

TOP TEN 2018

CHINA'S ENERGY EFFICIENCY BEST PRACTICES FOR THE INDUSTRIAL SECTOR

The National Development and Reform Commission of China (NDRC) guided the China Quality Certification Center (CQC) to develop a China TOP TENS Best Energy Efficient Practices list to highlight energy savings practices for China's industrial sector. The list covers a broad range of industrial practices spanning waste-heat recovery, integrating energy management system etc. The practices represent top cases in China that are innovative, sustainable reliable.

Each practice have been weighted using a structured methodology to determine its energy saving and cost achievement, sustainability, originality and innovation, replicability, as well as co-benefits.

How to use the list

Energy consumers, program administrators, developers, designers, and policy makers can use this list to consider the benefits of these practices, while producers of these practitioners can use this list and underlying research to promote their cases in the globally.

China will partner with other countries that also investigated industry practices, including France and Japan. Getting exposure to the Chinese audiences, for example, can be beneficial for Chinese producers to implement the practices in general, as China is one of the largest industrial markets in the world.

Top Tens Task Group

The Top Tens Task Group was established in 2013 and is managed through the International Partnership for Energy Efficiency Cooperation (IPEEC). China, co-leading with Australia, is together with members including Canada, France, Japan, South Korea, and the United States.

The objective of the task group is to improve energy efficiency globally through better exchange of information about technologies and practices. Members of the task group are developing domestic and international Top Tens lists, with related case studies, to provide practical information for technology users.

These will have broad international relevance and provide a range of comparative case studies in different national contexts.



TOP TEN 2018

ENERGY EFFICIENCY PRACTICES FOR CHINA INDUSTRY SECTOR

These are the practices that have demonstrated leading energy efficiencies across the China Industry sector and are innovative or provide other sustainability benefits. The score given is out of 100 possible points.

- 1**
Score: 84.3
The Case about Energy Management System Construction of China National Heavy-Duty Truck Group Corp
China National Heavy-Duty Truck Group Corp emphasizes on construction of energy management system...click for more
- 2**
Score: 83.3
The Case about Energy Conservation Practice of Energy Centralized Management and Control implemented by Yanggu Xiangguang Copper Co., Ltd
Yanggu Xiangguang Copper Co., Ltd actively promotes.. click for more
- 3**
Score: 82.2
The Case about Speed Regulation Technology Reconstruction of Winding-type Permanent Magnet Coupling of Shagang 2500KW Dust Blower
Shagang 2500KW Dust Exhaustion Fan uses Winding...click for more
- 4**
Score: 81.4
The World's Maximum Power Energy Conservation Practice of Flexible Driving Energy Saving Device for Permanent Magnetic Eddy Current of Xinyu Steel Group's Primary Dusting Exhausting Fan for Steel-making
The Blast furnace primary dust exhausting fan... click for more
- 5**
Score: 80.7
Application Practice of Compressed-air System's Energy Conservation Optimization Technology
Relied on the energy-saving optimization technology of compressed air system by independent research... click for more
- 6**
Score: 79.1
Energy System Construction Case of Capital Airport
The capital airport with the covered area of more than 1,500,000 square meters, and the annual comprehensive energy consumption exceeds 100,000 tce, is a "big energy user" in Beijing.... click for more
- 7**
Score: 77.0
The Case about Energy Conservation and Consumption Reduction Management Practice of Pacific Textiles Holdings Ltd
Pacific Textiles, Printing and Dyeing Co., Ltd...click for more
- 8**
Score: 76.7
The Project Case about Energy Efficiency Improvement of Regional Integration for East Sanlian, Branch Company of Shengli Oilfield
Aimed at 845 oil-water wells and the whole... click for more
- 9**
Score: 76.4
Low Temperature Waste-heat Power Generation Case of 2# S -Zorb Device in Yanshan Sinopec Company
This case has utilized the low temperature residual heat (130-140/70 C) of the bottom oil of the 2# 1.2 million.., click for more
- 10**
Score: 74.6
The Practice Application Case of Heat-power Cogeneration's Heating Technology Based on Large Temperature Difference
According to the overall heating planning,... click for more



TOP TENS

ENERGY EFFICIENCY PRACTICES FOR CHINA INDUSTRY SECTOR



1

SCORE 84.3

The Case about Energy Management System Construction of China National Heavy-Duty Truck Group Corp

China National Heavy-Duty Truck Group Corp emphasizes on construction of energy management system and fully promotes the energy conservation of technical reformation, processes and management. In this case, the company implementing technical reformation projects to deploy the opportunities for energy saving of technical reformation, establishing standards to deploy processes energy saving and management energy saving opportunities; Fully implementing management intelligence planning and operation control scheme, ensuring the implementation of various standards, forming the full process control of energy-use; Establishing a documentation systematic framework and implementation guidelines to form a long-term Mechanism.

