ABSOLUTE CLEAN ENERGY
PUBLIC COMPANY LIMITED

Company Core Competitive Advantages

Table of Contents

I Company Overview

II Industry Overview and Growth Potential

III Company Core Competitive Advantages

IV Financial Highlights

V Key Takeaways

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Company Core Competitive Advantages

ABSOLUTE CLEAN ENERGY
PUBLIC COMPANY LIMITED

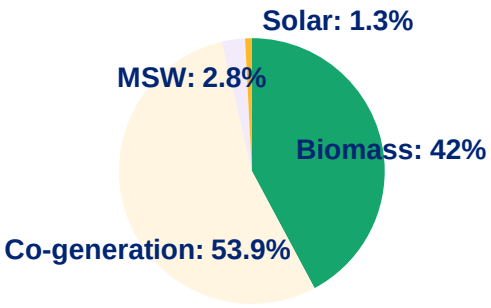
1. **Thailand's Leading Integrated Power Producer with highest growth potential** /1
2. **Proven Operational Capabilities**
3. **Secured Cash Flow Supported by PPA with EGAT/PEA**

Remark: /1 Estimated approximate MW growth during 2019-2022; Estimated MW growth of peers based on public information only

Target to Secure 1 GW Installed Capacity within 2024

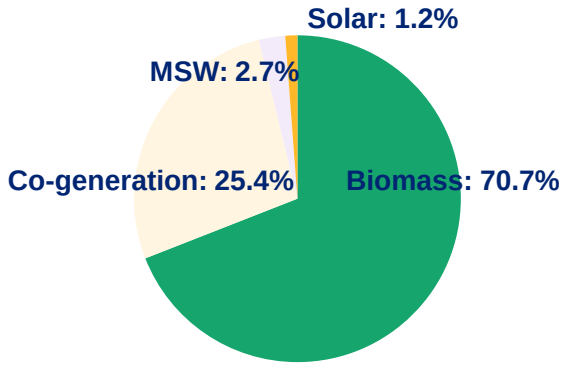
2019

COD Capacity : 212.18 MW
COD + Secure Pipeline : 421.37 MW/1



2022/1,/2

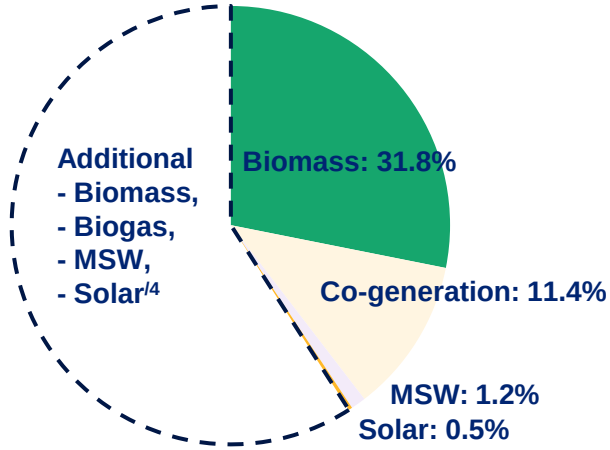
COD Capacity : 449.27 MW
COD + Secure Pipeline : 449.27+[x] MW



+28% MW CAGR
From 2019 - 2022

2024

COD Capacity : 449.27 +[x] MW
Target Capacity/3 : 1,000 MW



+36% MW CAGR
From 2019 - 2024

Remark: /1 Including APP's capacity MW of 9.9, Currently, APP's Shareholders sent LOI for APP's share purchase proposal to ACE
/2 Estimated timeline: Currently, Arbitration result states that PEA has to return PPA to ACE and with the assumption that normally power project's construction period is approx. 2 years
/3 Company Target to COD+ secure 1,000 MW within 2024
/4 Additional capacity is subject to management guidance, but will focus in renewable field.

