


Thai ESCO Association
สมาคมบริษัทจัดการพลังงานไทย




การจัดทำรายงานการตรวจสอบวิเคราะห์ความเป็นไปได้ เพื่อใช้สำหรับการตัดสินใจลงทุน(Investment Grade Audit)

23 January 2020

About me

Attaporn Rojanarak (อรรถพร โรจนารักษ์)

Director Manager

E-mail: attaporn@attainengineering.com

Education History

- Master of Engineering in Engineering Management, Kasetsart University
- Bachelor of Engineering, (Electrical Engineering),
  Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang (KMITL)

Module 3 :
Financial Analysis for ESCO Project

- Investment Grade Audit Report (IGA Report)
- ESCO Guaranteed Savings
- Financial Proposal

Module 3 :
Financial Analysis for ESCO Project

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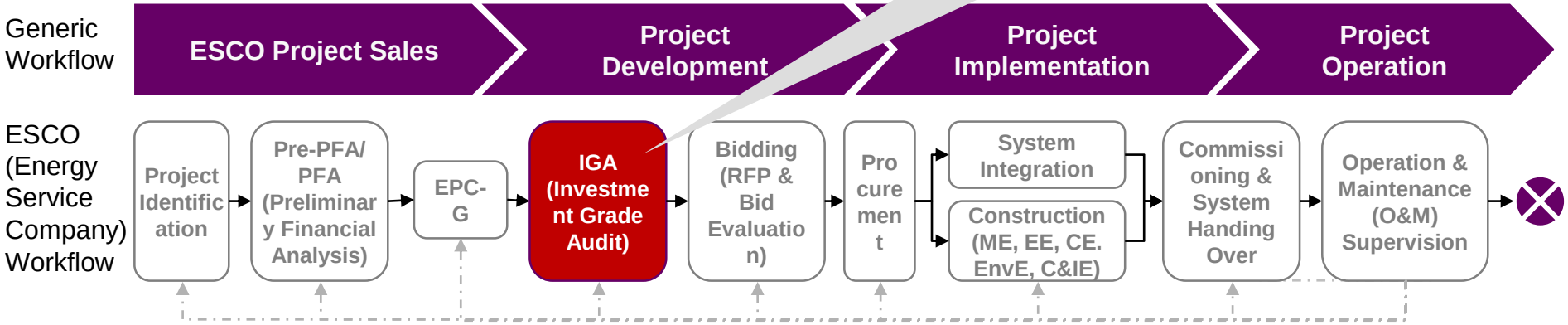
Investment Grade Audit Report (IGA Report);
Requirement: Usage of this template

IGA Report Objective:

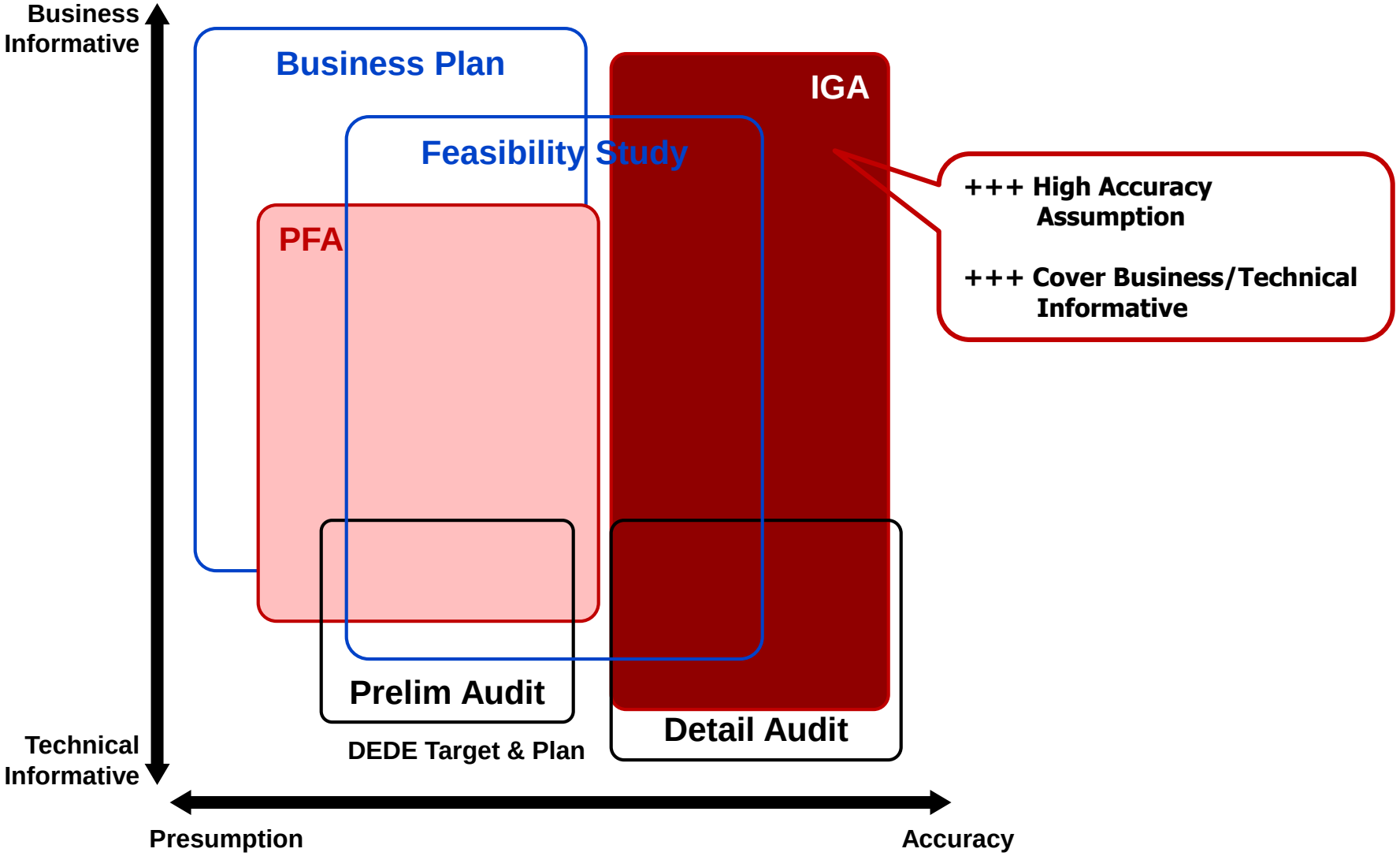
- Record all baseline information
  - *energy usage, associated equipment and operating mode*
- Present the refined evaluation of the energy savings potential and project cost
  - *compare with the Walk-Through Audit (WTA) preliminary assessment*
- IGA: ESCO is comfortable guaranteeing savings and cost
- The facility owner receives a detailed report highlighting the proposed project and analysis

External *Private* User:
- ✓ Client [Board Approval]
- ✓ Bank [Loan Application]
- ✓ Investor [Investment Consideration]

External *Public* User:
- ✓ BOI [BOI Application]
- ✓ Government [Permits]



Investment Grade Audit Report (IGA Report);
Holistic viewpoint: PFA, IGA, Feasibility Study, Business Plan



Investment Grade Audit Report (IGA Report);
IGA Report Template Content

Investment Grade Audit

"Investment Grade" Energy Audit

Content – IGA Report (Investment Grade Audit)
Executive Summary
Introduction
Energy Consumption Profile (Current & Future)
Selected Project Technology (s)
- SPT Introduction
- Conceptual Design <--> Technical Feasibility
- Detail Financial Analysis <--> Financial Feasibility
- Legal Feasibility
- Commercial Feasibility
- Risk Identification & Risk Mitigation
- M&V Plan
- Project Schedule
- Supplier List
Appendix: Link to EPC
Appendix: Reference Material
Appendix: Supporting Material

Evaluation Items

(1) IGA Objectives
(2) Process & Energy Information
(3) Details of Energy Conservation Measures (ECMs)
(4) Energy Saving Analysis of ECMs
(5) Engineering Design & Technical Analysis of ECMs
(6) Financial Analysis of ECMs
(7) Risk Analysis of ECMs
(8) Measurement & Verification Plan
(9) Legal & Regulation Analysis
(10) Implementation Plan

IGA Report Template Content & Checklist

1. Executive Summary

Content – IGA Report
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- ❑ Introduction to this IGA Report
- ❑ What have been done since getting approved to start the IGA until today
- ❑ Customer's Audited Energy outlook and Change found in IGA (👍👎)
- ❑ Our proposed design solution
- ❑ Project Location
- ❑ Project Timeframe
- ❑ Bottom Line: IGA Financial Return (optional: sensitivity analysis)
- ❑ Other options explored
- ❑ Legal, Commercial points, and Risk Management
- ❑ Why ESCO for this designed ECM (re-emphasize) → Owner should be aware that ,without ESCO, there is a high risk of project failure
- ❑ What's next (brief schedule)

