KAPSARC Discussion Paper

The KAPSARC Energy Policy Database: Introducing a Quantified Library of China's Energy Policies

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About KAPSARC

The King Abdullah Petroleum Studies and Research Center (KAPSARC) is an independent, non-profit research institution dedicated to researching energy economics, policy, technology, and the environment across all types of energy. KAPSARC's mandate is to advance the understanding of energy challenges and opportunities facing the world today and tomorrow, through unbiased, independent, and high-caliber research for the benefit of society. KAPSARC is located in Riyadh, Saudi Arabia.

Legal notice

Introduction

Government policy is a critical factor in the understanding of energy markets. Governments create constraints and incentives that drive behavior through policy. In turn, these behaviors have fundamental impacts on the functioning of markets. Despite the critical role of policy, it is rarely approached systematically from a research perspective. One of the first and most basic steps in a systematic approach is gaining a precise understanding of what policies exist, their intended outcomes, their geographical extent, duration, and expected evolution. A systematic understanding of policy, with this level of detail, would enable the research community to answer a variety of questions that, for now, are either over-simplified or ignored.

Policy, on its surface, is also a very unstructured and qualitative undertaking. There may be quantitative components, but policies are usually framed in sentences requiring interpretation of their meaning. This makes it difficult to incorporate an understanding of policy into quantitative approaches, other than by making assumptions as to the effect of policy in framing a quantitative model.

The KAPSARC Energy Policy Database (KEPD) is intended to address these two energy policy research limitations. The methodology described in this paper could be applied to any set of energy policies, though this becomes a large task very quickly. KEPD provides a systematic framework that allows the researcher to assemble a very detailed understanding of policies. The content of the policies of most interest, that is the instruments embedded within policy documents that have potential impact, are extracted as individual entries in the database. They are then converted into a structured and consistent form that is amenable to quantitative analytic approaches.

So that we might focus and refine the methodology, we have focused much more narrowly on major laws in recent years, which comprise the national level policies that regulate coal in China. However, KAPSARC is engaged in various efforts to apply this methodology to other energy policy domains. As these efforts mature and progress, we will incorporate them into the KEPD framework. Whether the topic is automotive policy in the United States or the policies that facilitate an energy transition in an individual European country, a quantified library of policies facilitates a more comprehensive study of their causes and effects as well as how they interact with global energy markets.

As an initial geography and topical area to focus on, coal policy in China provides a test case that will challenge the development of the methodology and also provide analytic value as the database is constructed. The sheer size of China's energy market means that even small changes to fuel mix, consumption, or production, can have a substantial global impact. Such shifts are driven not only by the country's macroeconomics, but also by the dynamics of international energy markets. China's government has responded to the country's changing needs and circumstance and in many cases has been the (direct or indirect) driver of these changes (Shen et al., 2012; Li and Wang, 2012). Balancing sustainable economic growth, energy security, and (more recently) environmental concerns, China's policymakers have initiated a number of evolutionary and even revolutionary changes in sectorial regulations that have had far-reaching effects on domestic, regional, and global energy markets.

The history of coal market liberalization in China is a good illustration of this "punctuated equilibrium" approach. Easing controls on coal prices while maintaining the government-set electricity tariffs created a background for price conflicts along the electricity value chain. In 2004, these tensions culminated in power blackouts domestically, amplifying volatility of energy markets internationally. Increased demand for fuel purchased as backup for power generation pushed up the oil demand growth by 5% compared to the previous year (Almeida 2010). In 2007, China further relaxed the coal price regulations abolishing the two-tier price system, in which only the volumes exceeding allocated quotas could be sold at market prices. Chinese coal consumers, having to deal with increased supply and price volatility on the domestic market, took advantage of the imports arbitrage opportunities. As a result, China went from being a net exporter of coal in 2007 (UN Comtrade) to the largest importer of coal in history by 2012 (Quiambao 2013, Koronowski 2013). Yet, these imported volumes represented less than ten percent of China's total coal consumption that year (CEIC 2014).

The role of policy in directing the country's energy trajectory and its effect on global markets has inspired a number of studies and reviews on governance of the energy sector in China. Nonetheless, such studies have usually been narrow in focus, directed towards specific questions. They provide the researcher, at best, with limited and loosely structured data for analysis of specific Chinese energy policy initiatives.

The ability to quickly summarize and digest energy policies enables a fuller appreciation by policymakers of how Chinese government action impacts domestic and global energy markets. Recognizing the value of such a capability, KAPSARC has adopted a systematic approach to creating a quantitative scheme for characterizing energy policies, and has applied this as a first step to coal policy in China. The result is a dataset that deconstructs laws and other policy documents, and describes the particular policy instruments embedded within documents. For example, a law may comprise hundreds of pages of text, but within the many pages of text are a number of specific policy measures that articulate policy instruments. Our approach to characterizing these documents results in a quantitative library of the specific policy measures contained with a set of legal documents, so that one may quickly understand the variety of instruments a policy document sets into place. Similar approaches have been used to categorize and analyze various types of regulations in a number of jurisdictions, but have not been widely utilized in energy policy research, particularly in application to China's energy policies.

Existing energy policy databases are generally focused on a specific field such as energy intensity, renewable energy or climate change policies. Examples include projects undertaken by the International Energy Agency: the Global Renewable Energy Policies and Measures Database, the Energy Efficiency Database, and Addressing Climate Change Database (IEA 2014). Geographically, most studies are focused on the OECD, while only occasional research efforts target China.

