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June 16 & 17, 2016 – Chicago

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Industrial End User Panel

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Los Angeles Cold Storage Company

NXTCOLD Oxnard, CA
Case Study

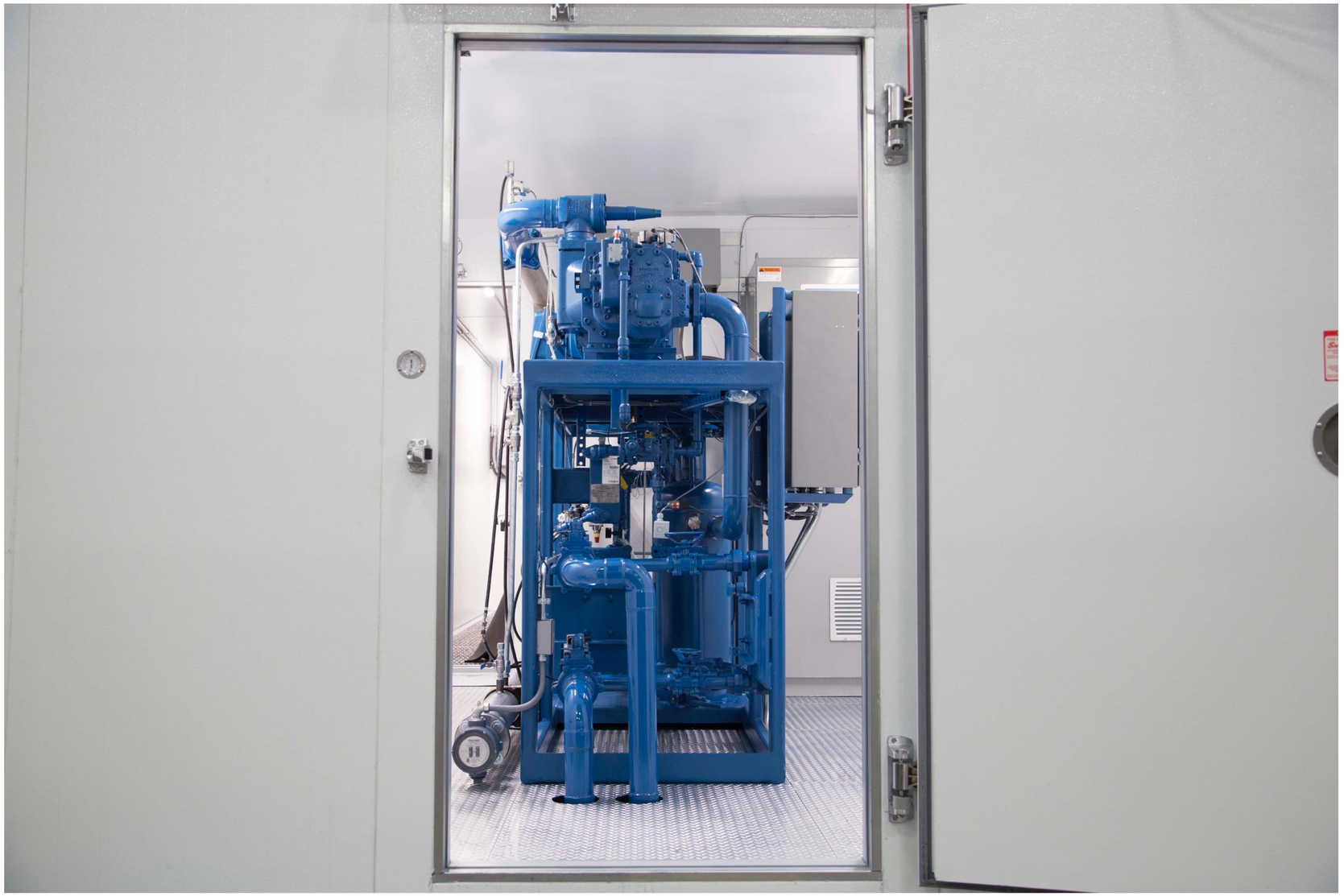
TYPICAL CENTRAL ENGINE ROOM FOR AMMONIA REFRIGERATION

