

CHAPTER 4

NATIONAL AND SUB-NATIONAL ENERGY POLICIES, PLANS AND PROGRAMMES AND THE USE OF SEA¹

This chapter describes the institutional and planning framework for the energy sector, the status of SEA practice, existing guidance for the development of national energy PPPs, and key questions that are likely to be addressed by such PPPs.

4.1 Institutional and planning framework in the energy sector

All countries face the challenges of climate change, and most have already taken steps to promote the transition away from fossil fuel consumption and enable and promote investment in renewable energy. It is reported that solar and wind are now being installed at a rate that is three times faster than all other new electricity sources combined².

Many countries have already, or are in the process of, reviewing/revising or developing new national energy policies, strategies and plans to reflect the need for developing renewable energy and set out how they will achieve such change. But, for most countries, the transition will be gradual (over many decades). As new renewable energy options are explored, committed to, and developed, there will still be a continuing need to rely on coal, oil and other fossil fuels for some time to come. So, most countries will continue to rely on a mix of energy sources (both fossil fuel-based and renewables-based) and their energy policies, plans and strategies will be likely to continue to reflect this.

Countries have developed a wide range of policies, plans and programmes (PPPs) to guide the development of the energy sector (see Table 4.1). A distinction can be made between PPPs at international, national and sub-national level. At national level, PPPs may cover the entire energy sector or individual sub-sectors such as the hydropower and tidal power sub-sectors. At the sub-national level, a more integrated approach is applied where the development of the energy infrastructure is balanced with other developments a geographic (e.g. region) or landscape level (see Figure 4.1). Box 4.1 describes the institutional and policy frameworks for a hierarchy of national energy plans in Zambia.

Energy policy-making planning has traditionally focused on estimating demand and determining the types of energy sources to be used to meet it. More recently, other goals such as minimising the cost of energy while addressing environmental concerns, particularly reducing greenhouse gas emissions, have been incorporated. Such policies and plans aim to guide the future of local, national, regional systems, reflecting the needs resulting from population growth and consumption patterns.

Despite these new challenges, energy planning and policy-making remains a largely technical and economic exercise. Wider environmental and social (including cultural) factors are highly relevant to developing models for meeting future energy demands but have largely been neglected. Energy planning is often conducted within governmental organisations but may also be carried out by large energy companies such as electric utilities or oil and gas producers. It may involve input from different stakeholders drawn from government agencies, local utilities, academia and other interest groups. Energy planning is frequently undertaken using integrated approaches that consider both the provision of energy supplies and the role of energy efficiency in reducing demands.

¹ This chapter has been developed in collaboration with Arend Kolhoff, Netherlands Commission for Environmental Assessment

² Blakers and Ruther (2023)

Table 4.1: Examples of types of energy policies, plans and strategies, all subject to SEA

	Type	Examples of SEAs for stated PPPs
International	Energy policy	<ul style="list-style-type: none"> • Nile equatorial lakes region 2007
	Power development plan	<ul style="list-style-type: none"> • Greater Mekong Sub-region 2015
National – sector wide	Policies	
	Energy policies	<ul style="list-style-type: none"> • Slovak Republic 1997, 2000; • Czech Republic 2002; • Ghana 2009; • Myanmar 2014; • Nigeria 2022; • Rwanda 2015; • Zambia 2019
	Plans	
	Energy development plan	<ul style="list-style-type: none"> • Estonia 2014; • Vietnam 2011, 2014, 2019; • Angola 2018; • Nigeria 2019; • Bhutan 2019;
	Energy and climate plan	<ul style="list-style-type: none"> • Slovenia 2019; • Netherlands 2021
	Energy productivity plan	<ul style="list-style-type: none"> • Australia 2015;
	Energy transition plan	<ul style="list-style-type: none"> • Ghana 2022, Nigeria 2022
	Renewable energy action plan (EU member states)	<ul style="list-style-type: none"> •
	National energy and climate plan (EU member states)	<ul style="list-style-type: none"> •
	Energy sector plan	<ul style="list-style-type: none"> • Samoa 2017
	Power sector master plan	<ul style="list-style-type: none"> • Cape Verde 2017
	Power contingency plan	<ul style="list-style-type: none"> • Philippines 2021
	Strategies	
	Energy strategy	<ul style="list-style-type: none"> • EU 2022; • Jordan 2020; • Montenegro 2013; • Serbia 2015;
Renewable energy strategy	<ul style="list-style-type: none"> • Azerbaijan 2016; • Zambia 2022 	
National – sub-sector	Hydropower sector plan	<ul style="list-style-type: none"> • Nepal 1997, 2014, [is there a newer SEA?] • Lao PDR 2004; • South Korea 2007; • Vietnam 2009; • Myanmar 2019
Sub-national plans	Electricity supply plan	<ul style="list-style-type: none"> • Canada 2012
	Hydropower development plan	<ul style="list-style-type: none"> • Vietnam 2008; • Bhutan 2011; • India 2012, 2014; • Pakistan 2014
	Regional energy strategies	<ul style="list-style-type: none"> • Netherlands 2022

Source: Kolhoff and Sloatweg (2021)

Box 4.1: Institutional and policy framework in the energy section Zambia

The Ministry of Energy is responsible for developing and implementing policies, plans, and programmes related to the production, distribution, and consumption of energy. Ministries of Finance, Water Development and Sanitation, Local Government play also a major role in the sector. The energy sector in Zambia is governed by the National Energy Policy 2019 and four Acts:

- The Energy Regulation Act established the Energy Regulation Board (ERB), as a body corporate, whose primary role is to licence entities that intend to produce energy.
- The Electricity Act provides for the regulation of generation, transmission, distribution and supply of electricity.
- The Petroleum Act provides for the importation, conveyancing and storage of petroleum and other inflammable oils.
- The Rural Electrification Act established the Rural Electrification Authority whose primary role is to provide electricity to rural areas of Zambia.

The National Energy Policy (NEP 2019) outlines the government's vision and goals for the sector and provides a framework for action. The policy aims to increase access to modern and reliable energy services, promote the use of renewable energy sources, and diversify the energy mix to reduce reliance on hydroelectric power. This policy builds on previous policies of 1994 and 2008 and is anchored on the Eighth National Development Plan (8NDP) and Vision 2030.

