CHP in the Hotel and Casino Market Sectors

Addendum I: Market Update

United States Environmental Protection Agency
Combined Heat and Power Partnership

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Report prepared by: Eastern Research Group, Inc. (ERG) for the U.S. Environmental Protection Agency, Combined Heat and Power Partnership, November 2007.

1.0 Overview

In December 2005, the U.S. Environmental Protection Agency (EPA) Combined Heat and Power (CHP) Partnership (CHPP) released *CHP in the Hotel and Casino Market Sectors* (the "December 2005 Market Assessment" in future references), which served as the CHPP's first comprehensive assessment of existing and potential growth of CHP systems in the hotel and casino sectors. This addendum is meant to provide updated data about the hotel and casino sectors since the December 2005 Market Assessment to inform CHPP of important changes to the existing use of CHP and existing market potential for use of new CHP in hotels and casinos. The December 2005 Market Assessment can be found on the CHP Partnership Web site at http://www.epa.gov/chp/documents/hotel_casino_analysis.pdf.

Over the past two years, the number of U.S. hotels and lodging establishments has decreased very slightly. While the size of the hotel industry has shrunk, the number of hotels with operating CHP systems has increased, from a total of 98 based on 2005 data, to 109 based on 2007 data.[1] California has experienced the greatest increase in the number of hotels operating CHP systems with nine, followed by New York with three. This growth represents a great opportunity to build on success and foster continued use of CHP.

The casino industry has experienced some growth from 2003 to 2006. During this period, there was a net increase of 21 land-based commercial casinos, with Nevada experiencing the most growth with 18 new land-based casinos. However, none of the new casinos in Nevada operate CHP systems. As the casino market is projected to continue growing in Nevada, these facilities represent a major opportunity for increased CHP deployment.

In addition to the casino growth experienced in Nevada, the Gulf Coast represents another significant market opportunity for future CHP utilization in the hotel and resort casino industry. In the aftermath of Hurricane Katrina, Mississippi has been extremely aggressive in reopening damaged casinos and has also invested billions of dollars in the development of new casino resorts. While several of these new resorts are already under construction, several proposed Mississippi coastal casinos are still in the early stages of conceptualization and design,

[1] CHP data comes from EEA's CHP Installation Database. The database does not necessarily capture new CHP systems as they become operational. Some installations captured in these numbers became operational in 2004. See Section 4.0.

representing a considerable opportunity for the integration of CHP into casino resort operations. Potential for CHP growth at casinos also exists in Connecticut and Pennsylvania. Connecticut currently has two large tribal casinos with the potential for expanded/new CHP, and Pennsylvania currently has several casinos in the planning stages. Coupled with favorable natural gas and electric rates (electric rate caps in Pennsylvania are also set to expire in 2010), the potential for CHP at Pennsylvania casinos is promising.

2.0 Updates to Hotel Market Data

EPA's December 2005 Market Assessment provided numerous hotel market data through 2004 from the American Hotel & Lodging Association's (AHLA's) 2005 Lodging Industry Profile. Since publication of this report, AHLA has released its 2006 Lodging Industry Profile,[2] which contains updated hotel market data through 2005. These updated data show minimal change in the total size of the U.S. lodging industry from 2004 to 2005 (see Tables 1 and 2). Table 2 highlights the change from 2004 to 2005 in the number of hotel properties and total rooms by hotel size, and the corresponding percent change.

Table 1: Number of Hotels and Lodging Establishments by Size and Total Hotel Revenue (Year 2004 and 2005 Data)

Hotel Size (Number of Rooms)	Properties in 2004	Properties in 2005	Total Number of Rooms in 2004	Total Number of Rooms in 2005
Under 75	27,464	27,416	1,163,668	1,160,329
75-149	14,326	14,432	1,524,099	1,532,477
150-299	4,235	4,182	847,089	836,554
300-500	1,070	1,062	398,491	396,544
Over 500	503	498	478,561	476,562
Total	**47,598**	**47,590**	**4,411,908**	**4,402,466**
2004 Revenue	**$113.7 billion**			
2005 Revenue	**$122.7 billion**			

Source: *2005 Lodging Industry Profile* and *2006 Lodging Industry Profile*, American Hotel & Lodging Association

[2] American Hotel & Lodging Association, 2006. *2006 Lodging Industry Profile*. <http://www.ahla.com/products_info_center_lip.asp>

Table 2: Change in Number of Hotels and Lodging Establishments by Size From 2004 to 2005

Hotel Size (Number of Rooms)	Properties	Total Number of Rooms	Percent Change (Properties)	Percent Change (Number of Rooms)
Under 75	-48	-3,339	-0.17%	-0.29%
75-149	106	8,378	0.74%	0.55%
150-299	-53	-10,535	-1.25%	-1.24%
300-500	-8	-1,947	-0.75%	-0.49%
Over 500	-5	-1,999	-0.99%	-0.42%
Total	**-8**	**-9,442**	**-0.02%**	**-0.21%**

Source: *2005 Lodging Industry Profile* and *2006 Lodging Industry Profile*, American Hotel & Lodging Association

Although hotels experienced a 7.9 percent increase in revenue from 2004 to 2005, the total number of hotels and lodging establishments decreased by less than one percent. The only hotel size category that experienced growth from 2004 to 2005 was the 75-149 room hotel category, which added 106 properties (representing a +0.74 percent change) and a total of 8,378 rooms (representing a +0.55 percent change).

