Advanced Wires Rates

Phase 01 – Global Jurisdictional Scan

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Objectives

1. Review other jurisdictions that have approached advanced rate structures for the following:
   - The consumer context
   - Approach to public/stakeholder engagement and communication strategy
   - Outcomes and lessons learned (identify exemplars and best practices)
   - Find examples of bills in other jurisdictions
   - Understand the impact of advanced rates introduction on the customer relationship

2. Inform the next phase of research: implications of discovery on sample screening, group composition

Overview

Our Approach: Review advanced wires rate implementation strategies and outcomes in other jurisdictions.

What has driven success and/or failure in other jurisdictions that we can learn from?

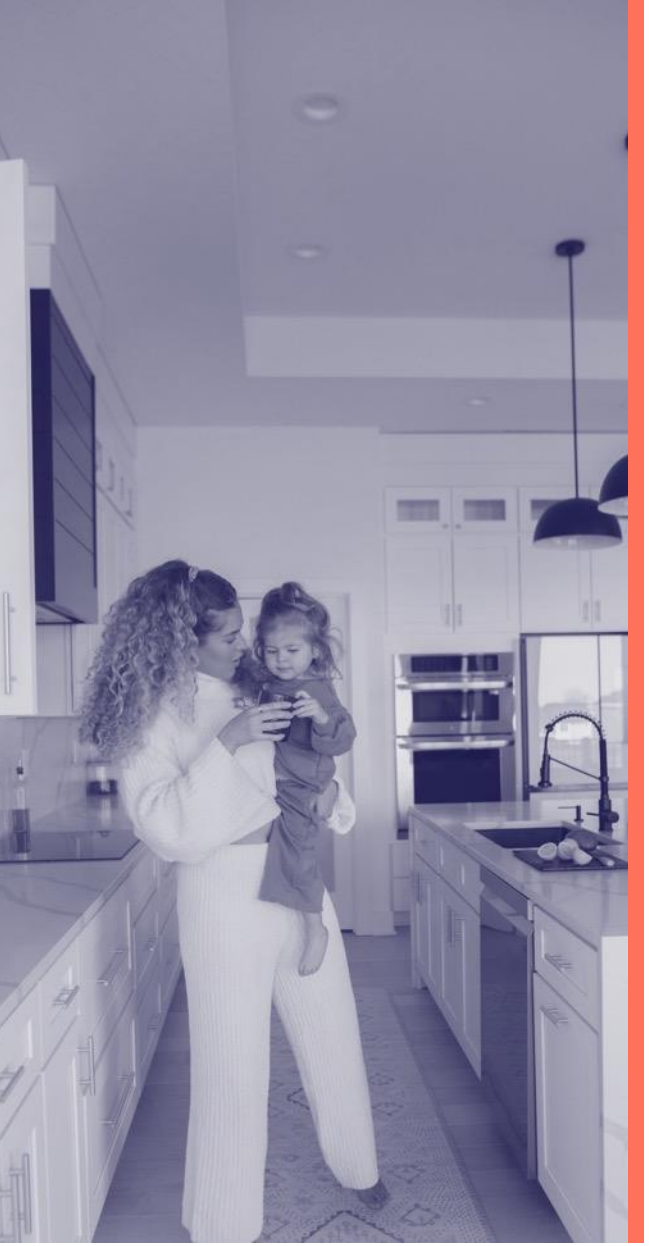
In-depth look at Ontario, BC, Arizona, and California (complete to implementation)

Review of feasibility studies and/or lessons learned documents from other North American jurisdictions include:

- Michigan
- Illinois
- Georgia
- Maryland
- Massachusetts
- Colorado
- Nova Scotia

In-depth look at Australia, Norway, Sweden, Norway, France, Spain (complete to implementation)

- Some tangential information on other countries may also be noted if referenced in review of the above.



Key Finding:
Alternative Rate Structures (e.g., Time of Use) can have a positive reputational and operational impact

Parks associates CSAT on TOU research (US)

- Research indicates that U.S. households with time-of-use (TOU) electricity billing report higher satisfaction levels compared to those without it.
- More than half (53%) of households with TOU billing are very satisfied with their electricity service.
- Compared to one-in-three (34%) households without TOU billing reporting the same level of satisfaction.
- Consumers are reluctant about TOU believing they will increase their bill, but once consumption patterns are adapted, some see lower bills and higher satisfaction.

However, there were more cautionary tales of advanced rate implementation than success stories. Strong, coordinated, and highly supportive approaches are key (see critical success factors next slide).

What we learned from the world

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Across all jurisdictions there were more cautionary tales (consumer push back, problematic implementation) than success stories.

Much of the opposition stemmed from weak consultation, communication issues, implementation complexity, privacy concerns, and organized consumer/association opposition rather than fundamental problems with the rate structures themselves.

Pilot programs that were properly implemented and communicated generally showed positive customer satisfaction among participants, strong uptake/support, and positive reputational (as well as operational) impact.

We found three exemplars in terms of consultation and communication design: Ontario, SCE Arizona Pilot, and Puget Sound WA Pilot.

Success stories primarily involved government and/or regulator, and DFO coordination.

Key Insight:

Opposition typically stems from communication failures, not rate structure problems.

Silver Lining:

Well-designed pilots show strong satisfaction and positive operational impact (next slide)

Summary of Critical Success Factors

Alternative Rate Pilots & Implementation

Success Factors:	Causes of Issues or Mixed Results:
Joint gov/regulator-DFO leadership	Unilateral or siloed oversight
Intensive, tailored customer education	Limited, one-way, or technical communication
Structured (funded) pilots and iterative feedback to provide validation, optimisation	Rushed, untested, or poorly monitored rollout
Simple, transparent rate design	Overly complex, confusing structures
Customer protections (bill guarantees)	Absence of opt-outs or risk mitigation
Ongoing support and responsiveness	Lack of post-rollout education/support
Proactive equity measures	Ignoring vulnerable group impacts

DETAILED RESULTS

Secondary scan of other jurisdictions

Global Success Factors (WHAT WORKED)

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Common Traits of Success

Joint Leadership and Broad Collaboration: The most successful implementations consistently involved joint leadership between government agencies (or regulators) and utilities/DFOs. This shared responsibility ensured oversight, transparency, and alignment with both policy goals and practical operational needs.

Intensive, Multi-Channel Customer Education: Robust education and outreach campaigns - using direct mail, online tools, bill inserts, videos, and personalized messaging - were pervasive among successful rollouts. These efforts demystified new rate structures and helped customers understand and adapt.

