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ARTICLE

Climate Effects in Environmental Impact Assessment

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Abstract
This article analyzes the application of environmental impact assessment as a tool for climate change mitigation from a global comparative perspective. It firstly confirms that, despite persistent resistance in a few jurisdictions, climate effect assessment is now widely applied on a global scale. Yet the article also shows that this practice has faced recurrent practical and conceptual issues, in particular, concerning the determination of the significance of a project's climate effect and the assessment of indirect effects. Lastly, this article assesses how states have addressed these issues and identifies good practices. In doing so, the article illustrates the potential of functionalist comparative analysis in advancing our understanding of climate law and suggesting policy-relevant conclusions.

Keywords: Environmental impact assessment; Climate change; Climate change mitigation; Greenhouse gas emissions; Downstream emissions; Environmental significance; Litigation

1. Introduction

States have long recognized that environmental impact assessment (EIA) should 'be undertaken for proposed activities that are likely to have a significant adverse impact on the environment', with a view to ensuring that decisions on whether to approve these activities are well informed.[1] While EIA focused originally on local environmental impacts, many countries have extended its scope to consider measures aimed at limiting greenhouse gas (GHG) emissions, thereby contributing to climate change mitigation one project at a time.[2] This article proposes to use the concept of 'climate effect assessment' (CEA) to refer to the application of EIA as a tool for climate change mitigation or, to put it in a different way, the integration of climate effects (in particular, GHG emissions) into the scope of EIA. In many jurisdictions, CEAs are

[1] Rio Declaration on Environment and Development, adopted by the United Nations (UN) Conference on Environment and Development, Rio de Janeiro (Brazil), 3–14 June 1992, UN Doc. A/CONF.151/26 (Vol. I), 12 Aug. 1992, Principle 17, available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf; see also United Nations Environment Programme (UNEP), 'Goals and Principles of Environmental Impact Assessment', 16 Jan. 1987, UN Doc. UNEP/GC.14/17, Annex III, Preamble.

[2] See references cited in Section 2.1 below.

now routinely conducted for GHG-intensive activities, including in respect of projects involving fossil-fuel extraction[3] and distribution,[4] power generation,[5] transportation,[6] and land-use changes.[7] A recent advisory opinion by the International Tribunal for the Law of the Sea identified CEA as a legal requirement under the United Nations (UN) Convention on the Law of the Sea[8] and suggested that a similar obligation could exist under customary international law.[9]

Yet the application of EIA to climate effects is not a straightforward process. As the European Court of Human Rights (ECtHR) noted in *Verein Klimaseniorinnen* v. *Switzerland*, 'fundamental differences' should caution a government against 'directly transposing' existing environmental rules to climate change.[10] While an actor's local air, water or ground pollution can predictably cause tangible harm to surrounding communities, an actor's GHG emissions do not 'harm' any individual or community in the same manner. Rather, the harm resulting from GHG emissions of a project – its 'climate effect' – is diffuse, global, and protracted. In these circumstances, one cannot simply assume (or rule out) that a regulatory tool effective in addressing localized environmental issues, such as EIA,[11] could readily and effectively be applied as an effective tool for addressing climate change.

Applying EIA as a tool for climate change raises at least two major issues worth investigating. Firstly, determining the significance of a project's climate effect is complicated by the fact that, when taken in isolation, a project's GHG emissions may appear as nothing more than a 'drop in the ocean'.[12] Secondly, the implementation of a project often has indirect effects on sources of GHG emissions located beyond the site of the project, sometimes in a different jurisdiction, which may be difficult to predict.

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3 *Waratah Coal Pty Ltd* v. *Youth Verdict Ltd (No. 6)* [2022] QLC 21.

4 *Mid States Coalition for Progress* v. *Surface Transportation Board* (8th Cir 2003) 345 F.3d 520.

5 *Earthlife Africa Johannesburg* v. *Minister of Environmental Affairs* [2017] 2 All SA 519 (GP).

6 Verfassungsgerichtshof, VfGH E 875/2017 (1 June 2017) (Austria) (*Re Vienna Airport Extension*).

7 *Center for Biological Diversity* v. *US Forest Service* (D. Montana 2023) 687 F.Supp.3d 1053.

8 Montego Bay (Jamaica), 10 Dec. 1982, in force 16 Nov. 1994, available at: http://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm.

9 *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law*, Advisory Opinion, 12 May 2024, paras 354–67 (COSIS), available at: https://www.itlos.org/fileadmin/itlos/documents/cases/31/Advisory_Opinion/C31_Adv_Op_21.05.2024_orig.pdf. On the existence of an EIA requirement (focusing on localized impacts) under customary international law see, e.g., International Court of Justice (ICJ) cases, *Pulp Mills on the River Uruguay (Argentina* v. *Uruguay)*, Judgment, *ICJ Reports* (2010), p. 14, para. 204; *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua) and Construction of a Road in Costa Rica along the San Juan River (Nicaragua* v. *Costa Rica)*, Judgment, *ICJ Reports* (2015), p. 665, para. 104. See generally B. Mayer, 'Climate Assessment as an Emerging Obligation under Customary International Law' (2019) 68(2) *International & Comparative Law Quarterly*, pp. 271–308.

10 *Verein Klimaseniorinnen Schweiz* v. *Switzerland*, ECtHR, App. No. 53600/20, 9 Apr. 2024, para. 422, available at: https://hudoc.echr.coe.int/?i=001-233206.

11 For a discussion of the effectiveness of EIA when applied to localized environmental issues see, e.g., J. Loomis & M. Dziedzic, 'Evaluating EIA Systems' Effectiveness: A State of the Art' (2018) 68 *Environmental Impact Assessment Review*, pp. 29–37; A. Caro-Gonzalez et al., 'From Procedural to Transformative: A Review of the Evolution of Effectiveness in EIA' (2023) 103 *Environmental Impact Assessment Review*, article 107256.

12 J. Peel, 'Issues in Climate Change Litigation' (2011) 5(1) *Carbon & Climate Law Review*, pp. 15–24, at 16.

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In this context, the present article aims to better understand how EIA is being applied, or could be applied, as a tool for climate change mitigation. More specifically, it aims to document the global diffusion of CEA, to identify the issues faced in its implementation, and to assess potential solutions in addressing these issues. To do so, the article relies mainly on a functionalist approach to comparative legal analysis. Comparative legal scholars have long argued that comparisons could enrich national policy debates by making available to decision makers 'a reservoir of different solutions' to common issues.[13] This is particularly relevant in fields where 'the legal system of every society faces essentially the same problems' but 'solves these problems by quite different means'.[14] Thus, comparative legal research is particularly promising with regard to CEA, in relation to which jurisdictions have faced common issues but have come up with distinct solutions, some certainly more satisfactory than others, as the article will show.

This article builds on a research project aimed at identifying and documenting the application of EIA as a tool for climate change mitigation. The research was not limited to a predetermined set of jurisdictions: it sought to identify and document relevant developments, and the solutions they may suggest, as broadly as practically possible. The research relied on institutional websites, legal databases, academic literature, and news reports, and made use of search engines and neutral machine translation services. Inevitably, the findings remained unsystematic as a result of practical constraints such as language barriers and lack of access to data, which have made it difficult to identify and document relevant developments in certain regions, particularly in developing countries. Nonetheless, developments were documented in more than 100 jurisdictions, allowing for the formulation of general conclusions regarding trends in EIA law and practice, the identification of recurrent issues, and the documentation of approaches to addressing these challenges.

This survey provides the basis for a functionalist analysis. Common issues are identified across jurisdictions, such as difficulties in determining the significance of a project's climate effect and the scope of the climate effects to be assessed in relation to a project. Further, potential solutions are identified based on developments taking place in various jurisdictions. The article does not go as far as formulating good practices or policy recommendations (which may well depend on the circumstances in which CEA is implemented), but it does identify approaches that regulatory agencies should at least consider when adopting or refining national frameworks.

Section 2 takes stock of the widespread adoption of CEA throughout the world, based on available documentation, while also acknowledging persistent objections from some judges and lawmakers in certain jurisdictions. The two remaining sections of the article delve more deeply into one of the main issues related to CEA before

[13] J. Hill, 'Comparative Law, Law Reform and Legal Theory' (1989) 9(1) *Oxford Journal of Legal Studies*, pp. 101–15, at 102.

[14] K. Zweigert, *Introduction to Comparative Law* (Clarendon, 3rd edn, 1998), p. 34; see also M. Mehling, 'The Comparative Law of Climate Change: A Research Agenda' (2015) 24(3) *Review of European, Comparative and International Environmental Law*, pp. 341–52.

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assessing potential solutions that have emerged from EIA law and practice.[15] Specifically, Section 3 explores the challenge of assessing the significance of a project's climate effect – whether as a way to determine if a CEA needs to be conducted or, subsequently, to decide on the project's approval – in spite of the marginal contribution of the project to global GHG emissions. Section 4 turns to the question of whether and, if so, how CEAs should document the indirect climate effects of projects, particularly the downstream emissions associated with fossil-fuel production projects.

2. The Practice of CEA

EIA is used as a tool for climate change mitigation in most, but not all, jurisdictions. This section firstly documents the widespread adoption of EIA and CEA before identifying the main factors of resistance from some judges and lawmakers.