Table 3 shows the top 15 national chains based on available rooms in the U.S as of 2007. The ranking is much the same as that which was included in the 2005 Market Assessment. Cendant Corporation, Marriott International, Inc., and Hilton Hotels Corporation remain the top three national chains. Changes from the rankings included in the 2005 Market Assessment include the addition of Caesar’s Entertainment, Inc., the relative ordering of La Quinta Corporation and Interstate Hotels & Resorts, and the exact number of available rooms for each chain.

Table 3: Top 15 National Chains by Number of Available Rooms in the U.S.

Hotel Chain	Domestic		International		Brand
	Rooms	Hotels	Rooms	Hotels	
Cendant Corporation	438,389	5,597	94,099	1,064	Amerihost Inn, Days Hotel, Days Inn, Days Serviced Apartments, Howard Johnson, Howard Johnson Express, Knights Inn, Ramada, Ramada International Plaza, Ramada International Hotels & Resorts, Ramada Limited, Ramada Limited, Ramada Plaza, Super 8, Thriftlod
Marriott International, Inc.	383,688	2,286	92,430	362	Courtyard, Fairfield Inn, Marriott Conference Centers, Marriott Executive Apartments, Marriott Hotels and Resorts, Renaissance Hotels & Resorts, Residence Inn, SpringHill Suites, The Ritz-Carlton & TownPlace Suites
Hilton Hotels Corporation	355,489	2,256	38,483	204	Conrad, Doubletree, Doubletree Club, Embassy Suites, Embassy Vacation Resort, Hampton Inn, Hampton Inn Suites, Hilton, Hilton Gaming, Hilton Garden Inn, Homewood Suites & Scandic Hotel
Inter-Continental Hotel Group	338,694	2,550	214,760	1,148	Candlewood, Centra, Crowne Plaza, Forum Hotel, Holiday Inn, Holiday Inn Express, Holiday Inn Garden Court, Holiday Inn Select, Hotel Indigo, Inter Continental, Parkroyal, Posthouse, Staybridge Suites, Sunspree Resorts & Toby Hotels.
Choice Hotels International, Inc.	326,010	4,032	79,869	887	Clarion, Comfort Inn, Comfort Suites, Econo Lodge, MainStay Suites, Quality, Quality Suites, Rodeway Inn, & Sleep Inn
Caesars Entertainment, Inc.	199,356	11	1,921	6	Caesars, Conrad, Hilton Gaming, & Sheraton Hotel.
Best Western International	186,426	2,201	116,169	1,754	Best Western
Accor North America	134,548	1,252	4,271	27	Coralia, Hotel Novotel, Hotel Sofitel, Mercure Hotel, Motel 6, Red Roof Inn, & Studio 6
Starwood Hotels & Resorts Worldwide, Inc.	121,271	346	103,131	374	Four Points, Hacienda, St. Regis, Luxury Collection, Sheratin Hotel, W Hotels, & Westin
Carlson Hospitality Worldwide	77,220	558	71,117	385	Country Inn & Suites, Park Inn, Park Plaza, Radisson, & Regent Hotels
HVM, L.L.C.	74,985	672	0	0	Crossland Suites, Extended Stay America, Extended Stay Deluxe, Homestead, & StudioPLUS.
Interstate Hotels & Resorts	65,885	283	670	4	Amerisuites, Best Western, Comfort Inn, Comfort Suites, Country Inn & Suites, Courtyard, Crowne Plaza, Doral, Doubletree, Doubletree Club, Embassy Suites, Four Points, Hampton Inn, Hampton Inn Suites, Hawthorn Suites, Hilton, Hilton Garden Inn, & Holiday
La Quinta Corporation	65,752	611	50	1	Baymont Inns & Suites, La Quinta Inns, & Woodfield Suites.
Hyatt Hotels Corporation	56,663	113	4,298	12	Hyatt
Host Marriott	50,959	100	1,641	4	Courtyard, Delta Hotels, Embassy Suites, Fairmont, Four Points, Four Seasons, Hilton, Hyatt, Marriott Conference Centers, Marriott Hotels and Resourts, Residence Inn, Swissotel, The Ritz-Carlton, & Westin.

3.0 Updates to Casino Market Data

Since publication of the December 2005 Market Assessment, three states have legalized casino gambling operations:[3] Arkansas (tribal casino gambling), Pennsylvania (racino gambling[4]), and Maine (racino gambling). With these new operations in place, as of July 2007, casino gambling (including land-based, riverboat, limited stakes, tribal, and racinos) was occurring in 38 states.

