C2ES CENTER FOR CLIMATE AND ENERGY SOLUTIONS

INTERNATIONAL

Enhancing Action & International Cooperation for the Doubling of Energy Efficiency by 2030

Discussion paper

September 19, 2024

Center for Climate and Energy Solutions

A. Summary

1. The period from the end of the global stocktake (GST) at COP28 (2023) through to COP30 (2025) is critical. During this time period we will learn the collective level of ambition of new climate targets, whether countries have taken into account the outcomes of COP28 in formulating them, and whether countries have put in place the domestic plans, legislation, finance and investment needed to implement those new targets. In the context of the Paris Agreement's ambition cycle, 2024 is a crucial year for preparation, action, and enhanced international cooperation.

2. The GST decision from COP28 sets out a number of key, transformational global targets and signals to Parties to: (i) inform their next nationally determined contributions (NDCs); and (ii) enhance implementation and international cooperation.[1] Parties are expected to communicate their NDCs by February 10, 2025, with an end date of 2035 by February 10, 2025.[2] The GST signals form part of the guidance and requirements that have been set out from Paris to date,[3] including that:

    - Each Party's successive NDC will represent a "progression" beyond its previous NDC and reflect its "highest possible ambition," reflecting its common but differentiated responsibilities and respective capabilities (CBDR-RC), in the light of different national circumstances[4]

- Parties "shall pursue domestic mitigation measures, with the aim of achieving the objectives" of their NDCs[5]
- Parties include, as part of the information to facilitate clarity, transparency, and understanding of NDCs:
  - how the Party considers that its NDC is fair and ambitious in the light of its national circumstances[6]
  - how the NDC contributes towards achieving the objective of the UN Framework Convention on Climate Change, as set out in its Article 2[7]
  - how the NDC is informed by the outcomes of the GST, in accordance with Article 4, paragraph 9, of the Paris Agreement[8]
- Parties come forward with ambitious, economy-wide emission reduction targets, covering all greenhouse gases, sectors and categories and aligned with limiting global warming to 1.5 degree C, as informed by the latest science, in the light of different national circumstances[9]
- Parties commit to accelerate action in this critical decade on the basis of the best available science, reflecting equity and the principle of CBDR-RC in the light of different national circumstances and in the context of sustainable development and efforts to eradicate poverty[10]
- Parties put in place new or intensify existing domestic arrangements for preparing and implementing successive NDCs[11]
- Parties present their next NDCs at a special event to be held under the auspices of the United Nations Secretary-General.[12]

3. The Presidencies' Troika letter from March 21, 2024 recognizes the need for leadership among an apparent wealth of actors, events, and pathways for Parties to avail themselves in their efforts to take forward the GST targets and signals.[13] Their second letter from July 23, 2024 further elaborates their Mission 1.5 work plan to engage Parties in a targeted set of activities for the remainder of 2024 to enhance ambition and enable action towards COP29.[14] While this establishes a welcome platform, Parties and non-Party stakeholders (NPS) may find a more elaborated vision helpful in guiding them to effectively action each of the GST targets and signals, reflect them in new NDCs, and achieve them.

4. In order to implement the GST targets and signals through enhanced NDC ambition and implementation, major barriers must be meaningfully addressed, turned into opportunities for enhanced international cooperation, and translated into development priorities and domestic policies. In the context of making the case for clear leadership to enable such action, this paper:

   - focuses on the GST decision's call to Parties to contribute to, in a nationally determined manner, the **doubling of energy efficiency globally by 2030** (that is, doubling the global average annual rate of energy efficiency improvements)[15]
   - sets out barriers and solutions, as identified by our work and others, that must be addressed and implemented to enable real action in 2024[16]
   - sets out key leadership considerations, how such a leadership role can be effectively utilized, and key priorities for 2024-2026.

5. Parties have nevertheless not yet accelerated the energy transition to the global pace and scale necessary to achieve the goals of the Paris Agreement, despite repeated observations that improvements in energy efficiency are "rational," the "right economic choice," "easy," or "obvious."[17] Energy efficiency improvements provide mitigation co-benefits, such as energy cost savings, job creation, enhanced energy security, and improved air quality and health.[18] Every country has potential to implement substantial energy efficiency improvements given that the potential to increase energy efficiency is more evenly distributed than renewable energy capacity.

6. Yet, for many reasons, energy efficiency improvements are often overlooked. A lack of understanding can lead to a lack of demand.[19] Energy policy has traditionally been dominated by a supply-side bias (i.e., how to produce more electricity?), with policymakers focusing less on the demand-side (i.e., how to consume less energy?). Energy efficiency is not very "glamourous" and can mean higher upfront costs that may put off consumers, even if they lead to long-term savings.[20] Given that efficiency is about many small changes adding up to major impact, achieving the global doubling of energy efficiency target will be challenging.
7. Many of the obstacles to accelerating energy efficiency improvements can largely be boiled down to four main, immediate challenges:

    - **lack of capacity to map and measure** energy efficiency gaps and improvement potential in different end-use sectors, resulting in uncertainty on where best to focus efforts, aggregate demand, and track progress
    - **lack of coordinated policy measures across end-use sectors** and insufficient capacity to enforce these
    - **supply chain constraints**, including those driven by geopolitics and friend-shoring, which limits access to technology and energy efficient appliances[15]
    - **the cost of capital**, which continues to increase, especially in developing countries.

8. Parties must respond quickly and tangibly to the call to doubling energy efficiency globally by 2030. A number of solutions and opportunities exist to help overcome these challenges. At the same time, clear leadership that is inspiring, inclusive, respects the nationally determined nature of NDCs and meets Parties and NPS where they are in terms of capacity, is essential. Enhanced international cooperation is vital to move from incrementalism to transformative levels of action in 2024 and beyond.

Paragraph 28 of the GST decision sets out a package of critical mitigation targets and signals.[21] The achievement of no one signal or target alone will result in the deep, rapid, and sustained reductions in greenhouse gas emissions in line with 1.5°C pathways.

However, to drive the achievement of the doubling of energy efficiency globally, **regional-level leaders should support the development of energy efficiency goals and implementation roadmaps for specific geographic areas and sectors**. Regional energy efficiency initiatives can foster understanding of effective local solutions, increase transparency of and accountability to national commitments like NDCs, and attract investment. This recommendation aligns with the High Level Climate Champions' vision and their efforts to regionalize the 2030 Climate Solutions framework for their accelerated adoption and implementation toward achievement of GST outcomes.

For example, an organization like the Latin American Energy Organization (OLADE),[22] a well-established regional energy organization with relevant energy efficiency studies and programs, could utilize its convening power, expertise, and relationships with financial institutions, capacity building centers and businesses to advance progress towards the doubling of energy efficiency in the Latin America and the Caribbean region.