FACTORY

FACTORY

TRAILER

POD FROM OUTSIDE



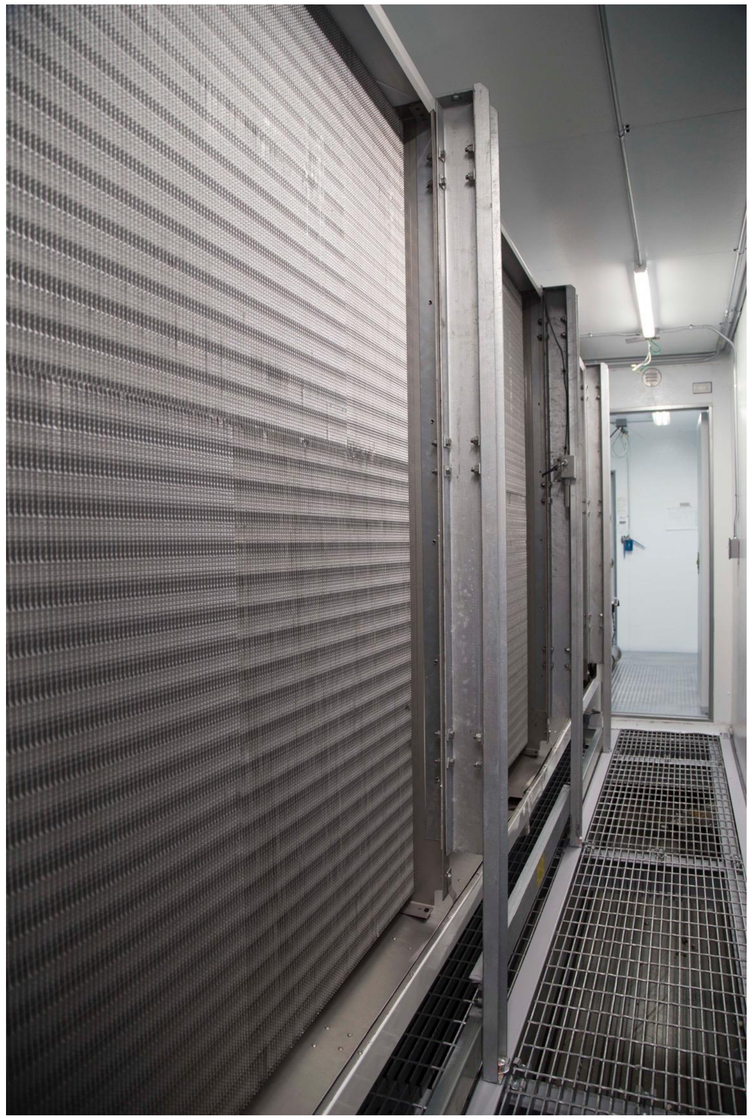
Entry to Evaporator

Compressor Pod

Electrical & Control Panels

Evaporator Fans

Evaporator Coils



DISTRIBUTED HIGH EFFICIENCY REFRIGERATION WITH ULTRA LOW AMMONIA CHARGE ELECTRONIC REFRIGERANT INJECTION CONTROL (ERIC)

CASE STUDY REPORT OBJECTIVES

SoCal Edison, Design and Engineering Services, *Report* ET13SCE7210:

- **Determine what, if any, demand savings can be attributed to the NXTCOLD technology as applied at the Lineage Facility.**
  - Determine baseline for the facility under existing conditions
  - Determine post retrofit under current operational conditions
  - Determine post retrofit under optimum operational conditions
- **Determine what, if any, energy savings can be attributed to the NXTCOLD technology as applied at the Lineage Facility.**
  - Determine baseline for the facility under existing conditions
  - Determine post retrofit under current operational conditions
  - Determine post retrofit under optimum operational conditions
- **Assess the overall feasibility of the technology as it is applied to cold storage refrigeration.**
  - Identify potential operational or non-energy benefit categories for use of the technology in similar applications.