Commercial casinos—the casino sector in which CHPP has focused its outreach efforts—are still operating in only 11 states. From 2003 to 2006, there has been relatively little growth in the commercial casino sector (see Tables 4 and 5).

Table 4: Number of Commercial Casinos by State and Type (2003 and 2006 Data)

	2003 Data				2006 Data			
	Type of Casino				Type of Casino			
State	Land	Race Track	River Boat	Total	Land	Race Track	River Boat	Total
Nevada	256			256	274			274
New Jersey	12			12	11			11
Mississippi			29	29			27	27
Indiana			10	10	1		10	11
Louisiana	1	3	14	18	1	3	12	16
Illinois			9	9			9	9
Missouri			11	11			11	11
Michigan	3			3	3			3
Iowa		3	10	13	3	3	10	16
Colorado	44			44	46			46
South Dakota	38			38	36			36
Total	**354**	**6**	**83**	**443**	**375**	**6**	**79**	**460**

Note: The American Gaming Association lists Mississippi's commercial casinos as dock-side and land-based, however does not specify the breakdown. As a result, Table 4 categorizes all of Mississippi's commercial casinos as riverboat.
Source: *2004 State of the States: The AGA Survey of Casino Entertainment* and *2007 State of the States*: *The AGA Survey of Casino Entertainment*, American Gaming Association

[3] Ernst & Young Global Limited, 2007. Global Gaming Bulletin, 25th Anniversary Edition. <http://www.hotelnewsresource.com/pdf/EY07090701.pdf>.
[4] Racinos are horse or greyhound race tracks which have casinos. In some cases, the casino games are limited to slot machines or video lottery terminals (VLTs) only. However, many locations are beginning to include table games such as blackjack, poker, and roulette.

Table 5: Change in Number of Commercial Casinos by State and Type from 2003 to 2006

	Type of Casino				
State	Change in Number of Casinos 2003 - 2006 Land	Change in Number of Casinos 2003 - 2006 Race Track	Change in Number of Casinos 2003 - 2006 River Boat	Total Change in Number of Casinos 2003-2006	Percent Change 2003 - 2006
Nevada	18	0	0	18	7.03%
New Jersey	-1	0	0	-1	-8.33%
Mississippi	0	0	-2	-2	-6.90%
Indiana	1	0	0	1	10.00%
Louisiana	0	0	-2	-2	-11.11%
Illinois	0	0	0	0	0.00%
Missouri	0	0	0	0	0.00%
Michigan	0	0	0	0	0.00%
Iowa	3	0	0	3	23.08%
Colorado	2	0	0	2	4.55%
South Dakota	-2	0	0	-2	-5.26%
Total	**21**	**0**	**-4**	**17**	**3.84%**

Source: *2004 State of the States: The AGA Survey of Casino Entertainment* and *2007 State of the States*: *The AGA Survey of Casino Entertainment*, American Gaming Association

Table 5, which illustrates the change in number of casinos by type and state, shows that from 2003 to 2006, the commercial casino sector experienced a net increase of 17 commercial casinos (21 land-based casinos), representing an overall 3.8 percent increase. Over this same time period, the largest growth in commercial casinos occurred in Nevada, which added 18 new land-based commercial casinos. Iowa, Colorado, and Indiana experienced smaller growth in commercial casinos, adding three, two, and one land-based casino(s) respectively for a total of six new land-based casinos among these three states. In South Dakota, Louisiana, and Mississippi two casinos closed, and in New Jersey one closed between 2003 and 2006. In addition, no updates to the 2002 economic census data have been made since 2005 which indicate 283 casinos with lodging.

Not captured in the American Gaming Association data shown in Table 5 is the more recent growth and re-development of commercial casinos in the Gulf Coast region following Hurricane Katrina. According to the American Gaming Association,[5] the gaming industry has invested nearly $1.4 billion for reconstruction of the Mississippi and Louisiana coasts following damage incurred as a result of Hurricane Katrina. The Gulf Coast News has reported seven new

[5] American Gaming Association, 2007.
<http://www.americangaming.org/Industry/factsheets/general_info_detail.cfv?id=38>

casinos and four reopened casinos (see Table 6) since December 2005.[6] In addition, two new casinos are under construction with three more slated for development.

Under Construction

- **Bacaran Bay Casino Resort**, owned and operated by Torguson Gaming Group, is scheduled for completion in 2010. A $500 million project, the new resort will contain 638 rooms in its all-suite hotel, as well as 432 one and two bedroom condominiums.

- **Harrah's Entertainment** has unveiled plans for **Margaritaville Casino & Resort**, a $700 million project, which represents the single largest investment in Mississippi since Hurricane Katrina. Harrah's expects this to be the first phase of a larger development project that may end up costing more than $1 billion. Construction began this past summer and is slated for completion in spring 2010.

