The DEER Demand Savings Definition

A Summary of Fake Energy Efficiency News: Misconceptions and Alternate Facts Presented about DEER Peak Demand Definition Update

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Alternate Fact #1:

The kW demand definition is related to “net” grid load peaking and the incremental generation resource addition of a CCT (in avoided costs).

Actual Fact #1:

The kW demand definition is related to the total T&D load as well as “negative” local load due to excess on-site (behind the meter) generation. Presenting averaged summer load profiles of “net” grid load is inappropriate.

For residential and small to medium non-residential customers the on-site generation does not impact the load reduction credit given for energy efficiency. This is to support net-zero designs.

Alternate Fact #2:

The hour integrated kW demand has moved from mid afternoon to early evening either now or will move to such a period in the next few years.

Actual Fact #2:

The hourly integrated kW grid total demand has been reasonably stable and centered in the 2-5PM time range until recently as it moved to be centered the 3-6PM or 4-6PM period. There is no evidence that the predictions of a post 6PM grid T&D peak demand is likely. Presenting averaged summer load profiles of “net” grid load is inappropriate in the comparative valuation of EE resources. We must also remember that the impact of local excess on-Site generation also contributes to the local T&D resource requirements.

DEER Demand Savings Definition

Elements of Definition – Historical Actual Grid Peak

Year	Megawatts at Peak Load*	Date	Time
1998	44,659	August 12	14:30
1999	45,884	July 12	16:52
2000	43,784	August 16	15:17
2001	41,419	August 7	16:17
2002	42,441	July 10	15:01
2003	42,689	July 17	15:22
2004	45,597	September 8	16:00
2005	45,431	July 20	15:22
2006	50,270	July 24	14:44
2007	48,615	August 31	15:27
2008	46,897	June 20	16:21
2009	46,042	September 3	16:17
2010	47,350	August 25	16:20
2011	45,545	September 7	16:30
2012	46,846	August 13	15:53
2013	45,097	June 28	16:54
2014	45,089	September 15	16:53
2015	46,519	September 10	15:38
2016	46,232	July 27	16:51
2017	50,116	September 1	15:58

California ISO

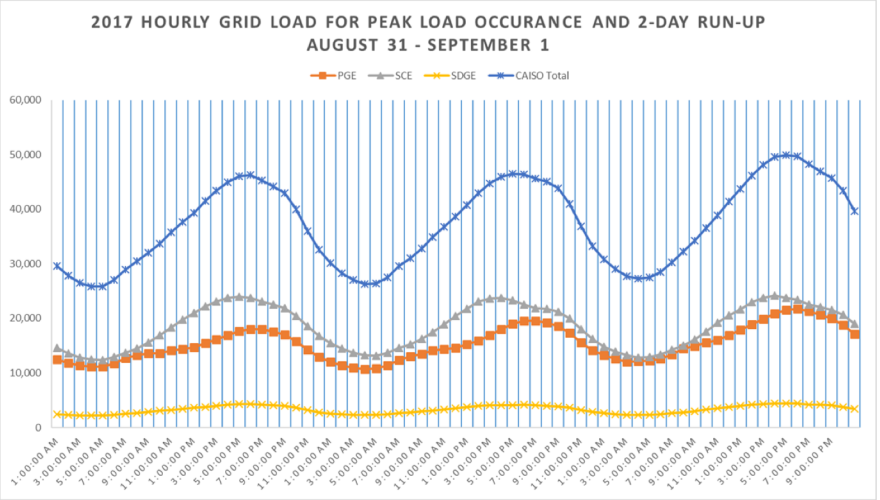
California ISO Peak Load History 1998 through 2017

Note: The DEER method for selecting the days of likely grid peak has proven accurate over the last 17 years of actual weather and actual recorded peak occurrence. However, the DEER CTZ table is for the CEC adopted typical weather.

