



# RENEWABLE ELECTRICITY

FOR A SUSTAINABLE FUTURE

SET AWARDS 2022  
SUSTAINABILITY EXCELLENCE

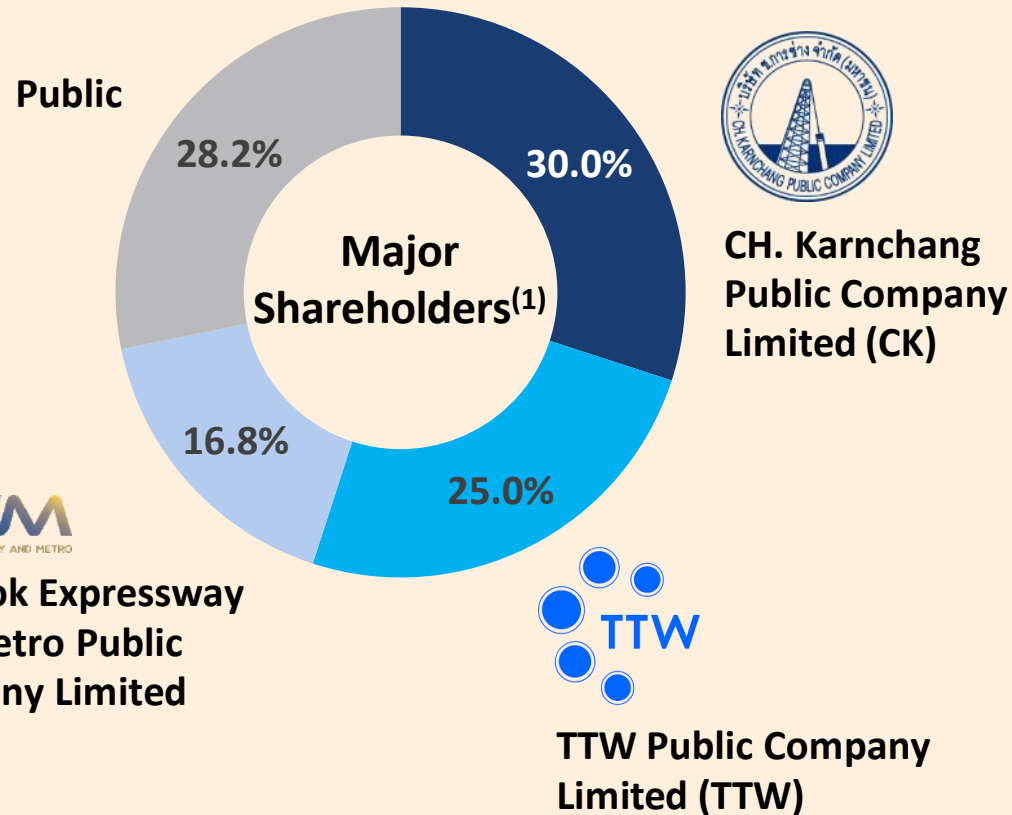


# 1. Corporate Overview





## The Power Investment Arm of CH. Karnchang Group



**Bangkok Expressway and Metro Public Company Limited (BEM)**



**TTW Public Company Limited (TTW)**



**CH. Karnchang Public Company Limited (CK)**

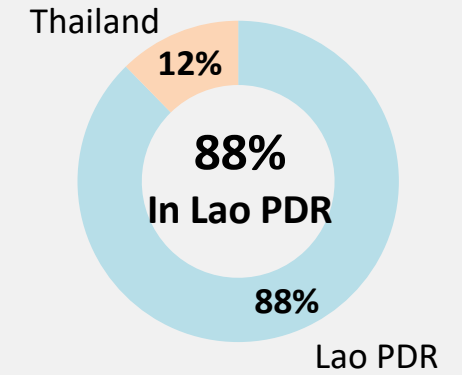
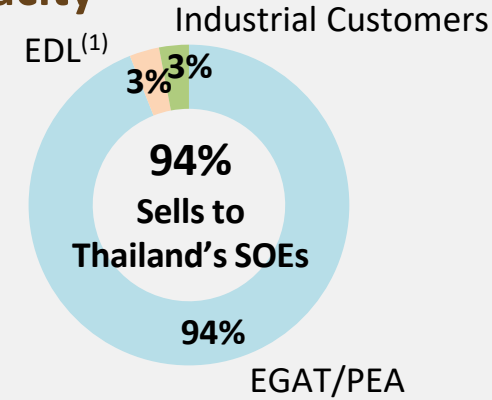
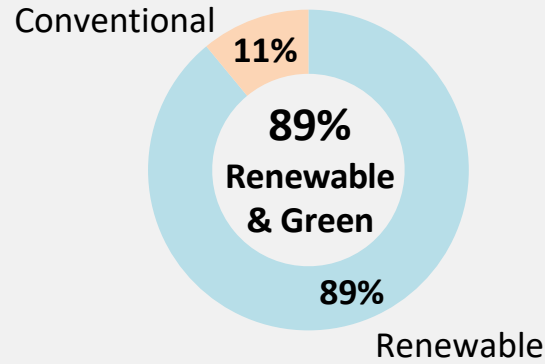
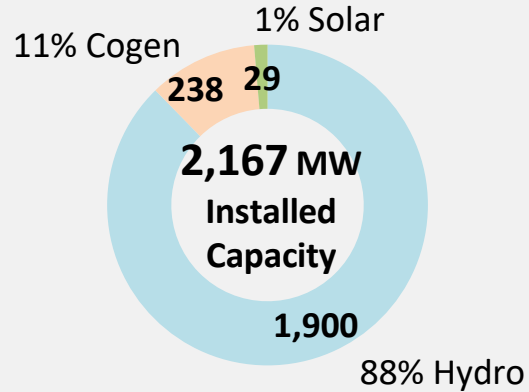