Proposed/Under Development

- **Bayview Casino Resort** is currently under design and is slated to feature 55,000 square feet of gaming space and a 500-room hotel.

- **Broadwater** (formerly President Casinos) is a large site, in which there have been rumors about a potential $2 billion development, which could result in the Coast's most significant casino and resort.

- **Royal D'Iberville Casino and Hotel** is looking to construct its first casino on the west side of Interstate 110 in D'Iberville. The Mississippi Gaming Commission declared the property a legal site for gambling and has approved development plans, which include a 60 square-foot casino with a 400-room hotel.

[6] Gulf Coast News.com, 2007. <http://www.gulfcoastnews.com/GCNnewsCasinoOpenings.htm>.

Table 6: New Casinos and Reopenings of Gulf Coast Casinos since December 2005

New Casinos	
Hollywood Casino (formerly the Bay St. Louis Casino Magic)	Opened August 31, 2007 in Bay St Louis, Mississippi.
Hard Rock Casino	Opened ahead of schedule on May 30, 2007 in Biloxi, Mississippi.
Island View Resort	Gulfport, Mississippi's only casino, opened August 18, 2006.
Isle of Capri Casino Resort (soon to change to "The Isle)	Opened December 26, 2005, with the casino inside of its hotel. The casino ***plans to spend more than $180 million on the expansion of its Biloxi, Mississippi, property,*** including a new land-based casino and the conversion of an existing gambling floor into convention and ballroom space. This expansion project is expected to be completed in May 2009.
The Palace Casino	Opened December 30, 2005 and ***announced plans on January 19, 2007 to start construction on a 20,000 square-foot expansion.***
Silver Slipper Casino	Opened November 9, 2006 in Hancock County.
Treasure Bay Casino	Opened its new hotel and casino in Biloxi, Mississippi, on July 2, 2007, marking the return of almost all casinos damaged or destroyed by Hurricane Katrina.
Trump Entertainment Resorts, Inc.	Has dropped its plans to construct a casino in Hancock County after negotiations with the land owner, Diamondhead Casino Corporation stalled in February 2007.
Reopenings	
Beau Rivage Resort and Casino	Reopened on August 26, 2006, the one-year anniversary of Hurricane Katrina.
Biloxi Grand Casino (owned by Harrah's)	Reopened August 17, 2007 in the surviving Bay View Hotel.
IP Casino Resort and Spa (formerly the Imperial Palace)	Reopened in December 2005 featuring 1,000 refurbished hotel rooms.
Boomtown Casino	Reopened June 29, 2006 with major improvements, including a new gaming floor on its renovated casino barge.

Source: Gulf Coast News, 2007.

In addition there are several potential opportunities for CHP development at casinos in Connecticut and Pennsylvania. Connecticut has two large existing casino resorts: the Foxwoods Resort and Casino and the Mohegan Sun Casino and Hotel.

- **The Foxwoods Resort and Casino** is located in Ledyard, Connecticut, and is owned by the Mashantucket Pequot Tribal Nation. Foxwoods is the largest casino in the world, with 340,000 square feet of gaming space in a complex that covers 4.7 million square feet. Accommodations at the resort total 1,416 guest rooms and suites, more than 55,000 square feet of meeting space and 25 conference rooms. Foxwoods recently unveiled plans for developing MGM Grand at Foxwoods, a new $700 million development project, scheduled for completion spring of 2008. The expansion will add nearly 2 million square feet of overall space, featuring significantly increased hotel, entertainment, restaurants, and gaming venues as well as enhanced corporate retreat, meeting, and convention resources.

- **The Mohegan Sun Casino and Hotel** is located in southeastern Connecticut and is owned by the Mohegan Tribal Nation. The hotel has almost 1,200 guest rooms and includes a spa, business center, and several fine and casual dining restaurants. The resort currently has a small fuel cell CHP system in operation, producing approximately 400 kW and 1.8 MMBtus.

In July 2004, the Pennsylvania legislature authorized the legalization of slot machines at 14 locations throughout the state. Licenses were awarded to the six racetracks listed below and slots are in place at all of them, except for Hollywood Casino at Penn National, which expects to have them in operation by early 2008. Additionally, one slot license is reserved for a future harness track which has not yet been built or named.

- Harrahs Chester Casino & Racetrack (www.harrahs.com/)
- Hollywood Casino at Penn National (www.pennnational.com/)
- The Meadows (www.themeadowsracing.com/)
- Mohegan Sun at Pocono Downs (www.poconodowns.com)
- Mount Airy Resort & Casino (www.mtairyresort.com)
- Philadelphia Park Casino and Racetrack (www.philadelphiapark.com)
- Presque Isle Downs and Casino (www.presqueisledowns.com)

Aside from the Mount Airy Lodge Resort in Mt. Poconom which opened in October 2007, the rest of the 14 casinos are under development. Two slot casinos are planned on the Philadelphia waterfront: Foxwoods Casino Philadelphia (www.foxwoods.com) and SugarHouse Casino (www.sugarhousecasino.com). Both casinos are still in the planning/development stages. The earliest that either casino is expected to open is late 2008. In Pittsburgh's North Shore area, the Majestic Star is expected to open in March 2008. Bethlehem, Pennsylvania will be home to the Sands Bethworks Casino (www.sandsbethworks.com/) which is expected to open in mid-2008. Finally, two slot parlors are allowed at two as-yet-to-be-determined hotels which each must have a minimum of 275 rooms. The decision to award the two licenses is not expected to be made until early 2008.

