

AFRY

ÅF PÖYRY

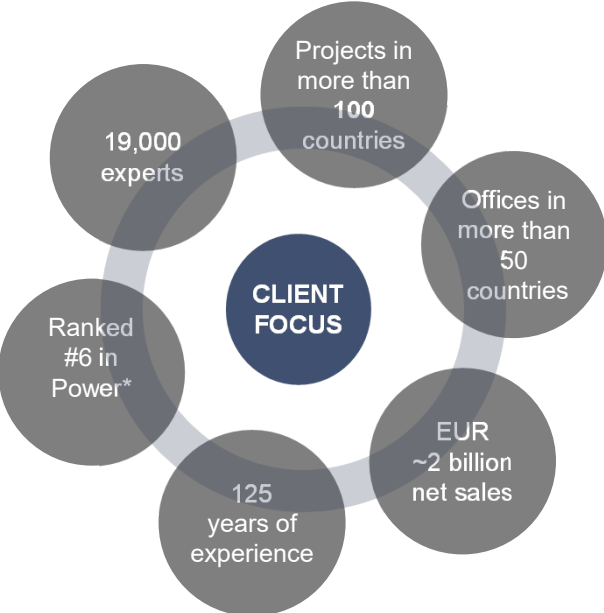
# Energy Business Asia Pacific

AFRY COMPANY INTRODUCTION

# AFRY – Summary

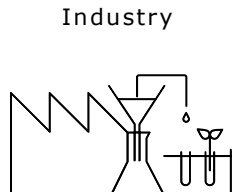
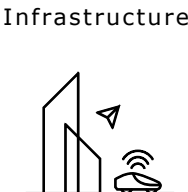
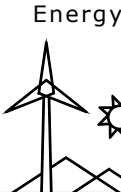
AFRY is an international leader within engineering, design and advisory services.

We are more than 19,000 devoted experts within the fields of infrastructure, industry and energy operating across the world to create sustainable solutions for the next generation.



No. of employees: **19,000**

Approx. annual revenue: **€2 bn**



Offices in countries: **50+**

# In 2019 ÅF and Pöyry became AFRY

- In February 2019 ÅF and Pöyry joined forces in order to become an international engineering, design and advisory company, driving digitalisation and sustainability for the energy, infrastructure and industrial sectors all over the world.
- In November 2019 ÅF Pöyry launched a new common brand, AFRY. The name is a combination of the letters in ÅF and Pöyry: AF+RY [er:fji]
- The new company ÅF Pöyry is listed in Stockholm Stock Exchange



# AFRY offerings in six divisions



## Infrastructure

Real estate  
Rail & Road  
Architecture  
Environment  
Water



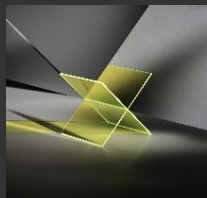
## Industrial & Digital Solutions

Food & Life Science  
Product and  
Software Design Automation  
Defense



## Process Industries

Pulp & paper  
Mining & Metals  
Steel Industry  
Oil & Gas



## AFRY X

Digital services and  
products

## Energy industry expertise

### Energy Division



Hydro  
Thermal  
Renewables  
Nuclear  
Transmission &  
Distribution

### Management Consulting



Strategy  
Commercial Due  
Diligence  
Process Improvement  
Transaction Advisory

Ranked no. 6 in power generation globally\*

**70%**

of Europe's major energy players use our electricity price projections

**>15%**

Contribution to hydropower capacity globally

**97**

Energy projects in more than 97 countries

**70 GW+**

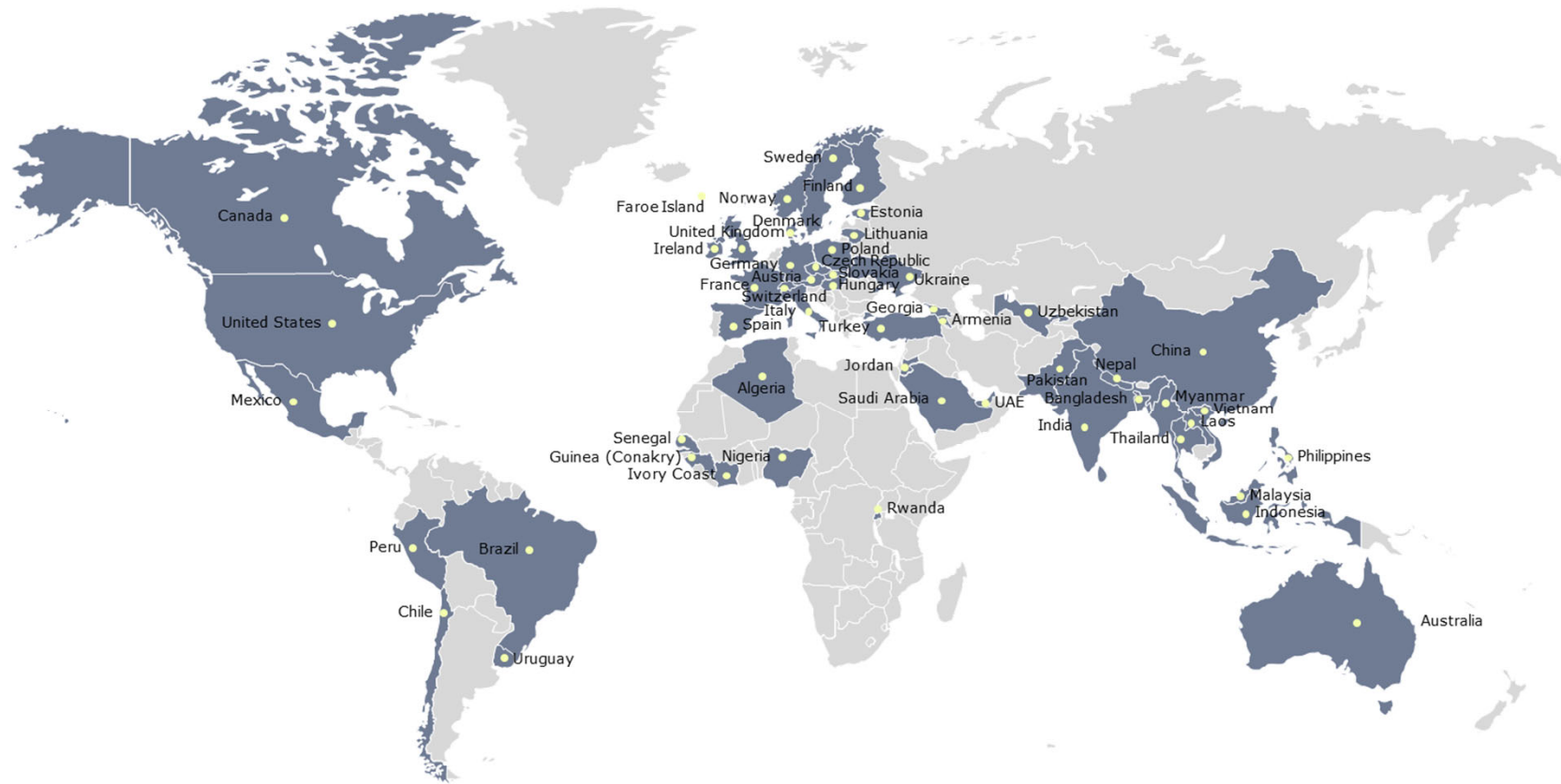
total combined capacity of thermal power plant projects designed and built

**400+**

Involved in over 400 solar power and over 400 onshore / offshore wind power projects globally

\*International Design Firm in T&D by ENR in 2021

# European HQ with offices in over 50 countries



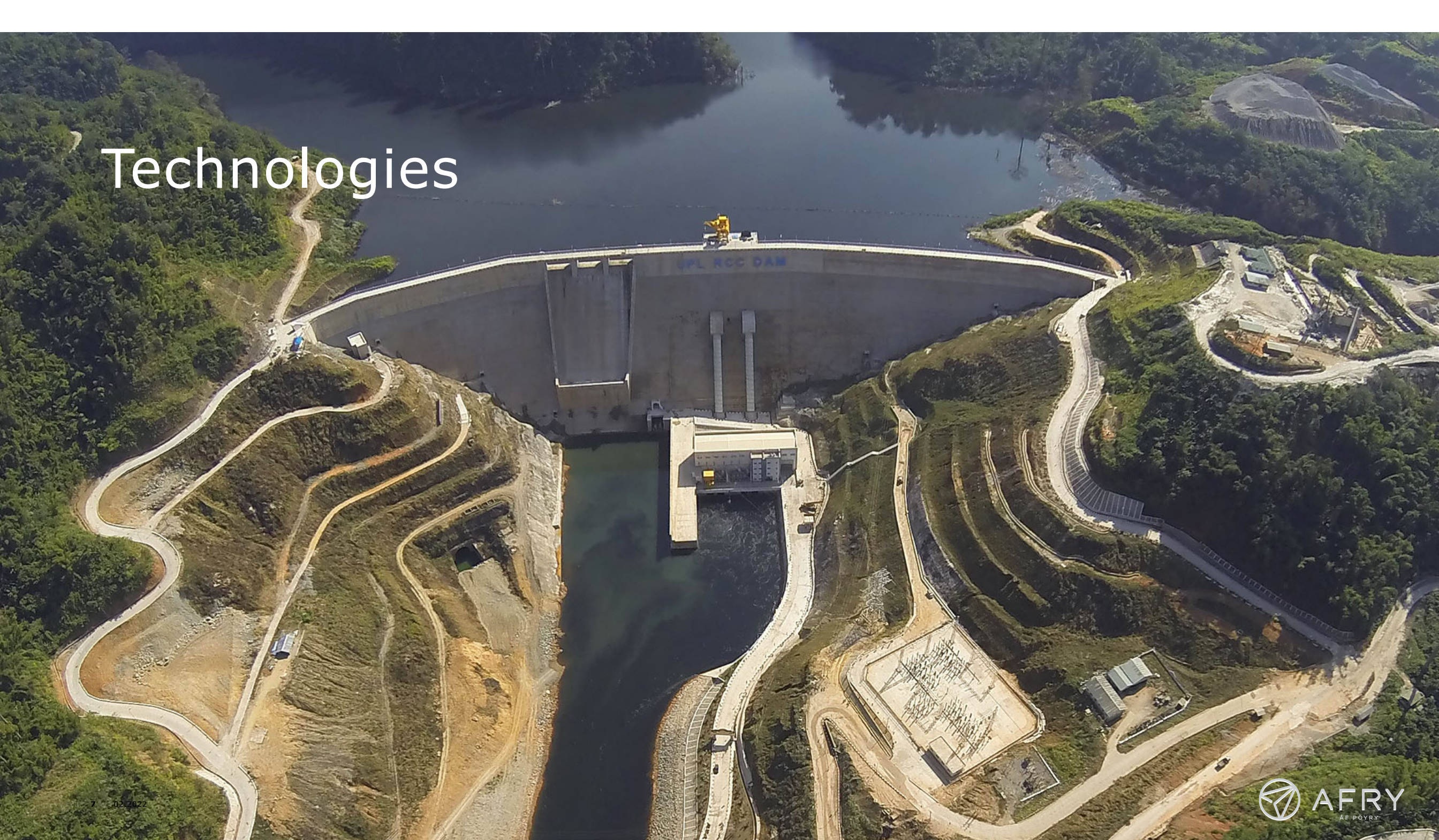
One regional energy team in Asia Pacific with offices in

- Thailand
- Philippines
- Malaysia
- Indonesia
- Vietnam
- India
- China
- Taiwan
- Australia

Total of 500+ energy professionals across Asia Pacific

More than 100 ongoing power sector assignments in Asia Pacific

# Technologies



# Solar Power

Solar power team in Asia region since 2008

## Global competence

- Involved in more than 400 solar PV projects, with more than 32,000 MW in generating capacity

## Asia

- One of the leading renewable energy consultants in the region
- Involved in more than 12,000 MW of solar power in Asia
- Owner's engineer during construction of a number of ground-mounted, floating solar and rooftop solar projects, including a 257MWp ground-mounted solar project, 90MW floating solar project and a total of 32MW rooftop solar project.
- Solar power teams in Thailand, Philippines, Malaysia, Indonesia, Vietnam and India





# AFRY's Solar PV and BESS geographical projects' footprint



# Solar Power Projects in Asia

## Thailand:

- NPS 90MW floating solar project
- Consulting Services for 30MW PV Project
- VTE\_1.2 MW-Solar Power Plant
- Solartron 10 MW - 3 Solar PV Power Plants
- Enmax 10 MW Solar PV Project
- ESP 129 MW Solar Power Plant Project
- ESL 127.4 MW<sub>DC</sub> Solar PV Power Project
- RES 7.8 MW - 10 solar PV rooftop projects
- SSP 40 MW Solar PV Power Plants
- ESN 126 MW Solar PV plant
- BSE-3 6 x 12.5 MW Solar PV power plants
- 6 x 9 MWac PV plants
- BSE phase 2: 4 x 12.5 MW PV plants

## Bangladesh

- 100 MW Madarganj Groundmounted Solar PV project

## Myanmar:

- 2 x 150 MW Solar PV Plant in Myanmar
- 3 Floating Solar PV power projects.

## Malaysia:

- 38MWdc Solar PV Plant
- LSSPV2 20MWac Solar PV Plant
- 19 MW Solar PV Project
- 29 MW Solar PV Project
- EDRA 50 MW Solar Power Plant Project
- 2 x 10 MW solar PV power plant projects in Malaysia

## Indonesia:

- 1.1 GW Solar PV project to export power to Singapore
- 250 MW Groundmounted East Java Solar PV project
- 280MW West Java Groundmounted Solar PV project
- 340MW Central Java Floating Solar project
- 90MW Floating Solar Singkarak

## Japan:

- 4 Solar PV projects
- 40 MW Chiba Solar Power Plants Project
- 2 PV plants: Kumena (34MW); Hosoe (75MW)
- Itochu 40 MW solar PV plant in Japan

## Palau:

- LTA for 16MW Solar PV project

## Cambodia:

- LTA for 60MW Solar PV IPP project
- OE for 30MW Solar PV IPP project

## Vietnam:

- 240MW Hoa Hoi Solar PV OE project
- Several Floating Solar Photovoltaic Power Plants
- 47.5 MWp Floating Solar Power Project
- 150 MW Solar PV Power Project
- 500 MW Solar PV Power Project

## Philippines:

- OE for 6MW Rooftop Solar Project
- Project PUMA 25MW Solar Power Projects
- Tarlac 30 MW Solar PV Project
- Roxas 30 MW Solar PV Project
- ATN 30 MW Solar PV power plant in the Philippines
- Project FUSION 60MW Solar Power Plants
- 150MW Floating Solar in Northern Philippines



# Wind Power

Wind power team in Asia region since 2008

## Global competence

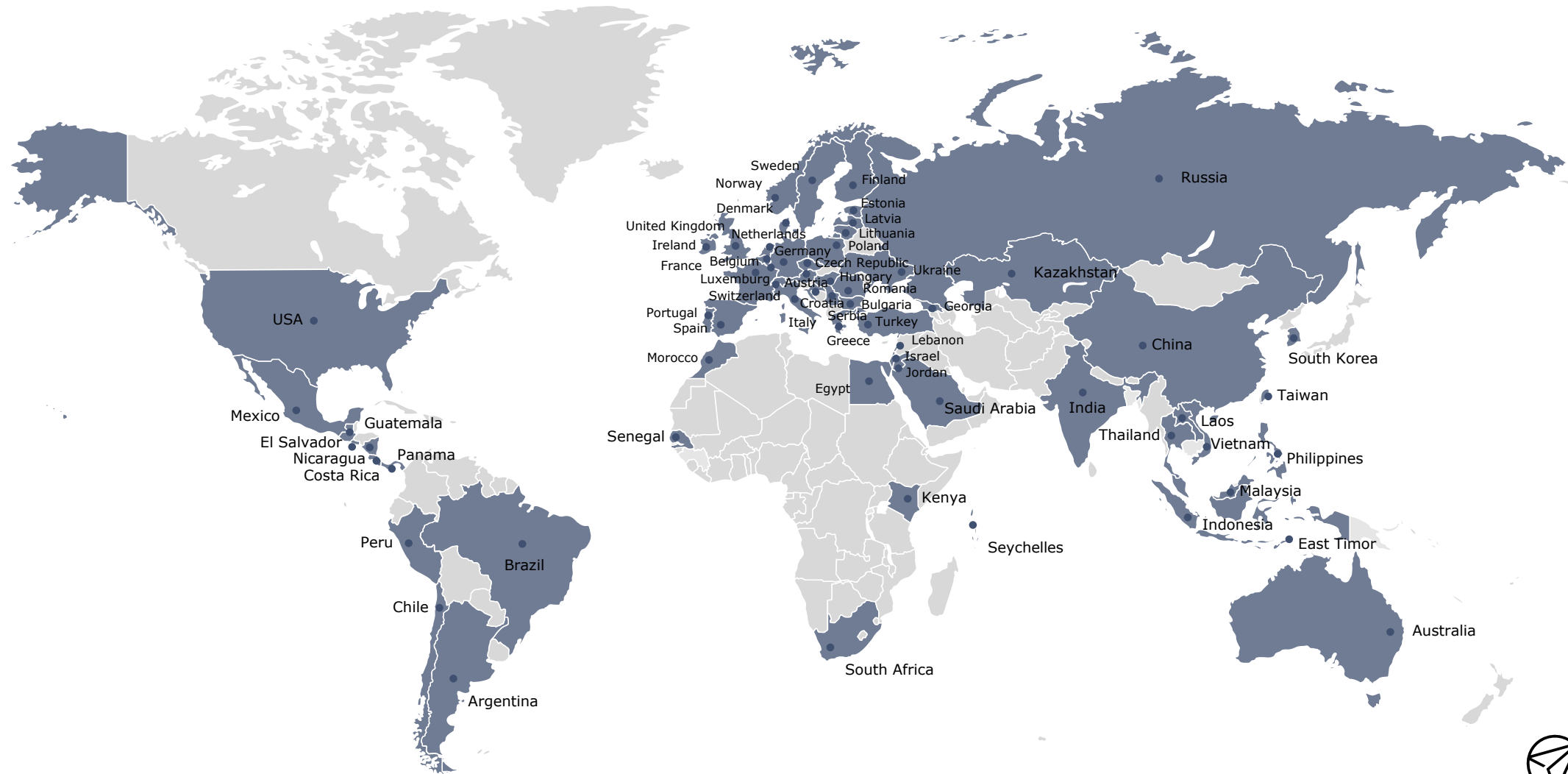
- Involved in more than 70 GW wind projects worldwide as Technical Advisor / Owner's Engineer and more than 90 GW as Commercial / Market Advisor
- More than 400 wind projects globally
- 30 years of experience in wind power
- 180+ wind power specialists of which 80+ with offshore wind expertise.

