# 中 金 招 标 有 限 责 任 公 司
## CHINA CAPITAL TENDERING CO., LTD.

| To: | 所有购买招标文件的潜在投标人 | Date: | 2026 年 1 月 13 日 |
|---|---|---|---|
| Originator: | 桑垠淼 | Telephone: | 010-68405033 |
| E-mail: | cctcwz@chinatendering.com.cn | Fax: | 010-68405006 |

**SUBJECT:** 利用法开署贷款淄博市供热管网互联互通和工业余热综合利用一期项目-常规供热设备及材料包

　(招标编号：0773-2550QGHW0070)

招标文件补遗第 1 号

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所有购买招标文件的潜在投标人：

　　现将上述项目的招标文件做出如下修改：

**1. 投标文件递交截止时间和开标时间变更/Amendment to Deadline for Submission of Tender Documents and Bid Opening Time**

　　投标文件递交截止时间和开标时间由 2026 年 1 月 26 日 9:30 时（北京时间）修改为：2026 年 1 月 29 日 9:30 时（北京时间）。

　　The Deadline for Submission of Bids and the bid opening time is changed from January 26, 2026, 9:30 a.m. (Beijing Time) to January 29, 2026, 9:30 a.m. (Beijing Time).

**2. 第二章：投标资料表 第 22.1 款/Section II. Bid Data Sheet (BDS) ITB22.1**

**原规定：**

投标文件的递交截止时间：

日期：2026 年 1 月 5 日

时间：上午 9:30（北京时间）

**现修改为：**

投标文件的递交截止时间：

日期：2026 年 1 月 29 日

时间：上午 9:30（北京时间）

**Original Provisions:**

The deadline for the submission of bids is:

Date: January 5, 2026

Time: 9:30 a.m. (Beijing time)

**Revised As Follows:**

The deadline for the submission of bids is:

Date: January 29, 2026

Time: 9:30 a.m. (Beijing time)

**3. 第二章：投标资料表 第 25.1 款 2./Section II. Bid Data Sheet (BDS) ITB25.1**

**原规定：**

开标地点：北京市海淀区西三环北路 21 号久凌大厦 15 层中金招标有限责任公司会议室

城市：北京

国家：中国

日期：2026 年 1 月 5 日

时间：上午 9:30（北京时间）

为正常推进开标，不设置最低投标人数量。

**现修改为：**

开标地点：北京市海淀区西三环北路 21 号久凌大厦 15 层中金招标有限责任公司会议室

城市：北京

国家：中国

日期：2026 年 1 月 29 日

时间：上午 9:30（北京时间）

为正常推进开标，不设置最低投标人数量。

**Original Provisions:**

The bid opening shall take place at:

Street Address: Meeting Room of China Capital Tendering Co., Ltd. 15th Floor, Jiuling Building, No. 21 West Third Ring North Road, Haidian District, Beijing

City: Beijing

Country: People's Republic of China

Date: January 5, 2026

Time: 9:30 a.m. (Beijing time)

No minimum number of bids is required in order to proceed to bid opening.

**Revised As Follows:**

The bid opening shall take place at:

Street Address: Meeting Room of China Capital Tendering Co., Ltd. 15th Floor, Jiuling Building, No. 21 West Third Ring North Road, Haidian District, Beijing

City: Beijing

Country: People's Republic of China

Date: January 29, 2026

Time: 9:30 a.m. (Beijing time)

No minimum number of bids is required in order to proceed to bid opening.

4. **第七章技术规范——表一：货物清单 六、阀门部分/Section VII. Schedule of Requirements——Table 1: List of Goods six、Valve**

替换

详见附件一：表一：货物清单 六、阀门部分

**Replacement**

Please refer to Attachment 1: Table 1: List of Goods six、Valve

5. **第七章技术规范——第九节 热网控制系统的专用技术参数/Section VII. Schedule of Requirements——Section 9: Specialized Technical Parameters for District Heating Control System**

替换

详见附件二：第九节 热网控制系统的专用技术参数

**Replacement**

Please refer to Attachment 2: Section 9: Specialized Technical Parameters for District Heating Control System

招标文件其他内容不变。

特此通知。

收到此通知，请盖章后扫描回复邮件确认。

The rest of the Bidding documents shall remain unchanged.

This is to inform you.

Please affix your company seal, scan the document and reply to the email for confirmation upon receipt of this notice.

中金招标有限责任公司
CHINA CAPITAL TENDERING CO., LTD.
**2026 年 1 月 13 日**

附件一：表一：货物清单 六、阀门部分/Attachment 1: Table 1: List of Goods six、Valve

附件二：第九节 热网控制系统的专用技术参数/Attachment 2: Section 9: Specialized Technical Parameters for District Heating Control System

附件三：标前会会议纪要/Minutes of Pre Bidding Meeting

# 回执

我方确认已收到利用法开署贷款淄博市供热管网互联互通和工业余热综合利用一期项目-常规供热设备及材料包（招标编号：0773-2550QGHW0070）招标文件补遗第 1 号。**We hereby confirm that we have received Addendum No. 1 to the Tender Documents for Zibo Heating Pipe Network Interconnection and Industrial Waste Heat Comprehensive Utilization Project Phase I - Conventional Heating Equipment and Material Package (IPC No: 0773-2550QGHW0070) .**

