

Pengalaman Industri dalam Program Industri Hijau

By

Ir Zulkaflī bin Mat Rani

Pengurus Besar

PPNJ POULTRY AND MEAT SDN BHD



GREENHOUSE GAS EFFECTS

The Sun

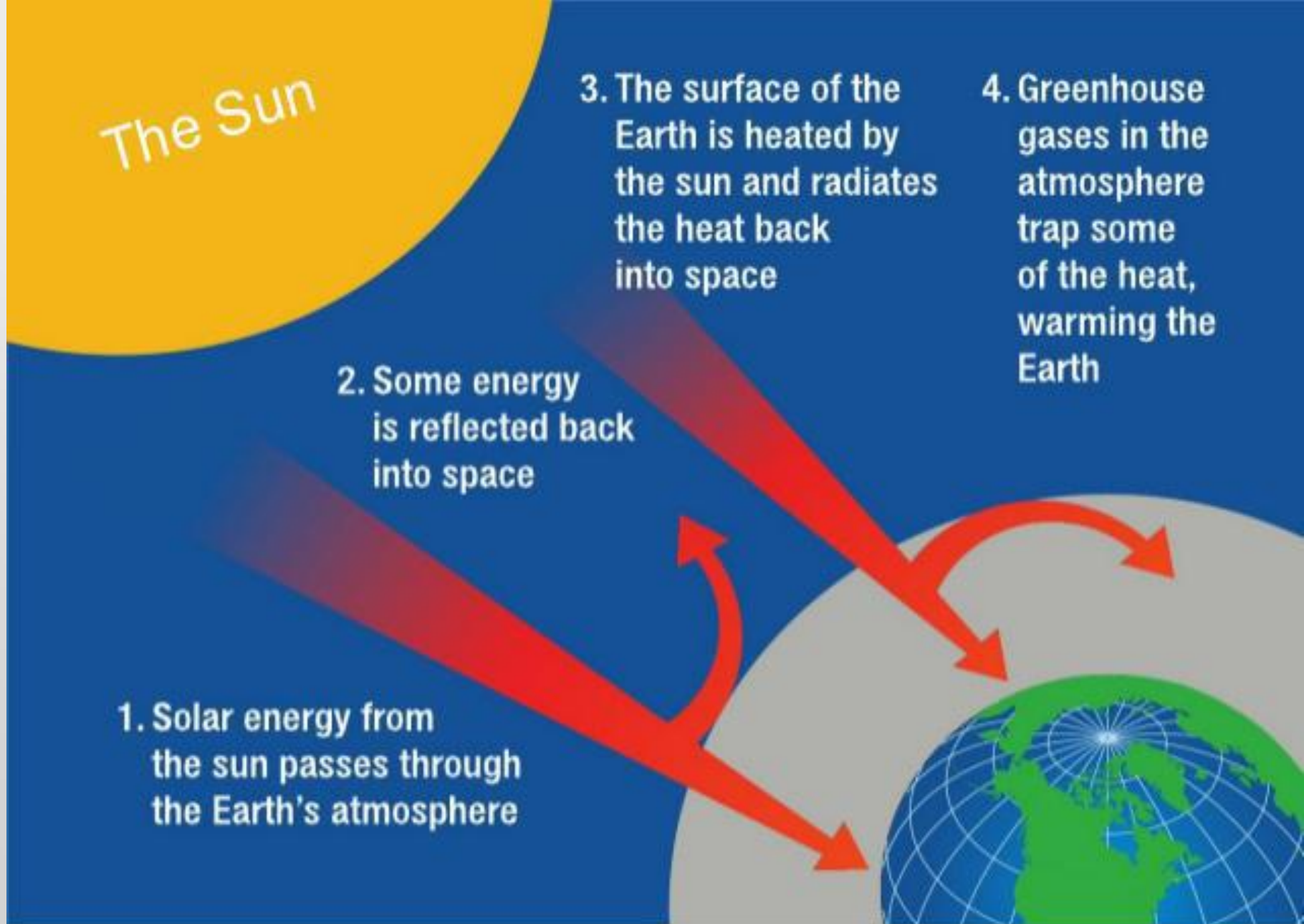
1. Solar energy from the sun passes through the Earth's atmosphere

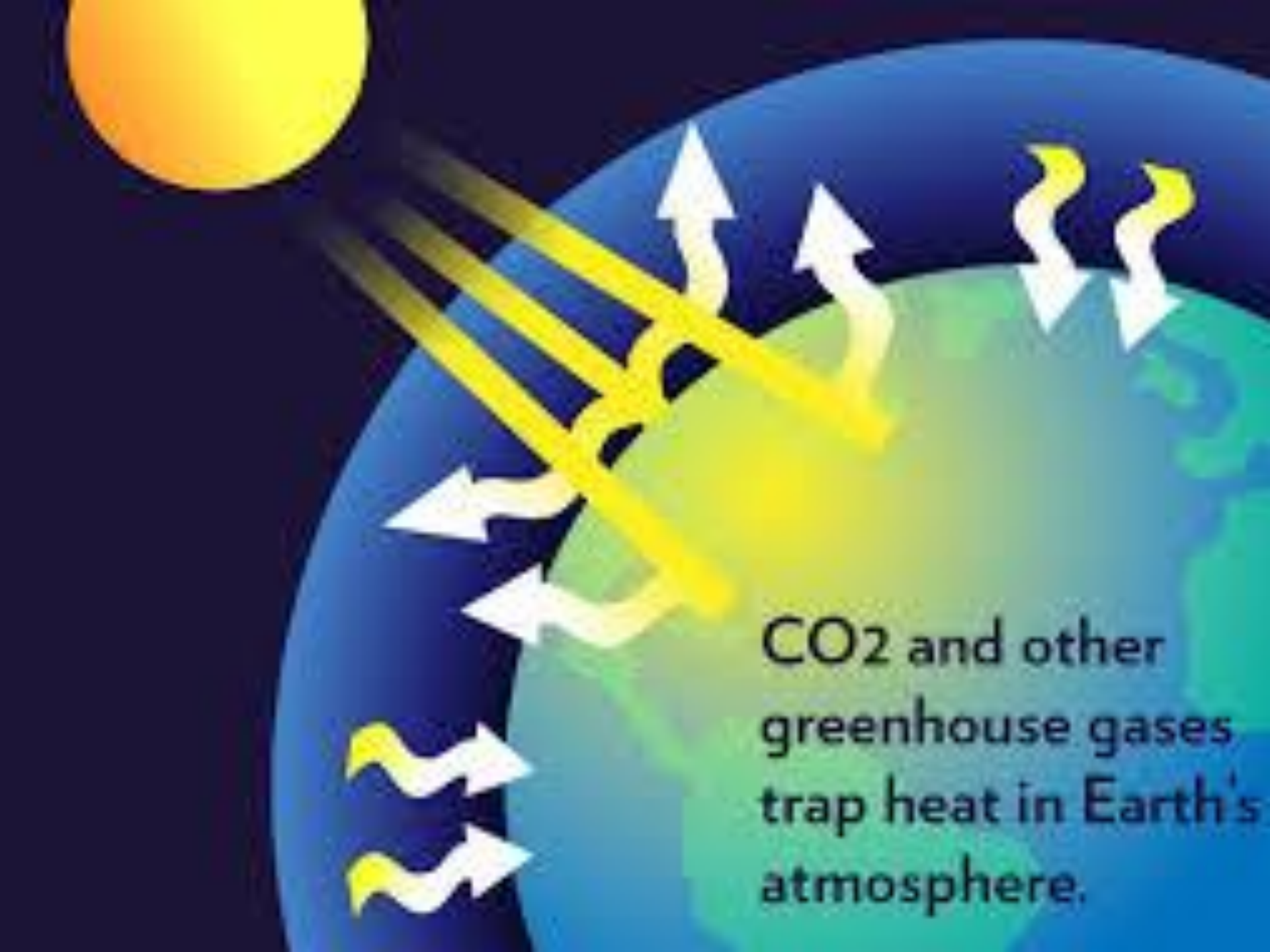
2. Some energy is reflected back into space

