

# Energy Records in lieu of Bills and Self Reports

*Optimizing data utility, quality and burden in the Residential Energy Consumption Survey (RECS)*



---

*Committee on National Statistics – Household Survey Producers Workshop*  
*Eileen O'Brien, Lead, Survey Operations, EIA*  
*June 1, 2011 | Washington, DC*

# Overview

- What is RECS?
- Challenges in capturing energy use and expenditures
- Using administrative records to reduce burden, improve quality
- Looking ahead

# RECS is a national, periodic survey that collects data about...

- Energy-related structural characteristics of housing units occupied as a primary residence
  - *Measured* square footage, roof and exterior wall type, windows/types...
- Appliances, equipment and electronics
  - HVAC and other equipment, home appliances, home electronics...
- Household demographics, energy usage behavior, and participation in energy-related programs
  - Weatherization, rebates, tax credits, loans, incentives, energy assistance...
- Fuels used, energy consumption and expenditures
  - 5 major fuels, wood, solar, other. How much, how used?
  - Who pays? How much?

# Role of RECS

- Supports analysis of current and long term U.S. energy demand within the United States
- Produces estimates of fuel sources, amounts, energy costs and uses within occupied housing units for a calendar year
- Up to 3 surveys per housing unit capture this information
  - RECS Household Survey
  - RECS Rental Agent Survey
  - RECS Energy Supplier Survey

# Key features of RECS Design

	Household	“Rental Agent”	Energy Supplier
<b>Sample, Frame</b>	Area, DSF	Network sample	Network sample
<b>Sample size</b>	18000 addresses 12000 completes	944 spawned 584 completes	1500 energy suppliers 20000 records
<b>Eligibility</b>	Occupied HU	energy costs included in rent	Sells or delivers energy (or both) to HU
<b>Respondent</b>	Adult occupant	Knowledgeable <u>agent</u>	Varies by size, type of supplier & mode
<b>Authority</b>	Voluntary	Voluntary	<i>Mandatory</i>
<b>Primary mode</b>	In-person	In-person or phone	Web portal, mixed form
<b>Instrument</b>	200+ questions	Only major energy characteristics	Cons., exp., beg/end dates of billing periods
<b>Reference period</b>	Calendar year (CY)	Current	16-20 months incl. CY
<b>Time Burden</b>	45-55 min.	15 min./form	30 min./form (??)
<b>Response Rate</b>	80%	63%	Supplier > 90% Household > 85%

# Challenges in collecting energy data

- RECS' reporting period is too long for household respondents to rely on memory, rules of thumb or bills (12-20 mos.)
- Respondents don't understand bill content (Payne, 2000)
- Efforts to improve bill comprehension are mixed even for savvier respondents (Payne, 1996)
- Knowledge and capacity to use bills is declining
  - Electronic bills are increasing – less interaction and encoding
  - Automatic bill pay –they never see the content

# Using energy bills call for some expertise

- Requires complex decoding and concept mapping skills
  - Bills include special charges that aren't in-scope for RECS
  - Numerous variations in terms for charges that are included\*
- May be necessary to disaggregate bill content
  - For example, multiple bills included within a bill, e.g., electricity and gas
  - Non energy data included, e.g., municipal water
- Bills include adjustments to previous/current charges
  - Late fees, repayment plans, flat fees not tied to consumption, e.g., outdoor lights...
  - Levelized billing...

\* See last page of this handout for list of charges found on just 117 bills.

# Bills alone won't work; content falls short.

In RECS 2005, a random sample of 113 cases yielded 137 respondent bills. Only 28 included all pages of a respondent's energy bill. Content varied widely.

