CUSTOMER CO-DESIGN WORKSHOP FINDINGS

Q1 2017

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PROJECT OVERVIEW

BACKGROUND

In light of recent direction given by the CPUC to all utilities, PG&E seeks to encourage customers to reduce their use of electricity overall – specifically around peak hours (duck curve) – using rates as a key lever and exploring support mechanisms to encourage customer behavior change.

PROJECT GOALS:

PG&E seeks to leverage a behavior neuroscience-based design-thinking approach to work alongside customers in **(1)** rate exploration and **(2)** increasing customer sense of control over time of use rates and shifting energy use.

OVERVIEW - METHODS

METHODS

Three co-design sessions were held in three locations (Sunnyvale, Fremont, and Fresno). Twelve (12) teams of customers generated **550+ design ideas** which were boiled down to **twelve design prototypes** (1 per team). We tagged/codified all 550+ designs into EIGHT (8) major themes of customer behavior/biases. Additionally, we coded ideas by location for any patterns.

FREQUENCY & PREFERENCE

All coded designs were tallied based on frequency of mention and preference. Ideas and designs that appear most frequently are considered easiest for customers to access from existing mental models (Fluency Effect). The most predominant customer designs were then **summarized into *nineteen (19) design targets*** (grouped under the eight themes).

OVERVIEW – METHODS

CUSTOMER CO-DESIGN WORKSHOP AGENDA

1	**Design Training**	customers learn how the human brain works
2	**Energy Education**	customers learn about energy 101
3	**Rate Design**	customers design rates for demand curve problem & react to TOU rates
4	**Behavior Design**	customers co-design behavior change scripts
5	**Presentation**	customers share language to communicate rate & behavior designs to their communities

OVERVIEW - FINDINGS

FINDINGS

PG&E customer ideas fell into eight (8) key psychological-behavioral **themes**:

1. Let me choose! (kind of…)
2. I need real-time feedback
3. Can I get a break?
4. Hey, what about *them?*
5. Credit me for being good
6. Everything x everything = nothing
7. The greater good metric
8. Teach my kid/family

CONCLUSIONS

Combining brain science principles with these key themes, we identify ***nineteen (19) potential design targets.***

coding & grouping

CO-DESIGN ANALYSIS

coding and grouping

SYNTHESIS

550+ design ideas by customers in the workshop were analyzed by:

—how often they came up across the three workshops

—the twelve (12) prototype designs because they are what the teams picked as their best idea

co-design findings

KEY CUSTOMER THEMES

When customers were asked to solve for an afternoon-evening peak,ideas fell along eight (8) main themes:

1. Let me choose! (kind of…)
2. I need real-time feedback
3. Can I get a break?
4. Hey, What about *them*?
5. Credit me for being good
6. Everything x everything = nothing
7. The greater good metric
8. Teach my kid / family

WHAT THIS REVEALS

Two distinct and paradoxical mindsets that co-exist in the customer's brain: the "VICTIM" and the "CHAMPION."

RATE DESIGN

RATE DESIGN WORKSHOP EXERCISE

Participants were asked how they would design solutions to align with the constraints of energy demand and the lower supply/higher cost of energy during the later afternoon /early evening.

NATURAL SOLUTION OF PEAK / OFF-PEAK PRICING

They naturally arrived at solutions of peak /off-peak pricing

RATE DESIGN

CUSTOMER RATE DESIGNS

Initial customer rate designs focused on discounting the cost of energy during off-peak hours and increasing the cost of energy during peak hours to incentivize shifting behaviors.

OFF-PEAK DISCOUNT > PEAK PRICE INCREASE

Almost all of the initial customer rate designs (especially in Fresno) emphasized discounting the cost of energy during off-peak hours, rather than increasing peak cost.

APPLYING NEUROSCIENCE

LOSS AVERSION

Customers cited saving money as a primary motivator

DESIRE FOR CERTAINTY

Customers desire a concrete savings or discount as the result of their behavior change efforts and want to feel appreciated similar to other consumer experiences (Kohl's, Club cards, etc.).

regarding rates, customers want **savings** from discounted off-peak hours to be visualized clearly

RATE REACTIONS

RATE REACTION WORKSHOP EXERCISE

Participants then responded to three (3) TOU rates by indicating their preference and as well as any modifications they would make to these presented rates:

(1) 3-hour peak
(2) 5-hour peak
(3) early bird / late bird

A NATURAL DESIRE FOR CHOICE

When customers were exposed to the TOU rates, they **naturally gravitated toward the option that allowed choice**

RATE REACTIONS

TOU RATE REACTIONS

When presented with three (3) TOU rates, most customer reactions reflected a strong desire to choose from a menu of flexible rate options.

CHOICE > PLAN SPECIFICS

Customer reactions revealed the need for people to choose from a menu of at least two (2) rate options, and a gravitation toward the early/late rate (which was the only rate presented which included more than one choice)

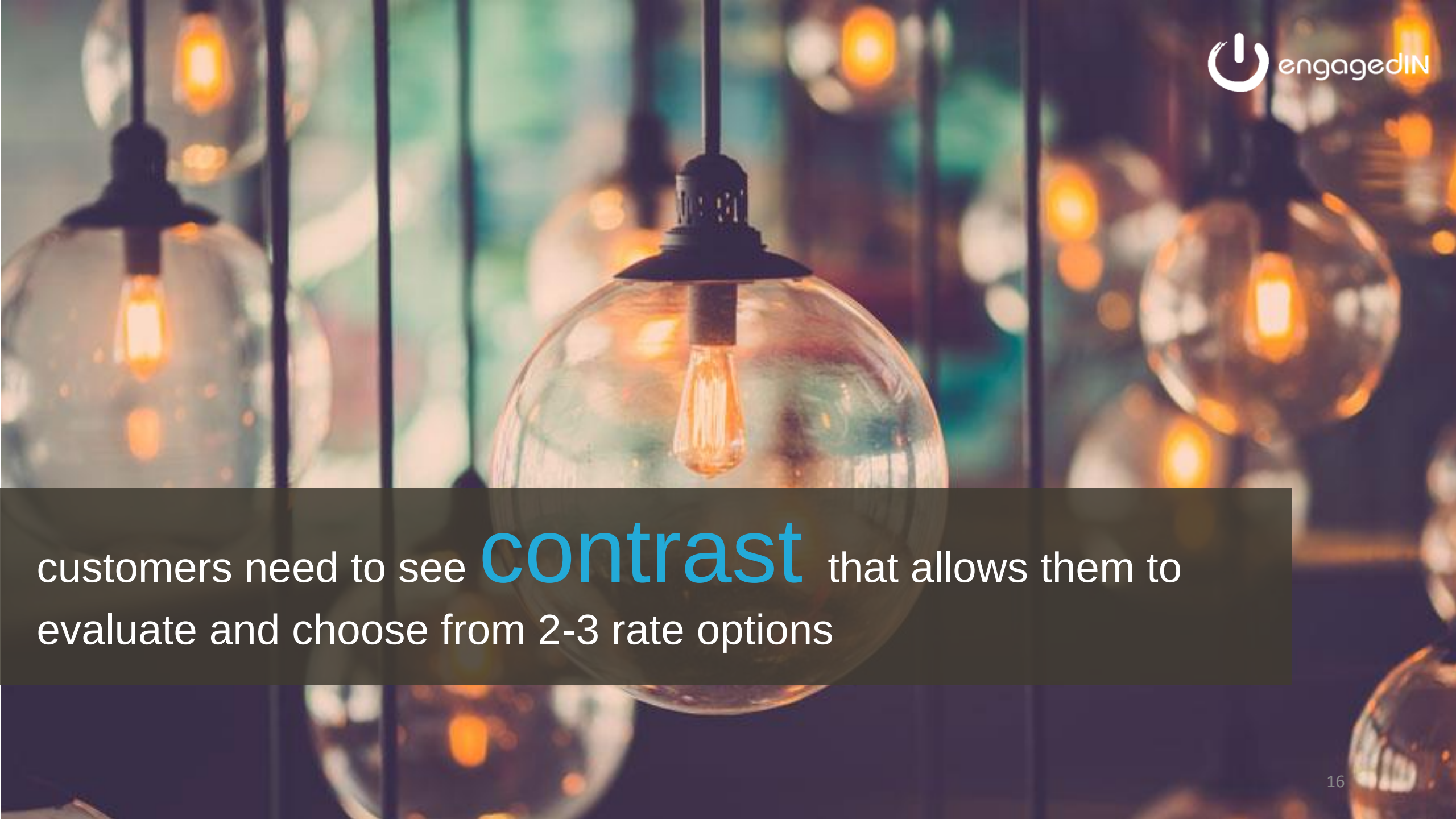
APPLYING NEUROSCIENCE

AMBIGUITY AND CONTRAST

In evaluating rates customers desired choice, but struggled to find reference points to help them compare their options

CHOICE OVERLOAD

Customers became overwhelmed when presented with too much detail on rate specifics, seeking the information that would enable them to see expected & actual bill impact



customers need to see contrast that allows them to evaluate and choose from 2-3 rate options

rate findings

RATE DESIGN – CAN I GET A BREAK?

When customers were asked to design rates to align energy use/demand with energy supply outside of peak hours, **almost all naturally came towards solutions of peak / off-peak pricing**

Customers want to avoid financial losses, and see discounted rates during off-peak hours as a motivator for changing their behavior so they can save money.

RATE REACTIONS – LET ME CHOOSE! (KIND OF…)

When customers were presented with TOU rates, **the majority expressed a need to choose** between plans

Customers do not want rates forced on them, they need the experience of choice, but they quickly become overwhelmed when exposed to too many variables and options

SOLUTION DESIGN

SOLUTION DESIGN WORKSHOP EXERCISE

Participants were asked to design a way to shift or reduce energy use behaviors for people within their community.

Participants worked in groups to ideate solutions for one major appliance, discuss and prioritize as a group, and prototype their best solution by including:

(1) Preference - explanation of the preferred rate and any modifications
(2) Solution - the solution they want people in their community to try
(3) Execution - how they would get people to adopt their proposed solution

who we talked to
SUNNYVALE

CLIMATE	Cool
SEGMENT	Energy Engaged; Early EV Adopters; High Income
PERSONAS	Style Seekers; Eco Active Go-Getters

SUNNYVALE BEHAVIOR SOLUTIONS

CUSTOMERS MOST FREQUENTLY SEEK TO:

1. build a feedback loop with more access to energy usage and cost information

2. increase flexibility of rate plans to allow for more customer choice

3. and, maximize savings through rewards that provide credit for good behavior

SUNNYVALE PROTOTYPES

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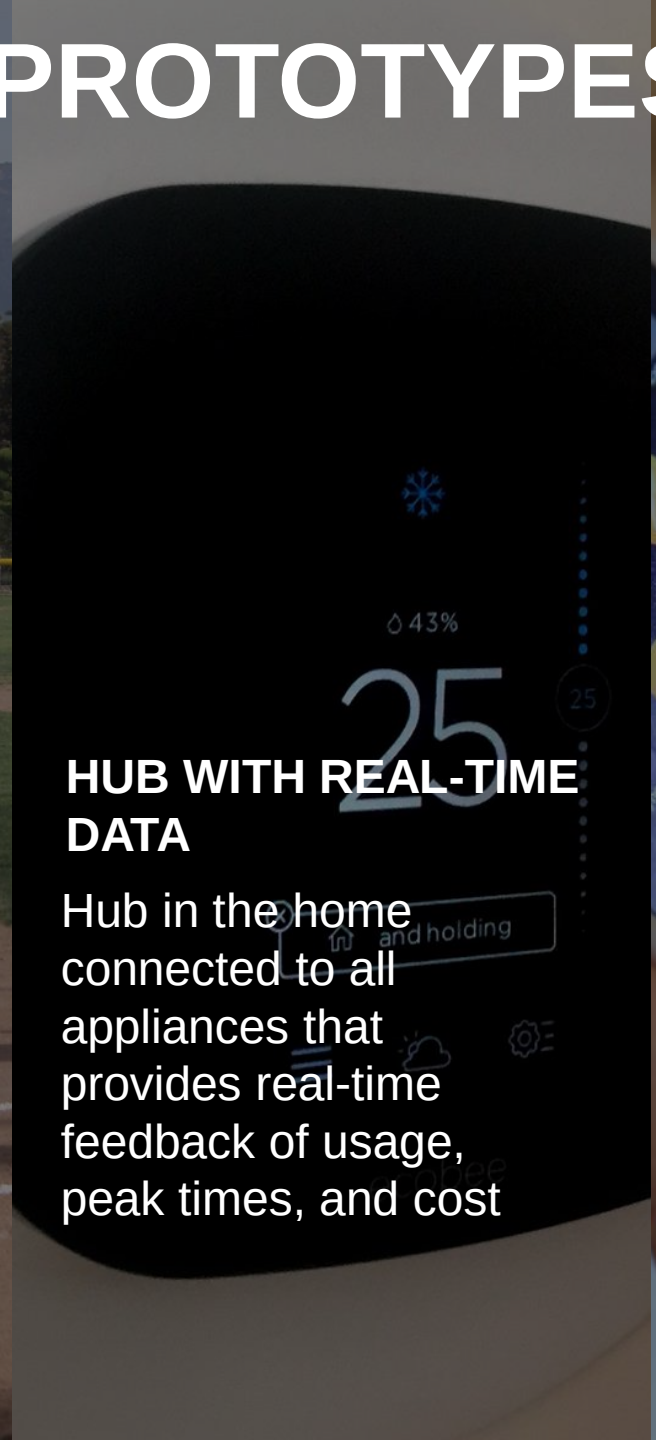
COMMUNITY LAUNDRY

Magnets are placed on washers and dryers in community laundry rooms calling out a laundry “happy hour” from 4-6pm and 9-11pm with hashtags for social sharing