Pilot Testing and Iterative Feedback: Programs that piloted new rates, gathered data, and refined approaches based on customer feedback before full rollout avoided major pitfalls. Pilots enabled identification and correction of communication or design flaws early (seen in California, Arizona (SRP), Fort Collins, Maryland, and Michigan).

Simplicity and Clarity in Rate Design: Simple, transparent rate structures (clear peak/off-peak definitions, prominent customer-facing explanations) correlated with positive outcomes in terms of both enrollment and satisfaction.

Customer Protections: Successful programs frequently integrated protections (like bill guarantees or opt-out options), reducing risk, and building trust (especially for vulnerable populations).

Ongoing Support: Continuous post-rollout support and education reinforced acceptance and led to durable changes in consumption patterns.

Star Examples:

Ontario

Salt River Project (AZ)

Puget Sound (WA)

France

Global Cautionary Tales (WHAT DIDN'T WORK)

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Factors Behind Mixed/Poor Results

Insufficient or Ineffective Communication: Programs that invested less in education, failed to personalize outreach, or relied heavily on technical jargon saw high rates of confusion, dissatisfaction, and low adoption. Customers who did not clearly understand the new rate structure or its benefits often resisted or opted out.

Complex or Unintuitive Rate Designs: Overly technical, complicated, or poorly explained pricing mechanisms increased perceived risk and customer frustration. Programs with frequent price changes (e.g., intraday RTP) without strong supporting tech faced notable difficulties.

Lack of Stakeholder Buy-In: Where utility, government, or customer advocacy involvement was limited or adversarial, controversies intensified - particularly when public campaigns or misinformation targeted unpopular elements (e.g., income-graduated fixed charges in California).

Poorly Executed Pilots or Rushed Rollouts: Programs that neglected phased testing, feedback incorporation, or post-launch customer service struggled to adapt to unforeseen problems, exacerbating public backlash.

Equity and Privacy Concerns: Outcomes were mixed or negative when impacts on low-income or technologically marginalized groups were inadequately addressed, or when rate design led to privacy doubts (e.g., use of income data).

Failure to Collaborate Across Systems: Making unilateral decisions without oversight and not working with government and stakeholders results in difficulties with implementation.

Problem Examples:

Arizona Public Service (initial rollout)

California RTP implementation

Learning from North America

Overview: Implementation in North America

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Jurisdiction	New Rate Implementation	Reputation Impact	Operating Impact
Ontario	Successful	**Positive**	Modest, but positive (3% NET in summer 2017, 2021 change to peak hours)
British Columbia	Successful	**No Change** 'optional' nature well received (reddit)	Estimate 8% of non-EV owners, and 25% of EV owners will opt in by 2030. No hard load-impact numbers.
Arizona Public	Successful (operationally)	**Negative**	Limited. Budget impact negative due to recovery from poor implementation.
Arizona Salt River	Successful (pilot) Pending (scale roll out)	**Positive**	TBC
California Multiple DFOs	Successful (Dynamic rates, Real-time yet to be completed)	**Mixed to Negative**	Dynamic rates is net positive, but real time pricing pilot has not realized significant new gains.
Washington Puget Sound	Successful (pilot) Pending (scale roll out)	**Positive**	Net positive (94% behaviour impact for participants)

Key Insight: Well-designed pilots show strong satisfaction and positive operational impact; however, consumers show reluctance to choose demand-based rates (modest uptake – 8% to 25%) out of concern it will will increase their bill.

Implication? Guarantee or line of sight to lower bills is required along with broad implementation

Detail: Canadian Examples

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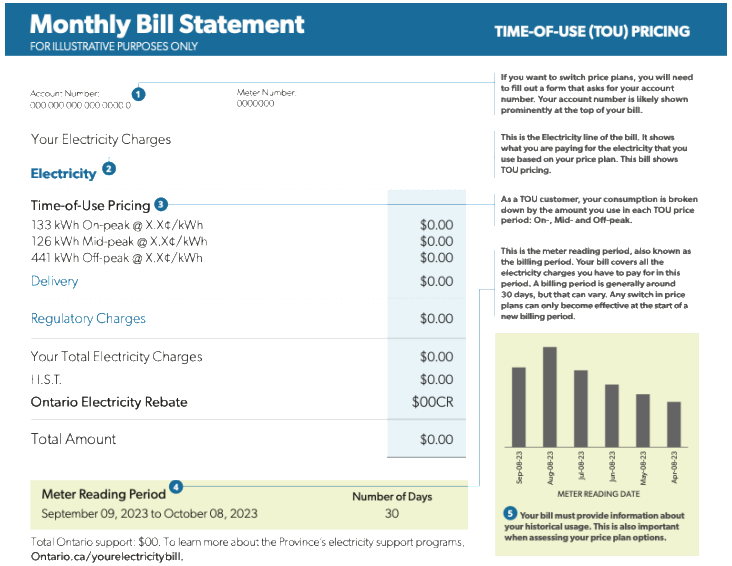
	Operating & Consumer Context	Approach to consultation	Communications Strategy	Outcomes (public feedback)
Ontario **Lead by: Gov. of Ontario**	• Officially implemented in 2009, slow rollout across jurisdictions, with a pause in 2020 for all off-peak during stay-at-home mandates. • Three options for customers: TOU (added 2009), Tiered (added 2020), Ultra-Low Overnight (added 2023). • Usage costs, not delivery or distribution charges.	• Pilot project (2005) • 2007-2008 Issued a Board Staff Discussion Paper for comment: electricity distributors, consumers, and electricity retailers all responded with comments (guided questions provided). Stakeholder meetings. • 2010: public comment periods and formal written feedback from utilities and other stakeholders. • 2010-2011 consultation to evaluate the structure and methodology for setting prices: Brattle Group Analysis, public stakeholder meetings. • 2020 asked for letters for feedback on tiered pricing. • 2022 stakeholder meetings, written comments to add ULO, pilot meta-analysis.	• In 2010 news article suggests that if you don't change habits increase in your bill will be 1%, but potential to lower bill. • 2023 news article highlighting ULO option • Government & OEB announcements, including OEB website showing how to choose. • Utilities sent notices, newsletters, and posted on their website. • Utilities required to include switch communications on bills.	• Pilot project: 78% would recommend TOU, 90% paid less. • In spite of a 2014 article suggesting little impact on conservation habits (early days), a Feb 2017 study suggests summer usage was down 3%. • 2021 study by Peters, Thomson, and Barr in Ontario found that **simplified bill formats**, highlighting high on-peak prices and providing **nudge reports** (e.g. comparisons with past use) helped shift household behavior: more off-peak usage and increased conservation mindset. • Discussions on SM re: which is better option, but overall satisfaction seems consistent. • Low complaint rates and high billing accuracy in ON. • Reports show that once they switched to tiered, few switched back.
BC **Lead by: BC Hydro and BCUC**	Optional Time-of-Use pricing; voluntary adoption; stable distribution charges; high consumer trust.	Public consultations via BC Hydro Integrated Resource Plan; regulatory hearings at British Columbia Utilities Commission.	Simple messaging emphasizing voluntary choice and predictability.	Minimal coverage; some negative pushback on social media; satisfaction scores remained stable (+2% in 2024, lower in 2025).

