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Energy Investment Risk Assessment for Nations along China's Belt & Road Initiative: A Deep Learning Method

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Abstract: In 2013, China proposed the “Belt & Road Initiative” which aims to invest the “Belt & Road” countries so as to help them develop their infrastructure and economy. China consumes the largest part of fossil energy of the whole world, so it is China’s priority to consider its energy supplying security. Therefore, it becomes urgent for China to invest the “Belt & Road” countries’ energy facilities. There comes a question: how to evaluate the overseas energy investment risk? To answer this question, this paper proposes a deep learning method to assess such risk of the 50 “Belt & Road” countries. Specifically, this paper first proposes an indicator system in which 6 main factors are separated into 36 sub-factors. This paper makes use of hierarchical convolution neural networks (CNN) to encode the historical statistics. The hierarchical structure could help CNN handle the long historical statistics more effectively and efficiently. Afterward, this paper leverages the self-attention layer to calculate the weights of each sub-factor. It could be observed that the resource potential is the most important indicator, while “years of China’s diplomatic relations” is the most important sub-indicator. Finally, we use a conditional random field (CRF) layer and softmax layer to compute the assessment scores of each country. Based on the experimental results, this paper suggests Russia, United Arab Emirates (UAE), Malaysia, Saudi Arabia, Pakistan, Indonesia, and Kazakhstan to be China’s most reliable choices for energy investment.

Keywords: energy investment risk assessment; seq2seq framework; Belt & Road initiative

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1. Introduction

In 2003, China proposed the “the Silk Road Economic Belt” and “21st century maritime Silk Road”, also known as “Belt & Road initiative” (<http://www.xinhuanet.com/silkroad/english/index.htm> (accessed on 1 September 2020)), aiming to invest those countries along the “Belt & Road”, helping them establish the infrastructure and foster the economic market. By doing so, China could share its own developing achievements with those countries, while securing its global financial and economic system. There have been more than 65 countries joining this project which covers the region of Central and Eastern Europe (16 countries), West Asia and Northern Africa (18 countries), South Asia (8 countries), Central Asia (5 countries), East Asia (1 country), Commonwealth of Independent States (7 countries), and Southeast Asia (10 countries). Many researchers conducted various studies based on this huge project, for example, the influence that the project imposing on China [1], financial measures for environmental degradation [2], macroeconomic-level influence [3], and efficiency of energy [4].

As a world-leading energy consuming country, it becomes really urgent for China to establish its oversea energy investment. Fortunately, the “Belt & Road” countries contain most of the fossil energy resource and production, about 58.8% oil, 79.9% natural gas, and 54.0% coal of the whole world, according to the Energy Information Administration (EIA) (<https://www.eia.gov> (accessed on 1 September 2020)). However, China may also

face unseen and unpredicted high risks when investing those “Belt & Road” countries as the majority of those countries are developing countries. For instance, the Middle East countries have abundant fossil energy; however, they tend to have unstable political environment and a higher risk of having a war comparing other regions of the world. Such potential risks may cause the China’s investment efforts in vain. Therefore, how to assess the overseas energy investment of China is the focus of this paper.

There do exist some studies considering the assessment of energy investment in various aspects. For instance, Reference [5] focuses on the energy facilities, like the energy grid, while Reference [6] works on the energy transmission risk. Ref. [7] takes the uncertain factors into consideration, like the price of fossil energy, electricity, CO₂, and so on. These methods only focus on the micro-level factors that may have influence on the energy investment. As pointed out by Reference [8], to have a comprehensive evaluation of China’s overseas energy investment, scholars should take both micro-level and macro-level factors into consideration.

In terms of macro-level factors, there are some international organizations rating the countries based on macroscopic quantitative analysis, such as Moody’s, Standard & Poor’s, and International Country Risk Guide (ICRG) (<https://epub.prsgroup.com/products/international-country-risk-guide-icrg> (accessed on 1 September 2020)). ICRG considers three macroscopic factors, including politics, economy, and finance. However, those ratings are not directly related to the fossil energy. Ref. [9], hence, proposes to consider the exportation of crude oil as a national factor via decomposition hybrid approach.

However, while most scholars only research the general energy investment risk assessment, few of them analyze the issue from China’s perspective [10–12]. This paper aims to fill this gap by conducting a thorough study on China’s overseas energy investment. In addition to the above discussed factors, this paper includes more related factors of the energy investment. For example, we take the resource potential and environment constraint into account. It is known that bilateral relationship between China and the targeted country also plays a vital role when it comes to the investment, since a friendly and stable relation will definitely smooth the mutual cooperation. Therefore, this paper also takes the Chinese factor as a vital index. In addition to the common macroscopic factors of political risk, investment environment, and economic foundation, the above six factors build the index system for foreign energy investment of China along the “Belt & Road”. Moreover, this paper further splits the above 6 indexes into 36 sub-indexes, trying to cover all necessary points that are worthwhile to be involved for evaluation.

Naturally there comes a question that how to evaluate the above index system? This paper proposes a sequence to sequence (seq2seq) framework inspired by the recent development of deep learning technique. This work first transforms the numerical statistics into embeddings so that the deep learning technique could be applied. Afterwards, to handle the historical statistics, the hierarchical convolution neural network (CNN) is applied as an encoder on the generated embeddings as such hierarchical architecture enables the model to deal with the long historical sequence. After processing the input embeddings via the CNN encoder, a self-attention layer is then adopted to compute the weights of each sub-index. Finally, the conditional random field (CRF) layer is utilized to calculate the final assessment results of each country.

This paper has three main contributions:

- Considering both micro-level and macro-level factors, as well as the energy-related factors, this paper builds an index system having six indicators to comprehensively assess China’s overseas energy investment risk on “Belt & Road” countries.
- This paper adopts a deep learning method to evaluate the above indicator system. Firstly the hierarchical CNN is leveraged to handle the historical numerical statistics, following the indicator weights assigning by the self-attention layer. Finally, the CRF layer is employed for calculating the final evaluation results.

- This work assigns the risk ratings of 50 “Belt & Road” countries so that a policy recommendation could be made in this paper for Chinese investors when it comes to the national energy investment.

The reminder of the paper is organized as follows. Firstly, Section 2 introduces the related work, and Section 3 justifies the detailed information of index system and deep learning framework. Section 4 presents the assessment results of 50 “Belt & Road” countries, along with the policy recommendation. Finally, Section 5 briefly concludes the findings of this work.

2. Related Work

2.1. Energy Investment Risk Assessment

This section introduces the related work about investment risk assessment, focusing on the energy field.

Ref. [5] considers the risk of power plants which focuses on the production of the energy, while Reference [6] chooses to pay attention to the transmission of the energy. Ref. [13] simulates a 2-period model of infrastructure investment to compute its carbon emissions, taking the climate uncertainty into consideration. Ref. [14] analyzes the impact on energy investments stemming from different emission permit classes, like gas and wind power plant. Ref. [15] employs a multistage decision model to analyze the investment in carbon capture and storage retrofits. Ref. [16] aims to research on scaling up investment on clean energy infrastructure and propose policy solutions for climate change mitigation. Ref. [17] proposes to study the impact of tourism’s carbon emission based on a life cycle assessment input–output model. Ref. [18] presents an economic work to evaluate the profitability of investments in renewable technologies for the production of electricity.

The above models only take advantage of the micro-level factors, while the mainstream methods consider the investment risk macroscopically. Moody’s, Standard & Poor’s, and ICRG publish the rating scores of each country around the world every year, mainly based on three factors, i.e., politics, finance, and economy [19,20] (also see Ref. [8]), and they have found that geopolitical climate and economic environment are two crucial indexes that should be paid attention to. Ref. [10] includes technical risks as an important factor, such as research and development (R&D) capacity and technology maturity. Ref. [21] stresses that government promotion and policy coordination play a vital role for China’s overseas direct investment (ODI). Ref. [22] finds that policy risk is the most important factor as it could directly influence the decision of a project, while market risk will have a bigger role with the policy and technique risks declining. Ref. [23] points out the risk of energy demands that may have a huge influence on the cooperation of the energy project. Ref. [11] focuses on the operational commercial risks and illustrates that law culture should be included, as well. Ref. [24] analyzed the impact of policy and regulatory risks, resource risk, inflation risk, and energy price risk to evaluate the renewable energy investment. Ref. [25] proposes the barriers during different decision-making stages, e.g., preliminary risk scanning stage, iterative economic appraisal process, project development stage, and capital access stage.

Inspired by the above introduced factors, this paper proposes a new indicator system which considers the energy investment risk on both macro-level and micro-level.

2.2. Evaluation Method

Here, this section introduces some traditional evaluation methods. Ref. [26] proposes to combine the 2-dimension linguistic information (describing the information fuzziness) and the cloud model (expressing information randomness) to form the risk evaluation framework. Ref. [27] takes the advantage of failure mode and effects analysis (FMEA) to analyze the potential failure of a system or a project. Ref. [28] proposes the combination and cloud model and technique for order preference by similarity to an ideal solution (TOPSIS) model which utilizes the cloud model to transform the qualitative evaluation and the TOPSIS model to calculate the alternatives’ closeness degree.

Ref. [29] applies the Analytic Hierarchy Process (AHP) and the Analytic Network Process (ANP) to assess the investment risk, which contains three phases. Based on a set of previously identified criteria, the first two phases will make a first decision of accepting or rejecting, while the last phases is to build a priority order about the projects. Ref. [30] calculates the correlation between indexes via ANP and assigns different weights on different projects. Ref. [31] proposes a multi-criteria decision-making (MCDM) model which is an integration of ANP and Decision-Making Trial and Evaluation Laboratory Model (DEMATEL) model to choose the most suitable projects.

However, the above models are only capable of dealing with the statistics on the last year, they failed to process the historical statistics. Therefore, this paper adopts the seq2seq framework, which is a deep learning technique to make full use of the historical statistics.