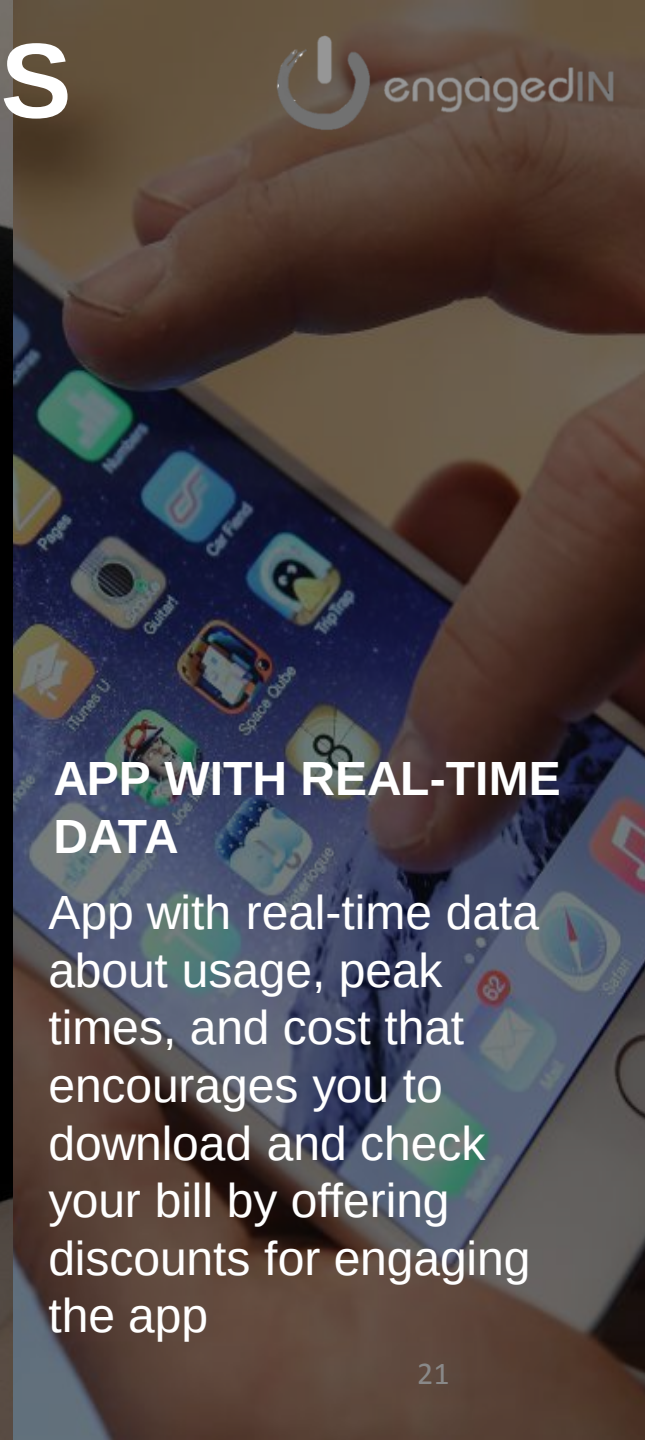
SHIFTING FAMILY ACTIVITIES

App that suggests ways to get out of the house with family during peak hours or, if staying in, shift from TV watching to devices that are charged in off-peak hours



HUB WITH REAL-TIME DATA

Hub in the home connected to all appliances that provides real-time feedback of usage, peak times, and cost



APP WITH REAL-TIME DATA

App with real-time data about usage, peak times, and cost that encourages you to download and check your bill by offering discounts for engaging the app

who we talked to
FREMONT

CLIMATE	Moderate
SEGMENT	Middle Income
PERSONAS	Stable Living; Gadget Family, Way Wired

FREMONT BEHAVIOR SOLUTIONS

CUSTOMERS MOST FREQUENTLY SEEK TO:

1. shift existing behaviors to new times with automation and reminders

2. adjust rates (offer discount periods) so customers can choose windows where they are charged less

3. and, improve the feedback loop through information displayed in bills

FREMONT PROTOTYPES

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“DISHY” REMINDERS

Cartoon “Dishy” who appears in different ad campaigns and on a magnet for the dishwasher that informs of peak hours by changing colors from green to red from 4-9pm

SMART DRYER

Ad campaign (TV, radio, billboards, app, texts, & bill inserts) encouraging the customers to shift laundry to off-peak hours and purchase a smart dryer

SMART THERMOSTAT

Incentive program (rebates?) for buying a smart thermostat advertised with endorsement from popular sports players and a referral program for friends and family

ADJUSTING HEATER PRESETS

Setting the heater to a lower temperature and leaving it, advertised through bill inserts, flyers, and mobile alerts

who we talked to

FRESNO

CLIMATE	Hot
SEGMENT	Low Income Minorities
PERSONAS	Living for Today; Heart and Home; Beyond Their Means

FRESNO BEHAVIOR SOLUTIONS

CUSTOMERS MOST FREQUENTLY SEEK TO:

1. shift existing behaviors to new times with automation and reminders

2. increase incentives for installing new energy efficient appliances and solar panels

3. and, increase community awareness of peak hours through multi-channel education efforts

FRESNO PROTOTYPES

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TV POP UP LOCK-OUT

Use TV less by having a peak hours reminder pop up with a code to exit/confirm you want to keep watching during a peak price time

REMINDER MAGNETS

“Save on your peak hours, to save your green dollars” slogan on commercials, flyers, and magnets

APP WITH REAL-TIME DATA

App with real-time data about usage, peak times, and cost in addition to projected monthly cost based on current usage

MONTH-LONG HEATER CHALLENGE

Setting heater to a lower temp for one month and showing savings in a way that can be easily shared with the community

in all three communities **choice** is the dominant desire, indicating an opportunity to design for autonomy

KEY CUSTOMER THEMES

When customers were asked to design ways to align energy use/demand with energy supply outside of peak hours, eight (8) themes emerged:

1. **LET ME CHOOSE! (KIND OF…)**

   Don't want rates forced on them, but it's hard to compare plans

2. **I NEED REAL-TIME FEEDBACK**

   Need visibility into usage, costs, and alternative options during day-to-day activities

3. **CAN I GET A BREAK?**

   Desire to minimize cost, making it easier to be more energy efficient

4. **HEY, WHAT ABOUT *THEM*?**

   Resentment and loss of hope can build if we are the only ones changing

5. **CREDIT ME FOR BEING GOOD**

   Desire for an added benefit, not just a reduced cost

6. **EVERYTHING X EVERYTHING = NOTHING**

   Too many variables to consider when managing energy and it feels like everything is restricted

7. **THE GREATER GOOD METRIC**

   Water conservation efforts were meaningful because of understood community impact and fear of repercussions

8. **TEACH MY KID / FAMILY**

   Kids and family members keep us honest, make us think of impact on others, & make us want to be a good role model

making insights actionable

DESIGN TARGETS

theme

1

LET ME CHOOSE (KIND OF…)

let me choose! (kind of...)

WHAT WE HEARD

“Don’t force me into a rate or a behavior that doesn’t work for my life”

“I can’t change everything at once, but I want options that work for me – I need your help but don’t tell me what to do”

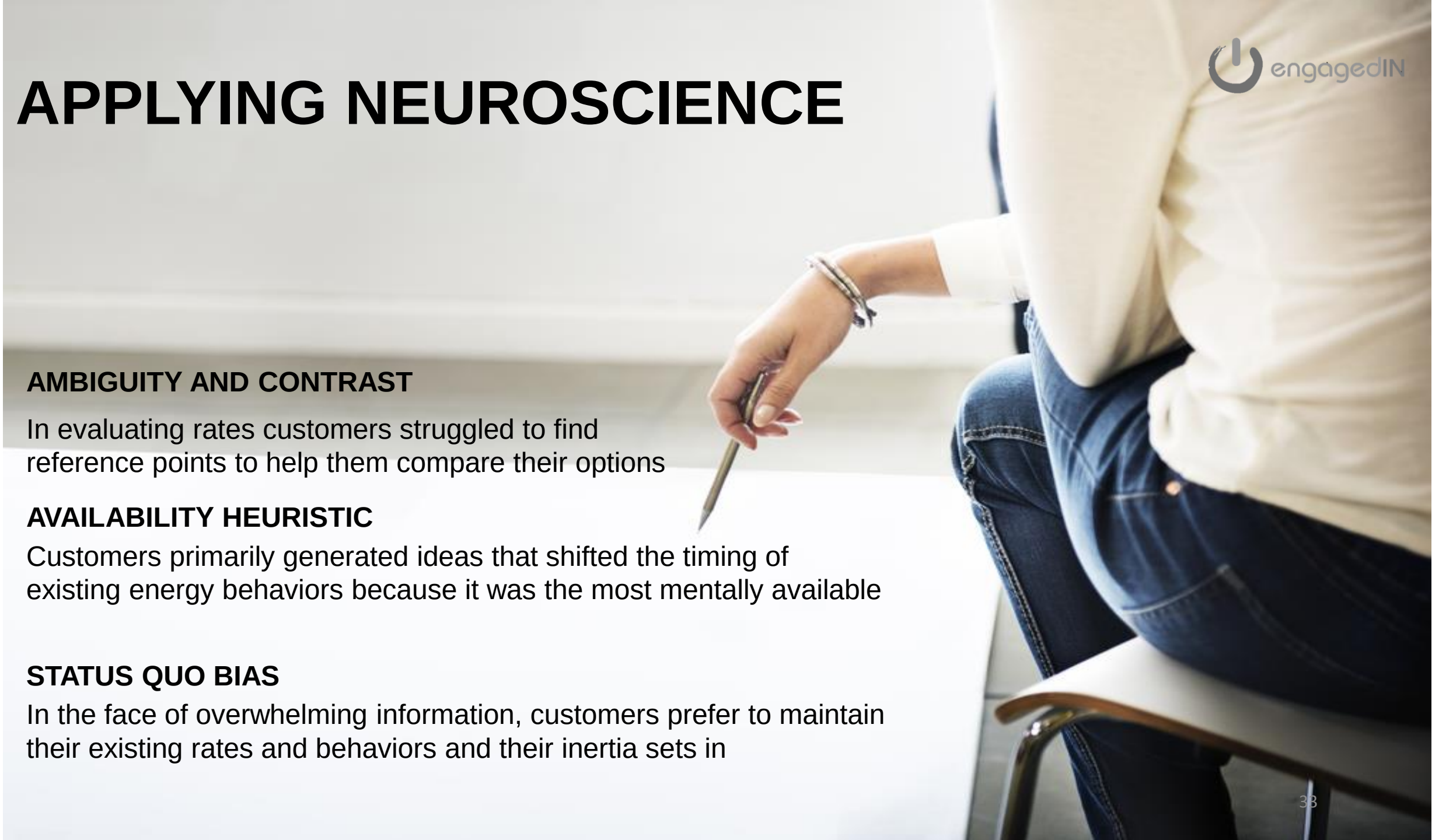
THE PITH

There appears to be a “toggle” in customer need for choice. On one hand, they say they want a personalized choice, on the other, they recognize how little they pay attention to it.

The PERCEPTION of choice is what matters—that PG&E appears to be listening and being compassionate to them personally would be reflected in the right # and type of rate choices

The “magic” number seems to be 2-3 choices, perhaps translated into a self-image such as “this rate is best for people with kids in the home”, etc..

APPLYING NEUROSCIENCE



AMBIGUITY AND CONTRAST

In evaluating rates customers struggled to find reference points to help them compare their options

AVAILABILITY HEURISTIC

Customers primarily generated ideas that shifted the timing of existing energy behaviors because it was the most mentally available

STATUS QUO BIAS

In the face of overwhelming information, customers prefer to maintain their existing rates and behaviors and their inertia sets in

theme

2

I NEED REAL-TIME FEEDBACK

I need real-time feedback

WHAT WE HEARD

“I don’t have a sense of how much I’m using, what it costs, and how to make it better without information in the moment”

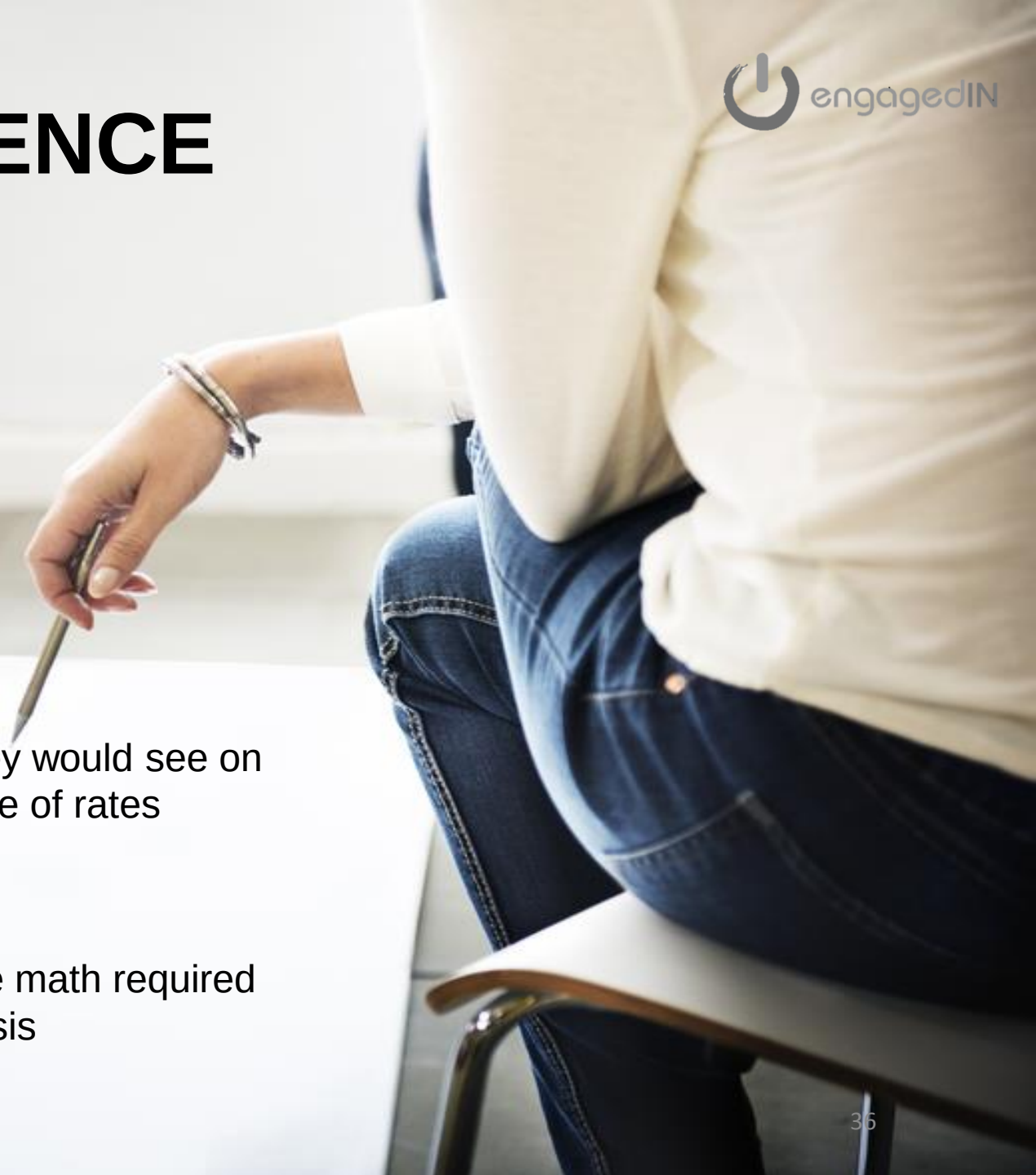
“I need real time notifications about peak times as I’m living my life”

THE PITH

Customers across all three locations came up with ideas to trigger their attention so that they could make informed choices in real time.