## Asia

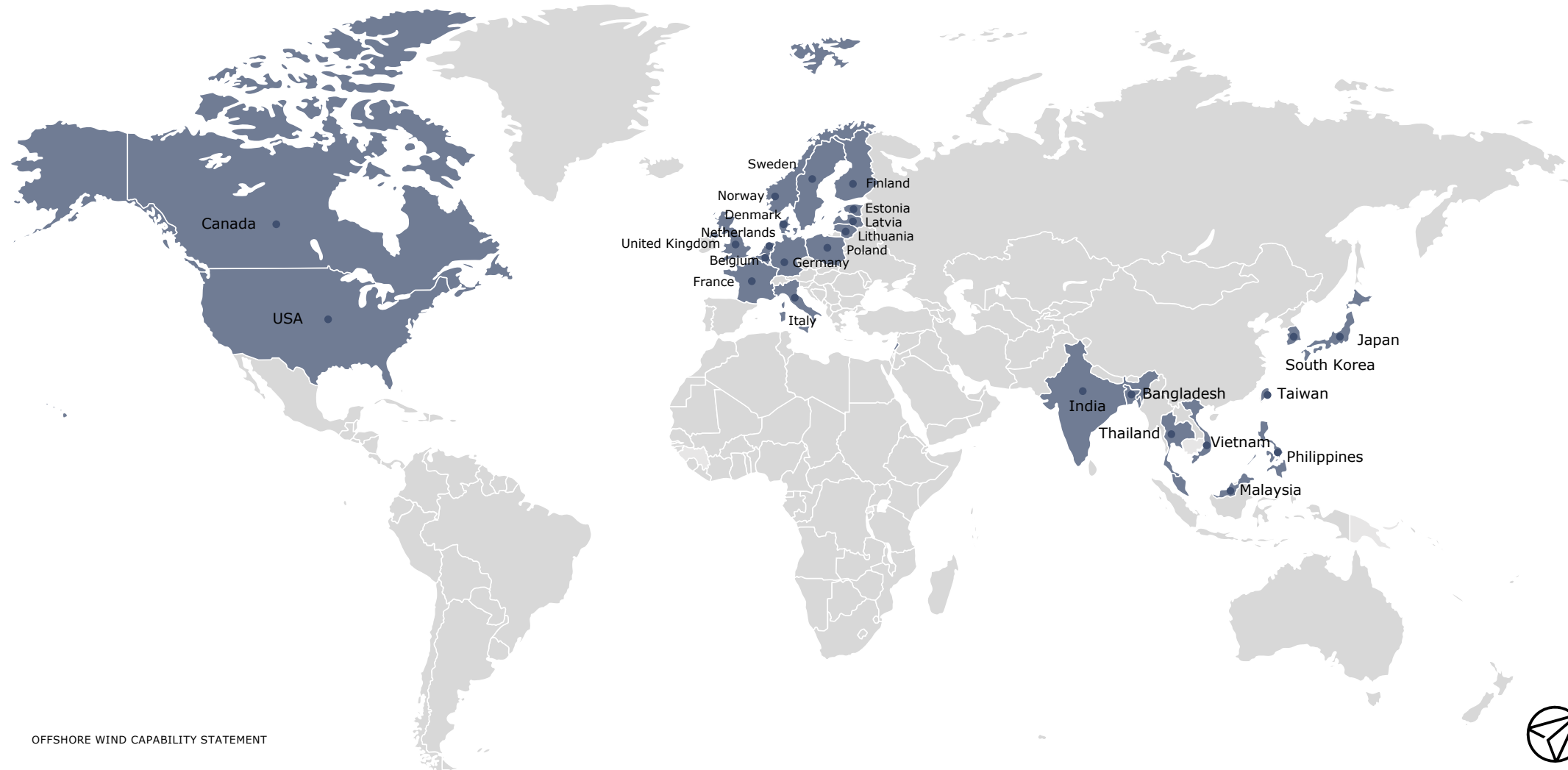
- One of the leading renewable energy consultants in the region
- Involved in more than 10,000 MW of wind power projects in Asia



# We have delivered wind power projects in over 60 countries

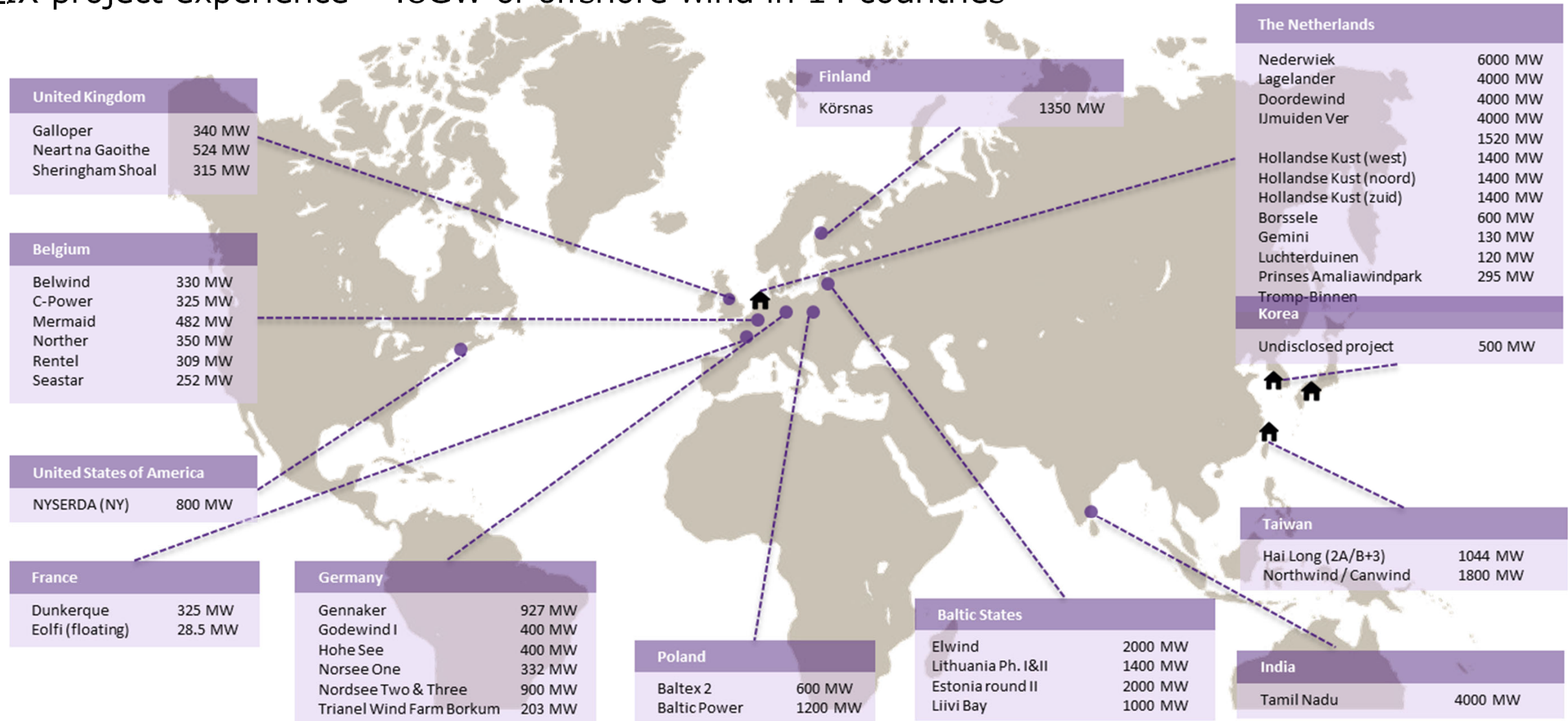


# We have provided our services on offshore wind power projects in 25 countries



# AFRY has acquired BLIX, a specialized Dutch wind power consultancy in offshore wind projects

BLIX project experience - 48GW of offshore wind in 14 countries



# Onshore and Offshore Wind Power Projects in Asia

## Uzbekistan:

- Owner's Engineer for 500MW Wind Farm project
- Owner's Engineer for 500MW Wind Farm project

## Thailand:

- 90MW onshore wind project
- Large offshore wind farm project
- Bo Thong 16MW Wind Farm
- Hanuman Wind Farm 260 MW
- Super Energy LGF 9 wind farms
- Koh Tao 6 MW Wind Farm
- Lom Ligor 10 MW Wind Farm
- HadKangHan 126 MW Wind Farm Project
- Chaiyaphum 80 MW Wind Power Project
- 9 x 60 MW Wind Farm projects
- 3 x 60 MW Wind Farm projects
- Theppana 15 MW Wind Power Project
- 80 MW Wind Farm project in Thailand
- Pro Ventum 90 MW wind farm Project
- Pre-FS for several offshore wind farm projects

## Malaysia:

- Large offshore wind farm project

## Lao PDR:

- 600 MW Monsoon wind farm project

## Indonesia:

- 100 MW Wind Farm Project in West Java
- 50 to 100 MW Wind Farm Project in East Java

## Japan:

- Commercial&Market Advisor for offshore wind farm sale transaction

## Republic of Korea:

- Owner's Engineer for 36 MW Gasan Wind Farm
- Commercial&Market Advisor for offshore wind farm sale transaction
- Floating LIDAR for offshore wind project

## Taiwan:

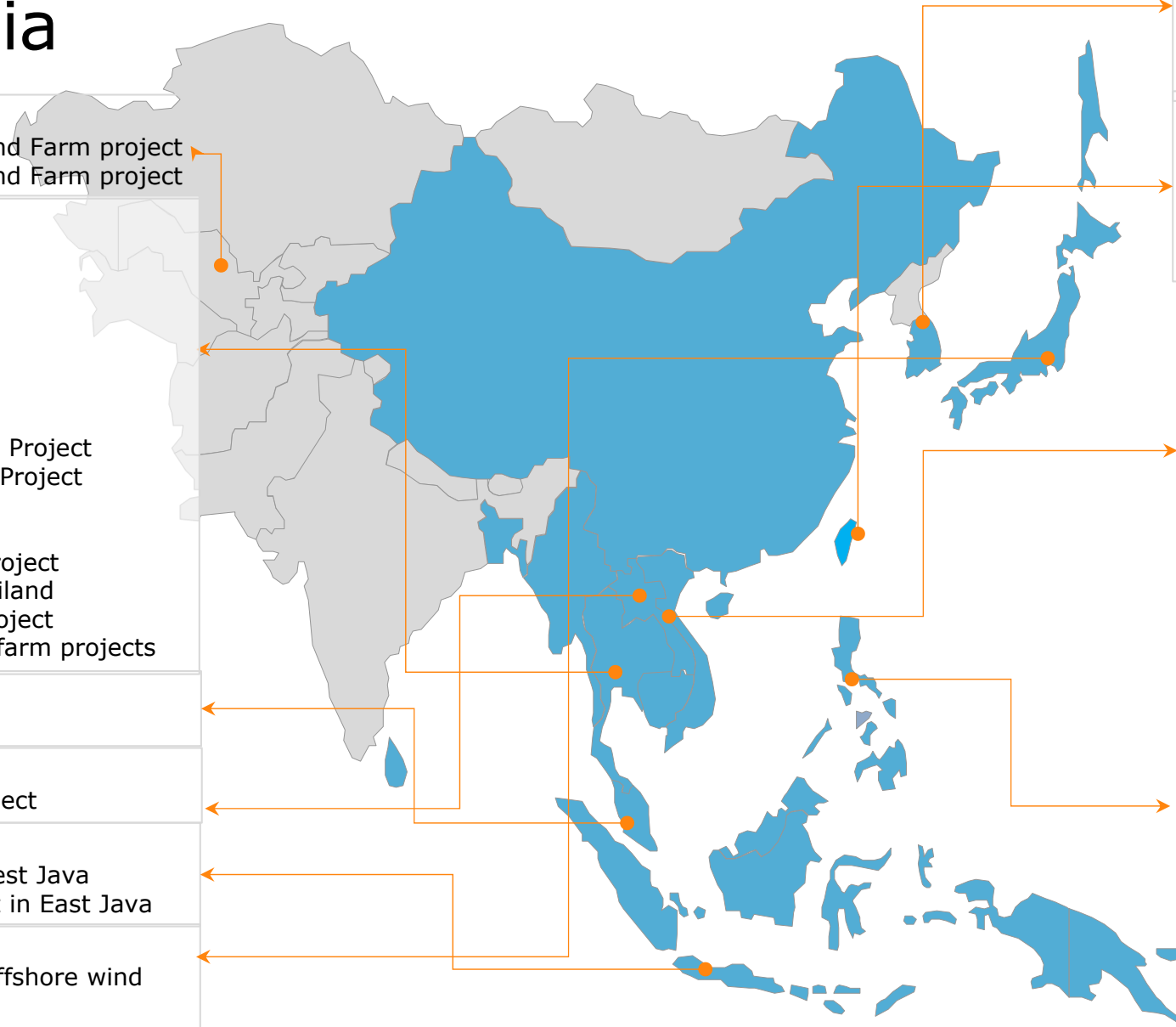
- Hai Long 2&3 offshore wind farm
- Commercial Advisor for two Offshore Wind Farms
- FS & basic design for 1.1 GW offshore wind farm

## Vietnam:

- 340 MW Nearshore Wind Farm Project
- Owner's Engineer for 48 MW Nearshore Wind Farm Project
- Owner's Engineer for 90 MW Wind farm project
- LTA for two Wind Farms 200 + 50 MW
- LTA for 3 Wind Farms, 48 MW each
- 118 MW Hanbaram Wind Farm Project
- 4 x 30 MW Huong Linh Wind Farm Projects

## Philippines:

- 500-1000MW offshore wind farm project site selection study
- 200 MW Wind Power Project in Rizal
- 81 MW Wind Power Project in Sembrano
- UPC Balaoi 150 MW Wind Energy Assessment Project
- 70 MW wind farm in the Philippines
- Project Nabas 50 MW wind farm in the Philippines
- 70 MW wind farm in the Philippines
- Project Phesi 3 x 16 MW Wind Farm
- LTA for 67.5MW Wind Project Rizal
- UPC Ilocos 80 MW wind farm



# Battery Storage

## Global competence

- AFRY covers the complete battery cycle – from production factories and battery design to battery storage owner's engineer services and battery recycling.
- With some 80 battery storage assignments (Feasibility studies, Engineering Reviews, Technical Advisory, Lenders Technical Advisor, Owner's Engineer, etc.) AFRY has executed battery storage projects in more than 20 countries.

## Asia

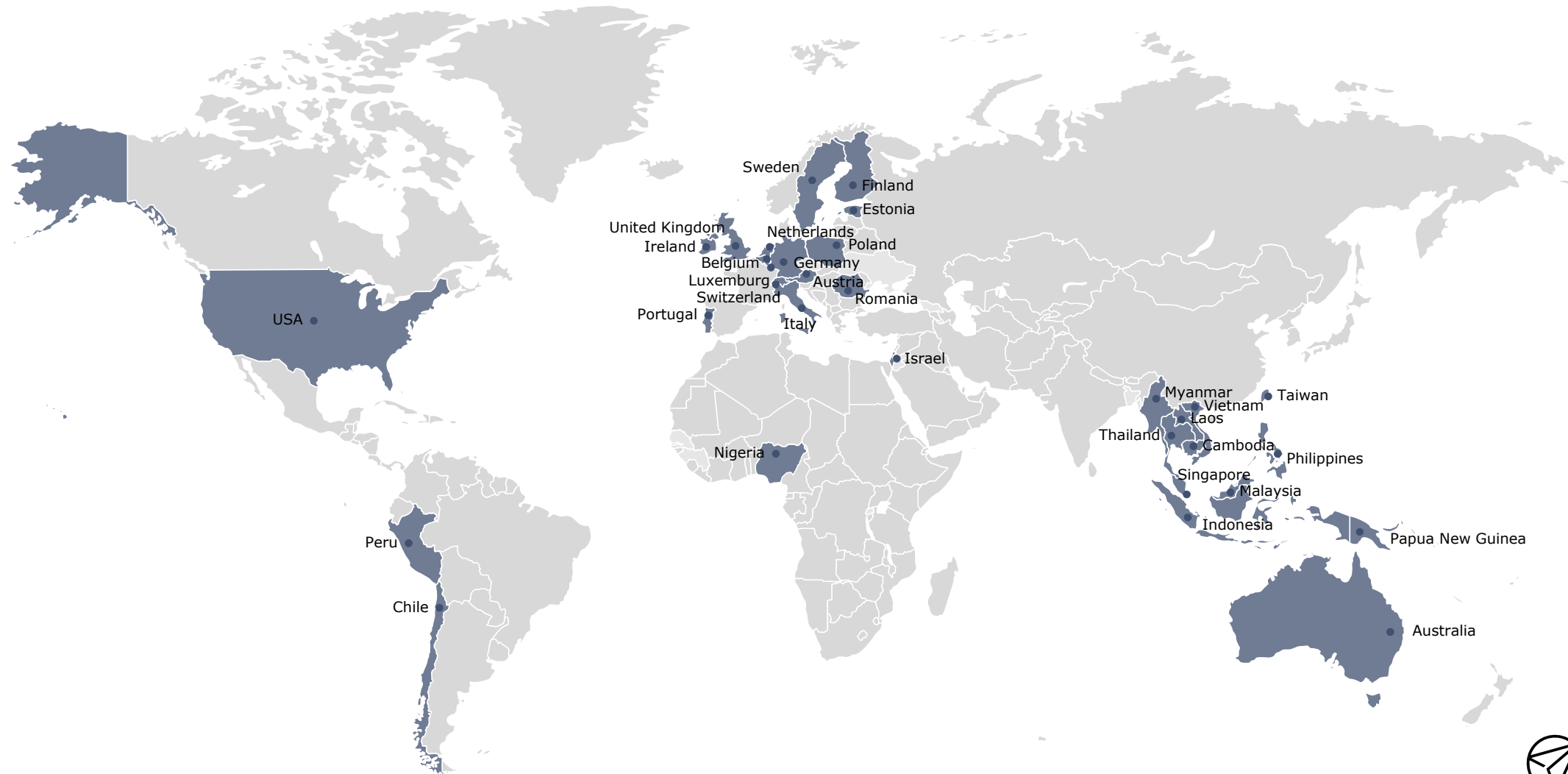
- In the last 5 years alone, AFRY have been Technical Advisor in 20 battery energy storage projects in South-East Asia.
- AFRY as the Lenders Technical Advisor in the "Battery Storage Deal of the Year"\*for ASEAN region.

\*The Asset Triple A Infrastructure Awards 2021

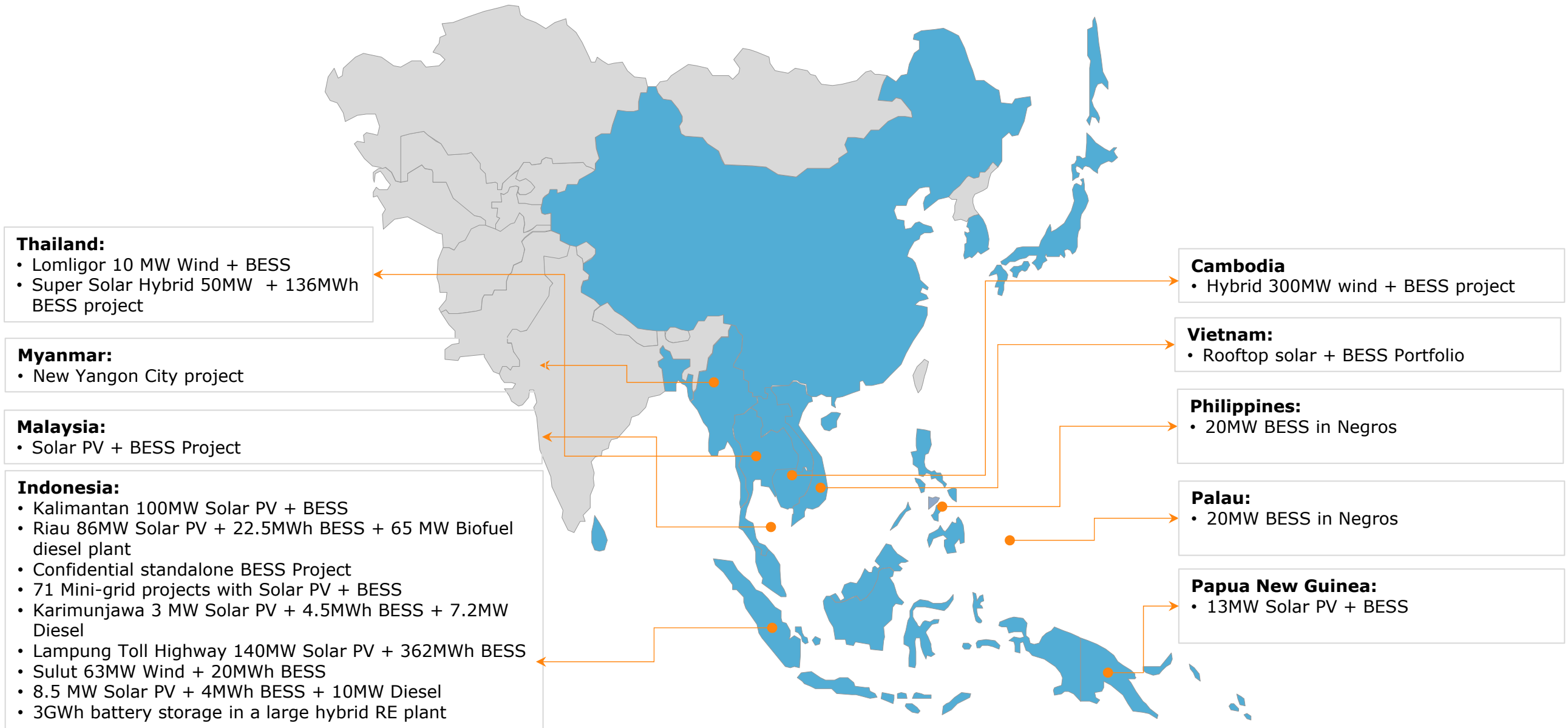




# We have delivered energy storage projects in over 30 countries



# Recent Battery Storage Projects in Asia Pacific



# Thermal - CCGT Projects

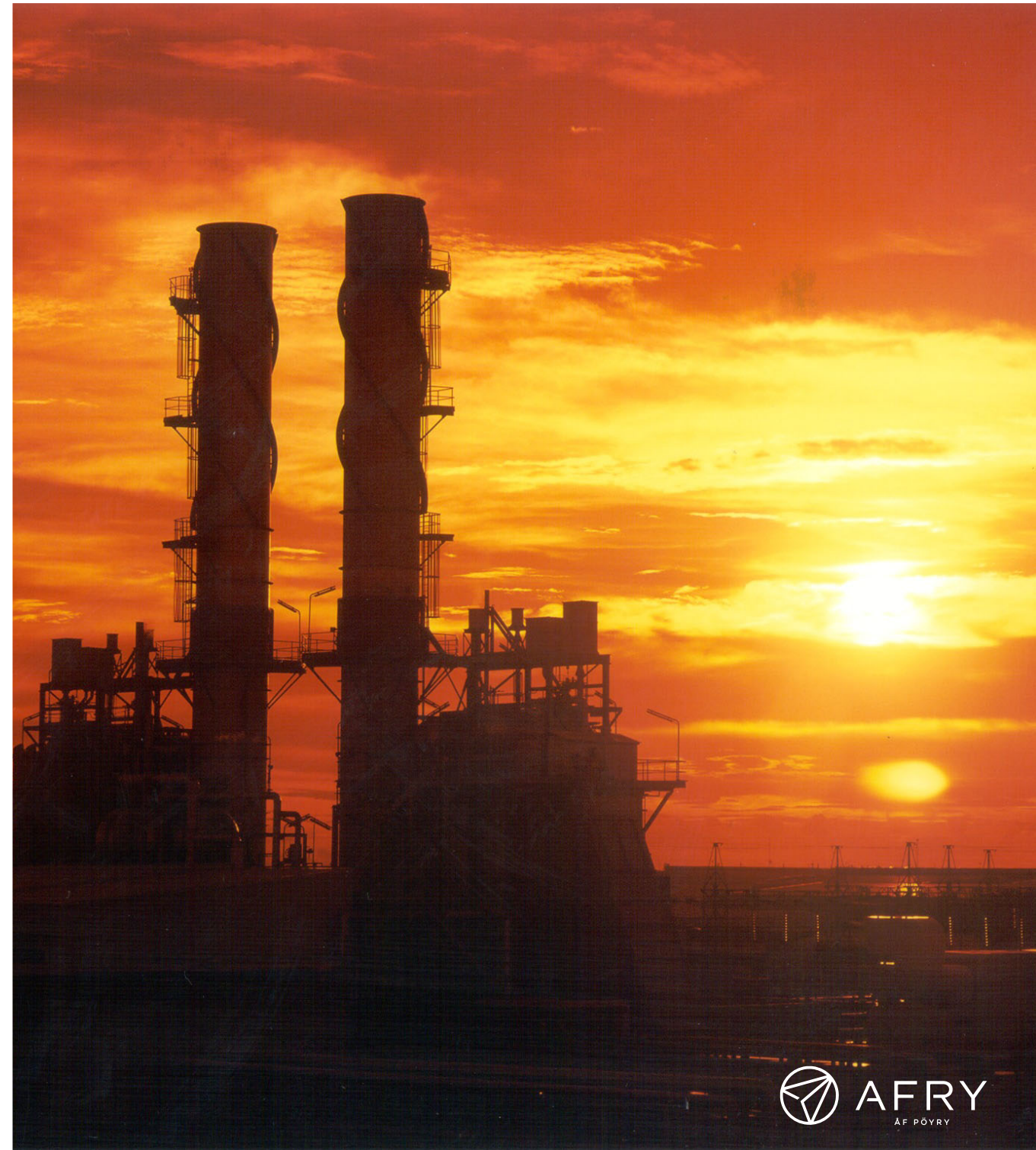
One of the leading thermal power sector consulting companies in SE Asia

