Mapping multilateral energy institutions: History and current trends

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Abstract

Globalization and increasing interdependence have ensured that issues of demand and supply-side management, energy resources and climate change transcend national borders and require global framework of cooperation. Therefore, while energy security still remains a very vital concern of individual nations, it would be erroneous to assume that global energy politics is dominantly a zero-sum game devoid of any cooperative initiatives.

This paper aims to trace the evolution of energy governance at a theoretical and practical level and seeks to understand today's global energy governance space. The paper develops upon the reasons for institutional evolution, i.e. essentially trying answer the question, 'why institutions develop over a period of time'. This understanding is further examined in the context of the history of global energy space to explain the presented theory with empirical examples. This also helps identify the priorities that were important for nations at various points in history. These are used as a frame to map the changing landscape of energy governance to understand how priorities have shifted and why changes have occurred. Finally this exercise helps identify gaps in the existing scenario in order to make the policy space more effective.

List of Abbreviations

Abbreviation	Full Form
ADB	Asian Development Bank
AfDB	African Development Bank
AfREC	African Energy Commission
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of South East Asian Nations
AU	African Union
BIMSTEC	Bay of Bengal Initiative for Multisectoral Technical and Economic Cooperation
CARICOM	Caribbean Community
ECOWAS	Economic Community of West Africa
ECT	Energy Charter Treaty
EITI	Extractive Industries Transparency Initiative
ERRA	Energy Regulators Regional Association
G20	Group of 20
G8	Group of 8
GEG	Global Energy Governance
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IEF	International Energy Forum
IORARC	Indian Ocean Rim Association for Regional Cooperation
IPCC	Intergovernmental Panel on Climate Change
IPEEC	International Partnership for Energy efficiency Cooperation
IRENA	International Renewable Energy Agency
MEF	Major Economies Forum
MERCOSUR	Mercado Común del Sur
OECD	Organization for Economic Cooperation and Development
OLADE	Latin American Energy Organization
OPEC	Organization of the Petroleum Exporting Countries
REN21	Renewable Energy Policy Network for the 21st Century
SAARC	South Asian Association of Regional Cooperation
SCO	Shanghai Cooperation Organization
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WTO	World Trade Organization

Mapping multilateral energy institutions: History and current trends

" And you all know security,
Is mortals' chiefest enemy"

<div align="right">Hecate in Macbeth, William Shakespeare</div>

Energy security has always been closely related to national security in both- military and economic sense. Almost till the end of the Second World War, interactions in the energy field were carried on primarily as a zero-sum game. Dependence on other nations for energy supplies was seen as a weakness and an imminent threat to security. This can be seen from this extract from Jimmy Carter's speech on July 15, 1979,

> "In little more than two decades we've gone from a position of energy independence to one in which almost half the oil we use comes from foreign countries, at prices that are going through the roof....This intolerable dependence on foreign oil threatens our economic independence and the very security of our nation. The energy crisis is real. It is worldwide. It is a clear and present danger to our nation."

<div align="right">(Carter, 1979).</div>

Today, coupled with questions of access to energy resources, and the availability of supply, there is also growing emphasis on the sustainability concerns. These sustainability concerns around the choice and volume of energy resources consumed, as well as their impacts on the environment cannot be solved through unilateral actions. Concerted and collaborative efforts are needed for a roadmap to address the energy crisis. Therefore, while energy security still remains a very vital concern of individual nations, it is erroneous to assume that global energy politics is dominantly a zero-sum game devoid of any cooperative initiatives. Globalization and increasing interdependence have ensured that issues of demand and supply-side management, energy resources and climate change transcend national borders and require global framework of cooperation.

This paper traces the evolution of energy governance at a theoretical and practical level and seeks to understand today's global energy governance space. In sections 1 and 2, we discuss the history of the evolution of institutions and the current global energy governance space to determine its dimensions, respectively. In section 3, we identify gaps in the existing scenario in order to make the policy space more effective.

Part 1: Institutions Today

1.1 Existing Institutions

In order to understand the institutions that operate within the global energy governance space today, it is critical that we create a comprehensive list of these organizations.[1]Although a number of other institutions exist, especially bilateral trade agreements or topically niche organizations, broadly these institutions represent the energy governance space between nations.

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[1] See Appendix: 1

1.2 History of Institutions

No country today can claim to be self-sufficient as far as its energy needs are concerned. As trade, investment, technological advances, exploration activity in energy increases, the role of institutions dealing with energy to regulate and coordinate activities in this sector also increases. This institutional process helps provide the rules of the game and also helps lead to the evolution of the rules to encompass new fields and developments in the area.

In this section we first look at the theoretical reasons for institutional changes- either creation of new institutions or changes within an institution. It essentially tries to answer the question, 'why institutions develop over a period of time'. Next, we pick out trends in the history of global energy space and explain the presented theory with empirical examples.

1.2.1 Why Institutions evolve?- A theoretical framework

In the last two decades there has been a spurt of institutions dealing with energy and climate change. In order to understand global energy governance, it is essential to first understand how the global energy space or the energy 'Regime Complex' has evolved.[2] We propose that regime changes take place due to a combination of factors which could include dissatisfaction with the current form of an institution, reaction to a crisis or threat, changes in ideas and norms in a particular domain, in the presence of strong leadership. Therefore, none of the above conditions are sufficient in themselves, there are usually multiple reasons acting simultaneously for change to take place. As John Kingdon (Kingdon, 1984)explains: problems, solutions (policies) and politics (a time when it is politically feasible) must be brought together by a policy entrepreneur for change to materialize.

I. Dissatisfaction as a driver of change

"As dissatisfaction about outcomes in the issue-area increases, so do opportunities for change in institutional landscape."

(Colgan, Keohane, & Van de Graaf, 2011)

An interesting way to look at some of the processes of why institutional changes occur is through looking at the dissatisfaction level in the global community with regards to an issue-area. In the work by Colgan, Keohane and Van de Graff (2011) they look at the nature and timing of institutional innovation in the light of Punctuated Equilibrium. They propose that demand for institutions is created when there is strong dissatisfaction. It is also important to see who is dissatisfied and how many are dissatisfied, as regime complexes are 'sticky'- difficult to change, and the more embedded a set of rules, norms and or information, the more resistant to institutional reform they will be. Thus, change occurs when a large number of actors and/or strong actors are dissatisfied enough to bear the cost of change. Smaller changes, like policy changes within an institution, will be easier to take place as they would require small investments. However, big institutional changes, like creation of a new institution, which require large investments, will be very difficult to bring about.

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[2]For the purpose of the paper we are assuming that the global energy space resembles a Regime Complex. A regime complex is "an array of partially overlapping and non-hierarchical institutions governing a particular issue area" (Raustiala & Victor, 2004) i.e. "a loosely coupled set of specific regimes" (Keohane & Victor, 2010), in this case the issue area under consideration is Energy

To understand better the impetus for institutional changes, it is important to look at the reasons for dissatisfaction. Dissatisfaction arises when there are observed or perceived gaps in the existing institutions. This section explains how different reasons for dissatisfaction with the status quo can lead to institutional reform.

A. *Inability of an institution to deal with new issues arising in an area due to limited mandate*

In this scenario, the institution exists and the membership of the institution is also amenable to deal with an additional issue area that is considered critical issue. However, the institution does not have the authority to deal with it. Thus, the scope of the institution is expanded and additional issues are added to the mandate. This translates into avoided transaction costs of creating a new institution with the set mechanism already in place. Thus, we can see that ASEAN was formed in 1967 but the ASEAN Centre for Energy was created in 1999. Similarly, in SAARC the process of energy cooperation started in January 2000, though the organization was created in 1985. Another example can be the Climate Technology Initiative, established in 1999, which operates as an implementing agreement under the International Energy Agency (IEA). Increasing activities in the climate and energy domains around the world were seen after the establishment of the Kyoto Protocol in 1997. A need felt at the regional level for better cooperation to address issues arising out of energy and better technical cooperation may have led to these organizations to innovate and develop energy centers. This type of dissatisfaction arises due to an absence of policies to deal with the new area. Therefore, the changes one can observe from these are more within the institutions where new set of rules in a new area are formulated.

B. *Lack of a forum to discuss the problem*

In this case, dissatisfaction arises because of a lack of a forum to discuss an issue. This dissatisfaction emanating from the concerned parties can lead to the formation of new institutions to deal with the issue. Here, the transaction costs are high but the level of dissatisfaction and the need for the institution are also high. Consequently, the nations involved are willing to bear the costs. A good example of organizations emerging through this form of dissatisfaction can be IAEA. Here, there was a growing need for an organization to deal with the physical security issues arising out of the use of nuclear energy for weapons. UNFCCC can also be a good example under this point where the global community felt the need to have a forum where they could discuss issues of climate change and measures to reduce the carbon emissions could be discussed.

Dissatisfaction in this category can also arise due to a lack felt at the regional level. Regional organizations maybe in a better position to deal with certain issues because of geographical contiguity, cultural similarity and also because they face similar problems. As opposed to multilateral efforts, regional efforts are more focused, have clearer objectives and can be achieved based on the collective will of the region (Mahajan & Sharma, 2011). We can see this from the formation of OLADE, OPEC. In other regional organizations like APEC, MERCOSUR, SAARC, ASEAN which were formed for broader economic cooperation but later included energy we can see both forms, that 'a lack of mandate' as well as 'a need for a forum' come into play. A regional lack was felt which led to the creation of the institution and subsequently a gap was felt within the policy structures which led to the expansion of the scope of the organization.

C. *Dissatisfaction due to a lack of strong enough representation of member nations and member nation concerns*

This depends upon how the power dynamics play out in an organization. The voting structure, the formation of the secretariat, special privileges and veto powers help decide this. Smaller nations (in terms of the size of their economy) or nations with lesser power may feel that their voices are not heard; alternately they may feel that for their concerns to be addressed adequately, a different platform is required. Regional groupings and institutions can be said to be a part of it. Though, it is important to mention that there are more important reasons as to why regional organizations emerge. Dissatisfaction with the general outcomes of existing institutions may result in the desire for a more focused concentration on regional problems. This dissatisfaction can also lead to the, less permanent, bloc formation in international negotiations to gain bargaining strength. The 43 member Alliance of small islands states at climate talks is a good example for this. These states will bear the direct brunt of climate change and face existential threat. Also, because of the very small size of their economies, individually, these states having a very weak or in some cases no voice at all on the global stage. Thus, an alliance to represent their position and rally the international community for collective action gives them more strength.