**单位名称（加盖公章）/Name of Entity (Seal Required):**

**日期/Date：**

Attachment 1: Table 1: List of Goods six    Valve

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

# List of Domestic Valves

| No. | Equipment/Material Name | Unit | QTY | Specification | Remarks | Standard No. | Delivery Date (Incoterms®) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Earliest Delivery Date | Latest Delivery Date | Bidder's Proposed Delivery Date |
| six、 Valve | | | | | | | | | |
| 1 | Butterfly Valve | set | 6 | DS363H-25C-DN1400 | | | | | |
| 2 | Butterfly Valve | set | 4 | DS363H-25C-DN1200 | | | | | |
| 3 | Butterfly Valve | set | 4 | DS363H-25C-DN1000 | | | | | |
| 4 | Butterfly Valve | set | 6 | DS363H-25C-DN800 | | | | | |
| 5 | Electrically operated fully welded ball valve | set | 2 | DN250　PN25 | Temperature resistant 100℃ integrated controller | | | | |
| 6 | Electrically operated fully welded ball valve | set | 1 | DN200　PN25 | Temperature resistant 100℃ integrated controller | | | | |
| 7 | Butterfly slow-closing non-return valve (equipped with weight hammer) | set | 1 | DN900　PN25 | | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 8 | Butterfly slow-closing non-return valve (equipped with weight hammer) | set | 4 | DN600　PN25 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9 | Full-port welded ball valve | set | 2 | DN200　PN25 | | | | | |
| 10 | Motorized full-port welded ball valve | set | 5 | DN200　PN25 | Temperature resistant 100℃ integrated controller | | | | |
| 11 | Motorized full-port welded ball valve | set | 1 | DN150　PN25 | Temperature resistant 100℃ integrated controller | | | | |
| 12 | Pilot-operated Safety Valve | set | 1 | DN200,60℃　PN25 | | | | | |
| 13 | Welded Ball Valve | set | 2 | Q367F-25C DN800 | | | | | |
| 14 | Welded Ball Valve | set | 12 | Q367F-25C DN600 | | | | | |
| 15 | Welded Ball Valve | set | 2 | Q367F-25C DN450 | | | | | |
| 16 | Welded Ball Valve | set | 6 | Q367F-25C DN400 | | | | | |
| 17 | Welded Ball Valve | set | 26 | Q367F-25C DN350 | | | | | |
| 18 | Welded Ball Valve | set | 20 | Q367F-25C DN300 | | | | | |
| 19 | Welded Ball Valve | set | 40 | Q361F-25C DN250 | | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 20 | Welded Ball Valve | set | 26 | Q361F-25C DN200 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 21 | Welded Ball Valve | set | 10 | Q361F-25C DN150 | | | | | |
| 22 | Welded Ball Valve | set | 6 | Q361F-25C DN125 | | | | | |
| 23 | Welded Ball Valve | set | 8 | Q361F-25C DN100 | | | | | |
| 24 | Welded Ball Valve | set | 2 | Q367F-16C DN250 | | | | | |
| 25 | Welded Ball Valve | set | 2 | Q367F-16C DN200 | | | | | |
| 26 | Welded Ball Valve | set | 4 | Q367F-16C DN500 | | | | | |
| 27 | Welded Ball Valve | set | 4 | Q361F-25C DN350 | | | | | |
| 28 | Welded Ball Valve | set | 6 | Q361F-25C DN300 | | | | | |
| 29 | Welded Ball Valve | set | 8 | Q361F-25C DN250 | | | | | |
| 30 | Welded Ball Valve | set | 54 | Q361F-25C DN200 | | | | | |
| 31 | Welded Ball Valve | set | 44 | Q361F-25C DN150 | | | | | |
| 32 | Welded Ball Valve | set | 28 | Q361F-25C DN125 | | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 33 | Welded Ball Valve | set | 26 | Q361F-25C DN100 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 34 | Welded Ball Valve | set | 4 | Q61F-25C DN80 | | | | | |
| 35 | Welded Ball Valve | set | 12 | Q61F-25C DN50 | | | | | |
| 36 | Welded Ball Valve | set | 10 | Q61F-25C DN25 | | | | | |
| 37 | Welded Ball Valve | set | 8 | Q61F-25C DN20 | | | | | |
| 38 | Welded Ball Valve | set | 10 | Q361F-16C-DN250 | | | | | |
| 39 | Welded Ball Valve | set | 8 | Q361F-16C-DN200 | | | | | |
| 40 | Welded Ball Valve | set | 4 | Q361F-16C-DN150 | | | | | |
| 41 | Welded Ball Valve | set | 2 | Q361F-16C-DN125 | | | | | |
| 42 | Welded Ball Valve | set | 2 | Q61F-16C-DN50 | | | | | |
| 43 | Welded Ball Valve | set | 4 | Q361H-25C-DN250 | | | | | |
| 44 | Welded Ball Valve | set | 8 | Q361H-25C-DN200 | | | | | |
| 45 | Flanged Ball Valve | set | 4 | Q341F-16C DN300 | Including Flange | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 46 | Flanged Ball Valve | set | 20 | Q341F-16C DN250 | Including Flange | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 47 | Flanged Ball Valve | set | 80 | Q341F-16C DN200 | Including Flange | | | | |
| 48 | Flanged Ball Valve | set | 100 | Q341F-16C DN150 | Including Flange | | | | |
| 49 | Flanged Ball Valve | set | 80 | Q341F-16C DN125 | Including Flange | | | | |
| 50 | Flanged Ball Valve | set | 96 | Q341F-16C DN100 | Including Flange | | | | |
| 51 | Flanged Ball Valve | set | 42 | Q41F-16C DN80 | Including Flange | | | | |
| 52 | Flanged Ball Valve | set | 72 | Q41F-16C DN65 | Including Flange | | | | |
| 53 | Flanged Ball Valve | set | 104 | Q41F-16C DN50 | Including Flange | | | | |
| 54 | Flanged Ball Valve | set | 92 | Q41F-16C DN40 | Including Flange | | | | |
| 55 | Flanged Ball Valve | set | 26 | Q41F-16C DN32 | Including Flange | | | | |
| 56 | Flanged Ball Valve | set | 156 | Q41F-16C DN25 | Including Flange | | | | |
| 57 | Flanged Ball Valve | set | 92 | Q41F-16C DN20 | Including Flange | | | | |
| 58 | Gate Valve | set | 28 | Z61H-16C DN100 | | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 59 | Gate Valve | set | 18 | Z61H-16C DN80 | | | | | |
|----|------------|-----|-----|---------------|---|---|---|---|---|
| 60 | Gate Valve | set | 4 | Z61H-16C DN65 | | | | | |
| 61 | Gate Valve | set | 2 | Z61H-16C DN50 | | | | | |
| 62 | Gate Valve | set | 2 | Z41H-16C DN200 | Including Flange | | | | |
| 63 | Gate Valve | set | 4 | Z41H-16C DN100 | Including Flange | | | | |
| 64 | Gate Valve | set | 10 | Z41H-16C DN80 | Including Flange | | | | |
| 65 | Gate Valve | set | 20 | Z41H-16C DN65 | Including Flange | | | | |
| 66 | Gate Valve | set | 46 | Z41H-16C DN50 | Including Flange | | | | |
| 67 | Gate Valve | set | 30 | Z41H-16C DN40 | Including Flange | | | | |
| 68 | Gate Valve | set | 10 | Z41H-16C DN32 | Including Flange | | | | |
| 69 | Gate Valve | set | 34 | Z41H-16C DN25 | Including Flange | | | | |
| 70 | Gate Valve | set | 26 | Z41H-16C DN20 | Including Flange | | | | |
| 71 | Welded Gate Valve | set | 4 | Z61H-16C-DN65 | | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 72 | Welded Gate Valve | set | 2 | Z61H-16C-DN50 | | | | | |
|----|-------------------|-----|---|---------------|---|---|---|---|---|
| 73 | Safety Valve | set | 2 | A48Y-16C DN65 | | | | | |
| 74 | Safety Valve | set | 2 | A48Y-16C DN50 | | | | | |
| 75 | Safety Valve | set | 2 | A48Y-16C DN40 | | | | | |
| 76 | Safety Valve | set | 2 | A47H-16C DN80 | | | | | |
| 77 | Safety Valve | set | 6 | A42Y-16C-DN65 | | | | | |
| 78 | Safety Valve | set | 8 | A42Y-16C-DN40 | | | | | |
| 79 | Globe Valve | set | 12 | J41H-16C DN300 | Including Flange | | | | |
| 80 | Globe Valve | set | 12 | J41H-16C DN250 | Including Flange | | | | |
| 81 | Globe Valve | set | 60 | J41H-16C DN200 | Including Flange | | | | |
| 82 | Globe Valve | set | 40 | J41H-16C DN150 | Including Flange | | | | |
| 83 | Globe Valve | set | 154 | J41H-16C-DN125 | Including Flange | | | | |
| 84 | Globe Valve | set | 86 | J41H-16C-DN100 | Including Flange | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 85 | Globe Valve | set | 46 | J41H-16C-DN80 | Including Flange | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 86 | Globe Valve | set | 14 | J41H-16C-DN65 | Including Flange | | | | |
| 87 | Globe Valve | set | 28 | J41H-16C-DN50 | Including Flange | | | | |
| 88 | Globe Valve | set | 2 | J41H-16C-DN40 | Including Flange | | | | |
| 89 | Globe Valve | set | 10 | J41H-16C-DN32 | Including Flange | | | | |
| 90 | Globe Valve | set | 4 | J41H-16C DN25 | Including Flange | | | | |
| 91 | Globe Valve | set | 4 | J41H-16C-DN20 | Including Flange | | | | |
| 92 | Globe Valve | set | 2 | J41H-16C DN15 | Including Flange | | | | |
| 93 | Welded Globe Valve | set | 4 | J61H-16C DN200 | | | | | |
| 94 | Balancing Valve (Flanged) | set | 2 | DN250 PN16 | Including Flange | | | | |
| 95 | Balancing Valve (Flanged) | set | 2 | DN200 PN16 | Including Flange | | | | |
| 96 | Balancing Valve (Flanged) | set | 2 | DN150 PN16 | Including Flange | | | | |
| 97 | Balancing Valve (Flanged) | set | 2 | DN125 PN16 | Including Flange | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 98 | Balancing Valve (Flanged) | set | 4 | DN100 PN16 | Including Flange | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 99 | Triple Offset Metal-Seated Flanged Butterfly Valve | set | 10 | D343H-16C DN250 | Including Flange | | | | |
| 100 | Triple Offset Metal-Seated Flanged Butterfly Valve | set | 16 | D343H-16C DN200 | Including Flange | | | | |
| 101 | Triple Offset Metal-Seated Flanged Butterfly Valve | set | 12 | D343H-16C DN150 | Including Flange | | | | |
| 102 | Triple Offset Metal-Seated Flanged Butterfly Valve | set | 2 | D343H-16C DN125 | Including Flange | | | | |
| 103 | Triple Offset Metal-Seated Flanged Butterfly Valve | set | 4 | D363H-16C DN200 | | | | | |
| 104 | Butterfly Valve | set | 4 | DS343H-16C-DN300 | Including Flange | | | | |
| 105 | Butterfly Valve | set | 10 | DS343H-16C-DN250 | Including Flange | | | | |
| 106 | Butterfly Valve | set | 22 | DS343H-16C-DN200 | Including Flange | | | | |
| 107 | Butterfly Valve | set | 42 | DS343H-16C-DN150 | Including Flange | | | | |
| 108 | Butterfly Valve | set | 32 | DS343H-16C-DN125 | Including Flange | | | | |
| 109 | Butterfly Valve | set | 16 | DS343H-16C-DN100 | Including Flange | | | | |
| 110 | Butterfly Valve | set | 12 | DS343H-16C-DN80 | Including Flange | | | | |