Package

Reference Example

IGA Report Template Content & Checklist

2. Introduction

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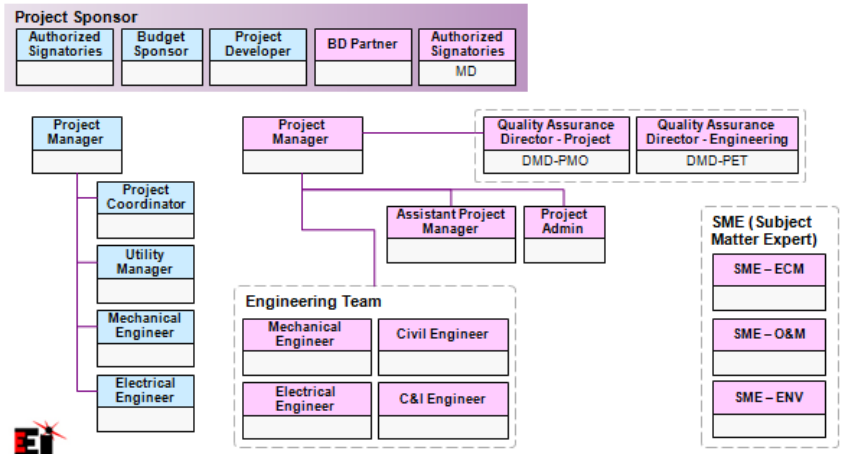
- **Introduction** to this IGA Report
- **Objective** of this IGA Report
- What have been **done** since getting approved to start the IGA until today
- Provide "List of Detail Information" collected
  - Date – Key Activity – Reference Documents (e.g. Minute of Meeting)
- Data/Information **logged/supplied by Client** (requesting date vs. receiving date & by who of Client)
- Data/Information **measured/collected by ESCO** (starting date vs. ending date & witnessed by who of Client)
- **Project Organization Chart** (Integrated: Client & ESCO)



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✓ **Example of "List of Detail Information"**

AGC Chemical Factory (ACTH)		As of:		As of: 21/9/58			
Item	Request	Request ®				Note	Received (Soft file)
		Hard copy	Status	Soft copy	Status		
1	General Information						
1.1	Overall plant layout (scale)	®	7 Apr 14	®	18 Apr 14	Soft copy - CAD file	1.1 THLS000_1.dwg
1.2	Piping/Cabling routing/layout (scale)			®		Soft copy - CAD file	
1.3	Process flow diagram	®	7 Apr 14			Received separate documents	
1.4	Energy consumption	®	7 Apr 14			Flake & Evaporation plant	
1.5	Electric bill from MEA (Last 12 months)	®			18 Apr 14		1.5 Electrical bill last 12 months.xlsx
1.6	NG bill from PTT (Last 12 months)	®					
1.7	Operating hour (crosscheck for actual heat consume)	®					
1.8	Any permission (Existing) - Ror Ngor 4, Construction Permit , etc.	®			18 Apr 14		1.8.1 รง 4 พระประแดง 56.PDF
					18 Apr 14		1.8.2 AGC สมุทร วอ 8 2013 gas station.PDF
					18 Apr 14		1.8.3 รายงานหม้อไอน้ำ July 2013.PDF

✓ All Data/Information from both client and ESCO will be presented in Appendix. (Such as Overall plant layout (scale), Electric bill Summarized (Last 12 months), Fuel bill Summarized (Last 12 months), Production Operating hour, Single Line and Distribution diagram (SLD), Steam Boiler P&I Diagram (Piping and Instrument Diagram), specify pressure, temperature and flow (consumption), etc.

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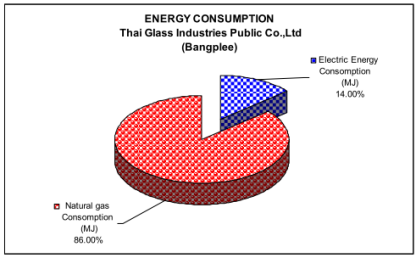
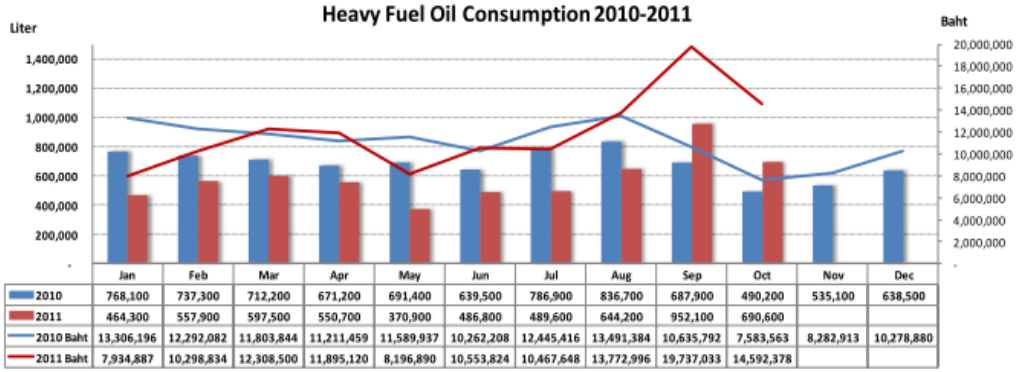
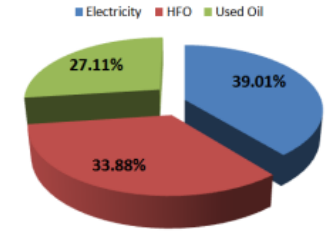
- Historical energy consumption profile **(Energy VS. Production)**
  - Past & Current information – actual bill, logged data, audited
  - Past & Current production information – **(1-3 years)**
  - Actual tariff and unit cost by-time are collected!





	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	768,100	737,300	712,200	671,200	691,400	639,500	786,900	836,700	687,900	490,200	535,100	638,500
2011	464,300	557,900	597,500	550,700	370,900	486,800	489,600	644,200	952,100	690,600		
2010 Baht	13,306,196	12,292,082	11,803,844	11,211,459	11,589,937	10,262,208	12,445,416	13,491,384	10,635,792	7,583,563	8,282,913	10,278,880
2011 Baht	7,934,887	10,298,834	12,308,500	11,895,120	8,196,890	10,553,824	10,467,648	13,772,996	19,737,033	14,592,378		



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- Energy Audit Result (Efficiency of System, Energy Profile, etc.) + Auditing Tools Table

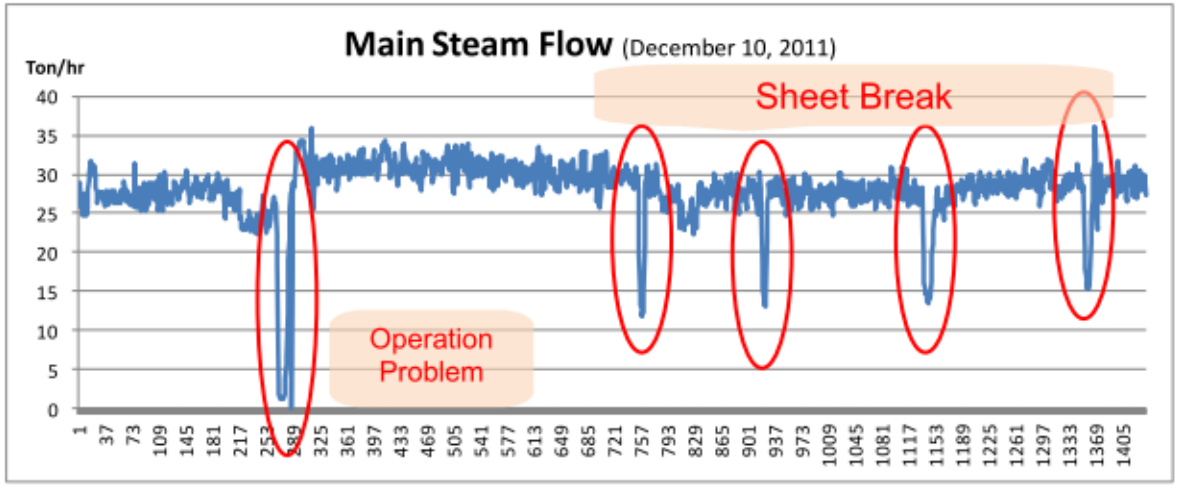
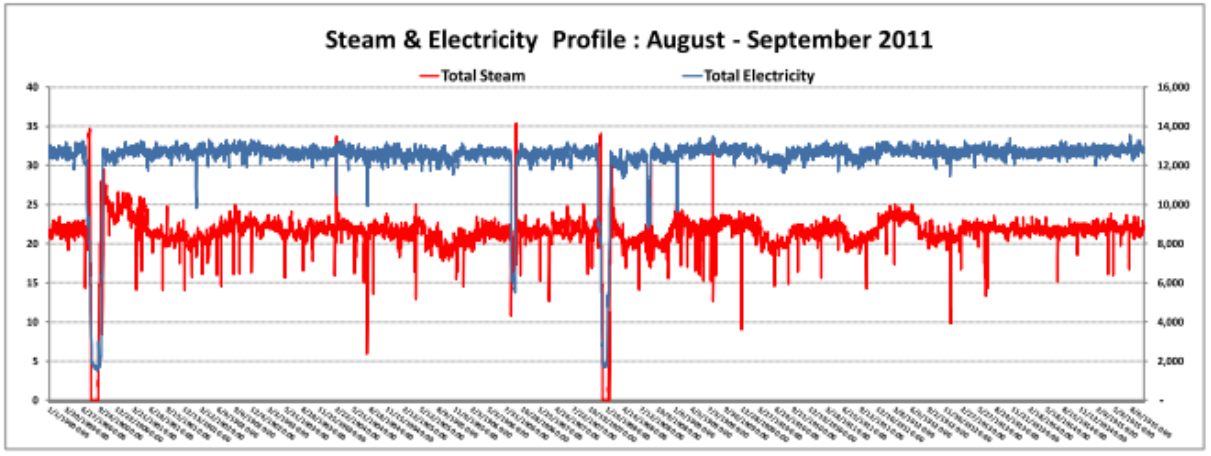


FIGURE 3-10: NST'S OPERATION INTERUPTION ON DECEMBER 10, 2011 (every 1 min.)



