Research on the Economic Connotation of New Energy and Traditional Energy

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Abstract. The extensive use of energy is the important characteristic of modern civilization, promote the development of human civilization, but also makes the survival of mankind faced with severe situation, the energy problem has become the important problems affecting economic and social development, many countries of the influence of the energy crisis, regard the energy security strategy as an important part of national security strategy. New energy is integrated into daily life and social economy, and the relationship between new energy and traditional energy has changed. Now new energy is no longer a concept, but a kind of resource, which is closely linked with the life. In this paper, by studying the traditional economic relationship between energy and new energy, we’ll discuss the mainstream trend of new energy, keep up with the pace of new era, and to make due contribution to the development of new energy.

1. Introduction
In history, the change of oil price directly affects the development of new energy. In the 1960s, the Middle East oil field was just beginning to develop, and no one wanted to replace oil with new energy. By the 1970s, the price of oil jumped, and in 1980 the number of private companies and governments in the United States and Europe soared tenfold to a peak. However, when oil prices collapsed in 1985, the government cancelled since 1985, most of the subsidies from 80s to early 80, the world oil consumption is under a system of low growth, new energy has been a lack of funding support. But starting in 2005, the rises in oil prices, new energy gain the favour of the government and enterprises, with the rise in oil prices to $147 per barrel in 2008, the government of photovoltaic, wind and other renewable energy subsidies also reached their peak. International oil prices have fallen sharply since mid-2014, and prices have fallen from $80 per year to $42. It is worth pondering whether this is a sign that oil is about to become a thing of the past.

2. New energy roles in the new era
History can be used for reference, but history will never repeat itself mechanically. New energy today is not the same as new energy at the end of the last century. Until 2005, new energy was being developed and tested, and the world's installed capacity was almost zero. But by 2014, the global photovoltaic (pv) power generation capacity of 180 w, wind power generation capacity of 370 gigawatts (gw), only two kinds of new energy, wind power and photovoltaic power generation total installed capacity of 550000 megawatts (gw), is close to 10% of the world's total installed capacity of 550, and formed a huge industry. More importantly, the cost of wind and photovoltaic power generation has fallen sharply, although it is more expensive than coal, but it has reached the price of oil and gas. Although photovoltaic power generation still needs government subsidies "lactation", cannot "weaning", but the degree of subsidy has
been greatly reduced. Germany's subsidies for photovoltaic subsidies in 2005 were 0.57 per kilowatt hour, and have now fallen to euro0.13. China for the first time in 2008 pv feed-in tariff pricing, the price is $4 a/c, is now down to 0.85 yuan per degree, that is to say, the thermal power feed-in tariff (0.4 yuan per degree), compared with the subsidy amount is reduced to 0.5 yuan from 3.6 yuan per degree, for those remote and shortage of power photovoltaic and even lower than the cost of coal-fired power generation. In many parts of the world, new energy has entered the mainstream.

