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Waste to Energy: 40-minute workshop

Question: How can turning waste into energy reduce costs and create income? Use Thai Eastern Group Holdings (TEGH). Prepare one example, the 3Rs and one key lesson. Then present for 3 minutes with 2 minutes of feedback.

Minutes	Decision or action	Output
0-5 | Recall	First minute: recall one example each. Next four: check deck pp. 7-9 and choose one waste-to-biogas story.	One verified example
5-20 | Discuss	5-10: name the waste and energy need. 10-15: test Risk, Resilience and Revenue. 15-20: decide what you would do in your own business.	One action and one condition
20-30 | Agree	20-25: compare lesson options. 25-30: agree one sentence and remove unsupported claims.	One shared key lesson
30-40 | Prepare	30-35: fill the three blocks. 35-38: rehearse for 3 minutes. 38-40: check sources and choose speaker plus Q&A helper.	One slide, not a deck

Recall checklist

Confirm: organic waste to biogas; biogas and biomass as energy; shared utilities and resource flows (deck p. 7). Find the circular system (p. 8). Distinguish 76.1% LPG substitution from the study's total-energy share (p. 9). Assignment 3Rs are Risk, Resilience, Revenue, not the deck's Responsibility, Resilience, Regenerative (p. 11).

Choose fast, then keep ONE example

Candidate	Risk	Resilience	Revenue	Evidence
Recommended: waste to biogas electricity	Fuel-price and waste exposure	Own useful energy supply	43 GWh; THB 180m+ avoided power cost	Study p. 7, Table 1; deck pp. 7-8
Alternative: biogas for rubber drying	Fossil-fuel dependence	Replace purchased thermal fuel	Lower fuel purchases; no separate baht value	Study pp. 3, 7; deck pp. 8-9
Supporting outlet: digestate fertiliser	Residual-biomass handling	Return nutrients to farms	Useful outlet; no separate sales figure	Study pp. 3, 7, 9; deck p. 7

Questions that force a decision

In your own business, what waste stream could replace which purchase? Who controls its quantity and quality? What if supply falls or tariffs change? Who owns maintenance and methane control? What would make you reject investment? Agree one next action, not a promise to build a plant.

Choose ONE key lesson

1. **Recommended: Use waste to replace a real cost before chasing new income.** Strongest because avoided electricity cost is quantified.
2. **Match the waste stream to a reliable energy need.** Useful if the group focuses on operating resilience.
3. **Measure the whole loop, not just the green claim.** Useful if feedback centres on evidence and governance.

Our decision: _____ **Investment condition:** _____
Speaker / Q&A helper: _____

Answers we can defend

Is the saving from waste or just electricity prices?

The electricity comes from the biogas system, but its monetary value uses prevailing industrial tariffs. The paper does not isolate a price effect. Treat THB 180m+ as avoided purchase cost, not audited net saving. Study p. 7, Table 1 and text.

What is the payback?

About 4.8 years for renewable-energy investments, estimated from company-reported performance. The paper does not publish a full project cash-flow model or capex breakdown. Tariffs, feedstock and regulation can change payback. Study pp. 7, 14, Table 5.

What if feedstock falls?

The model depends on available organic residues and wastewater. Less or poorer feedstock can reduce gas output and utilisation. Before investing, I would stress-test supply and retain backup energy. That recommendation is our analysis, not a measured scenario. Study pp. 13-14, 18.

Does this work outside palm and rubber?

The paper proposes cautious transfer to comparable agro-industrial and food-processing clusters. Check waste quality, energy demand, proximity, infrastructure, governance and regulation. It does not prove that every business needs its own digester. Study pp. 13, 17-18.

What happened to absolute emissions after expansion?

Study-period inventory totals fell from 84,478 to 75,851 tCO2e in 2022-2024. The paper says supplementary 2025 disclosure shows absolute emissions rising with capacity expansion. Track totals alongside intensity; do not claim emissions always fall. Study pp. 8-9, Table 2.

How reliable are company-reported numbers?

Selected indicators were cross-checked or independently verified, but that does not assure every economic claim. Two authors work for TEGH and disclose the potential conflict. It remains a single case without strong causal inference. Study pp. 5, 13, 19.

Where is the new income?

The strongest quantified evidence here is avoided power purchases. Digestate-based fertiliser creates a residual-biomass outlet and supports farmers; the study gives no separate fertiliser sales or profit figure. Do not call THB 180m+ sales revenue. Study pp. 3-4, 7, 9.

Is biogas the same as burning mixed rubbish?

No. This example is anaerobic digestion of palm oil mill effluent, rubber sludge and organic residues. Gas is used for drying and electricity; digestate is reused. It is not evidence about municipal mixed-waste incineration. Study pp. 3-4.

Why does the deck say 76.1%, not 35-40%?

Deck p. 9 reports LPG-to-bio-energy substitution of 76.1%. Study p. 9 reports biogas supplying 35-40% of total energy demand across rubber and palm in 2024. Different denominators and reporting contexts; neither should replace the other.

Why does the deck show 321,452 tCO2e, not 19,271?

Deck p. 9 shows 321,452 tonCO2e reduction, without a directly comparable period and boundary established here. Study pp. 1, 4 report estimated 19,271 tCO2e reduction in 2024. Present separately; do not add or equate them.

What I would say if I do not know

I don't have a verified figure for that. The study doesn't break it out, so I wouldn't guess. I'd check the underlying operating records or ask Khun Nuch before making that claim.

Numbers and limits to keep straight

2024: 43.0 GWh; more than THB 180m avoided electricity cost; about 4.8-year estimated payback (study p. 7). Biogas covers roughly 35-40% of total rubber/palm energy (p. 9). These are not all deck figures. Savings are not sales or net profit. Do not attribute the entire group profit increase to biogas.

Single case; partly company-reported; selected third-party checks only. Cradle-to-gate, not a complete downstream footprint (pp. 5-6, 13). TEGH employment of two authors is disclosed (p. 19). Absolute emissions rose after later capacity expansion (p. 9). No separate fertiliser sales number is provided.

Source trail

Khun Nuch class deck: pp. 7-9 for this example. Kokanutaporn, Rachuratchata, Aung and Sasaki (2026), *Industrial Symbiosis as a Carbon-Centered Operational Strategy*, Sustainability 18, 5547. doi:10.3390/su18115547. Paper pp. 19-20: site layout and resource-flow appendices; p. 18: conclusion. Full PDF, 12-question bank and precise number table: sasin.cfoth.ai/courses/mgmt-s-0024/presentation/tegh-study.html

Three-minute close: Use waste to replace a real cost before chasing new income.