The energy sector comprises both public and private actors. The Ministry of Energy also works with other government agencies, such as the Zambesi River authority, the Energy Regulation Board, to develop and implement specific plans and programs to achieve the goals of the National Energy Policy. For example, the Rural Electrification Master Plan (REMP) 2008 – 2030 outlines a strategy for expanding electricity access in rural areas, while the Renewable Energy Strategy and Action Plan 2022 sets out a roadmap for increasing the use of renewable energy in the country. The Ministry also provides guidance to the following State-owned enterprises: Indeni Petroleum Refinery Company Limited; Tanzania Zambia Mafuta pipelines Limited (TAZAMA); and ZESCO Limited.

Source: DT GLOBAL IDEV Europe S.L. Scoping Report: Strategic Environmental Assessment of the Energy Sector in Zambia (March, 2023).

Energy plans have traditionally played a strong role in setting the framework for regulations in the energy sector (e.g., concerning the type of power plants that can be built or prices that can be charged for fuels). But over the past three decades, in many countries, energy systems have been privatised and deregulated resulting in reduced energy planning and decisions have increasingly been left to the market. In the last few years, this trend has reversed following increasing concerns over the environmental impacts of energy consumption and production, particularly considering the threat of global climate change and the changing geo-political situation. Sustainable energy planning is particularly appropriate for communities who want to have access to electricity and develop their own decentralised energy-generating facilities.

Table 4.2: Examples of SEA applied to the energy sector policies, plans and strategies

Source: A.Kolhoff, Netherlands NCEA

Cases (with hyperlink to documents if available)		Country	Scale / Basin	Year / status	Subject of SEA	Level of influence
1	SEA or Energy Policy.	Slovak Republic (Box 4.1)	National	1997 and 2000	Energy policy	Moderate
2	SEA for Energy Policy.	Czech Republic (Box 4.1)	National	2002	Energy policy	No
3	Strategic/Sectoral, Social and Environmental Assessment of Power Development Options in The Nile Equatorial Lakes Region	Nile Equatorial Lakes Region	International	2007	Energy policy	Low
4	SEA for National Energy Policy. SEA case description available.	Ghana	National	2008	National energy Policy	Low
5	SEA for Power Development Plan VII. SEA report available: https://gms-eoc.org/resources/two-seas-on-power-development-planning-in-viet-nam	Viet Nam	National	2011	Power development plan VII (ex-ante)	High
6	SEA for Saskatchewan electricity planning.	Canada	State / province	2012	Electricity supply plan	Unknown
7	SEA for National Energy Development Strategy by 2030. Summary and review of SEA available: http://www.greenhome.co.me/fajlovi/greenhome/attach_fajlovi/eng/main-pages/2013/07/pdf/Review_Of_The_SEA_For_The_Draft_Energy_Development_Strategy_In_Montenegro_By_2030.pdf	Montenegro	National	2013	Energy strategy	Unknown
8	SEA for Revised Power Development Plan VII. SEA report not available.	Viet Nam	National	2014	Revised power development plan VII	High
9	SEA for Energy Sector Development Strategy. SEA report available: https://mingor.gov.hr/UserDocsImages/UPRAVA-ZA-PROCJENU-UTJECAJA-NA-OKOLIS-ODRZIVO-GOSPODARENJE-OTPADOM/Spuo/29_08_2017_SPU_POS_Strategija_RS.pdf	Serbia	National	2015	Energy strategy	Low
10	SEA for GMS power planning	Greater Mekong subregion 6 countries	International	2015	Power development plan	Unknown
11	SEA for National Energy Sector Policy	Rwanda	National	2015	Energy sector policy	Unknown
12	SEA for National Power Policy*.	Taiwan	National	2015	National power plan	Moderate

Cases (with hyperlink to documents if available)	Country	Scale / Basin	Year / status	Subject of SEA	Level of influence
13 SEA for National Strategy of Renewable Energy. Summary of SEA report available: https://unece.org/fileadmin/DAM/env/greeneconomy/Lea/EaP/SEA_Azerbaijan.pdf	Azerbaijan	National	2016	Nat. renewable energy strategy incl. hydropower	Unknown
14 SEA for Power Development Master Plan.	Angola	National	2018	Power development master plan	Unknown
15 SEA for Master Plan Study on National Power system development. SEA report available as part of master plan. https://africa-energy-portal.org/sites/default/files/2019-07/Master%20Plan%20Study%20for%20Power%20Sector%20System%20Development%20in%20Nigeria.pdf	Nigeria	National	2019	Power development master plan	Unknown
16 SEA for National Power Power System Master Plan 2040. SEA report available as part of master plan. https://openjicareport.jica.go.jp/pdf/12326856_01.pdf	Bhutan	National	2019	Power development master plan	Unknown
17 SEA of National Energy and Climate Plan	Slovenia	National	2019	Energy & climate plan	
18 SEA for National Power Plan.	Cambodia	National	On-going	Power development plan	...
19 SEA for Power Development Plan VIII.	Viet Nam	National	Ongoing	Power Development Plan VIII	...
20 Offshore Energy SEA – a series of SEAs since 2001	United Kingdom	National	Ongoing	Oil & gas	
21 SEA National Energy Policy	Zambia	National	Ongoing	Long term plan of entire secotr	

4.2 Status of SEA practice in the energy sector

Despite repeated calls to advance more strategic forms of impact assessment in energy planning, decisions about renewable energy development are still predominantly approached on a project-by-project basis³. Nevertheless, energy plans, programs, and sometimes policies are subject to strategic environmental assessment (SEA) in many parts of the world (see Table 4.2). In Europe, for example, energy plans are explicitly listed in the SEA Directive (2001/42/EC) while in low and middle-income countries energy is, next to transport, the most important sector in which SEAs are required to be undertaken.

