Leader in building mechanical facilities for a healthy indoor environment!!

WOOWON MNE
Woowon Mechanical & Environmental Engineers
1. Woowon MNE Introduction

1.1 Corporate Status
1.2 Corporate history
1.3 Corporate organization chart
1.4 Business domain
1.5 Award achievement
1.1 Corporate Status

Corporate Name
- Woowon MNE Inc.

C.I (Corporate Identity)
- Squares represent buildings that are economical and have minimal heat loss, and seven squares represent buildings of various uses.
- Woowon MNE's domain address is a company name converted to a number, and the number domain address is unique in Korea. (www.300302.com)

Corporate vision
- Leader in building mechanical facility technology for future-oriented healthy and pleasant environment creation
1.2 Corporate History

Corporate Overview

- License:
  - Registration of proprietor of engineering activities (No. 01-000003, Korea Engineering & Consulting Association)
  - Registration of professional fire-fighting system design service (Gwanak-gu No.2001-4)
  - Registration of construction supervision service (mechanical/electrical fire fighting facilities)(Gwanak-gu No.2005-10)
  - Registration of construction supervision service (mechanical facilities)(No.5-1)

- Location: 13, Jowonjungang-ro 1-gil, Gwanak-gu, Seoul(Sillim-dong)
  TEL.(02)860-9700 FAX.(02)860-9777

- Home Page: www.300302.com (E-mail: master@300302.com)

- CEO: Bong Tae PARK, Woon Seob BYUN

- Business Types: Air-conditioning refrigeration machinery and building mechanical facilities, firefighting system, industrial machinery

- Business Area: Design, Supervision

- Affiliated Research Institute: System research and development
1.2 Corporate History

- **1982.10.07** Established as WOOWON Facility Inc.
- **1982.10.07** Established a Affiliated Research Institute
- **1982.12.29** Acquisition of construction service (mechanical facilities)
- **1983.01.07** Opening of business
- **1983.05** Registration of personal engineering activities
- **1985.01.22** Integration of WOOWON Affiliated Research Institute and Woowon Facility Inc.
- **1985.05** Registration of Proprietor of engineering activities (mechanical, building facilities, fire fighting)
- **1985.08.29** Acquisition of fire-fighting system installation service
- **1985.10.01** Established a T.A.B division
- **1987.11.18** Awarded as a prime minister prize at the Energy Conservation Promotion Contest
- **1989.11.22** Registration of a WOOWON Affiliated Research Institute (under the Ministry of Science and Technology)
- **1994.** Company name changed (WOOWON Inc.)
- **2001.07.21** Business sector separation (WOOWON MNE Inc.)
- **2001.07.30** Registration of proprietor of engineering activities (first registered at 1993.06.09)
- **2001.07.30** Registration of professional fire-fighting system design service
- **2001.08** Signed a GRF exercise agreement - energy saving system design application
- **2001.09.04** Registration of construction supervision firm (first registered at 1996.02.05)
- **2003.02.26** Awarded as a minister of science and technology prize at the Second Professional Engineer's Day
- **2004.10.18** Honored with presidential science and technology prize at the First Engineering Day (CEO)
- **2004.11.24** Award as a technology prize by the Society of Air Conditioning and Refrigeration Engineers of Korea
- **2005.01.24** Registration of fire facility business - Construction supervision service (Mechanical fire fighting facilities)
- **2008.11.29** Relocation of Sillim-dong Office
- **2012.10.18** Honored with silver tower industrial medal of Korea (CEO)
- **2012.11.26** Awarded as an excellent technical ability prize by the Korean Association of Air Conditioning Refrigeration and Sanitary Engineers
- **2015.01.07** Awarded as an excellence building mechanical facilities engineer prize by the Korea Alliance of Mechanical Facilities Organizations
- **2015.09.09** Selected as a work-learning parallel company
- **2015.09.09** Selected as a K Brain Power company (excellent brain competence professional company)
- **2015.10.08** Registration of a Green Remolding business
- **2019.11.26** Registration of fire facility business - Construction supervision service (mechanical/electrical fire fighting facilities)
1.3 Corporate Organization Chart

Organization chart

C.E.O
Bong Tae Park

C.E.O
Woon Seob BYUN

Complex Design Division
Strategic Design Division
Green Design Division
Global BIM Division
Fire Fighting Division
Global BIM Division
Research Institute
Construction Management Division
Management Planning Division
Business Division