The COP Presidency Troika's leadership approach, including Mission 1.5 and Brazil's Presidency of the of the G20, provides a unique opportunity to set out a new model for collaborative leadership**.** Building

on the GST targets and signals from the UAE Consensus, COP29 must give Parties assurance that climate finance–drawn from a variety of sources–will be available such that: (i) Parties can come forward with ambitious NDCs and (ii) subsequently implement those NDCs. COP30 in Belém must reflect on the level of ambition presented by the NDCs and set the new direction as we head toward the end of this critical decade.

Questions for Consideration

- How are Parties planning to take forward in 2024 the signal to double energy efficiency by 2030? How will this be reflected in new NDCs in 2025?
- How can Parties be supported in enhancing energy efficiency in their NDCs?
- What is the plan to enhance international cooperation towards the doubling of energy efficiency by 2030?
- Which organization(s), countries, or regions are best placed to show leadership on this, and build momentum throughout 2024?

B. Context

9. The GST is a key part of the Paris Agreement's "ambition cycle."[23] Parties to the Paris Agreement are required to undertake a GST every five years "to take stock of the implementation of this Agreement to assess the collective progress towards achieving the purpose of this Agreement and its long-term goals…It shall do so in a comprehensive and facilitative manner, considering mitigation, adaptation and means of implementation and support, and in light of equity and the best available science."[24]

10. The outcome of the GST shall inform Parties in: (i) updating and enhancing, in a nationally determined manner, their actions and support (including their NDCs); and (ii) enhancing international cooperation for climate action.[25] The GST outcome also reaffirms sustainable and just solutions founded on meaningful, inclusive participation of all stakeholders and underlines that just transitions can support more robust and equitable mitigation outcomes.[26]

11. Parties are encouraged to communicate their NDCs by February 10, 2025 with an end date of 2035.[27] There are guidance and requirements for their NDCs that have been set out by Parties from Paris through to COP28 (see "Summary" above).

12. In the last NDC Synthesis Report, the following percentages of Parties refer to energy efficiency improvements in the following areas in their NDCs:[28]

    - 73 percent: buildings
    - 55 percent: transport
    - 33 percent: energy supply
    - 30 percent: industry
    - 50 percent: cross-cutting/multisector energy efficieny improvement.

13. The year 2024 is therefore a crucial year to take forward the GST targets and signals, translating them into effective domestic policies and measures as well as enhancing international cooperation on climate action. The moment of truth as to whether the GST, in the wider context of the Paris Agreement's ambition cycle, will have succeeded in increasing ambition will be February 10, 2025 when new NDCs must be tabled by all Parties. The collective impact of these will be set out in a synthesis report to be made available ahead of COP30.[29] Furthermore, COP30 in Belém should not be seen as a cliff edge; it will need to set out the world's response to level of ambition that countries have come forward with.

Doubling Energy Efficiency Globally by 2030: From Incremental to Transformational Change

14. According to the IEA, annual energy intensity improvement rate in 2022 was 2 percent.[30] To achieve net zero by 2050, the IEA indicates that annual energy intensity improvement would need to be 4 percent by 2030–double that in 2022.[31]

15. In recognition of the need for deep, rapid, and sustained reductions in greenhouse gas emissions in line with 1.5 degree C pathways, the GST decision called on Parties to contribute to, in a nationally determined manner, the **doubling of energy efficiency globally by 2030** (that is, doubling the global average annual rate of energy efficiency improvements).[32]

Barriers and Solutions to the Energy Transformation

16. Despite repeated observations and exhortations by some that improving energy efficiency is "rational," the "right economic choice," "easy," or "obvious," especially given the multiple mitigation co-benefits of such measures as previously mentioned, Parties have nevertheless not yet accelerated the rate of energy intensity improvements to the global pace and scale necessary to achieve the goals of the Paris Agreement. It is essential to understand and engage with the reasons for this.

Barriers

17. Parties still face a number of regulatory, economic, social, and technological barriers to implement a wide-scale shift to energy efficiency as primary measure to move away from fossil fuels. As identified by C2ES,[33] the GST's *Technical Dialogue Synthesis* report,[34] and other sources, these challenges include:

    - economic, institutional, socio-political and capacity barriers, including for the monitoring, enforcement and evaluation of policies[35]
    - implementing policies
    - siloed communication and action
    - lack of economic incentives to shift away from high-emission activities
    - behavioral inertia in energy consumption patterns
    - lack of accessible support and investments for the electricity sector in developing countries
    - high upfront capital costs

18. The biggest challenge to achieving the global target of doubling energy efficiency is mapping where and how improvements in energy efficiency can occur, as these involve different aspects of value chains, including a diversity of end-use sectors where interventions are possible, including changes in consumption patterns.

19. The GST decision notes that developing countries need an estimated US $5.8-5.9 trillion for their efforts to implement their current NDCs for the pre-2030 period (let alone new and more ambitious

ones by February 10, 2025). Climate finance pledged and provided is nowhere near that scale. In this context, the adoption of a new collective quantified goal (***NCQG***) at COP29 will be vital for setting out a way forward on the scale and type of finance needed to sustain and augment the climate action needed to achieve the goals of the Paris Agreement and net zero by 2050.[36]

20. It is also important to keep in mind that while leading companies in green tech may drive down prices, they may also drive competitors out of business. As the growing intersection of climate and trade policies highlight these issues, governments and multilateral development banks must work together to enable industrial strategies that diversify risk globally.

Solutions

21. A number of high-impact solutions and opportunities to address key challenges have been identified through a wealth of efforts across different fora. The following list draws from C2ES's work as well as the High Level Climate Champions' (***HLCs***) *2030 Climate Solutions*:[37]

Energy efficiency actions, solutions, and enablers
• Accelerating the pace of investment in developing countries to guarantee an equitable transition (Source: 2030 Climate Solutions)
• Transferring technology to developing countries for grid digitalization and storage/flexibility enhancement (Source: 2030 Climate Solutions)
• Implementing capacity building for workforce and regulatory/governance bodies (Source: 2030 Climate Solutions)
• Applying technologies for the digitalization of grids and appliances and the development of super efficient appliances to catalyze electrification (Source: 2030 Climate Solutions)
• Scaling and enhancing management of transmission and distribution systems and producing systemic innovation to enable smart electrification and sector coupling (Source: 2030 Climate Solutions)
• Phasing out inefficient fossil fuel subsidies which distort markets and artificially increase competitiveness of fossil fuels vs renewable energy sources (Source: 2030 Climate Solutions) and reducing attractiveness of energy savings via energy efficiency measures (Source: World Bank, 2022)
• Reducing capital costs, the key enabling factor to unleashing the potential of renewables development in developing countries, including de-risking mechanisms, guarantees, concessional loans and direct investment (Source: 2030 Climate Solutions)
• [In terms of built environment] Establishing national and local building energy code models, including market appropriate measures for buildings and support adoption of building energy codes at the sub-national level (Source: 2030 Climate Solutions)
• Implementing Minimum Energy Performance Standards (MEPS) (Source: 2030 Climate Solutions)
• [In terms of cooling in the built environment] Supporting increased market penetration of highly efficient air conditioning equipment and innovative technologies • Investing in appliance efficiency and enhanced implementation of passive cooling measures • Providing guidance for high efficiency cooling technologies • Expanding district cooling, trigeneration and thermal storage to help manage peak load (Source: 2030 Climate Solutions)
• [Road transport] Investing in the necessary charging infrastructure, emobility technology, and a sustainable electricity grid to lower upfront costs for users (Source: 2030 Climate Solutions)