The most common triggers tended to be start and stop alerts around peak time windows so they could know when to shift their energy use behaviors.

APPLYING NEUROSCIENCE



AMBIGUITY EFFECT

Customers struggled to make decisions without concrete information about the price differences between peak and off-peak hours

CERTAINTY EFFECT

Customers sought clarity around what cost impact they would see on their bill as a result of their changed behavior or choice of rates through mechanisms like text alerts

RATIO BIAS

Customers struggled to compare rates because of the math required to calculate their eventual bill impact on a monthly basis

theme

3

CAN I GET A BREAK?

can I get a break?

WHAT WE HEARD

“I don’t want to lose a bunch of money, so give me discounts for the things I have to do”

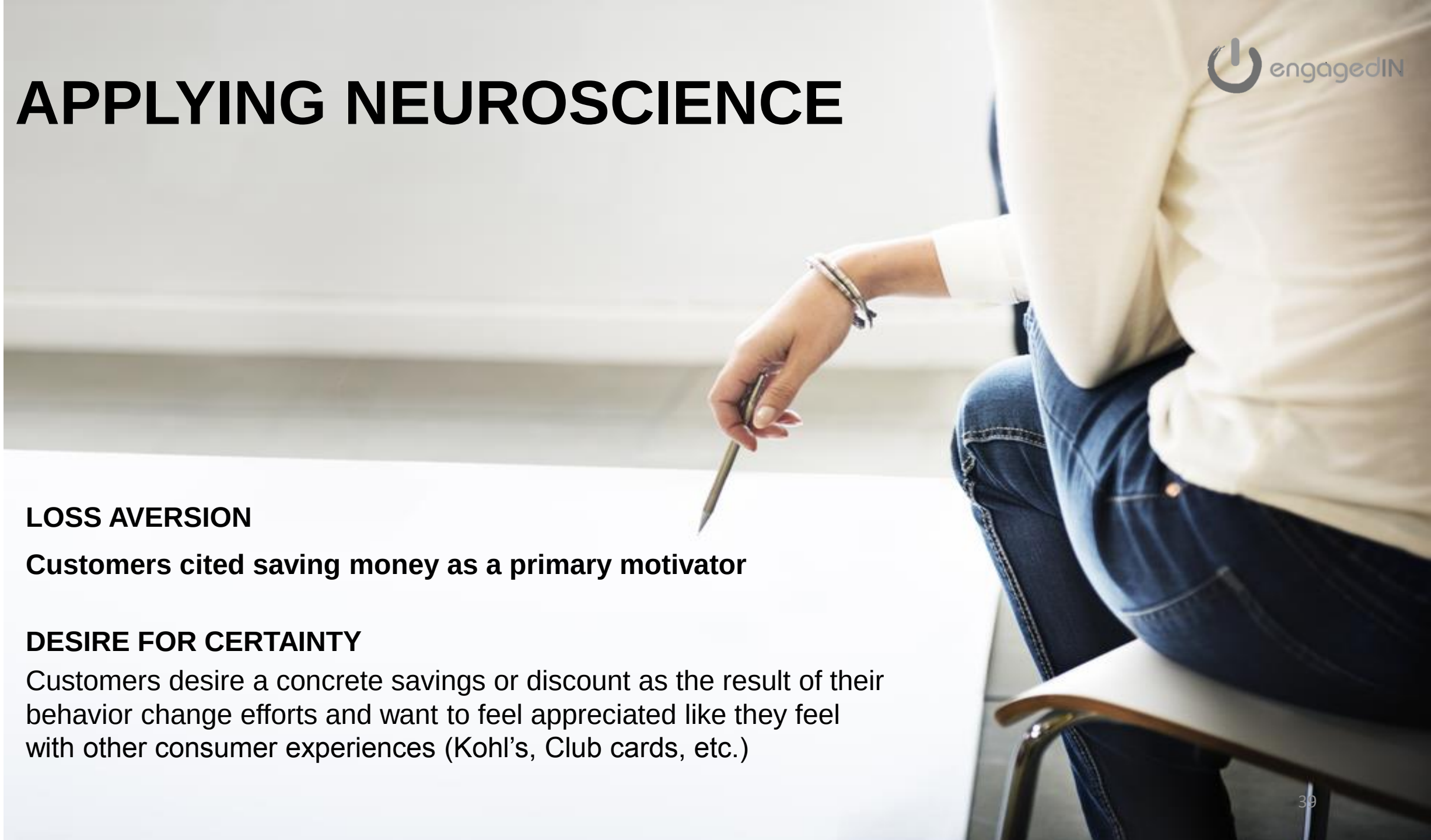
“I want to avoid losing more than I need to”

THE PITH

Consumers fear loss and can see PG&E as a losing and sometimes predatory relationship.

We saw multiple designs for a reward loop of some kind for their behavior. This most likely reflects a subconscious need for them to feel more safe in their relationship with PG&E.

APPLYING NEUROSCIENCE



LOSS AVERSION

Customers cited saving money as a primary motivator

DESIRE FOR CERTAINTY

Customers desire a concrete savings or discount as the result of their behavior change efforts and want to feel appreciated like they feel with other consumer experiences (Kohl's, Club cards, etc.)

theme

4

HEY, WHAT ABOUT *THEM?*

hey, what about *them*?

WHAT WE HEARD

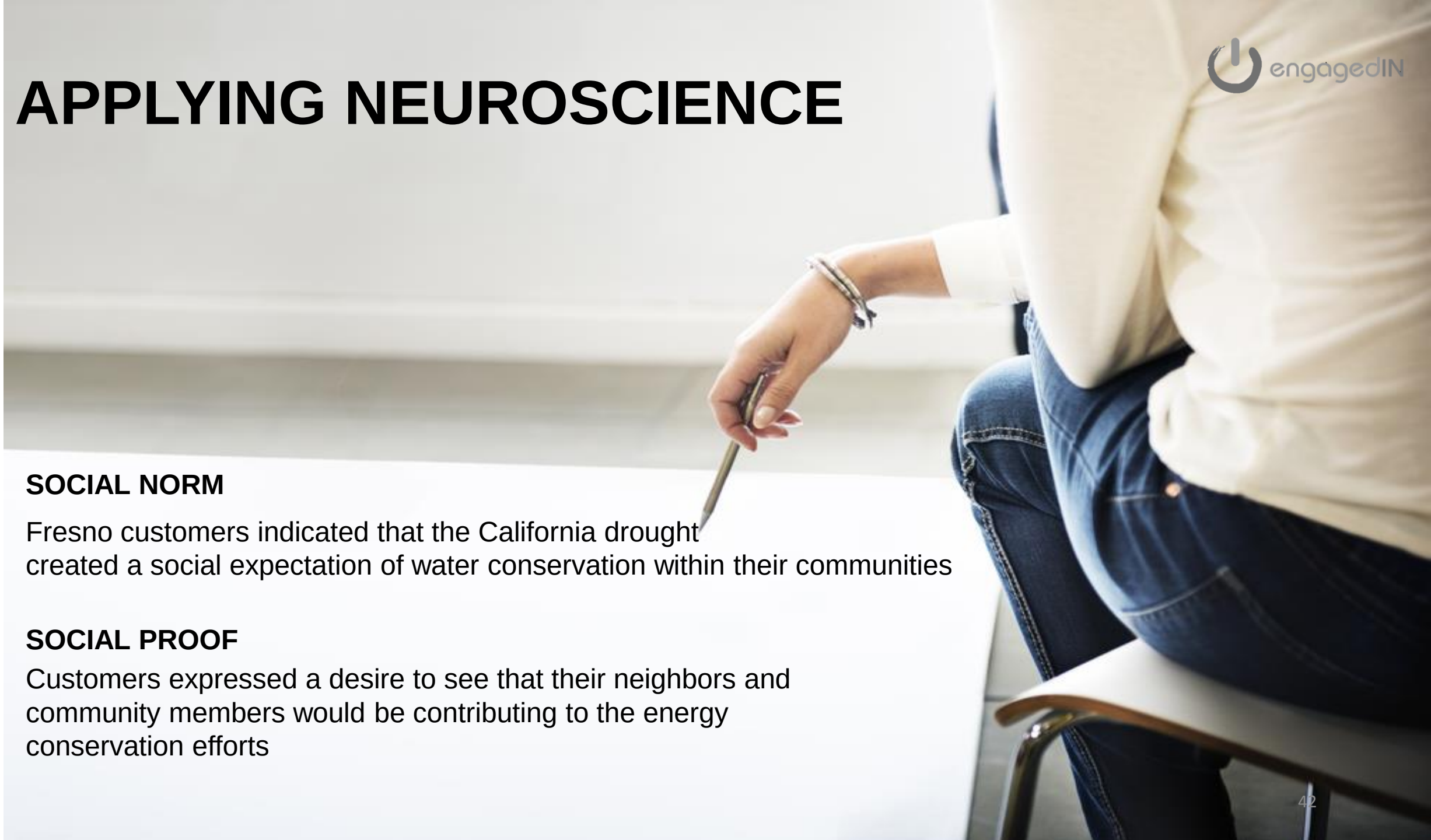
“Get my community on the same page.”

“It’s hard to be the only one changing.”

THE PITH

Most customers don’t know about energy and don’t care. In order to feel better and more impactful about their behavior change efforts, customers want PG&E to hold the surrounding neighbors and communities accountable.

APPLYING NEUROSCIENCE



SOCIAL NORM

Fresno customers indicated that the California drought created a social expectation of water conservation within their communities

SOCIAL PROOF

Customers expressed a desire to see that their neighbors and community members would be contributing to the energy conservation efforts

theme

5

CREDIT ME FOR BEING GOOD

credit me for being good

WHAT WE HEARD

“What do I stand to gain from changing, I should be rewarded for my good behavior”

“Pay me, I want to gain something”

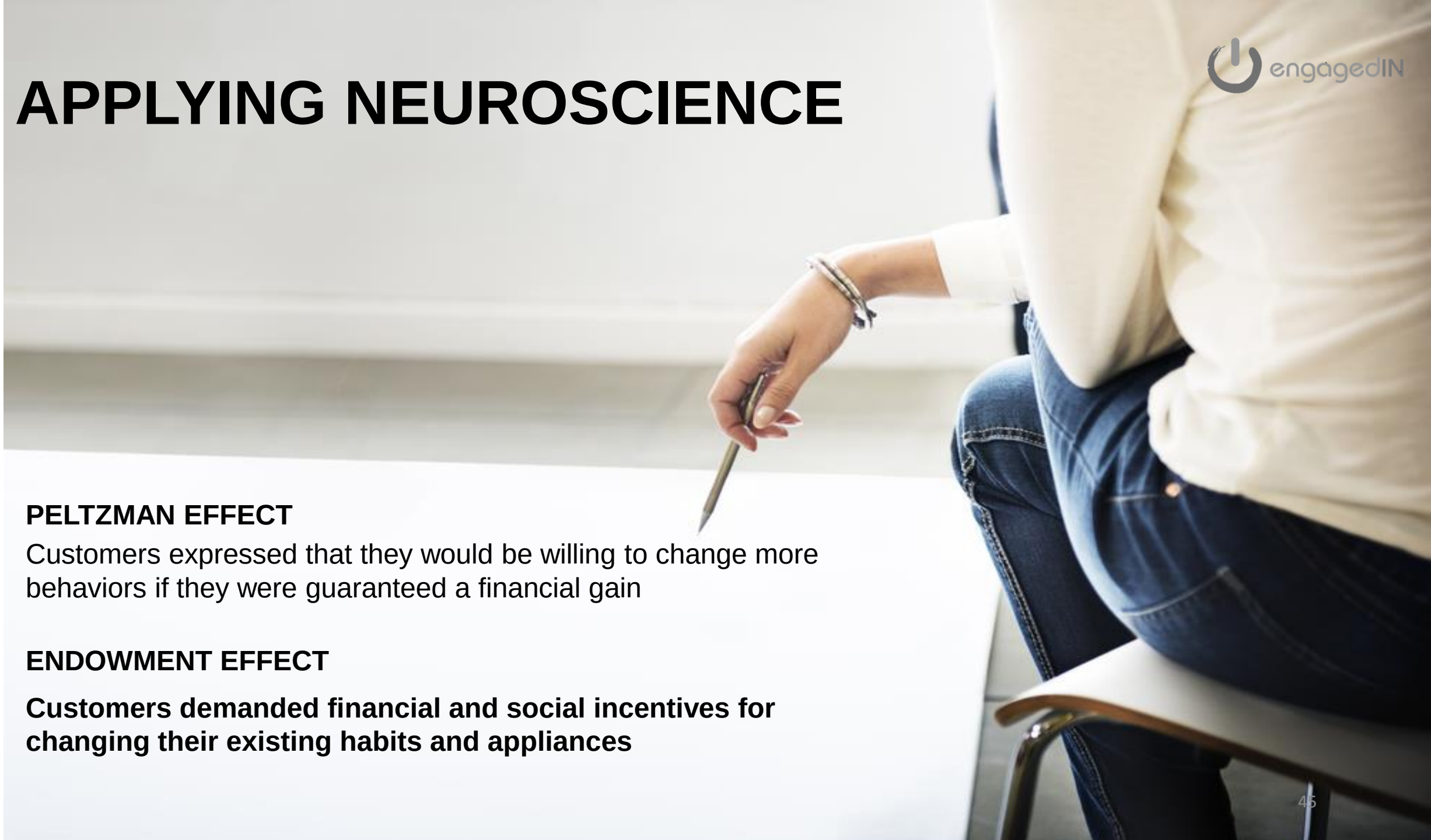
THE PITH

Customers are used to being rewarded for good behavior, whether good driver discounts, loyalty shopping cards, or cash back credit cards. The perception that they are getting something in return for their efforts is lacking in their relationship with PG&E.

