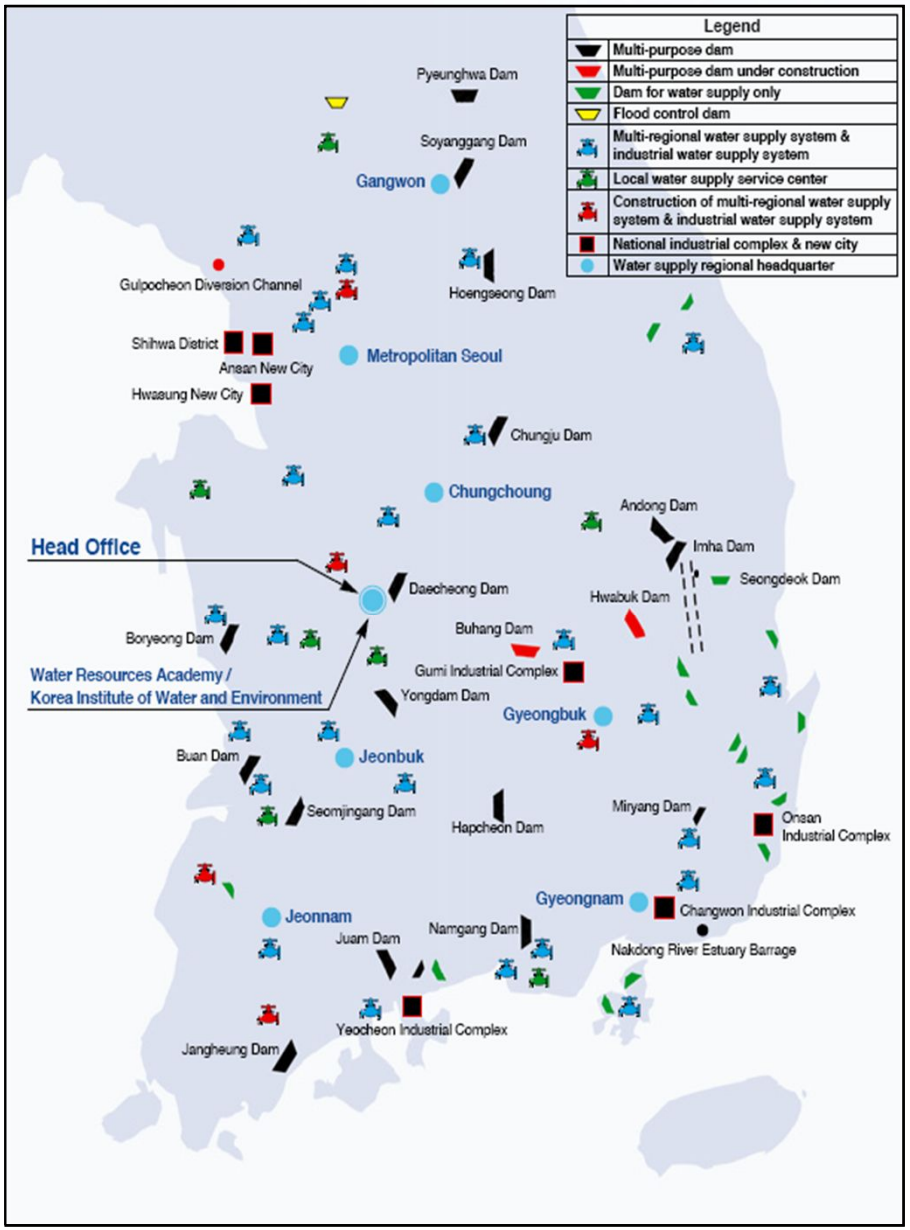
Hydropower Overseas Projects & Modernization Plan of K-water