Complex Design Division
- Complex Building high quality design

Strategic Design Division
- Professionalism by building characteristics
- High quality design

Green Design Division
- Improvement of Green building design quality
- Building remodeling design

Global BIM Division
- Overseas project
- BIM planning and design work

Affiliated Research Institute
- Building energy and green building certification
- Simulation, LCA and VE
- Research project service

Construction Management Division
- Improvement of Construction document Quality
- Construction document standardization

Fire Protection & Life Safety Division
- Fire-fighting mechanical, electrical design
- Fire Simulation
1.4 Business Domain

- **Mechanical and Fire Protection Design**
  (Feasibility analysis, Concept design, Schematic design, Preliminary design, Detailed design, Field support)

- **CM & Supervision**
  (Construction Management & Supervision)

- **BEEC & P.O.E / EA**
  (Building Energy Efficiency Consulting & Post Occupancy Evaluation / Energy Audit)

- **EEC & Certification**
  (Eco-friendly Engineering Consulting & Certification)

- **Simulation / LCA & V.E**
  (Energy, Computational fluid dynamics, Evacuation/ Life Cycle Cost Analysis & Value Engineering)

- **Research Project service**
  (National, Private)

![Diagram showing Business Domain services](image)
1.4 Business Domain

Affiliated Research Institute

- **Mechanical and Fire Protection Design**  
  (Feasibility analysis, Concept Design, Schematic Design)

- **Building Energy Performance Consulting**  
  (Building Energy Efficiency Consulting & Post Occupancy Evaluation)

- **EEC & Certification**  
  (Eco-friendly Engineering Consulting & Certification)

- **Simulation / LCA & V.E**  
  (Energy, Computational Fluid dynamics, Evacuation/ Life Cycle Cost Analysis & Value Engineering)

- **Research Project Service**  
  (National, Private)
1.5 Award achievement

1. 2019.10.08 CEO Woon Seob BYUN
   Awarded as a grand prize at The 4th Seoul Construction Award

2. 2019.07.18 Division Director Dong Kon HWANG
   Awarded as a minister of land, infrastructure and transport prize at the 4th building Mechanical Facilities Day

3. 2018.07.12 Division Director Song Woo LEE
   Awarded as an excellence building mechanical facilities engineer at the 3rd building Mechanical Facilities Day

4. 2017.10.12 CEO Woon Seob BYUN
   Awarded as an excellence prize at the 2nd Seoul Construction Award

5. 2015.11.07 CEO Woon Seob BYUN
   Awarded as a prime minister prize

6. 2015.01.08 CEO Woon Seob BYUN
   Awarded as an excellence building mechanical facilities engineer by the Korea Alliance of Mechanical Facilities Organizations

7. 2012.11.26 Division Director Dong Kon HWANG
   Awarded as an excellent technical ability prize by the Korean Association of Air Conditioning Refrigeration and sanitary Engineers

8. 2012.10.18 CEO Bong Tae PARK
   Honored with silver tower industrial medal of Korea

9. 2009.11.12 CEO Woon Seob BYUN
   Awarded as minister of knowledge economy prize

10. 2009.11.09 CEO Bong Tae PARK
    Awarded as prize at the Fire Prevention Day 47th anniversary

11. 2008.06.26 CEO Woon Seob BYUN
    Awarded as a best paper prize by the Society of Air Conditioning and Refrigeration Engineers of Korea

12. 2004.11.24 CEO Woon Seob BYUN
    Awarded as a technology prize by the Society of Air Conditioning and Refrigeration Engineers of Korea

13. 2004.10.18 CEO Bong Tae PARK
    Awarded as a science and technology prize of Korea

14. 2003.02.26 CEO Woon Seob BYUN
    Awarded as a minister of science and technology prize

15. 2001.11.27 Woonwon MNE Inc.
    ISO 9001 certification—Korea Foundation for Quality(AC-02901)

16. 1987.11.18 Woonwon MNE Inc.
    Awarded as a prime minister prize at the Energy Conservation Promotion Contest
2. Talent Acquisition & Development Strategies