From a methodological standpoint, the majority of existing energy database projects treat an individual policy document (e.g. an entire law) as the unit of observation or as a single database entry. Our approach breaks down documents into a number of different observations to capture distinct policy instruments that are embedded throughout a single document. For example, the section on China in the IEA/IRENA Global Renewable Energy Policies and Measures Database includes 54 policy documents classified only by policy types and policy targets

(IEA 2014). This "one document – one entry" approach complicates analysis of specific policy initiatives as a particular policy document can contain a number of distinctive policy targets or indicators. Consider the example of the Coal Industry Law of the People's Republic of China: it covers a broad range of topics, including (but not limited to) licensing, industry structure, safety measures, export regulations, etc. Other documents, such as the Five Year Energy Development Plan, further exacerbate this problem by covering various energy sectors and adjacent policy disciplines. Squeezing such overarching documents into a single database entry would result in omitting important details on actual policy initiatives.

Other projects have adopted a different approach. Their databases have been constructed around specific policy indicators and grouped by categories, as is the case with the OECD Database on Instruments Used for Environmental Policy and Natural Resources (OECD 2014). While this method reveals the detail and range of policy initiatives, the absence of any link to the parent document limits policy applications such as policy evolution or stakeholder analysis.

We intend to address these gaps in focus and structure through the KAPSARC Energy Policy Database (KEPD), which is being created as an open source policy database available to anyone interested in China's energy economy. The KEPD is designed to make this data more accessible and to enable all interested parties to analyze the policies directly, without relying on secondary studies and literature reviews. Structured on policy documents and disaggregated by specific policy initiatives, it is intended to become a benchmark reference tool for those who want to understand the policy status quo, the overall route the government has taken to arrive at this status quo, and the evolution of individual laws and policies from draft through enactment to revision and, ultimately, retirement.

This paper is presented as an introduction to KEPD. We outline the scope of the project, our strategic vision, and our current progress at a macroscopic level. We then discuss how the database is constructed, placing our innovations in their proper context given other existing policy databases. We showcase examples of potential applications of the database to drive analysis and produce results in the future. Finally, we describe challenges that the KEPD and similar projects may face. The insights may be relevant to anyone wishing to construct similar databases in the future.

Scope of the KEPD

The project aims to produce a searchable database covering all Chinese laws, policies, guidelines and regulations that affect the energy sector, across all fuel types and throughout the value chain. The database will contain all document versions available: initial drafts, enacted versions, and later revisions An important motivation for the KEPD project is to improve the understanding of how policies change in the drafting process and how changing priorities are reflected in updated policies. The database will cover Policy Documents issued by both central and provincial governments. Provincial governments often enact their own versions of centrally promulgated legislation, which comply with the originals to varying degrees. Beyond the formal Policy Documents, much important information regarding guidelines, non-binding targets or future government objectives, is channeled through press releases. The intent is that the database will also include these in due course.

Identifying relevant Policy Documents to be included in the KEPD can be subjective given that energy sector policy has fuzzy boundaries: it affects and is affected by a whole range of competing policy agendas. Environmental, economic, social, diplomatic, and health policies all interact with the

energy sector. This list is not exhaustive, but it illustrates that to provide a comprehensive listing, the KEPD will include entries drawn from many policy spheres.

The database will be made available through an on-line portal at http://kepd.kapsarc.org The data will be available as an Excel spreadsheet right away and soon placed into a Sharepoint portal. This will allow the user to search for specific Policy Documents and Policy Indicators, download selected data, and utilize visual analysis tools to extract insight. In the near term, KAPSARC is developing a dynamic web page that will allow the user to engage with the data in a much more interactive way.

Although the database will be written in English, all entries will be tied back to the original Chinese policy text and linked to the downloadable Policy Documents. Consequently, alongside the formal KEPD, KAPSARC will be releasing its own translations of many of China's energy policies in a systematic database. Currently, not all relevant government publications are translated and of those that are, official English versions do not always reflect the nuances of the Chinese original. As an aid to researchers looking at China's energy policy, our database of translated source documents will also be freely available.

To refine our methodology, streamline the process of data collection and produce a useful database subset, our initial scope covers the time period from 2005 (the year when the 11th Five Year Plan was initiated) until the end of 2013. If a legislative act had been passed and amended before 2005, we included the version which was effective at the beginning of 2005.

Accounting for 67% of China's total energy supply (NBS 2013), the coal sector is an obvious starting point in any analysis of Chinese energy. The initial scope therefore addresses the coal energy segment and related coal transformation and downstream industries, coding the major national laws and strategic plans e.g. the 11th and 12th Five Year Plans. The documents contained in the database are either specifically devoted to the coal sector, including its production, transformation and consumption segments (such as the Coal Law and its revised versions or the Electric Power Law), or affect the coal industry (such as the Environmental Protection Plans or the National Plan for Energy Conservation). A detailed list of the laws and plans included in this initial phase of the database is contained in Appendix 1, along with an indication of those which have already been entered.

The first on-line release includes the major laws database subset downloadable as an Excel file and through a Sharepoint portal at http://kepd.kapsarc.org. The expanded version containing strategic plans will be released during 2015.

In order to maintain systematic progress and to ensure that the KEPD has a real world use at all times, future work will continue in a phased rollout. Once the major national laws and strategic plans have been coded for the coal sector, we will then repeat the process for the other fuel types e.g. oil, gas, nuclear and renewables. Upon completion of this basic data set for each fuel type, we will then expand each fuel though the inclusion of a wider set of Policy Documents. In the final phases, we will widen the timeframe of the database. It is envisioned that this process will take some time to complete.