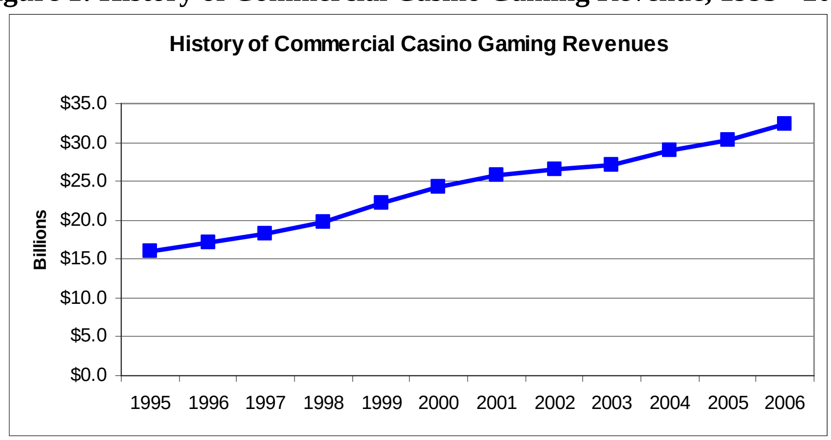
Another indication of growth in the commercial casino sector through 2006 is the steady increase in commercial casino gaming revenue (see Table 7 and Figure 1).

Table 7: Total U.S. Commercial Casino Gaming Revenues, 1995 - 2006

Year	Total Commercial Casino Gaming Revenue (Billions)
1995	$16.0
1996	$17.1
1997	$18.2
1998	$19.7
1999	$22.2
2000	$24.3
2001	$25.7
2002	$26.5
2003	$27.0
2004	$28.9
2005	$30.3
2006	$32.4

Source: American Gaming Association

Figure 1: History of Commercial Casino Gaming Revenue, 1995 - 2006



Source: American Gaming Association

While the total number of U.S. commercial casinos has increased by only 3.8 percent from 2003 to 2006, over this same time period, total U.S. commercial casino revenues have increased from $27 billion to more than $32 billion, representing a 20 percent increase. These data suggest that, despite limited growth in the number of commercial casinos over the past few years, demand and participation in commercial gambling has significantly increased. This trend could be a market indicator of future growth in the commercial casino sector (see Section 5.0 for more information).

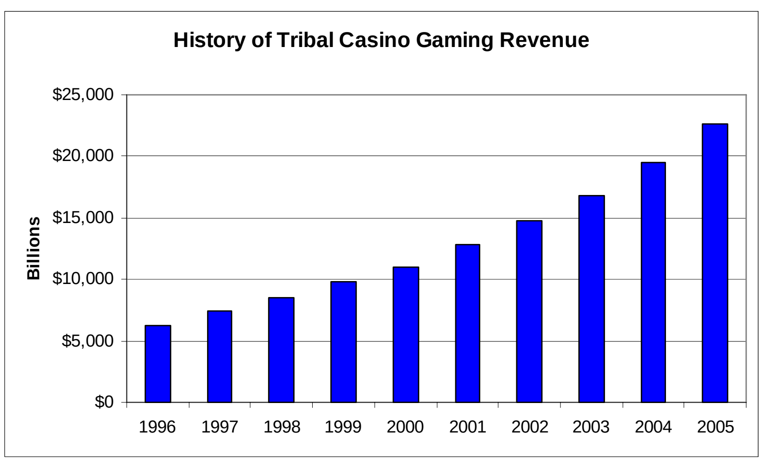
The tribal casino industry has also experienced continued and considerable growth in gaming revenues over the last decade (see Table 8 and Figure 2).

Table 8: Total Tribal Casino Gaming Revenue, 1996 – 2005

Year	Tribal Casino Gaming Revenue (Billions)	Percent Change from Previous Year
1996	$6,301	
1997	$7,451	18.3%
1998	$8,496	14.0%
1999	$9,800	15.3%
2000	$10,959	11.8%
2001	$12,822	17.0%
2002	$14,718	14.8%
2003	$16,826	14.3%
2004	$19,479	15.8%
2005	$22,630	16.2%

Source: *Global Gaming Bulletin: 25th Anniversary Edition*, Ernst & Young Global Limited, 2007

Figure 2: History of Tribal Casino Gaming Revenue, 1996 – 2005



Source: *Global Gaming Bulletin: 25th Anniversary Edition*, Ernst & Young Global Limited, 2007

Table 8 confirms the continued growth of the tribal casino sector, illustrating a consistent 12 to 18 percent annual increase in revenue over the nine-year period from 1996 to 2005. Sustained revenue growth in the tribal casino sector serves as another potential market indicator of growth within the casino industry as a whole.