• [Metals/mining] Setting up technology and financial assistance to accelerate decarbonisation of mining fleets - e.g. via transitioning fuel source or retrofitting existing vehicles (Source: 2030 Climate Solutions)
• [Hydrogen] Optimizing technology and supply chains for electrolysers and hydrogen or hydrogen derivative(s)-related technologies across the value chain (Source: 2030 Climate Solutions)
• [Steel] Phasing out blast furnaces, coke ovens and other emissions intensive assets (Source: 2030 Climate Solutions)
• [Steel/cement] Taking circular economy measures to reduce demand in volume (Source: 2030 Climate Solutions)

22. The **IEA** highlights buildings and road transport as sectors where technical and behavioral change interventions can significantly improve energy efficiency.[38] In terms of doubling the global rate of energy intensity improvements, IEA highlights three main solutions to drive energy efficiency improvements, which will require more rigorous polices to boost electrification, energy and resource efficiency, and incentivize behavioral change:[39]

    - switching to more efficient fuels[40]
    - improving technical efficiency[41]
    - using energy and materials more efficiently, leading to avoided demand.[42]

23. The **COP28 Presidency, IRENA and the Global Renewables Alliance** (**GRA**) also highlight the following policy actions:[43]

    - adopting a sector-coupling approach to the decarbonisation of economies by pursuing smart electrification of the transport, buildings and industry sectors
    - creating regional fora for co-ordinated planning among relevant authorities on infrastructure development, including renewable energy projects, grid and transmission assets, electric vehicle charging infrastructure and heat networks
    - introducing economic incentives for smart electrification and demand-side response (such as tax credits and innovation grants) to encourage private investment in sector-coupling solutions.

24. The **HLCs and the Marrakech Partnership for Global Climate Action** identify impactful climate solutions and opportunities for international cooperation.[44] At COP28, in the context of the conclusion of the GST and building on prior work, the HLCs presented the *2030 Climate Solutions*–an Implementation Roadmap that sets out solutions framed in specific actions, with insights from a wide range of NPS on effective measures being undertaken that need to be scaled up and replicated as well as current gaps that need to be bridged.[45] The Climate Solutions recommend key actions and means of implementation, which seek to achieve key targets for clean power by 2030.[46] These recommendations for actions and support overlap with high-impact opportunities and solutions to address barriers to energy efficiency, as also identified in work by C2ES.

C. Leadership for Doubling Energy Efficiency by 2030

The Troika, G7, G20, the IEA and IRENA

25. As an outcome of the UAE Consensus, the COP28 Presidency (UAE) will work together with the incoming Presidencies–Azerbaijan (COP29) and Brazil (COP30)–to drive ambitious collective action, including through the Roadmap to Mission 1.5C, an initiative to significantly enhance international cooperation and the international enabling environment to stimulate ambition in the next round of NDCs.[47] This configuration has been called "the Troika." The Troika, together with the G7 and G20 and through the Roadmap to Mission 1.5C, broadly seek to drive ambition and enhanced international cooperation.

26. At COP28, the UAE Presidency encouraged Heads of States and Governments to sign the COP28 Global Renewables and Energy Efficiency Pledge. The Pledge commits governments to work together in order to collectively double the global average annual rate of energy efficiency improvements from around 2 percent to over 4 percent every year until 2030 and to put the principle of energy efficiency as the "first fuel" at the core of policymaking, planning, and major investment decisions. 133 Parties have signed.[48]

27. Brazil, in its role as 2024 G20 President, plans to make recommendations on enhancing international cooperation to:[49]

    - support developing countries in building institutional capacity to design and implement country platforms, focusing on greenhouse gas emission reductions, resilience-building and achievement of the SDGs
    - address associated resource-mobilization challenges, with a view to equipping those plans and platforms with financial means, mechanisms and solutions
    - guided by the principles of equity and justice, tackle negative externalities and spillover effects of just transition plans, at the national and international levels.

28. In 2023, the IEA updated its *Net Zero Roadmaps* report and convened five High-Level Dialogues with the COP28 Presidency that were instrumental in building the global consensus needed for the outcomes in Dubai.[50] In February 2024, IEA Executive Director Dr. Fatih Birol stated that, in response to a call by IEA member country ministers, the IEA was prepared to help lead the implementation of the GST outcomes.[51] As indicated in their press release, these efforts include:

    - tracking and reporting on the COP28 commitments, in collaboration with UNFCCC[52]
    - supporting countries as they develop the next round of NDCs, and
    - helping develop solutions to deliver greater financing for clean energy transitions, particularly in emerging and developing economies.[53]

29. Dr. Birol also announced that the IEA will launch a new roundtable series in partnership with the COP29 Presidency. These roundtables will provide an important venue for countries to share experiences and expertise as they navigate the complexities of developing new NDCs and transition plans, and to establish priorities ahead of COP29 in November 2024. The IEA also continues to support best practice sharing in energy efficiency through a series of ongoing initiatives, such as the IEA Technology Collaboration Programme on Energy Efficient End-Use Equipment (4E).[54]

30. The IEA has established a website to track progress towards the energy targets set out in paragraph 28 of the GST decision.[55,56] The tracker, based on the IEA's Net Zero Emissions by 2050 Scenario and latest data analysis, shows where the world currently stands in relation to these objectives, as well as where it would need to be in 2030 to meet them–and be on a pathway to the COP28 target of net zero energy sector emissions by mid-century.

31. In its April 2024 communique, the G7 Climate, Energy and Environment Ministers further called upon the IEA to support the achievement of COP28 energy efficiency global pledge including through an Energy Efficiency Policy Toolkit. The G7 also welcomed the role of the Digital Demand Driven Electricity Networks (3DEN) Initiative,[57] launched in 2019, supported by the G7 Presidency with the support of IEA, in advancing international collaboration on energy efficiency.[58]

32. In June 2024, the COP29 Presidency announced it will partner with IRENA on the monitoring of progress towards tripling renewable energy capacity and doubling energy efficiency by 2030. In May 2024, the COP28 Presidency tasked IRENA with the establishment of a special annual report series dedicated to monitoring progress and providing recommendations on achieving key energy goals of GST outcome.[59]

33. These efforts reflect the need for focused leadership to specifically drive progress on each of the GST targets and signals.

2024 Energy-related Events, with a Focus on Energy Efficiency

34. Energy-related organizations, coalitions, and initiatives may meet or engage at a number of high-level clean energy or energy innovation-related events for the remainder of 2024.