2.3. Seq2seq Framework

Seq2seq framework is mainly composed of encoder and decoder usually choosing recurrent neural network (RNN) [32]. Its brief framework is shown as Figure 1. Specifically, given $\mathbf{x} = \{x_1, \dots, x_n\}$ as input sequence, where n denotes the number of the input elements, it is firstly computed by the encoder. The input element could be a number, a word or a vector. It will produce the hidden state $\mathbf{z} = (z_1, \dots, z_n)$ correspondingly. The decoder RNN takes $\mathbf{z}$ as input and obtains the output $\mathbf{y} = (y_1, \dots, y_n)$ literally from left to right. In order to generate y_{i+1} , the decoder will produce new hidden state h_{i+1} via the previous state h_i , a conditional input c_i based on the encoder output $\mathbf{z}$, along with target element y_i 's embedding g_i .

Figure 1. Sequence to sequence (seq2seq) framework.

The alternatives of RNN could be LSTM [33], GRU [34], and CNN [35]. In this paper, we introduce the hierarchical CNN framework, with its hierarchical architecture able to process the long sequence and improve the efficiency simultaneously.

3. Proposed Model

This section introduces the evaluation framework of China's oversea energy investment in detail. Firstly, the indicator system will be presented, including the detailed reason why certain factors are chosen. Then comes the deep learning framework, and every layer of the seq2seq model will be illustrated mathematically.

3.1. Indicators

Table 1 presents the proposed indicator system in detail with six main factors and 36 sub-factors.

Investment environment could be separated into six sub-indexes. Getting electricity is a country's fundamental ability to make the energy industry running smoothly. Starting a business helps one to judge if the investment could successfully get started. Dealing with construction permits helps one to tell if the invested energy facilities could be built smoothly. Enforcing contracts shows a country the ability to fulfill the investment cooperation contract. Resolving insolvency shows a country's ability to deal with the situation that in case invested companies go bankrupt. Paying tax shows the ability of a country to make itself fiscal stable.

Table 1. Investment risk assessment indicators.

Dimension	Indicators	Data Source
Investment environment	Getting electricity	World Bank [36]
	Starting a business	World Bank
	Dealing with construction permits	World Bank
	Enforcing contracts	World Bank
	Resolving insolvency	World Bank
	Paying tax	World Bank
Political risk	Internal conflict	ICRG [37]
	External conflict	ICRG
	Government stability	ICRG
	Corruption	ICRG
	Law and order	ICRG
	Democratic accountability	ICRG
Economic foundation	Real GDP growth	ICRG
	GDP per capita	ICRG
	Budget balance as a percentage of GDP	ICRG
	Foreign debt as a percentage of GDP	ICRG
	Exchange rate stability	ICRG
	Annual inflation rate	ICRG
Environment constraint	Energy intensity	EIA [38]
	Carbon dioxide emissions	EIA
	Nitrous oxide emissions	World Bank
	Carbon dioxide intensity	EIA
	Forest area (% of land area)	World Bank
	PM2.5	World Bank
Resource potential	Crude oil proved reserves	EIA
	Dry natural gas production	EIA
	Total oil production	EIA
	Crude oil distillation capacity	EIA
	Total exports of refined petroleum products	EIA
	Proved reserves of natural gas	EIA
Chinese factor	Value of contracted projects	China Statistical Yearbook [39]
	Outward FDI stock	Statistical Bulletin of China's Foreign Direct Investment [40]
	Years of China's diplomatic relations	Bai Du [41]
	Value of total imports from China	UN Comtrade Database [42]
	Persons abroad of contracted projects and labor services	China Statistical Yearbook
	Value of total exports to China	UN Comtrade Database

Political risk also plays a vital role for foreign investors. The internal conflict shows the country's government's ability to stabilize its domestic politic environment. The external conflict shows a country's ability to deal with diplomatic issues with other countries. Government stability is concerned with whether or not the cooperation could still exist if the government is overthrown. Corruption is also really important as a corrupted government may make the invested project really inefficiency. A good law and order can also make sure that the invested project could be conducted smoothly. Democratic accountability is also important to ensure that the project will not influenced by some unseen factors, like government corruption.

Economic foundation is mainly about the GDP data. Real GDP growth and GDP per capita can reflect the economic power and if its market is energetic or not. Budget balance as a percentage of GDP and foreign debt as a percentage of GDP shows a country's ability

to deal with its debt issue. Exchange rate stability and annual inflation rate are also very crucial as they reflect a country's ability to make its financial market stable.

The environment constraint could also be separated into six sub-indicators. Energy intensity reflects a country's energy usage efficiency. Carbon dioxide emissions, nitrous dioxide emissions, and carbon dioxide intensity reflects the country's ability in dealing with the climate warming challenge. Forest area (% of land area) reflects the potential that the natural resource could be exploited. PM2.5 reflects a country's ability in dealing with the pollution, which is also a limit for foreign investment.

Resource potential is mostly related to the fossil energy. Crude oil proved reserves and proved reserves of natural gas are the two main natural resource reserves which reflect the potential amount of fossil resource that could be mined. However, the potential of a country's natural resource that could be used is also limited by the production procedure. And total oil production and dry natural gas production reflect the country's production ability which could be improved by foreign investment on facilities. Crude oil distillation capacity could also be a limit. Total exports of refined petroleum products reflect the potential of a country to export its natural resource, which also have an impact on foreign investment.

This paper chooses six sub-factors for the Chinese factor. Value of contracted projects, persons abroad of contracted projects and labor services, value of total imports from China, and value of total exports to China reflect to which extent the targeted countries have incorporated with China on projects and economic markets. Outward FDI stock reflects to what extent China has involved in the stock and financial market of the targeted countries. Years of China's diplomatic relations reflects how long the friendly relationship has existed.

3.2. Seq2seq Framework

This section presents the proposed deep learning framework in detail, which is formed by several function layers. Figure 2 illustrates the framework in detail.

3.2.1. Embedding Layer

From Figure 2, one could observe that the procedure of the model is from bottom to the top. First of all, the input layer is the statistics of a country, represented as $S = \{x_1^k, x_2^k, \dots, x_n^k\}$, where $k \in \{1, 2, 3, \dots, 36\}$ denotes the specific sub-index, and $n = 7$ denotes the 7 year statistics. The deep learning model is not able to directly process the above numerical data, so this work adds an embedding layer which is able to transform the input numerical sequences to embeddings.

3.2.2. Hierarchical CNN Layer

To further process the embeddings layer, this paper introduces a hierarchical CNN layer as the encoder. As shown in Figure 2, a hierarchical CNN is composed of several CNN layers in which all elements could be interacted and covered via such architecture. Here, we set the kernel l of the CNN window as 3, and then a sequence having 7 elements can be covered by 4 layers. In each layer, in addition to the convolution component, the model also has non-linearity, which is used to focus on the more important elements of the whole sequence.

To generate the output of the hierarchical CNN layer, gated linear units (GLU) [43] are proposed, which could be mathematically computed as:

$$v([X \ Y]) = X \odot \sigma(Y), \quad (1)$$

in which $X, Y \in \mathbb{R}^d$ represent GLU's inputs, and $\odot$ denotes the element-wise production function. To realize the gate mechanism, the activation function σ is utilized, and this paper uses sigmoid in practice.

As this work stacks several CNN layers, there may be some information loss at the higher layer. Therefore, this work introduces the residual connections [44] to connect the

input and output layer. Overall, adding such a residual mechanism makes the final output calculated as follows:

$$h_t^k = v(W^l[h_{t-o/2}^{k-1}, \dots, h_{t+o/2}^{k-1}] + b_w^k) + h_t^{k-1}. \quad (2)$$

Afterwards a fully connected layer is adopted to transform the outputs of CNN to hidden state h^k , so that the self-attention mechanism can be adopted.

Figure 2. Investment risk assessment model framework.

3.2.3. Self-Attention Layer

Here, this work harnesses the self-attention layer to further process the output of the hierarchical CNN layer, which is able to calculate the weight of each sub-indicator. The equation that calculates the weights based on h_k could be represented as [45]:

$$f_h = \tanh(hW_a h^T + b_a), \quad (3)$$

$$A = \text{softmax}(f_h), \quad (4)$$

$$g = Ah = (g_1, g_2, \dots, g_n), \quad (5)$$

where f_h is the generated rating score of each sub-indicator, A is the sub-index's weight, and g is the output of the whole self-attention layer which will be processed by CRF layer and classification layer afterwards. W_a denotes the attention parameter matrix, while b_a denotes bias parameter.

3.3. CRF Layer

Here, this work uses the CRF layer to decide the rating score of each country. The input of this layer is the output the self-attention layer. For a sequence S , the input matrix I is denoted as $I = [I_1, I_2, \dots, I_n - 1]^T$, in which $I \in n \times d$. Let $I_{i,j}$ denote the probability score of the j^{th} score of the i^{th} element in the sequence. Given the sequence $S = \{x_1^k, x_2^k, \dots, x_n^k\}$, the CRF score could be calculated as follows:

$$f(X, y) = \sum_{i=0}^{s+1} O_{y_i, y_{i+1}} + \sum_{i=1}^s I_{i, y_i}, \quad (6)$$

in which T denotes the transition matrix, and $O_{i,j}$ is the corresponding transition score.

3.4. Classifier Layer

After the CRF layer, the classifier layer is finally utilized to generate the final score of each country. Mathematically, such procedure is shown as follows [35]:

$$p_t^i(\theta) = \frac{\exp(y_t^i)}{\sum_{j=1} \exp(y_t^j)}, \quad (7)$$

where θ represents all parameters, T is the label set, and $p_t^i(\theta)$ is the final score.

4. Experiments

This section presents the data statistics of the experiment in the first place, along with the detailed information of the experiment implementation. Then, China's overseas energy investment assessment results are introduced in detail. Finally, this section discusses the possible investment policies.

4.1. Data Statistics

There are 50 "Belt & Road" countries included in this work's investigation of the period 2013 to 2019. The average statistics of 50 countries are presented in Table 2, and the statistics of each year are attached in Appendix A.

From Table 2, one could observe that those countries have only 17.44% GDP of the world with their population being 41.48%. Such phenomenon verifies the fact that the majority of "Belt & Road" countries are under-developed; thus, foreign investment is strongly needed to help them improve the financial and economic situation. Despite their poor economic situation, they contain the majority of the natural resource. Specifically, comparing the world's statistics, they contain the 50.41% total oil supply, 57.45% crude oil proved reserves, 47.80% dry gas production, and 74.39% proved reserves of the natural gas. Due to their undeveloped facilities and infrastructures, their energy refinement capacity being 31.38% are quoted behind their proved reserves, which means that energy investment is promising to promote such ability. It is noticeable that those countries contain nearly 3/4 proved reserves of the natural gas of the whole world, which means that those countries have huge potential for further exploitation of natural gas.