Best in Class Billing for Demand-Based Rates: Ontario



Monthly Bill Statement
FOR ILLUSTRATIVE PURPOSES ONLY

TIME-OF-USE (TOU) PRICING

Account Number: 1
000 000 000 000 0000 0
Meter Number:
0000000

If you want to switch price plans, you will need to fill out a form that asks for your account number. Your account number is likely shown prominently at the top of your bill.

Your Electricity Charges

Electricity 2

This is the Electricity line of the bill. It shows what you are paying for the electricity that you use based on your price plan. This bill shows TOU pricing.

Time-of-Use Pricing 3	
133 kWh On-peak @ X.X¢/kWh	$0.00
126 kWh Mid-peak @ X.X¢/kWh	$0.00
441 kWh Off-peak @ X.X¢/kWh	$0.00
Delivery	$0.00
Regulatory Charges	$0.00
Your Total Electricity Charges	$0.00
H.S.T.	$0.00
Ontario Electricity Rebate	$00CR
Total Amount	$0.00

As a TOU customer, your consumption is broken down by the amount you use in each TOU price period: On-, Mid- and Off-peak.

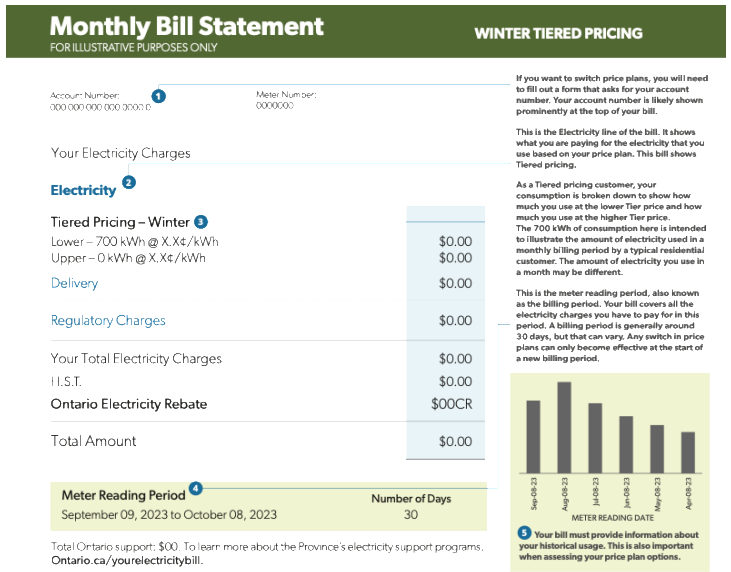
This is the meter reading period, also known as the billing period. Your bill covers all the electricity charges you have to pay for in this period. A billing period is generally around 30 days, but that can vary. Any switch in price plans can only become effective at the start of a new billing period.

Meter Reading Period 4	Number of Days
September 09, 2023 to October 08, 2023	30

Sep-08-23 Aug-08-23 Jul-08-23 Jun-08-23 May-08-23 Apr-08-23
METER READING DATE

5 Your bill must provide information about your historical usage. This is also important when assessing your price plan options.

Total Ontario support: $00. To learn more about the Province's electricity support programs, Ontario.ca/yourelectricitybill.



Monthly Bill Statement
FOR ILLUSTRATIVE PURPOSES ONLY

WINTER TIERED PRICING

Account Number: 1
000 000 000 000 0000 0
Meter Number:
0000000

If you want to switch price plans, you will need to fill out a form that asks for your account number. Your account number is likely shown prominently at the top of your bill.

Your Electricity Charges

Electricity 2

This is the Electricity line of the bill. It shows what you are paying for the electricity that you use based on your price plan. This bill shows Tiered pricing.

Tiered Pricing – Winter 3	
Lower – 700 kWh @ X.X¢/kWh	$0.00
Upper – 0 kWh @ X.X¢/kWh	$0.00
Delivery	$0.00
Regulatory Charges	$0.00
Your Total Electricity Charges	$0.00
H.S.T.	$0.00
Ontario Electricity Rebate	$00CR
Total Amount	$0.00

As a Tiered pricing customer, your consumption is broken down to show how much you use at the lower Tier price and how much you use at the higher Tier price. The 700 kWh of consumption here is intended to illustrate the amount of electricity used in a monthly billing period by a typical residential customer. The amount of electricity you use in a month may be different.

This is the meter reading period, also known as the billing period. Your bill covers all the electricity charges you have to pay for in this period. A billing period is generally around 30 days, but that can vary. Any switch in price plans can only become effective at the start of a new billing period.

Meter Reading Period 4	Number of Days
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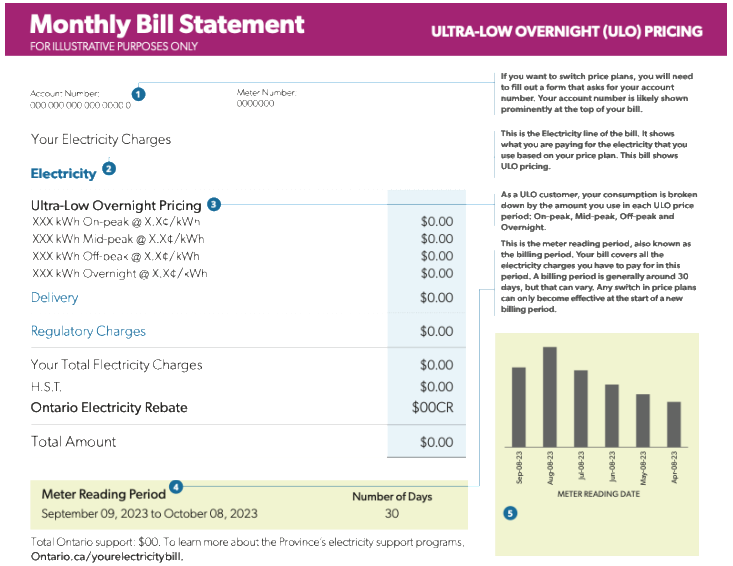

Monthly Bill Statement
FOR ILLUSTRATIVE PURPOSES ONLY

ULTRA-LOW OVERNIGHT (ULO) PRICING

Account Number: 1
000 000 000 000 0000 0
Meter Number:
0000000

If you want to switch price plans, you will need to fill out a form that asks for your account number. Your account number is likely shown prominently at the top of your bill.