DEER Demand Savings Definition

Alternative Peak Periods – 2017 Example

Dates	PGE	SCE	SDGE	CAISO Total	% of Peak
8/30/17 2:00 PM	15,427	22,254	3,768	41,544	83%
8/30/17 3:00 PM	16,167	23,118	3,964	43,345	87%
8/30/17 4:00 PM	16,944	23,759	4,188	44,992	90%
8/30/17 5:00 PM	17,640	23,997	4,321	46,062	92%
8/30/17 6:00 PM	18,037	23,770	4,328	46,235	93%
8/30/17 7:00 PM	18,031	23,030	4,175	45,329	91%
8/30/17 8:00 PM	17,510	22,512	4,086	44,199	89%
8/30/17 9:00 PM	16,984	21,915	3,935	42,921	86%
8/31/17 2:00 PM	15,893	23,037	3,971	43,003	86%
8/31/17 3:00 PM	16,911	23,687	4,069	44,770	90%
8/31/17 4:00 PM	17,969	23,771	4,133	45,979	92%
8/31/17 5:00 PM	18,981	23,270	4,127	46,485	93%
8/31/17 6:00 PM	19,535	22,503	4,190	46,334	93%
8/31/17 7:00 PM	19,565	21,858	4,085	45,607	91%
8/31/17 8:00 PM	19,194	21,709	4,035	45,030	90%
8/31/17 9:00 PM	18,601	21,261	3,925	43,874	88%
9/1/17 2:00 PM	18,876	22,962	4,235	46,177	93%
9/1/17 3:00 PM	19,902	23,775	4,360	48,146	96%
9/1/17 4:00 PM	20,852	24,186	4,477	49,627	99%
9/1/17 5:00 PM	**21,517**	**23,792**	**4,476**	**49,900**	**100%**
9/1/17 6:00 PM	21,714	23,419	4,405	49,649	99%
9/1/17 7:00 PM	21,333	22,580	4,236	48,256	97%
9/1/17 8:00 PM	20,672	22,050	4,161	46,980	94%
9/1/17 9:00 PM	20,006	21,556	4,065	45,717	92%
Average	18,678	22,907	4,155	45,840	92%



All Year All Hours	26,385
All Year 4-9PM	30,356
June 1-Sept 30 4-9PM	36,300
Aug 30 - Sept 1 4-9pm	46,172
Aug 30 - Sept 1 3-6pm	47,252
Aug 30 - Sept 1 2-5pm	46,590

Alternate Fact #3:

The latest avoided cost update combined with the use of DEER (or other) 8760 impact profiles takes care of any problem with the DEER definition being out-of-sync with the avoided cost 8760s and the use of a measure specific kW demand value is not needed.

Actual Fact #3:

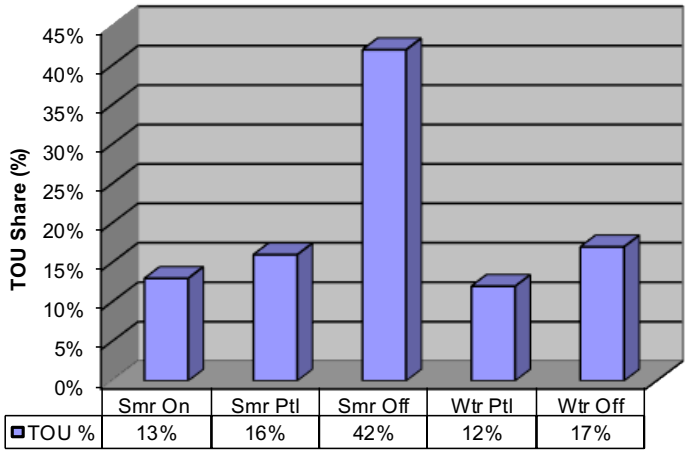
The 8760s in use are not measure specific but rather averaged values for classes of end use. Thus the use of a measure specific kW is required to get appropriate either absolute or comparative valuation of measures. The current CET software ignores the kW when 8760 measure profiles are used since the Gen and T&D avoided cost 8760s are combined and multiplied by the “averaged” measure 8760 profiles. Thus current TRC and PAC benefits are not properly valuing measures except by using their annual impact values with no differentiation of hourly actual performance.

Additionally the non-DEER TOU profiles (and the 8760 non-DEER profiles) are out-of-date and more represent end use profiles than measure impact profiles.