## Global competence

- One of the worldwide market leaders, having been involved in over 140GW of CCGT projects in 60 countries worldwide.
- Substantial involvement in the design and construction of over 30GW of CCGT projects during the last 10 years alone
- Strong experience in CCGT plants in all major roles – Owner's Engineer, Contractor's engineer/detail designer, and Lenders' Technical Advisor.

## Asia

- By end of 2022, 11 active CCGT construction projects as Owners Engineer including project management, design review and construction monitoring
- Complete basic + detail engineering and procurement assistance for 20 CCGT projects since 2010



# Recent Gas Turbine and Combined Cycle Power Projects in Asia (1/2)

## Thailand:

- 2500 MW CCGT Power Plant with H class technology
- 140 MW Amata B.Grimm Power 1&2 Limited
- 140 MW B. Grimm Power (Laem Chabang) 1 Limited
- 140 MW B. Grimm Power (Laem Chabang) 2 Limited
- 140 MW B.Grimm Power (Ratchaburi) 2 Limited
- Glow Phase 2 Re-powering project 30 MW CCGT Power Plants
- GULF JP 12 gas fired combined cycle cogeneration Power Plant Projects
- GULF JP 7 Combined Cycle Cogeneration Power Plant Projects
- North Bangkok 2 x 400 MW CCGT
- CUP-4 Project, THAILAND
- ABPR3 130 MW CCGT Project
- ABPR4 130 MW CCGT Project
- ABPR5 130 MW CCGT Project
- BOWIN1 132MW CCGT Project
- Amata Power Bang Pakong 4 120 MW CCGT Project
- Amata Power Bang Pakong 5 120 MW CCGT Project
- Khanom Expansion CCGT Project

## Myanmar:

- 1250 MW LNG to Power Project
- Expansion of 50 MW Gas Engine Power Plant
- 100 MW Gas Fired Power Plant Project
- Shwe Taung 60 MW CCGT project
- Kyaukphyu 120 MW CCGT IPP Project
- 400 MW Gas Fired CCGT IPP Project
- 250 MW CCPP
- 400 MW Hlaing Thar Yar CCGT project
- 500 MW CCGT using LNG derived fuel gas

## Malaysia:

- 1,440 MW Combined Cycle Gas Turbine Power Plant in Pasir Gudang, Johor
- 2,400 MW EDRA CCGT
- 650MW Perlis CCGT
- 220 MW Kulim CCGT

## Indonesia:

- Jawa-1 1600MW Combined Cycle power plant
- 20MW Natuna Gas Project
- Jawa Bali-3 500MW Combined Cycle Power Plant in Banten Area
- Tambak Lorok 700 MWe Gas-Fired Power Plant in Semarang, Central Java
- 300MW Combined Cycle Power Plant – Captive
- PT KDL 120 MW natural gas fired CCGT expansion project



# Recent Gas Turbine and Combined Cycle Power Projects in Asia (2/2)

## Bangladesh:

- 1,400 MW LNG to Power IPP
- Ashuganj 400 MW Combined Cycle Power Plant Project
- 170 MW Combined Cycle Gas Turbine Power Plant Expansion Project
- IPP 450 MW Combined Cycle Gas Turbine Power Plant

## Vietnam:

- Large Combined Cycle Gas Turbine Power Plant
- Nhon Trach 2 750 MW Combine Cycle Power Plant
- Ca Mau 2x750 MW Combined Cycle Plant
- Saigon Hi-Tech Park Power Project; 100 MW Gas-fired Industrial Power Plant Project

## Sri Lanka :

- Kerawalapitiya 300MW Combined Cycle Power Plant IPP Project

## Korea:

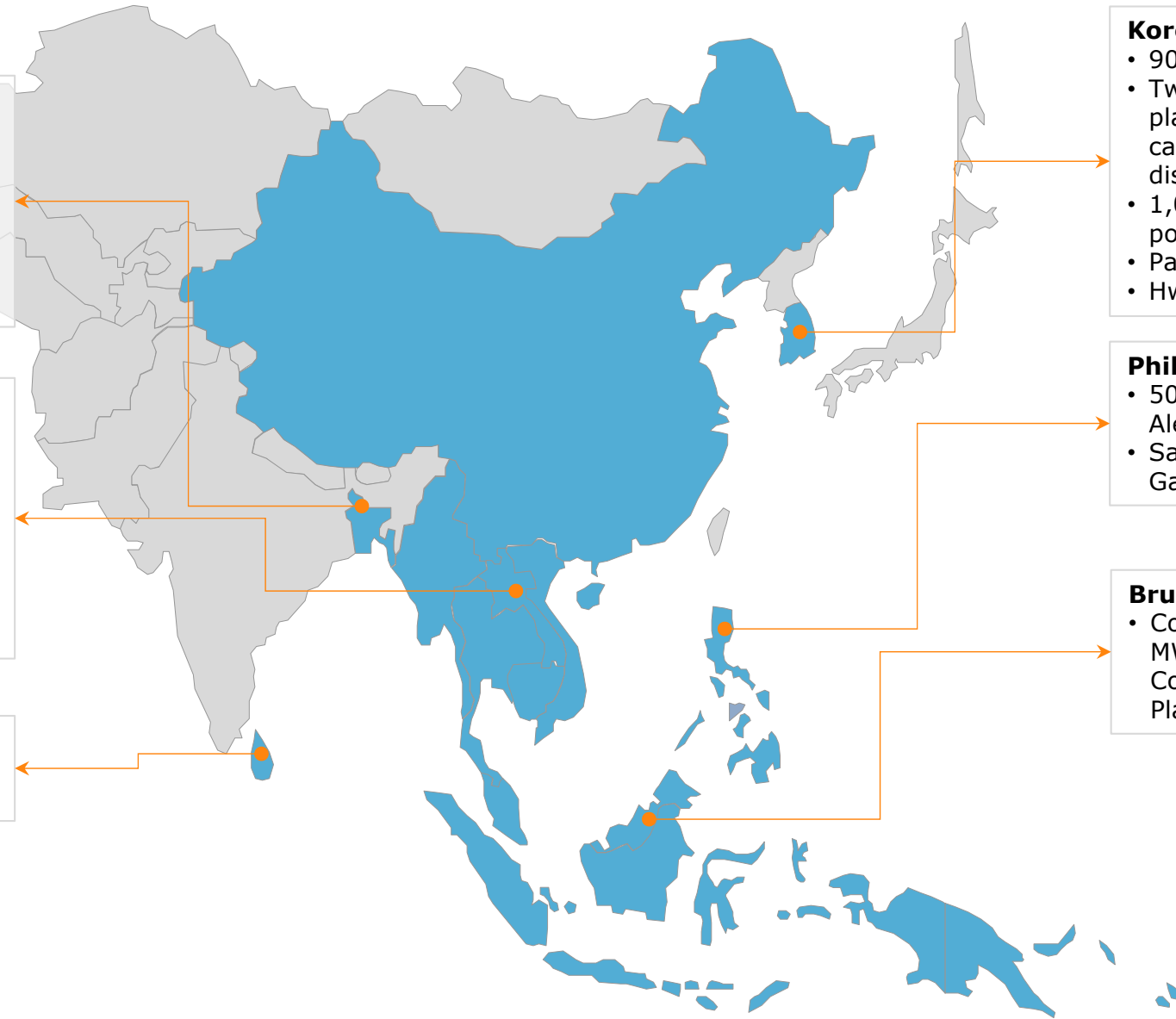
- 900 MW CCGT
- Two combined cycle LNG-fired power plant with an aggregate installed capacity of 900 MW, and 1,497 Gcal district heating facilities
- 1,074 MW LNG fired combined cycle power plant
- Paju Combined Heat and Power Plant
- Hwasung Cogeneration Plant 525 MW

## Philippines:

- 50 MW Gas-fired power plant in Alegria, Cebu
- San Pascual 300 MW Combined-Cycle Gas Turbine Power Plant

## Brunei:

- Co-generation Project (70 MW<sub>e</sub> / 100 MW<sub>th</sub>) San Pascual 300 MW Combined-Cycle Gas Turbine Power Plant



# LNG-to-Power and LNG Terminals

Ability to cover all key aspects of the development of LNG to Power projects:

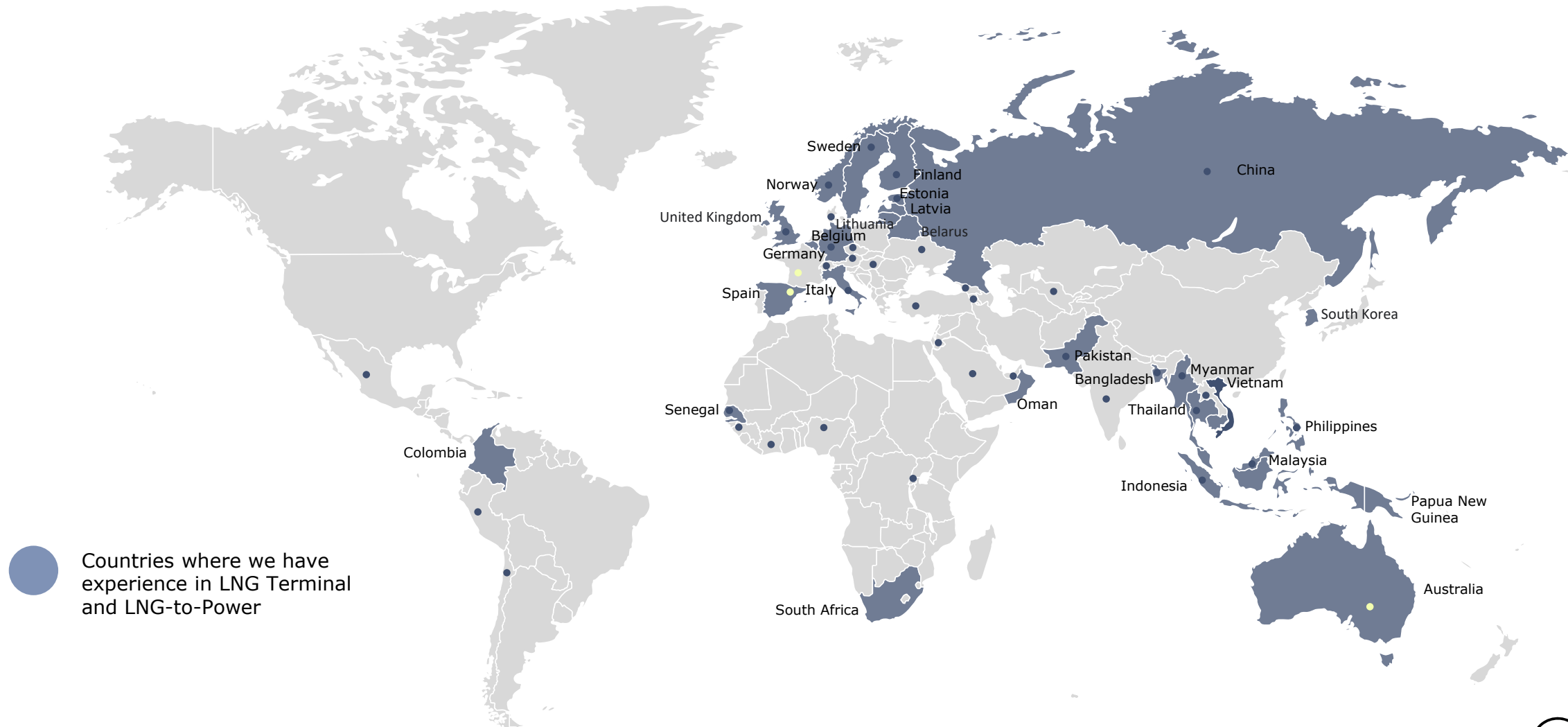
- Technical development for the power plant and power transmission
- Technical development for the LNG terminal (both onshore and offshore type)
- Market advisory for electricity markets and power sales
- Market advisory for LNG markets and LNG supply

AFRY's LNG to Power experience in numbers:

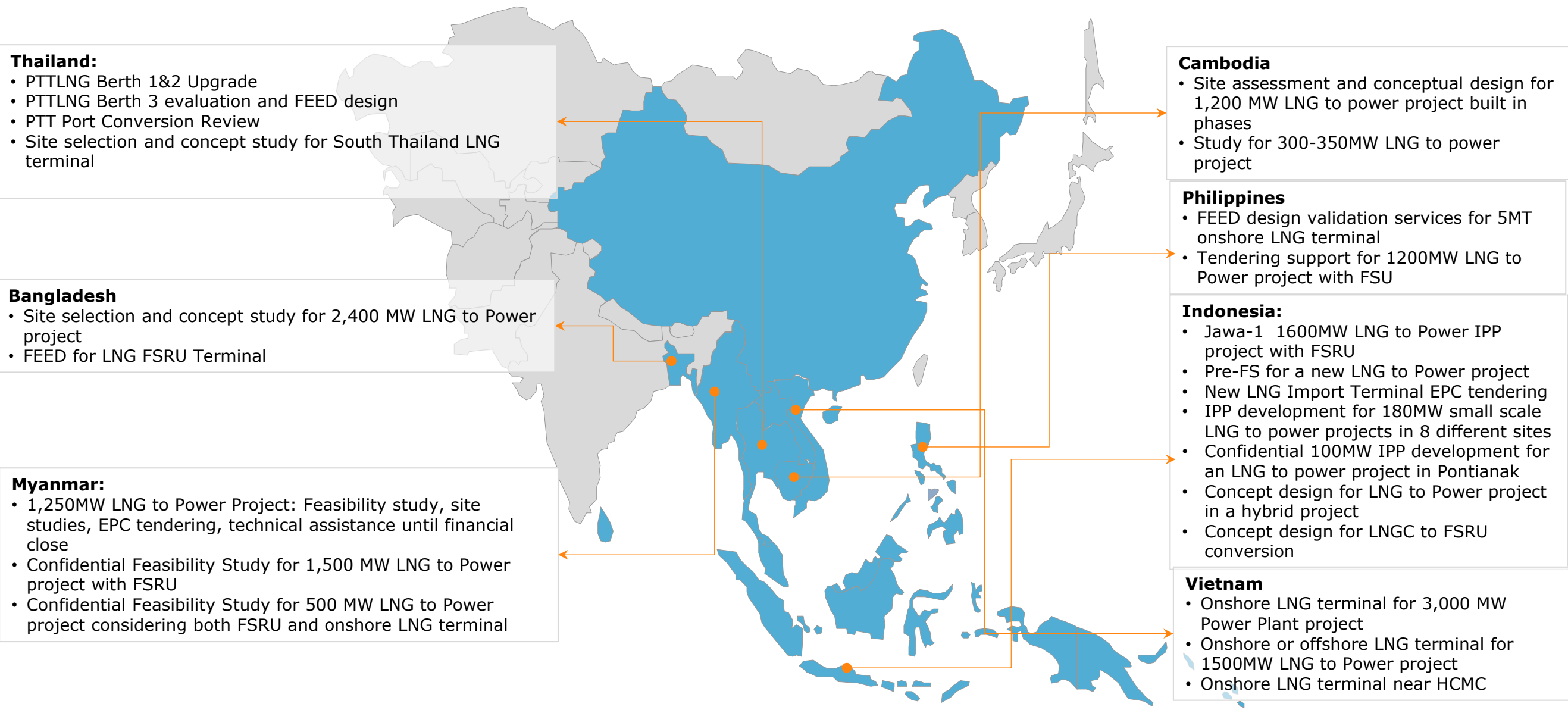
- Involved as Technical Advisor in the development of more than **15 GW of LNG to Power Projects**
- Involved as Technical or Commercial/Market Advisor in over **130 LNG projects**



# We have delivered LNG projects in around 30 countries



# Recent LNG Terminal and LNG-to-Power Projects in Asia



**Thailand:**

- PTTLNG Berth 1&2 Upgrade
- PTTLNG Berth 3 evaluation and FEED design
- PTT Port Conversion Review
- Site selection and concept study for South Thailand LNG terminal

**Bangladesh**

- Site selection and concept study for 2,400 MW LNG to Power project
- FEED for LNG FSRU Terminal

**Myanmar:**

- 1,250MW LNG to Power Project: Feasibility study, site studies, EPC tendering, technical assistance until financial close
- Confidential Feasibility Study for 1,500 MW LNG to Power project with FSRU
- Confidential Feasibility Study for 500 MW LNG to Power project considering both FSRU and onshore LNG terminal

**Cambodia**

- Site assessment and conceptual design for 1,200 MW LNG to power project built in phases
- Study for 300-350MW LNG to power project

**Philippines**

- FEED design validation services for 5MT onshore LNG terminal
- Tendering support for 1200MW LNG to Power project with FSU

**Indonesia:**

- Jawa-1 1600MW LNG to Power IPP project with FSRU
- Pre-FS for a new LNG to Power project
- New LNG Import Terminal EPC tendering
- IPP development for 180MW small scale LNG to power projects in 8 different sites
- Confidential 100MW IPP development for an LNG to power project in Pontianak
- Concept design for LNG to Power project in a hybrid project
- Concept design for LNGC to FSRU conversion

**Vietnam**

- Onshore LNG terminal for 3,000 MW Power Plant project
- Onshore or offshore LNG terminal for 1500MW LNG to Power project
- Onshore LNG terminal near HCMC



