advantages to this approach there are also disadvantages in terms of lack of community acceptance (shadow effect and negative impacts on the landscape, traffic on narrow country roads) as well as poor biodiversity aspects. A more diverse and innovative policy on forestry may form part of a national land use policy. The case study presents a useful example of such an approach where biodiversity forms a key feature of forest plans.

The *National Forest in the UK*[25] encompasses 200 square miles. It is located in the heart of England. It was conceived in 1987 to demonstrate the many benefits that trees and woodland can provide. The case study illustrates the value of a demonstration project of national scale in an important area of land use change (afforestation). Based on the scale of a National Park, a project like this could enhance public understanding and appreciation of a change in the landscape that is likely to happen in the Irish landscape as a result of increased tree planting in the future.

The *Biogas Production* example in *Denmark*[26] is based on a tradition of biogas plants that are used for CHP production in local towns. The biogas plants are therefore related to the settlement system of the country and demonstrate a dispersed pattern of distribution which may help to achieve community acceptance. Analogous to the origins of wind energy in Denmark (which was based on a dispersed spatial pattern of small windturbines), biogas production shows also a dispersed and localised spatial pattern. Coupled with the local ownership of the resource, this case study illustrates an interesting link between biogas production and small settlements in the rural area. The case study demonstrates potential value in exploring synergies between agriculture and energy and the benefits it could bring to small towns throughout Ireland.

Finally in this group of case studies, the *Coastal Zone Policy* in *Norway*[27], although a matter for local government policy, shows an aggregation of local policies into a national coastline policy. The policy shows a detailed land use allocation between nature protection, aquaculture and fishing. The case study shows that bottom up preparation of land use policies for the

23 See case study no. 11.
24 See case study no. 12.
25 See case study no. 15.
26 See case study no. 13.
27 See case study no. 14.

coastal zone can be aggregated successfully to a national policy on land use in the coastal area. While Norway is much bigger than Ireland, the relative importance of the coastal area to national land use policy is somewhat similar given Ireland's island status. Even with different types of land use zoning categories in the different municipalities, a national patchwork of plans can still be helpful.

Group Four – Optimal Land Use Options

This largest group of case studies focuses on the principle that a national land use policy should identify optimal land use for different parts of the country. It includes the following case studies:

- National Strategy
- Red and Green contours
- National Zones in Three Areas
- National Planning Framework
- Land Use Strategy
- Strategic Plan for Environment and Development
- Development Management Zones
- Resource Management Act
- National Policy Statements
- Structural Vision Map North Sea
- CO_2 atlas for carbon capture

The *National Strategy on Spatial Planning and the Environment*[28] is the latest national spatial strategy for the Netherlands. The Strategy includes a map which also covers the marine area. This latest version of national spatial planning in the Netherlands shows a strong move towards climate mitigation and adaptation measures given the emphasis on capacity for rivers to flood, nature and landscape and energy networks and renewable energy production. Like previous Dutch national strategies, the inclusion of a map adds to its usefulness in guiding planning policy at lower levels in the planning hierarchy emphasising the key issues of national importance that must be included in regional and local planning policies. The inclusion of the marine area in the national strategy is worthy of consideration.

The *Red and Green Contours* case study for the *Netherlands*[29] is an example of defining areas earmarked for urban development as well as areas to be protected for nature conservation. The adoption of strict boundaries at national level for both areas, while allowing policies for land in between these to be decided at local level, is an example of national land use planning. The red and green contour methodology is attractive because of its easy to grasp concept and clarity on maps. While the approach does not dictate the actual land use in an area, it does define a broadbrush land use pattern by distinguishing between three zones at national level: urban development (red: people and jobs), nature (green) and an intermediate zone which can accommodate a wide range of land uses but excluding housing and employment in order to minimise urban sprawl and minimise commuting travel distances.

The *National Zones in Three Areas* in *Denmark*[30] is an example of a long established policy to divide the country at national level in different zones for (i) urban development; (ii) summer house areas; and (iii) rural zones. The attraction of this example is, again, its simplicity. A national policy to distinguish between a small number of zones can help to categorise certain types of land uses in each of the three or four zones. For example, housing is normally permitted in the urban zone but only under certain conditions in the rural zone. The case

28 See case study no. 16.
29 See case study no. 17.
30 See case study no. 23.

study shows that the approach does not need to be exclusively 'top down'; while the subdivision of the country into the three zones is determined at national level, municipalities can initiate a change in the boundaries.

The *National Planning Framework from Scotland*[31] incorporates a National Spatial Strategy comprising five geographic action areas. The maps included in the (consultation) document set out strategic locations for elements of the strategy in a schematic but highly illustrative way. While the case study shows many similarities with the National Planning Framework for Ireland, it is different in that it is spatially and strategically explicit. This is demonstrated by listing national strategic infrastructure projects (e.g. high speed rail, location for pumped hydro storage, power station) that are sensitive to Nimby type objection campaigns if proposed at local level. The spatial identification of some of these strategic elements is innovative and has not been used in Ireland to date. The case study is therefore relevant and could be adopted in a revision of the NPF or incorporated in a National Land Use Policy.

In the example of the *Land Use Strategy in Scotland*[32] land use is considered in an integrated way by adopting a landscape, rather than sectoral, approach to setting out policies and initiatives that contribute to so-called 'overarching land use objectives'. Although the policy is called a land use strategy, it does not contain any maps indicating different types of land use. However, it does act as an umbrella policy document which links different national policies together in an integrated framework with an accessible concept of the different landscapes in the country. As such, it presents an attractive framework to link a wide range of policies for both urban and rural areas in a single written statement document.

The *Strategic Plan for Environment and Development* for *Malta*[33] is one of the rare examples of a zoning strategy for the entire country albeit a small country. The case study is interesting because it is an example of effectively a zoning map for a country. Even compared to zoning maps for county development plans, this map shows much detail in terms of the range of land uses. A second interesting feature is the fact that the planning for the marine area is integrated in the national spatial policy, similar to the case study from the Netherlands. This may be relevant for a national land use policy for Ireland given the often close linkage between sea based activities and those on the shore.

Although not definitive at this stage, the proposals to change the planning system in England[34] are interesting because if implemented, these proposals might include a designation of land in three zones at national level with development management effectively centralised to a large extent. The idea to designate different areas of a country or region in terms of planning policy, can be found in a number of countries (e.g. Denmark). However, the idea that is proposed here is different in that for certain parts of the country the discretion that is traditionally found at the local level of decision making, would be removed and as a result a more 'plan led' system is created where the principle of development is established at national level, while for other parts of the country the traditional form of granting planning permissions would continue to exist. Such a system would have implications for a national land use policy.

31 See case study no. 21.
32 See case study no. 20.
33 See case study no. 25.
34 See case study no. 22.

The two case studies from New Zealand[35] concentrate on legal instruments. Although the efficacy of the *Resource Management Act* of *New Zealand* has been criticised it is significant for this study because it approached planning from a comprehensive 'environmental resource' perspective and integrated the sustainable management of natural and physical resources such as land, air and water and focused on these resources and their sustainable management. The inclusion of this legislation as a case example is not meant for adoption of the legislative approach, but rather to recognise the approach that was taken when the Act was developed. The approach was one of essentially 'supply based planning' (resources and environmental limits dictate where development can take place) instead of traditional 'demand based planning' which is essentially predicting land use needs to accommodate social and economic developments in the future. In that sense the case study is highly relevant as it presents a possible way of approaching a national land use policy for Ireland, i.e. by defining resources and how these can best be managed.

The second case study of *National Policy Statements* is based on the Resource Management Act where such statements provide national direction on how local councils must implement the objectives of the Act. The case study illustrates how through the use of national guidelines or directives, land use policy can be formulated or at least influenced, at national level even if their implementation is ultimately determined by statutory local plans. The case study illustrates the use of consistent criteria in classifying land and recognises that good quality agricultural land should be protected. These examples can be seen as possible elements in a national land use policy for Ireland.

Finally in this group of case studies, two case studies relating to the marine environment are included.

The *Structural Vision Map North Sea*[36] is an early example in the *Netherlands* of marine spatial planning. The policy for the North Sea as one of the most intensively used marine areas is a clear example of land use planning in the marine area. It includes policies on topics such as: off-shore wind, nature and aquaculture. It has produced detailed spatial policy maps. The case study makes clear the interaction and mutual dependency between land use activities and off shore activities in the North Sea. Examples are the balance between on shore and off shore wind energy (more off shore makes it easier to achieve the national targets), the impact on fishing of increased off shore wind energy areas, the need to protect access routes to the main ports, and the sea as a potential source of construction material in the form of sand extraction. In the Irish context the emerging marine spatial planning initiatives should be closely coordinated with any national land use policy or strategy. The case study can be used as valuable reference material.

Finally, the CO_2 *Atlas for Carbon Capture* in *Norway*[37] is an example of a systematic analysis tool that was developed to estimate and define the potential locations for carbon storage and quantifying the available capacity in such storage areas. While most likely carbon capture in Ireland would be off-shore in depleted gas fields, it would come under marine spatial planning and also have a land use policy element in terms of necessary land based infrastructure (e.g. corridors for pipelines). The case study illustrates the benefit of a systematic search and protection of suitable sites even if in the short to medium term actual storage is unlikely.

35 See case studies no. 18 and 19.
36 See case study no. 24.
37 See case study no. 26.

4.2 Main Findings

An important principle that has emerged from the study of best practice in other countries, is the degree of integration between the *spatial planning* system in the relevant country and the *environmental policy*. The distinction between these two areas is becoming increasingly blurred and more integrated. Good examples of this process of change can be found in the New Zealand and Netherlands examples. In New Zealand, an innovative and progressive type of planning legislation was introduced in the early 1990s which was based on the principle of integrated resource management. In parallel, in the Netherlands a detailed and sophisticated system of land use planning has become increasingly aware of the constraints imposed by environmental limits. The discovery of contaminated soil under a proposed housing project in a small town in the 1980s created a shock realisation that environmental limits may dictate land use policy. In the decades to follow, soil remediation became a mainstream element of spatial planning policy. Also, the limitations imposed by underground water quality concerns and flood risk have guided land use planning since. Legally imposed noise level limitations, EU imposed restrictions on PM10 levels in the air (fine dust) led to the halting of development followed more recently by similar impacts in relation to nitrate level limits. In short, Dutch planners learned to accepts that where traditionally optimal land use patterns were based on traffic modelling, urban design theories, or spatial planning concepts, increasingly the location of land us is determined by 'what the environmental limits allow us to do'.

This somewhat anecdotal evidence is nonetheless illustrating a fundamental principle that is relevant to the study of best practice in national land use planning. It is the principle that land use planning in the future is likely to be more determined by the carrying capacity of the environment in a particular location or area, than the demand for land use that results from human activity. Put in another way: rather than determining residential land use zoning based on projecting future population and household formation in an area, the zoning of land for housing may well be determined by contours set by noise levels, flood risk areas, appropriate assessment limitations etc.[38] Of course, this is already happening in Ireland and elsewhere where development projects that are in accordance with development plan policies, may still be blocked due to environmental constraints.

Of particular interest therefore are the case studies from countries that suggest how environmental limits may dictate land use policy. But it may even be wrong to use the term 'environmental limits' as it suggests an approach where land use policy should be guided by socio-economic needs albeit perhaps constrained by environmental limits. Better still is the approach where the environmental capacity itself becomes the driver for land use policy. An example of this is the use of 'soil' as a parameter relevant for land use policy. The case studies from Switzerland and Belgium illustrate this approach where in the case from Switzerland[39] farming practice is related to the impact of fertiliser and crops on the soil while in the case from Belgium[40] 'soil sealing' is used as key statistic in assessing land use policy.

38 The author developed this distinction in his planning theory classes to planning students by distinguishing between traditional 'demand based planning' (where land use is a result of socio-economic forecasting) and 'supply based planning' (where land use is a result of the carrying capacity of a given area.)

39 See case study no. 2.

40 See case study no. 11.

Another example of adopting the environmental carrying capacity as a driver for determining land use policy, is the case study from Czech Republic. In that case[41] a Territorial System of Ecological Stability (TSES) forms part of national legislation. Defined as "an interconnected system of natural as well as modified semi-natural ecosystems keeping the natural balance", TSES is an integral part of spatial plans of local municipalities and therefore directly influences land use policy. At a more general level, the use of ecosystem services as a basis for defining optimal land use, suggests an interesting approach because it is a comprehensive concept that can be applied in a pseudo-scientific manner to determine the most appropriate land use types in certain areas. It is a comprehensive concept because ecosystem services relates to the wide range of functions incl. soil quality, water balance, biodiversity, but equally to tourism and landscape protection. The development of a map based resource that can be used by planners to recommend land use policy at different levels of 'resolution' is an interesting lesson learned from the Czech case study.

Examples of national land use policy in the form of spatial plans of land use designation, are found in several countries. While often only at the regional level (because planning at national level may not exist in the relevant country), the scale of the regional level in those countries can be equivalent to the national level in Ireland in terms of land area or population or both. Examples of such zoning type policies have been found in the following countries: Austria, Netherlands, Malta, Scotland. However, a distinction must be made between sectoral land use plans and comprehensive land use plans.

The case study from Austria[42] shows priority land use zones for: agriculture, industry and employment, mineral resources and green areas. In addition, the maps show a settlement hierarchy as well as building zones that have been taken from the lower level of municipal land use plans. The fact that these land use plans are based on river catchments is interesting but also the inclusion of positive zoning for open space and agriculture. Combining the case studies from the Czech Republic and Austria, one could adopt an approach where a national land use plan would begin by identifying for the areas outside urban settlements, green infrastructure networks (ecosystem services approach) with positive zoning for good quality agricultural land. Once such a mapping exercise is completed, one can then decide whether renewable energy (wind and solar) can be allowed on the green infrastructure land (probably yes) or on the agriculture lands (probably no).

Given the priority at national level to find land capable of being used for onshore wind farm development, the case study from the Netherlands[43] shows how this can be done by systematically examining for each part of the country where areas are potentially suitable for renewable energy projects. These so-called search areas are identified at regional level for further determination in local development plans. While the system of 'preferred areas' is already in place in local county development plans in Ireland, these areas are generic and reflect a passive approach of 'allowing' renewable energy projects in certain areas (or not as the case may be) rather than a more proactive approach as illustrated with the search areas in the Dutch case study example. A similar approach of adopting more precise boundaries of priority areas for wind energy, is found in the Austrian case study.[44]

41 See case study no. 9.
42 See case study no. 3.
43 See case study no. 1.
44 See case study no. 4.

Such a high level and broadbrush approach of national 'zoning' could be further supported by using evidence from the case study from the Netherlands[45] on adopting a National Nature Network. The significance of such a network (which would come under the heading of areas primarily for biodiversity) is not only the protection of land from urban development but also to identify missing parts that could be zoned for future incorporation in the network but where current use (e.g. urban development or fragmented housing) should be removed in the future. The current use then becomes a 'non-conforming' land use in the zoning policy which means that the use can continue to exist but any expansion or consolidation is prevented or at least discouraged.

A general weakness in the approach to Natura 2000 sites in Ireland is the lack of *integration* between the individual sites and the lack of *management plans* for these sites. In contrast, in the Dutch example of the Nature Network, the backbone of the green infrastructure network is the collection of Natura 2000 sites which is then expanded with other nature protection areas, waterways and environmentally friendly farming areas. The Czech case study illustrates the same point.

'Evidence based planning' is a term that is frequently used to highlight the need to root policy incl. land use policy in scientifically proven facts. In other words, the planning of land use should be based on facts rather than political priorities. For such an approach to work at national level, it is important to have 'metrics' that are agreed and that can be used to measure policy performance. The case studies from Belgium and UK[46] show how this can be done by measuring land cover and expressing it in the forms of a range of parameters. The Swiss case study[47] then shows how such parameters can be used to model future land use planning scenarios. Such scenario based forecasting is relevant for Ireland given the loss of farming land to urban expansion and fragmentation caused by one-off housing.

An area not yet mentioned but relevant for national land use policy is that of afforestation. The case study from Norway[48] shows how this may be addressed by emphasising the biodiversity value of forestry projects. Given the degree of opposition to monoculture forest projects and the concentration of these projects in specific parts of the country (e.g. Leitrim), the Norwegian case study is of interest as is the UK example[49] of a National Forest to demonstrate the many contributions that forest projects can make.

Based on the considerations outlined so far, it is possible to develop a land use strategy comprising five categories as follows:

- Areas primarily for *food production* (good soils) that should be protected from urban fragmentation and other non-compatible land uses.
- Areas primarily for *biodiversity* (green infrastructure) that should be protected from fragmentation although a range of land uses incl. renewable energy may be compatible.
- Areas primarily for *renewable energy* (wind and solar).
- Areas primarily for *urban development*.
- Areas primarily for *forest planting*.

45 See case study no. 6.
46 See case studies no. 7 and 11.
47 See case study no. 8.
48 See case study no. 12.
49 See case study no. 15.