K water

CONTENTS

1. K-water Overview

K-water Business Area



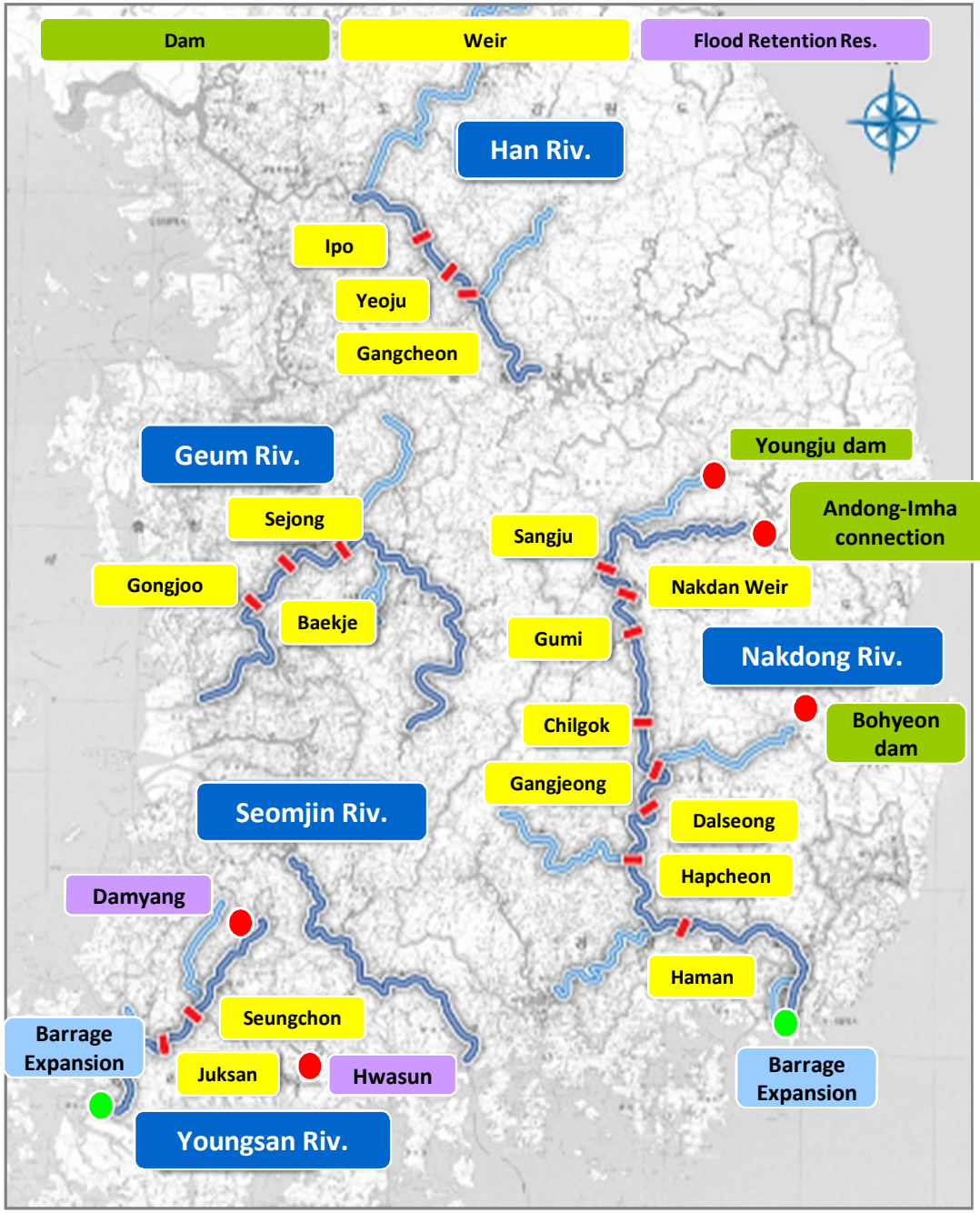
Business Area

- **Water Resource Management**
  - Multi-purpose dams
  - Canal & Navigation System
  - Hydrological data survey & Management
- **Water Supply & Sewerage Disposal**
  - Drinking water supply systems
  - Sewerage systems
  - Desalination Plants
  - Industrial Pure Water Supply
- **Renewable Energy Production**
  - Hydro power generation
  - Others (Tidal, Solar, Wind, etc)
- **Others**
  - Water Quality Management
  - Environmental & Social Impact Assessment
  - River Management
  - Eco System
  - Corporate Social Responsibility activities