# Biomass to Power

Solid experience in Biomass to Power projects

## Global competence

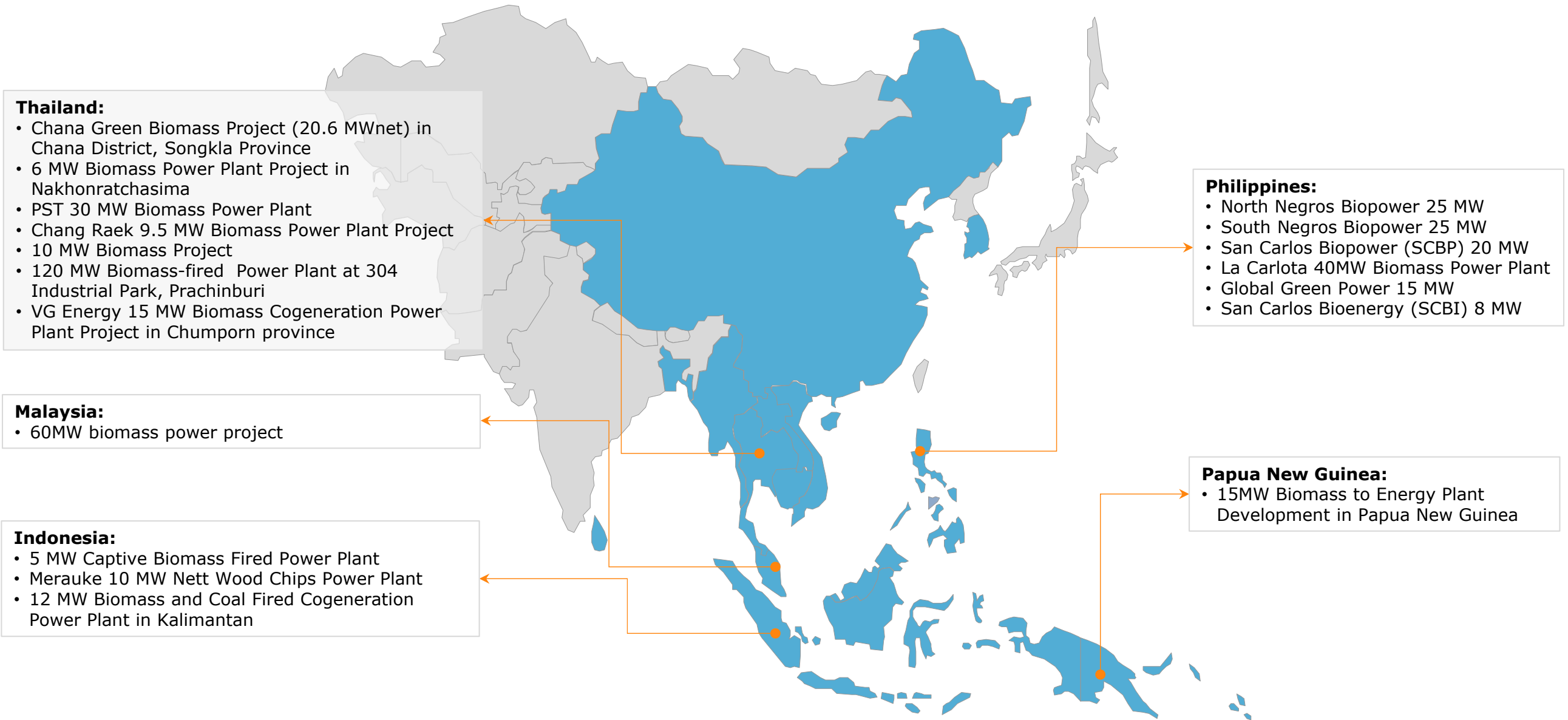
- Market leader in Europe in biomass to power, with more than 150 power projects in bioenergy, including biomass, biofuels, and biogas.
- Largest on-going biomass project: MGT 300 MW biomass project in UK
- Good experience in co-firing with biomass and biomass conversions

## Asia

- Large number of biomass to power projects in the region, up to 125MW unit size
- Experience as Technical Advisor, Owner's Engineer, Lenders Technical Advisor, Contractor's Engineer, EPC Contractor and O&M Management in biomass projects in Asia



# Recent Biomass Power Projects in Asia



# Waste-to-Energy

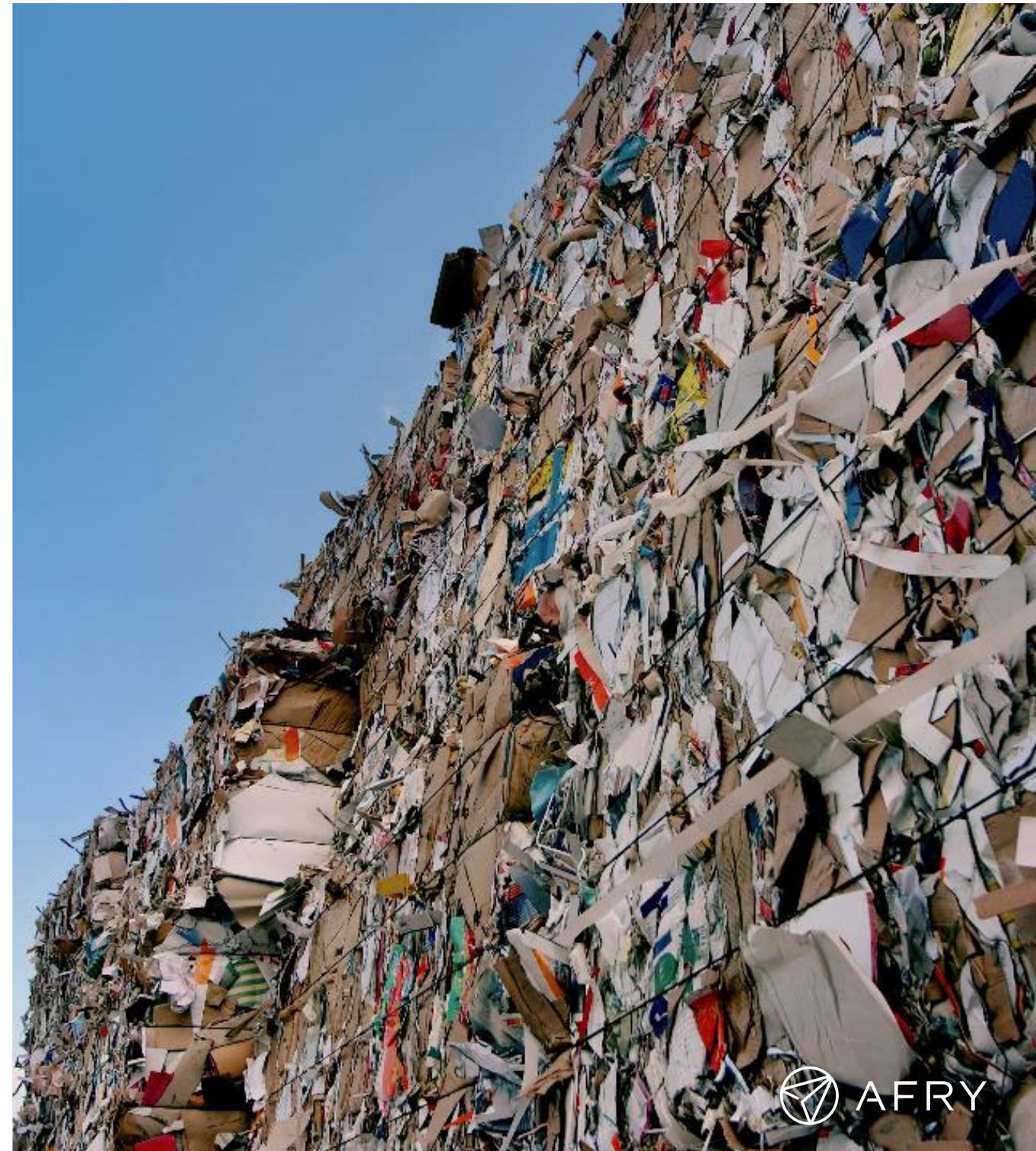
Over 50 years of experience in Waste-to-Energy projects

## Global competence

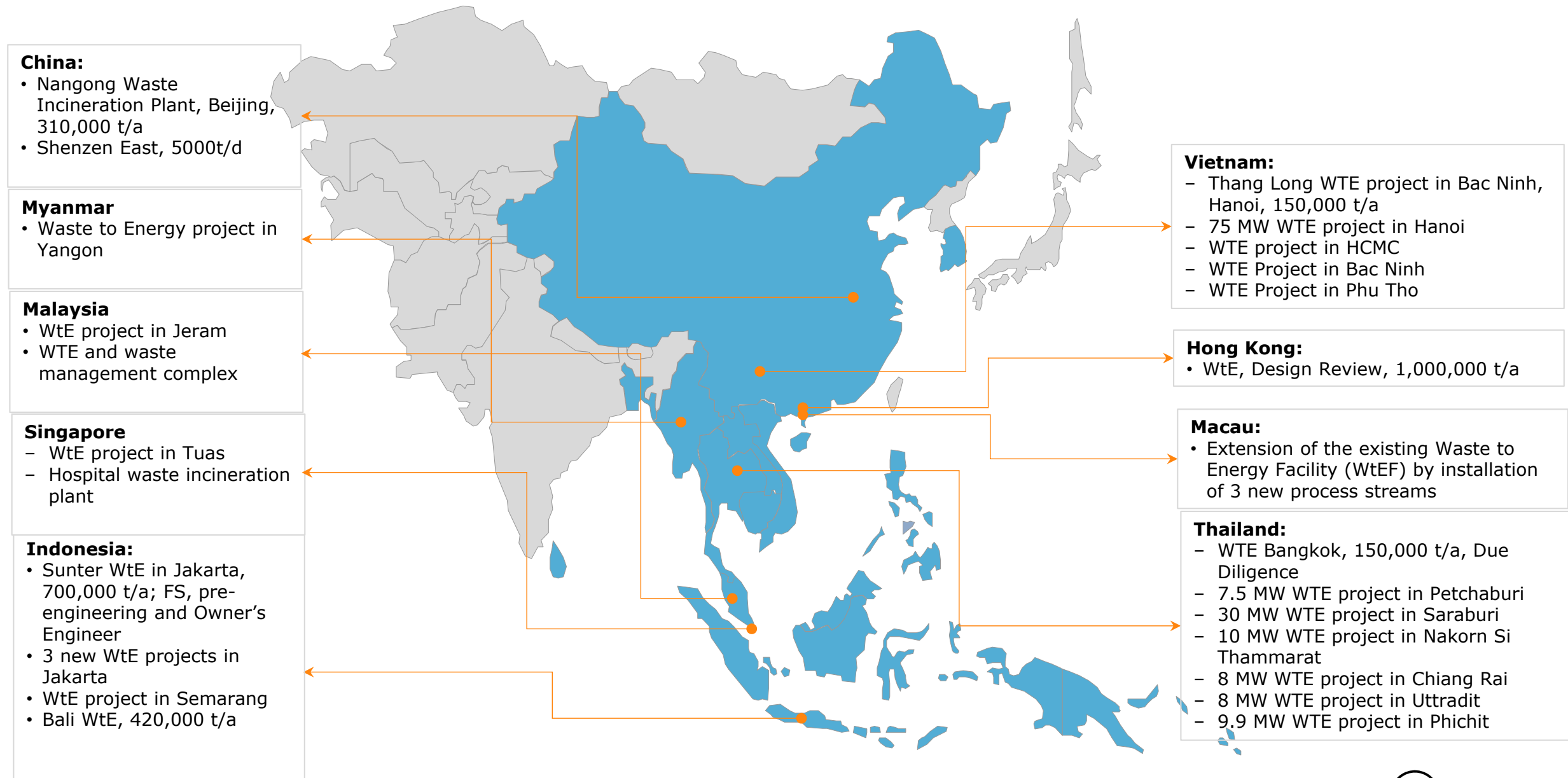
- Substantial involvement in 135 WtE projects with total capacity of over 20 million ton/a.
- Over 400 waste-to-energy related project assignments over the last 50 years.

## Asia

- Ten on-going waste-to-energy projects in the region as Technical Advisor, Owner's Engineer or Lenders Technical Advisor
- Involved in the largest WtE projects in Asia and globally, up to 5000 t/day



# Waste to Energy projects in Asia



# Hydropower

Over 120 years of experience in hydropower

## Global competence

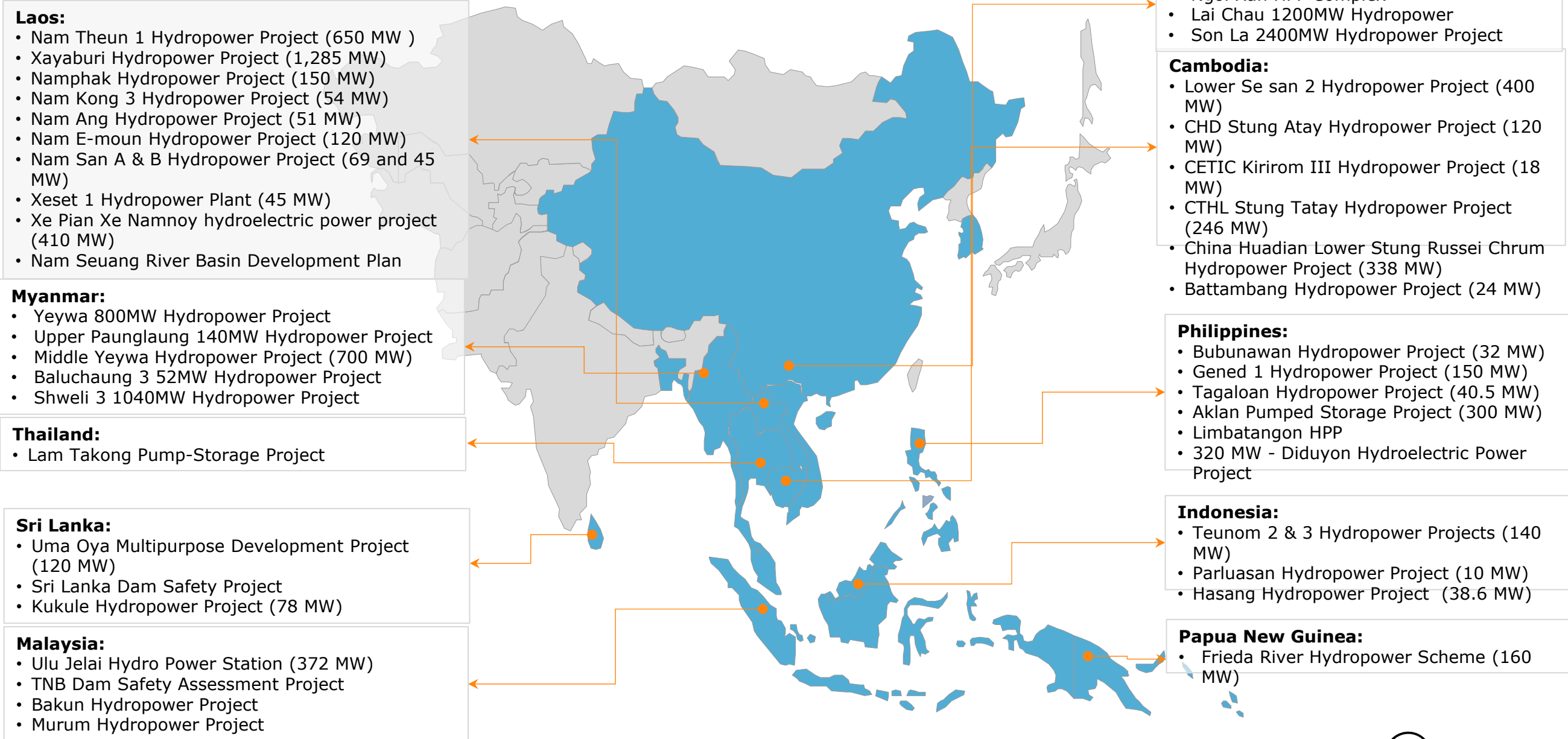
- AFRY involvement in more than 100,000 MW of hydropower projects globally (15% of the global capacity)
- More than 10,000 MW of hydropower capacity currently under design/construction by AFRY
- Hydropower experience in over 87 countries

## Asia

- 100 hydropower staff with Thailand as the regional headquarters
- 4,000 MW of hydropower projects currently under development or construction in Asia
- Key milestone projects in the region:
  - First Pelton turbines
  - Largest Concrete Faced Rockfill Dam (CFRD)
  - First Mekong Mainstream Project



# Recent Hydropower Projects in Asia



# Hydrogen & Ammonia

## Global competence

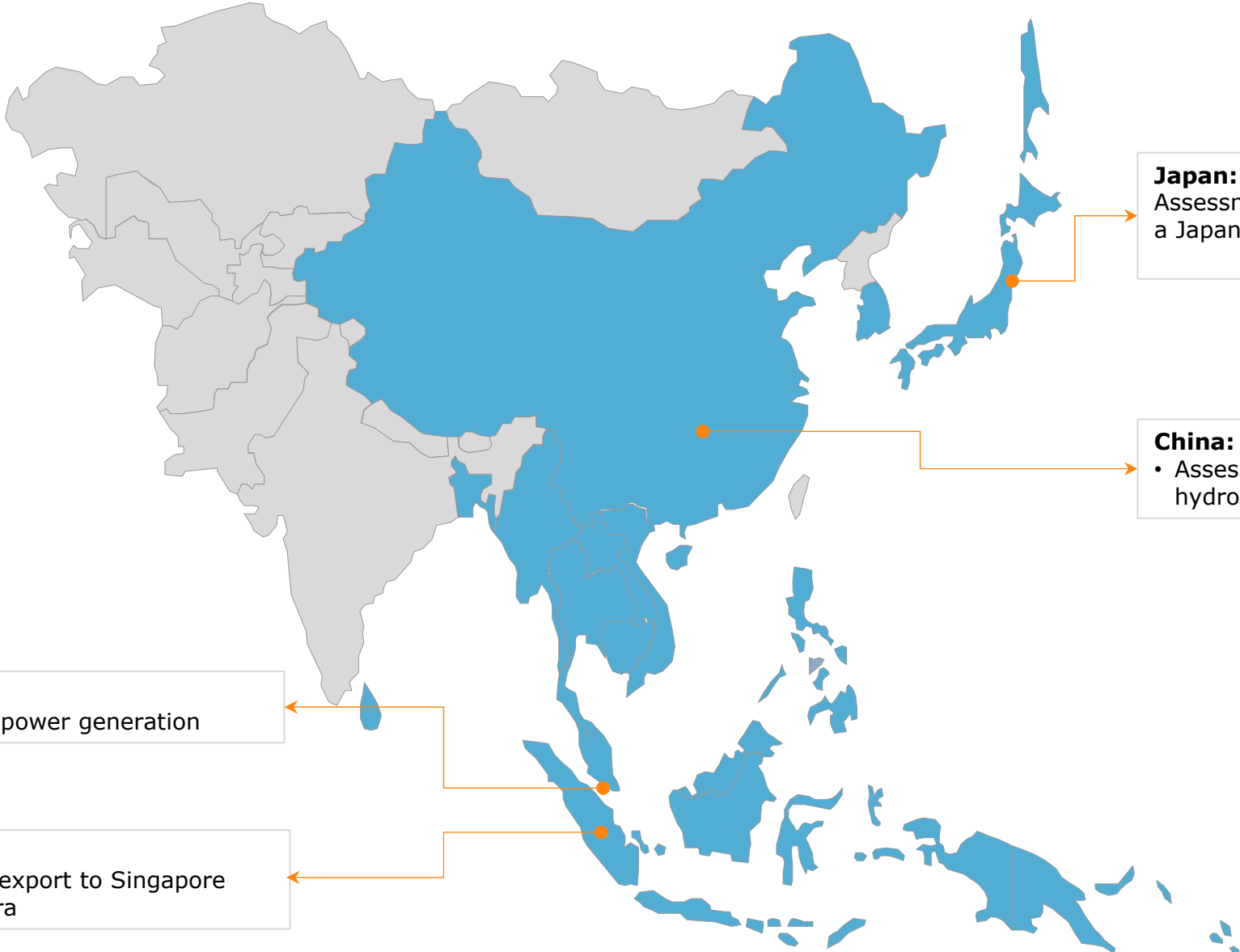
- Wide expertise across the hydrogen sector: markets, production, transport and utilisation
- Over 200 hydrogen/ammonia assignments delivered globally in over 30 countries

## Asia and Middle East

- Green hydrogen feasibility study in Indonesia for a major hydrogen export development
- Green ammonia project in Singapore
- Technical advisor to the largest global green ammonia production project
- Assessment of the global electrolyser market for an Asian client
- Market entry strategy into hydrogen/ammonia for an Asian client