Methodology and structure

In contrast to most existing energy database projects, we construct the KEPD by disaggregating Policy Documents into a series of Policy Indicators. Each Policy Indicator is recorded into the database as a single entry. In this way, individual Policy

Documents are summarized more comprehensively through a series of Policy Indicators. As reflected in the process flow diagram in Figure 1, initially a law or other type of policy is identified for inclusion in the database. The entire legal document is called a Policy Document. The Chinese language version of the document is then translated into English, so that a consistent set of English translations of Policy Documents will be available. A team of coders then examine the Policy Document and decompose it into the distinct policy instruments, which we call Policy Indicators. Each Policy Indicator is then further decomposed into a set of attributes that are both qualitative and quantitative. For example, sometimes Policy Indicators are further refined using a Policy Indicator Subclass, but this is not always required. With this systematic, comprehensive, and detailed approach to quantifying

the content in policy, the prevalence of Policy Indicators in different Policy Documents can be easily tracked. As part of the coding process, Policy Indicators are clustered within designated Focus Areas that group similar topical areas together so that the user may examine clusters of them around more general energy policy issues.

A second extension of previous work found in our approach is an increase in the number of attributes characterizing the database entries. Currently, we are coding for twenty-three attributes, but as our work progresses this number will likely increase. In common with most other policy databases, coded attributes include details such as a document identification number, the issuing authority (e.g. the National People's Congress), publication and enforcement dates, the source / hyperlink and the
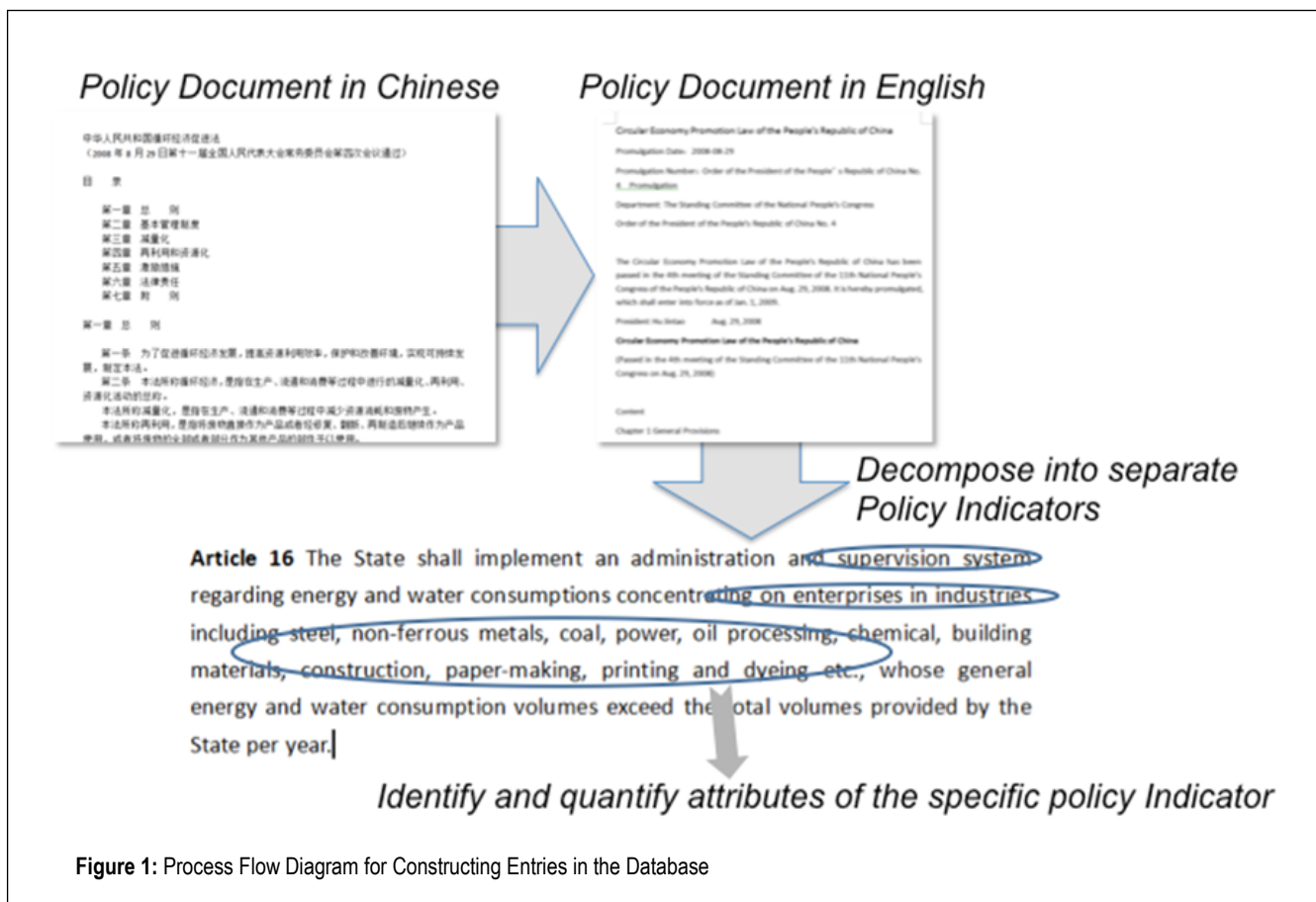