A study by Geissler *et al.* (2021) provides an overview of the current state of research on and practice of SEA in the energy sector. A key message is that SEAs for energy plans, programs and policies have similar shortcomings to SEAs in other sectors. In particular, the assessment of cumulative effects and the consideration of alternatives are done poorly. The authors observe that, almost without exception, plan alternatives instead of strategic alternatives are developed and assessed in practice. Based on detailed case reviews, they identify meaningful energy alternatives from policy to programme levels (Table 4.3).

Table 4.3: PPP levels and energy alternatives

Source Gessler *et al.* (2021)

Level	Characteristic	Alternatives	Energy alternatives	Methodology
Policy	Federal course and guidance	<ul style="list-style-type: none"> • System alternatives; • Strategic options 	<ul style="list-style-type: none"> • Alternative energy concepts; • Variations in energy mix; • Renewable sources; • Distribution options. 	Broad-brush, qualitative (e.g. scenario analysis)
Plan	Strategy for a spatial or sectoral planning section	<ul style="list-style-type: none"> • Development strategies within the sector, plan variations 	<ul style="list-style-type: none"> • Energy supply strategies; • Broad spatial alternatives; • Degree of exploitation; • Infrastructure options. 	Quantitative and qualitative methods (e.g. impact matrices)
Programme	Schedule of activities in a specific area	<ul style="list-style-type: none"> • Alternatives to proposed actions (site, scope, mode) 	<ul style="list-style-type: none"> • Site alternatives (bundle of projects); • Degree of exploitation; • Restriction options. 	Quantitative (e.g. MCA, CBA)

The study involved an internet search for SEAs undertaken for the energy sector. It identified 83 SEAs from 28 countries with environmental reports (ERs) published between 2001 and 2019 for which access to the ER or at least to the non-technical summary was given⁴.

But only a limited number of countries (20) have been identified as having applied an SEA process to the development of their national energy PPPs (see Table 4.3). Early examples are the SEAs for energy policies in the Czech and Slovak Republics (Box 4.2). Another is the from the UK where the Department for Business, Energy & Industrial Strategy (BEIS) (formerly DTI, BERR and DECC) has undertaken a sequence of Offshore Energy SEAs (OSEA) focused on oil and gas since 2001 (Box 4.3).

A recent case study used renewable energy transitions in Saskatchewan, Canada, to demonstrate how a transitions-based SEA framework can be applied to explore the capacity needs, opportunities, risks, and obstacles in existing institutions and governance arrangements for low-carbon transitions (Box 4.4).

³ Nwanakezi *et al.* (2022)

⁴ It is possible that earlier SEAs were not found as they might no longer be available online or never have been made available online in the first place.

Box 4.2: SEA of energy policy in Czech and Slovak Republics

SEA of Czech Energy Policy (1997): This identified objectives and measures for the development of the entire sector (electricity, coal and gas) including future privatisation and use of economic instruments. It also addressed the future use of nuclear power, including specific project issues:

- whether to stop or proceed with a second nuclear power plant already approved and partly built; and
- whether to change the limits for open-cast coal mining, which would result in the destruction of additional villages in North Bohemian and North Moravia.

The SEA process focused mainly on the elaboration of the report. Extensive scoping included a national public hearing to comment on the draft policy and the proposed assessment methodology. The scoping process initiated the development of three distinct scenarios of energy mixes.

These could be achieved by the use of available administrative, and legal and economic instruments to regulate behaviour of companies and individuals. The scenarios were extensively modelled and assessed against set of 16 categories of environmental, social and economic impacts. A public review of the draft SEA report was held in the main chamber of the Czech Senate.

SEA of the Slovak Updated Energy Policy (EP 1997): This comprised a number of steps:

- provision of information to the public about preparation of the EP;
- expert review, including presentation of opinions for public discussion;
- public forum on the EP with participation from state and professional bodies, industry, universities and research institutions, non-governmental organisations and the media;
- statement by the Ministry of Environment (MoE) on the basis of expert opinion, other comments and public discussion;
- conclusion of the public discussion, with the Statement of MoE and the Statement of the Ministry of Economics sent to all participants; and
- submission of a new version of the proposed EP to the Slovak government – subsequently approved.

The SEA process had a number of positive features, notably with regard to public consultation and input. But NGO representatives strongly criticised the shortcomings of EP-1997 and weaknesses in the process (e.g. weak scoping)

Source: Dusik (2003 a, b)

Box 4.3: Offshore energy SEAs in the UK

Since 2001, the UK has undertaken a series of Offshore Energy SEAs (OSEA) considering various areas of the UK continental shelf (SEA areas 1-8), in addition to an SEA for Round 2 wind leasing. The more recent Offshore Energy SEAs (OSEA, OSEA2, OSEA3 AND OSEA4) incorporated the entire UK continental shelf (with the exception of Northern Ireland and Scottish territorial waters for renewable energy, and Scottish territorial waters for carbon dioxide transport and storage), for technologies including oil and gas exploration and production, gas storage and offloading including carbon dioxide transport and storage, renewable energy (including wind, wave and tidal power), and offshore hydrogen production and transport.

As these SEAs have been carried out, the process has evolved and continues to improve. It includes consultation with the public, environmental authorities, and other bodies, together with such neighbouring states as may be potentially affected. The process is guided by a Steering Group comprising departmental representatives, conservation and other agencies, NGOs, industry representatives and independent experts. The diverse members' role is to act as technical peers, guiding the selection of SEA methods and identifying the right information sources.

Source: <https://www.gov.uk/government/collections/offshore-energy-strategic-environmental-assessments>

Box 4.4: SEA for energy transitions

A study showed how applying SEA to renewable energy transitions in Saskatchewan, Canada, identified significant benefits, opportunities, and risks in renewable energy transitions. Opportunities existed to address energy security concerns and promote distributed generation, but perceived risks included the immediate economic impacts of transitioning away from a fossil-based economy, reliability risks owing to the intermittent nature of renewables, and political uncertainty about the future electricity landscape.

The results showed the need for clear transition goals and implementation strategies, including full commitment to the transition agenda. For transitions-based SEA, results highlighted the need for transparency and accountability to ensure effective implementation and the difficulty in establishing new assessment regimes. The lessons of this study appear broadly relevant for addressing low-carbon transition challenges and opportunities in other jurisdictions.