Through years of practice, the Company has got to understand the key points of the system in depth, continuously promote the construction of the system, gained significant energy saving results. China National Heavy-Duty Truck Group Co., Ltd. is awarded as Ji Nan Energy Conservation Outstanding Contribution Enterprise, Leading Enterprise of Energy Management System Construction in Shandong Province. The case is in the short-list of the Eight Cases of Excellent Energy Management in China and the Energy Management Leadership Award in the 2018 Clean Energy Ministerial meeting, and has played an exemplary role in the continuous promotion of energy management systems in China.

Implementation entity China National Heavy-Duty Truck Group Corp

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	12.2/15
1.2 Cost effectiveness	8.7/10
1.3 Prospect	8.3/10
2. Sustainability	
2.1 Management factor	9.3/10
2.2 PDCA	7.0/10
3. Originality and innovation	
3.1 Originality	8.2/10
3.2 Innovation	8.2/10
4. 4. Transferability/Replicability	
4.1 General applicability	4.6/5
4.2 Ease of implementation	4.6/5
4.3 Ability to integrate external resources	4.4/5
5. Co-benefits	
5.1 Environmental	5.9/7
5.2 Social awareness	2.9/3
TOTAL	84.3/100



2

SCORE 83.3

The Case about Energy Conservation Practice of Energy Centralized Management and Control implemented by Yanggu Xiangguang Copper Co., Ltd

Yanggu Xiangguang Copper Co., Ltd actively promotes “Three-capacity” construction and constantly strengthens energy management. Firstly, by training energy managers to build a high-quality energy management team; Secondly, by Establishing and running energy management system to achieve institutionalization and long-term effects of energy management; Thirdly, by building energy management control center to realize the flat-management and high efficiency of energy management. “Three-capacity” promotes the continuous improvement of energy efficiency work, energy management level and energy-using efficiency in Yanggu Xiangguang Copper Co., Ltd.

Implementation entity: Yanggu Xiangguang Copper Co., Ltd

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	12.8/15
1.2 Cost effectiveness	9.2/10
1.3 Prospect	8.3/10
2. Sustainability	
2.1 Management factor	9.0/10
2.2 PDCA	6.0/10
3. Originality and innovation	
3.1 Originality	8.2/10
3.2 Innovation	8.2/10
4. 4. Transferability/Replicability	
4.1 General applicability	4.2/5
4.2 Ease of implementation	4.3/5
4.3 Ability to integrate external resources	4.3/5
5. Co-benefits	
5.1 Environmental	6.1/7
5.2 Social awareness	2.7/3
TOTAL	83.3/100

[Back to China's Best Practices list](#)

3

SCORE 82.2

The Case about Speed Regulation Technology Reconstruction of Winding-type Permanent Magnet Coupling of Shagang 2500KW Dust Exhaustion Fan

Shagang 2500KW Dust Exhaustion Fan uses Winding-type Permanent Magnet Coupling governor in place of previous Variable Speed Fluid Coupling, which is of more reliability without wasting hydraulic fluid, effectively isolates vibration and noise, reduces damaging of all equipment impact load in the entire gearing chain, has low cost of maintenance, outstanding energy saving results. Shagang users have measured by field meter, indicates the power saving rate was up to 41%. Electrical energy saving of this project annually is 4,305,000 kWh, equivalents to 1506.75 tce., and annual CO2 emissions reduction is 3228.75t. Total investment of the retrofit project is 2,100,000 yuan (Trial Price), the return of investment period is only 6.9 months. This project has high reproducibility, will make a significant energy saving and emission reduction results if it's fully implemented.