3. The surface of the Earth is heated by the sun and radiates the heat back into space

4. Greenhouse gases in the atmosphere trap some of the heat, warming the Earth

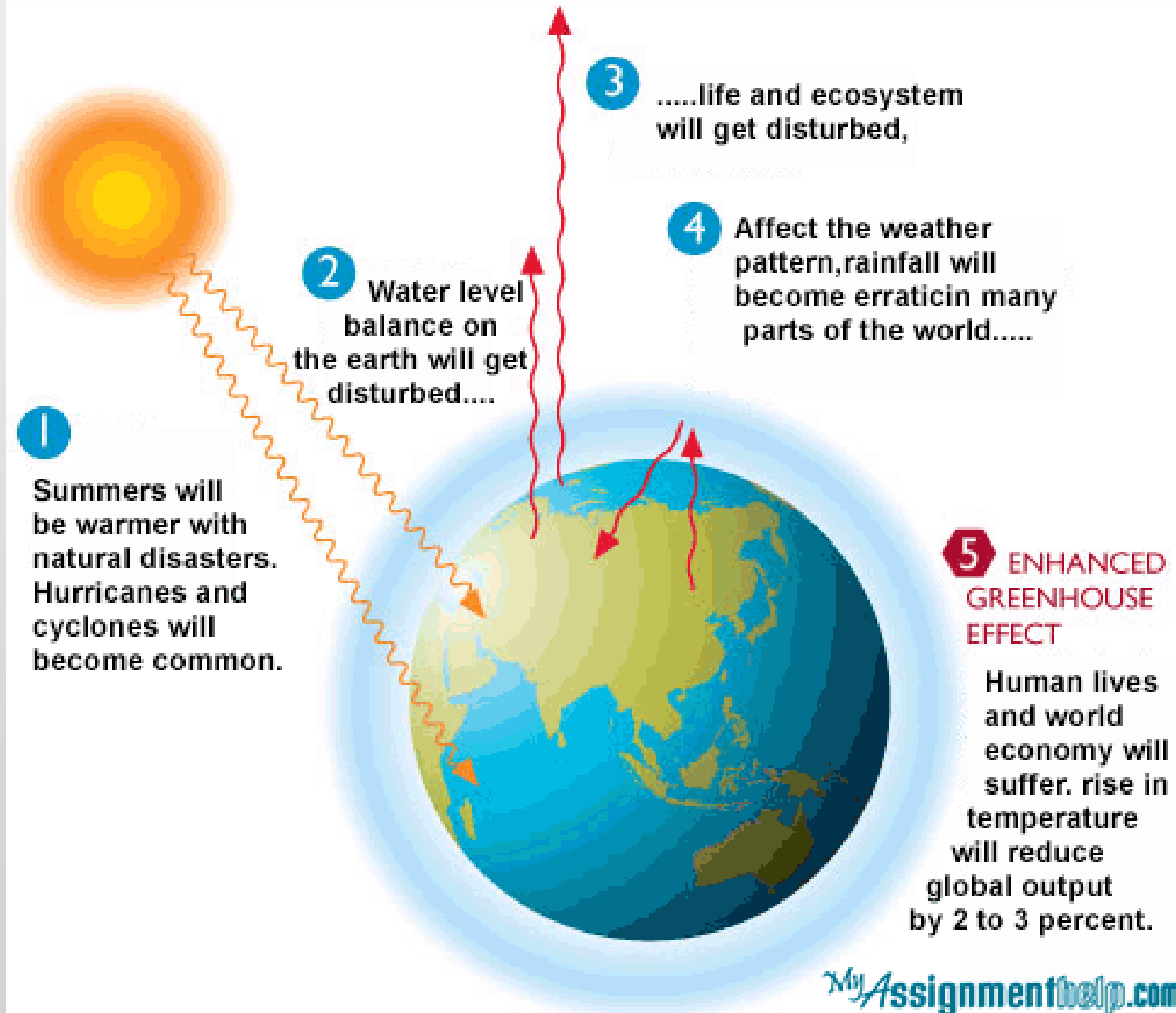
Green House Effect Diagram





CO₂ and other greenhouse gases trap heat in Earth's atmosphere.

What are the Disadvantages of Greenhouse Effect?



Global Warming

Global warming is the rise in the average temperature of Earth's atmosphere.



35%

Deforestation,
cars & trucks

60%

Of total
emissions come from
human activities

40%

Of total
 N_2O emissions
come from
human activities

METHANE

To offset the released
carbon the earth
need

68 billion
TREES

CARBON DIOXIDE

NITROUS OXIDE

What Contributes
to the **GREENHOUSE EFFECT**

ABOUT PPNJ POULTRY & MEAT SDN BHD

COMPANY BACKGROUND

- Subsidiary company of Johor Farmers Organisation
- Operated since 1st November 2002
- Halal Chicken slaughter house (slaughter chicken to produce chicken products)
- Processing Capacity, 1800 birds per hour.
- Products ; Whole chicken (super and standard), piece cut products, deboning products and further process products.



LOCATION



Address; Pusat Industri Peladang,
Batu 53 ¼ Jalan Ayer Hitam – Johor,
86100 Ayer Hitam, Johor Darul Takzim.
(PPNJ Simpang Renggam –Google Maps)

LOGO



MISSION

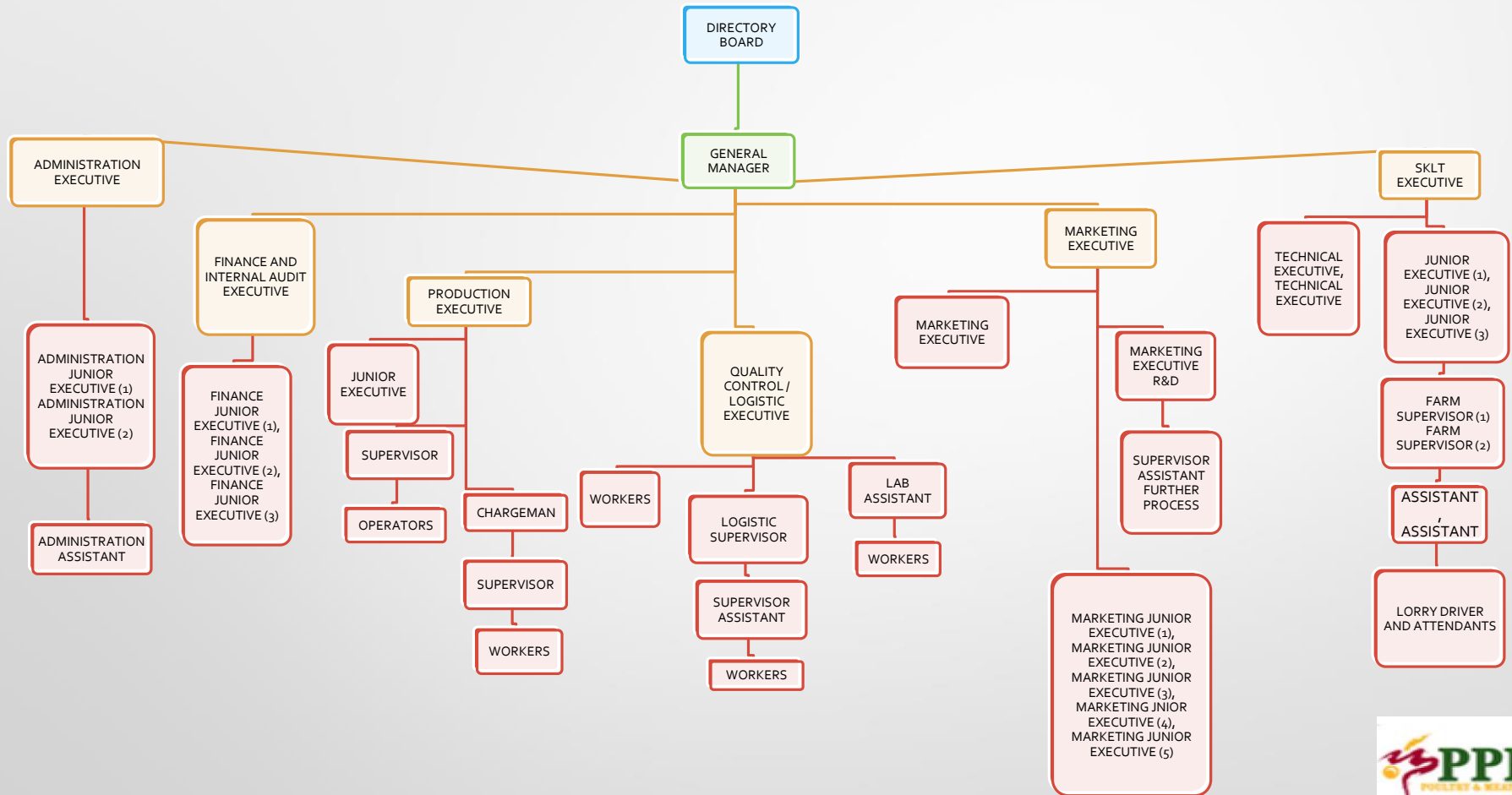
Continuing to improve products to fulfil customer satisfaction and helping PPNJ in improve social and economy of the farmer.

