IMPROVING DECISION-MAKING FOR THE ENERGY TRANSITION

Guidance for using Strategic Environmental Assessment

Compiled by:
Barry Dalal-Clayton
Miles Scott-Brown

July 2024
Version 1

IAIA
International Association for Impact Assessment

International Association for Impact Assessment (IAIA)

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SPONSORS

IAIA is grateful to the following organisations for the financial and technical support in developing this guidance.

Asian Development Bank (ADB)

Impact Assessment Agency of Canada (IAAC)

Impact Assessment Agency of Canada | Agence d'évaluation d'impact du Canada

International Finance Corporation (IFC)

IFC International Finance Corporation WORLD BANK GROUP

Global Gateway

Funded by the European Union under the ACSIIS program

Netherlands Commission for Environment Assessment (MER)

mer Netherlands Commission for Environmental Assessment

Government of Norway

Norway

This publication has been produced with financial support from Norway. The contents of this publication are the sole responsibility of IAIA and can in no way be taken to reflect the views of the Government of Norway

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FOREWORD

We live in an era of accelerating climate challenges and an urgent need to de-carbonize energy systems. Decision-makers across the globe face a daunting task of delivering a complex, rapid and just energy transition with potentially significant consequences across economies and societies. It is against this backdrop that the International Association for Impact Assessment (IAIA) is launching "Improving Decision-Making for the Energy Transition: Guidance for Using Strategic Environmental Assessment". We hope it will serve as an essential and timely reference for policy makers, planners, industry leaders, civil society, and other important stakeholders involved in the energy sector.

This guidance comes at a critical time. The past five years have witnessed remarkable growth in renewable energy generation, a trend set to increase. The International Energy Agency forecasts that more renewable energy will be added in the next five years than has been installed since the first commercial renewable energy power plant was built more than 100 years ago. Despite this progress, we are still not on a path to reach the agreed COP28 target of tripling global renewable energy generation by 2030. Reaching net zero by 2050 will remain out of reach if we continue on our current trajectory.

Rapid advancements in green technologies, greater efficiencies driving down cost, and a desire for greater energy security are set to deliver further exponential growth in renewable energy projects. But this will cause people to face a fundamental truth: the energy transition, while vital, is not benign; it is instead messy and challenging, and can cause many unintended consequences in a world of complex, inter-related systems.

Strategic Environmental Assessment (SEA) is a powerful and effective process to address this challenge. It provides a comprehensive framework to see the big picture, to harmonize renewable energy development with the interests of other sectors, address the perspectives of stakeholders, communities and marginalised groups; and ensure that sustainability considerations are paramount in protecting the future of life on our planet.

SEA is a proactive approach that examines the interconnected systems of people, our economies and our environments. It considers alternatives to proposed policies, plans and programmes for the energy transition and addresses the potential cumulative impacts that might arise from their implementation. SEA identifies ways to reduce or avoid potential negative environmental and socio-economic impacts, as well as how to find win-win outcomes and enhance the socio-economic benefits of energy projects. It improves the planning process by providing a clearer understanding of the consequences for future decisions.

For policy makers, SEAs can also provide a structure for progress on international commitments made under the Sustainable Development Goals, Nationally Determined Contributions under the Paris agreement, and the Global Biodiversity Framework and other international commitments.

This report is a practical guide for undertaking SEA to support strategic level policy-making, planning and programme development for the energy transition. It describes best practices for conducting SEA across the energy sector, and offers detailed methods and case studies across various energy types that illustrate its application in different contexts.

As we collectively strive to meet global climate goals and ambitions, this guidance will be a valuable resource. It will equip leaders to make informed, sustainable and wise decisions, and will help the public and industry to contribute to these decisions. Such decisions will shape the future of our energy systems, to best fit the natural and human environments where the projects will be developed, enabling a just and sustainable energy transition.

Alan Ehrlich

President
International Association for Impact Assessment

ABOUT IAIA

The International Association for Impact Assessment (IAIA) is the leading global network on best practice in the use of impact assessment for informed decision-making regarding policies, programmes, plans and projects (www.iaia.org). It was established in 1980 with a voluntary membership comprising professionals involved with impact assessment, including both environmental, social and health impact assessment and strategic environmental assessment. The association promotes the application of integrated and participatory approaches to impact assessment, conducted to the highest professional standards. See website: About IAIA.

IAIA has members from over 100 countries and membership is open to anyone. It has affiliate organisations in over almost 20 countries, including Cameroon, Canada (multiple affiliates: Ontario, Quebec, Western and Northern Canada), Germany, Ghana, Iran, Italy, South Korea, Mozambique, New Zealand, Nepal. Nigeria, Portugal, South Africa, Spain, and Zambia.

IAIA publishes *Impact Assessment and Project Appraisal,* a quarterly journal comprising peer-reviewed research articles, professional practice articles and book reviews of recently published titles, and also publishes a newsletter and other downloadable documents. IAIA's primary activities are its annual conference which is hosted by different countries and regularly attracts over 700 participants, and regional symposia.

ACKNOWLEDGEMENTS

The development of this guidance is an initiative of IAIA and has been undertaken with the active support of the Board.

All drafts have been compiled for IAIA by Barry Dalal-Clayton and Miles Scott-Brown.

Grateful thanks are due to Gary Baker – Chief Executive Officer of IAIA, David Bancroft – former Executive Director of IAIA, Bridget John – Chief Operating Officer of IAIA, Caitlyn Grimm – Events and Projects Officer of IAIA, as well as Arend Kolhoff – Technical Secretary for International Cooperation Netherlands Commission and former Co-Coordinator of the IAIA Climate Change Section, for their vision and leadership in launching and securing funding for this initiative.

IAIA would particularly like to thank Aaron Hynes and Annik Birnie (IAAC), Kate Lazarus (IFC), Bruce Dunn (ADB), Frank Eklo and Mari Lise Sjong (Norwegian Environment Agency) and the Government of Norway for their support and help in arranging funding and support for this initiative.

The Netherlands Commission for Environmental Assessment (NCEA) has provided support in kind (commissioning peer reviews of some chapters and reviewing the guidance). In this regard, thanks are due to Rob Verheem, Arend Kolhoff, Edy Blom and Arthur Neher.

The following individuals kindly accepted to serve on the Technical Advisory Committee (TAC) for Phases A and B and provided guidance and suggestions for the contents and structure of this guidance:

- Kate Lazarus (International Finance Corporation)
- Emma Marsden (Asian Development Bank)
- Bryony Walmsley (IAIA Board and Southern Africa Institute for Environmental Assessment - South Africa)
- David Annandale (Consultant, UK)
- Arend Kolhoff (Netherlands Commission for Environmental Assessment, and IAIA climate section)
- Gaby Factor (Past President of IAIA [2022-2023])

IAIA is grateful to the following experts who kindly undertook formal peer reviews of particular chapters:

- ***Chapter 1***: Bryony Walmsley, Southern Africa Institute for Environmental Assessment (SAIEA) - South Africa
- ***Chapter 2***: Bryony Walmsley, Southern Africa Institute for Environmental Assessment (SAIEA) - South Africa
- ***Chapter 3***: Bryony Walmsley, Southern Africa Institute for Environmental Assessment (SAIEA) - South Africa; Thomas Fischer, Liverpool University, UK.
- ***Chapter 4***: Arend Kolhoff, Netherlands Commission for Environmental Assessment; Roel Slootweg (SevS consultants, The Netherlands)
- ***Chapter 5:*** Pier Luigi Mossa and Mirko Corigliano, European Committee of International Commission on Large Dans (EURCOLD); Eric Vuillermet, BRL Ingéniere consultants, France and French Committee member to EURCOLD; Jeff Opperman (WWF); Doug Smith; Armeline Dimier, Leah Beche and Michel Tomasino, Electricité de France (EDF).
- ***Chapter 6***: Pieter Boot and Erik Zigterman (consultants).
- ***Chapter 7***: Jonathan Bonadio and Daniela Blazejova (Solar Power Europe); Carolin Brands and Alexia Ruvoleeto (Solar Stewardship Initiative).
- ***Chapter 8***: V.K. Bharadwaj (World Bioenergy Association).
- **Chapter 9**: Dr Eng Ir. Suryantini and Adele Manzella (International Geothermal Association).
- ***Chapter 10***: Lotta Pirttimaa (Ocean Energy Europe).
- ***Chapter 11***: Emmanuele Bianco (IRENA) and Smeeta Fokker (UNIDO).
- ***Chapter 12***: Will Rifkin, Michelle Duffy, Kathy Mee and Meg Sherval, University of Newcastle, Australia; Jessica Reeves, Federation University, Sally Weller, University of South Australia;

Rebecca Colvin, Australia National University; Robert Perey, Western Sydney University & University of Technology, Sydney; and Simon Wright, Charles Sturt University.

- ***Chapter 13:*** Jean Hubert, Directeur Général du SIFÉE (Francophone International Secretariat for Environmental Assessment, Quebec, Canada
- ***Chapter 14:*** John Horberry, consultant, UK

Thanks are also due to the following who provided information on existing SEA guidelines and guidance documents, and/or on private sector and IFIF/MDB engagement with SEA and/or who provided comments on the earlier drafts of the guidance:

- Merci Andrews, Canada
- Andrey Artov
- Mike Bamford, consultant, Australia
- Simon Brascoupe
- Jeremy Carew-Reid, International Centre for Environmental Management (ICEM), Hanoi
- Txomin Casanueva, Spain
- Heather Castleden, University of Victoria, BC, Canada
- Lori Anna Conzo, Global Biodiversity Lead, International Finance Corporation
- Peter Croal, Canada
- Jiri Dusik, Integra Consulting, Czech Republic
- Ric Eales, consultant, France
- Alan Ehrlich, Canada
- Professor Thomas Fischer, University of Liverpool
- Weston Fisher, USA
- Leah Fusco, Canada
- Chimwemwe R.Gamulani
- Dr. Gesa Geißler, Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences (BOKU), Vienna
- Rufus Howard, Institute for Environmental Management (IERA), UK
- Jennifer Hruza, International Finance Corporation
- Steve Isaac, Jacobs Consultants, UK
- Arend Kolhoff, Netherlands Commission for Environmental Assessment
- Ales Kregar, Slovenia
- Adjei-Fosu Kwaku, Ghana
- Elisa Landivar
- Kate Lazarus, Senior ESG Advisory Lead, Asia Pacific Environment, Social and Governance, International Finance Corporation
- George Ledec, World Bank (retired)
- Paul Lochner, CSIR, South Africa
- Tamara Maricic, Institute of Architecture and Urban & Spatial Planning of Serbia
- Greg Mawn, Australia
- Peter-John Meynell, Consultant, Scotland, UK
- Ajay Mathema, School of Environmental Management and Science, Kathmandu, Nepal
- Raimi Morufu, Federal University Otuoke, Nigeria
- Fabien Nathan, Electricité de France (EDF), Hydro Engineering Centre, France
- Genevieve O'Farrell, Asian Development Bank
- Jeff Opperman, WWF, USA
- Rowan Palmer, UNEP
- Vesna Kolar Planinšič, Ministry of Environment and Spatial Planning, Slovenija
- Joseph Price, UNEP
- Eleanor (Kate) Richardson, South African Bat Assessment Association
- Cecila Rocha, University of Porto, Portugal
- Mari Lise Sjong, National Environment Agency, Norway
- Dr. Peter Tarr, Southern Africa Institute of Environmental Assessment, Namibia
- Juan Carlos Tejeda-González, University of Colima, Mexico
- Simon Toogood, Mackenzie Valley Environmental Impact Review Board, Canada
- Jay Wagner, Plexus Energy, UK
- Cheryl Wasserman, Environmental Governance Institute International

- Barry Wiesner, Amethemba Environmental Management Consulting, South Africa
- Galina Williams, Australia
- Robert Young, Hatch, Canada

The materials in this guidance build on and draw from many sources including existing SEA guidelines from many countries and organisations. A starting point for the discussion of key issues for particular energy sub-sectors (in Chapters 5 - 12) were narratives developed for a regional scoping report for a SESA of the Energy Transmission Mechanism in SE Asia (ADB 2022).

BACKGROUND TO THE IAIA SEA GUIDANCE FOR THE ENERGY TRANSITION

Global challenges and why the SEA guidance is needed for the energy transition

The world is facing two man-made and intricately linked environmental crises which threaten the functioning of the earth as a system: climate change and the biodiversity crisis. Both crises are linked to energy (Box 1).

Box 1: Links between climate, biodiversity and energy, and associated global agreements

The causes of climate change (global warming) have been clearly shown to be linked to the emissions of greenhouse gases from burning fossil fuels. The biodiversity crisis (loss of habitats and species) is linked to the energy sector through biomass. In many poor regions, people depend directly on biomass for energy (fuelwood, peat, charcoal) while, in the energy transition, bio-based fuels (such as wood pellets or biodiesel) play an important role. Both are biodiversity dependent and may be drivers of ecosystem degradation due to overexploitation.

Three leading global agreements stress the need to address the climate and biodiversity crises in a coordinated manner, with human well-being as the overarching goal:

- ***The Sustainable Development Goals*** (UN, 2015), described as a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are 17 Goals, which are an urgent call for action by all countries - developed and developing - in a global partnership. SDG 7 is concerned with "affordable, reliable, sustainable and modern energy for all". The SDGs recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality and spur economic growth – all while tackling climate change and working to preserve our oceans and forests. They are integrated and indivisible and balance the three dimensions of sustainable development: economic, social and environmental.

- ***The Paris Agreement*** (UNFCCC, 2015) under the UN Framework Convention on Climate Change with its overarching goal to hold "*the increase in the global average temperature to well below 2°C above pre-industrial levels*" and pursue efforts "*to limit the temperature increase to 1.5°C above pre-industrial levels*." For the first time, a binding agreement brings all nations together to combat climate change and adapt to its effects. In their Nationally Determined Contributions (NDCs), countries communicate actions they will take to reduce their greenhouse gas emissions and actions they will take to build resilience to adapt to the impacts of climate change.

- ***The Global Biodiversity Framework*** (GBF, 2022) contains global goals and targets aiming to protect and restore nature for current and future generations, ensure its sustainable use as well as spur investments for a green global economy. Together with the Paris Agreement, the GBF paves the way towards a climate-neutral, nature-positive and resilient world by 2050. It has clear, measurable goals and targets, with complete monitoring, reporting and review arrangements to track progress. Target 14 of the GBF is to "integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral PPPs.

The consequence of these global agreements is that all sectors must contribute and collaborate to achieve a sustainable energy transition. Sectors must not only mitigate the negative environmental and socio-economic risks and impacts of implementing their policies, plans and programmes (PPPs), but must also align their PPPs to environmental (in particular climate) and socio-economic objectives and actively contribute to solutions. This will require a substantial change away from the business-as-usual approach. For the energy sector, it means a shift towards a sustainable economy that is not based on fossil fuels and overconsumption of natural resources, but which relies on low-carbon solutions, simultaneously promoting a circular economy and, where possible, creating positive outcomes for biodiversity (restoration of degraded or destroyed ecosystems).