Implementation entity: Jiangsu magnet Valley Technologies Co., Ltd

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	12.8/15
1.2 Cost effectiveness	9.0/10
1.3 Prospect	8.7/10
2. Sustainability	
2.1 Management factor	7.5/10
2.2 PDCA	5.6/10
3. Originality and innovation	
3.1 Originality	9.0/10
3.2 Innovation	7.7/10
4. 4. Transferability/Replicability	
4.1 General applicability	4.7/5
4.2 Ease of implementation	4.6/5
4.3 Ability to integrate external resources	4.0/5
5. Co-benefits	
5.1 Environmental	6.2/7
5.2 Social awareness	2.6/3
TOTAL	82.2/100

[Back to China's Best Practices list](#)

ENERGY EFFICIENCY PRACTICES FOR CHINA INDUSTRY SECTOR



SCORE 81.4

The World's Maximum Power Energy Conservation Practice of Flexible Driving Energy Saving Device for Permanent Magnetic Eddy Current of Xinyu Steel Group's Primary Dusting Exhausting Fan for Steel-making

The Blast furnace primary dust exhausting fan (3500KW, 1500RPM) of the second Steel Plant, Xinyu Group had formerly used Fluid Coupling, governed the speed of 600rpm as the lowest. In 2016, the plant has used flexible driving energy saving device WH-4000 of Magna Permanent Magnetic Eddy Current, the minimum speed could turn to 300rpm, which has 45% of electricity saving rate improvement compared with which of Fluid Coupling. The third party, Zhong Energy Saving Consulting Co., Ltd, has tested that the annual energy saving is up to 2261 tce. And also, this project is the first application of flexible driving variable speed energy saving device for Permanent Magnetic Eddy Current in the world's maximum Power (3500 kW) energy conservation practice.

Implementation entity: Magnadrive Corporation Limited, Jiangsu Glow Instrument and Meter Plant Co, Ltd

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	12.6/15
1.2 Cost effectiveness	8.7/10
1.3 Prospect	8.3/10
2. Sustainability	
2.1 Management factor	8.3/10
2.2 PDCA	5.7/10
3. Originality and innovation	
3.1 Originality	8.0/10
3.2 Innovation	8.7/10
4. 4. Transferability/Replicability	
4.1 General applicability	4.3/5
4.2 Ease of implementation	4.2/5
4.3 Ability to integrate external resources	3.8/5
5. Co-benefits	
5.1 Environmental	6.2/7
5.2 Social awareness	2.7/3
TOTAL	81.4/100

[Back to China's Best Practices list](#)



5

SCORE 80.7

Application Practice of Compressed-air System's Energy Conservation Optimization Technology

Relied on the energy-saving optimization technology of compressed air system by independent research, Beijing Ecoso Energy Technology Co., Ltd is committed to build a thousand of intelligent entrusted management air compression stations based on the cloud platform, build cloud data management platform of air compression stations, construct energy saving service platform of air compression industry, and providing energy saving scheme and implementation from the source of power to gas-use terminal. The demonstration project of Binzhou Mengwei Daika not only realizes the obvious effect on declining air compression efficiency but also regulates the figure of air compression station and management standards. At the same time, it changes the messy situation of traditional air compression station and gains many awards, such as the demonstration project of the Sino-US contract energy management in 2017 awarded by the 8th Sino-US Energy Efficiency Forum and the first batch of major technical equipment demonstration project in 2017.

Implementation entity: Beijing Ecoso Energy Technology Co., Ltd

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	13.2/15
1.2 Cost effectiveness	8.3/10
1.3 Prospect	8.7/10
2. Sustainability	
2.1 Management factor	7.2/10
2.2 PDCA	5.8/10
3. Originality and innovation	
3.1 Originality	8.2/10
3.2 Innovation	8.0/10
4. 4. Transferability/Replicability	
4.1 General applicability	4.8/5
4.2 Ease of implementation	4.4/5
4.3 Ability to integrate external resources	3.5/5
5. Co-benefits	
5.1 Environmental	6.1/7
5.2 Social awareness	2.7/3
TOTAL	80.7/100