This cash-back consumer expectation is being triggered and projected onto PG&E whenever PG&E is in the position of asking for collective, greater good types of behaviors, like energy conservation, thereby heightening the sense of “what’s in it for me?”

Even a token/perception of rewarding good behavior (cash, credit, recognition) would count.

APPLYING NEUROSCIENCE



PELTZMAN EFFECT

Customers expressed that they would be willing to change more behaviors if they were guaranteed a financial gain

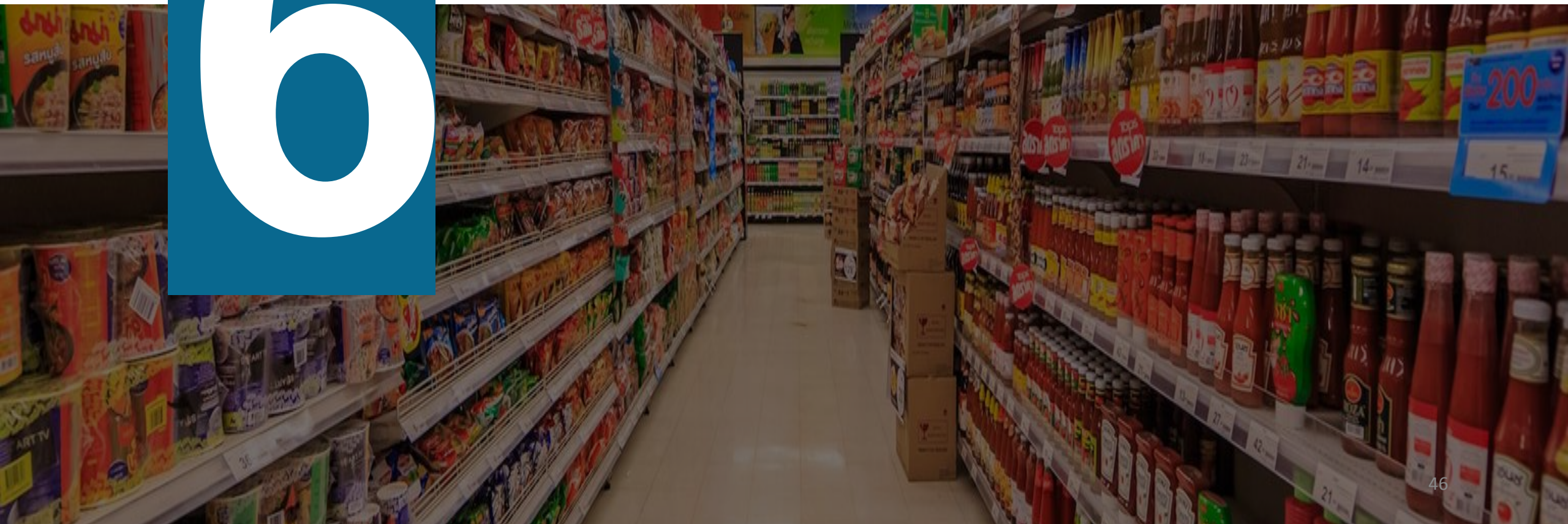
ENDOWMENT EFFECT

Customers demanded financial and social incentives for changing their existing habits and appliances

theme

6

EVERYTHING X EVERYTHING = NOTHING



everything x everything = nothing

WHAT WE HEARD

“There’s too much information about changing too many appliances in too many ways”

“My whole life [of energy behaviors] is on this list of things that use lots of energy”

THE PITH

When faced with the long list of electronics that use the most energy, customers were grieved and overwhelmed. They didn’t know where to start because it seemed like they had to change everything about how they were living.

A secondary reaction once they processed the disappointment and frustration of finding out that everything they do is “on the list” was to rebel and blame PG&E. This reaction can be avoided through using small behavior changes to build a sense of accomplishment.

DRAFT

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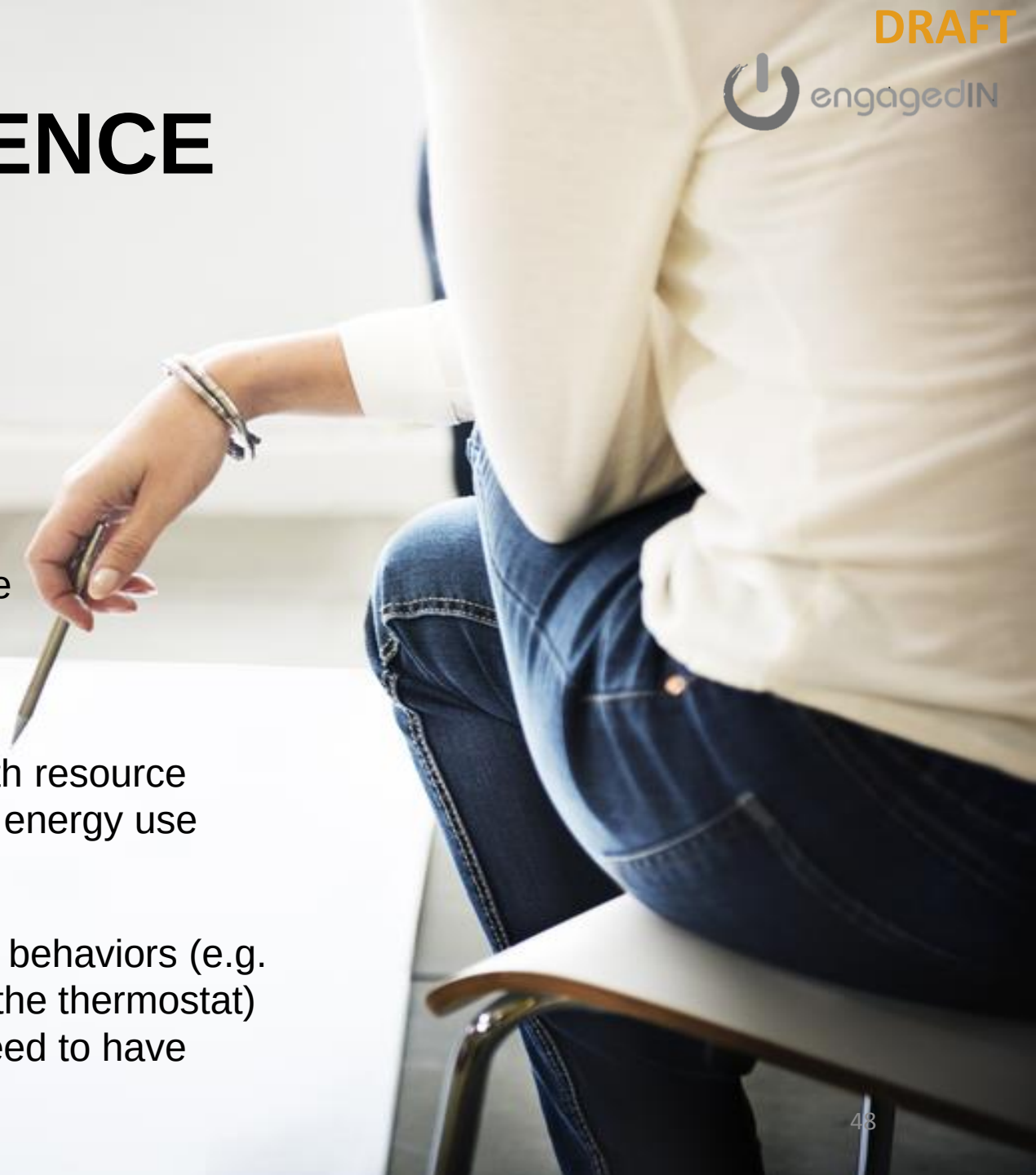
APPLYING NEUROSCIENCE



DECISION MAKING AS A RESOURCE

After a certain amount of mental effort, customers lose focus and their willpower and discipline weakens

CHOICE OVERLOAD

Customers became overwhelmed when presented with resource sheets outlining twenty (20) tips for reducing / shifting energy use

EGO DEPLETION

Customers designed many solutions around one-time behaviors (e.g. installing a smart appliance or permanently adjusting the thermostat) that would automate energy saving and reduce the need to have discipline each time

theme

7

THE GREATER GOOD METRIC

the greater good metric

WHAT WE HEARD

“Sometimes I do things with the community in mind and sometimes I act in my own best interest”

“If I’m going to change, I want my community changing with me”

THE PITH

Customers accept the idea of the greater good on two conditions: 1) they get recognized/rewarded and 2) PG&E makes everyone else do it too.

Customers acknowledge that there is a lack of awareness and lack of interest among neighbors and community members. They do not want to see how they are doing in comparison to their neighbors because they focus on those who are energy wasters compared to their household, which demoralizes them. Instead, they want to know that everyone is in this together.

DRAFT

APPLYING NEUROSCIENCE

SCARCITY

Customers provided examples of past campaigns directed at conservation of resources (water) and how awareness was spread throughout the community

SOCIAL DESIRABILITY BIAS

Customers expressed a desire to share with their friends and neighbors how much they would be saving with their proposed rate changes to influence others

SOCIAL NORM

Customers indicated that the California drought created a social expectation of water conservation within their communities

theme

8

TEACH MY KIDS / FAMILY

teach my kid / family

WHAT WE HEARD

“It has to be relevant in my family and community, otherwise it’s too hard for me to keep up the change without their support and accountability”

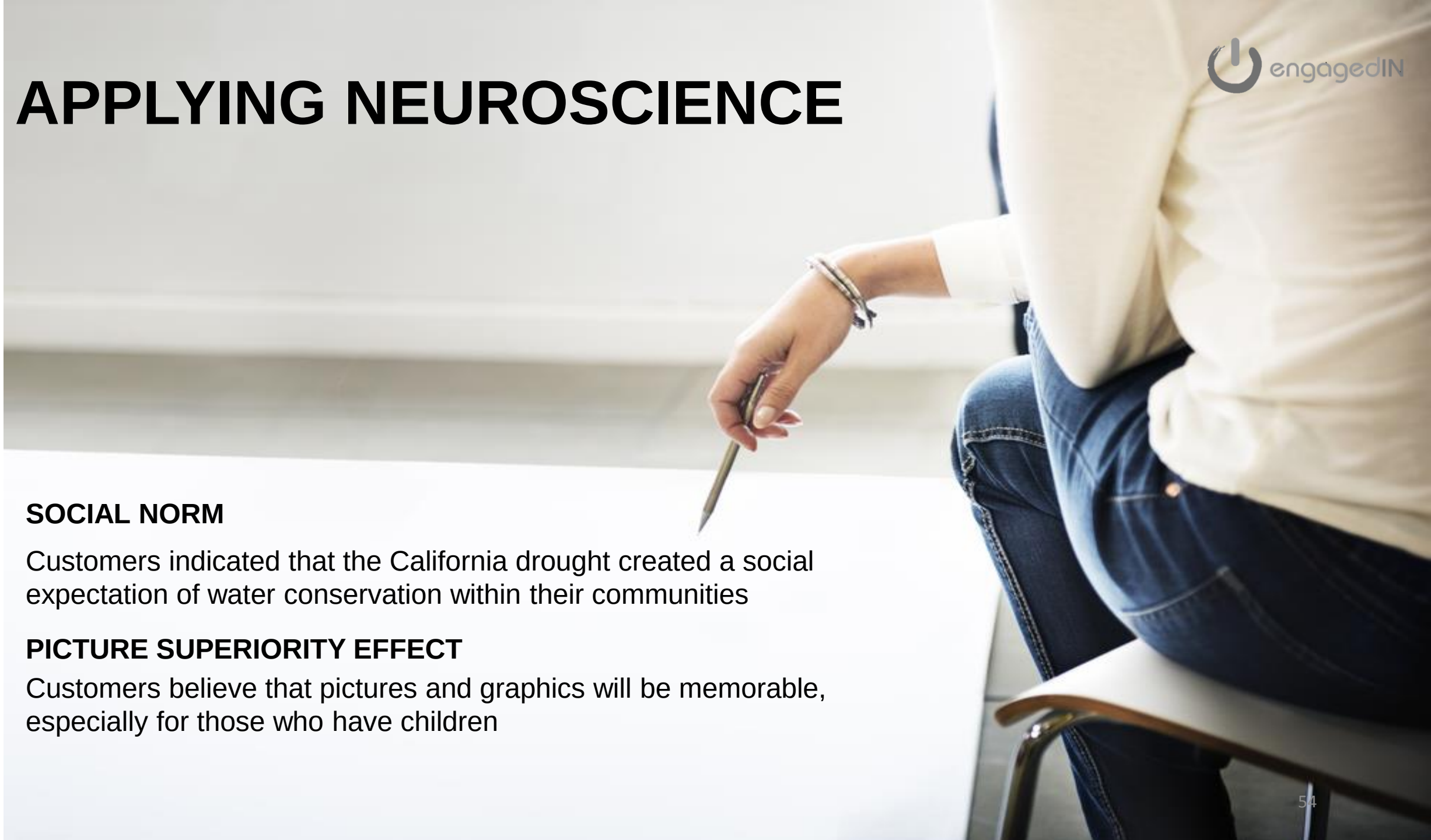
“Teach the kids and they’ll hold us accountable”

THE PITH

In order to create traction on their behavior change efforts, customers want PG&E to hold their families accountable too, because it is hard for them to do it.