As shown in Figures 1 and 2, the statistics of each year is served as the input element x_i . Then, it is transferred into embeddings via embedding layer, that is, using vector to represent number. Those embeddings will first be initialized randomly. Then, all 7-year data's embeddings are sent into the hierarchical CNN encoder layer, served as input and then grouped by each sub-indicator. The hierarchical CNN encoder will afterwards

generate new hidden states and the hidden states are further sent to the self-attention layer. As shown in Figure 2, the self-attention layer then assigns different weights to different sub-indicators, so as to obtain the weight of each indicator. Then, the hidden states processed by self-attention layer are sent to the CRF layer to generate the final embeddings which is able to be processed by softmax classifier layer. As shown in the top of Figure 2, after computing the final embeddings, the softmax classifier layer will assign each risk-level a score, while the highest score represents the risk-level the evaluated country belongs to Reference [46]. Through the above process, this work can transfer the statistics of each country into the evaluation of its investment risk.

All experiments are performed on a 64 bit Ubuntu 16.04.1 LTS system with Intel (R) Core (TM) i9-7900X CPU, 64 GB RAM, and a GTX-1080 GPU with 8 GB memory. The experiments is complemented via pytorch version 1.2.0.

Table 2. Main average statistics of 50 Nations alongside the China’s “Belt & Road Initiative” during the period from 2013 to 2019”.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	3.03	11.67	15.03	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	17.89	253.34	1675.00	35.00	736.34	95	353.32
ASEAN	Brunei	0.41	18.45	142.28	1.29	454.24	14.25	9.30
	Indonesia	258.82	947.42	957.32	4.26	2495.31	113.36	1123.25
	Malaysia	31.48	336.40	936.21	4.85	2546.85	121.25	1128.20
	Myanmar	52.22	62.43	21.21	0.07	469.32	10.00	58.00
	Philippines	115.23	289.34	27.21	0.16	105.65	3.31	281.00
	Singapore	5.55	318.19	27.30	0.00	0.00	0.00	1397.00
	Thailand	68.95	426.32	543.31	0.50	1498.20	12.31	597.22
	Vietnam	92.56	184.18	364.38	4.60	318.24	26.41	144.00
South Asia	Bangladesh	161.26	153.34	4.80	0.03	813.41	6.93	37.00
	India	1309.23	1878.45	1089.82	6.30	1227.31	46.32	4061.21
	Pakistan	189.84	243.21	85.11	0.27	1427.32	25.00	189.14
	Sri Lanka	21.48	78.32	−0.34	0.00	0.00	0.00	50.00
West Asia	Bahrain	1.28	34.28	64.38	0.15	563.45	3.82	263.01
	Cyprus	1.18	25.83	0.00	0.00	0.00	0.00	0.00
	Egypt	90.25	289.32	702.21	14.62	2045.32	79.21	732.30
	Greece	11.33	246.31	8.92	0.01	0.24	0.05	437.00
	Iran	80.48	518.63	3204.32	159.31	5735.21	1237.00	1477.00
	Iraq	36.04	242.41	3198.22	157.27	44.37	117.25	650.33
	Israel	8.55	301.28	5.99	0.01	235.45	10.03	232.00
	Jordan	6.99	36.63	0.51	0.00	5.50	0.27	91.23
	Kuwait	4.27	183.52	2836.25	109.00	582.34	71.35	945.00
	Lebanon	4.61	47.51	0.00	0.00	0.00	0.00	0.00
	Oman	3.96	82.49	958.35	5.75	1135.12	34.00	91.00
	Qatar	2.58	212.63	2121.32	27.33	5650.29	902.00	341.00
	Saudi Arabia	35.51	744.37	12,983.24	292.89	3638.82	293.98	2322.00
	Syria	31.19	18.45	73.52	2.81	197.63	10.00	255.23
	Turkey	78.60	846.41	64.32	0.31	19.30	0.37	724.27
	UAE	9.90	395.35	3453.24	99.82	1946.37	223.51	785.42
	Yemen	29.23	37.42	145.32	3.50	375.31	18.32	150.00
Russia and CIS	Armenia	2.99	13.69	0.00	0.00	0.00	0.00	0.00
	Ukraine	43.50	192.56	78.92	0.50	757.43	42.00	897.82
	Russia	146.70	2258.34	13028.34	88.00	22,842.45	1698.00	5573.34
Central and Eastern Europe	Albania	2.91	15.42	18.99	0.21	0.76	0.06	29.25
	Bulgaria	7.15	57.97	3.75	0.02	9.99	0.36	127.42
	Croatia	4.22	62.59	23.46	0.07	58.23	1.03	263.42
	Czech Republic	10.63	217.28	12.24	0.02	9.50	0.16	188.00
	Estonia	1.29	27.34	14.00	0.00	0.00	0.00	0.00
	Hungary	9.85	138.72	29.34	0.03	72.23	0.31	171.00
	Latvia	1.95	37.24	1.00	0.00	0.00	0.00	0.00
	Lithuania	2.90	50.25	8.95	0.01	0.00	0.00	200.00
	Poland	38.00	527.34	38.25	0.19	232.63	3.65	502.28
	Romania	19.89	198.38	107.64	0.80	395.72	3.97	546.37
	Serbia	7.15	45.88	23.42	0.09	25.37	1.80	223.48
	Slovakia	5.42	100.51	9.85	0.01	4.82	0.50	121.00
	Slovenia	2.07	50.23	0.32	0.00	0.15	0.00	15.50
Total		3036.75	13,387.44	45,978.38	982.43	58,082.35	5139.35	28,031.24
World		7264.45	763,224.24	91,780.38	1708.23	121,576.32	6906.25	89,386.48
Percentage (%)		41.48%	17.44%	50.41%	57.75%	47.80%	76.39%	31.38%

4.2. Experimental Results

This section presents the assessment results of the energy investment. Notice that Bi-LSTM module enables the model to deal with all 7-year statistics at once, and the following experimental results presented in this section are all computed based on 7-year data. Table 3 presents the weight of each indicator and sub-indicator, which are all calculated by self-attention layer. From it, one could draw a conclusion that the resource potential is the utmost crucial factor. It is intuitive that a country without any resource potential is not worthwhile to be invested at all. In the Chinese factor, the second important index implies the importance of keeping a friendly diplomatic relationship with the target country. Political risk deserves to be paid attention to, as well, since a stable political domestic situation of a country can help to secure foreign companies' investment. It is a bit unexpected that environment constraint and economic foundation have comparable weights. This is due to the fact that the climate warming challenge has currently become more severe, so more efforts are needed on constraining the environment degradation. The investment environment is the least important factor, which is also a bit unexpected. Energy investment is different from normal investment, so the traditional environment may simply not be that important in the energy field.

Table 3. Estimated weights of risk evaluation indicators for six dimensions based on the statistics from 2013 to 2019.

Dimension	Weight of Dimensions	Indicators	Weight of Indicators
Investment environment	0.090	Starting a business	0.005
		Dealing with construction permits	0.008
		Getting electricity	0.012
		Paying tax	0.026
		Enforcing contracts	0.018
		Resolving insolvency	0.021
Political risk	0.161	Government stability	0.037
		Internal conflict	0.033
		External conflict	0.014
		Corruption	0.026
		Law and order	0.016
		Democratic accountability	0.035
Economic foundation	0.145	GDP per capita	0.059
		Real GDP growth	0.013
		Annual inflation rate	0.010
		Budget balance as a percentage of GDP	0.024
		Foreign debt as a percentage of GDP	0.032
		Exchange rate stability	0.007
Environment constraint	0.147	Carbon dioxide emissions	0.019
		Nitrous oxide emissions	0.020
		Energy intensity	0.09
		Carbon dioxide intensity	0.012
		PM2.5	0.018
		Forest area (% of land area)	0.069
Resource potential	0.260	Total oil production	0.033
		Crude oil proved reserves	0.054
		Dry natural gas production	0.048
		Proved reserves of natural gas	0.059
		Crude oil distillation capacity	0.032
		Total exports of refined petroleum products	0.034
Chinese factor	0.197	Outward FDI stock	0.020
		Years of China's diplomatic relations	0.076
		Value of contracted projects	0.022
		Persons abroad of contracted projects and labor services	0.044
		Value of total imports from China	0.017
		Value of total exports to China	0.018

This paper further investigates the sub-factors as shown in the right columns of Table 3. One could observe that a simple but most important factor is the “years of China’s diplomatic relations”. This is because that a longer diplomatic relation usually provides more friendly and reliable bilateral relation, which could help to build a stable investment environment for Chinese companies. The “Forest area (% of land area)” is the second important sub-factor, which is unexpected. But it further stresses the importance of dealing with the climate changing in that every country should balance the resource exploitation and environment protection. Another crucial sub-factor is the “GDP per capita”, which is a fundamental index reflecting a country’s economic and developing level. As the resource potential is the most important main index, it is no doubt that “Crude oil proved reserves” and “Proved reserves of natural gas” are two factors worthwhile to be noticed. These two factors help Chinese companies to have a basic evaluation of how much investment return could be acquired. “Persons abroad of contracted projects and labor services” is a factor that cannot be ignored, as well, since it reflects to some extent that how open the target country is to the Chinese investment. With more Chinese workers in the targeted country, the investment project will definitely have a higher probability to achieve success.

The detailed assessment results are presented in Table 4 and Figure 3. The scores are calculated via the CRF layer and softmax layer. Overall, 10 countries belong to the highest risk, 11 countries belong to higher risk, 17 countries belong to medium risk, 10 countries belong to lower risk, and 2 countries belong to lowest risk. Only 12 countries have relatively low risk, which further verifies the importance of risk controlling when investing the “Belt & Road countries”. It is noticeable that countries having rich fossil energy, like crude oil and natural gas, also belong to lower risk, which further proves the importance of the potential resource factor. Chinese investors have no need to be concerned about the natural resources’ acquirement problem.

Figure 3. The results of the national energy investment risk evaluation.

