

ATMO
sphere
Business Case for
Natural Refrigerants



Heal the Earth,   
   Heal our Future



SINGAPORE 4TH SEPTEMBER 2018

Macro Economic Indicators



World's **4th** most populous country



256 million people

Total Area **5,193,250 km²**



GDP 2016 : **\$ 1074 billion**

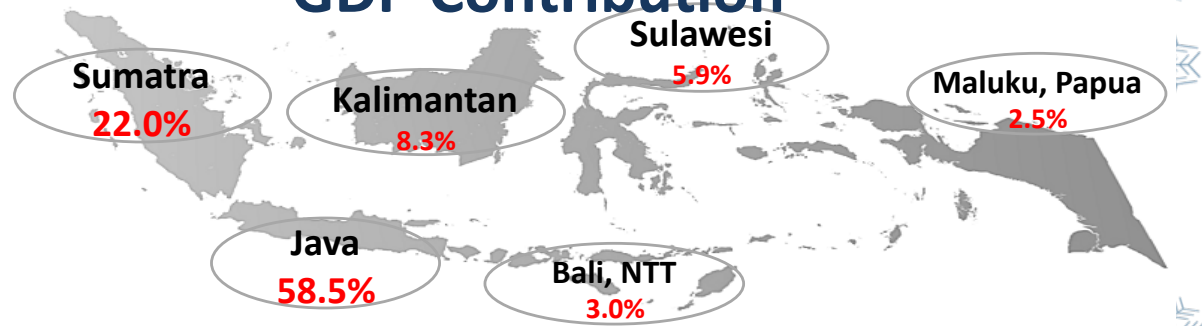


Per Capita 2016 : **\$ 4052**

17,500 islands



GDP Contribution



Rank **16th** GDP world and sustainable growth

Rank **3rd** Investment destination choice in Asia

Top **5** prospective investment destination in the world

Manageable Inflation & Exchange Rate

Historical Trend	2013	2014	2015	2016	2017
GDP % Growth	5.8	5.1	5.0	5.0	5.1
Total Export % Growth	-3.9	1.1	-2.1	-1.7	9.1
Total Import % Growth	-3	2.1	-6.4	-2.3	8.1
Foreign Investment Growth (%)	16	-0.3	17.0	8.4	6.1
Inflation rate (%)	8.4	8.4	3.4	3.02	3.6



Our Business Frame Work

KIAT ANANDA GROUP



Our Vision

Vision

TO BE THE BEST COLD CHAIN SOLUTION

Mission

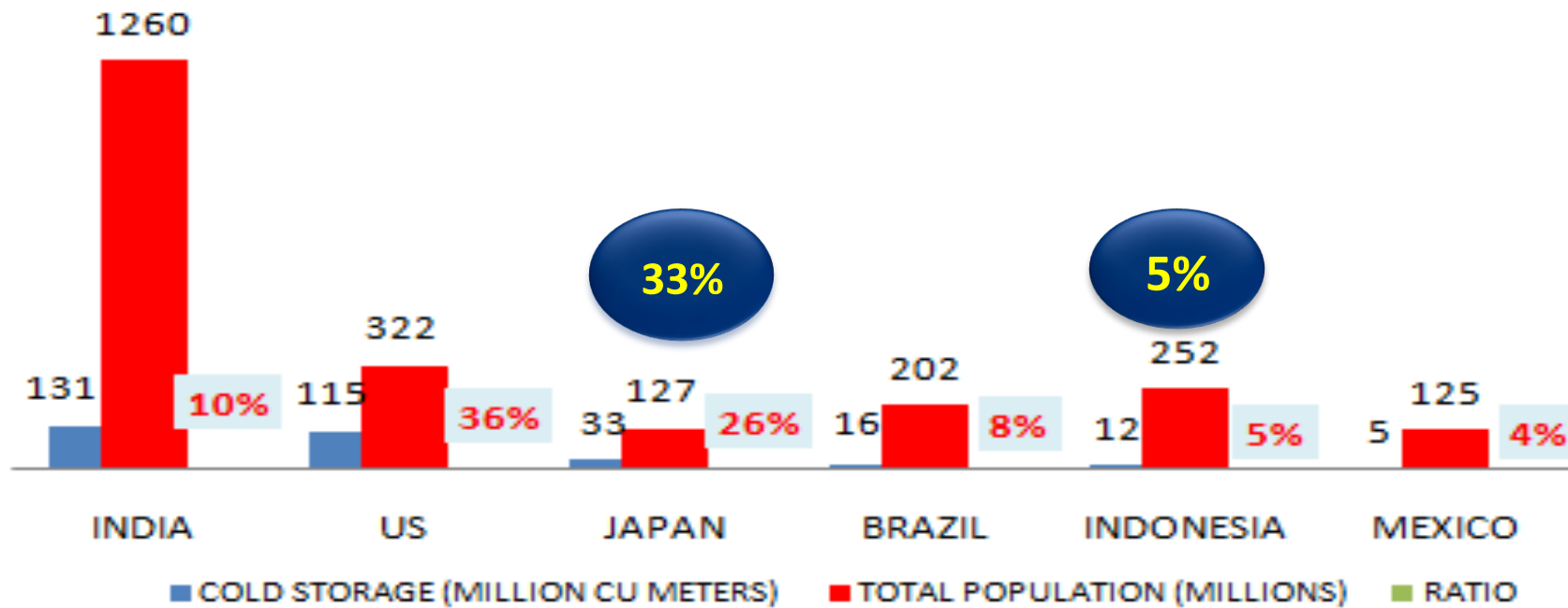
- ❖ Provide the best services to our customers
- ❖ Provide opportunity to qualified and highly talented employees together with the best system and best working facility, will guaranty company best services to customer.
- ❖ Our best recourses will guaranty the continuity of company growth and profitability for all stake holders.