2.1 R&D Manpower
2.2 Talent Acquisition & Development Strategies
2.1 R&D Manpower

Woowon MNE’s Manpower Status

- 5 Professional engineers (6.3% of total personnel), 2 ph.ds, Master’s degree or higher (25 personnels, 31%)
- Possibility of increase the proportion of R&D personnel by moving between departments
- Continuous recruitment of highly educated talents to improve R&D ability (All R&D Manpower’s education is Master’s or above)
- Service For over 25 years: 4 employees, over 15 years: 3 employees, over 5 years: 16 employees
- Practical Experience for over 45 years: 1 employees, over 35 years: 3 employees, over 25 years: 6 employees, over 15 years: 12 employees, over 5 years: 28 employees
2.2 Talent Acquisition & Development strategies

Talent Acquisition Strategy

**Hiring Talented people through various channels**

- **Recruitment of talents** recommended for graduate students (master’s and doctoral degrees) through cooperation with professors
- Participated in Ewha Womans University’s “Female Engineering Leader Training Program”
- Participated in Kookmin University’s “smart Equipment Engineering Manpower Training Advanced Track Research Project”
- Foster talents by signing and collaboration with Wonkwang University as “Family company”

**Currently employed personnel upbringing support and employment of college student interns**

- Support for in-depth professional education and degree acquisition (supporting doctoral degree while in office)
- Through College student Interns, Trainees (5-6 students each year) using “professional Skills Training” and Employment

**Long-term employee induction through various benefits and support**

- Long-term employee commendation and grant system for more than 5 years
- In-house professional engineer course
- Giving excellent work awards and grants every year
- Giving additional certification allowance for professional engineer and engineer
- Company Improvement Proposal Excellence Award
2.2 Talent Acquisition & Development strategies

**Talent Acquisition and Development Strategies**

- **Training for new employees**
  - OJT (On-the Job-Training)
    - Distribution of work taking into account positions and abilities (projects carried out by teams)
    - Mentoring (mentor/mentee) (Adaptability improvement and basic job training for new employees)

- **Regular in-house training/Invitation training**
  - In-house/ external invitation training plan established by Board of Education
  - External invitation training at least once a month (The 3rd week of every month Wednesday)
  - In-house seminar on more than 10 topics every year (The 4th week of every month Friday)

- **Performance Management System**
  - Self task performance assessment - Self-evaluate and reflect on performance evaluation
  - Performance evaluation by executive - Division directors in each department reflect evaluation of employees
2.2 Talent Acquisition & Development strategies

Professional competence and competitive secure

Securing domestic and foreign technological competitiveness and fostering technology

- Participate in annual academic conferences
  - Obtain latest research trends and new technology information
  - Journals, papers and conference presentations in related fields (annual) presentation of 4~5 papers
- Participate in various Forums and seminars
  - Identify recent issue trends and making network connections to other fields people
- Acquiring technical information through overseas project collaboration and work sharing

Expertise and Skills Retention Strategy

- Improving practical skills through our design field tour (Quarterly)
  - Improve work comprehension through practical field visits
- Improve job skills and reward through in-house tests for each job level in February (less than team leader level) and October (more than manager level)

[Excellent employee in company test]

[Participated in the Society of Air Conditioning and Refrigerating Engineers of Korea Conference]
### 2.2 Talent Acquisition & Development strategies

**Paper presented and participated in the conference (annual presentation 4~5 papers)**

<table>
<thead>
<tr>
<th>Subscribed Society and Seminars</th>
<th>Kinds</th>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Society of Air conditioning and Refrigerating Engineers of Korea (SAREK)</td>
<td>Summer and Winter Conference</td>
<td>Summer: June, Winter: November</td>
<td>Presentation</td>
</tr>
<tr>
<td>Korea Refrigeration and Air-conditioning Industry Association (REF)</td>
<td>Air-conditioning Section class</td>
<td>November</td>
<td>Presentation</td>
</tr>
<tr>
<td>Korea Solar Energy Society (KSES)</td>
<td>Spring and Autumn Conference</td>
<td>Spring: June, Autumn: November</td>
<td>Attending Seminar</td>
</tr>
<tr>
<td>Korea High-rise Architecture Forum (KSTBF)</td>
<td>Spring and Autumn International Symposium</td>
<td>Spring: April, Autumn: November</td>
<td>Attending debating society</td>
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<tr>
<td>Korea Green building Council (KGBC)</td>
<td>Autumn Conference</td>
<td>November</td>
<td>Attending Seminar</td>
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<thead>
<tr>
<th>Subscribed Society and Seminars</th>
<th>Kinds</th>
<th>Time</th>
<th>Activity</th>
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</thead>
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<td>Korea Society of Geothermal Energy Engineers (KSGEE)</td>
<td>Academic Lecture</td>
<td>December</td>
<td>Attending Seminar</td>
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<tr>
<td>Korea Institute of Fire Science &amp; Engineering (KIFSE)</td>
<td>Spring and Autumn Conference</td>
<td>Spring: April, Autumn: November</td>
<td>Attending Seminar</td>
</tr>
<tr>
<td>Korea Tunnelling and Underground Space Association (KTA)</td>
<td>Autumn Conference</td>
<td>October</td>
<td>Attending Seminar</td>
</tr>
<tr>
<td>Building Smart Korea (BSK)</td>
<td>BIM Conference</td>
<td>October</td>
<td>Attending Workshop</td>
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</table>