<u>Issue</u>	<u>Number of bills</u>
No account history on entire bill	8
Bar graphs ONLY (12-14 mos.)	9
Data for current month to a year ago	6
Data for current to previous month <u>and</u> year	2
Bar graphs <u>and</u> data by month (13 mos.)	2
Consumption data per month (12 mos.)	1



# RECS energy collection is conducted in two phases

## (1) In household, collect & scan a bill for each energy supplier

- Respondent reports energy supplier by name/fuel; interviewer selects supplier from drop down menu
- At the end of the household interview, Blaise prompts interviewer what to scan
  - Portable USB scanner; training module addresses interviewer's ability here
  - Done *outside* the survey instrument, tied to case management system
  - Missing documents are retrieved, monitored in case management system

## (2) Collect consumption & expenditures from supplier records

- Provide account number and service address to assist data retrieval

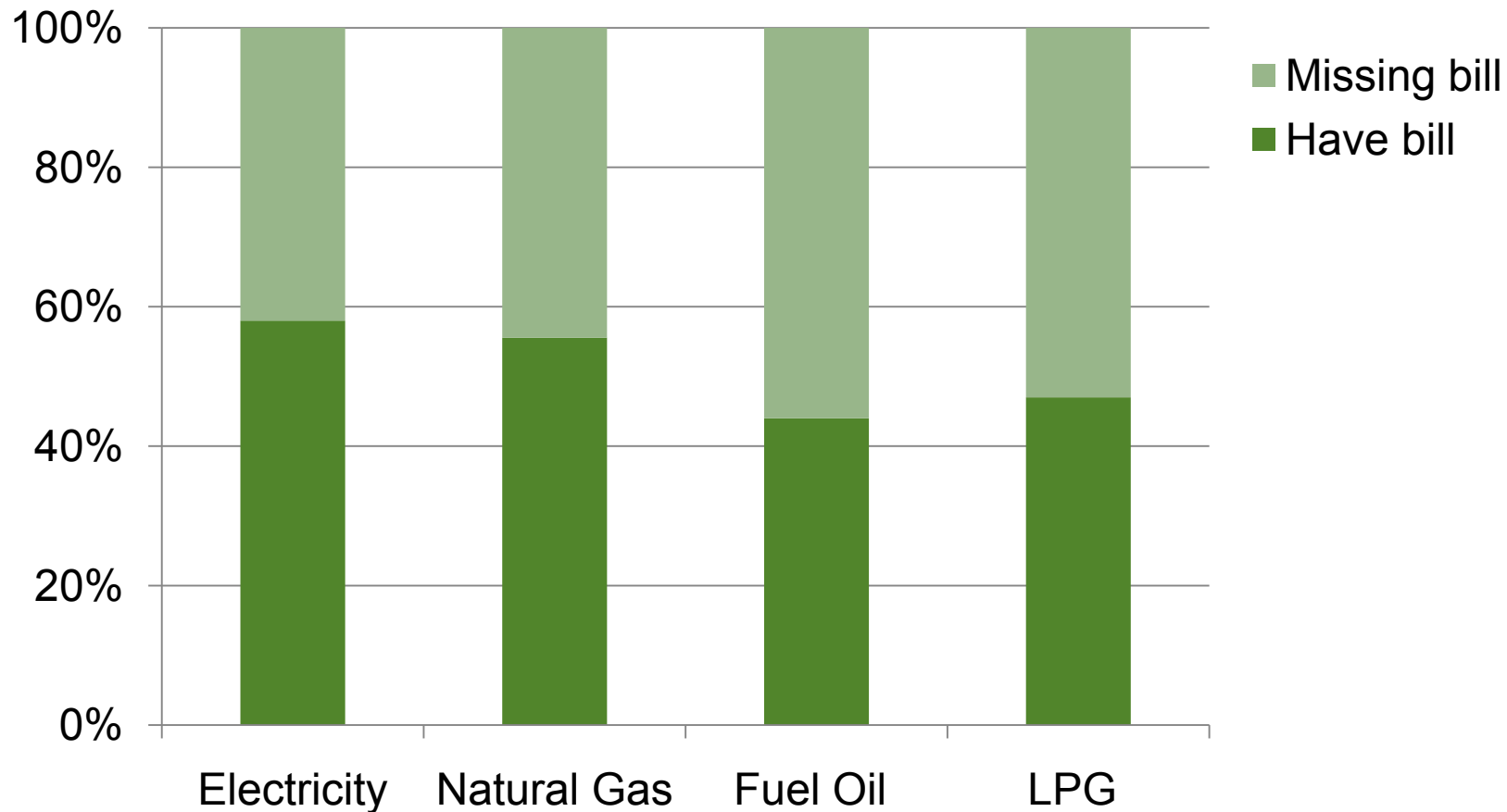
# How successful is collecting & scanning?

