Centre for Energy and Environmental Markets

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA



Network Tariff Analysis for EQL's Revised TSS 2020/25

- Residential customers

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ERGON ENERGY NETWORK | energex

Part of the Energy Queensland Group

Project Overview

- Aim is to determine the customer impacts of Energy Queensland's network tariffs proposed for the 2020/25 Revised Tariff Structure Statement [1]
- Residential and small business customers using less than 100MWh/year
- Also Life Support customers, and worked with CSIRO to assess impact on customers segmented according to demographic characteristics
- Focus on the impacts on customers of shifting from energy-based network tariffs towards tariff structures with TOU energy and kW demand charges
- Static analysis, so does not include customer response to price signals

- **Presentation outline**
  - Method
  - South East Residential
  - Ergon East Residential
  - Life Support customers
  - Segmented customers (demographic)

1. The network tariffs and rates used for the Ergon Energy customer impact analysis may not reflect the network tariffs and rates used by the QCA in their Retail Price Determination process.

Method

- The UNSW Tariff Tool was used to model the impact of network tariffs on different customer loads
  - Is an open source model that can be accessed at the CEEM website[1]
  - Sample load data from Frontier Economics from econometric modelling, each individual load is multiplied by its scaling factor, and so is intended to be statistically representative of customers in EQL's area.

Table 1 Number of customers with/out solar PV in the sample load data

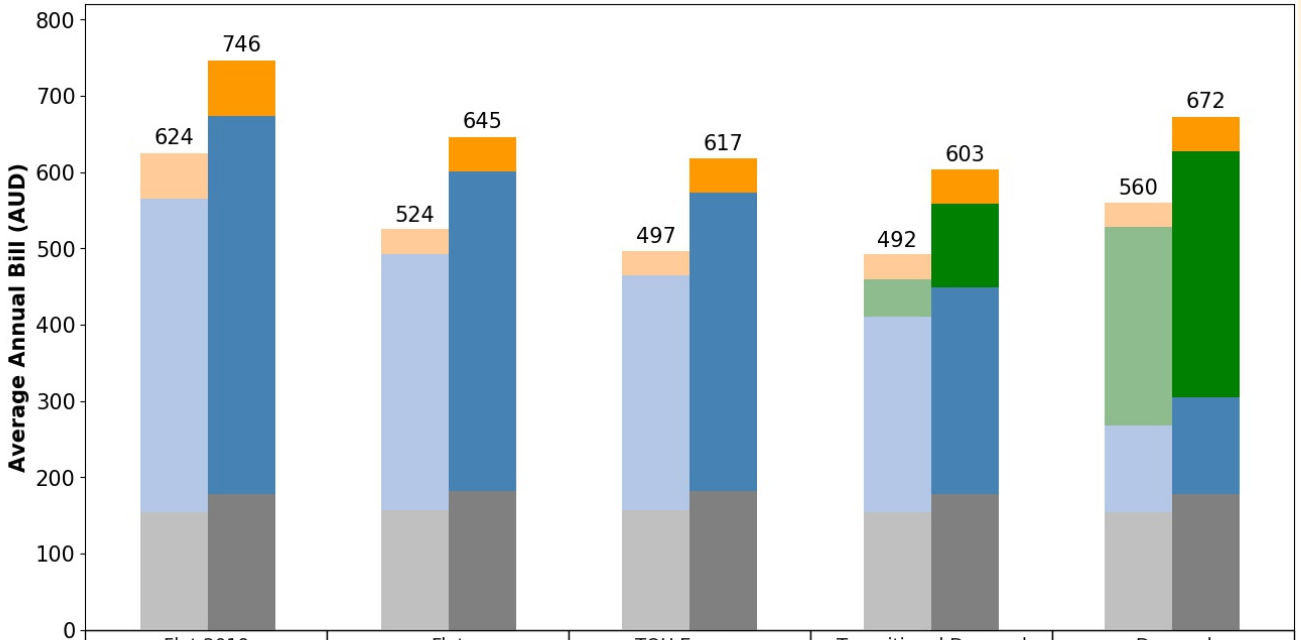
Region	Customer type	No PV	Percentage	With PV	Percentage	Total
South East	Residential	2,741	54%	2,293	46%	5,034
	Business	1,788	94%	108	6%	1,896
Ergon East	Residential	964	71%	394	29%	1,358
	Business	1,430	89%	183	11%	1,613
Ergon West	Residential	116	67%	36	24%	152
	Business	163	86%	26	14%	189
TOTALS		7,202		3,040		10,242

- Load data was also provided for customers on Life Support, and segmented residential data was provided by the CSIRO.

1. http://www.ceem.unsw.edu.au/cost-reflective-tariff-design

South East Residential – Average bills

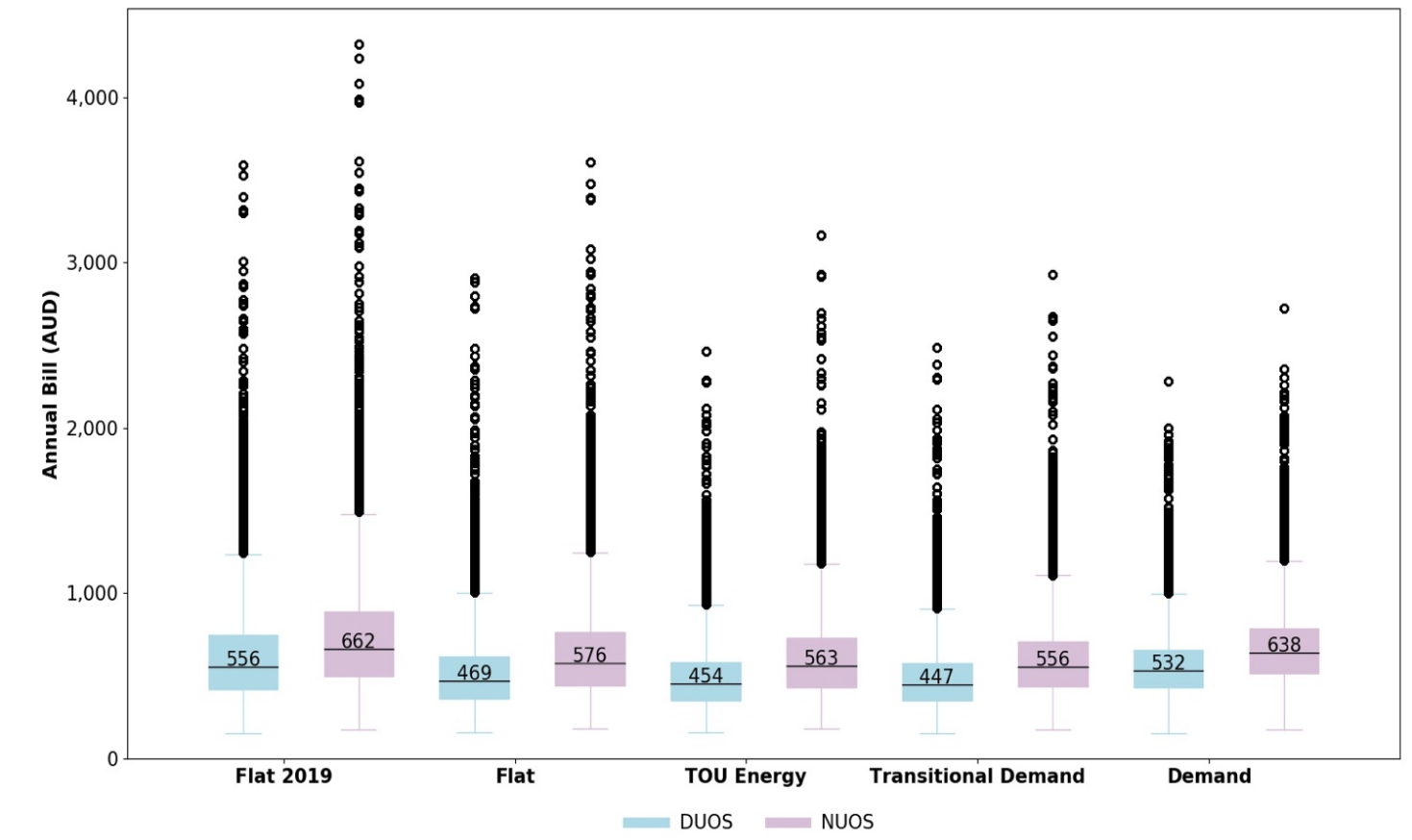
- Average and median bills under all the 2020/21 tariffs are lower than under the 2019/20 Flat tariff.
- Transitional Demand tariff (default if on an interval meter) results in the lowest average and median bills.
- Demand tariff highest but lower than the 2019/20 tariff => reduce peaks



	Flat 2019		Flat		TOU Energy		Transitional Demand		Demand	
	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS
CL Energy Charge	59	72	32	45	32	45	32	45	32	45
CL Daily Charge	0	0	0	0	0	0	0	0	0	0
Main Demand Charge	0	0	0	0	0	0	49	110	261	322
Main Energy Charge	412	496	336	418	308	391	258	270	114	127
Main Daily Charge	154	178	157	182	157	182	154	178	154	178

South East Residential – Median bills

- Most customers are fairly tightly clustered about the median, but there is a relatively small number of very high outliers under all tariffs.
- Outliers are lower under the demand tariffs, providing them with options to reduce their bills (they have more variation in energy use than in peaks)



South East Residential – Tariff impacts

- Compared to the 2019/20 Flat tariff the DUOS bill decreased the most
- Compared to the Flat tariff, most customers better off under Transitional Demand and TOUE tariffs, but not the Demand tariff (unless have good LF)

Table 5. Percentage Change in Customer Median Bills Compared to the 2019/20 Tariff, South East Residential