SCORE 79.1

Energy System Construction Case of Capital Airport

The capital airport with the covered area of more than 1,500,000 square meters, and the annual comprehensive energy consumption exceeds 100,000 tce, is a “big energy user” in Beijing. In addition, high standard of service demand, complex specific system and wide management scope bring difficulties to capital airport's energy saving work. To solve this problem, the capital airport regards energy management system development as the foundation and core of energy conservation work, and allocation every element of energy management into reality, followed the systematic way of Plan-Do-Check-Act (PDCA) improvement. In the operation process, strictly implements energy-saving operation, constantly optimizes the economic operation plan, effectively enhances the energy efficiency of the system. And, by introducing energy saving and consumption reduction mechanism of Energy Performance Contracting (EPC), carrying out the applications of clean light source, building photovoltaic power generation, and promoting the bridge-load power etc. measures, the capital airport annually saves electricity over 15 million kWh, saves fuels and reduces carbon emission equivalent to >100,000 tons a year.

Implementation entity: Beijing Capital International Airport Co, Ltd

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	11.7/15
1.2 Cost effectiveness	8.0/10
1.3 Prospect	8.3/10
2. Sustainability	
2.1 Management factor	8.3/10
2.2 PDCA	6.5/10
3. Originality and innovation	
3.1 Originality	7.5/10
3.2 Innovation	7.5/10
4. 4. Transferability/Replicability	
4.1 General applicability	4.3/5
4.2 Ease of implementation	4.5/5
4.3 Ability to integrate external resources	4.0/5
5. Co-benefits	
5.1 Environmental	5.6/7
5.2 Social awareness	2.8/3
TOTAL	79.1/100

ENERGY EFFICIENCY PRACTICES FOR CHINA INDUSTRY SECTOR



7

SCORE 77.0

The Case about Energy Conservation and Consumption Reduction Management Practice of Pacific Textiles Holdings Ltd.

Pacific Textiles, Printing and Dyeing Co., Ltd considers the work of energy-saving and cost-reduction as the gripper to improve the economic efficiency and the management level, continuously work for energy conservation and consumption reduction, reduces energy consumption of the company's products, which makes the company becomes the benchmark in this industry. And, in the Twelfth Five-Year Plan period, the company carried out more than ten energy-saving projects, achieved energy saving more than 10,000 tce. in annual average. Pacific Textiles, Printing and Dyeing Co., Ltd has gained certification of GB/T23331 and ISO50001 energy management system in 2011 and 2013 respectively. In 2015 the company won the award of NRDC Best Innovation Practice of Energy-Efficiency Prize, awarded by the Natural Resources Defense Council of the U.S. At the same time, the company becomes one of the first batch of pilot enterprises of industrial product ecological design in China. In 2015 and 2016 the company won the honors of the Top Ten enterprises in Guangzhou for energy-saving and cost-reducing. In 2017, the company became a winner of outstanding energy management case awarded enterprises, and then, the company has applied for energy management leading prize of 2018 Clean Energy Ministerial Meeting on behalf of China, and is awarded in the final list.

Implementation entity: Pacific Textiles, Printing and Dyeing Co., Ltd

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	11.8/15
1.2 Cost effectiveness	8.0/10
1.3 Prospect	7.7/10
2. Sustainability	
2.1 Management factor	8.2/10
2.2 PDCA	5.8/10
3. Originality and innovation	
3.1 Originality	7.8/10
3.2 Innovation	7.7/10
4. Transferability/Replicability	
4.1 General applicability	4.0/5
4.2 Ease of implementation	4.1/5
4.3 Ability to integrate external resources	3.8/5
5. Co-benefits	
5.1 Environmental	5.4/7
5.2 Social awareness	2.7/3
TOTAL	77.0/100



SCORE 76.7

The Project Case about Energy Efficiency Improvement of Regional Integration for East Sanlian, Branch Company of Shengli Oilfield

Aimed at 845 oil-water wells and the whole production process on ground in East Sanlian area of Shengli Oilfield comprehensive energy efficiency improvement project has utilized 15 technologies, such as streamline adjustment, lifting optimization design, high frequency coalescing water separation and pressure matching of pipe network etc. to implement energy saving technology transformation, full plays the coordination effectiveness of various technologies and oil reservoirs, processes, gathering and transportation, and ground systems, enhances the regional energy efficiency. The project has gained 1320 tons of oil increasing annually, annual energy saving 2284.5 tons of standard coal, and comprehensive energy consumption of tons of oil and gas has reduced by 7.09kg of standard coal/ton.