Your Electricity Charges

Electricity 2

This is the Electricity line of the bill. It shows what you are paying for the electricity that you use based on your price plan. This bill shows ULO pricing.

Ultra-Low Overnight Pricing 3	
XXX kWh On-peak @ X.X¢/kWh	$0.00
XXX kWh Mid-peak @ X.X¢/kWh	$0.00
XXX kWh Off-peak @ X.X¢/kWh	$0.00
XXX kWh Overnight @ X.X¢/kWh	$0.00
Delivery	$0.00
Regulatory Charges	$0.00
Your Total Electricity Charges	$0.00
H.S.T.	$0.00
Ontario Electricity Rebate	$00CR
Total Amount	$0.00

As a ULO customer, your consumption is broken down by the amount you use in each ULO price period: On-peak, Mid-peak, Off-peak and Overnight.

This is the meter reading period, also known as the billing period. Your bill covers all the electricity charges you have to pay for in this period. A billing period is generally around 30 days, but that can vary. Any switch in price plans can only become effective at the start of a new billing period.

Meter Reading Period 4	Number of Days
September 09, 2023 to October 08, 2023	30

Sep-08-23 Aug-08-23 Jul-08-23 Jun-08-23 May-08-23 Apr-08-23
METER READING DATE

5

Total Ontario support: $00. To learn more about the Province's electricity support programs, Ontario.ca/yourelectricitybill.

Ontario started with a single, default time-of-use structure. There was consumer resistance to this approach; lack of clarity, questions about transparency, ease of understanding, and lack of choice.

Overtime, Ontario moved to a framework where most residential and small business customers can choose among time-of-use, tiered, and ultra-low overnight price plans, with bill formats and explanatory materials adjusted to present these options and related usage more clearly. Overall, consumer feedback improved.

Best in Bill Presentment Improvement

Overview of US Implementation:

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Rate Structure/ Program	Status (2022–2025)	Nature	Outcome/Scale
Residential TOU	Widely implemented (default since 2021)	Full deployment	75–90% of IOU customers state-wide on TOU as of 2023–24; ongoing as default
SCE Flexible Pricing/RTP	Limited pilot, expanded 2024–2027	Pilot	Experimental, though now extended, with small customer bases and ongoing enrollment
PG&E AgFIT/CEV RTP	Pilot (2022–2027)	Pilot	Open to select agricultural and commercial customers; not full utility deployment
CalFUSE (statewide)	Not implemented; framework "in process"	Feasibility & pilots	Regulatory vision, with CPUC/CEC requiring more pilot results to inform full design (real-time rates).

Key Takeaways: US Implementations

- Only TOU has been fully implemented.
- RTP, CalFUSE-style, and other advanced alternatives are still at the pilot stage, with expansion/learning ongoing through 2027.
- Many reports and working group filings do provide valuable insight into design and lessons - but do not reflect “implementation” in the sense of broad, standard customer adoption.
- California is currently a North American leader in implementing TOU at scale, but even here, alternative structures (RTP, CalFUSE) remain in the pilot and policy development phase.

Detailed US Example: California

	Operating & Consumer Context	Approach to consultation	Communications Strategy	Outcomes (public feedback)
California: 2025/26 plans - (California Flexible Unified Signal for Energy) long term framework to achieve Real Time Pricing (RTP) rates. CaliFUSE is lead by California Public Utilities Commission (CPUC) but the stakeholder groups they included are: - DFOs - DERs - State Regulators; (CEC) - (CAISO) (involved in technical alignment and market integration)	TOU was enabled by the deployment of 13 million smart meters by California IOUs first with non-residential customers (2009), then TOU became default for residential customers slowly from approximately 2019 (they don't specify the exact year). However, *"By the end of 2021, more than half of California IOU ratepayers were on a time-varying rate."* (I.e., mandated started point). Step two (more recent) was real time pricing (RTP).	• Extensive Stakeholder Engagement: multi-year workshops, white papers, and formal rulemaking processes. • Limited Pilot-Scale Consultation: SCE's pilot focused on industry partners rather than broad public engagement • Traditional Regulatory Process: Based on established programs used standard utility rate case procedures.	Different locations within CA utilized different tools. The most common themes: • Early implementation: "extensive marketing, education tactics; direct mail/email, bill inserts, video, web-tiles/online ads." • "Test and learn" approach with pilots involving 400K+ customers to refine communication strategies. • Developed cross-organizational teams with up to 100 staff working on TOU transition at peak implementation. • Welcome packages, with in-home static cling tips and reminders. • Created personalized rate comparison tools that led to 400% increase in tool usage. • Bill protection offers - SCE offered one year of bill protection to reduce customer concerns (later add)	The positive: - Statewide dynamic rates achieved peak load reductions of 12% to 40% depending on customer cohort and technology involved. - Residential customers averaged 14% reduction in peak demand, and bill savings of around $60 (98% of EV charging off-peak). - Overall usage did not significantly reduce (just timing) - Moderate customer feedback on understanding. - Real time pricing pilot: slightly more peak-hour demand shifts, but not substantial incremental hourly load demand reduction. Customers received 'shadow bills' during pilot to compare cost under real time pricing. Higher bill volatility was observed (hence, bill protection was added) The negative: • Lower income customers found it more challenging • Organized Opposition Campaign: A "concerted misinformation campaign" emerged according to joint filings from NRDC and TURN • New coalitions formed specifically to oppose the policy and discredit supporters • An October 2023 legislator letter of concern was drafted • CaliFUSE was characterized as being "Complex"