Company Core Competitive Advantages – Proven Operational Capabilities

Leading Biomass Power Producer in Thailand

ACE's in-house R&D capabilities results in feedstock and O&M cost reduction with the target to reduce feedstock cost approx. 5% – 15% for current plant and 24.7%-27.8% on top for pipeline plant and O&M cost reduction approx. 15% – 25% in the next 2-3 years

Professional Run

- Biggest professional-run biomass power player in Thailand
- More than 1 year continuing operation before requiring shutdown maintenance
- Advanced Technology leading to feedstock flexibility

Advanced Technology

- ACE's ability to burn various types of high moisture content biomass efficiently up to 60-65%
- Various type of biomass mix with controllable cost
- ISO 9001, 14001, OHSAS 18001

Continuing Improvement

- Target to decrease feedstock cost of **5% -15%** by 2-3 years
- Additionally, potential plant heat rate decrease of **24.70%-27.81%**[/2] for pipeline plant (VSPP, SPP Hybrid)
- Target to decrease its O&M cost **15% -25%** by 2-3 years

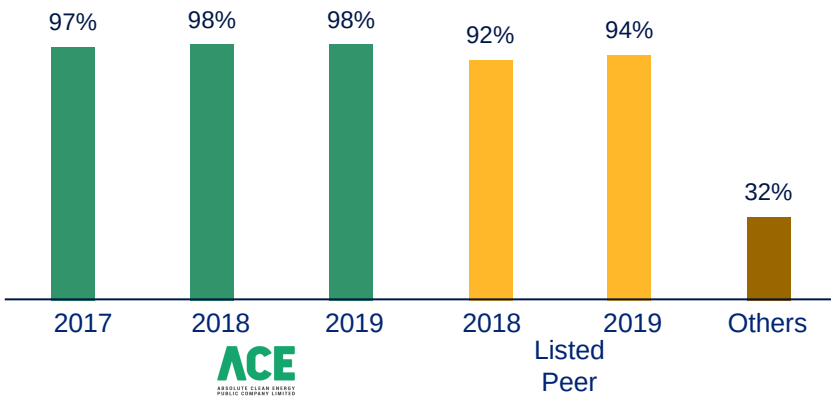
Proven Track Record

- 3 year performance track record of continued efficiency and profit margin improvement
- Proven ability to source biomass feedstock (no record of supply shortage)

Upside Potential

- Potential electricity sales of ~24 MW to IUs
- +15 operational years after PPA expire[/3]

Capacity Factor[/1]



- ✓ Biggest professional-run
- ✓ More than **1 year** continuing operation
- ✓ Ability to burn high moisture content **60%-65%**

Distinguished Efficiency

Source : Company annual report and presentation publicly available for peers' information

Remark: 1/ Selling capacity factor (Selling Electricity /(Total Operating hours * Selling Capacity))
2/ Due to new technology (high temp, high pressure turbine) and verified by third party technical advisor
3/ Third party technical report stated that general biomass powerplant has an average useful life of 25-30 years or greater in case of proper recurring maintenance

Company Core Competitive Advantages – Proven Operational Capabilities

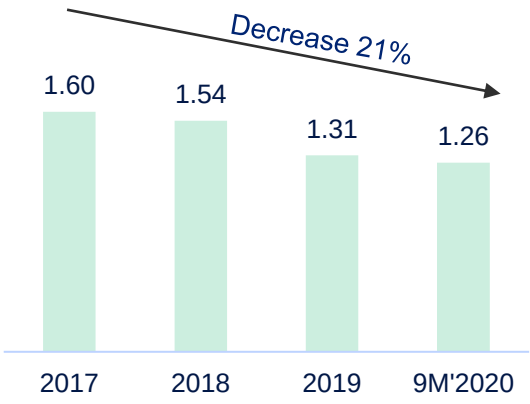
Leading Biomass Power Producer in Thailand

ACE's in-house R&D capabilities results in feedstock and O&M cost reduction with the target to reduce feedstock cost approx. 5% – 15% for current plant and 24.7%-27.8% on top for pipeline plant and O&M cost reduction approx. 15% – 25% in the next 2-3 years