2.1. Widespread Adoption

Since the United States (US) adopted the National Environmental Policy Act (NEPA) in 1969,[16] most countries, many subnational governments, and some other entities have established procedures for the assessment of the environmental impacts of activities that are likely to affect the environment.[17] These procedures aim at ensuring that decisions are well informed, rather than to pre-empt or substitute for political deliberations.[18] They typically apply notwithstanding whether the project is planned by a public agency or a private entity. In some jurisdictions, a distinction is drawn between 'EIA', which applies to concrete projects, and 'strategic environmental assessment' (SEA), which applies to broader policies, plans or programmes.[19] However, this terminology is not always used consistently, or at all.[20] This article uses 'EIA' and 'project' in a broad and generic sense. EIA frameworks usually involve six components: (i) the screening of planned activities to determine the need for an assessment procedure; (ii) the scoping of the assessment; (iii) the realization of the scientific study; (iv) public consultations; (v) a formal decision on whether to approve,

[15] This assessment of policy inevitably involves the complementary use of interdisciplinary policy analysis; see W. Dunn, *Public Policy Analysis: An Integrated Approach* (Routledge, 6th edn, 2017), p. 3, e.g., text at nn. 135–6 (relying on theoretical and empirical economic literature to assess arguments on perfect market substitution).

[16] 42 USC (2024) §§ 4321–70m–12.

[17] E.g., Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment [2014] OJ L 124/1; Environmental Assessment Act of 28 Oct. 2002 (China); California Environmental Quality Act, 1970 California Stat. 2780; Regulations on the Assessment of the Impact of Planned Economic and other Activities on the Environment in the Russian Federation, 16 May 2000 (No. 372).

[18] See *Robertson* v. *Methow Valley Citizens Council* (1989) 490 US 332, 351.

[19] Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, Kiev (Ukraine), 21 May 2003, in force 11 July 2010, available at: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4-b&chapter=27&clang=_en.

[20] See Regulation on Environmental Impact Assessment of Planning of 17 Aug. 2009 (China); 40 CFR (2024) § 1502.4 (National Environmental Policy Act Implementing Regulations).

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impose conditions on, or reject the project; and (vi) monitoring compliance with the decision.[21]

Many EIA laws and regulations did not initially specify whether an assessment of GHG emissions was required. Yet CEA requirements were often identified through an interpretation of these instruments and through a form of contagious lawmaking.[22] Thus, in as early as 2003, a US court found that the carbon dioxide (CO_2) of a power plant could fall within the scope of the impacts to be assessed under NEPA.[23] In the following year, a court in the Australian state of Victoria interpreted the state's EIA framework as implying that the EIA for a coal-mining project had to include a CEA.[24] Similar decisions were later reached in non-Western countries, for instance, with regard to coal-fired power plants, including in South Africa (2017),[25] Kenya (2019),[26] Chile (2022),[27] and Indonesia (2022).[28] In 2019, the National Green Tribunal of India dismissed a petition contending, among other things, that the government had failed to establish a mandatory CEA: in the Tribunal's view, this requirement already existed, implicitly, in the existing regulatory framework.[29] Even in the absence of such judicial decisions, administrative agencies have sometimes taken the initiative of requiring project proponents to undertake a CEA – for instance, in Mauritius,[30] Minnesota (US),[31] and China.[32]

Over time, a growing number of jurisdictions have sought to enhance legal certainty by including an express CEA requirement in their EIA instrument or in additional documents. In contrast to judicial decisions, these developments often clarify the modalities of a CEA, including the types of climate effect to be assessed and the

[21] A. Morrison-Saunders, *Advanced Introduction to Environmental Impact Assessment* (Edward Elgar, 2nd edn, 2023), pp. 41–81.

[22] See N. Affolder, 'Contagious Environmental Lawmaking' (2019) 31(2) *Journal of Environmental Law*, pp. 187–212.

[23] *Border Power Plant Working Group* v. *Department of Energy* (SD California 2003) 260 F.Supp.2d 997; see also *Mid States Coalition for Progress*, n. 4 above.

[24] *Australian Conservation Foundation* v. *Latrobe City Council* (2004) 140 LGERA 100.

[25] *Earthlife Africa Johannesburg*, n. 5 above.

[26] *Save Lamu* v. *National Environmental Management Authority*, National Green Tribunal, Nairobi (Kenya), Appeal No. NET 196/2016, Judgment, 26 June 2019, available at: https://climatecasechart.com/wp-content/uploads/non-us-case-documents/2019/20190626_Tribunal-Appeal-No.-Net-196-of-2016_decision.pdf.

[27] *Asociación de Prestadores de Servicios Turísticos de Mejillones* v. *Director Regional del Servicio de Evaluación Ambiental*, Corte Suprema de Justicia, 19 Apr. 2022, Rol 71628-2021, civil.

[28] *WALHI* v. *Provincial Government of West Java*, Administrative Court of West Java in Bandung, 13 Oct. 2022, Decision No. 52/G7LH/2022/PTUN.Bdg, para. 20, available at: https://elaw.org/resource/id_tanjungjatia_13oct22.

[29] *Pandey* v. *Union of India*, National Green Tribunal Principal Bench, New Delhi, Appl. No. 187/2017, [2019] NGT 843, paras 2–3, available at: https://perma.cc/32JF-JQAB.

[30] C. Elrick-Barr et al., *Integrating Climate Change into Environmental Impact Assessment in the Republic of Mauritius: Recommendations for Mainstreaming Climate Change into the EIA Framework* (United Nations Development Programme African Adaptation Programme, 2012), p. 15.

[31] K. Marohn, 'Minnesota Changes Environmental Review to Measure Climate Impacts', *MPR News*, 26 Dec. 2022, available at: https://www.mprnews.org/story/2022/12/26/minnesota-changes-environmental-review-to-measure-climate-impacts.

[32] Ministry of Environmental Protection, 'Technical Guidelines for Strategic Environmental Assessment: General Principles', HJ-130-2014, 1 Sept. 2014, A6.

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methodology to be used for their assessment. In the US, the Council on Environmental Quality (CEQ) adopted successive and detailed guidance documents advising national agencies on how to consider GHG emissions and climate change when implementing NEPA.[33] In 2014, the European Union (EU) revised its EIA Directive to require Member States to consider 'the impact of [a] project on climate' through an assessment of 'the nature and magnitude of greenhouse gas emissions'.[34] The European Commission adopted guidance documents,[35] although not as detailed and specific as the CEQ guidance. An express statutory CEA requirement has also been adopted in several other jurisdictions, including California (US),[36] Mexico,[37] New South Wales (Australia),[38] Norway,[39] and Quebec (Canada).[40]

Non-state actors have also implemented CEA requirements. In particular, the World Bank has long required the assessment of 'global environmental aspects' of planned action, including on climate change.[41] Other multilateral development banks have progressively adopted comparable rules.[42] In 2020, a CEA requirement was also included in a new edition of the Equator Principles,[43] a document adopted by over 100 private financial institutions as a pledge to assess the environmental and social risk arising from the projects they finance, in particular, in countries with lax environmental law or poor enforcement capability.[44]

2.2. Resistance and Opposition

While EIA is widely applied as a tool for climate change mitigation, it is not a universal practice. A few jurisdictions, like Singapore, do not have a mandatory EIA

[33] E.g. CEQ, 'National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change', 9 Jan. 2023, 88 *Federal Register* 1196 (CEQ, 2023 Guidance).

[34] Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment [2012] OJ L 26/1, consolidated as of 15 May 2014, Annex IV para. 5(f).

[35] European Commission, Directorate-General for Environment, *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Union, 2013), available at: https://data.europa.eu/doi/10.2779/11735; European Commission, *Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment* (European Union, 2013), available at: https://data.europa.eu/doi/10.2779/11869.

[36] California Pub. Res. Code (2024) § 21183.6.

[37] Ley general del equilibrio ecológico y la protección al ambiente, DOF 28-01-1988, last revised by DOF 24-01-2024, art. 41.

[38] Environmental Planning and Assessment Regulation 2021 (NSW), consolidated as of 14 Dec. 2023, ss. 29(3), 35BA, 35C, 35D, 79A(3)(c), 102(3)(a).

[39] Forskrift om konsekvensutredninger, FOR-2017-06-21-854, consolidated as of 1 Jan. 2024, ss. 10, 21.

[40] Regulation on Environmental Impact Assessment and Review Procedure of Certain Projects, D 287-2018, GOQ II, 1719A, 23 Mar. 2018.

[41] World Bank, Operational Policy 4.01, 'Environmental Assessment', Jan. 1999, para. 3 and n. 4.

[42] Asian Development Bank, 'Safeguard Policy Statement', June 2009, p. 38; African Development Bank Group, *Safeguards and Sustainability Series: Environmental and Social Assessment Series*, Vol. 1(5) (2015), p. 9; Asian Infrastructure Investment Bank, 'Environmental and Social Framework', amended Feb. 2019, p. 33.

[43] Equator Principles, version 4, July 2020, Principle 2, Annex A, available at: https://equator-principles.com/app/uploads/The-Equator-Principles_EP4_July2020.pdf.

[44] S. Lazarus, 'The Equator Principles at Ten Years' (2014) 5(3) *Transnational Legal Theory*, pp. 417–41.

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requirement. Others that do have a mandatory EIA did not extend it as a CEA. This is often related to administrative lethargy and the poor enforcement of EIA instruments, particularly in developing countries. Thus, despite the above-mentioned decision of the National Green Tribunal,[45] Indian authorities generally do not appear to require an assessment of GHG emissions as part of the EIA for relevant projects.[46] In contrast, some other jurisdictions have made a deliberate choice to exclude climate effects from the scope of their EIA framework.