Blow to make China's wind power industry policy "dongfeng" frequency out of the haze, for industrial development "second life". Shanghai securities news reporter learned that, the national energy administration is statistical "twelfth five-year" fifth batch of wind power project approval plan, project total installed capacity of more than 30 million kilowatts, is expected to reach about 34 million kilowatts. December 25 last year, the national energy administration issued a "about to submit the" twelfth five-year "fifth batch of wind power projects approved plan notice, request that tianjin, Shanghai, shandong, henan hand in annual report to the local wind power construction scale. According to the work plan, the energy bureau will issue the fifth approval plan for wind power projects in the 12th five-year plan in the first half of this year. Since 2011, our country has issued four batch of wind power project approved plans, all previous project total installed capacity of 28.83 million kilowatts, respectively 25.28 million kw, 28.72 million kw and 27.6 million kw, and total amount approved for more than 100 million kilowatts. Therefore, in terms of installed capacity, the approval plan for the fifth batch of wind power projects is the largest of the five approved plans during the 12th five-year plan period. According to the Shanghai newspaper, the fifth approval plan for wind power projects includes the conventional wind farm projects, as well as distributed wind power and distributed wind power heating projects. The 12th five-year plan, issued by the national energy administration, exceeded market expectations and showed the state's support for wind power development. A wind industry insider says the country has been encouraging the wind industry to grow, hoping for a bigger "step". The fifth approval plan for wind power projects is expected to be released soon. The itu statistics show that by the end of February 2015, grid wind power installed capacity in China for the first time 100 million kw, 100.04 million kw, continue to firmly in China's third largest installed wind power generation type and the world's first. The 31 provinces are hooked up to the wind farm, including Inner Mongolia, gansu grid wind power installed capacity of 21.25 million mw and 10.53 million mw respectively, hebei, xinjiang, shandong and liaoning province more than 5 million kilowatts. In addition, during the 13th five-year plan period, the wind power development goals are also planned to be adjusted. The country's wind power capacity will reach 200 million kilowatts by 2020, meeting five percent of the country's electricity needs, according to the China wind development roadmap 2050, which was released by the national development and reform commission.

Today, however, in order to make the wind power industry to speed up the development of the national energy administration and other relevant department plans to "much starker choices-and graver consequences-in" minimum target from 200 million kw to 250 million kw, for now this is enough to support the industry environment. Since last year, new energy industries such as wind power have developed steadily. According to the national energy administration, in 2014 China's wind power industry has maintained a strong growth momentum, wind annual installed capacity increased to a record high in 1981, the new wind power installed capacity of 23.35 million kilowatts, up 45% from a year earlier. Recently, the wind turbine blades and other wind power equipment listed companies also disclosed the 2014 annual report, the performance has increased significantly. Industry insiders said that with the wind abandoning rate falling steadily, China's wind power industry experienced a new wave of installation boom in 2015, and the profitability of wind power equipment industry rebounded strongly. It is worth noting that, in accordance with previous requirements of the energy management department, approved project construction must be adopted in the current year to enhance the seriousness of the approved plan. Projects that have been included in the approved plan have not been approved within the specified period and will be disqualified. The planned completion of future approval will be an important reference for the construction scale next year. In the 20th century, the new energy is a small game, scientists are some special effects, but twenty years after entering the 21st century, a surge in the number
of new energy, prices fell rapidly, making new energy in the position in the global economy has been vastly different.

Using granger causality test the relationship between energy and economy, the main function is to test whether there is a causal relationship between two economic variables, the policy has a certain economic significance. Through Granger causality test, this paper analyzes the relationship between new energy, traditional mineral energy and economic growth. The basic idea of Granger causality test is that if the change of variable X causes change in Y, then the change of X should occur before the change of Y, indicating that X is the Granger change that causes Y. According to AIC criterion and SC criterion, when the granger causality test is conducted, when the lag period is 2, p=2, the test results are shown in table 1.

| The original assumption | Statistics-F | Probability |
|------------------------|--------------|-------------|
| LnGDP is not the Granger reason of LnNEC | 0.4977 | 0.6352 |
| LnNEC is not the Granger reason of LnGDP | 2.2564 | 0.2003 |
| LnGDP is not the Granger reason of LnFEC | 0.7036 | 0.5380 |
| LnFEC is not the Granger reason of LnGDP | 4.8928 | 0.0665 |

3. Linear regression analysis of the relationship between new energy, traditional fossil energy and economic growth

The climate change caused by carbon emissions has never been more urgent, and the governments of the world have attached great importance to it. At the 2014 APEC meeting, the only document signed by the two major powers was the us-china memorandum of cooperation on climate change. Until 2005, no one really believed that pollution related to fossil fuels would have a devastating impact on human society. China's smog has reached the health and even lives of people in crisis. Whether it is oil, coal or natural gas, carbon pollution and dust emissions from the atmosphere are inevitable, although they can be reduced but not substantially reduced. The only way to deal with climate change and dust pollution is to replace or replace traditional fossil fuels with new clean energy. This is the internal impetus to increase the installed capacity of new energy. In 2000, no one realized that filling Beijing's fog could be fatal. But now, most ordinary Chinese are aware of the dangers of smog. People's sense of survival will prevail over all economic and political considerations, and the application of new energy has become an irresistible trend. While the cost of new energy is falling, it provides economic feasibility for the large-scale application of new energy.