- ❖ **CARE**
- ❖ **CLEAN**
- ❖ **FAST**
- ❖ **DICIPLINE**
- ❖ **CONSISTENCE**

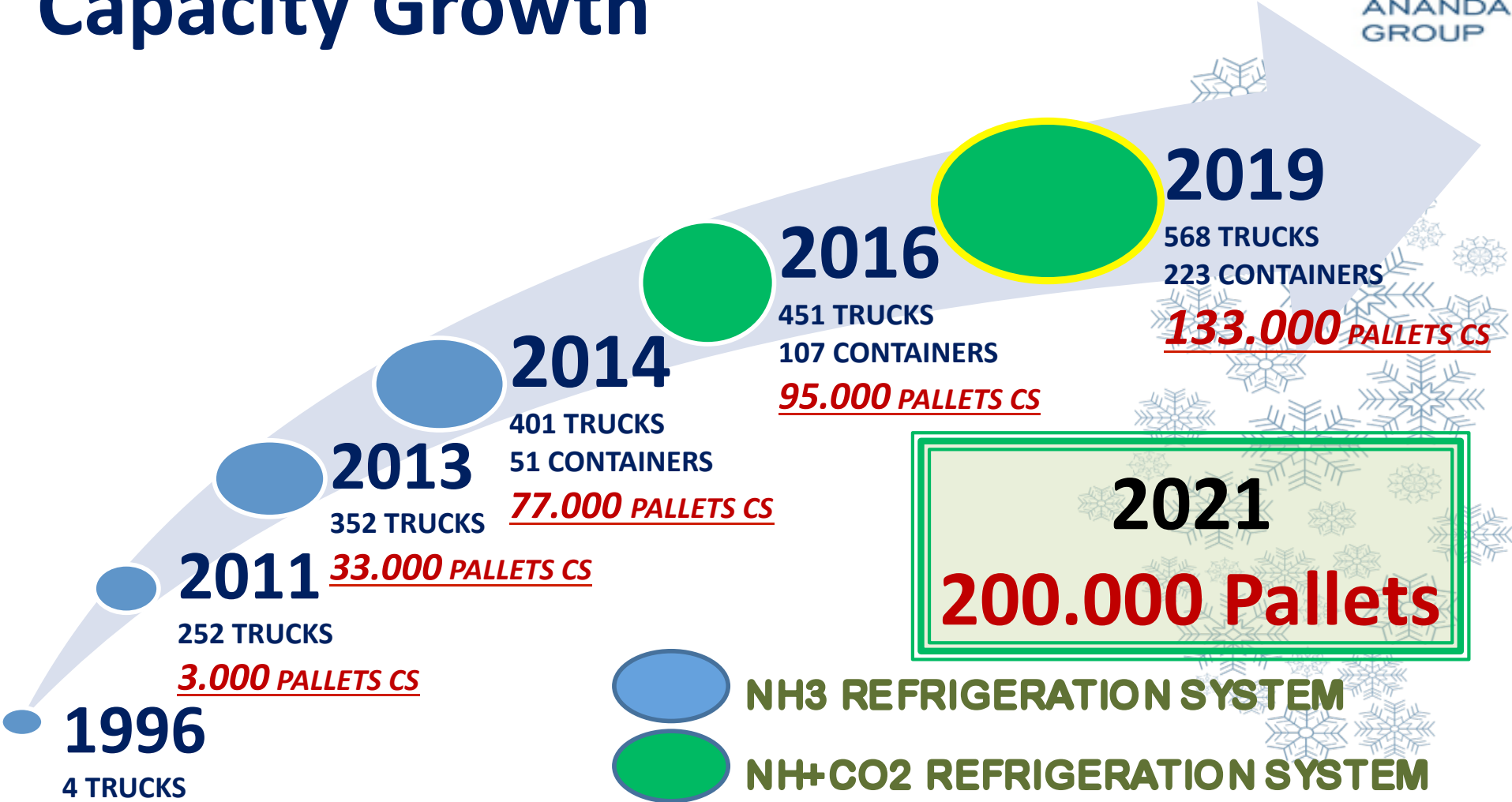
Cold Chain Industry

Cold Storage Capacity vs Population Ratio

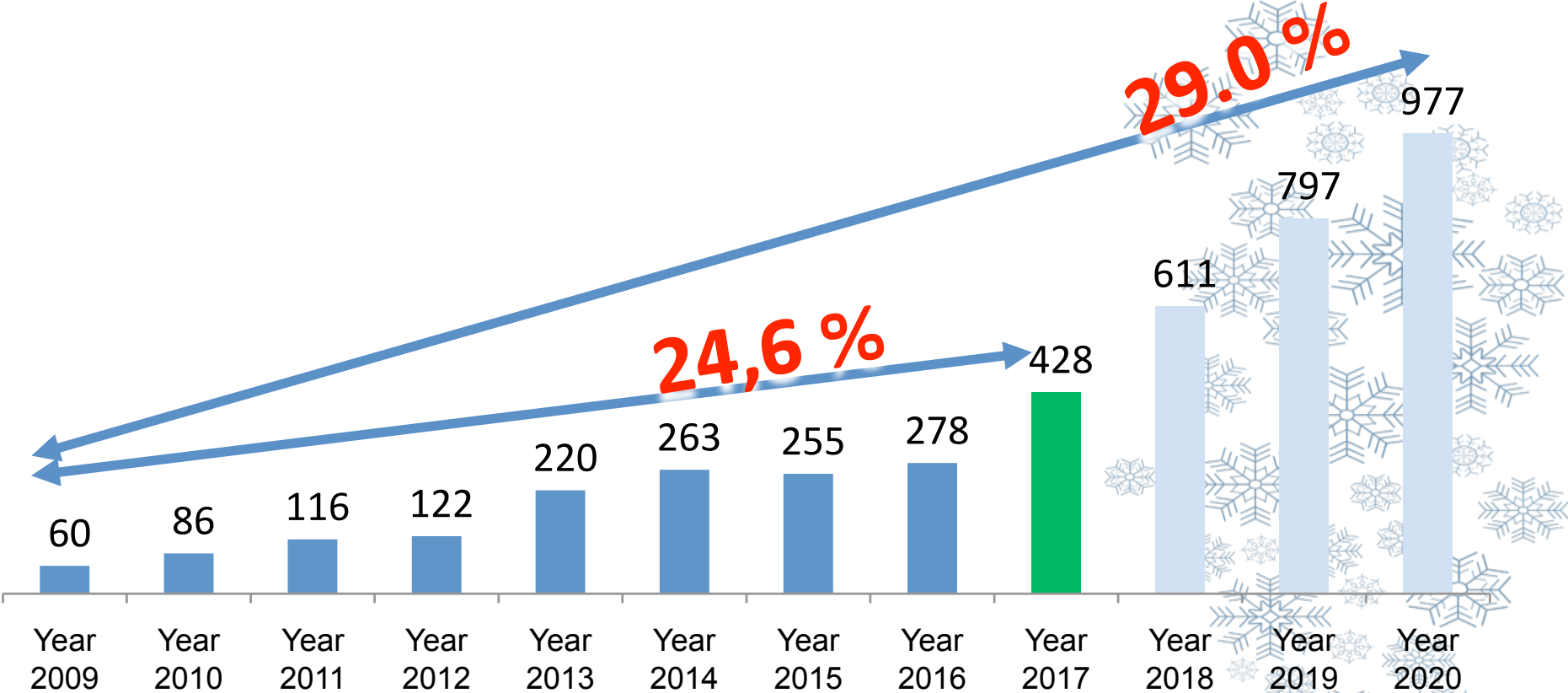


source: International Trade Administration

Capacity Growth



Kiat Ananda Group Sales CAGR



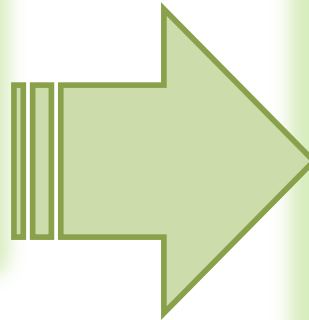
• **Country Supply Chain Growth (+7.6%)**

Cold Storage Locations



Blue Chip Customers





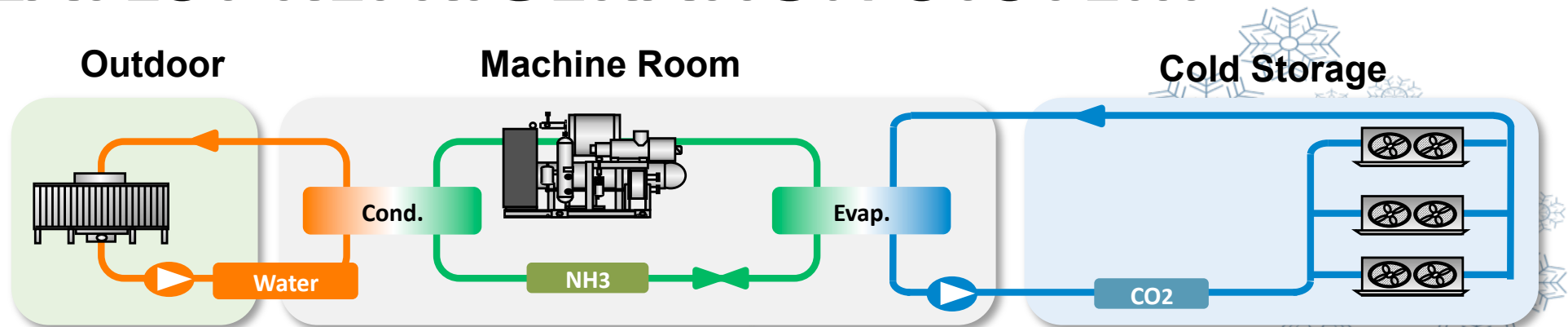
***“MORE ECO FRIENDLY MACHINERY”
MOVE TO CO2 REFRIGERATION SYSTEM***