## General Information

<b>Symbol</b>	:	CKP
<b>Established Date</b>	:	8 June 2011
<b>Listed Date</b>	:	18 July 2013
<b>Paid-up Shares</b>	:	8,129,382,729 shares
<b>Par</b>	:	Bt 1.00 per share
<b>Registered Capital</b>	:	Bt 8,129 mn
<b>Market Cap</b>	:	Bt 42,679 mn <sup>(2)</sup>
<b>Indices</b>	:	SET 100 SET THSI SET CLMV
<b>Sector</b>	:	Energy
<b>TRIS Rating</b>	:	A / Stable
<b>CG Score</b>	:	

(1) As of 30 June 2022, (2) As of 15 August 2022

## Installed Capacity



## Project Highlights



### Nam Ngum 2



**COD<sup>(2)</sup>:** 2013  
**Ownership:** 46.0%  
**Capacity MW:** 615  
**Equity MW:** 283



### Xayaburi



**COD:** 2019  
**Ownership:** 42.5%  
**Capacity MW:** 1,285  
**Equity MW:** 546



### Bangpa-in Cogeneration



**COD:** 2013, 2017  
**Ownership:** 65.0%  
**Capacity MW:** 238  
**Equity MW:** 155



### Solar Projects



**COD:** 2012-2020  
**Ownerships:** 30%-100%  
**Capacity MW:** 29  
**Equity MW:** 19

(1) Electricite du Laos; (2) Commercial Operation Date

# CKP Long-term Corporate Strategy

TO BE ONE OF THE REGION'S **LARGEST PRODUCERS**  
OF ELECTRICITY FROM **RENEWABLES** WITH ONE OF THE **LOWEST CARBON FOOTPRINTS**