Customers also want the kids to be taught good energy behaviors and practices, with the thought that they will influence the adults as seen in recycling and water saving behaviors

APPLYING NEUROSCIENCE

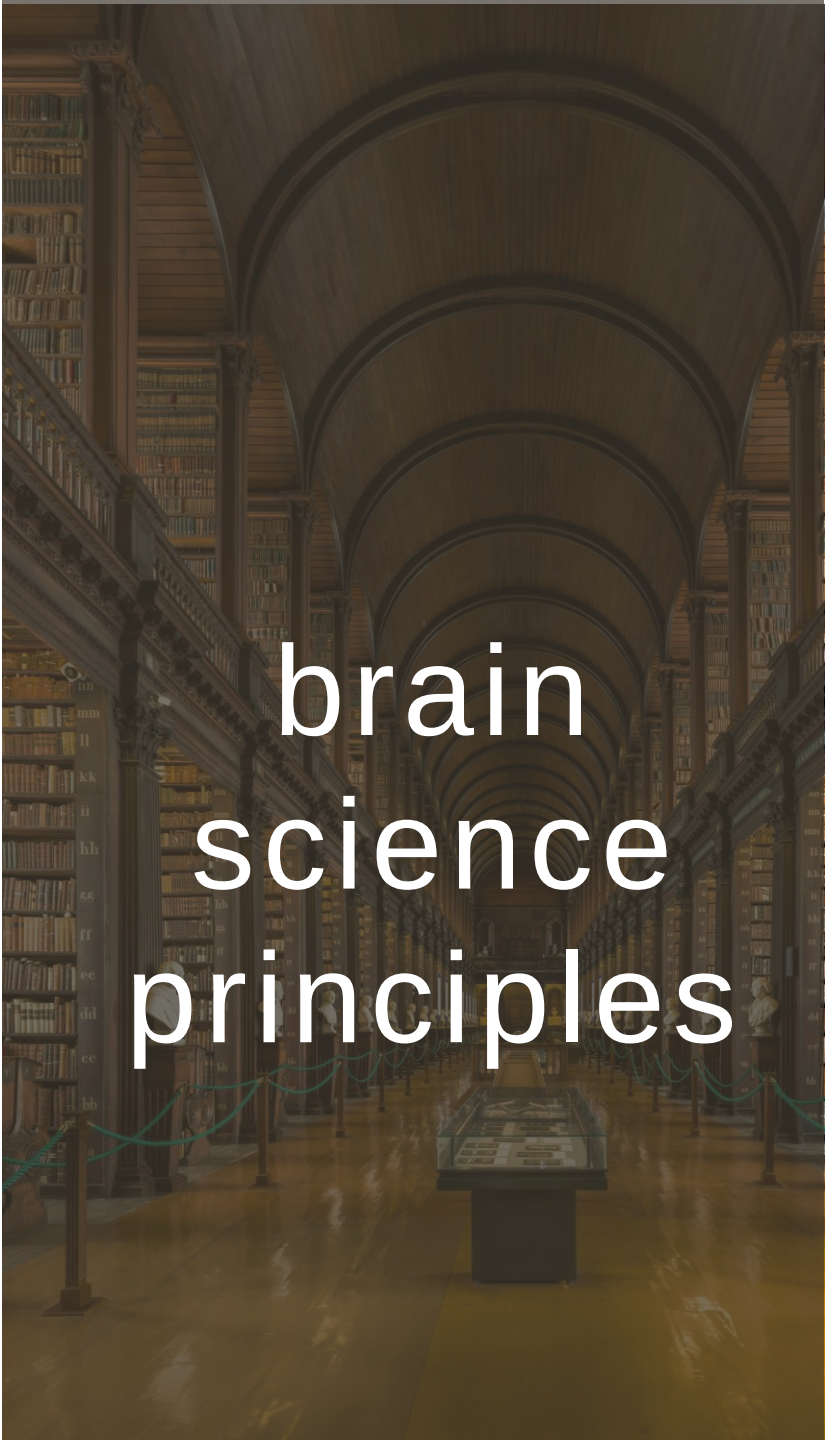


SOCIAL NORM

Customers indicated that the California drought created a social expectation of water conservation within their communities

PICTURE SUPERIORITY EFFECT

Customers believe that pictures and graphics will be memorable, especially for those who have children



KEY BRAIN SCIENCE PRINCIPLES

When customers are asked what they would do about the late afternoon / early evening peak in energy demand eight (8) themes emerge:

1. **LET ME CHOOSE! (KIND OF...)**

   Ambiguity and Contrast; Availability Heuristic; Status Quo Bias

2. **I NEED REAL-TIME FEEDBACK**

   Ambiguity Effect; Certainty Effect; Ratio Bias

3. **CAN I GET A BREAK?**

   Loss Aversion; Desire for Certainty

4. **HEY, WHAT ABOUT *THEM*?**

   Social Norm; Social Proof

5. **CREDIT ME FOR BEING GOOD**

   Peltzman Effect; Endowment Effect

6. **EVERYTHING X EVERYTHING = NOTHING**

   Decision Making as a Resource; Choice Overload; Ego Depletion

7. **THE GREATER GOOD METRIC**

   Scarcity; Social Desirability Bias; Social Norm

8. **TEACH MY KIDS / FAMILY**

   Social Norm; Picture Superiority Effect

DESIGN TARGETS

1.	**LET ME CHOOSE! (KIND OF…)**	1. Perception of customization 2. Illustrate impact of change
2.	**I NEED REAL-TIME FEEDBACK**	3. No math burden 4. Trigger system
3.	**CAN I GET A BREAK?**	5. Reframe loses as gains 6. Visualize savings
4.	**HEY, WHAT ABOUT *THEM*?**	7. Social proof 8. Peer-to-peer awareness 9. Mental shift to collective good
5.	**CREDIT ME FOR BEING GOOD**	10. Reward loop 11. Social / Emotional credit
6.	**EVERYTHING X EVERYTHING = NOTHING**	12. Constrained choice 13. Automate behavior
7.	**THE GREATER GOOD METRIC**	14. Social norms 15. Communicate community impact / comparisons 16. Celebrate efforts
8.	**TEACH MY KID / FAMILY**	17. Reinforce Scarcity 18. Approachable language 19. Appealing memorable images

APPENDIX

engagedIN/PG&E

APPLIED BRAIN SCIENCE PRINCIPLES

The fifteen (15) behavior science principles below were operate in the designs generated by customers during the co-design workshops

1. Ambiguity effect
2. Availability heuristic
3. Certainty effect
4. Choice overload
5. Ego depletion
6. Endowment Effect
7. Loss aversion
8. Peltzman Effect
9. Picture superiority
10. Ratio bias
11. Scarcity
12. Social desirability
13. Social norm
14. Social proof
15. Status quo bias

1. AMBIGUITY EFFECT

Definition: Tendency to avoid options for which missing information makes the probability seem unknown *(Ref 30)*

Customer Design Example: Customers struggled to make decisions without concrete information about the price differences between peak and off-peak hours

2. AVAILABILITY HEURISTIC

Definition: Definition: People make judgments about the likelihood of an event based on how easily an example, instance, or case comes to mind *(Ref 53)*

Customer Design Example: Customers primarily generated ideas that shifted the timing of existing behaviors because of how easy it is to retrieve existing information

3. CERTAINTY EFFECT

Definition: Changes in the probability of gains or losses do not affect people's subjective evaluations; there is a strong desire to achieve certainty (0% or 100% change) rather than an equally weighted change with less certainty. *(Ref 53)*

Customer Design Example: Customers sought clarity around what material impact they would see on their bill as a result of their changed behavior or choice of rates

4. CHOICE OVERLOAD

Definition: When too many choices are available, or choice attributes are too complex, flawed oversimplification shortcuts emerge in decision making *(Ref 46)*

Customer Design Example: Customers became overwhelmed when presented with resource sheets outlining twenty (20) tips for reducing / shifting energy use

5. EGO DEPLETION

Definition: Tasks requiring-self control can weaken willpower, leading to a diminished ability to exercise self-control *(Ref 8)*

Customer Design Example: Customers designed several solutions around one time behaviors that would automate energy saving efforts for the future to reduce ongoing discipline

6. ENDOWMENT EFFECT

Definition: The fact that people often demand much more to give up an object than they would be willing to pay to acquire it *(Ref 30)*

Customer Design Example: Customers demanded financial and social incentives for changing their existing habits and appliances

7. LOSS AVERSION

Definition: The pain of losing is psychologically about twice as powerful as the pleasure of gaining, making people more willing to take risks to avoid loss *(Ref 27, 44, 45)*

Customer Design Example: Customers cited saving money as a primary motivator for others

8. PELTZMAN EFFECT

Definition: The tendency to take greater risks when perceived safety increases *(Ref 30)*

Customer Design Example: Customers expressed that they would be wiling to change more behaviors if they were guaranteed a financial gain

9. PICTURE SUPERIORITY EFFECT

Definition: Concepts that are learned by viewing pictures are more easily and frequently recalled than are concepts that are learned by viewing their written word form counterparts *(Ref 30)*

Customer Design Example: Customers believe that pictures will be memorable, especially for those who have children

10. RATIO BIAS

Definition: It is more difficult to deal with proportions or ratios than with absolute numbers *(Ref 17)*

Customer Design Example: Customers struggled to compare rates because of the math required to calculate their eventual bill impact on a monthly basis

11. SCARCITY

Definition: When an object or resource is less readily available, it is perceived as more valuable *(Ref 10, 36)*

Customer Design Example: Customers provided examples of past campaigns directed at conservation of resources and how awareness was spread throughout the community

12. SOCIAL DESIRABILITY

Definition: Tendency to over-report socially desirable characteristics or behaviors in oneself and under-report socially undesirable characteristic or behaviors *(Ref 29, 49)*

Customer Design Example: Customers expressed a desire to share with their friends and neighbors how much they would be saving with their proposed changes

13. SOCIAL NORM

Definition: Signal appropriate behavior and are classed as behavioral expectations or rules within a group of people *(Ref 14)*

Customer Design Example: Customers indicated that the California drought created a social expectation of water conservation within their communities

14. SOCIAL PROOF

Definition: The influence exerted by others on our behavior can be expressed as being either normative or informational *(Ref 3)*

Customer Design Example: Customers expressed a desire to see that their neighbors and community members would be contributing to the energy conservation efforts and their would be a visible collective impact

15. STATUS QUO BIAS

Definition: People prefer things to stay the same by sticking with a decision previously made *(Ref 34, 46)*

Customer Design Example: In the face of overwhelming information, customers prefer to maintain their existing rates and behaviors and inertia develops

LITERATURE REVIEW and WORKSHOP DESIGN

engagedIN/PG&E

EXECUTIVE SUMMARY

BACKGROUND

In the wake of recent direction given by the California Energy Commission to all utilities, PG&E seeks to encourage customers to reduce their use of electricity overall – specifically around peak hours (duck curve) – using rates as a key lever and exploring the appropriate support mechanisms to encourage this behavior change

PROJECT GOALS:

PG&E seeks to leverage a science-based design-thinking approach to work alongside customers in **(1)** developing acceptance of TOU rates and **(2)** increasing sense of control over shifting energy use times

EXECUTIVE SUMMARY

FINDINGS

Relevant brain science from PG&E and literature was applied to workshop design

1. Three (3) relevant findings about users interactions with rates and bills
2. Six (6) corresponding brain science principles around energy use
3. Six (6) step co-design agenda & brain science strategy

CONCLUSIONS

Priming exercises will be incorporated throughout the co-design workshop to:

1. minimize rate confusion and decision fatigue
2. minimize distrust and resistance
3. maximize self-efficacy and control over energy use

EXECUTIVE SUMMARY

WHAT WE SHOULD DO IN THE CO-DESIGN WORKSHOP

1	**Rate Designs**	customers design rates within real world constraints
2	**Rate Reactions**	customers respond to pilot TOU rates
3	**Behavior Designs**	customers co-design behavior change scripts
4	**Communication**	customers share language to describe rate and behavior designs to their communities

findings review

EXISTING PG&E RESEARCH

engagedIN

making insight actionable

FINDINGS STRUCTURE

For each insight category: -

- highlight the most useful PG&E research findings
- outline the operant brain science
- and detail how to apply the brain science principles to the co-design workshop

PG&E FINDINGS REVIEW

engagedIN reviewed data from over 1,400+ pages spanning 25+ research initiatives from 2010 – 2016 and conducted nine (9) expert interviews. We grouped these findings into three (3) distinct insights that are pertinent for the facilitation of the co-design workshops.

EXISTING INSIGHTS FROM PG&E

What happens when customers interact with their bill:

1. Don’t know, don’t care
2. Distrust and rebellion
3. Don’t know how nor trust their ability to control their use

insight 1

DON’T KNOW, DON’T CARE

engagedIN

don’t know, don’t care
WHERE THIS SHOWS UP

LOW AWARENESS OF FINITE RESOURCE

Despite messaging efforts, most customers are not aware that energy is a finite resource, missing the opportunity to leverage the perception of scarcity as a motivator.