Potentially, there are numerous further linkages between energy sector activities and the above three global agreements, but they will depend on specific country and energy sector characteristics. This is why it may be difficult for sector authorities to address these cross-linkages with other sectors in an integrated manner when developing their sector PPPs. But this is a challenge that SEA can help to address by assessing the consequences of the initiatives (particularly PPPs) of an individual sector on domains beyond the horizon of that sector, and to identify opportunities for the sector to create win-win opportunities beyond its specific sector boundaries.

Climate is one of the key physical factors defining the type of ecosystems present in a region (including the type of crops which can be grown). Climate change will cause agro-ecological zones to shift (or even disappear), affecting the ability of a region to maintain its original ecosystems or types of cultivable crops. On the other hand, ecosystems act as climate stabilisers, governing patterns of evaporation and rainfall and providing system resilience to bounce back to normal after unexpected disastrous events.

Climate change is arguably the most critical existential challenge faced by the world today. The evidence for the need to take urgent steps to address this issue has been presented in reports by the Intergovernmental Panel on Climate Change (IPCC). The most recent report - the Sixth Assessment Report, was finalized on 4 April, 2022. It states that, *"in 2010-2019, average annual global greenhouse gas emissions were at their highest levels in human history, but the rate of growth has slowed; and that without immediate and deep emissions reductions across all sectors, limiting global warming to 1.5°C is beyond reach."*

Through various UN agreements reached at Conferences of the Parties to the UN Framework Convention on Climate Change (UNFCCC), countries have committed to address climate change by reducing emissions of greenhouse gases and to promote Energy Transition (ET) which requires the retirement of coal and other fossil fuel power facilities and movement towards renewable energy (RE) supplies (wind, hydropower, solar, tidal, bioenergy, geothermal, green ammonia and others).

According to REN21[1],

"The world is witnessing a remarkable boom in solar photovoltaics (PV) and a significant surge in energy investments. Global additions to renewable power capacity increased an estimated 36% in 2023 to reach around 473 gigawatts (GW), a new record for the 22nd consecutive year. Solar PV drove the increase and accounted for three-quarters of all the renewable power capacity additions in 2023."

In many countries, concerns about energy security have accelerated the transition to renewables and energy efficiency. However, some other countries have opted to embrace fossil fuels for energy supply assurance.[2] Global investment in both fossil gas and coal infrastructure remains substantial.[3] Many developing countries have prioritised short-term economic growth over long-term energy transition.

To support the energy transition, some countries are developing national energy plans and sector specific plans (see Chapter 4), whilst multilateral development banks and others are providing financial support for energy transition activities.

But such energy PPPs and implementing the energy transition (through PPPs and subsequent projects) will not be benign. They may also give rise to environmental and socio-economic impacts (some positive, many potentially negative if not well managed and mitigated). The opportunities can be enhanced, and the risks minimized, by applying impact assessment processes, particularly environmental and social impact assessment at the individual project level (e.g., for the retirement of a coal-fired power station, the closure of a coal mine, or the development of individual renewable energy generation facilities – including their associated infrastructure). At the higher planning and

[1] Global Overview (ren21.net)
[2] https://www.ren21.net/gsr-2024/#target_13
[3] https://www.ren21.net/gsr-2024/#target_14

programme levels, to move energy generation away from fossil fuels to renewable sources, strategic environmental assessment (SEA) is the most appropriate process to support ET planning and decision-making to respond to environmental and socio-economic concerns.

There has been very limited application to date of SEA for PPPs that focus on the energy transition and renewable energy development in general (although there are examples of SEAs for the energy sector in general – referenced in this guidance, that may include renewable energy components). Guidance for its application in this context does not exist but is critically required by practitioners and decision-makers. Furthermore, there is an urgent need for capacity strengthening and outreach, beyond the development of guidance, to explain to planners and decision-makers and decision-takers in the energy sector and others how SEA can help: what is its role and key steps, how it can benefit energy transition, the decisions that need to be made, and how to engage in the planning process.

Traditional environmental impact assessment (EIA) conducted at the individual project level has proven to be insufficient to deal with the bigger picture beyond project level impacts, to address cumulative impacts from multiple projects/developments and to protect the public interest. A more strategic approach is required to support policy-making and long-term planning by public and private actors in the energy sector. SEA is now a well-established procedure that supports such planning by ensuring that relevant alternatives are assessed, that all environmental and social effects are evaluated, and that all stakeholder interests are taken into account in the SEA.

SEA has been adopted by about 100 countries, nearly all high-income countries and an increasing number of low- and middle-income countries. In those countries without SEA legislation, the process is applied voluntarily and supported by IFIs and/or bilateral donors. As the global renewable energy sector is expected to expand significantly in the coming years, there is an immediate and pressing need for guidance to deal with siting issues, the overall lack of a comprehensive regulatory framework and increasing public concerns about the over-saturation of renewable energy projects in the landscape. These concerns can only be addressed at a strategic level, not at the individual project level.

A partnership approach to developing the guidance

Recognizing the necessary shift required towards the use of more renewable energy, the International Association of Impact Assessment (IAIA) launched a three-phased initiative in February 2022 to:

- ***Develop guidance*** (building on relevant existing initiatives) for the application of SEA to policies, plans and programmes for renewable energy development – focusing initially on the hydropower, solar, wind and bioenergy sub-sectors and subsequently expanded to include geothermal, tidal, green hydrogen, and coal fired power plant and coal mine closures;
- ***Establish a learning platform*** to share experiences with a broad group of stakeholders using the guidance and other platforms;
- ***Promote application of the guidance*** in selected countries to strengthen capacity and raise awareness (with training and coaching of stakeholders), to implement an outreach plan, and to gather experience - supporting SEA case applications of the guideline, and
- ***Launch a help desk team*** of experienced experts in the field of SEA and energy planning facilitated by respective practice organizations in this field.

IAIA is recognised as the leading international body for environmental assessment professionals and is well positioned to take a leading technical role in developing this SEA guidance for the renewable energy sector. But preparing such guidance is only one step. Securing practical application of the guidance will be dependent on the interest and commitment of a range of actors with responsibilities for SEA application, renewable energy development and financing the transition to renewable energy. Thus, IAIA has developed the guidance as a partnership initiative with the renewable energy sector, international and UN organisations, international finance institutions, bilateral donors, civil society representatives and other organisations. A partnership approach will also be required to apply and test the guidance.

Initiative phases

A: Launch Phase (January - June 2022):

- Development of a draft outline of the guidance;
- Establishment of oversight through a 'Partners Council' (PC) and 'Technical Advisory Committee' (TAC);
- Preparation of an inventory of existing SEA guidelines and an Inception Report on how to proceed in Phases B and C.

B: Development Phase (January 2023 – June 2024):

- Preparation of preliminary draft and full draft of the guidance (available on the IAIA website);
- Establishment of a Reference Group (RG);
- Inputs by RE experts, TAC, RG and IAIA members;
- Open review of preliminary and full drafts;
- Peer review of the 'full draft' chapters;
- Revision and finalization of Version 1 of the guidance;
- Professional copy editing of Version 1 and presenting it in a user-friendly and readable format;
- Securing financial support for follow-up to the project (implementation of the guidance, lessons learning, training, etc.), and

C: Implementation/roll-out Phase (2024 – 2027 onwards):

- Conversion of the guidance to an accessible, searchable, web-based format;
- Dissemination of the guidance;
- Development of training materials regarding SEA and its nature, role and modalities; its applicability to the energy transition; use of the guidance; and conducting a trainer orientation event;
- Regional and other workshops (piggy-backing on already planned events) to build awareness and provide training on the guidance and use of SEA in the renewable energy sector; including a pilot training course to test the training materials;
- Test application of the guidance to renewable energy plans and programmes in various countries by governments and others on a voluntary basis;
- Development of case studies documenting applications of SEA (using the guidance) for different renewable energy facilities;
- Revision of the guidance, where needed, to incorporate lessons learned from their application.

