



SHAPING THE GLOBAL GOVERNANCE OF RENEWABLES

A Comparative Institutional Analysis

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Executive Summary

Over the past decade, facilitating the widespread deployment of renewable energy sources (RES) and enabling their integration within the energy systems has become a central priority for various international organizations (IO) and initiatives. The architecture of a global renewable energy governance was first shaped by the International Energy Agency (IEA), which extended its initial scope of activities to tackle electricity market development, security issues and the specific challenges of low carbon technologies, especially RES such as wind and solar. Since then, new institutions with a dedicated yet global mandate such as the International Renewable Energy Agency (IRENA) have been launched. Beyond these intergovernmental energy agencies, other initiatives such as the Renewable Energy Policy Network for the 21st Century (REN21), the Clean Energy Ministerial (CEM) and Sustainable Energy for All (SEforALL) have been set up to address the need for greater international cooperation between public and private stakeholders, further expanding this governance architecture. The recent adoption of the 2030 Agenda for Sustainable Development and of the Paris Climate Agreement have created a renewed momentum for RES and led to the launch of complementary initiatives, such as the International Solar Alliance (ISA), the Africa Renewable Energy Initiative (AREI).

The IEA is the most mature of these institutions, and one of the most impactful thanks to a comprehensive expertise on the entire energy system. Yet in spite of its effective effort to reach out to key emerging economies, staff and membership restrictions limit its outreach, especially in Africa.

IRENA encompasses five times more members, which in theory enables it to reach out to more countries, including smaller ones. Yet, it is still in a maturing phase and its governance could be slowed by such a high number of countries and interests.

The recently established ISA is geographically and technology-focused as it specializes in maximizing the solar power potential of countries between the tropics. While it will take a few more years to assess its output and activities, it could play a key operational role, for instance in Africa, as it aims to tackle all solar power deployment challenges, including regulatory, financial and technical aspects.

This governance architecture, although multi-layered both from a geographical and technology point of view, is often complementary. It reflects several key sectoral trends: the falling costs of RES, their global deployment especially in emerging economies, the development of global value chains, all of which require a common effort of analysis, coordination and cooperation. Another critical missing aspect is that while institutions tend to work with governments and the private sector, they will increasingly have to include the role and actions of the non-governmental sector and of local entities, especially cities.

Last but not least, it is representative of political and geopolitical considerations, related to countries' strategies to push for specific technologies or focus areas, and promote their national and sometimes competing interests. The United States (US) and Japan are very influential within the IEA, Germany is very supportive of both the IEA and IRENA, while India and France are key backers of ISA. China is involved in all these institutions – it could possibly even join the ISA.

As member states are the ones defining these organisations' mandate and scope of activities, it is of their responsibility to come together and strive to streamline their work, resources and frame their cooperation to maximize each institution's added value.

Résumé

Au cours de ces dix dernières années, diverses organisations et initiatives internationales se sont donné comme priorités de faciliter le déploiement généralisé des énergies renouvelables (ENR) et de permettre leur intégration dans les systèmes énergétiques. L'Agence internationale de l'énergie (AIE) a été pionnière dans l'élaboration de l'architecture d'une gouvernance mondiale des énergies renouvelables. Elle a ensuite élargi son champ d'activité initial au développement du marché de l'électricité, aux problèmes de sécurité et aux défis spécifiques des technologies à faibles émissions de carbone, notamment les ENR telles que l'éolien et le solaire. Depuis, de nouvelles institutions dotées d'un mandat spécifique mais global, telles que l'Agence internationale pour les énergies renouvelables (IRENA), ont été créées. À côté de ces agences intergouvernementales de l'énergie, des initiatives telles que le *Renewable Energy Policy Network for the 21st Century* (REN21), le *Clean Energy Ministerial* (CEM) et *Sustainable Energy for All* (SEforALL) ont été mises en place pour répondre à la nécessité d'une coopération internationale accrue entre les acteurs publics et privés, élargissant encore cette architecture de gouvernance. L'adoption récente de l'Agenda 2030 du développement durable et de l'accord de Paris sur le climat a donné un nouvel élan aux ENR et a conduit au lancement d'initiatives complémentaires telles que l'Alliance solaire internationale (ASI) ou encore l'Initiative africaine pour les énergies renouvelables (AREI).

L'AIE est la plus mature de ces institutions. Grâce à son expertise complète de l'ensemble du système énergétique, elle est aussi l'une des plus influentes. Cependant, en dépit de réels efforts pour se rapprocher des principales économies émergentes, les conditions d'adhésion limitent la portée de ses travaux, en particulier en Afrique.

L'IRENA compte cinq fois plus de membres, ce qui lui permet théoriquement de toucher davantage de pays, y compris les plus petits. Cependant, elle est encore dans une phase de montée en puissance et sa gouvernance pourrait être ralentie par ce nombre élevé de pays aux intérêts divergents.

La récente ASI, spécialisée dans la maximisation du potentiel d'énergie solaire des pays situés sous les tropiques, a un axe géographique et technologique bien défini. Il faudra attendre quelques années pour

évaluer sa contribution, mais elle pourrait jouer un rôle opérationnel clé, en Afrique par exemple, dans la mesure où elle vise à relever tous les défis du déploiement de l'énergie solaire, y compris les aspects réglementaires, financiers et techniques.

Cette architecture de gouvernance, même si elle comporte plusieurs niveaux tant du point de vue géographique que technologique, est souvent complémentaire. Elle reflète plusieurs tendances sectorielles clés : la baisse des coûts des énergies renouvelables, leur déploiement généralisé, en particulier dans les économies émergentes, le développement des chaînes de valeur mondiales, dont chacune nécessite un travail commun d'analyse, de coordination et de coopération. De plus, au-delà de leurs efforts pour travailler avec les gouvernements et le secteur privé, ces institutions devront progressivement inclure le rôle et les actions du secteur non gouvernemental et des entités locales, en particulier des villes.

Enfin et surtout, elle est représentative des questions politiques et géopolitiques, liées aux stratégies des pays visant à développer des technologies ou des domaines d'intervention spécifiques et à promouvoir leurs intérêts nationaux et parfois concurrents. Les États-Unis et le Japon exercent une grande influence au sein de l'AIE, l'Allemagne soutient pleinement l'AIE et l'IRENA, tandis que l'Inde et la France sont des partenaires clés de l'ASI. La Chine est impliquée dans toutes ces institutions – elle pourrait même adhérer à l'ASI.

Comme ce sont les États membres qui définissent le mandat et le champ d'activité de ces organisations, il va de leur responsabilité de s'unir, de s'efforcer de rationaliser leurs travaux, leurs ressources et de structurer leur coopération de manière à maximiser la valeur ajoutée de chaque institution.

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Introduction

When discussing IOs, the United Nations (UN) is the first that comes to mind. Several UN agencies and programmes tackle some aspects related to RES¹ as part of their mandate: for example focusing on environmental stakes, investment information through the UN Environment Programme, mitigation potential through the UN Framework Convention on Climate Change (UNFCCC) or support to RES project implementation through the UN Development Program. Although the UN set up the “UN Energy” mechanism to coordinate these tasks, there is however no single UN entity with dedicated responsibility for energy, let alone RES.

While energy is considered a strategic economic sector and a matter of national security and sovereignty, international institutions and regimes for energy cooperation which have existed for decades (IEA, Organization of Petroleum Exporting Countries – OPEC, International Atomic Energy Agency –IAEA), have traditionally focused on conventional energy and fossil fuels in particular as the latter still account for the core part of global energy consumption. In comparison, RES have only quite recently emerged as a prominent subject of international energy governance, gaining momentum with the coupled surge of increased investment prospects and political commitments. Following the 1981 UN Conference on New and Renewable Sources of Energy, REN21, a non-governmental organisation, was only established in 2005, at a time when there was still no global focal point or even consolidated data on RES. The SEforALL and the CEM were created around the same time as the IRENA, i.e. less than ten years ago.

Energy production and use account for two thirds of the world’s greenhouse-gas (GHG) emissions,² but the rapid deployment of RES, coupled with energy efficiency, could achieve around 90% of the emission reductions needed in the energy sector by 2050 according to IRENA.³ At the heart of the Paris Climate Agreement, countries’ nationally determined contributions (NDCs) have often outlined the increase of the domestic

1. According to the IRENA Statute, “renewable energy” means “all forms of energy produced from renewable sources in a sustainable manner, which include, *inter alia*: 1. bioenergy; 2. geothermal energy; 3. hydropower; 4. ocean energy, including *inter alia* tidal, wave and ocean thermal energy; 5. solar energy; and 6. wind energy.” See: www.irena.org.