TO GENERATE AN OPTIMAL STABLE  
AND FAIR RETURN FOR SHAREHOLDERS



TO BE RESPONSIBLE TO THE ENVIRONMENT  
COMMUNITY AND ALL STAKEHOLDERS

## GROWTH

DOUBLE CAPACITY IN 3 YEARS

 **4,800 MW**  
Total by 2024

**95%**  
Renewable



Hydro



Wind



Solar



**ASEAN**  
Focused

## PROFITABILITY

OPERATIONAL EXCELLENCE



**Zero Downtime**  
Operation



**Regional Hydro**  
Forecasting & Shared  
Service Center



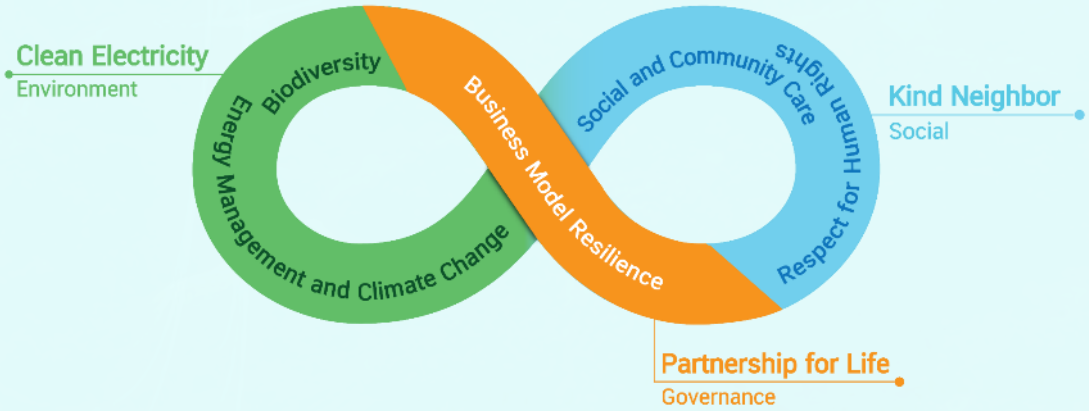
**One CKP**  
One Safety



**Green**  
Financing

## SUSTAINABILITY

STRENGTHEN BUSINESS SUSTAINABILITY, CLIMATE CHANGE  
STRATEGY, CG AND RISK MANAGEMENT

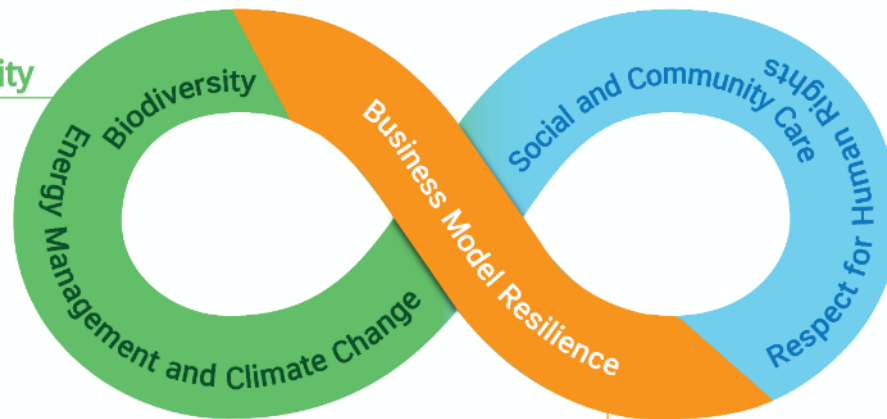




**Clean Electricity**  
Environment

**Kind Neighbor**  
Social

**Partnership for Life**  
Governance



## Clean Electricity

### Energy management and Climate Change

- 100% Renewable Electricity Consumption within Organization Including REC <sup>(1)</sup> by 2043
- > 95% Renewable Energy Capacity by 2043
- Net Zero GHG Emission by 2050

### Biodiversity

- Develop Biodiversity Roadmap by 2023
- Assessment of Residual Impact at all operation sites by 2025
- Strive toward No Net Loss (NNL) of Biodiversity and Ecosystem Services by 2040



## Kind Neighbor

### Respect for Human Rights

- Develop the Human Rights Roadmap for our business by 2022
- Raising Awareness for Human Rights cover 100% for Employee by 2022
- 100% Assessed Human Right Risk and Impact Assessment throughout our Value Chain
- Zero Cases of Human Rights Violation

### Social and Community Care

- Zero unresolved Complaints
- Develop CSR Strategy/Corporate Citizenship Strategy by 2022
- Creating Value for Society and Ecosystem with Renewable Electricity by 2026



## Partnership For Life

### Business Model Resilience

- Explore New Customers & Geographies within ASEAN
- Integrate Digital Transformation & other Innovations



(1) REC: Renewable Energy Certificate ใบรับรองเครดิตการผลิตพลังงานหมุนเวียน

## 2. Business Challenges & Resilience

การบริหารจัดการธุรกิจท่ามกลางแรงกดดันทางเศรษฐกิจ



# Business Challenges in Power Business

Two Main Business Challenges for CKPower are (1) Global Trends in Power Business and (2) Technology Disruption.