Water Resources Management of K-water

- **16 Multi-purpose dams Management**
  - Flooding Control
  - Water Supply
  - Hydro-Power Generation
- **Integrated Dam Operation Center**
  - Center Remotely controls all the dams

4 Rivers Restoration Project



- **Project cost : 20 billion USD**
- **Project period : 2009 ~ 2012**
- **Main work**

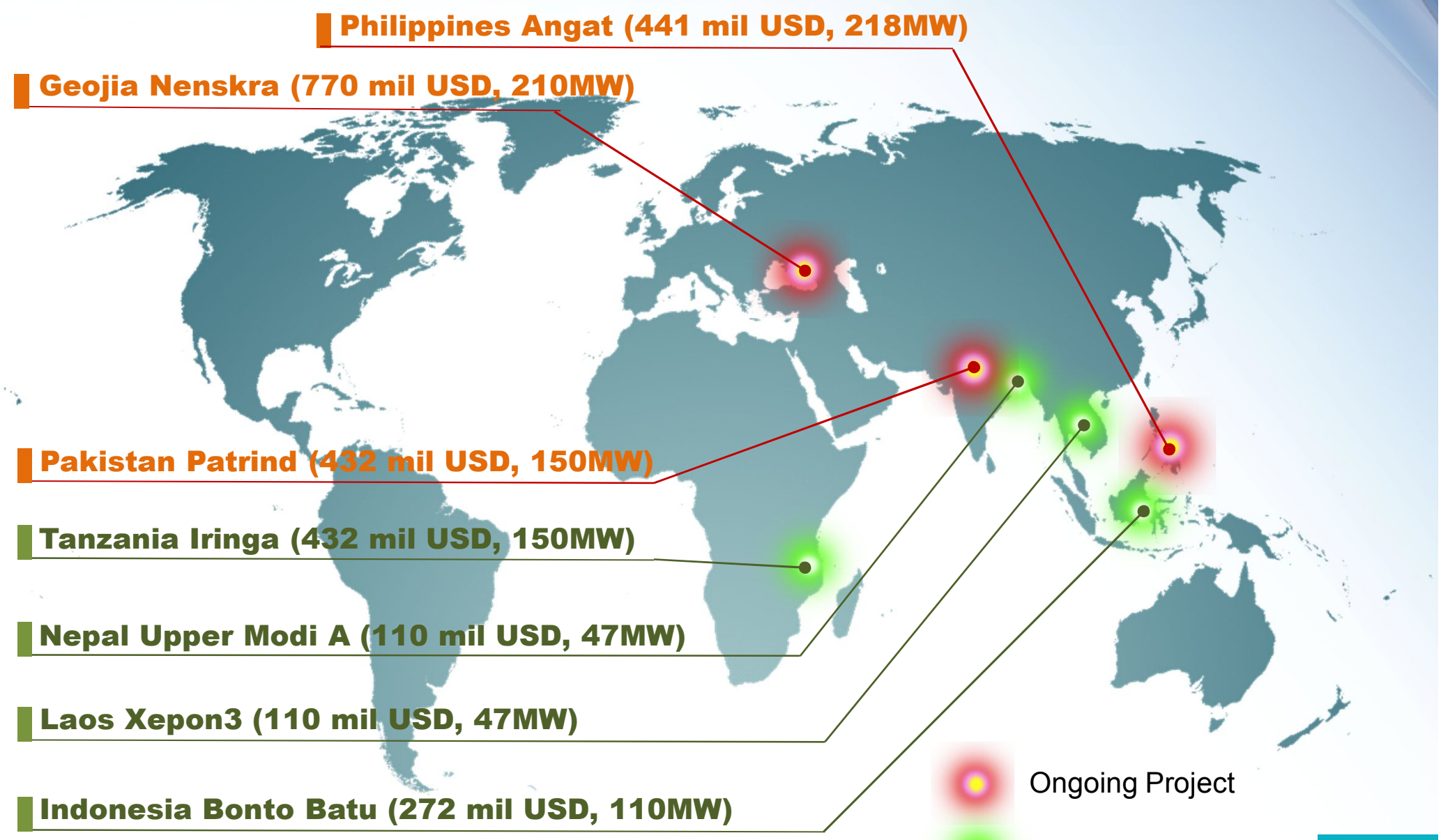
  : 16 Multi-purposed Weir, 450mil.㎥ - Dredging