In Kazakhstan[47] and, until 2022, in New Zealand,[48] the exclusion of climate effects from EIA was influenced largely by concerns that CEA would be redundant with cap-and-trade mechanisms. In principle, any policy or measure that reduces GHG emissions within the scope of a cap-and-trade mechanism would only cause emission allowances to be sold to and, used by, other actors, with no additional mitigation outcome overall – a phenomenon often referred to as a 'waterbed effect'.[49] Yet it is noteworthy that some jurisdictions, such as California and the EU, have adopted a CEA requirement in spite of having a cap-and-trade mechanism already in place.[50] Some mechanisms have been devised to adjust the cap of a cap-and-trade mechanism, with the view of 'puncturing' the waterbed.[51] These include allowing national authorities to limit the distribution of emission allowances or even purchase emission allowances already on the market. Overall, many – perhaps most – of a project's GHG emissions would take place beyond the sectorial, temporal or geographical scope of a national cap-and-trade mechanism. For instance, New Zealand's livestock emissions are (still) not included in its cap-and-trade mechanism.[52] As such, while avoiding a

[45] *Pandey*, n. 29 above.

[46] See, e.g., Ministry of Environment & Forests (India), 'Standard Terms of Reference (TOR) for EIA/EMP Report for Projects/Activities Requiring Environment Clearance under EIA Notification 2006', Apr. 2015, available at: https://environmentclearance.nic.in/writereaddata/Online/TOR/15_Oct_2021_17202435051665345ToR.pdf.

[47] Law amending the Environmental Code (3 Dec. 2011) No. 505-IV, Art. 31-1.2(13)–(14), modifying Environmental Code (9 Jan. 2007) No. 212-III-ZRK, Art. 38.2(1).

[48] Resource Management (Energy and Climate Change) Amendment Act 2004, s. 3(b)(ii); first reading of the Resource Management (Energy and Climate Change) Amendment Bill 2003, 5 Aug. 2024, 610 NZPD. See also *Environmental Defence Society Inc.* v. *Auckland Regional Council*, A183/2002 [2002] NZEnvC 315, [2002] NZRMA 492, (2003) 9 ELRNZ 1, para. 37(ii); but see Resource Management Amendment Act 2020, ss. 17–21, 35, 36.

[49] Such a waterbed effect has also been invoked to oppose various other measures aimed at reducing GHG emissions; see, e.g., S. Sorrell, 'Brexit: An Opportunity to Rethink UK Carbon Pricing', *Energy Post EU*, 28 Sept. 2016, available at: https://blogs.sussex.ac.uk/sussexenergygroup/2016/09/20/brexit-carbon-pricing; RWE AG, 'Proposals of Federal Ministry for Economic Affairs and Energy Endanger the Future Survival of Lignite', 20 Mar. 2015, available at: https://web.archive.org/web/20150524111127/http://www.rwe.com/web/cms/en/113648/rwe/press-news/press-release/?pmid=4012793.

[50] See *Climate Resolve* v. *County of Los Angeles*, Superior Court of California, County of Los Angeles, 5 Apr. 2021, Order, 19STCP01917, pp. 40–4, available at: https://climatecasechart.com/wp-content/uploads/case-documents/2021/20210405_docket-19STCP02100_order.pdf.

[51] Decision (EU) 2015/1814 concerning the Establishment and Operation of a Market Stability Reserve for the Union Greenhouse Gas Emission Trading Scheme and amending Directive 2003/87/EC [2015] OJ L 264/1.

[52] See L. Craymer, 'New Zealand Ends Plans to Price Agricultural Emissions', *Reuters*, 11 June 2024, available at: https://www.reuters.com/business/environment/new-zealand-ends-plans-price-agricultural-emissions-2024-06-11.

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waterbed effect should be an important consideration in the design of a cap-and-trade mechanism, this effect is not a convincing reason to exclude the application of EIA as a tool for climate change mitigation.

A more frequent ground for resistance and opposition to CEA relates to the abstract nature of climate effects. Opponents of a CEA requirement have pointed out that, by themselves, one project's GHG emissions would not directly cause any tangible effect on any specific communities or resources.[53] Yet scientists suggest that any incremental GHG emissions exacerbate climate change in a near-linear fashion.[54] Each billion tonnes of CO_2 is expected to increase global average temperature by approximately 0.0005°C, thereby amplifying a wide range of associated risks.[55] Thus, the US Supreme Court rightly noted the importance of considering even 'a small incremental step' towards addressing climate change.[56]

The opponents of a CEA requirement may further argue that an EIA framework does not, or should not, allow consideration of the extraterritorial effects of a project's GHG emissions. Thus, the Montana Environmental Policy Act (MEPA) formally excludes consideration of impacts unfolding 'beyond Montana's borders', especially those that are 'global in nature'.[57] Nonetheless, a state court held that an agency still had a duty to consider 'the greenhouse gas effects of [the] project as it relates to impacts *within the Montana borders*'.[58] This judgment is based on questionable grounds, as only an insignificant fraction of a project's climate effects would unfold within Montana.[59] On the other hand, by excluding any consideration of extraterritorial effects, the state legislation may appear incompatible with its international due diligence obligation related to climate change mitigation. In

[53] E.g., *West Coast ENT Inc.* v. *Buller Coal Ltd* [2013] NZSC 87, [2014] 1 NZLR 32, para. 123; *350 Montana* v. *Haaland* (9th Cir 2022) 50 F.4th 1254, 1281 (Nelson CJ, dissenting); CEQ, 'National Environmental Policy Act Implementing Regulations Revisions Phase 2', 1 May 2024, 89 *Federal Register* 35,442, at 35,508; *Environment Council of Central Queensland Inc.* v. *Minister for the Environment and Water* [2024] FCAFC 56, para. 89.

[54] Intergovernmental Panel on Climate Change (IPCC) (Core Writing Team, H. Lee & J. Romero (eds)), *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the IPCC* (IPCC, 2023), p. 83, available at: https://www.ipcc.ch/report/ar6/syr.

[55] R. Allan et al., 'Summary for Policymakers', in IPCC (V. Masson-Delmotte et al. (eds)), *Climate Change 2021: The Physical Science Basis. Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), pp. 3–31, at 28. On the near linearity of the socio-economic effects of climate change see also M. Burke, S. Hsiang & E. Miguel, 'Global Non-Linear Effect of Temperature on Economic Production' (2015) 527 *Nature*, pp. 235–9, at 239.

[56] *Massachusetts* v. *Environmental Protection Agency* (2007) 549 US 497, p. 524.

[57] Montana Code Annotated (2011) § 75-1-201(2)(a).

[58] See *Montana Environmental Information Center* v. *Montana Department of Environmental Quality*, Montana District Court, 6 Apr. 2023, DV21-01307, p. 29, available at: https://climatecasechart.com/wp-content/uploads/case-documents/2023/20230406_docket-DV21-01307_order.pdf (emphasis added). See also *Gray* v. *Minister for Planning* [2006] 152 LGERA 258 (NSWLEC), para. 100. On the subsequent episodes of conflict between the legislature and courts in Montana concerning the application of MEPA to climate change see *Held* v. *State of Montana*, Montana District Court, 14 Aug. 2023, CDV-2020-307, 2023 WL 5229257.

[59] See *Wildlife Preservation Society of Queensland Proserpine* v. *Minister for the Environment and Heritage* (2006) 93 ALD 84, para. 72.

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particular, it may conflict with what some refer to as a principle of non-discrimination in environmental protection: the notion that a state should not give less weight to environmental impacts in its decision-making process on the sole ground that these impacts would unfold beyond its borders.[60]

A more fundamental concern, however, relates to the effectiveness of EIA in addressing diffuse effects. If one approaches EIA merely as a means to mediate between project proponents and affected communities, its prospects as a tool for climate change mitigation are significantly limited by the absence of any community directly affected by the project's GHG emissions. Yet richer understandings of EIA are possible, including as a means to prompt stakeholders to 'move beyond strict self-interest … and thus [to] make decisions based on the common good'.[61] Indeed, while CEA does not prevent many GHG-intensive projects from being implemented,[62] this procedure can sometimes make a difference, albeit at the margins.[63] At times, increased scrutiny of the project's climate effects leads to an erosion of support for the project.[64] In other instances, a CEA may result in an administrative decision not to approve the project,[65] or to approve it subject to conditions aimed at reducing its GHG emissions[66] or at eliminating them altogether.[67] While rejection decisions could result in carbon leakage and other undesirable effects,[68] decisions approving activities with conditions are

[60] See, e.g., COSIS, n. 9 above, paras 354–6; *Verein Klimaseniorinnen*, n. 10 above. On the responsibility of the US for the conduct of a federated state see *LaGrand (Germany* v. *US)*, Provisional Measures, Order of 3 Mar. 1999, *ICJ Reports* (1999), p. 9, at para. 28. On the prohibition of such 'discrimination' see J. Knox, 'The Myth and Reality of Transboundary Environmental Impact Assessment' (2002) 96(2) *American Journal of International Law*, pp. 291–319; A. Boyle, 'Human Rights and the Environment: Where Next?' (2012) 23(3) *European Journal of International Law*, pp. 613–42, at 639–40.

[61] J. Holder, *Environmental Assessment: The Regulation of Decision Making* (Oxford University Press, 2005), p. 28.

[62] See, e.g., *Hazelwood West Field EES La Trobe Planning Scheme Amendment C32*, Panel established under the Planning and Environment Act 1987, Final Report, Mar. 2005, p. 243, available at: http://hazelwoodinquiry.archive.vic.gov.au/wp-content/uploads/2014/08/DSDBI.0007.001.0011.pdf.

[63] See E. O'Gorman, T. Hochstrasser & F. Renou-Wilson, 'Climate Impact Assessment Procedures: Time to Look Beyond Compliance?' (2024) 42(6) *Impact Assessment and Project Appraisal*, pp. 553–64.