35. Ideally, IEA and IRENA could begin to thread a coherent narrative on progress towards and implementation of the global goal of doubling energy efficiency through these events. Such guidance could take Parties and NPS from COP28 through the calendar of energy events and moments in such a way that they can build capacity and momentum towards the development and enactment of needed policy changes throughout 2024, building a strong platform for enhanced NDC ambition and subsequent implementation. A coherent thread through these events, focusing on the exchange of lessons learned and best practices for increasing energy efficiency between Parties and NPS can raise opportunities for enhanced international cooperation.

36. These events include:

JANUARY
13-14 January, IRENA General Assembly (Abu Dhabi, UAE)
15 January, Fourteenth Session of the IRENA Assembly, Part 1 (virtual)
FEBRUARY
14-15 February, IEA 2024 Ministerial Meeting (Paris, France)
MARCH
5-6 March, Powering Africa Summit (Washington, DC)
21-22 March, Copenhagen Climate Ministerial (Copenhagen, Denmark) *Presentation of the Troika vision and approach and officially launch of its work for the year*
APRIL
16-18 April, Fourteenth Session of the IRENA Assembly, Part 2 (Abu Dhabi, UAE)

22-25 April, World Energy Congress (Rotterdam, Netherlands)
25-26 April, Petersberg Climate Dialogue (Berlin, Germany) *Troika's first majlis with a focus on enabling the implementation of the energy transition outcomes from the first GST*
26 April, IEA Global Summit on People-Centred Clean Energy Transitions (Paris, France)
28-30 April, G7 Ministerial Meeting on Climate, Energy, and Environment (Torino, Italy)
MAY
14 May, IEA Summit on Clean Cooking in Africa (Paris, France)
15 May, First COP29-IEA High-Level Energy Transition Dialogue (Paris, France)
21-23 May, IEA 9th Annual Global Conference on Energy Efficiency (Nairobi, Kenya)
27-29 May, The Mitigation Work Programme's Third Global Dialogue and Investment-Focused Event (Bonn, Germany)
JUNE
3-13 June, SB60 (Bonn, Germany)
4-6 June, SEforALL Global Forum 2024 (Bridgetown, Saint Michael, Barbados)
14 June, Second COP29-IEA High-Level Energy Transition Dialogue (London, UK)
17-19 June, G7 Summit (Putignano, Puglia, Italy)
26-28 June, IRENA International Energy Workshop (IEW) 2024 (Bonn, Germany)
JULY
22-23 July, Ministerial on Climate Action (Wuhan, China) *Troika's second majlis with a focus on supporting the conservation, protection and restoration of forests, sinks and reservoirs, including through synergies between biodiversity and climate*
26-27 July, Presidency Heads of Delegation retreat (Shamakhi, Azerbaijan)
AUGUST
12-16 August, NDCs 3.0 Regional Forum for the Pacific (Apia, Samoa)
27-29 August, NDCs 3.0 Regional Forum for Latin America and the Caribbean (Bogota, Colombia)
SEPTEMBER
3-5 September, NDCs 3.0 Regional Forum for Eastern Europe and Central Asia (Istanbul, Türkiye)
5-6 September, Fifth Global Conference on Strengthening Synergies between the Paris Agreement and the 2030 Agenda for Sustainable Development (Rio de Janeiro, Brazil) *Troika's third majlis with a focus on galvanizing political momentum to enhance adaptation action and global resilience by 2030, including by addressing the adaptation finance gap*
TBD September, Presidency High-Level Energy Dialogue co-hosted with IEA (New York, New York)
10-24 September, UN General Assembly (New York, NY) *A high-level Troika event to showcase the leadership of early movers of 1.5 aligned NDCs*
19-20 September, 12th International Conference on Sustainable Development (New York, NY)
22-23 September, Summit of the Future (New York, NY)
23-25 September, First Global Renewables Summit (New York, NY)
23-25 September, NDCs 3.0 Regional Forum for the Middle East and North Africa (Tunis, Tunisia)
30 September to 2 October, NDCs 3.0 Regional Forum for Asia (Bangkok, Thailand)
OCTOBER
1-3 October, Joint Ministerial for Clean Energy Ministerial and Mission Innovation (CEM15 and MI-9) (Foz do Iguaçu, Brazil)
4-5 October, Fourth Global Dialogue and Fourth Investment-Focused Event under the Sharm el-Sheikh Mitigation Ambition and Implementation Work Programme (Sharm el-Sheikh, Egypt)
10-11 October, Pre-COP (Baku) *Troika High-level Dialogue to focus on NDC ambition and implementation to date*

23-25 October, G20 Joint Meeting of Climate Change and Finance Ministers (Washington, DC) *High-level Troika even on climate finance and investment frameworks to enhance ambition and enable implementation of NDCs*
22-27 October, Annual Meetings of the World Bank Group and the International Monetary Fund (IMF) (Washington, DC)
NOVEMBER
11-24 November, COP29 (Baku, Azerbaijan) • *A leaders-level event to focus on taking stock of the Troika's work and opportunities for strengthened ambition in 2025* • *High-level ministerial roundtable for the MWP.*
18-19 November, G20 Summit (Rio de Janeiro, Brazil)
DECEMBER
10-11 December, 21st Replenishment of the International Development Association (IDA21) Final Pledging and Replenishment Meeting

Capacity Building and Support for the Development of Energy Efficiency Policies and NDCs

37. Other initiatives can provide critical capacity-building support for the development of climate policy and NDCs. One key initiative is **UN Development Programme (*UNDP*)'s Climate Promise**.[60] Climate Promise leverages Parties' NDCs and brings together UNDP's infrastructure, networks and breadth of substantive offers to provide comprehensive support on NDC implementation. UNDP provides support to help countries take bold action to reduce their emissions, increase their resilience to climate impacts and support sustainable development priorities.

38. In April 2024, UNDP unveiled the next stage of Climate Promise, Climate Promise 2025, which will support countries in developing and delivering their pledges and draws on UNDP's newly established Climate Hub.[61] Climate Promise 2025 will link climate diplomacy and thought leadership with climate action and sustainable development at national and local levels to align the next generation of NDCs with the Paris Agreement goals.

39. Another key initiative is the **NDC Partnership**.[62] Leveraging more than 200 members and more than 80 institutions, the Partnership responds to requests for support needed to translate identified NDC implementation priorities into actionable policies and programs. Based on these requests, the membership offers a tailored package of expertise, technical assistance, and funding. This collaborative response provides developing countries with efficient access to a wide range of resources to adapt to and mitigate climate change and foster more equitable and sustainable development.