2. IEA, *Energy and Climate Change: World Energy Outlook Special Report*, 2015.

3. IRENA (2017), *Untapped Potential for Climate Action: Renewable Energy in Nationally Determined Contributions*, IRENA, Abu Dhabi, 2017.

share of RES as a key mitigation action point. Out of the 194 parties to the UNFCCC, 145 referred to RES in their NDCs, 109 further specifying quantified RES targets, which would require investments of over \$1.7 trillion by 2030.⁴ The adoption in 2015 of the Paris Climate Agreement and the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) thus represents a pivotal step; explicit support for renewable energy is further entrenched in international law. More precisely, SDG No.7 aims to “ensure access to affordable, reliable, sustainable and modern energy for all”, notably by increasing “substantially” the share of RE in the global energy mix by 2030 and enhancing international cooperation to upgrade research, technologies, and investments. As of today, some 88 initiatives have been registered for this specific RES target⁵ and the Climate Initiatives Platform accounts with not less than 57 initiatives whose mandates encompass RES.⁶

Beyond this sustainability agenda, the energy transition has vast economic and security implications, redefining energy independence strategies, geo-economic and geopolitical dynamics. Thanks to the combination of technological innovation, supportive public policies and market regulations, costs have sharply declined and RES have become competitive and even in some cases cheaper than conventional forms of energy. Since 2010, costs of new solar photovoltaics (PV) have fallen by 70%, wind by 25% and battery costs by 40%.⁷ RES is thus increasingly becoming a competitive option for power generation for various users and applications, including in developing countries. As of 2017, 19% of the world’s primary energy demand was based on RES and nuclear, and only half of the RES came from bioenergy, geothermal, hydropower, solar and wind.⁸ Although RES still account for a minor share of the global energy mix, they have been ranking first amongst energy investments and capacity installations these past years, in both developed and developing countries: in 2017, renewables saw the highest rate of generation growth among all energy sources⁹, a continuation of previous growth rates observed since 2010 and averaging 8% per year. End-use sectors also offer promising

4. *Ibid.*

5. GOAL 7, “Partnerships for the SDGs”, available at: <https://sustainabledevelopment.un.org>.

6. See: climateinitiativesplatform.org.

7. IEA, *World Energy Outlook 2017*, OECD Edition, 2017.

8. The remaining 9.6% RE is derived from is traditional uses of biomass (such as fuelwood and charcoal). *Tracking SDG 7: The Energy Progress Report*, International Bank for Reconstruction and Development / The World Bank, 2018.

9. IEA, *World Energy Outlook 2017*, *op. cit.*

prospects, as in the heating & cooling and transportation industries for instance, where the direct use of RES is set to double by 2040.¹⁰

Against this backdrop, an international governance system is progressively taking shape, with the objectives of reinforcing knowledge of the technologies, their potential, to share experiences and best practices for their efficient deployment and understand their local, regional and global, short and longer term impacts. This system is mainly characterized by its fragmentation, with the launch of numerous “initiatives” and “alliances” alongside more “traditional” IOs such as IEA or IRENA. As most international institutions active in climate, development, economic or financial affairs have taken on RES as part of their mandate, some additional dedicated coalitions have been set up at the occasion of COP21, such as the Africa Renewable Energy Initiative (AREI) and the International Solar Alliance (ISA).

However, the multiplication of IOs whose mandate are entirely or largely dedicated to RES has led to a confusion over the role these institutions play in the international governance and how they relate to each other. Focusing on five flagship organisations of international reach (IRENA, IEA & CEM, REN21, SEforALL) and two recent initiatives (ISA, AREI), this study shows how “traditional” energy agencies have gained a solid footing as overarching focal points and sources of information on RES. Clarifying the institutional landscape, it provides an assessment of the strategies adopted by other institutions to leverage transnational collaboration on selected RES issues. Finally, the study identifies the most influential stakeholders in these IOs, which remain mostly state-led and can be used as forums to promote national interests and ambitions.

10. *Ibid.*

The coexistence of two global agencies: the IEA and IRENA

The IEA was initially created in 1974 to foster the oil supply security of its member countries. Its mandate has been expanded since then to other fuels and technologies and to sustainable development, while IRENA was created in 2009 to accompany and foster the deployment of RES worldwide.

Both organisations were created to fill what was felt as an institutional void to answer pressing contemporary needs of intergovernmental cooperation in the energy sector. They have since become the overarching focal points and trusted sources of information and expertise on RES, although their visions of the energy transition differ, as illustrated in their prospective scenarios.

The IEA, technology-neutral “clean energy” hub

Created in the aftermath of the 1973 oil shock, when the concept of emerging economies was yet to be coined, the IEA has developed a historical expertise on fossil fuels and energy security. With IEA member states’ increased interest in sustainable energy systems, it has progressively deepened its grasp of RES, as reflected in its publications, internal structure and external engagement.

Beginning with a unit, the IEA upgraded its RES team to a “division” staffed by nine full-time analysts in 2008,¹¹ and up to 17 people as of June 2018 (out of a total of around 240 employees). In 2017, the IEA had 30 member states and relied on a budget of approximately €27,5M¹² while the

11. T. Van de Graaf, “Fragmentation in Global Energy Governance: Explaining the Creation of IRENA”, *Global Environmental Politics*, Vol. 13, No. 3, August 2013.

12. IEA, “Structure”, available at: www.iea.org.

IRENA, with 150 member countries (160 in 2019), was granted a budget of approximately \$30,5M, half of which covers staff costs (\$15,5M in 2017).¹³

The main decision-making body of the IEA, the Governing Board, who has final responsibility on the approval of the work programme and budget, and whose conclusions are binding, is composed of energy ministers (or their senior representatives) from each member country. As an OECD autonomous body, IEA accession is however still limited to OECD countries who can prove they have a given amount of crude oil and/or product reserves, as well as related legislation.¹⁴ In 2019, all but two IEA member countries (Mexico and Turkey) were developed economies¹⁵. The agency recognizes itself that its constituency accounts for just under half of the world's energy consumption whereas non-IEA countries will account for almost all the growth in energy demand up to 2030 and beyond.¹⁶

To address such challenges, the IEA's executive director announced in 2015 a modernization strategy, based on 3 pillars: expanding the IEA's mandate on energy security beyond oil to natural gas and electricity; opening the agency's doors to emerging countries; and turning the IEA into a "global clean energy hub", including on energy efficiency.¹⁷ To answer its limited membership drawback, the IEA puts the emphasis on its extensive network of partner experts around the world, e.g. through its Technology Collaboration Programmes, Energy Training Weeks and various capacity building activities. The agency also deepened engagement with non-member countries through partnerships joined by eight Association countries, after a lengthy process: Brazil, China, India, Indonesia, Morocco, Singapore, South Africa and Thailand. Together with Chile, in the process of accession to membership, the so-called "IEA family" accounts for more than 70% of global energy consumption. The latest illustration of this direction is the *Clean Energy Transitions Programme*, a €30M plan announced in 2018 to support "key countries that are seeking greater cooperation with the IEA" in their energy transition, such as Brazil, China, India, Indonesia, Mexico, and South Africa. The IEA also signed in 2018 an agreement with the African Union to develop a partnership on activities that could cover RES. While the IEA has a unique expertise, it remains to

13. IEA, "Proposed Programme and Budget for 2018-2019", Report of the Director General, available at: www.irena.org.

14. List of IEA Member Countries available at: www.iea.org.

15. According to the United Nations Statistical Division.

16. List of IEA Associated Countries available at: www.iea.org.

17. "Summary of the Chair, 2017 IEA Ministerial Meeting", IEA Newsroom, available at: www.iea.org.

be seen how it will be able to deliver efficiently on its growing responsibilities. Associated countries do not make mandatory financial contributions; beyond seconded national experts, their actual contribution is expected to be limited compared to the benefits they will enjoy from the IEA's programmes and activities.

According to the IEA,¹⁸ its core added value resides in its positioning as the only international energy agency working on the full spectrum of energy technologies, which provides the agency with a holistic perspective, notably on the linkages between RES, other energy sources and the energy system as a whole at national, regional and global levels. As such, the IEA has a unit specialized in market design and system integration of RES, which is key for mature RES markets. Some prominent member countries of the IEA are exporters and/or largely rely on the consumption of fossil fuels for their national economy, such as Australia, the US, Norway or Canada, and encourage research into solutions to minimise GHG emissions and stranded assets from fossil fuel exploitation, such as Carbon Capture, Utilization and Storage (CCUS). In this perspective, rather than focusing mainly on RES, the IEA champions the concept of "low-carbon" or "clean energy", which also helps to accommodate the sometimes conflicting agendas of its member countries, notably the US, which have withdrawn from the Paris Climate Agreement and support both CCUS and "clean coal" solutions.