Sihwa Tidal Power Plant

- World-biggest tidal power plant
- Generation capacity : 254 MW
- Budget : 355 million USD
- Construction periods : 2003 - 2011

2. Overseas Projects

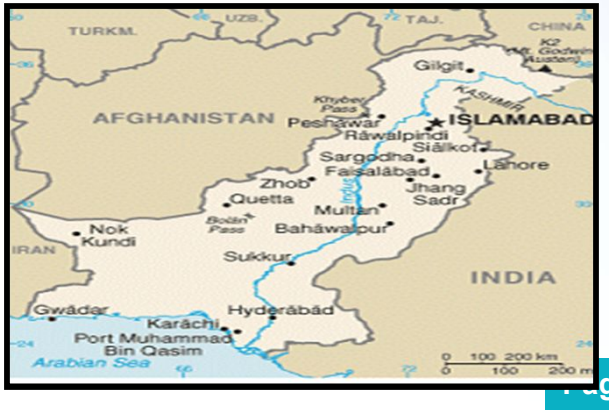
K-water Overseas Hydropower Projects



Pakistan, Patrind Hydropower Project

1st Oversea Investment Projects of K-water

- Total Budget : 432 million USD
- Generation Capacity : 150MW
- Type : Run of River
- Concession Periods : 30yr (BOT)