D. *Dissatisfaction due to limited membership*

Institutions may be formed to include members meeting certain criteria, either the size of the economy, geographical location, availability of certain resources, party to certain treaties etc. Dissatisfaction can arise due to inability or unwillingness to meet those criteria and hence lead to the formation of a parallel or a similar institution better suited for the purpose of the nations involved. Alternately, there might be policy changes within an institution as well to accommodate the newer members. E.g. G20 came into existence because this group was seen to be in a better position than the G8 to address the challenges of the economic crisis. The group has widened its scope and has also come up with a road map for member nations to address the problem of climate change.

II. As a response to a crisis or threats

Regime complexes and institutions, as mentioned above, tend to be sticky. Therefore to jolt the institutions from the state of innovation inertia, a shock or a crisis is required. A crisis tests the validity of old norms and rules. A stress test of this sort decides whether they should be followed or newer regulations are required to better deal with the new problem. It forces the member nations within an institution to innovate. This may lead to the formation of new institutions or it may lead to changes within an institution.

A. *Security threat, environmental threat, economic threat*

History is littered with examples where institutions have come into existence as a response to a threat or a crisis. The nature of these threats is such that it is not sufficient to deal with them on the national level alone. Coordinated and sustained actions are required. Hence, these institutions come into existence. Like, the League of Nations was formed at the end of World War I to prevent future destructive wars from taking place. Similarly the UN was formed after the end of the Second World War. The IAEA came into existence to deal with the very real physical security threat arising in the absence of a mechanism to regulate the use of

nuclear weapons. The G20 emerged as a response to the Economic crisis while the UNFCCC was formed to deal with the environmental threats due to climate change. These are but some examples which have formed as a result of threats. We feel that oil price crisis have played a major role in shaping the current global energy space, as explained in the figure below.
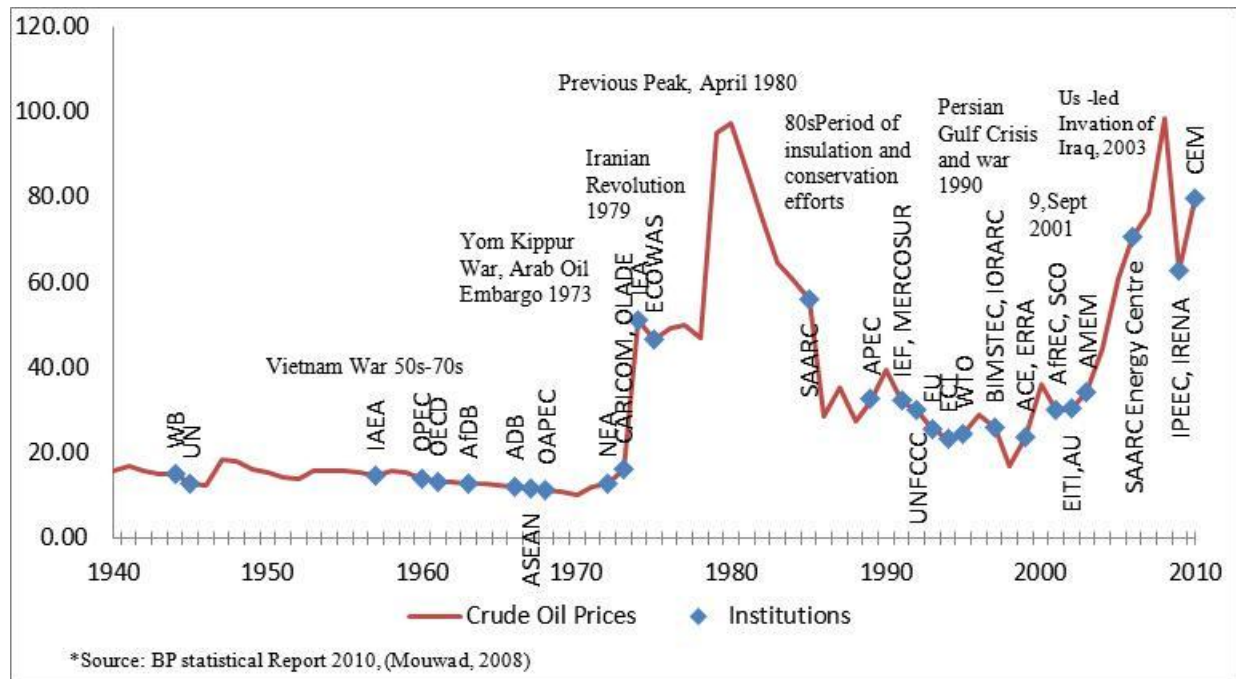
i) Oil price crisis

Figure 1: Representation of institutions according to the year they were established corresponding to the oil price at the time.
Source: Authors' visualization based on BP, 2010; Mouwad, 2008

Oil forms the most important fuel in the energy mix of all nations. Therefore, it stands to reason that drastic fluctuations in its price will cause institutional change (see figure 1). If we look at the history of global energy governance, we will find that many significant institutions have come into existence as a response to the Oil Price shocks. The OPEC emerged as a response to low oil price and the oil quotas to ensure that oil producing nations are ensured maximum profit. As a result of the first oil shock of 1973 we see the formation of IEA and OLADE. IEA was formed with the aim of trying to lessen oil supply disruptions. Similarly the Latin American and the Caribbean nations, which lacked comprehensive energy policies, felt a need to coordinate and develop their policies and actions as direct result of the Oil Shock. This led to the formation of OLADE. To deal with the crisis appropriately, its mandate included- cooperation, coordination and establishing an advisory body to help with the energy policies of the region. During the 1980s, the oil prices began to weaken and finally crashed in 1986. This producer-shock was supported by changes within the institution. OPEC introduced a group production ceiling and also combined it with OPEC/non-OPEC dialogue and cooperation to bring about market stability and reasonable prices. However, in the 90s hostility amongst the member nations of OPEC, the disintegration of the USSR and the East-Asian crisis saw falling crude prices but no changes within the OPEC. Fall of the USSR can explain the spurt of institutions between 1990 and 2000. Again, between 2000 and 2010, a decade which has seen a steady rise in the price of oil, there has been an increase in the

number of institutions dealing with energy and sustainability. With the rising price of oil and the growing energy demand of the countries, it has become imperative for nations to explore and secure other sources of energy. Thus, this shows that many institutional changes have occurred as a reaction to oil prices.

III. Change in ideas and norms

International cooperation cannot be completely explained without reference to the changes in ideas and norms. The values of the actors, the beliefs they hold about the interdependence of issues and the knowledge available to them all forms an important part of it. "Cooperation is affected by perception and misperception, the capacity to process information and learning" (Haagard & Simmons, 1987). Thus, the role of the epistemic community cannot be overlooked in helping build this perception.[3] They help in the creation and spread of new ideas. This change can be gradual but generally, will require the impetus of a crisis and/or a strong leadership shown either by a person or an organization to be realized. Ideological shifts can be carried forward only by vectors for transmission on both the international and national level. These vectors help implement the ideological shift and help in norm formation. Multilateral Development Banks like WB and ADB are particularly important vectors for the transmission of new ideas and norms (Nakhooda, 2011).Shift in ideologies can be very well explained in the case of institutions dealing with climate change. One can see a clear shift in the trend where almost all organizations dealing with energy now focus on climate change and sustainability issues.

IV. Strong leadership

The role of leadership or policy entrepreneur (Kingdon, 1984)cannot be ignored in the process of institutional (Kingdon, 1984) change and reform. Strong leadership also follows from the earlier point that, vectors for transformation are required to bring about institutional innovation. Therefore, leadership can be shown by individuals or a group of individuals. Oran Young (Young, 1989) classifies leadership as structural[4], entrepreneurial[5], and intellectual[6].

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[3] The concept of epistemic community was first introduced by John Ruggie and then refined by P.M.Haas. An epistemic community is a network of professionals with recognized expertise and authoritative claims to policy-relevant knowledge in a particular issue area. These professionals may have different disciplinary and professional backgrounds and may be located in different countries, but they share a set of norms that motivate their common action, a set of causal beliefs about central problems in their area of expertise, shared criteria for evaluating knowledge, and a common policy enterprise (Clunan).

[4] A structural leader is one who makes use of the structural power of the party or state he belongs in a bargaining process to bring about change. These types of leaders typically look for institutional arrangements which will be more favorable to their nation or party. One can see the traits of structural leadership employed by different nations in the climate change negotiations. For example in the climate change negotiations at COP15 the Brazil, India and China showed combined structural leadership. Even the USA and the Danish hosts displayed this form of leadership.

[5] Entrepreneurial leaders may or may not act in the name of a major stakeholder but they lead by making use of their negotiating skills. Charismatic leadership can also be classified under this. They act as agenda setters, shaping the form in which issues are presented for consideration. They draw attention to the important issues at stake and may also be inventors of innovative policy options to overcome bargaining impediments. However, entrepreneurs cannot achieve results single-handedly; it helps if there is an atmosphere of urgency or crisis and backing through a consensus in the scientific community. This can be seen in the creation of IRENA where the idea where the idea of a political organization was given by Hermann Scheer two decades prior to the formation of IRENA in 2009. But there was lack of sufficient support at the time.

[6] Intellectual leader may or may not be affiliated to an organization. He relies on the power of an idea to shape the bargaining process to bring about institutional change. The members of the epistemic community consisting of experts, scientists, academics can be said to fall under this category. Even institutions play the role of intellectual leaders by disseminating information, creating awareness and contributing to the change in ideology. IPCC is a good example of this. It assesses scientific, technical and socio-economic information regarding climate change produced around the globe and publishes assessment reports which spread information, help create new consensus and help in policy making.

However, the presence of leadership is a necessary condition and not a sufficient one. It has to work in tandem with other reasons. Also, it is important to state that success in regimes cannot occur without the contribution of several forms of leaderships.

To conclude, some of the ways change can take place is when there sufficiently large demand for an institution arising out of dissatisfaction, when the interests of major actors converge (who's interested), when there is shift in ideas in the presence of strong leadership, when there is a crisis situation. All these reasons can work individually or in conjunction with one or more reasons. The following section will look into the history of the institutions in global energy governance.

1.2.2 History of Institutions

By looking at the developing history of global energy governance, we see the priorities that were important for nations at the time. We can then map the changing landscape of energy governance and understand how priorities have shifted and why change has occurred. Six trends emerge when analyzing the timeline shown below (figures 2-4):

(1) energy governance began at the global scale in the 1950s and 1960s, with a keen eye towards physical security concerns; (2) from the early 1980s through the 1990s,we see that institutions that dealt with energy as a part of the whole, i.e. energy was not the sole focus of the organizations, increased. However, other than for nuclear energy, no global organization arose that dealt with energy; (3) there is a spark of institutions that rise in the immediate post-Cold War era; the first decade of the twenty-first century can be classified into two phases: (4) there is an increase in the number of energy-specific institutions, especially in the areas of research, as data regarding climate change and the need for renewable energy has increased awareness; and (5) we see many organizations in fact emerge from discussions within a previous institution.(6) High oil prices or greater fluctuation in oil prices have led to a growth in institutions, the decades between 1970 and 1980 and between 2000 and 2010.In this section, we will take the first five points and elaborate further. The sixth point has been explained in detail in section 3.2.1, subsection II-B.