IRENA, an inclusive "global voice" for renewables

IRENA positions itself as the "Global Voice for RES", and foresees an energy transition driven by RES coupled with energy efficiency. IRENA was officially founded in Bonn, Germany, the country who most actively sought its creation¹⁹ in 2009, and Abu Dhabi, capital of the United Arab Emirates, was selected to host its headquarters. While the IEA argues it is the only energy agency covering the full technology spectrum, the IRENA insists it is the only truly international energy agency. As of today, it aims for an almost universal status, with 160 member states.²⁰ All OECD countries have joined IRENA, and Brazil recently formalized its intention

18. Interview with an IEA representative, June 2018. Also, in its publications, the first words of the Agency to present itself are "The IEA examines the full spectrum of energy issues", e.g. in the *World Energy Outlook 2017*.

19. T. Van de Graaf, "Fragmentation in Global Energy Governance: Explaining the Creation of IRENA", *op. cit.*

20. Plus 24 states "in accession" (who have signed the IRENA treaty but not yet ratified it) including Austria or Chile.

to join the Agency.²¹ If the IEA has a long-established credibility and sells most of its flagship publications and data, IRENA is still in a period of self-promotion of its reports. They are freely accessible, a key advantage when targeting low-income countries and a governmental audience.

The IRENA Statute specifies that the objective of the Agency is to “promote the widespread and increased adoption and the sustainable use of all forms of [RES]”.²² Focused on the power sector during its first years (the agency only took office in 2011), the IRENA had been promoting the “business case” of RES as a reliable source of energy, and trying to rally as many member countries as possible. Since 2018, the IRENA entered a new phase with the adoption of its new medium term strategy. For the period 2018-2022, the IRENA defines its mission as “to play a leading role in the ongoing transformation of the global energy systems as a centre of excellence for knowledge and innovation, a global voice of [RES], a network hub for all stakeholders and a source of advice and support for countries”. Its membership elected Francesco La Camera, until then Director General for Sustainable Development, Energy and Climate at the Italian Ministry of Environment, as its new director general, who will lead the implementation of this renewed approach from April 2019.²³ The strategy is set in a context where RES have become a technically feasible and economically competitive source of power at a large scale, and its support has been institutionalized in energy diversification policies. Benefitting from this new setting, and a geographically-legitimate membership, the IRENA can now redirect its work on adopting a holistic approach to promote the mainstreaming of RES across all sectors, becoming an inclusive platform engaging increasingly beyond governments with non-state actors including local governments and the private sector. One such example is the co-operation agreement signed by IRENA with the People’s Government of Hebei Province (China) to provide the city of Zhangjiakou with a RES roadmap to support its ambition to generate 50% of its power from RES and deliver a “low-carbon” 2022 Winter Olympics.

21. “Brasil toma a decisão política de ingressar à Irena”, Notícias, Ministério de Minas e Energia, January 2018, available at: www.mme.gov.br.

22. “IRENA Statute, Article II”, available at: www.irena.org.

23. “Francesco La Camera appointed as new IRENA Director General”, Press Release, IRENA, 13 January 2019, available at: www.irena.org.

Mutually complementary organizations

A shared and highly-valued goal of both the IEA and IRENA is to provide high-quality information to inform member governments primarily, and increasingly, any interested stakeholder on RES. As a relatively recent and partly decentralized form of energy, RES have long suffered from an information deficit, which reinforces the importance of having overarching focal points for the collection, study and publication of consolidated data, analysis and projections. Both Agencies can be tasked by their members with tracking virtually every aspect of RES development and how they shape energy systems and economies: from public policies, regulatory or market frameworks, to the estimation of RES potential, local, regional and global perspectives, investments, costs, socio-economic or climate benefits such as job creation potential, and analyses on end-use sectors or technological innovation.

Both agencies publish reports covering this wide range of issues. The IEA provides information on the whole energy technologies spectrum which incorporate RES, including its flagship annual World Energy Outlook (WEO), reports on global technology or investments perspectives, member countries' energy policies (and Partner countries "series"), including policy recommendations, and online data benchmarking technologies with SDGs objectives. It has also gradually published more specialized documentation focused on RES only.²⁴ On the other hand, the IRENA publishes each year numerous reports – 40 in 2017 alone (!) – whose focus are always RES. It also provides online data and tools for project facilitation: maps to locate the resource potential for RES (*Global Atlas*), a guide to bankable RES project development (*Navigator*), a cost database or an intellectual property directory (*International Standards and Patents in Renewable Energy – INSPIRE*).

The IRENA and the IEA aim to maintain their independence from the private sector yet closely interact, encouraging information sharing by directly or indirectly soliciting industry representatives. Both agencies have set up working groups to collaborate more closely with non-governmental actors, notably the private sector. The IEA has an informal "Renewable Industry Advisory Board" made up of private-sector representatives from OECD member countries and Association countries, while the IRENA has more recently set up a "Coalition for action", which includes

24. Such as *Market Series – Renewables*, which provides an annual assessment and 5-year forecast of RE markets, or an *Insight Series* on specific technical challenges (e.g. *Insights Series 2018 – Renewable Heat Policies, System integration of renewables; RE for industry*; etc.).

representatives from civil society organisations (including REN21) and industry associations. Although participants do not have the competence to shape the work programme of the agencies, they can peer-review reports, bring input and expertise on private sector practices, financing, market experiences and technological innovations, as illustrated in IRENA's recent work on corporate sourcing of renewables, highlighting how a growing number of companies are making commitments to power their operations with RES. The IRENA tries to encourage networking and matchmaking between the private sector and other stakeholders, either directly through its dedicated online "Marketplace" platform, which aims to connect investors, technology suppliers and project owners; or indirectly through the organisation of gatherings such as the "Innovation Week" where industry representatives and experts are invited to discuss selected RES issues.

As part of their activities, the IRENA and IEA endeavour to communicate on their work, and share their data and expertise with partners, by participating in international forums (G20, United Nations High-level Political Forum on Sustainable Development, EU Sustainable Energy week, etc.), and through capacity building workshops.

They have become umbrellas for RES initiatives, further cementing their role as central focal points and forums on RES. The IEA was chosen to host the Clean Energy Ministerial (CEM) Secretariat and the IRENA that of the Global Geothermal Alliance (GGA), a climate-type coalition focused on geothermal development. The IEA coordinates several Technology Collaboration Programmes²⁵ on RES, while the IRENA oversees three Clean Energy Corridors, initiatives to accelerate the development and cross-border trade of renewable power, in cooperation with regional agencies in Africa and Central America. Last but not least, the IEA has an important training programme, open to countries beyond its "family".

So far, they share a similar yet not necessarily competing mandate on RES given the complexity and variety of dimensions and target countries at stake. Both agencies have cooperated on a few tangible projects. They co-feed a joint database on RES policies and measures and published two joint reports: one at the request of the German presidency of the G20 (2017) providing an estimation of investment needs to realise an energy transition compatible with the objectives of the Paris Agreement (see I. 2.), and

25. Technology Collaboration Programmes (TCPs) are independent, international groups of experts that enable governments and industries from around the world to lead programmes and projects on a wide range of energy technologies and related issues. See www.iea.org.

another on identifying policy barriers impeding RES development with REN21.²⁶

It remains to be seen whether the IRENA can manage to reinforce its credibility as the IEA is determined to become a “global hub” gradually taking on RES, electricity and climate issues, which in turn could be increasingly contested by one of its key members, the US. IRENA’s success will hinge upon its ability to assist countries, especially developing ones, in implementing policy reforms to favor RES development (technology transfer, education and skills, leveraging local content, market reforms, etc.). A key priority will be the streamlining and follow-up of its publications, for instance by engaging with national and regional agencies able to pick up from IRENA’s work towards tangible impact on the ground.

An illustration of the Agencies’ visions through prospective RES scenarios: similar diagnosis but different paths

Two approaches to the role of RES in the energy transition

They foresee different pathways for the long term global role of RES.²⁷ Since 1993, the IEA has developed its main simulation model for long-term global projections, the World Energy Model (WEM). The IRENA model, REmap, developed since 2014, covered in 2017 70 countries representing 90% of global energy use.²⁸ Both models assess factors such as energy supply, demand, technology potentials, costs, investment needs, etc., mostly relying on the collection of combined quantitative and qualitative data from varied sources: the agencies’ own statistics, direct interaction with national administrations, industry experts, reports from non-governmental organisations, notably industry associations and research centres. The models however adopt econometrics models with different assumptions on optimisation, the OECD ENV-Linkages (IEA) and the E3ME (IRENA). While the IEA model tends to assume optimal behaviours and automatic market adjustments, the one used by IRENA adopts a more

26. IRENA, IEA and REN21, *Renewable Energy Policies in a Time of Transition*, 2018, available at: www.irena.org.

27. This section is based on: IEA, *World Energy Outlook 2017*, *op. cit.*; IEA, *Energy Technology Perspectives 2017*, 2017; IRENA, *Global Energy Transformation: A Roadmap to 2050*, 2018, available at: www.irena.org. IEA & IRENA, *Perspectives for the Energy Transition: Investment Needs for a Low Carbon Energy System*, 2017.

