***ThermX**, by SolX Energy*
Technology Analysis in Room F of Vista Alegre Casino

The current report attempts to analyze energy savings through the replacement of two units of air conditioning equipment in room F, of Vista Alegre Casino. The selected technology was ThermX, along with consumption monitoring equipment was installed by Edita Panama, on top of the packaged unit machines.

The total cooling power in Vista Alegre Casino is 110 ton. This is distributed among different equipment. Below is the equipment list for room F. Two existing rooftop units (1x 8-ton, and 1x 10-ton) were removed and replaced with 2x 10 ton 2-stage packaged units integrated with ThermX solar technology.

Methodology:

- *The air conditioning equipment's temperatures have been set to accommodate the daily requirements of both units, therefore the pre and post install comparison is based on similar demand requirements.*
- *Identical temperature numbers have been set on both old and new equipment to recreate the same demand scenario.*
- *Consumption figures before and after the installation have been analyzed.*
- *The average daily temperatures have been recorded, establishing a similar climate and temperature baseline for both pre and post installation data collection.*

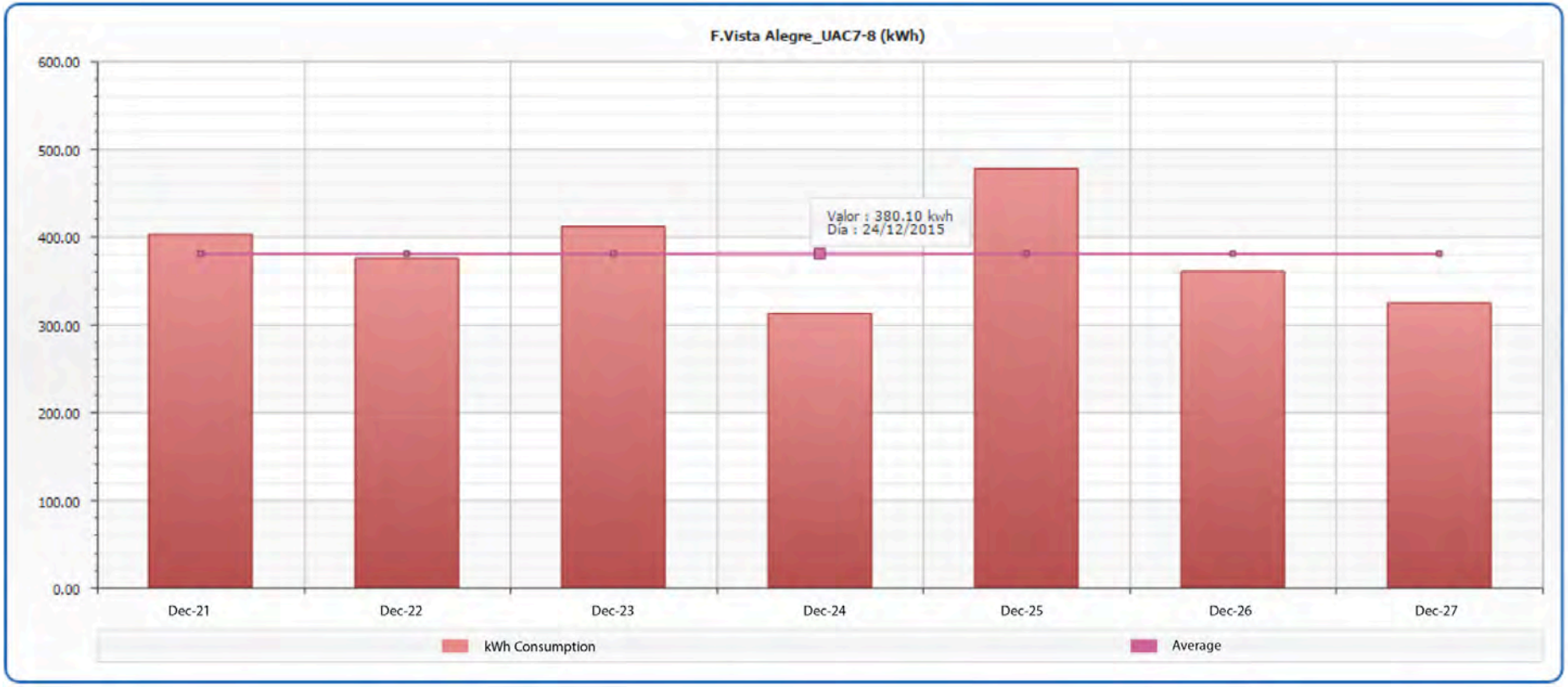
PREVIOUS EQUIPMENT CONSUMPTION ANALYSIS (From December 21st to 27th, 2015)