VISION

Became the main producer and provider for poultry product that halal, high quality , safe and clean for local market and export.



ORGANIZATIONAL CHART



Current project related to GREEN HOUSE GAS at PPNJ poultry and meat sdn bhd;

- 1) Solar Thermal Heater (to maintain water temperature at 60°C in scalding tank)
- 2) Biodigester and integrated system for poultry and meat waste water treatment

Project 1

Solar Thermal Heater (to maintain water temperature at 60°C in scalding tank)

Technical Issues/Problems:

High electricity consumption for steam boiler to produce hot water 60° C at scalding tank.

Solutions

- Energy audit
- To embark on energy saving measures
- Installation of solar thermal hot water by replace the electric boiler



**Before using
boiler**



**Now Solar
Thermal**

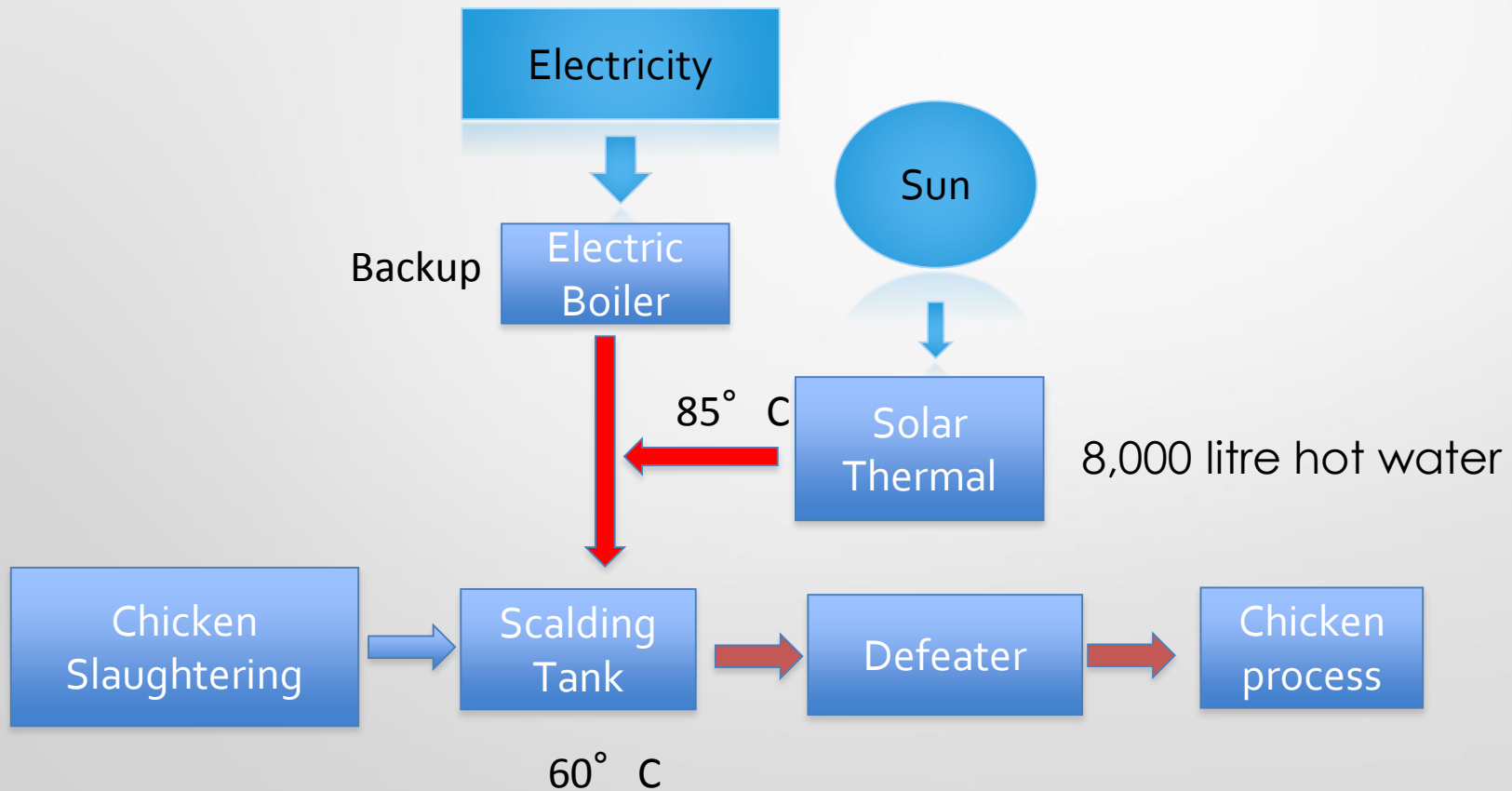


Scalding Tank

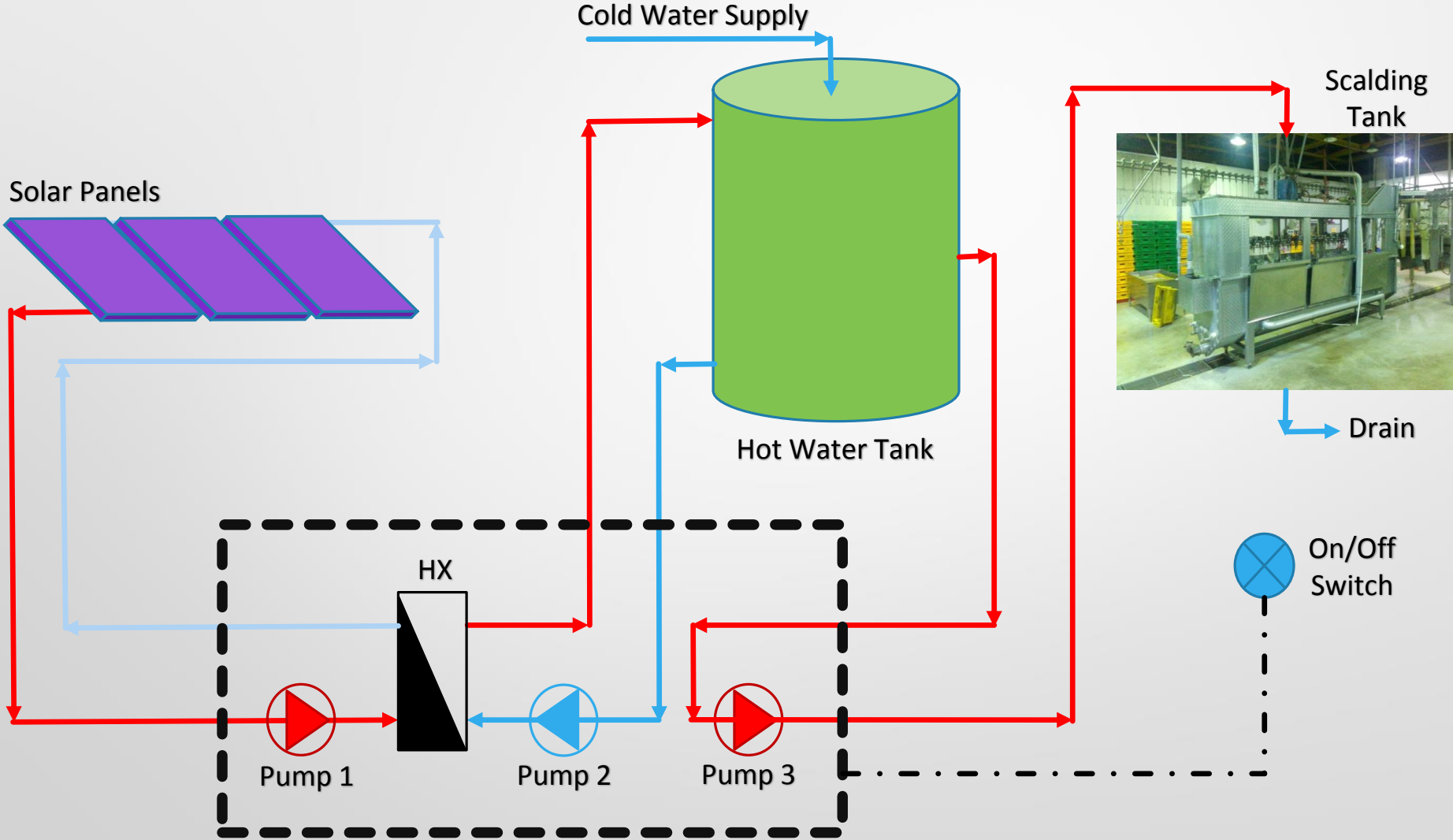
Solving SME Industry Wide Problem,P2-4



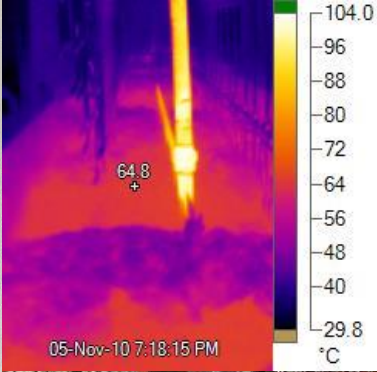
PPNJ Poultry and Meat Sdn. Bhd



System Diagram for Solar Hot Water System at PPNJ Machap



Pictures PPNJ



Solar Thermal Heater

SUMMARY

NO	Company Name	Industry	Problem	Temperature Requirement	Purpose	Capacity(L)	Cost (RM)
1	PPNJ	Poultry	Electricity High	Supply 85° C and process at 60° C	blanching process	8,000	460,000

RESULTS

- **Energy reduction:** 95% of Electric boiler which is saving RM120k/year(heating process)
- **Economic savings:** at least 10 % reduction in expenditure for total electricity usage at whole premise (RM1.2mil/year)
- **Environmental effect:**