Taking a closer look of Table 4, one could find that, though belonging to the same risk level, they are influenced by different indexes. For example, Russia and Singapore all belong to the lowest risk level; however, Russia has abundant natural resources and stable political environment, while Singapore, as a small country, has limited resources. But Singapore stands out because of its excellent economic foundation and investment environment. Therefore, for energy investment, Singapore may could only be considered as a resource transfer station. On contrary, based on the long-term and friendly diplomatic relation of China and Russia, this paper believes that Russia is the best choice for China to incorporate and invest.

Table 4. Evaluation results of the energy investment risk of the nation's along China's "Belt & Road Initiative" based on the statistics from 2013 to 2019. The score in bold is the highest of a raw score which, correspondingly, denotes the risk level a nation belongs to.

No.	Countries	Lowest-Risk	Lower-Risk	Medium-Risk	Higher-Risk	Highest-Risk
1	Russia	0.29353	0.28042	0.21147	0.12368	0.09089
2	Singapore	0.24358	0.22055	0.16791	0.17019	0.19774
3	Malaysia	0.22356	0.26490	0.25545	0.15697	0.09909
4	Indonesia	0.24129	0.26181	0.23575	0.14406	0.11706
5	UAE	0.24972	0.26893	0.22433	0.15067	0.10633
6	Qatar	0.24123	0.26508	0.21567	0.15976	0.11823
7	Kuwait	0.22873	0.24965	0.24481	0.15535	0.12144
8	Kazakhstan	0.20035	0.24871	0.22785	0.18127	0.14181
9	Iran	0.20963	0.24265	0.22343	0.17758	0.14681
10	Saudi Arabia	0.26472	0.27070	0.19589	0.14626	0.12241
11	Iraq	0.21371	0.24919	0.0.20758	0.17758	0.15193
12	Pakistan	0.20495	0.21453	0.20033	0.20942	0.17074
13	India	0.22532	0.24025	0.25476	0.15642	0.12322
14	Thailand	0.18589	0.23611	0.25916	0.18092	0.13789
15	Philippines	0.17462	0.204926	0.25923	0.21408	0.14712
16	Oman	0.20388	0.23432	0.26230	0.17282	0.12666
17	Azerbaijan	0.17201	0.20884	0.25344	0.21268	0.15301
18	Romania	0.198013	0.20906	0.24866	0.20881	0.13543
19	Turkey	0.16789	0.20972	0.24044	0.23755	0.14438
20	Yemen	0.18174	0.21516	0.25644	0.18626	0.16039
21	Israel	0.17129	0.19425	0.24578	0.23398	0.15468
22	Poland	0.19966	0.21190	0.23868	0.21647	0.13326
23	Vietnam	0.22465	0.23295	0.24790	0.16365	0.13083
24	Egypt	0.19556	0.23031	0.23997	0.16644	0.16769
25	Greece	0.16303	0.18913	0.24054	0.19694	0.21035
26	Bulgaria	0.18187	0.18930	0.22605	0.22419	0.17856
27	Brunei	0.20680	0.20492	0.22389	0.21119	0.17271
28	Slovakia	0.19468	0.19751	0.10823	0.10209	0.08349
29	Myanmar	0.20474	0.21812	0.21886	0.18747	0.17078
30	Czech Republic	0.19239	0.19337	0.22473	0.22510	0.16438
31	Jordan	0.14583	0.17398	0.20945	0.24079	0.22994
32	Albania	0.17709	0.17610	0.17640	0.24720	0.22318
33	Ukraine	0.16428	0.18471	0.23830	0.23831	0.17448
34	Hungary	0.18927	0.19577	0.21378	0.23568	0.16548
35	Serbia	0.17586	0.19014	0.21993	0.24544	0.16860
36	Bangladesh	0.14880	0.18763	0.22533	0.24786	0.19035
37	Croatia	0.15751	0.17546	0.22431	0.25437	0.18831
38	Belarus	0.14871	0.19020	0.21384	0.25330	0.19393
39	Bahrain	0.15979	0.18699	0.21889	0.25862	0.17568
40	Syria	0.16095	0.18925	0.20680	0.22226	0.22072
41	Lithuania	0.15507	0.17090	0.21372	0.22178	0.23851
42	Mongolia	0.18745	0.19030	0.16624	0.17012	0.28587
43	Estonia	0.14868	0.16019	0.19386	0.21440	0.28285
44	Sri Lanka	0.16029	0.19924	0.18169	0.18296	0.27580
45	Slovenia	0.14980	0.16979	0.17522	0.22637	0.27881
46	Cyprus	0.15376	0.17314	0.19627	0.18562	0.29119
47	Latvia	0.14731	0.15675	0.18764	0.20729	0.30099
48	Lebanon	0.12126	0.14002	0.17768	0.21355	0.34746
49	Moldova	0.10485	0.13164	0.15291	0.24557	0.36500
50	Armenia	0.09423	0.11963	0.14559	0.23985	0.40067

Moving to the lower risk level, one can see that there are several Middle East countries. Considering this region has higher risk of having a war and unstable political environment, it is a bit unexpected to still mark them as lower risk. The reason is that this region has the majority of the fossil resources of the whole world, so it is anyway worthwhile to have investment projects there. Among those countries, UAE, Qatar, and Saudi Arabia have relatively better government stability controlling the internal and external conflicts in the past decade, so they are good targeted countries for Chinese investors. Iran has a relatively stable domestic political environment, but it suffers from poor geopolitical and

external conflict. However, it is still ranked as lower-risk, which may be because of the abundant natural resources and friendly diplomatic relation with China. Such friendly diplomatic relation becomes stronger as China offered lots of help when the COVID-19 broke out. Therefore, Iran is also a good targeted country to be invested by Chinese companies. Kuwait and Iraq are two countries that suffered from war in recent history, so, although they are rated as lower-risk, China should be more careful when investing in these two countries.

In addition, aside from the above countries, Malaysia, Indonesia, Kazakhstan, and Pakistan are the other four lower-risk choices. Malaysia and Indonesia all belong to the ASEAN, which have just signed a great contract with China, i.e., Regional Comprehensive Economic Partnership (RCEP) project. This paper believes that having the support of this contract, the collaboration between these two countries will become more smooth. Kazakhstan and Pakistan are two border countries of China which could be more convenient for the energy resource cooperation, like building a channel to transmit the natural gas or oil. These two countries both have stable political environments, and their reserves of fossil energy may not be comparable to the Middle East, but their potentials are still quite promising.

This paper believes that with the deeper collaboration of China and “Belt & Road” countries, the infrastructures and maturity of market in those countries will be improved and more open to Chinese investors. Energy investment is only a starter; there will be more and more investments of high quality taking places in those developing countries, which will in turn further decrease the investment risk of this countries. A better global energy system can be built with China’s efforts and investments.

4.3. Discussion

Except for Russia, other countries may suffer from various factors politically or economically; however, they still attract the investors from the whole world. This reminds China to take a braver step and broader view when making the investment decisions, in seeking and digging the potential of those countries. In the meantime, China also needs to avoid other potential problems, for example, poor legislation situation. So, Chinese government can offer law consultation for the investors and help them conduct a thorough investigation before signing the contract.

As discussed in Section 2, there are several other factors could be take into consideration, like technical risks [10], market risks [22], and commercial risks [11]. It provides a direction for future work to make a more comprehensive research.

Based on the above analysis, we have the following countries recommended for Chinese investors in energy investors, namely, Russia, UAE, Saudi Arabia, Iran, Malaysia, Indonesia, Kazakhstan, and Pakistan.

5. Conclusions

China needs to build a stable energy system to secure its energy supply as it consumes the majority of the energy of the whole world. With the proposal of “Belt & Road initiative”, China can expand its oversea energy investment under the framework of this project.

This paper proposed to assess the above investment risk via a deep learning technique, and 50 countries were chosen to be estimated. In the first place, a new index system was built, having 6 main indexes which could be further separated by 36 sub-indexes. Then, the hierarchical CNN encoder is used to process the numerical statistics. Afterwards, this work harnesses the self-attention layer to assign weights on each sub-indicator. One could draw a conclusion that resource potential is the most crucial factor. Finally, a CRF layer and softmax layer are adopted to score each country deciding which risk level it belongs. Overall, this work has the following recommended countries, i.e., Russia, UAE, Saudi Arabia, Kazakhstan, Pakistan, Malaysia, and Indonesia.

As for future work, more factors, like technical or market risks, could be involved to have a more thorough investigation. Additionally, more advanced deep learning tech-

niques could also be included, like generative adversarial network (GAN) or reinforcement learning (GAN).