[64] On the project at issue in *Earthlife Africa Johannesburg* (n. 5 above) see Minister of Environmental Affairs, *Thabametsi Coal-Fired Power Station*, Reconsideration of Appeal Decision, LSA 142346, 30 Jan. 2018, s. 3.2, available at: https://perma.cc/7CEL-JABB (decision approving the project); 'The Writing Is on the Wall for Coal-Fired Stations in South Africa', *ESI Africa*, 4 June 2021, available at: https://www.esi-africa.com/industry-sectors/generation/the-writing-is-on-the-wall-for-coal-fired-stations-in-south-africa.

[65] *Gloucester Resources Ltd* v. *Minister for Planning* [2019] NSWLEC 7, para. 556; *Bylong Coal Project*, SSD 6367, NSW Independent Planning Commission, Statement of Reasons for Decision, 18 Sept. 2019, para. 817, available at: https://perma.cc/4K5C-HBGH; *Waratah Galilee Coal Mine*, Department of Environment and Science, 101/0032704, C-EA-100147684, Decision, 2 Nov. 2023, available at: https://perma.cc/3LNL-JQA5.

[66] *Mount Pleasant Optimisation Project*, NSW Independent Planning Commission, SSD 10418, Statement of Reasons for Decision, 6 Sept. 2022, para. 124, available at: https://perma.cc/8NKD-L48A. See also T. Ohsawa & P. Duinker, 'Climate-Change Mitigation in Canadian Environmental Impact Assessments' (2014) 32(3) *Impact Assessment & Project Appraisal*, pp. 222–33, at 226.

[67] *Ranch Resource Management and Development Plan and Spineflower Conservation Plan*, California Department of Fish and Wildlife, Final Actions and Supplemental Findings, 14 June 2017, p. 8, available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=145821&inline.

[68] See, in particular, the discussion of the market substitution effect in Section 4.1 below.

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almost certain to achieve genuine mitigation outcomes when these conditions are effective and properly implemented.

3. Assessing the Significance of Climate Effects

Many jurisdictions have struggled to define a consistent way of assessing the significance of a project's climate effect. This section analyzes the problem they have faced and rules out two prevalent approaches before assessing other potential solutions.

3.1. The Problem

One of the central functions of any EIA framework is to determine whether a project would have significant environmental impacts.[69] A preliminary determination of likely significance takes place at the screening and scoping stages, when the authorities decide on the need for and scope of an EIA procedure.[70] This is followed by a substantive determination of significance, informed by scientific research and public deliberations, as part of the decision on the merits of the project.[71] The finding that a project would have significant impacts does not typically preclude its approval, but it may result in additional legal and political scrutiny.[72]

In EIA law and practice, the issue of significance has often been raised in litigation against an agency's determination that a project would have no significant climate effect, based on the argument that it represents only a small fraction of global GHG emissions. These cases sometimes involved very large fossil-fuel projects[73] and, at other times, far more anodyne projects, such as road construction.[74] Further, the significance of a project's climate effect is also relevant in determining the need for a CEA, whether alongside the assessment of other potentially significant environmental impacts or not. Thus, in the US, Hawaii,[75] Minnesota,[76] and New York City[77] have decided to consider a project's energy consumption as a source of GHG emissions, in deciding whether a project must undertake an EIA. This measure could potentially

[69] J. Glasson & R. Therivel, *Introduction to Environmental Impact Assessment* (Routledge, 5th edn, 2019), p. 126.
[70] Ibid., pp. 86–8.
[71] Morrison-Saunders, n. 21 above, p. 54.
[72] Ibid., p. 66.
[73] E.g., *Pembina Institute for Appropriate Development* v. *Canada (Attorney General)* [2008] FCJ 324, 2008 FC 302, para. 78.
[74] See, e.g., Conseil d'État, 30 Dec. 2021, 438686, ECLI:FR:CECHR:2021:438686.20211230 (France), para. 26.
[75] Hawaii Code R (2024) § 11-200.1-13.
[76] Minnesota Environmental Quality Board, 'Environmental Assessment Worksheet', Dec. 2022, s. 18, available at: https://www.eqb.state.mn.us/environmental-review/overview/environmental-assessment-worksheet-eaw-process.
[77] Mayor's Office of Environmental Coordination, 'CEQR Technical Manual', Dec. 2021, Ch. 18, p. 7, available at: https://www.nyc.gov/site/oec/environmental-quality-review/technical-manual.page.

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extend EIA requirements to various projects, including data centres (for example, crypto-mining and AI facilities)[78] and healthcare facilities.

The EIA literature acknowledges that there is 'no single agreed method for determining significance'.[79] Whether an impact is deemed significant depends not only on an objective prediction of its magnitude, but also on a value-based threshold that 'separates the realm of the acceptable from the realm of the unacceptable'.[80] Most environmental impacts considered in EIA are direct and concrete, making it relatively easy for observers to agree on their significance. A project's impact would be conspicuously significant if it were to pose a real threat to human life, have a far-reaching impact on ecologically sensitive areas, or inhibit the attainment of statutory environmental quality objectives. In contrast, a project's GHG emissions have a far less direct and concrete effect on the environment and society. Even the largest GHG-emitting projects – some of which exceed a billion tonnes CO_2 in lifetime emissions[81] – contribute only a tiny fraction to cumulative anthropogenic GHG emissions (2 trillion tonnes CO_2).[82] As a result, these projects lead to an extremely small increase in global average temperature,[83] without any direct and predictable effect on any specific ecosystems, areas or communities.[84]

In the debate on whether climate effects should nonetheless be assessed, these effects are often characterized as the archetype of a 'cumulative impact'.[85] Indeed, climate effects 'result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions', in a context of 'individually minor but collectively significant actions taking place over a period of time'.[86] This characterization, however, provides little guidance on how the significance of climate effects is to be determined. Many EIA frameworks recognize the need to account for a project's cumulative impacts, but it is not clear precisely what that means. EIA scholars recognize cumulative impact assessment as 'one of the most challenging and least successful components of impact assessments'.[87]

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78 On the GHG emissions associated with energy consumption from crypto-mining facilities see C. Mora et al., 'Bitcoin Emissions Alone Could Push Global Warming above 2°C' (2018) 8(11) *Nature Climate Change*, pp. 931–33.

79 Morrison-Saunders, n. 21 above, p. 58.

80 A. Ehrlich & W. Ross, 'The Significance Spectrum and EIA Significance Determinations' (2015) 33(2) *Impact Assessment & Project Appraisal*, pp. 87–97, at 91–3. See also Department of Environmental Affairs and Tourism (DEAT) (South Africa), *Strategic Environmental Assessment*, Integrated Environmental Management Information Series No. 10 (DEAT, 2004), p. 15.

81 See, e.g., *Waratah Coal Pty Ltd* v. *Youth Verdict Ltd (No. 6)*, n. 3 above, para. 649.

82 Allan et al., n. 55 above, pp. 6–7.

83 See n. 55 above.

84 See n. 53 above.

85 E.g., *Center for Biological Diversity* v. *National Highway Traffic Safety Administration* (9th Cir 2008) 538 F.3d 1172, 1217; *Gloucester Resources Ltd*, n. 65 above, para. 516; COSIS, n. 9 above, para. 365.

86 40 CFR (2024) § 1508.1(g)(3).

87 C. Joseph et al., 'Improving Cumulative Effects Assessment: Alternative Approaches Based upon an Expert Survey and Literature Review' (2023) 41(2) *Impact Assessment & Project Appraisal*, pp. 162–74, at 162. See also, e.g., R. Morgan, 'Environmental Impact Assessment: The State of the Art' (2012) 30(1) *Impact Assessment & Project Appraisal*, pp. 5–14.

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3.2. Two Radical Approaches

To assess the significance of a project's cumulative impacts, including its climate effects, decision makers tend to rely on one of two radical and unsatisfactory approaches.

On the one hand, a radically inclusionary approach suggests that, once cumulative impact is deemed significant, any contribution to it should also be considered significant. In the words of Nelson and Shirley, 'causing minor harm to an already degraded environment should automatically be considered significant'.[88] As climate change is clearly a significant issue, the argument goes, 'we cannot afford to ignore even modest contributions to global warming'.[89]

However, this approach becomes entirely impractical if it implies that the climate effect of any project, however innocuous it might be, should be deemed significant. Undertaking a thorough assessment of the climate effects before carrying out even the most *de minimis* activities would surely not be a proper use of public or private resources.

On the other hand, the radically exclusionary approach suggests that it is only when the project's effects are significant by themselves that they ought to be considered significant overall. Thus, according to the Californian regulator, '[t]he mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable'.[90] This approach would result in virtually no project being considered to have a significant climate effect, as almost no project would produce any discernible change on a global scale by itself.[91]

Yet this latter approach ignores the fact that, as stated by a US Court of Appeal, 'a very small portion of a gargantuan source' of pollution could still constitute a very significant problem in its own terms.[92] Activities that emit large amounts of GHGs can be said to have a significant 'climate effect', if only in an abstract and statistical sense of the word 'effect'. Taken individually, they cause an extremely minor exacerbation of an extraordinarily broad range of risks. Society recognizes the significance of GHG emissions that do not directly cause any discernible harm, in particular by taking

[88] R. Nelson & L.M. Shirley, 'The Latent Potential of Cumulative Effects Concepts in National and International Environmental Impact Assessment Regimes' (2023) 12(1) *Transnational Environmental Law*, pp. 150–74, at 165.

