

# Innovative Automation Solutions for Professional Car Wash

## Case Study in Power Efficiency

### SITE PROFILES - SIDE BY SIDE

#### Hilltop Car Wash TN

219 HP controlled using basic cross the line motor starters.

- 120 HP of Dryer
- 40 HP of Vacuum
- Total HP = 219.0
- All motors run at 60HZ or 100% motor speed
- Period 3/12 to 4/13
- Car Volume is 7,232
- Total kWh is 30,600

#### Car Wash Clinic #1 TN

249 HP controlled using VFDs for the dryers and vacuums with soft starters and cross the line motor starters on other equipment.

- 120 HP of Dryer
- 40 HP of Vacuum
- Total HP = 249.0
- Dryers run at 48HZ or 80% motor speed for Base and Middle Packages and 56HZ or 93.33% motor speed for the Top Package
- Vacuums run on Auto.Drive™
- Period 3/12 to 4/9
- Car Volume is 6,668
- Total kWh is 16,128

### COMPARISON

Hilltop Car Wash used 4.2312 kWh / car during the test period.

Car Wash Clinic used 2.4187 kWh / car during the test period.

### CONCLUSION

Car Wash Clinic is operating **43% more power efficient** using VFD motor control than Hilltop even though they are using 30 HP more.

Without VFD's, Car Wash Clinic would have used 12,166 kWh more during the test period at an additional cost of **\$1,114.59** (not considering demand penalties).



Account Number: 182-0976.001  
Customer Name: Hill Top Car Wash  
Service Address: 9025 Jac Cate Rd  
Bldg Car Wash  
Ooltewah, TN 37363  
GSA/GPS >50 <1000KW

Meter Number	Type	From	To	Readings		Difference	Meter Multiplier	Total Usage
				Previous	Present			
304675	KWH	03/12/10	04/13/10	1007	1313	306	100	30600
304675	KW	03/12/10	04/13/10	0.000	1.345	1.345	100	134.500

Service	Amount
Customer Charge	\$ 9.90
Usage Charge	\$ 1,424.85
Usage Charge	\$ 777.04
Usage Charge	\$ 0.00
Demand Charge	\$ 1,186.39
Demand Charge	\$ 61.04 CR
Fuel Cost Adjustment	\$ 233.60
Sales Tax	\$ 3,570.74
<b>Total Current Charges</b>	<b>\$ 3,570.74</b>

Please Pay By  
April 30, 2010

Balances unpaid after this date are subject to a late fee and possible disconnection.

3-12 TO 4-13  
7,232 WASHED

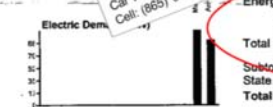


P.O. Box 59017  
Knoxville, TN 37950-9017  
(865) 524-2911  
www.kub.org

All KUB employees carry photo ID before letting workers... questions or concerns...  
Dig site: From: Jereme Tarr <jtarr340@gmail.com>  
To: Kati Pierce-kati@thecarwashsource.com  
Date: Fri, 23 Apr 2010 16:29:42 -0400  
Subject: Car count 3/12-4/9

Util: Kati,  
Ele: The car count at Clinton Highway from 3/12-4/9 is 6,668.  
Let me know if you need anything else.

Thanks,  
Jereme Tarr  
Director of Operations  
Car Wash Clinic  
Cell: (865) 803-8041



**Energy Charge**  
First 15,000 kWh @ \$0.09161 per kWh \$ 1,374.15  
Additional kWh @ \$0.04573 per kWh \$ 51.58  
Total Energy 16,128 kWh  
Subtotal \$ 1,425.73  
State Sales Tax \$ 142.33  
Total Electric Charges \$ 1,568.06

**Total Utility Charges for 6643 Clinton Hwy**  
Other Charges: \$ 115.94  
Adjustment: Canceled Bill (02/22-03/11) \$ -7,000.00

Name: LLC Integrated Management Service  
Acct Number: 9308203337  
Billing Date: 04/12/10  
Page: 1 of 1

Bill Summary	
Previous Amount Due	\$ 9,318.82
Payments Received	\$ 0.00
Current Charges	\$ -4,708.40
<b>Amount Due</b>	<b>\$ 4,610.42</b>

Category	Value	Rate	Total
Previous 12-Mth High Demand	105.98 kW		
30% of Contract/High Demand 12-Mth	31.79 kW		
Billable Demand	92.44 kW		
Volume	42.45 kW	@ \$13.95 per kW	\$ 592.60

Category	Value	Rate	Total
Energy Charge - Excess over 50 kW	15,000 kWh	@ \$0.09161 per kWh	\$ 1,374.15
Additional kWh	1,128 kWh	@ \$0.04573 per kWh	\$ 51.58
<b>Total Energy</b>	<b>16,128 kWh</b>		<b>\$ 1,425.73</b>
Subtotal			\$ 1,425.73
State Sales Tax			\$ 142.33
<b>Total Electric Charges</b>			<b>\$ 1,568.06</b>

\$ 115.94  
\$ 2,291.60  
\$ -7,000.00

- Rockwell Automation will supply a complete cabinet and drawings for the following Motor Driven Equipment (MDE):
- 1) 12 Wall mounted motor cabinet 60"x48"x12"
  - 1) 12 Wall mounted Motor (qty. 8 15HP)
  - 1) 12 Motor Circuit Protectors (MCP)
  - 1) 12 Motor contactors
  - 1) 12 Timers
  - 1) 12 Motor starter
  - 1) 12 Input CB w/Aux Motor contactor
  - 1) 15 HP Pendulum
  - 1) 2 HP F-B Mitter
  - 1) 2 HP S-S Mitter
  - 1) 7.5HP Prep gun
  - 1) 5HP Poodle
  - 2) 7.5HP Wraps
  - 1) 5HP Rocker
  - 2) 20HP Vacuum
  - 1) 7.5HP Conveyor
- Control transformer  
1KVA 24VAC  
1KVA 115VAC  
Motor mounted Operator Devices:  
- Dryer Fault P/L  
- Aux Motor Fault  
- Maintained E-Stop PB  
- 11 keyed selectors  
Individual Motor section nameplates  
1/2" terminal board as required.

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## APPLICATION INNOVATION

Anyone in our industry knows that the cost of utilities, in particular power, is increasing all of the time. Addressing waste in our motor driven systems not only delivers profit increases today, but also mitigates future profit erosion as utility companies increase rates. Centrifugal loads, like dryer fans, vacuum fans and pumps, by their nature use exponentially more power to reach maximum speed than any other speed less than max. We have developed several application techniques that drastically reduce power consumption using VFD's for Dryers, Vacuums and Pumps.

## CUSTOM SOLUTIONS

For advanced motor control and power management solutions, we are partnered with Rockwell Automation, leading global provider of industrial automation power, control and information solutions. Together, we provide custom solutions to help retail car wash operators lower their power consumption and optimize the performance of their equipment.



Car Wash Management Integrators  
3211 Creston Circle  
Superior Township, MI 48198  
866.868.5312 toll free phone/fax  
www.carwashcmi.com