Global Trends in  
Power Business



Technology  
Disruption



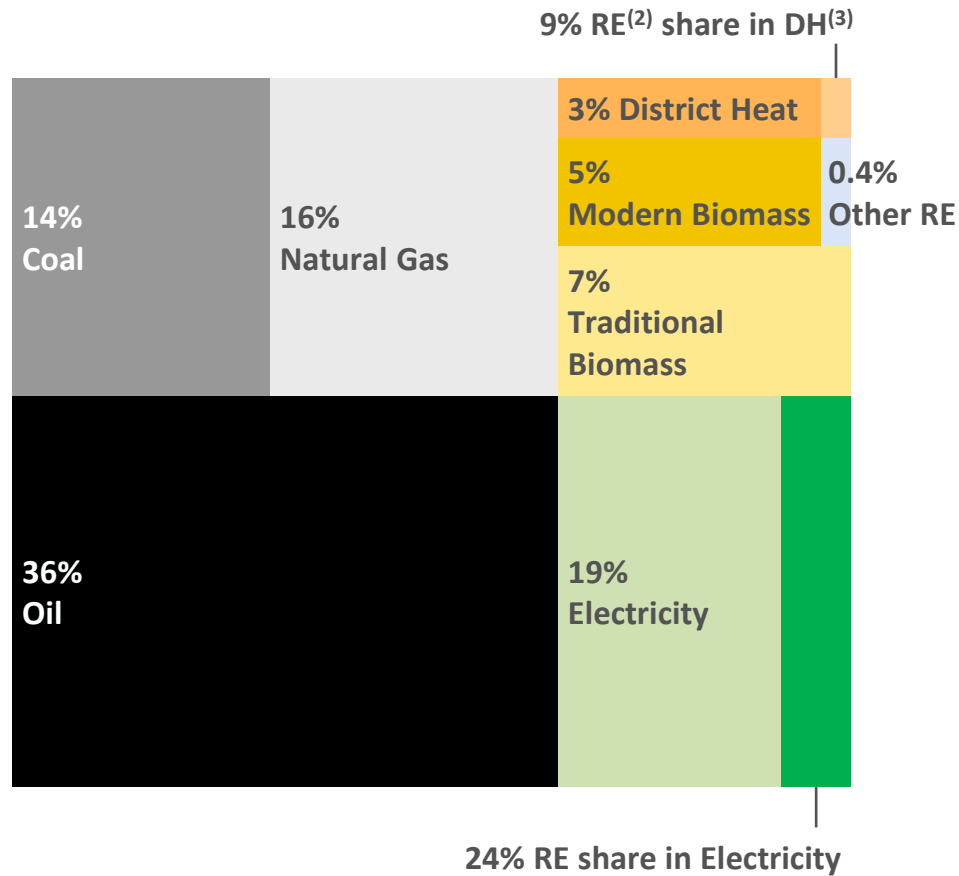


## Global Trends in Power Business

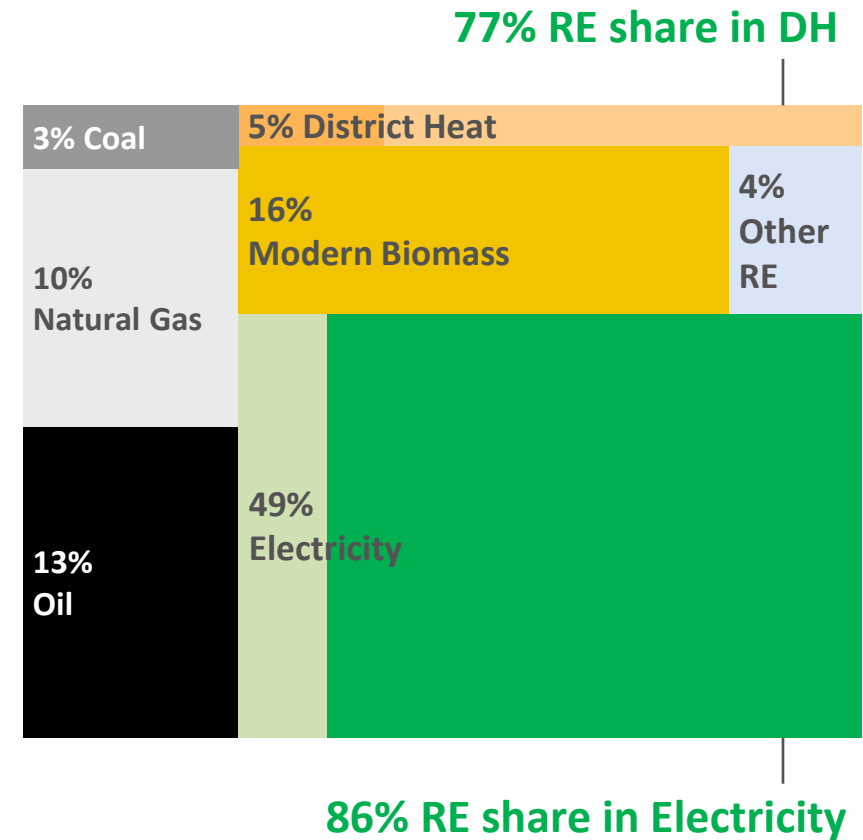
- Fossil fuel shortage & depletion driving price & inflation
- GHG Emissions from fossil fuel power plants cause more climate changes
- Accelerate action towards Net Zero GHG Emissions (COP26)

# Business Challenge #1: Global Energy Use Trend

**Today:**  
**395 EJ<sup>(1)</sup> Total Final Energy Use**



**2050:**  
**351 EJ Total Final Energy Use**

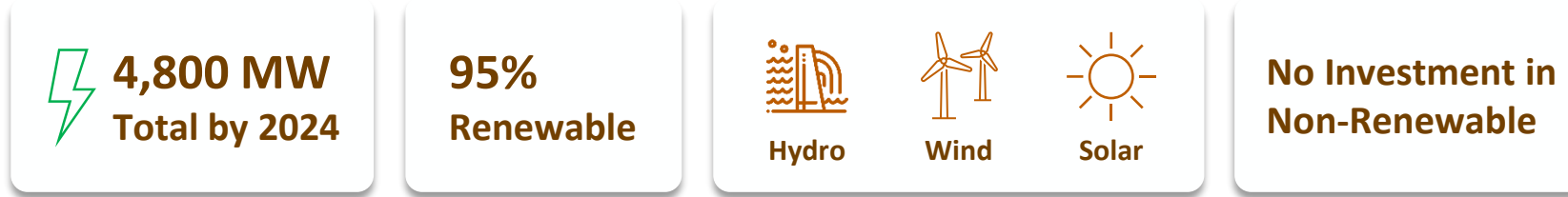


Source: [www.irena.org](http://www.irena.org)