[89] *City of Los Angeles* v. *National Highway Traffic Safety Administration* (DC Cir 1990) 912 F.2d 478, 501 (Wald CJ, dissenting in part). See also J. Blake et al., *Assessing Greenhouse Gas Emissions and Evaluating Their Significance* (Institute of Environmental Management & Assessment (IEMA), 2nd edn, 2022), p. 8; *Gloucester Resources Ltd*, n. 65 above, para. 516.

[90] California Code Regs (2024) title 14, § 15064(h)(4).

[91] C. Eccleston, 'Assessing Cumulative Significance of Greenhouse Gas Emissions: Resolving the Paradox – The Sphinx Solution' (2010) 12(2) *Environmental Practice*, pp. 105–15, at 111. See also M. Siegel & A. Loznak, 'Survey of Greenhouse Gas Considerations in Federal Environmental Impact Statements and Environmental Assessments for Fossil Fuel-related Projects 2017–2018', White Paper, Sabin Centre for Climate Change Law, Nov. 2019; *Environment Council of Central Queensland Inc.* v. *Minister for the Environment and Water* [2024] FCAFC 56, para. 89; *350 Montana*, n. 53 above, p. 1266.

[92] *Southwestern Electric Power Company* v. *US Environmental Protection Agency* (5th Cir 2019) 920 F.3d 999, p. 1032, cited in *350 Montana*, n. 53 above, pp. 1266–7.

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action to avoid such emissions, for instance, by closing coal plants. If society is willing to adopt various measures to avoid millions of tonnes of CO_2 emissions, then it seems reasonable for projects with similar levels of emissions to be subjected to some form of scrutiny.

3.3. Alternative Approaches

Going beyond the radical approaches documented above, EIA law and practice have identified three more promising ways to assess the significance of a project's climate impact: (i) thresholds, (ii) benchmarks, and (iii) economic valuation. Firstly, thresholds of magnitude may facilitate a preliminary determination of significance at the stages of screening and scoping. Several jurisdictions have adopted clear and specific thresholds. Many jurisdictions, for instance, have found that a project's climate effect ought to be thoroughly assessed if it exceeds a threshold set between 20 and 200 kilotonnes of CO_2 equivalent (kt CO_2e).[93] These thresholds have obvious limitations; for instance, they reduce significance to a mono-dimensional approach to magnitude, such as annual emissions, without accounting for the project's duration. Yet if any CEA is to be implemented at all, a line needs to be drawn between those projects the climate effects of which are or are not to be assessed. The absence of an explicit threshold has only forced agencies and courts to fill the gap in a less predictable way.[94] As such, explicit thresholds of magnitude play a useful role in advancing legal certainty at the scoping and screening stages.[95] On the other hand, this rudimentary approach cannot be usefully relied upon for the final determination of significance at the substantive decision-making stage if this means that a quantity of smaller projects would be preferred over a few larger ones.

Secondly, benchmarks can be used to assess the significance of a project's climate effect, including at the substantive decision-making stage. Benchmarks do not provide a purely objective test for the assessment of significance of climate effects;[96]

[93] European Investment Bank, 'Project Carbon Footprint Methodologies: Methodologies for the Assessment of Project Greenhouse Gas Emissions and Emission Variations', version 11.3, Jan. 2023, p. 3 (20 kt); CEQ, 'Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews', 24 Dec. 2014, 69 *Federal Register* 77802, at 77827–8 (25 kt); Environmental Protection Authority (Western Australia), 'Environmental Factor Guideline: Greenhouse Gas Emissions', Apr. 2023, p. 4 (100 kt); Equator Principles v.4, n. 43 above, Principle 2 (100 kt); Victoria State Government (Australia), Department of Transport and Planning, *Ministerial Guidelines for Assessment of Environmental Effects* (The State of Victoria Department of Transport and Planning, 8th edn, 2023), p. 15, available at: https://perma.cc/R392-26GN (200 kt).

[94] See *Hapner* v. *Tidwell* (9th Cir 2010) 621 F.3d 1239, p. 1242; *Center for Biological Diversity* v. *US Forest Service*, n. 7 above, p. 1065; *Swomley* v. *Schroyer* (D. Colorado 2020) 484 F.Supp.3d 970, pp. 973, 977 (together suggesting that a logging project should undertake a CEA if it extends to an area exceeding 15.8 km^2, but not if it is limited to an area of 6.6 km^2).

[95] See C. Eccleston, *Environmental Impact Assessment: A Guide to Best Professional Practices* (CRC Press, 2011), p. 14; J. Glasson, 'Principles and Purposes of Standards and Thresholds in the EIA Process', in M. Schmidt et al. (eds), *Standards and Thresholds for Impact Assessment: Environmental Protection in the European Union* (Springer 2008), pp. 3–18.

[96] See *Center for Biological Diversity* v. *Department of Fish and Wildlife* (2015) 62 Cal.4th 204, pp. 226–8.

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nonetheless, they can inform political deliberations by situating a project's GHG emissions in a relevant context.[97] Several benchmarks can be used in combination, including those that are empirical (e.g., observed levels of GHG emissions),[98] predictive (e.g., the projected level of GHG emissions at a given point in time),[99] and normative (e.g., a carbon budget).[100] Scale matters greatly in the selection of relevant benchmarks.[101] A project's GHG emissions may appear negligible when compared with a global benchmark,[102] but its socio-economic benefits would also appear negligible at that same global scale. For instance, a power plant would make a negligible contribution to meeting *global* energy needs. An assessment of the merits of the project, which involves a comparison of its costs and benefits, is better informed if these are assessed at the same (local) scale, as the use of vastly different scales would make a comparison extremely difficult.[103] Other potential benchmarks do not require the definition of a scale, but rather the selection of one or several relevant analogues. These sectorial benchmarks point, for instance, to a level of emissions intensity by similar facilities or to the use of the best available technology.[104] The climate effect of a cement factory would appear perhaps less significant, or at least more justifiable, if the factory were to emit fewer GHG emissions per tonne of cement compared with other cement factories.

Thirdly, economic valuation tools may also usefully, and perhaps more conveniently, inform the determination of the significance of a project's climate effects. For instance, a US interagency working group has developed estimates of the social cost of GHG emissions (IWG-SCGHG).[105] This tool has been widely used in the US at federal[106] and state[107] levels, as well as in several other jurisdictions.[108] As the CEQ points out, such economic valuation tools 'allow … for comparisons to other monetized values, and estimates the damages associated with GHG emissions over

[97] E.g., *Sierra Club* v. *Federal Energy Regulatory Commission* (DC Cir 2017) 867 F.3d 1357, p. 1374; Blake et al., n. 89 above, p. 8.

[98] *Diné Citizens against Ruining Our Environment* v. *Haaland* (10th Cir 2023) 59 F.4th 1016, pp. 1041–2.

[99] *Gray*, n. 58 above, para. 98.

[100] California Code Regs (2024) title 14, § 15064.4(b)(3).

[101] E.g. Ohsawa & Duinker, n. 66 above, p. 224.

[102] E.g., *350 Montana*, n. 53 above, p. 1281 (Nelson CJ, dissenting).

[103] *350 Montana*, ibid., p. 1269; New York City Executive Order 91 of 1977, Ch. 6, §§ 6–12.

[104] Environmental Assessment Office (British Columbia), 'Effects Assessment Policy', version 1.0, Apr. 2020, p. 58.

[105] IWG-SCGHG, 'Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide: Interim Estimates under Executive Order 13990', Feb. 2021, available at: https://www.energy.gov/sites/default/files/2024-06/129.%20Interagency%20Working%20Group%20on%20Social%20Cost%20of%20Greenhouse%20Gases%2C%20Social%20Cost%20of%20Carbon.pdf.

[106] *Diné Citizens against Ruining Our Environment*, n. 98 above, p. 1042.

[107] California Health & Safety Code (2024) § 38562.5; Colorado Rev. Stat. (2024) § 40-3.2-106(1); New York Env't Conserv. Law (McKinney 2024) § 75-0113(1).

[108] Environment and Climate Change Canada, 'Social Cost of Greenhouse Gas Estimates: Interim Updated Guidance for the Government of Canada', Apr. 2023, available at: https://www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/social-cost-ghg.html; *Hunter Environment Lobby Inc.* v. *Minister for Planning* [2011] NSWLEC 221, para. 96; ACT Climate Change Strategy 2019–25 (2019), p. 70 para. 5.5 (Goal 5B), available at: https://www.environment.act.gov.au/__data/assets/pdf_file/0003/1414641/ACT-Climate-Change-Strategy-2019-2025.pdf.

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time' in such a way as to 'assist agencies and the public in assessing the significance of climate impacts'.[109] Yet a major difficulty for society is to agree on the value of GHG emissions in the first place. The IWG-SCGHG relies on an economic valuation of the global harm caused by GHG emissions,[110] an approach that necessarily involves far-reaching judgements about the economic value of non-economic damage and, even more importantly, the discount rate applicable to harm that would unfold in the distant future.[111] Alternative valuation techniques involve an observation of the price that society appears to be willing to pay to avoid GHG emissions. This observation is based on the cost of the measures that are implemented and their predicted mitigation outcomes.[112] Another approach is to determine the price that needs to be imposed on GHG emissions to ensure the achievement of an emissions-reduction goal, such as the temperature goals of the Paris Agreement.[113] Despite major differences in their methodologies and assumptions, institutional studies using these various approaches to economic valuation tend to converge towards a relatively consistent range, typically between US$50 and 380 per tonne CO_2.[114]

There is no single best approach to the determination of the significance of a project's climate effect. In many cases, a CEA objective of informing the public and decision makers would be most effectively achieved by a combination of these three

[109] CEQ, 2023 Guidance, n. 33 above, p. 1202.