40. In June 2024, the NDC Partnership and the UNFCCC secretariat launched the **NDC 3.0 Navigator**. The NDC 3.0 Navigator is an interactive tool designed to support countries in raising NDC ambition and accelerating the implementation of the next round of NDCs. It brings together expert-created strategies, resources, and country insights to support countries in updating their NDCs.[63] The NDC Navigator also set out strategies for Parties translating "global efforts" on renewable capacity, energy efficiency improvements, and the low-carbon energy transition from the first GST into national mitigation efforts.[64]

41. In July 2024, UN Environment Programme, the UNDP and the NDC Partnership, in collaboration with the UNFCCC Secretariat announced that they are organizing **NDCs 3.0 Regional Fora**.[65] The closed-

door Fora will use insights from COP28 and the GST to focus on mitigation options, adaptation solutions and inclusion of super pollutants (short-lived non-carbon dioxide pollutants), such as methane and black carbon in the NDCs. Participants, invited from government ministries engaged in NDC development and implementation, will engage in peer-learning, explore innovative financing models and share how to develop policy roadmaps that lead to implementation. The Fora will be places to discuss how ambitious sectoral targets can lead to transformational change and investment plans.

42. As it relates to energy efficiency in particular, capacity building is needed to collect data and map energy efficiency potential across sectors (e.g., industry, buildings, transport, grids, agriculture) in order to guide policymaking, support behavioral change, and attract investments. Not every country or region is in a position to double their energy efficiency, therefore tracking progress towards the global goal will need to account for those differences.

Recommendation

43. Paragraph 28 of the GST decision sets out a package of critical mitigation targets and signals. The achievement of no one signal or target alone will result in the deep, rapid, and sustained reductions in greenhouse gas emissions in line with 1.5°C pathways.

44. However, to drive the achievement of the doubling of energy efficiency globally and recognizing that pathways to achieving energy efficiency goal may vary given how close a country or region is to a 4 percent energy intensity improvement rate, **regional-level leaders should support the development of on energy efficiency goals and implementation roadmaps for specific geographic areas and sectors**. Regional energy efficiency initiatives can foster understanding of effective local solutions, increase transparency of and accountability to national commitments like NDCs, and attract investment. While almost 90 percent of countries mention energy efficiency in their NDC, less than 50 percent mention appliances and equipment and only 25 percent specify appliance-related policies.[66] Regional leaders could also suggest templates for NDC language on energy efficiency.[67]

45. This recommendation aligns with the HLCs' vision and efforts to regionalize the 2030 Climate Solutions framework for their accelerated adoption and implementation toward achievement of GST outcomes. Regional energy organizations and programs with significant convening power and expertise could coordinate with relevant financial institutions, capacity building centers and businesses promote regional energy efficiency initiatives aligned with IEA's and IRENA's established international leadership.

46. The following are examples of potential regional leaders and regions:

- the Latin American Energy Organization (OLADE) for the Latin America and the Caribbean region
- the Regional Center for Renewable Energy and Energy Efficiency (RCREEE)[68] for the Middle East and North Africa (MENA) region
- the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE)[69] for Southern Africa, ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)[70] for West Africa, the East African Centre for Renewable Energy and Energy Efficiency (EACREEE)[71] for East Africa and the African Energy Commission (AFREC)[72] for the African continent
- the Economic Research Institute for ASEAN and East Asia (ERIA)[73] and the Centre for Energy (ACE)[74] for Southeast Asia.

47. The Troika, as a leader on ambition, can, in turn, leverage its role by:

- highlighting the importance of the role of regional leaders and conveners on energy efficiency
- partnering with energy-focused IGOs
- working with UNDP Climate Promise and the NDC Partnership in building capacity for energy efficiency policies and measures undergirding NDCs
- enabling collaboration and sharing best practice on key barriers to progress towards the doubling of energy efficiency by 2030
- exploring with Parties what a 1.5 degree C-aligned, just energy transition that achieves the doubling of energy efficiency target looks like and what it may require in various regions
- informing the UNSG's NDC support platform, or creating space for feedback between energy efficiency target efforts and the support platform.

Ongoing Leadership is Needed

48. The Troika and the Roadmap to Mission 1.5C provide a promising model of collaborative leadership that can provide continuity and a trajectory for enhanced international cooperation across critical years. The Troika's high level events planned for the latter half of 2024 can be critical for calling upon ministers and government leaders to lead on action to double energy capacity or invest in developing country efforts to do so. And COP29 could be a key moment to review efficiency progress toward achieving achieving the doubling of energy efficiency by 2030, after which the Troika could lay out a clear roadmap for events and action for 2025.

49. The near-term goal is action and implementation that inform enhanced NDCs and ambition up to and through the deadline for new NDCs by February 10, 2025. In the longer-term, such leadership will be critical for informing subsequent implementation.

50. The outcome of the negotiations on the NQCG in 2024 and broader financial developments will impact the environment for international cooperation. Once there has been sufficient time to analyze the NDCs in the annual update of the NDC synthesis report that will be made available ahead of COP30, it will become clearer whether the GST will have succeeded.[75] But this also means that Belém will not be the "NDC COP."

51. As such, 2025 will demonstrate how much more Parties are willing to commit to achieving the Paris goals. It is also possible that NDCs will reveal themselves to more usefully be investment plans or tools.[76]

52. The year 2025 will also mark the year that the Paris Agreement's enhanced transparency framework will be fully operational. New processes, like the facilitative multilateral consideration of process, provide opportunities for Parties to share best practices and lessons learned in implementing their NDCs.

53. Troika leadership and the incoming Brazilian Presidency must utilize the Roadmap to 1.5C and the outcomes of COP29 to skillfully build on the picture of progress drawn earlier in 2025 to a successful outcome at COP30 that nevertheless remains critical to ambition and enhanced international cooperation in 2026. COP30 in Belém should not be seen as a cliff edge, but a steppingstone to COP31 and beyond. In 2026, the second GST process begins again.

Conclusion

54. While there is a strong case for clear leadership to respond to the call to double renewable energy efficiency by 2030, there is also a need to be inclusive. Clearer leadership on implementing and coordination on the energy efficiency target, including how efforts are enacted on the ground, may elicit reactions that Parties are "being told what to do." As such, the national determinedness of NDCs and their domestic implementation must be clearly reiterated and respected.

55. At the same time, the value of clear leadership on the doubling of energy efficiency target will enable far greater and faster implementation than would otherwise be the case. In addition, tracking progress towards the achievement of the target at COP29 and COP30 is crucial to generate further momentum. Early action must be captured in the next round of NDCs due by February 10, 2025, laying a strong foundation for further efforts.

Annex: Measuring Energy Efficiency

1. The Sustainable Development Goal (***SDG***) 7 "Affordable and Clean Energy" provides a methodology to calculate energy efficiency as the energy intensity of the economy.[77] The SDG methodology to calculate energy intensity is based on a formula that closely simulates total energy consumption as supply:

   Total energy supply = Primary energy production + Import of primary and secondary energy - Export of primary and secondary energy - International (aviation and marine) bunkers - Stock changes.

2. Energy efficiency improvements over time are typically measured through a primary energy intensity indicator as the change in total energy needed to produce one unit of output or activity expressed through Gross Domestic Product (GDP). Negative values represent improvements in energy intensity (less energy is used to produce one unit of economic output), while positive values indicate worsening (more energy is used to produce one unit of economic output).