The Climate Action Plan sets out as an action to: …"*Progress a study reviewing the profile, sustainability, and supply of renewable transport fuels in Ireland, such as biofuels, advanced biofuels, e-fuels, synthetic fuels, biogas, and green hydrogen*."[50] A national policy on the production of biofuels is likely to have implications for national land use policy. An important element in this will be the question whether the production of biofuels will be decentralised with the fuels being used locally or centralised through perhaps local production but nationwide consumption by use in the gas network and transport fuels. The Danish case study[51] shows the scope for local production of biogas resulting in a dispersed pattern of production facilities with community based ownership and use. While it is unlikely that this approach will be adopted in Ireland, it is important to achieve clarity on the type of land use pattern that will result from the mainstreaming of this type of sustainable energy use and production. In this regard, the risk is that without such policy guidance, development may be in the form of ad hoc projects that are proposed through the planning system. There are already several examples of these facilities being proposed which result in community opposition where they are proposed and it is believed a number of projects have been refused planning permission.

While marine spatial planning may not form part of a national land use policy for Ireland, it is nonetheless interesting to note that in countries like the Netherlands[52], the most recent national spatial strategy for the country includes the marine area in its scope and mapping. The same was found in the case study of Malta.[53] Even where this is not done, the coastal area deserves special treatment in a national land use policy for an island state as Ireland is with such an extensive coastline. The case study from Norway[54] illustrates in an effective way how a bottom up approach can be sensible where coastal management policies of different local authorities are combined into a national patchwork policy. The case study also illustrates the use of a wide range of land use categories for the coastal zone and includes the sea where relevant, e.g. for inlets or bays. Fishing or aquaculture appear as valid zoning objectives for portions of the coastal zone.

To identify 'areas primarily for urban development' on a national land use policy map has merit in that it can be used to avoid 'hope values' emerging on good quality agricultural land. Such hope values frequently stifle agricultural production or investment in view of the likelihood that the land may become zoned for urban development in the next county development plan. If a national land use policy could determine the areas that are designated for plan led urban development in the future without assigning a zoning objective stating when these lands are needed, the corollary is that on other lands future zoning of the agricultural land for urban development is unlikely. This could achieve two benefits: first, good agricultural land could be protected from blight that occurs when long term agricultural use is seen as unlikely because the land will be zoned at some stage for urban expansion. Secondly, it can achieve the reduction of speculative land value gains for land that is outside the urban development zones because of the fact that

50 *Climate Action Plan 2021*, Annex of Actions, Action 294.
51 See case study no. 13.
52 See case study no. 16.
53 See case study no. 25.
54 See case study no. 14.

it is unlikely to be zoned for development. The case study from the Netherlands[55] which uses demarcation of land within red and green boundaries is an example of this approach. By defining the so-called 'red contours' on a map the country is divided in areas that are considered to be used for residential or employment uses now or in the future, whereas the land outside these red contours has a much more uncertain status but where zoning for residential or employment uses will not be allowed unless compelling arguments can be made by the local authority that it should be. The case study also shows that the demarcation of green contours can help strengthen nature protection and general green infrastructure policies.

A national land use policy can also be characterised by policy statements or guidelines or directives relating to specific forms of land use. The Irish planning system already has examples of this where guidelines on rural housing policy, wind energy guidelines as well as retail planning guidelines have established principles that will have an impact on land use relating to these three categories of development. These so-called Section 28 Guidelines on Rural Housing discourage one off housing in areas that are under urban pressure, determine appropriate separation distances from dwellinghouses for wind turbines or adopt the sequential principle where retail development should in the first instance be located within town centre areas. Such policy guidelines have successfully prevented the occurrence of hypermarkets in the open countryside which can be found in other countries. Several case studies show examples of such national policy statements. For example, the solar energy policy from Malta[56] and the case study from New Zealand.[57] In the case of the latter the proposed National Policy Statement on Indigenous Biodiversity requires local authorities to classify areas in terms of habitat quality by using criteria that are defined at national level. The policy statement thus achieves land use policy at local level that is consistent throughout the country by the application of a defined classification system.

The role of landscape character assessment, already an established practice in Ireland, takes on a new significance in the context of the case study from Scotland.[58] In this case study, the country is divided into seven distinct landscape categories. Rather than using this classification for rating the quality of the landscape however, the case study illustrates how it can form the basis for a land use strategy by its use as a communication tool. By demonstrating that each landscape justifies a certain balance of land use categories, the argument that 'not every land use can go anywhere in the country' gains credibility. It should be easy to understand for the public that settlements (one of the seven landscape types) are more suited for large buildings and less suited for wind farms than other landscape types. Approaching land use policy in this way through the lens of the landscape seems a worthwhile approach.

A persistent and perennial problem in land use policy all over the world is the acceptance of so-called 'locally unwanted land uses', land uses that are important for society (e.g. waste incineration sites, mobile phone masts, quarries or motorways) and therefore in the public interest but where considerable opposition can be mounted by local communities on the basis of real or perceived negative impacts on their local environment. This phenomenon

55 See case study no. 17.
56 See case study no. 5.
57 See case study no. 19.
58 See case study no. 20.

is sometimes referred to as NIMBYism (not in my backyard) but it can also be argued that the opposition is based on rational argument as seen from the local perspective. The characteristics of these projects are generally that the benefits are felt over a dispersed area (a region or entire country) whereas the negative impacts are confined to a local area (e.g. noise, air quality, radiation or visual impact).

While there is no ready made solution to address this problem, one way of reducing opposition can be by open debate at an early stage and rational site selection processes that are transparent. In that context it can be quite useful to identify projects of national or even international benefit in a national land use strategy. If the project is that important, it should be identified in a plan at national level. However, neither the National Spatial Strategy nor the more recent National Planning Framework contained a map which shows strategic infrastructure projects for the State. It is therefore of interest to observe the case study from Scotland[59] which shows so-called 'National Developments' on a map. These are defined as significant developments of national importance that will help to deliver the spatial strategy. A somewhat similar approach can be observed in the National Strategy for the Netherlands[60] and the case study from Malta[61] (albeit at a much smaller scale). For example, the Dutch strategy map includes routes for pipelines and the high voltage network as well as symbols for landing points for off shore wind energy, major ports and industrial areas as well as the National Nature Network.[62]

Such advance identification of locations for infrastructure projects that may prove to be controversial when proposed as development projects, is also necessary for carbon capture projects if this avenue of greenhouse gas reduction is pursued. The Norwegian case study[63] shows the potential of a systematic search for storage opportunities. Key sites that emerge from such a search at national level, could be identified in broad outline on a land use policy map.

4.3 Integration Within Countries Between Case Studies

The case studies that are included in this report cannot claim to represent a comprehensive coverage of national land use policy in the relevant countries that were shortlisted. By its nature, research of exemplar case studies must be selective while it is also possible that examples of national land use policy have been missed. The main criterion in selection of case studies has been the use of the 'axes of interest'. Bearing in mind this reservation, it is nonetheless of interest to examine to what extent the relevant case studies are integrated with one another in the relevant countries. The evidence is that there is a range from 'no integration' to 'full integration'. Examples of full integration can be summarised as follows.

59 See case study no. 21.
60 See case study no. 16.
61 See case study no. 25.
62 See case study no. 16.
63 See case study no. 26.

In the case of Austria, the two case studies of wind energy zoning and river corridor zoning are integrated because both mapping exercises are included in the statutory regional plan (in the case of the illustrated example, the plan for Obersteiermark East). Similarly, the Territorial System of Ecological Stability case study from Czech Republic shows strong integration with the spatial planning system because the system forms an integral part of statutory spatial plans of local municipalities. In the case of the Netherlands, the National Nature Network forms an integrated element of the National Strategy, while it will also be closely linked to the regional energy strategies and red and green contours case studies. There is therefore a strong link between all five examples from this country in terms of national land use planning, particularly because all five case studies are 'map based' and therefore spatially specific. In the case of Malta also the Natura 2000 management sites are included within Areas of High Landscape Protection within the map of the Strategic Plan for Environment and Development. Finally, the New Zealand case studies of the National Policy Statements and the Resource Management Act are strongly integrated because the National Policy Statements are based on the Resource Management Act. For Belgium, the case study of the adoption of national statistics in relation to land cover, seems integrated with policy documents because it adopts a measuring system that presumably is used consistently throughout policy documents.

Examples of countries where the selected case studies show no integration, include Denmark where the legal division of the country in three areas is not related to the biogas plant location pattern. Equally, the two case studies from Switzerland are not integrated (agricultural price supports and land use scenarios).

The degree of integration between case studies of other countries is more difficult to assess. For example, in the case of England it is not clear whether the proposed changes to the planning system (case study development management zones) will go ahead and if so, whether any link is made with the land cover accounts.

The case of Scotland is interesting because it has adopted both a National Planning Framework which has maps included as well as a National Land Use Strategy. However, because the latter does not have maps attached, it is difficult to assess to what degree both documents are aligned. The same can be said for the case studies from Norway where the spatially specific policies in relation to coastal zone management and forestry relate to different parts of the national territory and in the absence of a national spatial planning framework it is difficult to assess the degree of integration between both.

5. Conclusions

1. The purpose of a National Land Use Policy is to establish the *optimal* use of land as a scarce resource for society. However, as part of determining the optimal use, other issues must be considered. These include: (i) the issue of *equity* (where land uses can have local effects that are disproportionate to the benefits for society), mutual *compatibility* and even *synergy* between land uses. The latter introduces concepts of 'co-location', and shared or double land use.
2. The main axes of interest in relation to the land use review are related to: agriculture, biodiversity, energy, data modelling, forestry and water. Spatial data and agreed metrics in relation to land use, land cover are important as a basis for any national land use policy or strategy.
3. A distinction is made between spatial policies and sectoral policies. While *spatial policies* will generally be covered by 'spatial planning' in the countries studied, *sectoral policies* may be outside the spatial planning system but are nonetheless relevant for the land use review. Both types of policies have been included in the review of best practice.
4. The study has addressed a selection of ten countries forming a shortlist. Case studies have been selected from these countries. Based on the axes of interest case studies have been grouped in four groups as follows:
    a. *Group One – Diversification of Land Use For Farmers*
    b. *Group Two – Land Cover and Ecological Characteristics of the Land*
    c. *Group Three – Forestry, Wetlands and Biofuels*
    d. *Group Four – Optimal Land Use Options*
5. The main conclusions from the first group of case studies are the need for a plan led approach (e.g. by identifying suitable areas for renewable energy at national level) and a positive zoning approach for non-urban land uses resulting in the zoning of land outside urban settlements as well as within those. The case studies present good examples of how this can be done.
6. The second group of case studies demonstrates the fact that national ecological networks are an established practice in several European countries and can form the backbone of any national land use policy. Combined with the recognition of ecosystem services, such networks can support climate action policies and direct land use zoning at local level.
7. A second conclusion from this group of case studies is the need for agreed metrics to measure and compare land cover data. Such data sets can help to appreciate spatial trends in terms of fragmentation (affecting biodiversity) and soil sealing (affecting climate change robustness).
8. The third group of case studies explores the significant changes in land use that are likely to result from the need for tree planting, biofuels production and lands that can be allowed to flood during periods of heavy rainfall. National land use policy on forestry, location of biogas facilities and zoning in the coastal area provide useful examples.

9. There are relatively few countries that adopt a national map of land use policy. However, both the Netherlands and Scotland provide examples that are worth considering. The example from Malta shows that for smaller countries, adopting such a 'zoning approach at national level' is feasible where it is perhaps more difficult for larger countries. On that basis, it can be concluded that for a country of the scale of Ireland it should be feasible.
10. Throughout the range of case studies considered in this study, it appears clear that land use policy will increasingly be determined by environmental constraints and drivers that come under climate action policy. Examples of this are the need to improve biodiversity (resulting in green infrastructure networks), climate adaptation (resulting in proactively planning land use that is compatible with occasional flooding) and climate mitigation (resulting in increased forestry, changes in agricultural products, use of land for windfarms and solar farms). In combination with one another, these changes are likely to determine the future land use pattern of the country which can benefit from policy guidance at both national and local levels.

Appendix A – Case Study Descriptions

Group One – Diversification of Land Use For Farmers

This group of case studies addresses the explicit objectives in both the PfG and the CAP to address diversification of land use for farmers. This can mean new business models for farming but also the change of land use from farming to renewable energy generation. It includes the following case studies:

- Regional Energy Strategies
- Three tier sustainable agriculture policy
- River Corridor Zoning
- Wind energy zoning
- Solar Farm Policy

Country	Agriculture	Biofuels	Carbon Capture	Green Infrastructure	Energy	Forestry	Landscape Protection	Sea	Coastal Area	Nature Protection	National Guidelines	National Spatial Policy	Rural Areas	Soil Management	Thematic Maps	Ecosystem Services	Legislation
NL					■												
CH	❍																
AU	■				■												
MA					❍												

■ Strong integration

❍ Weak integration

1. Regional Energy Strategies

Country: Netherlands

Aspect: Energy

Synopsis

The *Regional Energy Strategies* in the *Netherlands* are prepared by and for 30 regions in the country. The strategies seek to define search areas for renewable energy (both wind and solar) that must then be considered by municipalities in their zoning policies.

Description

As part of the national agreement on Climate Action that was agreed by the Dutch Government in 2019, a halving of greenhouse gas emissions by 2030 was set as a target. In order to achieve this target, 30 energy regions have been established which have the task to investigate where and how land based renewable energy projects (both wind and solar) can best be located. It addresses questions such as how much space is available and for how much energy production and are the locations feasible in social (community acceptance) and financial terms. Each region has to describe their choices in a strategy document. The Regional Energy Strategy (RES) for the region around the city of Utrecht for example, identifies the total theoretically available roofspace as a percentage for roof mounted solar panels. Within each region, the task is to find suitable areas for both wind and solar energy. The term 'search areas' is used to indicate that the strategies do not present zoning plans or location choices but rather areas of potential interest for renewable energy projects which municipalities are expected to consider in preparing their land use plans. Interesting aspects of the adopted approach are: (i) the integration of wind and solar in terms of suitable areas and (ii) the approach of 'search areas'. In each strategy, areas are typically identified as search areas where municipalities can seek to find suitable locations for wind or solar or both in combination. A strategy also indicates for five main landscape character areas within the region, how wind turbines can best be accommodated in the landscape. This includes typologies for wind turbine patterns (e.g. line or cluster based) and solar farms (small or large scale, coupled to industry and infrastructure or stand alone, mosaic patterns etc.).

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Diversification of land use for farmers	Energy	Achieving a plan led approach to renewable energy planning.

Conclusion

Notwithstanding the adoption of wind energy mapping in county development plans in Ireland, spatial identification of suitable land for solar farms is generally lacking. The case study demonstrates how it is possible to adopt a plan led approach to the planning of wind farms and solar parks but in particular maximise the scope for combining wind and solar projects in a densely populated country. As the 'low hanging fruit' tends to run out in terms of suitable land in Ireland for wind and solar and as community objections continue, a plan led approach and minimisation of total land take seems essential. The case study may provide useful guidance.

References

- www.regionale-energiestrategie.nl/default.aspx

2. Three Tier Sustainable Agriculture Policy

Country: Switzerland

Aspect: Agriculture

Synopsis

The *Three Tier Sustainable Agriculture Policy* in *Switzerland* is system of direct payments with a basic payment based on the land area and a sum for grazing animals with additional sums for areas in difficult conditions, such as in upland and mountain areas or for certain environmentally friendly farming practices.

Description

Prior to the 1990s, Swiss agricultural policy guaranteed farmers fixed prices and markets. Since 1993 Switzerland has undertaken a series of reforms to the system of agricultural subsidies and introduced direct payments for public and ecological services. The main aim of the reform was to better align the direct payment system to meet policy goals, including for biodiversity. A key element of the reform entailed removing direct payments to livestock farmers and increasing payments to farmers able to meet biodiversity goals such as extensive upland grazing, and linking ecologically important areas. The core of the policy is that it has shifted supports to direct payments that are independent of production volume, aiming instead to compensate farmers for the provision of public and ecological services.

The system is a tiered system of direct payments with a basic payment based on the land area and a sum for grazing animals with additional sums for areas in difficult conditions, such as in upland and mountain areas. These are so-called general payments. In addition, farmers can seek access to direct ecological payments. The policy now differentiates between three different levels of public support depending on the sustainability of agriculture. Tier one is support for specific biotypes, such as extensive grassland and meadows, high-stem fruit trees and hedges. Tier two supports integrated production with reduced inputs, meeting higher ecological standards than conventional farming. Tier three is support for organic farming.

There are five minimum conditions necessary for farmers to receive payments for integrated production, the so-called 'ecological standard' of performance:

- Provide evidence of balanced use of nutrients with fertiliser matched to crop demands and livestock farmers having to sell surplus manures or reduce livestock numbers.
- Soils must be protected from erosion – erosive crops (e.g. maize) can only be cultivated if alternated in rotation with meadows and green manures.