[110] IWG-SCGHG, n. 105 above, 2.

[111] S. Rose et al., 'Cross-Working Group Box ECONOMIC: Estimating Global Economic Impacts from Climate Change', in IPCC (H.-O. Pörtner et al. (eds)), *Climate Change 2022: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2022), pp. 2495–9, at 2495–6; W. Nordhaus, 'Climate Change: The Ultimate Challenge for Economics' (2019) 109(6) *American Economic Review*, pp. 1991–2014, at 2004; *High Country Conservation Advocates* v. *US Forest Service* (D. Colorado 2014) 52 F.Supp.3d. 1174, p. 1193.

[112] R. Price, S. Thornton & S. Nelson, 'The Social Cost of Carbon and the Shadow Price of Carbon: What They Are, and How to Use Them in Economic Appraisal in the UK', Department for Environment, Food & Rural Affairs, Dec. 2007, p. 14.

[113] J. Stiglitz et al., *Report of the High-Level Commission on Carbon Prices* (Carbon Pricing Leadership Coalition, 2017), p. 33; N. Kaufman et al., 'A Near-Term to Net Zero Alternative to the Social Cost of Carbon for Setting Carbon Prices' (2020) 10 *Nature Climate Change*, pp. 1010–4. See also European Bank for Reconstruction and Development, 'Methodology for the Economic Assessment of EBRD Projects with High Greenhouse Gas Emissions', 22 Jan. 2019, p. 5, available at: https://www.ebrd.com/news/publications/institutional-documents/methodology-for-the-economic-assessment-of-ebrd-projects-with-high-greenhouse-gasemissions.html; World Bank, 'Shadow Price of Carbon in Economic Analysis: Guidance Note', 12 Nov. 2017, p. 3, available at: https://pubdocs.worldbank.org/en/911381516303509498/2017-Shadow-Price-of-Carbon-Guidance-Note-FINAL-CLEARED.pdf.

[114] 2020 value of CO_2 expected to be emitted in 2030. See, e.g., Environmental Protection Agency, 'EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances', 31 Oct. 2023, p. 4, available at: https://www.regulations.gov/document/EPA-HQ-OAR-2023-0434-0044; Environment and Climate Change (Canada), 'Social Cost of Greenhouse Gas Estimates: Interim Updated Guidance for the Government of Canada', Apr. 2023, available at: https://www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/social-cost-ghg.html; European Investment Bank, 'EIB Group Climate Bank Roadmap 2021–2025', Nov. 2020, pp. 47–8, 121, available at: https://www.eib.org/attachments/thematic/eib_group_climate_bank_roadmap_en.pdf. Currencies were converted with rates from 'Yearly Average Rates', *OFX.com*, available at: https://www.ofx.com/en-au/forex-news/historical-exchange-rates/yearly-average-rates, and US$ values as of 2020 were subsequently calculated based on 'Convert Current to Real US Dollars', *Areppim.com*, available at: https://stats.areppim.com/calc/calc_usdlrxdeflator.php.

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approaches. Clear and specific thresholds of magnitude can assist in a swift decision as to the need for a thorough assessment of a project's climate effects. Benchmarks and valuation tools can then inform the public and decision makers about the significance of a predicted level of GHG emissions and, eventually, whether to approve the project. While relying on a single approach runs the risk of presenting the assessment of a project's climate effect as an 'objective' and technical question best left to experts, a combination of these three approaches better reflects the value-based judgements involved in a determination of significance.

4. Assessing Indirect Climate Effects

Another frequent issue in EIA law and practice is whether and, if so, how indirect effects are to be assessed. In particular, courts around the world have been asked to decide whether the CEAs for fossil-fuel production or distribution projects should include an assessment of GHG emissions resulting from the subsequent combustion of the fossil fuel, which may involve another company at another location.[115] Other contentious indirect effects include the emissions resulting from the additional traffic that a road[116] or airport[117] may enable, the emissions embedded in a project's electricity consumption,[118] and the emissions associated with the production of milk that a cheese-making factory would purchase[119] or the cereals that a chicken-breeding farm would use.[120]

EIA law and practice remain divided as to whether such indirect climate effects should be documented.[121] In recent years, however, the pendulum seems to have swung in favour of an affirmative answer.[122] In principle, the goal of informing decision makers is best served by documenting all of a project's significant environmental effects;[123] indeed, many EIA instruments explicitly require the

[115] E.g., *Greenpeace Nordic Association* v. *Ministry of Petroleum and Energy*, Supreme Court of Norway, 22 Dec. 2020, Case No. 20-051052SIV-HRET; *Food and Water Watch* v. *Federal Energy Regulatory Commission* (DC Cir 2022) 28 F.4th 277.

[116] E.g., Conseil d'État, n. 74 above; *R (Boswell)* v. *Secretary of State for Transport* [2024] EWCA Civ 145.

[117] E.g., *Re Vienna Airport Extension*, n. 6 above; Cour administrative d'appel de Nantes, 14 Dec. 2023, 22MA02967.

[118] E.g., *North Coast Rivers Alliance* v. *Marin Municipal Water District Board of Directors* (2013) 216 Cal.App.4th 614, p. 651.

[119] *The National Trust for Ireland* v. *An Bord Pleanála* [2022] IESC 8.

[120] Cour administrative d'appel de Nantes, 10 Oct. 2023, 21NT02185.

[121] See, e.g., *Gloucester Resources Ltd*, n. 65 above, para. 492 (including downstream GHG emissions in the assessment of a coal mine); *Greenpeace Ltd* v. *Advocate General* [2021] CSIH 53, 2021 Scot (D) 9/10.

[122] See, in particular, *Waratah Coal Pty Ltd* v. *Youth Verdict Ltd (No. 6)*, n. 3 above (breaking with a series of cases by the Land Court of Queensland justifying the exclusion of indirect climate effects); *R (Finch)* v. *Surrey County Council* [2024] UKSC 20. See also C. Kaupa, 'Is It Still Permissible under EU Law to Issue New Permits for Oil and Gas Extraction?' (2024) 33(2) *Review of European, Comparative, and International Environmental Law*, pp. 236–49, at 238–243.

[123] See CEQ, 'National Environmental Policy Act Implementing Regulations Revisions', 20 Apr. 2022, 87 *Federal Register* 23453, 23467; Case C-72/95, *Aannemersbedrijf PK Kraaijeveld B.V.* v. *Gedeputeerde Staten van Zuid-Holland* [1996] ECR I-5431, para. 31.

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assessment of such indirect effects.[124] Yet judges and lawmakers have sometimes opposed the assessment of indirect climate effects by making one of the three arguments discussed in the following subsections: they have argued that (i) indirect GHG emissions would occur notwithstanding whether the project is approved ('market substitution argument'), (ii) an EIA should not consider GHG emissions unfolding overseas ('extraterritoriality argument'), or (iii) indirect GHG emissions cannot be accurately predicted ('uncertainties argument'). This section counters each of these arguments.

4.1. Market Substitution Argument

One common argument against the assessment of indirect GHG emissions is that these emissions, being driven by market forces, would occur regardless of whether the project is approved. For instance, the Land Court of Queensland (Australia) repeatedly found that rejecting coal mine projects would 'have no impact on climate change because it [would] have no impact on the global demand for coal and therefore no impact on global GHG emissions'.[125] In other words, a new coal mine would simply substitute for coal production from existing coal mines elsewhere, with no net impact on global coal consumption. This market substitution argument can apparently be made with regard to various types of indirect GHG emission, provided only that they take place in a competitive environment. For instance, a new cheese-making factory would simply substitute for other cheese-making factories to meet demand from cheese consumers.[126] This argument is generally made to exclude the assessment of indirect GHG emissions, but it could just as well be deployed in relation to direct climate effects, such as fugitive emissions associated with fossil-fuel production projects.

One objection to the market substitution argument is grounded in moral philosophy. Authors and judges have opposed what they call 'the drug dealers' defence', suggesting that '[t]here are few other contexts where a harmful behaviour or action is excused purely because another entity would have otherwise caused the harm'.[127] This objection is supported by non-consequentialist ethical theories, which suggest, for instance, that states 'have a duty to reduce *their* carbon footprint

[124] E.g., Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment [2012] OJ L 26/1, consolidated as of 15 May 2014, Art. 3(1); 40 CFR (2024), s. 1508.1(g)(2).

[125] *Xstrata Coal Queensland Pty Ltd* v. *Friends of the Earth, Brisbane* [2012] QLC 13, para. 559. See also *Hancock Coal Pty Ltd* v. *Kelly (No. 4)* [2014] QLC 12, para. 232; *Adani Mining Pty Ltd* v. *Land Services of Coast* [2015] QLC 48, para. 456; *Flat Canyon Federal Coal Lease Tract*, Bureau of Land Management, UTU-77114, Final Environmental Impact Statement, Jan. 2002, Ch. 2, p. 11; *Greenpeace Nordic Association*, n. 115 above, para. 234; *Greenpeace Ltd*, n. 121 above, para. 68; *Environment Council of Central Queensland Inc.* v. *Minister for the Environment and Water (No. 2)* [2023] FCA 1208, paras 127, 161.

[126] E.g., *The National Trust for Ireland*, n. 119 above, para. 108.

[127] J. Bell-James & B. Collins, '"If We Don't Mine Coal, Someone Else Will": Debunking the "Market Substitution Assumption" in Queensland Climate Change Litigation' (2020) 37(2) *Environmental & Planning Law Journal*, pp. 167–85, at 185. See also *Gloucester Resources Ltd*, n. 65 above, para. 545.

