The Design of Flat Energy Management Structure for Iron & Steel Enterprises in China

Yuhui Jin (Lead Author)
• Ph.D. Student, School of Energy and Power Engineering, Huazhong University of Science and Technology
• Phone & E-mail: +8613476133408, yuhui_jin1990@outlook.com
• Address: Room 621, The Power Building, Huazhong University of Science and Technology, 1037#, Luoyu Road, Hongshan District, Wuhan, Hubei Province, P.R. CHINA.

Yonghong Huang
• Professional-level Senior Engineer, Academy of Technology, WISDRI Engineering & Research Incorporation Limited
• Phone & E-mail: +8613986066578, 15042@wisdri.com

Shiping Jin
• Professor, School of Energy and Power Engineering, Huazhong University of Science and Technology
• Phone & E-mail: +8613707118223, 13707118223@163.com

Junyin Zhang
• Master Student, School of Energy and Power Engineering, Huazhong University of Science and Technology
• Phone & E-mail: +8613007146158, 634149799@qq.com

Yan Long
• Associate Professor, School of Energy and Power Engineering, Huazhong University of Science and Technology
• Phone & E-mail: +8613720282065, ly_hust@163.com

The work is supported by the National Key Research and Development Program of China (No. 2016YFF0201502-2), the Science & Technology Pillar Program of Hubei province (No. 2015BCA292) and the Fundamental Research Funds for the Central Universities (No. 2016YXZD007).
The Design of Flat Energy Management Structure for Iron & Steel Enterprises in China

Introduction

For China, iron and steel industry is the third biggest GHG contributor in 2014.

→ Energy saving is quite a significant issue for iron and steel enterprises in China.

The energy saving BATs (Best Action Technologies) for iron and steel industry have been applied on a large scale.

→ Informationized and effective energy management will play a more important role.

The necessity of energy management structure reconstruction

The hierarchical management structure → Low dispatch permission for dispatcher → Dispatch order delay → Miss the best dispatch time → Poor dispatch effect

Low efficiency: the hierarchical energy management structure

→ High efficiency: the flat energy management structure

The design of flat energy management structure

All the energy management structure patterns here are abstract summaries based on typical iron and steel enterprises in China. We divide all the patterns into two levels, total flat structure and partial flat structure, by different flatness.

Total flat structure:

Energy dispatch by energy center is to balance the supply and demand of energy, which is the key of energy management to achieve the least waste of energy.

The EMS and energy management of iron and steel enterprises in China

The following figures based on our investigation are demonstration of EMS and energy dispatch of iron and steel enterprises in China.

→ It is the hierarchical management structure and low information transfer efficiency that lead to inefficient energy management.

Many iron and steel enterprises in China have established energy control centers or energy centers with EMS (Energy Management System). However, the energy saving effects of EMS differ among different enterprises.

→ How to combine energy management with EMS is the key to make a difference, which means that a redesigning of energy management structure is necessary.

The EMS and energy management in iron and steel enterprises

EMS is an information platform to collect all important information. All these valuable information will support the energy management at all levels.

Partial flat structure:

Partial flat structure is the transitional phase of total flat structure, which generally means the operations can’t be unattended and with lower permission.

The following figures based on our investigation are the schematic diagrams of typical flat structure.

Case model 1 (based on Tianjin Iron & Steel Group Co., LTD.)

Features: typical partial flat structure, good energy saving effect, structure redundancy of energy center.

Case model 2 (based on Hunan Valin Xiangtan Iron and Steel CO.,LTD.)

Features: clear management level, limited energy dispatch permission.

Case model 3 (based on WISCO headquarters)

Features: fast management transition and adaptation, poor energy saving effect.