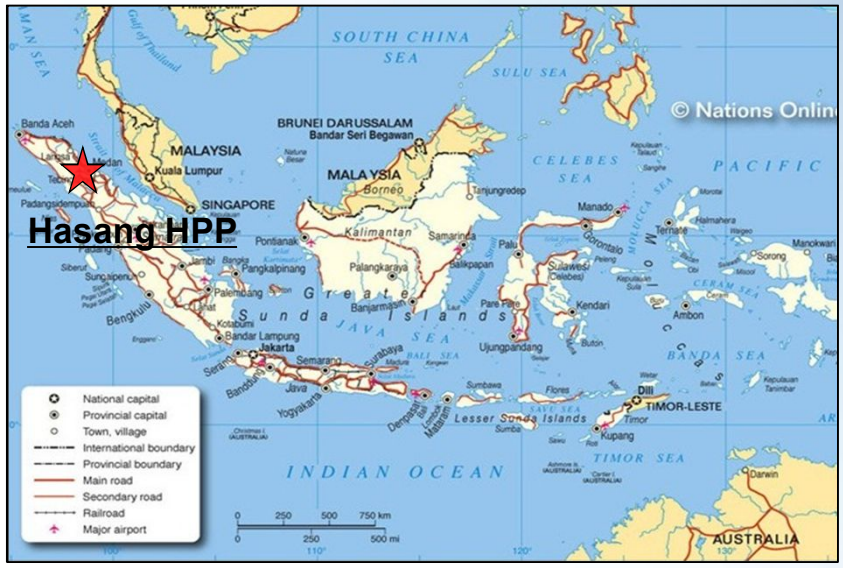
Philippines, Angat Hydropower Project

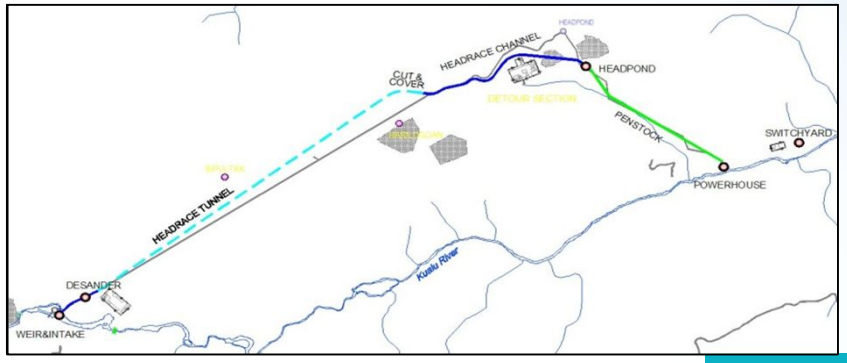
- Awarded as Preferred Bidder
- Generation Capacity: 218 MW
- Total Project Cost : 441 mil. USD

Indonesia, Hasang Hydropower Project

Project Management Consultancy for Hasang HPP

- Total Budget : 210 million USD
- Generation Capacity : 39MW
- Type : Run of River
- Concession Periods : 30yr (BOT)





❖ K-water's Role for Hasang HPP

- Project Management
- Technical Proposal Review
- Design and Construction Supervision
- Operation & Maintenance

3. Modernization Plan

History of Hydropower Development

Dam Hydro (1,001MW)

Sea Tidal (254MW)

Tot. Capacity
1,328MW
In 2015

1973 ··· 2009 2011 2012

- ✓ Dam Hydro : 9 Plants, 22 Turbines, 1,001MW
- ✓ Sea Tidal : 1 Plant, 10 Turbines, 254MW
- ✓ Small Hydro : 41 Plants, 83 Turbines, 73MW

4 Rivers Small Hydro (51MW)

K-water's Major Hydropower Status

Deacheong (90MW)

Opening year : 1980
Turbines : Francis(45MW) × 2

Hapcheon (100MW)

Opening year : 1987
Turbines : Francis(50MW) × 2

Yongdam (22MW)

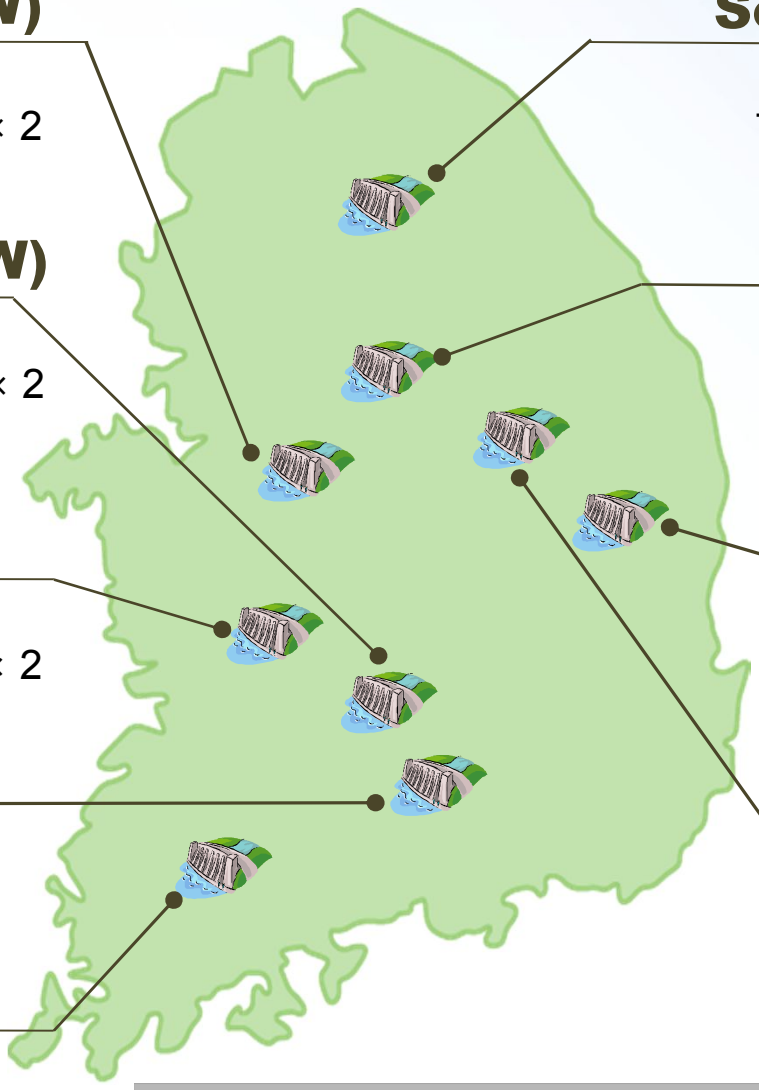
Opening year : 2001
Turbines : Francis(11MW) × 2