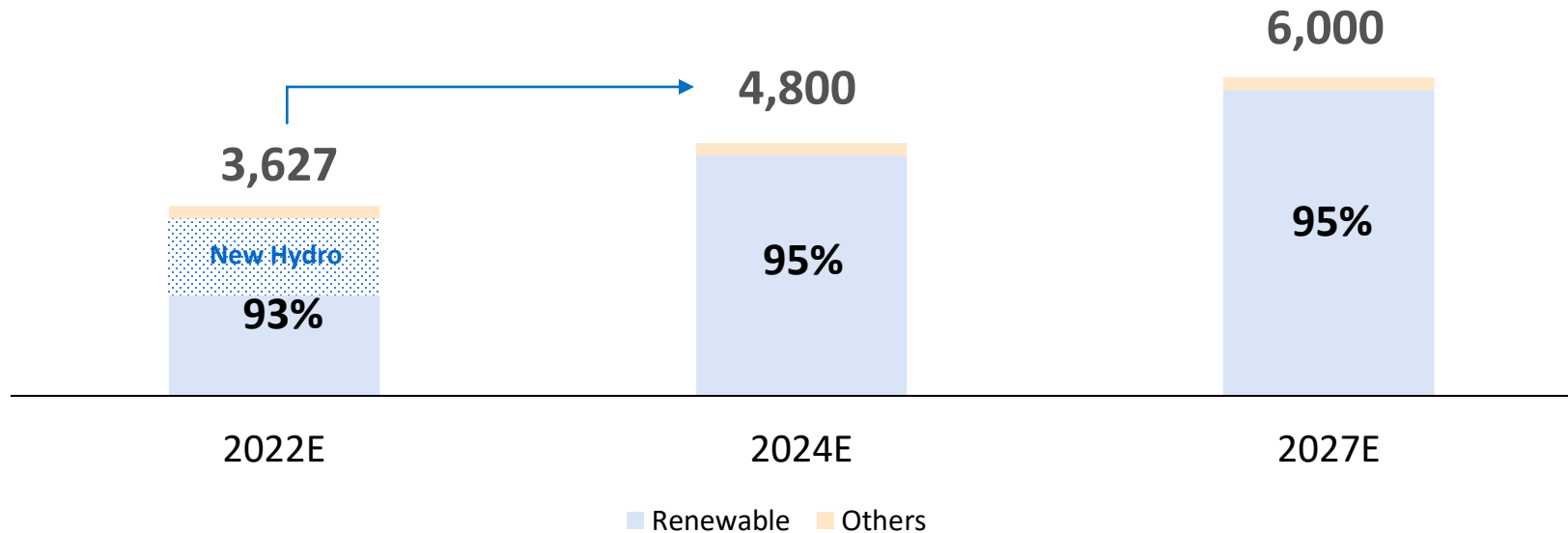
Note: (1) Exajoule; (2) Renewable Energy; (3) District Heat

# Business Challenge #1: Growth Strategy

Our Corporate Strategy is to invest only in renewable power plants with no plan for additional investment in cogeneration or fossil fuel related power plants to mitigate and minimize our reliance on depleting fuel sources.



## MEGAWATT INSTALLED CAPACITY







## Technology Disruption

- Technological disruption causing changes in demand patterns
- Innovation driving down investment cost and intensifying competition
- Rising demand of electricity from sustainable and environmentally responsible sources

# Business Challenge #2: Key Technological Trends in Power Industry

The following key technological developments are driving the changes and disruptions to the power generation industry.



## Green & Renewable Energy Focus

- Environmental concerns
- Demand for social responsibility
- Limited suppliers of fossil fuels



## Electric Vehicle & Digital Devices

- Electricity demand and usage behavior driven by:
- Shift in automotive industry towards electric vehicle
  - Proliferation of digital devices, cloud computing, etc.



## Battery Storage

- Volatile renewable power sources such as solar & wind driving development of battery storage as buffer / load management



## Off-grid Power Generation

- In-house power production i.e. solar rooftop bypassing national grids
- Bilateral tariff negotiation, independent from national price



## Smart Grid & 3<sup>rd</sup> Party Access

- AEC / EEC driving development of more advanced grid & transmission system
- Cross-border electricity sales with Thailand as center
- Extra High Voltage transmission & HVDC

**Hydro Power is an Absolute Solution for Technology Disruption**

# Business Challenge #2: Construction & Management Strategy for Our Investments

All our power plants are designed, constructed and managed with world-class highly-experienced contractors and operators and are based on long-term historical and statistical analysis of renewable resource to ensure long term adequacy of such natural resource availability, and consequently, long-term investment returns.



## World Class Design & Equipment

- World Class Engineering Design, Construction, Equipment, & Technology
- Proven Long-term Historical Hydrology and Geology Data
- Synergy through Vertical Integration with EPC<sup>(1)</sup> Contractor
  - Quality & Cost Competitiveness



## Zero Downtime Operation

- Predictive Maintenance
- BCM - Business Continuity Management
- International Standard of Health and Safety



## Regional Hydro Forecasting Center

- Centralized Hydrology Center
- Integration between NN2, XPCL and Future Projects
- Coordination across Cascade (including Side Flow Projects)



## Operational & Financial Risk Management

- Long-term Secured PPA with Shortfall/Makeup Mechanism
- Cash Flow Management with Financial Covenant, Cash Reserve, and Credit Line Commitment



## Environment & Social

- Utilize World-class Proven Technology
  - XPCL: World's First & Largest Fish Passing Facility, Integrated Fish Lock and Fish Ladder
  - LPCL: Fish passing innovation using gravity in place of pump station in operation