“TOU” impact profiles Example 1

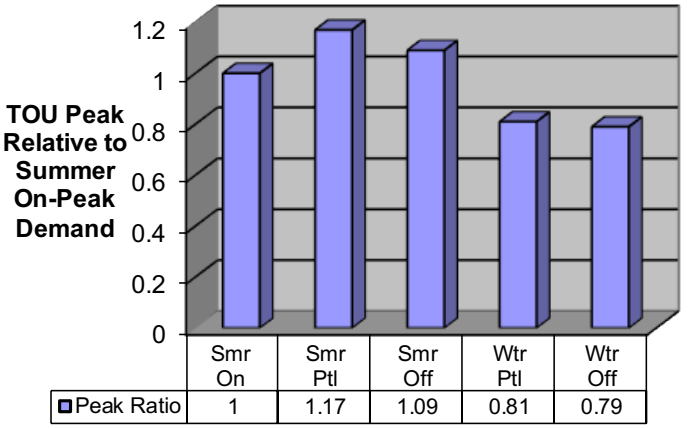
14 = Agricultural

TOU Energy Share



	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
TOU %	13%	16%	42%	12%	17%

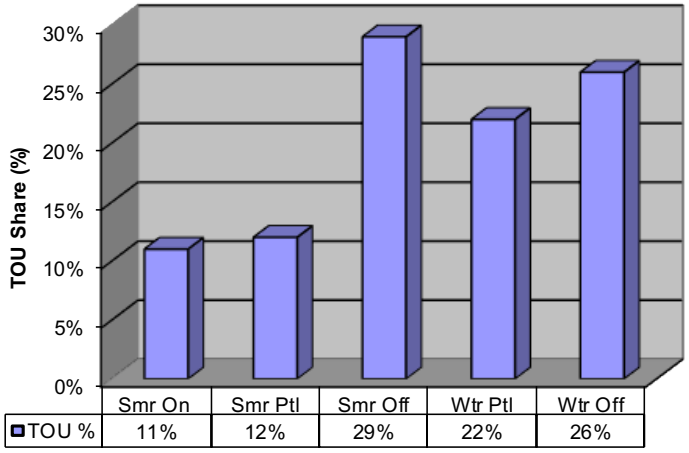
Peak kW Ratios



	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
Peak Ratio	1	1.17	1.09	0.81	0.79

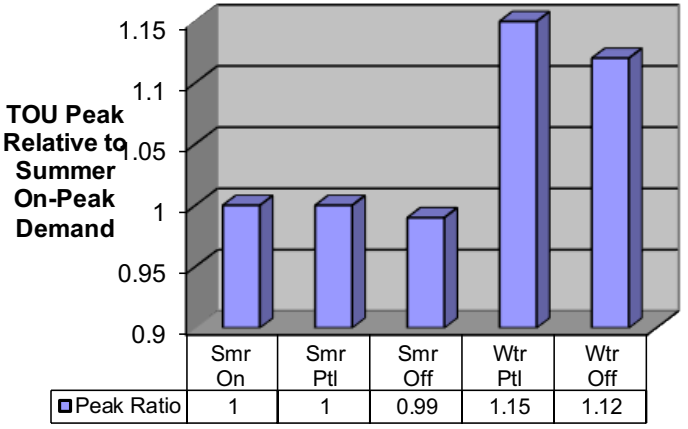
11 = Industrial Process

TOU Energy Share



	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
TOU %	11%	12%	29%	22%	26%

Peak kW Ratios

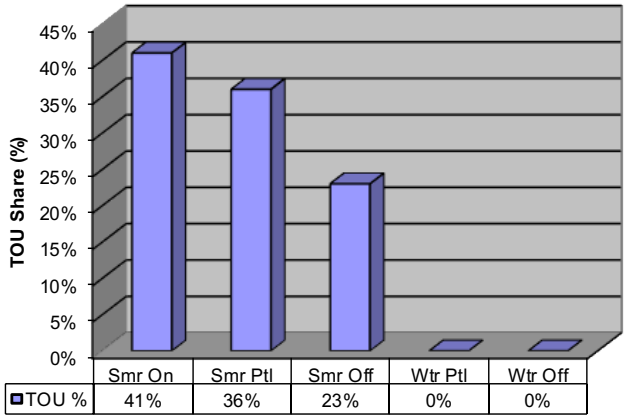


	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
Peak Ratio	1	1	0.99	1.15	1.12