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- Energy Audit Result (Efficiency of System, Energy Profile, etc.) + Auditing Tools Table

TABLE 3-3: LIST OF ENERGY AUDIT TOOLS

#	Name of Tool	Picture	Units	Details	Code
1	Digital Power meter CHAUVIN ARNOUX Model : C.A 8210 Range : 1A-1000 A , 600 v, 30 - 300 kW (with Y 13 Clamp)		1	Measurements of kW, voltage, anphere, and power factor	EEi.03
2	PROCESS METER FLUKE Model : 789 Range : 1000 v,400 mA		1	Measurements of voltage, anphur, and resistance	EEi.04
3	Data Logger Dent Model : ELITEpro Range : 0-600 Volts AC or 0-800 Volt DC,0-333 mV AC or 0-600 mV DC		2	Setting measuring frequency and recording of kW, voltage, amphere, power factor, and harmonic (Data Exportable to Excel)	EEi.07
4	Data Logger Wisco Model : ML 22 Range : 0-10 VDC,		2	Recording and setting recording frequency of voltage (Data Exportable to Excel)	EEi.10
5	CLAMP Meter FLUKE 334		1	Measuring of voltage, amphere, resistance	EEi.18
6	I.R Themo meter Model INF125		1	Temperature Range: -30 → +500°C Accuracy: 10°C → 30°: ±1°C; elsewhere, the greater of: ±1.5% of reading or 1.5°C Resolution: 0.2°C Emissivity: Preset to 0.95 Distance to spot Ratio: 10:	EEi.19
7	DVR-01 Cameri Capture		1	2.5" LCD monitor with 6 Infrared LED for night shot recording, 120 degree angle len, SDHC compatable, storage capacity 64GB	EEi.42

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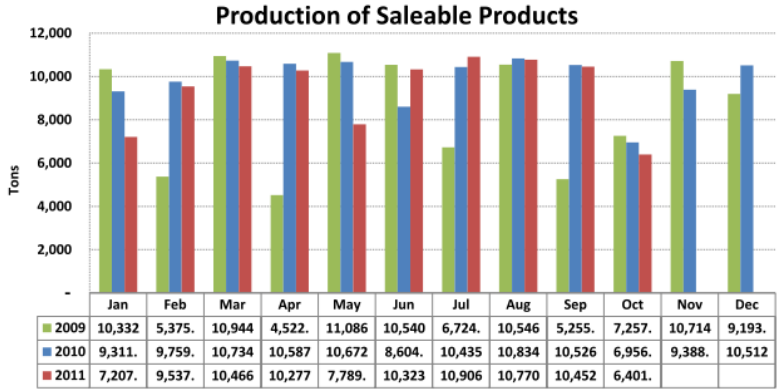
- Forecast production &process plan (Expansion or Downsizing **1-3 years**)
  - Matching energy consumption requirement



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	10,332	5,375.	10,944	4,522.	11,086	10,540	6,724.	10,546	5,255.	7,257.	10,714	9,193.
2010	9,311.	9,759.	10,734	10,587	10,672	8,604.	10,435	10,834	10,526	6,956.	9,388.	10,512
2011	7,207.	9,537.	10,466	10,277	7,789.	10,323	10,906	10,770	10,452	6,401.		

FIGURE 3-1 PRODUCTION OF NST 2009-2011

- Production Variance
  - Hourly swing within a day (e.g. peak vs. off-peak, working hours vs. non-working hours)
  - Daily swing within a week (e.g. weekday vs. weekend, TOU preference)
  - Monthly swing within a year (e.g. seasonal of raw material, seasonal of market)
  - Yearly swing within half-decade → **Depend on nature of business**
- Forecast by-product availability (from customer's process) (if to be utilized e.g. waste water, waste heat, biomass, …)
- **Current Integrated Utility Demand-Supply diagram** (e.g. block diagram showing connection between utilities and process)

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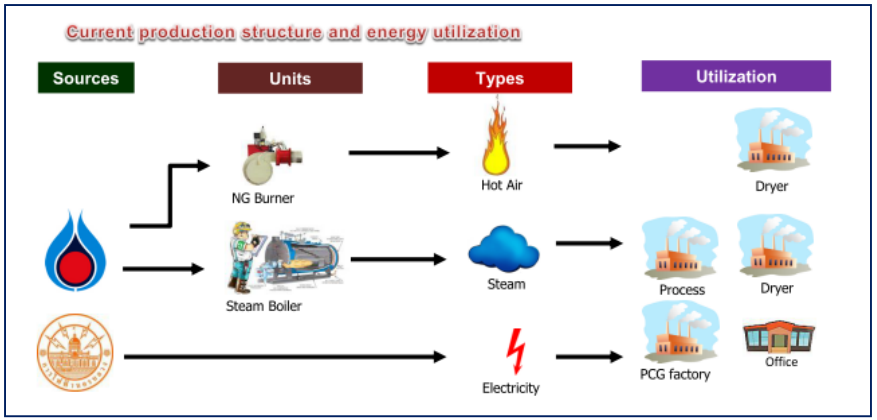
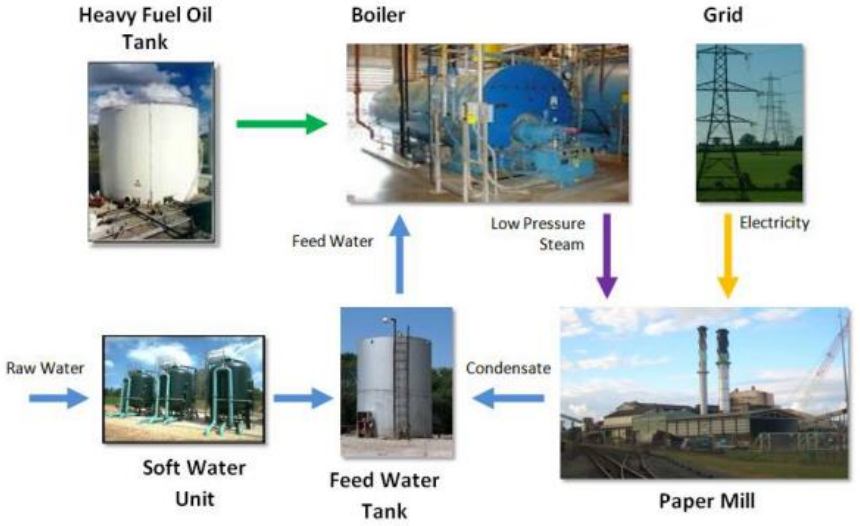
❑ **Current Integrated Utility Demand-Supply diagram**

(e.g. block diagram showing connection between utilities and process)





IGA Report Template Content & Checklist
4. SPT Introduction

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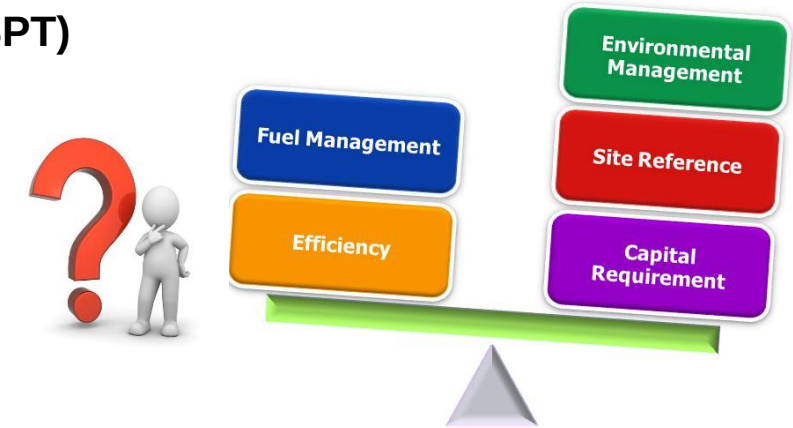
@Selected Project Technology (SPT)

❑ **Why this SPT is for you???**

❑ **SPT Introduction**



Content in SPT Introduction

❑ **What**: Brief about this SPT + "Process Block Diagram"

❑ **How**: How it work

❑ **Why**: **A**dvantage

Benefit (**F**unctional + **E**motional **(public perception)**

❑ **Limitation & Cons:** Disadvantage, Drawback

❑ **Reference & Credential:**

- ✓ This is not a too risky! Technology is proven!
- ✓ However, big challenging in Development & Implement & O&M
- ✓ Site Reference (Local & Abroad)
- ✓ **ESCO Value Proposition** on this SPT → ESCO's track records