- At least seven percent of the farm must be allocated for species diversity protection through unfertilised meadows, hedgerows, or orchards.
- Use of diverse crop rotations.
- Pesticides have to be reduced to established risk levels.

A vital element of the policy process is that responsibility to set, administer and monitor is delegated to cantons, farmers' unions and farm advisors, local bodies and non-government organisations. Pesticide applications have fallen by 23 percent since 1990, and phosphate use is down from 83 to 73 kg/ha.

The key elements of proof of ecological performance are an appropriate proportion of ecological compensation areas, rational use of fertilisers, crop rotation, soil protection, economic and specific use of plant treatment products and animal welfare measures. Linking direct payments to these conditions has resulted in almost all farmland in Switzerland being used in a more environmentally friendly way than in former times.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Diversification of land use for farmers	Agriculture	New products, business models

Conclusion

The case study is of interest because it provides evidence of a working system of recognising the public good value of the farmer as a custodian of the landscape which includes eco-system services beyond the pure production of food. It also has built in incentives to achieve CO_2 reduction and biodiversity enhancement (both key objectives in climate action policy) by changes in farming practices without forcing the farmers to engage in this.

References

- *Reforming agricultural subsidies to support biodiversity in Switzerland*, OECD Paris, 2017.
- *Swiss Agricultural Policy*, Federal Office for Agriculture, 2004
- https://www.fao.org/3/y3951e/y3951e07.htm, accessed 23/12/21.

3. River Corridor Zoning

Country: Austria

Aspect: Agriculture

Synopsis

The *River Corridor Zoning* example in *Austria* is a zoning policy of the area on both sides of a major river. The approach demonstrates a 'river catchment' approach to land use policy centred around agriculture as the main but not only land use. Although the river catchment incorporates both urban settlements as well as rural areas, the rural area dominates.

Description

The Regional Development Programme for the region 'Obersteiermark East' has a traditional land use map attached. This is a plan for the regional level of the planning hierarchy in Austria. The map shows preferred or priority

land uses for different parts of the region. The interesting aspect is however that the map concentrates the land use demarcation around the main rivers in the region. The remaining and most dominant area of the region has a general zoning objective of 'rural area' or 'forest'. Although the river catchment incorporates both urban settlements as well as rural areas and although the concentration on the river catchment may also be the result of the fact that most urban settlements are located near the river, the approach nonetheless demonstrates a 'river catchment' approach to land use policy. The land use map includes many urban type land uses identified such as: industry and employment, housing and retail. But it also includes – at equal level of zoning designation – land use categories that include: priority zones for agriculture, mining resources and green areas, as well as ecological corridors, forestry and water (lakes and rivers). The land use map therefore treats rural land use in equal status to urban land use. Because of this equal status, the case example can be seen as falling within the aspect of 'agriculture' demonstrating positive zoning for agricultural land use with emphasis on a river catchment area approach.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Diversification of land use for farmers	Agriculture	Selecting and designating priority areas for agriculture on regional and county maps

Conclusion

In Ireland, most county development plans don't include a zoning map for agriculture or rural land use. Instead, the zoning objectives maps generally concentrate on zoning objectives for urban settlements. The case study is relevant because it shows that positive zoning for agriculture can be achieved. This means that agricultural land use is seen as an objective to be achieved rather than an existing land use to be recognised and accepted but otherwise ignored in terms of land use planning. The case study demonstrates the use of priority zoning for good agricultural land that might prevent fragmentation or intrusion of urban activities.

References

- www.landesentwicklung.steiermark.at

This website includes regional development programmes for seven planning regions in the country. The case study is taken from one of these, the plan for Obersteiermark Ost.

4. Wind Energy Zoning

Country: Austria

Aspect: Energy

Synopsis

Case studies of *Wind Energy Zoning* can be found in many countries. The case study from *Austria* shows a system of priority, suitable and excluded areas similar to that adopted by local authorities in Ireland.

Description

The wind energy map for Steiermark (2019) is an example of regional based wind energy planning. It identifies three types of areas: priority zones, suitability zones and exclusion zones. The policy has statutory footing and is an amendment of the original policy which was adopted in 2013. In the priority zones (dark green on the map) development of new windparks or expansion of existing windparks is possible. The areas are chosen based on suitability for turbines but also grid connections. The suitability zones (light green) are considered second preference but erection of wind energy investment is generally possible. For the exclusion zones (red) windturbines are not permitted. Local municipalities are expected to include the zoning boundaries in their local plans but for priority zones the zoning objective is determined at regional level and cannot be challenged or changed in municipal plans. The map is available at three levels: a single map showing the entire region, section maps that show sections of the overview map in greater detail, and named priority zone maps where identification of the precise boundaries of the various zones is possible. The overall map is consistent with a set target of installed wind energy capacity in the region. This target is set down in a statutory planning document. The written statement attached to the policy includes the maps in A4 format at scale 1:50,000 scale maps. In total 15 of those easy to read maps are included: 6 for priority zones and 9 for suitable zones.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Diversification of land use for farmers	Energy	Achieving a plan led approach to renewable energy planning.

Conclusion

While the use of wind energy mapping is now well established in county development plans in Ireland, the maps are generally indicative and may lack spatial detail to identify precise boundaries on the ground.

References:

- *Steiermark Entwicklungsprogramm für den Sachbereich Windenergie*, 2013.
- www.landesentwicklung.steiermark.at

5. Solar Farm Policy

Country: Malta

Aspect: Energy

Synopsis

The *Solar Farm Policy* of *Malta* is a case study of defining criteria for the location of solar farms. The policy gives clear indications as to which locations are preferred. It also provides a hierarchy of preference (e.g. building roof in favour of land based).

Description:

The Solar Farm Policy that was adopted for nationwide application in Malta, dates from 2017 but was amended in 2021. The background to the policy is that the proliferation of small solar panel applications on buildings in towns and villages has a somewhat visually harmful effect while the contribution to the overall targets is modest. Instead, larger systems, typically deployed on rooftops of commercial or industrial buildings, tend to have a much lower visual impact This policy sets a framework which will determine which type of large scale PV systems would be permitted. The policy notes that large scale PV development on rooftops, often gives a new lease of life to an otherwise unutilised space and would, in general, be easily integrated with the grid. Similarly, PV systems covering car parks, add extra value by providing shelter for vehicles and are the ideal places for the installation of EV charge points which are in turn being deployed as part of the national electro-mobility plan. Quarries are prominent eyesores in parts of the islands. The policy encourages the restoration of disused quarries which may also lead to backfilling with inert construction waste. The policy includes definitions (e.g. a solar farm is min. 1000 sq m footprint). In terms of location solar farms should ideally be sited in the vicinity of urban areas, or areas with high electrical consumption. The policy document lists a number of types of preferred locations for solar parks. These include: large scale roof tops, areas specifically designated, sites within industrial areas, officially disused landfill sites, quarries. Solar parks are not allowed in: open countryside, protected or scenic areas, Natura 2000 sites, steeply sloping land.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Diversification of land use for farmers	Energy	Achieving a plan led approach to renewable energy planning.

Conclusion

The case study illustrates that in the absence of a zoning policy for solar parks, it is possible through national guidelines to indicate where a specific land use (in this case solar farms) should be located.

References:

- *Solar Farms Policy*, Approved October 2017 Updated Document June 2021
- https://www.pa.org.mt/en/supplementary-guidance

Group Two – Land Cover and Ecological Characteristics of the Land

This group of case studies addresses the emphasis in both the PfG and the CAP to improve biodiversity and know more about actual land use and land cover. The role of ecosystem services, green infrastructure, landscape protection and actual data re land use and land cover come under this group. It includes the following case studies:

- Nature Network Netherlands
- Land Cover Account
- Modelling using CLUE
- Territorial System of Ecological Stability
- Natura 2000 Management Plans
- Statistics

Country	Agriculture	Biofuels	Carbon Capture	Green Infrastructure	Energy	Forestry	Landscape Protection	Sea	Coastal Area	Nature Protection	National Guidelines	National Spatial Policy	Rural Areas	Soil Management	Thematic Maps	Modelling	Ecosystem Services	Legislation
NL				■														
UK																	■	
CH																■		
CZ																	■	
MA										■								
BE																■		

■ Strong integration

❍ Weak integration

6. Nature Network Netherlands

Country: Netherlands

Aspect: Green Infrastructure

Synopsis

The *Nature Network Netherlands* is an example of an ecological network defined at national level. The network has been used as a basis for land acquisition for nature protection.

Description

Planning at national level has been a tradition in the Netherlands for many years since the first National Spatial Strategy referred to as a 'report' was adopted in 1960. This was followed by the second report (1966), the third (1974), the fourth (1988) and the fifth (2001). Notwithstanding the withdrawal of national directive planning in the last two decades, the early adoption of a National Ecological Network has been maintained. Since 2014 it is known as the 'Nature Network Netherlands' (NNN) and responsibility has been transferred to the provisional level. The network incorporates the following elements:

- Existing nature areas incl. all national parks;
- Areas where new nature is being created;
- Agricultural areas where agricultural management is nature friendly;
- The waterways (lakes, rivers etc.)
- All Natura 2000 sites.

The realisation of the network requires land acquisition, prevention from development of certain areas and general zoning policies. Its purpose is to link nature areas with each other and reduce the loss of biodiversity. In addition to the enlargement of nature protection zones and linking these together, the management policies for agricultural use of land in between is also important. The number of so-called 'core areas' (areas larger than 250 hectares) as well as the total area covered by the network have increased significantly since its introduction. The painstaking realisation of the network has included investment in so-called 'eco-bridges': wide bridges across motorways that cannot be accessed by humans to increase the habitat areas for animal species.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Evaluation of ecological characteristics of the land	Biodiversity	Protection of high value areas

Conclusion

The case study comes closest to the definition of a 'national land use policy' since it dictates at national level which areas in the country should be protected for nature conservation and biodiversity enhancement. It is a prime example of a spatial network where at times areas that are small in terms of amount of hectares, are considered important to link nature areas together justifying detailed spatial planning policies that include buying out businesses, reintroducing nature on land that has been previously used for urban development and ecological management plans for Natura 2000 sites.

References

- www.government.nl/topics/nature-and-biodiversity/national-ecological-network-nen

7. Land Cover Account

Country: UK (England)

Aspect: Ecosystem Services

Synopsis

Land Cover ecosystem accounts for the United Kingdom (UK) have been carried out to enable a comparison between 1998 and 2007.

Description

This case study notes that both land use and land cover are important in understanding the changes in the ecosystems and ecosystem services. Based on Eurostat definitions, land cover is defined as the physical cover of the Earth's surface whereas land use is the socio-economic function of the land. Ecosystem services form an illustration of the close interrelation between these two. The main data sources for the study were: CORINE land cover data (CLC) and a Countryside Survey (CS). CLC is a map of the European land cover based on interpretation of satellite images. It provides comparable digital maps of land cover for each country for much of Europe. CS is a study of the natural resources of the UK's countryside conducted by the Centre for Ecology and Hydrology. The study sample consists of a set of 1km x 1km squares at the intersection of a grid of 15km x 15km squares covering Great Britain. The habitats in the whole of each sample square were mapped using a minimum mappable area of 400m2 where each mapped parcel was identified to belong to a Broad or Priority Habitat. These habitats were aggregated to match an established classification method while any area covered by less than 10% vegetation is classified as 'barren land/sparsely vegetated areas'. Corrections were made for predominantly urban areas which are excluded from the scope of the Countryside Survey (CS). The study thus carried out made it possible to develop a 'land cover account' which provides information about the surface area of the broad habitats and how it changed between 1998 and 2007. There are uncertainties about whether the Countryside Survey (currently the best data source to derive land cover accounts) will be conducted again in its current format. Future work should therefore investigate the possibility of using data from a satellite based land cover monitoring system currently being developed by the Centre for Ecology and Hydrology. The study concludes that further analysis examining interactions between land use and land cover would help to improve understanding of the changes in the ecosystems and ecosystem services.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Characteristics of land cover	Data Modelling	Systematic analysis of ecosystems services and land use

Conclusion

Land use accounts may assist in setting benchmark and target figures for a national land use policy. In addition, the case study shows the benefit of such accounts for the measurement and assessment of the value of ecosystem services to achieve society's objectives on biodiversity and other climate action policies.

References

- https://www.ons.gov.uk
- *UK Natural Capital Land Cover in the UK*, Office for National Statistics, 2015.

8. Modelling Using CLUE

Country: Switzerland

Aspect: Modelling

Synopsis

This case study examines the value of using a land use modelling approach to test scenarios of future land use change. This was done in a study for a Swiss region where a scenario of reduced agricultural production was tested in this way by using the CLUE model (Conversion of Land Use and its Effects).

Description

Land use change over time is a result of not only policy but also 'drivers' that can be modelled and therefore assist in predicting future land use patterns. Such land-use change models have been considered important tools for integrated environmental management by the authors of the CLUE-S model (Conversion of Land Use and its Effects). The value of using such a modelling approach is that scenarios of future land use change can be tested. This was done in a study for a Swiss region where a scenario of reduced agricultural production was tested in this way. The study describes 'storylines' for five scenarios of land use change (ranging between high vs low policy intervention and globalisation vs regionalisation) and produces five maps of potential future land use for the country in 2035. The study notes that increased urban area occurs at the expense of other land use types, particularly open land agriculture, and therefore has implications for provision of ecosystem services, biodiversity and functions of landscape. In the Swiss situation the outcome in terms of abandonment of agricultural use of Alpine regions is considered to be a realistic possibility if there is no policy intervention.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Characteristics of land cover	Data Modelling	Systems analysis of land uses

Conclusion

In Ireland significant changes in land use are happening in the rural area. These include continued urban sprawl (notwithstanding policy to curb this), generally ad hoc solar farm developments, wind farms, forest plantations. These changes are generally managed through the planning system but can create significant community opposition. It would be good if future land use patterns under different policy

scenarios can be tested to assist public debate as part of the preparation of a national land use policy. The case study shows how modelling of land use change can assist in this.

References

- Future landscapes of Switzerland: Risk areas for urbanisation and land abandonment, Bronwyn Price *et al*, *Applied Geography*, 57 (2015) 32-41.

9. Territorial System of Ecological Stability

Country: Czechia

Aspect: Ecosystem Services

Synopsis

The Territorial System of Ecological Stability forms part of national legislation in relation to green infrastructure and ecological networks while the Consolidated Layer of Ecosystems in Czechia was created as a map resource for an assessment of ecosystem services that was developed for a national/regional level of assessment.

Description

The Territorial System of Ecological Stability (TSES) forms part of national legislation and works well in the Czech Republic. The 'Consolidated Layer of Ecosystems in Czechia' was created as an academic study to create a map resource for an assessment of ecosystem services. It was developed for a national/regional level of assessment. The TSES is defined as "an interconnected system of natural as well as modified semi-natural ecosystems keeping the natural balance". TSES is an integral part of spatial plans of local municipalities. Effective TSES design should: (i) delineate areas large enough to support survival of species, (ii) delineate routes with relatively undisturbed species movement, (iii) create optimal spatial distribution of ecologically more stable areas, and (iv) divide ecologically less stable areas and ensure connectivity between them and ecologically more stable areas. The TSES is a hierarchical system and makes distinction between areas based on: (i) biogeographic significance and hierarchical level (i.e. local, regional, supraregional), (ii) degree of anthropogenic impact, and (iii) types of natural environment (i.e. terrestrial or water). Similar to ecological networks, TSES distinguishes core areas, so called bio-centres, biotic corridors and interaction elements. The latter can be seen as stepping stones for migration or the permanent existence of organisms. They are usually smaller than bio-centres or biotic corridors, do not fulfil pre-set criteria for these and can be designed only on local level. Unlike Green Infrastructure, TSES is a concept with a strict set of rules. On the one hand, this means that the concept is easily understandable, especially for professionals. On the other, it can easily omit other features in the landscape that do not follow these rules but have a positive effect on the landscape as well as on people.

The consolidated layer of ecosystems was created as a map resource for an assessment of ecosystem services. It combines the layer of biotopes mapping and other data sources for the country incl. geographic data, digital base of water management data, UrbanAtlas, and CORINE land cover data. It therefore enables a differentiation of natural biotopes and antropogenous types of ecosystems in such a resolution which is suitable for an assessment of ecosystem services. The methodology comprises 41 main categories of ecosystems in four hierarchical levels and six wider types of ecosystems and was developed for a national/regional level of assessment. More specific and detailed data sources can be used in a local resolution.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Evaluation of ecological characteristics of the land	Biodiversity	Quantification of ecosystem services through land use policy
Characteristics of land cover	Data Modelling	Systems analysis of land uses

Conclusion

The use of ecosystem services approach in the planning of land use and spatial planning in general, is relatively undeveloped. In the context of national land use policy, it is however highly relevant because the ecosystem services concept acknowledges the holistic value of the natural environment, not just for biodiversity but also to achieve economic and social objectives. The methodology that has been adopted here may be an example for use in Ireland which can then serve as an input into a national land use policy. In combination with the statutory system of identifying elements that form part of an ecological network through the TSES, ecosystem services can form an important input into determining land use policy at local and national levels.