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Appendix A

Table A1. Main statistics of 50 Nations alongside the China’s “Belt & Road Initiative in 2013”.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	2.86	12.58	14.05	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	17.04	243.78	1658.00	30.00	720.43	85	345.09
ASEAN	Brunei	0.41	16.11	135.31	1.10	440.38	13.80	8.60
	Indonesia	251.27	912.52	926.21	4.03	2486.18	108.40	1011.83
	Malaysia	29.47	323.34	669.04	4.00	2260.16	83.00	538.58
	Myanmar	52.98	58.65	20.64	0.05	462.63	10.00	57.00
	Philippines	97.57	271.93	26.52	0.14	102.77	3.48	273.00
	Singapore	5.40	300.29	24.88	0.00	0.00	0.00	1357.00
	Thailand	67.45	419.89	522.51	0.45	1476.17	10.06	584.25
	Vietnam	89.76	171.22	354.35	4.40	310.77	24.70	140.00
	Bangladesh	157.16	149.99	4.20	0.03	807.30	6.49	33.00
	India	1279.50	1863.21	1015.81	5.48	1218.37	43.83	4042.76
	Pakistan	181.19	231.15	85.14	0.25	1411.54	24.00	186.31
	Sri Lanka	20.58	74.29	−0.56	0.00	0.00	0.00	50.00
West Asia	Bahrain	1.35	32.90	61.36	0.12	554.45	3.25	253.65
	Cyprus	1.14	24.06	0.00	0.00	0.00	0.00	0.00
	Egypt	87.61	286.01	693.53	4.40	2034.14	77.20	726.25
	Greece	10.97	239.51	8.83	0.01	0.18	0.04	423.00
	Iran	77.15	511.62	3194.30	154.58	5696.06	1187.00	1451.00
	Iraq	34.11	232.50	3050.54	141.35	41.67	111.52	637.50
	Israel	8.06	292.41	5.76	0.01	227.43	9.48	220.00
	Jordan	7.21	33.59	0.45	0.00	5.30	0.21	90.40
	Kuwait	3.59	174.16	2798.64	104.00	576.02	63.50	936.00
	Lebanon	5.29	44.35	0.00	0.00	0.00	0.00	0.00
	Oman	3.91	78.18	946.04	5.50	1127.25	30.00	85.00
	Qatar	2.10	201.89	2067.14	25.38	5597.53	890.00	338.70
	Saudi Arabia	30.20	744.34	11,701.51	267.91	3526.20	287.84	2112.00
	Syria	19.32	14.34	71.70	2.50	187.17	8.50	239.87
	Turkey	76.22	823.24	60.22	0.27	18.96	0.22	714.28
	UAE	9.04	387.19	3443.71	97.80	1928.20	215.03	773.25
	Yemen	25.53	35.95	130.97	3.00	363.74	16.90	140.00
	Armenia	2.99	11.12	0.00	0.00	0.00	0.00	0.00
	Ukraine	45.49	181.33	74.88	0.40	745.15	39.00	879.76
	Russia	143.51	2230.63	10,757.91	80.00	22,139.33	1688.00	5430.91
Central and Eastern Europe	Albania	2.90	12.87	17.02	0.17	0.67	0.03	26.30
	Bulgaria	7.27	55.63	3.58	0.02	9.82	0.20	115.24
	Croatia	4.26	57.77	20.28	0.07	55.09	0.88	250.32
	Czech Republic	10.51	208.33	10.68	0.02	8.90	0.14	183.00
	Estonia	1.32	25.25	13.00	0.00	0.00	0.00	0.00
	Hungary	9.89	134.40	27.85	0.03	68.83	0.29	161.00
	Latvia	2.01	30.22	1.00	0.00	0.00	0.00	0.00
	Lithuania	2.96	46.42	8.83	0.01	0.00	0.00	190.00
	Poland	38.04	524.06	34.22	0.16	219.16	3.25	492.95
	Romania	19.98	191.55	103.65	0.60	385.39	3.73	537.28
	Serbia	7.16	45.52	21.32	0.08	24.30	1.70	214.83
	Slovakia	5.41	98.03	9.06	0.01	4.38	0.50	115.00
	Slovenia	2.06	47.68	0.31	0.00	0.11	0.00	13.50
	Total	2983.65	13,246.21	45,705.30	945.51	57,892.27	5086.25	27,270.69
World		7176.09	76,362.59	91,014.47	1648.86	121,283.20	6845.17	88,004.21
Percentage (%)		41.58%	17.35%	50.22%	57.34%	47.73%	74.30%	30.99%

Table A2. Main statistics of 50 Nations alongside the China’s “Belt & Road Initiative in 2014”.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	2.88	12.35	14.21	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	17.35	247.23	1661.00	31.00	720.23	85	346.28
ASEAN	Brunei	0.41	16.23	136.23	1.13	441.23	13.98	8.70
	Indonesia	253.45	923.46	932.31	4.05	2493.23	111.38	1017.23
	Malaysia	30.21	327.41	672.12	4.02	2283.34	83.50	541.23
	Myanmar	52.68	69.47	20.78	0.05	463.23	10.50	57.50
	Philippines	105.84	278.23	26.52	0.15	103.81	3.53	275.00
	Singapore	5.44	305.49	25.72	0.00	0.00	0.00	1357.00
	Thailand	67.74	422.97	523.47	0.48	1481.23	10.12	586.38
	Vietnam	90.23	175.92	355.38	4.42	314.34	25.32	145.00
	Bangladesh	160.23	150.02	4.20	0.03	812.34	6.83	33.46
	India	1295.34	1867.39	1028.34	5.68	1234.34	44.84	4068.24
	Pakistan	183.56	235.73	86.39	0.26	1415.35	24.50	189.34
	Sri Lanka	20.99	76.33	−0.32	0.00	0.00	0.00	50.00
South Asia	Bahrain	1.32	33.26	62.49	0.13	558.23	3.35	255.45
	Cyprus	1.15	25.30	0.00	0.00	0.00	0.00	0.00
West Asia	Egypt	88.46	286.92	695.32	4.45	2043.24	78.85	729.34
	Greece	11.21	241.23	8.93	0.01	0.19	0.05	425.15
	Iran	79.34	513.45	3200.32	156.78	5712.23	1192.46	1464.00
	Iraq	34.76	234.37	3103.23	144.49	42.35	114.35	645.24
	Israel	8.23	297.37	5.87	0.01	229.23	9.73	222.00
	Jordan	7.14	34.58	0.47	0.00	5.35	0.22	91.67
	Kuwait	3.76	178.92	2893.23	105.00	578.29	64.39	940.00
	Lebanon	4.76	45.78	0.00	0.00	0.00	0.00	0.00
	Oman	3.72	80.23	952.37	5.58	1131.23	32.00	87.00
	Qatar	2.36	207.23	2103.23	25.89	5602.38	894.35	339.48
	Saudi Arabia	32.47	746.59	11,802.32	273.34	3548.49	292.34	2126.00
	Syria	25.48	16.34	73.34	2.65	188.33	8.78	242.45
	Turkey	77.03	831.36	62.37	0.29	19.39	0.26	718.39
	UAE	9.37	386.38	3528.34	99.34	1931.24	217.39	776.48
	Yemen	26.12	35.99	140.23	3.05	365.35	16.95	142.00
Russia and CIS	Armenia	2.98	11.89	0.00	0.00	0.00	0.00	0.00
	Ukraine	43.57	185.95	77.32	0.43	748.34	40.00	884.89
	Russia	144.56	2243.68	10937.32	81.00	22847.23	1695.00	5436.78
Central and Eastern Europe	Albania	2.88	13.78	16.23	0.18	0.71	0.05	26.70
	Bulgaria	7.18	56.23	3.78	0.02	9.85	0.22	117.89
	Croatia	4.22	59.34	21.23	0.07	56.89	0.91	252.34
	Czech Republic	10.53	212.36	11.97	0.02	9.21	0.17	187.00
	Estonia	1.31	25.93	13.25	0.00	0.00	0.00	0.00
	Hungary	9.85	135.78	28.23	0.03	68.95	0.32	164.00
	Latvia	1.98	34.32	1.00	0.00	0.00	0.00	0.00
	Lithuania	2.91	48.34	8.82	0.01	0.00	0.00	192.00
	Poland	38.01	526.34	35.23	0.17	223.55	3.45	498.35
	Romania	19.94	193.58	104.78	0.65	389.34	3.84	541.38
	Serbia	7.15	45.68	22.33	0.08	24.45	1.85	217.38
	Slovakia	5.42	99.23	9.47	0.01	4.42	0.67	118.00
	Slovenia	2.06	48.78	0.33	0.00	0.14	0.00	13.38
Total		2992.78	13,298.47	45,803.30	957.34	57,907.27	5089.25	27,279.69
World		7182.23	76,3479.21	91,173.47	1702.45	121,379.14	6923.34	88,873.46
Percentage (%)		41.67%	17.41%	50.28%	57.45%	47.84%	74.36%	31.03%

Table A3. Main statistics of 50 Nations alongside the China’s “Belt & Road Initiative in 2015”.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	2.95	12.23	14.36	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	17.48	251.34	1662.37	31.50	723.33	86	351.23
ASEAN	Brunei	0.42	17.24	136.23	1.14	442.38	14.83	8.90
	Indonesia	255.33	933.24	932.31	4.12	2503.28	116.38	1022.38
	Malaysia	31.02	330.36	678.23	4.06	2287.12	84.50	544.34
	Myanmar	52.17	63.24	21.23	0.06	464.34	11.2	58.60
	Philippines	110.27	283.45	27.23	0.16	104.23	3.62	277.00
	Singapore	5.52	310.48	26.34	0.00	0.00	0.00	1362.00
	Thailand	68.28	424.56	526.45	0.57	1493.45	10.98	596.38
	Vietnam	91.57	179.83	359.93	4.57	316.45	26.38	147.00
	Bangladesh	160.32	151.78	4.25	0.03	813.47	6.99	34.34

Table A3. Cont.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
West Asia	India	1301.23	1871.78	1034.44	5.92	1248.37	45.39	4083.47
	Pakistan	186.91	239.02	88.34	0.28	1426.38	25.00	192.19
	Sri Lanka	21.12	77.05	−0.35	0.00	0.00	0.00	50.00
	Bahrain	1.23	33.92	63.45	0.14	562.38	3.40	259.45
	Cyprus	1.16	25.56	0.00	0.00	0.00	0.00	0.00
	Egypt	89.22	288.14	698.48	4.55	2058.48	80.36	734.29
	Greece	11.27	244.32	9.17	0.01	0.21	0.07	428.22
	Iran	80.24	515.98	3205.33	158.23	5716.37	1197.72	1466.00
	Iraq	35.55	241.47	3059.37	144.53	42.48	116.38	639.00
	Israel	8.35	299.46	5.88	0.21	228.39	9.72	222.00
	Jordan	7.15	35.27	0.47	0.00	5.50	0.23	91.20
	Kuwait	3.92	180.23	2803.23	104.50	578.066	64.50	942.00
	Lebanon	4.62	46.58	0.00	0.00	0.00	0.00	0.00
	Oman	3.86	81.43	953.34	5.90	1138.26	33.00	87.00
	Qatar	2.45	209.37	2078.23	27.43	5604.47	898.00	339.60
	Saudi Arabia	34.32	745.83	12,378.87	272.43	3578.91	289.99	2116.00
	Syria	28.38	17.23	72.37	2.60	189.28	9.50	246.35
	Turkey	77.83	838.78	61.23	0.32	19.96	0.26	723.28
	UAE	9.43	391.48	3523.23	100.47	1939.27	227.37	786.38
Russia and CIS	Yemen	27.47	36.45	145.23	4.00	372.38	18.80	147.00
	Armenia	2.99	12.93	0.00	0.00	0.00	0.00	0.00
	Ukraine	42.87	188.74	77.34	0.50	763.39	42.00	893.47
	Russia	145.27	2250.47	11,273.51	90.00	22,782.34	1692.00	5437.04
Central and Eastern Europe	Albania	2.88	14.34	18.20	0.19	0.72	0.03	27.40
	Bulgaria	7.17	56.89	3.65	0.02	9.96	0.25	119.20
	Croatia	4.21	61.46	21.45	0.07	57.12	0.91	255.32
	Czech Republic	10.55	215.38	12.39	0.02	8.99	0.15	189.00
	Estonia	1.31	26.37	16.00	0.00	0.00	0.00	0.00
	Hungary	9.84	137.82	29.89	0.03	69.38	0.32	167.00
	Latvia	1.98	35.49	1.00	0.00	0.00	0.00	0.00
	Lithuania	2.89	49.34	9.21	0.01	0.00	0.00	195.00
	Poland	38.00	526.92	36.44	0.18	224.38	3.73	503.43
	Romania	19.89	195.34	105.38	0.70	390.33	3.82	541.34
	Serbia	7.14	45.68	22.12	0.08	25.34	1.90	224.78
	Slovakia	5.41	100.12	9.12	0.01	4.45	0.60	119.00
	Slovenia	2.06	49.23	0.35	0.00	0.13	0.00	16.50
Total		3005.47	13,324.43	45,823.23	957.33	57,975.33	5098.56	27,836.26
World		7206.34	76,3389.48	91,479.29	1679.27	121,386.25	6867.26	88,689.23
Percentage (%)		41.70%	17.45%	50.59%	57.43%	47.89%	74.53%	31.22%

