

The background image is a photograph of the Chun_Cheon Cogeneration Plant. It shows several large, white, rectangular industrial buildings with flat roofs, arranged in a row. To the right of these buildings are several tall, cylindrical storage tanks. The plant is situated in a valley with green grass and some trees in the foreground. In the background, there are rolling hills under a clear sky. The image has a slightly grainy texture.

ConsMa 2017

Construction Management Case Study for Chun_Cheon Cogeneration Plant

2017.03



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01. Project Outline

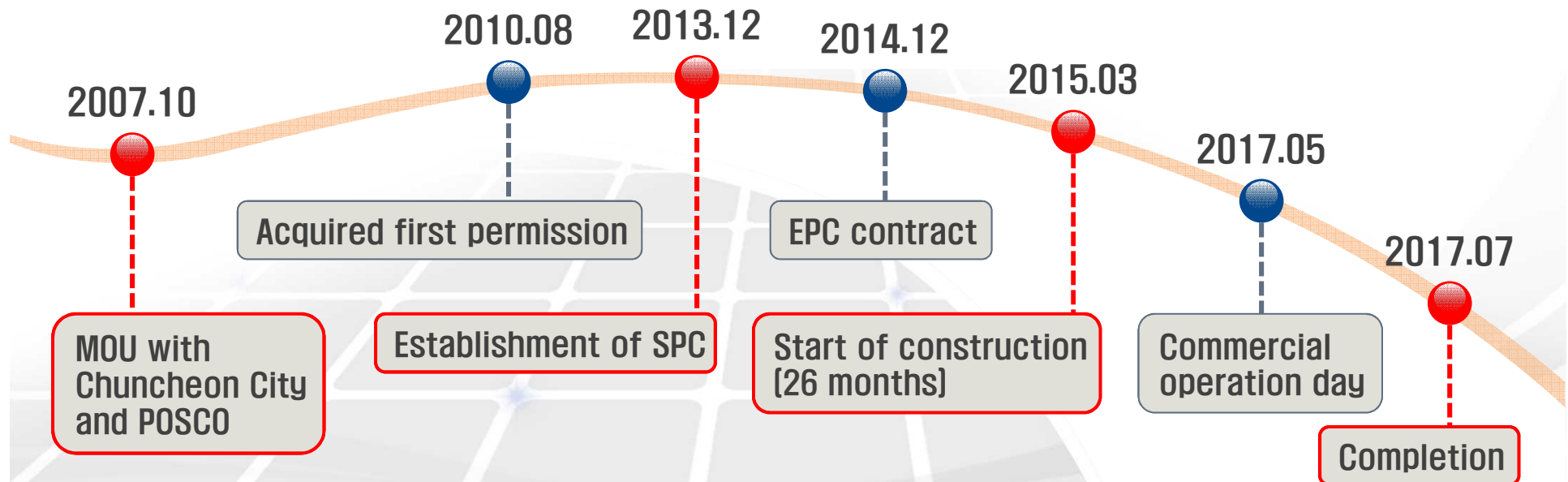
1.1 Background

Greenhouse Gases
Reduction policy

Supply
electric power

Provide
heating energy

1.2 Project Progress



1.3 Scope and duration of the project

Participants

Project Owner : Chuncheon Energy (SPC)
Participating Companies : POSCO E&C, HHIC, etc.

Location

**East Chuncheon industrial complex, Gangwon-do,
Republic of Korea**

Duration

March 2, 2015 ~ June 30, 2017 (28 months)

Facility Scope

Capacity : 470MW + 120Gcal/h (Heat)
Transmission line : 154kv / 4.7km
Heat Pipe : 45.8km

Cost

Project cost : 688,800 million won
Construction cost : 577,000 million won

CM duration

March 2, 2015 ~ July 31, 2017 (29 months)