IGA Report Template Content & Checklist

5. SPT: Conceptual Design

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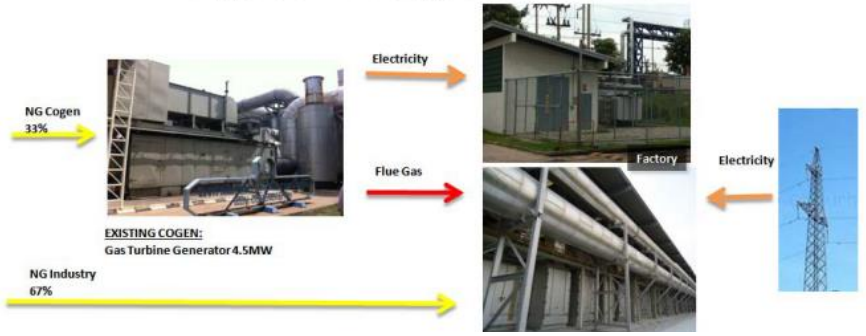
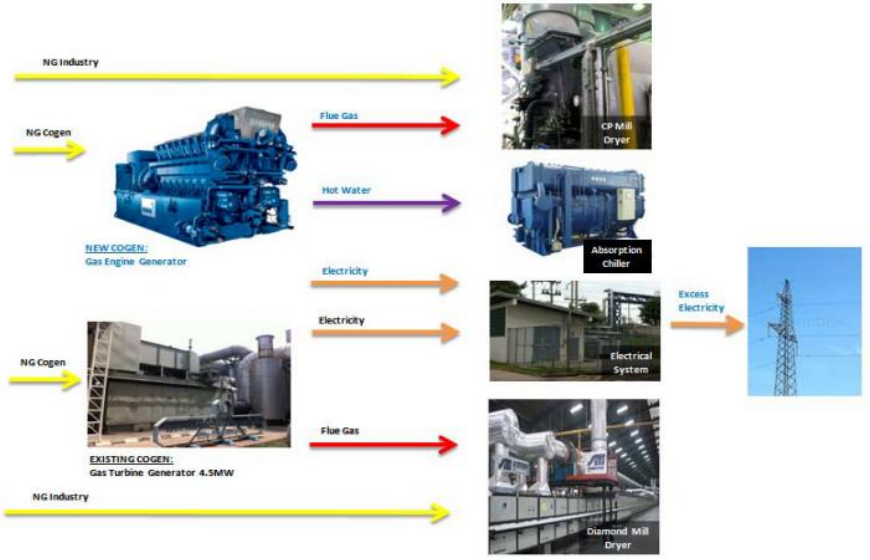
- **Before & After of** Block Diagram/ Process Flow Diagram
- Layout and Interconnection
- Heat Balance, Input-Output Calculation

Figure 3-1 Energy Source for TGP



Before

Figure 3-2 Integration of New Cogen into Existing System



After

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5. SPT: Conceptual Design

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Arranged by following this order :-

- ❑ **Site Conditions** - ^{O}C, %RH, Rainfall, Elevation, GPS, Area
- ❑ **SPT Design** – Block Diagram, Process Flow Diagram, M&H balance
  - *Design Alternatives/Options*
  - *Comparison of Alternatives/Options*
  - *ESCO's Suggestion & Rationale*
- ❑ **Civil** (Layout, number of floor, type of building, …, architect), 3D
- ❑ **Mechanical** (Piping Design route, Equipment specifications)
- ❑ **Electrical** (Single Line Diagram, Power System Study-**optional**)
- ❑ **Control & Instrument**, PMS, Network Diagram(Interconnection to other systems), Functions of C&I
- ❑ **Environmental* & Safety**
- ❑ **Fuel*** Lab test, Specification, Availability & Arrangement (Sourcing, Storage, Feeding)
- ❑ **Water*** Lab test, Specification, Availability & Reservoir, Design (Raw & Waste water, RO/DI plant, Water balance diagram ….)
- ❑ Supporting BOQ (Bill of Quantity) (if any)
- ❑ **Others special** (vary by project) i.e. soil test, contour survey

** Macro information could be provided in section of Risk Management*

IGA Report Template Content & Checklist

6. SPT: Detail Financial Analysis

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Financial Assumptions

- ❑ Loan Condition (% granted, grace period), Interest Rate)
- ❑ Interest During Construction (IDC)
  - Equity Draw Down (standard 25%, ask Cost of Capital (CoC))
  - Loan Draw Down (standard 75%)
- ❑ Exchange Rate
- ❑ State in report “not showing VAT and other tax”, etc.

Target ± 5% Accuracy

TIC (Total Investment Cost)

1/4

- Equipment Group 1
- Equipment Group …
- Equipment Group N
System Integration Cost
TEC (Total Equipment Cost)
Import Duty & Transportation cost
Legal & Permit (e.g. EIA/IEE, Regulation Compliance)
Fuel/Consumable during testing/commissioning cost
O&M Development cost + O&M Staff
ESCO PME and Construction Supervision cost
Land cost
IDC: Interest During Construction cost
Construction and All Risk Insurance cost
Contingency cost

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Revenue & Expense Assumptions

- ❑ **Base price** and **Escalation** of **current** utility cost
- ❑ Inflation Rate/Utilities Tariff Escalation Rate
- ❑ Operating hours (Power plant vs. Production (Energy consume))
- ❑ State not showing VAT and other tax (disclaiming Corporate Income Tax)

SPT Revenues

- ❑ **Explain Baseline energy profile**
  - ✓ *Electricity (Net Electricity & Demand Charge Saving)*
  - ✓ *Thermal: Steam, Hot Water, Hot air, etc.*
  - ✓ *Avoidance O&M Cost*

Baseline – Operation

- ❑ **Production Level and Variance** (peak vs. off-peak, working hours vs. non-working hours, weekday vs. weekend, TOU preference, seasonal of raw material, seasonal of market)
- ❑ **Existing O&M cost** (yearly maintenance, staff, planned overhaul, …)

Baseline – Utility Cost of existing

- ❑ **Existing Utility cost** (e.g. electricity, steam, fuel)
  - Total care on usage charge + demand charge
  - Formula to determine actual utility cost (e.g. conversion ratio, boiler efficiency)

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SPT Expenses

- ❑ **Explain every Expense Item in detail**
- ❑ **Fuel Expense**
- ❑ **O&M Breakdown** expense
  - Manpower & O&M Org Chart
  - Consumable & Chemical (e.g. for water treatment)
  - Minor Overhaul Plan
  - Major Overhaul Plan + Reserve Policy
- ❑ **Waste & Environmental** Management (e.g. Ash Disposal)
- ❑ **Land Rental** expense
- ❑ **Insurance** expense
- ❑ **Community Development Fund (ERC)**

Note: *Escalation of revenues and expenses in the 1st year should be according to number of years on development phase.*
i.e. some project construction phase is longer than 1 year

	Construction Year -1	*Construction Year 0*	*Share Saving Year 1*
Escalation rate (i)	*(1+i)^1*	*(1+i)^2*	*(1+i)^3*

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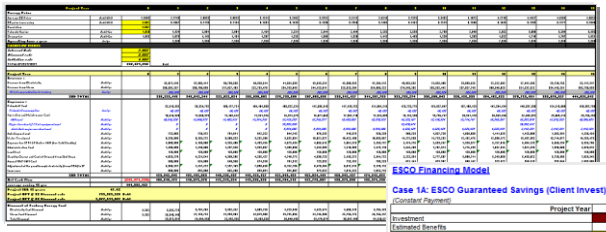
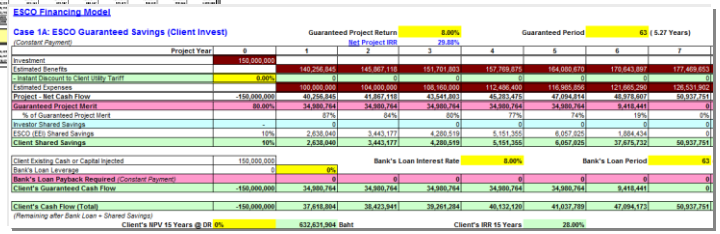
4/4

Output





- **Excel** Spreadsheet (show Revenues, Expenses, NCF, IRR, NPV, PB)
- Guaranteed Figures as per ESCO EPC
  - **Guaranteed Period**
  - **Guaranteed Amount** (For TIC and net savings shown)
- **Savings Guarantee explanation** (see Principal of ESCO Guaranteed Savings)
- **Sensitivity Analysis** Upside & downside scenario* (*Risk)

IGA Report Template Content & Checklist
7-8-9. SPT: Legal, Commercial, Risk

Content – IGA Report
Executive Summary
Introduction
Energy Consumption Profile(Current & Future)
Selected Project Technology, SPT
Conceptual Design <--> Technical Feasibility
Detail Financial Analysis <--> Financial Feasibility
Legal Feasibility
Commercial Feasibility
Risk Identification & Risk Mitigation
M&V Plan
Project Schedule
Supplier List
Appendix: Reference Material
Appendix: Supporting Material

- Focus in **responding/ supporting** to **Technical Feasibility Study** and **Financial Feasibility Study**

Legal Feasibility *(Will Legal allow us to do so?)*	**Commercial Feasibility** *(Would the other party really do as we wish?)*
❑ **Key Legal Issues**	❑ Availability of Transmission line and its load
❑ Environmental Compliance	❑ Power Purchase Agreement (if required)
❑ Ability to really construct at proposed site (Aor Bor Tor permission, Area Color Code (✓Purple ×Green)	❑ Fuel Supply Agreement (e.g. PTT, private, …)
❑ BOI Requirement & Procedure; any chicken & egg pre-requisite?	❑ By-product trade agreement (e.g. ash, waste)
❑ Viable steps required to utilize tax benefit	❑ Global Warming Benefit (CDM?, …)
❑ Permits & Regulations – What to do? When?	❑ Eligibility to get BOI privilege
	❑ Tax benefit (Import Duty, Corporate Income Tax)