Table A4. Main statistics of 50 Nations alongside the China's "Belt & Road Initiative in 2016".

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	3.01	11.65	15.05	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	17.94	253.27	1675.00	35.00	736.27	95	353.27
ASEAN	Brunei	0.42	18.46	142.32	1.30	454.27	14.28	9.34
	Indonesia	258.80	947.38	957.34	4.29	2495.34	113.39	1123.28
	Malaysia	31.52	336.43	936.23	4.89	2546.87	121.29	1128.23
	Myanmar	52.25	62.47	21.23	0.07	469.33	10.50	59.00
	Philippines	115.34	289.363	27.23	0.16	105.69	3.34	282.00
	Singapore	5.58	318.23	27.33	0.00	0.00	0.00	1398.00
	Thailand	68.98	426.36	543.34	0.50	1498.23	12.34	597.23
	Vietnam	92.63	184.23	364.43	4.80	318.34	26.43	145.00
South Asia	Bangladesh	161.51	153.23	4.80	0.03	813.47	6.98	37.00
	India	1309.71	1878.23	1089.93	6.33	1227.33	46.34	4061.24
	Pakistan	189.87	243.23	85.14	0.28	1427.34	25.50	189.23
	Sri Lanka	21.52	78.36	−0.30	0.00	0.00	0.00	50.00
West Asia	Bahrain	1.31	34.76	64.34	0.15	563.42	3.89	263.23
	Cyprus	1.18	25.92	0.00	0.00	0.00	0.00	0.00
	Egypt	90.21	289.37	702.23	4.65	2045.38	79.23	732.33
	Greece	11.35	246.33	8.94	0.01	0.22	0.05	435.00
	Iran	80.46	518.36	3204.23	159.33	5735.23	1238.00	1478.00
	Iraq	36.06	242.43	3198.23	157.24	44.34	117.23	650.23
	Israel	8.52	301.27	5.98	0.01	235.34	10.02	231.00
	Jordan	6.97	36.57	0.49	0.00	5.50	0.29	91.53

Table A4. Cont.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
Russia and CIS	Kuwait	4.25	183.54	2836.23	109.00	582.04	71.30	945.00
	Lebanon	4.59	47.46	0.00	0.00	0.00	0.00	0.00
	Oman	3.95	82.45	958.32	5.70	1135.02	34.00	91.00
	Qatar	2.57	212.56	2121.23	27.23	5650.23	902.00	341.50
	Saudi Arabia	35.47	744.34	12,983.22	292.82	3638.28	293.92	2321.00
	Syria	31.18	18.50	73.34	2.80	197.23	10.00	253.27
	Turkey	78.55	846.43	64.34	0.32	19.32	0.38	724.23
	UAE	9.85	395.34	3453.32	99.23	1946.23	223.45	785.32
	Yemen	29.13	37.38	145.20	3.50	375.32	18.29	150.00
	Armenia	2.99	13.68	0.00	0.00	0.00	0.00	0.00
	Ukraine	42.50	192.36	78.23	0.50	757.23	42.00	897.32
	Russia	146.30	2257.89	13028.23	88.00	22,842.34	1698.00	5573.01
Central and Eastern Europe	Albania	2.88	15.38	18.94	0.21	0.74	0.06	29.23
	Bulgaria	7.12	57.98	3.72	0.02	9.97	0.35	127.45
	Croatia	4.20	62.58	23.45	0.07	58.12	1.02	263.39
	Czech Republic	10.56	217.48	12.34	0.02	9.50	0.16	189.00
	Estonia	1.31	27.48	14.00	0.00	0.00	0.00	0.00
	Hungary	9.83	138.69	29.23	0.03	72.13	0.32	171.00
	Latvia	1.97	37.34	1.00	0.00	0.00	0.00	0.00
	Lithuania	2.87	50.23	8.95	0.01	0.00	0.00	200.00
	Poland	38.00	527.32	38.23	0.19	232.34	3.67	502.23
	Romania	19.86	198.32	107.34	0.80	395.67	3.92	546.34
	Serbia	7.13	45.87	23.45	0.09	25.34	1.80	223.45
	Slovakia	5.41	100.49	9.83	0.01	4.79	0.50	122.00
	Slovenia	2.06	50.43	0.31	0.00	0.14	0.00	15.50
	Total	3012.34	13,389.62	45,983.23	984.23	58,056.34	5138.23	28,033.33
	World	7262.30	76,3224.48	91,783.34	1702.12	121,563.30	6902.12	89,374.34
	Percentage (%)	41.47%	17.46%	50.43%	57.78%	47.82%	76.41%	31.42%

Table A5. Main statistics of 50 Nations alongside the China's "Belt & Road Initiative in 2017".

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	3.05	11.78	15.10	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	18.23	258.23	1682.00	36.00	741.23	97	358.67
ASEAN	Brunei	0.43	19.23	143.44	1.42	457.34	14.56	9.41
	Indonesia	259.23	951.23	962.34	4.35	2503.34	116.42	1137.31
	Malaysia	32.34	340.32	942.34	4.92	2553.23	124.33	1132.45
	Myanmar	52.34	63.78	21.78	0.07	475.34	11.00	60.00
	Philippines	116.89	293.34	28.34	0.17	107.34	3.45	286.00
	Singapore	5.62	324.34	28.34	0.00	0.00	0.00	1403.00
	Thailand	69.23	428.34	546.34	0.55	1503.32	15.35	605.44
	Vietnam	94.34	187.34	368.35	4.85	322.34	27.83	147.00
South Asia	Bangladesh	163.34	155.34	4.90	0.04	818.34	7.05	38.00
	India	1315.34	1893.44	1097.34	6.45	1237.34	47.34	4072.34
	Pakistan	191.23	246.34	87.34	0.30	1431.23	26.00	192.15
	Sri Lanka	22.34	78.98	−0.45	0.00	0.00	0.00	50.00
West Asia	Bahrain	1.36	35.33	66.23	0.17	565.34	3.92	267.34
	Cyprus	1.17	26.34	0.00	0.00	0.00	0.00	0.00
	Egypt	90.56	293.43	705.34	4.70	2058.24	82.34	736.37
	Greece	11.78	249.23	9.04	0.01	0.25	0.06	437.00
	Iran	82.34	521.23	3264.33	163.23	5757.34	1242.00	1485.00
	Iraq	36.76	245.34	3221.23	160.23	45.34	119.36	652.34
	Israel	8.62	303.23	6.05	0.01	239.23	10.22	235.00
	Jordan	7.03	37.34	0.52	0.00	5.80	0.32	92.45
	Kuwait	4.30	184.34	2846.34	112.00	586.34	71.96	947.00
	Lebanon	4.62	47.98	0.00	0.00	0.00	0.00	0.00
	Oman	3.97	82.67	961.23	5.80	1123.39	35.00	92.00
	Qatar	2.62	214.23	2127.34	27.46	5657.23	905.00	344.30
	Saudi Arabia	36.23	749.23	13,022.23	297.29	3648.31	296.02	2325.00
	Syria	31.53	19.00	74.23	2.95	198.23	10.50	257.45
	Turkey	79.23	847.23	65.43	0.34	19.76	0.42	728.34
	UAE	9.95	398.23	3489.33	100.46	1963.34	227.67	763.43

Table A5. Cont.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
Russia and CIS	Yemen	29.24	38.45	147.45	3.70	378.34	18.67	152.00
	Armenia	3.05	14.23	0.00	0.00	0.00	0.00	0.00
	Ukraine	43.48	196.50	80.34	0.55	762.34	42.50	902.45
	Russia	148.32	228.39	13239.67	90.00	23,026.35	1703.00	5662.05
Central and Eastern Europe	Albania	2.95	16.45	19.45	0.25	0.79	0.07	30.24
	Bulgaria	7.37	59.26	4.02	0.02	10.05	0.42	131.23
	Croatia	4.52	64.56	25.34	0.08	60.34	1.35	268.39
	Czech Republic	11.24	224.43	13.56	0.02	9.80	0.19	193.00
	Estonia	1.39	28.38	14.50	0.00	0.00	0.00	0.00
	Hungary	9.95	142.35	30.21	0.03	73.24	0.35	173.00
	Latvia	2.04	38.34	1.00	0.00	0.00	0.00	0.00
	Lithuania	2.91	51.45	9.02	0.01	0.00	0.00	202.00
	Poland	39.34	532.34	39.34	0.21	238.34	3.87	505.37
	Romania	20.15	200.34	108.34	0.85	398.37	4.05	552.23
	Serbia	7.57	46.98	25.34	0.10	27.32	2.03	227.34
	Slovakia	5.51	102.35	9.98	0.01	4.83	0.55	125.00
	Slovenia	2.16	52.34	0.35	0.00	0.15	0.00	15.80
	Total	3123.34	13,873.34	46,923.34	996.16	59,782.45	5,222.32	28,736.22
	World	7462.46	78,3473.67	93,232.36	1759.32	124,782.23	7057.26	90,273.46
	Percentage (%)	41.52%	17.58%	50.52%	57.79%	47.91%	76.56%	31.82%

Table A6. Main statistics of 50 Nations alongside the China's "Belt & Road Initiative in 2018".