Summary of Outcomes: California

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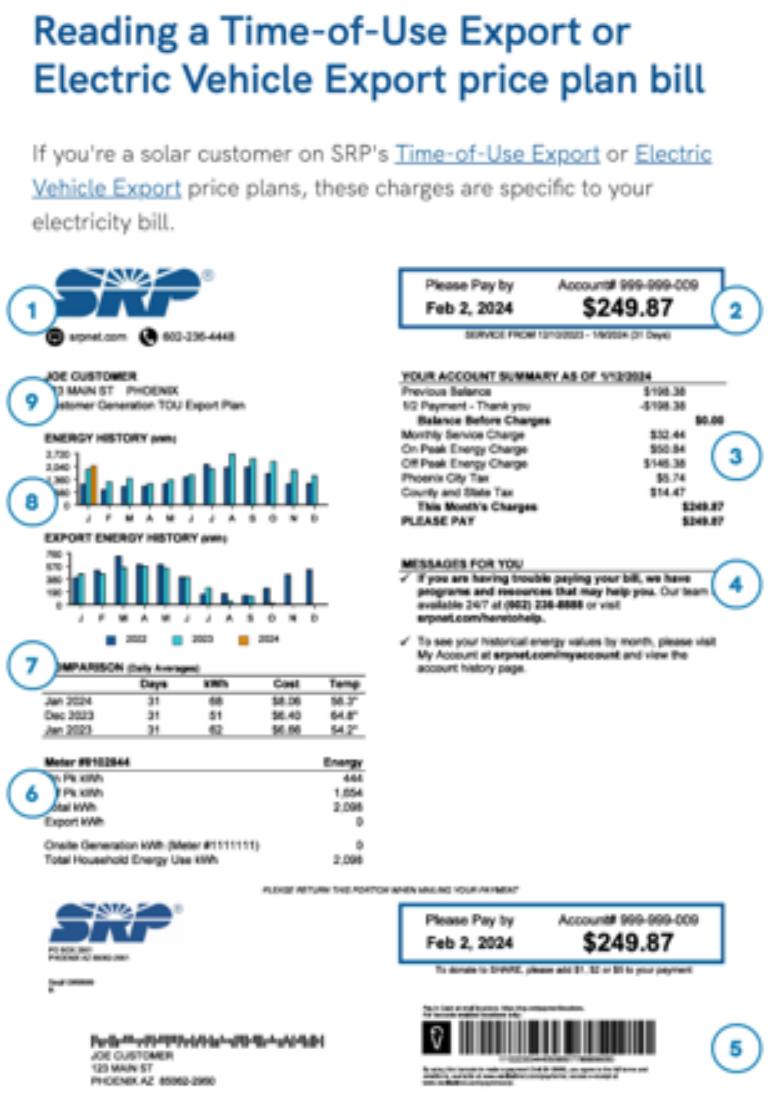
Challenges Identified:

- Time-of-Use tariff users in general studies showed 24% believed they were on the wrong tariff.
- 44% of TOU tariff users experienced problems of some kind.
- Greatest dissatisfaction was among those with storage heating (20% dissatisfied).
- The evidence shows that while there was significant negative pushback on California's implementation of TOU and RTP rate structures, **much of the opposition stemmed from communication issues, implementation complexity, privacy concerns, and organized opposition campaigns** rather than fundamental problems with the rate structures themselves.

Detailed US Example: Arizona

	Approach to consultation	Communications Strategy	Outcomes (public feedback)
Arizona Public Service Implemented in 2017 for APS Lead by: Both utilities (Primarily APS & SRP) and government (approved/modified proposals)	• APS: met twice with stakeholders (consumer & environmental advocates). • Groups requested they be more inclusive, although it seems that wasn't the case, as a staff consultant report criticizes rollout claiming they ignored input from consumer groups, failing to incorporate feedback on messaging, performance metrics, or transitional protections; they did not target communications to low-income or fixed-income customers, relied mainly on quantity of outreach (ads, posts, bill inserts), not assessing whether customers understood changes. • Criticized for one-way presentation not a discussion.	APS (flawed): Bill inserts & direct mail; Digital ads & social media, updated website explaining the pricing structure and offered online tools to estimate plan savings, after being criticized for poor communication and consultation entered an agreement to fund improved education & outreach.	• APS had to pay rebates to customers it went over so badly. • Comments on Reddit and consumer affairs suggest they aren't saving much and/or are frustrated that it's costing them more. • ACC commissioned a review and found APS's outreach strategy was poor, and customers found TOU & demand charges confusing.
Arizona Salt River Project SRP started consultation in 2024 and implementing Nov 2025 billing period. Both utilities (Primarily APS & SRP) and the government (approved/modified proposals)	• SRP: Stakeholder Meetings & Pricing Process Consultations. Customer research (4 90 min. focus groups & 2 phases of quant with n=1400 SRP customers, including a conjoint), pilot programs (n=1,000), and stakeholder input informed rate design and TOU evolution. Customer research reports saved.	SRP: public pricing process asking for feedback, it is now approved and will start Nov 2025 billing cycle. Detailed online pages explaining breakdowns of on-peak & off-peak hours by season, pricing per KWH, and suggestions for managing energy use. They also published PDF documents summarizing adjustments to plan, bill impact analyses, and responses to public consultation.	• SRP: hasn't been implemented yet, but there has been some praise from Western Resource Advocates: • *"SRP's proposed TOU rates are innovative and align customer financial incentives with what is best for both SRP and other SRP customers."*

Best in Class SRP US Billing Example: Arizona



APS does a walk-thru video on how to read the new bill:

- *https://www.aps.com/en/Residential/Billing-and-Payment/New-Bill-T*

Best in Bill and Rate Education

Best in Class Pilot: Puget Sound, WA 2023

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Pilot Structure:

- 8,700 HH enrolled across 3 TOU rates; 2,900 basic TOU, 4,300 TOU with Peak Time Rebates, 1,000 in super off-peak rate designed specifically for EV homes (which was most successful).

Customer Engagement Metrics:

- 94% of TOU participants used rate advisor tools to evaluate options.
- 88% found rate comparisons easy to understand.
- 84% said rate comparisons influenced their enrollment decision.
- **94% of customers took action to reduce usage during peak periods.**
- Over 80% of customers correctly identified peak periods after education.

What made the pilot so successful?

- ✓ **Customer choice** – customers could choose whether to participate, and opt-in to enroll in a specific structure.
- ✓ **Personalized approach** - Using customer-specific data to show individual bill impacts.
- ✓ **Multi-channel strategy** - Combining direct mail, digital tools, phone support, and in-person outreach (one example used a segmentation for planning).
- ✓ **Continuous engagement** - Not just initial education but ongoing support and coaching.
- ✓ **Simple messaging** - Keeping explanations clear and avoiding utility jargon.
- ✓ **Financial focus** - Emphasizing bill savings and economic benefits.
- ✓ **Automation integration** - Pairing education with enabling technologies to reduce customer burden.