Figure 1: Process Flow Diagram for Constructing Entries in the Database

document type e.g. a law, plan, provision or statement. Beyond these basic indicators, we have included a range of attributes to allow for more useful and meaningful searches and analyses. A list of attributes and their description can be found in Appendix 2.
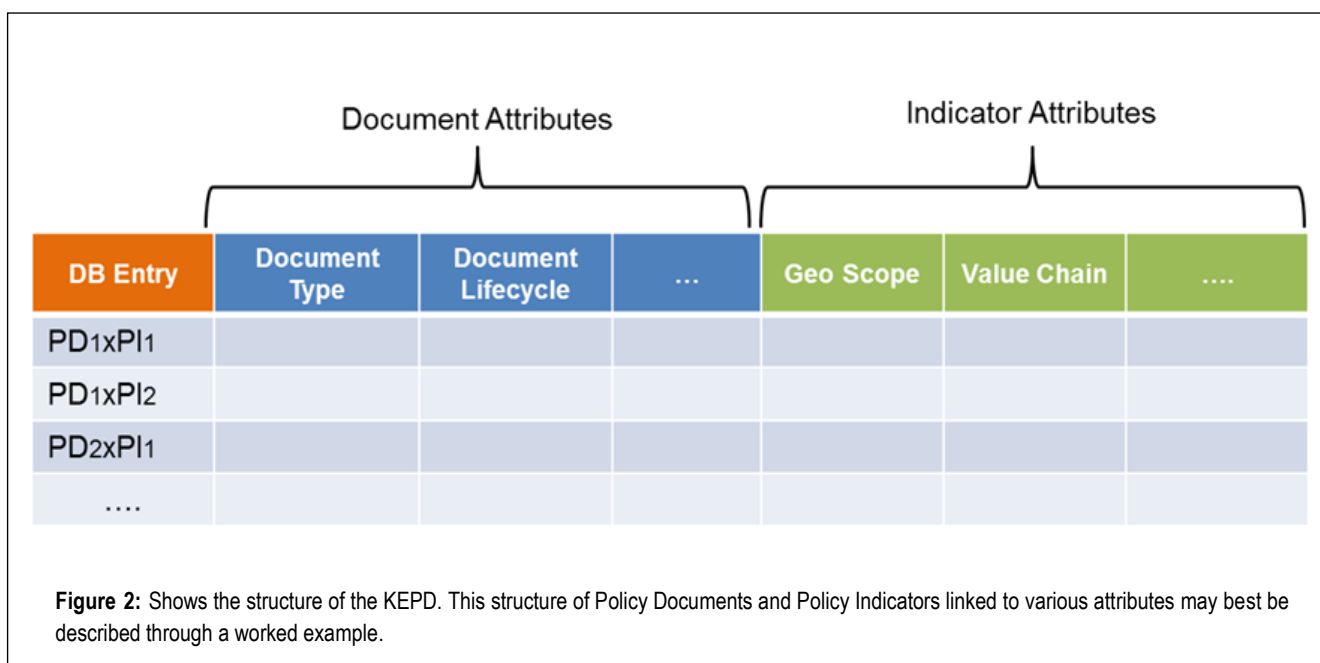
A third extension found in the KEPD is the range and specificity of Policy Indicators that can be included. Policy Indicators can be quantitative (with an exact, measurable and time specified target where applicable), quantifiable (measurable trends such as increase or decrease), or qualitative (entirely descriptive). Such approach enables compiling different types of Policy Indicators (targets, initiatives, specific measures and general industry regulations) into a single database.

Central to the coal industry in China, the Coal Industry Law exists in three versions: it was first promulgated in 1996, with amendments passed in 2011 and 2013. All three versions are contained within the database, each as separate Policy Documents. Looking just at the original (included within the database as the version active on January

1, 2005), the Policy Document appears in the database as 128 separate entries. Each entry for this Policy Document is given the same information for Issuing authority (Standing Committee of the National People's Congress), Publication date (29.08.1996), Enactment date (01.12.1996), Document type (Law), and Relevance Score (1) as they relate back to the same document.

Each of these 128 entries is an individual phrase or excerpt defined by its Policy Indicators. In the case of the Coal Law, there are 66 different Policy Indicators. These include "mining method", "quality control", and "safety requirements", etc. As an aid to navigation, Policy Indicators are aggregated into broader Focus Areas e.g. "resources", "industry development" and "investment" among others.

Let us continue with an example of a specific Policy Indicator within the Coal Industry Law Policy Document. Based on the excerpt from the text of the document ("the State shall encourage coal mining enterprises to carry out secondary mining or extract residual coal"), we created a Policy Indicator "comprehensive utilization" under the "resources"

	Document Attributes			Indicator Attributes		
DB Entry	**Document Type**	**Document Lifecycle**	**...**	**Geo Scope**	**Value Chain**	**....**
PD₁xPI₁						
PD₁xPI₂						
PD₂xPI₁						
....						

Figure 2: Shows the structure of the KEPD. This structure of Policy Documents and Policy Indicators linked to various attributes may best be described through a worked example.

Focus Area umbrella and assigned it a Policy Indicator Subclass "residual mining".

The entry (Policy Indicator) is also described using a number of attributes. Our example would be classified as "binding" (as opposed to "non-binding"), "active" (as opposed to "draft", "revised" or "retired") and "qualitative" (as opposed to "quantitative" or "quantifiable"). Following this, the geographical scope (in this case - national), the types of coal (all types), and the sections of the value chain affected (mining) are all detailed. The entry's policy subjects are marked as "governing bodies" and "coal mining enterprises".

To enable easy searches and quantitative analyses, except in the case of text entries, most details are encoded through binary switches. An excerpt from the KEPD is provided in Appendix 3.

Applications for policy research

The structure of the database, specifically its use of Policy Indicators and binary switches to encode a wide range of information about each individual policy contained within a single Policy Document, enables a variety of analyses.

In future, it will be possible to look at how provinces have acted on national legislation when the database contains provincial legislation. Moving beyond a focus on coal and expanding the timeframe will allow inter-fuel comparisons and studies of how exogenous factors may be driving policy formation. Nonetheless, even with the KEPD in its current limited form, we can gain insights from the structure of Policy Documents and evolution of policies.

Structural analysis

The KEPD allows a two-directional structural analysis: decomposition of a Policy Document by Focus Areas or Policy Indicators, and distribution of Policy Indicators or Focus Areas across various Policy Documents.

