Literature and internet search for demand control kitchen ventilation load profile

Other key words:

* Demand Control Kitchen Ventilation (DCKV)
* Kitchen Exhaust Hood Demand Controlled Ventilation
* Exhaust Fan (EF)
* Make-up air (MUA)
* Energy load profile
* Hourly load profile

Sources

The first two documents come from an email thread titled “SWFS012v01:Kitchen Hood DCV updates”. Per that email, SCE is trying to track down the data, so I will not make any further attempts to contact anyone regarding these two studies.

## 1 “Fact Sheet DCKV Pechanga\_Apr2015rev3.pdf”

An SCE case study shows approximately 7 days of load profile line plots in grainy images: three plots show one exhaust fan and two make up air fans. No dates are provided. The email messages and filename suggest the location is Pechanga Casino, although the site is anonymous in the document.

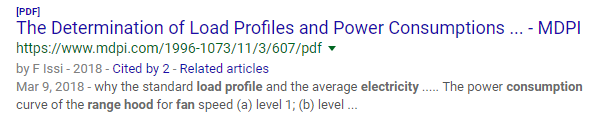
## 2 “et\_07\_10\_dcv\_com\_kitch\_hoods\_final\_report.pdf”

An SCE Design & Engineering Services study, from June 30, 2009. Reports measurement and verification of 5 sites and installations.

Source: <https://www.etcc-ca.com/reports/dcv-commercial-hood>

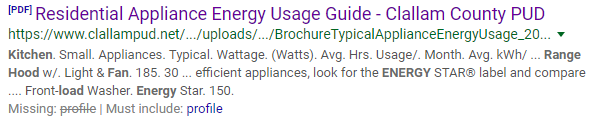
## 3 “energies-11-00607.pdf”

Mentions a range hood, but is a residential study, and does not include demand-controlled ventilation.



## 4 “BrochureTypicalApplianceEnergyUsage\_2014-09-26.pdf”

This is a Residential Appliance Energy Usage Guide from Clallam County Public Utility District (PUD). Mentions “range hood w/ light and fan” to have a typical wattage 185 W, Average monthly usage of 30 hours, average energy usage of 5.6 kWh/month. Does not discuss load profile or demand control.



## 5 “Energy\_Reduction\_in\_Commercial\_Kitchens\_SFIA.pdf”

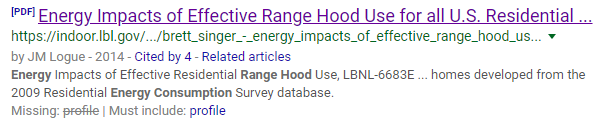
This Masters thesis discusses energy use of many kitchen appliances including DCKV via the Melink product retrofit on an 18 ft hood in a commercial restaurant (Werewolf, San Diego). The document shows overlaid before and after profiles, each over a 24 hour span. I attempted to contact the author (Denis Livchak) via LinkedIn to request data, and also by emailing the Food Service Technology Center ([fstc@frontierenergy.com](mailto:fstc@frontierenergy.com)). (Can’t tell but this food service tech center probably was sponsored by either SCE or PG&E - see the workpaper.)

In response, Denis Livchak ([dlivchak@frontierenergy.com](mailto:dlivchak@frontierenergy.com)) emailed back to say that the project was part of a 3-year CEC Cookline project, for which a final report is pending. He was unable to answer when the project will be completed and whether the report will include the requested data. He seemed unwilling to provide the data. He suggested “Please ask your utility client to contact us directly.”



## 6 “brett\_singer\_-\_energy\_impacts\_of\_effective\_range\_hood\_use\_for\_all\_u.s\_residential\_cooking”

This article (apparently both an LBNL report and HVAC&R publication) discusses residential ventilation, but does not discuss load profiles.



## 7 “et13pge8151\_dcvandemsreport\_final.pdf”

Energy Management Systems (EMS) and Demand-Controlled Kitchen Ventilation (DCKV) Energy Savings in Restaurants, PG&E project ET13PGE8151, year 2013-2014.