28. *Ibid.*

empirical approach that tends to put a greater emphasis on the potentials of additional regulation for RES development.²⁹ The data is aggregated in spread sheets, analysed and used to present several scenarios on the future of energy. The “New policies Scenario” (NPS, the central scenario of the WEO, IEA) or “Reference Case” (IRENA) forecasts how the energy transition is likely to happen given the policies and measures announced and/or put in place by countries (including NDCs) as of today. In 2017, the German government requested the IRENA and IEA to present their analysis of an energy sector transition consistent with the objectives of the Paris Agreement to inform G20 work on energy and climate in the context of the German G20 presidency. The agencies presented climate-focused “backcasting” scenarios: the “66% 2 °C Scenario” (IEA), and the “REmap case” (IRENA), evaluating how the energy transition should unfold up to 2050 to limit the rise in global temperature to below 2°C above pre-industrial levels by the end of the century (with a 66% probability). Focusing on these scenarios offers a unique level-playing field to compare the agencies’ visions.

Commonalities

Both the IEA and IRENA agree on the overall message to circulate: an energy transition compatible with the objectives of the Paris Climate Agreement is technically and economically feasible but will require deep political and economic shifts and commitments, which are currently insufficient. It is noteworthy to mention that both agencies agree on several key recommendations to implement, notably: extensively reform energy markets and policies, increase investment in research and innovation, foster energy efficiency efforts and policies, implement a rapid phasing out of fossil fuel subsidies, an aggressive carbon pricing, and shift to a holistic approach integrating end-use sectors, which account for a large portion of energy use and emissions (transports, industry, buildings). Although the agencies conducted their analysis separately, they reached similar results on investment needs. Both agencies agree that around \$120 trillion would be needed to achieve such a transition between 2015 and 2050. This represents a 30% increase as compared to the 93 trillion envisaged by the current and planned policies according to IRENA, who insists the investments’ impact on world job creations (a net gain of 11M by 2050) and GDP would be positive (+0,6% in the worst case scenario), thanks to the

29. “Methodology background document: Development of a decarbonisation pathway for the global energy system to 2050. A country-by-country analysis for the G20 based on IRENA’s REmap and Renewable Energy Benefits programmes”, IRENA, 2017.

effect of associated pro-growth policies.³⁰ The IEA predicts that overall fossil fuel investment would decline, but would be largely offset by a 150% increase in RES supply investment.³¹

Differences

The difference in technological pathways are the epitome illustration of these agencies' visions. While the IEA presents a “pathway towards energy sector decarbonisation that is technology-neutral and includes all low-carbon technologies” (including RES but also nuclear and fossil fuels with large scale deployment of CCS, which is questionable given the handful of projects currently undertaken globally), the IRENA REmap scenario “stresses the potential of energy efficiency and [renewable energy] sources to achieve the climate goal [...] over other decarbonisation approaches such as CCS and nuclear energy, though these options are also included”.³² The agencies base their analysis on different assumptions, e.g. the potential for innovation, cost decline or social acceptability of technologies such as nuclear energy or CCS. Additionally, it can be argued that the latter are technologically and financially challenging for developing countries, who make up most of IRENA's membership, especially in a context of growing competitiveness of RES. Hence the IRENA envisages that nuclear energy does not experience any new capacity installations from 2016 levels, while the IEA scenario encourages the expansion of nuclear power deployment “where acceptable”. According to the IEA, although coal is to decline rapidly, fossil fuels “remain an important part of the energy system in the 66% 2°C Scenario in 2050”, with new investment in oil supply, natural gas and widespread deployment of CCS. On the other hand, IRENA foresees that total fossil fuel use in 2050 would stand at a third of today's level and that the role of natural gas should be limited unless coupled with high levels of CCS. The IEA 66% 2°C scenario foresees a share of 47% of RES in the global primary energy mix in 2050, while IRENA's REmap estimates the share must reach 65%. Although not as climate-compatible as the 66% 2°C scenario, the IEA's Sustainable Development Scenario,³³ has been criticized for not being aligned with the +1.5°C trajectory and not enough

30. IRENA, *Global Energy Transformation: A Roadmap to 2050*, 2018, available at: <https://irena.org>.

31. IEA & IRENA, *Perspectives for the Energy Transition: Investment Needs for a Low Carbon Energy System*, *op. cit.*

32. *Ibid.*

33. A novelty of the 2017 WEO edition, the “Sustainable Development Scenario” (SDS) is a benchmark scenario which delivers on the Paris Agreement of “well below 2°C” but not 1.5°C and which ambitions to balance international objectives of several SDGs on universal energy access, air quality and climate (hence resulting in higher emissions than in the faster transition scenario).

brought forward compared to the NPS³⁴. It foresees a share of 28% RES in total final energy consumption (TFEC, which includes all end-uses) in 2040,³⁵ while REmap estimates that renewables can make up 60% or more of many countries' TFEC by 2050.³⁶

Evaluating the impact of these scenarios on public decisions is not an easy task. If the IEA's *World Energy Outlook* (WEO) is renowned for its market-oriented scenarios, IRENA has focused its forecasting work on evaluations of the potential for scaling up RES development. While some IEA provisions have been criticized for envisioning an important share of fossil fuel use up to 2040 or underestimating the development of RES such as solar PV,³⁷ the Agency argues that its approach is realistic: if such provisions do not display a positive outlook, they are a needed reminder that current policies are lagging behind and call for ambitious reforms. Long-term energy modelling is a challenging exercise as it relies on varying national capacities in terms of statistics and factors that are hard to predict (technological disruptions, macroeconomic variations, policy reforms, etc.). What's more, these energy models are very much designed for centralized power systems, for which RES schemes are challenging to accurately account, e.g. off-grid or mini-grid capacities. The IRENA has launched in 2018 a joint campaign with the CEM³⁸ to promote the wider adoption and improved use of long-term model-based energy scenarios, which could impact future RES analyses.

34. "Fact Check: IEA Climate Scenarios Are not Aligned with Paris Goals", *Investor Briefing*, Oil Change International, Greenpeace, October 2018, available at: www.greenpeace.org.uk.

35. IEA, *World Energy Outlook 2017*, *op. cit.*, Table 7.3.

36. For instance, China could increase the share of RE in its energy use from 7% in 2015 to 67% in 2050. In the European Union (EU), the share could grow from about 17% to over 70%. India and the United States could see shares increase to two-thirds or more. Source: IRENA, *Global Energy Transformation: A Roadmap to 2050*, *op. cit.*

37 See e.g. M. Metayer, C. Breyer and H.-J. Fell, *The projections for the future and quality in the past of the World Energy Outlook for solar PV and other renewable energy technologies*, Conference paper, September 2015, available at: www.researchgate.net; K. Mackenzie, "Why IEA Scenarios Should Be Treated with Extreme Caution", Guest Post, *Financial Times*, available at: <https://ftalphaville.ft.com>; K. Mohn, "Undressing the Emperor: A Critical Review of IEA's WEO", University of Stavanger Business School, 2016, available at: www1.uis.no.

38 Clean Energy Ministerial, "Long Term Energy Scenarios for the Clean Energy Transition", available at: www.cleanenergyministerial.org.

The role of multi-stakeholder networks

Apart from energy agencies like the IRENA and IEA, other forms of international cooperation on RES have gradually emerged, such as collaborative platforms focused on selected countries/regions (the CEM, AREI, ISA). These organizations and programmes share to a certain extent the same structure: a core secretariat or management team with limited human and financial resources, with strong reliance on members and partners, through the creation of more specialized working groups. In fact, these organisations tend to play the role of supervising entities for work collaboration, convening meetings, and taking charge of administrative and communication duties. They bring a multi-stakeholder approach to RES governance, which allows for representatives from civil society or the private sector to fully weigh in on their work, as in SEforALL and REN21, and bring expertise in fields where they play a critical role, such as financing, technology innovation, project implementation, or public acceptability of RES.

Capitalize on extensive networks to support the RES sector at large

Although they differ in terms of main areas of focus or institutional structures, a first category could be identified as rallying networks:³⁹ international institutions with a broad mandate to support RES development at large, without preference for a specific technology. Their main contribution is to maintain transnational networks of diverse RES stakeholders to advocate for and support policy reforms or business practices conducive to upscaling RES development. They usually publish a limited number of reports and organise at least one gathering every year to keep up the momentum on RES development and deliver selected key messages to raise awareness amongst policy makers and the broader public.