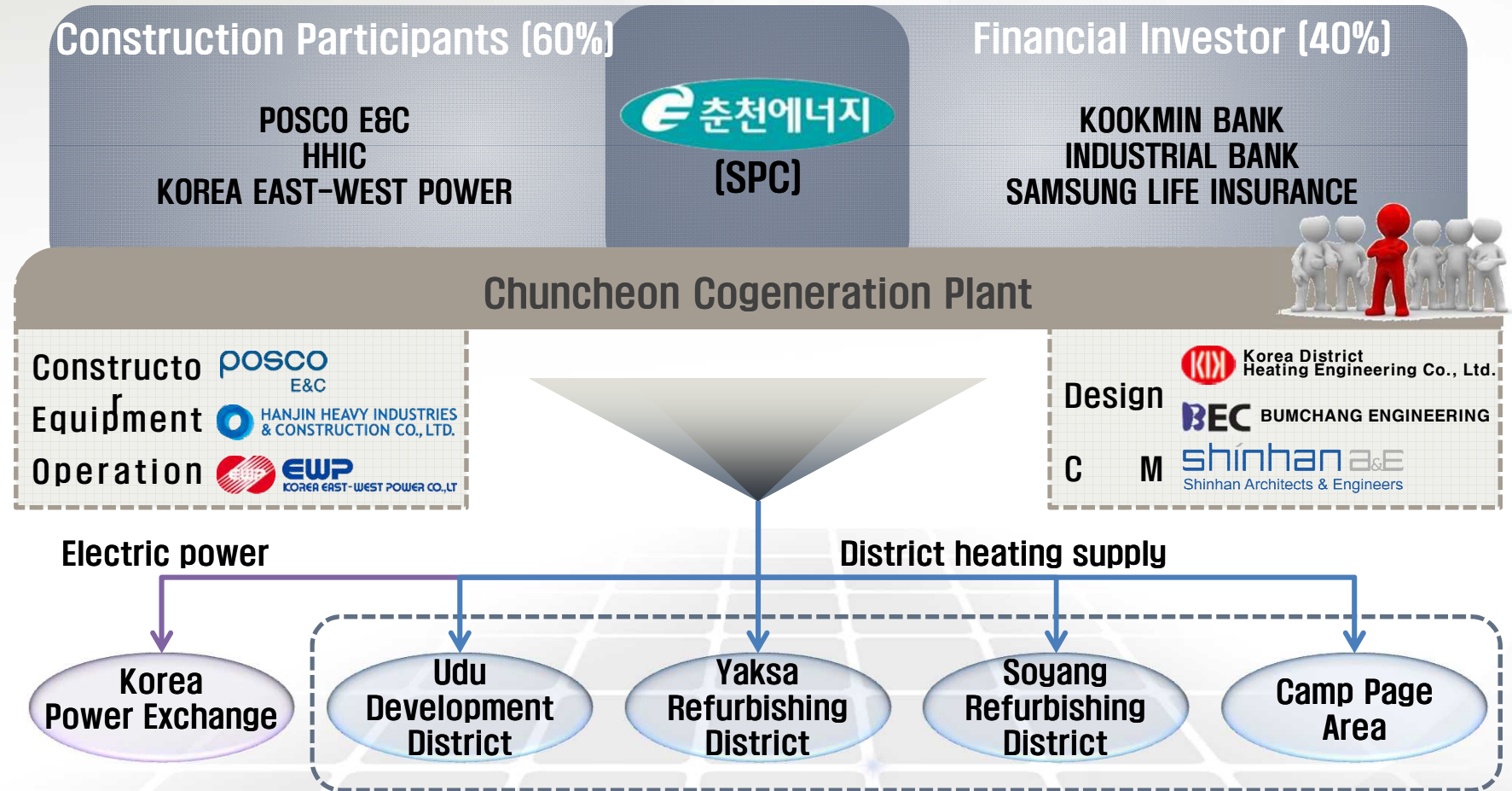
CM Service fee

3,550 million won



02. Characteristics of the Project

2.1 Project Organization



Extension of Power Plant by *public-private partnership, PPP*

2.2 Project Overview

Power Plant

- Capacity : 470MW + 120Gcal/hr
 - Gas turbine : 1 EA (315MW)
 - Steam turbine : 1 EA (155MW)
 - Heat Recovery Steam Generator : 1 EA



Transmission Line

- Voltage : 154kv
- Connection system : South Chuncheon ~ West Hongcheon Substation
- 4.7km, 154kv branch connection

춘천에너지
[SPC]