3. The "average annual rate of energy efficiency improvements" is the year-on-year decrease in this primary energy intensity indicator. At a constant GDP, an energy efficiency improvement is reflected in reduced primary energy consumption.[78]

4. Final energy consumption is not typically used as a basis for calculation of aggregated energy efficiency targets because it does not take into account energy losses in the supply chain, such as in the fuel to usable forms of energy conversion, humanly induced biological processes associated with this conversion (e.g., methane release from waste), energy transportation, voltage transformation, and electricity transmission and distribution. Final energy intensity is also seldom used as an aggregate indicator of energy efficiency because it requires the capacity to measure final consumption at distributed end-use points across the economy which may lead to double counting of energy efficiency outcomes across coupled economic sectors.[79]

5. Energy savings can nevertheless be measured at specific end-use points for facility or appliance energy efficiency benchmarking. For example, energy efficiency improvements in buildings (industrial, commercial or residential) can be measured per area relative to a historic or best in-class baseline. Smart meters associated with energy management software can provide real-time energy consumption data as a basis to calculate efficiency; when these automated systems are lacking, estimates can be made.[80]

6. It is worth noting that:

   - the expected rate of improvement as a decrease in energy intensity in time in the global economy will be determined and sometimes limited by local differences in the economic structure (e.g., the share of large, energy-consuming industries), geographic characteristics (e.g., longer distances leading to higher demand for transport), climate and weather conditions (e.g., changes in demand for heating or cooling), and the exchange rate[81]
   - the IEA acknowledges that "doubling" means different things to different countries or regions depending on how close they are to the 4 percent primary energy intensity improvement rate today.[82]

7. The implications for countries and regions when tracking and reporting on progress toward the global energy efficiency target have not been elaborated. There is a tradeoff between development and climate impacts linked to energy consumption, with equity implications that need to be acknowledged when measuring global progress toward the doubling of energy efficiency by 2030. For example, it is

likely for a developing country to see its energy intensity indicator rise with per capita income. Increased purchasing power improves access to energy intensive appliances. Even as the most efficient technologies are available and become affordable, their use may lead to a greater increase in energy consumption relative to GDP growth. Improvements in the quality of life and resilience to climate change in some cases (e.g., via better cooling systems) may lead to a deterioration in the energy efficiency indicator, at least up to a certain level of income and other factors at play.

Endnotes

[1] United Nations Framework Convention on Climate Change [hereinafter UNFCCC], *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 79 (December 13, 2023), https://unfccc.int/documents/637073.
[2] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 170; See also, UNFCCC, *Paris Agreement*, Art. 4.9, December 12, 2015, T.I.A.S No. 15-1104, https://unfccc.int/sites/default/files/english_paris_agreement.pdf; UNFCCC, *Adoption of the Paris Agreement*, Decision 1/CP.21, ¶¶ 22-25 (January 29, 2016), https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf#page=2; UNFCCC, *Common time frames for nationally determined contributions referred to in Article 4, paragraph 10, of the Paris Agreement*, Decision 6/CMA.3, ¶ 2 (March 8, 2022), https://unfccc.int/sites/default/files/resource/CMA2021_10_Add3_E.pdf (Encourages Parties to communicate in 2025 a nationally determined contribution with an end date of 2035, in 2030 a nationally determined contribution with an end date of 2040, and so forth every five years thereafter); UNFCCC, *Report on the 11th meeting of the Paris Agreement Implementation and Compliance Meeting*, PAICC/2024/M11/4, ¶ 19 (April 17-19, 2024), https://unfccc.int/sites/default/files/resource/PAICC_11_meeting_report.pdf.
[3] *Features and Normative Requirements for Nationally Determined Contributions* (Arlington, VA: Center for Climate and Energy Solutions [hereinafter C2ES], June 2024), https://www.c2es.org/wp-content/uploads/2024/06/20240619-C2ES-NDC-Features-Normative-Requirements.pdf.
[4] UNFCCC, *Paris Agreement*, Arts. 3, 4.3; UNFCCC, *Further guidance in relation to the mitigation section of decision 1/CP.21*, Decision 4/CMA.1, Annex I, ¶ 4(c) (19 March 2019), https://unfccc.int/sites/default/files/resource/cma2018_3_add1_advance.pdf.
[5] UNFCCC, *Paris Agreement*, Art. 4.2.
[6] UNFCCC, *Paris Agreement*, Arts. 3, 4.3; UNFCCC, *Further guidance in relation to the mitigation section of decision 1/CP.21*, Decision 4/CMA.1, Annex I, ¶ 6.
[7] UNFCCC, *Paris Agreement*, Arts. 3, 4.3; UNFCCC, *Further guidance in relation to the mitigation section of decision* 1/CP.21, Decision 4/CMA.1, Annex I, ¶ 7.
[8] UNFCCC, *Further guidance in relation to the mitigation section of decision 1/CP.21*, Decision 4/CMA.1, Annex I, ¶4(c).
[9] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 39.
[10] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 6.
[11] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 171.
[12] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 179.
[13] Sultan al Jaber, Mukhtar Babayev, and Marina Silva, "COP Presidencies Troika Letter to Parties," UNFCCC, March 2024, https://unfccc.int/sites/default/files/resource/presidencies_troika_letter_to_parties.pdf.
[14] Sultan al Jaber, Mukhtar Babayev, and Marina Silva, "Troika Second Letter to Parties and Observers," UNFCCC, July 23, 2024, https://unfccc.int/sites/default/files/resource/troika_second_letter_to_parties_and_observers__july_2024.pdf.
[15] Our intention is that future papers will examine the need for leadership across other global stocktake (***GST***) signals, including in relation to adaptation.
[16] Kaveh Guilanpour et al., *A Solutions-oriented Approach to the Paris Agreement's Global Stocktake* (Arlington, VA: Center for Climate and Energy Solutions [hereinafter C2ES], November 2023), https://www.c2es.org/document/a-solutions-oriented-approach-to-the-paris-agreements-global-stocktake/; UNFCCC, *Technical dialogue of the first global stocktake: Synthesis report by the co-facilitators on the technical dialogue* (September 8, 2023), https://unfccc.int/sites/default/files/resource/sb2023_09E.pdf; United Nations Climate Change High-Level Champions [hereinafter HLCs], *2030 Climate Solutions: Implementation Roadmap* (Bonn, Germany: UNFCCC, December 2023), https://climatechampions.unfccc.int/wp-content/uploads/2023/12/2030-Climate-Solutions-Publication-Implementation-roadmap.pdf.