- Household measurement worksheet: 10,256 forms (85%)
  - 92% of cases where consent to measure was given
- “Authorization” form for supplier records: 11,472 forms (95%)
- Mo\$ recent energy bill: 11,120 bills (56% overall)

Fuel Type	Number needed	Number provided	Percent
Electricity	11,532	6,831	59%
Natural Gas	6,679	3,587	54%
Propane	825	360	44%
<u>Fuel Oil</u>	<u>718</u>	<u>342</u>	<u>48%</u>
	19,754	11,120	56%

# Most likely to have electricity bill on hand

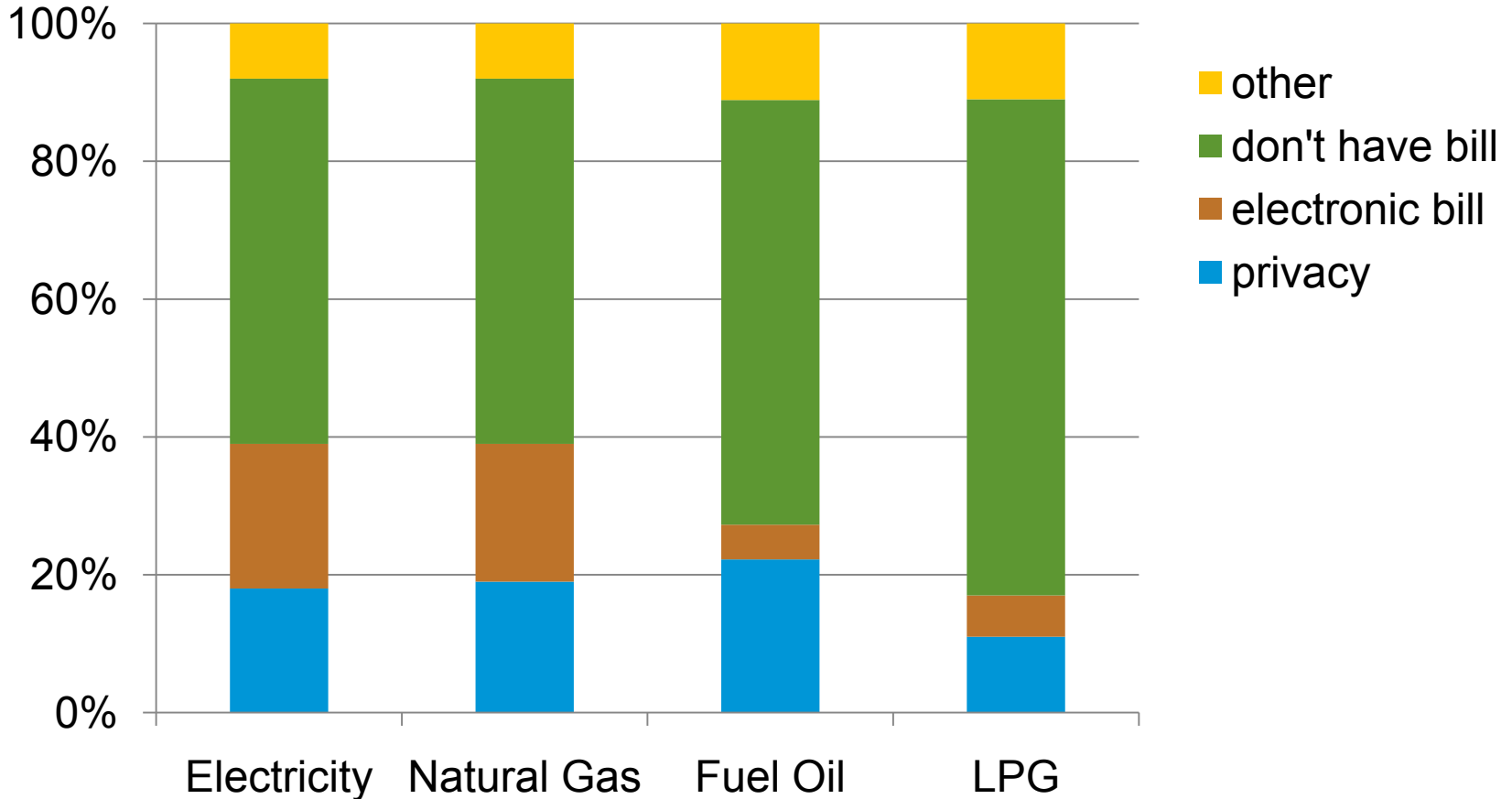
Percent by fuel type



Source: RECS 2009 Household & Energy Supplier interview data

# Accessibility of bills limits use in RECS

Percent by reason\*



\*Respondent is not explicitly asked. Interviewer field codes reason for not providing a bill.

Source: RECS 2009 Household & Energy Supplier interview data

# Method for collecting data from suppliers

- Account numbers and service addresses are captured from scanned bills where possible, sample addresses for the rest
- Pre-contacts by mail to alert, then telephone contact to identify key respondent
- Graduated, phased roll-out by fuel to test systems
- Web supports three main response formats: online teleform by customer and fuel with built-in edits, downloadable standardized spreadsheet, PDF form to print & fax.
- Non-standard formats are accepted, but rarely used

# Challenges in RECS methodology

- Linking sampled address to customer records is tricky
  - Which? Sampled address, updates from interview, —service address” on bill?
  - Intensive to capture service address & account numbers, critical to use them
  - Customer names sometimes useful to suppliers, but not EIA—so, not collected
- Customer privacy concerns growing; suppliers are protective
  - Who owns the data? Company policies, Federal, State, & local laws compete
- Two phase collection is costlier, adds time, affects response
- Natural state of data are in different form from RECS request
  - Billing systems not standardized. Does survey capture standardized data?
  - Transforming systems data increases burden to suppliers, adds new error?
  - Older data are archived and require different, more intensive retrieval efforts

# Value of RECS methodology

- Makes maximum use of respondent's minimum knowledge
  - Provide supplier name by fuel and bills, which has other useful information: service address, account number and some info on cost and fees
- Uses energy suppliers' administrative records efficiently
  - Easy retrieval by account number
  - Much less unit and item nonresponse
  - Less nonsampling error
- Allows flexibility in reporting format and mode
  - Mode options as well as nonstandard reporting formats
  - Some accommodation for privacy concerns: —Authorization” forms
  - Rescheduling due dates, 1-800 help number, web FAQs, full access to EIA