I. The Early Years: Security Concerns

The advent of industrial revolution increased the demand for energy amongst the western nations. However, prior to the Second World War the energy markets were primarily autarkic. Those nations which had the resources produced to satisfy their needs and those who didn't went out in search for colonies which did. Energy was, and still is, tightly wound with the national security of the nation. Therefore excessive dependence for energy on competing nations would have been considered as threat to the national security of the nation concerned.

The conclusion of World War II and the beginning of the Cold War sparked new security fears across the Iron Curtain. Policymakers coming off of an extremely taxing war of Western Europe and the Pacific saw security implications of a rising USSR. And even prior to the conclusion of the War, animosity had grown between the two new superpowers. All international policy issues of the 1950s, in this way, were couched in security concerns of the first and second world.

With nuclear weapons already being developed and spread, the acquisition of fissile materials began to escalate and as a result, energy and security became intricately tied. With the United

States and the Soviet Union already in possession of nuclear weapons, regulating the exploration of nuclear fissile material became a global desire, and one particularly important for the United States. The volatility in the bipolar world led to security-conscious policy-makers, and after witnessing the devastation in Hiroshima and Nagasaki, Japan, to conclude World War II, the United States was weary of such technology being developed in their enemies' territory.

Thus, we see that this security threat led to one of the first instances of the regulation of energy. The search for controls of nuclear energy and technologies began in 1946, with the UN General Assembly searching for ways for the two superpowers to eliminate nuclear weapons. This was shortly seen as impossible, and as a result proposals began not to roll back nuclear weapons, but to stop their spread and regulate peaceful nuclear technologies.

Dissatisfaction with the ability of the global institute at the time – The United Nations, to deal with the growing problem of nuclear weapons led President Dwight D. Eisenhower of the USA to address the UN General Assembly in 1953. He intricately tied global security with energy exploration, proposing international regulation and promotion of peaceful use of atomic power while also drawing down the stockpile for nuclear weapons (Eisenhower, 1953). The centerpiece of this proposal was the creation of an International Atomic Energy Agency "to which the governments principally involved would make joint contributions" from their stockpiles of fissile material and natural uranium (Fischer, 2003). Thus he showed both structural and entrepreneurial leadership to bring together the present dissatisfaction, during a crisis situation (the world faced physical security threat) to build a consensus for an international institution dealing with nuclear energy.

Although ultimately the central concept – of the IAEA providing a bank of nuclear materials to draw down US and Soviet stocks – did not come to fruition (in fact, regardless of the IAEA, nuclear weapon acquisition rose sharply through to the 1970s), the IAEA did in fact begin to regulate internationally the inevitable spread of nuclear technology. In the long run, neither US attempts to preserve the nuclear monopoly, nor the controls that the supplying nations placed (much later) on their nuclear exports, would be decisive in determining whether nations used nuclear energy for military in addition to peaceful ends. The determining factor would be the security needs and perceptions of the growing number of nations that became technically equipped to make that choice.

But this founding language and its purposes shortly after inception demonstrate the energy concerns of the international community and their implications to the physical security. Where the IAEA was unable to gain enough regulatory power to eliminate the spread of nuclear technologies, its founding demonstrated an effort to advance and regulate peaceful nuclear energy in a world that was rapidly weaponizing this technology. At its founding, the IAEA was empowered to:

- Take any action needed to promote research on, development of, and practical applications of nuclear energy for peaceful purposes (Article III.A.1);
- Provide materials, services, equipment and facilities for such research and development, and for practical applications of atomic energy "with due consideration for the needs of the under-developed areas of the world" (Article III.A.2);
- Foster the exchange of scientific and technical information (Article III.A.3);
- Establish and apply safeguards to ensure that any nuclear assistance or supplies with which the IAEA was associated should not be used to further any military

> purposes — and apply such safeguards, if so requested, to any bilateral or multilateral arrangement (Article III.A.5); and

—Establish or adopt nuclear safety standards (Article III.A.6)

<div align="right">(Eisenhower, 1953)</div>

All of this demonstrates the intricate tie between security and energy that existed in this early to mid-Cold War period.

Security issues continued to stimulate the formation of energy institutions, but instead of security regarding weapons-grade uranium, it shifted in the 1960s and 1970s to economic security attempting to balance the consumer-producer dynamic within the oil sector. Where the IAEA was an international movement began through the United Nations, the other multinational issue-oriented organizations that emerged before the 1980s were smaller in membership and responded to significant economic security threats posed by external actions targeting the region.

Prior to 1965(the formation of OPEC), the oil industry was dominated by seven main petroleum producing companies, called as the 'Seven Sisters', namely: Standard Company of New York, Standard Company of California, Texaco, Gulf, Royal Dutch Shell, British Petroleum, and Standard Oil of New Jersey. These companies worked as consortiums to control the oil supply in many countries in the Middle East, in addition to working extensively in all aspects of oil, from drilling to refinement. This enabled the companies to monopolize the world oil market and set prices as they wished.

In addition, after World War II and with the bipolarization of the globe in the Cold War, there was discontent amongst the developing countries due to their struggle against discriminations by dominant powers. These countries were struggling to achieve their economic rights in a world seeking to meet the demands of the developed world (Razavi, 2010). The formation of the International Monetary Fund and the World Bank in 1945 served the interests of developed countries. Rather than tackle the issue on a global level, regional efforts were being made to regulate these issues. Economic blocs were being formed within the poles created in the Cold War. The European Economic Community was established two years prior to OPEC, seeking to reduce tariffs between member countries. In the communist bloc, we see the Council for Mutual Economic Assistance. With a world increasingly focused on developed nations' economic strength and continuing prosperity, raw materials producing nations were, in many eyes, simply a mine of goods, and the security of these nations, especially economically, was at stake.

Thus, between the rapidly reducing price of oil set by the 'Seven Sisters' multinational companies as well as the inability to developing countries to put forth their economic requirements in the rapidly polarizing world, petroleum nations began discussions to try to restore strength. Venezuela and Iran showed entrepreneurial leadership and began these discussions in 1949, approaching Iraq, Kuwait, and Saudi Arabia for the purpose of exchanging views and exploring avenues for communication exchange. Although minor and more ad-hoc methods of regulation began during the 1950s, they largely failed.

The price of oil fell in the beginning of 1960 to a low $1.50/barrel. In addition, a 1960 law signed by American President Dwight Eisenhower ensured this price's rapid decrease in these nations specifically, as it forced quotas on Venezuelan and Persian Gulf oil imports in favor of the Canadian and Mexican oil industries. During 10-14th September 1960, these nations began to discuss ways to increase the price of crude oil produced by their respective countries, and formed OPEC as a response to these economic security concerns. Thus we see

that OPEC was formed as a result of dissatisfaction with the system at the time due to lack of voice and proper representation of the problem of the producer nations and really low prices of oil, leading to a crisis type situation for the oil producing nations. The idea of a producers' organization was initiated by Venezuela and Iran which finally came into existence and 9 other nations joined the initial five.

The 1965 formation of OPEC was a culmination of regional and economically congruent nations feeling the external pressure from the establishment of oil quotas. OPEC's stated objective is: " to co-ordinate and unify petroleum policies among Member Countries, in order to secure fair and stable prices for petroleum producers; an efficient, economic and regular supply of petroleum to consuming nations; and a fair return on capital to those investing in the industry," (OPEC, 2012). In this way, OPEC's primary function is ensuring that oil-producing nations receive maximum profits while stabilizing a potentially volatile market for producers.

We see alliances again form to stem energy security threats in 1974, with the formation of the International Energy Agency, as industrialized nations responded to the oil crisis of the early 1970s spurred by OPEC. As Arab members of OPEC demonstrated against pro-Israel action by the United States during the Yom Kippur War, they declared an embargo of oil exports in October 1973. As a result, prices of oil increased substantially, even after the agreed settlement of January 1974.

Given the inability for the Organization of Economic Cooperation and Development to respond (the OECD had capability to deal with energy questions but could not respond effectively to a crisis; even OECD's Oil Apportionment decision laying out procedures to be carried out in the event of an oil supply emergency in Europe), the developed nations identified a need for a new intergovernmental body in energy. United States Secretary of State Henry Kissinger proposed the organization in December 1973, an organization that would respond to the physical disruptions in the supply of oil as well as serving as an information source on the oil market and other energy sectors. In addition to other actions, the IEA mitigates the immediate oil price shocks by mandating total oil stock levels equivalent to at least 90 days of previous year's net imports (Scott, 1994). Thus, oil price shock, dissatisfaction with the existing organization to deal with the crisis lead to the formation of IEA with intellectual leadership provided by Henry Kissinger.

Each of these organizations demonstrates how the integration of various security threats like economic, physical, energy played in energy regulatory formation at the international level. The IAEA was concerned about the rapid growth in interest of both weaponized and peaceful nuclear fuel; OPEC was concerned about their economic security, the monopolization of the oil sector, and the disinterest by developed countries in regards to their economic security; and the IEA was created to respond to and lessen the effects of oil supply disruptions, lessons learned from the early 1970s. Between OPEC and the IEA, we also see energy contextualized in economic interests. In a way, OPEC and the IEA began the cartelization of energy, specifically the oil sector, and this began a wedge between the consumers and producers that the international community later had to find ways to break in order to efficiently regulate energy and find common ground.

II. Energy as a part of a whole

The late 1980s and 1990s began to shift the ways countries interacted with each other, economically and culturally. Technological advances in computing allowed the ease of collaborations across science and industry. Media advanced cross-cultural collaboration and the export of especially Western music and movies around the world. The innovation in telecommunications made leveraging skills around the world easy and efficient, and it allowed companies to begin marketing products across boundaries. And the innovations in transport allowed businesses to ship products and employees quickly and easily. As a result, there was a change in ideology and companies began to look outside their borders to leverage markets, and the prospect of nations reducing barriers to increase production and efficiency became a priority.

As a result of the changing ideas in the favour of globalization, we begin to see a marked shift in the types of global institutions that formed, and this influenced the way nations began to treat energy as well. Countries sought to increase the ease of trade and transport while still regulating it, and as a result energy was rolled into this larger framework. This was a shift from earlier institutions: where earlier institutions directly related to energy in the physical and economic security context for its members, this globalization treated energy in the context of greater goals in increasing trade. The institutions were (and in cases, still are) little influenced by the energy realities of the situation. A shift in ideology caused by technological changes and growing consensus that no nation can be self-sufficient led to institutions to being to see energy indirectly in terms of trade and globalization.