Source: *Nwanakezie et al. (2022)*

As for any other SEA, its application to energy PPPs should seek to merge with and support the process of development of the PPP to achieve maximum influence on its design and content. The experience of Vietnam in applying SEA to support preparation of successive Power Development Plans (PDPs) illustrates an evolution in SEA integration (Box 4.5)

Box 4.5: Evolution in SEA integration in Vietnam's Power Development Plans

The case of Viet Nam's Power Development Plans (PDPs) illustrates how incorporating SEA into the planning process for successive PDPs ensured that they were based on a more thorough understanding of their implications for the economy, society, and environment of the country.

The first integration of SEA into the PDP was done in the preparation of the Hydropower Master Plan in the context of PDP VI. This pilot SEA considered the potential impacts of 21 large-scale hydropower schemes included in PDP VI. Five scenarios were considered: one with a base case consisting of the existing schemes included in PDP VI, and four that progressively reduced the number of hydropower schemes and replaced them with least-cost alternatives (generally thermal power) identified through the PDP process. The impacts of alternative generating sources were considered in each scenario, providing a meaningful analysis of the different options to meet the needs for generation capacity defined in PDP VI.

The lessons learned from the pilot SEA showed that changes were needed in the PDP planning process to ensure that social and environmental impacts were fully integrated into the plans for the sector. The SEA proposed a detailed model of how this was to be achieved and to inform the development of the SEA in PDP VII, which was based on the experiences and capacities developed in the execution of the pilot hydropower SEA linked to PDP VI.

The original PDP VII was prepared in 2011–2012 to guide the development of the power sector for the period 2011–2030. It analysed future electricity demand scenarios by sector, considering potential economic and social development trends. It also assessed the most effective, least-cost power generation options for meeting likely future demand patterns. The plan's SEA was done simultaneously with the preparation of the PDP. While there was close coordination at the different stages of analysis during the PDP and the SEA preparation, there were also limitations in the extent to which the SEA was fully integrated into the PDP process.

Awareness of these impacts and concerns that the demand projections were too high led to a revision of PDP VII. The preparation of the revised PDP was based on the SEA from the original plan, with the scenarios in the analysis defined in relation to impacts identified in the SEA and related to the achievement of policies on renewable energy and energy efficiency.

The latest version of Viet Nam's PDP—the revised PDP VII (RPDP VII)—is a model of good practice in integrating an SEA in the preparation of a strategic plan that is important not just for Viet Nam but for the power sector of other countries, particularly in the Greater Mekong Subregion. The SEA provided an understanding of the implications of the different development options in the PDP, leading to significant changes in the final contents of the plan, ensuring better alignment to national development policies of Viet Nam and that it more effectively reflected specific national targets in areas such as renewable energy and greenhouse gas (GHG) mitigation.

Source: ADB (2018)

Regional cooperation will be of increasing importance in developing such PPPs as there will be collective opportunities for diversifying electricity generation mixes and reducing reliance on fossil fuel resources.

4.3 Guidance for developing national energy PPPs

4.3.1 Introduction

It is often difficult to know whether individual governments have issued internal guidance for developing energy PPPs as this information may not be made public.

The EU has issued guidance for preparing progress reports on the implementation of National Energy and Climate Plans (NECPs) (EU 2022). It sets out setting out principles and good practice and describes how the reports should address a range of issues. But there is not specific requirement to subject the NECPs to an SEA process (EU 2022).⁵ (NECPs are discussed in section 4.3).

In the USA, guidance is available for community energy strategic planning (USDE 2013) (Box 4.6) whilst, in the UK, Energy Systems Catapult has published **guidance on how to create a Local Area Energy Plan** (LAEP) (Box 4.7). Both suggest a series of steps for the process.

Box 4.6: Guide to Community Energy Strategic Planning (CESP), USA

In 2013, the US Department of Energy prepared a Guide to Community Energy Strategic Planning (CESP) (USDE 2013). It offers the following 10-step process for creating a robust strategic energy plan for a local government and community that can help save money, create local jobs, and improve national security:

- 1: Establish and charge a leadership team;
- 2: Identify and engage stakeholders;
- 3: Develop an energy vision;
- 4: Assess the current energy profile;
- 5: Develop energy goals and strategies;
- 6: Identify and prioritize actions;
- 7: Put together a financing strategy;
- 8: Develop a blueprint for implementation;
- 9: Plan to evaluate;
- 10: Develop, adopt, and publicize the CESP.

The guide offers tools and tips to complete each step and highlights examples from successful planning efforts around the country. It aims to help local governments and community stakeholders to use the CESP framework to build on initial energy successes by moving from single projects and programs to a comprehensive, long-term energy strategy that delivers benefits for years to come.

A CESP is seen not as a static document but rather as a long-term blueprint to focus and guide efforts and actions toward a defined energy vision. The plan articulates goals, develops strategies and actions to meet the goals, and identifies and allocates resources to assure effective completion of these strategies.

Source: USDE 2013.

⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX%3A52022XC1229%2802%29%from=EN>

Box 4.7: Guidance on how to create a Local Area Energy Plan (LAEP), UK

In the UK, Energy Systems Catapult has published **guidance on how to create a Local Area Energy Plan** (LAEP), aimed at local government organisations who are looking to create a plan to help them meet their net zero goals and climate emergency declarations⁶. A LAEP sets out the change required to transition an area's energy system to Net Zero in a given timeframe. This is achieved by exploring potential pathways that consider a range of technologies and scenarios, and when combined with stakeholder engagement leads to the identification of the most cost-effective preferred pathway and a sequenced plan of proposed actions to achieving an area's Net Zero goal.

The Guidance provides a detailed description of a 7-stage end-to-end process:

1. Preparation
2. Stakeholder Identification and Engagement
3. Understanding and Representing the Current Local Energy System
4. Modelling Options for the Future
5. Scenario Refinement and Selection
6. Actions, Priorities, and Decisions
7. Create the Plan

Source: <https://es.catapult.org.uk/guide/guidance-on-creating-a-local-area-energy-plan/>

Training

The International Renewable Energy Agency (IRENA) provides capacity building support to countries for developing or updating national energy masterplans through its Masterplan Development Support Programme⁷. The programme typically spans one to two years and includes several weeks of in-country training to calibrate a system planning test model, explore energy planning scenarios, and develop a national energy masterplan document. In-country sessions are complemented by online training and other meetings.