39. E. Morgera and K. Kulovesi, *Research Handbook on International Law and Natural Resources*, Edward Elgar Publishing, 2016.

REN21: up-to-date and specialized data on RES

Created in 2005 as a follow-up to the International Conference for Renewable Energies held in Bonn the previous year,⁴⁰ REN21 presents itself as a global multi stakeholder network, which aims to facilitate knowledge sharing, policy development and joint action. The Network has chosen to focus its work on a selected number of publications on policies, regional status or future potential for RES development. REN21 sees its work as a complement to, and cooperates with IRENA, the IEA, SEforALL, as well as experts from the governmental, academic, or private sector, to cement the credibility of its data. They drive REN21's activities, as opposed to agencies such as the IEA or IRENA (where only member countries have competency to vote for a work programme). For instance, REN21's *Renewables Global Futures* report aims to "spur debate about the opportunities and challenges of a 100% [RES] future" by 2050. Although IRENA values such exercises, it realises its 2050 REmap scenario is already very challenging for its members, especially for large economies. If the IEA's *Market Report Series: Renewables 2018* focuses on RES market evolution and medium term forecast, REN21's flagship publication, *Renewables Global Status Report (GSR)* tracks the annual development of RES, integrates into a single report market trends with more specialized stakes such as decentralized RES for energy access, system integration, synergy with energy efficiency or corporate sourcing of RES.

The 2018 edition of its GSR was solely funded by UN Environment and the German government. In 2015, REN21's \$1,5M budget was entirely financed by grants from the German and South African governments (South Africa was hosting in 2015 its International Renewable Energy Conference) as well as UN agencies or the OPEC Fund for International Development.⁴¹ REN21's role was clear at a time when the institutional landscape dedicated to RES was much different from what it is today; IRENA and SEforALL had not yet been created, the IEA had less capacity devoted to RES analysis and hence data on global renewable power was scarcely available. The Network is currently considering updating its strategy. It may decide to engage and encourage linkages with stakeholders beyond the power sector and to focus on subjects where consolidated data is still limited such as decentralized power in developing countries,

40. REN21, *Renewables Global Futures Report*, 2013, available at: www.ren21.net.

41. REN21, *Annual Report 2016*, available at: www.ren21.net; REN21, *REN21 Strategy and Workplan 2016 – 2018*, available at: www.ren21.net.

sourcing of RES by local governments, and end-use sectors (heating & cooling, transports, agriculture, etc.).

SEforALL: championing the role of sustainable energy access through RES

Launched in 2011 by former UN Secretary General Ban Ki Moon, SEforALL is a non-governmental organization whose goals are aligned with those of SDG7⁴² and as such, focuses on universal access to energy, especially in developing countries. While SDG7 targets a “substantial increase”, SEforALL even calls for the doubling of the RES share in the global energy mix by 2030. It organizes every year the SEforALL Forum, an opportunity for draw the attention of the energy community on the issue of energy access, to communicate around progress made, challenges ahead and for diverse stakeholders to present solutions and enter into new collaboration projects. On RES, it aims to “help leaders scale-up renewables by leveraging the work of its partners – telling stories of success [and] support the continued development, and implementation, of global and national roadmaps”.⁴³ The organization’s work is allocated to partners through several “hubs” meant for knowledge generation and exchange. The thematic hub dedicated to RES is hosted by IRENA, who develops said roadmaps (the “REmap” initiative).

SEforALL has played a key role in developing indicators and gathering data to benchmark the progress made toward the achievement of SDG7 targets and the efforts needed to reach them. However, energy access represents a very broad mandate, covering numerous stakes. With the adoption of the 2030 Sustainable Development Agenda, the institutionalization of the SDGs review process, undertaken by other institutions, and the strengthening of other entities on the question of energy access, off-grid deployment or partnerships facilitation, the strategy of SEforALL has been severely challenged lately. Its 2016-2021 strategy suggests new areas for a more tangible impact such as building a coalition to boost RES financing, and a knowledge platform to help address market failures that inhibit the scale up of renewables, e.g. in off-grid and mini-grid markets.

42. 1. Ensure universal access to affordable, reliable & modern energy services; 2. Double the share of RE in the global energy mix; 3. Double the global rate of improvement in energy efficiency by 2030.

43. Sustainable Energy for All, “Strategic Framework for Results”, June 2016, available at: www.seforall.org.

RES cooperation in Africa

Global energy access remains a critical challenge, especially in Africa, given a slow progress struggling to cope with population growth and the imperative to ensure that the electrification is sustainable. Sub-Saharan Africa retains much of the attention given with over 600 million people without access to electricity and sustainable and affordable energy services.⁴⁴ In 2015, the IRENA estimated that the African continent had the potential to add more than 300GW of RES by 2030, an overall tenfold increase from 2013 levels.⁴⁵

At the trans-national level on the continent, energy is a competence mainly scattered among the African Union (AU), the African Development Bank (AfDB) and sub-regional organisations and their technical and implementing agencies specialized in energy efficiency and RES.⁴⁶ Africa accounts with numerous energy initiatives covering RES,⁴⁷ among which: the Africa Clean Energy Corridors, an initiative managed by IRENA, sub-regional organisations and countries to promote accelerated development and cross-border trade of RES; or the Africa-European Union Renewable Energy Cooperation Programme (RECP), part of the energy partnership between the EU and the AU, which focused on market information, capacity building and offers a platform for project development. SEforALL features an Africa Hub, in charge of its mandate in the region, jointly managed by the AU, the AfDB, the NEPAD Agency, the implementing technical arm of the AU, which oversees the 2040 Africa Power Vision that notably calls for “implementing off-grid solutions and making full usage of the vast RES potential in Africa”.⁴⁸ The AfDB further oversees its financial instrument, the Sustainable Energy Fund for Africa (SEFA, \$95M pledged);⁴⁹ the New Deal on Energy for Africa, a public-private partnerships platform for financing energy access and signed in 2018 a joint declaration with the ISA to cooperate on solar energy financing and

44. World Bank, “Progress Towards Sustainable Energy: Global Tracking Framework 2017”, 2017, available at: www.worldbank.org.

45. IRENA, *Africa 2030: Roadmap for a Renewable Energy Future*, 2015, available at: www.res4africa.org.

46. The Regional Center for RE and Energy Efficiency (RCREEE) in North Africa, ECOWAS Center for RE and Energy Efficiency (ECREEE) in West Africa, East African Centre for RE and Energy Efficiency (EACREEE), SADC Centre for RE and Energy Efficiency (SACREEE) in Southern Africa.

47. *Mapping of Energy Initiatives and Programs in Africa*, Africa-EU Energy Partnership, May 2016, available at: www.euei-pdf.org.

48. “Africa Power Vision”, Nepad.org, available at: www.nepad.org.

49. The SEFA is a multi-donor trust fund administered by the AfDB – anchored in a commitment of \$60 million by the Governments of Denmark and the United States – to support small- and medium-scale RE and Energy Efficiency (EE) projects in Africa.

development.⁵⁰ The World Bank, other bilateral aid and development programmes are also active, alongside China's infrastructure financing.

The AREI aims to be an umbrella platform of coordination for regional institutions and the many existing initiatives tackling RES on the African continent to foster partnerships and optimize efforts. The initiative adopts a holistic approach to the sector, its core work areas stretching from the mapping and strengthening of policies, regulations and programmes, to capacity building, mobilization of financing and support to project development.⁵¹ These activities aim at fostering the conditions needed to ultimately achieve at least 10 GW of new and additional RES generation capacity by 2020, and mobilize the African potential to generate at least 300 GW by 2030. "Africa-owned and Africa-led" (the board is composed by the heads of member states nominated by each of the five sub-regions), the AREI is placed under the mandate of the African Union.⁵²

From its launch at COP21 (late 2015) until 2017, the AREI has completed its first development phase and selected a first round of 24 projects for funding. The organisation has now entered a phase of operationalisation. Doubts over the capacity of the AREI to structure a truly regional cooperation platform have emerged, after the resignation of the former head of its Independent Delivery Unit (IDU, its staff), and as questions were raised over the role of France and the EU,⁵³ the only permanent observers to the board. The latter were suspected of pushing for a set of projects regardless of the criteria set forth by the AREI for selection. From 2020, it aims to enter into a second phase of full-scale roll-out of nationally determined policies, programmes, incentives, project identifications and assessments. The initiative has recently recruited its core staff, appointed a new IDU director, Safiatou Alzouma Nouhou, none other than the former Programme Officer for Sub-Saharan Africa of IRENA and started consultations in the sub-regions in 2018, to evaluate the needs and capacity of appropriation of the initiative by national administrations, in order to present a tailored work programme for the coming years. Without the proper resources to do so, it aims to rely on the sub-regional organizations, and more specifically their technical energy centres, to pick

50. "AfDB and ISA Team-Up to Drive Solar Development in Africa", African Development Bank Group, 16 March 2018, available at: www.afdb.org.