This shift in treating energy is, in one sense, predictable. Between OPEC and the IEA, the major source of fuel (oil) had representative bodies for both the major producers and major consumers. In addition, the largest defense-energy security concern (nuclear weapons) had a regulatory body in its charge. The shifting world order, the expansion of technology, and the need for trade agreements between nations largely drove the creation of global institutions, with energy folded into the mix.

The Asia Pacific Economic Cooperation is a good example of this type. It was established in 1989 to support economic growth in the region by promoting free and open trade and investment, accelerating regional economic integration, encouraging economic and technical cooperation and promoting business (APEC, Mission Statement). The Energy Working group was immediately launched in 1990 (which also coincides with an Oil Price shock due to Persian Gulf Crisis) 'to maximize the energy sector's contribution to the region's economic and social well-being and mitigating the environmental effects of energy supply and use' (APEC, Energy). Four other expert groups dealing with clean fossil energy; efficiency and conservation; energy data and analysis; and new and renewable energy technologies were also formed. A task force on Energy Trade and Investment was created to facilitate cooperation and promote regional energy trade and investment liberalization with particular focus on climate change policies. This task force was also mandated to consider approaches to greenhouse gas emissions and carbon pricing across the region. Thus energy cooperation within the region benefited greatly through APEC.

We see similar emergence of institutions that affect energy as a piece to a whole throughout this time period. Mercado Comundel Sur (MERCOSUR) is another example of this shift in international priorities regarding regulatory frameworks. South American nations had discussed such a trade union and common market since the 1960s, but development interest

strengthened when Brazil and Argentina created the bilateral Programa de Integracion y Cooperacion Argentino-Brasileno (PICAB) in 1985, which pursued a bilateral common market. . MERCOSUR's development in 1991 sought to develop the economies of its members, making them internationally competitive, despite the long-standing rivals in the Southern Atlantic statesAgain the establishment can be looked with the background of the Gulf crisis in 1990. Energy trade and transport, as a result, opened up significantly within the region, but the primary purpose concerned trade generally (Roett, 1999).

The formation of both MERCOSUR and APEC can also be looked in the light of dissatisfaction due to the lack of a forum to better address regional issues.

Other examples (the North American Free Trade Agreement, Indian Ocean Rim Association for Regional Cooperation) further reinforce this shift. The economic concerns of the rapidly globalizing world in the 1980s and 1990s caused a broader perspective within institutions that affected energy; in many ways, energy became just one of many priorities taken up by these nations.

III. The End of the Cold War and the Start of New Energy Partnerships

A third shift in the establishment of energy governance institutions occurs at the disintegration of the USSR leading to the end of the Cold War creating a new world order. This crisis created opportunities for new global institutions to bring together nations previously separated by the Iron Curtain and accurately reflect the new balance of power. Energy, perhaps more than other issue areas, had the greatest opportunity to expand across the East-West divide, especially in mainland Europe. Countries in West Europe, rapidly growing economically, had increased demand for energy. The Persian Gulf crisis of the early 1990s awakened these nations to the necessity of diversification of energy sources to obtain greater energy security. With resource-rich countries in Eastern Europe now opening their borders to trade, including coal-rich Poland, natural gas and oil-rich Russia, and with transit through Ukraine and Bulgaria, Western Europe could satisfy their growing demand. In addition, Eastern Europe and Russia at this time needed significant capital, technological, and knowledge investments to further develop their economies.

While a number of bilateral agreements responded to this change, the Energy Charter Treaty in 1994 was the most significant institution filling this need. The gaps emerging from the end of the Cold War caused the ECT's emergence as the first multilateral treaty that imposed binding commitments in the area of energy to incorporate the mutual interests that both West Europe and Eastern Europe had in the energy sector. With the ECT's insurance of open, competitive markets and sustainable development while strengthening the rule of law on energy issues, the ECT sought to bring together resource-rich and demand-heavy nations of continental Europe and beyond. The ECT, in this way, provided a level arena for debate to reduce non-commercial risks attached to energy security and ensure energy trade to be non-discriminatory and consistent with WTO guidelines (Sharma, 2010). Thus, a political and economic crisis arising from the disintegration of the USSR which opened up the new Eastern European nations in need of trade and investment, a lack of a regional organization to sufficiently and securely address the issues arising out of the transit of energy, and a need for an organization to safeguard the substantial investments made in energy led to the formation of ECT.

IV. Climate Change

We have identified a number of shifts in the history of energy governance. The earlier concerns of global security and energy spurred the creation of the first energy institutions in 1957. However, other than nuclear energy, most of the cooperation in the Energy field has been fragmented and mostly regional. Energy became folded into larger organizations concerned with trade and transfer on a more general scale, especially at the regional level. With the end of the Cold War, restructuring the international energy regulatory system became a priority to incorporate new, resource rich nations.

Moving into the first decade of the 21st century, we see a rapid expansion in the number of environment and climate change institutions, correlating with the increasing academic studies and media attention towards ongoing climate change. Coupled with this the rising oil prices, due to difficulties in oil production, international security policies (including the Iraq War of 2003), and major oil spills promoted an interest in the research regarding renewable. Thus, the work done by the epistemic communities over a couple of decades prior to this was backed by a crisis situation which led to a shift in ideas in ideologies.

We see two distinct trends in institutions taking hold of climate change in the early 2000s: the creation of new agencies as well as the refocusing of older regional bodies towards climate change and environmental policy. This can be explained by the dissatisfaction principle and of course, the looming problem of climate change. New institutions came into existence to deal with previously unseen challenges. The formation of UNFCCC can be attributed to the dissatisfaction from the lack of a global institute to deal with the problem. While many regional organizations recognized the need to address this emerging challenge and expanded their mandates to include climate change. The threat of climate change brought alternative energy, issues of conservation and energy efficiency to the foreground.

The prime example of the renewable resources gap creating new agencies at the international level is the International Renewable Energy Agency (IRENA). Founded in 2009, it seeks to promote widespread and increased adoption and sustainable use of all forms of renewable energy. The concept of a political organization for renewable energy can be placed two decades back to Hermann Scheer who, as explained above in section 3.2.1 showed intellectual leadership. However, it was only the push from nations themselves as well as other associations (most notably the World Wind Energy Association) ensured the creation. The foundation of IRENA began with the Preparatory Conference for the Foundation of IRENA in April 2008. Representatives from sixty countries expressed overall support and discussed future objectives, activities, organizational structure, and financing. A cornerstone to the objective was tackling key issues facing global energy security future and how renewable energy could fill the gap.

The focus on sustainability also brought into focus best practices in the environmental sector. Resource rich but economically and institutionally underdeveloped countries producing energy were facing rampant corruption in its management. In order to set a global standard for transparency on oil, gas, and minerals and bring about good governance practices in the exploitation of these resources, the Extractive Industries Transparency Initiative (EITI) was set up. It is an example of a body seeking to improve energy security for industry as well as nations. Announced by then-Prime Minister of the United Kingdom Tony Blair in September 2002, the aim of the EITI is to increase transparency over payments by companies to governments in regards to natural resource extraction. Responding to an industry where transparent payments and insurance was previously unavailable, the ability for governments and industry to open up was necessary for effective business. The EITI, in this way, "supports

improved governance in resource-rich countries through the verification and full publication of company payments and government revenues from oil, gas, and mining" (EITI, 2009).

While new cooperation occurred, older agencies also began to broaden their scope to include climate change, renewable energy, and energy security foci. ASEAN, established in 1967, began to shift focus towards a more environmental perspective at the turn of the century. Where prior years, environmental policy was rarely discussed, 2002 found the organization signing the ASEAN Agreement on Transboundary Haze pollution, to control this environmental hazard. In addition, the organization pushed the Cebu Declaration on East Asian Energy Security, the ASEAN Wildlife Enforcement Network, and the Asia-Pacific Partnership on Clean Development and Climate, both of which were in response to the potential effects of climate change.

Thus, especially in the field of climate change, it can be seen that most institutions have arisen because multiple reasons coming into play. The combination of dissatisfaction due to the lack of an organization dealing with and promoting aspects of climate change (renewable energy, efficiency, sustainability, etc.) on an international and a regional scale, different forms of leaderships shown by individuals and organizations as well as a shift in ideology explained in the earlier paragraph have worked in tandem leading to a spurt of institutions dealing climate change.

V. Growing out of Existing Institutions

Many organizations have explicitly been formed within the precipice of another organization, seeking to fill gaps in an existing institution the energy governance space that have been left over. This is critical to mention because it is self-recognition that certain organizations have identified gaps within their founding and sought to fill them by creating new organizations. We can see the dissatisfaction principle at work here. An organization which stands out specifically in this regard: Clean Energy Ministerial.

The Clean Energy Ministerial emerged as a result of the Major Economies Forum and the UNFCCC meeting in 2009. As a forum, its role is to promote policies and programs that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy (CEM). In the UNFCCC conference of parties in December 2009, the need was identified to bring together ministers with responsibility for clean energy technologies from the world's major economies. As a result, CEM has been created to fulfill this hole.

We see, then, although this is only beginning, institutions are emerging that seek to fill holes left by the space. CEM is one example, but the fact that both policy-makers and nations themselves understand the need to identify holes in the energy governance space is a positive sign that new energy challenges will be met.

1.3 Conclusion

Thus section 1.2 gave a theoretical and empirical understanding of the reason for change in the global energy governance. The interplay of various issues within the energy regime and the drivers of change are important to understand, to help identify the gaps in governance structures and strategies; thus, helping to improve them. The next section will do a mapping of how the global energy space looks like charting the number of institutions, the various issue areas they deal with, the number of members, the regions they cover to help give a clearer picture of how the space has evolved over time.

Part 2: Institutional Mapping

Given the theoretical background and historical understanding, we must next understand the current institutional space. With an understanding of the history presented in Part 1, Part 2 seeks to understand and categorize institutions that exist today to deal with energy policy.

Section 2.1 will present the framework for analysis, define an effective space generally, and discuss the levels of analysis to judge energy governance space or regime complex. Section 2.2 presents a mapping of the global energy space to see which institutions exist, how big they are, what their type is and which issues they deal with. Through this mapping we analyze the trends that have emerged in the global energy space. Section 2.3 will summarize and present the conclusions from this analysis.

2.1 Framework for Analysis

Determination of an effective policy governance space (regardless of the specific type of area, whether it deals with energy, security, criminal law, etc.) requires that the institutions that exist in the space represent a variety of members, regions, objectives, and subject matters relating to the policy area in discussion (in this case, energy). By looking at institutions on these levels, we will gain not only an understanding of energy governance – its strengths and its weaknesses – but we will also be able to point out the areas where these institutions fall short in.