References

- http://www.ecosystemservices.cz/en/
- Territorial System of Ecological Stability as a regional example for Green Infrastructure planning in the Czech Republic, Hana Skokanová, Tomáš Slach, *Landscape Online*, 2020, vol. 80, Pages 1-13.

10. Natura 2000 Management Plans

Country: Malta

Aspect: Nature Protection

Synopsis

In *Malta* the *Natura 2000 Management Plans* case study is an example of not only protection of Natura 2000 sites but developing individual management plans for each of these. This case study is of interest in view of the general lack of such management plans in Ireland.

Description

The Natura 2000 network forms the backbone of the Green Infrastructure network. Management of Natura 2000 sites and integration into local green infrastructure networks is therefore important. Under the Habitat Directive (Art. 6.1) Member States shall establish the necessary conservation measures involving, if need be, appropriate management plans specifically designed for the sites or integrated into other development plans. Spatial planning has a key role. Currently there are 34 terrestrial Natura 2000 sites designated in the Maltese Islands. The consideration of site management for such sites emanates from the legal requirement to prepare conservation measures for these protected sites under national legislation as transposed from the

Habitats Directive. Malta was granted funding through the European Agricultural Fund for Rural Development to co-finance a project in order to meet the obligations emanating from the Habitats and Birds Directives. The overall aim of this project, entitled "Natura 2000 Management Planning for Malta and Gozo" was to establish management plans and legal provisions for the management of all terrestrial Natura 2000 sites in the Maltese Islands and to increase awareness of Natura 2000 amongst the general public and stakeholders. The management planning exercise involved gathering information, carrying out surveys, defining conservation objectives, and identifying management measures, with intensive stakeholder involvement throughout the entire process. While, management plans were compiled for most of the sites forming part of the terrestrial Natura 2000 Network, Conservation Orders were considered to be a more appropriate tool for some of the sites. The management plans include detailed site descriptions, evaluation and conservation objectives, management actions, a work plan structure and a reporting and review plan.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Evaluation of ecological characteristics of the land	Biodiversity	Improvement of biodiversity.

Conclusion

Ireland has few management plans for its network of sites that form part of the Natura 2000 network. A more proactive and positive policy as distinct from mere protection and conservation through appropriate assessment procedures, would be of benefit. The case study illustrates how this can be done nationwide and feed into a national land use policy.

References

- *Visions for Malta's Terrestrial Natura 2000 Sites*, Environment and Resources Authority, Malta.
- Management Plans for Terrestrial Natura 2000 Sites in Malta & Gozo – ERA

11. Statistics

Country: Belgium

Aspect: Modelling

Synopsis

A national report for the Flanders region in Belgium present a spatial analysis of the country by using four key statistics (land use, settlement area, sealed area and buildings) in order to assess how spatial patterns have developed.

Description

The Belgian-Flanders 'spatial report' provides a spatial analysis of the country. It uses a number of key statistics in order to assess issues such as 'open areas', 'fragmentation', 'ribbon development' and how these spatial patterns have developed. Four key parameters are used: land use, settlement area, sealed area and

buildings. The 'land use' parameter includes human activities (e.g. residential) as well as agricultural products (e.g. grass land or crops), and nature (forest and shrubs). The term 'settlement area' relates to the term used by the European Commission. The 'sealed area' comprises the area of land that is covered by impermeable or semi-permeable material (e.g. roads, roofs etc.). Finally, buildings represent the footprint of the built environment. By using these four variables a picture is built up which shows that for example, in a six year period (2013-2019) residential land use increased by 2.4 hectares per day. The total settlement area increased during that period 5.1 hectares per day. Total area covered under 'soil sealing' increased from 14 to 15 % of the country area. The area covered by buildings increased from 5.6 to 5.9 % of national area. What these figures show is that the total area that is covered by impermeable material is significantly greater (15%) than the buildings themselves (6%). The statistics are used to describe different patterns of urbanisation, assess the 'problem' of fragmentation and ribbon development (a characteristic of Belgian urban development) and formulate policy objectives such as compact growth and achieving 'open areas' as green belt zones.

Conclusion

The approach that is adopted in this case study can be useful to measure trends in sealing of soil and fragmentation of open areas, both important issues in climate adaptation and biodiversity improvement. By adopting a systematic approach achievements can be made visible and negative trends can be spotted.

References

- Ruimterapport 2021 – Departement Omgeving (vlaanderen.be)

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Characteristics of land cover	Data Modelling	Systematic analysis of land use and land cover at national level.

Group Three – Forestry, Wetlands and Biofuels

This group of case studies approaches the topic of land use policy from the aspect of climate adaptation and mitigation and the changes in land use that may result from this. It includes the following case studies:

- Forest Habitat Inventory
- Biogas production
- Coastal Zone Policy
- National Forest Strategy

Country	Agriculture	Biofuels	Carbon Capture	Green Infrastructure	Energy	Forestry	Landscape Protection	Sea	Coastal Area	Nature Protection	National Guidelines	National Spatial Policy	Rural Areas	Soil Management	Thematic Maps	Ecosystem Services	Legislation
NO						❍			❍								
DK		❍															
UK						❍											

■ Strong integration

❍ Weak integration

12. Forest Habitat Inventory

Country: Norway

Aspect: Forestry

Synopsis

The *Forest Habitat Inventory* of *Norway* is an example of combining biodiversity policy with forest management. The inventory generates comparable data on important habitats for biodiversity in forests. This information is used when making forestry plans.

Description

The habitat inventory generates comparable data on important habitats for biodiversity in forests. This information is used when making forestry plans. The purpose is to improve the environmental considerations in the activities of each landowner, including the plans for new forest roads, which forest stands that are scheduled for cutting, and when and how they are cut. The inventory is an important basis for a sustainable management and for timber certification in the forestry sector in Norway. However, the inventory data is also used in other contexts than forestry plans,

such as land planning within the municipalities. The local authorities can consult the habitat maps when evaluating alternative areas for new roads, power lines, buildings etc. The CHI model (Complementary Hotspot Inventory) was developed in the MiS project and constitutes the basis for the habitat inventory, and for the application of inventory data. As sufficient species data for prioritisation is not obtainable at the forest stand scale, the model was based on habitats, and on documented relationships between species distributions and habitat types. The CHI combines two main strategies of cost-efficient biodiversity conservation: the identification of «hotspots» and «complementary» areas. Biodiversity hotspots are areas with high density of rare and threatened species, whereas complementary areas are sites that differ markedly in species composition.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Availability of suitable land for forestry	Forestry	Forest management plans

Conclusion

Afforestation policy in Ireland has to date concentrated on fast growing and monoculture plantations.[64] While there are clear advantages to this approach there are also disadvantages in terms of lack of community acceptance (shadow effect and negative impacts on the landscape, traffic on narrow country roads) as well as poor biodiversity aspects. A more diverse and innovative policy on forestry may form part of a national land use policy. The case study presents a useful example of such an approach where biodiversity forms a key feature of forest plans.

References:

- The Norwegian Forest Habitat Inventory – regjeringen.no

13. Biogas Production

Country: Denmark

Aspect: Biofuels

Synopsis

The *Biogas Production* example in *Denmark* is based on a tradition of biogas plants that are used for CHP production in local towns. The biogas plants are therefore related to the settlement system of the country and demonstrate a dispersed pattern of distribution which may help to achieve community acceptance.

Description

Biogas production in Denmark has traditionally been spread throughout the country. The majority of biogas plants are manure-based agricultural plants located near farms while

64 Note from Norwegian contact: It is widely recognised in the Norwegian debate on resource management that monocultures tend to marginalise land and reduce biodiversity. It may be more profitable in the short term. Government policy emphasises the maintenance of biodiversity, though there are differing views on how to go about it between e.g. the ministry of the envirionment and the ministry of agriculture. Typical example: spruce forest planting schemes.

other biogas plants are part of waste water treatment plants located in or near bigger cities. A smaller number of biogas plants are industrial or landfill plants treating organic wastes from these sites. Biogas is a renewable energy that can replace natural gas. It is produced by anaerobic digestion of organic material. Manure, sewage sludge and other organic waste types from industries and households are suitable feedstocks. Biogas production is thus a combined energy production and a waste treatment technology. In Denmark, the biogas plants have been primarily used for CHP production in local towns. A base off-take is thus guaranteed but the sole reliance on local needs creates an obstacle to the expansion of biogas. Following the introduction of feed-in premiums in 2014, biomethane injection into the gas grid was given a strong impetus, widening the consumer base: it now accounts for over 10% of volumes transported in the natural gas grid. Denmark has significant experience with support of biogas technologies incl. support schemes to facilitate large scale deployment.

In Denmark biogas production was traditionally focused on a jointly owned biogas plant owned by 10-20 farmers which would be used for CHP production in local towns. Each town would typically have a small district heating system securing a base take-off for the plant. Biogas production in Denmark has increased significantly to result in a current production of biogas that is injected into the gas system at a level of almost 25% of national gas consumption. Manure represents more than three quarters of the total feedstock input on agricultural biogas plants. Energy crops such as corn and beets can be used in biogas production to increase the organic matter and thus the total production of biogas. However, when using energy crops in biogas production, the benefits for climate and environment are reduced. The Danish Energy Agency regulates the amount of energy crops in the production of biogas.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Production of biomethane	Energy	Renewable energy

Conclusion

Analogous to the origins of wind energy in Denmark (which was based on a dispersed spatial pattern of small windturbines), biogas production shows also a dispersed and localised spatial pattern. Coupled with the local ownership of the resource, this case study illustrates an interesting link between biogas production and small settlements in the rural area. The case study demonstrates potential value in exploring synergies between agriculture and energy and the benefits it could bring to small towns throughout Ireland.

References

- *Biogas and Biomethane in Europe – lessons from Denmark, Germany and Italy*, 2019
- Biogas in Denmark | Energistyrelsen (ens.dk) accessed 11/12/21

14. Coastal Zone Policy

Country: Norway

Aspect: Coastal Area

Synopsis

The *Coastal Zone Policy* in *Norway*, although a matter for local government policy, shows an aggregation of local policies into a national coastline policy. The policy shows a detailed land use allocation between nature protection, aquaculture and fishing.

Description

Although coastal zone management policy is a responsibility for local government in Norway (municipalities) the deep fjords frequently require intermunicipal cooperation. A report on the coastal management policy for the country as a whole noted that nine such intermunicipal planning processes were carried out. The number of municipalities involved in these intermunicipal plans varied between 2 and 13. By the end of 2015, most municipalities located along the vast Norwegian coastline, had prepared or adopted a coastal management policy for their territory. The individual plans were not synchronised in terms of plan period, for example the start of the plan period for the individual plans varied between from before 1999 to after 2010. The plans show detailed demarcation of different zones both on land and in the sea for different purposes. For example, many plans identify designated zones for aquaculture. Nature protection zones are also identified while 'fishing' as a use is designated for the remaining waters. There are some interesting categories such as fish spawning grounds, conservation and cultural sites/landmarks. Some plans identify 'clear air' zones. Shipping routes are also identified on the maps. Some plans also indicate in a matrix form whether a particular use has positive or negative implications for objectives for the local area plan. For example, aquaculture may have potential negative consequences for transport, visual amenity and recreation objectives and the plan may seek to minimise these through the careful selection of the amount of area designated for aquaculture and its location within the coastal zone of the municipality or region. There is concern regarding actual and potential conflict of interest between aquaculture, marine biodiversity and conservation. These are very real and hot issues. Today the coastal plans are mostly integrated with the municipal strategic spatial plan (kommuneplan) and reviewed and revised as a part of the regular (4 year) review period. The local authority decides on when to start the review and when to adopt the revised plan. When coastal plans were introduced by the Ministry of the Environment, they were developed as „sector plans". In order to make coastal zone planning "enforceable" they have become a part of the ordinary land use planning system and today the planning and building legislation enables local authorities to regulate the use of coastal sea space for alternative purposes.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Characteristics of land cover	Data Modelling	Land use designation can provide detailed quantified information on national potential for different activities incl. aquaculture, recreation and renewable energy.
Scope for wetlands enhancement	Water	CZM can provide designated areas for flood zones which improve resilience to climate change but also improve biodiversity.

Conclusion

The case study shows that bottom up preparation of land use policies for the coastal zone can be aggregated successfully to a national policy on land use in the coastal area. While Norway is much bigger than Ireland, the relative importance of the coastal area to national land use policy is somewhat similar given Ireland's island status. Even with different types of land use zoning categories in the different municipalities, a national patchwork of plans can still be extremely helpful.

References

- *Hvordan planlegges kystsonen?*, June 2017. nofima_planlegging_kystsonen.pdf (regjeringen.no)

15. National Forest Strategy

Country: UK (England)

Aspect: Forestry

Synopsis

The National Forest encompasses 200 square miles was conceived in 1987 to demonstrate the many benefits that trees and woodland can bestow. It is located in the heart of England.

Description

The National Forest encompasses 200 square miles of the heart of England. The idea is to create, within this setting, a vast new forested landscape for the nation, that frames a mosaic of farms, open land, towns and villages. From its original 6% woodland cover, the eventual wooded area will spread over about a third of the area, thereby establishing a substantial working forest and transforming the landscape, the environment and the economy of the Forest area. The National Forest was conceived in 1987 to demonstrate the many benefits that trees and woodland can bestow. It could

be genuinely multi-purpose – a new resource for recreation and tourism, creating rich new wildlife habitats, restoring damaged landscapes and offering an alternative, productive use of farmland. Following three years of research and consultation the strategy was published, to widespread acclaim in 1994. The National Forest is embedded in Government policy, is recognised as a national exemplar of sustainable development and is contributing to a wide range of UK sustainable development indicators. The National Forest is not a statutory designation but is recognised as an important consideration in statutory planning terms. The Forest is recognised in the England Forestry Strategy as a national exemplar of multi-purpose forestry. The theme will be continued of creating genuinely multipurpose woodlands which produce good quality timber, enhance the landscape, enrich biodiversity and create opportunities for recreation, access and community involvement. This recognises that not every use is suitable in every woodland, but all woods should have more than a single purpose.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Diversification of land use for farmers	Agriculture	New products, business models
Availability of suitable land for forestry	Forestry	Forest management plans

Conclusion

The case study illustrates the value of a demonstration project of national scale in an important area of land use change (afforestation). Based on the scale of a National Park, the project could enhance public understanding and appreciation of a change in the landscape that is likely to result in the Irish landscape as a result of increased tree planting in the future.

References

- *The National Forest – Strategy 2014-2024*
- www.nationalforest.org

Group Four – Optimal Land Use Options

This group of case studies focuses on the principle that a national land use policy should identify optimal land use for different parts of the country. It includes the following case studies:

- National Strategy
- Red and Green contours
- Resource Management Act
- National Policy Statements
- Land Use Strategy
- National Planning Framework
- Development Management Zones
- National Zones in Three Areas
- Structural Vision Map North Sea
- Strategic Plan for Environment and Development
- CO_2 atlas for carbon capture

Country	Agriculture	Biofuels	Carbon Capture	Green Infrastructure	Energy	Forestry	Landscape Protection	Sea	Coastal Area	Nature Protection	National Guidelines	National Spatial Policy	Rural Areas	Soil Management	Thematic Maps	Ecosystem Services	Legislation
NL								■				■					
NZ											■						■
UK							❍					❍					
DK																	❍
MA												■					
NO			❍														

■ **Strong integration**

❍ Weak integration

16. National Strategy

Country: Netherlands

Aspect: National Spatial Policy

Synopsis

The National Strategy on Spatial Planning and the Environment is the latest national spatial strategy for the Netherlands. The Strategy includes a map which includes the marine area also.

Description

The National Strategy on Spatial Planning and the Environment is the latest national spatial strategy for the Netherlands. The map shows schematic designations under the following categories:

- Water safety and room for water and rivers
- Nature, landscape and green Area
- Cyclic agriculture, fishery and marine culture
- Industry, logistics and business estates
- Energy networks
- Energy production
- Urban regions and accessibility

An additional map, called the map of the National Main Structure for the Living Environment features the structural elements at national level for which national government bears responsibility.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Land Use & Infrastructure	National Spatial Policy

Conclusion

This latest version of national spatial planning in the Netherlands shows a strong move towards climate mitigation and adaptation measures given the emphasis on: capacity for rivers to flood, nature and landscape, and energy networks and production. Like previous Dutch national strategies, the inclusion of a map adds to its usefulness in guiding planning policy at lower levels in the planning hierarchy emphasising the key issues of national importance that must be included in regional and local planning policies. The inclusion of the marine area in the national strategy is worthy of consideration.