Governance

Three bodies were established to provide for oversight, technical review and engagement in the process of developing the guidance:

Partners Council *– to:*

- Review project documents (e.g., the Concept Note; Inception Report, Draft Guidance);
- Monitor progress of the initiative;
- Advise and assist on securing sources of funding and support;
- Advise on opportunities to pilot/apply the guidance;
- Recommend possible additional members of the Council;
- Advocate for uptake and application of the SEA guidance for renewable energy, and
- Plan for implementation of Phases B & C.

Technical Advisory Committee *– to:*

- Provide technical support and guidance on the process of developing the guidance.

Reference Group – a larger group of all interested individuals and organisations that are interested in the guidance initiative – to:

- Engage in broaden debate and information/experience gathering and build support for the initiative and its outputs, and subsequent uptake of the guidance, and
- Share experiences and engage in dialogue on associated issues.

AIMS OF THE GUIDANCE

For most countries, the transition away from fossil fuels to renewable energy as part of the energy transition will not focus on a single type of energy source or technology. It will inevitably involve a balance of different renewable sources and will, at least for the foreseeable future, continue to derive energy from non-renewable sources (fossil fuels) to meet a significant proportion of energy demand and ensure energy security – especially given continued population growth, rising energy demand, and geopolitical uncertainties. Therefore, this mix is likely to be reflected in national and sub-national energy strategies, policies and plans for some years to come.

The energy transition process will not be easy and will not be completed in the next few years, more likely over the coming decades – despite that fact that the pace of renewables development is accelerating as countries seek to meet their climate obligations in line with the Paris Agreement.

This guidance addresses the application of SEA to the energy transition: notably the early retirement of coal-fired power plants, changes to intermediary coal-based supply chains and associated closure of coal mines; and the development of the renewable energy sector and associated energy sector restructuring. Currently, the guidance covers the following renewable energy types: hydropower, wind, solar, bioenergy, geothermal energy, tidal energy and green hydrogen and ammonia. Other types (e.g., nuclear) may be added in the next version of the guidance along with the transition from liquid or gas fossil fuels. The guidance is, therefore, primarily concerned with the supply side of energy.

Some chapters focus on the 'why and how' of SEA (aims, role, stages and tasks) whilst others address coal mining and power generation and various renewable energy technologies. The latter chapters discuss the main technologies in use and the key environmental and socio-economic issues associated with them. SEAs for the energy transition will need to address such issues and provide direction for project level EIAs (for projects concerned with coal closure and renewable energy development) about the issues that will need to be considered.

Many of the environmental and socio-economic issues discussed in Chapters 5 – 12 will appear to be at a project level. This is because most our knowledge of these issues is derived from experience of implementing energy generation activities around the world - both for fossil fuel and renewable energy developments and projects. These are the very issues likely to be identified during scoping for an SEA (see Chapter 2, section 2.5), either because stakeholders are familiar with them or, often, because they have been directly affected by them. It is important to understand these issues because they may give rise to cumulative impacts from multiple projects when a PPP is implemented, and a critical role of SEA is to identify the potential and risk of cumulative impacts arising. Furthermore, these are the issues that may require to be addressed by changes to existing laws, regulations or PPPs, and this is a matter on which an SEA should make recommendations.

This guidance is "high-level" and does not go into detail about the options and opportunities for mitigation measures to avoid or minimize/reduce negative impacts, or to offset and compensate for them, or to restore/rehabilitate land at the end of a project, or about how to enhance positive impacts. That is one of the functions of individual project EIAs.

There are many generalized SEA guidelines published by governments and organisations. A survey of existing guidelines undertaken during Phase A of this initiative identified 142 guidelines – available at: https//www.iaia.org/pdf/hot-topics/inventory-of-SEA-guidelines.pdf. The number of such guidelines can be expected to increase in future to meet the demands of energy transition across the globe. Some of these address individual renewable energy sub-sectors (e.g., hydropower, wind), but none are currently available that cover the entire renewable energy field or the energy transition.

This guidance fills this critical gap and aims to promote sustainability in the energy transition to renewable sources. It particularly aims to promote a common approach and best practice, based on internationally accepted principles and good practices for SEA. The key target groups for the guidance include:

- ***SEA practitioners/professionals*** tasked with preparing an SEA for either (i) a PPP process under responsibilities of an energy department (energy sector planning), or (ii) for a multi-sector

PPP process in which the energy department has to play its role (e.g. spatial planning or regional development planning);

- ***Government ministries, departments and agencies***, particularly those responsible for energy planning and development and environment agencies responsible for national SEA systems/regulations;

- ***International organisations*** focused on renewable energy development;

- ***Financing organisations*** (including multilateral development banks and bilateral donors) that support the transition to renewable energy and which require due diligence to be carried out and environmental and social safeguards to be complied for both private and public sector investments in renewables;

- ***Sector organizations*** that advocate for a specific renewable energy technology;

- ***UN and other international organisations*** which promote the transition to renewable energy and which provide advice and support to governments;

- ***NGOs and CSOs*** with an interest or mandate covering renewable energy;

- ***Private sector energy companies and renewable energy developers*** with interest in moving to the use of renewable energy or securing their projects and minimizing planning related risks. The guidance sets out the key environmental and socio-economic issues likely to arise when developing various renewable energy options. These issues will need to be addressed in the development and operation of facilities in relation to overarching policies, plans and programs for renewable energy development;

- ***Researchers and academics*** working in the field of renewable energy and to students studying impact assessment, climate change and the energy transition in its many forms;

- ***Other stakeholders*** with an interest in or likely to be affected by the energy transition to renewable energy.

STRUCTURE OF THE GUIDANCE AND HOW TO USE IT

This guidance has been compiled in a modular format with the aim that, subsequently, it will be converted to a searchable online resource on the IAIA website; and revised, updated and expanded (e.g., new modules) as needed.

The guidance is framed in two main parts.

Part A – the why, what and how of SEA. It provides generic information that will be common to all SEAs undertaken in the renewable energy sector:

- Chapter 1 gives a background to SEA, explaining how it differs from EIA and discussing issues such as benefits of SEA, objectives, costs, stakeholder engagement and institutional arrangements;
- Chapter 2 describes the key stages and tasks in the SEA process and methodologies, and
- Chapter 3 sets out the legal requirements and commitments for applying SEA.

These chapters will be particularly helpful for those practitioners with limited previous experience of SEA, enabling them to draw on international experience and good practice when designing and conducting SEA processes. There is no 'blueprint or 'one size fits all' approach to SEA. But the basic stages and tasks are similar for all SEAs.

Part B – focus on specific energy sectors and associated issues. It first addresses overall energy PPPs (Chapter 4) followed by individual renewable energy sub-sectors (hydropower, wind, solar, bioenergy, geothermal, tidal and green hydrogen/ammonia) (Chapters 5-11). It also includes a chapter addressing the retirement of coal-fired power plants and closing coal mines (Chapter 12) as this will be a key element of the transition to renewable energy for many countries. It also features a chapter on associated infrastructure (e.g., transmission lines, sub-stations, access roads, electricity storage facilities, and terminals, ports and harbours) and supply chains which are critical to the energy transition (Chapter 13).

Each of Chapters 5 – 13 are presented in a common format:

- A short explanation of why SEA is important to the sub-sector;
- A discussion of existing guidelines/guidance for the sub-sector;
- Global installed capacity;
- A brief background to the sub-sector (e.g., types of technology in use);
- A discussion of the environmental and social issues associated with developing energy generation facilities. Each individual SEA will need to determine which are the key issues that should be focused on.