This research seeks to define the dimensions of the space of energy governance institutions, including, but not limited to: which countries are members, are particular regions better represented than others, and are there members missing; is there a lack of large or small organizations, or are sizes well-represented; are critical energy issues being dealt with within these institutions; and are there a number of methods that institutions use to try to solve problems that emerge in the space.

2.2 Understanding the Dimensions of the Space

This section seeks to identify institutions based on a number of different parameters as a way of understanding which institutions exist, whether the representation is adequate along a number of different dimensions, and if there are gaps in the types of institutions that need to be filled.

Four broad organizational categories stand out based on previous theoretical investigation. First, do institutions, especially multilateral institutions which are less inclusive, have participation of major actors? Do lead producers and consumers of energy join global governance mechanisms in energy? It is critical for the energy governance to have those nations or regions most invested in the outcomes involved in the organizations.

The second is size, here we will identify whether institutions that exist are varied in size- this includes institutions with a small number of members to those that are global in their coverage.

Third, the energy space as a whole should deal with a range of issue areas that affect the globe with regard to energy.

The fourth category is the nature of their functioning: whether they are formal institutions or networks. Energy governance benefits from a variety of institutions, some seeking to regulate

through formal processes while others are networks that allow information transfer or opportunities for informal agreements and stakeholder understanding.

This section will categorize institutions along these dimensions. It will also interact these dimensions, drawing conclusions of global energy governance's institutional representation both in terms of which aspects are adequately represented and which gaps exist.

2.2.1 Membership

As discussed previously, membership plays a key role in understanding an institution's mandate, scope, and area of influence. Membership of influential countries, both in terms of international clout as well as priority regions for the policy space, is integral for institutional effectiveness. In global energy governance, this includes regions that are heavy producers and consumers of energy. If global energy governance is devoid of these members, it will lack the power to make relevant recommendations or even influence policy-makers.

Investigation was restricted to multilateral organizations because it is clear that more international organizations with near global membership will include the major producers and consumers; if, for instance, we include the UN or the WTO in this analysis, the lead producers and consumers would of course be present; that is a requirement easier to fulfill. More critical analysis occurs in small and large multilateral organizations, where lead producers and consumers must still be present. In this way, multilateral institutions were isolated and analyzed in conjunction with producers and consumers. In energy governance, we see that these institutions are adequately representing critical nations influencing the policy space.
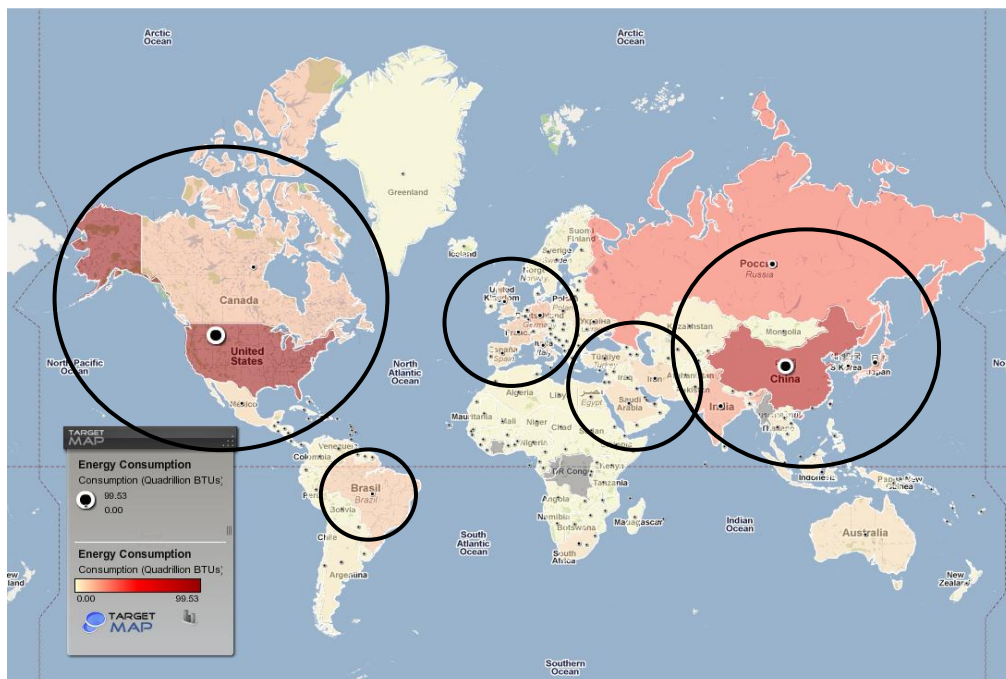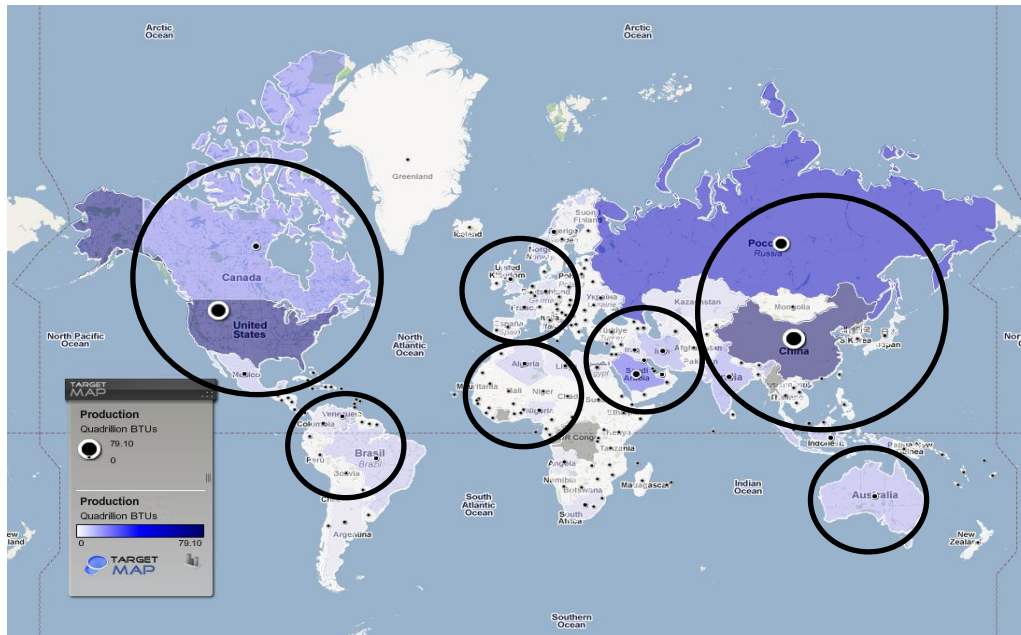

Map 1: Energy Consumers (Data from World Bank)
Source: Authors' visualization

Map 1 shows the lead energy consumers of the world, with the darker nations consuming higher amounts of energy. We see five primary regions in which energy consumption is

greatest: North America, eastern South America (specifically Brazil), Western Europe & Russia, the Middle East, and the Asian giants (India, China, and Japan).

Map 2: Energy Producers (Data from World Bank)
Source: Authors' visualization

The map of global producers (Map 2) and its regional breakdown is similar. North America is still strongly represented. In South America, nations producing energy expand to include much of northern South America, including Venezuela and Columbia. Western Europe and Russia are still well represented, as are the Middle East and the Asian giants. Two more regions are major energy producers that are not major energy consumers: Western Africa (Algeria, Nigeria) and the Indian Ocean region (Indonesia and Australia).

Comparing the membership of multilateral partnerships with previous maps of lead producers and consumers, we see significant overlaps. North America, South America, Western Europe, Russia, Asian giants, and the Indian Ocean nations are all represented in multilateral organizations. In regards to membership representation, then, we can conclude that multilateral organizations are representing nations critical to energy policy.

2.2.2 Size

With membership of critically affected nations being established, we can understand how institutions stack up in terms of size next. Size distinction is important to make for two reasons: (1) because organizations function differently depending on their size (2) defining global energy governance by the size dimension allows us to understand whether organizations of particular sizes are more prevalent than others
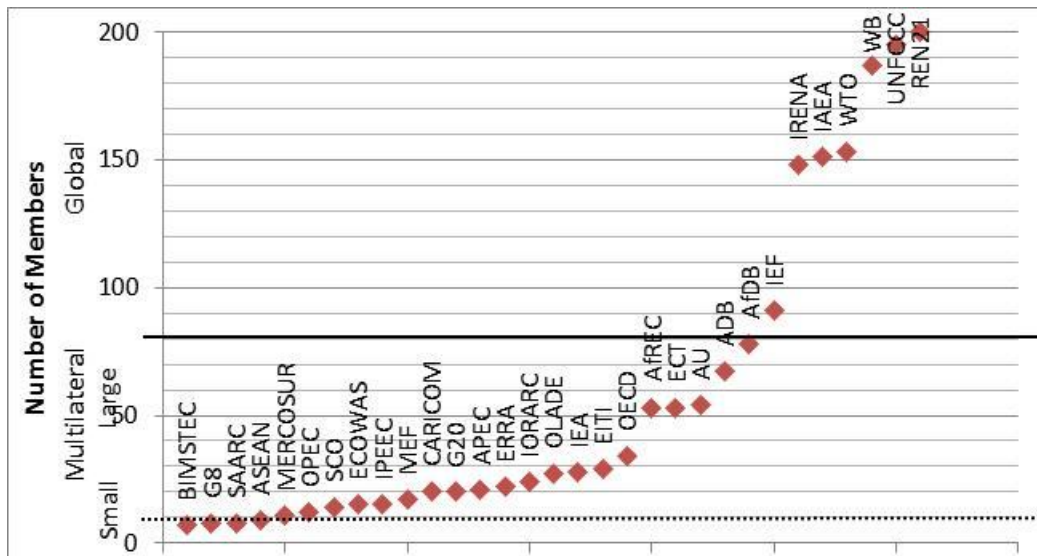
Figure 2: Institutions and their Members
Source: Authors' visualization

Figure 2 organizes institutions by the number of members in order to demonstrate the number of institutions that are global, large, and small multilateral. We are defining global institutions as those above 90 members (approximately half the number of nations in the world). This is a natural break within the data, as the difference between the International Energy Forum and the Energy Charter Treaty is almost forty members. Below this, we categorize the area generally as multilateral, with the upper section called "larger multilateral" and the lower section called "smaller multilateral." Smaller multilateral organizations are targeted to a specific and limited set of nations (those with fewer than 10 members). Although the distinction between institutions close to this line dividing smaller and larger multilateral organizations may be minute (such as MERCOSUR and ASEAN), it is still critical to make the distinction to account for the influence membership size has on the functioning of organizations in the middle band of these areas. For instance, similarities based on size exist between NAFTA and BIMSTEC because of their membership that will be difficult to fold into a category with the IEA.