TABLE 1 – CURRENT OPERATION SAVINGS ANALYSIS

NxtCold Performance Summary -- Current Operation Scenario

Month	Avg Tons	Hours	Cooling Load Ton-Hr	Current KW	Diversity Factor **	Refrigeration Only Estimated KWH	Meter KWH	Remaining Energy - - Blast Freezing and Remaining Refrigeration	Nxt Cold Tons	Remaining Tons	NXT COLD KW/TON	PLANT KW/TON	New KW	New KWH	Savings KW	Savings KWH	Demand Rate ($/kw)	Energy Rate ($/KWH)	Savings $
J	83.45	744	62,086	327	95%	231,389	382,963	151,574	62	10	1.59	3.92	137.81	102,532	189.56	128,857	$ 14.88	$ 0.08659	$ 13,978
F	83.45	672	56,077	327	80%	175,997	270,833	94,837	62	10	1.59	3.92	137.81	92,609	189.56	83,388	$ 14.88	$ 0.08659	$ 10,041
M	83.45	744	62,086	327	80%	194,854	759,210	564,356	62	10	1.59	3.92	137.81	102,532	189.56	92,322	$ 14.88	$ 0.08659	$ 10,815
A	83.45	744	62,086	327	80%	194,854	874,959	680,105	62	10	1.59	3.92	137.81	102,532	189.56	92,322	$ 14.88	$ 0.08659	$ 10,815
M	90.00	744	66,960	353	80%	210,152	980,918	770,766	62	28	1.59	3.92	208.43	155,070	144.65	55,082	$ 14.88	$ 0.08659	$ 6,922
J	95.00	720	68,400	373	80%	214,671	1,592,723	1,378,052	62	33	1.59	3.92	228.04	164,190	144.65	50,481	$ 14.88	$ 0.13769	$ 9,103
J	100.00	744	74,400	392	80%	233,502	1,069,224	835,722	62	38	1.59	3.92	247.66	184,257	144.65	49,245	$ 14.88	$ 0.13769	$ 8,933
A	110.00	720	79,200	432	70%	217,496	771,789	554,293	62	48	1.59	3.92	286.89	206,560	144.65	10,936	$ 14.88	$ 0.13769	$ 3,658
S	100.00	720	72,000	392	60%	169,477	391,347	221,870	62	38	1.59	3.92	247.66	178,314	144.65	(8,836)	$ 14.88	$ 0.13769	$ 936
O	90.00	744	66,960	353	80%	210,152	544,156	334,004	62	28	1.59	3.92	208.43	155,070	144.65	55,082	$ 14.88	$ 0.13769	$ 9,737
N	83.45	720	60,083	327	80%	188,568	422,402	233,834	62	10	1.59	3.92	137.81	99,224	189.56	89,344	$ 14.88	$ 0.08659	$ 10,557
D	83.45	744	62,086	327	50%	121,784	172,300	50,516	62	10	1.59	3.92	137.81	102,532	189.56	19,252	$ 14.88	$ 0.08659	$ 4,488
		8,760				2,362,894	8,232,824	5,869,929								717,475			$ 99,983

** Note For this analysis, the diversity factor was developed in looking at the product supply. From Mid November thru February very little blast freezing occurs. The load for these months is primarily due to refrigeration. Since the cooling load in ton hours is only for the area covered by the Nxt Cold Unit, the savings is based only on the difference for that area.

TABLE 2 – OPTIMUM OPERATION SAVINGS ANALYSIS

NxtCold Performance Summary -- Optimum Operation Scenario

Month	Avg Tons	Hours	Cooling Load Ton-Hr	Current KW	Diversity Factor **	Refrigeration Only Estimated KWH	Meter KWH	Remaining Energy -- Blast Freezing and Remaining Refrigeration	Nxt Cold Tons	Remaining Tons	NXT COLD KW/TON	PLANT KW/TON	New KW	New KWH	Savings KW	Savings KWH	Demand Rate ($/kw)	Energy Rate ($/KWH)	Savings $
J	83.45	744	62,086	327	95%	231,389	382,963	151,574	83.45	-	1.59	3.92	132.68	98,716	194.69	132,672	$ 14.88	$ 0.08659	$ 14,385
F	83.45	672	56,077	327	80%	175,997	270,833	94,837	83.45	-	1.59	3.92	132.68	89,163	194.69	86,834	$ 14.88	$ 0.08659	$ 10,416
M	83.45	744	62,086	327	80%	194,854	759,210	564,356	83.45	-	1.59	3.92	132.68	98,716	194.69	96,137	$ 14.88	$ 0.08659	$ 11,222
A	83.45	744	62,086	327	80%	194,854	874,959	680,105	83.45	-	1.59	3.92	132.68	98,716	194.69	96,137	$ 14.88	$ 0.08659	$ 11,222
M	90.00	744	66,960	353	80%	210,152	980,918	770,766	90.00	-	1.59	3.92	143.10	106,467	209.98	103,685	$ 14.88	$ 0.08659	$ 12,103
J	95.00	720	68,400	373	80%	214,671	1,592,723	1,378,052	95.00	-	1.59	3.92	151.05	108,756	221.64	105,915	$ 14.88	$ 0.13769	$ 17,881
J	100.00	744	74,400	392	80%	233,502	1,069,224	835,722	100.00	-	1.59	3.92	159.00	118,296	233.31	115,206	$ 14.88	$ 0.13769	$ 19,334
A	110.00	720	79,200	432	70%	217,496	771,789	554,293	110.00	-	1.59	3.92	174.90	125,928	256.64	91,567	$ 14.88	$ 0.13769	$ 16,427
S	100.00	720	72,000	392	60%	169,477	391,347	221,870	100.00	-	1.59	3.92	159.00	114,480	233.31	54,997	$ 14.88	$ 0.13769	$ 11,044
O	90.00	744	66,960	353	80%	210,152	544,156	334,004	90.00	-	1.59	3.92	143.10	106,467	209.98	103,685	$ 14.88	$ 0.13769	$ 17,401
N	83.45	720	60,083	327	80%	188,568	422,402	233,834	83.45	-	1.59	3.92	132.68	95,532	194.69	93,036	$ 14.88	$ 0.08659	$ 10,953
D	83.45	744	62,086	327	50%	121,784	172,300	50,516	83.45	-	1.59	3.92	132.68	98,716	194.69	23,067	$ 14.88	$ 0.08659	$ 4,894
		8,760				2,362,894	8,232,824	5,869,929								1,102,938			$ 157,281