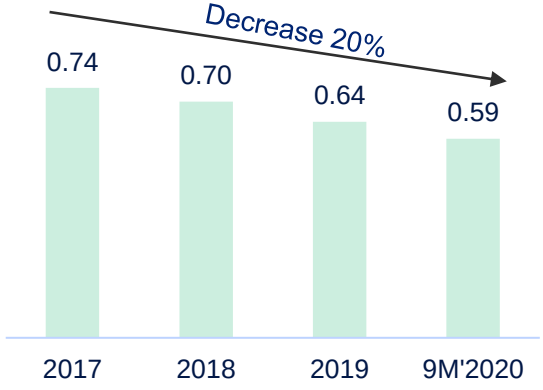
Professional Run	Advanced Technology	Continuing Improvement	Proven Track Record	Upside Potential
• Biggest professional-run biomass power player in Thailand • More than 1 year continuing operation before requiring shutdown maintenance • Advanced Technology leading to feedstock flexibility	• ACE's ability to burn various types of high moisture content biomass efficiently up to 60-65% • Various type of biomass mix with controllable cost • ISO 9001, 14001, OHSAS 18001	• Target to decrease feedstock cost of **5% -15%** by 2-3 years • Additionally, potential plant heat rate decrease of **24.70%-27.81%**[2] for pipeline plant (VSPP, SPP Hybrid) • Target to decrease its O&M cost **15% -25%** by 2-3 years	• 3 year performance track record of continued efficiency and profit margin improvement • Proven ability to source biomass feedstock (no record of supply shortage)	• Potential electricity sales of ~24 MW to IUs • +15 operational years after PPA expire[3]

Feedstock & O&M Cost

Feedstock Cost
(THB/ kWh produced)



O&M Cost
(THB/ kWh produced)



- ✓ To decrease Feedstock cost **5%-15%** by 2-3 years
- ✓ **24.70%-27.81% Plant heat rate decrease** on top for VSPP, SPP Hybrid pipeline
- ✓ To decrease O&M cost **15%-25%** by 2-3 years

Potentially Improving Margin

Remark: 1/ Selling capacity factor (Selling Electricity /(Total Operating hours * Selling Capacity))
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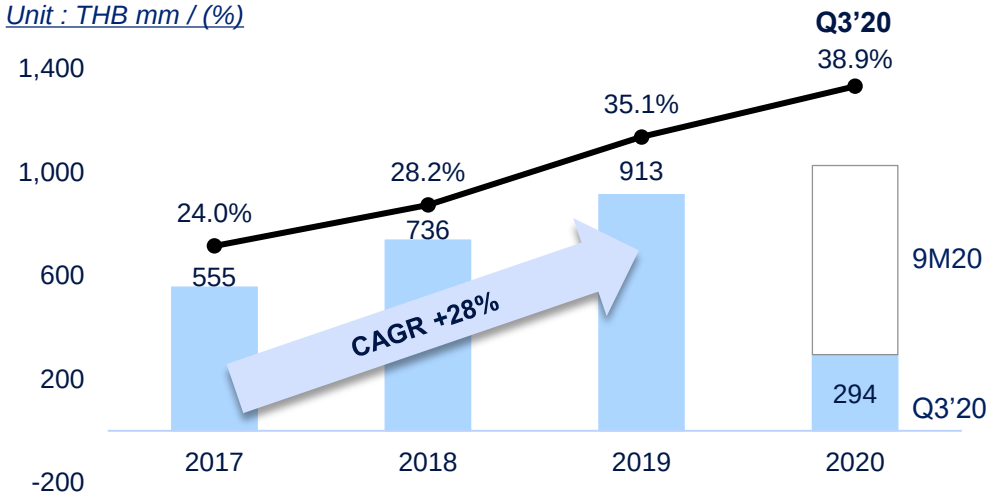
Company Core Competitive Advantages – Proven Operational Capabilities