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irrespective of what others do',[128] or otherwise must refrain from 'profit[ing] from an injustice'.[129] By contrast, the market substitution argument is plainly supported by consequentialist ethical theories: if the moral value of one's action is determined by the consequence, nothing is wrong with an action without consequences.[130] Therefore, whether one is persuaded by the moral objection to the market substitution argument – assuming that the argument is economically valid – depends entirely on the ethical theory on which one relies.

A more compelling objection to the market substitution argument challenges its economic foundation.[131] To justify the exclusion of indirect (or direct) climate effects, the market substitution argument needs not only to show that market substitution occurs, but also that it is (at least nearly) 'perfect'. This means that the argument needs to show that there would be '*the same amount* of GHG emissions' with or without the project.[132] In reality, while some market substitution is likely to occur in relation to activities that take place in a competitive environment, it is unlikely to be 'perfect'.[133] For instance, the coal produced from a new mine would be likely to replace some of the coal from existing mines, but it would also drive prices down – if only slightly – by increasing competition in the relevant coal market, thus incentivizing higher consumption.[134] Perfect market substitution would occur only if either the price elasticity of supply was *infinite* (that is, if other producers could increase production without any price increase) or the price elasticity of demand was *null* (if consumers would buy the exact same quantity notwithstanding any price increase). However, either of these hypotheses goes against the basic tenets of economic theory[135] as well as empirical research on price elasticities, including in the energy sector.[136] As such, the CEQ rightly recommends that agencies 'should not simply assume that if the federal action does not take place, another action will perfectly substitute for it and generate

[128] A. Fragnière, 'Climate Change and Individual Duties' (2016) 7(6) *WIREs Climate Change*, pp. 798–814, at 804.

[129] M. Rendall, 'Carbon Leakage and the Argument from No Difference' (2015) 24(4) *Environmental Values*, pp. 535–52, at 541.

[130] See *Coast and Country Association of Queensland Inc.* v. *Smith* [2016] QCA 242, para. 45.

[131] See, e.g., *Mid States Coalition for Progress*, n. 4 above, p. 549; *WildEarth Guardians* v. *US Bureau of Land Management* (10th Cir 2017) 870 F.3d 1222, pp. 1235–6.

[132] B. Preston, 'Contemporary Issues in Environmental Impact Assessment' (2020) 37 *Environmental & Planning Law Journal*, pp. 423–42, at 438 (emphasis added). See also G. Dwyer, '"Market Substitution" in the Context of Climate Litigation' (2022) 12(1) *Climate Law*, pp. 1–31, at 14–5. While asserting that market substitution does not need to be 'perfect' for the argument to hold, Dwyer adds that the substitution must 'generat[e] *similar* impacts' (ibid., p. 14). Yet there is no reason to assume that imperfect market substitution would generally generate similar impacts.

[133] *Finch*, n. 122 above, para. 2.

[134] See G. Asheim et al., 'The Case for a Supply-Side Climate Treaty' (2019) 365(6451) *Science*, pp. 325–7, at 325; F. Green & R. Denniss, 'Cutting with Both Arms of the Scissors: The Economic and Political Case for Restrictive Supply-Side Climate Policies' (2018) 150 *Climatic Change* pp. 73–87, at 77.

[135] P. Samuelson & W. Nordhaus, *Economics* (Irwin, 19th edn, 2010), pp. 47, 108–9. See also S. Holt & C. McGrath, 'Climate Change: Is the Common Law up to the Task?' (2018) 24 *Auckland University Law Review*, pp. 10–31, at 21; Bell-James & Collins, n. 127 above, p. 175.

[136] See Bureau of Ocean Energy Management, 'Consumer Surplus and Energy Substitutes for OCS Oil and Gas Production: The 2021 Revised Market Simulation Model (MarketSim)', OCS Study BOEM 2021-072, Nov. 2021, pp. 17–20, available at: https://www.boem.gov/marketsim-model-documentation.

identical emissions'.[137] In aggregate, the creation of new fossil-fuel projects is instrumental to the increase in global GHG emissions from the combustion of fossil fuels.

A complicating factor is that, to the extent that market substitution does occur, it may not be climate-neutral. For instance, substituting coal from existing mines with coal from a new mine may have important implications for downstream emissions if the substitute coal is of a different quality, with a different energy or carbon intensity.[138] *A fortiori*, a new natural gas well may have some climate benefits if it leads to substitution of natural gas for coal.[139] It is not entirely inconceivable that such intermodal substitution could balance the climate effect of the additional emissions from increased fossil-fuel consumption.[140] Even if the fossil fuel provided is of the same nature and quality, project-specific circumstances, such as the measures taken to reduce fugitive emissions, may affect the emissions associated with their production and distribution.[141] These observations have led the Supreme Court of Norway to decry that assessing indirect GHG emissions is 'complicated and controversial'.[142] Yet it is precisely *because* assessing these indirect climate effects is difficult that EIA can play a useful role in informing political deliberations.

4.2. Extraterritoriality Argument

Another frequent concern with indirect climate effects is that they may result from activities conducted in another jurisdiction. For instance, the downstream emissions of a coal mine may be associated with coal consumption overseas.[143] In such circumstances, it has been argued, a CEA should not, or could not, consider indirect climate effects.

An initial question is whether a state has the right to take measures aimed at reducing indirect GHG emissions when these emissions would unfold overseas. In this regard, the *Lotus* principle establishes that, while a state 'may not exercise its power … in the territory of another State', it may nonetheless 'exercis[e] jurisdiction in its own territory … in respect of any case which relates to acts which have taken place abroad'.[144] Accordingly, as far as international law is concerned, a state is

[137] CEQ, 2023 Guidance, n. 33 above, p. 1205.
[138] *Hancock Coal*, n. 125 above, paras 227, 232.
[139] See B. Mayer, 'The Duty of Care of Fossil-Fuel Producers for Climate Change Mitigation: *Milieudefensie* v. *Royal Dutch Shell*, District Court of The Hague (The Netherlands)' (2022) 11(2) *Transnational Environmental Law*, pp. 407–18, at 414; *Milieudefensie* v. *Royal Dutch Shell*, Court of Appeal of the Hague, 12 Nov. 2024, ECLI:NL:GHDHA:2024:2100, para. 7.75.
[140] *Allegheny Defense Project* v. *Federal Energy Regulatory Commission* (DC Cir 2019) 932 F.3d 940, p. 946.
[141] See C. Hilson, 'Emissions Intensity: Do We Need a CBAM for Oil and Gas Imports?' (2023) 17(2) *The Journal of World Energy Law & Business*, pp. 136–41.
[142] *Greenpeace Nordic Association*, n. 115 above, para. 234.
[143] See, e.g., *Adani Mining*, n. 125 above, para. 449.
[144] *SS Lotus (France* v. *Turkey)* [1927] PCIJ Series A No. 10, pp. 18–9.

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allowed to take into account extraterritorial effects when regulating activities occurring within its territory.[145]

Courts have sometimes postulated that climate treaties establish a 'division of responsibilities between states', including a 'clear principle' according to which 'each state is responsible for' limiting and reducing GHG emissions within its own territory.[146] This conventional division of responsibilities, however, exists mainly in relation to states' obligations to inventory GHG emissions, as a way to avoid omissions and double-counting.[147] Regarding substantive obligations, neither the UN Framework Convention on Climate Change[148] nor the Paris Agreement[149] limit a state's mitigation action to its own territory.[150] States have occasionally taken steps,[151] or formally committed to actions,[152] aimed at reducing extraterritorial GHG emissions. Some courts have gone as far as to suggest that states have a duty to reduce emissions overseas whenever possible.[153]

A more complex issue relates to the legitimacy for a national government to assess, through a national EIA, the merits of activities that occur overseas. For instance, in determining whether a gas well project should be approved, an EIA may need to consider whether the use of the natural gas in another country is justified. This assessment would need to consider not only national and global climate goals but also the other state's own development objectives and national circumstances.[154] In considering the effect of a project on extraterritorial activities, a national EIA would

[145] See *Border Power Plant Working Group*, n. 23 above; Case C-366/10, *Air Transport Association of America* v. *Secretary of State for Energy and Climate Change* [2011] 2011 ECR I-13755, para. 125; *Center for Biological Diversity* v. *Bernhardt* (9th Cir 2020) 982 F.3d 723, p. 740. But see *Sierra Club Canada Foundation* v. *Minister of Environment and Climate Change* [2023] FCJ 840, 2003 FC 849, para. 67; *Re Vienna Airport Extension*, n. 6 above.

[146] *Greenpeace Nordic Association*, n. 115 above, para. 159. See also *Australian Conservation Foundation Inc.* v. *Minister for the Environment* (2016) 251 FCR 308, para. 51.

[147] E.g., Decision 18/CMA.1, 'Modalities, Procedures and Guidelines for the Transparency Framework for Action and Support referred to in Article 13 of the Paris Agreement', 19 Mar. 2019, UN Doc. FCCC/PA/CMA/2018/3/Add.2, p. 18, Annex para. 17; K. Rypdal et al., 'Introduction to the 2006 Guidelines', in S. Eggleston et al. (eds), *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IGES 2006) Vol. 1, Ch. 1, p. 4.

[148] New York, NY (US), 9 May 1992, in force 21 Mar. 1994, available at: https://unfccc.int.

[149] Paris (France), 12 Dec. 2015, in force 4 Nov. 2016, available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf.

[150] B. Mayer & Z. Ding, 'Climate Change Mitigation in the Aviation Sector: A Critical Overview of National and International Initiatives' (2023) 12(1) *Transnational Environmental Law*, pp. 14–41, at 20.