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	3.02	11.67	15.12	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	18.45	261.23	1687.00	36.00	745.13	97.50	362.23
ASEAN	Brunei	0.45	20.26	146.23	1.47	461.23	14.78	9.73
	Indonesia	262.34	957.32	969.34	4.40	2514.24	118.49	1142.45
	Malaysia	34.41	345.39	942.34	4.92	2553.23	124.33	1132.45
	Myanmar	52.37	64.28	22.34	0.07	478.24	11.50	62.00
	Philippines	117.20	298.68	29.23	0.18	108.26	3.47	289.00
	Singapore	5.68	327.34	28.49	0.00	0.00	0.00	1437.00
	Thailand	70.34	432.34	548.34	0.59	1523.44	16.36	607.39
	Vietnam	95.34	189.34	370.23	4.90	326.34	28.32	148.00
	Bangladesh	165.32	157.39	4.95	0.05	821.23	7.15	39.00
South Asia	India	1324.23	1923.23	1135.34	6.50	1284.34	47.89	4086.34
	Pakistan	196.34	250.35	88.89	0.32	1478.34	26.50	196.23
	Sri Lanka	23.24	81.23	−0.39	0.00	0.00	0.00	50.00
	Bahrain	1.43	37.33	69.34	0.18	572.34	3.96	271.22
	Cyprus	1.19	26.76	0.00	0.00	0.00	0.00	0.00
	Egypt	91.23	295.98	708.39	4.73	2073.33	84.34	742.23
	Greece	11.89	252.34	9.38	0.01	0.27	0.06	438.00
	Iran	82.79	523.45	3247.34	167.23	5758.23	1265.00	1487.00
	Iraq	36.99	247.56	3237.23	163.43	46.48	120.34	657.42
West Asia	Israel	8.89	309.23	6.07	0.01	245.34	10.47	237.00
	Jordan	7.05	37.67	0.57	0.00	5.90	0.35	93.52
	Kuwait	4.32	186.37	2838.34	113.00	589.27	73.45	949.00
	Lebanon	4.69	48.31	0.00	0.00	0.00	0.00	0.00
	Oman	4.06	83.47	965.23	5.90	1132.35	36.00	93.00
	Qatar	2.65	219.48	2134.48	29.34	5678.45	912.00	347.60
	Saudi Arabia	37.23	753.23	13432.48	302.21	3832.49	297.02	2372.00
	Syria	32.38	19.50	77.24	2.97	200.34	10.59	262.56
	Turkey	80.48	852.49	67.34	0.41	20.38	0.47	733.23
	UAE	10.02	403.23	3503.34	103.23	1976.49	231.87	772.56
	Yemen	30.32	42.34	152.23	3.80	382.43	19.44	154.00
	Armenia	3.24	14.39	0.00	0.00	0.00	0.00	0.00
	Ukraine	44.35	198.34	82.34	0.60	778.33	44.32	923.65
	Russia	153.23	242.23	13,679.77	92.00	23,743.64	1787.00	5732.12
	Albania	3.01	16.98	20.12	0.27	0.83	0.08	31.23
	Bulgaria	7.45	60.34	4.12	0.03	10.20	0.48	136.34
	Croatia	4.58	66.45	28.34	0.09	63.43	1.38	271.29
Central and Eastern Europe	Czech Republic	11.38	228.39	14.78	0.02	9.90	0.27	195.00
	Estonia	1.42	29.34	15.00	0.00	0.00	0.00	0.00
	Hungary	10.23	147.34	32.34	0.03	75.47	0.38	175.00
	Latvia	2.12	38.45	1.00	0.00	0.00	0.00	0.00

Table A6. Cont.

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
	Lithuania	2.95	51.89	9.19	0.01	0.00	0.00	206.00
	Poland	40.24	539.23	40.37	0.22	243.45	3.91	507.47
	Romania	20.16	206.34	111.23	0.91	401.23	4.08	567.23
	Serbia	7.59	47.34	26.35	0.10	29.34	2.48	232.23
	Slovakia	5.62	107.34	10.23	0.01	4.91	0.59	127.00
	Slovenia	2.36	53.42	0.38	0.00	0.17	0.00	17.34
Total		3239.76	14,021.34	47,239.47	1032.34	60,146.56	5,302.43	29,372.33
World		7634.35	794,732.67	93,834.58	1802.34	125,001.02	7126.34	90,892.56
Percentage (%)		41.56%	17.63%	50.55%	57.82%	48.03%	77.01%	31.93%

Table A7. Main statistics of 50 Nations alongside the China's "Belt & Road Initiative in 2019".

Region	Country	Population (Million)	GDP (Billion Dollars)	Total Oil Supply (Thousand Barrels per Day)	Crude Oil Proved Reserves (Billion Barrels)	Dry Gas Production (Billion Cubic Feet)	Proved Reserves of Natural Gas (Trillion Cubit Feet)	Crude Oil Distillation Capacity (Thousand Barrels per Day)
East Asia	Mongolia	3.06	11.89	15.14	NA	0.00	0.00	0.00
Central Asia	Kazakhstan	19.21	265.34	1692.00	36.50	751.23	99.70	365.35
ASEAN	Brunei	0.47	20.28	147.34	1.49	463.45	15.34	9.92
	Indonesia	266.34	958.33	973.55	4.43	2523.34	121.23	1157.34
	Malaysia	35.23	352.23	947.23	5.02	2573.23	127.32	1158.74
	Myanmar	53.33	65.34	23.58	0.07	482.34	12.10	63.00
	Philippines	118.32	301.24	30.27	0.21	113.84	3.52	291.00
	Singapore	5.72	328.23	29.23	0.00	0.00	0.00	1441.00
	Thailand	70.57	435.28	551.23	0.61	1547.34	16.46	611.34
	Vietnam	96.23	192.34	373.23	4.92	327.34	28.93	150.00
South Asia	Bangladesh	166.34	158.23	4.97	0.06	823.45	7.18	39.50
	India	1338.34	1931.46	1173.32	6.55	1297.23	48.34	4103.42
	Pakistan	199.32	252.34	89.24	0.34	1498.23	26.80	198.34
	Sri Lanka	23.36	81.32	−0.37	0.00	0.00	0.00	51.00
West Asia	Bahrain	1.47	37.37	70.23	0.19	575.34	4.05	274.34
	Cyprus	1.24	27.48	0.00	0.00	0.00	0.00	0.00
	Egypt	92.45	298.39	711.23	4.93	2086.34	85.34	746.63
	Greece	12.32	258.29	9.46	0.01	0.32	0.07	442.00
	Iran	83.23	526.39	3258.34	172.23	5802.34	1272.00	1491.00
	Iraq	38.32	252.34	3242.34	165.29	47.29	123.92	652.34
	Israel	8.93	311.36	6.13	0.01	247.38	11.34	241.00
	Jordan	7.09	38.23	0.59	0.00	5.95	0.37	94.35
	Kuwait	4.43	189.23	2843.64	114.00	591.23	74.56	950.00
	Lebanon	4.72	49.23	0.00	0.00	0.00	0.00	0.00
	Oman	4.12	84.34	969.34	5.93	1143.24	36.50	93.50
	Qatar	2.87	221.23	2198.34	30.23	5682.24	915.00	349.24
	Saudi Arabia	38.45	761.23	13,734.33	309.36	3873.53	301.24	2385.00
	Syria	34.23	20.01	79.35	3.05	205.34	11.54	265.34
	Turkey	81.24	856.34	69.34	0.47	21.34	0.52	737.45
	UAE	10.21	406.37	3524.87	106.45	1992.23	242.13	785.34
	Yemen	33.24	45.34	159.34	3.90	392.34	20.14	158.00
Russia and CIS	Armenia	3.34	15.12	0.00	0.00	0.00	0.00	0.00
	Ukraine	46.78	204.34	91.23	0.70	789.34	49.46	934.55
	Russia	158.23	251.23	13,932.78	95.00	24,327.34	1814.00	5821.35
Central and Eastern Europe	Albania	3.08	18.48	23.24	0.36	0.95	0.10	33.56
	Bulgaria	7.52	62.34	4.54	0.03	10.50	0.52	141.23
	Croatia	4.63	67.82	29.23	0.10	64.23	1.42	274.34
	Czech Republic	11.64	232.11	16.32	0.03	10.00	0.28	197.00
	Estonia	1.45	30.23	16.00	0.00	0.00	0.00	0.00
	Hungary	11.24	148.23	33.54	0.03	77.39	0.41	178.00
	Latvia	2.23	39.53	1.00	0.00	0.00	0.00	0.00
	Lithuania	3.00	52.98	9.27	0.01	0.00	0.00	208.00
	Poland	42.34	542.53	42.34	0.24	247.34	3.98	511.34
	Romania	22.37	211.34	118.34	0.96	405.34	4.11	573.23
	Serbia	7.73	48.29	28.93	0.12	29.83	2.83	239.34
	Slovakia	5.75	110.23	10.93	0.01	4.95	0.63	129.00
	Slovenia	2.46	56.34	0.43	0.00	0.19	0.00	18.34
Total		3346.23	14,632.42	47,982.45	1103.57	60,743.65	5,902.57	29,932.33
World		7783.23	798,632.58	94,893.58	1889.34	125,892.23	7,382.43	91,238.56
Percentage (%)		41.61%	17.65%	50.58%	57.85%	48.12%	77.16%	32.02%