淄博市供热管网互联互通和工业余热综合利用一期项目技术规范

Technical Specifications for Phase I Project of Zibo District Heating Network Interconnection and Industrial Waste Heat Comprehensive Utilization

| 111 | Butterfly Valve | set | 28 | D341X-16C-DN200 | Including Flange | | | | |
| 112 | Butterfly Valve | set | 20 | D341X-16C-DN150 | Including Flange | | | | |
| 113 | Butterfly Valve | set | 8 | D341X-16C-DN125 | Including Flange | | | | |
| 114 | Butterfly Valve | set | 4 | D341X-16C-DN100 | Including Flange | | | | |
| 115 | Control Valve | set | 6 | DN250-16C | | | | | |
| 116 | Control Valve | set | 22 | DN200-16C | | | | | |
| 117 | Control Valve | set | 28 | DN150-16C | | | | | |
| 118 | Control Valve | set | 22 | DN125-16C | | | | | |
| 119 | Control Valve | set | 23 | DN100-16C | | | | | |
| 120 | Control Valve | set | 8 | DN80-16C | | | | | |
| 121 | Control Valve | set | 8 | DN65-16C | | | | | |
| 122 | Check Valve | set | 2 | HC41X-16C-DN40 | | | | | |
| 123 | Check Valve | set | 2 | HC41X-16C-DN50 | | | | | |

| 124 | Check Valve | set | 8 | H41S-16-DN50 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 125 | Check Valve | set | 10 | H41S-16-DN40 | | | | | |
| 126 | Check Valve | set | 4 | H41S-16-DN25 | | | | | |
| 127 | Butterfly Check Valve | set | 2 | DH76X-16C-DN80 | Including Flange | | | | |
| 128 | Butterfly Check Valve | set | 6 | DH76X-16C-DN125 | Including Flange | | | | |
| 129 | Butterfly Check Valve | set | 14 | DH76H-16C-DN150 | Including Flange | | | | |
| 130 | Butterfly Check Valve | set | 8 | DH76X-16C-DN200 | Including Flange | | | | |
| 131 | Butterfly Check Valve | set | 2 | DH76X-16C-DN250 | Including Flange | | | | |
| 132 | Butterfly Check Valve | set | 4 | DH76X-16C-DN300 | Including Flange | | | | |

# List of imported valves

| No. | Equipment/Material Name | Unit | QTY | Specification | Remarks | Standard No. | Delivery Date (Incoterms®) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Earliest Delivery Date | Latest Delivery Date | Bidder's Proposed Delivery Date |
| 1 | Butterfly Valve | set | 2 | DN1400 | | | | | |
| 2 | Butterfly Valve | set | 2 | DN1200 | | | | | |
| 3 | Butterfly Valve | set | 4 | DN1000 | | | | | |
| 4 | Electrically operated fully welded ball valve | set | 2 | DN1000　PN25 | | | | | |
| 5 | Electrically operated fully welded ball valve | set | 1 | DN700　PN25 | | | | | |
| 6 | Weld-type butterfly valve | set | 4 | DN1000　D363H-25 | | | | | |
| 7 | Weld-type butterfly valve | set | 8 | DN600　D363H-25 | | | | | |
| | | | 23 | | | | | | |

# Attachment 2: Section 9 Special Technical Parameters of the Heat Network Control System

## Section 9 Special Technical Parameters of the Heat Network Control System

This section specifies the special parameters and technical requirements for heat network equipment. Bidders shall read this section in conjunction with the general technical specifications in Sections 2 to 4 of this Code, as well as Section 5 – Technical Specifications for Equipment Installation at Booster Pump Stations and Heat Exchange Stations, to gain a complete understanding of the technical and functional requirements for individual equipment and heat exchange station systems. In the event of any conflict between the provisions of other sections and this section, this section shall take precedence.

The contents and requirements specified in this technical specification represent the minimum mandatory requirements deemed necessary by the Tenderee. The complete set of equipment supplied by the Supplier shall be technically advanced, safe, reliable, stable in operation, and convenient for installation and maintenance. The Supplier shall be responsible to the Tenderee for the overall technical performance and safety performance of the supplied equipment. Meanwhile, the dimensions of the equipment provided by the Bidder shall meet the existing installation requirements.

For the heat network portion, the Supplier is only required to supply the equipment and materials; the installation works shall be carried out under a separate installation contract.

### 9.1 Project Description and Scope of Supply

### 9.1.1 Project Description

The equipment referred to in this document is used for the intelligent heating upper-level SCADA control system, smart heating big data management system, smart heating dispatch management platform, R&D and optimization of a smart heating management system based on machine learning and reinforcement learning, construction of a smart heating data center, and construction of an integrated dispatch center for the urban heating comprehensive energy-saving renovation and construction project. This is a functional tender project. All related software and hardware must meet the functional requirements.