[151] See N. Dubash et al., 'National and Sub-national Policies and Institutions', in IPCC (P. Shukla et al. (eds)), *Climate Change 2022: Mitigation of Climate Change. Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2022), pp. 1355–450, at 1393.

[152] EU, Updated NDC, 16 Oct. 2023, p. 12; Switzerland, First NDC, 9 Dec. 2020, p. 1.

[153] *Milieudefensie* v. *Royal Dutch Shell*, District Court of The Hague, 26 May 2021, ECLI:NL:RBDHA:2021:5337; *Verein Klimaseniorinnen Schweiz*, n. 10 above, para. 287. See also UN Committee on Economic, Social and Cultural Rights, 'Concluding Observations, Fourth Periodic Report of Ecuador', 14 Nov. 2019, UN Doc. E/C.12/ECU/CO/4, para. 12.

[154] See *Royal Forest and Bird Protection Society of New Zealand Inc.* v. *Buller Coal Ltd* [2012] NZHC 2156, para. 53; *West Coast ENT*, n. 53 above, para. 111; *Greenpeace New Zealand Inc.* v. *Genesis Power Ltd* [2008] NZSC 112, [2009] 1 NZLR 730, para. 12.

inevitably involve some interaction with the internal affairs of another state. Yet such interaction can hardly be avoided between states that are trade partners. The decision *not* to consider a project's extraterritorial indirect climate effects would equally result in some interaction in the domestic affairs of other states. For instance, the plentiful availability of cheap fossil fuels on global markets would make it politically more challenging for governments to limit their national GHG emissions.

4.3. Uncertainties Argument

A more fundamental concern relates to the very possibility of assessing indirect climate effects. Judges have found that such effects are 'incapable of measurement or assessment',[155] or are at least not 'practicable'.[156] Almost by definition, a project's indirect climate effects depend in part on factors extraneous to the project, including economic, technological, regulatory, demographic, and cultural variables.[157] The extent of this epistemological issue depends on the type of indirect effects under consideration. The GHG emissions resulting from the consumption of fossil fuels of a known quality are fairly predictable.[158] In contrast, the consequences of market substitution for GHG emissions can be far more difficult to predict, in particular, when there is a risk of intermodal substitution, such as between natural gas and coal. A project's effects can extend *ad infinitum*, like the waves created by a stone on a pond, to increasingly remote and unpredictable effects, including through technological development, public opinion, and democratic processes.

These epistemological concerns are real and well founded, but they do not justify doing away with an assessment of indirect climate effects that are potentially significant. A general principle in EIA law and practice is that '[e]nvironmental effects are not to be disregarded merely because they are difficult to identify and quantify'.[159] Ignoring indirect (or other) climate effects merely because they are difficult to predict would result in biased information about the merits of a project. This, in turn, could mislead the public and the decision makers, ultimately undermining the purpose of an EIA. Addressing uncertainties and providing the best information available are among the central functions of EIAs.[160] EIAs routinely deal with uncertainties by first seeking

[155] *The National Trust for Ireland*, n. 119 above, para. 110.

[156] *Greenpeace Ltd*, n. 121 above, para. 68.

[157] *Adani Mining Pty Ltd*, Department of the Environment (Cth), 2010/5736, Statement of Reasons, 13 Oct. 2015, para. 140, available at: http://epbcnotices.environment.gov.au/_entity/annotation/45c02035-e672-e511-b93f-005056ba00a7/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1712258955789; but see *Finch*, n. 122 above, para. 103 (suggesting that the downstream emissions of an oil well are fully predictable, thus omitting issues in assessing the market substitution effect and the proportion of fugitive emissions, among other things).

[158] M. Burger & J. Wentz, 'Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Review' (2017) 41(1) *Harvard Environmental Law Review*, pp. 110–88, at 114; *Center for Biological Diversity* v. *Bernhardt*, n. 145 above, pp. 739, 751; *Sovereign Inupiat for a Living Arctic* v. *Bureau of Land Management* (D. Alaska 2021) 555 F.Supp.3d 739, p. 764; *Friends of the Earth* v. *Haaland* (D. DC 2022) 583 F.Supp.3d 113, p. 139.

[159] M. Raff, 'Ten Principles of Quality in Environmental Impact Assessment' (1997) 14(3) *Environmental and Planning Law Journal*, pp. 207–21, at 209. See also *Gray*, n. 58 above, para. 138.

[160] Glasson & Therivel, n. 69 above, p. 122.

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to reduce them as far as possible and then by disclosing them in a clear and transparent manner.[161]

Methodological tools already exist to reduce uncertainties relating to indirect climate effects. GHG emissions accounting methodologies have been developed by the Intergovernmental Panel on Climate Change[162] and by the GHG Protocol.[163] These documents include some suggestions on the way in which one might deal with certain sources of uncertainty, such as the lack of available data.[164] They highlight the need to define 'key' sources of emissions,[165] including 'significant secondary effects',[166] and to subject them to more intense scrutiny. This is in agreement with EIA law and practice. For instance, the interpretation of NEPA requires agencies to 'discuss impacts in proportion to their significance',[167] which calls for a thorough discussion of the downstream emissions of fossil-fuel projects,[168] while justifying a more succinct treatment of effects that 'are so remote as to be indiscernible'.[169]

Further, EIAs must clearly communicate the existence of uncertainties to the public and decision makers. GHG emissions accounting tools note that '[u]ncertainty estimates are an essential element of a complete inventory of greenhouse gas emissions and removals'.[170] Consistently, the CEQ recommends that CEAs 'explain any uncertainty' when quantifying direct and indirect climate effects.[171] US courts have further noted that a clear acknowledgement of uncertainties would allow readers to take 'the resulting estimates with the appropriate amount of salt'.[172] With any feasible prediction and a clear acknowledgement of remaining uncertainties, the public and decision makers would be better equipped to make what they consider to be the appropriate decision regarding the merits of the project.

5. Conclusion

Most jurisdictions across the world have applied existing EIA frameworks as a tool to mitigate climate change, aiming to reduce GHG emissions, one project at a time. This article has shown that, in doing so, authorities have faced similar issues and sometimes adopted different solutions. One issue that many jurisdictions have faced is the assessment of the

[161] Ibid., pp. 122–4.
[162] E.g., Eggleston et al., n. 147 above.
[163] E.g., The Greenhouse Gas Protocol, 'The GHG Protocol for Project Accounting', World Business Council for Sustainable Development and World Resources Institute, 2005, available at: https://ghgprotocol.org/project-protocol.
[164] See, e.g., W. Irving, 'Time Series Consistency', in Eggleston et al., n. 147 above, Vol. 1, Ch. 5, pp. 8–14.
[165] A. Herold et al., 'Methodological Choice and Identification of Key Categories' in Eggleston et al., n. 147 above, Vol. 1, Ch. 4, p. 4.
[166] GHG Protocol, n. 163 above, p. 34.
[167] 40 CFR (2024) § 1502.2(b).
[168] *WildEarth Guardians* v. *Zinke* (D. DC 2019) 368 F.Supp.3d 41, p. 75.
[169] *Swomley* v. *Schroyer* (D. Colorado 2020) 484 F.Supp.3d 970, p. 976, affirmed (10th Cir 2021) 2021 WL 4810161.
[170] C. Frey et al., 'Uncertainties', in Eggleston et al., n. 147 above, Vol. 1, Ch. 3, p. 6. See also GHG Protocol, n. 163 above, p. 23.
[171] CEQ, 2023 Guidance, n. 33 above, p. 1204.
[172] *Sierra Club* v. *Federal Energy Regulatory Commission*, n. 97 above, p. 1374.

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'significance' of a project's climate effect. This assessment is essential firstly for determining the need for a comprehensive assessment, and then again for appraising the merits of the project. In this respect, good practices include the adoption of clear thresholds of magnitude to be used at the screening and scoping stages. Additionally, there should be reliance on empirical and normative benchmarks and on economic valuation tools at the decision-making stage. Another frequent issue concerns the assessment of indirect climate effects. This assessment is complicated by the potential for market substitution, the extraterritoriality of some sources of indirect GHG emissions, and uncertainties regarding these emission sources. Yet none of these factors justifies the complete exclusion of indirect climate effects from the scope of CEAs. To provide relevant information to the public and decision makers, a CEA should account as precisely as possible for any potentially significant effect, while also acknowledging any remaining uncertainties.

These developments confirm the potential for EIA to be implemented as an effective tool for climate change mitigation. CEA is certainly not a silver bullet, and it does not prevent the implementation of every GHG-intensive project. Yet, when properly implemented, CEA can make a difference by ensuring that the public and decision makers are well informed about the effects of projects on climate change and shed light on potential inconsistencies between individual projects and climate policies. In particular, CEAs have led to the imposition of significant changes to projects,[173] or even to their rejection,[174] in ways that have limited GHG emissions and thus contributed incrementally to global efforts on climate change mitigation.

More generally, this article illustrates the potential for comparative research on climate law. Under the Paris Agreement, every state has committed to take measures to mitigate climate change. These national efforts often rely on a relatively limited set of legal instruments, such as market-based mechanisms, carbon taxes, and various types of technical standard and regulatory tool such as EIA. Litigation is also raising similar questions across jurisdictions, in spite of vast differences between legal systems. For instance, issues arise concerning the standing of individuals, the relevance of tort law and human rights law, the separation of powers, and the interpretation of open-ended due diligence obligations. In this context, global comparative perspectives can enrich national legal and policy debates regarding potential actions to mitigate climate change.

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[173] See at nn. 64–5 above.
[174] See at nn. 66–7 above.

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