⁶ See: <https://es.catapult.org.uk/guide/guidance-on-creating-a-local-area-energy-plan/>

⁷ see: www.irena.org

EU requirements for energy plans

EU member states

The European Commission require EU member states to submit a National Renewable Energy Action Plan (NREAP) outlining commitments and initiatives to develop renewable energy by 30 June 2010. . NREAPs provided a detailed road map of how each member state expected to reach its legally binding 2020 target for the share of renewable energy in its total energy consumption, as required by article 4 of the Renewable Energy Directive (2009/28/EC). The plans set out sectoral targets, the technology mix expected to be used, the trajectory to be followed, and the measures and reforms to be undertaken to overcome the barriers to developing renewable energy.

Each NREAP report provided details of the expected share of energy provided by renewable sources up to and including 2020. The overall target for EU countries is to obtain 20% of their energy usage from renewable energy sources although targets for each country vary considerably. In addition, targets are broken down further by each energy use sector including transport, electricity and the heating and cooling sectors.

In the European Union, a Regulation on the Governance of the Energy Union and Climate Action (EU)2018/1999 entered into force on 24 December 2018 as part of the Clean Energy for all Europeans package. Under rules in this regulation, all member states were required to prepare a draft (by 2020) of a 10-year integrated national energy and climate plans (NECP) (Box 4.8) for the period from 2021 to 2030 charting how they aim to meet the EU's energy and climate targets for 2030. The NECPs outline how EU countries intend to address: energy efficiency; renewables; greenhouse gas emissions reductions; interconnections; and research and innovation. Each Member State is required to ensure that the public is given early and effective opportunities to participate in the preparation of the draft integrated national energy and climate plan.

The integrated NECP approach requires a coordination of purpose across all government departments. It also provides a level of planning that aims to ease public and private investment. The fact that all EU countries are using a similar template means that they can work together to make efficiency gains across borders⁸. Each Member State must submit a progress report each two years.

The EU Regulation on the Governance of the Energy Union and Climate Action (EU 2018/1999) requires that an NECP should include an assessment of the impacts of the planned policies and measures (Box 4.5, bullet (f)); but it does not specifically state that countries undertake an SEA for the NECP.

Notably, the EU SEA Directive (2001/42/EC) (transposed into UK law) does not apply SEA to policies. But it does apply to energy plans, and NECPs are plans; and the EU Directive explicitly requires an SEA for energy plans. It does not appear that SEAs have routinely been undertaken when NECPs have been developed by EU member states. The UK did not prepare such an SEA for its draft NECP in 2020 (Box 4.9).

⁸ https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_en

Box 4.8: Integrated national energy and climate plans

The integrated national energy and climate plans (NECP) provide an overview of the current energy system and policy situation. They set out national objectives for each of the five dimensions of the Energy Union and corresponding policies and measures to meet those objectives. A socially acceptable and just transition to a sustainable low-carbon economy requires changes in investment behaviour, as regards both public and private investment, and incentives across the entire policy spectrum. The plans should be stable to ensure the transparency and predictability of national policies and measures to ensure investment certainty.

The draft plans offer a common, solid, and comparable platform to actively engage and discuss in a synchronized way across Europe with civil society, business and local governments on the EU's common challenges and long-term priorities in the field of energy and climate.

Source: https://energy.ec.europa.eu/system/files/2019-06/national_energy-and_climate-plans_v4_0.pdf

According to Chapter 2, Article 3 of the Regulation, integrated national energy and climate plans shall consist of the following main sections:

- An overview of the process followed for establishing the plan consisting of an executive summary, a description of the public consultation and involvement of stakeholders and their results, and of regional cooperation with other Member States in preparing the plan;
- A description of national objectives, targets and contributions relating to the dimensions of the Energy Union;
- A description of the planned policies and measures in relation to the corresponding objectives, targets and contributions set out under point (b) as well as a general overview of the investment needed to meet the corresponding objectives, targets and contributions;
- A description of the current situation of the five dimensions of the Energy Union, including with regard to the energy system and greenhouse gas emissions and removals as well as projections with regard to the objectives referred to in point (b) with already existing policies and measures;
- Where applicable, a description of the regulatory and non-regulatory barriers and hurdles to delivering the objectives, targets or contributions related to renewable energy and energy efficiency;
- An **assessment of the impacts of the planned policies and measures** to meet the objectives referred to in point (b), including their consistency with the long-term greenhouse gas emission reduction objectives under the Paris Agreement and the long-term strategies;
- A **general assessment of the impacts of the planned policies and measures on competitiveness** linked to the five dimensions of the Energy Union;
- An annex setting out the Member State's methodologies and policy measures for achieving the energy savings requirement.

Furthermore, under Article 8, Member States shall describe their assessment, at national and, where applicable, regional level, of:

The **impacts on the development of the energy system and greenhouse gas emissions** and removals for the duration of the plan and for a period of ten years following the latest year covered by the plan, under the planned policies and measures or groups of measures, including a comparison with the projections based on existing policies and measures or groups of measures as referred to in paragraph;

The **macroeconomic and, to the extent feasible, the health, environmental, skills and social impact of the planned policies and** measures or groups of measures including a **comparison with the projections based on existing policies and measures or groups of measures**. The methodology used to assess those impacts shall be made public;

Interactions between existing policies and measures or groups of measures and planned policies and measures or groups of measures within a policy dimension and between existing policies and measures or groups of measures and planned policies and measures or groups of measures of different dimensions. Projections concerning security of supply, infrastructure and market integration shall be linked to robust energy efficiency scenarios;

Source: https://energy-ec-europa-eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0001.01.ENG&toc=OJ:L:2018:328:FULL

Box 4.9: Environmental assessment of the UK's draft NECP

Section 5 of the report on the UK's integrated NECP (DBEIS 2020 Section 5) discusses the impact assessment of planned policies and measures. It sets out climate risks and the expected impacts (improvements) of proposed measures on air quality as well as the macroeconomic health, environmental, employment and education, skills and social impacts including just transition aspects. But these issues are described in very general terms in narrative format with some tables. It concludes that future investments will be likely to be highly sensitive to how climate change evolves over the next two to three decades. There is no indication of what impact assessment methodology was used, if any. If SEA had been applied to this plan and other NECPs, it would likely have addressed a much wider range of environmental and social concerns likely to arise when implementing the NECP.