kW consumption graph

Measuring Point	Rate	Parameter	Period	Max Value.	Min. Value	Average Value
F.Vista Alegre_UAC7-8	BTD	PIII	12/21/2015 - 12/27/2015	24.4	1.3	14.9

			Data Chart			Energy Data		
Measuring Point	Period	Parameter	Max. Value	Min. Value	Average Value	Maximum (KW)	Energy (kWh)	Cost ($)
F.Vista Alegre_UAC7-8	12-21-2015 - 12-27-2015	PIII	24.4 (Dec-25 13:50)	1.3 (Dec-27 03:24)	14.9	24.0	2,661.0	430.4

Previous equipment's average daily kWh consumption for same period (380.10 kWh)



CONSUMPTION ANALYSIS: PREVIOUS VS. NEW EQUIPMENT

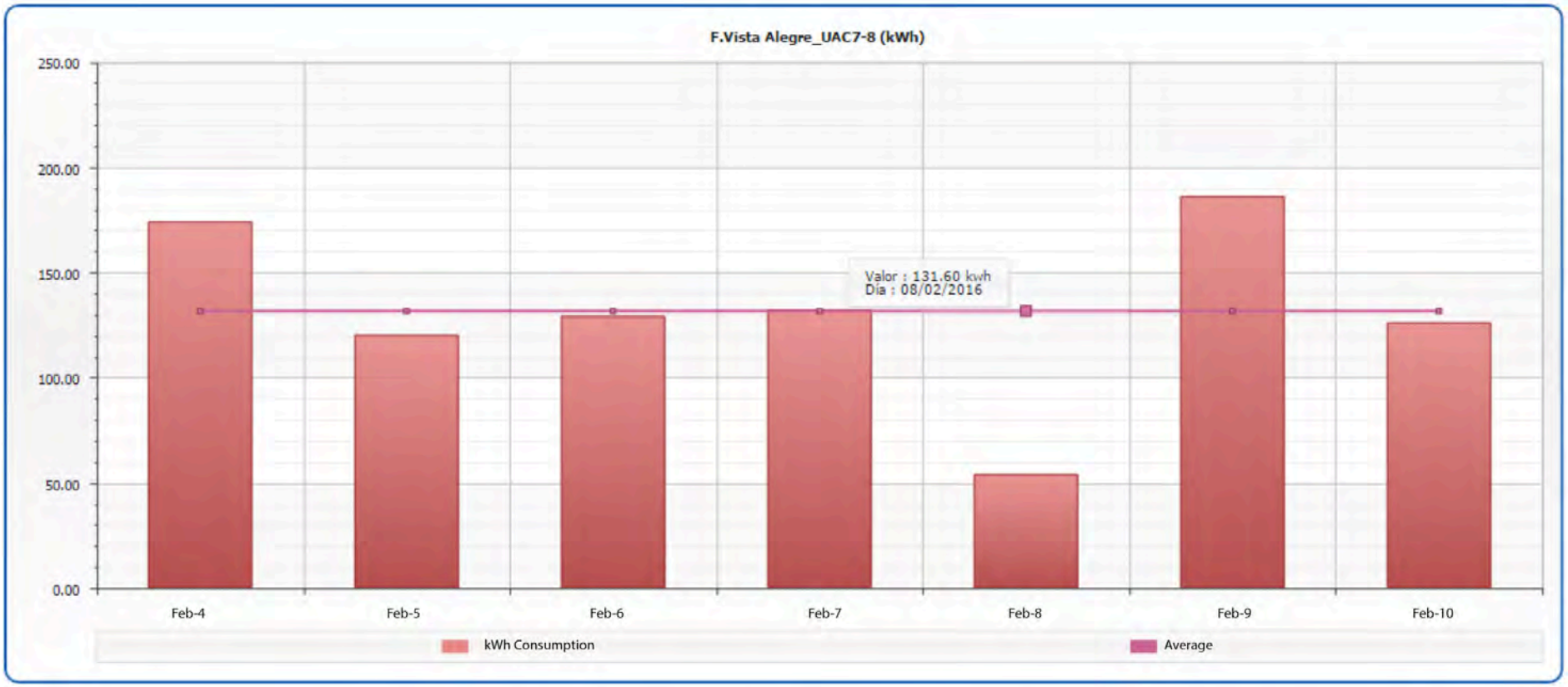
Previous equipment in Blue and new equipment in Red

