BEST-Cement Training Workshops

Yantai (Shandong Province)
Shijiazhuang (Hebei Province)
Taiyuan (Shanxi Province)
July, 2008

9 July **Shandong Province Cement Enterprise Energy Efficiency Benchmarking Training Conference**, Chaired by Shandong Energy Efficiency Association
Attendees: 29 people from 17 cement plants
http://ies.lbl.gov/China/Attendees.Yantai.pdf

Opening remarks

Shandong Economic and Trade Commission – Mr. Zhao Xudong
Yantai Economic and Trade Commission
China Cement Association – Zeng Xuemin
Lawrence Berkeley National Laboratory – Lynn Price
Energy Foundation – He Ping

Presentations

Update of national policies of energy conservation target and energy benchmarking management in China, Zhou Fuqiu, Energy Research Institute, NDRC, http://ies.lbl.gov/China/Zhou.Fuqiu.National.E.Saving.Policies.pdf

Update of energy benchmarking in cement industry, Zeng Xuemin, China Cement Association, http://ies.lbl.gov/China/CCA.Tianjin.EE.Benchmarking.Cement.pdf

National standards for the limited values of energy consumption of cement products, Tianjin Cement Industry Design & Research Institute, http://ies.lbl.gov/China/Tianjin.E.Standards.Cement.pdf

Best international practices of energy benchmarking in cement industry and introduction to BEST Cement, Christina Galitsky, Lawrence Berkeley National Laboratory http://ies.lbl.gov/China/BEST-Cement.Training.ppt

BEST-Cement Tool Demonstration, Zhou Nan, Lawrence Berkeley National Laboratory

Providing technical support to the cement plants for their energy conservation activities, China Cement Association, China Building Materials Academy, Tianjin Cement Industry Design & Research Institute (http://ies.lbl.gov/China/Tianjin.ppt), One Carbon/Azure International (http://ies.lbl.gov/China/OneCarbon.ppt), Schneider Electric

Hands-On Break-Out Session

Groups tested BEST-Cement Tool

Christina Galitsky describing BEST-Cement

Zhou Nan demonstrating BEST-Cement

Hand-On Break-Out Session

14-15 July **Hebei Province Cement Enterprise Energy Efficiency Benchmarking Training Conference**, Chaired by Hebei Building Material Association
Attendees: 51 people from 37 cement plants

Opening remarks

Hebei Building Materials Association – Ge Xudong, Secretary General
- Hebei is the 5th largest cement producing province in China
- Cement plays a very important role in the province
- Structure of the plants is not good – consume a lot of energy
- Some small plants will be closed by 2010.

Hebei Provincial Development and Reform Commission – Wang Jinghu
- Only 7 provinces in China that didn't meet their energy saving target
- Hebei is one of them
- Companies that are doing well receive awards
- Companies that are not doing well were criticized by the local government

China Cement Association – Zeng Xuemin
Lawrence Berkeley National Laboratory – Lynn Price
Energy Foundation – He Ping

Presentations

Update of national policies of energy conservation target and energy benchmarking management in China, Liu Zhiping, Energy Research Institute, NDRC

Update of energy benchmarking in cement industry, Zeng Xuemin, China Cement Association, http://ies.lbl.gov/China/CCA.Tianjin.EE.Benchmarking.Cement.pdf

National standards for the limited values of energy consumption of cement products, Tianjin Cement Industry Design & Research Institute, http://ies.lbl.gov/China/Tianjin.E.Standards.Cement.pdf

Methodologies of evaluating energy savings for sectors and enterprises, Energy Research Institute, NDRC

Best international practices of energy benchmarking in cement industry and introduction to BEST Cement, Christina Galitsky, Lawrence Berkeley National Laboratory http://ies.lbl.gov/China/BEST-Cement.Training.ppt

BEST-Cement Tool Demonstration, Zhou Nan, Lawrence Berkeley National Laboratory

Lessons learned from energy conservation activities by two cement plants in Hebei: Tangshen Jigong Cement Co., Ltd. and Luquan Quzhai Cement Co., Ltd.

Implementation manual of energy efficiency benchmarking in cement enterprises, China Cement Association and Tianjin Cement Industry Design & Research Institute

Providing technical support to the cement plants for their energy conservation activities, China Cement Association, China Building Materials Academy, Tianjin Cement Industry Design & Research Institute (http://ies.lbl.gov/China/Tianjin.ppt), One Carbon/Azure International (http://ies.lbl.gov/China/OneCarbon.ppt), Schneider Electric

Hands-On Break-Out Session

Groups tested BEST-Cement Tool

16-17 July **Shanxi Province Cement Enterprise Energy Efficiency Benchmarking Training Conference**, Chaired by Shanxi Association of Environment and Resources Comprehensive Utilization
Attendees: Shanxi Province: 60 people from 55 cement plants