- Manage complaints
- Review existing underground facilities

- Manage main equipment transport and installation
- Manage commissioning

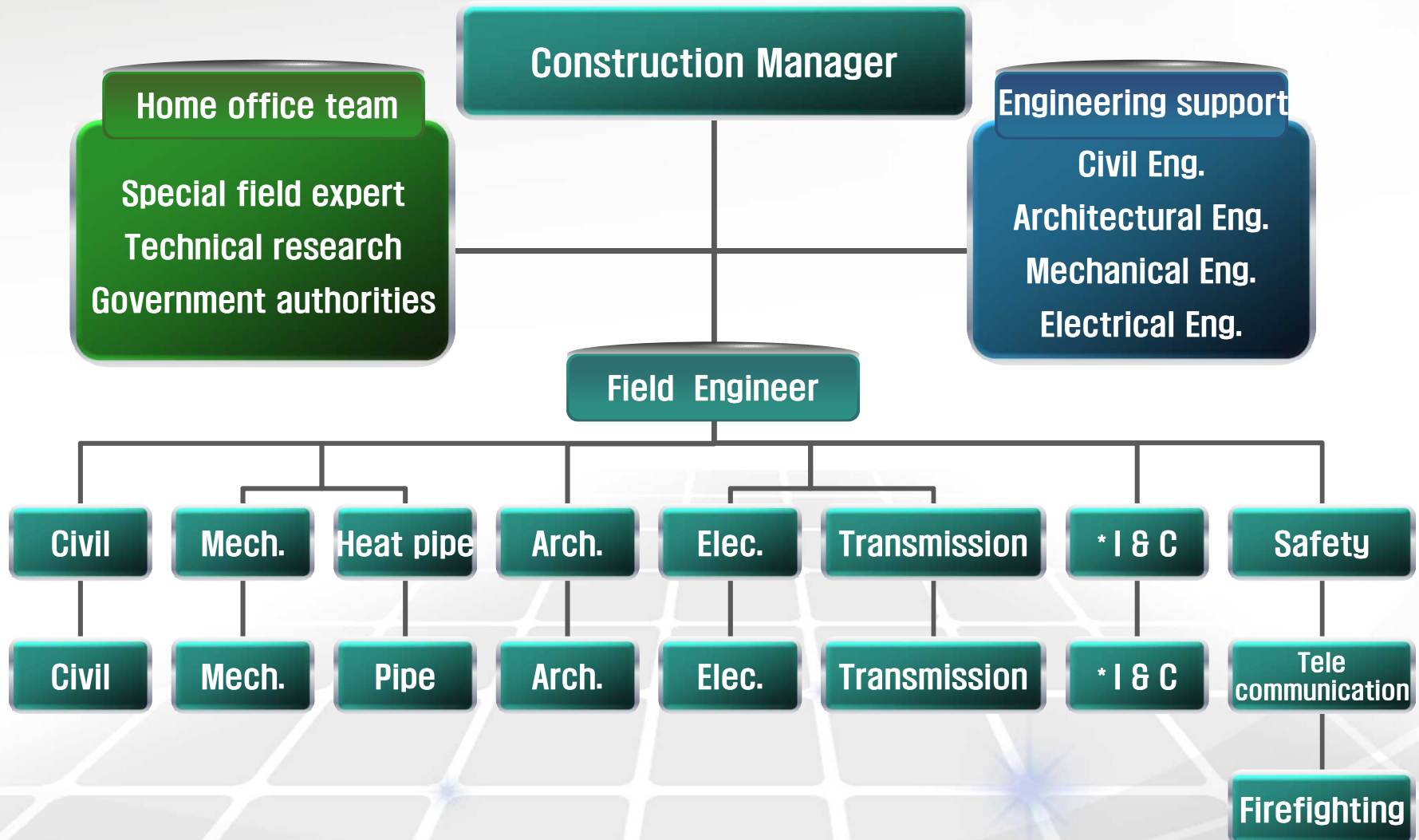
- Length : 45.8km
- Supply area : Heating energy supply and recovery of 4 districts (Udu, Soyong, Yaksa, Camp page)