- **Attending lecture about practical design training for mechanical and electrical departments of 1st group construction company in Korea**
  (educator: CEO Woon Seob BYUN, Affiliated Research Institute Division Director Dong Kon HWANG, Division Director Kyu Ho CHAE, Division Director Song Woo LEE, Division Director Jong Sin LEE)
- **Lecturing at a renowned university in Korea - Department of Architecture / Building Engineering**
  (CEO Bong Tae PARK: Visiting professors at Hanyang University, Yonsei University, Pukyong National University)  
  (CEO Woon Seob BYUN: Lecturing at Korea University, Hanyang University, Seoul City University, Soongsil University, Hongik University)
3. Technology Innovation capacity

3.1 Woowon MNE’s Technology Innovation Capability
3.2 R&D Achievements and brain industry sector sales status
3.3 Excellence of research results and technology
3.1 Woowon MNE’s Technology Innovation Capability

Creating a work environment for both companies and employees

Thorough adherence to basics and creation of an efficient work environment

- Create a pleasant working environment by cleaning and arrangement data on the last Friday of Each quarter
- Periodic replacement of aesthetic flower pots for public place and office
- Every Friday is day without night work (family day)
- Assuring employee health by conducting national gymnastics at rest time (2:25 pm every day)
- Periodic replacement of technical terminology paper attached at toilet wall

Strengthen employee cohesion

- Promote unity through Happy Day (All Employees’ Association) event after quarterly cleaning
- Spring picnic, fall workshop (1 night 2 days domestic, 2 nights 3 days abroad) held annually
- Cultural Day event held once a quarter (watching dramas, performances, movies, sports, etc.)
3.1 Woowon MNE’s Technology Innovation Capability

Work efficiency through in-house data standardization

- Repetitive tasks and cost savings
  - Provide compatibility due to frequent takeover

- Review, calculation
  - Provide drawing method

- Low quality prevention
  - High quality of consumer
  - Product selection help

Work efficiency and time saving
In-house data standardization

Use design manual

- Mechanical Facilities Design Manual (Total 3)
- Mechanical Facilities System Manual
- Mechanical Facilities Drawing Manual
- Mechanical Facilities Laws, etc.

Leverage document standard forms

- Contract, Official document, Meeting notes, etc.
- Drawing standard form, calculation standard form, specification standard form, etc.
- Use of groupware such as company CI and electronic approval

- Document standardization improves work efficiency and document quality
- Design manuals are organized by subjects for each volume so that experienced personnel can review related materials
- Design manual is the First and Unique product in domestic building mechanical facilities design industry (copyright registration)
- New content updated every year
3.1 Woowon MNE’s Technology Innovation Capability

In-house data standardization and internationalization

Application of international design codes

- Localization and use of international codes such as IBC, IMC, IPC, IECC
- ASHARE Standard, Guideline are translated and contained into manual and use them
3.1 Woowon MNE’s Technology Innovation Capability

DB management (server construction) - systematic technical management

DB double storage
- Storage server (hard drive)
- Web hard service (DROPBOX)
- Semi-annual (June, December) Server DB Data Collection

Project management
- Classification by use such as accommodation, exhibition, education, business
- Prize design, TK, BTL, technology proposal, master plan, research proposal, etc.

Design data management
- Design data by year
- Design criteria, papers, reports, articles, gazettes, etc.
- Green-building certification system, performance, etc.
- Research data
- Forms, work-related programs and tools
3.2 R&D Achievements and brain business sector sales status

R&D Achievements

- Sales area divided into design/research/supervision/lease
- The design/research field is included in the brain industry
  The sales ratio of the 2 sectors is very high, with **98.4%**
  (Due to the nature of engineering companies, most of them are included in the brain industry)
  * Brain industry in engineering: research, planning, feasibility study, preliminary design, construction management, etc.