[17] Joanna Gill, "Energy efficiency: the net zero no brainer that has come of age," *Context*, January 19, 2024, https://www.context.news/net-zero/energy-efficiency-the-net-zero-no-brainer-that-has-come-of-age?utm_source=newsletter&utm_medium=email&utm_campaign=context-climate.
[18] World Economic Forum [hereinafter WEF], Transforming Energy Demand: White Paper (Geneva, Switzerland: WEF, January 2024), https://www3.weforum.org/docs/WEF_Transforming_Energy_Demand_2024.pdf.
[19] Felicia Jackson, "Why Is Energy Efficiency Being Ignored?," Forbes (December 7, 2022), https://www.forbes.com/sites/feliciajackson/2022/12/02/why-is-energy-efficiency-being-ignored.
[20] Noé van Hulst, "The untapped potential of energy efficiency," *International Energy Agency [hereinafter* IEA*]*, May 11, 2017, https://www.iea.org/commentaries/the-untapped-potential-of-energy-efficiency.
[21] UNFCCC, Outcome of the first global stocktake, Decision 1/CMA.5, ¶ 28.
[22] Latin American Energy Organization [hereinafter OLADE], *Energy Efficiency Program for Latin America and the Caribbean (PALCEE), phases I, II, and II* (Quito, Ecuador: OLADE, 2024), https://www.olade.org/en/energy-efficiency-program-for-latin-america-and-the-caribbean-palcee-phases-i-ii-and-iii/.
[23] The process of increasing commitment to climate action through the global stocktake (GST) to inform climate action—including updating nationally determined contributions (***NDCs***) and national adaptation plans—is part of what is known as the Paris Agreement's "ambition cycle." It also includes the "enhanced transparency framework," the process for countries to gather and report greenhouse gas inventory data, track their progress against the overarching goals of the Paris Agreement and their own NDCs and deliver updates on the financial support they are providing or receiving. Parties are required to submit their first biennial transparency report (***BTR1***) and national inventory report by the end of December 2024.
[24] UNFCCC, *Paris Agreement*, Arts. 14.1, 14.2.
[25] UNFCCC, *Paris Agreement*, Art. 14.3.
[26] UNFCCC, *Outcome of the first global stocktake,* Decision 1/CMA.5, ¶¶ 9-10.
[27] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 170; UNFCCC, *Paris Agreement*, Art. 4.9; UNFCCC, *Adoption of the Paris Agreement*, 1/CP.21, ¶¶ 22-25; UNFCCC, *Common time frames for nationally determined contributions referred to in Article 4, paragraph 10, of the Paris Agreement*, Decision 6/CMA.3, ¶ 2 (Encourages Parties to communicate in 2025 a NDC with an end date of 2035, in 2030 a NDC with an end date of 2040, and so forth every five years thereafter).
[28] *Nationally determined contributions under the Paris Agreement Synthesis report* 37, Figure 12 Share of Parties referring to the specific priority areas and frequently indicated mitigation options in nationally determined contributions (UNFCCC, November 14, 2023), https://unfccc.int/sites/default/files/resource/cma2023_12.pdf.
[29] UNFCCC, *Glasgow Climate Pact*, Decision 1/CMA.3, ¶ 30 (March 8, 2022), https://unfccc.int/sites/default/files/resource/cma2021_10a01E.pdf.
[30] IEA, "Energy efficiency and behavioural change," *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach* (Paris, France: IEA, 2023), https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach.
[31] IEA, "Energy efficiency and behavioural change," *Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach*.
[32] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 28(a).
[33] Guilanpour et al., *A Solutions-oriented Approach to the Paris Agreement's Global*; Lavanya Rajamani et al., *Re-invigorating the UN Climate Regime in the Wider Landscape of Climate Action* (Arlington, VA: Center for Climate and Energy Solutions, November 2023), https://www.c2es.org/document/re-invigorating-the-un-climate-regime/.
[34] UNFCCC, *Technical dialogue of the first global stocktake: Synthesis report by the co-facilitators on the technical dialogue*.
[35] Ruoyo Chen et al., *Realizing the Potential of Energy Efficiency in Latin America and the Caribbean (English)* (Washington, D.C.: World Bank Group, December 2022), http://documents.worldbank.org/curated/en/099854005092338445/IDU0541d1c4104cfd0449a089b90f7882cb769c0.

[36] Eda Kosma, Kaveh Guilanpour, and Leila Pourarkin, *Rising to the Climate Finance Challenge* (Arlington, VA: C2ES, 2024), https://www.c2es.org/wp-content/uploads/2024/04/20240410-C2ES-Consultation-Rising-to-the-climate-finance-challenge.pdf.
[37] Guilanpour et al., *A Solutions-oriented Approach to the Paris Agreement's Global*; Rajamani et al., *Re-invigorating the UN Climate Regime in the Wider Landscape of Climate Action,* (Arlington, VA: C2ES, November 2023); HLCs, *2030 Climate Solutions: Implementation Roadmap*.
[38] IEA, "Energy efficiency and behavioural change," *Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach*.
[39] IEA, *What does doubling global progress on energy efficiency entail?*, (Paris, France: IEA, 2023), https://www.iea.org/reports/energy-efficiency-2023/what-does-doubling-global-progress-on-energy-efficiency-entail.
[40] This is mainly achieved via electrifying traditional fossil fuelsystems, such as heat pumps in buildings and electric vehicles in transport, but also clean cookstoves for low-income families. It must be noted that shifting to renewable energy sources is a form of fuel switching which is a measure of energy efficiency in the sense that these renewable sources entail fewer losses during the conversion from heat, motion or light energy to electric power.
[41] This targets energy savings obtained through better insulated building construction and using more efficient appliances such as air conditioners and refrigerators, but also driving more fuel-efficient vehicles and improving industrial processes for less energy use.
[42] This is mostly achieved by changes in energy consumption patterns by users. For instance, adjusting space temperatures for heating and cooling, increasing circularity in supply chains, and minimising the material content of products through recycling which reduces the energy required to manufacture them.
[43] COP28, IRENA, and Globale Renewables Alliance, *Tripling renewable power and doubling energy efficiency by 2030: Crucial steps toward 1.5°C* (Abu Dhabi, UAE: IRENA, 2023), https://www.irena.org/Publications/2023/Oct/Tripling-renewable-power-and-doubling-energy-efficiency-by-2030.
[44] The role of the HLCs was established at COP21 to connect the work of governments with the main voluntary and collaborative actions taken by cities, regions, businesses, and investors. The HLCs' initiatives and analytical work are offered as valuable resources to Parties in taking climate action. UNFCCC, "The High Level Climate Champions," n.d., https://climatechampions.unfccc.int/un-climate-change-high-level-champions/.
[45] HLCs, *2030 Climate Solutions: Implementation Roadmap*.
[46] These actions and enablers have been drawn from the HLCs work on the 2030 Breakthroughs, which sets out a Clean Power Breakthrough aiming for solar and wind to make up at least 40 percent – and all renewables to make up at least 60 percent – of global electricity generation by 2030. "2030 Breakthroughs," Climate Champion, accessed August 15, 2024, https://climatechampions.unfccc.int/system/breakthroughs/. They also draw on the Breakthrough Agenda; its aims to make clean power "the most affordable and reliable option for all countries to meet their power needs efficiently by 2030." "Breakthrough Agenda," Climate Champions, accessed August 15, 2024, https://breakthroughagenda.org/.
[47] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 191.
[48] "Global Renewables and Energy Efficiency Pledge," COP28, accessed July 16, 2024, https://www.cop28.com/en/global-renewables-and-energy-efficiency-pledge.
[49] The G20's Task Force on a Global Mobilization Against Climate Change (TF-CLIMA), *Issue Note* (2024), https://www.g20.org/pt-br/documentos/tf-clima-issue-note-g20-brasil.pdf.
[50] First published in 2021 and updated in September 2023, the IEA's Net Zero Roadmaps report demonstrated that ramping up renewables like solar and wind power, improving energy efficiency, cutting methane emissions and increasing electrification would deliver more than 80 percent of the emissions reductions needed by 2030. "The path to limiting global warming to 1.5˚C has narrowed, but clean energy growth is keeping it open," *IEA*, September 26, 2023, https://www.iea.org/news/the-path-to-limiting-global-warming-to-1-5-c-has-narrowed-but-clean-energy-growth-is-keeping-it-open.
[51] "At IEA Ministerial Meeting and 50th Anniversary, global leaders pledge to strengthen energy security and accelerate clean transitions to keep 1.5˚C target alive," *IEA*, February 14, 2024, https://www.iea.org/news/at-iea-