Those member states that did undertake an SEA include Bulgaria, Ireland, and Slovenia (Box 4.10). But the 'quality' of these SEAs varies. Some were completed after the Strategic Environmental and Social Management Plans (SESMPs (may have been termed a SEMP) (see section 3.5) started to be implemented, others are still not complete (e.g. Bulgaria). Only two of the SEAs could be judged as complying with the steps required by the EU Directive (Spain and Slovenia).

Box 4.10: SEA of NECP, Slovenia, 2019-202

Slovenia carried out a comprehensive SEA of its NECP in parallel to the plan process. It involved both internal (experts) and open scoping on effects, criteria, and measures. This involved extensive stakeholder participation, including a scoping workshop with interested ministries, organisations and NGOs as well as public discussion and a public presentation of the SEA report. The SEA addressed various key themes: mitigation and adaptation to climate change; population and health; sustainable use of natural resources; biodiversity and good ecological status of protected areas, including Natura 2000 European Ecological Network; protection of cultural heritage; landscape and stable society. The significance of likely impacts was assessed for four scenarios: existing measures; additional measures 1; additional measures 2; and an ambitious scenario with the recommendations of the European Commission 2030 with a view to 2050.

The SEA was prepared by an external team of SEA experts. The process of plan preparation was led by the Ministry of infrastructure and the SEA process by the Ministry of the Environment and Spatial Planning, which issued an opinion on the SEA Report quality and an environmental acceptability decision (after checking that environmentally accepted measures and mitigation measures were included in the plan).

Sources:

Vesna Kolar Planinšič, Ministry of Environment and Spatial Planning, Slovenia.

<https://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/nacionalni-energetski-in-podnebni-nacrt/dokumenti/%23c96>

EU applicant countries

Contracting parties (countries aspiring to join the EU) of the Energy Community⁹ are also developing NECPs (first drafts due by June 2023, final draft by June 2024). Unlike EU member states, they are obliged by an SEA Decision of the Community's Ministerial Council¹⁰ and the Governance Regulation of the Community¹¹ for SEAs to be prepared when preparing such plans. Their preparation is monitored by the Energy Community Secretariat. To date (February 2023)¹², the following have been completed:

- Albania: the NECP was adopted before the SEA was completed. The NECP will be reviewed to reflect the SEA findings before finalisation.
- Macedonia: adopted the NECP without the (obligatory) consent of the Ministry of Environment to ensure its alignment with the SEA and that public comments have been considered. The NECP will be reviewed before finalisation.
- Georgia, Montenegro and Serbia are currently undertaking SEAs for their NECPs.
- Other countries are in the early stage of the NECP process, except for Ukraine due to martial law and the ongoing conflict with Russia.

SEA for energy plans outside the EU Note to reviewers: This section still to be developed.
Please provide information/suggest text

Outside the EU, South East Asia has considerable experience of using SEA related to energy planning with a particularly strong focus on hydropower. The ADB has been a driver for more than 15 years.

⁹ The Energy Community is an international organisation (established by treaty in 2005) which brings together the European Union and its neighbours to create an integrated pan-European energy market (www.energy-community.org).

¹⁰ https://www.energy-community.org/dam/jcr:33b7fa10-df38-44ae-b2bf-58c250a4a298/Decision_2016_13_MC_ENV.pdf

¹¹ https://www.energy-community.org/dam/jcr:c755f9db-f6e7-448c-9cf5-0a5f02113ae2/19thMCDDecision14_CEP11_30112021.pdf

¹² Information provided by Energy Community Secretariat, Vienna

4.4 Guidance for the development of energy and other sub-national plans

In a growing number of countries, the mandate for decision-making on new energy infrastructure is divided between the authorities at national and sub-national levels (Figure 4.1). Typically, decisions about the fuel mix and large-scale investments such as hydropower projects and power transmission lines are taken at the national level. At sub-national levels, decisions are made on siting of the more decentralised infrastructure elements of the energy system. These sub-national decisions are increasingly made in the context of regional spatial or river basin plans. Since substantial guidance exists on these forms of planning¹³, the following paragraphs provide only some basic information on this in relation to energy planning.

Traditionally, governments have developed energy and other national plans at a central level and have issued instructions to sub-national authorities concerning their implementation. There has been little input from decentralised planning levels in the preparation of these plans. This top-down approach has often failed to draw lessons and perspectives from sub-national levels (e.g., regional, state, district and local, etc.). A more unified approach is increasingly advocated with two-way communication and dialogue between central and decentralised authorities and stakeholders.

Equally, government ministries/departments tend to operate in silos with little communication or cooperation between them (horizontal) . Addressing the challenge of climate change will require a major effort to foster and forge inter-ministerial cooperation and collaboration/integration between those responsible for the development of different renewable energy sub-sectors

SEA is a participatory process which depends on stakeholder engagement and inputs and is well-placed to foster improved vertical and horizontal communication and dialogue on energy and other issues (see Figure 4.1).