We see a prevalence of multilateral institutions between ten and forty members, with fewer global and small organizations. Further inferences can be drawn about the size of an institution when we see size interact with the type of functioning of the organization and the issue areas these institutions deal with.

2.2.3 Issue Areas

Young (1980) discusses the importance of issue areas of the institution to understand its mandate and effectiveness – to label the organization. In energy policy, four key areas of interest arise that global governance should seek to promote and regulate. Specifically, these are: trade and cross country investments; international supply and demand risks; sustainability; domestic management of energy resources which included the development of domestic energy resources and domestic energy regulation.[7]

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[7] See Mahajan, 2012 for more details on the functional classifications.

Each institution can take on more than one of these goals within their mandate but may also focus only on one of these policy areas within energy. An institution that focuses on one of these issues will be able to delve deeper into the area's intricacies; an institution that has a broader mandate can relate issues to one another. In this way, the prevalence of both institutional approaches is critical to a functioning energy governance space.

The coding of this data relied on the charters and outputs of each individual institution. Figure 4 breaks down the result of this coding. A single point in these charts is an institution's work in a single area. Therefore, an institution can be represented more than once if it works in more than one area.
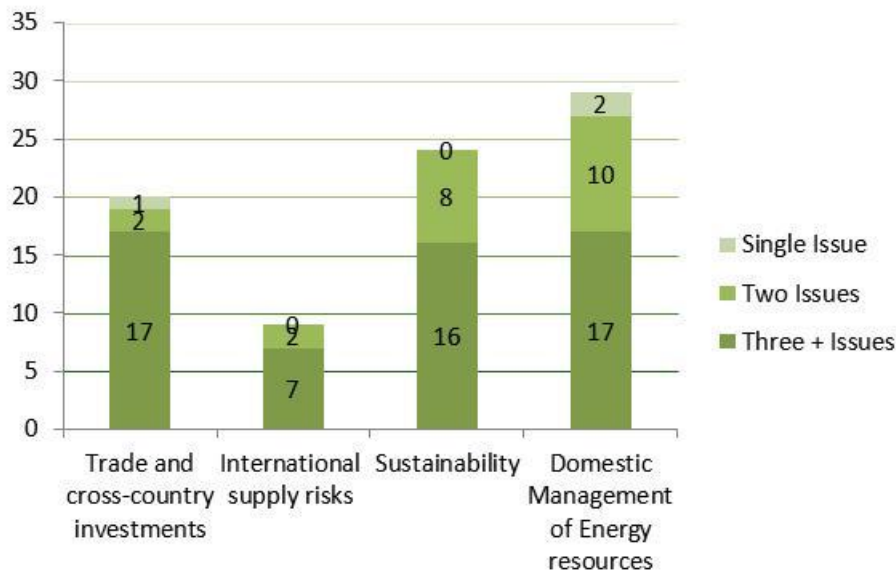

Figure 3: Institutional areas based on focus of institutions
Source: Authors' visualization

Figure 3 shows the dedication to a particular area within energy governance by total institutions. The purpose of this is to demonstrate the relative importance the energy governance apparatus gives to different issues. It breaks down this analysis further and adds another dimension. As we can see, there are hardly any institutions dealing with a single issue. There are more institutions dealing with three or more issues suggesting that functioning of the organization is quite diffused. This can been good as could imply that the institutions get to address a gamut of issues in the energy space. However, one can also deduce that very few 'specialist' organizations are created like EITI or ERRA. These organizations were created for a set purpose and therefore to diversify into other issues will make it lose its characteristics. In an energy regime complex, it is essential that there exist institutions which address a range of issues as well as specific institutions for target areas. Only this way can a holistic governance space arise.

The subsequent figures will look at each issue area and the corresponding size of the institutions. This will help us get a better picture with regards to which institutions are dealing with which issue areas.
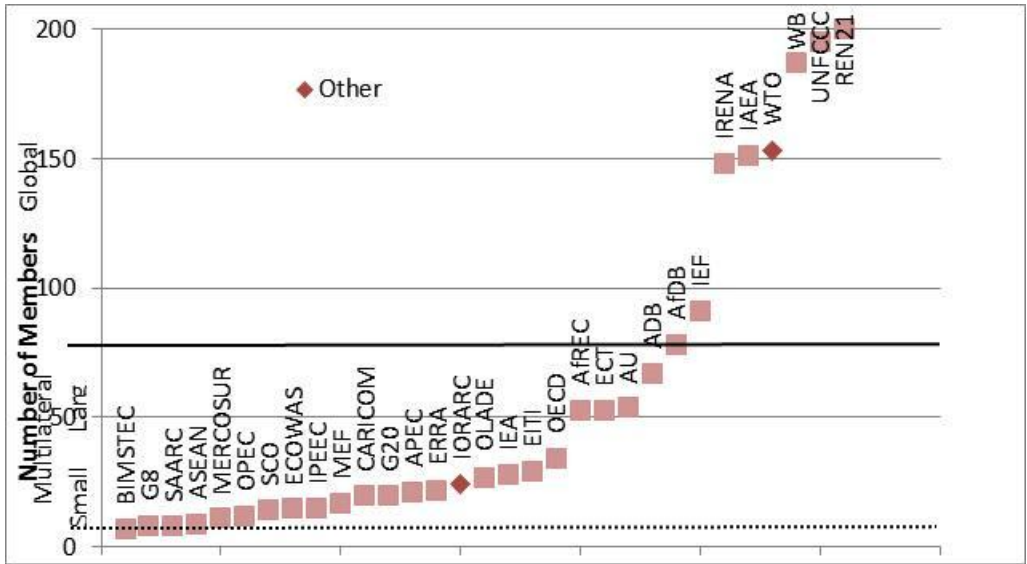
Figure 4: Number of Countries by Domestic Management of Energy Resources
Source: Authors' visualization

As we can see from figure 3, the highest percentage of institutions can be seen in 'Domestic Management of Energy Resources'.[8] Also, as charted in figure 4 above, most barring WTO and IORARC, all institutions have included this issue area under their mandate.
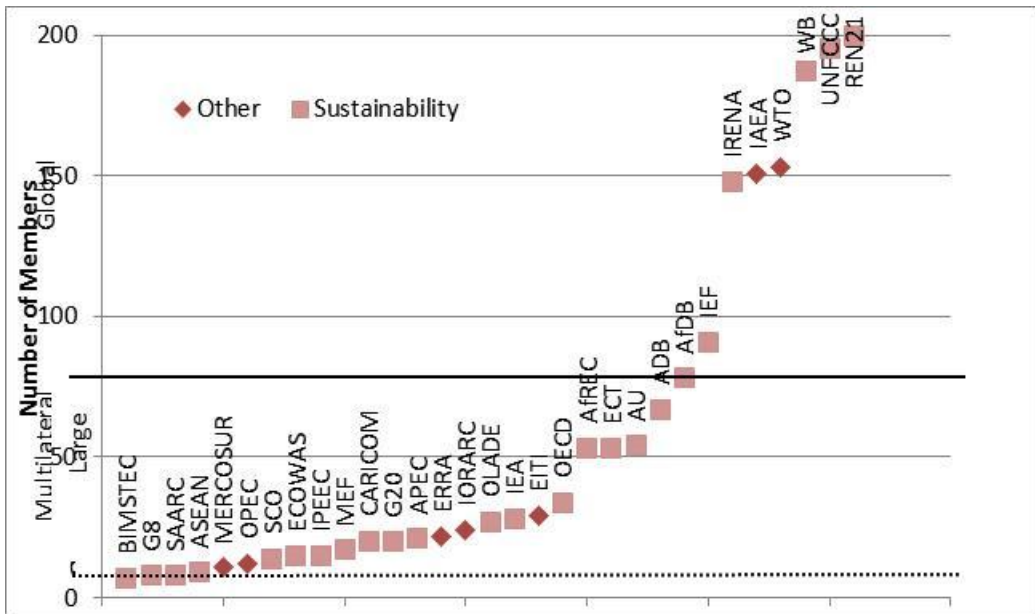

Figure 5: Number of Countries by Sustainability
Source: Authors' visualization

The second highest number of institutions can be found in Sustainability. As seen from the picture above, again, almost all institutions try to address this issue area. Global, large, and small multilateral institutions work on creating knowledge, awareness, and regulation towards sustainability.

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[8] This can lead one to conclude that 'Domestic Management of Energy Resources' is the most regulated area. However, as will be seen subsequently (Figure 11), a majority of these institutions are voluntary.

Both, domestic management of energy resources and sustainability issues, are closely linked to each other and related to the domestic policies of a country suggesting that perhaps international institutions have an impact on them. However, only a look at the functioning of these organizations will tell us whether they have a direct impact on domestic jurisdiction or an indirect one through spread of information.
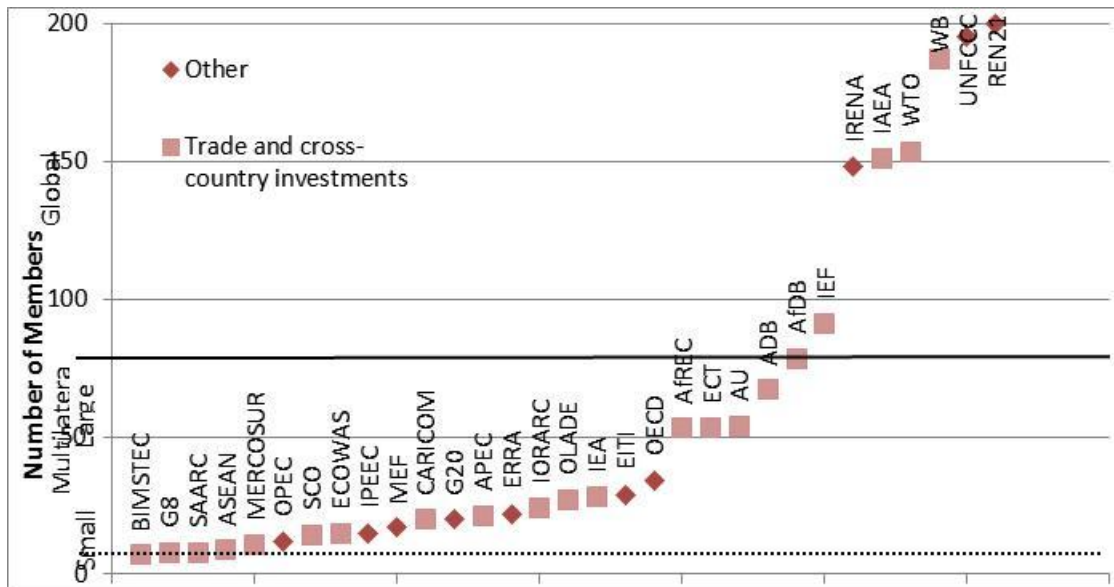

