

The Geopolitics of the Energy Transition and Opportunities for International Cooperation

December 1, 2023



This Readout and Recommendations summarizes the main conclusions and insights from the Geopolitics of the Energy Transition convening organized by E3G and the Stanley Center for Peace and Security with support from the Pocantico Center of the Rockefeller Brothers Fund in Tarrytown, New York. It should not be assumed that every attendee subscribes to all of its recommendations, observations, and conclusions.

The objectives of the workshop were to identify the key implications of the energy transition for current geopolitical relationships, form a body of understanding, and establish a new agenda for the geopolitics of the transition.

The Salience of the Energy Transition for Geopolitics and International Cooperation

The world has started the shift toward a new energy system, ushering in a new era of geopolitics. This raises questions about key assumptions for how countries relate, in terms of economic ties, political alignments, and interdependencies. As efforts to act on climate change increase, there is a need to look at all these elements together to understand the emerging geopolitics of the global energy transition.

This includes examining how geopolitics and the energy transition affect one another. The war in Ukraine and US-China tensions have changed the dynamics of the energy transition. The European Union (EU) and the United States have adopted industrial policies to accelerate the transition, leading to global consequences on energy security and commodity price volatility. **Yet energy transition and climate policy perspectives are currently siloed from or borrowed for geopolitical policymaking based on many assumptions from a global fossil fuel energy system.**

Using various framing lenses to assess geopolitics—major powers and regional blocs, Global North–Global South relations,

and transnational and social change—allows a richer and more holistic inquiry into what the geopolitics of the energy transition means. The current conversation mostly concerns climate and energy, with slightly more understanding of finance and trade, and the security perspective is practically absent. **Examining the interrelation of climate, energy, finance, trade, and security altogether** provides a better basis for policy directions toward greater peace and security as the world transitions.

Themes such as fragmentation, major power competition, and nationalism have gained traction, but there is a need to examine the underlying assumptions and dynamics of these themes, as well as set aside space for cooperation. The US-China relationship and relationships between major trading blocs are framed by competition, with fewer ideas emerging on the vital necessity of cooperation. Most of the commentary on competition that seeks balance merely comes across as how to not let things get out of hand. **The current geopolitical narrative leans heavily on competition, but there must be a correction if the necessity of the energy transition is to steer geopolitics in a way that avoids runaway climate catastrophe.**

Key Takeaways

1. The concept of energy security differs dramatically between a more competitive fossil fuel paradigm concerned with a reliable flow of fossil fuels for combustion and a more cooperative renewables paradigm based on a varied supply chain of materials to build systems. Incumbent energy security frameworks are often outdated and tend to privilege fossil fuels while ignoring the benefits of renewable energy systems.
2. The decline of fossil fuels raises questions about fundamental assumptions in major international security relationships and alignments, particularly around the leverage and significance of the Middle East, Russia's role in Eurasia, and the contextual backdrop to tensions in Northeast and Southeast Asia.
3. New frameworks for regional cooperation, especially among developing countries, on renewable energy systems can bring about new practices of reciprocation, interdependence, and noninterference. Security-based geopolitical frameworks ignore that the transition is fundamentally multipolar, giving developing countries and regional blocs new opportunities and leverage.
4. Major importing economies of oil and gas should explore mutual benefits in accelerating the energy transition and managing supply and demand volatility. This has the potential of bringing together major economies such as China, the European Union, Japan, India, and Korea, among others, to expand their range of relationships in a more multipolar global arena.
5. Further surfacing of the potential cooperative geopolitical alignments around finance and trade can unlock progress in efforts to reform the international financial system and address the spillover effects of recent industrial policy measures by major economies.

Fossil Fuels Versus Renewable Dynamics

The differences between fossil fuel and renewable systems will drive changes in geopolitics.