Heat Pipeline



03. Works of CM

3.1 Organization and Main Service



* I&C : Information and control

3.1 Organization and Main Work

3.1.1 Works of field engineer

Design management

- Check design
- Minimize design change



Schedule management

- Schedule review
- Manage of schedule delay

Quality management

- Material and workers
- Works Interface

Safety/ Environmental | management

- On site inspection
- Safety check and training

3.1 Organization and Main Work

3.1.2 Works of engineering support

Field inspection

- Field inspection (Every 1 month)
- Support for owners and field requests



Schedule management

- Review of schedule
- Review of recovery schedule

Quality management

- Inspection and check special equipment
- Support defectives

Safety/ Environmental | management

- Site patrol
- Joint inspection

3.1 Organization and Main Work

3.1.3 Works of home office team

Technical reference support

- Experience and technical reference support



Response authorities

- Permitting and licensing
- Manage complaints

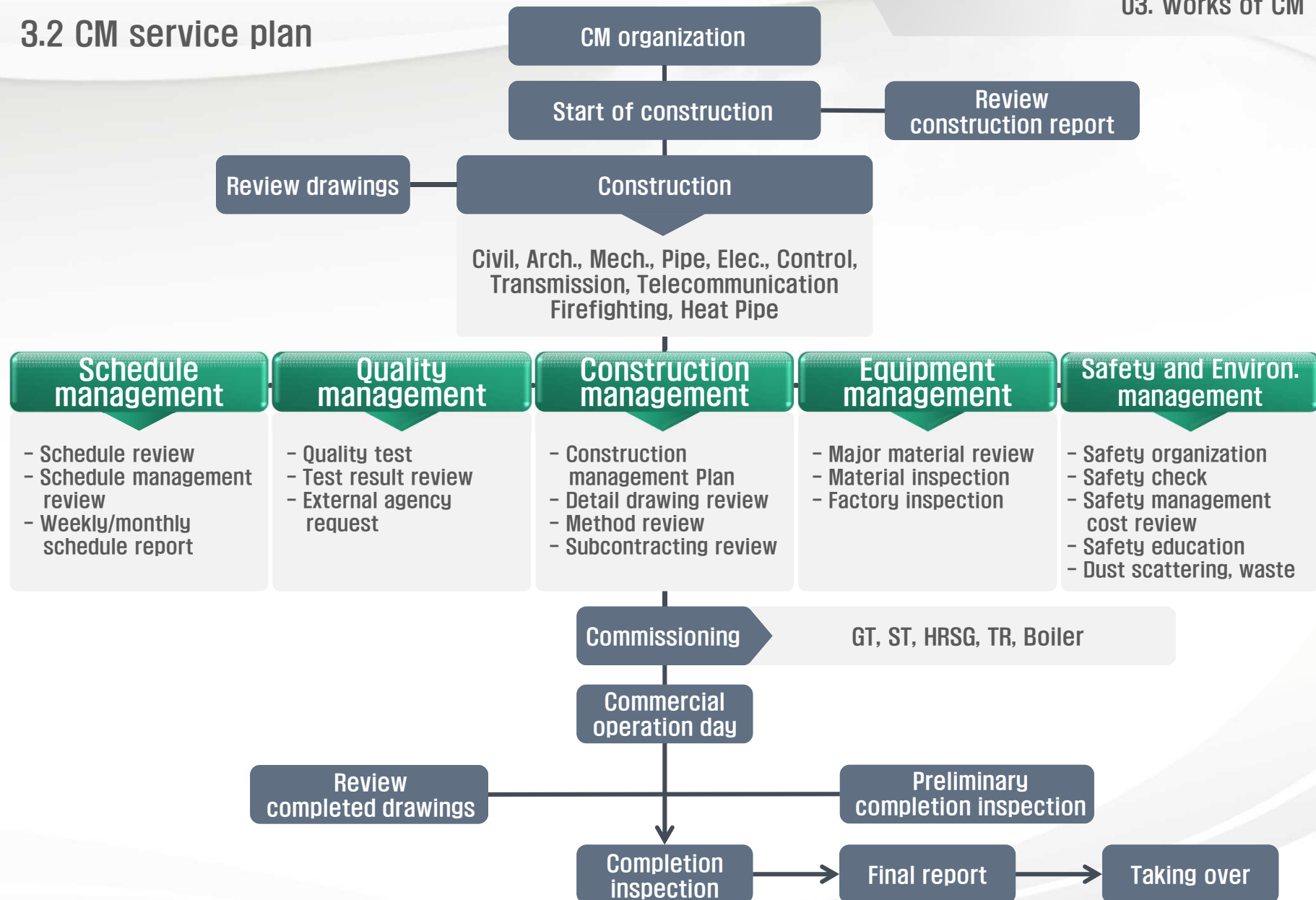
Technical research institute

- Review suitability of new technology

Special support

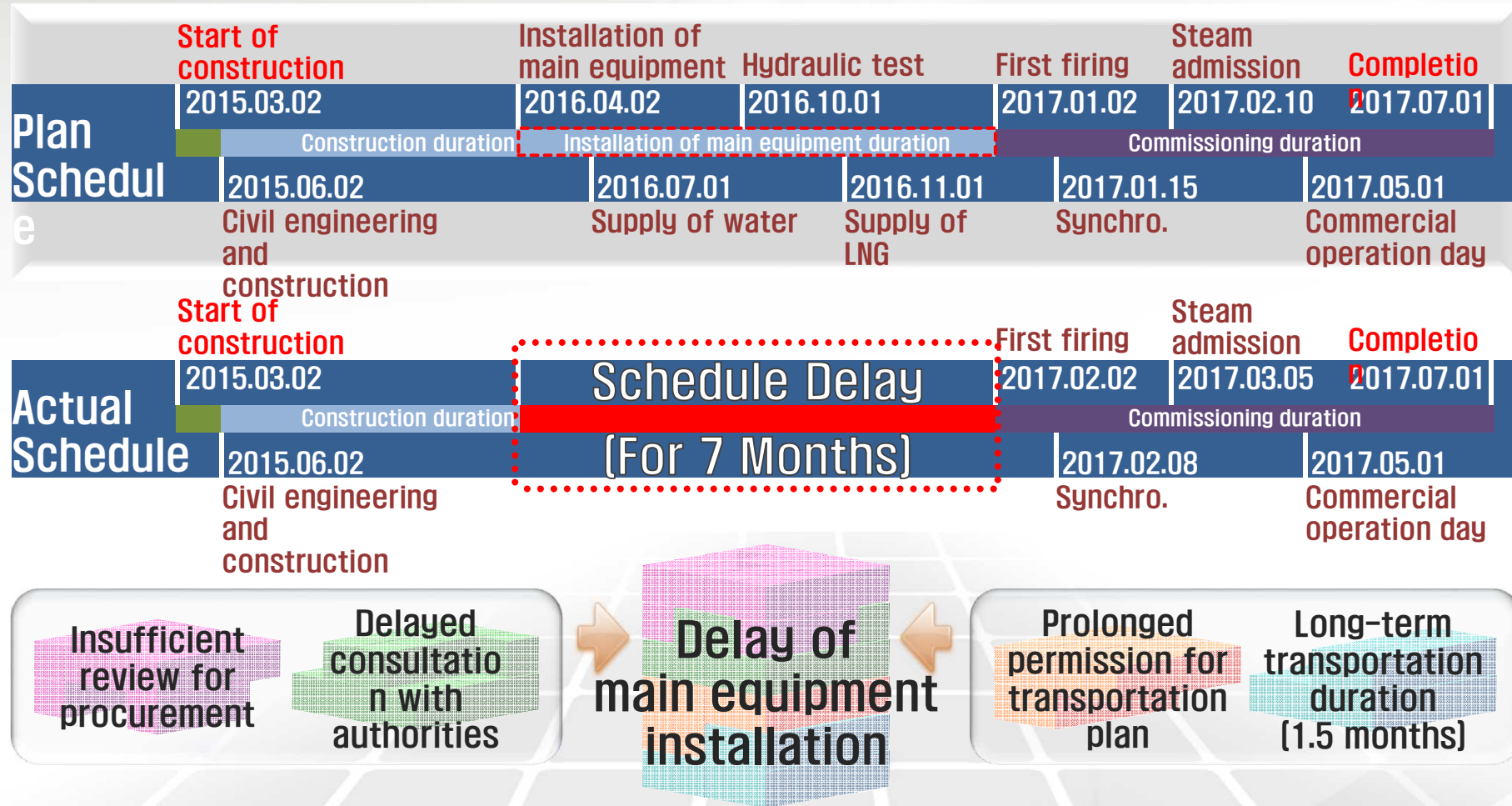
- PF procedure review
- Power plant facility