- 299,520 kWh/year ,221.94 ton CO₂/year)
- Creates model for industry-wide solution for poultry industry

Project 2

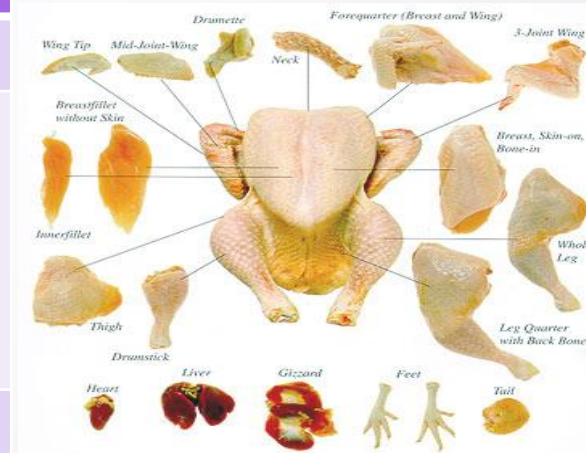
Biodigester and integrated system for poultry and meat waste water treatment

Project background

1	Project Owner	Department of Environment Ministry of Natural Resources and Environment Malaysia
2	Project consultant	Sirim Berhad
3	Project host	PPNJ Poultry and Meat Sdn. Bhd. (Subsidiary Company of Johor Farmers Organisation)
4	Project Duration	2016-2017
5	Scope	To provide Cleaner Production (CP) training, detail CP auditing and implementation of selected CP options including installation of pilot plant of biodigester system
6	Objective	To enhance company environmental performance and compliance

DETAIL OF PRODUCTS

Department	List of Product
Evisceration	Feet, Liver, Gizzard
Whole Chicken Product	W/chicken with head & feet, W/chicken w/o head & feet, W/chicken w/o head & feet (oder), W/chicken w/o head & feet (eden), W/chicken w/o head & feet (double), W/chicken t/reject, Spring chicken, W/chicken triple spring, W/chicken w/o head, feet, bishop nose (LEGOLAND)
Piece Cut Product	Rib, Thigh, Keel, Wing, Drumstick, Neck, Bishop Nose, 8 Piece Cut, 9 piece Cut, 10 piece Cut, 12 Piece Cut, 16 piece Cut, 22 piece Cut
Debone Product	Carcass, Fillet, Skinless Boneless Breast, Boneless Breast, Debone Whole Leg, Skinless Boneless Leg, Boneless Leg, BQ Wing, Chicken Chop, Curry Cut, Chicken Cube
Further Process Product	Nugget, Chicken Ties, Fried Chicken, Roasted Chicken, Chicken Finger, Popcorn, Chicken Breaded, Satay Rempah