Implementation entity: China Petroleum & Chemical Corporation, SINOPEC Shengli Oilfield Company

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	11.6/15
1.2 Cost effectiveness	7.2/10
1.3 Prospect	7.8/10
2. Sustainability	
2.1 Management factor	8.0/10
2.2 PDCA	5.6/10
3. Originality and innovation	
3.1 Originality	7.8/10
3.2 Innovation	8.2/10
4. Transferability/Replicability	
4.1 General applicability	3.7/5
4.2 Ease of implementation	4.2/5
4.3 Ability to integrate external resources	4.0/5
5. Co-benefits	
5.1 Environmental	6.2/7
5.2 Social awareness	2.6/3
TOTAL	76.7/100

[Back to China's Best Practices list](#)



SCORE 76.4

Low Temperature Waste-heat Power Generation Case of 2# S-Zorb Device in Yanshan Sinopec Company

This case has utilized the low temperature residual heat (130-140/70 C) of the bottom oil of the 2# 1.2 million tons/year S-Zorb plant to setup the ORC organic Rankine cycle generator set. The bottom oil enters directly into the evaporator to transfer the heat to the circulating working fluid of the circulating system. The working fluid steam enters the screw expander to work, drives the generator to generate electricity, and then circulates again in the system after the working fluid is cooled and condensed. According to the project metering, the output power of the unit is about 677kW, the net generating capacity of the unit is about 535kW, which can meet the total power load of 50% of the device, and the energy consumption of the device is reduced by 15%, the energy saving can be reached to 1,680,000 kgce/ year. In the repair period, and has a precondition of reserved interfaces, the project can be implemented without stopping work.

Implementation entity: Sinopec Engineering Incorporation

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	11.4/15
1.2 Cost effectiveness	7.8/10
1.3 Prospect	8.0/10
2. Sustainability	
2.1 Management factor	7.3/10
2.2 PDCA	5.8/10
3. Originality and innovation	
3.1 Originality	7.8/10
3.2 Innovation	7.8/10
4. Transferability/Replicability	
4.1 General applicability	3.8/5
4.2 Ease of implementation	3.7/5
4.3 Ability to integrate external resources	3.5/5
5. Co-benefits	
5.1 Environmental	6.5/7
5.2 Social awareness	2.8/3
TOTAL	76.4/100

[Back to China's Best Practices list](#)

10

SCORE 74.6

The Practice Application Case of Heat-power Cogeneration's Heating Technology Based on Large Temperature Difference

According to the overall heating planning of Datong and the actual heating situation of the power plant, this case is based on the central heating project of Datong in Shanxi province, is a retrofit project utilizing the heat and power cogeneration technology of large temperature difference. In this project, there are 104 absorption heat pump units are installed in the 2nd level heat exchange stations in the city to reduce the return temperature of the primary network. Correspondingly, In the power plant, an integrated absorption heat pump unit with four pre-heat exchangers are installed in the 2 x 220MW and 2 x 300MW units, to recover the waste heat of steam turbine exhaust steam and to heat the hot water in primary network. The project has reduced the return water temperature of the primary network to 39 degrees Celsius, improved the transportation capacity of the pipeline network by 38% and increased the heating area by 8.89 million m². The project annually saves 232,000 tons of standard coal, reduces 599,000 tons of carbon dioxide emissions, 8,100 tons of sulfur dioxide and 34,700 tons of smoke-dust emission. It plays an important role in alleviating the contradiction between insufficient heat sources and increasing demand of heating in urban areas and gains notable social and economic benefits.

Implementation entity: Shanxi Datang International Yungang Thermal Power Co., Ltd

Score and weighting

Indicator	Score
1. Energy saving and cost achievement	
1.1 Energy savings	11.8/15
1.2 Cost effectiveness	6.7/10
1.3 Prospect	7.7/10
2. Sustainability	
2.1 Management factor	7.5/10
2.2 PDCA	5.7/10
3. Originality and innovation	
3.1 Originality	7.5/10
3.2 Innovation	7.7/10
4. 4. Transferability/Replicability	
4.1 General applicability	3.7/5
4.2 Ease of implementation	4.0/5
4.3 Ability to integrate external resources	3.5/5
5. Co-benefits	
5.1 Environmental	6.3/7
5.2 Social awareness	2.7/3
TOTAL	74.6/100