Each of the renewable energy type chapters (Chapter 5-13) contains a brief technical background to the particular type (e.g., technologies involved, installed capacity in leading generation countries) and discusses the key associated environmental and socio-economic issues. The latter material provides a resource to support the scoping of key issues during SEAs for the energy transition.

Finally, Chapter 14 provides guidance to government institutions and other organisations likely to commission or undertake SEAs for national energy plans or PPPs, as part of the energy transition.

The Part B chapters do not discuss generic SEA methodology issues (these are discussed in detail in Part A: Chapters 1 and 2); but they do address particular methodological aspects that may be specific to or particularly important for SEAs of individual types of renewable energy.

A range of annexes provide additional information and details pertinent to SEA, including annex 19 which defines the technical terms used throughout the guidance.

It is assumed that many users will not read the entire guidance from start to finish, rather, it is more likely that individuals will look at particular chapters that interest them. For this reason, readers will find that there is some repetition of key information in different chapters. This is deliberate to ensure that important issues and context (particularly about the basics of SEA) are not missed by readers concerned only with specific chapters (e.g., those concerned with individual renewable energy sub-sectors).

The intention is that this guidance will provide the material for IAIA to develop a searchable online resource which can be regularly revised and expanded, e.g. to include case studies, additional reference material, videos and other information relevant to the use of SEA for the energy transition.

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ALARP	As low as reasonably practicable
CBD	Convention of Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DAC	Development Assistance Committee of OECD
EC	European Commission
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
ES	Environmental Statement
ESIA	Environmental and Social Impact Assessment
ESCAP	UN Economic and Social Commission for Asia and the Pacific (ESCAP)
ESQOs	Environmental and social quality objectives
FDI	Foreign Direct Investment
GIS	Geographical information system
GLOF	Glacial Lake Outburst Flood
IAIA	International Association for Impact Assessment
I&AP	Interested and Affected Parties
IEC	Independent Expert Committee
IFC	International Finance Corporation
LAC	Limits of Acceptable Change
LPG	Liquid Petroleum Gas
MDG	Millennium Development Goal
MEA	Multi-lateral Environmental Agreement
NGO	Non-Governmental Organisation
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
PPP	Policies, Plans and Programmes
RE	Renewable Energy
SDG	Sustainable Development Goal
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SESMP	Strategic Environmental and Social Management Plan
SoE	State of the Environment Report
TOR	Terms of Reference
UNDP	United Nations Development Programme
UNECE	United National Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCC	United Nations Framework Convention on Climate Change
WB	World Bank
WTO	World Trade Organisation

PREFACE

Why the energy transition needs SEA

1. A brief introduction to SEA

Across the world, environmental impact assessment (EIA) and environmental and social impact assessment (ESIA) are commonly required to be undertaken for individual development projects. Strategic Environmental Assessment (SEA) is a higher-level tool for assessing the environmental and socio-economic risks and impacts of the policies, plans and programmes (PPPs) which subsequently give rise to individual development initiatives/projects. For example, a hydropower sector PPP can promote investments in cascade hydropower schemes along a river or in a basin as well as associated infrastructure, such as transmission lines and access roads. Each of these developments will give rise to environmental and socio-economic impacts (both positive and negative) and in combination with other developments will also lead to cumulative impacts on valued environmental and social components.

Project-level EIA/ESIA usually only considers the impacts associated with individual developments or projects and it may also consider cumulative impacts arising from the combination of individual projects as part of the project regulatory application. However, it doesn't consider the bigger picture at a regional level of planning for multiple developments prior to decisions being made on individual projects. This is the role of SEA. It can help with the planning and positioning of individual development projects/schemes. SEA also looks at alternatives to the policies, programs and plans (PPP) concerned, helping decision-makers to choose the technologies to be allowed/encouraged, the best locations for facility siting and the identification of go or no-go areas.

Chapter 1 provides a more extensive introduction to SEA and Chapter 2 sets out details of how it is undertaken, and the steps involved.

2. We need to consider the bigger picture and avoid unintended consequences

The transition away from fossil fuels to renewable energy sources aims to reduce emissions of CO_2 and other greenhouse gases, a key driver of climate change. But it is important that in considering all phases of the energy transition (including retiring coal-fired power plants, closing coal mines, and developing renewable energy sources), we do not overlook that these actions may also give rise to unforeseen environmental and socio-economic consequences that can undermine human well-being, impede achieving sustainable development and contribute further to breaching planetary boundaries.[4] We must plan to manage these adverse consequences while at the same time maximizing the benefits and opportunities that a transition to renewable energy brings.

There are some notable examples of major environmental and social disasters that had their causes in poor planning, a lack of foresight and failure to take a strategic view, e.g.,

- The ***Dust Bowl*** was a period of severe dust storms that greatly damaged the ecology and agriculture of the American and Canadian prairies during the 1930s. The phenomenon was caused by a combination of natural factors (severe drought) and manmade factors (a failure to apply dryland farming methods to prevent wind erosion, most notably the destruction of the natural topsoil through deep ploughing by settlers in the region and replacing native grasses that were able to trap moisture and sustain grazing. Some 400,000 km^2 of land were laid bare, affecting many thousands of families.[5]

[4] The concept of nine planetary boundaries within which humanity can continue to develop and thrive was introduced by Rockstrom *et al*. (2009). In September 2023, a team of scientists quantified, for the first time, all nine processes that regulate the stability and resilience of the Earth system: climate change*, novel entities*, stratospheric ozone depletion, atmospheric aerosol loading, ocean acidification, biogeochemical flows*, freshwater change*, land system change* and biosphere integrity* - six of which (marked *) have now been breached (Richardson et al., 2023)

[5] Dust Bowl: Causes, Definition & Years | HISTORY

- ***Land degradation/desertification***. The Sahel region once supported vast trading empires, where people were prosperous and developed extensive agricultural and livestock practices. The fragile ecosystem was unable to sustain its growing population. Increased pressure on the land and poor resource exploitation practices made droughts more ruinous, leading to a loss of grazing land, huge losses of livestock, famine and migration/refugees. The increase of grazing and agriculture, promoted by governments to maximise economic returns (but without any strategic assessment of the likely consequences) and the farmers themselves in rainy periods, caused systematic over-exploitation of the land well above its average capacity to provide water and pasture.[6]

- ***Shrinking of the Aral Sea*** – once the fourth largest inland sea in the world, with a vibrant fishing industry (e.g., high-value sturgeon and value-adding associated canning industries). In the 1950's, the Soviet Union decided to divert water from two feeder rivers of the Aral Sea lying between Kazakhstan to its north and Uzbekistan to its south (Figure 1). The water was used for irrigated and mechanised cotton, wheat, rice production (monoculture) on low-lying plains with poor, shallow soils and low rainfall – an area traditionally used by nomadic pastoralists.