Gambar Produk

Produk



Ayam Bulat



Ayam Super
Tanpa kepala,
Kaki, Hati dan
Pedal



Ayam Giblet
Dengan
Kepala, Kaki,
Hati dan Pedal

Keratan Ayam



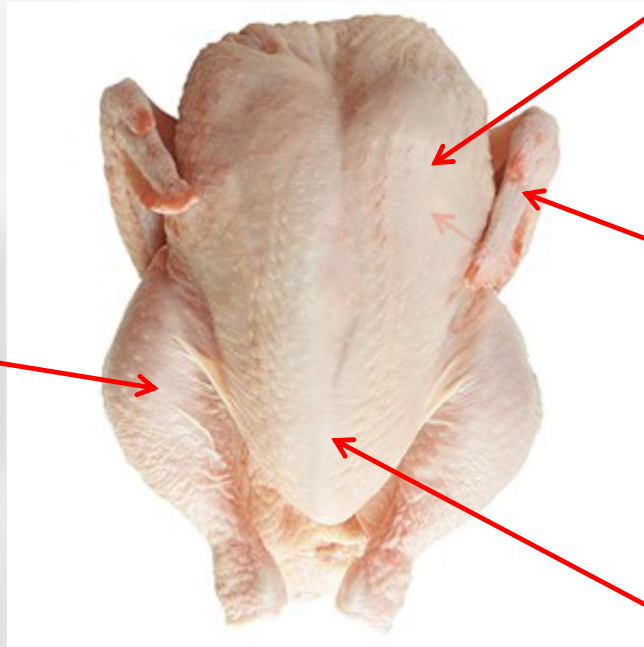
**THIGH/
PUNGGUNG**



**WHOLE LEG/
PEHA BESAR**



**DRUMSTICK/
PEHA**



RIBS/RUSUK



**WINGS/
KEPAK**



KEEL/DADA

Produk Debone



**BONELESS
BREAST/
DADA TANPA
TULANG**



FILLET



**B.B.Q.
WINGS**



DRUMMET



MIDDLE WING



**BONELESS
LEG**



**CHICKEN
CHOP**

Produk Sampingan



**FEET/
KAKI**



**LIVER/
HATI**



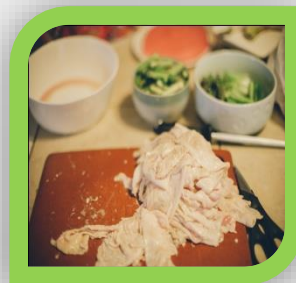
**GIZZARD/
PEDAL**



**BISHOP NOSE/
TONGKENG**



**NECK/
LEHER**



**SKIN/
KULIT**



**FAT/
LEMAK**



**CARCASS/
RANGKA**

Produk Tambah Nilai



**CHICKEN
SATAY**



**POPCORN
CHICKEN**



**FRIED
CHICKEN**



**SERUNDING
AYAM**



**ROASTED
BLACKPEPPER
CHICKEN**



NUGGET

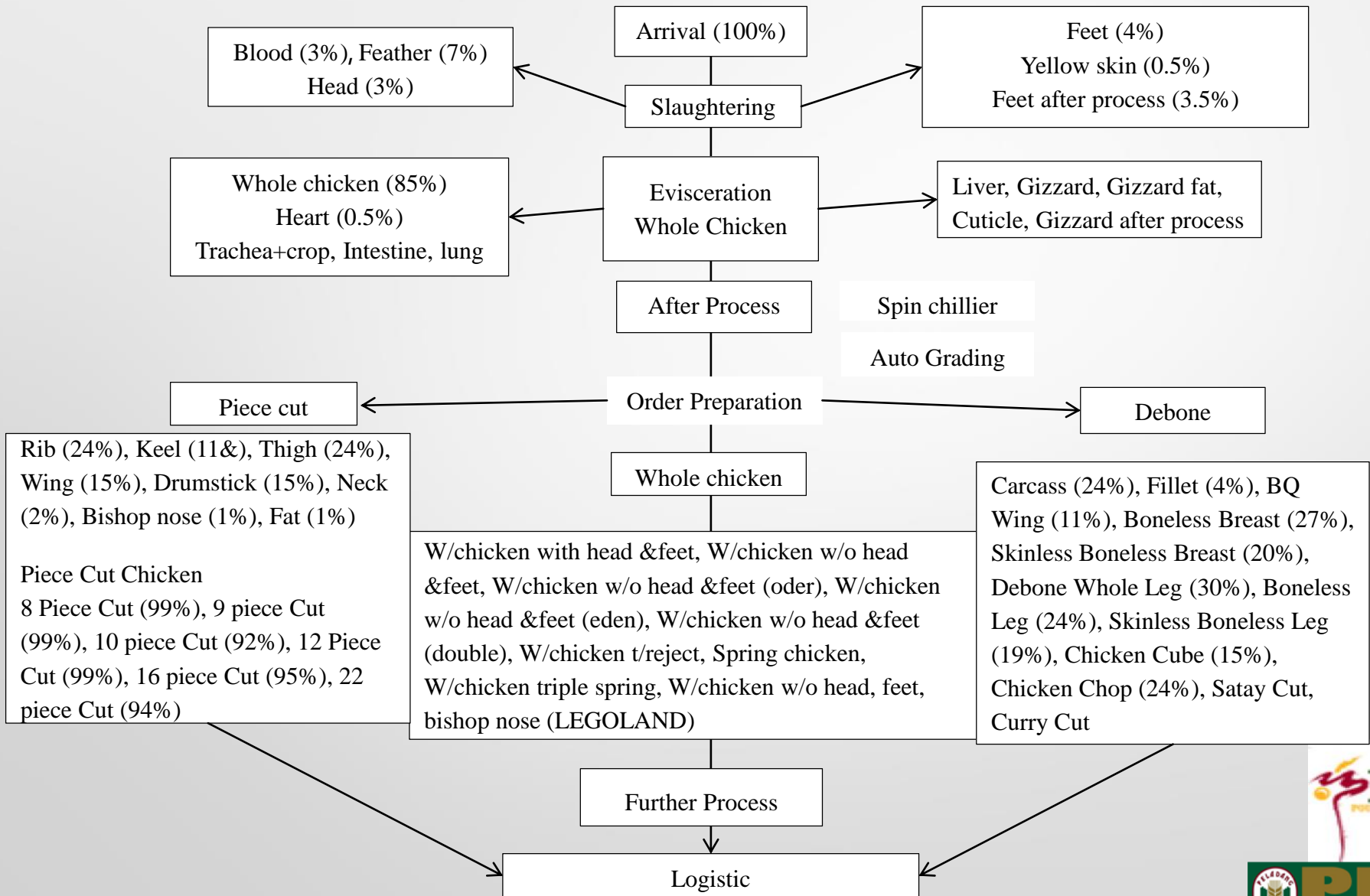


**NUGGET
AISKRIM**

Contoh Pembungkusan Produk Hiliran

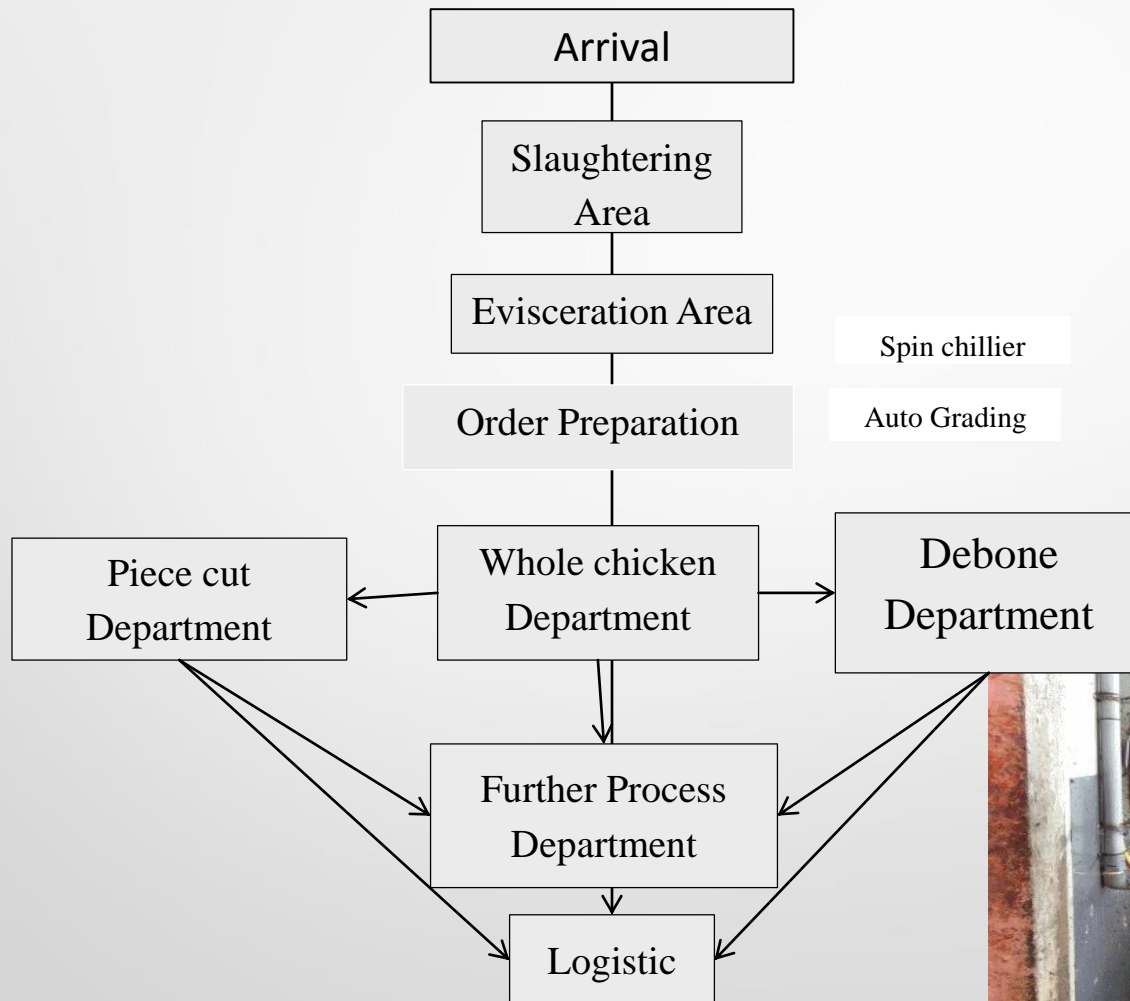


PRODUCT FLOW CHART (YIELD)