### 9.1.2 Scope of Supply

The procurement list for the smart heating integrated management and control system is as follows:

| No. | Name | Specification | Quantity |
|---|---|---|---|
| 1 | Smart Heating Big Data Management Platform | Customized according to the company's actual needs | 1 |
| 2 | Smart Heating Dispatch Management Platform | Customized according to the company's actual needs | 1 |
| 3 | R&D and Optimization of Smart Heating Management System Based on Machine Learning and Reinforcement Learning | Customized according to the company's actual needs | 1 |
| 4 | Customer Service, Billing, and Hotline Platform | Customized according to the company's actual needs | 1 |
| 5 | Smart Heating Data Center Construction | Customized according to the company's actual needs | 1 |

| No. | Name | Specification | Quantity |
|---|---|---|---|
| 6 | Integrated Dispatch Center Construction Project | Customized according to the company's actual | 1 |

## 9.2 Smart Heating SCADA Control System

### 9.2.1 Overall Functions

The Smart Heating SCADA Control System serves as the management center for monitoring and controlling various heat exchange stations in the district heating system, and mainly performs the following functions in the heating system:

1. Local and remote automatic control of on-site equipment.

2. Energy consumption statistics and display: statistics, display and analysis of the consumption of various energy sources such as water, electricity and heat.

3. Real-time monitoring of operating parameters and status of equipment, instruments, sensors, etc.

4. Realize intelligent automatic regulation of heat sources, heat networks and heat exchange stations to support system optimization and decision-making.

5. Heating load forecasting function, which combines meteorological information and heating regulation experience to realize heat and temperature prediction and control of heat exchange stations.

6. Ability to alarm major faults and high/low limits in heat exchange stations, such as parameter threshold alarms, equipment operation alarms (pump stop, water leakage, blockage, heat exchanger failure), etc.

7. Ability to store and query heating system data at different sampling intervals, and support communication with mainstream databases.

8. Functions such as chart analysis, historical data trend analysis, and custom report generation.

### 9.2.2 Specific Requirements

1. Online Data Acquisition

(1) Automatically collect real-time data from various control systems/instruments and configure front-end acquisition servers/devices.

(2) Support both time-driven and event-driven data acquisition and transmission methods.

(3) Ensure real-time performance, completeness, accuracy, consistency, and security of data.

(4) Acquisition devices shall have numerical calculation functions to process instantaneous flow, pulse quantities, etc.

(5) Support standard communication protocols (such as TCP/IP, MODBUS).

(6) Regularly upload the working status of acquisition devices to the upper-level system.

2. Centralized Data Monitoring

(1) Overview screen: Display key data, trends, alarms, analysis, and production reports of the pipe network and heat exchange stations at different authority levels such as group level and subsidiary level.

(2) Station monitoring: Display real-time operating status and energy consumption data of each heat exchange station.

(3) Data tables: Provide periodic or event-triggered parameter reports, supporting display, editing, printing, and export to databases or HTML format.

(4) Data trends: Provide customizable trend screens to record parameter changes, supporting multi-curve display, data export, and redundant services.

3. Alarm Functions

(1) Centrally display current alarms and their statuses.

(2) Trigger obvious audible and visual alarms when data exceeds limits until returning to normal, and save records.

(3) Alarms shall be time-stamped in milliseconds and support multiple sources such as variables and expressions.

(4) Alarms can be distinguished and filtered by attributes such as color, priority, and time.

(5) Alarm-triggered actions (such as playing sounds) can be configured.

4. System Management

(1) Operation Diagnosis: Provide system health monitoring tools to record running time, resource usage, user logins, system logs, and other information.

(2) Security Management:

• Support a security system based on user groups/roles, and support both local and Windows domain authentication.

• Implement multi-level secure access control with no limit on the number of users/user groups.

• Allow real-time addition/deletion of users, and strictly control the content they can view and operate based on permissions.

• Permissions are uniformly verified by the server, and operators are restricted from shutting down the system or switching to other programs.

5. Data Interfaces with Other Systems

(1) Provide standard data interfaces (such as OPC, ODBC, API) to facilitate integration with other systems.

(2) Support providing real-time operating data, equipment status, and energy metering parameters to other information systems to support energy management and analytical decision-making.

6. Industrial Real-Time/Historical Database Software Requirements

(1) Adopt a mature commercial database that supports high-speed data storage and query (100,000 tags/second storage speed and 50,000 tags/second query speed).

(2) Support standard SQL queries with clear data types.

(3) Provide "change-triggered logging compression" compression functionality with configurable deadband and sampling periods.

(4) Seamless two-way communication with SCADA software through APIs, supporting redundant switching and data backfilling.

(5) Support C/S and B/S access, providing Web queries, Excel connectivity, and built-in client tools.

(6) Support deadband and rate-of-change compression algorithms, with a tag capacity of no less than 250,000 tags and the ability to store historical data for more than 5 years.

(7) Support multiple data acquisition methods, secondary data correction, operation tracking, time synchronization, and cluster redundancy.

(8) Provide event triggering, permission management, dynamic statistics, and rich data interfaces (such as OLE-DB, OPC HDA).

**9.2.3 Inspection and Testing Requirements**

1. System Architecture and Performance

Adopt a mature, reliable, and modular distributed C/S architecture that is easy to expand (unlimited number of clients/servers), supports load balancing of data processing tasks, maintains

database uniqueness, and provides comprehensive redundancy from servers and networks to controllers, supporting automatic data compensation and I/O communication redundancy switching.

2. Configuration Development and Openness

Provide a user-friendly graphical development environment that supports logic, sequence, and continuous control algorithms, with online engineering modification and synchronous update capabilities (no third-party software required). Support object-oriented reusable configuration methods to improve engineering efficiency. High openness with support for standard data exchange technologies such as OPC, ODBC, and API, and free compatibility with mainstream I/O devices.

3. Data Management and Access

Adopt an integrated configuration database to ensure configuration consistency. Support Web-based process graphic display, provide tools for importing and exporting variables, support embedded clock synchronization to ensure unified system time, and support cluster management. After authorization, real-time data can be accessed by any computer.

4. Security and Permission Management

Provide multi-level operation authorization and login mechanisms to strictly prevent unauthorized operations, and control the content accessible and operable by different users through permissions.

5. Scalability and Maintenance

The system shall have sufficient scalability, and software point upgrades shall protect existing investments. Software licensing shall use hardware-based authorization to avoid licensing issues caused by system reinstallation. Support C-like and VBA scripting to meet specific functional expansion needs. Provide a free development version of the software, with charges only for the runtime version.

**9.3 Smart Heating Big Data Management System**

**9.3.1 Overall Functional Requirements**

1. Data Governance System Construction

Follow the principles of "standards first, quality-oriented, and business-driven" to build a governance framework covering the entire data lifecycle. The core is to establish unified standards, implement quality control, and carry out special governance to systematically solve problems such as data silos, inconsistent standards, and low quality, and provide high-quality data assets for subsequent data applications.

2. Enterprise-Level Data Warehouse Construction

The goal is to integrate global data and support in-depth analysis. Key tasks include:

(1) Build a data hub: Adopt a layered architecture and subject model to integrate multi-source data and create a unified, elastically scalable data hub.

(2) Ensure performance: Optimize through indexing, partitioning, caching, and other technologies to ensure efficient response for queries and analysis.

(3) Output standards: During construction, through professional consulting services, sort out business processes, define core indicators and interface specifications, and ultimately form a unified data standard system.