To explore new energy consumption and the traditional mineral which part of energy consumption is more can promote the development of economy. Based on the actual situation in as investigation object, we set up new energy and traditional energy minerals as independent variables, GDP as the dependent variable of the classical linear regression model, regression model form is as follows:

$$\ln\text{LnGDP} = \beta_1 \times \ln\text{NEC} + \beta_2 \times \ln\text{FEC} + c$$  (1)

$\ln\text{NEC}$ represents gross domestic product, $\ln\text{NEC}$ represents the consumption of new energy, and $\ln\text{FEC}$ represents the consumption of traditional mineral energy.

In this paper, Eviews5.0 software is used to conduct linear regression analysis of model (1) according to relevant data, and the results are shown in figure 1. As can be seen from figure 1, the regression equation (1) shows that the self-correlation test value (durbin-watson value) is 0.709, which is far from the standard value 2, that is, the model has self-correlation. In order to eliminate the autocorrelation problem of regression model (1), this paper adds a first-order autocorrelation item AR (1) in the regression equation (1), and the improvement is shown as follows:

$$\ln\text{GDP} = \beta_1 \times \ln\text{NEC} + \beta_2 \times \ln\text{FEC} + AR(1) + c$$  (2)
The results of regression analysis of (2) are shown in figure 3. As can be seen from figure 3, the self-correlation test value (durbin-watson value) of the modified relationship is 1.8736, that is, the self-correlation of the model is well solved.

Through the above analysis, the quantitative relationship between GDP and energy consumption can be obtained:

$$\ln GDP = 0.2614 \times \ln NEC + 0.1135 \times \ln FEC + [AR(1) = 0.6147] + 5.1802 \quad (3)$$

By the regression equation (3), the new energy and traditional fossil energy consumption can promote the economic growth of sichuan province, but the new energy for the contribution rate of GDP growth is about 2.3 times that of the traditional mineral energy (0.2614/0.0.1135).

**Table 2. Results of regression analysis of economic growth and energy consumption**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| C        | 5.180214    | 0.989948   | 5.232817    | 0.0012|
| LNNEC    | 0.261451    | 0.128420   | 2.039901    | 0.0812|
| LNFE     | 0.113479    | 0.097598   | 1.162726    | 0.2830|
| AR(1)    | 0.614707    | 0.278304   | 2.208758    | 0.0629|

| R-squared | 0.956546 | Mean dependent var | 8.316573 |
| Adjusted R-squared | 0.937923 | S. D. dependent var | 0.114295 |
| S.E. of regression | 0.028477 | Akaike info criterion | -4.004168 |
| Sum squared resid | 0.006676 | Schwarz criterion | -3.859479 |
| Log likelihood | 26.02292 | F-statistic | 51.36381 |
| Durbin-Watson stat | 1.8783614 | Prob(F-statistic) | 0.000039 |

**Table 3. Results of the improved economic growth and energy consumption regression analysis**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| C        | 5.760110    | 0.366718   | 15.70721    | 0.0000|
| LNNEC    | 0.083860    | 0.116647   | 0.718920    | 0.4904|
| LNFE     | 0.210309    | 0.131552   | 1.598672    | 0.1444|

| R-squared | 0.896737 | Mean dependent var | 8.307025 |
| Adjusted R-squared | 0.873790 | S. D. dependent var | 0.113884 |
| S.E. of regression | 0.040459 | Akaike info criterion | -3.364757 |
| Sum squared resid | 0.014732 | Schwarz criterion | -3.243530 |
| Log likelihood | 23.18854 | F-statistic | 39.07125 |
| Durbin-Watson stat | 0.709174 | Prob(F-statistic) | 0.000037 |
4. Sign of the price of oil