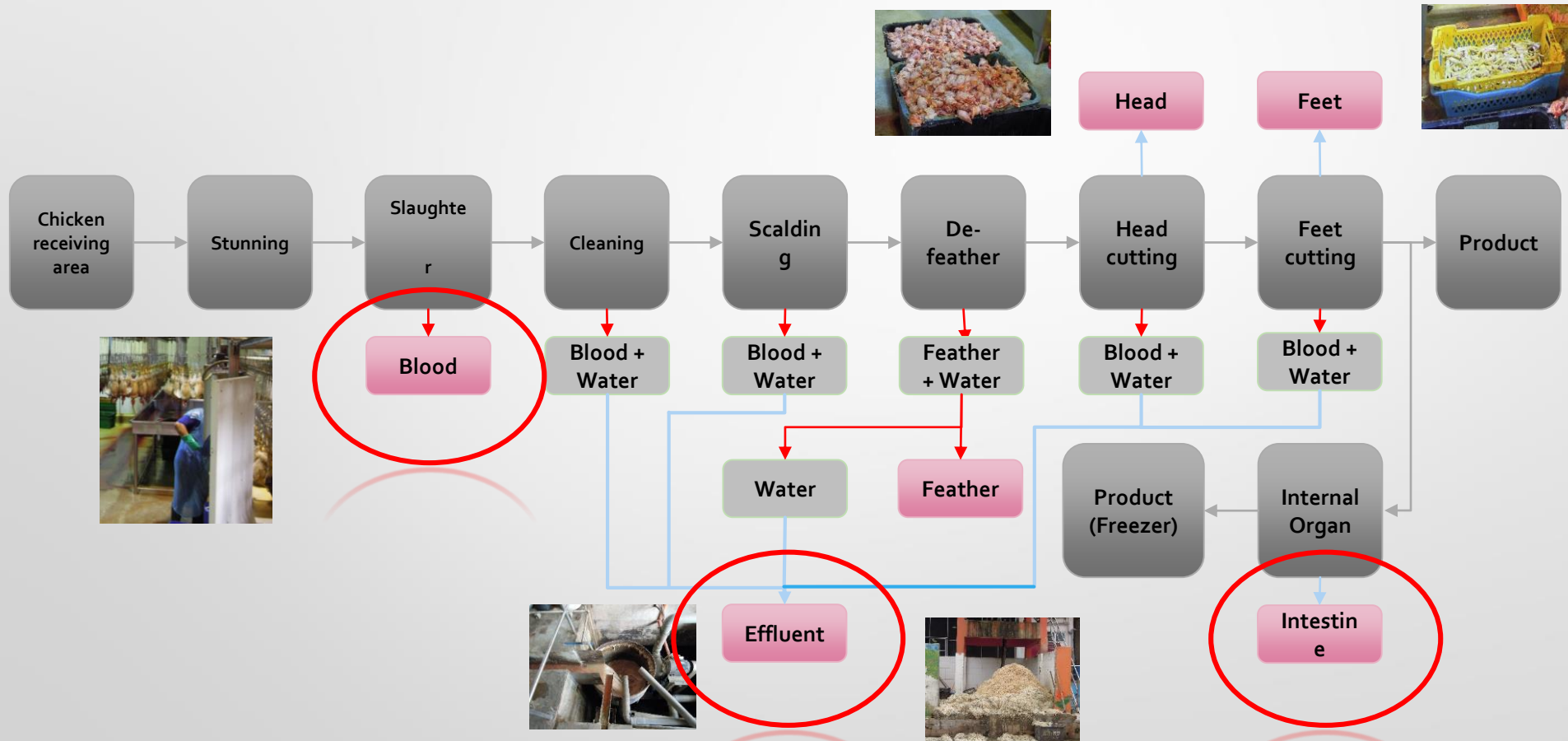




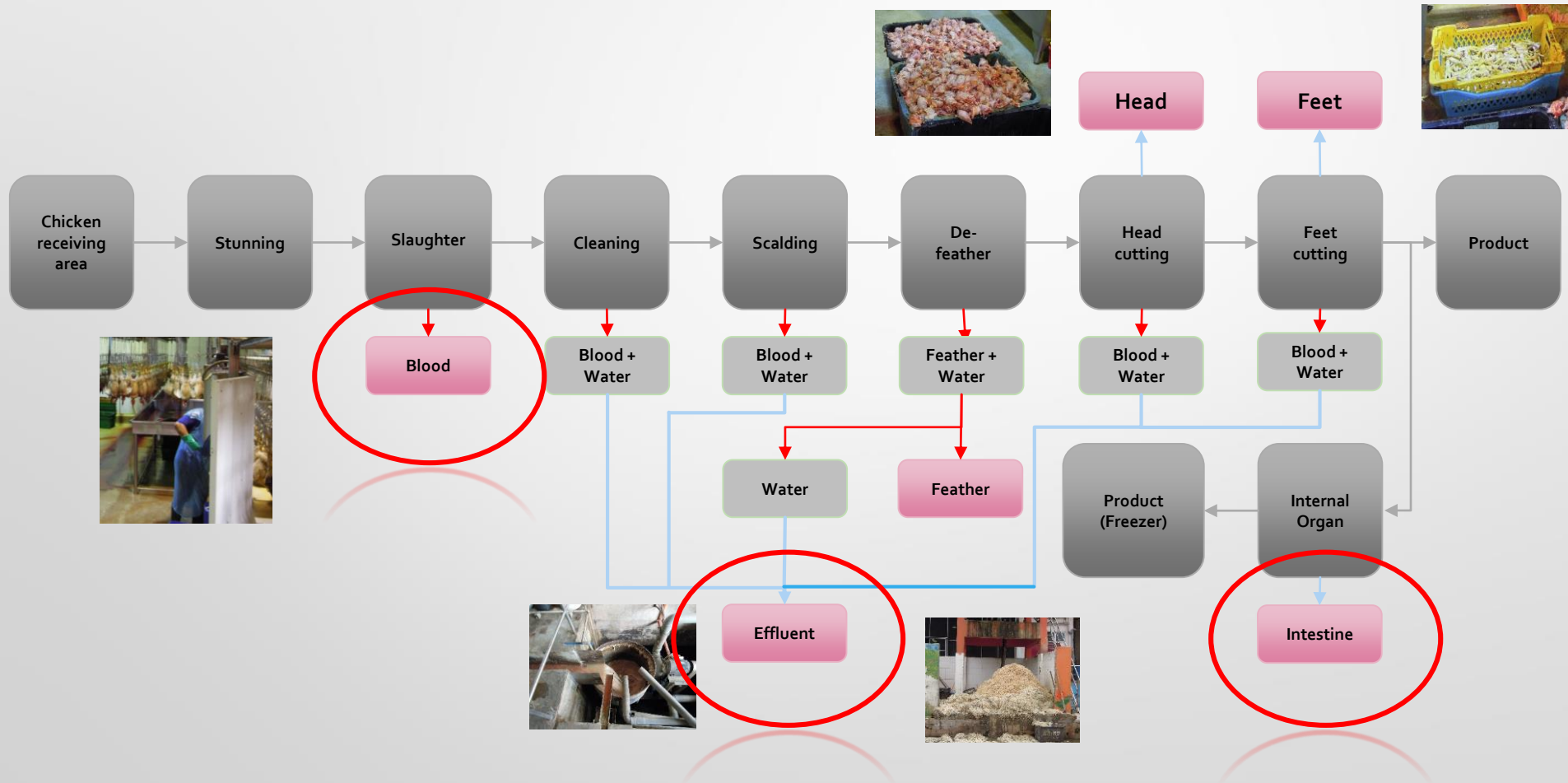
PROCESS FLOW CHART



PROCESS FLOW DIAGRAM + EFFLUENT



PROCESS FLOW DIAGRAM + EFFLUENT



Current Waste Treatment

- 1) Blood - dispose to dumping area
- 2) Waste water - waste water treatment (open anaerobic pond)
- 3) Intestine – dispose into fish pond

Environmental issue

1) Methane gas release to atmosphere, as greenhouse gas

Cleaner Production Program

Stage procedure

STAGE	TASK	OUTCOME
<p>STAGE 1 : PLANNING AND ORGANISING</p>	<ul style="list-style-type: none"> • Task 1: Obtaining management commitment • Task 2: CP Team Formation • Task 3: Setting Objectives 	<p>CP Policy and Framework</p>
<p>STAGE 2: INITIAL ASSESSEMENT</p>	<ul style="list-style-type: none"> • Task 4: Collecting existing data • Task 5: Developing a material flow assessment 	<p>CP hotspot</p>
<p>STAGE 3: DETAIL ASSESSMENT</p>	<ul style="list-style-type: none"> • Task 6: Waste, energy and environmental audits 	<p>Existing Operation overview</p>
<p>STAGE 4: GENERATING AND EVALUATION OF CP OPTIONS</p>	<ul style="list-style-type: none"> • Task 7: Identifying cleaner production options • Task 8: Technical, Economic and Environmental feasibility 	<p>Feasible CP options</p>
<p>STAGE 5: IMPLEMENTING CP OPTION AND CONTINUOUS IMPROVEMENT</p>	<ul style="list-style-type: none"> • Task 9: Incorporating changes into organisation system of management • Task 10: Identifying new/additional options for continuous improvement. 	<p>Improve company environmental performance and compliance</p>

Cleaner Production Benefits

ENVIRONMENT	COMPANY	WORKERS
Reduce environmental risk	Enhance environmental performance and compliance	Improve health and safety
Reduce/eliminate emission	Reduce operation cost	Improve working condition
Sustainable resource consumption	Improve operation efficiency	
Good environmental management	Increase company profits	Increase productivity

Project activities



Effluent Characteristics

No.	Parameter	unit	Wastewater Effluent (Morning)	Wastewater Effluent (Evening)
1.	pH	-	6.65	6.67
2.	BOD	mg/L	566	530
3.	COD	mg/L	1,413	1,325
4.	Total Solid	mg/L	2,227	2,313
5.	Volatile solid	mg/L	1,768	1,836
6.	Oil & Grease	%	505	234
7.	Carbon, C	%	0.13	0.12
8.	Hydrogen, H	%	13.95	15.9
9.	Nitrogen, N	%	0.03	0.015
10.	Sulfur, S	%	0.41	0.41
11.	Oxygen, O	%	55.74	55.19
12.	Total Kjeldahl Nitrogen	mg/L	211	201