(Sample) Permission, Regulation, and Privilege

BOI	PEA/MEA	PTT	DIW	COP
อบต.	DPT	ERC	DEDE	EIA

IGA Report Template Content & Checklist

7-8-9. SPT: Legal, Commercial, Risks

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Introduction
Energy Consumption Profile(Current & Future)
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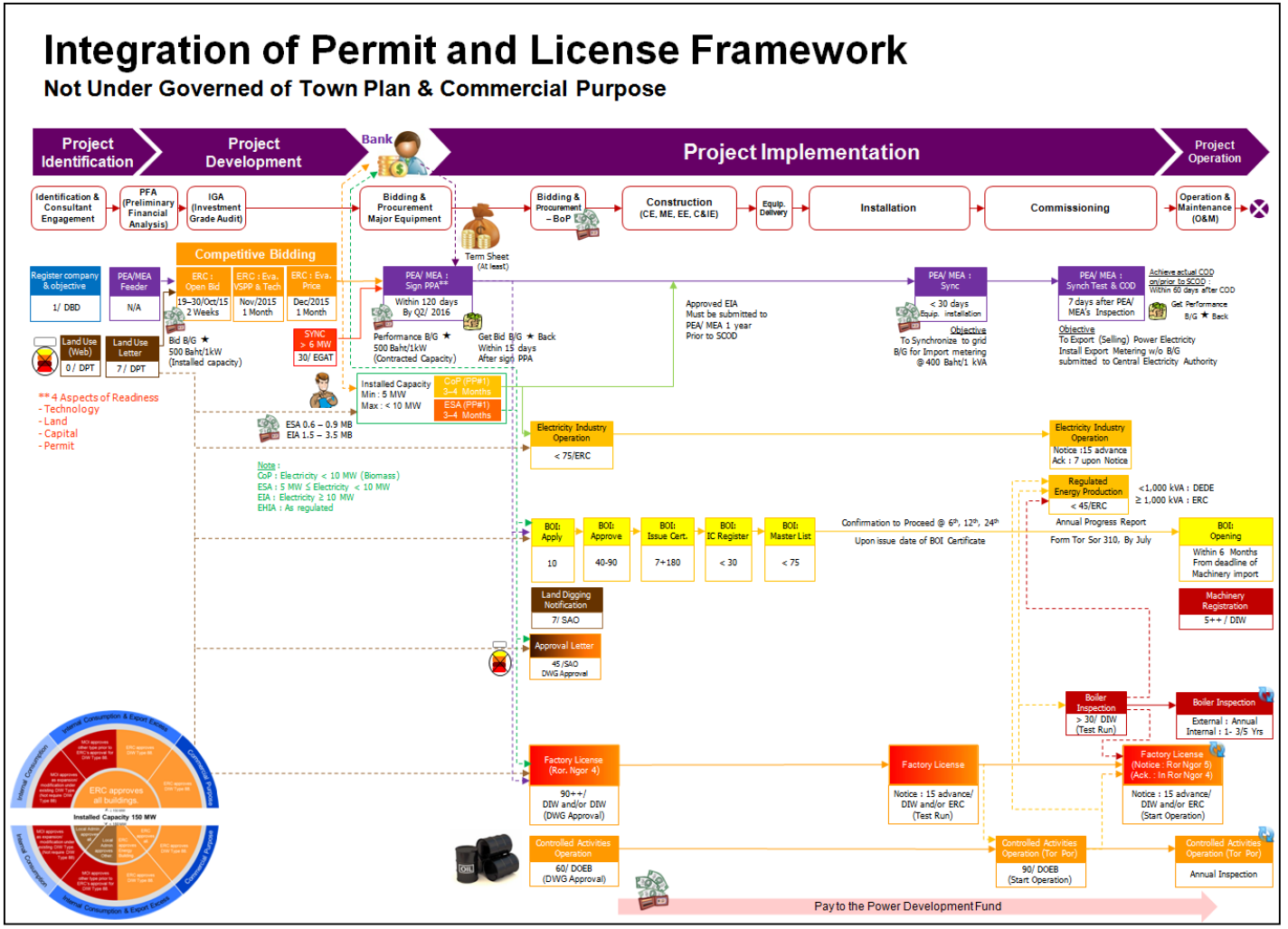
Example overview flowchart's CoP – Permits & Regulations



IGA Report Template Content & Checklist
7-8-9. SPT: Legal, Commercial, Risks

Content – IGA Report
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Introduction
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Selected Project Technology, SPT
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Commercial Feasibility
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Risk Identified vs. Risk Mitigation Strategy vs. Risk Impact

- Focus in **answering the mismatch/ non-aligning items** of all 4 angles of Feasibility Study **(Technical, Financial, Legal, Commercial)**
- ❑ **Summarize well mitigated risks** (and already incorporated and explained at the Feasibility Study section)
- ❑ **Identify** Risk
- ❑ **Explain** Risk clearly
- ❑ **Elaborate clearly** on Risk Mitigation Strategy **(5W1H – What, When, Where, Why, Who and How)**
- ❑ Run **Sensitivity Analysis: Downside** on Impact Analysis
- ❑ **Checklist of risks** = every items/ bullets for all 4 angles of Feasibility Study
- ❑ Risk Management Tools as used in **Project Status Report**

Risk Management			
Risk	**Resolution / Risk Mitigation Plan**	**Impact to Project**	**Responsible Person**

IGA Report Template Content & Checklist
7-8-9. SPT: Legal, Commercial, Risks

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Appendix: Supporting Material

Example

IGA Report Template Content & Checklist
10. SPT: M&V Plan

Content – IGA Report
Executive Summary
Introduction
Energy Consumption Profile(Current & Future)
Selected Project Technology, SPT
Conceptual Design <--> Technical Feasibility
Detail Financial Analysis <--> Financial Feasibility
Legal Feasibility
Commercial Feasibility
Risk Identification & Risk Mitigation
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Appendix: Supporting Material

M&V Plan

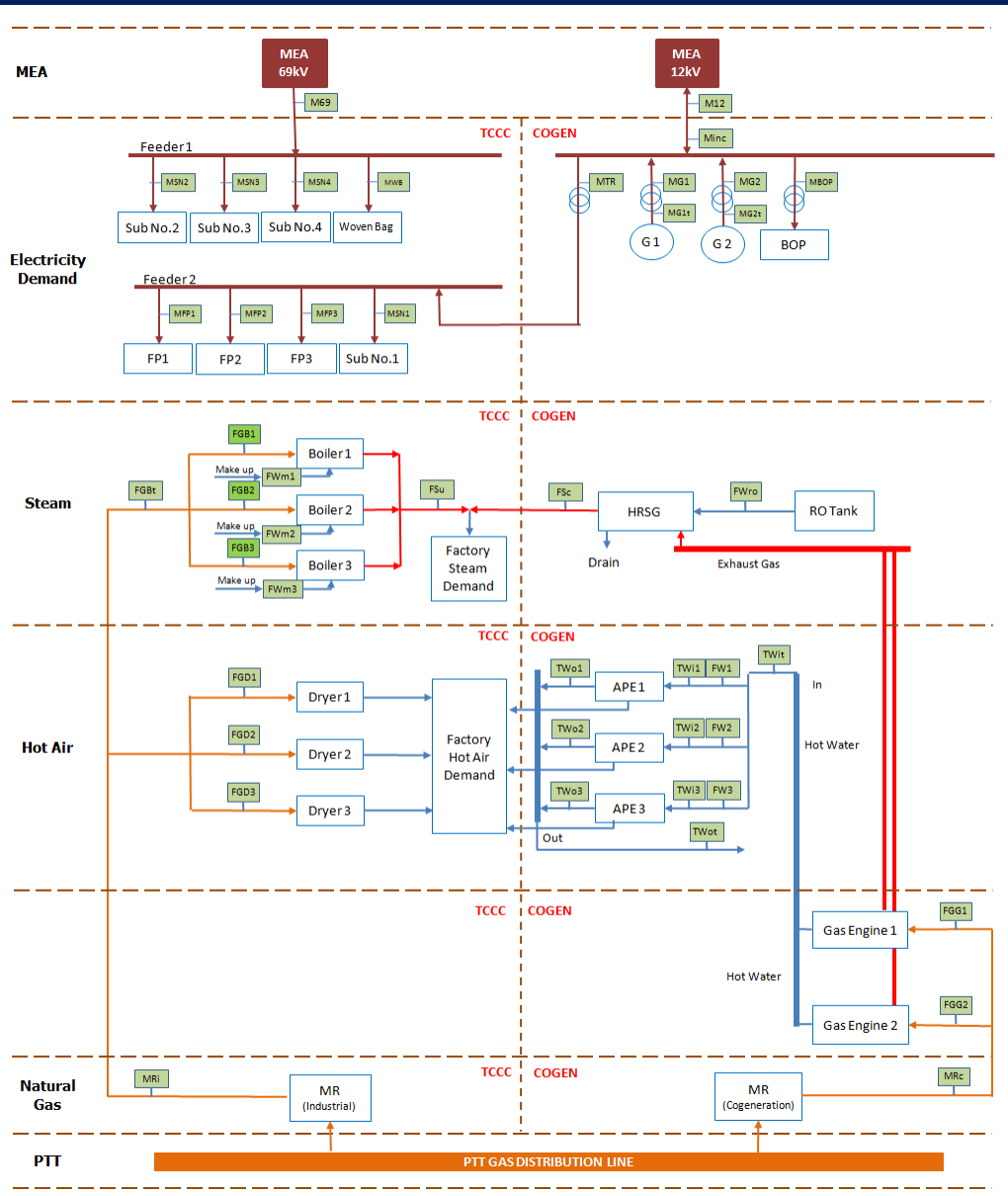
- ❑ Items on Project Benefit vs. Project Expense vs. Project Net Cash Flow
- ❑ Formula/ calculation/ Logic/ Agreement of every item
- ❑ Diagram of **Metering Point** and **source of post-installation data**
- ❑ **Data collection approach** (Manual? PMS? client's accounting data?) and **by who**
- ❑ **Plan (when, how, by who)** to measure every baseline/ derive formula constant (k value)
- ❑ Frequency of M&V Report
- ❑ Emphasize on future activity to further develop and mutually agree on **M&V Report Template** before project COD