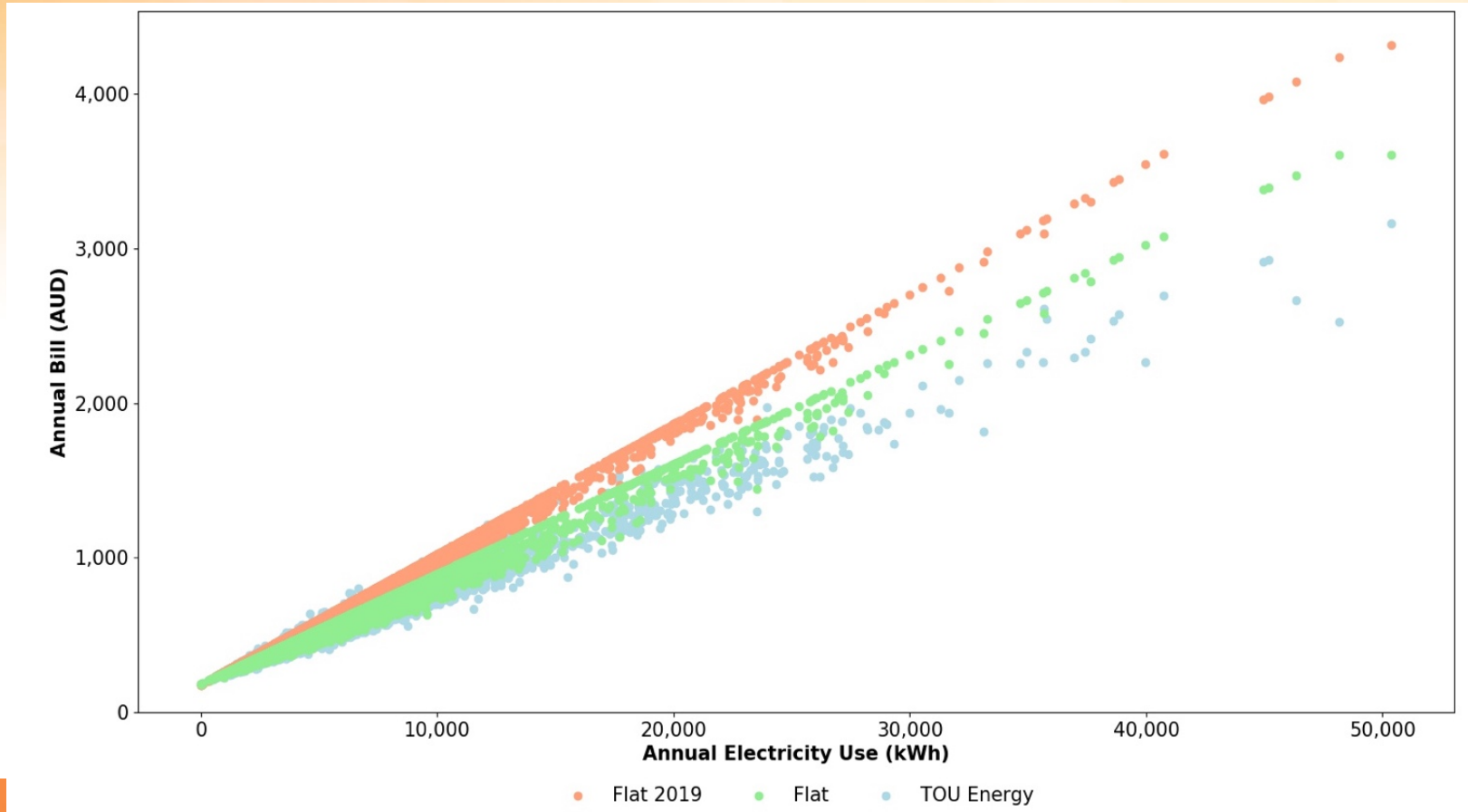
Tariff	Change	
	DUOS	NUOS
Flat	-16%	-13%
TOU Energy	-18%	-15%
Transitional Demand	-20%	-16%
Demand	-4%	-4%

Table 6. Percentage of Customers Better Off and Worse Off When Moving from the Flat Tariff, South East Residential

Tariff	DUOS		NUOS	
	Better Off	Worse Off	Better Off	Worse Off
TOU Energy	71%	29%	69%	31%
Transitional Demand	90%	10%	75%	25%
Demand	24%	76%	30%	70%

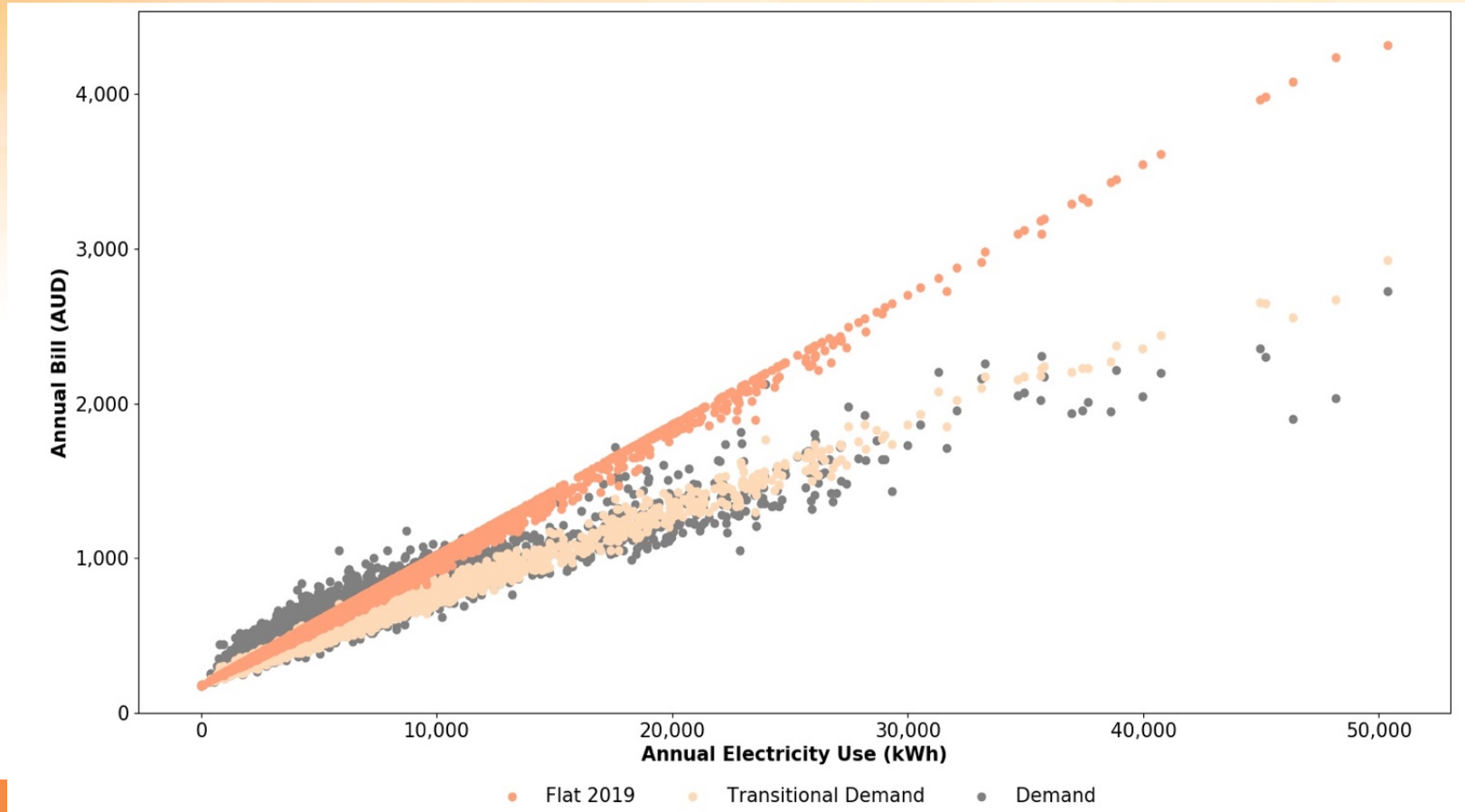
South East Residential – NUOS compared to elec use 1

- Compared to the 2019/20 Flat tariff, the Flat and TOU Energy tariffs result in lower bills for most customers
- The scatter from the TOU Energy tariff results in some lower use customers having higher bills (but is an optional tariff)



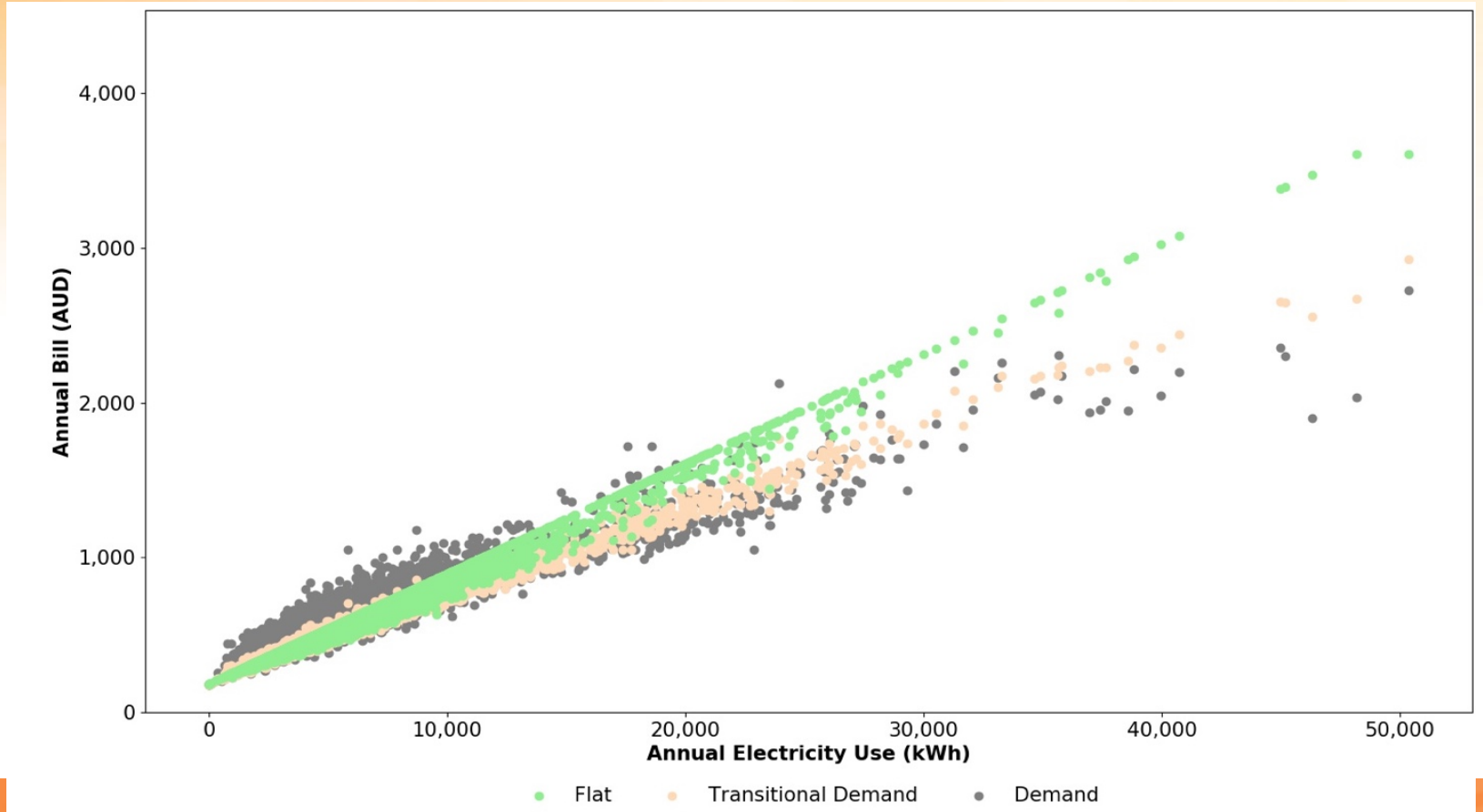
South East Residential – NUOS compared to elec use 2