<table>
<thead>
<tr>
<th>Share of corporate sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>supervisión</td>
</tr>
<tr>
<td>1.44%</td>
</tr>
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<table>
<thead>
<tr>
<th>Brain industry sector sales status</th>
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<tbody>
<tr>
<td>Unit: In millions of Korean won</td>
</tr>
<tr>
<td>2011</td>
</tr>
<tr>
<td>6,570</td>
</tr>
</tbody>
</table>

- The brain business sector generates sales of more than 6.5 billion annually
- Brain industry sector is main business area
Performance of research projects in the last 5 years (total 20 cases)

1. Development of clean air-conditioning ventilation system in connection with new and renewable energy indoor and outdoor heat and air environment information  
   (2019. 8 ~ 2024. 4, Korea Institute of Construction Technology)

2. Feasibility study and conceptual design of smart energy AP unit development  
   (2019. 10 ~ 2019. 12, Korea Institute of Construction Technology)

3. Design service for downward installation of aerial piping in user’s machine room  
   (2019. 8 ~ 2019. 8, Korea District Heating Corporation)

4. Desert climate adaptive smart greenhouse and cooling package demonstration model development  
   (2019. 8 ~ 2012. 10, Agriculture, Forestry and Food Technology Planning and Evaluation Institute)

5. Data center air conditioning system analysis of domestic and foreign technology trends and suggestion of optimal air conditioning design techniques for computerized equipment  
   (2019. 5 ~ 2019. 6, Korean Society for Equipment Engineering)

6. Development of cooling package technology for stable cultivation of large-scale glass greenhouses in summer and research on field  
   (2018. 11 ~ 2021. 8, Agriculture, Forestry and Food Technology Planning and Evaluation Institute)

7. Detailed design service for 4th generation district heating implementation design and construction  
   (2019. 5 ~ 2019. 10, Research Institute of Advanced Technology)

8. Development of optimal heat supply system for district heating in connection with zero energy buildings  
   (2018. 11 ~ 2020. 11, Korea Institute of Construction Technology)

9. Research on technical standards such as energy/air conditioning/ventilation for the implementation of the Mechanical Equipment Act  

10. Permanent standard heat consumption analysis and utilization research by district heating apartment house size  
    (2018. 9 ~ 2019. 5, Korea Institute of Construction Technology)

Indoor and outdoor thermal air environment in connection with new and renewable energy Development of an information linkage clean air conditioning system

Development of cooling package technology for stable cultivation of large-scale glass greenhouses in summer and research on field

District heating apartments by size Standard heat consumption analysis and utilization research
3.3 Excellence of research results and possessed technology

Performance of research projects in the last 5 years (total 20 cases)

11. Research on research on revision of product quality (architectural machinery engineering) (2018. 7 ~ 2018. 11, Korea Engineering Association)

12. Implementation plan and cost analysis for each long-term housing facility design (2018. 7 ~ 2018. 10, Seoul City Corporation)


15. Smart energy analysis and operation guide development by building type (business, medical facility) (2018. 3 ~ 2019. 11, Korea Energy Agency)

16. BEMS optimization solution that responds to demand for saving 15% of energy in buildings of large hospital (2017. 12 ~ 2020. 12, Korea Institute of Energy Technology Evaluation)

17. General building unit cooling load standard revision and load factor optimization study (2017. 6 ~ 2018. 1, Korea District Heating Corporation)


### Patent Registration Status

**Dehumidifier and air conditioning system using this dehumidifier**

- **Registration Code/Date**: 10–1230741 (2013.01.31)
- **Applicant**: Woowon MNE Inc.
- **Inventor**: 1. BongTae PRAK 2. DongKon HWANG

**Drainage heat exchanger and heat exchange system including this**

- **Registration Code/Date**: 10–103492 (2011.05.03)
- **Applicant**: Seongrak Lee, Woowon MNE Inc.
- **Inventor**: 1. Seongrak Lee, 2. NamGi Jung

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### 3.3 Excellence of research results and possessed technology
### Copyright Registration Status (9 cases)