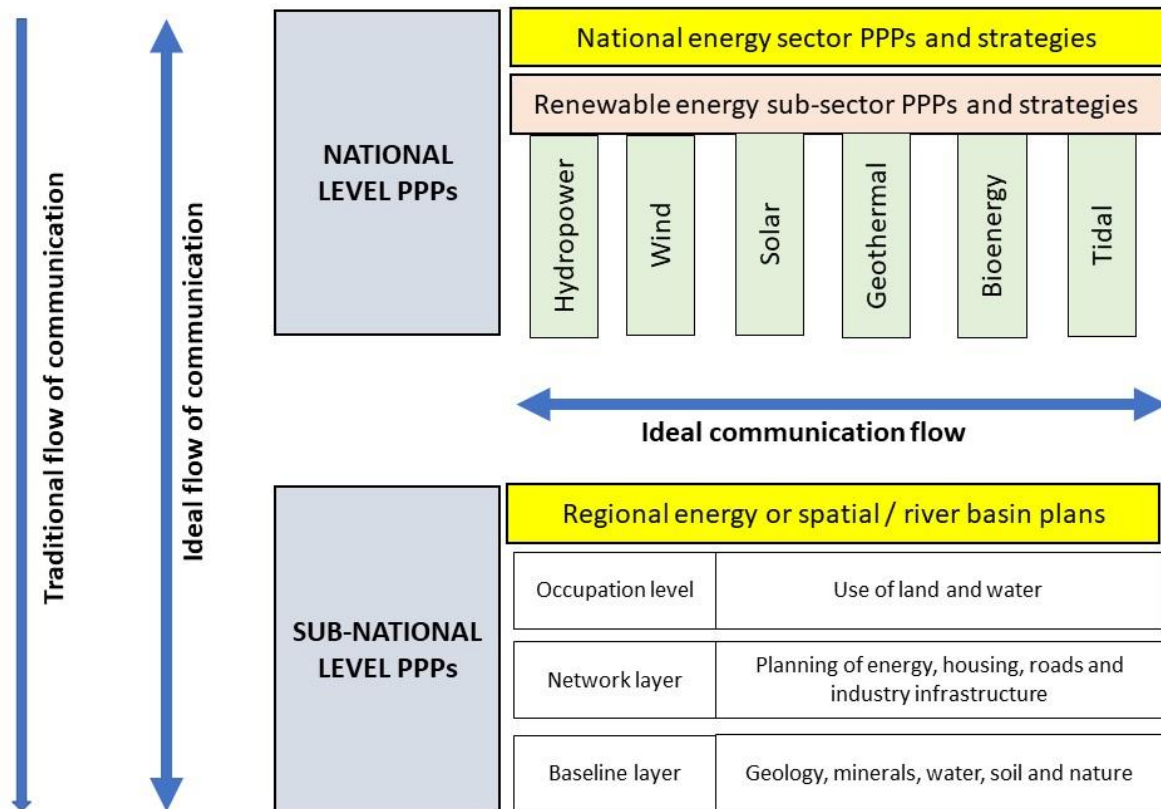
Spatial planning

Regional/spatial planning gives geographical expression to the economic, social, cultural and ecological policies of a country. It is used by governments to manage the development of land within their jurisdictions. Such planning involves the systematic assessment of land and water potential, alternatives for land and water use, and economic and social conditions to select and adopt the best land-use options. It provides a framework to guide investment decisions.

Countries may have a long tradition of using a structured planning hierarchy, both for spatial plans (e.g. regional development plans) and in a temporal sense (e.g. 5-year development plans). In such situations SEA can provide useful support to the existing planning procedures. Other countries may have no such a tradition in spatial planning. In these cases, SEA may be used as a structuring principle to kick-start the process; an approach that integrates planning and SEA procedures may evolve from such learning-by-doing.

¹³ UNECE (2008), FAO (2020), EU (2009), European Commission (2009)]

Figure 4.1: Illustration of a framework to guide energy planning by countries



Note: the 'levels' approach is based on van Schaick and Klaasen (2011).

The Netherlands, for example, has a long tradition of planning as well as using SEA. At the sub-national level authorities have a strong mandate to develop and implement new energy infrastructure (Box 4.1). Kenya has about ten years of experience of undertaking SEAs and, since 2012, Kenya's counties have been mandated to take decisions on small scale energy and other infrastructure. Each county prepares a five-year integrated development plan for investments in new local energy infrastructure and a ten-year spatial plan for the siting of such infrastructure. SEA is mandatory for both plans but its application is still at an early stage.

River basin plans

Since the early 1990s, integrated water resource management (IWRM) has been the accepted management approach for efficient, coordinated, equitable and sustainable development and management of water resources, land and related resources in river basins. The development and sustainable use of water resources requires that they are allocated amongst or competing human activities. This implies decision-making in complex situations, often with conflicting interests. Intensive and timely consultation of all stakeholders is of utmost importance.

IWRM deals with planning in a spatial context. Hydropower capacity, in particularly, is ideally developed in the context of a river basin plan to enable balanced decision-making for all interests. In Rwanda, SEA has proven to enable the balanced development of hydropower in a river basin plan¹⁴.

¹⁴ NCEA (2012)

4.5 Guidance for developing SEA supporting energy PPPs

4.5.1 Steps in undertaking an SEA for an energy sector PPP

In most countries having legislative or regulatory requirements for SEA, energy sector PPPs are specifically identified as requiring an SEA. Similarly, multilateral development banks usually require an SEA/SESA to be completed when they are providing funding for energy sector development such as initiatives to support the energy transition. Examples regarding the latter include SEAs initiated by the Asian Development Bank in Indonesia (in 2022) and scoping for a possible SEA in the Philippines (in 2023), both linked to implementing the Energy Transition Mechanism in countries in Southeast Asia.

4.5.2 Key considerations in the planning of the energy sector concerns that an energy PPP will need to address

An SEA will need to be designed and focused so that it provides timely and meaningful information regarding the following issues that a PPP is likely to address at the national and sub-national, sector and sub-sector levels.