BLIND EYE UNTIL THEIR BILL ARRIVES

Because rate plans seem complicated and difficult to compare, customers don’t bother to learn how their behavior can impact their bill, only paying attention when the amount on the bill arrives and exceeds their budget

engagedIN

insight 2

DISTRUST & REBELLION

engagedIN

distrust & rebellion

WHERE THIS SHOWS UP

NO ONE TO TRUST

PG&E is perceived as a monopoly that is too big and too powerful to care about customers, so many don't believe or use all of the beneficial support that PG&E offers

RESISTANCE TO PRESCRIPTIONS

When changes are made, customers assume it's to increase profits at their expense, making them resistant to any changes or suggestions offered

insight 3

DON’T KNOW HOW, NOR TRUST ABILITY

engagedIN

don’t know how, nor trust ability
WHERE THIS SHOWS UP

FEAR OF CHANGE, DESIRE FOR CERTAINTY

Customers don’t see their energy-saving behaviors, like changing light bulbs, improve their bill and already don’t take the time to learn how it is calculated - therefore fear they will unknowingly spike their bill if they change rate plans

FRUSTRATING FEEDBACK LOOP

Customers also are frustrated when their bill doesn’t move down in light of their efforts, and usage alerts intended to help instead evoke a sense of helplessness because customers justify that they still need to continue using energy through the rest of the month

summary

THREE (3) USEFUL PG&E FINDINGS

1	**Don’t know, don’t care**	customers only pay attention when their bill exceeds their expectations or they experience a problem with their power
2	**Distrust & rebellion**	customers believe PG&E’s rate changes are to increase profits, and rebel against suggestions to change their behavior
3	**Don’t know how, nor trust ability to control their use**	The link between behavior and bill impact is unclear, making it tough for customers to feel a sense of control over their energy costs

what customers appreciate

TRENDS THAT ARE WORKING

MORE CHOICE, MORE FEEDBACK

utilities that have explored variable pricing with frequent price change alerts (ex: Oklahoma) and offer choices between 5-hour, 4-hour, and 3-hour peak windows have experienced positive responses from customers

PARTICIPATION & TAILORED SUPPORT

customers (especially CARE) who are enrolled in support programs and those who leverage phone, onsite, or online rate consultation tend to report higher overall satisfaction and appreciation for PG&E

CLARITY & DETAIL

customers respond positively to messaging that is straightforward, visual, and detailed with approachable language

literature review

APPLIED BRAIN SCIENCE PRINCIPLES

engagedIN

making insight actionable

FINDINGS STRUCTURE

We will define key brain science principles, show how they are at play with energy use, and give **EXAMPLES** of how we can apply them to the rate change design project

BEHAVIOR LIBRARY LITERATURE REVIEW

engagedIN reviewed hundreds of peer-reviewed journal articles and scientific texts to find six (6) behavior science principles with strongest match to the (3) PG&E insights for shaping the upcoming co-design sessions

PG& E INSIGHT MATCH	BRAIN SCIENCE PRINCIPLES
Don’t know, don’t care	**1.** Decision Making as a Resource
	2. Ambiguity and Contrast
Distrust and rebellion	**3.** Reward/Expectation Disconnect
	4. Choice Supportive Bias
Don’t know how nor trust their ability	**5.** Regret Aversion
	6. Past-Self Future Self

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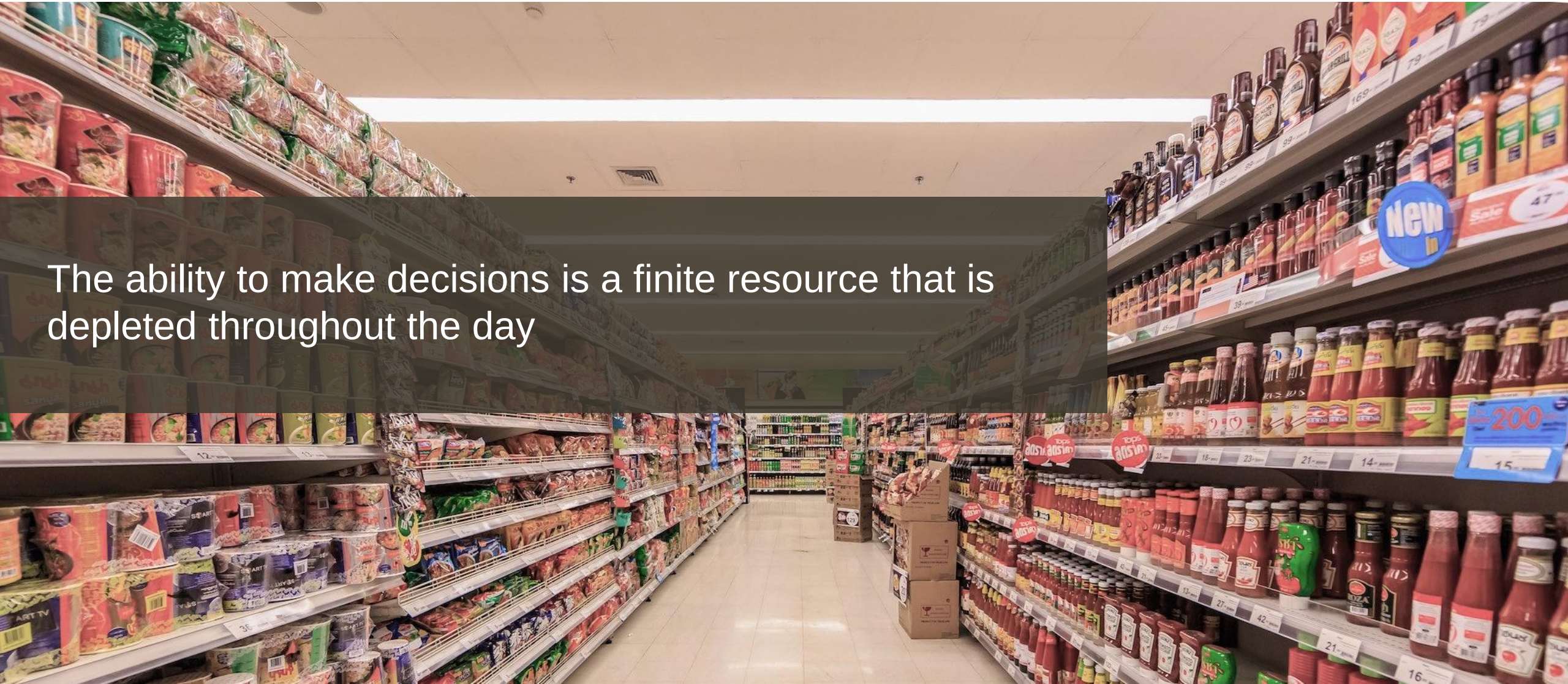
brain science principle- don’t know, don’t care

1. DECISION MAKING AS A RESOURCE



The ability to make decisions is a finite resource that is depleted throughout the day

THREE CHOICES

are the most people can reliably choose from

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RELEVANT BEHAVIORS

APATHY TOWARDS RATE EDUCATION

Customers don’t pay attention to rate education materials until they see a spike in their bill or experience a problem with their energy - this lack of awareness makes it difficult to make informed decisions

CONNECTING BEHAVIORS TO BILLS

Customers don’t understand how their energy use behaviors impact their bill, making it difficult to decide how to to best lower their bill

DIFFICULTY COMPARING PLANS

Rate plans are complex, and customers don’t know which attributes of the plan to consider when comparing rate plans against one another

brain science principle- don’t know, don’t care

2. AMBIGUITY AND CONTRAST

The brain understands new concepts through comparison and contrast

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RELEVANT BEHAVIORS

CLEAR LINKS

Customers feel there is no direct line of sight connecting their behaviors to rates and those rates to their bill, making it difficult for customers to compare between rate plans

PICKING BEHAVIORS

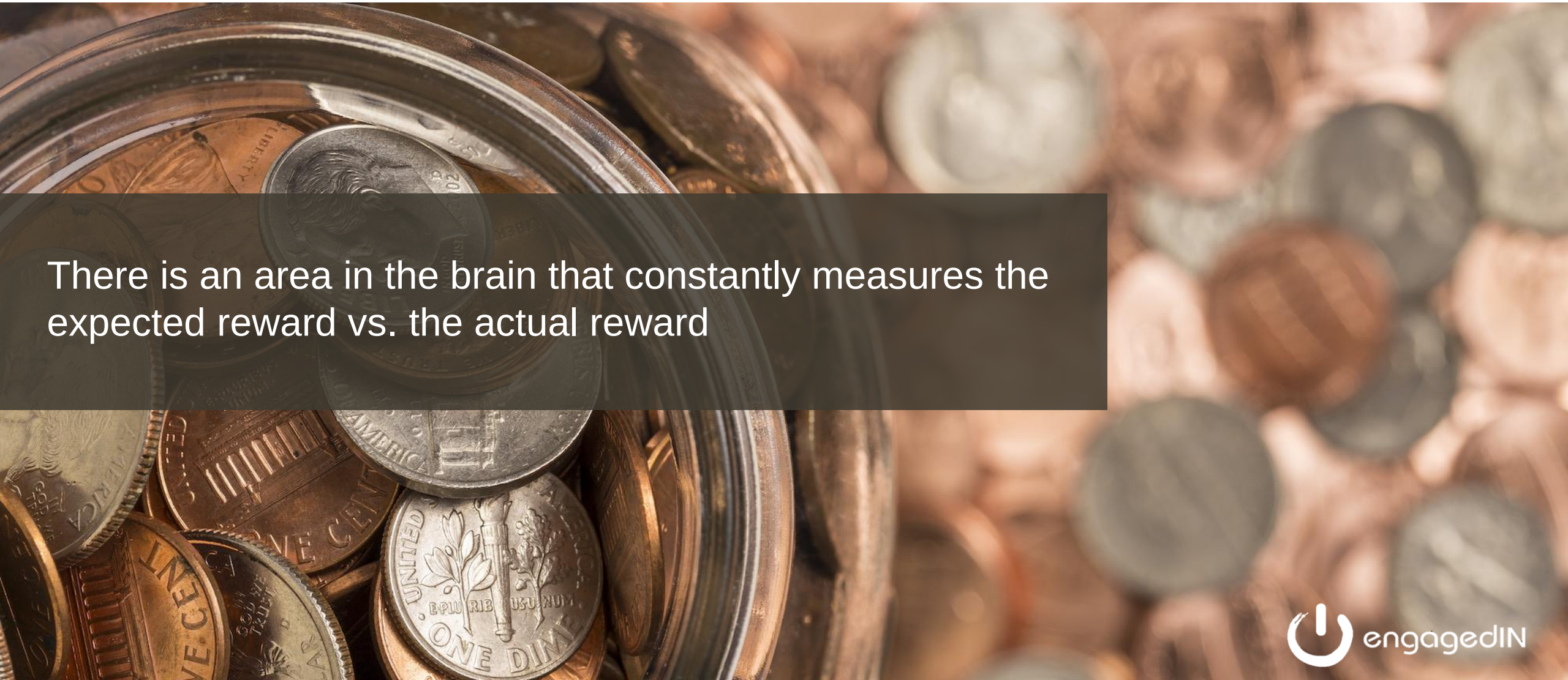
Customers do not know which behavior changes will have the biggest impact on their bill – “if I don’t know the right thing I’ll do nothing”

NO LEARNING FROM MISTAKES

When bills arrive, it’s hard for customers to retrace their steps over the past month to figure out how they arrived at their current cost

brain science principle- distrust and rebellion

3. REWARD-EXPECTATION DISCONNECT



There is an area in the brain that constantly measures the expected reward vs. the actual reward

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RELEVANT BEHAVIORS

MINIMAL SAVINGS TO REWARD CHANGE

Many customers feel like they are already doing their best to reduce their energy use but they don't see a significant impact on their bill

LIMITED TO MONTHLY FEEDBACK

The monthly bill is the only feedback customers receive that shows them the impact of their efforts to save—too long of a wait to reinforce behavior

SUCCESSFUL CHANGE WITH NO IMPACT

Some customers believe they are on a TOU rate when in fact they are on tiered rates, so their efforts to change behavior are mismatched with how their bill is calculated

brain science principle- distrust and rebellion

4. CHOICE SUPPORTIVE BIAS

RELATED BEHAVIORS

MINDLESS ENERGY CONSUMPTION

Customers do not have a clear sense of which behaviors have the highest impact on their bill and run certain high energy appliances mindlessly

DEFENSIVENESS OVER DOING MORE

Customers become defensive when asked to further reduce energy consumption because they perceive that they are good—and already doing everything they can

DESIRE FOR CONCESSIONS

Customers believe that their utility should do more to increase the supply of energy, so they resist changing their usage to accommodate the finite supply

brain science principle- don’t know how, nor trust ability

5. REGRET AVERSION

Fearing that a decision will be wrong in hindsight, people will seek certainty before making a commitment

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RELEVANT BEHAVIORS

FEAR OF CHANGING PLANS

Customers avoid committing to a new plan, even those where they would benefit financially, if they do not understand its full impact for fear of accidentally increasing their bill