Learning from
The World

Detailed US Example: California

	Operating & Consumer Context	Approach to consultation	Communications Strategy	Outcomes (public feedback)
New South Wales (AU) AEMC (government advisor) 2014 DNSPs 2015-2019, 2023-2024 Gov't 2020-2024	• 2014: AEMC Rule change requiring network tariffs to be "cost reflective." • Introduced: 1 July 2017 (for new/changed connections with smart meters). • Default for most smart-meter customers: 1 July 2024. • Existing flat-rate customers can still stay on their old tariff unless they opt to switch.	• 2014-2017 Distribution Network Service Providers (DNSPs) started consulting on TOU and demand tariffs. • These consultations were mainly workshops and targeted stakeholder meetings. • 2018-2019: pilot projects with stakeholder feedback loops. • Dec 2021: NSW Gov't consultation built on the fact that TOU pricing was already embedded in network tariffs by DNSPs. Sought feedback on consultation paper about smart meter rollout, tariff innovation, and customer protections. • 2021-2023 DNSP pilots and trials, and more extensive feedback: stakeholder workshops, publish issues papers, and seek submissions for their 2024–29 TSS.	• DNSPs: Multifaceted approach to communication, for example Essential Energy had web-based resources brochures, FAQs and transparent regulatory documents available. Government: • 2021 consultation papers and submissions, followed by an extensive communications approach with accessible resources, tools, and program updates to support households through the transition. • 2024 Consumer Energy Strategy included public announcements, funding plans and clear actions to support residents. • Ongoing public resources including online tools, targets, incentives, and updates to help citizens understand energy options and benefits. These communications were tailored to specific groups such as low-income households, renters, and culturally diverse communities.	• There was pushback from the public when the DNSPs made their changes mainly due to bill shock (much higher bills with TOU), low-income, renters or those unable to change their usage were unfairly disadvantaged thus equity concerns were large in Australia as well as Arizona. Many felt they were switched without their informed approval, determining when to use essential services generated anxiety, with people wanting a flat rate simple bill. • The public is still uncertain about TOUs, but the government is shaping policy based on their feedback.

Detailed US Example: Europe

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Jurisdiction / Lead by	Operating & Consumer Context	Approach to consultation	Communications Strategy	Outcomes (public feedback)
Sweden: Energy Markets Inspectorate set regulations and supported consumer choice.	Liberalized retail market; widespread smart meters; majority on monthly variable contracts; lower trust.	Pilots and municipal-level studies; Energy Markets Inspectorate oversaw consumer feedback.	Educational outreach on smart meters and optional contracts, but limited understanding of hourly pricing.	High share on monthly averaging; limited behavioral change; concerns over complexity and fairness.
Norway: Norwegian Water Resources and Energy Directorate mandated advanced metering and tariffs.	Mandatory hourly spot pricing via Nord Pool; 90%+ on dynamic rates; trust challenges during 2021–22 crisis.	Regulatory-mandated rollout with some public hearings; limited ongoing consumer input.	Limited consumer-facing education; relied heavily on automation potential.	Trust dropped significantly during energy crisis; subsidies needed to maintain acceptance.
France: Electricité de France and the Energy Regulation Commission led the Tempo rollout with coordinated oversight.	National rollout of Linky smart meters; Tempo tariff; moderate complexity with strong peak reduction.	Structured communication campaigns around Tempo tariff; Electricité de France engaged directly with households.	Color-coded daily signals (Blue/White/Red) announced one day in advance; easy-to-digest messaging.	High engagement on white/red days; ~6 GW peak reduction; moderate satisfaction with some confusion.
Spain: National Commission on Markets and Competition regulated tariffs; government intervened with subsidies during crisis.	Universal smart meters; default Voluntary Price for the Small Consumer tariff tied to wholesale market.	National Commission on Markets and Competition-led consultation; adjustments after consumer backlash during 2021–22 crisis.	Emphasis on transparency of hourly prices; communication during crises focused on subsidies.	Strong demand signals but volatility caused bill spikes; trust weakened; many shifted to fixed-price contracts.

Highlight Outcomes: France

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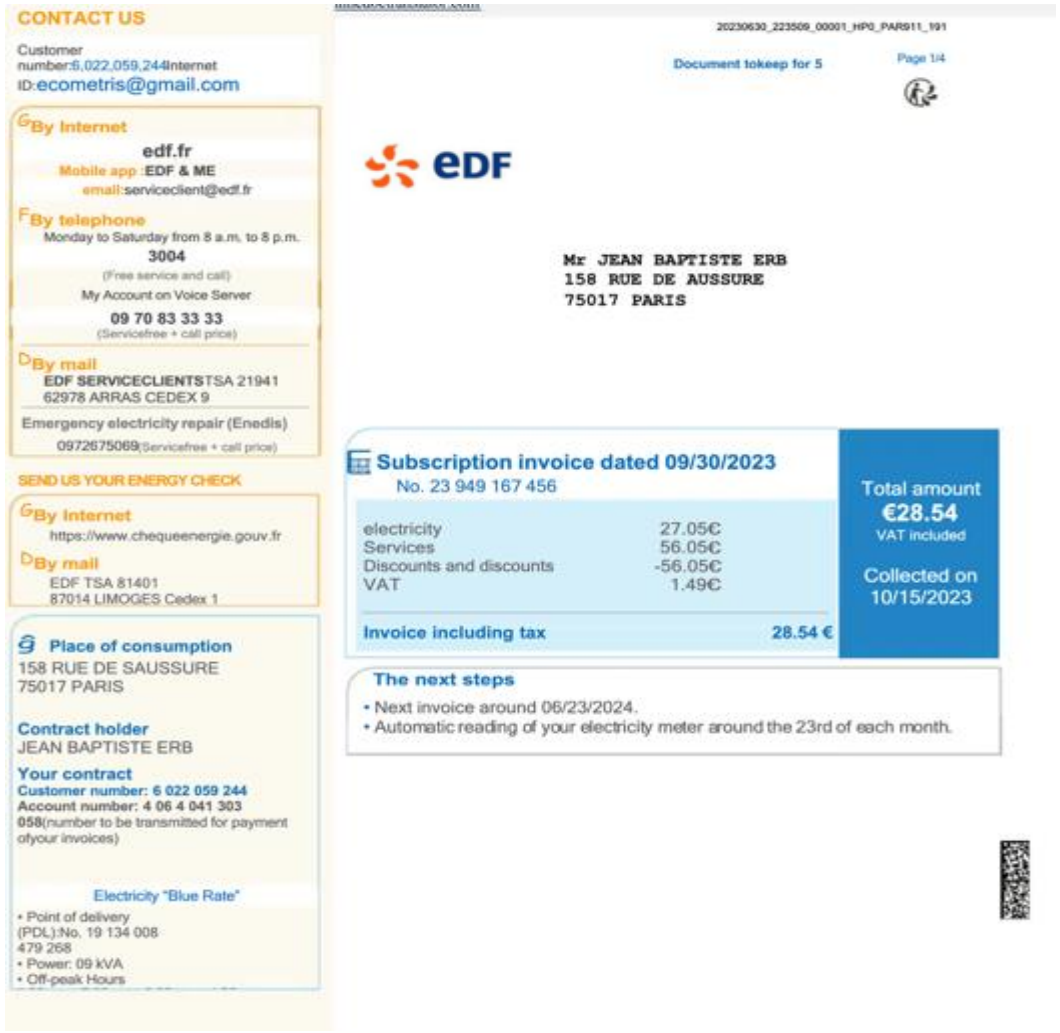
- France developed a mandatory Tariff on residence to help manage peak electricity demand and reduce reliance on fossil-fuel generation. This initiative was part of the national rollout of “Linky” smart meters, completed between 2011 and 2021. The ‘Tempo’ tariff is a regulated Time-of-Use (TOU) pricing system managed by Electricité de France (EDF).
- The Tempo Tariff categorizes days into three types: Blue (300 days per year) with the lowest rates, White (43 days per year) with moderate rates, and Red (22 days per year) with the highest electricity prices. Consumers are notified a day in advance of the pricing color, allowing them to adjust their usage. Each day type includes both off-peak and peak pricing periods.
- France's Tempo Tariff has successfully reduced electricity demand by approximately 6 gigawatts during Red Days. The advance notification system improves consumer participation by providing predictability. The intuitive color-coded structure has proven to be both easy to understand and effective. Unlike real-time spot pricing systems, France avoided major consumer backlash during the 2022 energy crisis by maintaining rate stability. The program also minimizes reliance on direct government subsidies, enhancing fiscal sustainability.