Figure 1: Major rivers diverted for irrigated agriculture schemes in Kazakhstan and Uzbekistan
Source: Wikimedia Commons, Shannon1, 2017

A consequence of this ill-planning initiative has been a shrinking of the Aral Sea to a tenth of its original extent (Figure 2). This has led to: the salinity of the remining sea increasing by 300%; the fishing industry entirely collapsing by 1982 (Figure 3); changes to the local climate – the sea no longer acts as a barrier to cold wind leading to a considerable reduction in cotton and other crops; the loss of most birds and mammals; entire villages and towns abandoned; and the incidence of

[6] From the Dust Bowl to the Sahel | Earthdata (nasa.gov)

throat cancer amongst local inhabitants rising to nine times higher than world average. It is estimated that it would require US$300 billion to restore prior ecological functioning, which may not even be fully recoverable.[7]

Figure 2: The shrinking of the Aral Sea
(Source: Wikimedia Commons, NASA Collage by Producercunningham, 2014

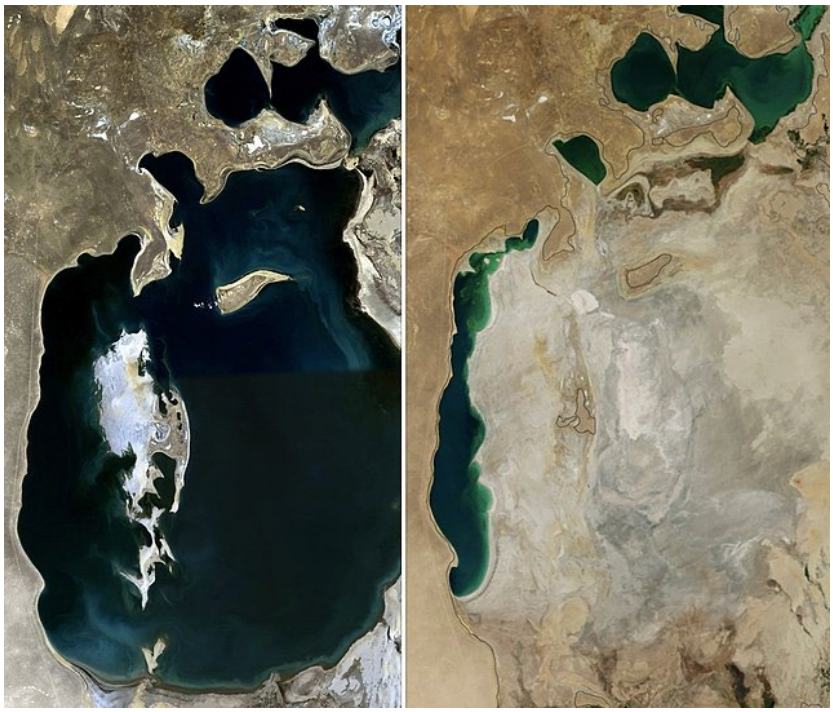


Figure 3: Dry Aral Sea bed and stranded fishing vessels

Policies, plans and programmes to foster the energy transition are no different to any other sector development PPPs. They all usually have good intentions that aim to tackle critical issues and to increase growth, employment, and prosperity. We can no longer afford to develop and promote such PPPs in ignorance of their likely environmental and socio-economic consequences – whether positive or negative.

[7] USAID Broadens Aral Sea Restoration Project with $1.6 Million in Funding for Uzbekistan - U.S. Embassy in Uzbekistan (usembassy.gov)

It is imperative that we develop a clear understanding of the potential cumulative, regional and "higher level" planning risks and impacts, their linkages and their unintended consequences associated with the energy transition to avoid unnecessary social and environmental risks, impacts and disasters such as those highlighted above. At the same time, we also need to identify the potential benefits and opportunities brought by development of renewable energy sources. SEA is an internationally recognised process that can provide this understanding and identify measure to enhance benefits and mitigate against the potential negative outcomes while promoting positive ones, ideally before project level decisions are made.

3. Benefits of SEA

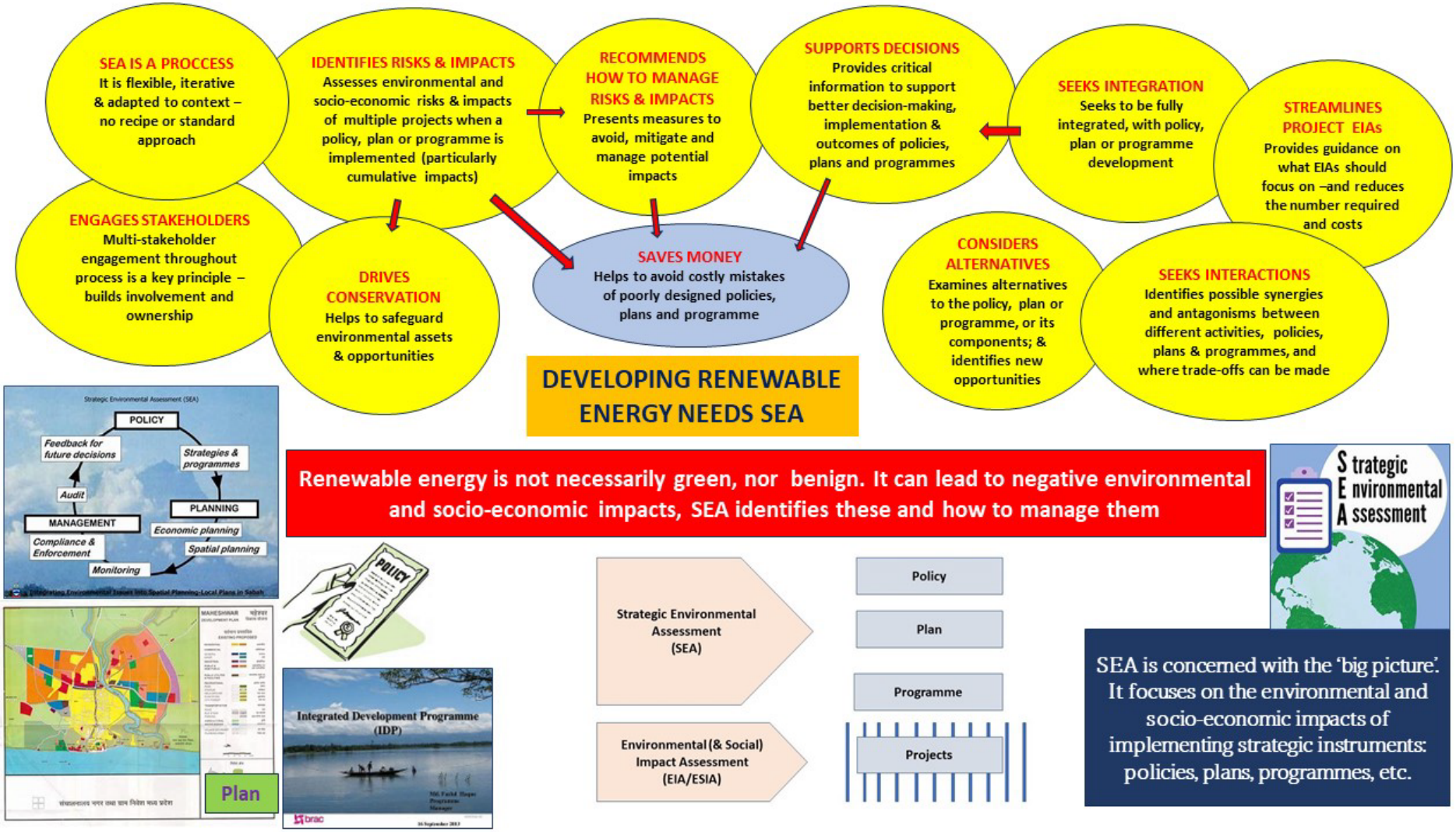
SEA has multiple benefits, not only for the environment and social settings but also in terms of the economy of a country or region. It is both a process and a mechanism to support the systematic integration of environmental, socio-economic and sustainability considerations in a policy, plan or programme (PPP) (Figure 4). In this way, it is a key process to support countries achieve the goals of creating a green and circular economy. [8] A good SEA can yield some noteworthy benefits, including safeguarding the environmental and social assets and opportunities upon which all people depend, particularly the poor and most vulnerable, thereby promoting poverty reduction; and supporting a gradual shift of decision-making towards genuine sustainable development, by:

- Facilitating the identification of new opportunities for sound environmental and social management;
- Facilitating improved consideration of environmental and socio-economic considerations (including health) and limits in the formulation of a PPP;
- Considering alternatives, and
- Encouraging the search for win-win options that open opportunities for new developments (a) within the carrying capacity of ecosystems or (b)within the tolerance of social systems.