- Transitional Demand tariff generally results in lower bills, again apart from a small number of low electricity use customers.
- Demand tariff has increased scatter and smaller customers can be worse off



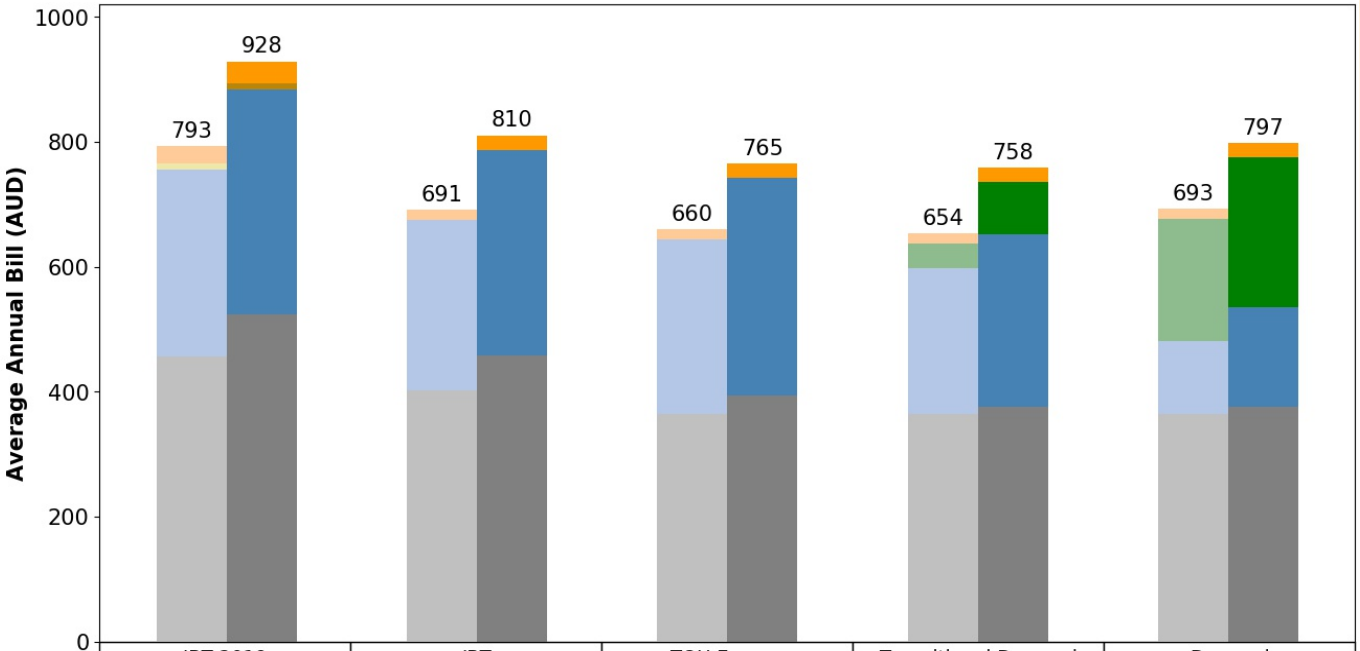
South East Residential – NUOS compared to elec use 3

- As expected, the bill reductions compared to the Flat tariff are not as great as compared to the 2019/20 Flat tariff (because Flat tariff is already lower).
- Customers that can reduce demand peaks will have improved outcomes.



Ergon East Residential – Average bills

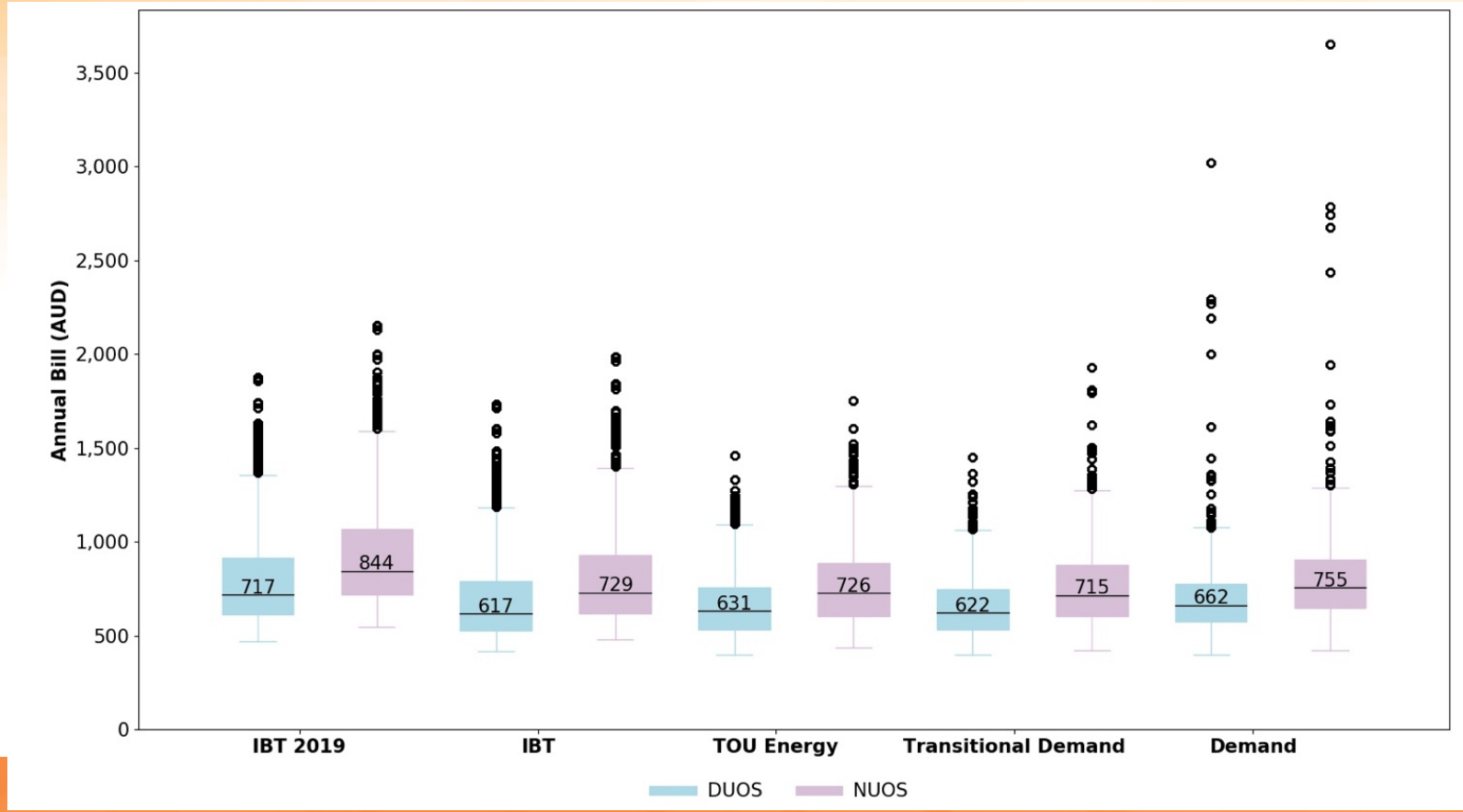
- Average and median bills under all the 2020/21 tariffs are lower than under the 2019/20 Flat tariff.
- Transitional Demand tariff (default if on an interval meter) results in the lowest average and median bills.
- TOU Energy, Demand tariff average NUOS bills lower than under the IBT.



	IBT 2019		IBT		TOU Energy		Transitional Demand		Demand	
	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS
CL Energy Charge	28	34	16	23	16	23	16	23	16	23
CL Daily Charge	11	11	0	0	0	0	0	0	0	0
Main Demand Charge	0	0	0	0	0	0	39	83	196	240
Main Energy Charge	299	359	273	329	279	349	234	276	117	159
Main Daily Charge	456	525	402	459	365	394	365	376	365	376

Ergon East Residential – Median bills

- Most customers are fairly tightly clustered about the median, but there are some very high outliers, especially under the Demand tariff. Likely that these customers are cross subsidised if under a Flat tariff.
- Demand tariff median bills are higher than under the IBT. Indicates peaks during the 4pm-9pm window, and potential to reduce bills.