Refrigerants Regulations

CFC R-11 • R-12 1996 Phased Out (Ozone Depletion + Global Warming)	HCFC R-22 • R-123 2020 Developed Countries Phase Out 2030 Developing Countries Phase Out Montreal Protocol (Ozone Depletion + Global Warming)	HFC R-134a • R-404A • R-407C • R-410A By 2012 Reduce 6% compared to 1990 (for Developed Countries) Kyoto Protocol (Global Warming)	NATURAL R717 (Ammonia) • R744 (CO2) • Water • Air R290 (Propane) • R600a (Isobutene)
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Refrigerant Type	CFC (Phased Out Refrigerant)			HCFC (Restricted)	HFC (Substitute Refrigerant)				Natural Refrigerant (Sustainable Refrigerant)		
Refrigerant	R11	R12	R502	R22	R134a	R404A	R407C	R410A	R717 - NH3	R744 - CO2	R600a
ODP	1	1	0.334	0.055	0	0	0	0	0	0	0
GWP	4750	10900	4520	1810	1430	3780	1650	1980	<1	1	4
	- Contribute to Ozone Depletion - Contribute to Global Warming - Phased out on 1996			- Usage Restriction by Montreal Protocol	- Unstable Chemical Composition - No Impact to Ozone Depletion - Stipulated as Green House Gas by Kyoto Protocol				- Zero/Small impact on ODP and GWP		