Addressing examples of such interactions in more detail, Figure 3 shows the semantic composition (specific policy Focus Areas related to the coal energy sector) of the two environmental laws: the Water Pollution Prevention and Control Law and the Law on the Prevention and Control of Atmospheric Pollution.

The Law on the Prevention and Control of Atmospheric Pollution exemplifies a more

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Water Pollution Prevention and Control Law (1996)	Law on the Prevention and Control of Atmospheric Pollution (2000)
•Environmental protection •Technology •Legal liabilities	•Environmental protection •Fuel mix •Industry concentration •Management and operations •Product •Technology •Legal liabilities

Figure 3: Example of Structural Comparison of Policy Documents

comprehensive policy approach (at least in regards to the coal industry regulations): besides the standard Focus Areas typical for environmental legislation – "environmental protection", "technology", and "legal liabilities", it encompasses such policy dimensions as "fuel mix", "industry concentration", "product" and "management and operations".

There are several possibilities for these distinctions: evolution of Chinese environmental policymaking towards a more comprehensive approach (the Water Pollution Prevention and Control Law was adopted earlier); higher priority of atmospheric pollution problem perceived by the country's policymakers; more significant "contribution" of the coal sector to the air pollution rather than the water pollution agenda. This case illustrates applicability of the structured database method to identifying policy patterns and developing hypotheses.

The Policy Document / Focus Area nexus can be examined from the opposite perspective: proliferation of specific Focus Areas across a range of Policy Documents. Figure 4 illustrates a simple application of this approach.

Reframing the Policy Documents / Focus Areas matrix from the Focus Area's perspective helps detect top policy priorities addressed by the PRC at the highest legislative level during a specific time period and, more generally, identify key stakeholders and governing bodies that are responsible for regulations of particular industry aspects. For example, technology-related policies can be found in ten different normative documents ranging from industry-specific legislation to environmental protection acts. On the other hand, such seemingly important spheres as coal exports or the industry investment policies are being addressed in a very few laws. That may indicate that these Focus Areas are regulated on the ministerial (departmental) level and are not taken to the top legislative stage – the Standing Committee of the National People's Congress.

The evolution of policies

Besides providing a snapshot of the current energy policies in China, the KEPD will allow researchers and analysts to track how specific Policy Documents or initiatives evolve over time.

The Cleaner Production Promotion law is one of several acts that already appear in the database in
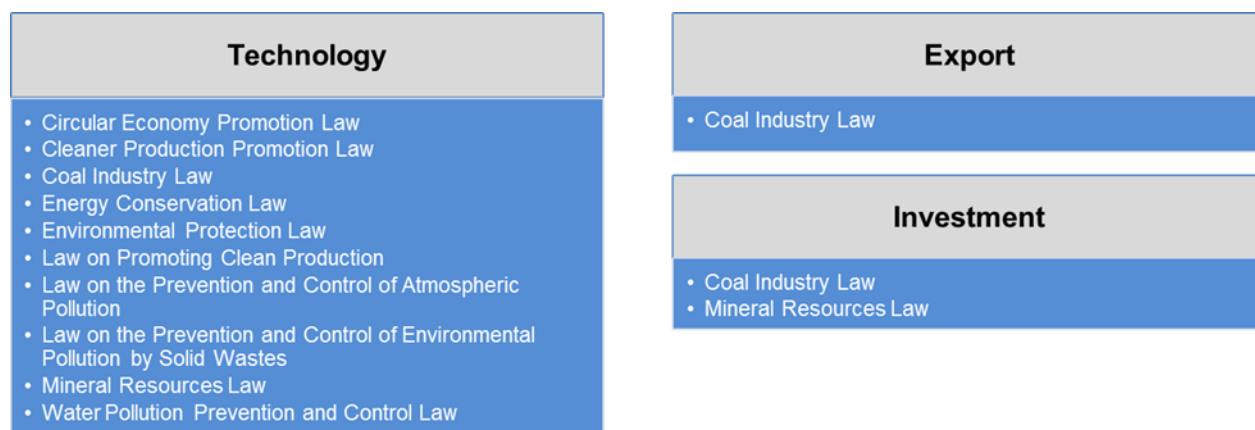
Technology

- Circular Economy Promotion Law
- Cleaner Production Promotion Law
- Coal Industry Law
- Energy Conservation Law
- Environmental Protection Law
- Law on Promoting Clean Production
- Law on the Prevention and Control of Atmospheric Pollution
- Law on the Prevention and Control of Environmental Pollution by Solid Wastes
- Mineral Resources Law
- Water Pollution Prevention and Control Law

Export

- Coal Industry Law

Investment

- Coal Industry Law
- Mineral Resources Law

Figure 4: Example of Policy Documents (in blue) that align within Focus Areas (in grey)

multiple versions. Both its 2002 original and the 2012 amendment are fully coded. The law's intent was to reduce waste and inefficiency in the use of resources across the value chain. There was a goal of "comprehensive resource utilization", with better cooperation between enterprises and the adoption of techniques that raised efficiency and reduced pollution. These goals remained the same in the 2012 revision, but as had become clear, the law had not succeeded in its aim of controlling pollution. Energy and resource efficiency had improved, but overall use was still growing rapidly and pollution levels were becoming more problematic. The new version contained amendments that demanded more detailed monitoring of resource consumption and waste generation as well as specifying financial penalties for companies that failed to do so.

The database allows a researcher to understand how an individual Policy Document has changed through time, in this example becoming more detailed and stipulating penalties for defaulters. It allows analysis at two levels. First, the structure of documents (the Focus Areas and Policy Indicators within each Policy Document) can be compared for a quick, overall view. Second, the text and attributes of the individual entries can be compared for a more detailed understanding.