4.0 Change in CHP Capacity in Hotels and Casinos

EEA's CHP Installation Database[7] shows a net increase of 11 CHP systems (13 new systems and two systems removed from service) in operation in hotels and casinos as compared to the data used in the December 2005 Market Assessment, resulting in a total of 109 CHP systems (see Table 9). Data contained in EEA's CHP Installation Database is not necessarily added as new CHP systems become operational. Of the 13 systems added to the database since the December 2005 Market Assessment, one became operational in 2003, six became operational in 2004, and six became operational in 2005 or 2006. As such, only the six systems that became operational in 2005 and 2006 are actually newly installed.

Table 9: Change in Casino and Hotel CHP Operations by State, 2005 - 2007

	2005*		2007*		Change			
State	# Sites	Capacity (kW)	# Sites	Capacity (kW)	Change (# sites)	% change (# sites)	Change (kW)	% change (kW)
AK	2	5,950	2	5,950	0	0.0%	0	0.0%
AZ	1	1,650	1	1,650	0	0.0%	0	0.0%
CA	57	27,003	66	29,168	9	15.8%	2,165	8.0%
CT	2	550	2	550	0	0.0%	0	0.0%
FL	1	125	1	125	0	0.0%	0	0.0%
HI	3	1,550	2	550	-1	-33.3%	-1,000	-64.5%
IN	1	90	0	0	-1	-100.0%	-90	-100.0%
MA	5	560	5	560	0	0.0%	0	0.0%
MI	1	125	1	125	0	0.0%	0	0.0%
MO	1	150	1	150	0	0.0%	0	0.0%
ND	1	30	1	30	0	0.0%	0	0.0%
NE	1	82	1	82	0	0.0%	0	0.0%
NJ	8	1,710	9	1,830	1	12.5%	120	7.0%
NM	1	28	1	30	0	0.0%	2	7.1%
NV	1	4,900	1	4,900	0	0.0%	0	0.0%
NY	6	7,935	9	14,610	3	50.0%	6,675	84.1%
OH	1	100	1	100	0	0.0%	0	0.0%
TN	1	5,200	1	5,200	0	0.0%	0	0.0%
TX	2	355	2	355	0	0.0%	0	0.0%
UT	1	1,950	1	1,950	0	0.0%	0	0.0%
WV	1	3,150	1	3,150	0	0.0%	0	0.0%
Total	**98**	**63,193**	**109**	**71,065**	**11**	**11.2%**	**7,872**	**12.5%**

*EEA's CHP Installation Database does not necessarily capture new CHP systems as they become operational. "2007" indicates CHP data contained in the database as of October 19, 2007 and "2005" indicates CHP data from the database used in the December 2005 Market Assessment.
Source: EEA CHP Installation Database

Table 9 illustrates that California experienced the largest growth in hotel and casino CHP installations when comparing the 2005 and 2007 data, adding nine new CHP systems in hotels and casinos. Of these nine systems, four became operational in 2005 or 2006. New York began operating three new CHP systems in hotels and casinos (two of which became operational in 2006), and New Jersey began operating one new CHP system (which became operational in 2004). During this same time period, Hawaii and Indiana each removed a hotel/casino CHP system from operation. This activity resulted in the net addition of approximately 7,900 kW of new CHP capacity, representing an increase of more than 12 percent from 2005 to 2007.

[7] EEA's CHP Installation Database can be accessed online at: www.eea-inc.com/chpdata/index.html.

Of the recent growth in operating CHP systems in U.S. hotels and casinos, most of the systems rely on reciprocating engines (six new systems) and microturbines (four new systems). Of the added capacity since 2005 data were retrieved from the EEA database, more than 77 percent is generated via CHP systems using reciprocating engines as the prime mover (see Table 10).

Table 10: Change in Casino and Hotel CHP Operations by Prime Mover, 2005 – 2007

	2005*		2007*		Change	
Prime Mover	**# Sites**	**Capacity (kW)**	**# Sites**	**Capacity (kW)**	**Change (# sites)**	**Change (kW)**
Combustion Turbine	4	12,450	4	12,750	0	300
Reciprocating Engine	78	48,225	84	54,345	6	6,120
Fuel Cell	5	1,350	6	2,350	1	1,000
Microturbine	11	1,138	15	1,620	4	482
Total	**98**	**63,163**	**109**	**71,065**	**11**	**7,902**

*EEA's CHP Installation Database does not necessarily capture new CHP systems as they become operational. "2007" indicates CHP data contained in the database as of October 19, 2007 and "2005" indicates CHP data from the database used in the December 2005 Market Assessment.
Source: EEA CHP Installation Database

Table 11 reveals that, of the net increase in hotel/casino CHP systems in operation since 2005, 10 of the new systems have capacities under 500 kW, and five of the new systems have capacities under 100 kW. Only one of the new CHP systems has a capacity greater than 5 MW—the Seneca Casino Resort in New York, which became operational in 2006.