Effluent Characteristics

No.	Parameter	unit	Wastewater Effluent (Morning)	Wastewater Effluent (Evening)	Parameter	Unit	Result
1	Al	mg/L	1.4	1.2	Total Coliform	cfu/g	20,300,000
2	Ba	mg/L	0.1	0.1	E. coli	cfu/g	43,000
3	Ca	mg/L	73.2	65.8	Pseudomonas aeruginosa	cfu/g	ND (< 10)
4	Cd	mg/L	0.0006	0.0003	*Salmonella sp.	Absent/Present	Absent
5	Cr	mg/L	0.02	0.01	*Shigella sp.	Absent/Present	Absent
6	Cu	mg/L	1.1	0.9	*Vibro sp.	Absent/Present	Absent
7	Fe	mg/L	4.4	3.8	*Faecal streptococci	cfu/g	ND (< 10)
8	K	mg/L	47.5	44.3	*Enterococci sp.	cfu/g	ND (< 10)
9	Mg	mg/L	9.5	8.3			
10	Mn	mg/L	0.5	0.4			
11	Mo	mg/L	0.01	0.01			
13	Na	mg/L	0.05	0.05			
14	Ni	mg/L	0.01	0.01			
15	P	mg/L	24.0	22.1			
16	Pb	mg/L	0.02	0.02			
17	Ti	mg/L	0.01	0.01			
18	V	mg/L	0.003	0.004			

Characteristics (Blood, Intestine and Head)

No.	Parameter	Unit	Blood	Head	Intestine
1.	BOD	mg/L	29,950	-	-
2.	COD	mg/L	60,250	-	-
3.	pH	-	6.47	-	-
4.	Total Solid	%	-	27.0	30.4
5.	Volatile solid	%	-	25.0	26.2
6.	Oil & Grease	%	-	8.62	8.18
7.	Carbon, C	%	-	60.5	54.2
8.	Hydrogen, H	%	-	11.8	10.7
9.	Nitrogen, N	%	-	7	6.9
10.	Sulfur, S	%	-	1.1	0.8
11.	Oxygen, O	%	-	13.7	14.7
12.	Total Kjeldahl Nitrogen	%	-	2.2	1.5

No.	Parameter	Unit	Head	Intestine
1.	Al	mg/L	< 7.6	< 8.2
2.	As	mg/L	1.1	< 5.7
3.	Ba	mg/L	< 1.2	0.9
4.	Ca	mg/L	102	8,379
5.	Cd	mg/L	0.2	0.1
6.	Cr	mg/L	< 0.6	< 0.7
7.	Cu	mg/L	< 40.5	< 0.8
8.	Fe	mg/L	18.0	0.1
9.	K	mg/L	1,855	1,407
10.	Mg	mg/L	282	301
11.	Mn	mg/L	5.8	0.3
12.	Mo	mg/L	< 0.4	< 0.4
13.	Ni	mg/L	0.7	0.2
14.	P	mg/L	1,897	4,706
15.	Pb	mg/L	1.3	2.0
16.	Se	mg/L	3.3	3.7
17.	Ti	mg/L	< 0.5	< 0.5
18.	Tl	mg/L	< 3.2	< 3.5
19.	V	mg/L	0.5	< 0.6
20.	Zn	mg/L	28.0	15.7

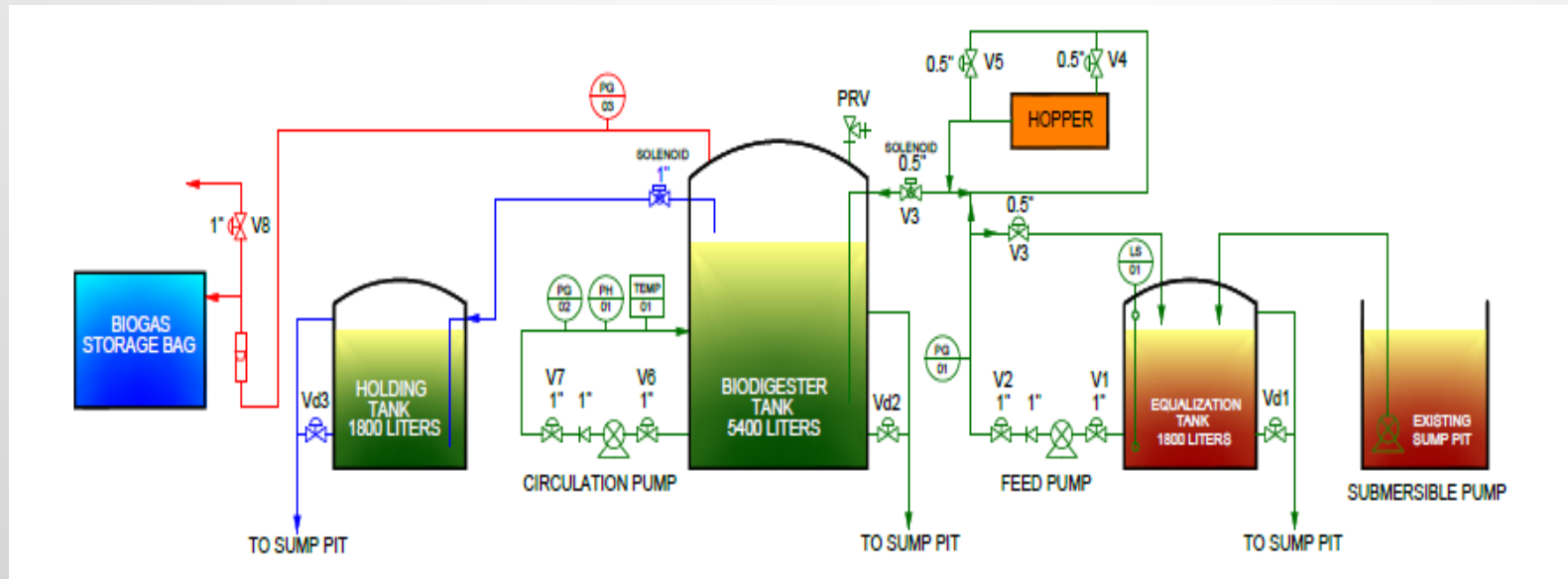
BASIS REKABENTUK

Substrate	Biogas BMP calculated	Actual Biogas generation from bioreactor	Efficiency of biogas production
Offal (32g)	8,309 ml/day	6,400 ml/day	77%
Effluent (940ml) + Blood (60ml)	2,882 ml/day	2,445 ml/day	85%
Effluent (1000ml) (by calculation)	1,670 ml/day	1,420 ml/day	<i>Assume 85%</i>
Offal (32g)+ Effluent (940ml) + Blood (60ml) (by calculation)	11,191 ml/day	8,845 ml/day	<i>Assume 77%</i>