** Note For this analysis, the diversity factor was developed in looking at the product supply. From Mid November thru February very little blast freezing occurs. The load for these months is primarily due to refrigeration. Since the cooling load in ton hours is only for the area covered by the Nxt Cold Unit, the savings is based only on the difference for that area.

TABLE 3 – SAVINGS SUMMARY

NXTCOLD Savings Summary

Month	Total Building Utility Data			Current Operation						Optimum Operation					
	KW	KWH	$	KW Savings	KWH Savings	$ Savings	% KW Savings	% KWH Savings	% $ Savings	KW	KWH	$	% KW Savings	% KWH Savings	% $ Savings
J	1,351	382,963	$ 53,267	190	128,857	$ 13,978	14%	34%	26%	195	132,672	$ 14,385	14%	35%	27%
F	1,099	270,833	$ 39,808	190	83,388	$ 10,041	17%	31%	25%	195	86,834	$ 10,416	18%	32%	26%
M	2,772	759,210	$ 106,987	190	92,322	$ 10,815	7%	12%	10%	195	96,137	$ 11,222	7%	13%	10%
A	2,189	874,959	$ 108,332	190	92,322	$ 10,815	9%	11%	10%	195	96,137	$ 11,222	9%	11%	10%
M	2,712	980,918	$ 125,292	145	55,082	$ 6,922	5%	6%	6%	210	103,685	$ 12,103	8%	11%	10%
J	3,098	1,592,723	$ 265,406	145	50,481	$ 9,103	5%	3%	3%	222	105,915	$ 17,881	7%	7%	7%
J	2,635	1,069,224	$ 186,433	145	49,245	$ 8,933	5%	5%	5%	233	115,206	$ 19,334	9%	11%	10%
A	2,083	771,789	$ 137,266	145	10,936	$ 3,658	7%	1%	3%	257	91,567	$ 16,427	12%	12%	12%
S	1,154	391,347	$ 71,062	145	(8,836)	$ 936	13%	-2%	1%	233	54,997	$ 11,044	20%	14%	16%
O	1,483	544,156	$ 96,995	145	55,082	$ 9,737	10%	10%	10%	210	103,685	$ 17,401	14%	19%	18%
N	2,129	422,402	$ 68,252	190	89,344	$ 10,557	9%	21%	15%	195	93,036	$ 10,953	9%	22%	16%
D	732	172,300	$ 25,812	190	19,252	$ 4,488	26%	11%	17%	195	23,067	$ 4,894	27%	13%	19%
Totals		**8,232,823.80**	**$ 1,284,912**		**717,475**	**$ 99,983**	**11%**	**9%**	**8%**		**1,102,938**	**$ 157,281**	13%	13%	12%

Performance & Dependability

AAIM controls
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GEA
Hillphoenix A DOVER COMPANY
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GÜNTNER
SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL® Company

For excellence in performance & dependability we would like to recognize these companies who all came together to provide near perfect results.

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Thank you very much!