What did France get right?

- Implementing a system that provides advance signals to consumers fosters trust and engagement from consumers. The use of this pricing model can enhance clarity and encourage behavioral change but has also shown to reduce peak demand while minimizing political and social risks.
- Customers were given welcome packages which explained the new system that included both a printed and digital explanation of how it works, a calendar showing the expected demand, and examples of the bills including simulations of each scenario. France demonstrates that moderate complexity, when paired with strong communication, can achieve significant energy savings and public support.

Bill Examples: France



CONTACT US

Customer number:6,022,059,244Internet ID:ecometris@gmail.com

By Internet
edf.fr
Mobile app :EDF & ME
email:serviceclient@edf.fr

By telephone
Monday to Saturday from 8 a.m. to 8 p.m.
3004
(Free service and call)
My Account on Voice Server
09 70 83 33 33
(Servicefree + call price)

By mail
EDF SERVICECLIENTSTSA 21941
62978 ARRAS CEDEX 9

Emergency electricity repair (Enedis)
0972675069(Servicefree + call price)

SEND US YOUR ENERGY CHECK

By Internet
https://www.chequeenergie.gouv.fr

By mail
EDF TSA 81401
87014 LIMOGES Cedex 1

Place of consumption
158 RUE DE SAUSSURE
75017 PARIS

Contract holder
JEAN BAPTISTE ERB

Your contract
Customer number: 6 022 059 244
Account number: 4 06 4 041 303
058(number to be transmitted for payment ofyour invoices)

Electricity "Blue Rate"
• Point of delivery (PDL):No. 19 134 008 479 268
• Power: 09 kVA
• Off-peak Hours

20230630_223509_00001_HP0_PARS11_191

Document tokeep for 5 Page 1/4

EDF

Mr JEAN BAPTISTE ERB
158 RUE DE AUSSURE
75017 PARIS

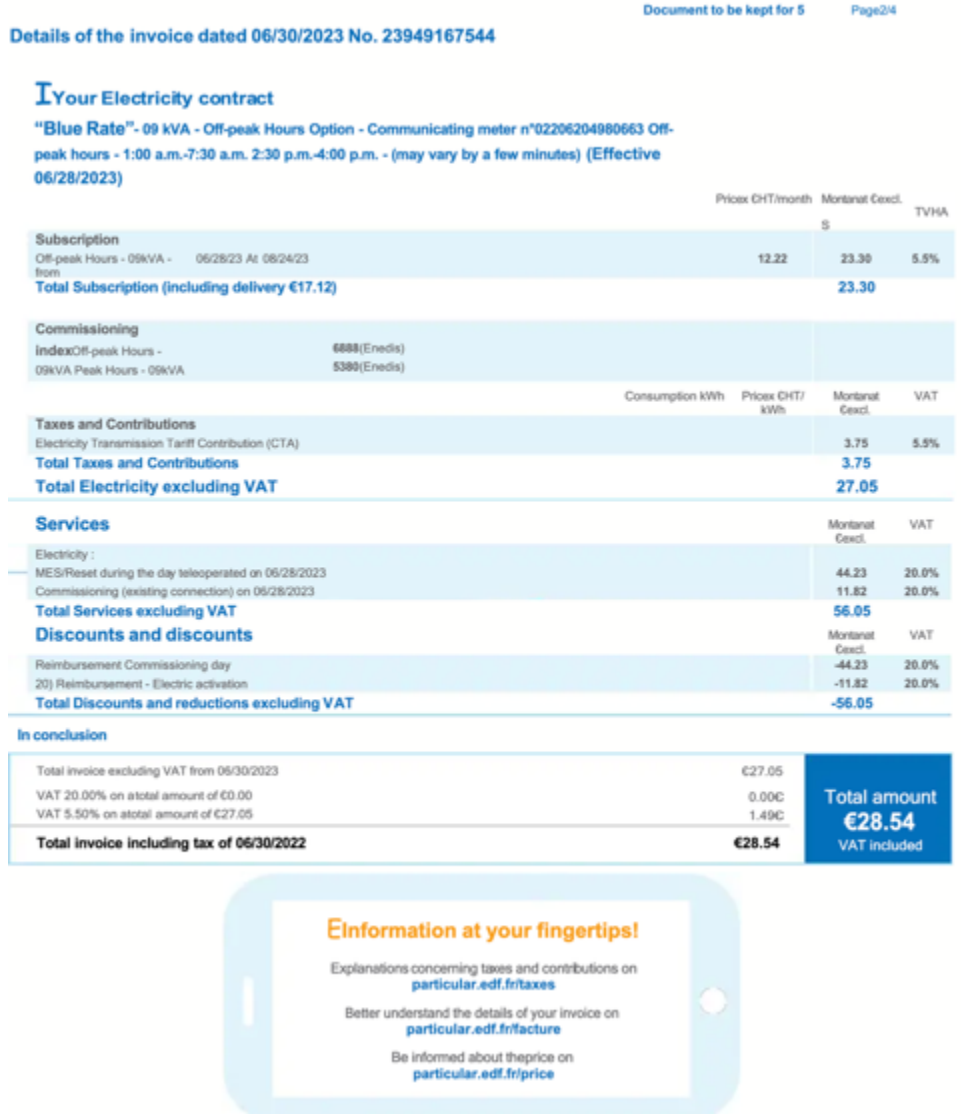
Subscription invoice dated 09/30/2023
No. 23 949 167 456

electricity	27.05€
Services	56.05€
Discounts and discounts	-56.05€
VAT	1.49€
Invoice including tax	28.54 €

Total amount €28.54 VAT included

Collected on 10/15/2023

The next steps
• Next invoice around 06/23/2024.
• Automatic reading of your electricity meter around the 23rd of each month.