3. Business Theme Analysis Construction

With "cockpit + theme screens" as the core, build a three-level visualization system for the group, business units, and individual businesses. Key points include:

(1) Multi-terminal adaptation: Support seamless access from command center large screens, PCs, and mobile devices.

(2) Core functions: Focus on developing real-time monitoring, drill-through analysis, and intelligent early warning to achieve "view the whole situation on one screen and know details with one click," enhancing management and business response efficiency.

### 9.3.3 Platform Construction Requirements

The system construction shall follow the core principles of "stability, scalability, and security," and adopt advanced architectures such as microservices to build an independently controllable and sustainably iterable technical base.

1.Core Requirements for Technical Components

(1) Tool Selection: Priority shall be given to domestic compatibility and industry maturity. The ETL tool must provide at least one year of authorization, and the data analysis tool must provide permanent, unlimited-user authorization.

(2) ETL Tool: Must support access to multi-source heterogeneous data, and provide full and incremental (including sub-second real-time) synchronization, visual data processing, task scheduling and monitoring, data API services, and data lineage analysis.

(3) Data Analysis Tool: Must be a full-stack design supporting zero-code development, complex reports and large-screen cockpit creation, dynamic interactive analysis, professional data entry, fine-grained permission control, and multi-terminal adaptive display, with compatibility in domestic environments.

2. Security and Integration Architecture

(1) Unified Identity Management: Establish a centralized user directory to achieve full-platform single sign-on (SSO) and user lifecycle management. Support standard SSO protocols, multi-factor authentication, hierarchical authorization, and comprehensive operation auditing.

(2) Standardization and Openness: Provide standardized interfaces and client adaptation solutions to ensure good integration with domestic software/hardware environments and existing business systems.

3.Performance and Reliability Indicators

The system must meet high-performance and high-reliability requirements, including:• Simple query response ≤ 1 second• Complex report generation ≤ 5 seconds• Support ≥ 300 concurrent users• Real-time data synchronization delay ≤ 3 seconds• Cluster deployment of key components with automatic failover (≤ 30 seconds)• Ensure 7×24 stable operation

3. Project Service Assurance

4. A composite project team with heating industry experience must be assigned. Systematic training (theoretical and practical) shall be provided to ensure the internal team can independently

operate, maintain, and develop the system. A one-year warranty shall be provided after delivery,

and a hierarchical response mechanism shall be established to ensure continuous system optimization.

**9.4 Smart Heating Dispatch Management Platform**

**9.4.1 Functional Requirements**

**1. Heating Operation Monitoring System**

1) Panoramic Monitoring: Based on the overall heating network map, provide an overview of the

entire network operation status, and conduct hierarchical real-time monitoring of heat sources,

heat exchange stations, and field instruments. Support timeout color-coding and alarm prompts.

2) Load Forecasting and Dispatch

(1) Provide 3-day daily and hourly load forecasting for heat exchange stations, and guide

operational adjustment strategies by comparing forecasted vs. actual load deviations.

(2) Build group-level, subsidiary-level, and branch-level dispatch management systems supporting

online dispatch order issuance, work order processing, and feedback.

3) Refined Energy Consumption and Cost Management

Establish a multi-dimensional (time, space, project) energy consumption analysis and station

ranking system. Support custom energy reports, flexible configuration of energy indicators and unit prices for each station, and enable cost statistics and ranking.

4) Core Supporting Functions

(1) Historical Data: Provide parameter trend curves and multi-data comparison analysis.

(2) Weather Integration: Access real-time and forecast weather data to support load forecasting.

(3) Alarm Management: Include rule configuration, real-time alarm push, and historical record

query.

(4) System Configuration: Support basic information management (heat sources, stations, areas) and user permission management.

2. Digital Twin System

3D Scene Construction: Quickly build a digital twin model of the heating network as a data visualization carrier.

Data Fusion Visualization: Overlay real-time operational data, equipment status, and alarm

information onto the 3D model for dynamic display.

Visual Cockpit: Integrate key operational charts in the 3D scene, supporting free rotation, scaling, and perspective switching for an immersive monitoring experience.

3.Equipment Management System

Equipment Asset Management: Establish a full-lifecycle electronic record including basic information, attributes, changes, and relationships.

Multi-dimensional Statistics: Support quantity statistics and analysis by equipment type, manufacturer, service life, etc.

Basic Data Maintenance: Unified management of standardized master data such as manufacturers, product series, and model templates.

## 9.4.2 Platform Construction Requirements

1. Platform Foundation and Independence

(1) The platform must be fully independently developed by the supplier with no third-party intellectual property disputes with no third-party intellectual property disputes, and support unlimited device access.

(2) Adopt a B/S architecture to ensure cross-browser compatibility.

(3) The core backend must be developed in JAVA and stably deployable on Windows/Linux.

(4) Business data must use mainstream or domestic databases.

(5) The user account system must support flexible definition, with a mandatory password policy of 8–16 characters including uppercase, lowercase, numbers, and special symbols.

2. Technical Roadmap and Implementation Standards

(1) System Integration: Use standardized interfaces and security protocols to ensure compatibility and scalability.

(2) Information Architecture: Must comply with national and industry data standards, provide comprehensive data management, ETL, and reporting functions, and ensure a stable and scalable architecture.

(3) System Security: Must fully comply with national and local information security regulations and protection requirements.

(4) Deployment and Maintenance: Support hierarchical deployment and maintenance on designated servers.

## 9.4.3 After-Sales Service

1. Service Commitment and System

The bidder shall provide high-quality after-sales support through professional services. The bid document shall include a detailed after-sales service commitment, service content, service methods, and charging standards.

2.Free Warranty Period Service (Two Years After Acceptance)

(1) Service Scope: Provide 7×24 technical support to ensure the system operates properly. Services include system troubleshooting, free functional upgrades, and optimization at the data configuration level.

(2) Response Time: Fault response time ≤ 2 hours. If the issue cannot be resolved remotely, on-site arrival is required within 12 hours, and fault resolution within 8 hours.

(3) Service Methods: A combination of remote support and on-site service.

3. Post-Warranty Service

The winning bidder shall provide lifelong maintenance services, which may be subject to reasonable fees.
(1)If subsequent supplementary requirements match the winning bidder's product development plan, free upgrades may be provided; other customized development requirements shall be separately negotiated.
(2) Specific service fees shall be agreed upon by both parties. If no agreement can be reached, the tenderee has the right to purchase separately.

4. Software Defects and Changes
(1) In the event of system abnormalities, the winning bidder shall respond in accordance with the above time limits and may charge relevant travel and service fees after the warranty period based on agreed standards.
(2) For optimizations and changes at the data configuration level, the tenderee's personnel shall be responsible for the main operations, and the winning bidder shall provide necessary assistance.

**9.5 R&D and Optimization of Smart Heating Management System Based on Machine Learning and Reinforcement Learning**

**9.5.1 Functional Requirements**

(1) Platform Architecture and Cost Optimization

Without changing the existing deployment architecture, optimize cloud resource costs by evaluating and adjusting virtual machine specifications, load balancing, storage, and network configurations to achieve elastic scaling and on-demand resource allocation.

(2)Data Warehouse Migration and Performance Improvement

Perform overall migration and optimization of the data warehouse, including database selection and restructuring, implementation of a secure and reliable data migration plan, and comprehensive code decoupling and performance tuning to meet higher-performance data governance and analysis requirements.