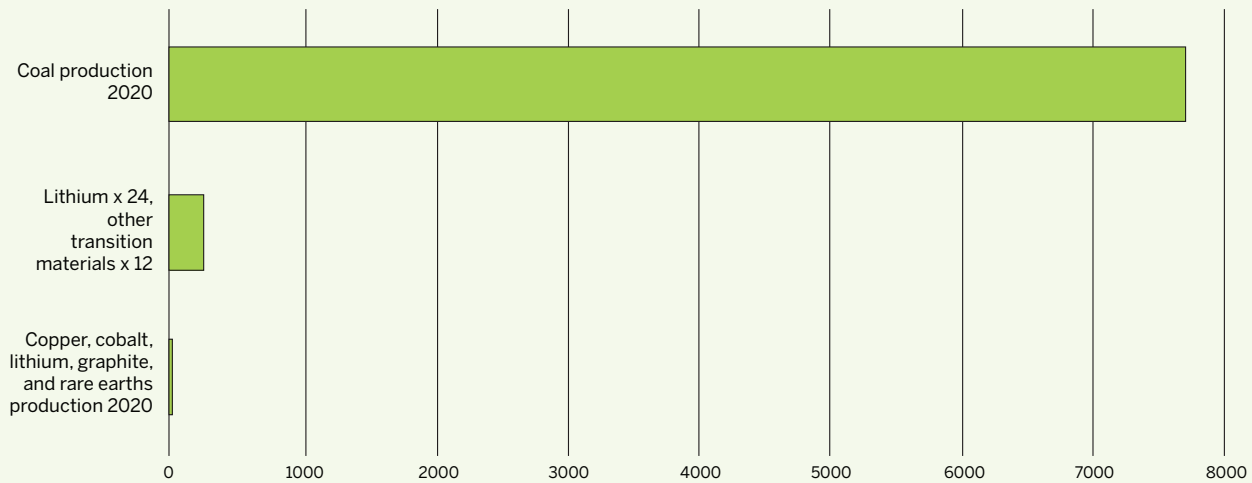
As countries shift to renewable energy systems, their international and national policies for energy security will shift. Trade will become less of a security risk for fossil fuel importing countries. Natural resource extraction, while still important to the build-out of renewable systems, will not be a powerful security concern.

Stock versus Flow: The key difference between the two is that renewable energy is a stock, not dependent on continuous fuel combustion (flow) to operate. For policymakers concerned with energy security, the risk for fossil fuel infrastructure is on securing a continuous supply of fuel. For renewables, the risk and material intensity is front loaded. The assembly and provision of material inputs for renewable energy is only important at the construction stage because once built, the systems are relatively independent. This detaches the function of a built renewable energy system from an international fuel market, shielding it from volatility, which affects fossil fuel prices.

Embargoes and Trade: Stemming from the key difference between fossil fuels and renewables of stocks and flows, fossil fuels are subject to embargoes or tariffs that affect their price and the operation of combustion engines, turbines, or boilers. The supply chain for a fossil fuel plant is continuous and may cross oceans and borders, requiring continuous upkeep. The effect of an embargo on a part of the renewable energy systems (RES) supply chain will not affect the operation of built renewable energy systems, even if it slows the adoption of new RES. This lowers the geopolitical clout wielded by important countries in the RES supply chain when compared to fossil fuel producers.



Production of Coal Versus Transition Materials in 2020 (Million Tonnes)



Created by the Center for Energy Studies, Rice University's Baker Institute.

- Coal production in 2020 was 350 times greater than that of energy transition materials. Oil production was 190 times greater.
- Increasing production of transition metals by a factor of 12 (and lithium x 24) still results in output that is just 3.3 percent that of coal.
- The transition to renewables will bring declines in mining, trade.

Critical Minerals Are Fundamentally Different than Fossil Fuels

FOSSIL FUELS



Large mining quantities

In 2021, 15 billion tonnes of fossil fuels were extracted.¹



Generate huge rents

Oil and gas exports alone represented a value of USD 2 trillion in 2021.³



Combusted as fuel

Fossil fuels are primarily burned as fuel, accounting for approximately 94% of their usage.⁵



Energy security risk

A disruption in the supply of fossil fuels can lead to immediate energy shortages and price spikes.



Not recyclable

Fossil fuels are primarily consumed through combustion and cannot be recovered or repurposed.

CRITICAL MATERIALS



Low mining quantities

Some 10 million tonnes of energy transition minerals were produced in 2022 for low-carbon technologies.²



Generate smaller profits

Exports of copper, nickel, lithium, cobalt and rare earths generated USD 96 billion in 2021.



Input to manufacturing

Critical materials are housed within energy assets that typically have a 10–30 year lifespan.



Energy transition risk

Disruptions in the supply of critical minerals can delay the construction of new clean energy assets but do not affect current energy prices or supply.