References

1. Zhang, L. (Ed.) Chapter 1—Introduction. In *Engineering Properties of Rocks*, 2nd ed.; Butterworth-Heinemann: Oxford, UK, 2017; pp. 1–18. [\[CrossRef\]](#)
2. Hafeez, M.; Chunhui, Y.; Strohmaier, D.; Ahmed, M.; Jie, L. Does finance affect environmental degradation: Evidence from One Belt and One Road Initiative region? *Environ. Sci. Pollut. Res. Int.* **2018**, *25*, 9579–9592. [\[CrossRef\]](#)
3. Zhai, F. China's belt and road initiative: A preliminary quantitative assessment. *J. Asian Econ.* **2018**, *55*, 84–92. [\[CrossRef\]](#)
4. Han, L.; Han, B.; Shi, X.; Su, B.; Lv, X.; Lei, X. Energy efficiency convergence across countries in the context of China's Belt & Road initiative. *Appl. Energy* **2018**, *213*, 112–122. [\[CrossRef\]](#)
5. Dockner, E.J.; Kucsera, D.; Rammerstorfer, M. Investment, firm value, and risk for a system operator balancing energy grids. *Energy Econ.* **2013**, *37*, 182–192. [\[CrossRef\]](#)
6. Pringles, R.; Olsina, F.; Garcés, F. Real option valuation of power transmission investments by stochastic simulation. *Energy Econ.* **2015**, *47*, 215–226. [\[CrossRef\]](#)
7. Zhang, M.; Zhou, P.; Zhou, D. A real options model for renewable energy investment with application to solar photovoltaic power generation in China. *Energy Econ.* **2016**, *59*, 213–226. [\[CrossRef\]](#)
8. Duan, F.; Ji, Q.; Liu, B.Y.; Fan, Y. Energy investment risk assessment for nations along China's Belt & Road Initiative. *J. Clean. Prod.* **2018**, *170*, 535–547. [\[CrossRef\]](#)
9. Li, J.P.; Tang, L.; Sun, X.L.; Yu, L.A.; He, W.; Yang, Y.Y. Country risk forecasting for major oil exporting countries: A decomposition hybrid approach. *Comput. Ind. Eng.* **2012**, *63*, 641–651. [\[CrossRef\]](#)
10. Wu, Y.; Wang, J.; Ji, S.; Song, Z. Renewable energy investment risk assessment for nations along China's Belt & Road Initiative: An ANP-cloud model method. *Energy* **2020**, *190*, 116381. [\[CrossRef\]](#)
11. Zhang, R.; Andam, F.; Shi, G. Environmental and social risk evaluation of overseas investment under the China-Pakistan Economic Corridor. *Environ. Monit. Assess.* **2017**, *189*, 253. [\[CrossRef\]](#)
12. Zhang, R.; Shi, G.; Wang, Y.; Zhao, S.; Ahmad, S.; Zhang, X.; Deng, Q. Social impact assessment of investment activities in the China-Pakistan economic corridor. *Impact Assess. Proj. Apprais.* **2018**, *36*, 331–347. [\[CrossRef\]](#)
13. Strand, J.; Miller, S.; Siddiqui, S. Long-run carbon emission implications of energy-intensive infrastructure investments with a retrofit option. *Energy Econ.* **2014**, *46*, 308–317. [\[CrossRef\]](#)
14. Hieronymi, P.; Schüller, D. The Clean-Development Mechanism, stochastic permit prices and energy investments. *Energy Econ.* **2015**, *47*, 25–36. [\[CrossRef\]](#)
15. Mo, J.L.; Schleich, J.; Zhu, L.; Fan, Y. Delaying the introduction of emissions trading systems—Implications for power plant investment and operation from a multi-stage decision model. *Energy Econ.* **2015**, *52*, 255–264. [\[CrossRef\]](#)
16. Jones, A.W. Perceived barriers and policy solutions in clean energy infrastructure investment. *J. Clean. Prod.* **2015**, *104*, 297–304. [\[CrossRef\]](#)
17. Cadarso, M.A.; Gomez, N.; Lopez, L.A.; Tobarra, M.A. Calculating tourism's carbon footprint: Measuring the impact of investments. *J. Clean. Prod.* **2016**, *111*, 529–537. [\[CrossRef\]](#)
18. Cucchiella, F.; Gastaldi, M.; Trosini, M. Investments and cleaner energy production: A portfolio analysis in the Italian electricity market. *J. Clean. Prod.* **2017**, *142*, 121–132. [\[CrossRef\]](#)
19. Feder, G.; Uy, L.V. The determinants of international creditworthiness and their policy implications. *J. Policy Model.* **1985**, *7*, 133–156. [\[CrossRef\]](#)
20. Brewer, T.L.; Rivoli, P. Politics and Perceived Country Creditworthiness in International Banking. *J. Money Credit. Bank.* **1990**, *22*, 357–369. [\[CrossRef\]](#)
21. Du, J.; Zhang, Y. Does One Belt One Road initiative promote Chinese overseas direct investment? *China Econ. Rev.* **2018**, *47*, 189–205. [\[CrossRef\]](#)
22. Liu, X.; Zeng, M. Renewable energy investment risk evaluation model based on system dynamics. *Renew. Sustain. Energy Rev.* **2017**, *73*, 782–788. [\[CrossRef\]](#)
23. Liu, K.; Shen, X.; Tan, Z.; Guo, W. Grey Clustering Analysis Method for Overseas Energy Project Investment Risk Decision. *Syst. Eng. Procedia* **2012**, *3*, 55–62. [\[CrossRef\]](#)
24. Gatzert, N.; Vogl, N. Evaluating investments in renewable energy under policy risks. *Energy Policy* **2016**, *95*, 238–252. [\[CrossRef\]](#)
25. Hu, J.; Harmsen, R.; Crijns-Graus, W.; Worrell, E. Barriers to investment in utility-scale variable renewable electricity (VRE) generation projects. *Renew. Energy* **2018**, *121*, 730–744. [\[CrossRef\]](#)
26. Wu, Y.; Xu, C.; Li, L.; Wang, Y.; Chen, K.; Xu, R. A risk assessment framework of PPP waste-to-energy incineration projects in China under 2-dimension linguistic environment. *J. Clean. Prod.* **2018**, *183*, 602–617. [\[CrossRef\]](#)
27. Wang, Y.; Zhao, X.; Bian, J.; Liao, R.; Yang, L. Cloud model-based risk assessment of power transformer. In Proceedings of the International Conference on High Voltage Engineering & Application, Shanghai, China, 17–20 September 2012.
28. Li, C.; Wang, Y.; Lin, S. The Risk Assessment Study for Electric Power Marketing Competitiveness Based on Cloud Model and TOPSIS. *IOP Conf. Ser. Mater. Sci. Eng.* **2017**, *242*, 012116. [\[CrossRef\]](#)
29. Aragonés-Beltrán, P.; Chaparro-González, F.; Pastor-Ferrando, J.P.; Pla-Rubio, A. An AHP (Analytic Hierarchy Process)/ANP (Analytic Network Process)-based multi-criteria decision approach for the selection of solar-thermal power plant investment projects. *Energy* **2014**, *66*, 222–238. [\[CrossRef\]](#)

30. Wu, Y.P. Inflation with teleparallelism: Can torsion generate primordial fluctuations without local Lorentz symmetry? *Phys. Lett. B* **2016**, *762*, 157–161. [[CrossRef](#)]
31. Büyüközkan, G.; Güler, S. An integrated DEMATEL-ANP approach for renewable energy resources selection in Turkey. *Int. J. Prod. Econ.* **2016**, *182*, 435–448. [[CrossRef](#)]
32. Sutskever, I.; Vinyals, O.; Le, Q.V. Sequence to Sequence Learning with Neural Networks. In Proceedings of the NIPS, Montreal, QC, Canada, 8–13 December 2014; pp. 3104–3112.
33. Hochreiter, S.; Schmidhuber, J. Long Short-Term Memory. *Neural Comput.* **1997**, *9*, 1735–1780. [[CrossRef](#)]
34. Cho, K.; van Merriënboer, B.; Gülçehre, Ç.; Bahdanau, D.; Bougares, F.; Schwenk, H.; Bengio, Y. Learning Phrase Representations using RNN Encoder-Decoder for Statistical Machine Translation. In Proceedings of the EMNLP, Doha, Qatar, 25–29 October 2014; pp. 1724–1734.
35. Gehring, J.; Auli, M.; Grangier, D.; Yarats, D.; Dauphin, Y.N. Convolutional Sequence to Sequence Learning. In Proceedings of the 34th International Conference on Machine Learning—ICML 2017, Sydney, Australia, 6–11 August 2017; pp. 1243–1252.
36. Available online: <https://databank.worldbank.org/home.aspx> (accessed on 1 September 2020).
37. Available online: <https://epub.prsgroup.com/products/international-country-risk-guideicrg> (accessed on 1 September 2020).
38. Available online: <https://www.eia.gov> (accessed on 1 September 2020).
39. Available online: <https://www.chinayearbooks.com> (accessed on 1 September 2020).
40. Available online: <https://www.scirp.org> (accessed on 1 September 2020).
41. Available online: <https://www.baidu.com> (accessed on 1 September 2020).
42. Available online: <https://comtrade.un.org> (accessed on 1 September 2020).
43. Dauphin, Y.N.; Fan, A.; Auli, M.; Grangier, D. Language Modeling with Gated Convolutional Networks. In Proceedings of the ICML, Sydney, Australia, 6–11 August 2017; pp. 933–941.
44. He, K.; Zhang, X.; Ren, S.; Sun, J. Deep Residual Learning for Image Recognition. In Proceedings of the 2016 IEEE Conference on Computer Vision and Pattern Recognition—CVPR 2016, Las Vegas, NV, USA, 27–30 June 2016; pp. 770–778. [[CrossRef](#)]
45. Vaswani, A.; Shazeer, N.; Parmar, N.; Uszkoreit, J.; Jones, L.; Gomez, A.N.; Kaiser, L.; Polosukhin, I. Attention is All you Need. In Proceedings of the Advances in Neural Information Processing Systems 30: Annual Conference on Neural Information Processing Systems 2017, Long Beach, CA, USA, 4–9 December 2017; pp. 5998–6008.
46. Tan, Z.; Zhao, X.; Wang, W.; Xiao, W. Jointly Extracting Multiple Triplets with Multilayer Translation Constraints. In Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence—AAAI 2019 Honolulu, HI, USA, 27 January–1 February 2019; pp. 7080–7087. [[CrossRef](#)]