Ergon East Residential – Tariff impacts

- Compared to the 2019/20 Flat tariff the DUOS and NUOS bills decrease by a similar amount
- Compared to the Flat tariff, most customers better off under the Transitional Demand and TOUE tariffs, but not the Demand tariff (unless have good LF)

Table 13. Percentage Change in Customer Median Bills Compared to the 2019/20 Tariff, Ergon East Residential

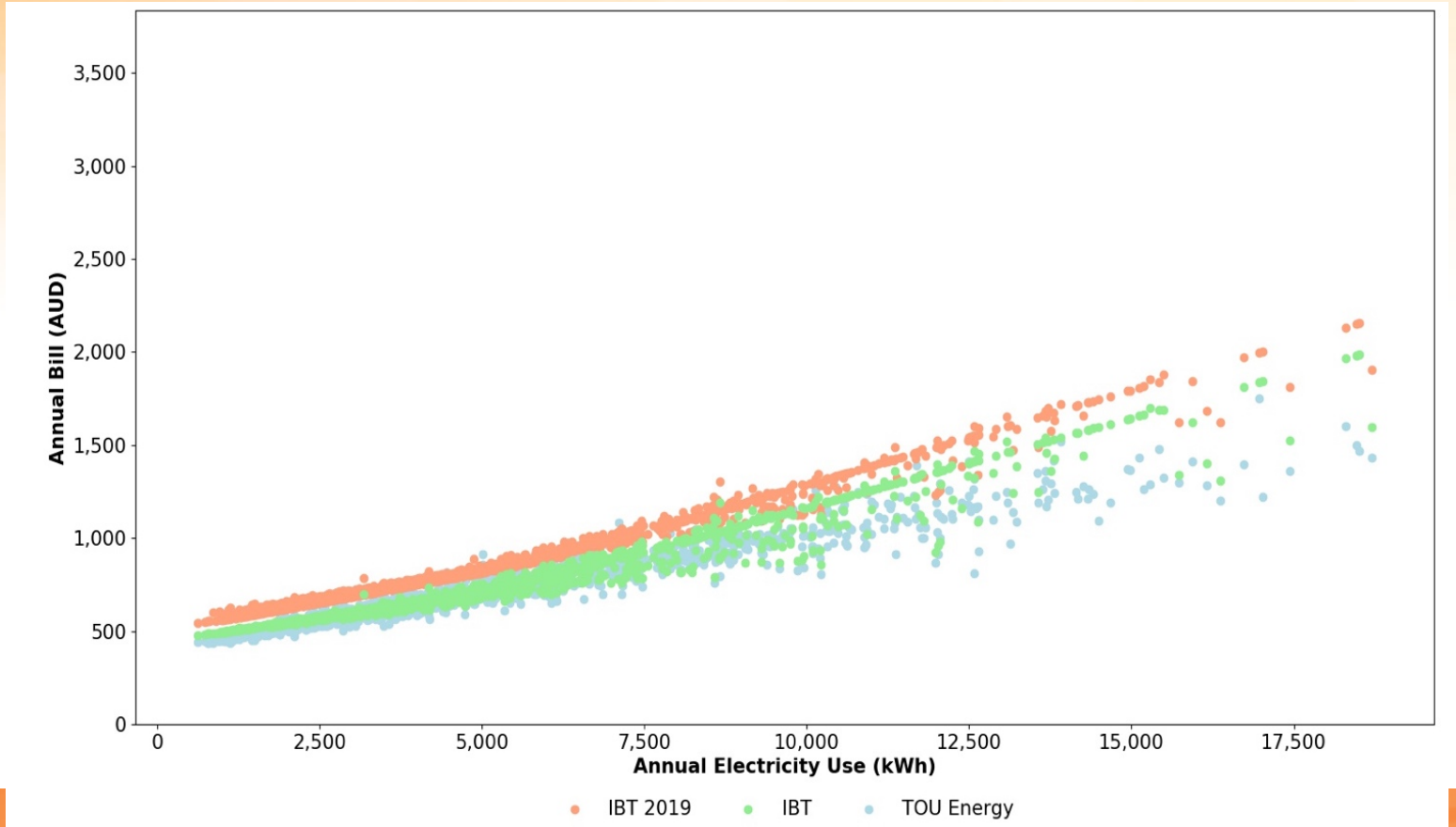
Tariff	Change	
	DUOS	NUOS
IBT	-14%	-14%
TOU Energy	-12%	-14%
Transitional Demand	-13%	-15%
Demand	-8%	-11%

Table 14. Percentage of Customers Better Off and Worse Off When Moving from the IBT Tariff, Ergon East Residential

Tariff	DUOS		NUOS	
	Better Off	Worse Off	Better Off	Worse Off
TOU Energy	58%	42%	74%	26%
Transitional Demand	54%	46%	87%	13%
Demand	34%	66%	47%	53%

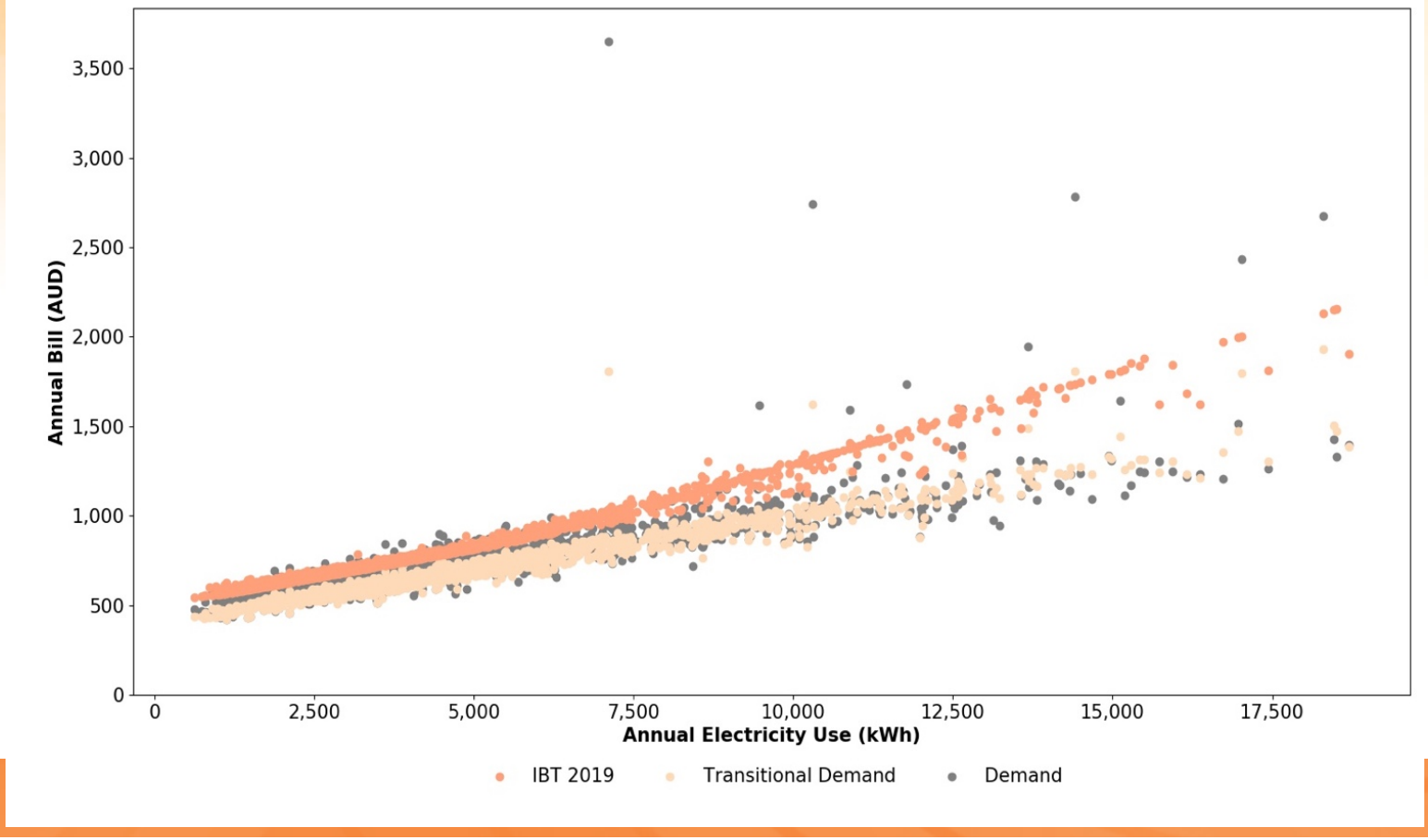
Ergon East Residential – NUOS compared to elec use 1

- Compared to the 2019/20 IBT tariff, the IBT and TOU Energy tariffs result in lower bills for most customers
- The scatter from the TOU Energy tariff results in some customers having higher bills (but is an optional tariff)



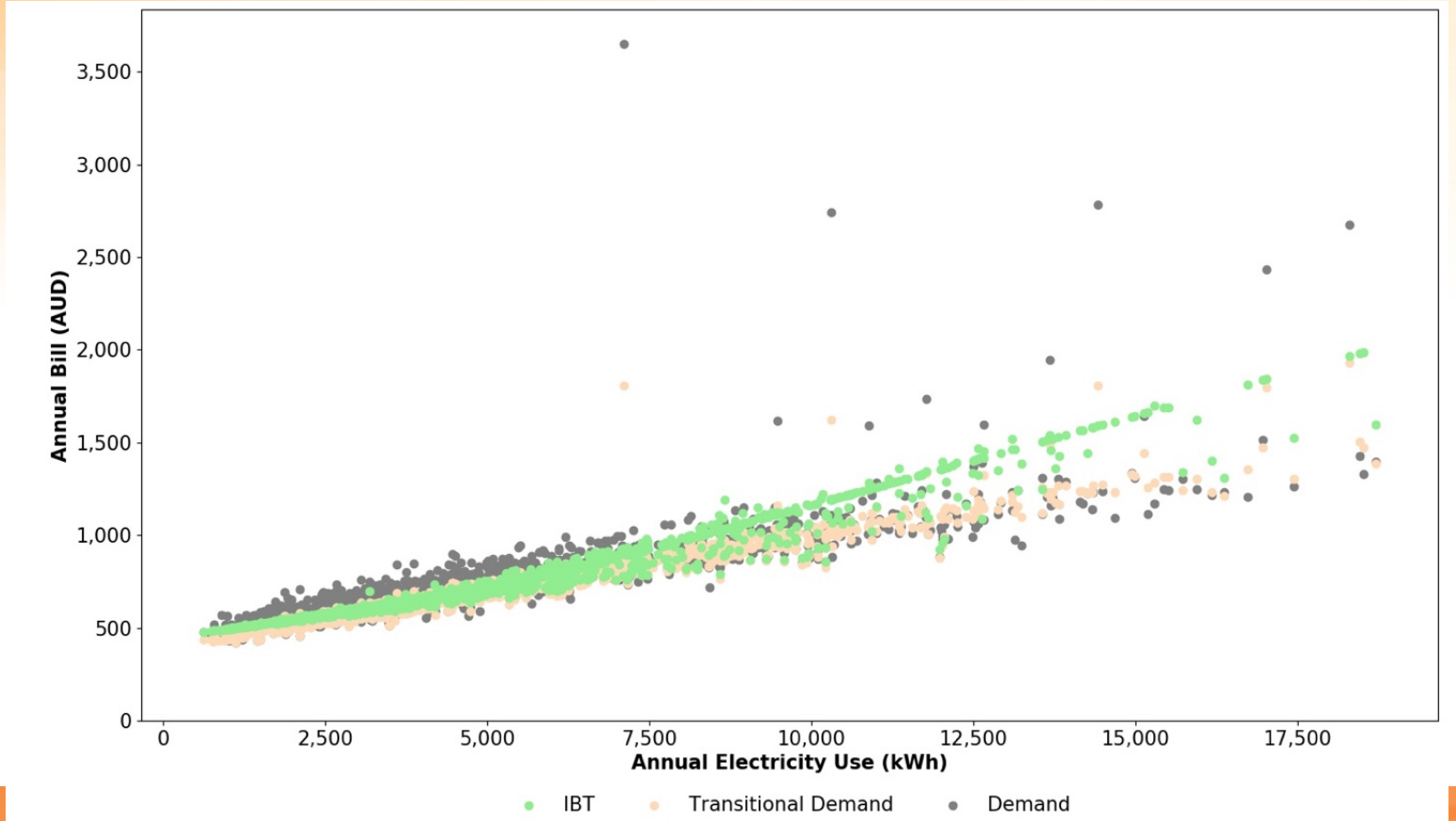
Ergon East Residential – NUOS compared to elec use 2