Reusable and recyclable

High potential for reducing use, reusing, and recycling.

Notes: [1] Figure is for 2021 and taken from BP's Statistical Review of World Energy. Oil and coal figures were available in tonnes; gas data were available in billion cubic metres (bcm) to billion tonnes using the formula (1 m³ = 0.712 kg), based on BP's methodology, which is also used by Hannah Ritchie; <https://hannahritchie.substack.com/p/mining-low-carbon-vs-fossil>.

[2] Based on IRENA calculations, production of materials (copper, lithium, graphite, nickel, cobalt, manganese, rare earth elements, and platinum group metals) for renewable energy-related technologies in 2022 amounted to some 10 million tonnes. [3] In 2021, exports of crude petroleum (HS 2709) generated USD 951 billion; refined petroleum (HS 2710) generated USD 746 billion; liquefied natural gas (HS 27111100) generated USD 162 billion; and natural gas in gaseous state (HS 271121) generated USD 173 billion. [4] In 2021, exports of copper ores and concentrates (HS 2603) generated USD 91.1 billion; nickel ores and concentrates (HS 2604) generated USD 4.24 billion; cobalt ores and concentrates (HS 2605) generated USD 118 million. With respect to rare-earth metals, scandium and yttrium (HS 280530) generated USD 586 million. [5] Calculated from IEA's World Energy Balance (2020), available from: www.iea.org/Sankey. Created by IRENA, International Renewable Energy Agency.



Implications of Fossil Fuel Decline

Even if fossil fuel demand grows over the next few years, it is projected to peak before 2030 and could fall by up to **75 percent for gas and 76 percent for oil by 2050**. To stay aligned with the Paris Agreement, global natural gas demand needs to decline by 19 percent by 2030, yet even without **additional climate policy, gas demand in key markets is likely to fall**. Renewable energy systems (RES), on the other hand, already account for 80 percent of global electricity demand growth, with year-on-year growth set to quadruple, becoming **larger than gas and coal in the next five years**. RES price out many fossil-fuel-based systems even without additional climate mitigation policies.

The decline in fossil fuel demand will have far reaching economic, security, and geopolitical implications. Between infrastructure, financial investment, and reserves, fossil fuels account for over \$60 trillion in asset value and up to \$10 trillion in flow value per year.

As the value of fossil assets give way to alternative energy sources, financial markets will react fast to fossil fuel demand reduction and falling rents. At present, almost all producing countries plan to be the last one standing, shown by the continued growth of fossil infrastructure, well beyond what the world's carbon budget can handle. Price volatility is likely to result from the misalignment between fossil fuel producers' expectations and market demand. This resulting instability is a big challenge for producers with undiversified economies where the effects are felt more strongly. A volatile transition also harms consuming countries through short-term price crunches and inconsistent market signals. While richer nations may be able to spend their way through volatility, emerging markets will be harmed the most.

In response, the world will have to manage supply and demand in the decade after peak demand to soften price volatility and maintain political resilience for the transition. For lower income producers with fragile institutions lacking a diversified economy, the impact of the transition will be felt more dramatically. Current macroeconomic trends such as high levels of sovereign debt and uneven credit ratings will further differentiate producers' economic vulnerability.

Global coordination on energy, finance/trade, and security is needed for dealing with volatility, as well as questioning existing assumptions. Major powers have a range of options to set consistent demand signals that would reduce price volatility and smooth the transition. Consumer country coordination through mechanisms like clubs may help set the standards and rules for RES price signals to help the transition.

Many international relationships are predicated on the continuous flow of fossil fuels across borders. As a result of falling demand, these relationships may begin to fade as the geopolitical leverage and importance of producers fades. Major powers looking to bolster their energy security will look toward partners that will help

them build out renewable energy over fossil fuels, gaining more leverage over fossil fuel producers.

Implications of the Rise of Renewables

Deployment of renewables is rising exponentially, capturing much of the growth in energy demand. New estimates driven by the energy crisis from Russia's invasion of Ukraine shows an **85 percent acceleration in the deployment of renewable energy** over the next five years. According to International Energy Agency models, renewable energy could account for 45 to 60 percent of global electricity generation by mid-century. To meet the Paris Agreement's aim of 1.5°C, the world will have to deploy renewables at a breakneck pace of around **1.5 trillion watts per year by 2030**.