GCCA ASSEMBLY OF COMMITTEES
FAIRMONT, WASHINGTON, DC
JULY 26–28, 2015

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John S. Scherer, LA Cold Storage

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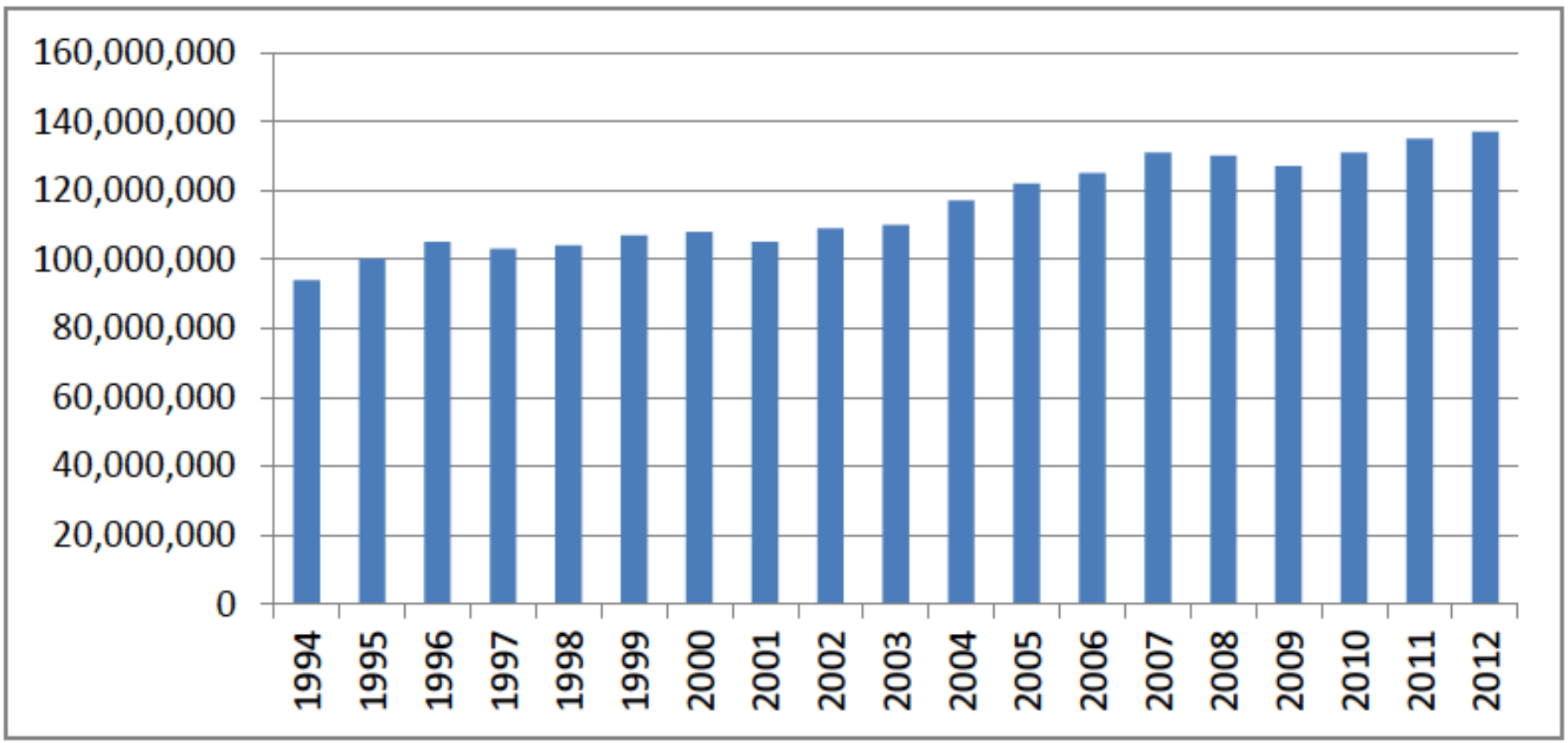
FAIRMONT, WASHINGTON, DC
JULY 26–28, 2015

Global ammonia production (tons)