“TOU” impact profiles Example 2

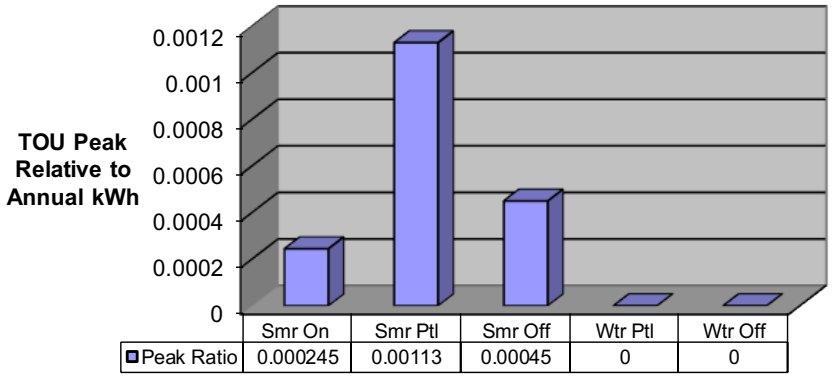
33 = Res. Insul. Cen. A/C

TOU Energy Share



	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
TOU %	41%	36%	23%	0%	0%

Peak kW Factors

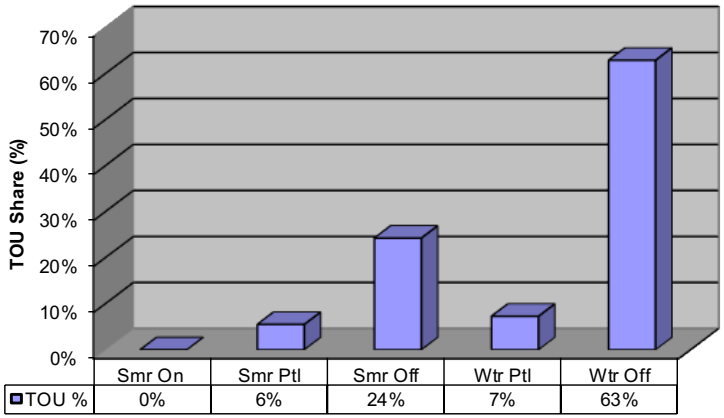


	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
Peak Ratio	0.000245	0.00113	0.00045	0	0

Misc._Commercial | Outdoor Lt

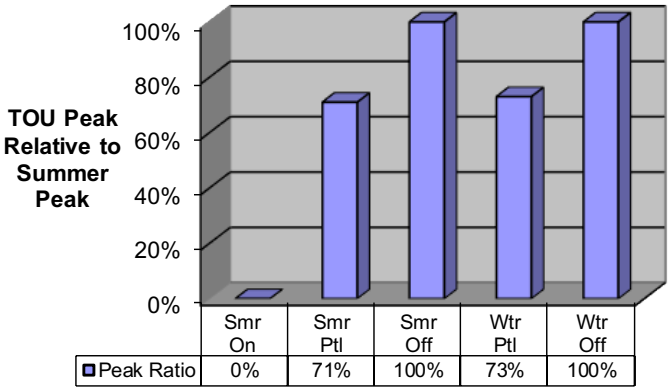
Misc._Commercial : Outdoor Lt : All

TOU Energy Share



	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
TOU %	0%	6%	24%	7%	63%

Peak kW Factors



	Smr On	Smr Ptl	Smr Off	Wtr Ptl	Wtr Off
Peak Ratio	0%	71%	100%	73%	100%

Use of DEER Hourly Profiles

Use of DEER hourly impact profiles versus IOU TOU period profiles in 2017 claims (Electric claims excluding Codes and Standards programs)

All Claims

IOU	Yr 1 Net kW	Yr 1 Net kWH	Life Net kW	Life Net kWH	Incentives
PGE	32.2%	59.3%	41.0%	42.5%	60.3%
SCE	89.0%	77.0%	89.4%	74.7%	81.8%
SDGE	71.0%	80.9%	70.8%	94.9%	89.7%
Grand Total	57.1%	70.0%	61.7%	66.5%	74.8%

Residential Claims

PGE	17.3%	73.0%	17.2%	43.2%	82.8%
SCE	95.4%	93.6%	96.2%	92.6%	91.6%
SDGE	66.4%	79.6%	66.4%	95.6%	90.2%
Grand Total	49.0%	81.7%	49.1%	80.4%	88.5%

Non-Residential Claims

PGE	60.4%	46.6%	87.0%	42.1%	49.1%
SCE	81.7%	58.1%	81.7%	56.2%	72.3%
SDGE	95.4%	89.7%	95.2%	89.4%	87.1%
Grand Total	72.1%	53.9%	85.4%	50.2%	60.7%

Alternate Fact Conclusion:

At this time the shifting of the DEER peak demand definition from a 2-5PM to 4-9PM period is indicated.