### In-house Engineering Expertise

*Design, Engineering, Operation & Maintenance Capabilities within CKP*

### Exploration Team

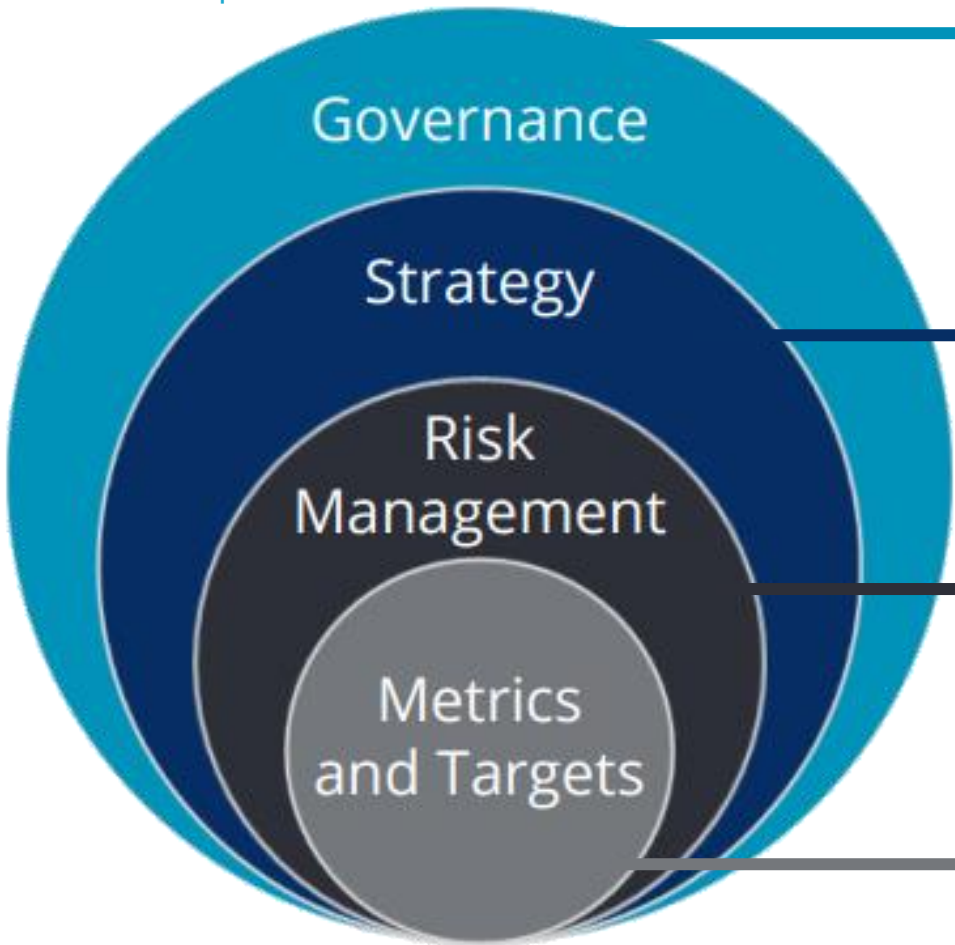
*Dedicated Engineering Team to Explore and Integrate New Technologies into CKP's Operations*



## 3. Climate Change

การบริหารจัดการธุรกิจท่ามกลางแรงกดดันทาง  
การเปลี่ยนแปลงสภาพภูมิอากาศ





- Governance / KPI / Incentives
- Oversight on strategic business plan, budget, monitoring, and implementation

- Renewable energy growth plan
- No additional fossil fuel powerplant
- Carbon pricing
- Increase internal use of renewable energy
- Accelerate fuel switching
- Afforestation

- Risks and opportunities assessment
- Enterprise Risk Management
- Potential Opportunity for further development

- Direct GHG emission (Scope 1- tCO<sub>2</sub>e)
- Indirect GHG emission (Scope 2- tCO<sub>2</sub>e)
- GHG Intensity emission (tCO<sub>2</sub>e/MWh)
- Renewable Energy Capacity (MW)
- Renewable Electricity Consumption (MWh)



## Risks

### Physical Risk



- Increase Extreme Weather
- Flood
- Drought
- Increased Temperature

### Transition Risk



- Impact caused by renewable plant
- Stakeholder concern and negative feedback
- Increased Technological Competition
- Change in customer demand and behavior
- Increased pricing of GHG Emissions
- Mandates on and regulation of existing products and services