Further key benefits are listed in Box 2.

[8] A model that seeks to reduce the consumption of finite resources and the generation of waste and pollution by keeping products, components and materials in use for as long as possible.

Figure 4: SEA supports developing more sustainable policies, plans and programmes



Box 2: Key benefits of SEA

SEA increases efficiency of elaboration of PPPs and improves the PPP decision-making process and development outcomes by:

- Enabling the identification of PPP development options that perform well against environment and socio-economic quality objectives, supporting a shift towards sustainable development;
- Warning decision-makers and the public about potentially unsustainable development options, which can help to prevent costly mistakes and conflicts – particularly over the use of natural resources;
- Providing environmentally and socially based evidence to support informed decisions;
- Providing insights into the trade-offs between such environmental and socio-economic issues, which increases the chances to find solutions that benefit all stakeholders;
- Identifying new environmental and socio-economic benefits and opportunities;
- Streamlining decision-making systems by reducing the complexity of environmental and social issues at the different stages of decision-making hierarchies;
- Supporting project-level decisions as these can be based on a previously optimised PPPs;
- Identifying and addressing potential areas of antagonism/conflict or inconsistency between PPPs early in the PPP formulation process and thereby preventing costly mistakes; and identifying synergies between PPPs that can deliver win-win opportunities.
- Improving governance by integrating public consultation in strategic-level decision-making;
- Identifying where changes are needed to the existing legal and regulatory framework;
- Improving inter-institutional coordination and implementation of complex decisions;
- Facilitating trans-boundary co-operation;
- Identifying monitoring requirements and follow-up measures to ensure effective implementation of PPPs that address SEA recommendations, and
- Improving understanding of cause-effect relationships through monitoring PPP implementation.
- Engaging governments to make early planning level decisions and provide guidance for project proponents.

SEA improves public trust in government policy-makers

- SEA allows stakeholders and the public to express their views on the proposed PPP during the consultation process, increasing the overall transparency of strategic decision-making.
- It improves public confidence in the SEA process by incorporating stakeholders' comments and opinions in a meaningful way that impacts decision-making;
- As a result, this helps policy and decision-makers to gain public trust and credibility in the planning process.
- Furthermore, a properly executed and accountable SEA also enhances the credibility of policies, plans, and programmes, and potentially helps to mobilize key stakeholders to support their enactment.
- SEA and EIA allow for the mitigation of both local as well as regional environmental and social problems. Such mitigation is more likely to be successful if proposed measures enjoy the support and agreement (mandate) of stakeholders achieved through their engagement early on in the SEA process.
- It also provides for a monitoring and follow-up process to track and ensure that SEA recommendations are implemented.

SEA strengthens and streamlines project specific EIAs by:

- Addressing a wider range of alternatives than is normally possible in project EIA, including through the use of scenarios;
- Considering cumulative effects and relatively large-scale environmental and social changes that are difficult to address in an EIA;

- Exploring the opportunities for and constraints to development posed by the broader receiving environment, thus ensuring development is sustainable within identified limits
- Assisting in defining and maintaining a chosen level of environmental and social quality objectives;
- Identifying ways to foster inter-institutional coordination which are often not possible at the level of project EIA while identifying constraints to doing so.
- Supporting planning for sustainable development and rational land use planning avoiding "overcrowding" and providing a tiered approach to avoiding exceedance of thresholds and carrying capacity.
- Making mitigation and management recommendations that should be addressed by EIAs for individual projects.

Government regulators and Environment Departments in many countries are overburdened by the volume of project EIAs being submitted and requiring their review and approval. It is not uncommon to see piles of such reports in offices awaiting attention. As indicated above, SEA is closely linked to EIA. They are part of a spectrum on impact assessment approaches. They can feed information and support each other. SEA can take information and lessons learned from multiple EIAs. But they can also streamline EIAs, reduce the numbers required and cut costs by:

- Ruling out the need for EIAs of particular activities or project types that will not be permissible under a PPP;
- Identifying the most appropriate areas/scenarios for development ('go' and 'no-go' zones), such that the priority issues for EIA have already been identified and minimised (e.g., through appropriate siting of leasing areas). This means that EIA alternatives assessment is essentially the identification of the optimal feasible solution in terms of project-level environmental and social impacts and mitigation
- Identifying major issues at the strategic level and indicating where only additional or site-specific information may be required for the individual project;
- Identifying and assimilating a broad array of information and data that is subsequently available to project EIAs – thus reducing their costs and effort involved.
- Helping to standardize approvals and improve environmental and social performance, and
- Suggesting elements for project EIA terms of reference.
- Managing cumulative impacts of individual projects at a regional level.

SEA helps to save time and money and prevent costly mistakes

SEA provides precautionary signals that help to warn decision-makers at an early stage about environmentally and socially unsustainable development options. Ultimately, this saves time and money as problematic options are disregarded and only a few resources are spent on their development. The decision-making process also becomes less time consuming and efficient as planners are effectively able to gather and analyse inputs from relevant stakeholders in a timely manner. It also saves the cost of remediation of future environmental disasters that would occur due to unsustainable development strategies.

SEA strengthens governance

Documenting the PPP development process through an SEA increases the overall transparency and credibility of strategic decision-making and allows the early consideration of the opinions of key stakeholders in the planning process. Properly undertaken and accountable SEA enhances the credibility of PPPs by strengthening the governance of individual government institutions and fostering cooperation and coordination between them. It may mobilize public support for implementation – a PPP will naturally be far more effective when the values, views, opinions, and knowledge of the public have truly become part of the decision-making process. Thereby an SEA helps to build an overall 'enabling environment' for sustainable options.

3.6 Why success is not necessarily optimal

SEA has not always been as successful in its implementation as it could be. There are many reasons for this:

- Government often does not have the internal capacity nor budgets available to undertake SEA, yet alone to do it themselves;
- Lack of baseline environmental and social data required for meaningful decision-making;
- Lack of political will or inertia to initiate SEA;
- Political and economic pressure to proceed with individual project developments prior to putting a strategic planning framework in place.
- Lack of coordination and being "out of sync" with private sector development;
- Many government departments work in siloes with little opportunity given for inter-institutional cooperation and coordination
- Lack of adequate or effective public consultation;
- Failure to implement SEA recommendations and lasting follow-measures

4. How government institutions and other organisations can use SEA to support the energy transition

Usually, it will be national government departments (particularly those responsible for energy) that will need to consider commissioning or undertaking an SEA to support decision-making regarding the energy transition in the country. This could be for:

- A national energy plan, policies, programme or strategy - likely to include both existing energy-generation sources, methods and technologies, as well as promoting one or more renewable energy options;
- A PPP for particular energy/renewable energy sector (e.g., hydropower, wind, solar, geothermal, bioenergy, tidal, or other options such as green hydrogen), and
- A PPP for multiple renewable energy sectors in combination with closure of fossil-fuel power generation, mines and supply chains.

Funding agencies, particularly multilateral development banks, may also require an SEA to be carried out to satisfy safeguard requirements linked to funding support for the energy transition.

An important factor is that achieving the energy transition will involve multiple government ministries and agencies and this will require the involvement and "buy-in" of private sector energy companies and investors as well as the public. This makes it a complex process with a wide array of participants with different political and economic interests, each of which have their own agendas, policies, responsibilities. Mechanisms will be needed to ensure that all such stakeholders are engaged, can contribute their perspectives and have a role to play.