LATEST REFRIGERATION SYSTEM



Safety

**High Efficient
IPM Motor**

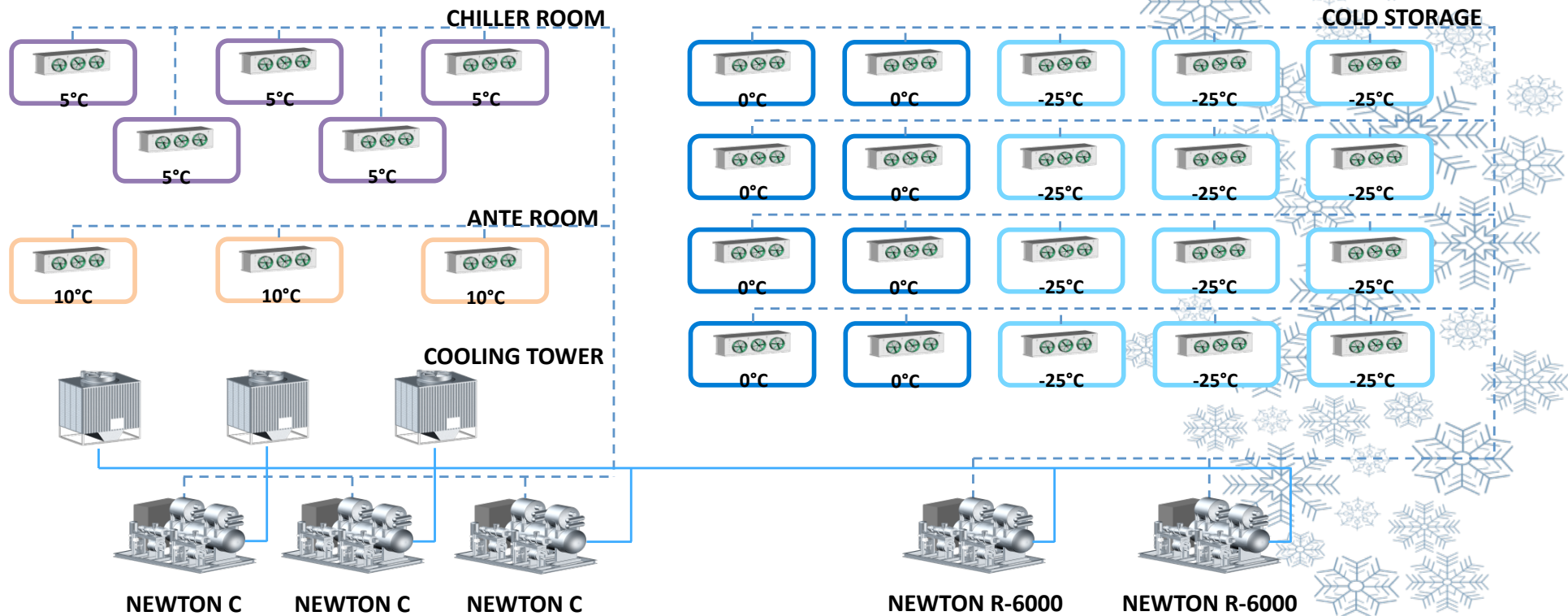


**No Oil in the
System**

**Minimum
Ammonia
Charge**

NH3 / CO2 cooling systems

SYSTEM REFERENCE (SURABAYA STORAGE) NH3 / CO2 System



COMPARISON OF POWER CONSUMPTION AMMONIA VS FREON R-404A

NO	PLANT	AMMONIA			FREON R-404A (estimated)		
		REFRIGERANT	COMPRESSOR ABSORBED POWER (KW)	C.O.P	REFRIGERANT	COMPRESSOR ABSORBED POWER (KW)	C.O.P
1	PT. KIAT ANANDA COLD STORAGE 1	NH3	209.6	2.37	FREON	234.1	2.12
2	PT. KIAT ANANDA COLD STORAGE 2	NH3	371.5	2.20		435.3	1.88
3	PT. KIAT ANANDA COLD STORAGE 3	NH3	650.4	2.18		769.4	1.85
4	PT. ANANDA SOLUSINDO	NH3	703.8	3.47		941.7	2.59
5	PT. KIAT ANANDA COLD STORAGE 5	CO2	367.0	2.95		471.0	2.30
		TOTAL	2,302.0		TOTAL	2,852.0	