The study looked at retrofits at three sites, across which there were a total of 8 independent loads measured. The report shows plots of 24 hours of data for each of pre- and post-install periods. Since the report was sponsored by PG&E, that utility should have access to the data. Note per excerpt:

Fisher-Nickel, Inc. (FNI) conducted this technology evaluation for Pacific Gas and Electric Company with overall guidance and management from Jeff Beresini and Charlene Spoor. For more information on this project, contact JLBd@pge.com or [CLCi@pge.com](mailto:CLCi@pge.com).

Following these directions, I emailed Jeff Beresini and Charlene Spoor to ask about the data. Charlene responded directing me to contact

Source: <https://www.etcc-ca.com/reports/energy-management-systems-ems-and-demand-controlled-kitchen-ventilation-dckv-energy-savings>

## 8 Note

Note this website has some pretty and well written design guides, but sadly no data on load profiles.

<https://caenergywise.com/design-guides/>

## 9 “Kitchen\_DVC\_Case\_Study\_UCLA\_Covel\_draft01.pdf”

This is a CEC PIER draft case study describes an incentive under a partnership between UC, CSU, and the IOUs. “Melink controls were installed at the kitchen of Covel Commons to control three exhaust hood fans and a make-up air unit. … These four fans total 40 nameplate horsepower (35 kW actual load). … At UCLA, performance data was collected in January 2008 and May 2009.” Plots show daily usage; however it is conceivable that the authors retained more refined data. However, no contact information was provided in the document.

Source: <http://www.uc-ciee.org/partnershipdemonstrations.org/file_browser/db/Kitchen_DVC_Case_Study_UCLA_Covel_draft01.pdf>

## 10 Case\_Study DCKV\_Compilation\_Web.pdf

The PIER case study for the UC/CSU/IOU partnership appears to have been updated and issued in this document. This version shows more sites totaling an additional 79 hp beyond the Covell Commons site. Although it does not show load profiles, it does provide contact information:

|  |  |
| --- | --- |
| Any questions about this project, including technology costs, can be directed to: | |
| DAVID GRUPP  Western Cooling Efficiency Center, UC Davis  [djgrupp@ucdavis.edu](mailto:djgrupp@ucdavis.edu)  wcec.ucdavis.edu | KARL JOHNSON  California Institute for Energy and Environment  [karl.johnson@uc-ciee.org](mailto:karl.johnson@uc-ciee.org)  uc-ciee.org |

Before contacting these people, I checked and determined that this is one of the sites included in the “11 sites” mentioned in the draft workpaper, which includes projects at UC Berkeley and Santa Barbara. The email thread described at the beginning of this document indicates that SCE is reaching out directly to find the data. So I have not contacted these people.

Source: <http://www.uc-ciee.org/partnershipdemonstrations.org/downloads/Case_Study%20DCKV_Compilation_Web.pdf>

## 11 “NREL\_CBP\_exhaust\_hood.pdf”

Summarizes the measure, but does not include any novel data. Includes a potentially useful list of references.

Source: <https://www.seventhwave.org/new-technologies/kitchen-exhaust-hood-controls> which links to <http://www.seventhwave.org/sites/default/files/NREL_CBP_exhaust_hood.pdf>

## 12 “ASHRAE-Future\_of\_DCV.pdf”

Includes a time series plot with reference to a possible source of data.

<https://fishnick.com/publications/ventilation/ASHRAE-Future_of_DCV.pdf>

13 “CEC-500-2003-096-A08.PDF”

CEC Report from 2003. Described as “A joint project between Purdue and NIST.” Demand controlled ventilation assessment. Includes some interesting figures regarding fast-food restaurant occupancy and ventilation rates over a Friday-Saturday span, but is not directly associated with the measure at hand (specific to kitchen ventilation and fan power profile).

Eg. p. 263, figure 1(f) shows fast food restaurant occupancy, and p. 276, figure 5 shows ventilation rates (cfm).

See attachment 8 from: <https://www.energy.ca.gov/pier/project_reports/500-03-096.html>

## 14 “Clark\_Kerr\_UC\_Berkeley.pdf”

2006 PIER Program Case Study for UC Berkeley’s Clark Kerr Campus Dining retrofit project. This is the source of the plot reproduced in #12.

Source: <http://www.culinairesystems.com/files/Clark_Kerr_UC_Berkeley.pdf>

California Energy Commission (CEC). 2018. *2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24).* CEC-400-2018-020-CMF-Standards