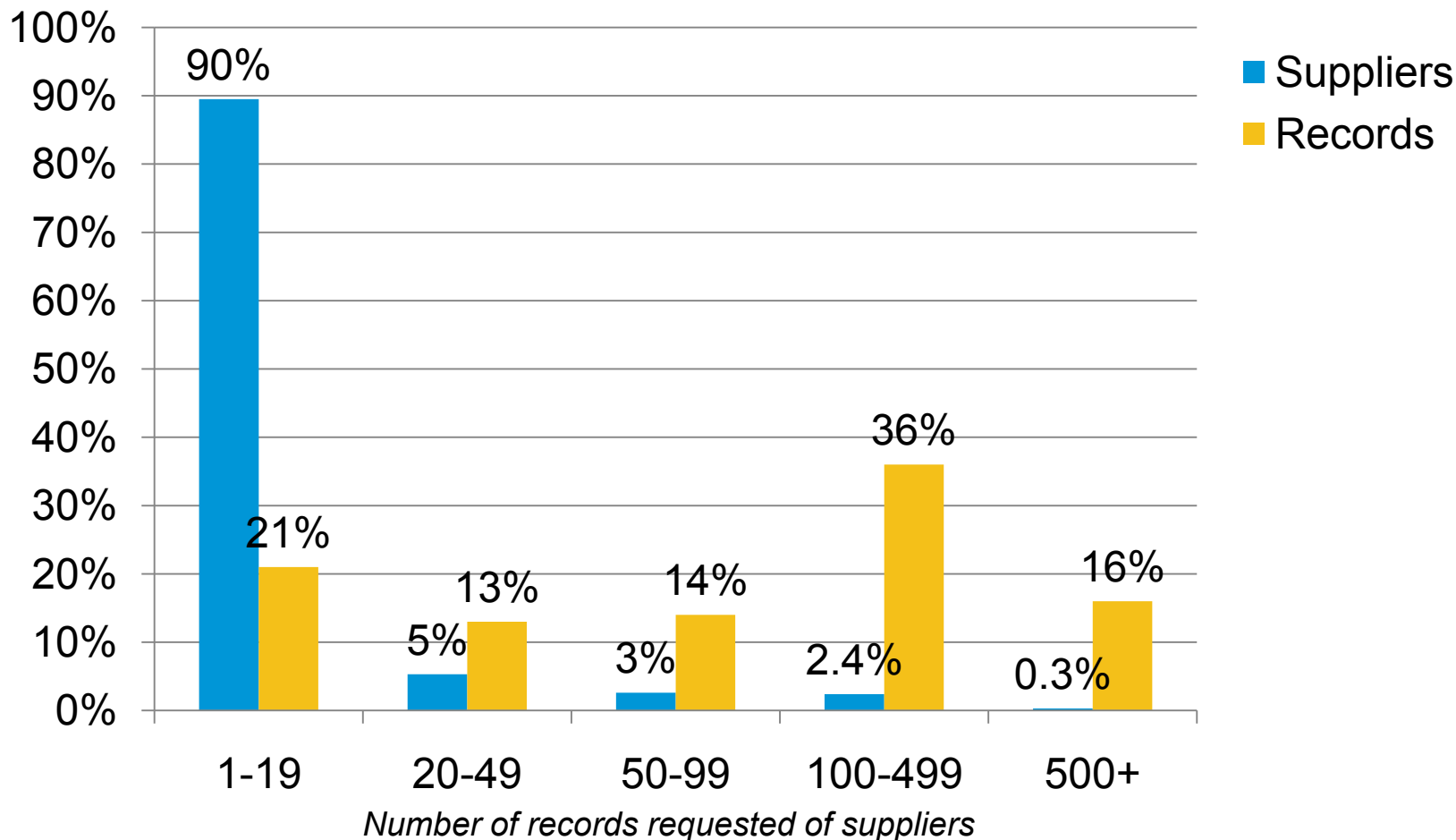
# Performance

- Response rates on course to be best ever
  - With a month to go 76% household records in; 72% of suppliers have responded (large suppliers still working)
- Data quality much improved: 75% coming in ‘clean’
- Have addressed all privacy concerns satisfactorily



# About 3% of suppliers provide 52% of the records

Percent of suppliers by number of records requested, share of total records requested