Disaggregation of Policy Documents in the Focus Area and Policy Indicator formats also allows tracking of how specific policy initiatives evolved over time. Consider an example of the "technology restrictions" Focus Area. If we look at the major coal related laws that were active at the start of 2005, we can quickly identify technologies that had the most restrictions imposed: coal-heating boilers, indigenous coke production technologies and more general categories including polluting, outdated, and energy intensive technologies. Since 2005, coal-fired power generation made it on to the "black list" and further restrictions (imports and manufacturing ban on top of previously prohibited installation)

were placed on coal-fired boilers. These initiatives exemplify the strict measures put in place by the government in response to environmental challenges. The Policy Document / Policy Indicator structure of KEPD facilitates tracing these changes to particular policy actions. In this case, tracing changes in the Energy Conservation Law of 2007 and Circular Economy Promotion Law of 2008 respectively.

Examples of KEPD applications

As the project evolves to encompass more energy Policy Documents of various properties, the scope of potential policy research questions that can be addressed using this tool will also expand to include the following spheres:

Quantitative analysis: The database enables the analyst to evaluate Policy Indicators of a qualitative nature, including those describing a desired policy state or direction without providing numeric values. Examples include entries such as: "The State shall protect the facilities of coal mining enterprises" or "Unified control shall be maintained over export of coal". The numbers of database entries relevant to specific Policy Indicators during any given time period can help uncover policy priorities and their shifts over time. Also, the number of database entries per any given policy attribute, such as various segments of the industry value chain or types of fuel, can reveal additional dimensions of energy policy priorities or efficacy of policies.

Quantifiable indicators can be utilized in tracking and measuring the progress of certain policy initiatives. Quantitative Policy Indicator's, on the other hand, unleash a whole new dimension of policy research: quantitative, statistical analysis that examines the causal relationship (in either direction) between policy and observable phenomena. What are the drivers of policy change, and what are the impacts of policy over time?

Stakeholder analysis: Major laws regulating the energy industry in China are released at the national level with oversight by the State Council, along with party and government authorities. A number of governing bodies (the National Energy Administration [NEA], the National Development and Reform Commission [NDRC], and to a lesser extent the National Energy Commission [NEC]) also issue energy-related regulations. The database aids tracing the effects of various stakeholders on the evolution of a particular policy. It also allows the researcher to address a number of other questions, such as: Are there any internal policy conflicts manifesting themselves in contradicting Policy Indicators or in enforcement of a particular Policy Indicators by different governing bodies? Which authorities are de facto responsible for specific policy initiatives and does this picture match official governance structure or perceived power balances?

Policy interventions vs. exogenous factors: Given a large enough sample of the KEPD entries related to a specific Policy Indicator or Focus Area, we can explore interdependencies of Policy Indicators and their attributes with a number of exogenous datasets using statistical tools. One potential example could be price interventions by the Chinese government in the coal market and their correlation with prices of imported or domestically produced coal, electricity price index, stock levels, and other factors.

Policy forecast: Analysis of the policy evolution processes, the role of various stakeholders and exogenous factors performed on expanded dataset of Policy Documents, can help identify patterns providing insights into policy formation or facilitate scenario analysis of Chinese energy sector and its global impact.

Policy homogeneity: A number of researchers explore the issue of policy implementation in China's energy sector (Lieberthal & Oksenberg 1988; Kostka & Hobbs 2011). One of the main problems in implementing the centrally approved framework manifests itself in delays or distortions occurring on the provincial and municipal levels in the process of developing specific policy measures. It can be helpful to compare attributes of Policy Indicators introduced by the central, provincial, and municipal authorities, and identifying time periods required to develop corresponding Policy Documents on various levels of hierarchy. This provides insight into whether coordination of policymaking authorities in China has improved over time.

Another source of legislative heterogeneity arises from differences in structures of provincial energy (and coal) balances. Given significant contributions of the coal industry to provincial GDP and employment, net coal exporting provinces have different incentives and policy priorities than net coal importers.

Geospatial analysis: With the exception of a small number of Policy Indicators targeting China's autonomous regions, the geographical scope of the most major coal-related policies can be classified as "national". Expanding the dataset by including provincial and regional specific indicators and quantitative targets will allow representation of China's energy policies in geospatial format and framing policy analysis from a geographical perspective.

Challenges and mitigation strategies

In addition to obvious language / translation issues, we have identified three "strategic" challenges facing the KEPD project, which are relevant for all policy database projects: *replicability*, *completeness, sustainability,* and *releasability*.

Replicability

The replicability problem has two major aspects: developing a database structure which would allow seamless expansion and compatibility of various types of energy Policy Documents, and eliminating or at least reducing the effects of human error on the database development process.

In completing the first stage of the KEPD project, we have detected two key factors that help ensure replicability:

– Transparent coding methodology (transformation of Policy Documents' content into database entries)

– Basic knowledge of relevant industry and legislation, which has to be developed by every project participant including coders

Therefore, measures addressing the replicability problem are not limited to developing a clear coding manual (which is necessary), but may also include the introduction of a structured training curriculum for potential project participants.

In addition to clearly defined structure, methodology, and training process, one of the options to mitigate replicability problem is to develop automated text analysis tools. These tools can help identify relevant Policy Documents, perform text analysis, and identify the key topics (which can be set up as Focus Areas or Policy Indicators). These techniques cannot yet provide a complete substitute for human expertise, but they can facilitate the database expansion process and serve as an additional control mechanism.

Completeness

The conclusions one may infer from the database are only as general as the Policy Documents included. At present, the KEPD is a proof of concept for a set of major laws for coal at the national level in China for a particular period of time, Consequently, it is difficult to make general statements about Chinese energy policy, or even coal policy, with the current coverage of Policy Documents. However, with time this will become a more complete database that can support more general statements.