Leading Biomass Power Producer in Thailand

ACE's in-house R&D capabilities results in feedstock and O&M cost reductions with the target to reduce feedstock cost approx. 5% – 15% for operating power plants and 24.7%-27.8% on top for power plants in the pipeline and O&M cost reduction approx. 15% – 25% in the next 2-3 years

Professional Run	Advanced Technology	Continuing Improvement	Proven Track Record	Upside Potential
• Biggest professional-run biomass power player in Thailand • More than 1 year continuing operation before requiring shutdown maintenance • Advanced Technology leading to feedstock flexibility	• ACE's ability to burn various types of high moisture content biomass efficiently up to 60-65% • Various type of biomass mix with controllable cost • ISO 9001, 14001, OHSAS 18001	• Target to decrease feedstock cost of **5% -15%** by 2-3 years • Additionally, potential plant heat rate decrease of **24.70%-27.81%**[/2] for pipeline plant (VSPP, SPP Hybrid) • Target to decrease its O&M cost **15% -25%** by 2-3 years	• 3 year performance track record of continued efficiency and profit margin improvement • Proven ability to source biomass feedstock (no record of supply shortage)	• Potential electricity sales of ~24 MW to IUs • +15 operational years after PPA expire[/3]

Gross Profit and Gross Profit Margin



- ✓ Track record with Improvement
- ✓ **~24 Potential MW** sales to IUs
- ✓ **+15 operational years**[/3] after PPA

Upside potential in the near future

Remark: 1/ Selling capacity factor (Selling Electricity /(Total Operating hours * Selling Capacity))
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Company Core Competitive Advantages – Proven Operational Capabilities

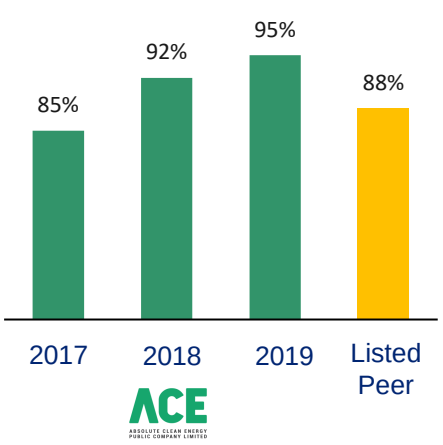
Most Efficient Municipal Solid Waste (MSW) Power Producer in Thailand

ACE's early engagement in MSW, reputable bidding track record and renowned expertise will secure the upcoming MSW bidding opportunity

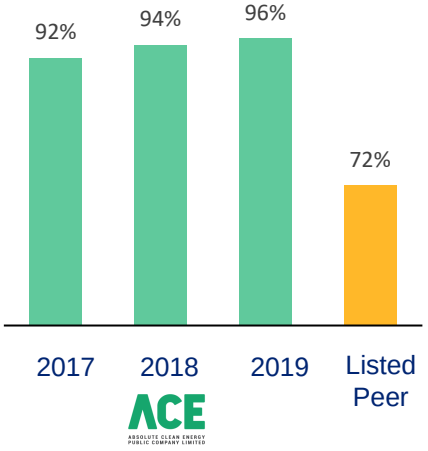
Professional Run	Advanced Technology	International Recognition	Proven Track Record	Upside Potential
• Most efficient MSW power plant operator in Thailand • Strong in-house O&M Team • Target to decrease its O&M cost **15% -25%** by 2-3 years	• ACE's high technological plant could burn high moisture content municipal solid waste up to 80% with efficiency • Zero discharge • Odorless • ISO 9001, 14001, OHSAS 18001	• Received 3Rs Awards in 2016 for being an environment friendly power operator. • Thailand' Minister of Interior , Minister of Energy and government officials of other countries to visit the plant as MSW prototype	• 3 year performance track record with high efficiency and high profit margin • Abundant supply of waste	• Potential electricity sales of 0.4 MW (9% increase in excess of current PPA MW) • Tipping fee will enhance project return (fee increase 10%/3 years)