- Transitional Demand tariff generally results in lower bills, again apart from some customers with peaky demand.
- Demand tariff has increased scatter and so some outlier customers can be worse off – assuming no changes to their load profile.



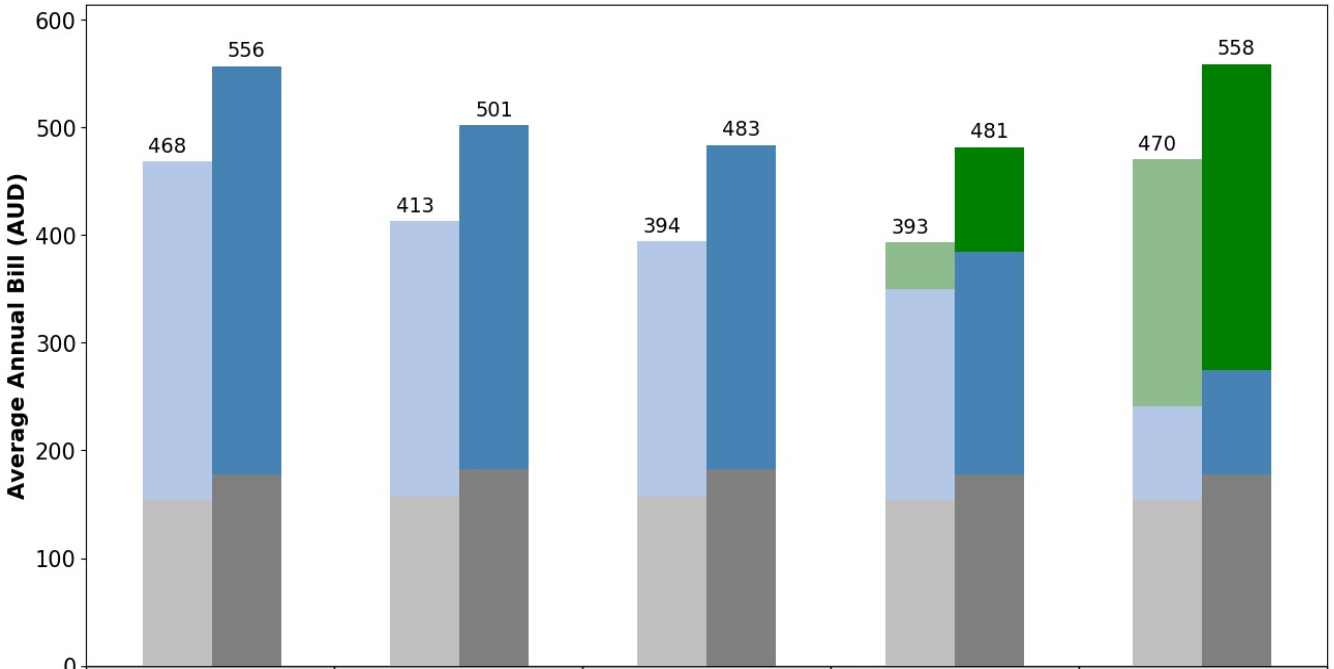
Ergon East Residential – NUOS compared to elec use 3

- As expected, compared to the Flat tariff, the Demand tariff can result in higher bills for smaller customers - because Flat tariff is already lower (as can the Transitional Demand tariff but to a much smaller extent).
- Customers that reduce demand peaks will have improved outcomes.



Life Support Customers (24) – Average bills (Energex)

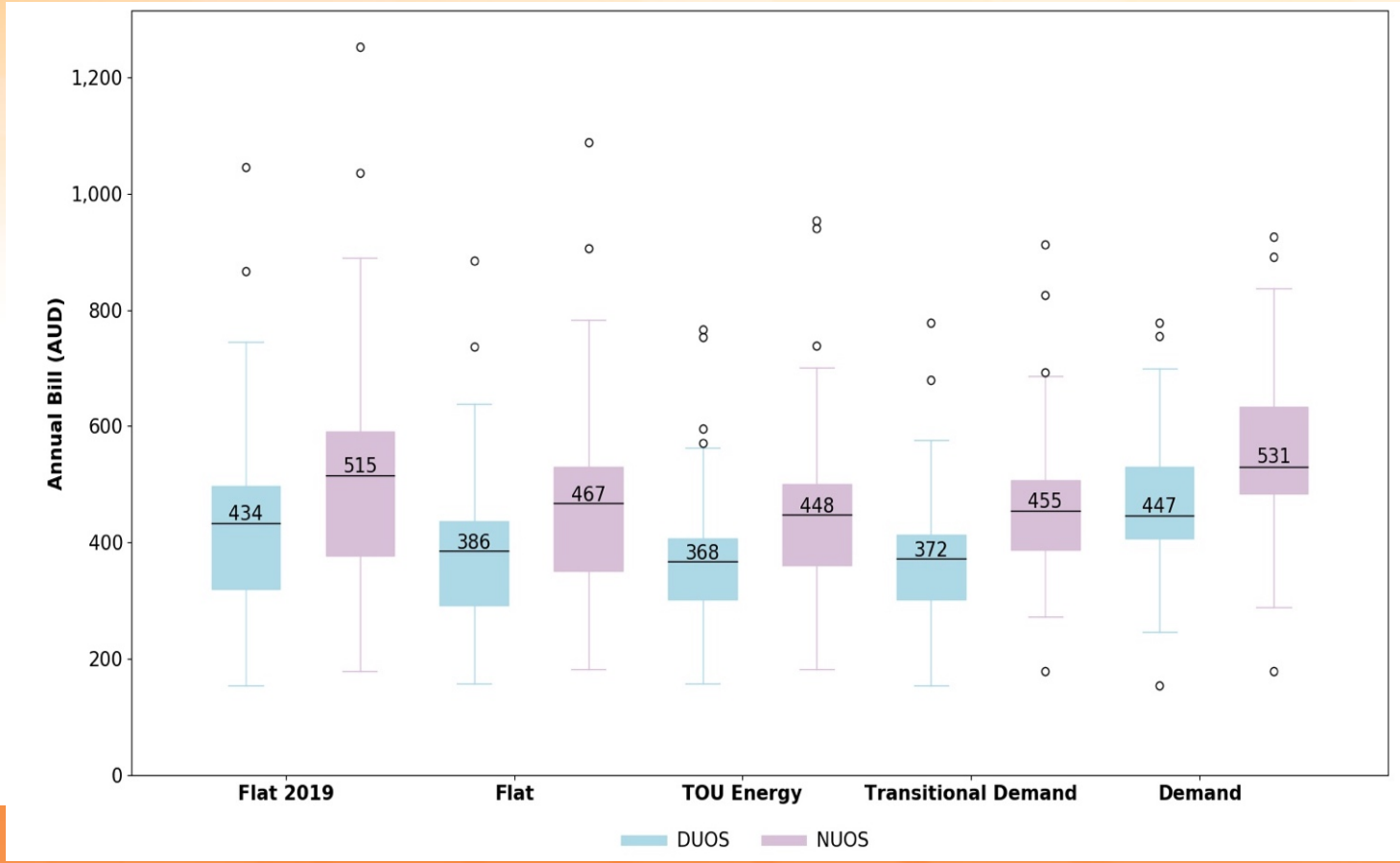
- Average and median bills under all the 2020/21 tariffs, apart from the Demand tariff, are lower than under the 2019/20 Flat tariff.
- Transitional Demand tariff results in the lowest average and median bills, and the Demand tariff is highest (note the small number of customers).