The question of the completeness of the database (how comprehensive is the scope of its coverage) is an issue that will be addressed over time, as more Policy Documents are added to the database. As China continues to revise and adopt new policies, this becomes a never-ending task. Nevertheless, the completeness of the database is an important consideration in making generalizations about Chinese energy policy.

Sustainability

The sustainability issue arises from the necessity to keep up with the legislation updates. In recent years, there have been significant shifts in regulations and development of China's energy markets. The pace of policy evolution is unlikely to slow in the near term. If the ambition of the KEPD project goes beyond providing data input for a limited number of research questions, it will be essential to ensure the database remains up to date.

Keeping up with new legal and policy updates becomes much more problematic as the number of Policy Documents expands. The problem can be eased by establishing a set of data sources for Policy Documents and types of documents to be included in the database expansion. However, at a certain point, the volume of related work is likely to make internal organizational capabilities insufficient and the project will require external contribution/ collaborations. KAPSARC is designing projects with universities to engage students specializing in law, energy, or policy analysis, to address this need.

Guided by clear instructions, students can provide significant input to the development of the database, at the same time gaining practical experience in data management and policy analysis.

Releasability

Finally, the releasability problem refers to two major aspects:

– The sets of the data that can be released due to copyright issues

– Strategies to make the released "product" more appealing and accessible to users

Regarding the first issue, the only current constraint is copyright protection of existing English translations of Chinese energy Policy Documents performed by third parties. All the other database attributes, which have been developed and populated internally, including publicly available original versions of China's regulations and policy actions, can be released without legal consequences.

To increase engagement of intended users, the KEPD will not be limited to just a raw database in a table format. At a minimum, a user-friendly "package" would include an interactive web interface for data processing and a visualization toolkit for online visitors, as well as a detailed user guide describing available tools and project methodology.

Next steps

The usability and broad range of research implications call for continued expansion of the existing database to embrace Policy Documents related to other energy subsectors, specific energy policy focus areas, and provincial level regulations with the ultimate goal to release a comprehensive China Energy Policy Database.

KEPD showcases several advantages over existing datasets and some more traditional, purely qualitative, work that has been published to date. Our objective with the KEPD is:

– Creation of a comprehensive and easy to use reference base for China's energy policies that will fill existing data gaps.

– Introduction of a policy database methodology that can be utilized across various energy sectors and geographies.

– Development of a systematic policy analysis tool that includes a number of visualization and organizational options to support analysis.

The KEPD project provides a potential platform for energy policy discussions and collaboration. We encourage interested parties to get in touch with KAPSARC with suggestions or comments that can help drive the development of a database that we hope will become the benchmark tool in China's energy policy analysis.

> **We encourage interested parties to get in touch with KAPSARC with suggestions or comments that can help drive the development of the database. You can access the KEPD at http://kepd.kapsarc.org**
>
> **Please send your feedback, comments and suggestions to: philipp.galkin@kapsarc.org**

Appendix 1: Policy Documents included in initial phase

	Major Coal-related Regulations and Plans of the PRC	Enforcement Year		
		Original	Amendments	Entered
1	Coal Industry Law of the People's Republic of China	1996	2011, 2013	Yes
2	Circular Economy Promotion Law of the People's Republic of China	2008		Yes
3	Electric Power Law of the People's Republic of China	1995	2009	Yes
4	Mineral Resources Law of the People's Republic of China	1986*	1996, 2009	Yes
5	Land Administration Law of the People's Republic of China	1986*	1988*, 2004	Yes
6	Cleaner Production Promotion Law of the People's Republic of China	2002	2012	Yes
7	Price Law of the People's Republic of China	1997		Yes
8	Enterprise Income Tax Law of the People's Republic of China	2007		Yes
9	Law of the People's Republic of China on the State-Owned Assets of Enterprises	2008		Yes
10	Mine Safety Law of the People's Republic Of China	1993	2009	Yes
11	Anti-Monopoly Law of the People's Republic Of China	2007		Yes
12	Energy Conservation Law of the People's Republic of China	1997	2007	Yes
13	Law of the People's Republic of China on Appraising of Environment Impacts	2002		Yes
14	Environmental Protection Law of the People's Republic of China	1989	2007	Yes
15	Forestry Law of the People's Republic of China	1979*	1984*, 1998	Yes
16	Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution	1995*	2000	Yes
17	Water Pollution Prevention and Control Law of the People's Republic of China	1984*	1996, 2008	Yes
18	Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste	1995*	2004	Yes
19	Water and Soil Conservation Law of the People's Republic of China	1991	2010	Yes
20	11th Five Year Plan	2006		Yes
21	Proposal of the Central Committee of CPC on Formulating the 11th Five Year Plan for National Economic and Social Development	2005		Yes
22	Comprehensive Work Plan for Energy Conservation and Emission Reduction - 11th Five Year Plan	2007		

23	Energy Development Plan - 11th Five Year Plan	2007		Yes
24	Coal Industry Development Plan - 11th Five Year Plan	2007		
25	Acid rain and SO2 Control – 11th Five Year Plan	2008		
26	Environmental Protection Plan - 11th Five Year Plan	2007		Yes
27	12th Five Year Plan	2011		Yes
28	Proposal of the Central Committee of CPC on Formulating the 12th Five Year Plan for National Economic and Social Development	2010		Yes
29	Comprehensive Work Plan for Energy Conservation and Emission Reduction - 12th Five Year Plan	2011		
30	Energy Development Plan - 12th Five Year Plan	2013		Yes
31	Coal Industry Development Plan - 12th Five Year Plan	2012		
32	Clean Coal Technology Development Plan - 12th Five Year Plan	2012		
33	Air Pollution Prevention and Control - 12th Five Year Plan (key areas)	2012		
34	Environmental Protection Plan - 12th Five Year Plan	2011		Yes
35	Water Pollution Prevention Plan 2011-2015 (key areas)	2012		
36	National Climate Change Plan	2007		
37	National Medium and Long - term Science and Technology Development Plan	2006		
38	National Medium and Long - term Specific Plan for Energy Conservation	2004		

* Versions of laws that were superseded by revisions before 2005 have not been included. Only versions in force on or after January 1, 2005 are included in the current phase of the database.