At present much of the supply chain for renewable energy is concentrated in a few countries with choke points for particular materials and manufacturing capabilities. This concentration has become a source of geopolitical tension, as much of the manufacturing capacity, alongside the mining and refining of critical raw materials (CRMs), is divided over geopolitical lines.

Chinese domination of the mining and refining of critical minerals has caused governments in the EU and the United States to issue CRM strategies and carry out diplomacy of their own to "friend-shore" and "de-risk" their supply. CRMs have become an easy way for fossil fuel interests to securitize RES; CRMs' importance as a geopolitical focal point is likely overemphasized.

Though China is certainly a big player in RES manufacturing, the supply chain of these systems is often globally distributed. For example, in 2021, Indonesia **produced 37 percent of the world's nickel**, a metal essential for EV batteries, hydrogen electrolyzers, and wind turbines, while the country aims to produce even more in the next year. The value chain for renewables may bring about more cooperative approaches to trade as a broad and global coalition of countries seeks to maximize the benefits of RES production. Advantages over fossil fuel extraction—like an expanded tax base, absence-of-resource curse, more attractive high skilled jobs, and a lack of exposure to a volatile and geopolitically influenced global fossil fuel market—can build stronger and larger political coalitions for clean energy systems. Though the interdependency of a varied supply chain can bring countries together, that interdependency threatens rapid deployment because of security dilemmas.

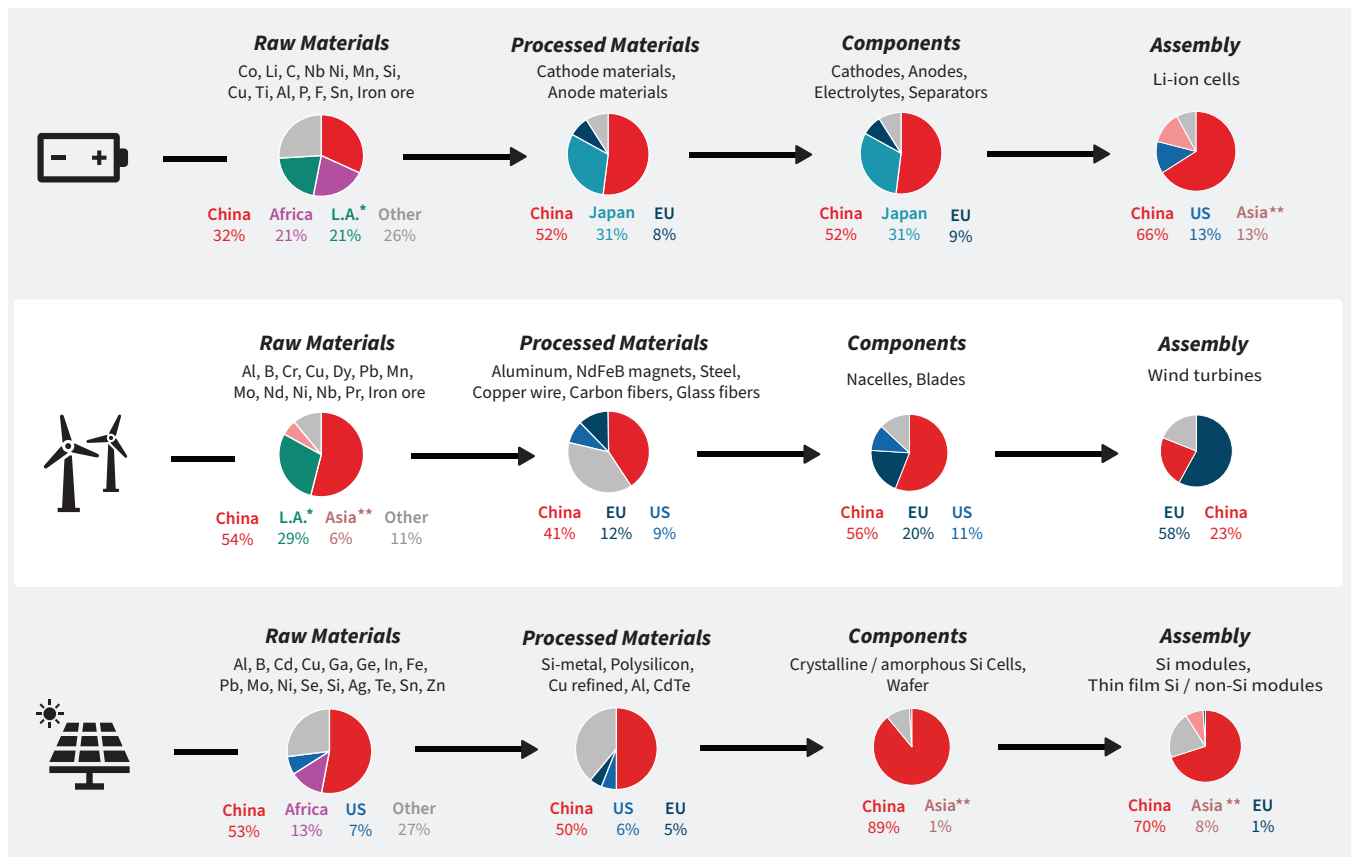
Energy security definitions often reflect outdated geopolitical frames. Current uses are related to the Carter Doctrine focused on energy security by acquiring fossil fuels. Outdated frames tend to ignore the benefits of a transition. Energy security based on RES heightens previously neglected variables like grid and energy infrastructure security, and demand-side management, while cross-border transmission and undersea cables become new vulnerabilities.