	Flat 2019		Flat		TOU Energy		Transitional Demand		Demand	
	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS	DUOS	NUOS
Demand Charge	0	0	0	0	0	0	43	97	229	283
Energy Charge	315	379	256	319	237	301	197	206	87	97
Daily Charge	154	178	157	182	157	182	154	178	154	178

Life Support Customers – Median bills

- Most customers are fairly concentrated about the median.
- Outliers are lower under the demand tariffs, but median still high so more customers have peaky loads (the high average isn't driven by outliers)



Life Support Customers – Tariff impacts

- Compared to the 2019/20 Flat tariff the DUOS bill decreases the most
- Compared to the Flat tariff, most customers better off under the Transitional Demand and TOUE tariffs, but not the Demand tariff (unless have good LF)

Table 21. Percentage Change in Customer Median Bills Compared to the 2019/20 Tariff

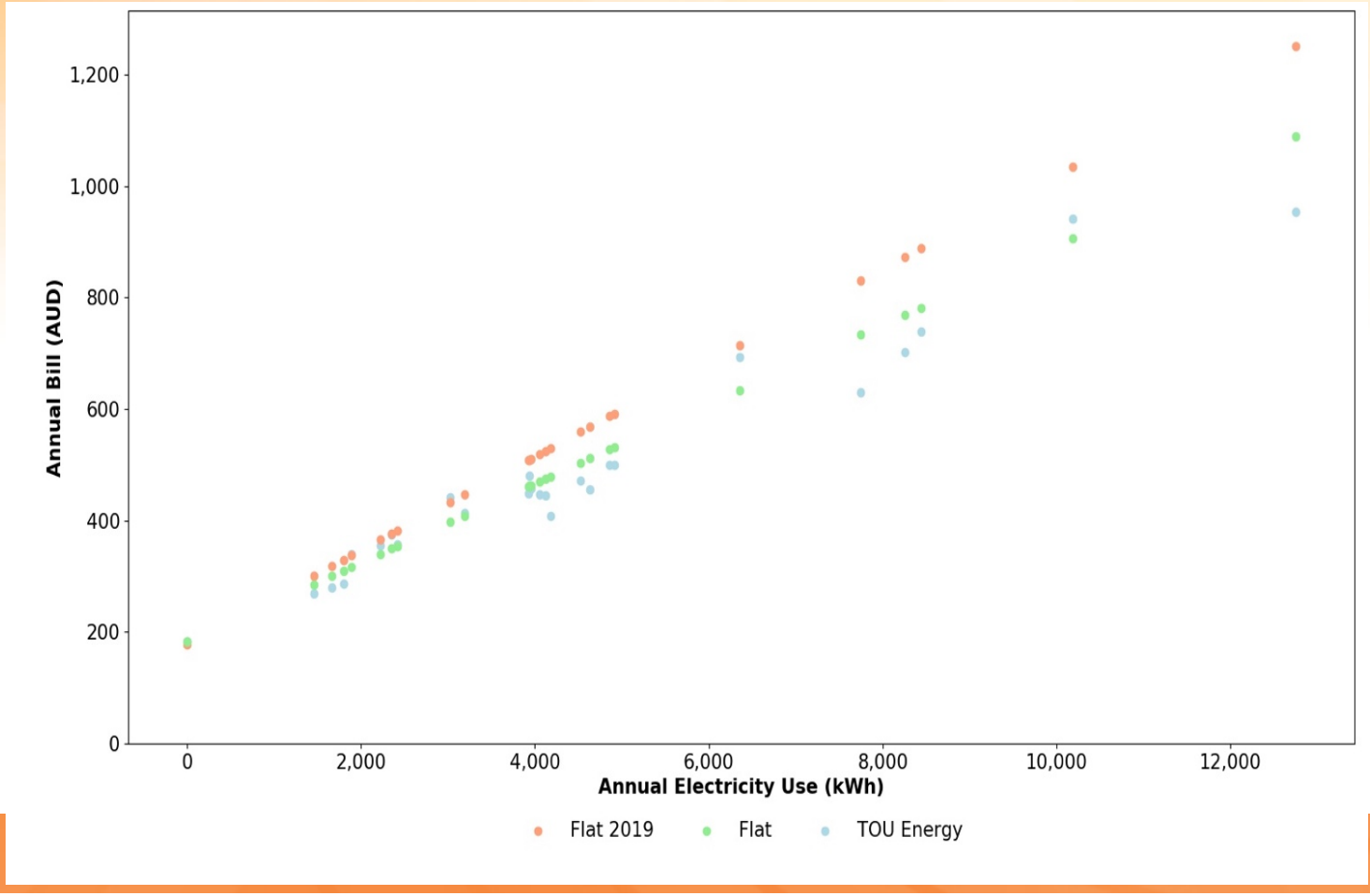
Tariff	Change	
	DUOS	NUOS
Flat	-11%	-9%
TOU Energy	-15%	-13%
Transitional Demand	-14%	-12%
Demand	3%	3%

Table 22. Percentage of Customers Better Off and Worse Off When Moving from the Flat Tariff, Life Support, Residential

Tariff	DUOS		NUOS	
	Better Off	Worse Off	Better Off	Worse Off
TOU Energy	62%	35%	62%	35%
Transitional Demand	81%	19%	65%	35%
Demand	15%	85%	23%	77%

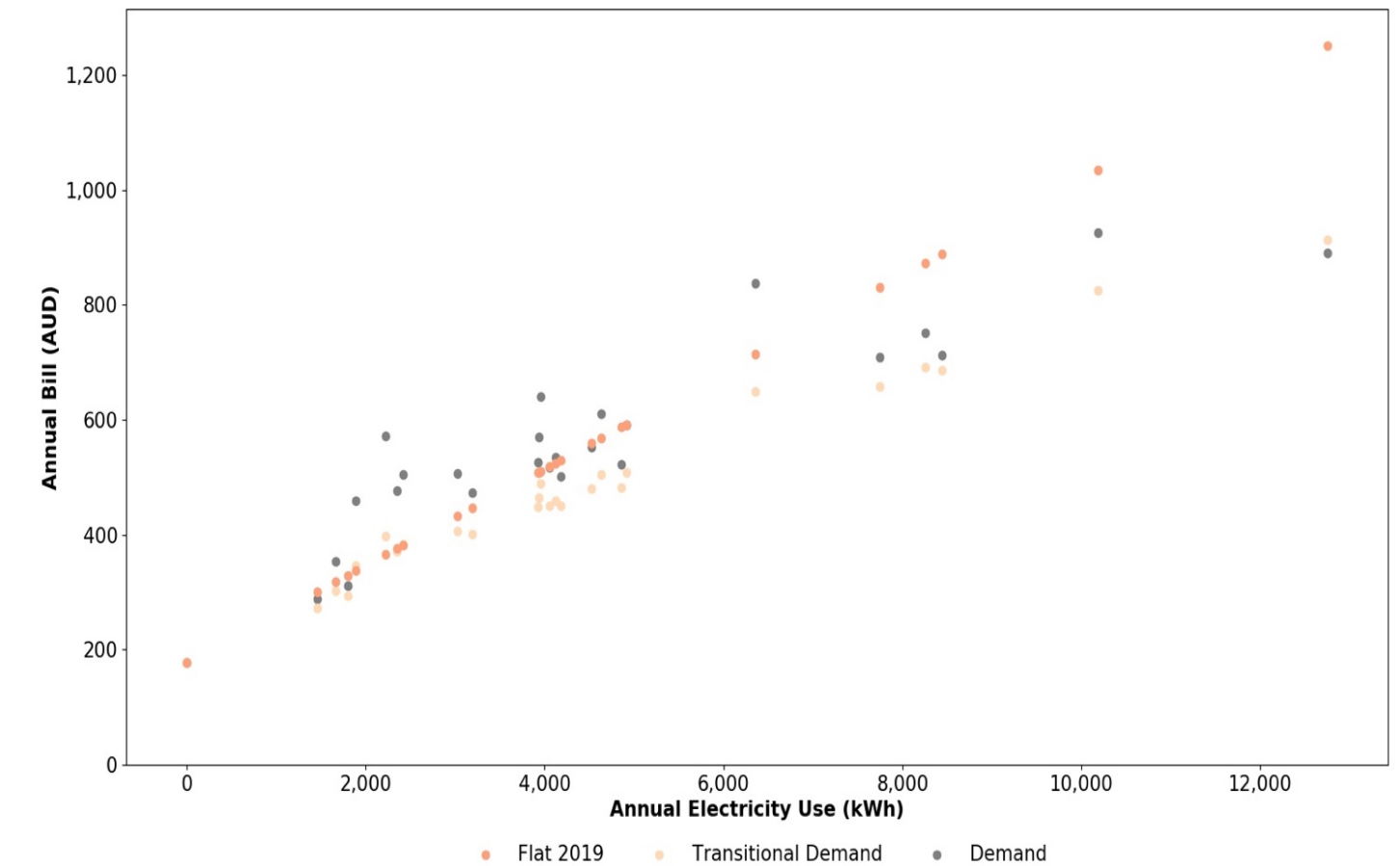
Life Support Customers – NUOS compared to elec use 1

- Flat and TOU Energy tariffs result in lower bills for almost all customers
- The scatter from the TOU Energy tariff results in some customers having higher bills (but is an optional tariff)



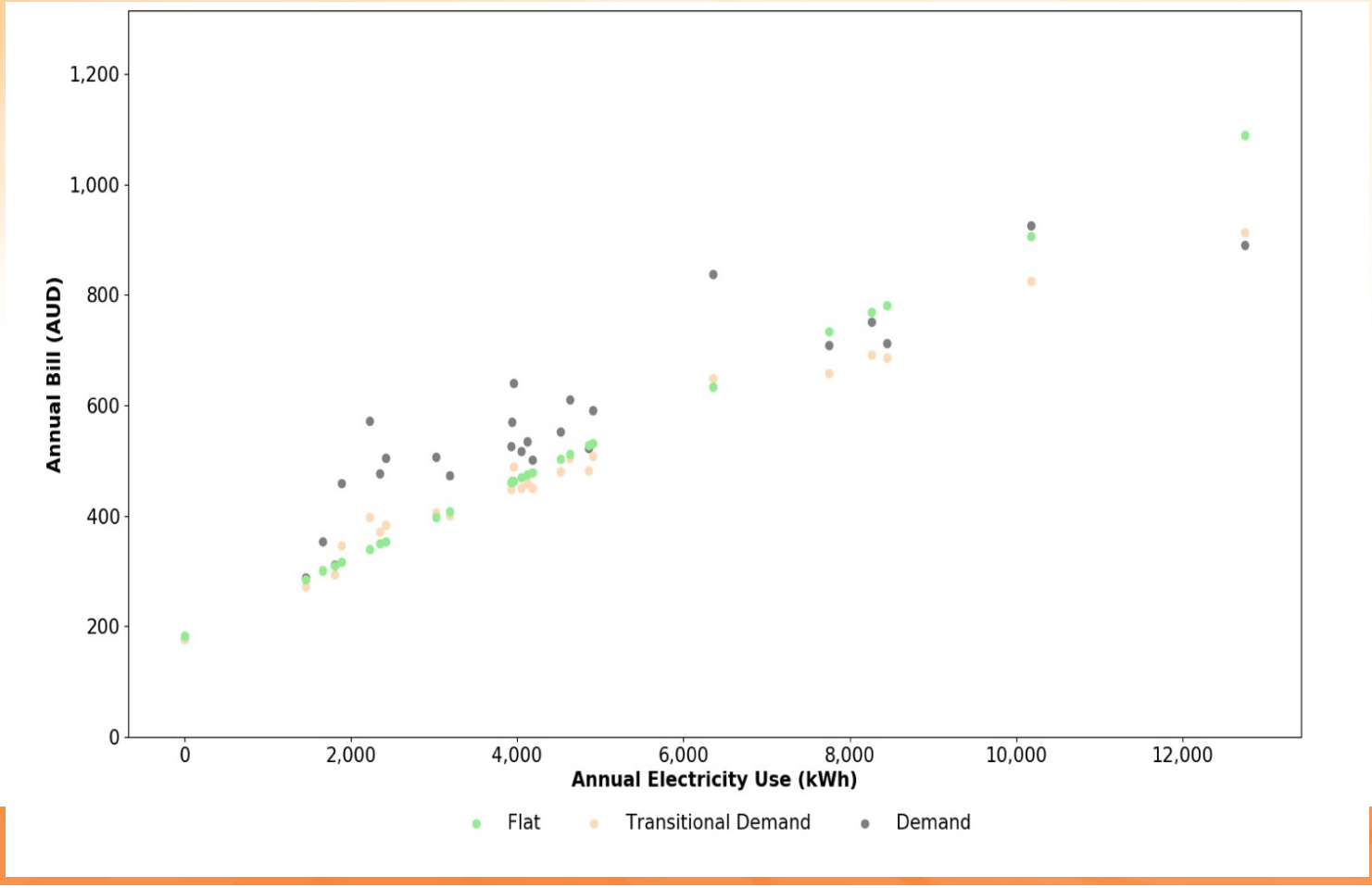
Life Support Customers – NUOS compared to elec use 2