Namgang (14MW)

Opening year : 1998
Turbines : Bulb(7MW) × 2

Juam (22.5MW)

Opening year : 1991
Turbines : Francis(11.25MW) × 2



Soyanggang (200MW)

Opening year : 1973
Turbines : Francis(100MW) × 2

Chungju (106MW)

Opening year : 1985
Turbines : Francis(25MW) × 4
Bulb(3MW) × 2

Imha (50MW)

Opening year : 1985
Turbines : Francis(25MW) × 4
Bulb(3MW) × 2

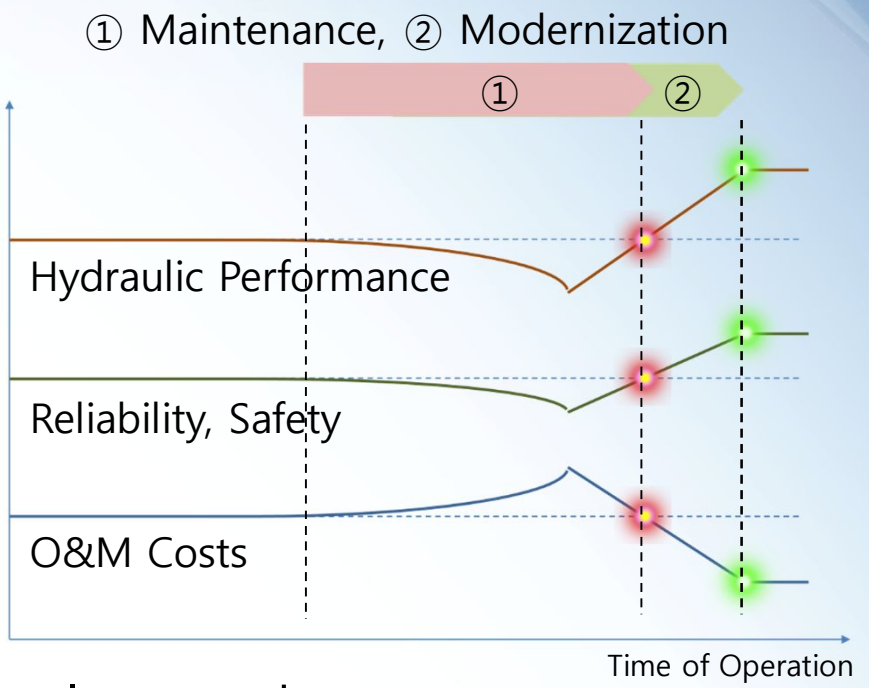
Andong (90MW)

Opening year : 1976
Turbines : Deriaz(45MW) × 2

The operating-year is around

Why is modernization needed?