(3)R&D of Automated Deployment System

Based on the Infrastructure as Code (IaC) concept, develop an automated deployment system using Terraform. Support parameterized deployment of multiple environments (development, testing, production) within the existing VPC, and provide deployment monitoring, one-click rollback, and complete change history management.

(4)Modernization of Front-End System

Perform overall reconstruction of the front-end using mainstream frameworks and responsive design to achieve multi-terminal adaptation and improved user experience. Support panoramic

monitoring of heating stations, algorithm configuration back-end, and comprehensive system

management and security control.

(5)Data Integration and Interface Compatibility

The new platform must be fully compatible with existing data acquisition systems and provide data cleaning, buffered transmission, and acquisition status monitoring to ensure stable and reliable data flow.

(6) Optimization of Machine Learning Algorithms

Model Upgrade: Upgrade the existing single model to a Stacking ensemble model to improve prediction accuracy and speed, and improve evaluation tools.

Data Monitoring: Develop a data quality monitoring module for anomaly detection and alarm of sensor data.

Special Models: Establish extreme weather response models to enable automatic model switching and strategy adjustment during cold waves and other scenarios.

Mode Support: Support multiple generalized operation modes such as smart heating, constant temperature, and constant heat.

(7) Expansion of Reinforcement Learning Architecture

Extend the current reinforcement learning control capability (supporting only single stations) to

multi-station unified modeling and collaborative scheduling. Reconstruct the data and training

system to support parallel simulation and training of multiple stations, and optimize performance to avoid excessive computing resource expansion.

(8) R&D of Customer Service Intelligent Agent System

Knowledge Base Management: Support upload, parsing, and structured storage of multi-source

documents (including various formats).

Intelligent Q&A: Provide accurate retrieval based on the knowledge base, generate traceable and credible answers, and support multi-round conversations.

System Management: Provide complete user permissions, model configuration (supporting multiple AI models), and system monitoring capabilities.

**9.5.2 Platform Construction Requirements**

1. Performance and Scalability

1)Response Speed:

(1) Page loading and data query response time $\leq$ 5 seconds (95% of cases).

(2) API interfaces: query and control commands $\leq$ 1 second; simple report generation $\leq$ 10 seconds (95% of cases).

2)Processing Capacity:

(1) Concurrency: Support $\geq$ 100 concurrent online users.

(2) Data: Support real-time data collection from $\geq$ 500 stations, process $\geq$ 5000 records per second,

and handle $\geq$ 20 control commands in parallel.

3)Database Performance:

(1) Queries: Simple queries ≤ 100ms; complex queries ≤ 5 seconds; aggregate statistics ≤ 3 seconds.

(2) Writes: Single insert ≤ 50ms; batch insert (1000 records) ≤ 5 seconds.

(3) Connections: Support ≥ 100 concurrent connections.

4)Scalability:

The system architecture must support smooth expansion to 1000 stations, 1000 users, 10TB of data, and beyond without reconstruction. Adopt a modular and configurable design with

standardized interfaces to facilitate functional expansion and third-party integration.

2. Security

1. Authentication and Authorization: Support username/password, multi-factor authentication,

   and SSO. Implement role-based fine-grained access control (function and data level).

2. Security Protection: Provide basic protection against brute force attacks, SQL injection, XSS, CSRF, etc.

3. Audit and Logging: Maintain complete user operation logs (retained for ≥ 6 months), support query and export, and alarm on abnormal operations.

4. Compliance: The platform must meet Level 3 protection requirements in accordance with

   GB/T 22239-2019 and assist in completing evaluation and filing.

3. Usability and Maintainability

1.User Interface: User-friendly and industry-appropriate, supporting adaptive access from PCs

   (1920x1080+), tablets, and mobile phones.

2.Ease of Operation: Simplified common operations with quick access, batch processing, and undo/confirmation mechanisms.

3.Maintainability: Provide complete logging and diagnostic tools, support hot updates (without service interruption), and include robust version management and rollback mechanisms. System upgrades must be documented, completed within ≤ 2 hours, and support automatic data migration.

4.Training and Support

A complete training plan (including targets, content, and schedule) must be provided to ensure users can effectively use the system.

**9.5.3 After-Sales Service**

1.The bidder must commit to providing professional and efficient services and establishing a sound service system (including commitment letter, service content, methods, and fees). After winning the bid, 7×24 technical support must be provided to ensure stable system operation.

2. During the warranty period (two years after acceptance), free maintenance and upgrades are provided with the following response requirements:

- Fault response time ≤ 2 hours.

- If remote resolution is not possible, on-site arrival within 12 hours and fault repair within 8

  hours.

- Service methods include remote support and on-site service.

3.Post-warranty service:

- Lifelong paid maintenance is available, with fees negotiated by both parties.
- If supplementary requirements match the product roadmap, free upgrades may be provided; other customized development is subject to separate pricing.

4. Other provisions:

- System fault handling follows the above response time limits; service fees may apply after the warranty period.
- Data configuration optimization is the responsibility of the tenderee's personnel, with the winning bidder providing necessary assistance.

**9.6 Construction of Smart Customer Service, Billing, and Hotline Platform**

**9.6.1 Functional Requirements**

1. Intelligent Billing System

1) The system aims to achieve full-process digital management of heating fees and convenient

multi-channel payment, with unified billing parameters and household profile management as the

core.

2) Support flexible fee settings, electronic contract signing, and various preferential policies.

Provide a billing workbench with multi-condition search and batch processing capabilities,

covering suspension/resumption of supply, refunds, and other heating change businesses, and link with approval workflows.

3) Integrate multi-channel payment (WeChat, Alipay, banks, etc.), electronic invoicing, automatic

reminders, and integrated business-finance reconciliation to ensure clear capital flow.

4) Support intuitive billing overviews and in-depth analysis through an operation cockpit and data

mapping.

2. Intelligent Customer Service Management System

1)Build an omnichannel, intelligent customer service and repair management hub. Through a

powerful customer service workbench, 实现 pop-up caller information, quick queries, one-click

dispatching, and integration with production system data.

2)Support full-process electronic work order management with customizable templates, intelligent

routing, timeout reminders, mobile APP processing, and multi-dimensional assessment.

3)Integrate AI customer service, intelligent scheduling, and call volume forecasting to improve efficiency, and monitor agent status, work order progress, and GIS staff positioning in real time through a visual monitoring screen.

4)Include dedicated modules for 12345 work orders, room temperature monitoring, and

knowledge base construction to form a closed-loop service system.

3.   Business Support Mobile APP

1)The APP provides a mobile work platform for meter readers, maintenance staff, and other frontline personnel.

2)Core functions include mobile work order processing (receiving, claiming, clock-in, photo

upload, electronic signature), on-site maintenance support (one-click calling, viewing customer

history and profiles), mobile billing and inspection (household queries, bank reconciliation, valve operation tasks and records), and valve data viewing.

3)Integrate knowledge base queries and to-do approval functions to improve field work efficiency

and collaboration.

4. Call Center System

The call center system must include IVR voice navigation, caller pop-up, agent monitoring, agent

routing, call recording, AI Q&A, speech recognition, AI robots, and outbound robots. These functions reduce agent pressure during peak periods and improve user experience.