(a) National and sector wide level

In most countries energy sector decisions are made at national level by the Ministry of Energy (or equivalent). Key issues and key associated questions that will be addressed in national policies, plans and strategies include:

- The fuel mix (i.e. the composition of the energy sources)
 - The fuel mix in all countries is changing as the share of renewable energy is increasing whilst the share of non-renewable energy is decreasing. Decisions about the future fuel mix are set out in a long-, medium- or short-term strategy or plan.
 - How will the fuel mix develop in the next 30 years?
- Private versus public responsibility
 - The engagement of the private sector differs significantly between countries. Even if the private sector has a major responsibility for energy generation and delivery, guidance is still provided by the public sector.
 - What are the responsibilities of the private and the public sector concerning production and distribution of energy?
- Energy import and export
 - The existing energy trade balance of a country will change as a result of the energy transition. This mean that a country will have to decide about its future trade balance.
 - What is the share of energy that will be imported?
 - What is the share of energy that will be exported?
- International network of electricity
- Increasingly, countries are co-operating in regional blocks such as the East African Community to ensure their energy security and to enable import and export between countries in the region and abroad. Due to the energy shift, it is expected that these international networks will become more important.
 - What are the expected linkages to an international electricity network?
- Access to energy and centralized versus decentralized energy systems

- Access to energy by all people is an important objective in many low income countries. The energy transition offers the opportunity for rural areas to develop decentralized energy systems instead of costly centralised ones.
 - Which areas in the country have/will have access to centralised or decentralised energy systems?
 - What centralised and decentralised energy systems will be developed?

(b) Sub-national level

In some countries, national authorities have mandated the authorities at sub-national authorities (e.g. at regional level) to achieve a set energy target in a particular period of time. The latter authorities then have responsibility to decide on the fuel mix and locations for generation in such a way that the new energy infrastructure is well integrated in the administrative region. This is usually set out in a sub-national plan (e.g. Box 4.11).

- **Site selection and routing of energy infrastructure**

The energy transition requires large scale investments in new energy generation and storage facilities, and infrastructure for the transport of energy.

- What new energy facilities need to be developed?
- What site will be selected for new energy facilities?
- What energy storage facilities will be developed and where?
- What routes will transmission lines follow?

Box 4.11: Regional energy strategies in the Netherlands 2021

In the Netherlands, the national targets for energy transition have been set in the National Energy and Climate plan 2019;. Co₂ emissions are set to be reduced by 49% (compared to 1990) by 2023, and by 100% by 2050. These targets have been translated to sub-national authorities in 30 regions. In each region, regional energy strategies were developed in 2021. They focus on generating sustainable electricity, mainly through solar and wind facilities. An integrated, landscape approach was applied to balance the different interests. These strategies were developed through participatory processes involving authorities, the private sector and communities. Local initiatives are supported and the aim is benefit-sharing for 50% of all installed solar and wind. The strategies have each been subject to SEA.

[We need to find out what were the outcome(s) of these SEA – did they result in major recommendations or changes to the strategies?

(c) Sub-sector level

Besides decisions at the national and energy sector level, in nearly all countries, additional decisions are made at sub-sector level. Chapters 5 – 10 discuss the key environmental; and socio-economic issues likely to arise when developing facilities, respectively, for the hydropower, wind, solar, bioenergy, geothermal and tidal energy sub-sectors, whilst chapter 11 addresses issues associated with retiring coal-fired power plants (CFPPs) and closing associated coal mines.

Often, national plans set out decisions for each energy sub-sector concerning, for example, energy capacity, number of facilities and site selection.

Common set of issues to be addressed

For all the sources of renewable energy discussed the following chapters, and for retiring CFPPs and closing coal mines, there is a relatively common set of issues for which there is potential for environmental and socio-economic impacts to arise for which management and mitigation measures need to be addressed (see Tables 4.4 and 4.5, respectively). The specifics of these likely impacts for different energy sources are addressed in subsequent chapters.

Given the challenges of climate change and international commitments concerning GHG emissions, new or revised energy PPPs need to focus on how to change the balance in energy sources to reduce emissions and to promote and invest in renewable energy options. Many countries have already made considerable progress in this transition. An SEA for a national or more local energy PPP seeking to promote this transition will need to address all these issues (as applicable).

Table 4.4: Key environmental issues associated with closing coal-fired power plants/coal mines and developing new renewable energy facilities

Theme	CFPP	Coal Mines	Geotherm	Hydro	Solar	Tidal	Wind	Bioenergy
	Early Retirement	Closure	Development					
Integrity of habitats and preservation of biodiversity								
Integrity of protected & sensitive areas								
Delivery of ecosystem services								
Maintenance of air quality								
Fresh water use/demand								
Maintenance of water quality								
Waste (solid, gas, liquid, toxic, hazardous, spoil) & pollution								
Land/water contamination								
Noise and vibration								
Greenhouse gas emissions								
Land degradation (erosion/sedimentation/deforestation)								
Land/marine use change								
Flooding								
Hydrological change (rivers, estuaries)								
Demand for mineral extraction								
Risk of earthquake damage								
Land drainage								
Visual impacts								

Note: Issues may be directly related to the retirement/closure of CFPPs/mines or development of RE facilities; or indirectly to the need for associated infrastructure (e.g. access roads, transmission lines) and material sourcing (e.g. minerals).

Table 4.5: Key socio-economic associated with closing coal-fired power plants/coal mines and developing new renewable energy facilities

Theme	CFPP	Coal Mines	Geotherm	Hydro	Solar	Tidal	Wind	Bioenergy
	Early Retirement	Closure	Development					
Economic growth								
Legacy socioeconomic issues								
Employment and labour conditions								
Local economy and livelihoods								
Gender and vulnerability								
Indigenous communities								
Food security and price								
Skilled workers								
Health and safety								
Physical and economic displacement								
Conflicts								
Migration								
Community engagement and cohesion								
Public services and infrastructure								
Cultural heritage								
Human rights								

Note: Issues may be directly related to the retirement/closure of CFPPs/mines or development of RE facilities; or indirectly to the need for associated infrastructure (e.g. access roads, transmission lines) and material sourcing (e.g. minerals).

TIPS

- When designing the SEA process, identify how it can be integrated with the PPP process to the greatest extent possible.
- Clarify the process and steps involved in developing/revising the energy PPP; determine how the SEA can best support and inform the PPP process - identify the critical decision-making points/stages when information and recommendations from the SEA will have utility and could have influence.
- Identify the key actors involved in developing/revising the PPP and make sure they are informed of the SEA, understand how it can help their work, and are involved in (e.g., kept informed) of SEA progress, and receive essential information at appropriate and critical times.

ADD MORE