References

- Draft National Strategy on Spatial Planning and the Environment, Dutch Government, 2020. https://novistukken.nl/english/default.aspx

17. Red and Green Contours

Country: Netherlands

Aspect: National Spatial Policy

Synopsis

The *Red and Green Contours* case study for the *Netherlands* is an example of defining areas earmarked for urban development and areas to be protected for nature conservation. The adoption of strict boundaries at national level while allowing policies for areas in between to be decided at local level, is an example of national land use planning.

Description

The fifth report on spatial planning was proposed in 2001. In it the Government would designate the main areas for urban development. This report introduced an approach of defining so-called red and green contours. Housing and employment land uses would need to be concentrated within the areas defined by red contours while the green contours would define areas to be kept open and reserved for nature. While the fifth report was never adopted by the Government, the methodology of defining red and green contours on land use maps, was followed at municipal and provincial levels. By protecting nature within the green contours on the provincial maps, a link was made to the National Nature Network (see separate case study). The actual location of the contours in this methodology is defined in local development plans. What is determined at national level is the principle. An interesting aspect of the approach is that the areas outside the red contours and also outside green contours, would be considered suitable for activities that are often difficult to accommodate within the built up area, such as: campsites, extractive industry, recreation areas, petrol stations etc.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Land Use & Infrastructure	National Spatial Policy

Conclusion

The red and green contour methodology is attractive because of its easy to grasp concept and clarity on maps. While the approach does not dictate the actual land use in an area, it does define a broadbrush land use pattern by distinguishing between three zones at national level: urban development (people and jobs), nature and an intermediate zone which can accommodate a wide range of land uses but excluding housing and employment in order to minimise urban sprawl and minimise commuting travel distances.

References

- *Dutch Land-use Planning: The Principles and the Practice*, Barrie Needham, 2014

18. Resource Management Act

Country: New Zealand

Aspect: Legislation

Synopsis

Although the efficacy of the *Resource Management Act* of *New Zealand* has been criticised it is significant for this study because it approached planning from a comprehensive 'environmental resource' perspective and integrated the sustainable management of natural and physical resources such as land, air and water and focused on these resources and their sustainable management.

Description

New Zealand is an island nation with a population of just over five million and a land area of 268,000 square kilometres. About a third of its population lives in or near Auckland, its economically dominant urban centre. Some of these characteristics are comparable to Ireland. The country's spatial and environmental objectives are implemented through the Resource Management Act 1991 (RMA). Its functions are administered primarily through local government. The RMA revolutionised land use planning and environmental management in New Zealand. It was a product of rising environmental awareness in New Zealand and abroad, and recognised the need to integrate an array of separate legislation addressing land use, water, air and soil, among other things. It is therefore an example of an integrated piece of legislation that deals with planning of land use as well as environmental impacts of development, two areas that have not been integrated in most planning systems. (A similar merging of legislation resulting in a 'one stop shop' for permits, is currently being introduced in the Netherlands as a major overhaul of its planning system.) The purpose of the RMA set the ambitious objective of sustainable management of natural and physical resources. Reviews of the legislation have concluded that it suffered from a lack of clarity about how it should be applied with insufficient provision of national direction and general lack of clear environmental limits in local plans. It also failed to provide for sufficient housing development and outcomes on matters such as freshwater quality and biological diversity were disappointing.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Legislation	Land use policy instruments that is based on the limitations of available resources.

Conclusion

The inclusion of this legislation as a case example is not meant for adoption of the legislative approach, but rather to recognise the approach that was taken when the Act was developed. The approach was one of essentially 'supply based planning' (resources and environmental limits dictate where development can take place) instead of traditional 'demand based planning' which

is essentially predicting land use needs to accommodate social and economic developments in the future. In that sense the case study is highly relevant as it presents a possible way of approaching a national land use policy for Ireland, i.e. by defining resources and how these can best be managed.

References

Resource Management Act, 1991.

19. National Policy Statements

Country: New Zealand

Aspect: National Policy Statements

Synopsis

Adopting *National Policy Statements* that relate to land use is based on the Resource Management Act in *New Zealand* where such statements provide national direction on how local councils must implement the objectives of the Act.

Description

The Resource Management Act provides for the adoption of National Policy Statements (NPS's) which provide national direction on how regional and territorial councils must implement the objectives of the RMA. Such NPSs, in particular where these relate to land use are therefore of interest for the present study. While the rate of promulgation of these National Policy Statements has been slow (the first NPS was not introduced until 2008, seventeen years after the RMA came into force), their introduction has increased in recent years driven by concerns that local government was unable to effect satisfactory environmental outcomes. The latest proposed NPSs on Productive Land and Indigenous Biodiversity are considered here.

The proposed NPS on Highly Productive Land is of interest because it addresses the concerns that agricultural production land (often of high quality for agricultural production) in the vicinity of urban areas is either lost to agricultural production as a result of urban expansion, or hampered in its optimal production value as a result of urban fringe problems (such as trespass or fragmentation) or because of hope of higher land values for future rezoning. This can result in the paradox that poorer quality agricultural land is used in favour of the best agricultural land because of its proximity near urban centres. The proposed NPS would require local authorities to identify highly productive land based on a set of defined criteria (soil capability, climate, water availability, size etc). A key focus of the NPS is to protect highly productive land from "inappropriate" use and development.

In a similar way the proposed NPS on Indigenous Biodiversity is also an example of national land use policy because it requires (amongst other things) local authorities to: classify areas of significant indigenous vegetation and/or significant habitat of indigenous fauna as either High or Medium. The fact that local authority must do this by using consistent application of criteria that are listed in the NPS in an appendix is an interesting aspect of the case study.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Land Use & Infrastructure	National Spatial Policy

Conclusion

The case study illustrates how through the use of national guidelines or directives, land use policy can be formulated or at least influenced, at national level even if their implementation is ultimately determined by statutory local plans. The illustrations of the case study of the use of consistent criteria in classifying land and the recognition that good quality agricultural land should be protected, can be seen as possible elements in a national land use policy for Ireland.

References

- *Valuing highly productive land: a summary, A summary of the proposed national policy statement for highly productive land*, New Zealand Government, 2019
- *Draft National Policy Statement for Indigenous Biodiversity*, Ministry for the Environment New Zealand, 2019.

20. Land Use Strategy

Country: UK – Scotland

Aspect: Landscape Protection

Synopsis

In the example of the *Land Use Strategy* in *Scotland* land use is considered in an integrated way by taking a landscape, rather than sectoral, approach to setting out policies and initiatives that contribute to overarching land use objectives.

Description

While the Scottish Land Use Strategy is not a strategy for landscape protection per se, by adopting the landscapes of the country as a way to approach policymaking, it does put the landscape central. The current 'Land Use Strategy 2021-2026' is the third of its kind. Previous strategies date from 2011 and 2016. The strategy presents a series of illustrative landscapes to represent different types of land in Scotland. This approach seeks to achieve a holistic rather than sectoral approach to setting out policies and initiatives that contribute to three overarching land use objectives. The approach adopts seven illustrative landscapes and is based on the principle to achieve an optimal balance between different land use priorities (ranging between agriculture, biodiversity, ecosystem services etc.) in a landscape. The seven illustrative landscapes are:

- *Settlements* – cities, towns, villages and hamlets.
- *Enclosed Farmland* – arable fields producing the high-quality produce such as cereals, fruits and vegetables
- *Semi-natural land* – mixed farmland, forests, hills, mountains and moors.
- *Rivers and water bodies* – rivers, wetlands and lochs.
- *Coastal* – rugged cliffs to pearly sand beaches.
- *Islands* – outstanding natural resources, from unique ecosystems to powerful winds and tides.
- *Marine* – offshore marine environment.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Characteristics of land cover	Data Modelling	Landscape as a framework for policy proposals.
Optimal Land Use Options	Land Use & Infrastructure	Landscape as a framework for policy proposals.

Conclusion

Although the policy is called a land use strategy, it does not contain any maps indicating different types of land use. However, it does act as an umbrella policy document which links different national policies together in an integrated framework with an accessible concept of the different landscapes in the country. As such, it presents an attractive framework to link a wide range of policies for both urban and rural areas in a single written statement document.

References

- *Scotland's Third Land Use Strategy 2021-2026*, March 2021.

21. National Planning Framework

Country: UK – Scotland

Aspect: National Spatial Policy

Synopsis

This policy document incorporates a National Spatial Strategy comprising five geographic action areas. The maps included in the (consultation) document set out strategic locations for elements of the strategy in a schematic but highly illustrative way.

Description

The fourth national planning framework incorporates a National Spatial Strategy as Part 1. The strategy is captured in a schematic map which includes elements such as: the main cities, major ports, transmission infrastructure, strategic routes, as well as maritime routes and an indication of the marine area significance for the 'blue economy'. Divided between: liveable places, productive places and distinctive places, it lists a number of strategic elements of the strategy.

Part 2 of the planning framework lists so-called 'National Developments' defined as significant developments of national importance that will help to deliver the spatial strategy. These national developments are listed under the three categories of 'places' and include: (liveable places) the Central Scotland Green Network, the national walking and cycling network, urban transit networks for the three main cities, circular economy material management facilities, digital fibre network, (productive places) pumped hydro storage, renewable electricity (generation and transmission) infrastructure, high speed rail connection and (distinctive places): Edinburgh Waterfront, Stranrear Gateway Aberdeen Harbour. These national developments are shown on a single map.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Land Use & Infrastructure	Identification of strategic elements of national importance on a map.

Conclusions

While the case study shows many similarities with the National Planning Framework for Ireland, it is different in that it is spatially and strategically explicit. This is demonstrated by listing national strategic infrastructure projects (e.g. high speed rail, location for pumped hydro storage, power station) that are sensitive to Nimby type objection campaigns if proposed at local level. The spatial identification of some of these strategic elements is innovative and has not been used in Ireland to date. The case study is therefore highly relevant and can be adopted in a revision of the NPF or can be incorporated in a National Land Use Policy.

References

- *Scotland 2045 – Our Fourth National Planning Framework (Draft)*, Scottish Government 2021.

22. Development Management Zones

Country: UK – England

Aspect: National Spatial Policy

Synopsis

The proposals to change the planning system in England would include a designation of land in three zones at national level with development management centralised to a large extent.

Description

'Planning for the Future' is a White Paper suggesting an overhaul of the planning system in England. The Paper was published for public consultation in August 2020. Amongst the proposals in the White Paper is a suggestion to divide the country into three areas in terms of the treatment of planning applications for development. Simplified Local Plans would place land in three categories – growth areas "suitable for substantial development", renewal areas "suitable for some development" and protected areas. General development management policies would be set nationally, with Local Plans containing "clear rules" with design codes and site- and area-specific requirements. *Growth areas* (suitable for substantial development) would automatically be granted outline planning permission for the principle of development, while automatic approvals would also be available for pre-established development types in other areas suitable for building. In areas suitable for development (*Renewal areas*), there would be a general presumption in favour of development established in legislation. In areas where development is restricted (*Protected areas*) any development proposals would come forward as now through planning applications being made to the local authority (except where they are subject to permitted development rights or development orders), and judged against policies set out in the National Planning Policy Framework.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Legislation	National Spatial Policy

Conclusion

The idea to designate different areas of a country or region in terms of planning policy, can be found in a number of countries (e.g. Denmark). However, the idea that is proposed here is different in that for certain parts of the country the discretion traditionally found in development control or development management, is removed and as a result a more 'plan led' system is created where the principle of development is established at national level, while for other parts of the country the traditional form of granting planning permissions would continue to exit. Such a system would have implications for a national land use policy.

References

Planning for the Future: Planning policy changes in England in 2020 and future reforms, Commons Library Research Briefing, February 2022.

23. National Zones in Three Areas

Country: Denmark

Aspect: Legislation

Synopsis

The *National Zones in Three Areas* in *Denmark* is an example of a long established policy to divide the country at national level in different zones for (i) urban development; (ii) summer house areas; and (iii) rural zones.

Description

In the national Planning Act Denmark is divided into three zones: urban zones; summer house areas; and rural zones. The purpose of this division is to prevent sparsely placed buildings and facilities in the open country and to secure urban development where this is intended and planned for. Different possibilities for development are connected to the specific zoning. In rural zones a permit is required to erect new buildings or change the use of existing buildings. Summer house areas are laid out in a local plan and there are national restrictions regarding permanent habitation and the rights of foreigners to purchase summer houses in these areas. In urban zones the landowner has a right to erect buildings etc. in accordance with a local development plan. However, the municipality can issue a prohibition notice to obstruct such development and must then within a year propose a new local development plan. Change of zone classification from a rural zone to either an urban zone or a summer house area is regulated in the municipal plan and in the local development plans.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Legislation	National Spatial Policy

Conclusion

The attraction of this example is its simplicity. A national policy to distinguish between a small number of zones can help to categorise certain types of land uses in each of the three or four zones. For example, housing is normally permitted in the urban zone but only under certain conditions in the rural zone. The case study shows that the approach does not need to be exclusively 'top down'; while the subdivision of the country into the three zones is determined at national level, municipalities can inititate a change in the boundaries.

References

https://www.dlapiper.com/da/global/insights/publications/2019/12/planning-and-environment-journal-1/denmark/ accessed 8/12/21.

24. Structural Vision Map North Sea

Country: Netherlands

Aspect: Marine

Synopsis

The *Structural Vision Map North Sea* is an early example in the *Netherlands* of marine spatial planning. The policy for the North Sea as one of the most intensively used marine areas is a clear example of land use planning in the marine area. It includes policies on topics such as: off-shore wind, nature and aquaculture. It has produced detailed spatial policy maps.

Description

The structural vision map offers an overview of all spatial and planning functions on the North Sea in the policy period 2022-2027. It forms part of the North Sea Programme (NSP) which forms the structural vision for the North Sea as referred to in the Spatial Planning Act. It includes designated Natura 2000 sites of ecological value for which management plans must be prepared. It also includes designated wind farm zones as well as search areas for the challenge of further developing offshore wind energy beyond 2030. The strategy makes clear how many claims there are and how conflicts between the various activities must be recognised and considered. The increase in various activities on the North Sea and the claims on physical space are only permissible if the ecosystem of the North Sea can cope with them. The further development of offshore wind energy will result in a reduction of fishable acreage. Other forms of food provision at sea are mariculture and aquaculture. Shared use of the space in wind farms could create possibilities for this. Maritime traffic on the North Sea is both varied and intensive. The increasing intensity of maritime traffic necessitates international agreements on ships' routeing. These routes are essential to guaranteeing the accessibility and the competitive position of the Dutch sea ports. The map also designates sand extraction areas, preferred routes for cables and pipelines and shipping anchorage areas.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Land Use & Infrastructure Legislation	Marine Spatial Planning

Conclusion

The case study makes clear the interaction and mutual dependency between land use activities and off shore activities in the North Sea. Examples are the balance between on shore and off shore wind energy (off shore makes it easier to achieve the national targets), the impact on fishing of increased off shore wind energy areas, the need to protect access to the main ports, and the sea as a potential source of construction material in the form of sand extraction. In the Irish context the emerging marine spatial planning initiatives should be closely coordinated with any national land use policy or strategy. The case study can be used as valuable reference material.

References

- *Draft North Sea Programme 2022-2027*, Government of The Netherlands, 2021.

25. Strategic Plan for Environment and Development

Country: Malta

Aspect: National Spatial Policy

Synopsis

The *Strategic Plan for Environment and Development* for *Malta* is one of the rare examples of a zoning strategy for the entire country albeit a small country.

Description

The Strategic Plan for Environment and Development (SPED) makes proposals for the future spatial distribution of development and the protection of the environment on land and sea. Uniquely, the plan makes distinction between five zones, two of which are sea based (urban zone, rural zone, coastal zone (up to 12 nautical miles), marine area (between 12 and 25 nautical miles) plus the second island Gozo. A single land use zoning map identifies the following elements:

- Principal Urban Area as a zoned area on the map
- Hierarchy of settlements (regional and small)
- Infrastructure projects (power stations, electricity interconnector, sewage treatment plants, waste management plants)

- Key employment locations (business and enterprise hubs)
- Social and Community Facility Priority Areas
- Sports complexes, recreation areas
- Country parks
- Strategic road network plus park and ride locations
- Areas of Landscape Protection and High Landscape Protection
- Strategic Open Gap to be maintained
- Airport
- Distinction in predominantly urban and predominantly rural coastal zone
- Industry freeport, fishing harbours.

A separate map shows strategic objectives for the marine based zones which include in addition to maritime uses and environmental objectives also existing infrastructure in designated areas: spoil ground, approach routes, aquaculture sites, dive sites and swimming zones.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Land Use & Infrastructure	National Spatial Policy

Conclusion

This plan is interesting because it is an example of effectively a zoning map for a country. Even compared to zoning maps for county development plans, this map shows much more detail in terms of the range of land uses. A second interesting feature is the fact that the planning for the marine area is integrated in the national spatial policy. This may be relevant for a national land use policy for Ireland given the often close linkage between sea based activities and those on the shore.