9.6.2 Platform Construction Requirements

1.   Performance and Scalability

1)   Response Speed:

(1) Page loading and data query response time ≤ 5 seconds (95% of cases).

(2) API interfaces: query and control commands ≤ 1 second; simple report generation ≤ 10 seconds (95% of cases).

2)Processing Capacity:

(1) Concurrency: Support ≥ 100 concurrent online users.

(2) Data: Support real-time data collection from ≥ 500 stations, process ≥ 5000 records per second,

and handle ≥ 20 control commands in parallel.

3)Database Performance:

(1) Queries: Simple queries ≤ 100ms; complex queries ≤ 5 seconds; aggregate statistics ≤ 3 seconds.

(2) Writes: Single insert ≤ 50ms; batch insert (1000 records) ≤ 5 seconds.(3) Connections: Support ≥ 100 concurrent connections.

4)Scalability:The system architecture must support smooth expansion to 1000 stations, 1000 users, 10TB of data, and beyond without reconstruction. Adopt a modular and configurable design with

standardized interfaces to facilitate functional expansion and third-party integration.

2.   Security

1)Authentication and Authorization: Support username/password, multi-factor authentication, and

SSO. Implement role-based fine-grained access control (function and data level).

2)Security Protection: Provide basic protection against brute force attacks, SQL injection, XSS, CSRF, etc.

3)Audit and Logging: Maintain complete user operation logs (retained for ≥ 6 months), support query and export, and alarm on abnormal operations.

4)Compliance: The platform must meet Level 3 protection requirements in accordance with GB/T 22239-2019 and assist in completing evaluation and filing.

3. Usability and Maintainability

1)User Interface: User-friendly and industry-appropriate, supporting adaptive access from PCs (1920x1080+), tablets, and mobile phones.

2)Ease of Operation: Simplified common operations with quick access, batch processing, and undo/confirmation mechanisms.

3)Maintainability: Provide complete logging and diagnostic tools, support hot updates (without service interruption), and include robust version management and rollback mechanisms. System upgrades must be documented, completed within ≤ 2 hours, and support automatic data migration.

4. Training and Support

A complete training plan (including targets, content, and schedule) must be provided to ensure users can effectively use the system.

5. Level Protection

In accordance with GB/T 22239-2019, the platform must be rated as Level 3 and constructed to meet national security standards. A qualified testing organization must issue paper and electronic test reports, and assist the employer in completing filing with relevant cybersecurity authorities and obtaining a filing certificate.

**9.6.3 After-Sales Service**

1.The bidder must commit to providing professional and efficient services and establishing a sound service system (including commitment letter, service content, methods, and fees). After winning the bid, 7×24 technical support must be provided to ensure stable system operation.

2. During the warranty period (two years after acceptance), free maintenance and upgrades are provided with the following response requirements:

- Fault response time ≤ 2 hours.

- If remote resolution is not possible, on-site arrival within 12 hours and fault repair within 8 hours.

- Service methods include remote support and on-site service.

3. Post-warranty service:

- Lifelong paid maintenance is available, with fees negotiated by both parties.
- If supplementary requirements match the product roadmap, free upgrades may be provided; other customized development is subject to separate pricing.

4. Other provisions:

- System fault handling follows the above response time limits; service fees may apply after the warranty period.
- Data configuration optimization is the responsibility of the tenderee's personnel, with the winning bidder providing necessary assistance.

**9.7 Construction of Smart Heating Data Center**

**9.7.1 General Requirements**

The construction of the Smart Heating Data Center aims to build a safe, reliable,

high-performance, and scalable infrastructure platform. The core content includes: adopting an

active-standby dual-center disaster recovery architecture, where the new primary center hosts core services, and the original data center is upgraded to a backup center to ensure business continuity. The security system must fully meet the Level 3 requirements of the National Cybersecurity Protection Classifications, with systematic construction covering technical protection, management mechanisms, and operational systems. The technical platform will be based on a distributed architecture to achieve resource pooling and elastic scaling of computing and storage resources. Through technologies such as such technologies as data layering and striping, it will

provide high-performance read/write capabilities and multi-dimensional protection for business

systems, ensuring stable, reliable, and sustainable operation of the platform.

**9.7.2 Specific Functional Requirements**

This project aims to build a comprehensive, intelligent, and highly reliable network and security system. The core construction content is as follows:

1. Elastic Network and Intelligent Load Balancing

(1) Provide a comprehensive load balancing solution across multiple data centers, multiple links, and server levels.

(2) Monitor the status of all resources in real time and intelligently distribute user access requests to optimize traffic and improve resource utilization.

(3) Support connection with major cloud platforms and smooth IPv6 transition.

2. Multi-dimensional and In-depth Security Protection

(1) Deploy next-generation intelligent firewalls that integrate intrusion prevention, virus

protection, and other functions to provide Layer 2–7 security protection.

(2) Through full-network behavior management, achieve visibility, control, and threat awareness

of internal assets, identities, and network behaviors.

(3) Use deep traffic analysis technology to detect and defend against advanced threats such as APT attacks and ransomware.

3. Intelligent Security Operations and Auditing

(1) Establish a Security Operations Center (SOC) to provide 7×24 security monitoring, threat analysis, and emergency response.

(2) Build a centralized log auditing platform to meet security event traceability and compliance requirements.

(3) Implement unified operation and maintenance security management to strictly audit and control the behaviors of O&M personnel, devices, and operations.

4. End-to-End Security and High Availability Assurance

(1) Provide end-to-end security protection covering users, terminals, applications, connections,

permissions, and data.

(2) Ensure high reliability and continuity of the system architecture from the hardware, platform, and business levels.

(3) Complete the construction of a high-standard data center room, including power supply and

distribution, HVAC, power and environment monitoring, fire protection systems, etc., to provide a stable and reliable physical foundation for the entire platform.

### 9.7.3 Implementation Requirements

1. Delivery Period: All equipment shall be debugged within 90 days after receiving the notice from the tenderee, delivered to the location designated by the tenderee, and accepted by the tenderee before formal delivery. If unqualified products or items that do not meet the contractual quality requirements are found, the tenderee has the right to refuse acceptance. Any resulting delays in delivery or increase in costs shall be fully borne by the winning bidder.

2. During the warranty period, in case of non-human damage to any of the above equipment

during use, the winning bidder shall provide free on-site repair and replacement services and bear

all related costs. The winning bidder must provide 7×24 response service. General issues shall be resolved within 24 hours; major issues or other problems that cannot be resolved quickly shall be resolved or a clear solution proposed within one week. Otherwise, the winning bidder shall compensate the purchaser for corresponding losses in accordance with the contract.

3. During the warranty period, if the equipment is confirmed to be defective—including potential

defects or the use of non-conforming materials—the winning bidder shall immediately repair or

replace the defective goods or components free of charge to ensure they meet the contractual technical and performance requirements. If the winning bidder fails to remedy the defect within five working days after receiving the notice, the purchaser may take necessary remedial measures at the winning bidder's risk and expense, and the purchaser reserves the right to claim compensation through legal means.

4. To ensure optimal use of the product functions, the bidder shall provide product training to the technical and management personnel designated by the tenderee. A detailed training plan must be formulated, covering the principles and technical performance of the provided equipment, operation and maintenance methods, installation and debugging, daily O&M, basic log analysis, fault risk troubleshooting, and other aspects.