Measuring Point	Rate	Parameter	Period	Max. Value	Min. Value	Average Value
F.Vista Alegre_UAC7-8	BTD	PIII	12/21/2015 - 12/27/2015	24.4	1.3	13.7
F.Vista Alegre_UAC7-8	BTD	PIII	02/04/2016 - 02/10/2016	11.4	0.8	4.7

			Data Chart				Energy Data		
Measuring Point	Period	Parameter	Max. Value		Min. Value		Average Value	Maximum (KW)	Energy (kWh)	Cost ($)
F.Vista Aledre_UAC7-8	12/21/2015 - 12/27/2015	PIII	24.4	(Dec-25) 13:40	1.3	(Dec-27) 03:23	13.7	24.0	2,661.0	430.4
F.Vista Alegre_UAC7-8	2/4/2016 - 2/10/2016	PIII	11.4	(Feb-04) 13:46	0.8	(Feb-10) 22:16	4.7	12.9	921.0	146.0
Total Difference		-	-		-		-	11.1	1,740.0	284.5
Percentage Difference		-	-		-		-	53.7%	66%	66%

ThermX equipment's daily consumption (131.60 kWh)

On February 8th, a communication shutdown occurred that was compensated, energy-wise, by the elevated consumption of February 9th. The outstanding number here is the average consumption of 131,6 kwh/day vs. the 380 kwh/day of the old equipment.



OVERALL CONSUMPTION ANALYSIS OF THE ENTIRE CASINO, BEFORE AND AFTER THE INSTALLATION

Previous equipment in Blue and new equipment in Red

Measuring Point	Rate	Parameter	Period	Max. Value	Min. Value	Average Value
F. Vista Alegre	BTD	PIII	12-21-2015 - 12-27-2015	195.5	127.3	161.2
F. Vista Alegre	BTD	PIII	02/04/2016 - 02/10/2016	183.2	123.2	147.8

			Data Chart			Energy Data		
Measuring Point	Period	Parameter	Max. Value	Min. Value	Average Value	Maximum (KW)	Energy (kWh)	Cost ($)
F. Vista Aledre_UAC7-8	12/21/2015 - 12/27/2015	PIII	195.4 (Dec-24) 12:13	127.3 (Dec-27) 03:49	161.2	190.9	27,195.0	4,398.8
F. Vista Alegre_UAC7-8	2/4/2016 - 2/10/2016	PIII	183.2 (Feb-05) 12:15	123.2 (Feb-06) 04:07	147.8	179.4	25,914.0	4,106.6
Total Difference		-	-	-	-	11.5	1,281.0	292.2
Percentage Difference		-	-	-	-	6.4%	4.9%	7.1%

CONSUMPTION ANALYSIS BEFORE AND AFTER INSTALLATION

Detailed Data

1st PERIOD. Old equipment	OVERVIEW		12/21/2015	12/22/2015	12/23/2015	12/24/2015	12/25/2015	12/26/2015	12/27/2015
Exterior Average Temperature	Average	29.1	29	29	29	29	29	29,5	29
Comfort Temperature	Average	22.9	23	22.93	23	23	22.5	23.06	22.87
New Equipment Consumption (kwh)	Aggregate	2,661	402	375	411	312	477	360	324
Max Power Expended (kW)	Average	24.0	23.7	23.8	24.4	23.7	24.4	24.2	24
General Consumption (kwh)	Aggregate	27,195	3939	3930	3951	3096	4572	3969	3738
Max Power Expended	Average	191.7	191.4	191.8	191.2	195.4	187.1	192.8	192.4