Oil reserves have always been controversial, but one thing is indisputable: oil reserves are limited and dwindling. The difficulty of mining will inevitably increase, which will lead to the increase of production cost. Although the shale oil and gas production were once thought to be able to reduce the cost, but now it seems that shale oil extraction costs close to $70 per barrel, although similar to China's oil production cost, but the cost is much higher than the Middle East and other Opec countries, while those reserves, is not new, but in the past was placed on the adverse "mining", now due to technical progress into "mining". As oil reserves dwindle, oil prices will continue to rise as costs rise. Although oil prices are not only affected by costs but also by demand and politics, the cost of oil extraction is the bottom line. Even if the price of oil fell to $40 today, no one would think that oil would sustain the price. Countries now have a clear understanding of the cyclical nature of oil prices, and they are not as alarmist as stock market investors. Government policymakers recognize the need to develop new sources of energy in response to rising oil prices. This not only reduces the need for environmental pollution, but also enhances national energy independence and the means of dealing with geopolitical struggle. In addition, government policy makers have recognized that environmental security and energy security have become critical issues, not just posterity. As a result, most governments have used the fall in oil prices to raise the consumption tax to subsidise new sources of energy such as photovoltaic and wind power. The Chinese government is no exception. Fortunately, for the price of oil in the cyclical fluctuations, it is not just a small number of elite and government decision makers in the field of new energy, and energy more and more get of energy producers and consumers. This constitutes the basis for new energy applications.

There are signs that global oil production will continue to grow, and that the global economic downturn will lead to demand for crude oil not to rise soon, and that the supply glut will not change. Coupled with a stronger dollar, inventory capacity increase continues a supply glut factors, although the geopolitical support prices factors still exist, such as the lack of stimulation in a certain period, powerful impetus to the rise in oil prices, downward pressure on oil prices will be basic remain unchanged. As a result, international oil prices will remain low in 2015 and take some time to recover. In that case, international agencies have recently lowered their expectations for the future of international oil prices, arguing that oil prices will remain low for a year or two. In January 2015, the US energy information administration (EIA) revised down its forecast for oil prices, which rose from $68 to $58 per barrel at the end of last year to $55 from $63 per barrel. In addition to environmental impact assessments, investment Banks such as Goldman Sachs, chase shares, barclays and bank of America Merrill Lynch also cut their oil price forecasts. With international oil prices falling, the golden age of oil has passed and the post-oil era has arrived. International oil prices are still cyclical, but they are hard to recover before the international financial crisis, amid growing calls for a low-carbon environment and energy efficiency. In the face of a drop in oil prices, Opec, the United States, Russia and other major oil producers will be subject to the influence of different level, as the dominant force in the international crude oil market, the adjustment of energy strategy and policy adjustments that not allow to ignore the influence of international energy structure.