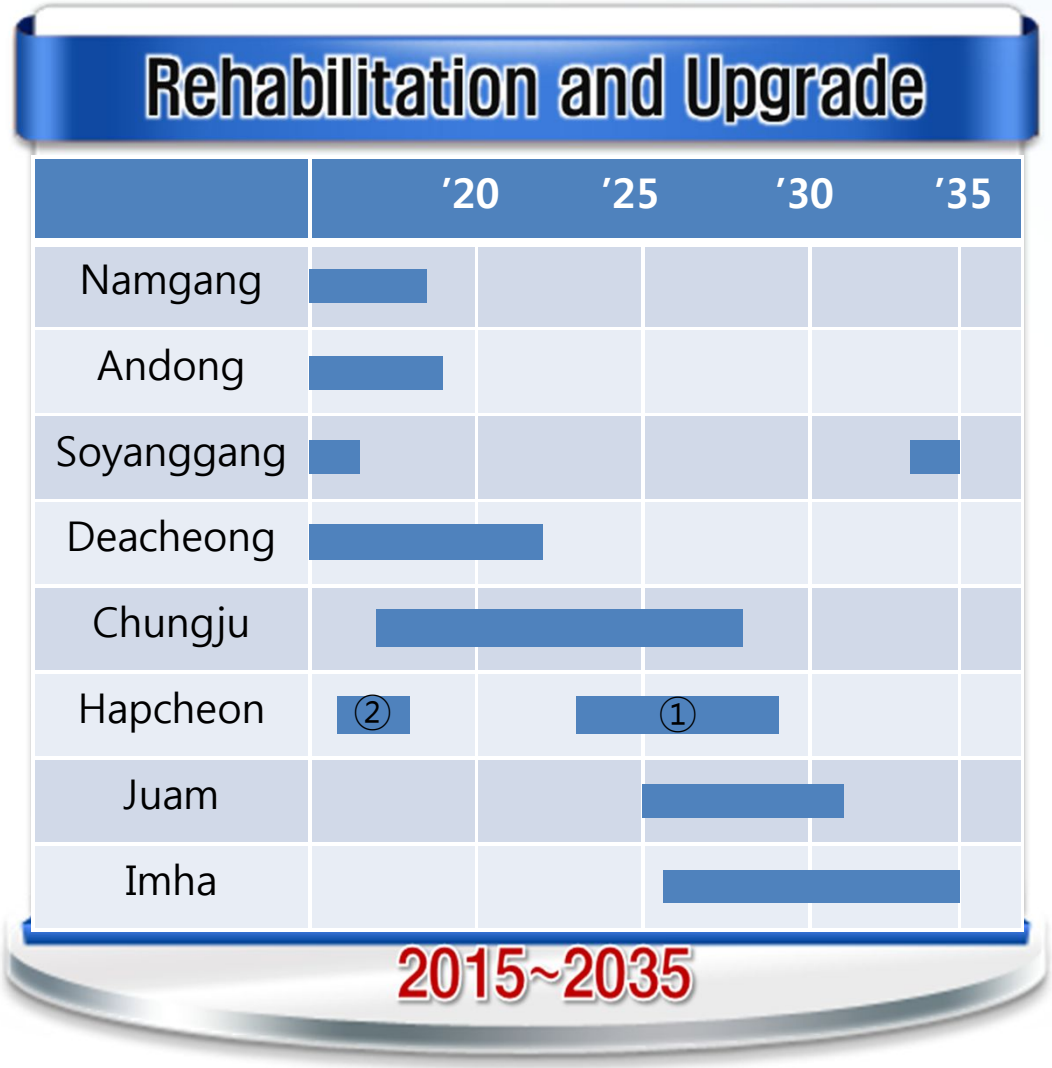
- Plant performance upgrade and improvement of the return of investment
  - Increased plant availability, reliability, plant lifetime, and safety
  - Reduced O&M costs of standstills



- Reasonable cost
  - No additional buildings and quickly implemented
  - No resettlement or immigration of the local people
  - Normally no environmental impact assessment requested

- Additional renewable energy
  - New technologies are adopted so that performance increase is expected

Modernization plan



- ✓ Object : 22 turbines (980MW)
- ✓ Total Cost : 606 million USD
- ✓ Duration : ~2035

THANK YOU

K water