ministerial-meeting-and-50th-anniversary-global-leaders-pledge-to-strengthen-energy-security-and-accelerate-clean-transitions-to-keep-1-5-c-target-alive.

[52] IEA, *COP28: Tracking the energy outcomes* (Paris, France: IEA, 2024), https://www.iea.org/topics/cop28-tracking-the-energy-outcomes.

[53] "At IEA event, COP28 President and other climate and energy leaders identify priority actions to deliver on Dubai outcomes," *IEA*, February 20, 2024, https://www.iea.org/news/at-iea-event-cop28-president-and-other-climate-and-energy-leaders-identify-priority-actions-to-deliver-on-dubai-outcomes.

[54] "About 4E," IEA Technology Collarboration Programme on Energy Efficient End-Use Equipment (4E), accessed August 15, 2024, https://www.iea-4e.org/about-4e/.

[55] IEA, COP28: Tracking the Energy Outcomes, https://www.iea.org/topics/cop28-tracking-the-energy-outcomes?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top.

[56] UNFCCC, Outcome of the first global stocktake, Decision 1/CMA.5, ¶ 28.

[57] "Digital Demand-Driven Electricity Networks Initiative," IEA, accessed August 15, 2024, https://www.iea.org/programmes/digital-demand-driven-electricity-networks-initiative.

[58] G7 Italia, *Climate, Energy and Environment Ministers' Meeting Communique,* (Torino, Italy: April 2024), https://www.g7italy.it/wp-content/uploads/G7-Climate-Energy-Environment-Ministerial-Communique_Final.pdf.

[59] "COP29 Joins IRENA to Track UAE Consensus Energy Outcomes set at COP28," IRENA, June 5, 2024, https://www.irena.org/News/pressreleases/2024/Jun/COP29-Joins-IRENA-to-Track-UAE-Consensus-Energy-Outcomes-set-at-COP28.

[60] "Climate Promise," UN Development Programme [hereinafter UNDP], accessed August 15, 2024, https://climatepromise.undp.org.

[61] "UN Development Programme launches next phase of flagship climate action initiative," *UNDP*, April 23, 2024, https://climatepromise.undp.org/news-and-stories/un-development-programme-launches-next-phase-flagship-climate-action-initiative.

[62] "About Us," NDC Partnership, accessed August 15, 2024, https://ndcpartnership.org/about-us.

[63] NDC Partnership, accessed June 28, 2024, https://ndcnavigator.org/.

[64] "Aligned to the Paris Agreement Temperature Goal: Exploring Sector-Specific Opportunities," NDC Navigator, accessed July 18, 2024, https://ndcnavigator.org/routes/temperature-goal/sector-specific-opportunities.

[65] "Regional Fora Aim to Increase Country Ambition Ahead of Next Round of Climate Plans," UNFCCC, July 23, 2024, https://unfccc.int/news/regional-fora-aim-to-increase-country-ambition-ahead-of-next-round-of-climate-plans.

[66] Lauren Boucher and Jilian Webber, *Appliance Efficiency in NDCs: Tracking Changes in Nationally Commitments to the Paris Agreement* (CLASP, November 2023), https://www.clasp.ngo/research/all/appliance-efficiency-in-ndcs/.

[67] "Net Zero Appliances NDC Toolkit," CLASP, accessed September 11, 2024, https://www.clasp.ngo/tools/ndc-appliance-efficiency-toolkit/.

[68] "Projects," Regional Center for Renewable Energy and Energy Efficiency, accessed August 15, 2024, https://rcreee.org/projects/.

[69] SADC Centre for Renewable energy and Energy Efficiency, accessed September 12, 2024, http://www.sacreee.org/.

[70] ECOWAS Centre for Renewable Energy and Energy Efficiency, accessed September 12, 2024, https://www.ecreee.org/.

[71] East African Centre of Excellence for Renewable Energy and Efficiency, accessed September 12, 2024, https://www.eacreee.org/.

[72] "African Energy Efficiency Programme," African Energy Commission, accessed August 15, 2024, https://au-afrec.org/energy-efficiency-programme.

[73] Economic Research Institute for ASEAN and East Asia, accessed September 12, 2024, https://www.eria.org/.

[74] "Energy and Climate Change in ASEAN," Accept II ASEAN Climate Change and Energy Project, accessed August 15, 2024, https://accept.aseanenergy.org/.

[75] UNFCCC, Glasgow Climate Pact, Decision 1/CMA.3, ¶ 30.

[76] UNFCCC, "Building Support for More Ambitious Climate Actions," March 14, 2024, https://unfccc.int/news/building-support-for-more-ambitious-national-climate-action-plans.

[77] IEA, IRENA, United Nations Statistcs Arabia, World Bank, and World Health Organisation, "Methodology: Energy Efficiency," in *Tracking SDG 7: The Energy Progress*, (Washington, D.C.: The World Bank Energy Sector Management Assistance Program, 2024), https://trackingsdg7.esmap.org/methodology.
[78] The equation to be fulfilled is a derivative of energy use: *EI(t) - EI(t-1)/ EI (t-1) = -4%*; where *EI* is energy intensity and *(t-1)* and *(t)* are two successive moments in time.
[79] UNDP, "Sustainable Energy for All: Global Tracking Framework," Chapter 3. Energy Efficiency, 2015. https://www.undp.org/sites/g/files/zskgke326/files/publications/8-GTF_ch3.pdf.
[80] UNIDO, "What is an energy management system?", 9 November 2021, https://www.unido.org/stories/what-energy-management-system.
[81] "Energy End-uses and Efficiency Indicators Data Explorer," IEA, updated December 18, 2023, https://www.iea.org/data-and-statistics/data-tools/energy-end-uses-and-efficiency-indicators-data-explorer.
[82] "What does doubling global progress on energy efficiency entail?" IEA, 2023, https://www.iea.org/reports/energy-efficiency-2023/what-does-doubling-global-progress-on-energy-efficiency-entail.