DESIRE FOR CERTAINTY

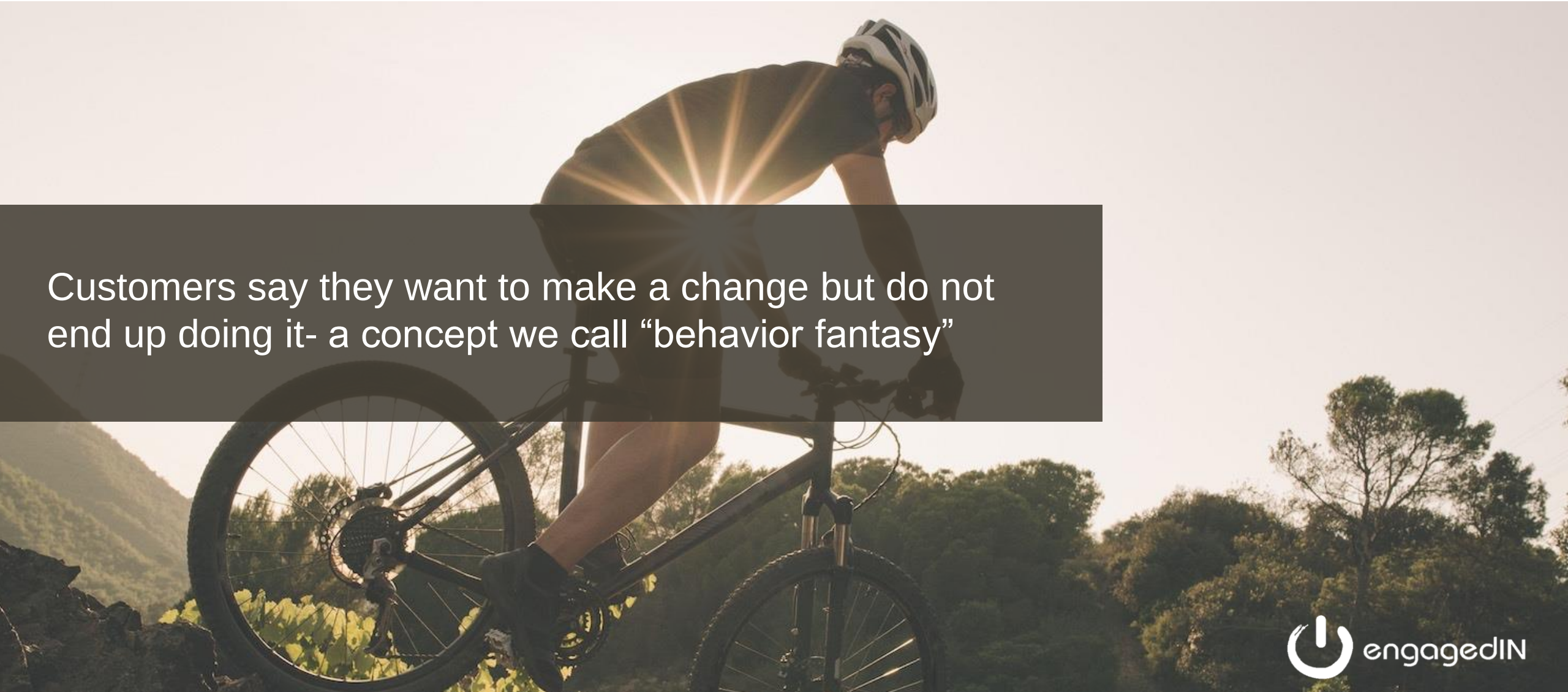
Customers are eager to know for certain what their bill amount would be and are uncomfortable calculating future rates for themselves

DOUBT THEIR ABILITIES

Customers report difficulty understanding kilowatts, and how to translate rate information into practical behaviors that would give them control over their bills

brain science principle- don’t know how, nor trust abilities

6. PAST-SELF FUTURE-SELF DISCONNECT



Customers say they want to make a change but do not end up doing it- a concept we call “behavior fantasy”

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RELEVANT BEHAVIORS

MINIMAL ONLINE ENGAGEMENT

Customers have requested customized explanations of how they could benefit from a different rate plan, but do not use the tools available on the website

REQUESTS FOR MORE

Customers request more frequent communication from PG&E providing suggestions for behavior change, but rarely read the materials sent and incorporate the changes

CONFOUNDING EFFORTS

Customer bills are connected to households where multiple people can neutralize the positive behavior change made by a few members of the household

summary

SIX (6) APPLIED BRAIN SCIENCE PRINCIPLES

1	**Decision Making as a Resource**	Finite resource depleted throughout the day
2	**Ambiguity and Contrast**	Brain understands contrast
3	**Reward/Expectation Disconnect**	Brain keeps track of expected vs. actual rewards
4	**Choice Supportive Bias**	Brain overestimates how often we do something good
5	**Regret Aversion**	Brain fears mistakes and seeks certainty
6	**Past-Self Future-Self**	We want to do things, but don't do them

summary

DESIGNING FOR SIX (6)
APPLIED BRAIN SCIENCE PRINCIPLES

1	**Decision Making as a Resource**	Energy ed. presented in simple icons & sets of (3)
2	**Ambiguity and Contrast**	Rate attributes contrasted to show bill impact
3	**Reward/Expectation Disconnect**	Reward loop as design constraint
4	**Choice Supportive Bias**	Designing to increase existing working behaviors
5	**Regret Aversion**	Bill impact as a presentation constraint
6	**Past-Self Future-Self**	Brain-behavior gap normalized in warm up activities

THREE (3) PG&E FINDINGS

1	**Don’t know, don’t care**	Customers only pay attention when their bill exceeds their expectations or they experience a problem with their power
2	**Distrust & rebellion**	Customers believe PG&E’s rate changes are to increase profits, and rebel against suggestions to change their behavior
3	**Don’t know how, nor trust ability to control their use**	The link between behavior and bill impact is unclear, making it tough for customers to feel a sense of control over their energy costs

DESIGNING FOR THREE (3) PG&E FINDINGS

1	**Don’t know, don’t care**	Energy education section outlines the value propositions to decreasing energy consumption and shifting energy use behaviors to off peak hours
2	**Distrust & rebellion**	Design training places customers in PG&E’s shoes making them design experts, and energy education reveals rate design constraints
3	**Don’t know how, nor trust ability to control their use**	Behavior design section outlines example behaviors and their relative impact to create a sense of choice, self-efficacy, and control over managing energy costs.

SIX (6) APPLIED BRAIN SCIENCE PRINCIPLES

1.	**Decision Making as a Resource**	Finite resource depleted throughout the day
2.	**Ambiguity and Contrast**	Brain understands contrast
3.	**Reward/Expectation Disconnect**	Brain keeps track of expected vs. actual rewards
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DESIGNING FOR SIX (6) APPLIED BRAIN SCIENCE PRINCIPLES

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SIX (6) SECTION CO-DESIGN WORKSHOP STRATEGY

30 min	Design Training	design thinking tools and introductory exercises
10 min	Energy Education	graphic explanation of energy supply and rate constraints
10 min	Rate Design	customer ideation activity
10 min	Rate Discussion	exposure to TOU rates and guided discussion
60 min	Behavior Design	customer ideation activity
30 min	Presentations	customer proposed solutions

APPLIED BRAIN SCIENCE PRINCIPLES

The thirty (30) behavior science principles below will be incorporated into the facilitation of our co-design workshops

1. Actor-observer bias
2. Ambiguity effect
3. Availability heuristic
4. Backfire effect
5. Certainty effect
6. Choice overload
7. Confirmation bias
8. Conservatism
9. Curse of knowledge
10. Default architecture
11. Ego depletion
12. Essentialism
13. Framing effect
14. Loss aversion
15. Picture superiority
16. Post-purchase rationalization
17. Precommitment
18. Preference
19. Primacy effect
20. Priming (conceptual)
21. Ratio bias
22. Reactance
23. Regret aversion
24. Scarcity
25. Social desirability
26. Social norm
27. Social proof
28. Status quo bias
29. System justification
30. Temporal discounting

1. ACTOR-OBSERVER BIAS

Definition: The tendency for explanations of other individuals' behaviors to overemphasized the influence of their personality and underemphasize the influence of their situation *(Ref 30)*

Impact to PG&E: By having customers as designers designing for others, we bridge the can between how we rationalize our own behavior compared to others

2. AMBIGUITY EFFECT

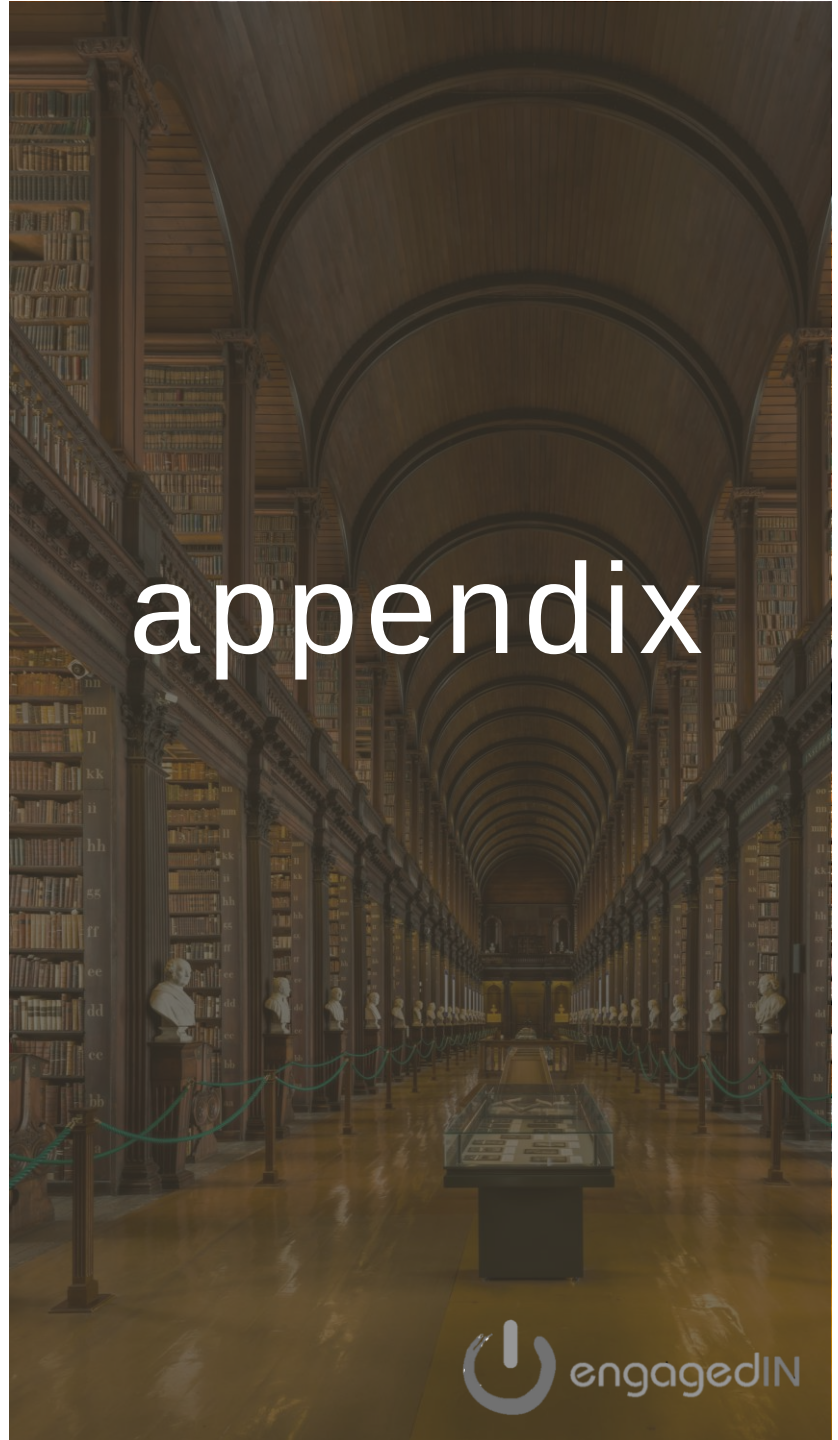
Definition: Tendency to avoid options for which missing information makes the probability seem unknown *(Ref 30)*

Impact to PG&E: customers in the co-design will be provided rate comparisons as part of their design training

3. AVAILABILITY HEURISTIC

Definition: People make judgments about the likelihood of an event based on how easily an example, instance, or case comes to mind *(Ref 53)*

Impact to PG&E: For each design assignment, customers will be presented with 2-3 examples to socialize and normalize energy saving behaviors, making them readily available to start the ideation phase



4. BACKFIRE EFFECT

Definition: When people react to disconfirm evidence by strengthening their beliefs *(Ref 30)*

Impact to PG&E: Rate reaction discussion will be couched in a paradigm of comparing design options to highlight the elements for improvement rather than just eliciting complaints

5. CERTAINTY EFFECT

Definition: Changes in the probability of gains or losses do not affect people's subjective evaluations; there is a strong desire to achieve certainty (0% or 100% change) rather than an equally weighted change with less certainty. *(Ref 53)*

Impact to PG&E: customers will be presented with behaviors that can be 100% eliminated in addition to harm reduction models to appeal to the desire for certainty

6. CHOICE OVERLOAD

Definition: When too many choices are available, or choice attributes are too complex, flawed oversimplification shortcuts emerge in decision making *(Ref 46)*

Impact to PG&E: customers in the co-design will be presented only 3 TOU rate plans from the pilot with the default option layered 2nd in the sequence

7. CONFIRMATION BIAS

Definition: People seek out or evaluate information in a way that fits with their existing thinking and preconceptions *(Ref 39)*

Impact to PG&E: 1st customers design within constraints to show how closely their authored options align with the 3 TOU pilot rates– narrowing gap between us vs them

8. CONSERVATISM

Definition: High values and high likelihoods are overestimated while low values and low likelihoods are underestimated *(Ref 41)*

Impact to PG&E: customers in the co-design will be provided with practical examples that show the impact of rate changes as part of their design training

9. CURSE OF KNOWLEDGE

Definition: When better-informed people find it extremely difficult to think about problems from the perspective of lesser-informed people *(Ref 30)*

Impact to PG&E: engagedIN will facilitate to minimize presence of “utility experts” and normalize participation

10. DEFAULT ARCHITECTURE

Definition: Choice architecture technique to pre-set course of action when there is inertia or uncertainty in decision-making *(Ref 52)*

Impact to PG&E: Teach customers in the co-design how default techniques can be leveraged in designs as part of their design toolkit to socialize and normalize the concept while gauging their tolerance for this approach for their communities