IGA Report Template Content & Checklist

10. SPT: M&V Plan

Content – IGA Report
Executive Summary
Introduction
Energy Consumption Profile(Current & Future)
Selected Project Technology, SPT
Conceptual Design <--> Technical Feasibility
Detail Financial Analysis <--> Financial Feasibility
Legal Feasibility
Commercial Feasibility
Risk Identification & Risk Mitigation
M&V Plan
Project Schedule
Supplier List
Appendix: Reference Material
Appendix: Supporting Material

Example for M&V plan



IGA Report Template Content & Checklist
11. SPT: Project Schedule

Content – IGA Report
Executive Summary
Introduction
Energy Consumption Profile(Current & Future)
Selected Project Technology, SPT
Conceptual Design <--> Technical Feasibility
Detail Financial Analysis <--> Financial Feasibility
Legal Feasibility
Commercial Feasibility
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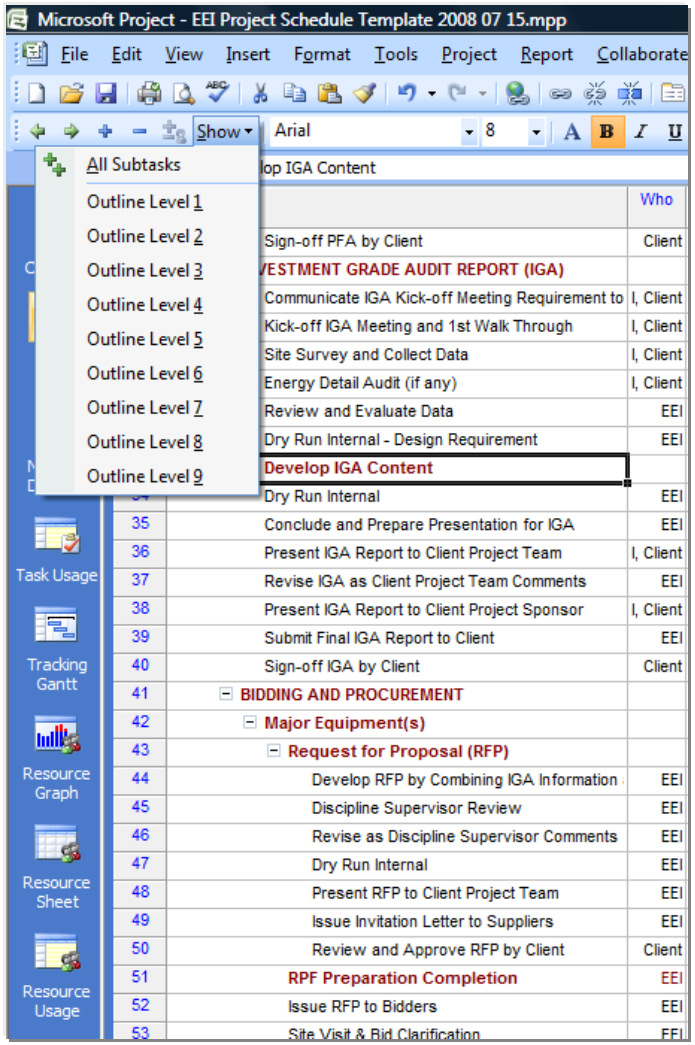
Appendix: Reference Material
Appendix: Supporting Material

Project Schedule

- ❑ Show **past activities** for **credibility**
- ❑ Show **coming activities** (i.e. RFP & Bid Evaluation) for **cooperation**
- ❑ Show **Key Milestones** of **Implementation activities** to answer ***project COD (when?), critical path, delay bottleneck, key dependencies, client key activities not to delay the project***



IGA Report Template Content & Checklist
12. SPT: Supplier List

Content – IGA Report
Executive Summary
Introduction
Energy Consumption Profile(Current & Future)
Selected SPT(s)
Conceptual Design <--> Technical Feasibility
Detail Financial Analysis <--> Financial Feasibility
Legal Feasibility
Commercial Feasibility
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Supplier List
Appendix: Reference Material
Appendix: Supporting Material

Supplier List – Major Equipments Only!

Should be ESCO & Customer Preferred Suppliers

Company Profile

- ❑ Equipment Brand Name
- ❑ Country of Business Operation
- ❑ Country of Technology License

Track Record (Operating & Under Construction)

- ❑ Site Reference in Thailand
- ❑ Site Reference in Thailand – similar project
- ❑ Site Reference in this world
- ❑ Site Reference in this world – similar project

Insight

- ❑ Strength of this Supplier
- ❑ Weakness of this Supplier *(if appropriate only!)*

Contact Conveniency

- ❑ Branch office in Thailand?
- ❑ Authorized Dealer in Thailand?
- ❑ Authorized Service Provider in Thailand?

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IGA Report Template Content & Checklist
12. Appendix 1, 2, …

Content – IGA Report
Executive Summary
Introduction
Energy Consumption Profile(Current & Future)
Selected SPT(s)
Conceptual Design <--> Technical Feasibility
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Appendix: Supporting Material

- **Reference Material**
  - Customer's data e.g. logged sheet, Billings
  - Audited Data

- **Supporting Material**
  - Fuel Analysis (biomass, MSW, sludge, etc.)
  - Water properties
  - Soil Test
  - Bill of Quantities; Civil, EE, ME, C&I
  - Diagrams; civil 2D/3D, single line diagram, piping diagram, C&I network diagram
  - Plant Layout
  - Process Flow Diagram/ Battery limit diagram
  - Emission Regulations
  - VSPP Regulations

Module 3 :
Financial Analysis for ESCO Project

- Investment Grade Audit Report (IGA Report)
- ESCO Guaranteed Savings
- Financial Proposal

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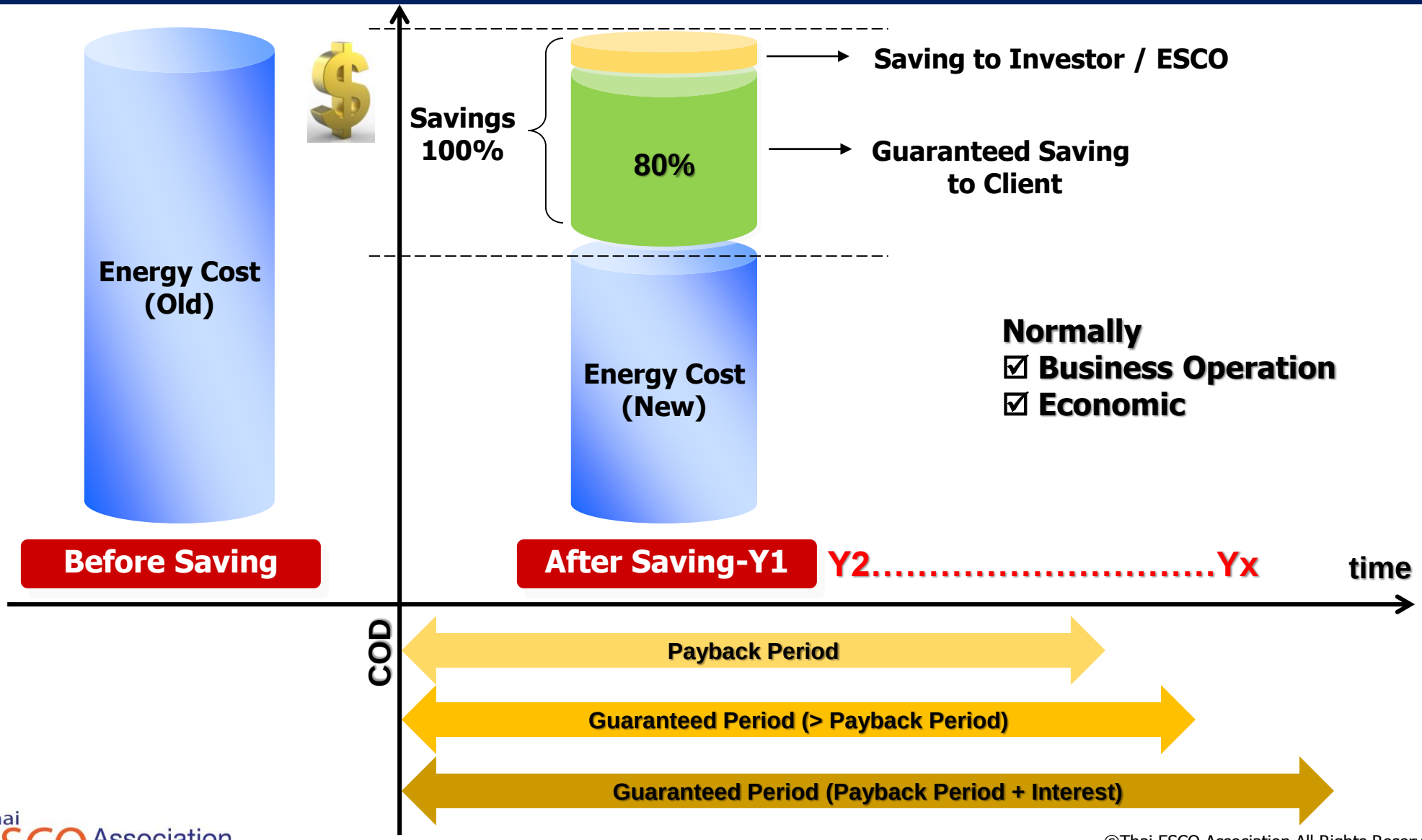
ESCO Guaranteed Savings