A drop in oil prices is not in the interests of the Opec countries, round but a drop in oil prices, Saudi Arabia, Kuwait and other countries to accept a lower price and attitude with other member states appear differentiation, Saudi Arabia and other members of the important change, means that Opec's failure by adjusting the output regulation, price means represented by Saudi Arabia's the beginning of the Opec countries have gradually abandoned oil policies designed to support oil prices in the past, will consolidate and strive for market share as its focus more oil strategic choice. The low cost of oil production in the Middle East is enough to withstand a prolonged decline in oil prices and the ability to maintain oil export markets through price advantage. Rystad energy and Morgan Stanley estimates that in the Middle East oil drilling cost is only $27, significantly lower than other regions, because of the north American shale oil by horizontal drilling techniques and hydraulic fracturing technology, the production cost is also high of $65 per barrel. At the same time, Saudi Arabia's debt levels are low, with cash reserves of almost $800 billion and a policy space for price wars. The us oil industry has expanded
rapidly in recent years due to increased production of shale oil, but the growth in oil production has never been tested by the continuing decline in oil prices. Saudi Arabia's continued decline in exports to the United States in November and January increased pressure on U.S. energy producers. Owing to the three aspects below, low oil prices could dampen new investment and the continued production of oil fields, lead to a decline in shale production growth. The cost of shale oil and gas is higher than that of traditional underground Wells. Although there is a big difference in the cost of shale oil between different regions and Wells in the same region, some of the high costs of the shale oil Wells will lose their economic value in the current oil price. In the other three years, the decline in shale oil Wells was 60-91%, well above the average drop of 5% in average Wells. According to the report, since last December, the United States has more than 40 oil company in 2015, spending cuts, it is the first time, in recent six years, that there are signs of a slowdown in oil output growth, That's to say, the international oil prices continue to drop And there is impact on shale oil exploitation. Persistently low oil prices will compress margins for many small and medium-sized energy companies, especially those with less debt or debt. The body of the small and medium-sized energy company is to realize the shale gas revolution, during the period of 2008-2013, a large number of small and medium-sized shale oil companies in the United States use of shale oil and gas boom invested heavily, a large number of backlog, formation of high debt, lead to over the years has been in a state of lack of cash flow.

As a result, companies with higher costs and higher debt levels are more likely to be the first to cut production. The export ban on shale oil in China has been relaxed under the double pressure of declining output growth and domestic opposition, but the path to complete relief may not be smooth or even repeated. At the same time, the USA may push the shale oil and gas market to the threshold, taking advantage of this opportunity, eliminate companies whose oil production efficiency, restruct new equity and asset in shale gas fields. Under the influence of the Ukraine crisis, European and American sanctions against Russia are increasing, and the Russian economy is obviously adversely affected. The drop in oil prices has further exacerbated the risk of economic decline and even stagnation. The asia-pacific region has been a highly competitive consumer market for oil and gas, and the drop in oil prices is better than the "accelerator" that pushes Russia's energy strategy eastward. Russia's energy ministry made it clear in its "2035 energy strategy" that accelerating access to the asia-pacific market is a top priority for energy strategy. Russia is eager to build closer ties with energy-hungry China and other asia-pacific countries, expanding its oil and gas exports to the region and reducing its overdependence on Europe.

5. Conclusion
People often say that the stock market is a barometer of industry. As oil prices plunged, shares of global photovoltaic companies fell sharply. This has led many stock investors to panic. In fact, U.S. PV stocks have fallen sharply, because they have accumulated so much momentum that they now need to release some sellers. This is one aspect of the investor's inertia about past oil prices and new energy, and the role of multidimensional gaming. In China, more than 70% of electricity is provided by coal and electricity to provide power less than 15% (70%), the United States, China's oil are mainly used for transport, therefore, not a lot of overlap and photovoltaic power generation. As A result, share prices have not been affected by too much oil. The past economic crisis and energy crisis are the death of new energy. However, when new energy is integrated into daily life and social economy, the relationship between new energy and traditional energy has changed. Now, new energy is not our future choice, but how fast and how far we can go. The collapse in the price of oil, which has led to a pause or long pause in new energy development, has disappeared since disappeared.

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References
[1] Becker, D. (1998). Telephone interview, July29. Daniel Becker isdirector of Sierra Club’s Global
Warming and Energy Program.

[2] Cackette, T. (2003). Personal Communication, May 14. Tom Cackette is Chief Deputy Executive Officer at CARB.

[3] Comby, B. (2002). Telephone interview, April 3. Bruno Comby is the president of L’Association des Ecologistes Pour le Nucléaire.

[4] Geraghty, A. (1998). Telephone interview, June 21. Anne Geraghty is a former Manager of the Transportation.