Availability Factor and Capacity Factor[/1]

Availability Factor



Capacity Factor



- ✓ Most efficient MSW
- ✓ Ability to burn high moisture content up to **80%**
- ✓ **Zero** discharge and **Odorless**

Distinguished Efficiency and Eco friendly

Source : Company annual report and presentation publicly available for peers' information

Remark: 1/ Capacity factor (Produced Electricity /(Total Operating hours * Total Capacity)), For Selling capacity factor of 2017,2018 and 6M2019 are 98%,100% and 99% respectively.

Company Core Competitive Advantages – Proven Operational Capabilities

Thailand' Minister of Interior and Minister of Energy visited KK MSW Power plant

ACE's early engagement in MSW, reputable bidding track record and renowned expertise will secure the upcoming MSW bidding opportunity

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Gen. Anupong Paojinda (Minister of Interior) visited MSW power plant at 3 May 2018

Mr. Siri Jirapongphan (minister of Energy) visited MSW power plant at 12 Dec 2018

Company Core Competitive Advantages – Proven Operational Capabilities

Energy Regulatory Commission visit KK MSW Power Plant

ACE's early engagement in MSW, reputable bidding track record and renowned expertise will secure the upcoming MSW bidding opportunity

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Kraisi Kanasuta (Former member of ERC) visited MSW KK powerplant

Mr. Kurujit Nakornthap Chairman of Energy Affairs Committee and Member of the National Reform Steering Assembly (NRSA)visited MSW KK powerplant

Company Core Competitive Advantages – Proven Operational Capabilities

Sri Lanka' Supreme Ambassadors visit KK MSW Power Plant

ACE's early engagement in MSW, reputable bidding track record and renowned expertise will secure the upcoming MSW bidding opportunity

Professional Run	Advanced Technology	International Recognition	Proven Track Record	Upside Potential
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H.E.Mrs.Kshenuka Dhireni Senewiratne (Sri Lanka's Supreme Ambassdor) visited MSW KK powerplant at 11 Dec 2018

Company Core Competitive Advantages – Proven Operational Capabilities

Bangladesh's Minister visit KK MSW Power Plant

ACE's early engagement in MSW, reputable bidding track record and renowned expertise will secure the upcoming MSW bidding opportunity

Professional Run	Advanced Technology	International Recognition	Proven Track Record	Upside Potential
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H.E.Mrs.Kshenuka Dhireni Senewiratne (Sri Lanka's Supreme Ambassador) visited MSW KK powerplant at 11 Dec 2018

Md. Tajul Islam (Minister of Local Government and Rural Development) visited MSW KK powerplant at 16 Feb 2019

Khon Kaen MSW Power Plants visited by numerous Regional Municipal and government agencies

Environmental Inspection Division Team visited MSW KK powerplant

Indonesia Vice President Deligation visited MSW KK powerplant

Director-General of the Department of Local Administration visited MSW KK powerplant

Director-General of the Pollution Control Department visited MSW KK powerplant

Deputy Director-General of the Department of Local Administration visited MSW KK powerplant

Amnat Charoen Governor visited MSW KK powerplant

Khon Kaen MSW Power Plants visited by numerous Regional Municipal and government agencies

Phuket Municipal visited MSW KK powerplant

Udonthani Municipal visited MSW KK powerplant

Executive Committee of local administrative organization from Surat Thani visited MSW KK powerplant

Management team from Choomporn Municipal

Nonsira, Khon Kaen Municipal visited MSW KK powerplant

Management team from Roi Et Municipal

Khon Kaen MSW Power Plants visited by numerous Regional Municipal and government agencies

Management team from Maha Sarakham Municipal

Board of Directors, Ministry of Energy and Ministry of Local Administration from Bangladesh visted MSW KK powerplant