3.2 CM service plan



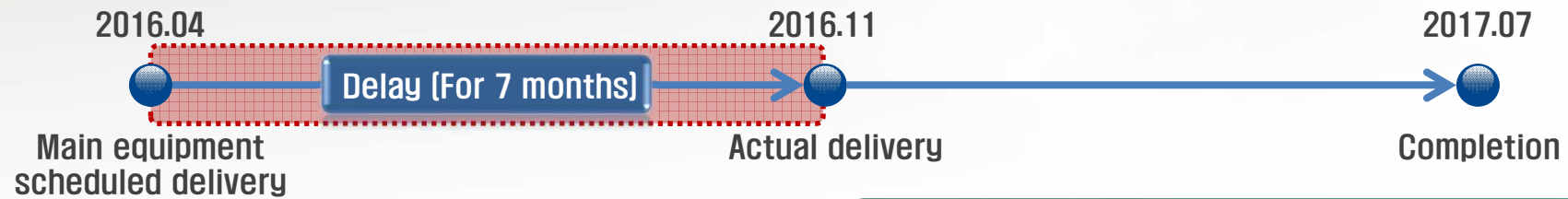
04. Achievements

4.1 Compliance of Planned schedule

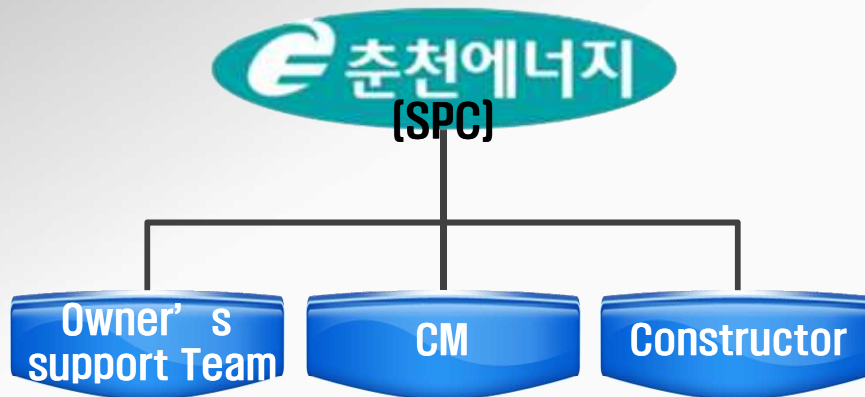


Establish of recovery schedule , comply with planned schedule

4.2 TF Formed to Normalize Project



TF



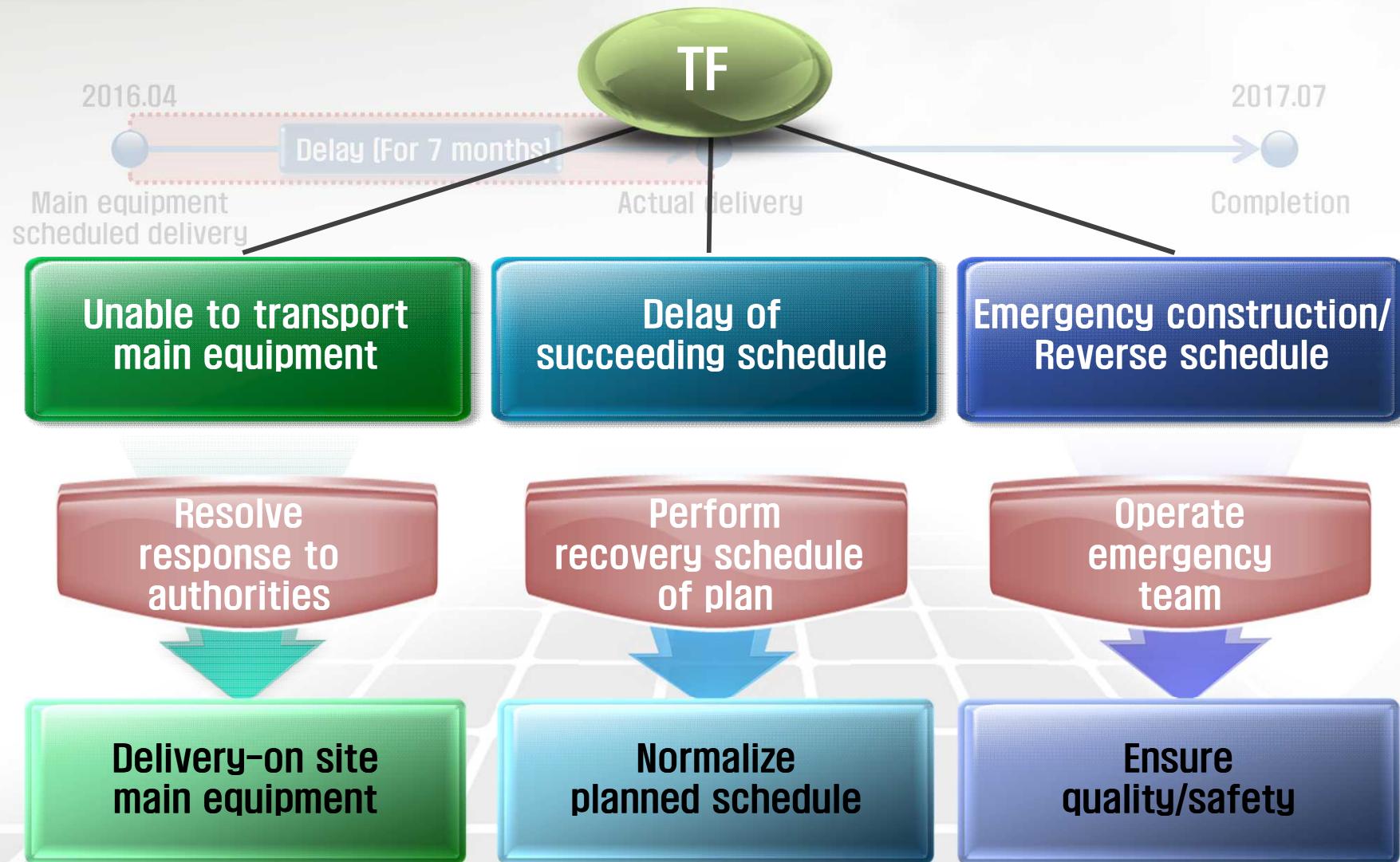
Purpose

- ① Alternative for delay schedule
- ② Ensure commissioning schedule and quality
- ③ Establish partnership among participants