Long-term legend ■ Very Low ■ Low ■ Medium ■ High ■ Very High

## Opportunities



**Renewable Energy growth**



**Low carbon technology integration e.g. resource efficiency in production, energy saving program in owned assets**

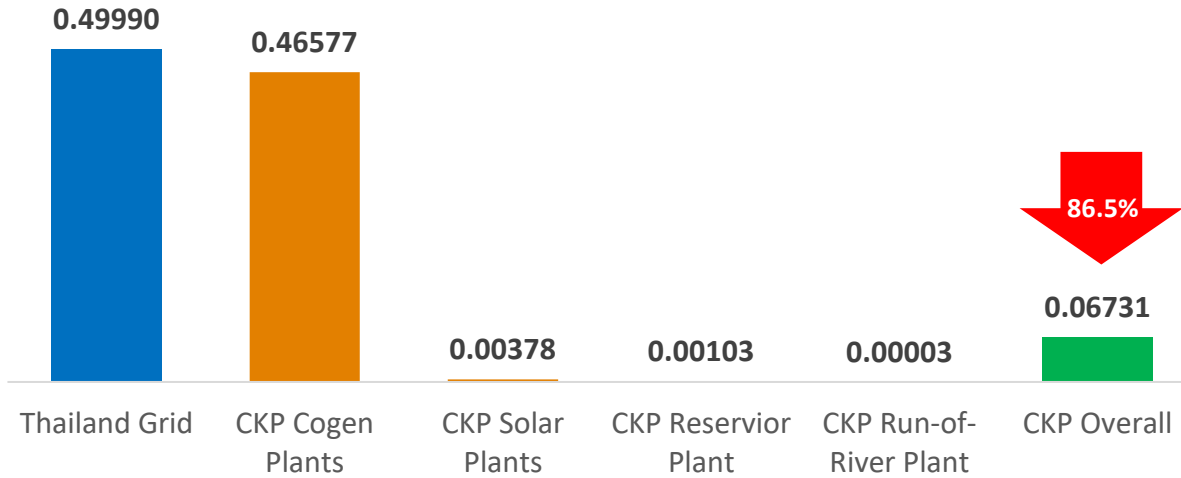


**Environment Attribution Certificate (EAC) participation e.g. I-REC<sup>(1)</sup>**

<sup>(1)</sup> REC: Renewable Energy Certificate ใบรับรองเครดิตการผลิตพลังงานหมุนเวียน



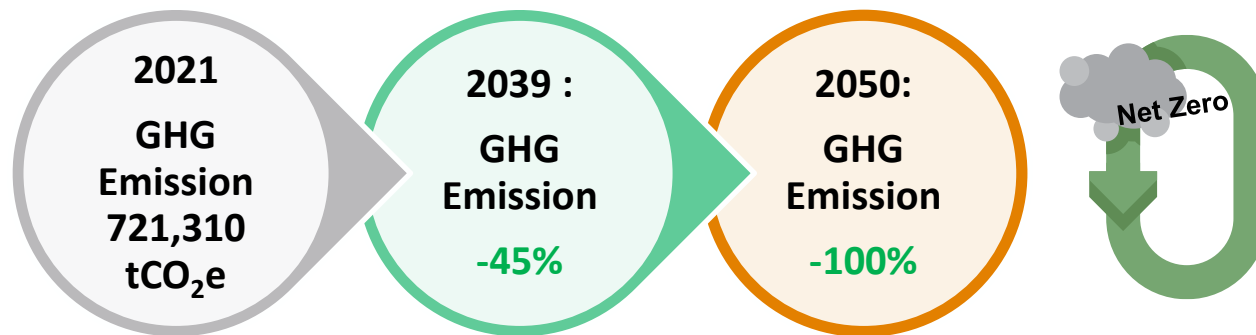
## CKP GHG Emission Intensity VS Thailand Grid (tCO<sub>2</sub>e/MWh)



## CKP Avoided 4.6 MtCO<sub>2</sub>e of GHG Emission in 2021 (Annually)

Power Plant Type	GHG Avoidance in 2021 (tCO <sub>2</sub> e)
CKP Solar Plants	11,621
CKP NN2	922,224
CKP XPCL	3,651,611
<b>Total</b>	<b>4,585,456</b>

## CKPower GHG Emission Pathway



- CKPower expects to achieve a net zero GHG emission by 2050
- Key initiatives to meet 100% renewable electricity consumption:
  - 100% Reduction of absolute GHG Emission (GHG Scope 1 and Scope 2 (tCO<sub>2</sub>e))
  - 100% Reduction of GHG Intensity Emission
  - Reduction of non-renewable power plants in portfolio
  - Afforestation



## 4. Value Added to Communities & Environment

บทบาทของบริษัทในการสร้างการเปลี่ยนแปลงเชิงบวก  
ต่อสังคม และ/หรือ สิ่งแวดล้อม



## ເຕັມ COMPETENCY

Empower communities with our core competency and give a better quality of life through access to clean energy and essential utilities



## ສ້າງ CONNECTION

Connect with value co-creation partners to sustainably strengthen and empower society

## ຕ່ຳ CO-CREATION

co-create with community to improve processes, and develop innovations for a sustainable society

## ຮ່ວມ COOPERATION

cooperation with employees and communities to bring about development and advancement of society at large

Create a learning resource about renewable energy and bringing the competency to equip communities in the area surrounding the power plant with clean energy





# 6 Consecutive Years of CKPower's Hinghoi Project



## 2017 Hing Hoi 2

Ban Mae Loe Border Patrol Police Education Center, Mae Sariang District, Mae Hong Son Province



## 2018 Hing Hoi 3

Ban Mae Mu Nai Border Patrol Police Education Center under the sponsorship of CK Power Public Company Limited, Mae Chaem District, Chiang Mai Province



## 2020 Hing Hoi 4

Ban Kang School in Luang Prabang District, Lao PDR and communities surrounding the Xayaburi Hydroelectric Power Plant



## 2021-2022 Hing Hoi 6

Hin Hua Seua Kindergarten, in the vicinity of the Nam Ngum 2 Hydroelectric Power Plant in Xaisomboun Province, the Lao PDR



## 2016 Hing Hoi 1

Poo Kham Noi Village, Mae Pa Klang Village, Sop Moei District, Mae Hong Son Province