# Green Hydrogen / Ammonia Projects in Asia Pacific



**Japan:**  
Assessment of the electrolyser market for a Japanese technology company

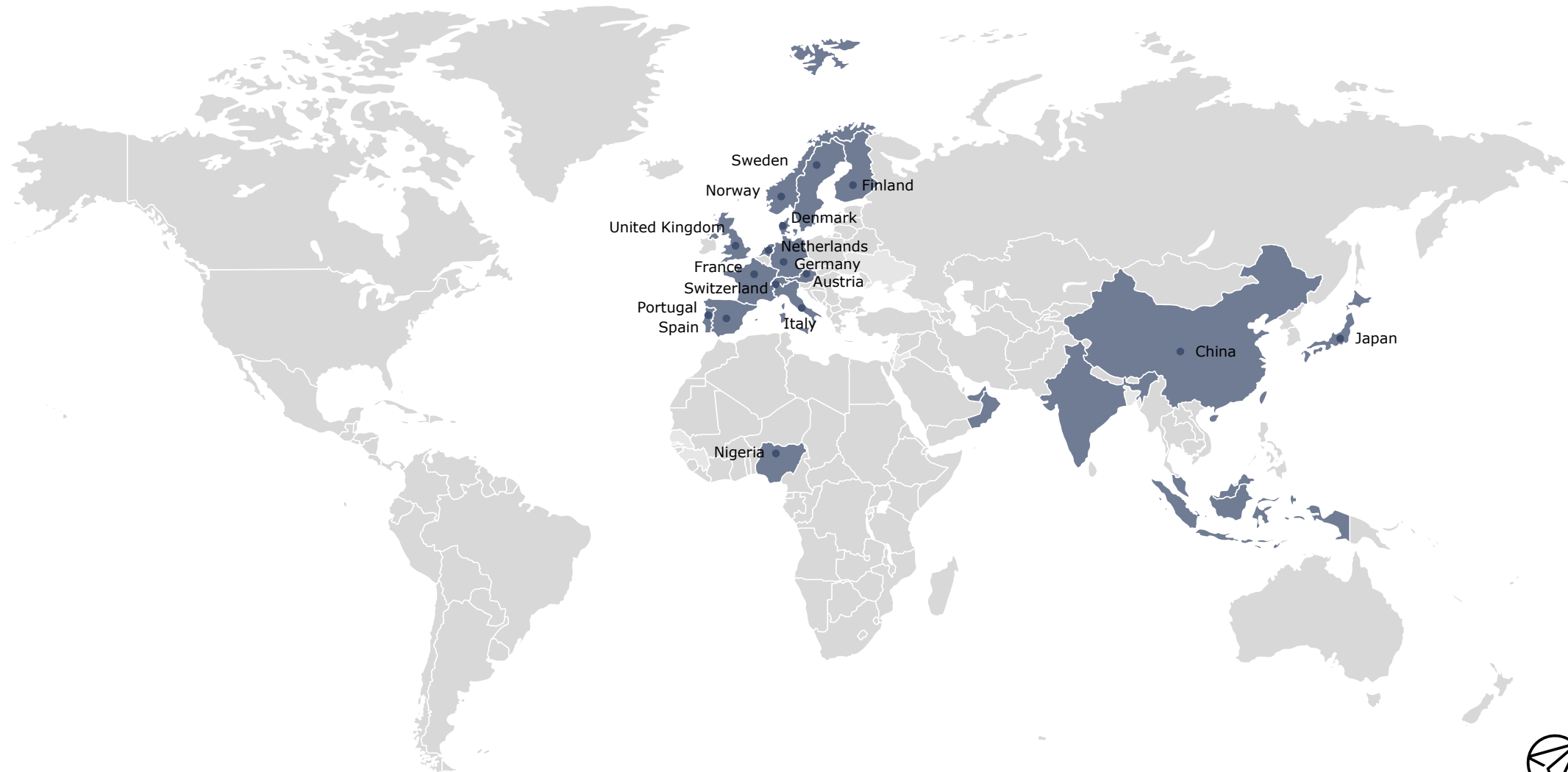
**China:**  
• Assessment of the potential for hydrogen HGVs in China

**Singapore**  
• 50MW Green ammonia project for power generation

**Indonesia:**  
• Large green hydrogen project for export to Singapore  
• Green hydrogen project in Sumatra



# We have delivered H2 and P2X projects in over 30 countries



# Transmission and Distribution

## Global competence

- One of the largest international T&D consultancies, ranked #5 International Design Firm in T&D by ENR in 2021
- Services cover planning and development, design and tendering, project execution, HVDC systems and smart technologies up to 750kV
- Global leader in HVDC technology including subsea cables
- Over 350 T&D experts in Europe, Middle East, Africa and Asia

## Asia

- Transmission lines and substations to connect Thermal, Hydropower and Renewable Energy projects to the grid
- Power system studies for renewable energy projects
- Submarine cable interconnection projects between the ASEAN countries



# Recent Transmission, Distribution and Substation Projects

## Myanmar:

- Grid Impact Study and Interconnection Cost Estimate in Myanmar
- Project preparatory technical assistance (PPTA)
- Power system of Myanmar power grid Consultancy services

## Indonesia:

- Cost benefit analysis of electrical interconnections between the various Indonesian islands/power grids, including submarine cable projects
- Bontang Electrical System Study
- Jambi ~300MW power plant project transmission line
- JAWA -1 1600MW Combined Cycle power plant transmission line
- 2x100MW Kalsel IPP including 150 kV transmission line
- 2x100MW coal plant green field project located in South Kalimantan with transmission line

## Singapore:

- Study on submarine cable interconnection connecting Singapore to a neighbouring country
- Conceptual design for submarine cable interconnection to import renewable energy to Singapore

## Cambodia:

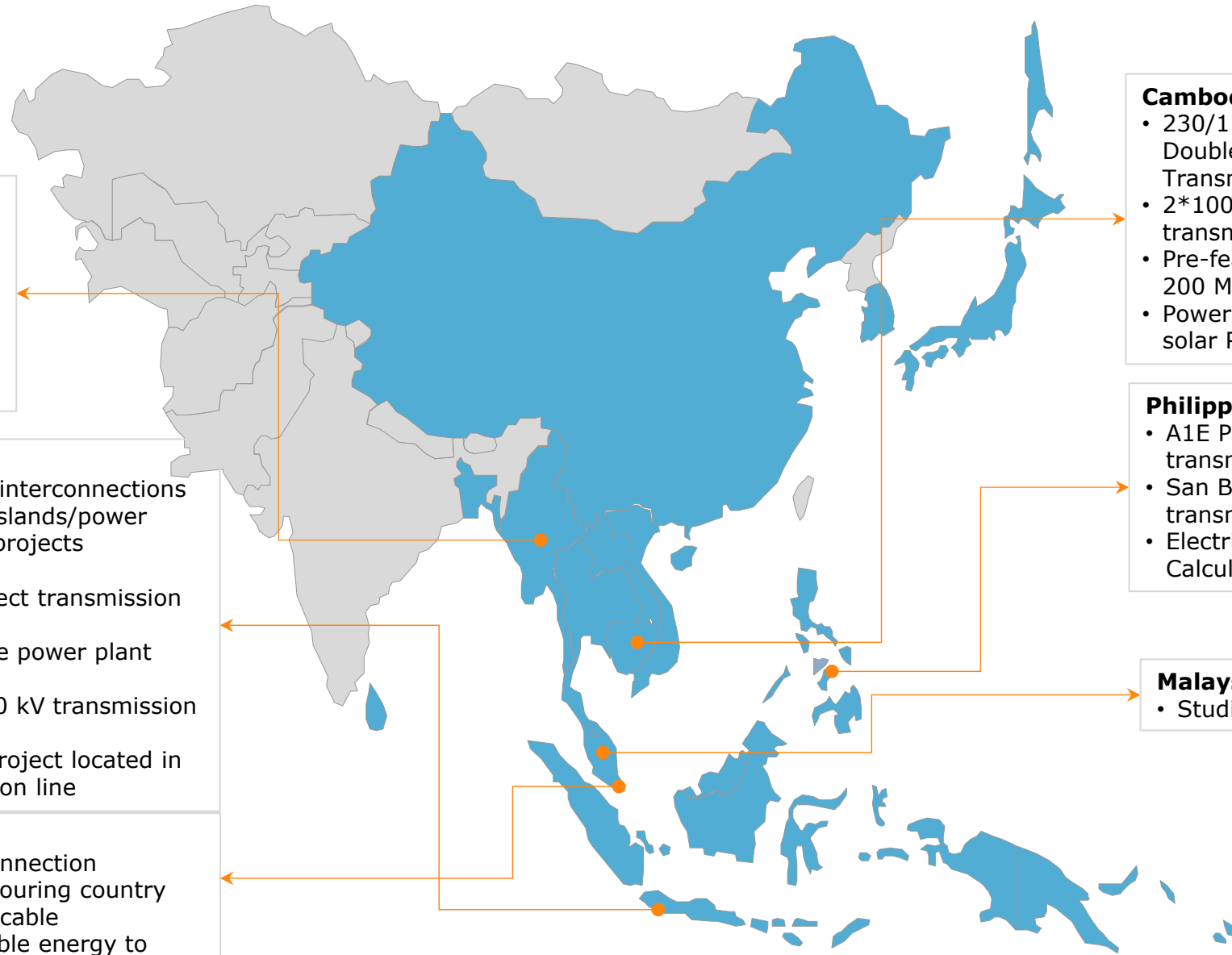
- 230/115/22 kV Substations and 110 km Double Circuit 230kV Overhead Transmission Line in Cambodia
- 2\*1000 MW power plant project with transmission line
- Pre-feasibility study for Sihanoukville 200 MW with transmission line
- Power system studies for maximum solar PV injection to the grid

## Philippines:

- A1E Power plant project with transmission line
- San Buenaventura CFPP with transmission line
- Electrical Network Modelling and Calculation

## Malaysia:

- Studies on Sarawak 500 kV



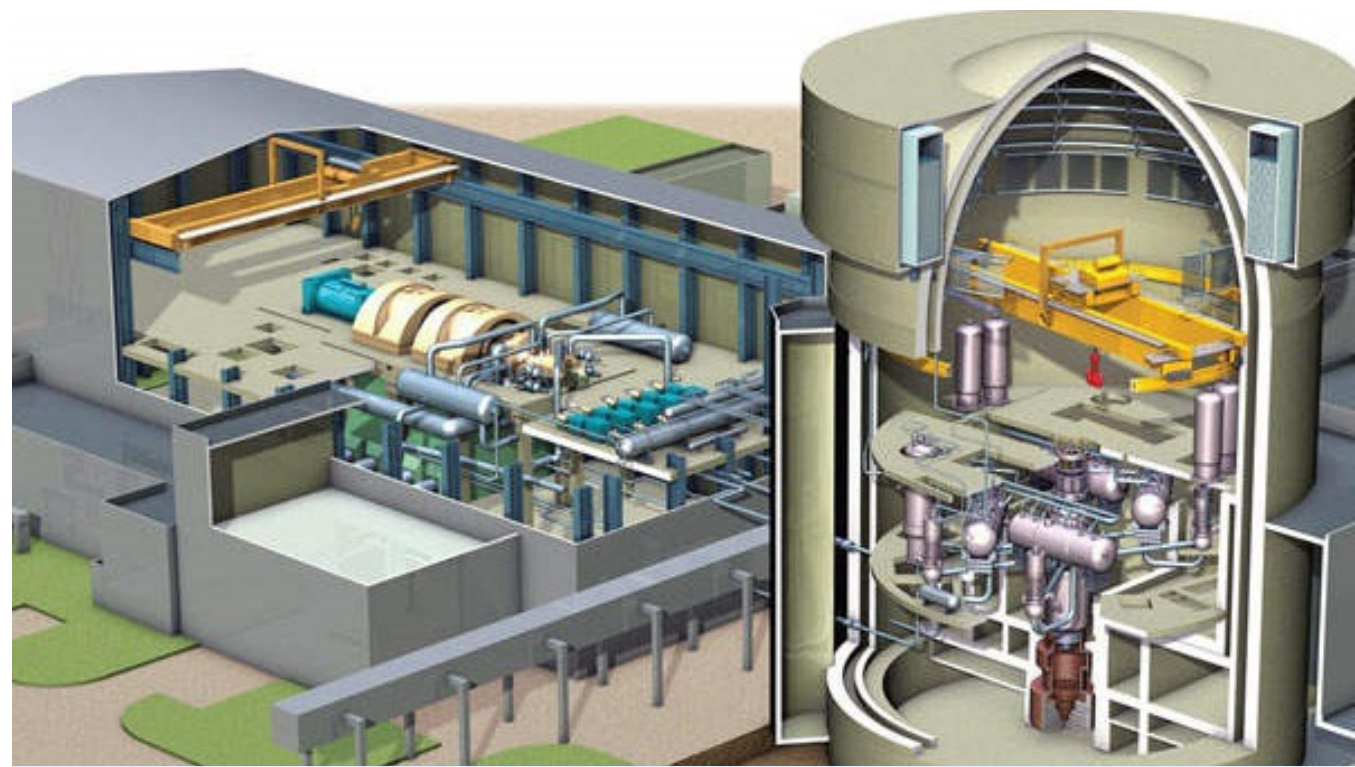
# Nuclear Power

## Global competence

- Nuclear expertise going back over 40 years
- Services for entire life span: new build, operation, life cycle extension, decommissioning, disposal
- Expertise for all reactor technologies
- SMR expertise

## Asia

- Nuclear power planning, site evaluation, technology selection, feasibility studies, technical design, permitting support and research reactor projects executed in Indonesia, Philippines, Thailand and Vietnam.



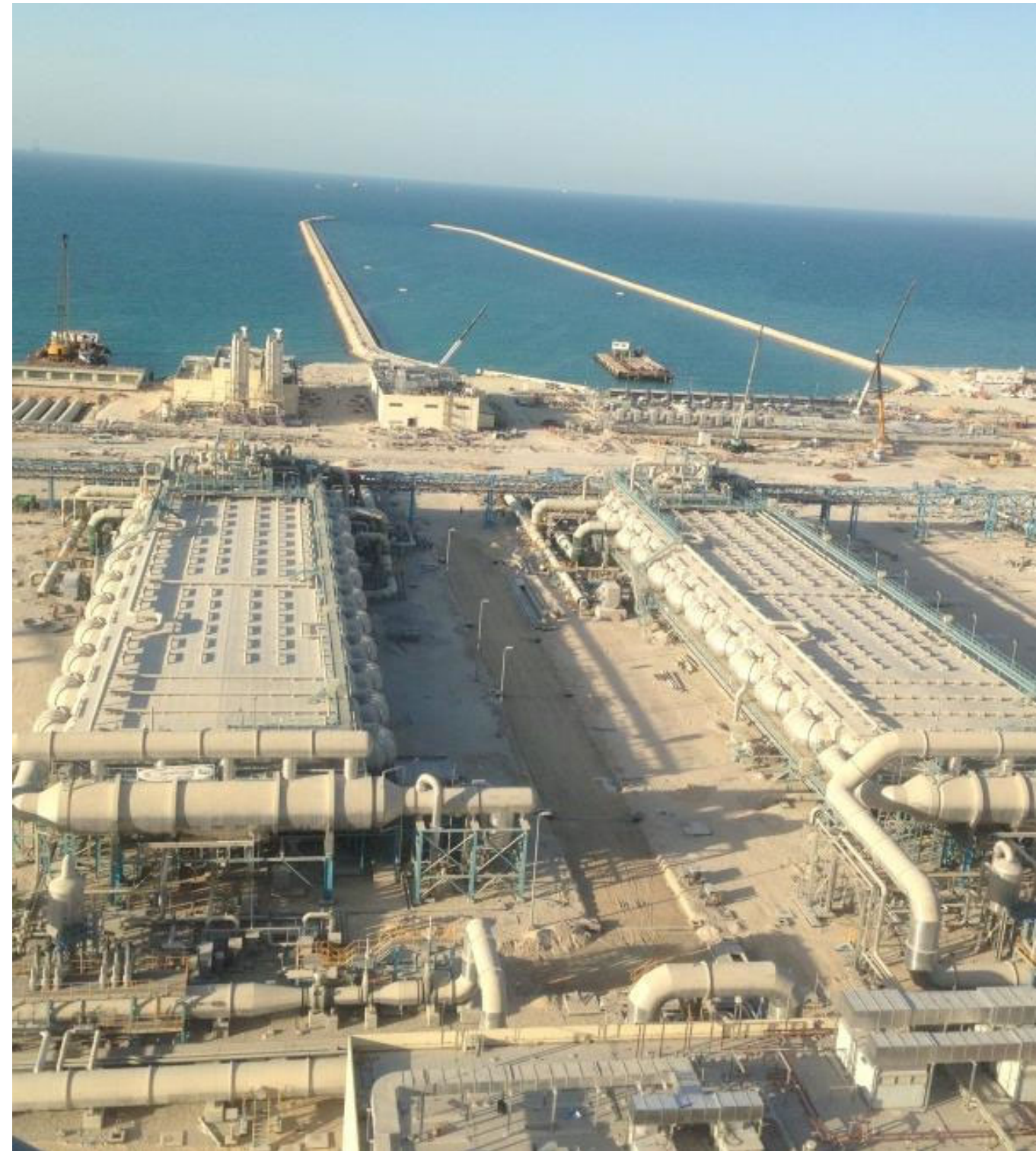
# Desalination

## Global competence

- Involved worldwide in over 25 large scale desalination projects
- Owner's Engineer for the largest combined power and desalination plant in the world, Ras Al Khair in Saudi Arabia, which has capacity of 1,036,000 m<sup>3</sup>/day (MSF & RO) and 2,400MW. The plant was selected the Desalination Plant of the Year in 2015.

## Asia and Middle East

- Large number of Owner's Engineer type desalination and water pipeline projects executed in the Middle East
- Several studies for SEA desalination projects
- Engineering for the Western Galilee RO project



# Services



# Strong Track Record in Owner's Engineer Services

Owner's engineer construction experience:

- More than 20,000 MW of thermal power and renewable energy projects as owner's engineer in the last 10 years only
- Owner's engineer project references for individual projects up to 2,600 MW
- Owner's engineer construction assignments in more than 40 thermal power and renewable energy plants in the last 10 years alone



# Recent Owner's Engineer Construction Projects in Asia

## Sri Lanka:

- Puttalam 3x300MW Thermal power project

## Bangladesh:

- Ashuganj East 400MW CCGT
- 750MW CCGT

## Cambodia:

- 30 MWac Solar PV Power Plant in Banteay Meanchey
- 2x50MW CEL I Thermal Power Project
- 137MW CEL II Thermal Power Project

## Malaysia:

- Track 4A 1,440MW CCGT Project
- 25MW Uitm Solar PV Project
- 29MW Leader Solar PV Project

## Thailand:

- 30 MWp NPS Floating solar project
- U-Tapao CCGT project
- Glow Phase 2 GSPPR CCGT project
- BPLC1 140 MW CCGT project
- ABP1R & ABP2R 140 MW CCGT projects
- GSPP1 140 MW CCGT project
- GPCR1 & GPCR2 140 MW projects
- Bangkok Cogen GIS Substation and Ductbank Distribution Network Project
- 16 MW Bo Thong Wind Power Plant
- ABPR 3 120MW CCGT power project
- ABPR 4 120MW CCGT power project
- ABPR 5 120MW CCGT power project
- CUP 4 cogeneration plant project
- Hadkanghan 126MW wind power project
- Bowin 132MW CCGT power project
- ABP4 & 5 2x132MW CCGT power projects
- Glow Phase 5 342MW CCGT power project