### 9.8 Integrated Dispatch Center Construction Project

The Integrated Dispatch Center Construction Project is a centralized management and control system for the heating system of Zibo City. The system requires the unified construction of an integrated dispatch center, a customer service center, a booster pump station control center, and

comprehensive wiring, among other components. The Integrated Dispatch Center hosts the core systems such as the heating big data platform, heating supervision platform, and heating dispatch management platform, as well as the command and dispatch system.

1. Command and Dispatch Center: Equipped with a dispatch large-screen system and a video

conferencing system. The dispatch large screen displays dispatch information, and the video conferencing system enables online video communication to ensure the effectiveness of dispatch.

2. Customer Service Center: Equipped with a large-screen system and a customer service hotline

system. To ensure timely and effective resolution of customer issues and improve heating service quality, the customer service hotline system requires 80 positions, and thus 80 sets of customer service equipment must be configured.

**Section 10 Tender Drawings**
Drawings are attached separately.

Attachment 3: Minutes of the Pre-Bid Meeting

## Minutes of the Pre-Bid Meeting

**Project Name**:Zibo Heating Pipe Network Interconnection and Industrial Waste Heat Comprehensive Utilization Project Phase I - Conventional Heating Equipment and Material Package

**Meeting Topic**: Pre-Bid Q&A Meeting

**Meeting Time**: 10:00–11:00,   December 12, 2025

### 1. Introduction of Participants

The following personnel attended the pre-bid Q&A meeting:

Zibo Heating Group Co., Ltd.

CHINA CAPITAL TENDERING CO., LTD.
 **Wang Xiangyu**

Representatives of potential bidders

### 2. Q&A Summary

Prior to this Q&A meeting, the tendering agency and the Employer had successively received a list of questions from potential bidders via email. During the meeting, the tendering agency and the Employer responded to the received questions one by one, with timely supplementation and correction provided by the Employer's experts as appropriate. Questions raised on-site by the participating potential bidders were also answered in detail. For the specific questions and responses, please refer to Annex 1.

### 3. Reminders and Other Matters

1. Submission of hard-copy bid documents is required for this tender. All bidders are reminded that if submitting documents by mail, they must call the tendering agency after sending the documents to confirm receipt, so as to avoid unnecessary omissions.
2. All bidder representatives who attended the meeting are requested to send an email to the reserved mailbox of the tendering agency for receiving the minutes of this meeting.

**Annex 1: List of Questions and Responses**

| No. | Question | Response |
|---|---|---|
| 1 | Tender Document Commercial Section, Page 34: 4.2 Special Experience – 5. Qualifications of Pipe and Steel ManufacturersRequirement: "(2) National inspection standard Grade A or above."Q: At present, manufacturers can only provide the Special Equipment Manufacturing License (Class A). Please confirm whether this is acceptable. | A: Yes, acceptable. |
| 2 | Clarification on the category of electric control valves. Q: If classified as valve category, is it required to provide financial statements and after-sales service documents? If classified as electrical category, is it required to provide performance certificates? | A: Classified as valve category; financial statements and after-sales service documents are required. |
| 3 | Requirements for manufacturers of heat exchangers and heat exchange units:Design, manufacture, inspection and acceptance standards for plate heat exchangers shall refer to the national standard of the People's Republic of China NB/T 47004.1-2017. Q: Manufacturers can only provide a product certificate of conformity and will not make other responses to this requirement. Is this acceptable? | A: Not acceptable. Relevant inspection reports must be provided. |
| 4 | Products with relatively small procurement volume that are suitable for local procurement or shall be procured from relevant designated departments (e.g.: seamless steel pipes, manufactured steel products, lighting systems, fire protection systems, security systems, parking systems, and auxiliary bulk products such as water tanks, metal flexible joints, engineer stations, printers, etc.). Q: For such products, is it acceptable to only provide basic manufacturer qualifications, or can it be clearly specified that some products do not need to provide qualifications? | A: Only basic manufacturer qualifications are required. Products without manufacturer qualifications cannot be used.For seamless steel pipes (with outer diameter D ≥ 57 mm requiring fixed length) and manufactured steel products, delivery on site shall be provided in accordance with national standards; for other products, the qualifications shall be provided in the bid documents.For all products covered by this item, they must be provided in strict accordance with the standards and specifications required by the tender documents; if not clearly specified in the tender documents, they shall be implemented in accordance with relevant national |

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| | | standards. |
| 5 | Technical Section, Page 214, "9.6 Energy Integrated Dispatch Center Construction Project" states: "The integrated energy dispatch center construction project is a centralized management and control system for energy systems such as heating and gas of Zibo Heating Group Co., Ltd."<br>Q: Please confirm whether gas is included. | A: It is a centralized management and control system for the heating energy system of Zibo Heating Group Co., Ltd. |
| 6 | Technical Section, Pages 182 and 183: Technical parameters of "strainers" are conflicting and inconsistent.<br>Q: The filtration accuracy and temperature resistance parameters of the strainers are contradictory. Please clarify the relevant data. | A: For the cyclone strainer, the filtration accuracy is 2.5 mm and the temperature resistance is 80°C. |
| 7 | The technical description of the customer service center is not accurate enough and it is hoped to be refined.<br>Q: Can a detailed technical description of the customer service center be provided? | A: There is a modification to the tender documents; please refer to Addendum No. 1. |
| 8 | Tender Document Commercial Section, Page 34:4.2 Special Experience – 5. Qualifications of Pipe and Steel Manufacturers Requirement: "(2) National inspection standard Grade A or above."<br>Q: At present, manufacturers can only provide the Special Equipment Manufacturing License (Class A). Please confirm whether this is acceptable. | A: Yes, acceptable. |
| 9 | Tender Document Commercial Section (Chinese) Page 50 / (English) Page 56:Form FIN3.1: Financial Situation and Performance: The English version of the form lists 5 years, while the note below the form requires the latest 3 years' financial reports, which is contradictory.<br>Q: How many years of financial statements need to be prepared? Please clarify the time period (e.g., the latest three years: 2022 to 2024) | A: Section 3.1 Financial Capacity on Page 32 of the tender documents has clear requirements. Please revise the standard document in accordance with the tender document requirements. |
| 10 | Technical Section – "Table 1 List of Goods"<br>Delivery date in accordance with Incoterms<br><br>| Earliest Delivery Date | Latest Delivery Date | Bidder's Delivery Date |<br>| --- | --- | --- |<br>| | | |<br><br>Q: Can the Employer provide a clear delivery | A: Delivery shall be made within one month from the date of notification. Failure to complete delivery shall be penalized in accordance with the contract terms. |

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| | lead-time schedule specifying the required delivery dates?) | |
| 11 | In the Technical Section, the products such as pumps, electrical components, automatic control devices, instruments, valves, and control valves within the heat exchange unit appear repeatedly. Q: For the repeated items in the heat exchange unit, can they be deleted and noted in the response description as "see individual product items for details"? | A: Yes. |
| 12 | Technical Section – List of Equipment – X. Expansion Joints Q: Is the compensation amount L=300 for all expansion joints? | A: For each pipe diameter, please quote for compensation amounts of L=100mm, L=200mm, L=300mm, and L=400mm. The compensation amount shall not exceed the pipe diameter. |
| 13 | Technical Section – List of Equipment – VI. Valves Q: Which valves are imported and which are domestic? | A: There is a modification to the tender documents; please refer to Addendum No. 1. |