Figure 6: Number of countries by Trade and cross-country investments
Source: Authors' visualization

Trade and cross-county investment forms $1/4^{th}$ of the sample size implying that many that a significant amount of organizations deal with this issue. It can be seen that all regional organizations deal with trade and cross-country investments. It will be seen in the subsequent section as to how many of these organizations are binding or voluntary. However, in the case of energy especially "oil and gas, they are commodities that are already or increasingly being traded on the global scale. Market forces of demand and supply mediated by price mechanisms are key factors in determining levels of investment, production and consumption" (Goldthau & Witte, 2010). These markets cannot function without institutions. Therefore, increasing trade will require more institutions. This can explain why all regional organizations also address this issue area. At the global level, it is important to be able to regulate or cooperate on trade law; at the large multilateral level, there are benefits from free trade or exchange of energy resources that are easier to mandate; and at the small multilateral level there are commonalities that can be used and exploited at the international stage in regards to risk management.
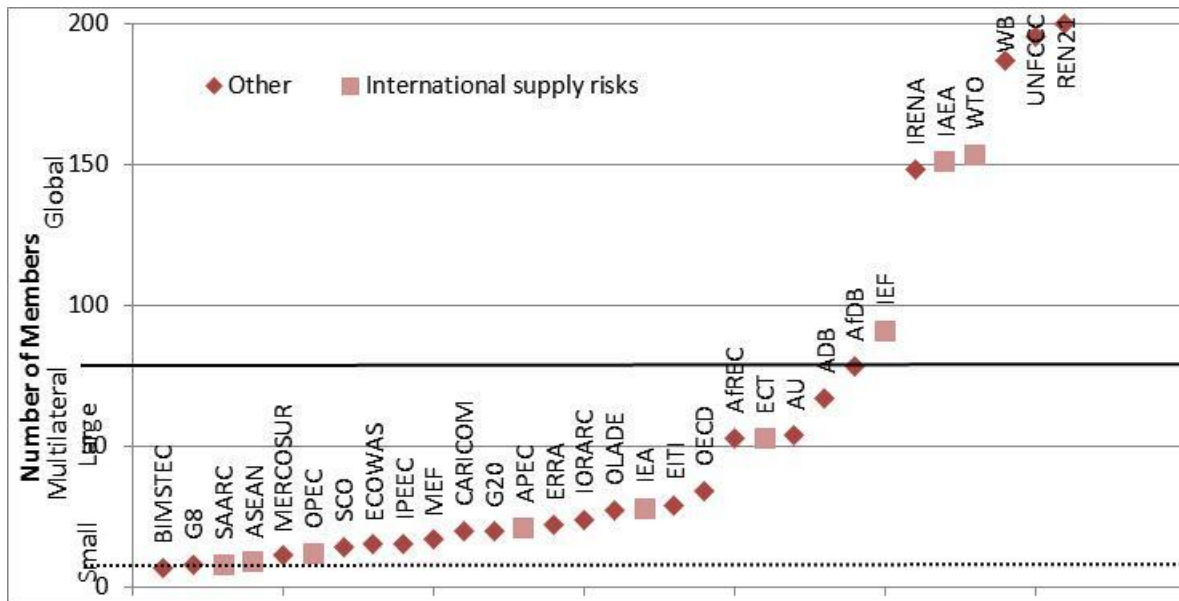
Figure 7: Number of Countries by International Supply Risks
Source: Authors' visualization

While APEC, ASEAN and SAARC try and tackle international supply risks in energy, there are more specific and specialized institutions which have been built to address this issue for example OPEC, IEA, IAEA. One can conclude that only those organizations which have a composition of substantial producers or economies large enough to create a substantial buffer stock will be able to deal with this issue area. Hence, we see that this area has the least number of organizations.

2.2.4. Organization Type

After understanding the issue areas of energy governance and institutions within it, we now describe the space in terms of the final dimension: organization type.

An organization's type can be placed in one of two broad categories: formal and network or informal. A formal organization is one which has a charter or a legal instrument ratified by the members that defines its mandate and/or has a permanent secretariat. It seeks to develop and establish formal standards for the member nations.

On the other hand, networks can be defined as informal organizations which provide a forum for exchange of information and best practices, help in research and development and help in developing public-private partnerships (Keohane & Victor, 2010). Networks are created by a convergence of or consensus in objectives among participants, enforced by mutual self-interest and "gentlemen's agreements" and monitored by mutual surveillance. As research centers, networks gather information from nations, nonprofits, scientists, and businesses to provide recommendations to member countries or global institutions. They allow a collection of information on rapidly emerging areas, such as sustainability or climate change, to influence direct policy-makers. And as forums, on the other hand, they facilitate candid dialogue among members to help generate political leadership necessary to achieve successful outcomes and advance exploration of initiatives across various sectors of actors.

The classification of institutions can be further divided as obligatory or voluntary. Obligatory institutions as the name suggests expect adherence by the member nations to mutual agreed

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and ratified decisions. They seek to have control over state action through binding decisions. While voluntary organizations advice on best practices but leave it on the member nations to decide whether they want to implement them or not. Going by the definition of networks above, all organizations classified as 'networks' will, necessarily, be 'voluntary'. However, formal organizations can be either 'obligatory' or 'voluntary'. For instance, in the case of most regional organizations, they have been formed on the basis of a specific charter and mandate, have an independent secretariat and seek to establish regional standards. Once, a member state agrees to them, these become obligatory. However, in the field of energy, many of these organizations function as voluntary formal institutions advising on the best norms and standards.

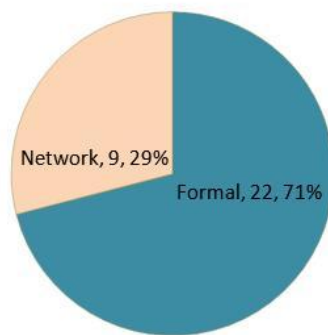Figure 8 shows the break-down of organizations as formal or networks.

Figure 8: Percentage of organizations classified as Networks or Forums
Source: Authors' visualization

Figure 8 suggests that there are more formal insitutions than networks in the global energy space. This would mean that member nations prefer to meet in formal conditions to discuss the various issue areas of energy. However, a cleared picture emerges when we see how many of the total institutes are voluntary and how many binding as show in figure 9.
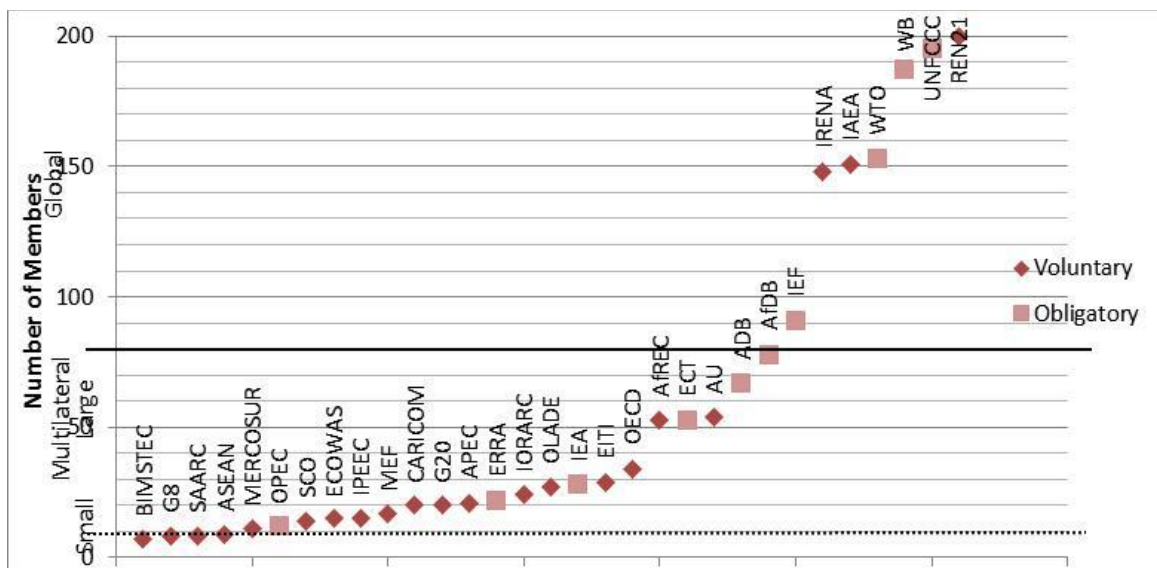

Figure 9: Number of countries per organisations classifed as Voluntary or Obligatory while dealing with Energy
Source: Authors' visualization

As we study figures 8 and 9, a few trends emerge. While 71% of institutions are formal, most amongts them are voluntary. It is seen that no small multilateral organisation is obligatory although, one would expect more binding institutions at this level as a smaller, more focused group will have similar interests, better geographical connectivity (if they are regional organisations) and will reduce bargaining time and transaction cost. However, that is not seen here. Of the 10 obligatory regimes, 6 fall in the 'larger' mulitlateral organisatoins category. Suprisingly, there is an equal distribution of obligatory and voluntary organisatoin at the global level. The orgnisations which are obligatory are those which are those which are specific in their functioning dealing with only one or two issues. Suggesting that it is easier for specifc institutions to be obligaorty and the diffuse ones to be voluntary.

Regional organisations while having specific mandates are classified as voluntary based on how energy is viewed within the organisation in the current form. However, the organisations provide the institutional mechanisms required to have obligatory rules and regulations guiding energy choices or behaviour. As seen in figure 9, all regional organisations are also voluntary in their treatment of energy suggesting that energy is still an issue which is primarily regulated at the domestic level

One has to point out, that due to the nature of developmental banks and the econmic instruments available to them, they will of course be 'obligatory' but their influence is restricted to those nations it provides loans too. Thus, seeking help is voluntary but following the conditions is obligatory. So while the banks will have their own norms and rules, the implementation will not be universal.

Futher analyses can be made by interacting Issue Area and Organisation type. This will also help us explain some of the trends seen in section 2.2.3.