11. EGO DEPLETION

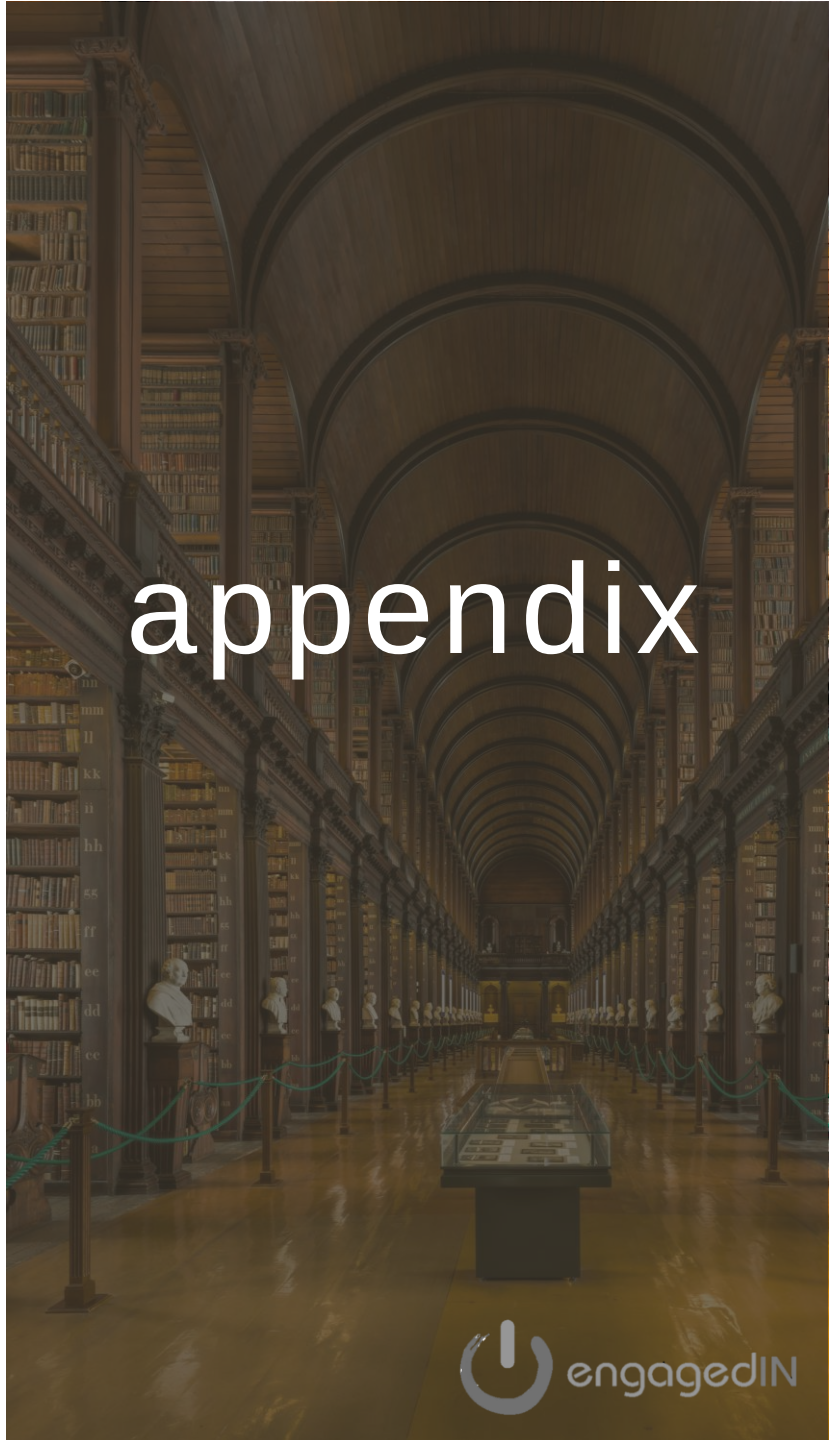
Definition: Tasks requiring-self control can weaken willpower, leading to a diminished ability to exercise self-control *(Ref 8)*

Impact to PG&E: Additive behaviors will be designed before reducing behaviors that have already been scaled back

12. ESSENTIALISM

Definition: Categorizing things according to their essential nature, in spite of variations *(Ref 30)*

Impact to PG&E: customers will be led through a discussion that draws comparisons between the customer generated rate plans and PG&E pilot TOU rates



13. FRAMING EFFECT

Definition: Different conclusions can be drawn from the same information, depending on how or by whom that information is presented *(Ref 27, 32, 42)*

Impact to PG&E: Participants will be taught this concept as part of their design toolkit

14. LOSS AVERSION

Definition: The pain of losing is psychologically about twice as powerful as the pleasure of gaining, making people more willing to take risks to avoid loss *(Ref 27, 44, 45)*

Impact to PG&E: Focus on increasing existing behaviors by removing friction first, then design for adding friction after

15. PICTURE SUPERIORITY EFFECT

Definition: Concepts that are learned by viewing pictures are more easily and frequently recalled than are concepts that are learned by viewing their written word form counterparts *(Ref 30)*

Impact to PG&E: Facilitators will use a whiteboard to sketch out the way energy is generated and associated costs so that it is visually as well as verbally communicated

16. POST-PURCHASE RATIONALIZATION

Definition: The tendency to persuade oneself through rational argument that a purchase was a good value *(Ref 26,28)*

Impact to PG&E: customers will be guided to first increase existing behaviors that already have some traction

17. PRECOMMITMENT

Definition: In an effort to align future behavior, being consistent is best achieved by making a commitment, especially if it is done publicly *(Ref 14)*

Impact to PG&E: Teach customers the benefits of commitment and encourage them to think through how to encourage commitment in the presentation of their prototypes

18. PREFERENCE

Definition: Ordering of different options in terms of expected levels of happiness, gratification, utility, etc. *(Ref 4)*

Impact to PG&E: Provide customers with reference points on relative impact and cost of different behaviors so that they can prioritize their preferences

19. PRIMACY EFFECT

Definition: The items near the end of a sequence are the easiest to recall, followed by the items at the beginning of a sequence; items in the middle are the least likely to be remembered *(Ref 30)*

Impact to PG&E: customers will be taught this concept as part of their design toolkit

20. PRIMING (CONCEPTUAL)

Definition: Exposing participants to stimuli that evokes meanings that activate associated memory can influence people's behavior on subsequent tasks *(Ref 37, 53)*

Impact to PG&E: Putting customers in the role of design experts designing for others to reduce defensiveness

21. RATIO BIAS

Definition: It is more difficult to deal with proportions or ratios than with absolute numbers *(Ref 17)*

Impact to PG&E: Discussion of kw ratios will be minimized, instead emphasizing seasonal and yearly costs/savings

22. REACTANCE

Definition: The urge to do the opposite of what someone wants you to do out of a need to resist a perceived attempt to constrain your freedom of choice *(Ref 30)*

Impact to PG&E: All 3 pilot TOU rates will be presented to provide customers with a range of options that align more or less closely to their own designs and create a sense of choice

23. REGRET AVERSION

Definition: Fear of that their decision will be wrong in hindsight *(Ref 14, 20, 48, 50)*

Impact to PG&E: customers will be presented a menu of behavior change options and their relative impact to remove the doubt that their decision will be wrong in hindsight

24. SCARCITY

Definition: When an object or resource is less readily available, it is perceived as more valuable *(Ref 10, 36)*

Impact to PG&E: Prime customers in the co-design sessions with this information to gather how attitudes shift and what designs they would engineer for rates & behavior change scripts

25. SOCIAL DESIRABILITY BIAS

Definition: Tendency to over-report socially desirable characteristics or behaviors in oneself and under-report socially undesirable characteristic or behaviors *(Ref 29, 49)*

Impact to PG&E: Session will be initiated by having customers & facilitators admit what they do humorously to help normalize the brain/behavior gap and establish their position as designers for the rest

26. SOCIAL NORM

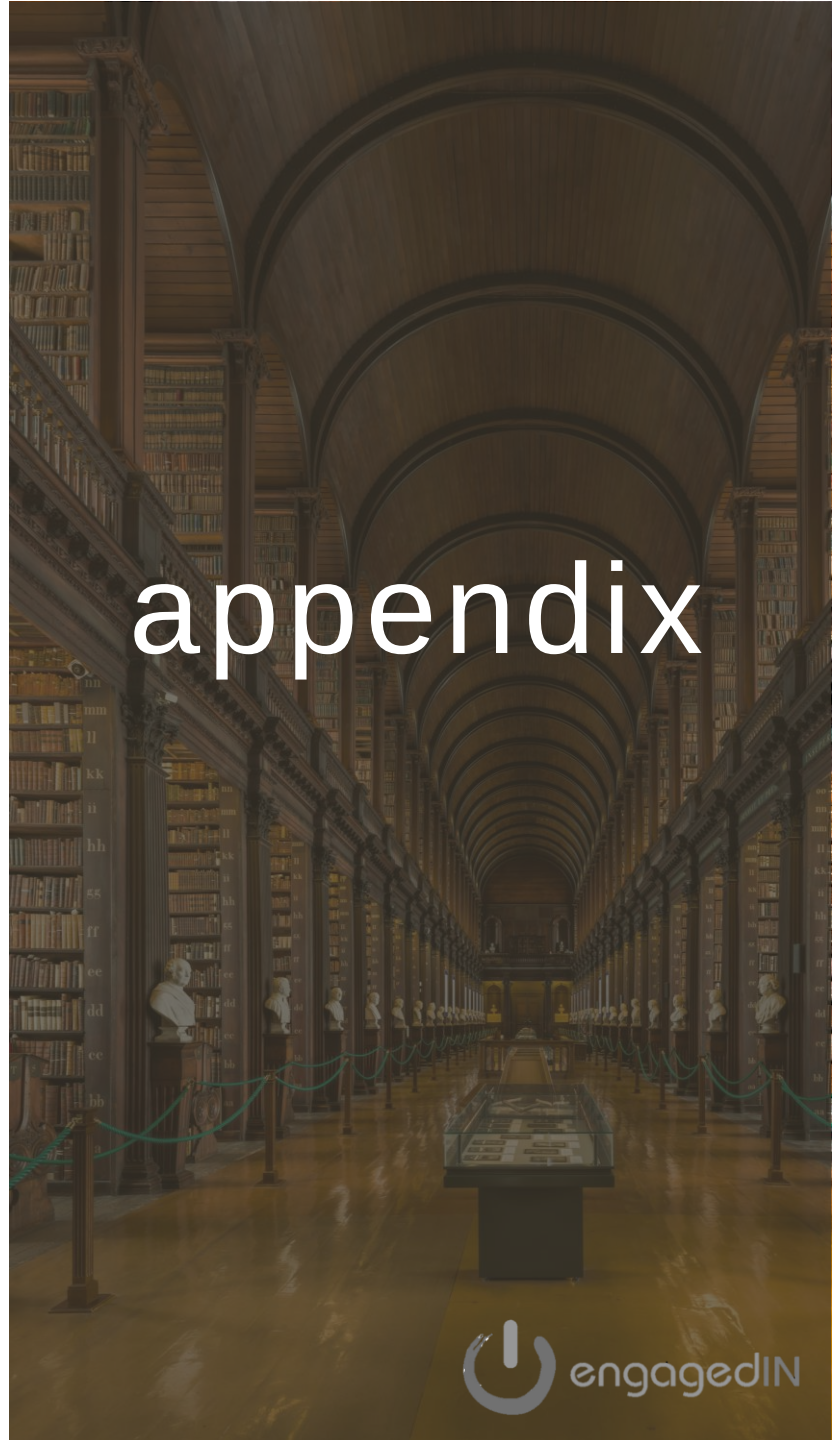
Definition: Signal appropriate behavior and are classed as behavioral expectations or rules within a group of people *(Ref 14)*

Impact to PG&E: customers will be instructed to design around the social norms within their communities

27. SOCIAL PROOF

Definition: The influence exerted by others on our behavior can be expressed as being either normative or informational *(Ref 3)*

Impact to PG&E: customers will contribute community norms and examples of success. Failed attempts will be normalized in warm up activities



28. STATUS QUO BIAS

Definition: People prefer things to stay the same by sticking with a decision previously made *(Ref 34, 46)*

Impact to PG&E: Bill Protection will be communicated as part of the rate plan reveal to reduce anxiety around change

29. SYSTEM JUSTIFICATION

Definition: Existing social, economic, and political arrangements tend to be preferred, and alternatives disparaged sometimes even at the expense of individual and collective self-interest *(Ref 30)*

Impact to PG&E: Invite a discussion about existing energy saving behaviors that they have observed from others to use the status quo as a building block to increase behavior

30. TEMPORAL DISCOUNTING

Definition: The pain of losing is psychologically about twice as powerful as the pleasure of gaining, making people more willing to take risks to avoid loss *(Ref 35)*

Impact to PG&E: Teach customers the positive effects of a well-timed reward as part of the design training

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PG&E REFFERENCE MATERIALS

2016 - December

- customer Satisfaction Survey Overview
- 5373 - TOD 4to9 Welcome Kit_R8
- 5373 - TOD 3 Seasons Welcome Kit_R8
- 5373 - TOD 6to9 Welcome Kit_R8

2016 - November

- PG&E | Tips Library
- Advice 4949-E: Pacific Gas and Electric Company’s Marketing, Education & Outreach Plan in Compliance With December 17, 2015 Assigned Commissioner and Administrative Law Judge’s Ruling and Decision 15-07-001

REFERENCES

2016 - October

- SMB TVP Transition Research 2010-16: Learnings to Date in preparation for Residential TOU Transition
- TOU Statewide Messaging Concept Test Study: customer Insights & Strategy

2016 - March

- Rate Reform Marketing, Education and Outreach Tracking Survey Report: Baseline
- PG&E Comments in Response to Administrative Law Judge's Ruling Dated: TOU OIR Comments

2016 - February

- SMB Peak Day Pricing (PDP) 2015 Experience Survey Wave 1 (Among 2014 Defaulters) - Final Report
- 2015 SMB Peak Day Pricing (PDP_ Opt-Out Survey, Wave 2 (Among 2014 Unenrollers and 2015 Defaulters) - Final Report

2015 - December

- SMB Peak Day Pricing Awareness Survey Wave 9 Results
- Peak Period Alignment Conjoint Results

2015 - June

- PG&E Residential customer Overview

2015 - March

- Hiner - TOU and SmartRate Rate Development Conjoint Research Report: Among Residential customers

2014 - December

- Rates Round Up: HIghlights of 2014 Residential Rates Research & customer Insights (December 2014)

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2014 - September

- Hiner - TOU Rate Development Conjoint Research Report: Among Residential customers

2013 - August

- Residential Rate OIR customer Survey Research

2012 - June

- Rates: The customer Point of View

2012 - April

- Greenberg - PG&E SMB TVP Outreach

2012 - February

- Greenberg - PG&E SMB TVP - Topline - Preliminary Thoughts on Quantitative Findings

2010 - September

- Greenberg - PG&E PDP Education and Messaging Study 2: SMB and Small Ag