51. "Action Plan", Africa Renewable Energy Initiative, October 2016, available at: www.arei.org.

52. The AREI is steered by the President of the Republic of Guinea Alpha Conde, the Board is constituted by the Heads of the 5 member states nominated by their respective sub-regions and includes representatives of the AU Commission, the AfDB and the Committee of African Heads of State and Government on Climate Change (CAHOSCC).

53. See e.g. "AREI International CSO Statement", ActionAid USA, 18 May 2017, available at: www.actionaidusa.org.

up on policy recommendations and on project implementation. Supported at a high level both politically by a board composed of heads of States, and financially through the pledge made by international donors to contribute \$10 billion (until 2020)⁵⁴ to the initiative, the AREI holds the keys to becoming an umbrella platform for a more integrated pan-African collaboration on RES.

The coalitions strategy: focusing support around leading technologies and countries

A second category of organisation could be drawn from the examples of CEM and ISA, which have adopted a slightly more political strategy, by focusing their support on selected technologies and countries with the most potential: “clean energy” technologies in developed and emerging countries for the CEM fora, solar in intertropical countries for the ISA.

CEM: offering a forum for leaders on “clean energy” technologies and best practices

The original idea for the CEM’s creation in 2010 derives from a US initiative to organize the first high-level ministerial meeting exclusively dedicated to “clean energy”. Before being hosted by the IEA, with whom it collaborates extensively, its Secretariat was mostly undertaken by the US Department of Energy.⁵⁵ Today, to maximize impact, the CEM adopts an approach similar to that of the G20, as it has chosen to focus on 24 developed countries or emerging economies⁵⁶ plus the European Commission, considered leaders in at least one “clean energy” field, and accounting for 90% of global clean energy investment.⁵⁷

In the RES field, the CEM oversees a Solar and Wind Working Group, which focuses on two projects: one on capacity building and approaches to system and market integration of RES, carried out by the IEA; and a second on auction schemes, study cases and recommendations, carried out by the IRENA. The CEM is also part of the leaders of the “Corporate

54. “Joint Statement on Advancing of the Africa Renewable Energy Initiative”, AREI, available at: www.arei.org.

55. D. Sandalow, “The History and Future of the CEM”, Columbia Center on Global Energy Policy, 2016, available at: <http://energypolicy.columbia.edu>.

56. Current CEM members: Australia, Brazil, Canada, Chile, China, Denmark, the European Commission, Finland, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Norway, Russia, Saudi Arabia, South Africa, Spain, Sweden, the United Arab Emirates, the UK, the USA.

57. “About the CEM”, available at: www.cleanenergyministerial.org.

sourcing of renewables” campaign, which aims to get more companies to commit to powering their operations with renewables by communicating around study cases. It also coordinates other initiatives and campaigns on stakes indirectly impacting RES such as distributed generation, power system flexibility, or investments. The CEM aims to offer practical advice through the Renewable Energy Policy Advice Network (REPAN) a jointly-led initiative of the IRENA and the CEM’s Clean Energy Solutions Center, a platform offering policy assistance, operated by the US National Renewable Energy Laboratory (NREL). The REPAN aims to leverage both organizations’ resources by coordinating a global network of experts and practitioners to help countries design and implement RES policies and programs.

The CEM’s unclear governance and budget allocation⁵⁸, its limited membership and its mandate on “clean energy”, understood as encompassing RES and energy efficiency along with technologies such as nuclear energy or CCS, prevents it from becoming a leader organization on RES, while its projects specifically dedicated to RES are mostly the work of the IRENA and IEA. With limited human resources (only 9 members of staff make up the Secretariat), its added value mainly resides in its position as a hub on diverse technologies facilitating knowledge exchange of interested parties notably through its now annual ministerial meeting, the Clean Energy Ministerial.

ISA: ensuring the conditions to upscale solar PV development in solar-rich countries

As of today, 48 countries are members and another 71 are currently signatories⁵⁹ of the ISA. This French-Indian initiative was launched at COP21 and became an international organisation in December 2017. The ISA targets a total of 121 prospective “solar resources rich” member countries located between the two tropics, including those with territories there, such as Japan, the Netherlands, the UK or the US. The ISA foresees the status of Partner countries, which China might join, unless it becomes a member.⁶⁰ Its strategy is to focus on the main barriers to solar investments in order to drive down costs and serve its ultimate ambitious goal: to deploy over 1000 GW of solar energy and mobilise more than \$1000 billion into solar power by 2030. The ISA showcases other IOs’ data on solar PV,

58. *Ibid.*

59. They still have not ratified the ISA Framework agreement.

60. Partner Countries are eligible to participate in programmes of the ISA with the approval of members participating in the programmes.

such as IRENA reports, and focuses on their operationalisation. The Alliance is currently working on five programmes: two of them launched: one aiming to simplify the development, monitoring and practices surrounding solar applications for the agricultural sector and a second one dedicated to easing and thus scaling up the financing of solar projects through the design and promotion of convergent procurement documentation, credit enhancement mechanism and practices. Three other programmes adopting a similar approach are currently in the making to assess the potential, harmonize demand and pool resources for the development of solar mini grids (especially relevant for island states, rural and remote areas); of rooftop solar; and of solar-powered electric mobility (transport sector and storage). The ISA also aims to work on capacity building through the establishment of a network of solar resources centres, some of them to become centres of excellence, e.g. for quality control.

The idea behind the creation of ISA was to provide a platform for countries seeking to develop solar energy, as opposed to IOs mainly driven by countries with strong solar industries. As a coalition led by its member countries, the ISA currently focuses on solar PV only, but could tackle solar CSP or thermal in the future if the need was to be expressed. According to the IEA, Solar PV should become the largest source of low-carbon capacity by 2040.⁶¹ By focusing its mandate on this promising technology, one of the most affordable forms of modern RES, and on countries lying between the two tropics, the ISA wishes to position itself as a leading energy alliance for developing countries.⁶² ISA has the potential to play an important role for energy access and new financing schemes in countries where investment risks currently remain a key barrier for RES upscaling. Contrarily to the IRENA and IEA, it however relies only on voluntary contributions, the most important currently brought by France (€700M committed) and India, to support the organization in cementing its presence over its first years of activity. Like the AREI, the ISA is still in launch phase, most of the work still borne by the Secretariat, whereas its future depends on the degree of involvement of countries and partners in its projects.

61. IEA, *World Energy Outlook 2017*, *op. cit.*

62. At the first Assembly of the ISA, Indian Prime Minister Narendra Modi displayed this ambition by declaring the ISA will have a similar role in the future to that currently played by the OPEC. Source: V. Mohan, "ISA Could Replace Opec as Key Global Energy Supplier in Future: PM Modi, *Times of India*, 3 October 2018, available at: <https://timesofindia.indiatimes.com>.

As part of a crowded institutional landscape, the success of such multi-stakeholders coalitions varies widely, as they rely on limited human resources, voluntary funding, the degree of commitment of their members and partners, the objectives they set out, etc. A critical factor relies on political support from countries, who take these IOs as platforms to display their ambitions.

“One can only do so much”: collaboration in spite of partially competing mandates

Although clarifications would be welcome for external observers, most of these organizations and coalitions regularly collaborate, albeit to diverse extents. They also tend to argue that the challenges facing RES development are such that any party’s contribution is welcome. As previously mentioned throughout this study, partnerships on diverse topics are countless amongst these institutions: joint initiatives and publications, knowledge exchange, etc. For instance, IRENA’s *REmade Index* report was published in the frame of the CEM’s *Corporate Sourcing of Renewables Campaign*. The IRENA and IEA are both custodian agencies of SDG7. The Global Tracking Framework (GTF), a dashboard documenting progress towards SDG7 objectives, is a product of the SEforALL “Knowledge Hub”, co-led by the IEA and the World Bank with a consortium of partners including UN Regional Economic Commissions, the IRENA or REN21.

However, their overlapping or competing mandates seem to prevent an optimal streamlining of competencies, especially at a time when countries seek to rationalize their financial contributions to IOs. For example, REN21’s *GSR* is quite similar to IRENA’s *REthinking Energy* report, which also examines annual trends and developments in RE, including policies, investments, access, etc. Another example is the “IEA Geothermal”, placed under the auspices of the IEA, and the Global Geothermal Alliance (GGA), which Secretariat is handled by IRENA. Both coalitions share a strikingly similar mandate, to provide a platform for cooperation for stakeholders of the geothermal sector, but it does not appear that they plan to merge or even cooperate with each other. Both the IEA and IRENA ultimately work on a programme shaped by their members. Every member of the IEA is also part of the membership of IRENA and it will be up to them to clarify the partially overlapping activities of the agencies.