- Transitional Demand tariff generally results in lower bills, apart from some smaller customers.
- Demand tariff has increased scatter and smaller customers can be worse off – assuming no changes to their load profile



Life Support Customers – compared to elec use 3

- As expected, there are now some bill increases compared to the Flat tariff (because Flat tariff is already lower than the 2019/20 Flat)



Customer Segment Analysis

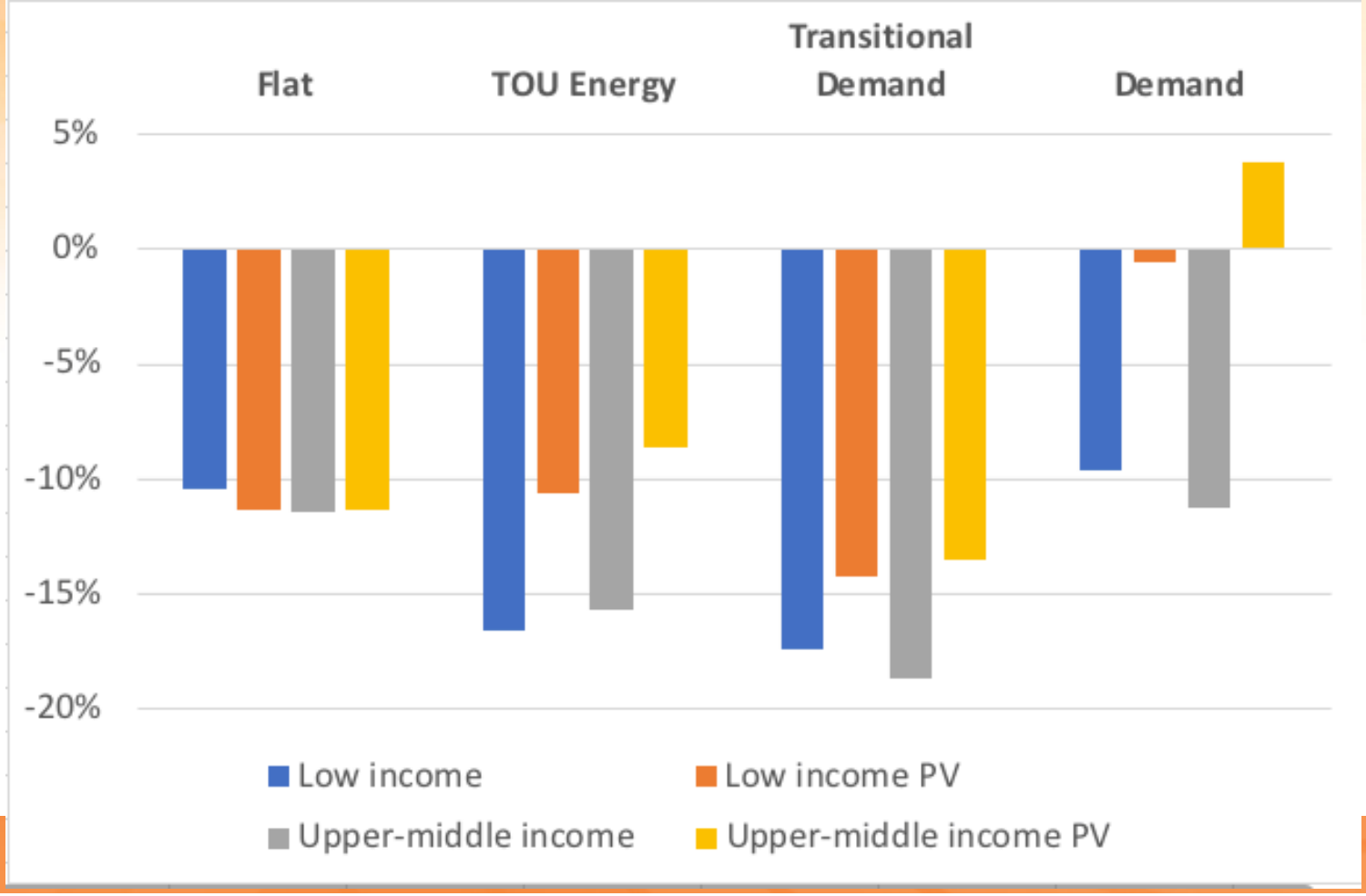
- Based on demographic information from the 2012-13 Reward Based Trial with updated interval datasets to expand the size of the database.
- Customers segmented according to demographics:
  - Property type: Detached or not
  - Household composition: single/couples, with/out children
  - Household income bracket: low, middle, upper
- Relatively small number of customers in each segment, unlikely to be representative, treat results with caution
- EQL intends to expand the size of the database over the 2020-25 regulatory control period
- Segments may also have overlap in important characteristics

South East: Average bill changes cf 2019/20 Flat tariff

Segment	Customers	Average elec use (kWh/yr)	Average CL use (kWh/yr)
Energex	125		
1	Detached low-income home (excluding single-parents), no solar PV		
	21	4,969	90
1s	Detached low-income home (excluding single-parents), with solar PV		
	13	4,150	565
2	Detached upper-middle-income homes (excluding single parents), no solar PV		
	7	5,542	311
2s	Detached upper-middle-income homes (excluding single parents), with solar PV		
	17	5,906	169

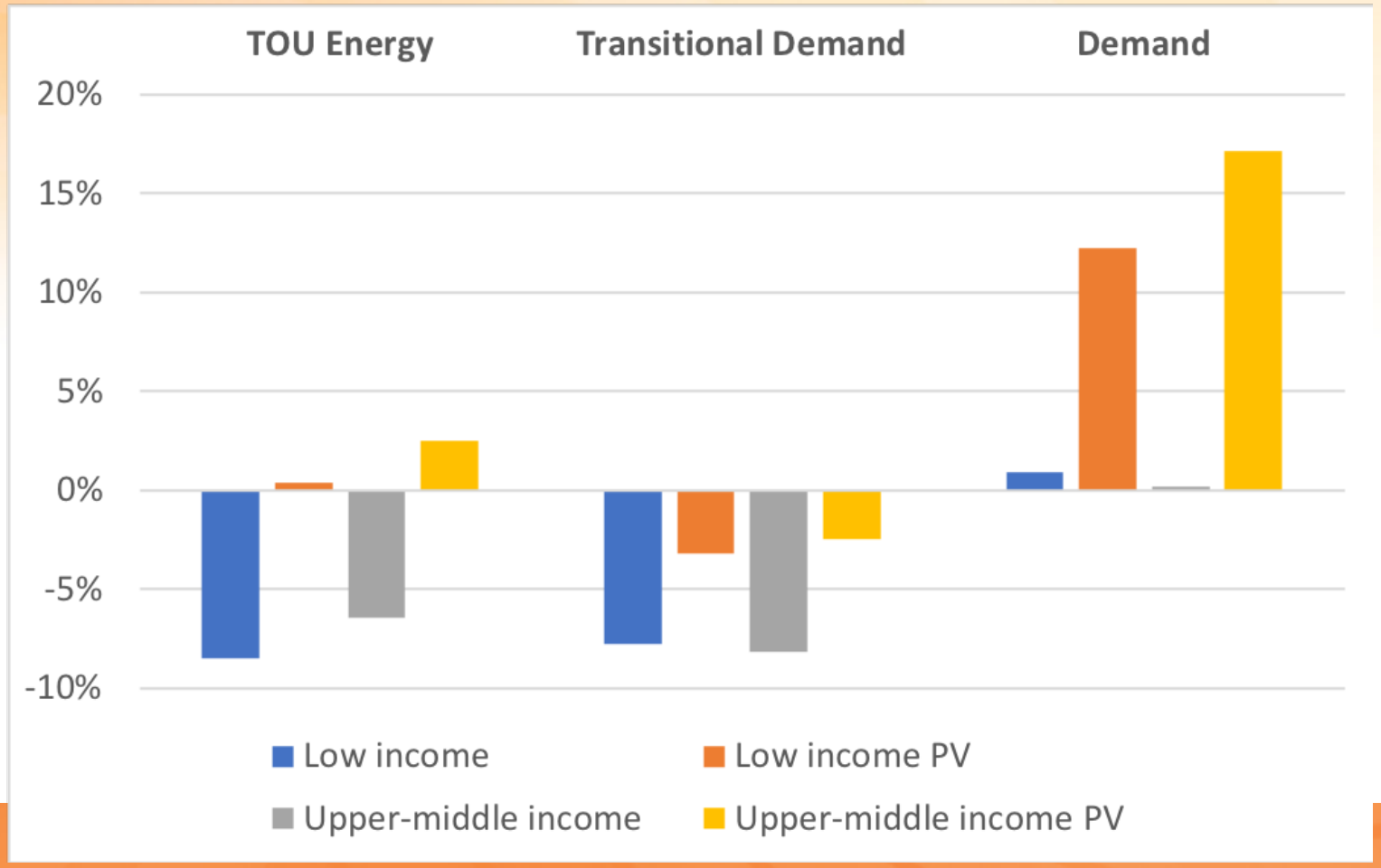
South East: Average bill changes cf 2019/20 Flat tariff