FAIR &
TECHNICAL RISK MANAGEABLE

Principal of ESCO Guaranteed Savings



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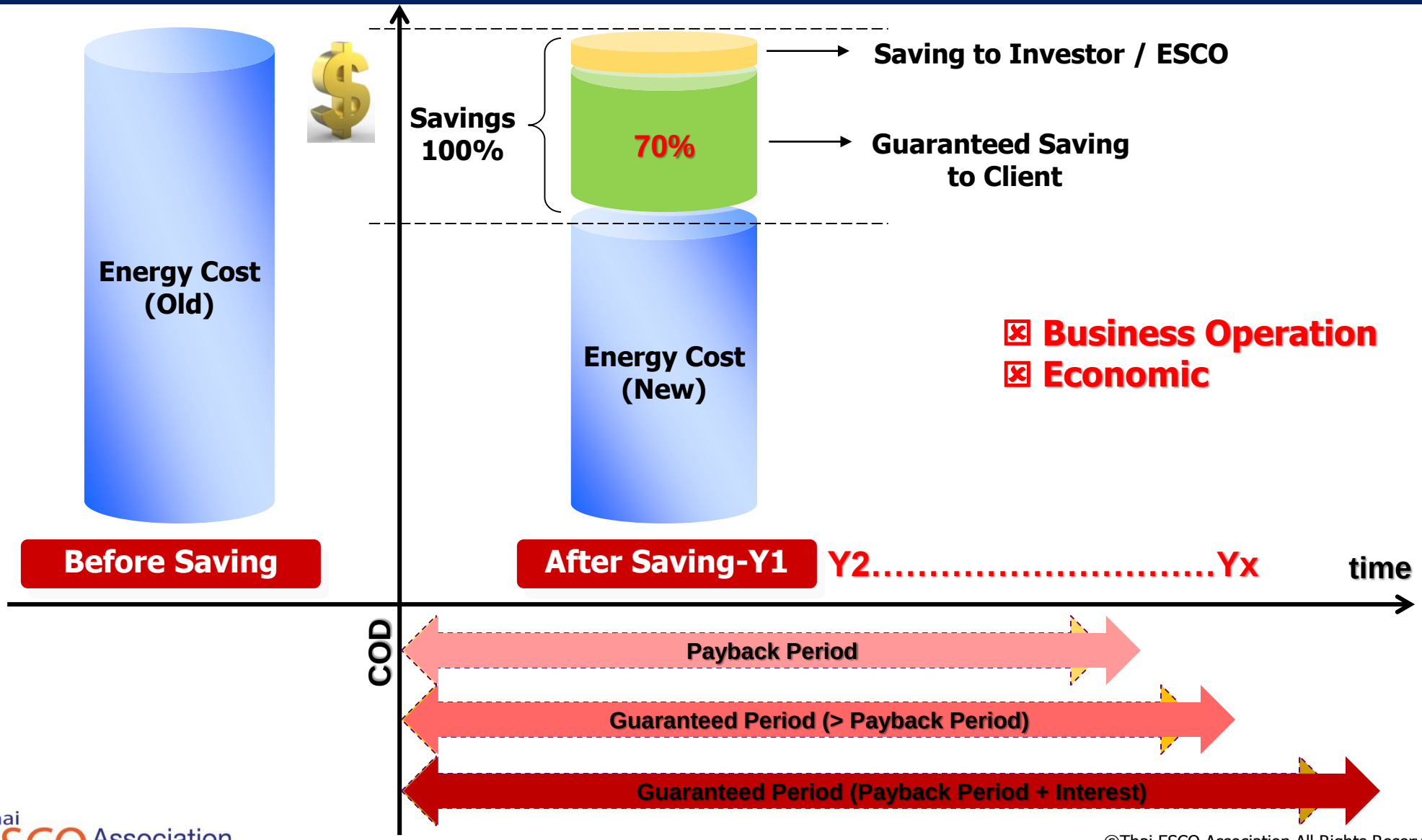
ESCO Guaranteed Savings

FAIR &
TECHNICAL RISK MANAGEABLE

Principal of ESCO Guaranteed Savings



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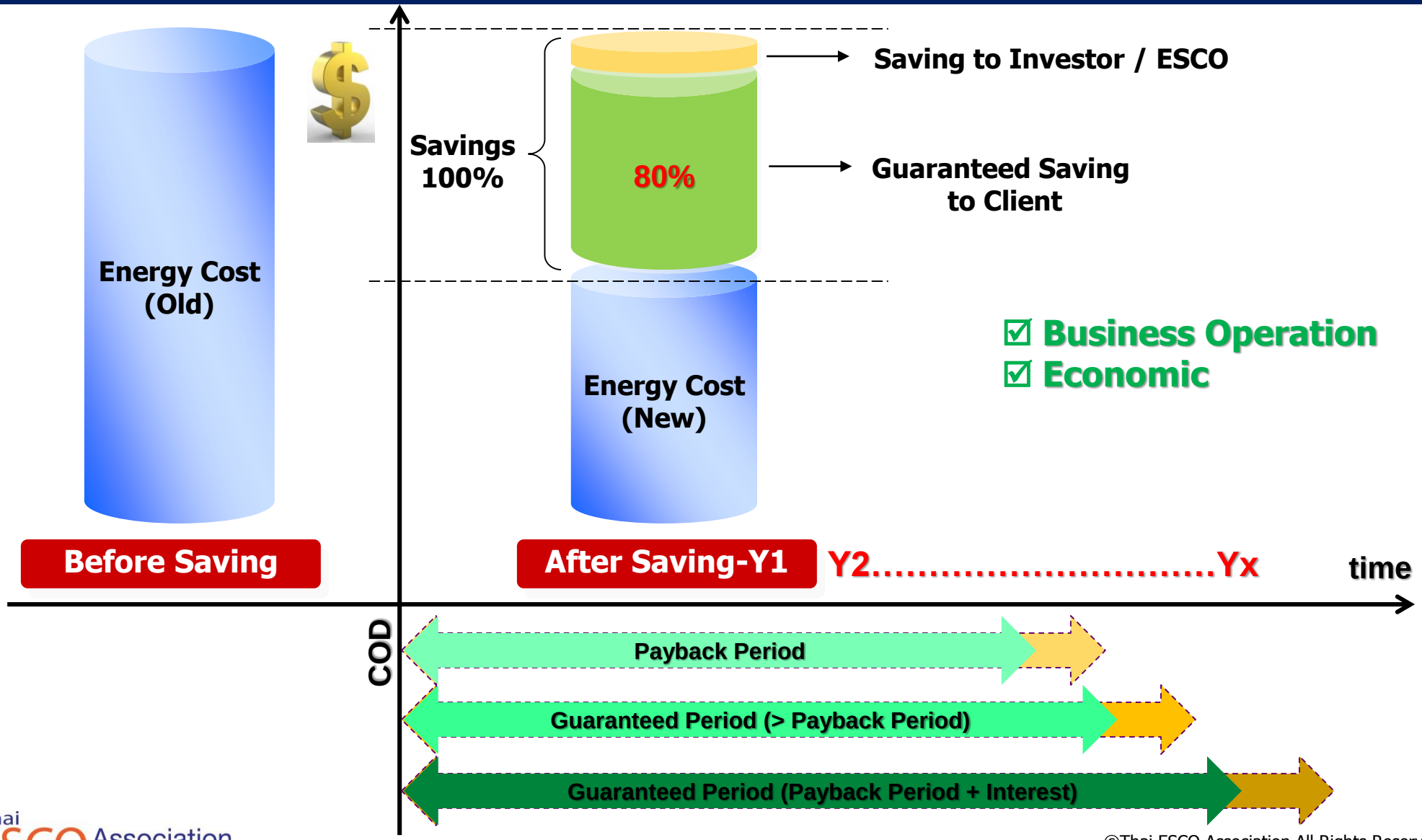
ESCO Guaranteed Savings

FAIR &
TECHNICAL RISK MANAGEABLE

Principal of ESCO Guaranteed Savings



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ESCO Guaranteed Savings

FAIR &
TECHNICAL RISK MANAGEABLE

Generally type of ESCO Guaranteed Savings

Option 1: Constant Payment

Option 2: 1st Year Low, 2nd onward Constant Payment

Option 3: Exact 80% Guaranteed Project Merit for every year

Guaranteed Project Merit

- ☑ Technical Risk
- ☒ Business Operation Risk
- ☒ Economic Risk

Y2.....Yx

time

ESCO Guaranteed Savings

Option 1: Constant Payment

Guaranteed Project Return	8.00%	Guaranteed Period	88 (7.33 Years)

Changeable here.