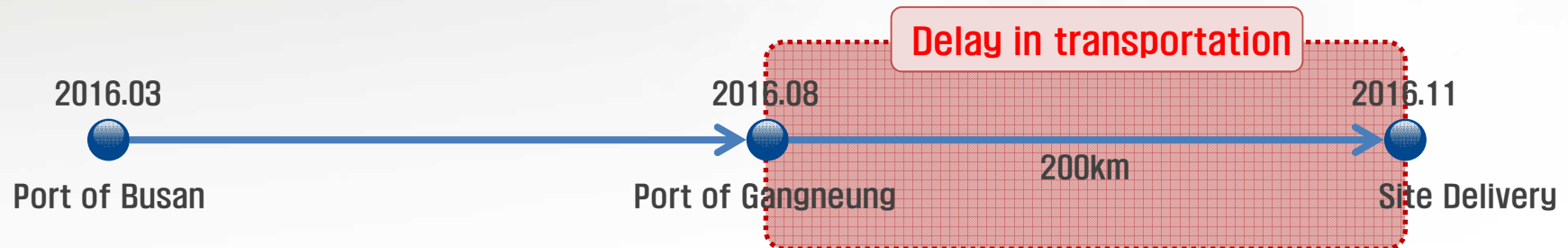
Work plan

- ① Commercial operation date compliance plan
 - Reduction of installation/commissioning schedule
- ② Quality and safety Management
 - Ensure quality and safety management according to emergency construction

4.3 TF Achievements



4.4 Main Equipment Import



Issue

Exceeded capacity of main equipment
[Weight 12 times, Axially-loaded 3.4 times,
Length 2 times, Area 2.1 times]

Unable to route

[Sharp turn, Old bridge, Road destruction,
Safety risk, Control road]



Generator
(469.2 ton)



Gas Turbine
(371.4 ton)



Transformer
(281.1 ton)

Method

TF team plan

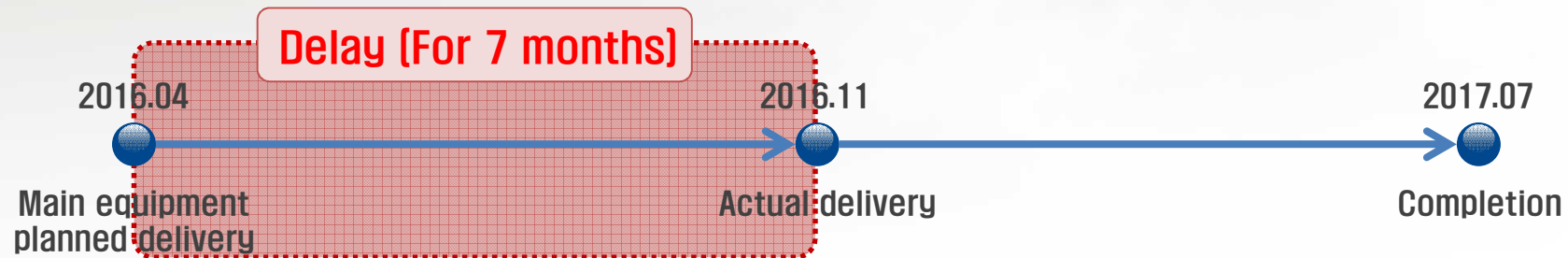
- ① Road diagnosis report
 - ② Partial transportation plan
 - ③ Route, safety plan
- Agency
3 times
consultation

2016.07.14 Gangneung city
→ Permission of local road

2016.07.26 Wonju Regional Construction and
Management Administration
→ Permission of national road

*Partial transferring the main equipment for 1.5 months
[2 times, From September 26, 2016 to November 3, 2016]*