Actual Fact Conclusion:

At this time the shifting of the DEER peak demand definition from a 2-5PM to 3-6PM or perhaps a 4-6PM period is indicated. The three days and 3 hours per day should be kept. The CET should be changed to separate the Gen and T&D portions of the avoided costs and utilize measure specific kW values applied to the T&D portion. TOU load profiles should be updated with more appropriate TOU periods and replaced with 8760 values ASAP (as was directed in 2006).

DEER Demand Savings Definition
Alternative Peak Day and Hour Periods
Using DEER Hourly Profiles for HVAC Measure

	Single Family Home	Large Office	
	CZ10	CZ03	CZ06
Current DEER	100%	100%	100%
Current DEER Shifted to 3-6PM	105%	91%	94%
Current DEER Shifted to 4-9PM	81%	42%	54%
4-9 PM June-Sept Weekdays	38%	46%	60%
4-9 PM June-Sept All Days	37%	40%	53%
4-9 PM All Year Weekdays	15%	34%	44%
4-9 PM All Year All Days	15%	29%	38%

Slides From Previous Workshop for Reference Use Only

DEER Demand Savings Definition
Elements of Definition

Step 1

Select days when grid peak is likely to occur:

- for the period June 1st and September 30th
- excluding weekends or holidays
- three consecutive days with the highest three value sum of
  - average temperature over the three-day period +
  - the average temperature from noon to 6 p.m. over the three-day period +
  - the peak temperature over the three-day period

Typical weather (i.e., CEC CTZ's) versus specific years of local weather can result in different days

DEER Demand Savings Definition

Elements of Definition – Weather File Change in 2013

Climate Zone	CZ2 (2008 Title-24) Weather Files					CZ2010 (2013 Title-24) Weather Files				
	Start Date		Weekday	Peak T	Ave T	Start Date		Weekday	Peak T	Ave T
CZ01	Sep	30	Mon	80	58.0	Sep	16	Wed	81	59.8
CZ02	Jul	22	Mon	99	77.9	Jul	8	Wed	103	75.9
CZ03	Jul	17	Wed	89	65.4	Jul	8	Wed	91	69.2
CZ04	Jul	17	Wed	97	70.8	Sep	1	Tue	99	77.5
CZ05	Sep	3	Tue	93	67.6	Sep	8	Tue	87	64.8
CZ06	Jul	9	Tue	85	69.0	Sep	1	Tue	102	77.1
CZ07	Sep	9	Mon	92	70.1	Sep	1	Tue	90	73.9
CZ08	Sep	23	Mon	98	78.2	Sep	1	Tue	105	79.8
CZ09	Aug	6	Tue	101	78.3	Sep	1	Tue	107	86.6
CZ10	Jul	8	Mon	104	83.5	Sep	1	Tue	109	86.3
CZ11	Jul	31	Wed	104	80.7	Jul	8	Wed	113	88.3
CZ12	Aug	5	Mon	103	81.0	Jul	8	Wed	109	82.4
CZ13	Aug	14	Wed	106	87.1	Jul	8	Wed	108	86.7
CZ14	Jul	9	Tue	106	89.7	Aug	26	Wed	105	86.8
CZ15	Jul	30	Tue	114	96.2	Aug	25	Tue	112	97.5
CZ16	Aug	6	Tue	96	73.1	Jul	8	Wed	90	78.8

DEER Demand Savings Definition
Elements of Definition

Step 2

Calculate the demand reduction for the measure or project:

- calculate the hourly energy use for the base case (pre-existing or standard case) and the installed measure case
- average that hourly savings value for the 2pm – 5pm (three hours) peak period during the three day grid peak period identified in step 1

DEER Demand Savings Definition

Alternative Peak Periods – DEER Residential

Location	Lighting Measure		SEER 17 Measure	
	3p to 6p	4p to 9p	3p to 6p	4p to 9p
CZ01	7%	67%	-48%	-90%
CZ02	-3%	23%	16%	14%
CZ03	3%	30%	15%	10%
CZ04	-1%	30%	8%	-3%
CZ05	5%	42%	13%	-19%
CZ06	2%	38%	7%	-7%
CZ07	4%	47%	3%	-10%
CZ08	5%	59%	-2%	-15%
CZ09	3%	63%	-1%	-26%
CZ10	3%	61%	2%	-18%
CZ11	-2%	33%	9%	1%
CZ12	-5%	25%	14%	15%
CZ13	0%	40%	11%	16%
CZ14	3%	53%	-1%	-15%
CZ15	4%	53%	2%	3%
CZ16	5%	38%	3%	-5%