Source: RECS 2009 Energy Supplier Survey frame

# Lessons we've learned

- Mandatory, yes, but accommodation and support is critical
- How companies are organized is more predictive of mode choice when options are available
- Web is good! Cleaner data, legitimacy, timelier, instant feedback
- Regulatory environment introduces elevated response strategies and privacy & confidentiality concerns
- Asking questions tangential to records system increases effort and item nonresponse considerably, ~~My~~ "My job is to produce bills"

# Looking ahead

- Evaluate multimode RECS 2009 approach
- Further reduce burden on suppliers
- Increase household delivery of sample bills
- Understand and manage response errors
  - Compare records against bills provided for frame, response errors
  - Tailor questionnaires by replacing generic terms in survey instructions with specific terms found in supplier bills
  - Pre-assign optimal response mode

# For more information

U.S. Energy Information Administration home page | [www.eia.gov](http://www.eia.gov)

RECS and related data | <http://www.eia.gov/consumption/residential/>

---

## *RECS Team*

*RECS Survey Manager, Chip Berry*

[james.berry@eia.gov](mailto:james.berry@eia.gov)

*Supplier Survey, Marilyn Worthy*

[marilyn.worthy@eia.gov](mailto:marilyn.worthy@eia.gov)

*Energy & Survey Stats*

*Bill McNary*

[william.mcnary@eia.gov](mailto:william.mcnary@eia.gov)

*Danni Mayclin*

[danielle.mayclin@eia.gov](mailto:danielle.mayclin@eia.gov)

*Statistical Methods, Dr. Ed Cureg*

[edgardo.cureg@eiagov](mailto:edgardo.cureg@eiagov)

## List of Charges Found on Sample of Scanned Bills

<b>Delivery Charges</b>	State Gross Receipts Tax	Energy exchange credit
Delivery chg	School Tax	Public purpose <del>prgms</del>
Distribution Charge	Excise tax	Nuclear decommissioning
Customer chg	<b>Adjustments</b>	Trust transfer amount
Market transition	Fuel Cost adjustment	DWR bond charge
Transition	Energy Cost adjustment	Ongoing CTC
Non-utility generation	Power cost adjustment	Energy cost recovery amt
chg	Resource adjustment	OUCC*/Industrial
Transition bond charge	Interim Rate Adjustment	Group/NIPSCO 5.6526% Credit
System control chg	Electric commodity adjustment	MTA surcharge
Regulatory assets	Municipal franchise adjustment	Energy rate reduction
recovery	<del>Purch</del> cap cost adjustment	Environmental surcharge
Societal benefits charge	State tax adjustment (deduction)	Natural Gas trust fund charge
Renewable energy	Temperate rate adjustment	DC rights-of-way fee
charge	Distribution adjustment charges	Facility Charge
Energy conservation	Resource adjustment	Upstream Cost
Competitive transition	<b>Other</b>	Commodity Cost
assessment	Basic Service charge	Deferred Gas Cost
Conservation and load	Monthly cost of basic service	Base Tariff rate
management program	State energy surcharge	PV Refinancing Credit
Non-bypassable FMCC	Pipeline transport charge --	Quality of Service Credit
Delivery tax	Interstate pipeline transportation	Access Fee
Public Space Occupancy	chg	Pipeline Safety Fee
surcharge	Franchise charge	
Reliability energy trust	City fees	
fund	City license fee	
<b>Supply Charges</b>	Municipal charge	
Transmission service	ISRS	
chg	Energy charge	
(Basic) generation	Interim energy charge	
<del>Bypassable</del> FMCC	Gas hedge	
<b>Taxes</b>	Weather normalization	
State sales tax	Security light	
Local Option tax	Air Quality Imp	
City tax	Demand side mgmt cost	
County tax	Blue sky usage	
Taxes on ISRS	Low income assistance	
State public utility tax	Discounts	
Energy commission tax	Bill assistance program	
Utility users' tax	Controlled Air Condition Credit	
Sales tax	Electric conservation <del>prgm</del>	charge