Case 1A: ESCO Guaranteed Savings (Client Invest)

(Constant Payment)

Guaranteed Project Return 8.00% Guaranteed Period 88 (7.33 Years)

Net Project IRR 15 Years 21.76% Net Project IRR 20 Years 22.82%

Project Year	0	1	2	3	4	5	6	7	8	9
Within/Partial/Beyond?		Within	Within	Within	Within	Within	Within	Within	Partial	Beyond
Investment	232,157,934									
Estimated Benefits		47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
- Instant Discount to Client Utility Tariff	0.00%	0	0	0	0	0	0	0	0	0
Estimated Expenses		0	0	0	0	0	0	0	0	0
Project - Net Cash Flow	-232,157,934	47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
Guaranteed Project Merit	80.69%	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	13,983,165	0
% of Guaranteed Project Merit		88%	86%	83%	81%	79%	76%	74%	24%	0%
ESCO (EEI) Shared Savings	10%	2,732,635	3,443,856	4,176,414	4,930,949	5,708,120	6,508,606	7,333,107	2,727,447	0
Client Shared Savings	10%	2,732,635	3,443,856	4,176,414	4,930,949	5,708,120	6,508,606	7,333,107	41,603,566	60,063,604

Client's Analysis

Bank's Loan Interest Rate 7.00%

Bank's Loan Repayment Period 88 (7.33 Years)

Client Existing Cash or Capital Injected	232,157,934									
Bank's Loan Leverage	0	0%								
Within/Partial/Beyond?		Within	Within	Within	Within	Within	Within	Within	Partial	Beyond
Bank's Loan Payback Required *(Constant Payment)*		0	0	0	0	0	0	0	0	0
Client's Guaranteed Cash Flow	-232,157,934	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	13,983,165	0
Client's Cash Flow (Total)	-232,157,934	44,682,129	45,393,350	46,125,908	46,880,443	47,657,614	48,458,100	49,282,601	55,586,731	60,063,604

(Remaining after Bank Loan + Shared Savings)

Client's NPV 15 Years @ DR 0% 612,144,035 Baht Client's IRR 15 Years 20.18%

Client's NPV 20 Years @ DR 0% 1,004,333,383 Baht Client's IRR 20 Years 21.40%

47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	41,949,494	13,983,165	0

Guaranteed Project Merit < **Project - Net Cash Flow**

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ESCO Guaranteed Savings

Option 2: 1st Year Low, 2nd onward Constant Payment

Guaranteed Project Return 8.00% **Guaranteed Period** 88 (7.33 Years)

Changeable here.

Case 1B : ESCO Guaranteed Savings (Client Invest)

(1st Year Low, 2nd onward Constant Payment)

Guaranteed Project Return 8.00% **Guaranteed Period** 88 (7.33 Years)

Net Project IRR 15 Years 21.76% Net Project IRR 20 Years 22.82%

Project Year	0	1	2	3	4	5	6	7	8	9
Within/Partial/Beyond?		*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Partial*	*Beyond*
Investment	232,157,934									
Estimated Benefits		47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
- Instant Discount to Client Utility Tariff	0.00%	0	0	0	0	0	0	0	0	0
Estimated Expenses		0	0	0	0	0	0	0	0	0
Project - Net Cash Flow	-232,157,934	47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
Project Payback - Principal		19,000,000								
Project Payback - Interest		17,052,635								
Guaranteed Project Merit	80.73%	36,052,635	43,009,477	43,009,477	43,009,477	43,009,477	43,009,477	43,009,477	14,336,492	0
% of Guaranteed Project Merit		76%	88%	86%	83%	81%	78%	76%	25%	0%
Client Shared Savings	10%	5,681,064	2,913,865	3,646,423	4,400,958	5,178,129	5,978,615	6,803,115	41,426,903	60,063,604
ESCO (EEI) Shared Savings	10%	5,681,064	2,913,865	3,646,423	4,400,958	5,178,129	5,978,615	6,803,115	2,550,784	0

Client's Analysis

Client Existing Cash or Capital Injected	232,157,934	**Bank's Loan Interest Rate**	7.0%
Bank's Loan Leverage	0	0%	**Bank's Loan Repayment Period** 88 (7.33 Years)

Within/Partial/Beyond?		*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Partial*	*Beyond*
Bank's Loan Payback Required *(Constant Payment)*		0	0	0	0	0	0	0	0	0
Client's Guaranteed Cash Flow	-232,157,934	36,052,635	43,009,477	43,009,477	43,009,477	43,009,477	43,009,477	43,009,477	14,336,492	0
Client's Cash Flow (Total)	-232,157,934	41,733,699	45,923,342	46,655,900	47,410,434	48,187,605	48,988,091	49,812,592	55,763,395	60,063,604

(Remaining after Bank Loan + Shared Savings)

Client's NPV 15 Years @ DR 0% 612,552,217 Baht **Client's IRR 15 Years** 20.09%

Client's NPV 20 Years @ DR 0% 1,004,741,565 Baht **Client's IRR 20 Years** 21.32%

47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
19,000,000								
17,052,635								
36,052,635	43,009,477	43,009,477	43,009,477	43,009,477	43,009,477	43,009,477	14,336,492	0

Changeable here.

Guaranteed Project Merit < **Project - Net Cash Flow**

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ESCO Guaranteed Savings

Option 3: Exact 80% Guaranteed Project Merit for every year

Guaranteed Period 88 (7.33 Years)

Changeable here.

Case 1C : ESCO Guaranteed Savings (Client Invest)

(Exact 80% Guaranteed Project Merit for every year)

Guaranteed Period 88 (7.33 Years)

Net Project IRR 15 Years 21.76% Net Project IRR 20 Years 22.82%

ESCO guaranteed amount & period can cover full principal + interest rate of 6.87%

Project Year	0	1	2	3	4	5	6	7	8	9
Within/Partial/Beyond?		*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Partial*	*Beyond*
Investment	232,157,934									
Estimated Benefits		47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
- Instant Discount to Client Utility Tariff	0.00%	0	0	0	0	0	0	0	0	0
Estimated Expenses		0	0	0	0	0	0	0	0	0
Project - Net Cash Flow	-232,157,934	47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
Guaranteed Project Merit	80.0%	37,931,811	39,069,765	40,241,858	41,449,114	42,692,587	43,973,365	45,292,566	15,550,448	0
% of Guaranteed Project Merit		80%	80%	80%	80%	80%	80%	80%	27%	0%
Client Shared Savings	10%	4,741,476	4,883,721	5,030,232	5,181,139	5,336,573	5,496,671	5,661,571	40,819,925	60,063,604
ESCO (EEI) Shared Savings	10%	4,741,476	4,883,721	5,030,232	5,181,139	5,336,573	5,496,671	5,661,571	1,943,806	0

Client Analysis

Client Existing Cash or Capital Injected	232,157,934	Bank's Loan Interest Rate	7.0%
Bank's Loan Leverage	0	Bank's Loan Repayment Period	88 (7.33 Years)
	0%		

Within/Partial/Beyond?		*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Within*	*Partial*	*Beyond*
Bank's Loan Payback Required *(Constant Payment Type)*		0	0	0	0	0	0	0	0	0
Client's Guaranteed Cash Flow	-232,157,934	37,931,811	39,069,765	40,241,858	41,449,114	42,692,587	43,973,365	45,292,566	15,550,448	0
Client's Cash Flow (Total)	-232,157,934	42,673,287	43,953,486	45,272,090	46,630,253	48,029,161	49,470,035	50,954,137	56,370,373	60,063,604

(Remaining after Bank Loan + Shared Savings)

Client's NPV 15 Years @ DR 0% 611,429,980 Baht

Client's NPV 20 Years @ DR 0% 1,003,619,329 Baht

Client's IRR 15 Years 19.98%

Client's IRR 20 Years 21.22%

47,414,764	48,837,206	50,302,323	51,811,392	53,365,734	54,966,706	56,615,707	58,314,178	60,063,604
37,931,811	39,069,765	40,241,858	41,449,114	42,692,587	43,973,365	45,292,566	15,550,448	0
80%	80%	80%	80%	80%	80%	80%	27%	0%

Changeable here.

Guaranteed Project Merit < **Project - Net Cash Flow**

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Module 3 :
Financial Analysis for ESCO Project

- Investment Grade Audit Report (IGA Report)
- ESCO Guaranteed Savings
- Financial Proposal

Financial Proposal

Content – IGA Report (Investment Grade Audit)
Executive Summary
Introduction
Energy Consumption Profile (Current & Future)
Selected Project Technology (s)
- SPT Introduction
- Conceptual Design <--> Technical Feasibility
- Detail Financial Analysis <--> Financial Feasibility
- Legal Feasibility
- Commercial Feasibility
- Risk Identification & Risk Mitigation
- M&V Plan
- Project Schedule
- Supplier List
Appendix: Link to EPC
Appendix: Reference Material
Appendix: Supporting Material

Cover

	Financial Proposal
	Executive Summary
	Borrower Profile
☒	- Background, Opportunity
☒	- Corporate Structure
☒	- Financial Statements of the Borrower & Group Holding on company basis (B/S, P/L, C/F)
	Project Information
☒	**Business Plan**
☒	**Marketing Plan**
☑	**Technical Aspect**
☑	- Energy Profile
☑	- Conceptual Design
☑	- Risk Analysis
☑	**Commercial / Financial Aspect**
☑	- Assumption
☑	- Cashflow Projection
☑	- Sensitivity Analysis

Thai ESCO Association สมาคมบริษัทจัดการพลังงานไทย



Thank you

For More Information

Please Contact

Thai ESCO Association
212/3 Moo.5 Bypass Pakkred Rd.,
Pakkred, Pakkred, Nonthaburi, THAILAND, 11120
T. +66 (0) 2590 0397
Website: http://www.thaiesco.org
E-mail: association@thaiesco.org