Table 11: Change in Casino and Hotel CHP Operations by Size Range, 2005 - 2007

	2005*	2007*	Change
Size Range	**# Sites**	**# Sites**	
0-100 kW	40	45	5
100-500 kW	39	44	5
500-1000 kW	5	5	0
1-5 MW	10	10	0
>5 MW	4	5	1
Total	**98**	**109**	**11**

EEA's CHP Installation Database does not necessarily capture new CHP systems as they become operational. "2007" indicates CHP data contained in the database as of October 19, 2007 and "2005" indicates CHP data from the database used in the December 2005 Market Assessment.
Source: EEA CHP Installation Database

Table 12 provides additional details about the 13 new CHP systems added to EEA's CHP Installation Database since the December 2005 Market Assessment.

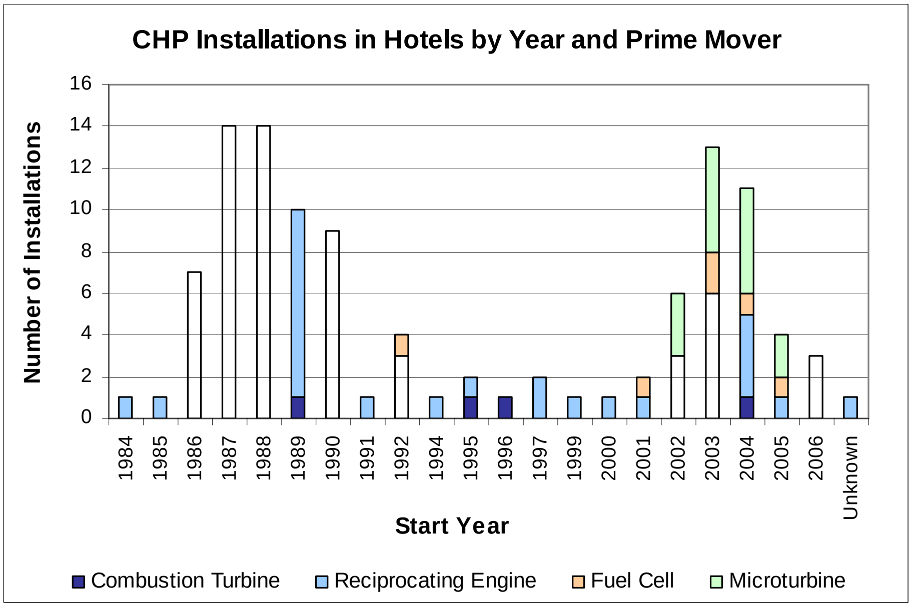
Table 12: Hotel/Casino CHP Systems Added to the EEA CHP Installation Database Since 2005

Organization Name	Facility Name	City	State	Prime Mover	Fuel Class	Capacity (kW)	Year Operational	Utility Name
Chaminade Conference Center and Hotel / BluePoint Energy	Chaminade Conference Center and Hotel	Santa Cruz	CA	Engine	Natural Gas	270	2006	Pacific Gas & Electric
Motel	Motel	Riverhead	NY	Engine	Natural Gas	75	2006	
Seneca Casino Resort	Seneca Casino Resort	Niagara Falls	NY	Engine	Natural Gas	6000	2006	
Embassy Suites	Embassy Suites San Luis Obispo	San Luis Obispo	CA	Engine	Natural Gas	85	2005	
Resort	Resort	Big Sur	CA	Microturbine	Natural Gas	60	2005	
Ritz Carlton	Ritz Carlton San Francisco	San Francisco	CA	Microturbine	Natural Gas	240	2005	Pacific Gas and Electric
Glenwood Inn	Glenwood Inn	Menlo Park	CA	Engine	Natural Gas	60	2004	
Hotel	Hotel	Culver City	CA	Engine	Natural Gas	300	2004	
Motel	Motel	Colton	CA	Microturbine	Natural Gas	90	2004	
Sheraton Hotels	Sheraton San Diego Hotel & Marina, East Tower	San Diego	CA	Fuel cell	Natural Gas	1000	2004	San Diego Gas & Electric
The Nites Inn Hotel	Nites Inn of Ontario	Ontario	CA	Microturbine	Natural Gas	60	2004	
Harvey Cedars Bible Conference Complex	Harvey Cedars Bible Conference Complex	Long Beach Island	NJ	Microturbine	Natural Gas	120	2004	
Hudson Hotel	Hudson Hotel	New York	NY	Engine	Natural Gas	300	2003	Consolidated Edison

Source: EEA CHP Installation Database

While the data indicate recent growth in operating CHP systems in the hotel and casino sector, Figure 3 illustrates that this growth has slowed compared to two periods of rapid growth, which occurred during the late 1980s and 2002 to 2004 (see Figure 3). However, some of the appearance of a slow period could be due to a lag in how EEA's CHP Installation Database captures operational projects, as demonstrated by the fact that the most current data contains projects that became operational in 2004 that were not captured in the December 2005 Market Assessment.