Local government leaders from Songkhla province visited MSW KK powerplant in order to solve the local waste issues

Management team from Krabi Municipal

Municipal team team from Udonthani

Municipal team team from Banpai, Khon Khaen

Company Core Competitive Advantages – Proven Operational Capabilities

Most Efficient MSW Power Producer in Thailand

ACE's early engagement in MSW, reputable bidding track record and renowned expertise will secure the upcoming MSW bidding opportunity

Professional Run	Advanced Technology	International Recognition	Proven Track Record	Upside Potential
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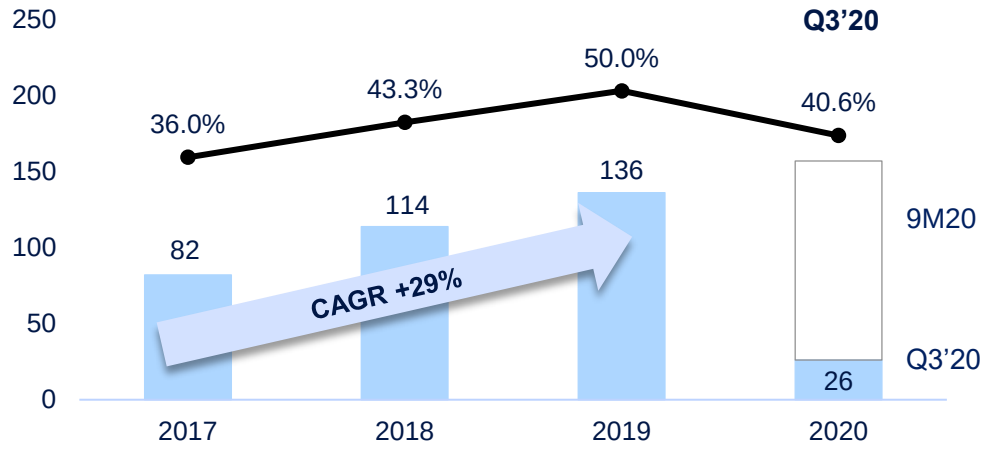
Gross Profit and Gross Profit Margin

Unit : THB mm / (%)



- ✓ Track record with Improvement
- ✓ **~0.4 Potential MW** sales to IUs
- ✓ Additional **Tipping fee** enhance return

Upside potential in the near future

Company Core Competitive Advantages – Proven Operational Capabilities

Competitive SPP Co-Generation Power Producer

Defensive scheme of Co-Generation Power Plant would help balance risk scheme of company's powerplant portfolio

Professional Run

- One of the most efficient SPP Co-Generation powerplant operator in Thailand

Advanced Technology

- ACE's high technological to control and manage plant according to EGAT demand
- ISO 9001, 14001, 18001

Continuing Improvement

- Strong in-house O&M Team
- Target to decrease its O&M cost **15% - 25%** by 2-3 years

Proven Track Record

- 3 year performance track record with high efficiency and competitive margin
- Cost pass-through scheme could result in stable margin
- Long term gas purchase contract with PTT

Upside Potential

- Potential sales to IUs of ~20 MW
- Potential steam sales from IUs for more than 100,000 tons/year
- +25 operational years after PPA expire /2

Availability Factor and Capacity Factor/1

Availability Factor

Capacity Factor

- ✓ One of the most efficient SPP Co-Gen
- ✓ Strong in-house O&M
- ✓ To decrease O&M cost of **15%-25%** by 2-3 years

Balance company risk profile

Remark: 1/ Selling capacity factor (Selling Electricity /(Total Operating hours * Selling Capacity))
2/ Third party technical report stated that general natural gas powerplant has an average useful life of 30 -60 years