The actual influence of these IOs will also depend on their capacity to collaborate with national and regional administrations as well as other institutions able to take on their work towards the subsequent stages of reform and RES development, which require important budgetary, technical, or human resources, such as financing or project implementation.

The RES governance: institutions as tool to promote national interests

Strategies of developed economies

Though they vow to increasingly take into account non-governmental actors, the majority of these IOs' membership is limited to States, holding the prerogative to decide on their strategy, work programme and core budget, to which they contribute. Most of the key drivers of RES development also remain national competences, like legislation, regulatory framework, policies, NDC commitments, procurement regulations, etc. None of the evoked institutions has any express or implied power to negotiate or establish international legal obligations or targets on RES, which remains a State prerogative. By joining or partnering with these IOs, countries send a political message on their commitment to RES and engage in forums they can use to reinforce national ambitions.

Unsurprisingly, developed countries with the strongest domestic policies for RES are among the most active ones within these fora. Germany is by far designated as the most active country within these circles. The IRENA was notably created under German leadership,⁶³ its Innovation and Technology Centre (ITC), which plays a major part in the organisation's analytical work is located in Bonn, and provided with around \$5M a year in funding from Germany.⁶⁴ While the country was trying to promote RES and its domestic success in the field, it felt a specialised agency was needed to provide a new vision and tailored expertise, e.g. on how to adapt energy markets to more decentralised energy sources, as opposed to existing IOs "not fully reflecting the potential of renewable energy".⁶⁵ In 2018, IRENA keeps working on this new vision,

63. T. Van de Graaf, "Fragmentation in Global Energy Governance: Explaining the Creation of IRENA", *op. cit.*

64. "State Secretary Baake heads German delegation at 8th IRENA Assembly", *Press Release*, German Federal Ministry for Economic Affairs and Energy, 12 January 2018, available at: www.bmwi.de.

65. "The Case for an International Renewable Energy Agency", Preparatory Conference for the foundation of IRENA, German Federal Government, Berlin, 2008, available at: www.wcre.de.

as it set up a *Global Commission on the Geopolitics of Energy Transformation*), stating that “while most geopolitical analyses of energy related issues have focused on conventional fuels [...] the Commission will examine the immediate and longer-term geopolitical implications of global energy transformation driven by large scale-up of [RE].”⁶⁶

With the “Energiewende” Germany has committed to entirely phase out nuclear energy and to have 80% of its gross electricity consumption met by RES (by 2050), which translates into its presence and financial support within IOs. It featured amongst the top-five countries granting most financial support to RES in 2016,⁶⁷ and provides numerous voluntary contributions to IOs’ work. Host of COP21, France pursues high ambitions with regards to renewables deployment⁶⁸ and it can rely on a diverse industrial ecosystem and strong institutional and diplomatic capacities. Out of the discussed IOs, the IEA and REN21 are based in France, the ISA was launched thanks to French support, the first director of IRENA was French and France is the only “international partner” country participating as standing observer within the AREI.⁶⁹

On the other hand, the involvement of countries such as the US or the UAE in these forums are part of a “clean energy” approach they champion, in which RES are to be examined on an equal footing with other “low carbon” options such as nuclear energy or fossil fuels equipped with carbon capture, utilisation and storage (CCUS). Under Trump’s Presidency, the US administration has brought the IEA to put a greater emphasis on the potential and need of CCUS in its analyses and activities – a special summit was held in Edinburgh on this issue, following one at the 2017 Ministerial meeting. In spite of closing the DoE’s Office of International Climate and Technology, the US has also continued to engage the CEM in promoting its concept of clean energy, which includes “clean coal”. At the latest (9th) CEM Ministerial meeting in 2018, two new initiatives were launched on a proposition of the US: one on nuclear energy, and another on CCUS, highlighting their continued activism within the forum and its shift with the Trump administration.⁷⁰

66. Commission set up with the support of Germany, Norway and the United Arab Emirates (UAE). “New Global Commission to Examine Geopolitics of Energy Transformation”, *Press Release*, IRENA, available at: www.irena.org.

67. Followed by United States, China, Japan and Italy. IEA, *World Energy Outlook 2017*, *op. cit.*

68. e.g. France aims to double the share of RES in its gross final energy consumption, from 16% in 2018, to 32% by 2030.

69. Along with the European Union.

70. “Department of Energy Launches Two New Clean Energy Initiatives at Ninth Clean Energy Ministerial”, United States Energy Department, 24 May 2018, available at: www.energy.gov.

Other developed countries such as Denmark (wind energy), Norway (CCUS, training and capacity building) or Japan (hydrogen) also play a prominent role, given the importance of their political, technical and financial support.

The increasing weight of emerging global players

The UAE, a renowned oil-producing country, notably succeeded in obtaining the establishment of IRENA's headquarters in its capital, a unique political occasion to put the country at the forefront of the international community with the establishment of the first universal IO in the Middle East which has many OPEC producers as members, who cannot work closely with the IEA for example. It was also a symbolic gesture of the country's consciousness of the need to diversify its economy, of its ambition to remain a leader in the energy field, and a "clean tech" hub in the Middle East and beyond. From a practical standpoint, the establishment of a new IO presents high costs and some countries were not entirely convinced of the need to set up a new agency outside of existing frameworks. The UAE hence covers logistics costs and provides up to \$50M annually to fund RE projects in developing countries via the facility it set up with IRENA through the Abu Dhabi Fund for Development.

However, one of the most impressive dynamics within these organisations is the increased presence of emerging economies, especially China, and more recently, India.

For China, they offer platforms to address its own challenges, while serving a more global strategy to promote RES and leverage Chinese financing, technology, norms and manufacturing advantages. China is a member of most of the CEM's initiatives. A shift in influence was clearly perceived as China, the host country of the latest (8th) CEM, stated the primary goal of the meeting was "to launch a new era of 'shared global leadership'". The country announced it would lead two new CEM campaigns dedicated to issues of acute relevance for its national energy sector : one on electric vehicles, another on power plant flexibility "expected to play a pivotal role in defining international best practices"; the country also announced it was joining several additional initiatives, notably the CEM Solar and Wind Working Group, deepening its involvement on diverse expertise areas within the institution.⁷¹

71. "CEM8 CHAIR'S SUMMARY: Shared Global Leadership in Clean Energy", Clean Energy Ministerium, 2017, available at: <http://archive.cleanenergyministerial.org>

Although not a member of the IEA, China was among the first countries to activate the association status with the Agency (in 2015) and had several “seconded experts”⁷² in various divisions learning about IEA’s methodologies and providing expertise about their own country. In its 2017 edition, the WEO featured a “China Energy Outlook”. The country has since announced a three-year cooperation programme with the IEA, which notably covers grid integration of RES, and the launching of the process to establish an umbrella centre for such bilateral programmes in China. It remains however to be seen how the growing US-China tensions will impact China-IEA relations. The country announced a similar project in 2017 as it proposed to establish an IRENA-China international research and cooperation centre for the energy transition to support the activities of a coalition of partner countries.⁷³

As illustrated by its decision in 2018 to put a cap on solar development,⁷⁴ China is trying to cope with the rapid development of the sector. Integration of large shares of RES and grid interconnectivity will likely be a priority area of work for the country, especially in the context of the Belt and Road Initiative. According to IRENA’s director general, the initiative has the potential to interconnect grids and expand electricity markets to countries with high RES potential, including in Central Asia.⁷⁵ A completely different tone to that of the IEA, which ignores the initiative as several of its members do not recognize it. State Grid Corporation of China (SGCC) has entered into agreement with IRENA in 2017 on secondment of personnel and activities related to integrating high shares of wind and solar, interconnection, Clean Energy Corridors and smart grids, not only in China but also in developing countries, particularly in Africa, Central America and South East Asia.⁷⁶ In 2017, the China-Africa RE Cooperation and Innovation Alliance, a coalition of financing institutions and smart grid manufacturers, entered into an agreement with the AREI for technological and financial support.⁷⁷ Associating itself with a more technical and political platform is complementary to China’s own views for more inclusiveness in global energy governance. Each “alternative”

72. Staff sent and paid by Chinese institutions for a limited period.

73. *Annual Report of the Director General on the Implementation of the Work Programme and Budget for 2016-2017*, IRENA, available at: www.irena.org.

74. “China Solar Firms Urge Govt to Rethink Capacity Cap, Subsidy Cut: Letter”, *Reuters*, 7 June 2018, available at: www.reuters.com.