DEER Demand Savings Definition

Alternative Peak Periods – DEER Non-Res Lighting

	Small Office		Large Office		Small Retail		3-Story Large Retail	
Location	3-6 pm	4-9 pm	3-6 pm	4-9 pm	3-6 pm	4-9 pm	3-6 pm	4-9 pm
CZ01	-6.3%	-46.2%	-8.9%	-45.1%	-3.0%	-24.8%	1.1%	-8.6%
CZ02	-5.3%	-48.8%	-9.6%	-47.1%	-3.1%	-24.8%	0.4%	0.5%
CZ03	-9.1%	-50.2%	-13.9%	-49.4%	-9.3%	-42.3%	-0.8%	-19.6%
CZ04	-6.9%	-50.7%	-15.0%	-22.0%	-7.7%	-37.1%	-0.3%	-18.0%
CZ05	-6.0%	-52.5%	-11.4%	-49.4%	-4.5%	-30.7%	-0.9%	-7.1%
CZ06	-6.3%	-51.5%	-11.3%	-49.4%	-4.5%	-27.4%	0.2%	-4.6%
CZ07	-3.9%	-48.1%	-9.4%	-48.0%	-3.6%	-23.0%	0.1%	1.4%
CZ08	-3.7%	-49.0%	-9.6%	-25.3%	-3.1%	-23.5%	0.5%	1.7%
CZ09	-7.9%	-53.4%	-11.1%	-49.6%	-4.8%	-27.6%	-0.1%	-5.0%
CZ10	-5.3%	-49.8%	-8.8%	-31.6%	-3.4%	-24.0%	0.1%	1.2%
CZ11	0.7%	-46.1%	-12.2%	-16.5%	-8.0%	-36.3%	-0.6%	-17.7%
CZ12	-5.3%	-48.8%	-8.2%	-31.8%	-3.4%	-23.7%	0.6%	2.0%
CZ13	-6.0%	-51.8%	-12.9%	-50.3%	-7.2%	-36.3%	-0.4%	-17.8%
CZ14	-6.0%	-52.5%	-10.9%	-37.2%	-5.8%	-27.2%	0.5%	-3.8%
CZ15	-5.7%	-50.9%	-11.1%	-29.2%	-4.0%	-26.9%	0.0%	-4.8%
CZ16	-4.0%	-51.5%	-11.1%	-49.9%	-4.1%	-27.2%	0.1%	-4.5%

DEER Demand Savings Definition

Alternative Peak Periods – DEER Non-Res HVAC

	Small Office		Large Office		3-Story Large Retail	
CTZ	3-6 pm	4-9 pm	3-6 pm	4-9 pm	3-6 pm	4-9 pm
CZ01	0.0%	-70.0%	-6.0%	-67.8%	-4.5%	-40.0%
CZ02	-2.0%	-62.0%	-0.1%	-36.3%	3.4%	-7.0%
CZ03	0.0%	-60.0%	12.4%	-42.7%	-3.8%	-33.8%
CZ04	4.9%	-50.2%	-5.1%	-38.5%	-1.9%	-26.7%
CZ05	-9.4%	-66.3%	-11.4%	-57.6%	-11.9%	-30.6%
CZ06	-3.6%	-62.9%	-5.0%	-53.4%	0.2%	-18.6%
CZ07	-8.2%	-64.6%	-7.7%	-61.7%	-1.8%	-3.8%
CZ08	-7.5%	-64.8%	-7.7%	-62.2%	-0.6%	-13.6%
CZ09	-6.6%	-63.7%	-4.4%	-49.2%	-1.5%	-16.5%
CZ10	-6.7%	-64.0%	-6.1%	-51.3%	-2.4%	-11.0%
CZ11	-3.0%	-55.2%	0.5%	-31.2%	-0.4%	-18.2%
CZ12	0.0%	-61.2%	-2.6%	-46.3%	2.8%	0.2%
CZ13	9.0%	-51.6%	0.8%	-35.6%	3.8%	-18.3%
CZ14	-2.1%	-61.6%	0.1%	-44.6%	4.2%	-7.0%
CZ15	-1.9%	-61.1%	-2.4%	-40.9%	3.1%	-6.5%
CZ16	-1.9%	-61.9%	-1.7%	-43.0%	1.7%	-8.9%