Company Core Competitive Advantages – Proven Operational Capabilities

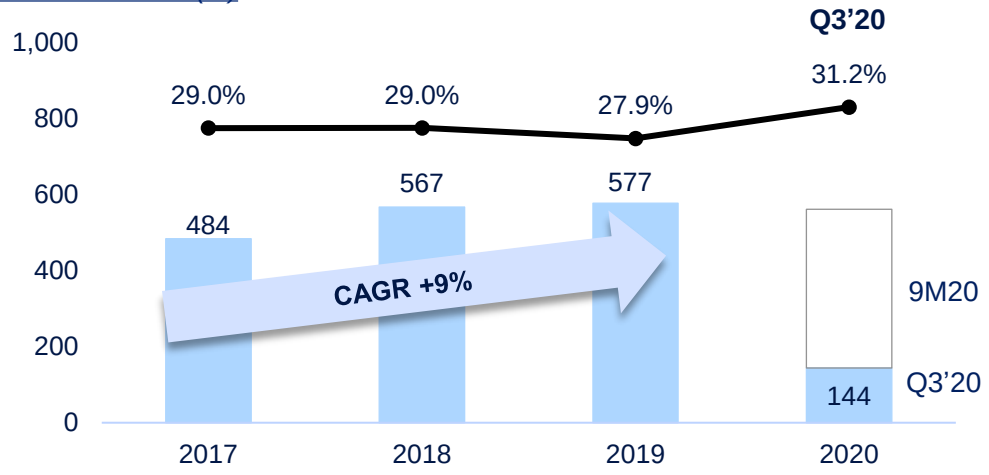
Competitive SPP Co-Generation Power Producer

Defensive scheme of Co-Generation Power Plant would help balance risk scheme of company's powerplant portfolio

Professional Run	Advanced Technology	Continuing Improvement	Proven Track Record	Upside Potential
• One of the most efficient SPP Co-Generation powerplant operator in Thailand	• ACE's high technological to control and manage plant according to EGAT demand • ISO 9001, 14001, OHSAS 18001	• Strong in-house O&M Team • Target to decrease its O&M cost **15% -25%** by 2-3 years	• 3 year performance track record with high efficiency and competitive margin • Cost pass-through scheme could result in stable margin • Long term gas purchase contract with PTT	• Potential sales to IUs of ~20 MW • Potential steam sales from IUs for more than 100,000 tons/year • +25 operational years after PPA expire /2

Gross Profit and Gross Profit Margin

Unit : THB mm / (%)



- ✓ Track record with stable margin
- ✓ ~20 Potential MW sales to IUs
- ✓ **+25 operational years/2** after PPA

Upside potential in the near future

Secured Cash Flow Supported by PPA with EGAT/PEA

Reliable revenue source with high efficiency and controlled cost can guarantee cash flow to the company

ABSOLUTE CLEAN ENERGY PUBLIC COMPANY LIMITED

	Biomass	MSW	Co-Generation
2022 Revenue Contribution	Industrial Users 8% / EGAT Power for Thai Happiness, PEA Provincial Electricity Authority 92%	Industrial Users 10% / PEA Provincial Electricity Authority 90%	Industrial Users 18% / EGAT Power for Thai Happiness 82%
Availability Factor[/1] *Capacity Factor[/1]*	AF : 92% *CF : 98%*	AF : 95% *CF : 96%*	AF : 100% *CF : 82%*
Feedstock Sufficiency	• ~10,000 MW available • Feedstock development plan	• MSW service agreement with government	• Long term purchase agreement with PTT
Feedstock Cost Control	Controllable	No feedstock Cost	Cost pass-through
Upside Potential	✓ Potential Sales to IUs ✓ ~15 operation years after PPA[/2]	✓ Tipping fee ✓ Potential Sales to IUs	✓ Potential Sales to IUs ✓ ~25 operation years after PPA[/3]
Result	**Secured cashflow with upside potential**		

Remark: 1/ AF and CF of 2019
2/ Third party technical report stated that general biomass powerplant has an average useful life of 25-30 years or greater in case of proper recurring maintenance
3/ Third party technical report stated that general natural gas powerplant has an average useful life of 30-60 years