The energy transition in more-powerful nations may slow down the global transition if they do not consider the international



Clean Energy Mineral Supply Chains and Top Global Suppliers

Batteries, Wind, and Solar PV



* Latin America

** Excluding China and Japan

Source: Created by Ian Barlow based on data from European Commission, *Critical Materials for Strategic Technologies and Sectors in the EU—A Foresight Study, 2020* (Brussels: European Commission, 2020).

impact of protectionist elements in their energy policies (e.g., the US Inflation Reduction Act and EU Green Deal Industrial Plan). Subsidies in wealthy nations can limit CRMs and redirect renewable energy supply chains toward the largest markets, rather than supporting a transition everywhere. Further competitive policies such as sanctions and export controls among great power competition risks creating barriers to a rapid global transition, despite the overall cost reduction of new clean technology.

For the world to successfully build out renewables, regional and multipolar leadership must ensure that developing nations are not left behind. Energy demand growth in the next few decades will overwhelmingly come from developing countries as their economies grow and electricity access is more widely distributed. Especially in the context of US-China bifurcation, it is in most countries' interest to increase regional cooperation that may result in new institutions like cooperative forums or regionally owned financial institutions and infrastructure. The switch to renewable energy will benefit from more regional coordination for cross-border grids connecting supply to demand.

Identifying Major Geopolitical Issues

Further examination of the energy transition from the perspective of foreign policy and international security raises many fundamental issues, including the foundation of major international security relationships, current in vogue foreign policy frameworks, and the urge to disaggregate global institutions and form major power blocs.

The foundation of some existing national security arrangements and objectives, such as US ties with Saudi Arabia, overlap heavily with middle-income fossil fuel exporters and may be challenged during the energy transition. As these relationships fade, regional cooperation and new power brokers may need to address the question of power transitions. The Middle East and North Africa (MENA) region in particular may see greater turmoil as current international security arrangements fade, but it may also have an opportunity to relieve itself of the burdens of global energy security based on competition around fossil fuels.



Other major geopolitical tensions require an energy transition perspective as well. Russia's future in the world and in Central Asia is uncertain, but it will continue to play a massive role in global balance of power and the future of petrostates. In the backdrop of growing tensions in East Asia and the Pacific, there is a need to examine further dynamics of energy supply logistics and island-chain military strategies.

Current foreign policy frameworks (like those of autocracies versus democracies) and energy frameworks (like those of fossil fuel producers versus consumers) do not consider how state relations shift with the energy transition. Finding coherent frameworks for understanding climate and foreign policy objectives will give policymakers the tools to grapple with multiple challenges at once.

Price volatility resulting from the mismatch between the supply and demand for fossil fuels threatens the possibility of a smooth transition. Swings will happen more violently and quickly than assumed, especially once financial actors see the writing on the wall for fossil fuel demand. Coordination between consumers and producers along with successful interventions from international financial institutions can help reduce the economic damage from volatility.