References:

- *Strategic Plan for Environment and Development*, July 2015. Planning Authority (pa.org.mt)

26. CO_2 Atlas for Carbon Capture

Country: Norway

Aspect: Carbon Capture

Synopsis

The *CO_2 Atlas for Carbon Capture* in *Norway* is an example of a systematic analysis tool that was developed to estimate and define the potential locations for carbon storage and quantifying the available capacity in such storage areas.

Description

Capture and storage of CO_2 in geological formations emerges as an important potential measure to reduce global emissions. The Norwegian government places great emphasis on Carbon Capture and Storage (CCS) as a measure to reduce CO_2 emissions. The government has set ambitious goals for

achieving CO_2 capture at gas fired power plants and for establishing a chain for transport and injection of CO_2. There is significant technical potential for storing CO_2 in geological formations around the world. Producing oil and gas fields, abandoned oil and gas fields and other formations such as saline aquifers are all candidates for such storage. Storage in reservoirs that are no longer in operation is a good solution in terms of geology because these structures are likely to be impermeable after having held oil and gas for millions of years. Other formations are also considered to be secure storage alternatives for CO_2.

The CO_2 Storage Atlas of the Norwegian part of the North Sea has been prepared by the Norwegian Petroleum Directorate, on request by the Ministry of Petroleum and Energy. This is a very recent development. It is quite controversial with regard to e.g.: the costs of capturing, transport and reinjection but also with the environmental lobby as the question is raised whether carbon capture and injection is a means of legitimising continued or even increased production and consumption of carbon fuels.

One of the key objectives for this atlas is to provide input on where it is possible to implement safe long-term storage of CO_2, and how much capacity there is for geological storage of CO_2. The Atlas seeks to assess capacity for storage in depleted oil and gas fields and underground aquifers. Aquifers were evaluated with regard to reservoir quality and presence of relevant sealing formations. The methodology used is based on a 'stepwise approximation' that is described in the form of a 'maturation pyramid' based on four steps:

- Step 1 – screening phase that identifies possible aquifers suitable for storage of CO_2
- Step 2 – storage volume of prospects of reasonable size and quality is calculated
- Step 3 – revised calculation of storage volume taking into account technical and regulator aspects
- Step 4 – injection of CO_2 in the reservoir.

The atlas shows that it is possible to store more than 80 billion tonnes of carbon dioxide.

Relevance for National Land Use Policy

Purpose	Sector	Policy Example
Optimal Land Use Options	Greenhouse Gas Reduction	Carbon Capture can reduce CO_2 emissions

Conclusion

While most likely carbon capture in Ireland would be off-shore in depleted gas fields, it would come under marine spatial planning and also have a land use policy element in terms of necessary land based infrastructure (e.g. corridors for pipelines). The case study illustrates the benefit of a systematic search and protection of suitable sites even if in the short to medium term actual storage is unlikely.

References

- *Norwegian CO_2 Storage Atlas Norwegian North Sea*, Norwegian Petroleum Directorate.
- Carbon storage – The Norwegian Petroleum Directorate (npd.no) accessed 12/12/21.

Appendix B – Questionnaire Survey of ECTP-CEU Member Associations

ECTP-CEU (European Council of Spatial Planners – Conseil Européen des Urbanistes) brings together 28 professional spatial planning assocations and institutes from 24 European countries. The countries that are included in the survey are:

Austria, Belgium, Croatia, Cyprus, Czechia, Estonia, France, Germany, Greece, Hungary, Italy, Malta, Norway, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, UK.

Please answer all of the questions. Please only say YES if the policy has a SPATIAL component.

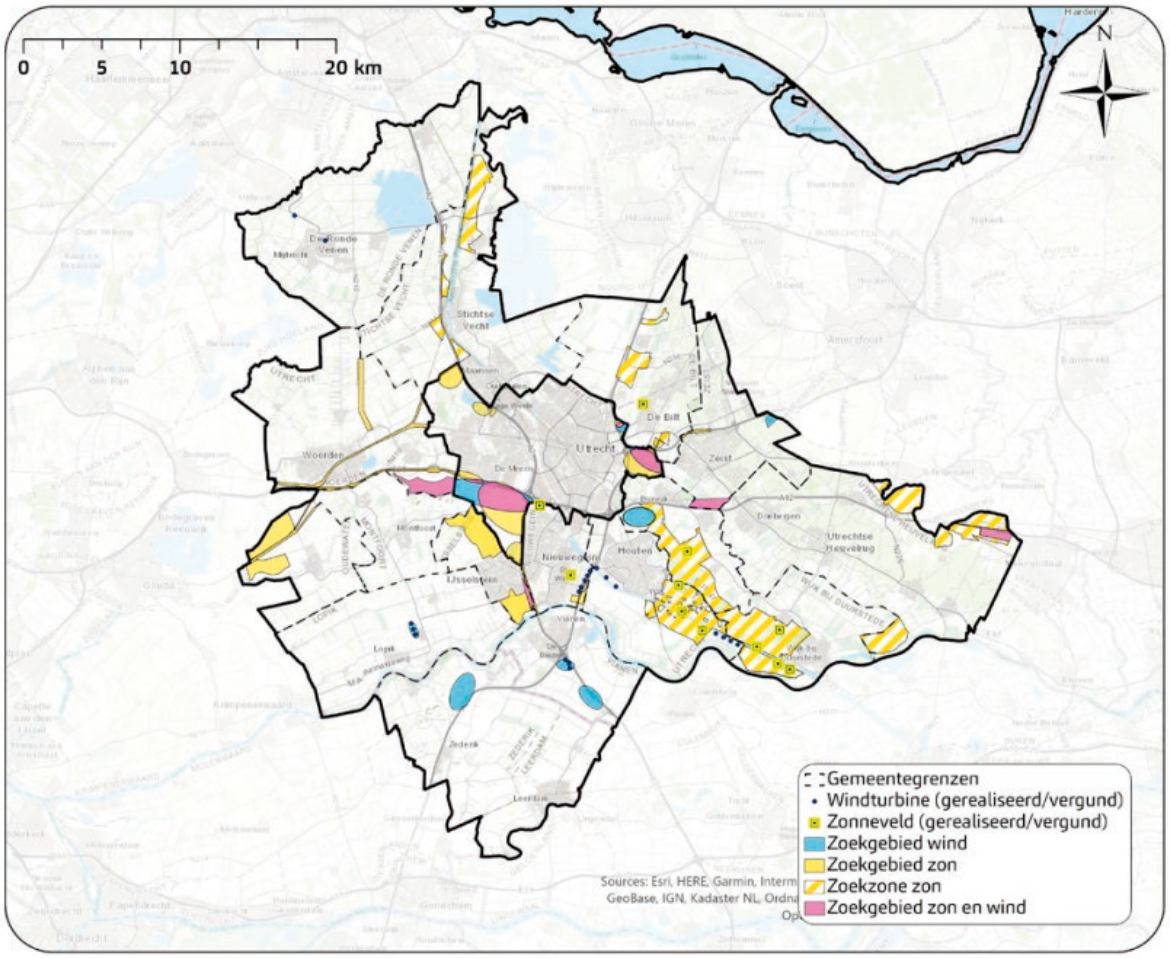
Does your country have examples of the following national land use policies:	For example...	Yes/ No	If yes, please provide brief note or website link
A policy for *Agriculture*.	An example would be a policy for protection of agricultural land from other uses.		
A policy for *Biofuels* incl. Biogas.	An example would be national targets for certain types of biofuels like manure or short rotation crops or a policy to replace natural gas in the grid network by biogas.		
A policy for *Carbon Capture* or Carbon Storage.	An example would be a policy that sets targets at national or regional level for carbon storage or a policy that identifies locations for carbon storage.		
A policy for *Green Infrastructure*.	An example would be a (national) ecological network to protect biodiversity.		
A policy for (renewable) *Energy* (networks or sources).	An example would be a policy stating the amount of wind energy or solar energy to be realised over a certain period.		

Does your country have examples of the following national land use policies:	For example...	Yes/ No	If yes, please provide brief note or website link
A policy for *Forestry*.	An example would be targets for tree planting or nature protection in forests.		
A policy for *Landscape Protection*.	An example would be a policy on recognising valuable landscapes that need protection.		
A policy for the *Sea* (marine spatial planning)	An example would be a marine spatial plan for off shore wind parks.		
A policy for the *Coastal Area*.	An example would be a Coastal Zone Management plan.		
A policy for *Nature Protection*.	An example would be a policy on National Parks.		
National Planning Policy Statements or Guidelines.	An example would be a national planning guideline on wind farms.		
A *National Spatial Policy*.	An example would be the zoning of different parts of the country for different purposes.		
A policy for *Rural Areas*.	An example would be a policy for village protection.		
A policy for *Soil Management*.	An example would be restrictions for intensive farming on certain types of soil.		
A policy on *Thematic Maps*.	An example of a thematic map would be: areas suitable for wind energy or areas with different landscape values.		

Does your country have examples of the following national land use policies:	For example...	Yes/ No	If yes, please provide brief note or website link
A policy on *Ecosystem Services*.	An example would be the Mapping and Assessment of Ecosystems and their Services (MAES)		
National policy in the form of *Legislation* (other than Natura 2000 sites).	An example would be legislation to implement the EU Directive on the geological storage of CO_2.		
Any other example of National Land Use Policy (please fill in)			

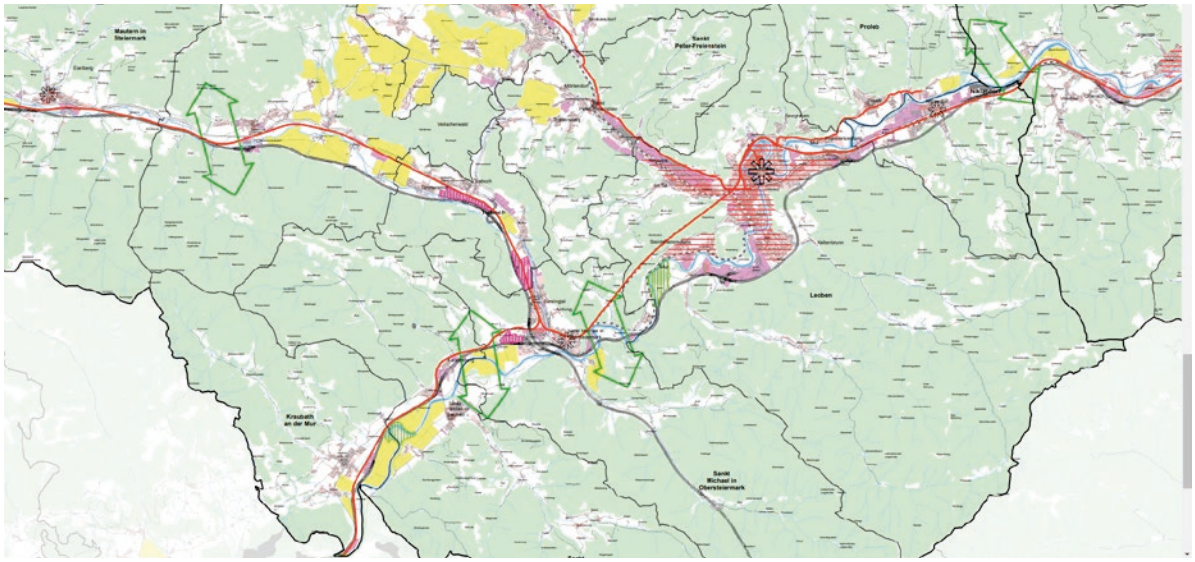
Appendix C – Some Illustrations from Case Studies

Figure 1: Province of Utrecht, Netherlands. Blue indicates search areas for wind, yellow for solar and pink for wind and solar combined. (case study 1: Regional Energy Strategies)



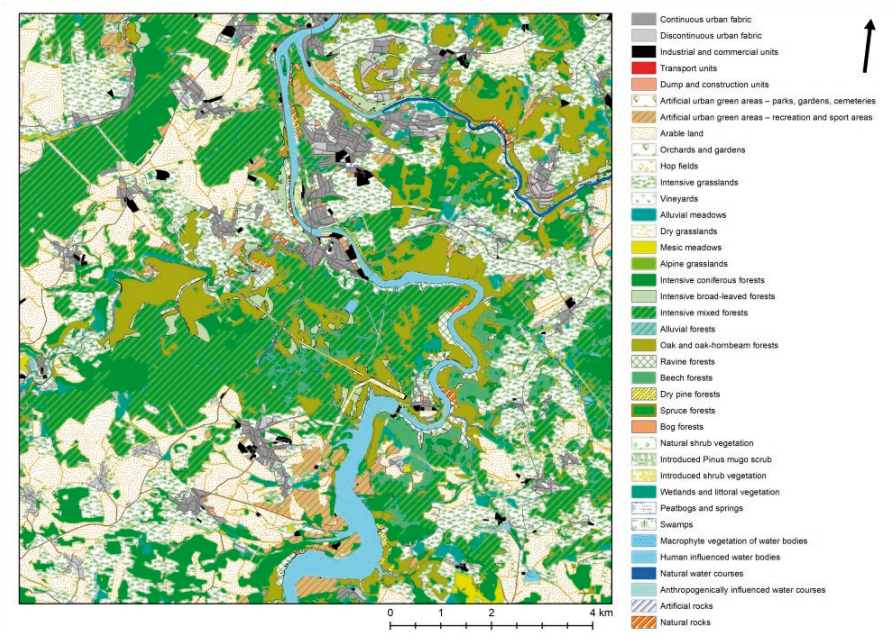
Source: www.regionale-energiestrategie.nl/default.aspx

Figure 2: Regional Plan Obersteiermark, Austria. Yellow indicates a priority zone for agriculture. (case study 3: River Corridor Zoning)



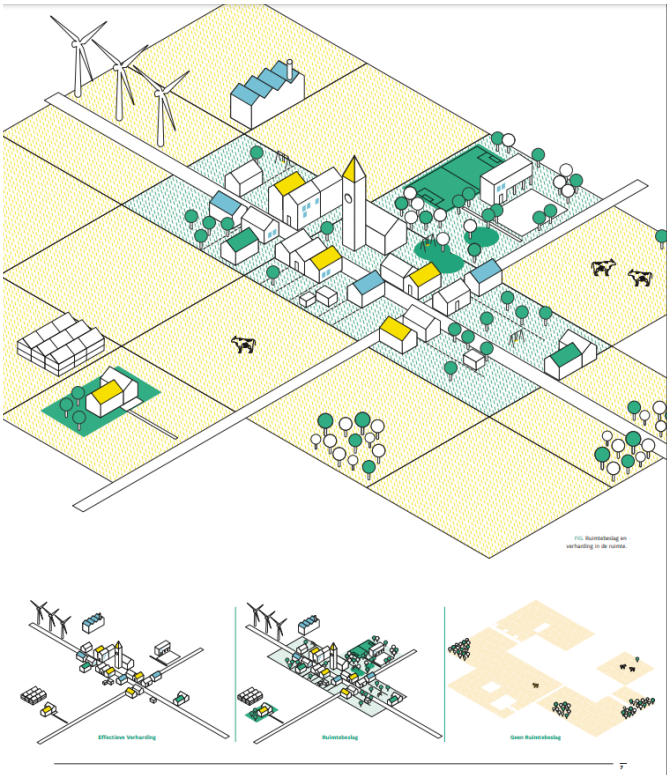
Source: www.landesentwicklung.steiermark.at

Figure 3: Consolidated Layer of Ecosystems (case study 9: Territorial Systems of Ecological Stability).



Source: http://www.ecosystemservices.cz/en/

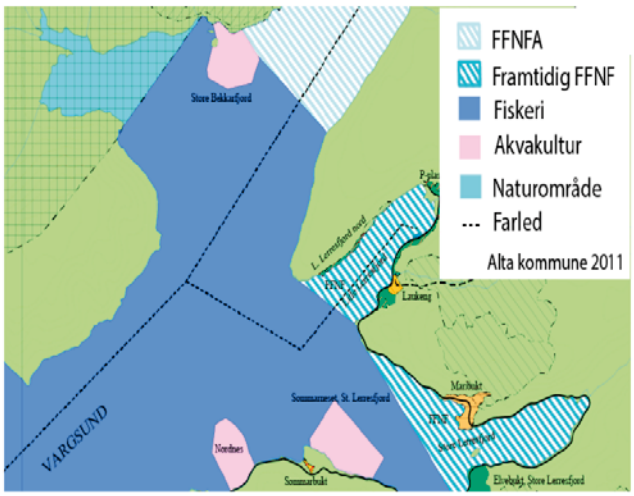
Figure 4: From left to right: soil sealing, settlement area, open area. (Case study 11: Statistics)



Source: Ruimterapport 2021 – Departement Omgeving (vlaanderen.be)

Figure 5: Municipal coastal zone plans. (Case study 14: Coastal Zone Policy).