Figure 3: CHP Installations in Hotels and Casinos by Year and Prime Mover



Source: EEA CHP Installation Database

With the 2006 addition of one new CHP system in the Seneca Casino Resort, in Niagara Falls, New York, a total of five casino resorts are operating in the United States with CHP systems (see Table 13).

Table 13: Casino Resorts with Operating CHP Systems

Hotel/Casino Resort	Location	CHP Capacity
Morongo Casino Resort and Spa	Cabazon, California	14 MW
Seneca Casino Resort	Niagara Falls, New York	6 MW
Turning Stone Casino and Resort	Verona, New York	5.5 MW
Rio All-Suite Hotel and Casino	Las Vegas, Nevada	4.9 MW
Mohegan Sun Casino and Hotel	Uncasville, Connecticut	0.4 MW

Source: EEA CHP Installation Database

5.0 Hotel and Casino CHP Market Potential

With a slight decrease in the number of U.S. hotels (less than one percent) and only modest growth in the number of U.S. commercial casinos (less than four percent), the technical market potential for CHP in hotels and casinos has remained relatively unchanged since publication of EPA's December 2005 Market Assessment. Nevada holds claim to 18 of the 24 new land-based commercial casinos built and occupied between 2003 and 2006. Despite the fact that none of these new facilities installed a CHP system, continued casino growth in Nevada represents an excellent opportunity for CHP implementation in the future. Additionally, though the economic and policy environment does not appear particularly favorable to CHP in the Gulf Coast region, the plethora of new casino resorts being built in Mississippi indicates the potential for CHP growth in the Gulf Coast region.

In addition to the potential for growth of the CHP market in Nevada and Gulf Coast casinos, hotel developers and owners have demonstrated interest in CHP in California and New York, evidenced by the addition of nine new CHP systems in California and three new CHP systems in New York hotels since 2004. Given this level of interest, there is potential for additional CHP growth in California's and New York's hotel industries, especially with further CHPP outreach about the successes of these new systems and continued outreach of the economic, reliability, and environmental benefits of CHP in hotels and casinos.

Additional potential for CHP growth exists in casinos in Connecticut and Pennsylvania. As mentioned in Section 3.0, there are two large casino resorts in Connecticut (Foxwoods and Mohegan Sun) that represent potential targets for Partnership outreach. The Mohegan Sun currently utilizes a CHP system, but it is very small for the facility's size and could potentially be expanded. The Foxwoods Resort and Casino does not have a CHP system and they are planning an expansion which may represent an opportunity for CHP consideration (although the project is scheduled for completion in spring 2008 which may be too late). Pennsylvania has several casinos still in the planning stages with projected operational dates in 2008 that represent a potential target for CHP outreach. Contact with Maryanne Campbell (Philadelphia Gas Works) indicated that she could be a champion for CHP in hotels/casinos in Pennsylvania; at the very least Ms. Campbell can serve as an initial contact to further assess the potential for CHP in Pennsylvania's hotels and casinos.

A comparison of electric and natural gas rates (see Table 14) in the target states mentioned above—California, Connecticut, Louisiana, Mississippi, Nevada, New York, and Pennsylvania—shows that industrial electric prices in these states have increased between 3 percent and 49 percent since 2005. At the same time, natural gas prices have decreased in California, Connecticut, Louisiana, Mississippi, and Pennsylvania, and though both electric and gas prices have increased in New York and Nevada, electric rates have done so more rapidly. These data are another indicator of the increased opportunity for CHP in these states.

Table 14: Electric and Natural Gas Prices in Selected States in 2005 and 2007

State	Average Industrial Electric Price* in 2005 (¢/kWh)	Industrial Electric Price* in July 2007 (¢/kWh)	Percent Change	Average Industrial Natural Gas Price in 2005 ($/MMBtu)	Industrial Natural Gas Price in July 2007 ($/MMBtu)	Percent Change
California	9.50	11.02	+16.0%	9.84	9.70	-1.4%
Connecticut	9.39	13.95	+48.6%	11.68	10.26	-12.2%
Louisiana	6.75	6.95	+3.0%	9.11	7.72	-15.3%
Mississippi	5.39	5.82	+8.0%	9.10	8.33	-8.5%
Nevada	7.65	10.27	+34.2%	9.82	12.08	+23.0%
New York	8.21	9.58	+16.7%	9.88	11.34	+14.8%
Pennsylvania	6.29	7.15	+13.7%	11.30	11.22	-0.7%

*While hotels are not industrial facilities, the size and scope of operations more closely matches the EIA industrial price than the EIA commercial price, which is affected by a large number of very small commercial customers.

Source: U.S. Department of Energy, Energy Information Administration, 2007