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<tr>
<th>No</th>
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<th>Kind of literary work</th>
<th>Registration date</th>
<th>Registration Number</th>
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<tr>
<td>1</td>
<td>Woowon MNE HVAC Basic design suggestions</td>
<td>Literary work</td>
<td>2019. 11. 14</td>
<td>C-2019-033298</td>
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<td>2</td>
<td>Mechanical Facilities Design Manual (1,2)</td>
<td>Editorial work</td>
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<td>2010. 01. 19</td>
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<td>4</td>
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<td>C-2010-000738</td>
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<td>2010. 01. 25</td>
<td>C-2010-000939</td>
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<td>Mechanical Load Calculation Sheet</td>
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<td>2010. 01. 25</td>
<td>C-2010-000942</td>
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<td>Mechanical Facilities Design Manual</td>
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<td>2010. 01. 25</td>
<td>C-2010-000943</td>
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<td>10</td>
<td>Keangnam Hanoi Landmark Tower (Mechanical Engineering)</td>
<td>Literary work</td>
<td>2010. 02. 05</td>
<td>C-2010-001680</td>
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</tbody>
</table>

#### 3.3 Excellence of research results and possessed technology
3.3 Excellence of research results and possessed technology

Excellence of possessed technology

- Energy efficient design from early design stage
- Mechanical system design considering comprehensive convenience of future maintenance

Excellence of Retention technology

- Qualitative improvement of overall mechanical facilities design about air conditioning, refrigeration, sanitation, automatic control, firefighting, etc. for energy-related buildings
- Contributing to the establishment of mechanical facilities design technology through on-site supervision

Advanced application Of design techniques

- Apply international standards, codes, guidelines, specifications, etc.
- Design condition setting, load calculation and analysis reflecting site characteristics
- Analyze the life cycle cost (LCC) from planning, preliminary design, detailed design, construction, maintenance, demolition and remodeling to design an efficient facility system with minimum cost
3.3 Excellence of research results and possessed technology

Commercialization results through possessed technology

Building total energy consumption prediction program (BESS) development

- Seoul Metropolitan Government's BESS program was developed by our company (2011) for use in deliberations
- Saves 64 billion annually and reduces energy consumption (390 million kwh) and carbon emissions by 96,000 tons (press release)

Getting many building energy efficiency level 1 certification including Korea’s first public building

- Female family complex facility "space saving" construction, building energy efficiency 1+ grade (primary energy consumption per unit area of 200kWh/m2 yr or less, preliminary certification, 2018. 4)
- Certification a lot aside from space living, Hyangnam Kindergarten, Yongsan Hotel, Hamdaemun-ro 5ga Urban Environment Improvement project, etc.

[Seoul Metropolitan Government's Building total energy consumption prediction program (BESS)]

[From the left, Space living, Hyangnam Kindergarten, Namdaemun 5ga Energy Efficiency Grade Main Certification and Preliminary Certification]
3.3 Excellence of research results and possessed technology

Commercialization results through possessed technology

Seoul Metropolitan Government Introduce Building Total Energy Consumption system

Seoul Metropolitan Government will reduce building energy consumption by 20% until 2030

서울시, 건축물 '에너지소비총량제' 도입

공공건물의 20%를 절감하기 위해 서울시는 건축물의 에너지 소비량을 절감하기 위한 '에너지소비총량제'를 도입할 계획이다. 2030년에까지 에너지 소비량을 20% 절감하는 대책을 마련하고 있는 서울시는 건축물의 에너지 효율성을 높이기 위한 대책을 마련하고 있는 중이다.

이제 도입된 에너지소비총량제는 공공건물의 에너지 소비량을 절감하기 위한 대책으로서, 공공건물의 에너지 소비량을 줄이기 위한 정책을 마련하고 있는 서울시의 대책이 시민들의 관심을 받고 있다.

서울시는 에너지 소비량을 절감하기 위한 대책으로서, 공공건물의 에너지 소비량을 줄이기 위한 정책을 마련하고 있는 서울시의 대책이 시민들의 관심을 받고 있다.
3.3 Excellence of research results and possessed technology

Commercialization results through holding technology

Energy-saving design technology propagation

- Applying energy-saving design technology to many public buildings and private buildings
- Energy-saving design technology reduces building energy costs by more than 20%

National prestige elevated through national infrastructure and overseas projects

- Participated in the design of building mechanical facilities system for large-scale overseas design projects such as Vietnam Hanoi Landmark Tower (70th floor), Vietnam Danang City Office (34th floor), Japanese Embassy in Japan, Central Bank of Iraq

[Japanese Embassy official residence building reconstruction] [Vietnam Hanoi Landmark Tower] [Cambodia Phnom Penh IFC] [Vietnam Danang City Office]
### Major projects in Korea (about 1500 cases)