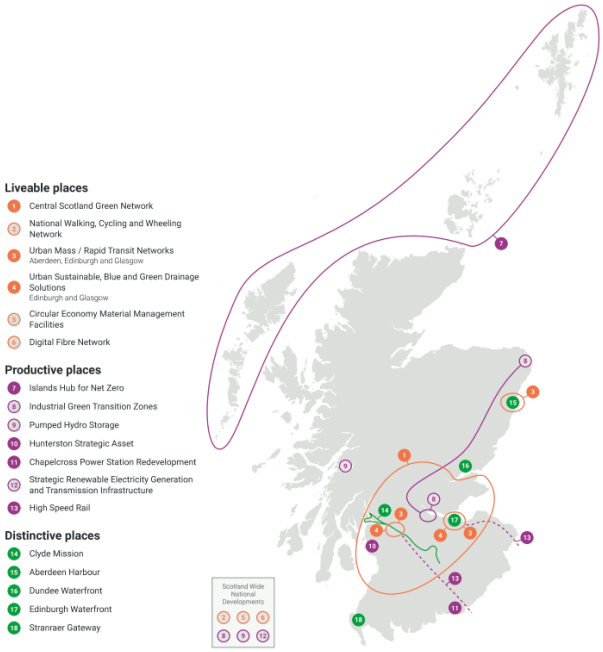
arealplan for sjøområdene. I planbestemmelsene heter det at: "*Hele anlegget, inkludert fortøyninger, fôrflåter og boliger på sjø skal ligge innenfor områder avsatt til akvakultur*". Sett fra oppdretternes side, er denne løsningen lite fleksibel. A-områdene er tegnet opp slik anleggene lå i 2009, og det vil ikke være mulig å endre posisjonen til anlegget, for eksempel dreie anleggene dersom man i ettertid tar nye strømmålinger som viser at anleggene egentlig ikke ligger optimalt plassert, med mindre man søker om dispensasjon fra arealplanen.



Figur 4.1 Utsnitt av Alta kommunes arealplan. Fiskeområder vises i mørk blå, mens skraverte blå områder er fellesområder uten akvakultur. Akvakulturområder (rosa) er satt av som énbruksområder.

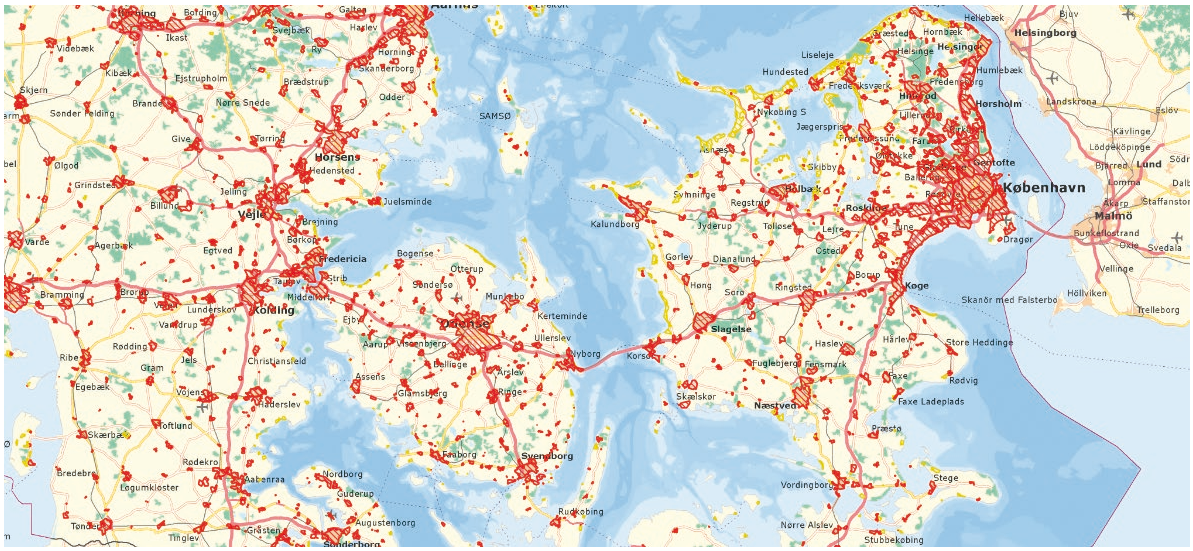
Source: nofima_planlegging_kystsonen.pdf (regjeringen.no)

Figure 6: Mapping of National Developments. (Case study 21: National Planning Framework)



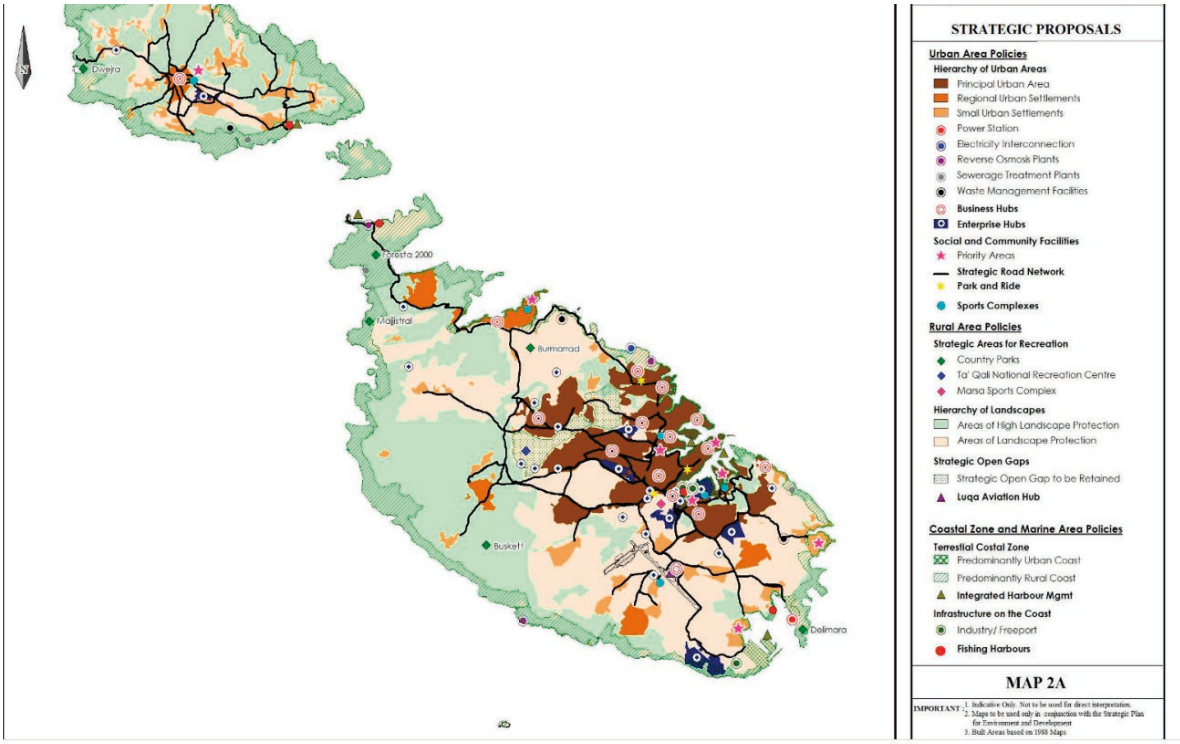
Source: *Scotland 2045 – Our Fourth National Planning Framework (Draft)*, Scottish Government 2021.

Figure 7: Urban zones (red) and summer house areas (yellow). The remaining areas are rural zones. (Case study 23: National Zones in Three Areas).



Source: https://www.dlapiper.com/da/global/insights/publications/2019/12/planning-and-environment-journal-1/denmark/

Figure 8: Malta National Plan (Case study 25: Strategic Plan for Environment and Development).



Source: Planning Authority (pa.org.mt)

Appendix D – Questionnaire Responses

Questionnaire Research of National Land Use Policies

Please answer all of the questions. Please only say YES if the policy has a SPATIAL component.

Does your country have examples of the following national land use policies:

A policy for *Agriculture*.

Country	If yes, please provide brief note or website link
Austria	https://www.landesentwicklung.steiermark.at/cms/beitrag/12644878/141975702/
Czechia	Strategy of Ministry of Agriculture of the Czech Republic https://eagri.cz/public/web/mze/ministerstvo-zemedelstvi/koncepce-a-strategie/strategie-resortu-ministerstva-1.html Act 334/1992 Coll. about agricultural land protection + Czech Rural Development Programme
France	https://agence-cohesion-territoires.gouv.fr/agenda-rural-46
Malta	National Agricultural Policy (https://agrikoltura.gov.mt/en/agric/Pages/nationalAgriPolicy.aspx)
Norway	Soil conservation – regjeringen.no
Portugal	https://www.dgadr.gov.pt/
Spain	https://www.mapa.gob.es/es/pac/post-2020/sfc2021-pepac-enviado-29-12-2021_tcm30-585202.pdf On December 29, 2021, the proposal for the Strategic Plan of the Spanish Common Agricultural Policy was sent to the European Commission.
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/
UK General	https://www.gov.uk/government/news/government-unveils-path-to-sustainable-farming-from-2021
Italy	https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11259

A policy for *Biofuels* incl. Biogas.

Country	If yes, please provide brief note or website link
Austria	https://www.klimaaktiv.at/dam/jcr:7aaf03ec-7de7-4e88-a94e-a7c12c1bc190/2014%2009%20leitfaden%20biogas%20FNR.PDF
Czechia	https://www.mpo.cz/en/energy/state-energy-policy/state-energy-policy--233258/
France	https://www.ecologie.gouv.fr/biogaz
Malta	https://mtip.gov.mt/en/Documents/NPF%20Malta.pdf https://mra.mt/lifecycle-ghg-emissions/
Norway	
Portugal	https://www.lneg.pt/wp-content/uploads/2021/05/Relatorio-de-Sustentabilidade-dos-biocombustiveis-Portugal-2020.pdf https://www.ense-epe.pt/news/novas-metas-de-incorporacao-de-biocombustiveis/
Spain	The Ministry for the Ecological Transition and the Demographic Challenge (MITECO) has published the proposed Biogas Roadmap, with 43 lines of action to multiply by 3.8 the sustainable production of this gas from renewable sources until 2030.
UK Scotland	https://www.gov.scot/policies/renewable-and-low-carbon-energy/bioenergy-action-plan/
UK General	https://www.gov.uk/guidance/industrial-energy-and-non-food-crops-business-opportunities-for-farmers#full-publication-update-history
Italy	https://www.mise.gov.it/index.php/it/198-notizie-stampa/2040668-pniec2030

A policy for *Carbon Capture* or Carbon Storage.

Country	If yes, please provide brief note or website link
Austria	
Czechia	
France	
Malta	
Norway	Sub sea carbon storage: white paper: Meld. St. 29 (2020-2021) – regjeringen.no
Portugal	
Spain	Law 40/2010, of December 29, on geological storage of carbon dioxide https://www.boe.es/buscar/pdf/2010/BOE-A-2010-20049-consolidado.pdf
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/
UK General	https://www.gov.uk/guidance/uk-carbon-capture-and-storage-government-funding-and-support
Italy	

A policy for *Green Infrastructure*.

Country	If yes, please provide brief note or website link
Austria	
Czechia	So called Territorial system of ecological stability https://www.interreg-central.eu/Content.Node/TSES-as-Regional-Example-for-GI-Planning-in-CZ-SKOKANOV-.pdf
France	http://www.trameverteetbleue.fr/entree-geographique
Malta	https://era.org.mt/investing-in-the-multi-functionality-of-green-infrastructure-gi-an-information-document-to-support-gi-thinking-in-malta/ Malta National Biodiversity Strategy & Action Plan (https://era.org.mt/maltas-national-biodiversity-strategy-action-plan-2012-2020/)
Norway	Legislation: natural / biological diversity: Lov om forvaltning av naturens mangfold (naturmangfoldloven) – Lovdata further information: Nature Diversity Act – regjeringen.no
Portugal	https://www.igamaot.gov.pt/reserva-ecologica-nacional-ren/
Spain	National Strategy for Green Infrastructure and Ecological Connectivity and Restoration https://www.miteco.gob.es/es/biodiversidad/temas/ecosistemas-y-conectividad/infraestructura-verde/Infr_verde.aspx
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/
UK General	https://www.gov.uk/guidance/natural-environment
Italy	https://www.mite.gov.it/pagina/strategia-nazionale-la-biodiversita-al-2030 Natura 2000 Italia, https://www.mite.gov.it/pagina/sic-zsc-e-zps-italia

A policy for (renewable) *Energy* (networks or sources).

Country	If yes, please provide brief note or website link
Austria	https://www.landesentwicklung.steiermark.at/cms/beitrag/12755541/154267170/
Czechia	State Energy Policy https://www.mpo.cz/en/energy/state-energy-policy/state-energy-policy--233258/
France	https://www.ecologie.gouv.fr/dispositifs-soutien-aux-energies-renouvelables
Malta	National Renewable Energy Action Plan (https://drive.google.com/file/d/18afxVA-V6YmrNrF0yus6Xv-rmHuTnLCM/view) Solar Farms Policy (supplementary planning policy – https://www.pa.org.mt/en/supplementary-guidance-details/solar-farm-policy)
Norway	Information on government. Policy: Renewable Energy – regjeringen.no
Portugal	https://www.dgeg.gov.pt/pt/areas-setoriais/energia/energias-renovaveis-e-sustentabilidade/energia-eolica/ https://www.dgeg.gov.pt/pt/areas-transversais/relacoes-internacionais/politica-energetica/
Spain	Integrated National Energy and Climate Plan 2021-2030 (PNIEC) https://www.boe.es/boe/dias/2021/03/31/pdfs/BOE-A-2021-5106.pdf
UK Scotland	https://www.sepa.org.uk/media/162922/lups-bp-gu2c-iii-land-use-planning-background-paper-on-renewable-energy.pdf
UK General	NPPF : renewal energy schemes allowed in the Green Belt.
Italy	Piano Energia e Clima (PNIEC) https://www.mise.gov.it/index.php/it/198-notizie-stampa/2040668-pniec2030

A policy for *Forestry*.

Country	If yes, please provide brief note or website link
Austria	https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10010371
Czechia	Strategy of development of the Czech forestry (state land only) https://lesycr.cz/tiskova-zprava/lesy-ceske-republiky-zverejnily-strategii-rozvoje/
France	https://www.onf.fr/onf/lonf-agit/+/5bb::planter-les-forets-de-demain-un-defi-face-au-rechauffement-climatique.html https://www.ecologie.gouv.fr/forets-francaises-et-changement-climatique
Malta	https://environment.gov.mt/en/Documents/Downloads/afforestationRestorationEcologyCassar.pdf
Norway	Information on government. policy: Forestry – regjeringen.no Legislation: Lov om skogbruk (skogbrukslova) – Lovdata
Spain	The Spanish Forest Plan (2002-2032). https://www.miteco.gob.es/es/biodiversidad/temas/politica-forestal/planificacion-forestal/politica-forestal-en-espana/pfe_plan_forestal_esp.aspx
UK Scotland	https://forestry.gov.scot/publications/forestry-strategy
UK General	https://consult.defra.gov.uk/forestry/england-tree-strategy/supporting_documents/englandtreestrategyconsultationdocument%20%20correctedv1.pdf
Italy	Strategia Forestale Nazionale (regola competenze regionali) https://www.reterurale.it/foreste/StrategiaForestaleNazionale Forestry Protection Strategypol https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/17813

A policy for *Landscape Protection*.

Country	If yes, please provide brief note or website link
Austria	https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrStmk&Gesetzesnummer=20001381
Czechia	Methodology of landscape quality evaluation Landscape atlas of the CR https://www.mzp.cz/atlas.krajiny/start.pdf
France	https://www.ecologie.gouv.fr/politique-des-paysages
Malta	National Strategy for the Environment – Vision (https://era.org.mt/wp-content/uploads/2020/12/NSE-Wellbeing-First-Vision-Final.pdf) Malta National Biodiversity Strategy & Action Plan (https://era.org.mt/maltas-national-biodiversity-strategy-action-plan-2012-2020/)
Norway	A range of references to individual protected landscapes: Søk – regjeringen.no National parks: Nasjonalparker i Norge – regjeringen.no and reference list: Søk – regjeringen.no Legislation: Lov om miljøvern på Svalbard (svalbardmiljøloven) – Lovdata And mainland: Forskrift om overgangsbestemmelser etter naturmangfoldloven § 77 i forbindelse med erstatning ved vedtak om vern av område som nasjonalpark eller landskapsvernområde etter den tidligere naturvernloven – Lovdata
Portugal	https://pnap.dgterritorio.gov.pt/node/466
Spain	The Atlas of the Landscapes of Spain https://www.miteco.gob.es/es/biodiversidad/servicios/banco-datos-naturaleza/informacion-disponible/Paisajes.aspx
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/
UK General	https://www.gov.uk/guidance/natural-environment
Italy	https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11257

A policy for the *Sea* (marine spatial planning).