Opening remarks

Shanxi Provincial Economic Commission
- 84% of energy in Shanxi province is for industry
- Shanxi province did not meet its target in 2006
- 86 Top-1000 enterprises in Shanxi Province
- added another 114 enterprises to make Top-200 program
- saved 5 Mtce in 2007

China Cement Association – Zeng Xuemin
Lawrence Berkeley National Laboratory – Lynn Price
Energy Foundation – He Ping

Presentations

Update of national policies of energy conservation target and energy benchmarking management in China, Liu Zhiping, Energy Research Institute, NDRC

Update of energy benchmarking in cement industry, Zeng Xuemin, China Cement Association, http://ies.lbl.gov/China/CCA.Tianjin.EE.Benchmarking.Cement.pdf

National standards for the limited values of energy consumption of cement products, Tianjin Cement Industry Design & Research Institute, http://ies.lbl.gov/China/Tianjin.E.Standards.Cement.pdf

Evaluation methods of regional/enterprises' energy saving potential and effects, Xiong Huawen, Energy Research Institute, NDRC

Best international practices of energy benchmarking in cement industry and introduction to BEST Cement, Christina Galitsky, Lawrence Berkeley National Laboratory http://ies.lbl.gov/China/BEST-Cement.Training.ppt

BEST-Cement Tool Demonstration, Zhou Nan, Lawrence Berkeley National Laboratory

Energy assessment for cement plants, China Building Materials Academy

Latest development of energy efficiency in cement enterprises, China Building Materials Academy

Lessons learned from energy conservation activities in two cement plants in Shanxi Province: Zhihai cement plant and Shitou cement plant

Providing technical support to the cement plants for their energy conservation activities, China Cement Association, China Building Materials Academy, Tianjin Cement Industry Design & Research Institute (http://ies.lbl.gov/China/Tianjin.ppt), One Carbon/Azure International (http://ies.lbl.gov/China/OneCarbon.ppt), Schneider Electric

Hands-On Break-Out Session

Groups tested BEST-Cement Tool






Appendix A – Results of Participant Survey

Yantai, Shandong **Total: 32**		Excel-lent	Very Good	Good	Fair	Poor
1	Please rate your overall satisfaction with the BEST Cement training	22	8	1	1	0
2	What rating would you give the instructors on their knowledge of the subject matter?	16	13	3	0	0
3	What rating would you give the instructors on their ability to respond to questions and provide examples?	17	12	3	0	0
4	To what extent was the information presented at a level that was easy to use and understand?	10	16	4	2	0
5	What is your overall evaluation of BEST Cement?	10	18	3	1	0
6	Do you think you will use BEST Cement for your cement plant?	Yes- 30			No- 0	

Remarks: 2 people did not answer Q6.

Hebei **Total: 24**		Excel-lent	Very Good	Good	Fair	Poor
1	Please rate your overall satisfaction with the BEST Cement training	18	6	0	0	0
2	What rating would you give the instructors on their knowledge of the subject matter?	15	7	2	0	0
3	What rating would you give the instructors on their ability to respond to questions and provide examples?	17	6	1	0	0
4	To what extent was the information presented at a level that was easy to use and understand?	14	8	2	0	0
5	What is your overall evaluation of BEST Cement?	11	8	5	0	0
6	Do you think you will use BEST Cement for your cement plant?	Yes-23			No- 0	

Remarks: 1 person did not answer Q6

Shanxi **Total: 9**		Excel-lent	Very Good	Good	Fair	Poor
1	Please rate your overall satisfaction with the BEST Cement training	4	4	1	0	0
2	What rating would you give the instructors on their knowledge of the subject matter?	3	4	2	0	0
3	What rating would you give the instructors on their ability to respond to questions and provide examples?	3	5	1	0	0
4	To what extent was the information presented at a level that was easy to use and understand?	1	7	1	0	0
5	What is your overall evaluation of BEST Cement?	4	4	1	0	0
6	Do you think you will use BEST Cement for your cement plant?	Yes- 8			No- 0	

Remarks: 1 person did not answer Q6

Appendix B - Hands on examples for BEST-Cement

Example #1 - Beibei Cement Plant
Data for a Plant in China with a % Reduction Target

Your target is a 20% final energy reduction. After you have benchmarked your plant, construct an energy management plan to achieve your savings goal of 20% using the energy efficiency measures section of the tool.

Raw Materials used at your plant (tonnes/year):

Limestone:	1,500,000
Gypsum:	50,000
Clay minerals:	0
Iron ore:	0
Blast furnace slag:	100,000
Other slags:	50,000
Fly ash:	0
Natural pozzolans:	100,000
Limestone powder:	0
Municipal wastes:	0

You preblend and crush all of your raw materials.
You only dry the slags you add to your raw material mix, but you grind all slags and pozzolans.