<table>
<thead>
<tr>
<th>Project name</th>
<th>Total Area</th>
<th>Architectural scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incheon 151 Tower</td>
<td>662,303 m²</td>
<td>2 underground levels 151 ground levels</td>
</tr>
<tr>
<td>Ilsan China Town</td>
<td>25,349 m²</td>
<td>7 underground levels 81 ground levels</td>
</tr>
<tr>
<td>Songdo New Town Convention complex</td>
<td>361,871 m²</td>
<td>3 underground levels 68 ground levels</td>
</tr>
<tr>
<td>Songdo New Town 125 Block Residential Complex</td>
<td>531,721 m²</td>
<td>2 underground levels 63 ground levels</td>
</tr>
<tr>
<td>Seoul International Finance Center (SIFC)</td>
<td>494,551 m²</td>
<td>7 underground levels 55 ground levels</td>
</tr>
<tr>
<td>Seoul IT Complex</td>
<td>72,424 m²</td>
<td>6 underground levels 21 ground levels</td>
</tr>
<tr>
<td>Seoul Metropolitan New Government Building</td>
<td>90,788 m²</td>
<td>5 underground levels 13 ground levels</td>
</tr>
<tr>
<td>Sangam-dong MBC New Office Construction</td>
<td>148,754 m²</td>
<td>3 underground levels 13 ground levels</td>
</tr>
<tr>
<td>Sangam-dong World Cup Stadium</td>
<td>98,706 m²</td>
<td>1 underground levels 5 ground levels</td>
</tr>
<tr>
<td>Seoul Agricultural and Marine Products Wholesale Market</td>
<td>189,614 m²</td>
<td>1 underground levels 5 ground levels</td>
</tr>
<tr>
<td>Chungcheongnam-do provincial Government and assembly building Construction</td>
<td>103,272 m²</td>
<td>2 underground levels 7 ground levels</td>
</tr>
</tbody>
</table>
3.3 Excellence of research results and possessed technology

Distribution of overseas major project results

- Bakı Olympic Stadium of SOCAR, Azerbaijan (G.F.A. 496,000m²)
- Crude Central Bank, Iraq (G.F.A. 56,000m²)
- MOS Headquarters Development, Mongolia (G.F.A. 33,980m²)
- Philippine Arena, Philippines (G.F.A. 70,270m²)
- King Abdullah Sports City, Saudi Arabia (G.F.A. 31,031m²)
- BRAC 3 Tower Block Project, Bangladesh (G.F.A. 76,900m²)
- Keangnam Hanoi Landmark Tower, Vietnam (G.F.A. 691,000m²)
- Pacific Ocean Research Center, Micronesia (G.F.A. 4,498m²)

* Number of Records
- Vietnam: 6
- Mongolia: 2
- Iraq: 1
- Cambodia: 2
- Azerbaijan: 2
- USA: 1
- Saudi Arabia: 1
- Eritrea: 1
- Bangladesh: 1
- Afghanistan: 1
- Oman: 1
- Philippines: 1
- Sudan: 1
- Micronesia: 1
- China: 1
- Japan: 1
- Honduras: 1

2020. 1 statistics
3.3 Excellence of research results and possessed technology

### Major Projects in overseas

<table>
<thead>
<tr>
<th>Project name</th>
<th>Total Area</th>
<th>Architectural scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iran Atlas Plaza</td>
<td>465,793㎡</td>
<td>7 underground levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28 ground levels</td>
</tr>
<tr>
<td>Saudi King Abdullah Sports City</td>
<td>31,031㎡</td>
<td>3 ground levels</td>
</tr>
<tr>
<td>Iraq Crude Central Bank Construction</td>
<td>66,000㎡</td>
<td>1 underground level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 ground levels</td>
</tr>
<tr>
<td>Oman Dopar State Government building</td>
<td>37,547㎡</td>
<td>4 ground levels</td>
</tr>
<tr>
<td>Azerbaijan Baku Olympic Stadium</td>
<td>496,000㎡</td>
<td>1 underground level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 ground levels</td>
</tr>
<tr>
<td>Cambodia AEON Mall Project</td>
<td>103,758㎡</td>
<td>5 ground levels</td>
</tr>
<tr>
<td>Cambodia AngkorWat Business Center</td>
<td>4,999㎡</td>
<td>1 ground level</td>
</tr>
<tr>
<td>Philippines Manila Arena</td>
<td>70,270㎡</td>
<td>3 ground levels</td>
</tr>
<tr>
<td>Vietnam 108 Department of Defense Central Hospital</td>
<td>132,000㎡</td>
<td>1 underground level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 ground levels</td>
</tr>
<tr>
<td>Vietnam Hanoi Landmark Tower</td>
<td>611,573㎡</td>
<td>2 underground levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 ground levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 underground levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 ground levels</td>
</tr>
<tr>
<td>Vietnam Danang City Hall Construction</td>
<td>67,642㎡</td>
<td>2 underground levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 ground levels</td>
</tr>
<tr>
<td>Mongolia MCS HEADQUARTERS</td>
<td>33,900㎡</td>
<td>1 underground level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27 ground levels</td>
</tr>
<tr>
<td>Singapore Seagate Design Center Proposal Design and many others (17 countries)</td>
<td>41,983㎡</td>
<td>10 underground levels</td>
</tr>
</tbody>
</table>
4. Constant Growth Possibility