75. “An Ancient Route Renewed”, *Press Release*, IRENA, 16 May 2017, available at: <https://irenanewsroom.org>.

76. “IRENA and State Grid Corporation of China Team-Up to Expand Regional Renewable Capacities”, *Press Release*, IRENA, 12 November 2017, available at: www.irena.org.

77. “China, Africa Step-Up Renewable Energy Cooperation”, *Xinhua*, 31 août 2017, available at: www.xinhuanet.com.

financing institution set up at the initiative of China — the Asian Infrastructure Investment Bank, New Development Bank (former “BRICS Bank”) and Silk Road Fund — expressly put RES as part of their mandate. Although China’s political role still lags behind that of countries like Germany, it is growing rapidly and the knowledge exchange and support it seeks in these IOs should help reinforce it.

While China ranks first, India, whose population is expected to overtake that of China by 2024,⁷⁸ stands 5th in renewable power and 6th in solar power installed capacity in the world.⁷⁹ In 2017, investment in renewable power topped that for fossil fuel-based power generation for the first time.⁸⁰ The country recently set a target setting RE close to 20% of the country’s total power consumption by 2022, which would require 15 GW of annual solar installations, slightly higher than what China achieved in 2015.⁸¹ The creation of ISA and increased engagement of the country in multilateral energy organisations, indicate that India aims at becoming a leader in the field, especially for developing countries. Like China, India recently (2017) became an Associated country of the IEA. Similar to IRENA for the UAE, the ISA is the first intergovernmental treaty-based organization headquartered in India. A joint initiative of France and India, the ISA is part of a larger “win-win” strategic partnership which has witnessed France put its diplomatic network at work and commit financial contributions to support the establishment of the Alliance and its reach to regions where India does not hold as important an influence as France or China, like in Africa. To support this strategy, India pledged in 2015 a concessional credit line to Africa over five years, earmarking up to \$2B for solar energy projects, largely off-grid, to be implemented through the ISA.⁸² In June 2018, French and Indian RE private sector associations were still the only ones partnering, although a committee to facilitate private sector engagement is being set up. The ISA further entered into an agreement with the World Bank to use its global development network, knowledge and financing capacity, announcing that the latter planned to provide more than \$1 billion to support India’s initiatives through

78. *The World Population Prospects: The 2017 Revision*, United Nations Department of Economic and Social Affairs, available at: www.un.org.

79. India Ministry of New and Renewable Energy.

80. *World Energy Investment 2018*, IEA, Paris.

81. “Renewable Energy Prospects for India, a working paper based on REmap”, IRENA, 2017, available at: www.irena.org.

82. “Multi-Billion Dollar Africa-India Partnership Aims to Eradicate Energy Poverty”, Thomson Reuters Foundation News, 12 June 2017, available at: news.trust.org.

investments in solar generation.⁸³ Lastly, it is cooperating with the French-led TerraWatt Initiative, which was launched in parallel in 2015 to structure dialogue between countries and industry and to operationalize financing in solar energy.⁸⁴

The China – India competition for leadership is somehow visible in the speculations surrounding China’s vow to become a member of ISA. In 2015, Indian PM Modi invited China to join the ISA, a call which received no response up until 2018, when China witnessed that the Alliance had effectively been launched and attracted more than 30 member states. Although China could feel like it does not need to participate in India’s diplomatic stunt while it launched its own regional infrastructure initiative,⁸⁵ the ISA represents an interesting market opportunity for China as the first world manufacturer of solar cells, especially at a time of slowing domestic growth in the sector. For India, such an addition to the membership of ISA would greatly cement the political and financial weight of the initiative, as well as represent potential market opportunities for the emerging Indian solar industry. This contingency is however felt as a threat by some, who fear that the weight of China could crush India’s leadership of the initiative, and compromise its willingness to build its “Make in India” solar manufacturing capacities.⁸⁶ Indeed, India imports more than 80% of its solar cells from China.⁸⁷

83. “World Bank, India Sign Deal to Boost Solar Globally”, *Press Release*, The World Bank, 30 June 2016, available at: www.worldbank.org.

84. See: <https://terrawatt.org>.

85. The Belt and Road initiative, which India has criticized for planning infrastructures building in an area of Kashmir disputed between India and Pakistan.

86. S. Bhattacharya, E. Niranjana, C. Purushothaman, *India and the International Solar Alliance*, Institute for Defence Studies and Analyses, 2018.

87. A. Deo, “The International Solar Alliance’s China Conundrum”, Observer Research Foundation, 20 March 2018, available at: www.orfonline.org.

Conclusion

Almost a niche issue a decade ago, RES are now the focus of a crowded institutional landscape within the global energy governance. Most of these organisations have been created sporadically in response to pressing challenges: the oil shock for the IEA, rapid RES development for IRENA, SDGs for SEforALL, etc. rather than in a coherent fashion. With the strengthening of the energy agencies' mandate over RES, and the recent emergence of regional platforms of cooperation such as the ISA or AREI, the role of specialized RES initiatives is being challenged. The post-2015 momentum period is however a pivotal time for each of these institutions, which are aware of the need to define clearly their objectives and demonstrate the complementarity of their positioning.

Advocating for the business case of RES is no longer a prerequisite and there is a shared understanding of the need to adopt a more holistic “energy transition” approach to RES on the one hand, while also focussing on smaller countries with nascent interest, clear potential and yet little capabilities. A shared vow of these international initiatives is to improve their multi-stakeholders approach to leverage on the funding or implementing capacities of regional and local institutions and of the private sector. Necessarily coupled with increased transparency to prevent conflicts of interests, this could give a new impetus by mobilizing new actors, notably from end-sectors who in many parts of the world feel less informed or concerned by RES (e.g. transport, agriculture/water, buildings, etc.) and operationalize the recommendations presented by these organisations. In the longer term, the existence of smaller initiatives might be threatened by agencies which have partially taken up on their activities while combining more important resources (budget, staff and political weight).

Governments remain however the leading actors within these IOs as they are key to finance them. While being dominated by developed countries mastering every aspect of RES development such as Germany, the growing activism of emerging economies such as China or India in these circles is a signal of their ambitions to reach the status of regional and ultimately global leaders not only in the industrial sector, but also in the geopolitics of the energy transition.

This global governance architecture misses institutions or programmes that systematically tackle some critical aspects of the energy transition complementary to RES and which would need greater international cooperation: energy efficiency (mostly dealt with by the IEA, with its strengths and limits), global recycling opportunities, mobility, waste to energy, phasing out fossil fuel subsidies or air cooling which, if left unaddressed in many parts of the world, will be fundamental obstacles for addressing the climate change threat. All these institutions give limited attention to one key issue which will increasingly impact markets: the unprecedented industrial and geo-economic competition related to the development and control of low carbon energy technologies value chains and their system integration.

With energy remaining a key security and economic prerogative, and the setting up of at least two strong agencies with partially competing mandates outside of the UN framework, it is not only unlikely that a central world energy organization will be created any time soon, but it would also probably be deemed irrelevant. This does not undermine however the reality of a fragmentation of RES governance and the need for greater rationalisation. As these organisations ultimately serve their membership, who contribute to their budget and approve their programmes and strategies, it is their responsibility to bring clarifications in order to make the most efficient use over their allocated resources and encourage them to exchange views and best practices. A suggestion could be that IEA and IRENA member states officially agree on a clear allocation of tasks, a set of long-term objectives and a framework for cooperation between the two agencies. The election in 2019 of a new director general for IRENA could be an opportunity to do so. They should reinforce their capacity building support and the monitoring and evaluation of their activities for increased accountability, in order to avoid duplications and enable better prioritization.

The capacity of AREI to overcome an initial development assistance-type of approach to actively involve African governments and administrations in the initiative will also largely shape its future. Focusing on involving regional institutions, such as the AU, is certainly helpful to foster political awareness but an approach targeting sub-regional institutions, such as ECOWAS could be more effective given a greater convergence among its members and more efficient institutions and proximity.

Another suggestion is for these organisations to reinforce their partnerships with research & development stakeholders, financial institutions and national regulators to address key barriers and create a

level playing field for RES development. A critical element is how these institutions interact with the academic sector and overall, provide a free access to their publications. That will be essential in the future, and while IRENA's data are free, those of the IEA are often available at a cost, automatically limiting their outreach. Although not relevant for every aspect of RES support, initiatives such as the development of standardized contracts, networks of training centres or risk mitigation mechanisms as set out by ISA for solar energy could also become an example of practical governance.

Many opportunities are still to be seized and only time will tell which stakeholders and institutions have chosen the right track, to become the most authoritative voices in the global governance for renewables.