4.5 Normalized Plan Schedule



Issue

Delayed related schedule

Incomplete in schedule

Method

Reverse schedule management

Complex succeeding schedule plan

Shortening the period of performance test

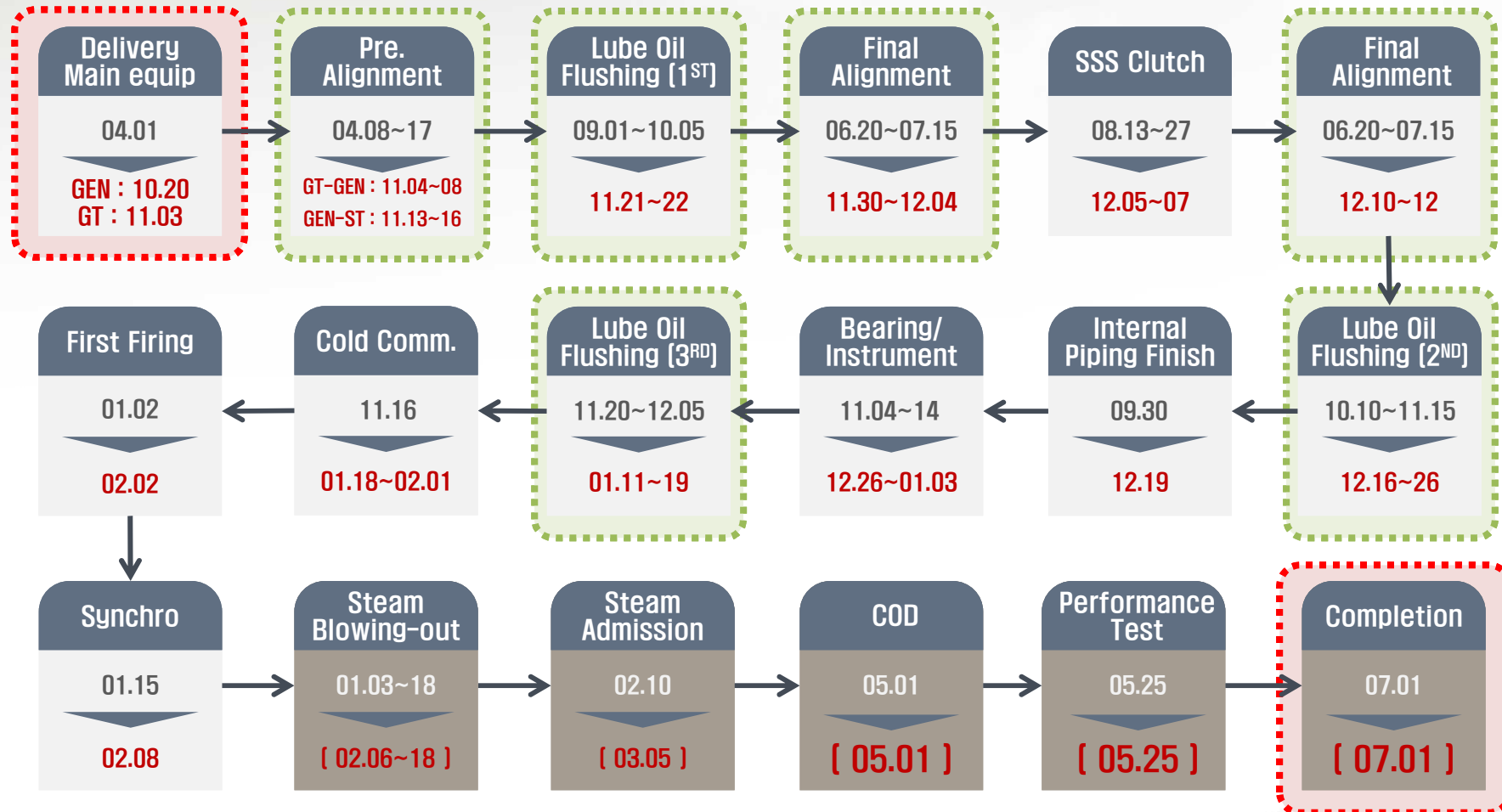
• Early installation of connection facilities

• Installation of main equipment and commissioning of connection facilities at the same time

• Test and inspection method consultation

Ensure schedule compliance according to
consultation about interface control

4.6 Major schedules and plans after carry-in main equipment



Shortened lube oil flushing period by about 2 months
(88 days → 22 days)

4.7 Quality and Safety Management

Issue

**Quality
and safety deterioration
due to recovery schedule**

Method

**Construction
quality
assurance**

Reverse
schedule



- Pre-simulation review according to construction plan

**Circulation
work**

Emergency
construction



- Worker and engineer circulation work
- Safety Check
- Training for worker

**Consultation
committee**

Unification of
commissioning
decision



- Separate operation about commissioning and repair worker
- Input Engineer additional during commissioning

Ensure quality and safety through systematic management

05. Conclusion

Reason Carry-in delay of the main equipment
(For 7 months)



Phase 1 Early installation of sub equipment

Phase 2 Reduce the installation period by connecting facilities after arriving main equipment



Phase 3 Implement emergency construction for compliance with planned schedule (2 times shifts)

Phase 4 Ensure commissioning schedule (GT, GEN)



**Quick Performance of the recovery schedule
for normalizing the planned schedule**



Thank you for Listening

shinhan a&E
Shinhan Architects & Engineers