## Korea:

- 36 MW Gasan Wind Power project

## Vietnam:

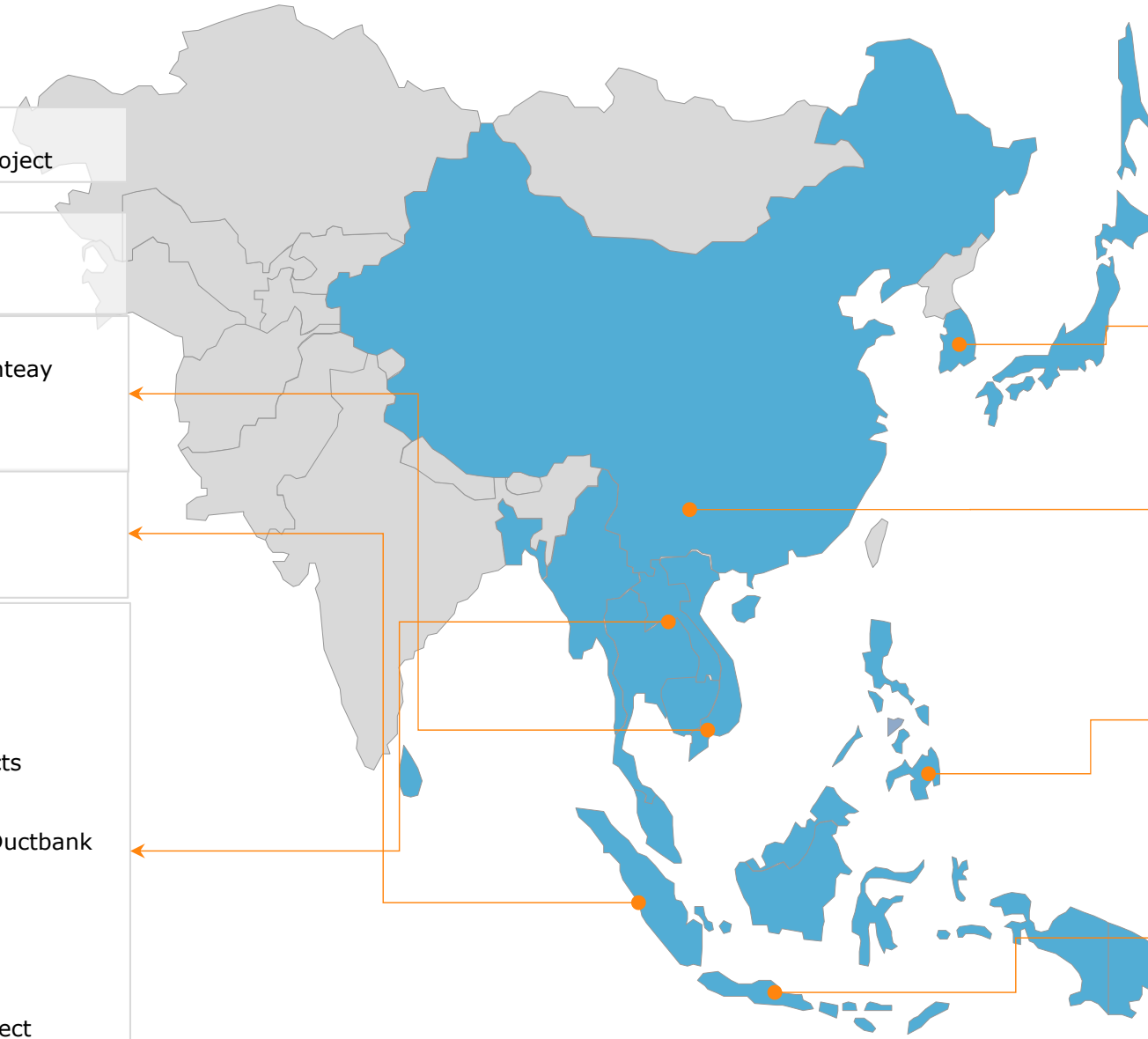
- 257MWp Hoa Hoi Solar PV Project
- 32MW rooftop solar PV Project
- 48MW onshore Wind Power Project
- 48 MW Tra Vinh Nearshore Wind Power Project
- 30 MW Vinh Chau Wind Power Project
- 1,320MW Van Phong 1 Thermal Power Project
- 750MW Nhon Trach 2 CCGT power project

## Philippines:

- 6 MW Rooftop Solar PV Power Project in the Philippines.
- 70MW Solar PV Project
- 22MW South Negros Biomass Project

## Indonesia:

- Tanjung Jati 2x1000MW Thermal Power Project
- Central Java 2x1,000 MW Thermal Power Project
- Sulbagut 1 2x50MW Thermal Power Project
- Kalsel 2x100MW Thermal Power Project
- Merak 2x60MW Thermal Power Project
- Grati 450MW CCGT Project





# Strong Track Record in Lenders Technical Advisory (LTA) Services

## Global LTA experience:

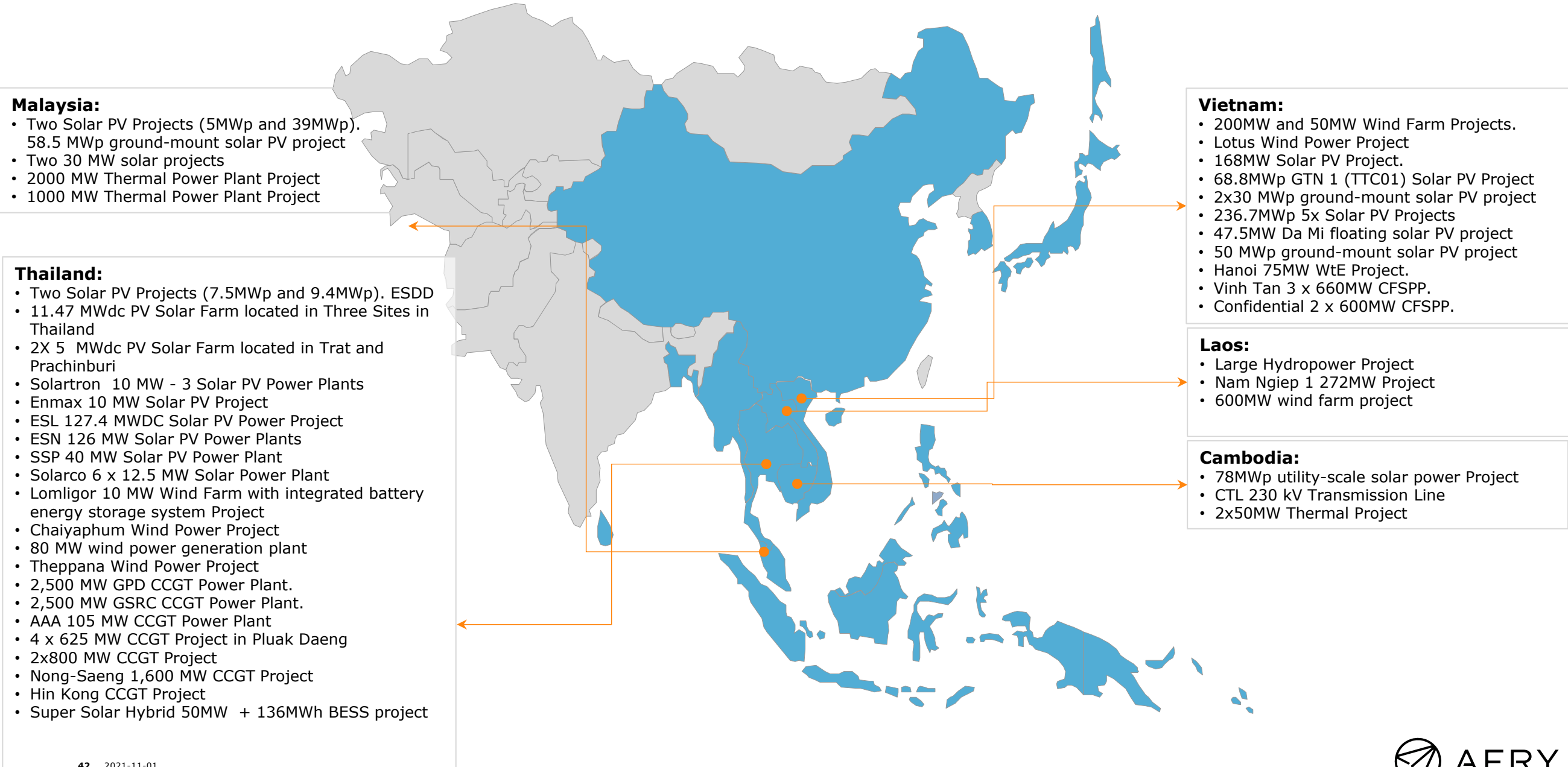
- More than 75,000 MW of LTA projects globally
- More than 250 LTA projects
- Experience in gas/LNG, hydro, solar, wind, battery storage, waste-to-energy, biomass, desalination, geothermal, oil, hybrid plants and T&D
- LTA project references for projects with lending up to USD 2.5 billion and plant capacity up to 2,500 MW

## LTA experience in APAC:

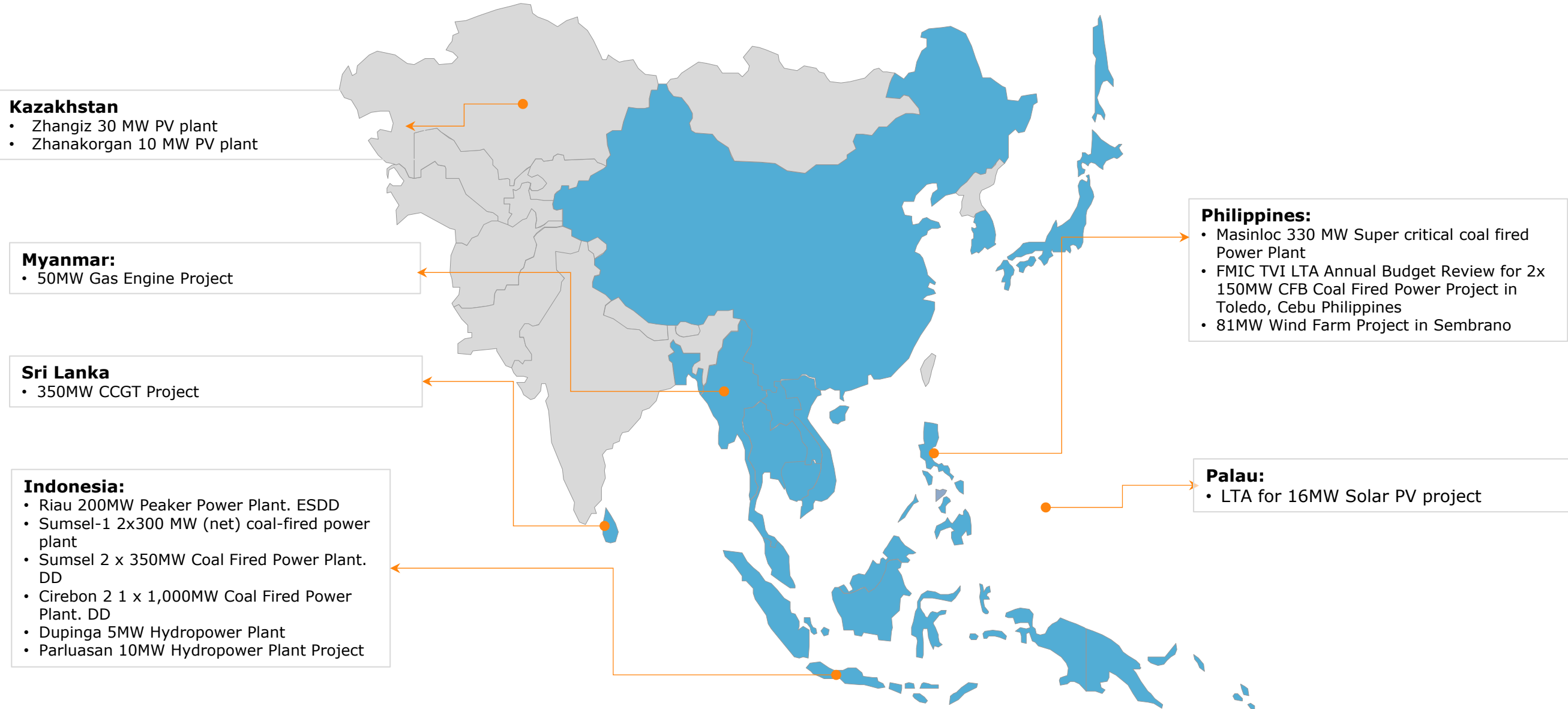
- Awarded “Technical Advisor of the Year, APAC” in 2022 IJGlobal Awards
- More than 45,000 MW of LTA projects
- More than 135 LTA projects
- Good LTA experience with JBIC, ADB, Korea Eximbank, etc.



# Recent Lenders Technical Advisor Projects in Asia (1/2)



# Recent Lenders Technical Advisor Projects in Asia (2/2)



# Recent ADB and JBIC Lenders Technical Advisor Projects in Asia



# Strong Track Record in Due Diligence Services in Transactions

## Technical due diligence experience:

- AFRY within top 3 technical due diligence providers for energy M&As in the last 5 years<sup>(1)</sup>
- More than 450 technical due diligence assignments for thermal, hydropower and renewable energy projects, including large portfolios of up to 20GW
- More than 170,000 MW of power generation assets

## Environmental due diligence experience:

- More than 180 environmental due diligences

## Commercial/Market due diligence experience:

- More than 360,000 MW of power generation assets



# Recent Technical Due Diligence Projects in Asia

- Myanmar**
- 300MW solar PV project
  - 100MW gas-fired project

- Bangladesh**
- 220MW CCGT project

- Cambodia**
- 200MW Thermal power project
  - 3000MW Thermal power project

- Thailand:**
- 4 x 1.5 MW Northern Biogas Plant
  - Solar Project Pannacotta
  - Large Thermal IPP project

- Indonesia**
- Portfolio of gas, geothermal and hydropower assets

- Malaysia:**
- 44MW solar PV portfolio
  - 20MW solar PV project
  - 220MW CCGT project

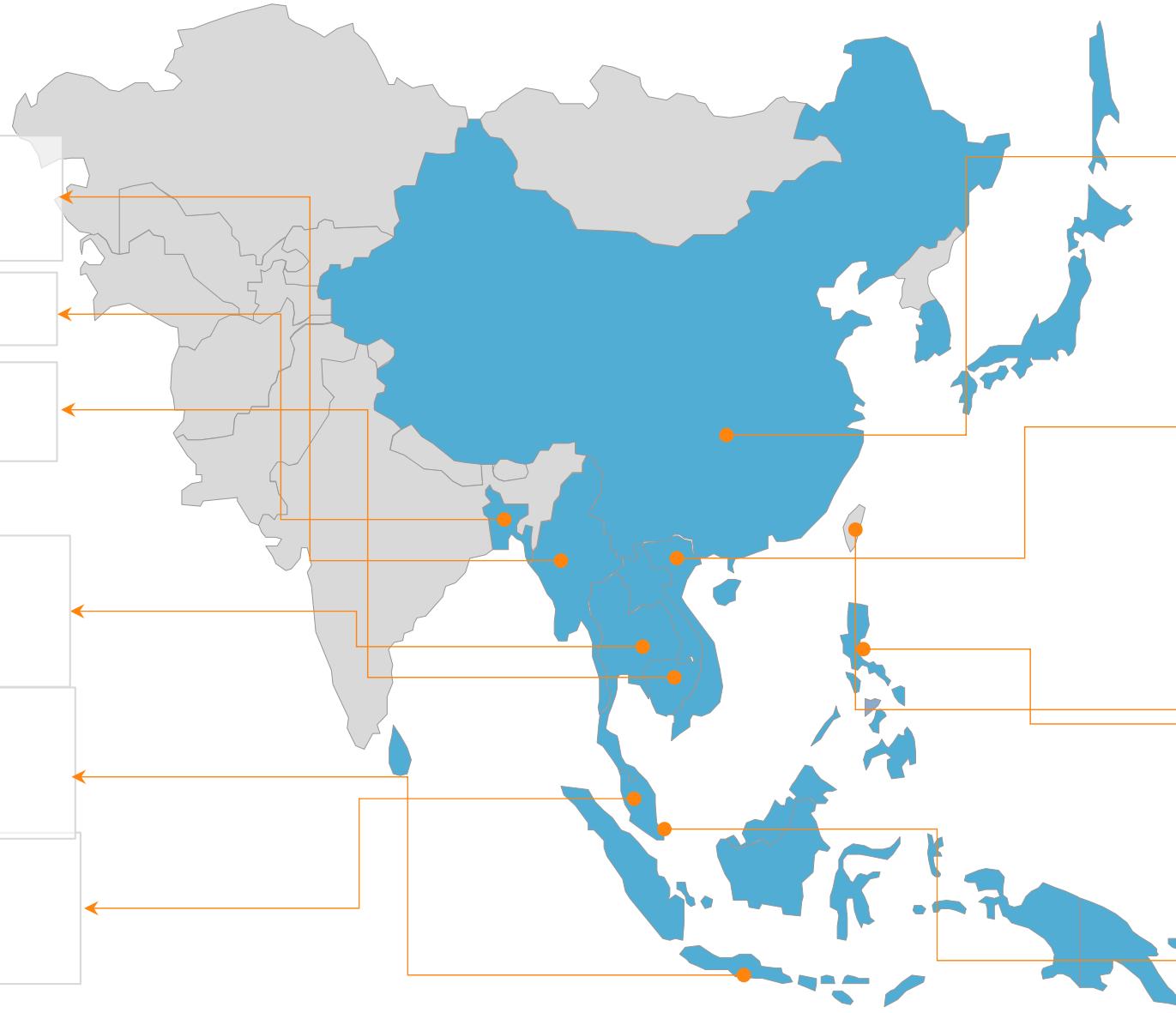
- China:**
- LNG terminal project
  - 4 rooftop solar projects

- Vietnam:**
- WtE project in HCMC
  - LNG terminal project in Vietnam
  - Vietnam BESS BSB Platform Project
  - 16 TDD for 35+15MW Solar
  - TDD of 10MWp Solar Rooftop Projects
  - TDD for 30MW solar plant in Binh Thuan province
  - 30MWp rooftop solar portfolio
  - TDD for a portfolio of 5 rooftop projects
  - 35MWp Solar PV ground mounted utility scale project
  - 247MWp 5x Solar PV Groundmount and Floating Projects in Binh Thuan, Quang Tri, and Binh Dinh
  - 279MWp Solar PV Project in Ninh Thuan

- Philippines:**
- 75MWP Solar Plant project in Pangasinan
  - 200MW Wind farm project
  - Technical Due Diligence for Expansion (Unit 4)