4.1 Executive Competency
4.2 Efforts for constant Growth
4.3 Market analysis
4.1 Executive competency

Corporate Value of Executives

CEO’s leadership

Organization culture

- Working for yourself and creating an organization filled with confidence and accomplishments based on job responsibilities

Core Value

- Successful project performance
- Dynamics of outstanding core talents with creative Craftsmanship
- Realizing Korea’s Best Engineering Company in Technology and Company Reliability

Management Philosophy

- Craftsmanship with commitment to researching and developing new technologies and systems
- Providing comfort for humans and cutting-edge technology for industry
- Research of new technologies and system development for quality improvement of engineering technology
4.2 Efforts for constant Growth

Quality improvement plan (Q.C meeting)

- Q.C meetings are held in the executive’s meeting room every Thursday at 8:00
- Select project every month and deliver it to the person in charge
- Consideration of importance and specificity when selecting a project
- After the person in charge presented the PT, the executives give their opinions on the preliminary review and ask questions
- The person in charge Reflects and complements the review opinions in the project and shares the results with each division

[Q.C meeting picture]
4.2 Efforts for constant Growth

Q.C case
4.2 Efforts for constant Growth

Efforts for constant Growth

Manager-level meeting (person in charge discussions, every Wednesday from 8:00~8:40)

- Contribute to the company’s development based on practical know-how and discussion of improvement
- Project indirect experience by sharing issue project design
- Establish various standards and criterions by performing various standardization work (Now we are working on standardizing the detail to improve drawing quality)
- Notice of law revision

Strengthen professionalism

- Improving professionalism by granting educational opportunities for special interests
- Expand the scope of professional work with energy simulation programs (e-Plus, Transys, TRACE 700, etc.), LCC, VE, etc.
- Acquisition of new technology and accumulation of technology by attending specialized committees such as renewable energy, skyscrapers, subway and tunnel ventilation, BIM, firefighting, etc.
- Continuing external invitational training to improve technology (Now on TA pipeline program training Every Monday evening)
4.3 Market analysis

Domestic market

- The domestic energy efficiency building market is estimated to be about 3.9 trillion won.
- The HVAC sector accounts for about 50% of the total energy efficiency building market, followed by efficiency materials and BEMS.
- The domestic low-energy building market is estimated to be about 5 trillion won by 2020.
- Positive outlook for the construction market and expected growth in the building energy efficiency market, including new demand growth that meets global standards due to the Winter Olympics.

Refer to the report “2013 - 2014 Domestic Market Forecast for Energy Technology” [KETEP/Ministry of Trade, Industry and Energy]
4.3 Market analysis

Overseas market

Overseas Project Contract Trends

- Large construction firms and architects are focusing their efforts on developing overseas markets by escaping the domestic market.
- The share of overseas project contracts, a brain industry, is gradually increasing (7.6% → 14.9%)
- High possibility for constant growth in the future

<table>
<thead>
<tr>
<th>Year</th>
<th>Total amount</th>
<th>Overseas</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>10,466</td>
<td>799</td>
<td>7.6%</td>
</tr>
<tr>
<td>2012</td>
<td>7,761</td>
<td>648</td>
<td>8.3%</td>
</tr>
<tr>
<td>2013</td>
<td>7,957</td>
<td>1,186</td>
<td>14.9%</td>
</tr>
</tbody>
</table>
Thank you