Both of your kilns are NSP kilns, one produces 250,000 tonnes/year of clinker and one produces 750,000 tonnes/year of clinker.

You produce the following cement types:

- 500,000 tonnes/year of pure Portland cement of the lowest quality (42.5/42.5R)
- 250,000 tonnes/year of 32.5 slag cement
- 250,000 tonnes/year of 42.5 slag cement
- 250,000 tonnes/year of 52.5R Pozzolana cement

All mills at your plant are ball mills. You grind 155,555 tonnes of coal. A quarry is not located at your site and you do not generate any electricity on site.

You purchase and use electricity for the following processes (kWh/year):

Preblending:	3,500,000
Crushing:	1,500,000
Grinding:	42,400,000
Additive crushing and grinding:	20,000,000
Fuel grinding:	5,500,000
Homogenization:	4,000,000
Kiln preheaters:	140,000,000
Clinker cooler:	4,500,000
Cement grinding:	75,500,000
Other conveying and auxiliaries:	14,250,000
Other electricity:	2,000,000

You use coal for the following processes:
Additive drying: 5,000,000 kg of cleaned coal
Precalciners: 5,555,500 kg of cleaned coal
Kiln: 145,000,000 kg of cleaned coal

You pay 0.5 RMB/kWh for electricity and 0.7 RMB/kgce for coal.

Example #2 - Jingjing Cement Plant
Data for a Plant in China with an Energy-Saving Target

Your target is a reduction of 28,000 tce over 5 years. After you have benchmarked your plant, construct an energy management plan to achieve your savings goal of 28,000tce using the energy efficiency measures section of the tool.

Raw Materials used at your plant (tonnes/year):

Limestone:	500,000
Gypsum:	25,000
Clay minerals:	5000
Iron ore:	0
Blast furnace slag:	0
Other slags:	0
Fly ash	0
Natural pozzolans:	0
Limestone powder:	0
Municipal wastes:	0
Other 1:	0
Other 2:	0

You preblend and crush all of your raw materials.

Both of your kilns are preheater kilns, one produces 325,000 tonnes/year of clinker and one produces 250,000 tonnes/year of clinker.

You produce only Portland cement:
60,000 tonnes/year of low quality (42.5) pure Portland cement
300,000 tonnes/year of 52.5 pure Portland cement
250,000 tonnes/year of high quality (62.5/62.5R) pure Portland cement

Your raw material grinding mills and fuel grinding mills are ball mills but you have new horizontal roller mills to grind cement. You grind 145,000 tonnes of coal. You have a quarry located at your site. You do not generate any electricity on site.

You purchase and use electricity for the following processes (kWh/year):

Raw materials conveying:	500,000
Preblending:	700,000
Crushing:	425,000
Grinding:	10,000,000
Fuel grinding:	5,200,000
Homogenization:	1,000,000
Kiln preheaters:	1,400,000
Clinker cooler:	25,000,000
Cement grinding:	22,500,000
Other conveying and auxiliaries:	8,250,000
Other electricity:	700,000

You use coal for the following processes:
Kiln: 145,000,000 kg of cleaned coal

You pay 0.55 RMB/kWh for electricity and 600 RMB/tonne of coal.

Example #3 - Huanhuan Cement Plant
Data for a Plant in China with a Specific Budget for Energy Efficiency

You are trying to reduce energy consumption at your plant and you have a budget of 125,000,000 RMB. After benchmarking your plant, construct an energy efficiency plan for your plant, using the energy efficiency measures section of the tool to maximize the energy savings with the assigned budget.

Raw Materials used at your plant (tonnes/year):

Limestone:	2,000,000
Gypsum:	120,000
Fly ash:	200,000
Limestone powder:	100,000

You preblend and crush all of your raw materials.
You to not need to dry any additives but you grind all your fly ash before blending.

You have one NSP kiln which produces 1,000,000 tonnes/year of clinker and one preheater kiln that produces 500,000 tonnes/year of clinker.

You produce the following cement types:
450,000 tonnes/year of pure Portland cement of the lowest quality
300,000 tonnes/year of 52.5 Portland cement
100,000 tonnes/year of high quality (62.5) Portland cement
300,000 tonnes/year of both 42.5 and 52.5 fly ash cement
200,000 tonnes/year of 32.5 limestone cement
150,000 tonnes/year of 42.5 limestone cement

You have two raw materials milling lines, half of your production goes to each line. One is a ball mill and one is a vertical roller mill. You grind 233,500 tonnes of coal in a vertical roller mill. You just installed a new high pressure roller press to handle all the Portland cement that you produce. The rest is ground in your old ball mills.

Your quarry is located off site.

You generate 20% of the electricity you use on site. All of this is generated through waste heat, no extra fuels are used to produce this electricity.