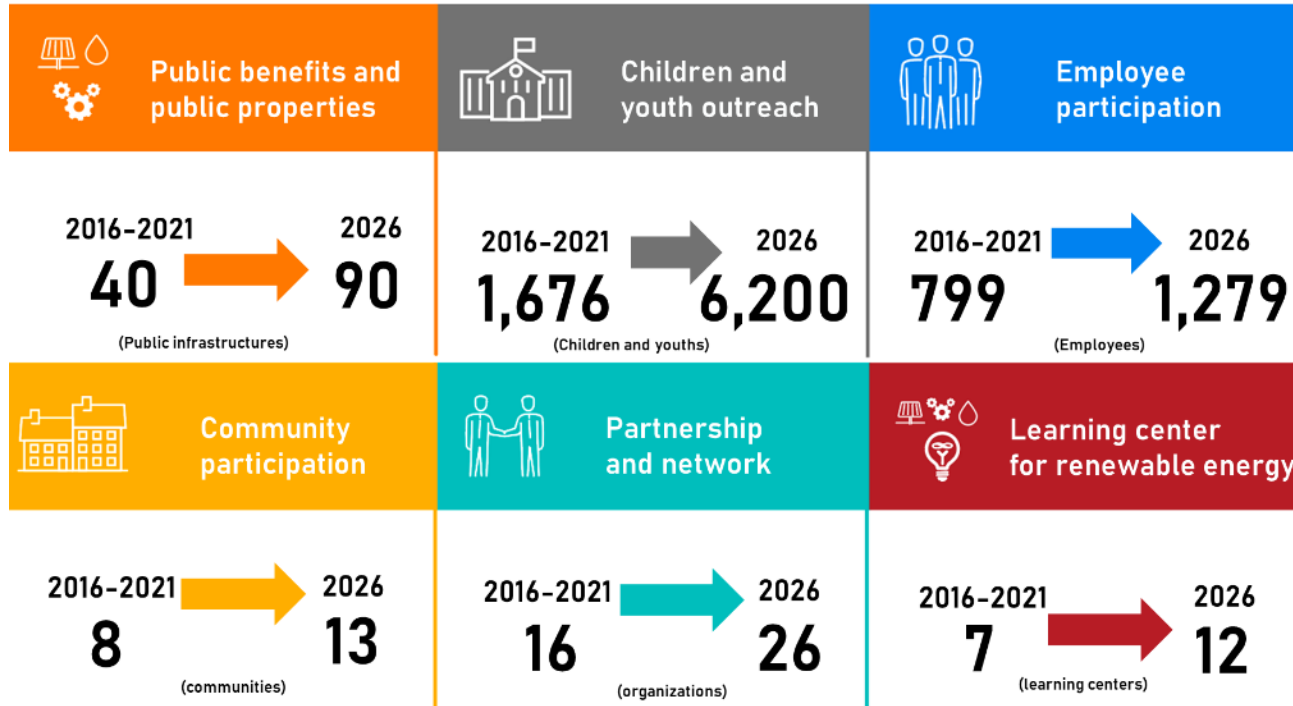
## 2021 Hing Hoi 5

Wat Kudi Prasit School, Lam Sai Sub-district, Ayutthaya Province and communities surrounding Bangpa-in Cogeneration Power Plant





# 10 Years Roadmap for Value Creation to Society




## ENVIRONMENTAL

### Clean Electricity


#### Energy Management and Climate Change



**Net Zero GHG Emission by 2050**

**100%** 

Renewable Electricity Consumption within Organization by 2043 <sup>(1)</sup>

**>95%** 

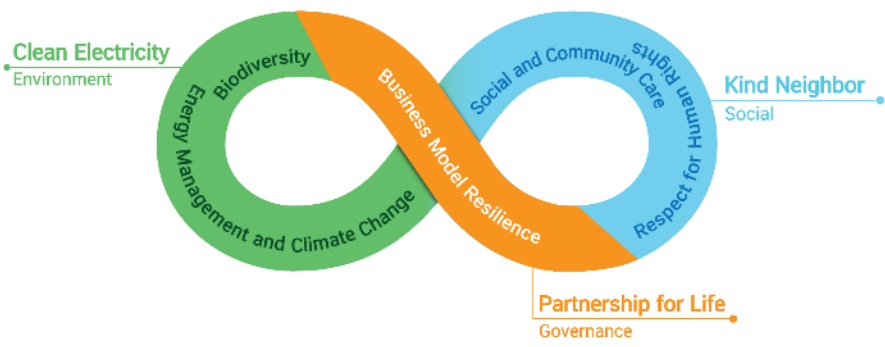
Renewable Energy Capacity by 2043

#### Biodiversity

Assessment of residual impact at all operation sites by 2025 

Strive toward No Net Loss of biodiversity and ecosystem services by 2040 

## Renewable Electricity for a Sustainable Future



## GOVERNANCE

### Partnership for Life

#### Business Model Resilience



- Explore new customers & geographies within ASEAN
- Integrate digital transformation & other innovations

## SOCIAL

### Kind Neighbor

#### Respect for Human Rights

**100%** assessed Human Right Risk and Impact Assessment <sup>(2)</sup>



**Zero** cases Violation

#### Social and Community Care

**Zero** unresolved complaints 




**Creating Value for society and ecosystem with renewable electricity**



<sup>(1)</sup> Including REC  
<sup>(2)</sup> Throughout value chain