Another merging area of parallel interaction is the Just Transition making sure that no-one is left out of the energy transition (see section 5).

SEA should also be of interest to the private sector to help major investors weigh up their options and plan for developing renewable energy sources. By having an SEA in place, approved by stakeholders and governments, prior to the issuance of licenses for renewable energy projects, this can increase investor confidence that individual projects can proceed with minimum delay and setback due to unresolved environmental and social issues.

Box 3 summarises the relevance of SEA for governments, energy companies and developers and affected communities.

Box 3: Relevance of SEA for key stakeholders in the energy transition

For governments

The use of SEA helps to balance multiple interests in relation to energy transition developments and the planning/construction of associated infrastructure. For example, it can:

- Lead to better preparedness and strategic governance in managing biodiversity and natural resources;
- Ensure that all interests in the energy transition are considered and protected, including vulnerable groups and those who normally do not have a voice in the planning process;
- Provide clarity on the tasks that need to be carried out, with a clear division of responsibilities between government agencies and private sector partners, and
- Offer a clear view of the concerns and aspirations of other stakeholders in society and ensure more transparent decision-making, which usually will enhance support.

For energy companies and developers

- Carrying out an SEA for the energy sector as a whole or for energy planning in a particular region in which companies are interested to invest in renewable energy development can lead to more sustainable and cost-effective projects;
- An SEA may identify the most suitable areas for investments, preventing costly mistakes (such as those caused by water scarcity);
- It can engage local stakeholders, which may build support for renewable energy projects and could prevent resistance or conflict, particularly if shared benefits can be provided, and
- Research and assessment undertaken as part of SEA baseline studies can also be used for project-specific ESIAs, saving time and money.

This all helps to secure effective investment in the renewable energy sector while maximizing the benefits for companies and society.

For affected communities

- An SEA may lead to renewable energy initiatives making a better contribution to regional and national development while minimizing the negative consequences.
- Vulnerable groups, and ecosystem services they usually depend on, may receive the attention they require through their active involvement and consideration in the SEA process.

Adapted from MER/IGF/IISD (2024)

Whilst SEA laws and regulations have been promulgated in more than 100 countries around the world, awareness of the process, its modalities and benefits remain limited in line agencies. There is an urgent need to raise such awareness and provide training on the role of SEA in supporting the energy transition. Energy ministries/departments should be encouraged to send relevant officials to available SEA training courses[9] or to arrange for SEA awareness-raising and training courses to be conducted – either nationally or regionally.

Chapter 14 provides detailed guidance and tips for those government institutions and other organisations likely to commission or undertake SEAs for national energy plans or PPPs, particularly as part of the energy transition away from generating power from fossil fuels to the use of renewable energy sources.

[9] IAIA offers training course at its annual conferences (see www.iaia.org)

5. SEA and Just Transition

Uptake of the Just Transition concept

Just transition (JT) is a requirement of the energy transition. The concept was first used in the 1980s by US trade unions to protect workers affected by new water and air pollution regulations. The trade union movement developed JT as a framework to encompass a wide range of social interventions needed to secure workers' rights and livelihoods for those economies shifting to sustainable production, primarily combating climate change and protecting biodiversity. In recent years, the concept has gained traction with reference to meeting climate goals by ensuring the whole of society – all communities, all workers, all social groups – are brought along in the pivot to a net-zero future and that no one is left out of it. [10] It is highly relevant to the energy sector, as the shift from fossil fuels to renewable and low-carbon energy will entail loss of jobs in some sectors and creation of jobs in others.

The International Labour Organization (ILO) defines JT as: "*Greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind*."[11]

JT often seeks to unite social and climate justice, for example, for coal workers in coal-dependent developing regions who lack employment opportunities beyond coal when transitioning to other forms of renewable energy.

A number of organizations have used the concept of a JT with respect to environmental and/or climate justice.

With regards to climate change mitigation, the IPCC defines JT as: "A set of principles, processes and practices that aim to ensure that no people, workers, places, sectors, countries or regions are left behind in the transition from a high-carbon to a low carbon economy."[12]

Language regarding JT and the creation of decent work is included in the Preamble to the UN Paris Agreement agreed at the UN Climate Change Conference in 2015 (COP21). The importance of JT was subsequently highlighted in the Solidarity and Just Transition Silesia Declaration adopted at the 2018 UN Climate Change Conference in Katowice, Poland (COP24). The Declaration encourages all relevant UN agencies to proceed with its implementation and consider the issue of JT when drafting and implementing parties' nationally determined contributions, or NDCs.

At COP26 in Glasgow, the European Investment Bank announced a set of ***JT common principles*** agreed upon with multilateral development banks, aligning with the Paris Agreement. The principles refer to focusing financing on the transition to net zero carbon economies, while keeping socio-economic effects in mind, along with policy engagement and plans for inclusion and gender equality, all aiming to deliver long-term economic transformation.

A number of multi-lateral development banks have vowed to uphold the principles of climate change mitigation and a JT.[13]

The relationship between SEA and the Just Transition

SEA and JT can be seen as having parallel and complementary aims. They both seek to address the environmental and socio-economic impacts and opportunities brought about by the energy transition, but with differences in focus. SEA is concerned with the environmental and socio-economic effects of PPPs, whilst JT mainly emphasises social concerns (employment, livelihoods, health, and safety) largely at the asset level.

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[10] What is just transition? And why is it important? | Climate Promise (undp.org)
[11] Frequently Asked Questions on just transition (ilo.org)
[12] IPCC (2022)
[13] Source: Just transition - Wikipedia

SEA is not specific to the energy transition. It is a process that supports policy-making and strategic planning across many sectors where the environmental and socio-economic benefits, risks and impacts of development decisions need to be assessed.

As applied to the energy transition and to individual (sometimes multiple) sectors, SEA provides a high-level assessment of government energy-related policies, plans or programmes (PPPs). It is not concerned with individual energy asset or projects. Those are the focus of project-level environmental and social impact assessment (ESIA). SEA aims to identify the potential environmental and socio-economic benefits and the negative risks and impacts of the energy transition; and identifies the potential opportunities to promote sustainable development through the energy transition. The SEA produces an Environmental and Social Management Plan (SESMP) recommending how the opportunities, risks and impacts of the energy transition can be managed by the responsible implementing agencies and others.

In contrast a just energy transition can have both a strategic as well as an asset/project-level focus. Its focus is on the process of transitioning to a low-carbon and sustainable economy in a way that is fair and equitable for all stakeholders, including workers, communities, and vulnerable populations. Special attention is paid to energy poverty. It involves ensuring that the benefits and costs of the transition are distributed fairly, and that workers in industries that are being phased out are not left behind or worse off. The outputs of assessments concerned with JT identify specific social interventions required to minimize social, economic, labour and health and safety risks of the energy transition at both a strategic and asset level. There have been calls for the JT to also include more consideration of environmental risks.[14]

While these analyses are different with regard to their outputs, the data and information derived from both JT and the SEA processes should be mutually supportive. The findings of the JT can also help inform the SEA process for the energy transition.

The relationship between JT and SEA lies in their shared goal of promoting sustainable development and ensuring that the benefits, risks and impacts of decisions about energy distribution are distributed fairly amongst all parties. SEA can be used to assess the potential benefits and impacts of a JT plan, and to identify ways to ensure that the transition is fair and equitable for all stakeholders. Similarly, assessments for JT in a country can inform the development of SEA by highlighting the needs and interests of workers, communities, and vulnerable populations.

In short, both JT and SEA are important vehicles for promoting sustainable development and ensuring that the benefits, risks and impacts of decisions regarding the energy transition are distributed fairly amongst all those involved.

[14] e.g. Abram *et al*., 2022).