The Environment and Ammonia

Estimates published by third parties

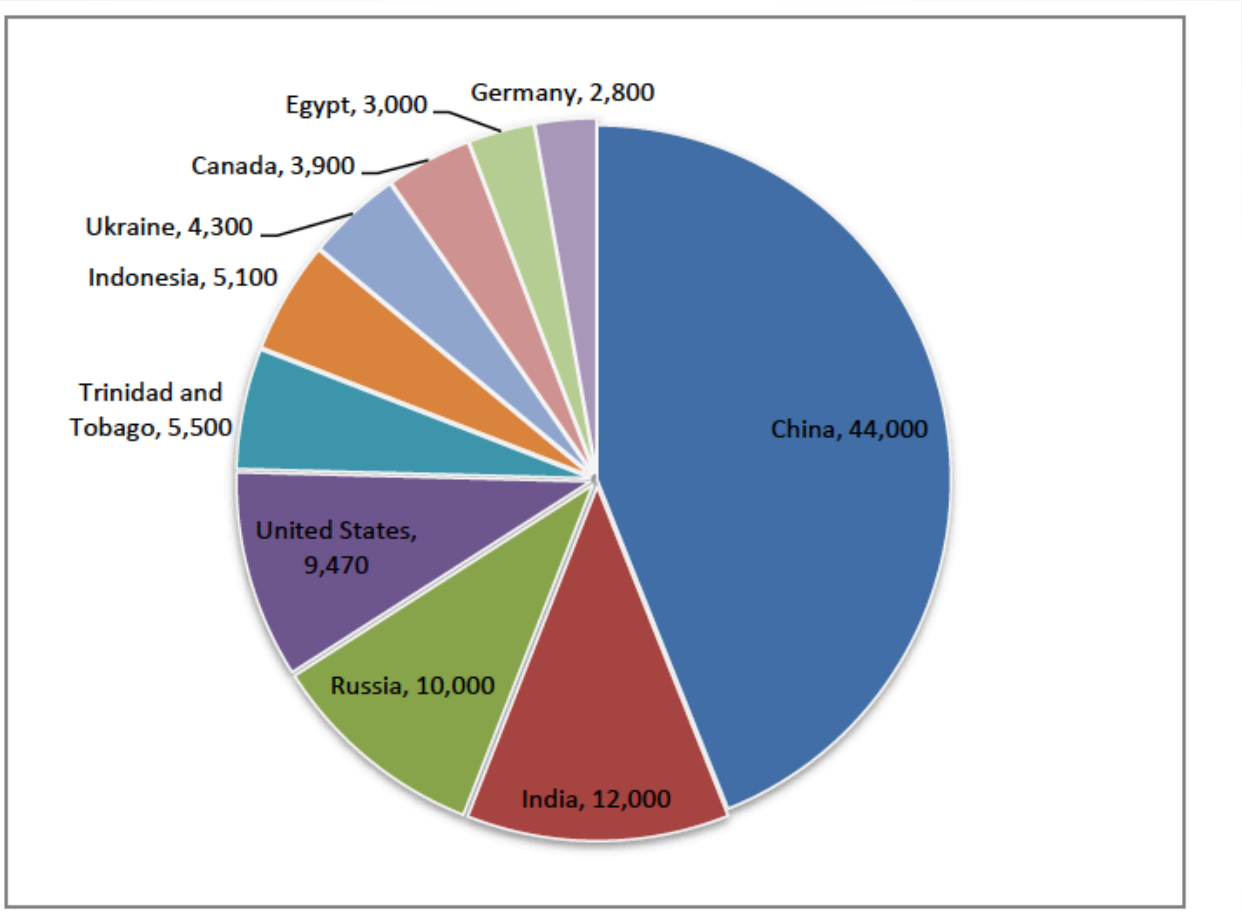
1. 95% of ammonia on the planet is naturally created.
2. Lightening leads to creation of 20 to 40 Billion pounds of ammonia per year.
3. Alfalfa and soy bean crops produce over 500 Billion pounds of ammonia per year.
4. The human body can not function properly without producing ammonia. A person may produce 15 grams of ammonia per day. The population of California of over 40 million people, for example, may produce nearly 500 million pounds of ammonia per year.
5. It has been estimated 3 to 6 trillion pounds of ammonia is created on the planet each year.

The Environment and Ammonia Refrigeration

Estimates published by third parties

1. Global ammonia production by man is about 4 billion pounds per year.
2. Over 85% of ammonia produced by man is used as fertilizer and fertilizer related products.
3. Over 13% of ammonia produced by man is used in industrial processes and production of various products.
4. Ammonia used for refrigeration is in the less than 2% category of man made ammonia.
5. Assuming ammonia is replenished in refrigeration systems at a rate of 8% per year, ammonia refrigeration accounts for less than .16% of ammonia produced by man.
6. This .16% of man made ammonia accounts for a tiny percentage of one tenth of one percent of ammonia created on the planet each year.

Top Ten Global Ammonia Producers



It all boils down to education, education, education.

Questions & Answers