2.2.5 Interaction of Issue area and Organization type

Thus far, we have demonstrated that, largely, global energy governance institutions are well-distributed across the dimensions needed to establish an effective space. On membership, we see critical producers and consumers of energy are represented in multilateral institutions. In terms of size, we see that although there are fewer global and small multilateral institutions, there is representation across different categories of institutions. In terms of issue area, we see international domestic management of energy resources and sustainability are issues that are better represented in energy governance. Lastly, we have seen that while there are more formal institutions than networks, there are fewer obligatory ones than voluntary. The final step is to understand the relationship between issue area and organization type in multilateral energy institutions.
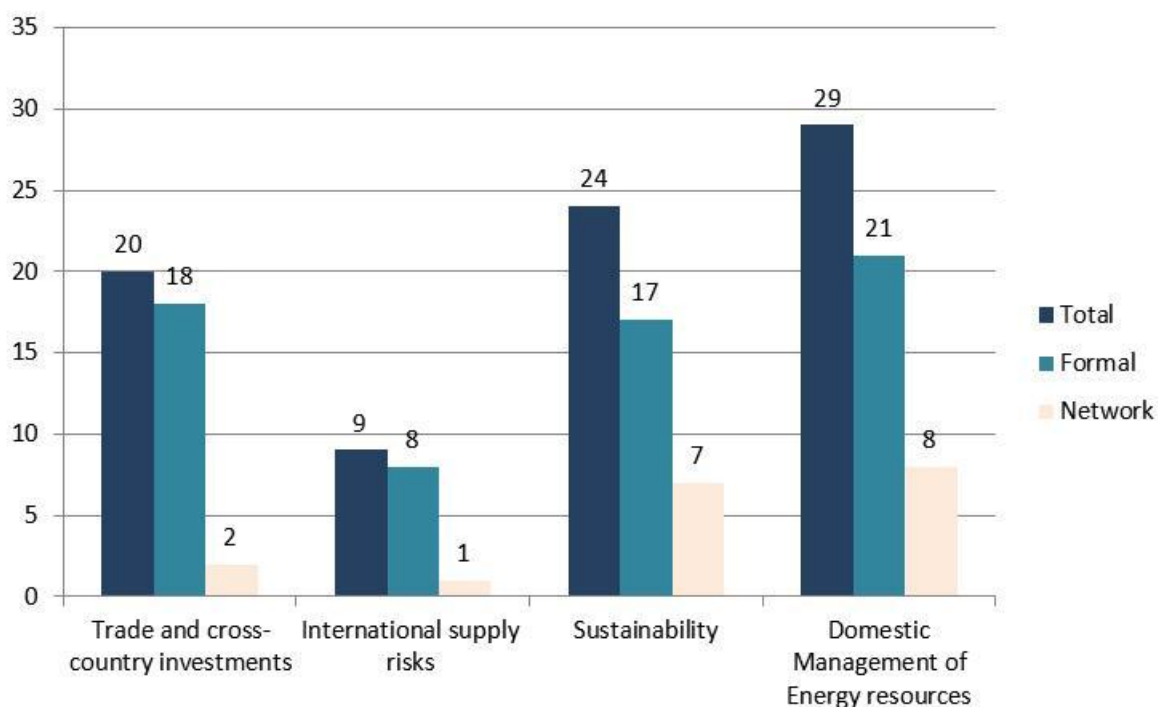
Figure 10: Number of institutions according to issue area as per organization type
Source: Authors' visualization

Looking from the perspective of issue area, figure 10 breaks down whether the organizations are formal or networks. We see that there is a higher concentration of formal organizations vis-à-vis networks. 27.5% of the institutions in Domestic management are networks, while there are 29% networks in sustainability. International supply risks and trade and cross country investments have 11% and 10% respectively. This would suggest that energy issue areas are best dealt with in a formal setting. However, figure 11 helps clarify this picture further.
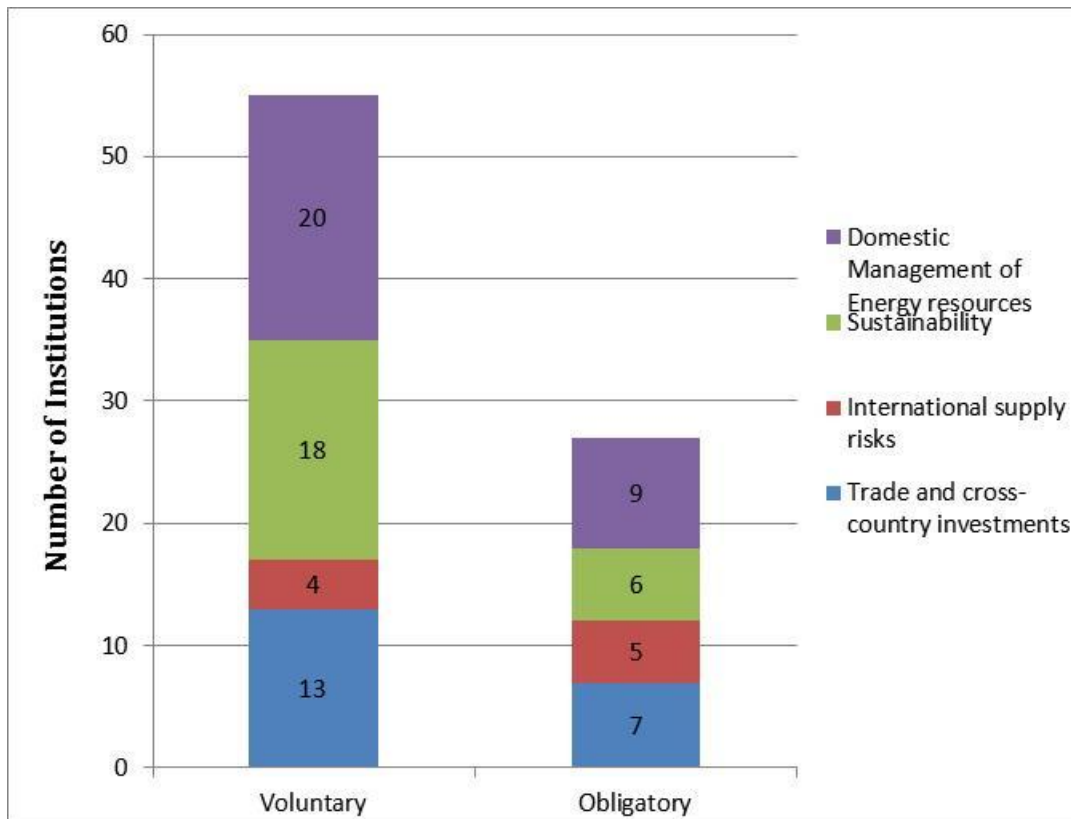
Figure 11: Number of institutions per issue area interacted with organization type
Source: Authors' visualization

Figure 11 shows that while there might be more formal organizations, there are more voluntary organizations than obligatory ones while dealing with specific issue areas. In the above graph 31% of institutions dealing with 'Domestic Management of Energy Resources' are obligatory while 25% in sustainability, 55% in international supply risks and 35% in trade and cross country investments. This changes our analysis in section 2.2.3. This shows, that while 'Domestic Management' may have more number of institutions dealing with the issue, there is a higher percentage of obligatory institutions in 'International Supply Risks' followed by 'Trade and cross country investments'. This suggests that energy security concerns are the foremost of the member nations involved and hence, there are obligatory, formal institutions dealing with it. Similarly, the trade of energy commodities requires some formal, obligatory structure. The nature of both these issues is such that they need to be addressed in a global or large multilateral forum. They require international cooperation.

'Domestic Management of resources' and 'Sustainability' emerge as largely domestic issues. Both are intrinsically linked to a country's growth and development. States are reluctant to give up their rights to make policy in the energy sector. Therefore, while there are a few obligatory organizations in this area, many organizations which give directives on these issues are voluntary. Its regulation and governance primarily takes place at the national level. However, these two issue areas benefit greatly through spread of information and research through the networks.

2.3 Results

Given the mapping in this paper, we can conclude that the global energy governance and its institutions are ready for further case study analysis to determine effectiveness.

Following the mapping exercise the following key points were established:

- Membership: We see that critical members are included in multilateral organizations;
- Size: We see energy institutions of varied sizes, but fewer small multilateral and global institutions;
- The institutions tend to be more diffused addressing three or more issue areas with only a few focused single or double issue institutions;
- There are more formal binding institutions than there are networks, however, there are more voluntary institutions than there are obligatory ones.
- While there are a number of organizations addressing the domestic issues (resource management and sustainability) as compared to international supply risks and supply, the number of obligatory organizations for the latter two issues is greater than that for the former two.
- Within International Supply risk issue area, around 55% of the organizations are binding, showing the importance of energy security concerns. However, because of the small total number of organizations, it also shows that not many nations are in a position to address the problem internationally.
- Sustainability is primarily focused in networks, perhaps because it is a much more research focused area relying on science as a backbone of policy

Part 3: Conclusion

Having looked at the evolution of global energy governance and the current trends in the energy space today, certain limitations in assessing these organizations were faced. While we have mapped the institutions and charted their characteristics, it is difficult to assess and measure the impact of these institutions on regional and domestic policies. Second, the level of autonomy acceded to the institutions is different. The level of independence is also difficult to measure. Third, if the institutions lack an independent bureaucracy, its neutrality from the interests of its member nations is questioned. E.g. if the manpower has allegiance to the state (Ministries of a state's government forming a part of the secretariat), then will they initiate discussions or publish reports which may not be politically or economically beneficial to their governments or states. Fourth, the stated goal of the institution cannot be used as a measure to see how an institution has turned out as the mandates of institutions develop over time. As Paul Pierson (1994) says "the current functioning of an institution cannot be derived from the aspirations of the original designers". Lastly, international organizations but those addressing energy in particular face collective action problems. There is no central coordinating role in global energy governance, no transnational regulation of climate change or fossil fuels markets. Since these issues are closely tied in with the interests of the states, it becomes increasingly difficult to achieve collective action.

This mapping exercise however, helps identify the gaps and instigates further research in the global energy space focusing on individual institutions.

Appendix: List of International Organizations considered in the project

Org	Short Forms
Asian Development Bank	ADB
African Development Bank	AfDB
African Energy Commission	AfREC
African Union	AU
Asia Pacific Economic Cooperation	APEC
Association of South East Asian Nations	ASEAN
Bay of Bengal Initiative for Multisectoral Technical and Economic Cooperation	BIMSTEC
Caribbean Community	CARICOM
Economic Community of West Africa	ECOWAS
Energy Charter Treaty	ECT
Energy Regulators Regional Association	ERRA
Extractive Industries Transparency Initiative	EITI
Group of 20	G20
Group of 8	G8
Indian Ocean Rim Association for Regional Cooperation	IORARC
International Atomic Energy Agency	IAEA
International Energy Agency	IEA
International Energy Forum	IEF
International Partnership for Energy efficiency Cooperation	IPEEC
International Renewable Energy Agency	IRENA
Latin American Energy Organisation	OLADE
Major Economies Forum	MEF
Mercado Común del Sur	MERCOSUR
Organization for Economic Cooperation and Development	OECD
Organization of the Petroleum Exporting Countries	OPEC
Renewable Energy Policy Network for the 21st Century	REN21
Shanghai Cooperation Organisation	SCO
South Asian Association of Regional Cooperation	SAARC
United Nations Framework Convention on Climate Change	UNFCCC
World Bank	WB
World Trade Organisation	WTO

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