- TOU Energy and Transitional Demand: similar decreases, smaller decreases if have PV
- Demand tariff: similar but smaller decreases and increase with solar PV



South East: Average bill changes cf Flat tariff

- TOU Energy and Transitional Demand: similar decreases, small increase or smaller decreases if have PV
- Demand tariff: significant increase with solar PV

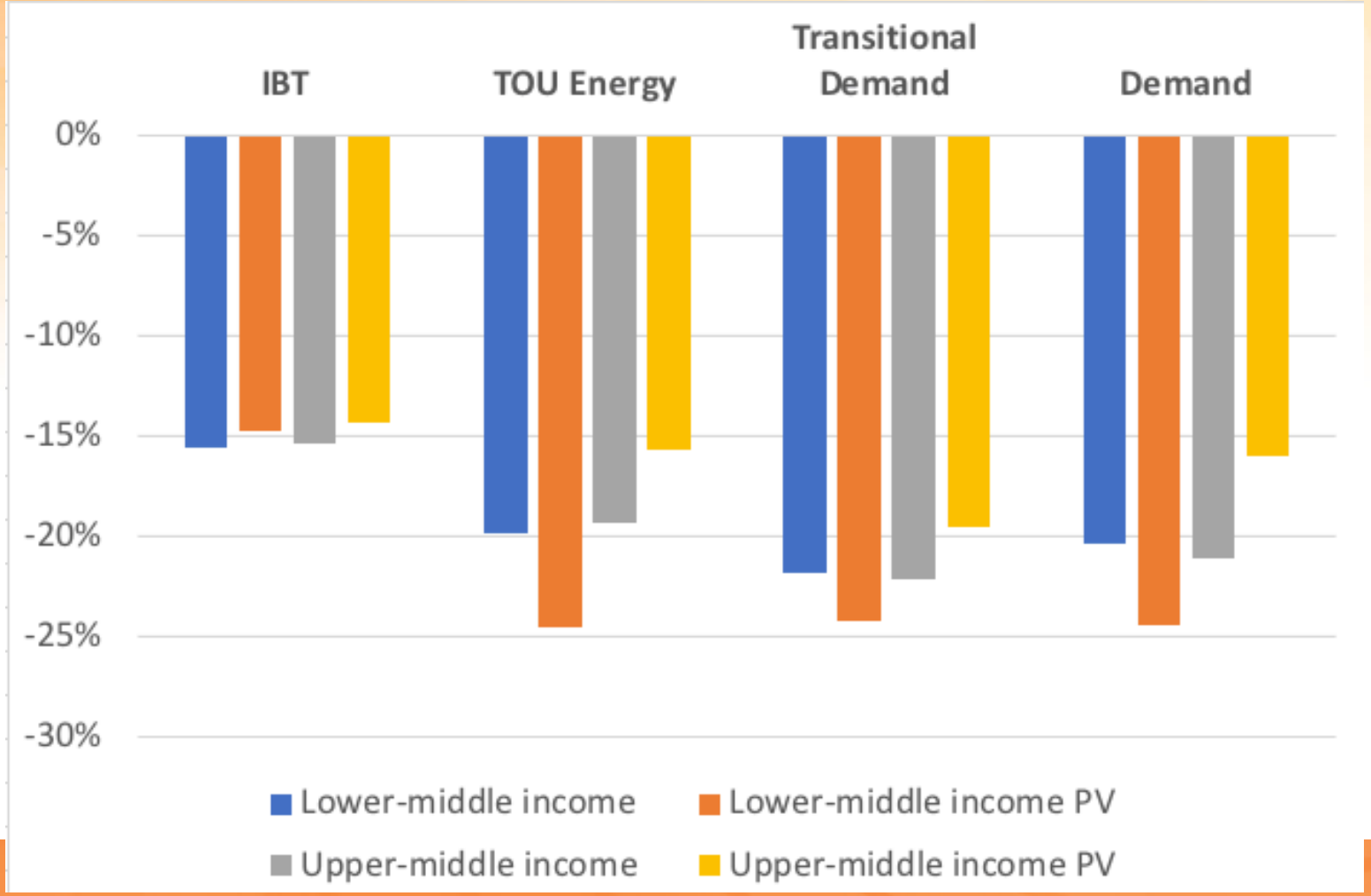


Ergon East; Average bill changes cf 2019/20 IBT tariff

Segment	Customers	Average elec use (kWh/yr)	Average CL use (kWh/yr)
Ergon East	160		
2	Detached lower-middle-income home (excluding single-parents), no solar PV		
	70	6,105	1,584
2s	Detached lower-middle-income home (excluding single-parents), with solar PV		
	3	8,746	2,535
3	Detached upper-middle-income (excluding couples without children), no solar PV		
	17	7,355	2,065
3s	Detached upper-middle-income (excluding couples w/o children), with solar PV		
	5	6,443	501

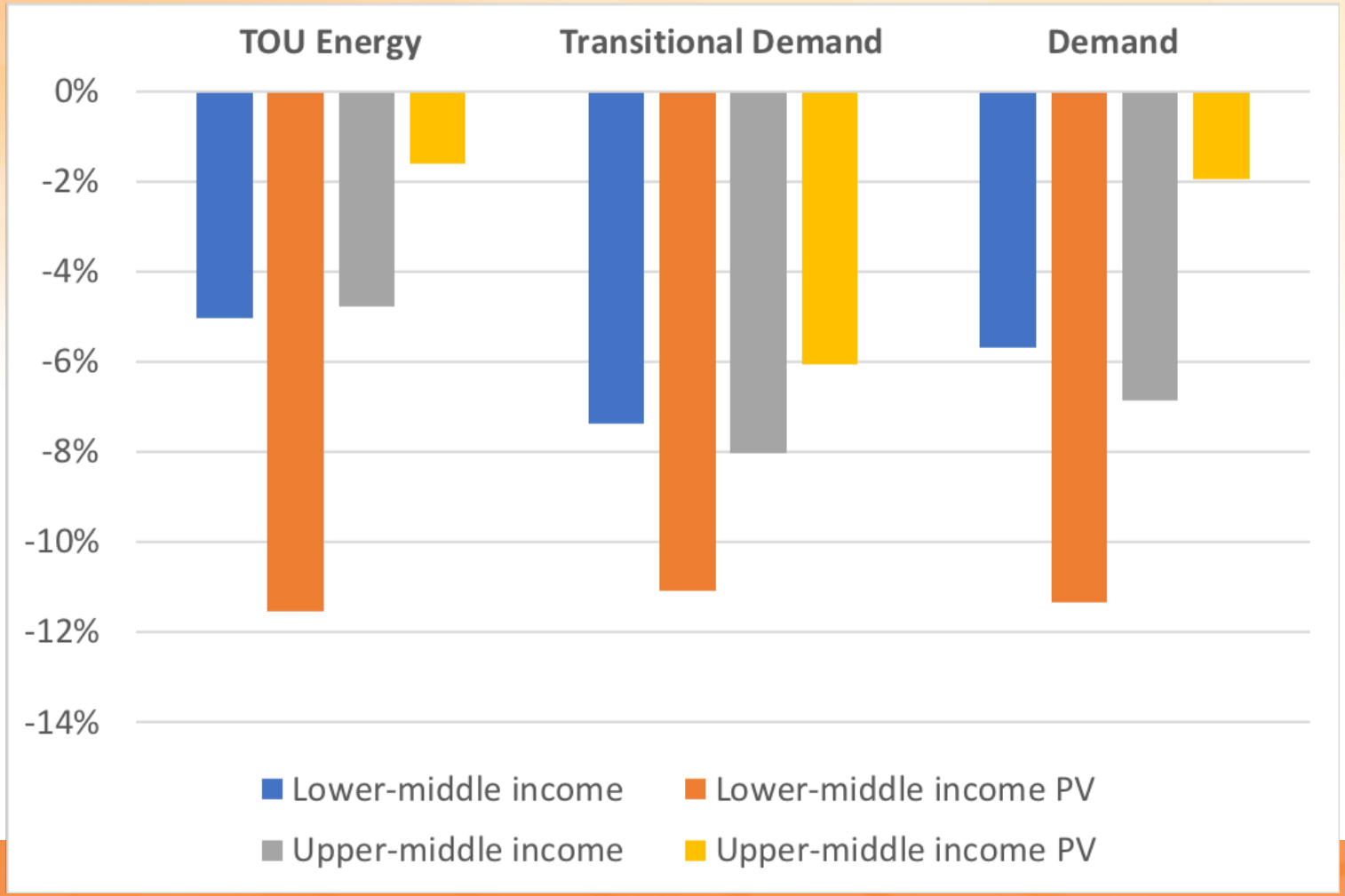
Ergon East: Average bill changes cf 2019/20 IBT tariff

- Lower-middle income with PV has greatest decreases
- Upper-middle income with PV has smallest decreases



Ergon East; Average bill changes cf IBT tariff

- Lower-middle income with PV has greatest decreases
- Upper-middle income with PV has smallest decreases



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Thank you… and *questions*

Many of our publications are available at:
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Solar PV systems in Sample

Table 2 Size distribution of solar PV (by inverter)

Region	Customer type	Minimum (kW)	Maximum (kW)	Average (kW)	Median (kW)
South East	Residential	1	12.95	1.34	3.6
	Business	1.5	100	17.2	20
Ergon East	Residential	1	15	1.63	3.6
	Business	1.5	366	27.6	5
Ergon West	Residential	1.5	15	2.29	3.9
	Business	1.5	20	5.29	4.1