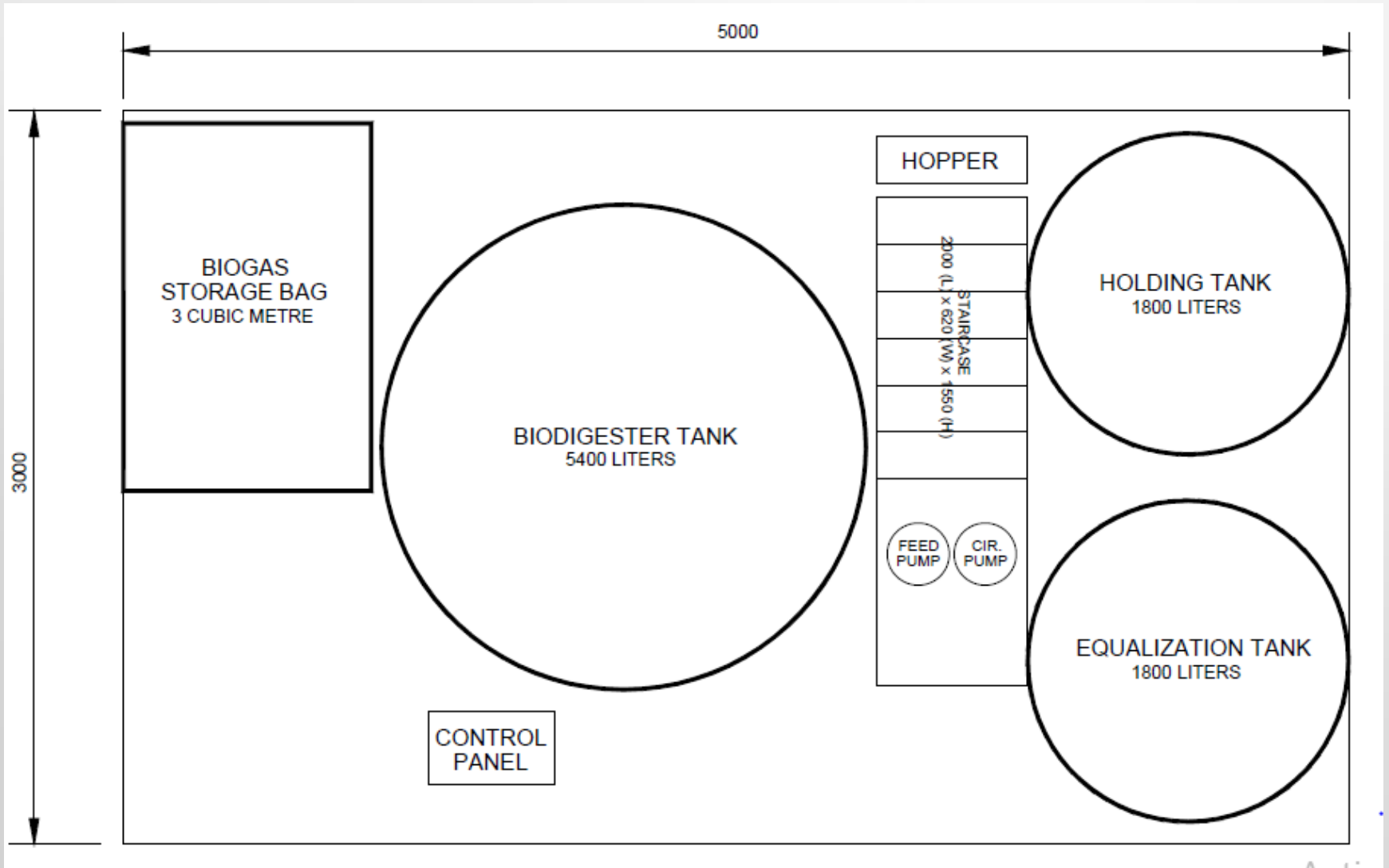
Biodigester Pilot Plant

1.	Reactor type	Complete mixed batch reactor
2.	Volume	5.0 m ³
3.	Feed	Raw Effluent
4.	Feed flowrate	1.0 m ³ /day
5.	Hydraulic retention time	5 day
6.	Gas Yield	0.85 Nm ³ /day Biogas can replace the use of fossil fuel. Potentially used to produce electricity, operate machinery or as alternative fuel for heating.

Biodigester Schematic Diagram



PLAN VIEW



Biodigester Pilot Plan



DEMONSTRATION – SYSTEM BIODIGESTER



SUBSTRATE

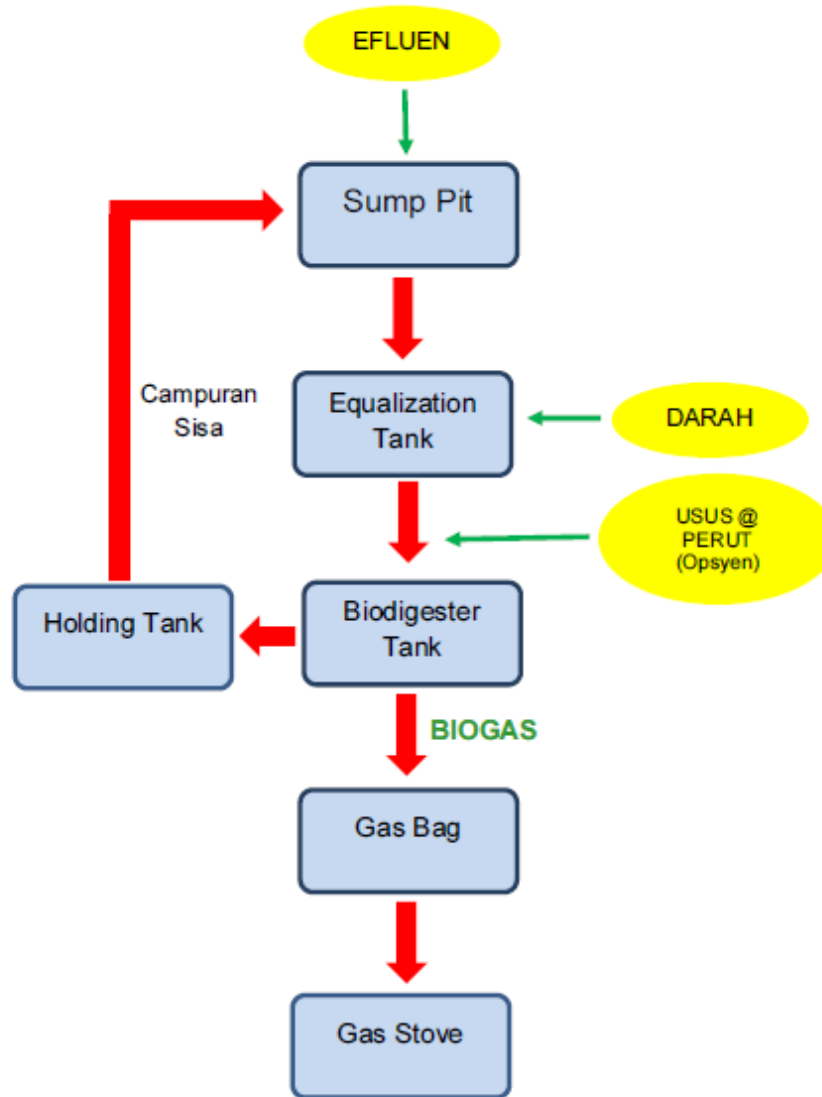
Bil.	Jenis Bahan	Nota
1.	Efluen air sisa	Bahan suapan utama
2.	Darah ayam	Bahan suapan utama
3.	Usus/Perut Ayam	Bahan suapan alternatif

RATIO

RETENTION TIME: 5 HARI

Isipadu Keseluruhan (<i>Total Volume</i>)	Efluen	Darah	Usus (Opsyen)
1,000mililiter	940 milliliter	60 milliliter	32 g
1,000 Liter	940 Liter	60 Liter	32 kg
5,000 Liter	4,700 Liter	300 Liter	160 kg

FLOW PROCESS



POTENSI BIOGAS

Data Teori Demonstrasi Loji Biogas		
Ratio Eff/Blood	94:6	
V Digester	5	m ³
COD	5025	mg/L
Feeding Rate	1	m ³ /day
Biogas Production	2.28	m ³ /day
CH ₄ Prod @ 55%	1.25	m ³ /day

Potensi Penjanaan Elektrik		
Max Generation @ 100% efficiency	0.52	kW
Genset @ 38% efficiency	0.20	kW

0.20 kW bermaksud keupayaan membekal tenaga elektrik bagi beban 200 W
Cth. 5 biji lampu kalimantang 36 W setiap satu (Jumlah 180 W)

LIMITATION

Jenis Sisa	Berat drpd Ayam Hidup (%)	Anggaran Berat Harian (kg/hari)
		18,494
Darah (+ Air)	3.3	610
Usus	4.1	758
Kepala	3.2	592
	Kadar Alir (m³/hari)	
Efluen	192	

*Berdasar pada data 3 tahun

*Anggaran 5 m³/hari

Operasi kilang 26 hari/bulan

Contoh: Campuran Efluen dan Darah

	Efluen (L/hari)	Darah (L/hari)	Biogas (m ³ /hari)	CH ₄ (m ³ /hari)	Elektrik (kW)
Demo Loji Biogas	940	60	2.28	1.25	0.2
Maksima Harian	9,400	600	22.8	12.5	2.0

DATA FROM SYSTEM BIODIGESTER

- Biogas composition :
 - CH₄ Metana: 71.2%, CO₂ Korbon dioksida: 21.9%, H₂S Hidrogen sulfida: 75ppm (0.0008%)

Date	Remarks	pH	COD (mg/L)	TS (mg/L)	VS (mg/L)	VFA			Biogas (%)		
						Acetic Acid (ppm)	Propionic acid (ppm)	Butyric acid (ppm)	CH ₄	CO ₂	H ₂ S (ppm)
19/5/2017	Seeding	7.63		23,895	12,562	ND	ND	ND			
18/7/2017	In	6.61	1,556								
	Out	7.7	405								
	AD	7.13	386	1,195	428	ND	ND	ND	71.2	21.9	75.0

COD removal: 74%

Note: *ND = Not Detected

Methane trapping in Palm Oil Mill Effluent Treatment







**SEKIAN,
TERIMA KASIH**