Appendix 2: Attributed included in the KEPD

Document Name

The official name of the Policy Document (be it a law, plan, policy, statute, regulation etc.).

Issued by

The issuing authority e.g. Standing Committee of the National People's Congress.

Document ID

This is an internal reference number, giving each Policy Document a unique number.

Publication Date

The date the draft of the Policy Document being coded was published.

Reference / Enforcement Date

The date the draft of the Policy Document being coded was enacted and came into force.

Source

If the information has been culled from a third party database, the details are entered here.

Hyperlink

A link to any websites containing the Policy Document.

Document Type

The Policy Document can be classified as a Law, Plan, Regulation, Notice, Press Release, etc.

Relevance Score

What is the main focus of the Policy Document?

– 1 signifies a sector specific focus (currently this would denote a narrow focus on coal)

– 2 signifies Policy Documents dealing with the energy sector more broadly

– 3 is used for Policy Documents that affect energy tangentially (such as an Environmental Protection law).

Policy Indicator

This is a specific target or policy initiative. Along with the Policy Document it defines the Database entry: single Policy Document can have many different Policy Indicators. The Policy Indicator list is flexible, but to ensure usability it is better if entries are tied to existing Policy Indicators before new ones are added. Where the policy is even narrower than the Policy Indicator level allows, a further subdivision can be entered here. Each database entry can be defined by a unique combination of Policy Document + Policy Indicator (+ subdivision).

Focus Area

To facilitate navigation and analysis, Policy Indicators are grouped according to theme. This enables more broad brush interrogations of the data which do not require the full level of detail. These themes are called Focus Areas. The list is not fixed but is not completely fluid. As new Policy Documents are entered, new Focus Areas may be defined, but in large we expect the current list to be sufficient.

Governance

Is the policy binding or non-binding? Most Policy Indicators included in laws are, of course, binding, but some government guidelines need not be. An example could lie in country-level coal consumption targets that currently represent the State's ambition rather than strictly imposed targets.

Policy Lifecycle

Intention, draft, activation, revision, retirement: at what stage is the entry? This will change for individual Policy Indicator entries in the same Policy Document. A revised Policy Document may contain Policy Indicators that are new, that are the same as in previous versions, that are amended from previous versions or that are retired.

Policy Indicator Type

What does the policy actually say? Policy Indicators can be quantitative, quantifiable or qualitative as discussed in the main body of the text.

- Quantitative: value
- Quantifiable: direction
- Qualitative: description

The details are stored in one of three cells, depending upon their type (quantitative, quantifiable or qualitative). Splitting them in this way makes data searches and analyses more straightforward.

Geographic Scope

A series of cells allow the geographic scope to be defined. All cells are completed with either a 1 (indicating that the cell is true) or 0 (false).

The first level is:

- National
- Multi-provincial
- Provincial
- Multi-municipal
- Municipal

Beyond this, the actual provinces covered are then specified in the same way (there are 31 cells, one for each of the 31 provinces on the mainland).

Hong Kong, Macau and Taiwan are all excluded from the study.

Fuel Type

In the current phase of the database, everything pertains to coal. As other fuels are added in later phases, we will specify the fuel type. In addition to this we specify the sub-classes of each fuel covered by the Policy Indicator.

In the current phase, coal can be defined as:

- Lignite
- Sub-bituminous
- Bituminous: Thermal
- Bituminous: Coking
- Anthracite

Value Chain

Which segments of the value chain does the entry's Policy Indicator cover? Again the current phase only has options for coal; these options will be broadened and expanded as necessary as we include other fuel types.

For now, upstream, midstream and downstream can be defined as follows:

Upstream
- Exploration
- Mining

Midstream
- Transportation
- Transformation (coke, gas, liquids)

Downstream
- Downstream: electricity
- Downstream: industry

– Residential Consumption

– Trading and Management

Policy Subjects

What actors in the energy sector are affected by the coded policy?

– Governing bodies: Entities within the governance structure, local or central authorities

– Enterprises: Companies or other commercial actors within the energy sector

– Unions and associations: The All-China Federation of Trade Unions and any industrial or trade association (e.g. CREIA: Chinese Renewable Energy Industries Association), unions of enterprises

– Individuals: Employees, individual actors within the sector or households affected downstream

As an example, the phrase "we need to control pollution in the steel industry" would cover governing bodies (the "we") and enterprises (the "steel industry").

Policy Strength Score

This is set to zero if the Policy Indicator is not binding. If it is binding, it is determined by geographic scope.

– National = 5

– Multi-provincial = 4

– Provincial = 3

– Multi-municipal = 2

– Municipal = 1

Notes

Anything that is not covered elsewhere and would add clarity.

Text

The actual text (in English and Chinese) that has been coded in the entry is included.

Appendix 3: Excerpt from KAPSARC Energy Policy Database

References

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Notes

Notes

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About KEPD

The KAPSARC Energy Policy Database (KEPD) is an open source policy database available to anyone interested in China's energy economy. It is intended to enable the researcher to quickly identify, summarize, and digest policy documents and specific policy measures. The KEPD captures a wide range of information about each individual policy contained within a single policy document enabling a variety of analyses. The database will be made available through an on-line portal at http://kepd.kapsarc.org

KAPSARC Discussion Paper