Geopolitical fragmentation slows the energy transition and puts pressure on institutions, including standard setters for RES as well as multilateral development banks, to reform their lending practices, either through new management or ownership, lest others will be created. Building buy-in for the transition from developing countries requires shifting the narrative on renewable energy, aligning the transition with national priorities such as economic development.

Further analysis and dialogue are needed if the energy transition has the potential to reshape many of these fundamental geopolitical issues, particularly around rethinking core assumptions about the last half century of international security relationships, examining how geopolitics and the global existential priority of addressing climate change are related, and finding opportunities for countries to cooperate for greater peace and security and sustainability in a new geopolitical landscape.

Geopolitics and the International Climate Process

The fight over fossil fuels will become the central issue at this year's COP28 negotiations, especially since fossil fuel phaseout language was so contentious at COP27. The UAE presidency and others are pressing for a focus on "emissions" rather than fossil fuels, while other countries view renewables build-out and firm commitment to fossil fuel phaseouts as essential. While positions do not neatly fall along producer or consumer lines, the COP reflects geopolitical interests of countries, complicating agreement on a host of issues.

Some of the key points of contention in the COP, such as the fossil fuel phaseout language and support for carbon management, demonstrate the need to grapple with the intersection of

geopolitics and the energy transition. Successful coordination through the COP on fossil fuel phaseout language can open the conversation to address volatility, yet the body is not mandated nor equipped to manage the global energy market. But the COP could be an opportunity to emphasize the framework of renewable energy security and contrast it with the insecurity of fossil-fuel-based systems.

Conclusion

From the discussion in Pocantico, the group identified ways forward for the conversation on the geopolitics of the energy transition. There are still questions to be answered and bridges to be built in the CSO community to become better advocates of the energy transition and its role in peace and security.

One purpose of the convening, reiterated by the participants, was the need to break down barriers between peace and security, energy, and climate epistemic communities. Additional research into the topics presented in this paper and successful advocacy is possible by inviting different communities to work together. Adding the climate lens to Russia's changing geopolitical role, shifting dynamics in the Middle East, and China-US relations can help the climate community deftly navigate geopolitics. For the peace and security community, understanding the importance of the energy transition alongside its own changes to geopolitics will help civil society better understand topics such as CRM strategies and clean energy trade.

This group should explore new avenues for research and analysis that examine shifting geopolitics of the energy transition. Combining factors such as national security alignment, petro-state vulnerability, fossil fuel consumer alignment, and renewable supply chains are underresearched topics with major implications. Research outputs such as an atlas can easily communicate the renewable energy and fossil fuel factors identified by participants. Advocacy and research exploring the issue of supply and demand volatility for energy could include a consumers and producers dialogue that seeks to reduce volatility and drive new definitions of energy security. Regional cooperation on interdependent renewable energy infrastructure and supply chains will become an important development in climate policy and geopolitics. More research is needed to identify the major players and the regional dynamics that may arise as a result.

Through better coordination between communities, we can better educate policymakers at the highest levels on the geopolitical consequences of domestic climate and energy legislation. Mapping these dynamics while being realistic about volatility will actually engender more resilience for climate action. Finally, climate's overlap with finance and trade has become a major topic in the past few years but is now entangled with security and economic concerns. How to best deliver climate-friendly goals for the globe in the face of geopolitical competition remains uncertain but is ready for an intervention.



Cover: In the heart of Eemshaven's industrial harbor, a lone wind turbine stands tall, asserting its presence beneath the stormy skies of the Netherlands. As the sun dips below the horizon, casting an orange glow, a coal-burning power station looms in the background, with thick smoke billowing into the air, Eemshaven, Netherlands, May, 2023. Photo by Tim van der Kuip/Unsplash.



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About E3G

E3G is a nonprofit public interest organization with offices in London, Brussels, Berlin, and Washington, DC, as well as programs in Latin America and Asia. E3G's mission is to accelerate the global transition to a climate safe world. E3G works in three ways: as a strategic hub—providing political intelligence and strategy for change; as a coalition broker—convener of powerful coalitions for change around issues of common interest, framing public debates and directly influencing key decision-makers; as a thought leader and system innovator, developing new political frames, innovative policies, institutions, and systems for replication and learning for change. Founded in 2004 by senior members of the UK government, we work on the politics and the policy to make the necessary possible. Visit www.e3g.org.