You use purchased and produced electricity for the following processes (kWh/year):

Preblending:	3,200,000
Crushing:	1,200,000
Grinding:	45,000,000
Additive crushing and grinding:	6,000,000
Fuel grinding:	6,000,000
Homogenization:	1,500,000
Kiln preheaters:	20,000,000
Clinker cooler:	4,500,000
Cement grinding:	60,000,000
Other conveying and auxiliaries:	22,000,000
Other electricity:	3,000,000

You use coal for the following processes:
Precalciners: 8,500,000 kg of cleaned coal
Kiln: 225,000,000 kg of cleaned coal

You pay 0.5 RMB/kWh for electricity and 600 RMB/tonne for coal.

Example #4 Yingying Cement Plant
Data for a Plant in China with a Payback Period of 3 years for Energy Efficiency Measures

You are trying to reduce energy consumption at your plant. You can put together a package of measures as long as the total payback period is less than 3 years for the whole package. Using this limitation, try to make your facility as efficient as possible.

Raw Materials used at your plant (tonnes/year):

Limestone:	2,000,000
Gypsum:	200,000
Blast furnace slag:	500,000
Other slags:	100,000
Fly ash:	200,000
Sewage waste:	250,000

You preblend and crush all of your raw materials.
You dry all your sewage in addition to all your slags and you grind all your slags and fly ash before blending.

You have only one dry hollow kiln which produces 1,500,000 tonnes/year of clinker.

You produce the following cement types:
100,000 tonnes/year of pure Portland cement of the lowest quality
900,000 tonnes/year of 32.5 common Portland cement
500,000 tonnes/year of 32.5 and 52.5 slag cement (1,000,000 tonnes total)
300,000 tonnes/year of 52.5 fly ash cement

You have only one milling line, all ball mills. You grind 511,500 tonnes/year of coal.
Your quarry is located off site.

You generate 10% of the electricity you use on site. All of this is generated through coal, no waste heat is currently are used to produce this electricity.

You use purchased and self-produced electricity for the following processes (kWh/year):

Preblending:	6,000,000
Crushing:	2,000,000
Grinding:	90,000,000
Additive crushing and grinding:	40,000,000
Fuel grinding:	20,000,000
Homogenization:	2,000,000
Kiln preheaters:	20,000,000
Clinker cooler:	60,000,000
Cement grinding:	150,000,000
Other conveying and auxiliaries:	28,000,000
Other electricity:	4,000,000

You use coal for the following processes:
Additive drying: 44,500,000 kg of cleaned coal
Precalciners: 112,000,000 kg of cleaned coal
Kiln: 350,000,000 kg of cleaned coal

You pay 0.6RMB/kWh for electricity and 550 RMB/tonne for coal.

Example #5 - Nini Cement Plant
Data for a Plant in China with a Carbon Dioxide Emissions Reduction Target

Your target is a CO_2 reduction of 50,000 tonnes CO_2 per year. After you benchmark your plant, construct an energy management plan to achieve your savings goal using the energy efficiency measures section of the tool.

Raw Materials used at your plant (tonnes/year):

Limestone:	1,500,000
Gypsum:	50,000
Clay minerals:	0
Iron ore:	0
Blast furnace slag:	100,000
Other slags:	50,000
Fly ash:	0
Natural pozzolans:	100,000
Limestone powder:	0
Municipal wastes:	0
Other 1:	0
Other 2:	0

You preblend and crush all of your raw materials.
You only dry the slags you add to your raw material mix, but you grind all slags and pozzolans.

Both of your kilns are NSP kilns, one produces 250,000 tonnes/year of clinker and one produces 750,000 tonnes/year of clinker.

You produce the following cement types:
500,000 tonnes/year of pure Portland cement of the lowest quality (42.5/42.5R)
250,000 tonnes/year of 32.5 slag cement
250,000 tonnes/year of 42.5 slag cement
250,000 tonnes/year of 52.5R Pozzolana cement

All mills at your plant are ball mills. You grind 155,555 tonnes of coal. A quarry is not located at your site and you do not generate any electricity on site.

You purchase and use electricity for the following processes (kWh/year):

Preblending:	3,500,000
Crushing:	1,500,000
Grinding:	42,400,000
Additive crushing and grinding:	20,000,000
Fuel grinding:	5,500,000
Homogenization:	4,000,000
Kiln preheaters:	140,000,000
Clinker cooler:	4,500,000
Cement grinding:	75,500,000
Other conveying and auxiliaries:	14,250,000
Other electricity:	2,000,000

You use coal for the following processes:
Additive drying: 5,000,000 kg of cleaned coal
Precalciners: 5,555,500 kg of cleaned coal
Kiln: 145,000,000 kg of cleaned coal
You pay 0.5RMB/kWh for electricity and 0.7 RMB/kgce for coal