- Taiwan:**
- 55MW solar PV portfolio

- Singapore:**
- Large Waste to Energy project



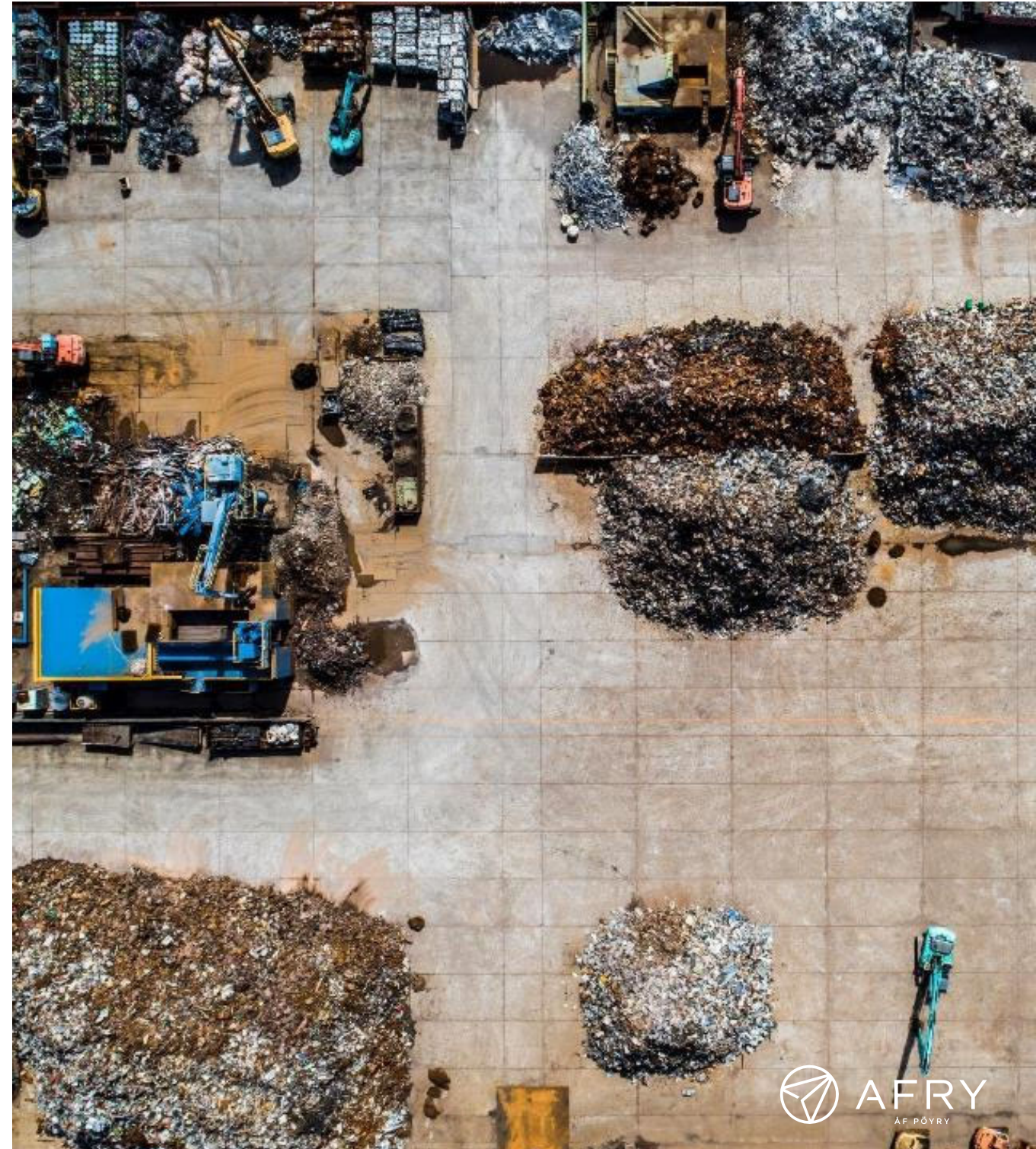
# Environmental and Social Services

## Global competence

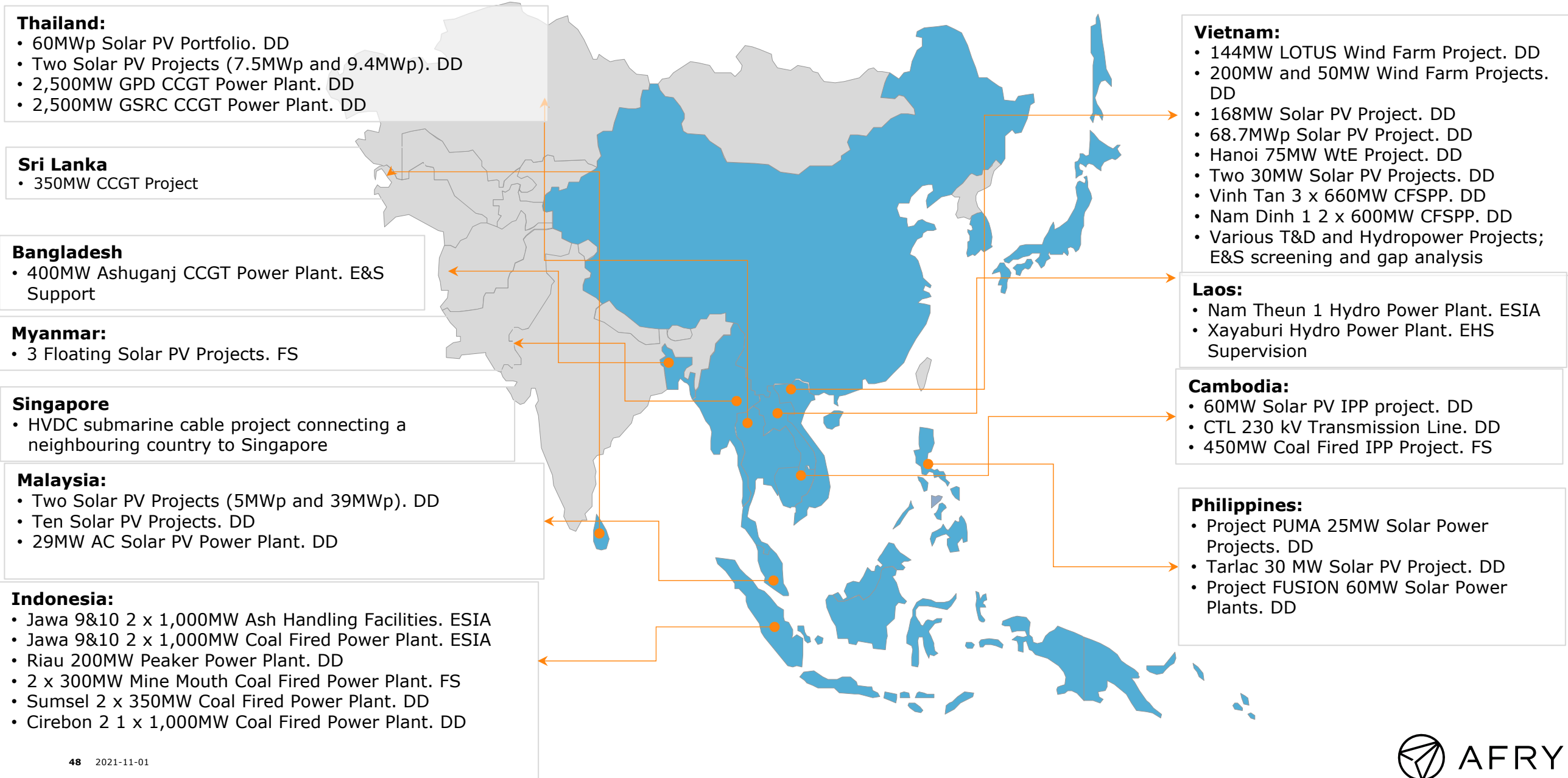
- Complete environmental, social and sustainability service portfolio
- Team of over 350 environmental experts
- Over 180 environmental due diligences globally in the last 10 years alone

## Asia

- Strong expertise in environmental and social consulting for thermal power, hydropower, waste-to-energy and renewable energy
- Good experience in ESIA's, environmental due diligences and acting as lenders Environmental and Social Advisor in power plant projects



# Recent Power Plant Environmental and Social Projects in Asia





# Management Consulting

## Energy sector management consulting and market advisory

### Global competence

- The leading electricity sector market consultant in Europe, with over 300 energy market experts
- 70% of Europe's major energy players rely on our projections

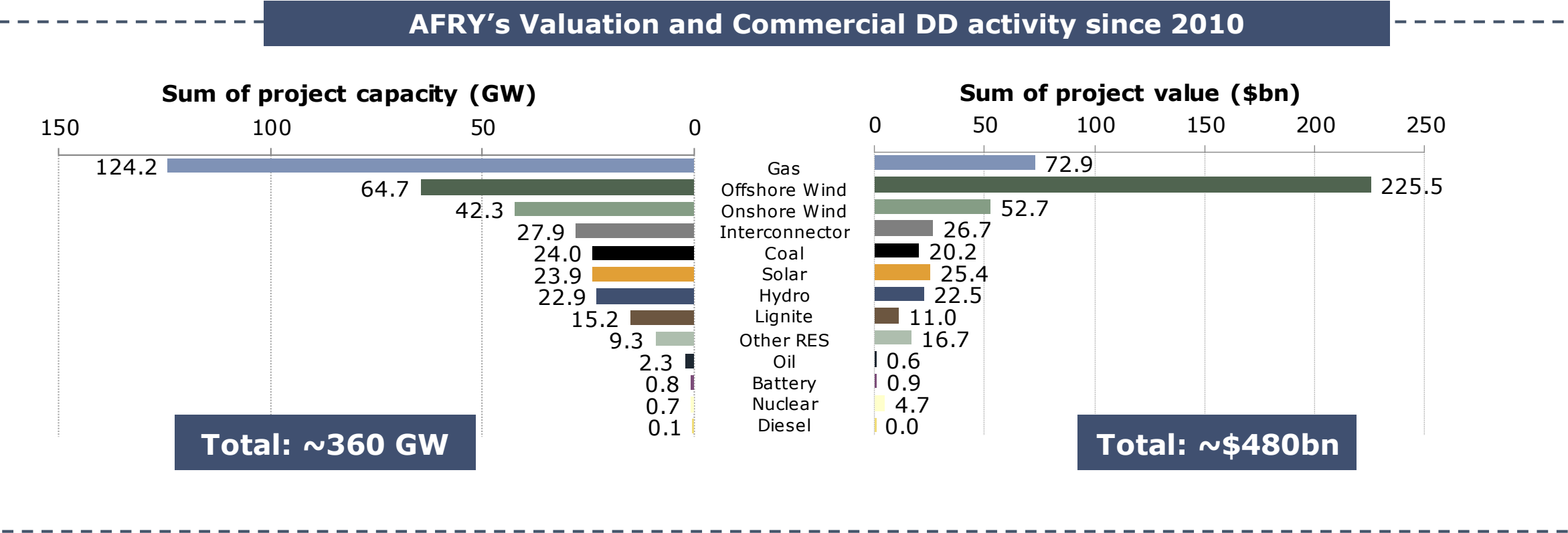
### Asia

- Energy consulting and market advisory services team in the region since 2011
- Existing electricity market models for 13 countries in the region
- Market and commercial due diligence supporting transactions
- LNG market advisory services
- 200+ market advisory projects completed in Asia



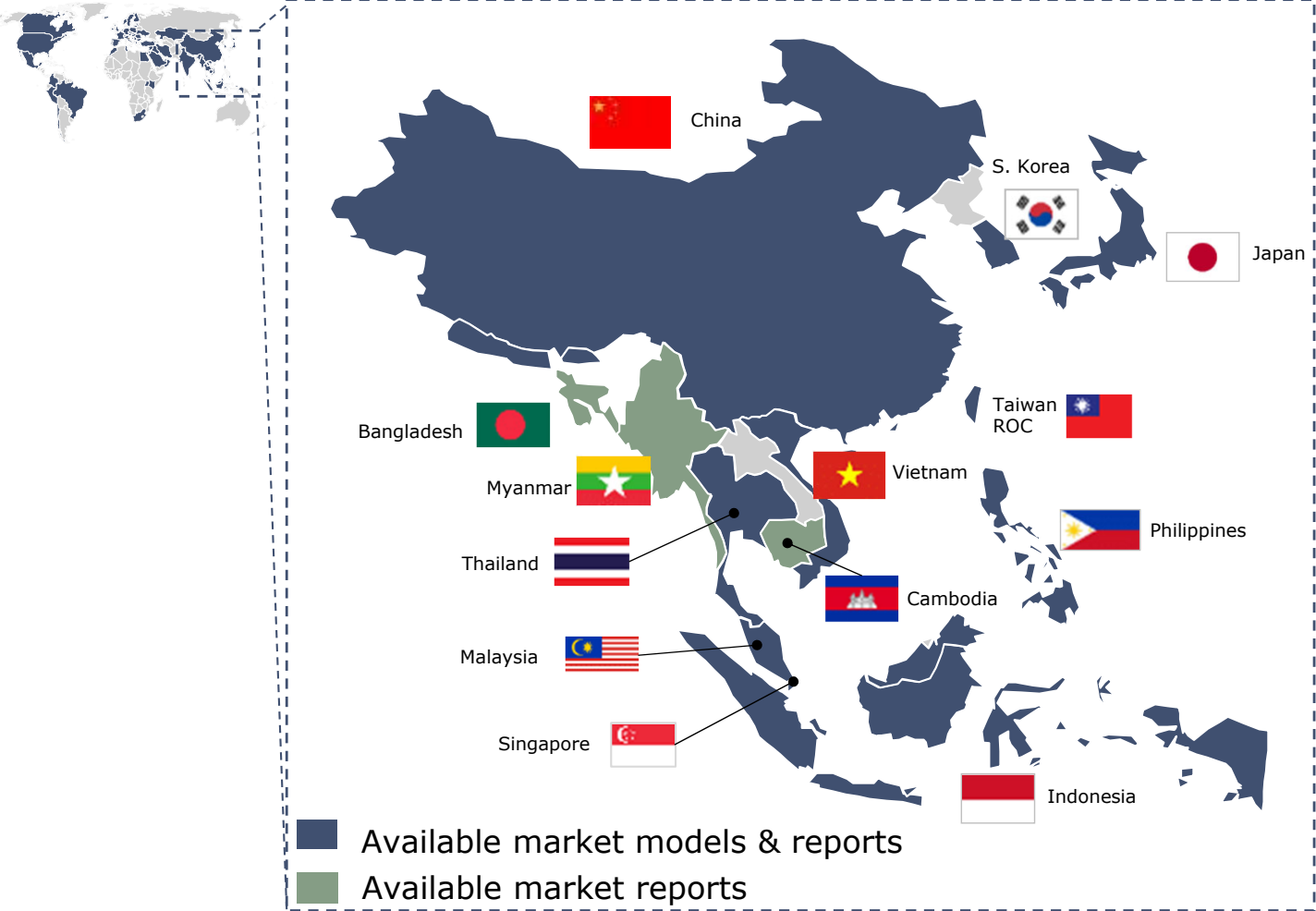
# Leading Transaction Advisor

Working as lenders market advisor or directly on buy-& sell-side transactions AFRY has valued ~360GW\* capacity worth over \$480bn since 2010



\*Projects shown only include transactions where AFRY have provided generation asset specific revenue analysis or in-depth DD. Many more of our clients use our reports and price projections for their own modelling, valuations and screening (not include in above totals). AFRY also provide extensive electricity, gas and district heating/cooling network asset valuations – again these are not shown in the above chart.

# Market-Related Energy Transition Advisory Services in Asia



**200+**

AFRY has successfully completed over 200 **market-related projects in Asia**

**>2 billion**

AFRY has market models for 19 countries and provinces in Asia, representing **over 2 billion people**

**13**

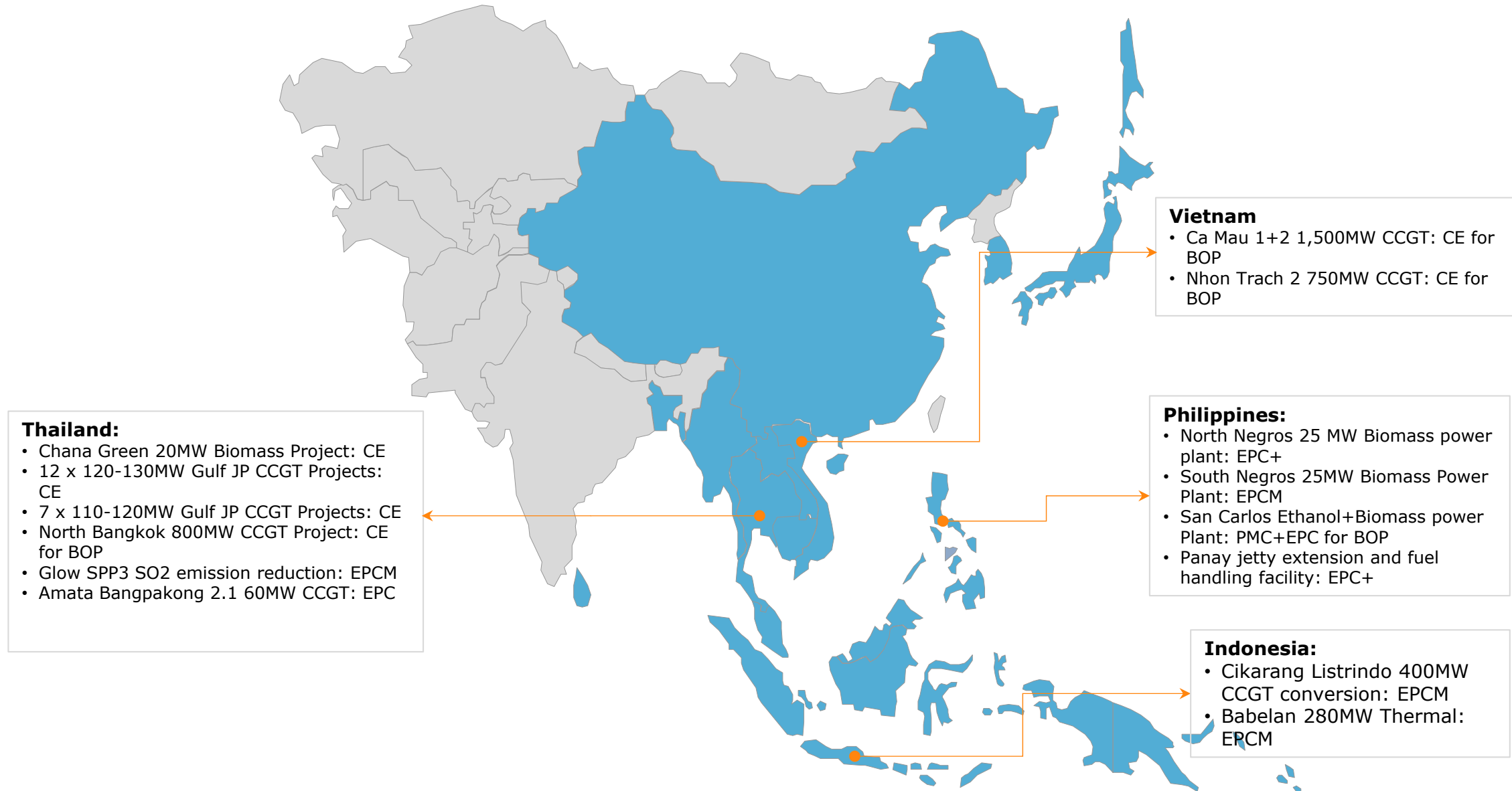
**Coverage** of 13 locations in Asia

# EPC/EPCM/Contractor's Engineer Services

- Complete basic and detail engineering and procurement support for thermal power, hydro power and renewable energy projects
- Construction management at the site
- More than 20 contractors engineer projects executed out of our Asian offices in the last 10 years alone
- About 20 EPC or EPCM projects executed in Asia



# Recent EPC/EPCM/Contractor's Engineer Projects in Asia



# Selected Countries



# AFRY's SEA Region HQ in Thailand

- 200 staff consisting a mix of international and local experts
- Regional headquarters for most of AFRY's Asia operations
- Leading consulting engineering company in power sector in Thailand
- About 65 major power plant projects and over 250 power sector-related assignments executed in Thailand
- Engineering Centre for AFRY's worldwide operations offering complete conceptual, basic and detail engineering services for contractors, suppliers and project owners for their worldwide projects



AFRY Bangkok office in Vanit II Bldg, New Petchburi Rd.

# AFRY in the Philippines

- Leading consultant of Banks, Investors and Developers
- Over 20 assignments yearly involving feasibility studies, due diligence and lenders technical advisor
- Over 70 staff composed of expatriates and local experts
- Provides services to the major power plant developers with over 80% as repeat clients
- Experts in solar, wind, biomass, hydro power and gas technologies
- EPC Contractor for select power developments



AFRY Manila office in King's Court, Makati



# AFRY in Vietnam

- AFRY has been active in the Vietnam power market almost 50 years. Hanoi office established in 1997.
- AFRY has currently about 40 staff in Vietnam
- More than 7,000 MW of on-going power projects in Vietnam, including e.g., LNG, gas, onshore and offshore wind, solar and waste-to-energy, as well as T&D.
- Involved in over 2,200 MW of solar and 2,000 MW of wind power projects in Vietnam
- Owner's engineer (OE) experience during construction of over 10,000 MW of thermal, hydro and renewable power capacity in Vietnam (total of 15 OE construction projects).OE for one of the largest single location 257MW Solar project.
- LTA experience for 5,000 MW of energy projects in Vietnam
- Involved in three of the first waste-to-energy projects in Vietnam
- Altogether over 150 power sector assignments executed in the country



AFRY Hanoi office in BIDV Tower

# AFRY in Indonesia

- Present in Indonesia for the past 25 years
- Wholly owned local AFRY company and business license since 1996. AFRY has an office in Jakarta.
- AFRY has currently about 40 staff in Indonesia
- More than 90 power sector projects, inclusive of studies, executed in the country so far
- Owner's Engineer in 12 power plant implementation projects with total capacity of more than 3,000 MW
- Experience in gas, LNG, hydro, biomass, geothermal, wind, solar, transmission and distribution sectors in Indonesia
- In the last two years, involved in a total of 20 wind/solar/battery/hybrid power projects in the country, as well as 5 waste-to-energy project developments.



# AFRY in Malaysia

- AFRY has been active in Malaysia since 1969
- Current office in Kuala Lumpur was established in 2001
- About 100 power sector assignments, ranging from small studies to very large owner's engineer assignments executed in Malaysia so far
- Owner's Engineer for the SPG Track 4A 1,440 MW CCGT plant in Johor, selected by POWER magazine as "Plant of the Year"
- Owner's Engineer for two Large Scale Solar plants
- Framework Agreement with Energy Commission as Technical Advisor
- Experience in hydro, gas, solar, wind, waste-to-energy and transmission and distribution sectors in Malaysia

AFRY KL office in Menara Hap Seng 2 Bldg



# AFRY in Singapore

- AFRY established a local company in Singapore in 1992 and has been active in the Singapore market for already 30 years
- For clients in Singapore, AFRY offers a wide variety of energy sector services in the whole Asia Pacific region from its large office network in the region. This includes e.g. energy sector market, technical and environmental advisory services as well as engineering services for different kind of power and energy projects.
- AFRY has also been active in local energy projects in Singapore with 15 power sector assignments in the last 10 years alone. These projects include renewable energy, green hydrogen, waste-to-energy, LNG/gas-fired combined cycle, and submarine cable projects, as well as energy sector management and market consulting services for the Singapore power, hydrogen, ammonia markets.