1st PERIOD. New equipment	OVERVIEW		02/04/2016	02/05/2016	02/06/2016	02/07/2016	02/08/2016	02/09/2016	02/10/2016
Exterior Average Temperature	Average	28.3	28.5	28	28	27	28.5	28.5	29.5
Comfort Temperature	Average	23.0	22.87	23	22.93	23	23	23.06	22.93
New Equipment Consumption (kwh)	Aggregate	908	174	121	129	132	54	186	126
Max Power Expended (kW)	Average	10.1	11.7	10.8	9.3	10.5	8.8	9.8	9.8
General Consumption (kwh)	Aggregate	25,478	4012	3448	3618	3582	3589	3587	3642
Max Power Expended	Average	176.3	183.1	185	172.9	176.1	171.8	171.7	173.8

Consumption Saving (kWh)		
Room F with New Equipment	**-66%**	
Casino General Meter	**-6%**	**18% of the air conditioning was replaced**

Other Technical Data		
Exterior Temperatures' changes	-3%	February's records are lower. Energy saving is facilitated although the differential is 0.8
Comfort Temperatures' changes	0%	Comfort conditions haven't been changed in any of the periods
Peak power reduction	-58%	Direct result of ThermX cooling system installation

ECONOMIC ANALYISIS OF THE INVESTMENT

Detailed Data

PROJECTION AND TECHNICAL-ECONOMIC PROFITABILITY DATA

Real	Annual Cost and Consumption	Consumption	Cost ($)	Cost ($/kwh)
%	Current Scenario	kWh	$	
91.2	Total daily energy consumption	1,406,614	$ 322,415	0.2292 $/kwh
9.8	Estimated daily consumption: 2 machines, 10 ton	138,372	$ 31,717	
Savings	Projected Scenario	kWh	$	
-6%	Total energy consumption	1,315,458	$ ---	
-66%	Estimated consumption: new machines, 10 ton	47,216	$ 10,823	
-6%	Estimated annual savings	91,156	$ 20,894	

ECONOMIC DATA

Investment and Maintenance		Base	
Investment	$	**56,000**	
Supply by 2 high-efficiency 10 ton machines w/ThermX	$	56,000	
Avoided Investment	$	**40,000**	Estimated cost according to PO16
Avoided investment in 2 conventional, 10 ton machines	$	40,000	

INVESTMENT PROFITABILITY

Inc. Elect	Savings measure	Projections	Actual	Savings	Year 1	Year 2
4%	**Estimated savings**	**$**	**$**	**113,170**	**20,894**	**21,730**
	Investment	**56,000**	**56,000**	56,000	20,894	21,730
	Accumulated Benefits	**90,629**	**113,170**			
	IRR (5 years)	**18%**	**28%**			
	PAYBACK Years	**3.1**	**2.5**			

OVER=INVESTMENT PROFITABILITY (Basic Equipment vs. High Efficiency Equipment)

Inc. Elect	Savings Measure	Projections	Actual	Savings	Year 1	Year 2
4%	**Estimated savings**	**$**	**$**	**113.170**	**20.894**	**21,730**
	Overinvestment	**16,000**	**16,000**	16,000	20,894	21,730
	Accumulated Benefits	**90,629**	**113,170**			
	IRR (5 years)	**105%**	**205%**			
	PAYBACK years	**0.9**	**0.7**			

CONCLUSIONS

- *The new equipment's output is excellent, exceeding saving predictions from 40% to 60%.*
- *Also, the investment´s profitability has increased by 10 percentage points over initial projections. The total Internal Rate of Return went from 18% to 28%, and the estimated payback reduced from 3.1 to 2.5 years.*
- *The number selected as overinvestment (conventional machine investment vs. high efficiency machine investment) recovers in 0.7 years, which gives the overinvestment a 205% IRR.*

FACILITY PICTURES