Country	If yes, please provide brief note or website link
Austria	No
Czechia	No
France	https://www.eoliennesenmer.fr/
Malta	Strategic Plan for the Environment and Development (https://pa.org.mt/en/strategic-plan) MSFD Programme of Measures (https://era.org.mt/maltas-programme-of-measures-for-the-marine-strategy-framework-directive/)
Norway	Meld. St. 29 (2020-2021) – regjeringen.no including carbon capture
Portugal	https://www.psoem.pt/ https://www.dgpm.mm.gov.pt/ordenamento-e-maritimo
Spain	Strategy for the development of Offshore Wind and Sea Energies https://www.miteco.gob.es/es/ministerio/planes-estrategias/desarrollo-eolica-marina-energias/default.aspx
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/ https://www.gov.scot/publications/offshore-wind-policy-statement/documents/
UK General	Marine planning published by Marine Management Organisation; DEFRA, Environment Agency, Natural England – see https://www.gov.uk/topic/planning-development/marine-planning Marine plans in place for each region of England. (2020). East of England good example of wind energy policies due to being along North Sea. https://www.gov.uk/government/collections/east-marine-plans
Italy	https://www.mite.gov.it/sites/default/files/archivio/allegati/strategia_marina/dpcm_1_12_2017_linee_guida_psm.pdf

A policy for the *Coastal Area*.

Country	If yes, please provide brief note or website link
Austria	No
Czechia	No
France	https://www.ecologie.gouv.fr/specificites-damenagement-du-littoral-instructions-elus
Malta	Local Plans (https://www.pa.org.mt/en/local-plans)
Norway	Local and regional responsibility over many years. Reference with brief English summary: nofima_planlegging_kystsonen.pdf (regjeringen.no)
Portugal	https://apambiente.pt/index.php/agua/planos-e-programas-da-orla-costeira
Spain	National Strategic Plan for the Protection of the Coast is in the approval process At level of regional plans for coastal protection in most of the autonomous communities. By example Coast Plan of Basque Country https://www.euskadi.eus/contenidos/informacion/pts_litoral/es_7559/adjuntos/texto/Tomo2_Version_14-03-07.pdf
UK Scotland	https://www.nature.scot/sites/default/files/2019-05/Planning%20ahead%20for%20coastal%20change%20guidance.pdf
UK General	2019: Published by Environment Agency – Shoreline Management Plans (England and Wales) https://www.gov.uk/government/publications/shoreline-management-plans-smps
Italy	Programma di Gestione delle Aree Costiere https://www.mite.gov.it/sites/default/files/archivio/normativa/progetti_CAMP_2feb_2022.pdf

A policy for *Nature Protection*.

Country	If yes, please provide brief note or website link
Austria	https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=LrStmk&Gesetzesnummer=20001381
Czechia	Act 114/1992 Coll. about nature protection
France	http://www.parcsnationaux.fr/fr/des-decouvertes/les-parcs-nationaux-de-france/les-dix-missions-des-parcs-nationaux-de-france#:~:text=L'%C3%A9tablissement%20public%20d'un,formation%20des%20acteurs%20du%20territoire
Malta	National Strategy for the Environment – Vision (https://era.org.mt/wp-content/uploads/2020/12/NSE-Wellbeing-First-Vision-Final.pdf) Malta National Biodiversity Strategy & Action Plan (https://era.org.mt/maltas-national-biodiversity-strategy-action-plan-2012-2020/) Management Plans for Terrestrial Natura 2000 Sites in Malta and Gozo (https://era.org.mt/management-plans-for-terrestrial-natura-2000-sites-in-malta-gozo/)
Norway	See landscape protection
Portugal	https://www.icnf.pt/oquefazemos/materiaisinformativoseeducativos/areasprotegidas/parquesnaturais
Spain	The National Parks Network (16 national parks) https://www.miteco.gob.es/es/red-parques-nacionales/la-red/
UK Scotland	No
UK General	Nature protection falls under the NPPF but see also the 25 year environment plan (updated 2021) https://www.gov.uk/government/publications/25-year-environment-plan/25-year-environment-plan-our-targets-at-a-glance
Italy	Piani Parchi Nazionali https://www.isprambiente.gov.it/it/banche-dati/repertorio-dello-stato-di-attuazione-dei-piani-per-il-parco-nei-parchi-nazionali

***National Planning Policy Statements* or Guidelines.**

Country	If yes, please provide brief note or website link
Austria	https://www.landesentwicklung.steiermark.at/cms/beitrag/12755541/154267170/
Czechia	No
France	https://www.ecologie.gouv.fr/eolien-terrestre
Malta	The Planning Authority through the years has issued a number of specific policy documents which can be found on the PA's website – https://www.pa.org.mt/en/supplementary-guidance – e.g. fuel stations, childcare facilities, solar farm policy, cemeteries policy, fireworks factory policy, micro-wind turbines, etc.
Norway	National planning guidelines on a wide range of topics ref: planretningslinjer – Søk (bing.com) Examples: * land use and transport * climate and adaptation to climate change * differentiated use of the coastal zone – and others
Portugal	https://www.dgeg.gov.pt/pt/areas-transversais/relacoes-internacionais/politica-energetica/
Spain	No
UK Scotland	https://www.gov.scot/publications/onshore-wind-policy-statement-refresh-2021-consultative-draft/pages/3/
UK General	See above on marine planning, and NPPF, and renewable energy policies
Italy	Direttiva alluvioni http://www.pcn.minambiente.it/mattm/direttiva-alluvioni/

A *National Spatial Policy*.

Country	If yes, please provide brief note or website link
Austria	https://www.landesentwicklung.steiermark.at/cms/ziel/154267079/DE/ https://www.oerok.gv.at/oerek-2030
Czechia	Regional Development Strategy 21 https://www.mmr.cz/en/microsites/uzemni-dimenze/regional-development-strategy-21 Spatial Development Policy http://www.uur.cz/images/1-uzemni-planovani-a-stavebni-rad/politika-uzemniho-rozvoje-aktualizace-1-2015/publikace-apur-cr-2015-en.pdf
France	https://www.ecologie.gouv.fr/sraddet-schema-strategique-prescriptif-et-integrateur-regions https://www.hautsdefrance.fr/la-region-adopte-son-sraddet/ https://www.centre-valdeloire.fr/comprendre/territoire/centre-val-de-loire-la-region-360deg
Malta	Strategic Plan for the Environment and Development (https://pa.org.mt/en/strategic-plan)
Norway	No
Portugal	https://www.dgterritorio.gov.pt/ https://www.dgterritorio.gov.pt/ordenamento-do-territorio https://www.dgterritorio.gov.pt/snit
Spain	No
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/

Country	If yes, please provide brief note or website link
UK General	NPPF – see above. There is no zoning for different parts of the country for different purposes. National Parks, Green Belts and some other landscape designations are nationally designated but the actual detailed land use is determined and mapped locally. In England, the Government is trying to reform the planning system. In its White Paper of 2021, it proposed a new system of zoning the whole country into three different zones: growth, renewal and protection. Growth for green undeveloped land; renewal for urban regeneration and brownfield land, and protection for landscape beauty, GB. and open countryside. The White Paper did not survive its first publication but it might return in similar format later in 2022. The TCPA has a good analysis of it at: https://www.tcpa.org.uk/planning-white-paper-faqs
Italy	Strategia Nazionale Aree Interne (regola competenze regionali) https://www.agenziacoesione.gov.it/strategia-nazionale-aree-interne/

A policy for *Rural Areas.*

Country	If yes, please provide brief note or website link
Austria	https://www.oerok.gv.at/region/programmperioden-vor-2014/laendliche-entwicklung-2007-2013
Czechia	Linked to EU funds https://www.dotaceeu.cz/en/evropske-fondy-v-cr/2014-2020/operacni-programy/list/program-rozvoje-venkova
France	https://www.les-plus-beaux-villages-de-france.org/fr/le-label/comment-devient-on-lun-des-plus-beaux-villages-de-france/les-criteres/
Malta	Rural Policy & Design Guidance (supplementary planning policy – https://pa.org.mt/en/supplementary-guidance-details/rural-policy-and-design-guidance-2014)
Norway	Planning and building law (physical planning and land use) is universal for the whole country and the responsibility of the primary local authorities (kommune). National and county Regional policies tend to differentiate between urban and rural areas. These are economic/financial – structural and spatial in nature. They cover most sectors: education, health, transport, business development agriculture, fisheries and more.
Portugal	https://www.rederural.gov.pt/
Spain	https://www.mapa.gob.es/es/desarrollo-rural/planes-y-estrategias/ley-para-el-desarrollo-sostenible-del-medio-rural/prog-desarrollo-rural-sostenible/
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/
UK General	https://www.lakedistrict.gov.uk/planning/planningpolicies/local-plan Village conservation policies in the Lake District can be found in the above mentioned plan at: https://www.lakedistrict.gov.uk/planning/conservationareas
Italy	https://www.reterurale.it/psrn

A policy for *Soil Management*.

Country	If yes, please provide brief note or website link
Austria	https://www.landesentwicklung.steiermark.at/cms/beitrag/12636599/141975702/
Czechia	No
France	https://www.afes.fr/les-sols/sols-et-legislations/
Malta	FERTILE SOIL (PRESERVATION) ACT (https://agrikoltura.gov.mt/en/agricultural_directorate/Documents/soilTransfer/soilAct.pdf)
Norway	Policy on soil protection Hva er jordvern – Landbruksdirektoratet
Portugal	https://www.rederural.gov.pt/ https://www.rederural.gov.pt/images/Noticias/2019/Directrizes_Volunt%C3%A1rias.pdf
Spain	No
UK Scotland	https://www.sepa.org.uk/environment/land/soil/#protection
UK General	See above under agriculture
Italy	https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2016-06-28;132

A policy on *Thematic Maps*.

Country	If yes, please provide brief note or website link
Austria	https://www.landesentwicklung.steiermark.at/cms/beitrag/12755541/154267170/ https://www.noe.gv.at/noe/Energie/Photovoltaik.html
Czechia	Landscape atlas of the Czech Republic https://www.mzp.cz/atlas.krajiny/start.pdf Flood risk maps https://www.mzp.cz/cz/povodnove_mapy_stanovene_zaplavove_uzemi
France	https://objectif-paysages.developpement-durable.gouv.fr/les-atlas-de-paysages-20
Malta	Areas, sites and features of conservation value (scheduled property) under the Development Planning Act of 2016 (Act VII of 2016), accessible from https://pamapserver.pa.org.mt/ Protected natural areas, sites and features (protected areas) under the Environment Protection Act of 2016 (Act I of 2016), accessible from https://meps.eraportal.org.mt/
Norway	The policy seems to develop in the direction of offshore windparks. Land based windmills-potential: NVE: 13 områder best egnet for nye vindkraftverk | Hvor blir det åpnet for nye vindmøller? NVE peker i sitt forslag til nasjonal ramme for vindkraft på 13 særlig egnede områder. Se opptak av lanseringen. (energiogklima.no) Maps – environmental topics: See the directorate of the environment. Arter og naturtyper – Miljødirektoratet (miljodirektoratet.no)
Portugal	https://snig.dgterritorio.gov.pt/
Spain	No
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/

Country	If yes, please provide brief note or website link
UK General	Policy on landscape values, but no national zoning. Landscape areas are allocated in certain areas through national parks, areas of outstanding natural beauty (AONB), and other national and local designations (RAMSAR Sites; SSSIs etc). Each application for say, wind energy area is taken on merit and the discretionary planning system applied – all applications considered despite any allocation in any plan, and the Local Plan is the primary material consideration for responding to an application for development.
Italy	Risorse genetiche forestali https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/16635

A policy on *Ecosystem Services*.

Country	If yes, please provide brief note or website link
Austria	https://info.bmlrt.gv.at/service/publikationen.html
Czechia	http://www.ecosystemservices.cz/en/
France	https://www.ecologie.gouv.fr/levaluation-francaise-des-ecosystemes-et-des-services-ecosystemiques
Malta	Malta National Biodiversity Strategy & Action Plan (https://era.org.mt/maltas-national-biodiversity-strategy-action-plan-2012-2020/)
Norway	No
Portugal	https://florestas.pt/
Spain	National Strategy for integral management of biodiversity and its ecosystem services https://www.minambiente.gov.co/wp-content/uploads/2021/10/Poli%CC%81tica-Nacional-de-Gestio%CC%81n-Integral-de-la-Biodiver.pdf
UK Scotland	https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/ecosystem-approach/how-apply-ecosystem-approach
UK General	No
Italy	progetto Life Sam4cp http://www.sam4cp.eu/simulatore/

National policy in the form of *Legislation* (other than Natura 2000 sites).

Country	If yes, please provide brief note or website link
Austria	No
Czechia	Climate Protection Policy of the Czech Republic, 2017. Act 85/2012 Coll. about carbon capture in the rock
France	https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000043956924
Malta	No
Norway	Relevant legislation referred to above. In addition to those mentioned: planning and building act: Lov om planlegging og byggesaksbehandling (plan- og bygningsloven) – Lovdata
Portugal	No
Spain	Law 40/2010, of December 29, on geological storage of carbon dioxide https://www.boe.es/buscar/pdf/2010/BOE-A-2010-20049-consolidado.pdf
UK Scotland	https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/
UK General	There is some quantification and measurement of land-take. This is measured, monitored and published by the Office for National Statistics (ONS) (https://www.ons.gov.uk), especially in relation to rural land, agricultural land, and green belt land. In the latest statistics for land take in the countryside, called the 'UK Natural Capital Land Cover in the UK' (https://www.ons.gov.uk/economy/environmentalaccounts/articles/uknaturalcapitallandcoverintheuk/2015-03-17) (latest 2015), they assess land cover and eco-system accounts based on data from the Countryside Survey. Land cover is different to land use and the former is defined as the type of natural function of land (where natural habitats exist), which is not built upon (although some of the land cover might be domesticated land not built upon (e.g. golf course). The survey contributes to and makes use of EU terminology for definitions, including comprehensive maps, and relates to the whole of the UK (Great Britain and Northern Ireland). This survey excludes urban areas, where reliance for measuring its land take is on the Ordnance Survey Land Use Account (latest 2013).

Country	If yes, please provide brief note or website link
Italy	Testo Unico delle Norme in Materia Ambientale https://pdc.mite.gov.it/sites/default/files/allegati/DLgs_152_03_04_2006_TestoUnicoAmbientale.pdf

Any other example of National Land Use Policy (please fill in)

Country	If yes, please provide brief note or website link
Austria (air quality)	https://www.landesentwicklung.steiermark.at/cms/beitrag/12636483/141975683/
Czechia	Act no. 167/2008 Coll. on environmental damage prevention
France	https://agence-cohesion-territoires.gouv.fr/phase-de-signature-en-voie-dachevement-dici-la-fin-janvier-775
Malta	Other environmental plans and policies with land-use implications include: (i) Air Quality Plan for the Maltese Islands (https://era.org.mt/air-quality-plan-for-the-maltese-islands/) (ii) Noise Action Plan (https://era.org.mt/noise-action-plan/) (iii) Waste Management Plan (https://era.org.mt/long-term-waste-management-plan-2021-2030/) (iv) Construction and Demolition Waste Strategy (https://era.org.mt/construction-and-demolition-waste-strategy-for-malta-2021-2030-managing-construction-demolition-resources/) Other plans: National Transport Strategy and Master Plan (https://www.transport.gov.mt/strategies/strategies-policies-actions/national-transport-strategy-and-transport-master-plan-1343
Norway	One example: legislation on extraction of minerals Lov om erverv og utvinning av mineralressurser (mineralloven) – Lovdata Otherwise: road and rail legislation, airports, energy and other infrastructure
Portugal	No
Spain	
UK Scotland	

Country	If yes, please provide brief note or website link
UK General	One big question is what happens to the implementation of the EIA Directive now that the UK has left the EU. This is the responsibility of many different departments – Department of Environment Food and Rural Affairs (DEFRA) and Department of Levelling Up etc. We do not know yet how many of the EU laws will be retained as this is going through parliament at present. There is a fear that England or UK will withdraw some of these laws. It might be that the EIA Directive has to be applied despite leaving the EU.
Italy	banca-delle-terre https://www.ismea.it/banca-delle-terre

References

Government of Ireland 2021, *Climate Action Plan 2021 – Securing our Future*, Government of Ireland, 2021

Programme for Government – Our Shared Future, June 2020.

Sustainable Rural Housing – Guidelines for Planning Authorities, 2005, Map 1 – Indicative Outline of NSS Rural Area Types.

The Governance of Land Use In OECD Countries: Policy Analysis and Recommendations, OECD 2017, p. 42.

Comparative Analysis of Territorial Governance and Spatial Planning Systems in Europe, Final Report, Espon 2018

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Phase 1 Document 02: Stakeholder Categorisation

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Phase 1 Document 04: Land Use Policy Catalogue (Appendix)

Phase 1 Document 05: Land Use Indicators

Phase 1 Document 06: National Land Use Policy - Review of International Best Practice 1

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