# AFRY in India

- AFRY has had presence in the Indian power market since 1985
- One of the leading international hydropower consulting engineering companies in India and a growing presence in solar and wind sector in the country
- AFRY has two offices in India:
  - Noida office, with main focus on hydropower and a total of 90 staff
  - Pune office, with some 40 staff, of which 20 are in solar, wind, battery storage and thermal power sector
- Power sector clients include NHPC, NTPC, NEEPCO, HPPCL, SJVNL, THDC, Reliance, Greenco and many other Indian IPP developers, as well as several international banks.
- Sample projects:
  - Technical Due Diligence for the evaluation of 1.5 GW Portfolio of Utility-scale and C&I Solar PV Projects across India.
  - Detailed design for 1200MW Pinnapuram Integrated Renewable Energy Pumped Storage Project



# AFRY in Myanmar

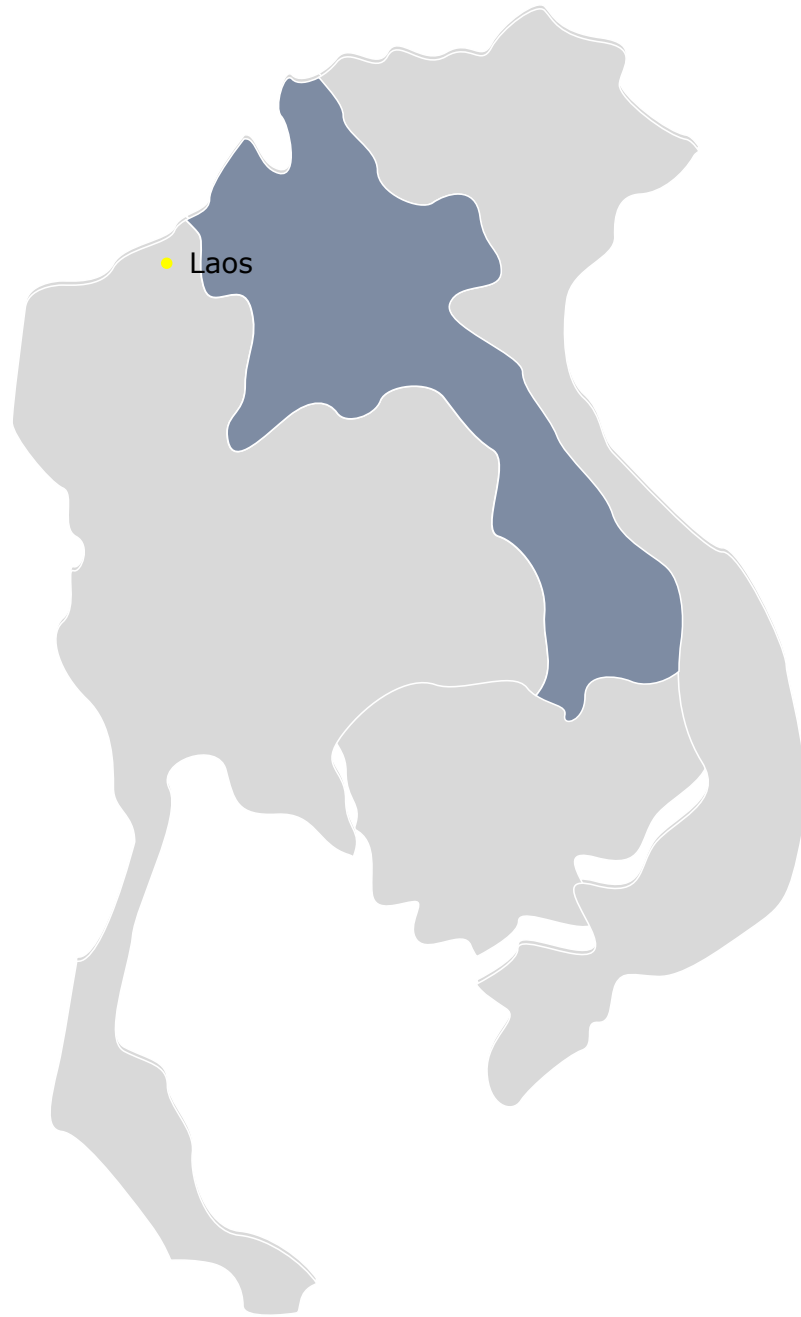
- AFRY has been supporting Myanmar power sector development for almost 40 years.
- In the last 10 years alone, we have been involved in over 30 power sector assignments in the country, including LNG-to-Power, CCGT, gas engines, hydro, waste-to-energy, solar, wind, and transmission & distribution sectors.
- AFRY has been involved in eleven (11) gas fired combined cycle power plant project developments in Myanmar. The latest of these is the Thilawa 1,250 MW integrated LNG-to-Power project, where AFRY is the technical advisor during the development phase for the Japanese consortium, led by Marubeni.
- AFRY has an existing branch in Myanmar and some 10 power sector staff in the country.



# AFRY in Cambodia

- AFRY is the leading power sector consultant for Cambodian power generation projects and has been involved in 20 power generation projects in Cambodia in the last 10 years alone, covering thermal, hydropower, solar, diesel and transmission projects.
- AFRY's experience in Cambodian power sector includes owner's engineer, lenders technical advisor, independent engineer and a large number of pre-feasibility and feasibility study type assignments.
- AFRY group has an existing branch in Cambodia.





## Recent Projects in Laos

- 600MW Monsoon onshore wind farm project: Lenders Technical Advisor
- Nam Theun I HPP : Feasibility study, Social and Environmental Impact Assessment Study (ESIA)
- Xayaburi 1,285 MW Hydroelectric Project : Independent Engineer Services for Gov of Lao
- Xeset 1 Hydropower Project : Consulting services for rehabilitation of the electromechanical equipment of the power plant, including assessment, tender design and documents.
- Nam Ngum 3 Hydropower Project : Due Diligence and technical support for financial analysis
- Detailed assessments of renewables markets in each country in SE Asia
- Feasibility study services for AIDC 700 MW coal-fired power plant in Sekong
- Nam Kong 3 Hydropower Project : Basic Design, Tender Design and Tender Documents, Detailed Design, Owner's engineer and Site Supervision



# Recent Projects in Singapore



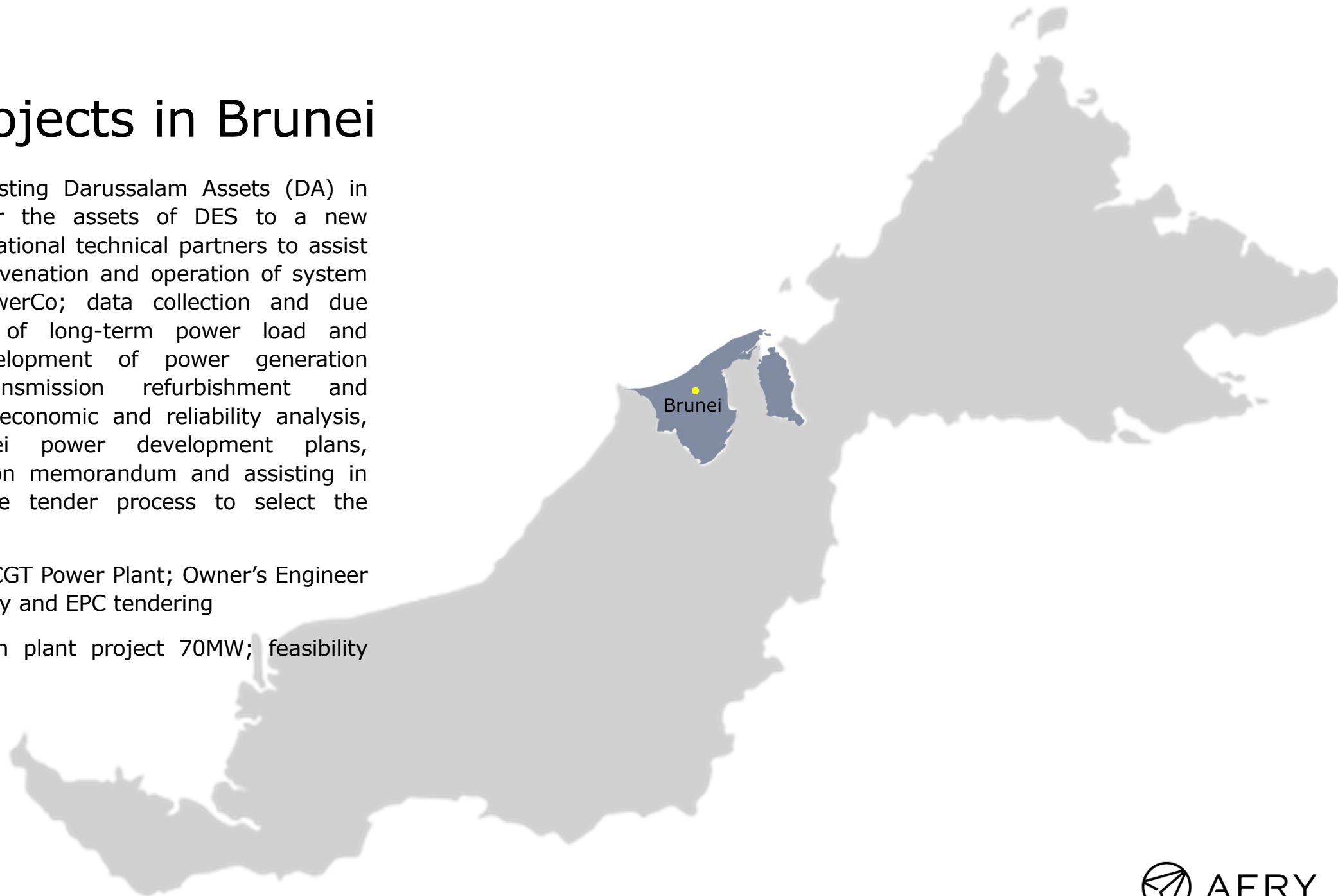
- Technical and environmental advisory service in connection with a ~4GW solar PV and battery storage project planning to import renewable energy to Singapore, including construction of a submarine cable interconnection to Singapore
- Green hydrogen production and export pre-feasibility and feasibility study to produce green hydrogen by a large solar PV plant in a neighbouring country and export it to Singapore; green hydrogen market study in Singapore and the region
- Green ammonia project conceptual design and cost estimates covering the whole value chain from green ammonia production abroad, shipping and utilizing in 50MW power generator in Singapore
- HVDC submarine cable interconnection study to connect Singapore with a neighbouring country for renewable energy imports – this would be currently the longest HVDC interconnector in the world
- Lenders Technical Advisor for 10MW waste-to-energy project
- Market analysis, policy recommendations, strategy assessment, price projections, bespoke market modelling of the Singapore electricity market
- Technical Due Diligence Services for a large Waste to Energy Plant in Singapore
- Technical Due Diligence Services for a large gas-fired CCGT project in Singapore

# Recent Projects in Brunei

— Technical Advisor assisting Darussalam Assets (DA) in their project to transfer the assets of DES to a new PowerCo, and find international technical partners to assist in the consolidation, rejuvenation and operation of system assets in the new PowerCo; data collection and due diligence, development of long-term power load and demand forecast, development of power generation expansion plans, transmission refurbishment and development plan, grid economic and reliability analysis, presentation of Brunei power development plans, preparation of information memorandum and assisting in the management of the tender process to select the technical partner.

—Pulau Muara 400MW CCGT Power Plant; Owner's Engineer services for Feasibility study and EPC tendering

—Gas-fired Co-generation plant project 70MW; feasibility study services



# Recent Projects in Bangladesh

- 718 MW Meghnaghat Independent Power Project : Owner's engineer services during development and construction phase
- 100MW Madarganj Solar PV project; EPC tendering and Owner's Engineer services during construction
- 220 MW Independent Power Plant in Bangladesh : Technical Due Diligence Services
- 1200-1400 MW Independent Gas-fired CCGT Power Plant on a Build, Own and Operate basis; Developer's Engineer services
- Bangladesh Market Advisory Services : Market Advisory Services
- Bangladesh Gas and Power Market Study
- Site Selection & Concept Study for LNG Based 2,400MW Power Project, Bangladesh
- FEED for LNG FSRU Terminal, Kutubdia Energy Hub Project, Bangladesh
- Ashuganj East 400 MW Combined Cycle Power Plant Project : Owner's engineer services during construction



# Recent Projects in India



- Independent Yield Assessment for 420 MW That Project
- Pinnapuram project in Andhra Pradesh under the Integrated Renewable Energy Storage Project (IRESP) - 1200 MW pumped hydro storage plant combined with 400MW wind
- Renewable Asset (about 1.5 GW)  
: Technical Due Diligence
- ACTIS TDD for 200MW in India
- Energy Yield assessment for 3 PV Plants
  - Badla (70 MWac)
  - Katol (40 MWac)
  - Allahabad (50 MWac)
- Technical due diligence for biomass to power assets
- Commercial strategy for corporate PPAs
- 4 PV Plants for an aggregate of about 285 MWp DC in the following states:
  - Rajasthan
  - Maharastra
  - UP
  - Karnataka
- Market assessment and electricity price modeling

# Recent Projects in Sri Lanka

- 350 MW combined cycle power plant located at Kerawalapitiya : Lender's Technical Advisory (LTA)
- Kerawalapitiya 300MW Combined Cycle Power Plant IPP Project : Technical Advisory services
- Puttalam Coal Power Project, Phase II : Owner's Engineering Services
- Uma Oya 120MW Multipurpose Hydropower Development Project: Pre-feasibility review, feasibility study, detail design, construction drawings and construction supervision



# Recent Projects in Pakistan

- Due Diligences of hydropower assets
- Diamer Basha Dam\_Construction Design, Construction Supervision and Contract Administration
- Tarbela 5th Extension Project : Project Management, Design Review, Construction Supervision
- Feasibility study service for Lower Spat Gah
- Management consulting for SK Kaigah HPP
- Energy Analysis and efficiency : Modelling of different operation modes for a power plant
- Chak Jhumra Biomass Power Plant - Feasibility Study
- Four new coal fired power plants near load centers in Punjab



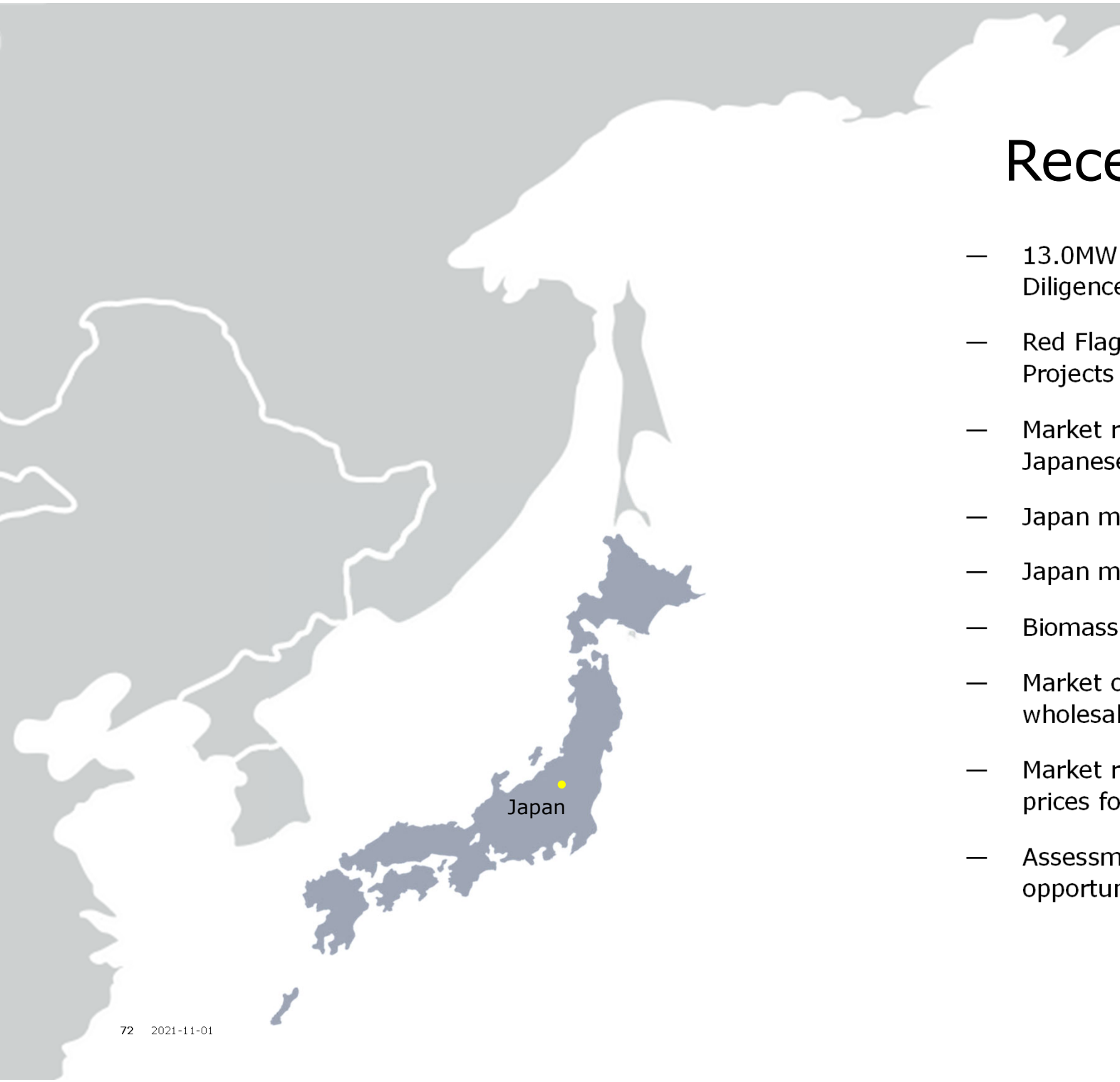


## Recent Projects in Taiwan

- Hai Long 2&3 offshore wind project (by BLIX)
- Technical Advisory services for ca. 1000MW CCGT project
- Taiwan Offshore wind 1.1GW Project : Feasibility study / Basic design electrical infrastructure Offshore/On Shore
- 53.8MWp Solar PV portfolio in Taiwan : Technical Due Diligence Service for rooftop and groundmounted solar PV assets
- Technical Advisor for gas turbine replacement in a large CCGT plant
- Changhua Offshore Windfarm 109 MW : Grid code compliance modelling
- Technical Advisory services for 500MW Combined Cycle Power Plant in Taiwan; EPC tendering
- Taiwan market report and price forecasting
- Taiwan market report and dispatch forecast for CCGT project
- Taiwan power market review, wholesale price forecasting, and dispatch modelling
- Taiwan power market assessment and wholesale price forecasting

# Recent Projects in Japan

- 13.0MWp 2x Solar PV Projects in Japan: Technical Due Diligence Services
- Red Flag Due Diligence For A Portfolio Of Solar and biomass Projects [ 35 sites located in Thailand and Japan ]
- Market report and bespoke modelling : Analysis of the Japanese electricity market
- Japan market report, power price projections, and solar GWAs
- Japan market report and price projections
- Biomass specification review and generic conversion study
- Market overview and high-level projections of LCOE and wholesale price
- Market reports, wholesale price forecasting, and captured prices for wind & solar
- Assessment of gas and power markets, and gas-to-power opportunities in selected countries





# Recent Projects in South Korea

- B.Grimm\_36 MW Gasan Wind Farm  
: Owner's Engineering service
- Offshore wind farm floating LIDAR project
- South Korea Market Model
- Korea Market Report and Price Projections
- Project Kingpin (Paju) technical due diligence: 2 units of 911MW CCGT power plant and associated facilities; Gas Turbine: Siemens SGT6-8000H+ (H-class)
- Pocheon Combined Heat & Power Plant Project  
: Technical consultancy
- Technical due diligence for 1,074 MW LNG fired combined cycle power plant



South  
Korea

# Recent Projects in Papua New Guinea

- Pre-FEED for about 200MW LNG-fired CCGT
- Micro FSRP Power Island Barge Concept : Technical advisory services for Floating LNG Storage and Power Barge (FSRP)
- Design and technical specifications for a 13 MWAC Solar PV plant for the EPC supply tendering.
- PNGB 1x30MW Biomass Plant : Front End Engineering Design (FEED)
- 15MW Biomass to Energy Plant Development in Papua New Guinea : Front End Engineering Design (FEED)



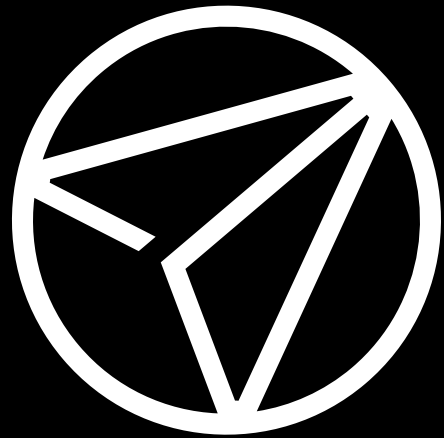
# Recent Projects in Australia

- Newton Project (Wind / BESS / GT assets) : Technical due diligence services
- FEED design for 1500-2000MW pump storage hydro
- Owner's engineer project management services for a solar power plant in Queensland
- Aggregated demand side management and the role of battery storage in the Australian NEM : Management consulting services
- Market reports, power price projections, and GWA price projections for solar PV : Power market assessment services
- Hydrogen demand, supply assessment : Market Analysis services
- Sourcing, policies and potential demand for ammonia in power and shipping : Market Analysis services
- Shoalhaven 235MW Pump Storage Hydro Project : Technical Advisory services
- Reference design for 325MW pump storage hydro
- Snowy Pump Storage Hydro Project : Concept study, Tender design as Contractor's Engineer for CJV (EPC)
- 2 solar PV plants for an aggregate of about 135 MW : Technical Advisory services



A close-up photograph of a globe, partially obscured by vibrant green grass. The globe is the central focus, showing the outlines of continents and oceans. The grass blades are in sharp focus in the foreground and background, creating a sense of depth and natural setting. The overall color palette is dominated by greens and blues, with a soft, natural light. The text 'Making Future' is centered over the globe in a clean, white, sans-serif font.

# Making Future



AFRY

ÅF PÖYRY