**estimated with water cooled condensing unit*

TOTAL SAVED CO2 EMISSION

2,142 Tons / Year

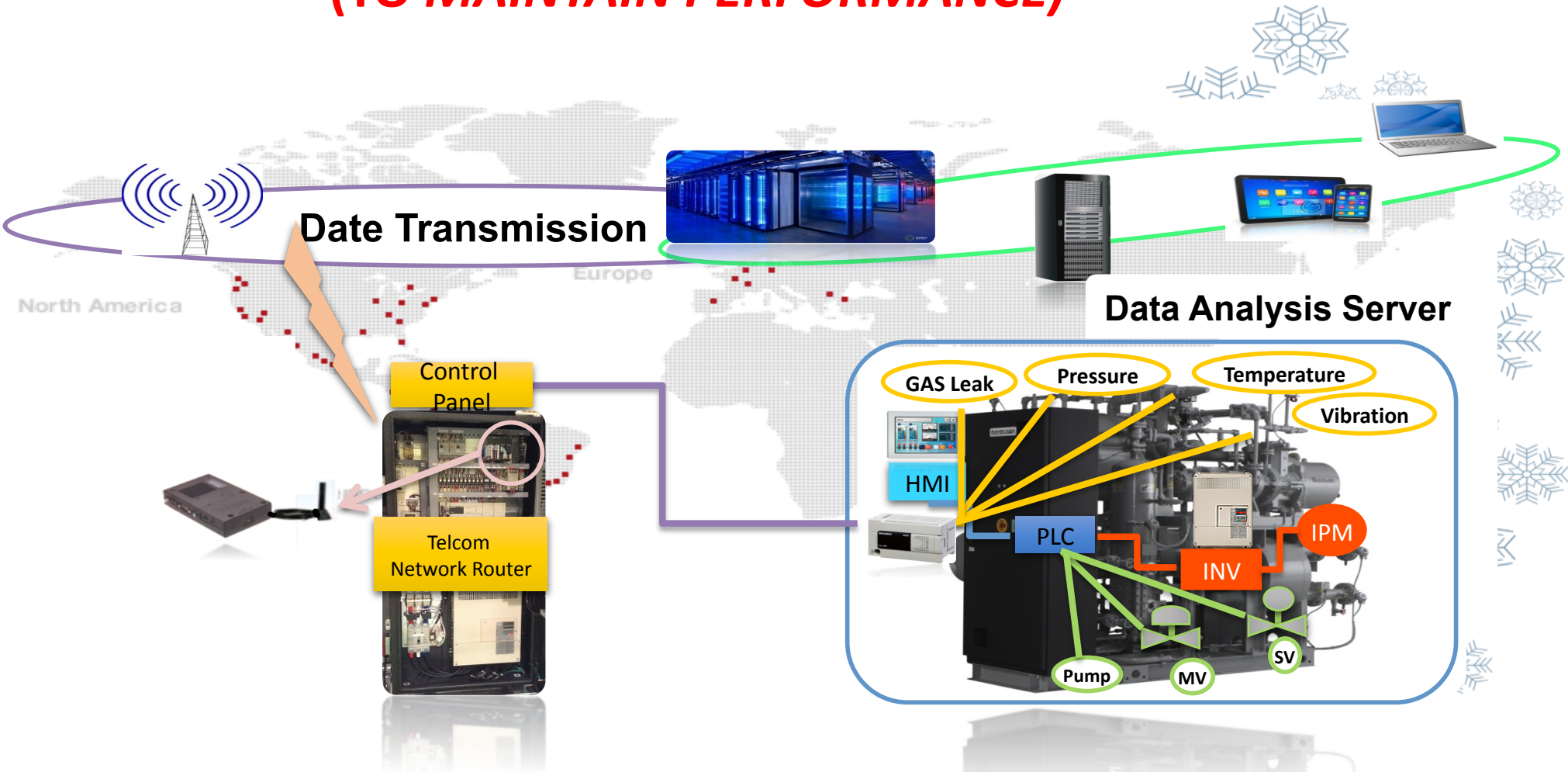
**Emission factor for grid connected power; 0.741 tCO2/MWh*

Saved Power Consumption per year

2890.8 MW

**14.4 hours per day*

Remote Monitoring System (TO MAINTAIN PERFORMANCE)



THANK YOU
Visit Our Website
<http://www.kiatananda.com>