Document to be kept for 5 Page2/4

Details of the invoice dated 06/30/2023 No. 23949167544

Your Electricity contract

"Blue Rate"- 09 kVA - Off-peak Hours Option - Communicating meter n°02206204980663 Off-peak hours - 1:00 a.m.-7:30 a.m. 2:30 p.m.-4:00 p.m. - (may vary by a few minutes) (Effective 06/28/2023)

		Pricex CHT/month	Montanat €excl.	TVHA
Subscription				
Off-peak Hours - 09kVA - from	06/28/23 At 08/24/23	12.22	23.30	5.5%
Total Subscription (including delivery €17.12)			23.30	

Commissioning		
Index Off-peak Hours -	6888(Enedis)	
09kVA Peak Hours - 09kVA	5380(Enedis)	

	Consumption kWh	Pricex CHT/ kWh	Montanat €excl.	VAT
Taxes and Contributions				
Electricity Transmission Tariff Contribution (CTA)			3.75	5.5%
Total Taxes and Contributions			3.75	
Total Electricity excluding VAT			27.05	

Services			
		Montanat €excl.	VAT
Electricity :			
MES/Reset during the day teleoperated on 06/28/2023		44.23	20.0%
Commissioning (existing connection) on 06/28/2023		11.82	20.0%
Total Services excluding VAT		56.05	

Discounts and discounts			
		Montanat €excl.	VAT
Reimbursement Commissioning day		-44.23	20.0%
20) Reimbursement - Electric activation		-11.82	20.0%
Total Discounts and reductions excluding VAT		-56.05	

In conclusion

Total invoice excluding VAT from 06/30/2023	€27.05
VAT 20.00% on atotal amount of €0.00	0.00€
VAT 5.50% on atotal amount of €27.05	1.49€
Total invoice including tax of 06/30/2022	€28.54

Total amount €28.54 VAT included

Information at your fingertips!

Explanations concerning taxes and contributions on particular.edf.fr/taxes

Better understand the details of your invoice on particular.edf.fr/facture

Be informed about theprice on particular.edf.fr/price

What we learned from the cautionary tales:

Implementation and successful goal attainment is challenging Best strategies to mitigate risks and/or course correct include;

- Conducting and listening to (incorporating) public consultation (360 feedback demonstrates input has been addressed, and if not, why).
- Ensuring communications are easy to understand and targeted (not just one broad message for all). Those who were successful started at the highest, most basic level and allowed for those who are informed/engaged to have access to more detail if desired (good communication is about clarity and shared value).
- There's a risk that low-income and culturally diverse households will be hit the hardest with TOU. Arizona (and NSW, see Overseas Learning) had to rebate customers. Trust is better maintained by getting ahead of this.
- Ensuring that education shows how to save money. Successful communication was not aimed at selling TOU as an energy saving measure only (i.e., communicate shared responsibility and shared benefit).
- The public wants transparency in the process. Transparency, consistency, and cohesive messages across all parties supports trust.

Summary of Lessons Learned by Source:

1. Early Engagement	*Stakeholder trust and support are built by starting consultation early and maintaining open dialogue throughout the process. 1, 2*
2. Education	*Intensive, multi-channel customer education and support are necessary for public acceptance and behavioral change. 6, 7, 8*
3. Transparency	*Clearly explain how input is used and close the feedback loop to maintain stakeholder and public trust. 1, 2, 5*
4. Pilots & Feedback	*Pilots and randomized controlled trials enable adjustment of design and communications before full rollout, reducing risk. 8, 6*
5. Collaboration	*Joint utility-government-stakeholder leadership delivers more robust and accepted outcomes. 4, 1, 3*
6. Simplicity	*Simple and transparent rate structures ease communication and understanding; avoid unnecessary complexity. 8, 6, 9*
7. Inclusion	*Use diverse engagement methods to ensure marginalized and less technical voices are heard. 1, 5*
8. Ongoing Support	*Provide continuous resources and support after implementation for new customers and emerging challenges. 7, 8*
9. Address Concerns	*Anticipate public mistrust and opposition, particularly around bill impacts, data privacy, and equity, and address with facts. 10*

1. https://pubs.naruc.org/pub/7A519871-155D-0A36-3117-96A8D0ECB5DA
2. https://e21initiative.org/wp-content/uploads/2018/01/e21_Forum_TOUPilotBestPractices_5.05.17.pdf
3. https://www.cityenergyproject.org/wp-content/uploads/2018/02/IMT_PCC_Stakeholder_Guide.pdf
4. https://www.synapse-energy.com/sites/default/files/22-086%20Comments%20on%20TOU%20Rates.pdf
5. https://ppl-ai-file-upload.s3.amazonaws.com/web/direct-files/collection_b760f885-5b23-4edd-adac-f2993fe5ee67/4363145b-f145-45a0-b68c-00086d614132/Slides-CalFUSE-Workshop-21July2022f-PUBLISH-PDF.pdf
6. https://gridx.com/considerations-when-implementing-and-driving-adoption-of-tou-rates/
7. https://natural-resources.canada.ca/sites/www.nrcan.gc.ca/files/energy/pdf/engagementguide_eng_12.pdf
8. https://e21initiative.org/wp-content/uploads/2018/01/e21_Forum_TOUPilotBestPractices_5.05.17.pdf
9. https://votesolar.org/wp-content/uploads/2020/12/TOU-Paper-7.17.17.pdf
10. Pritzker Paper, TOU Rates.

Implications for Next Phases of Research

Implications

Our consultation plan is on the right track (iterative)

- Communications considerations will be critical to explore and test (current knowledge, ease of understanding of various options, language and tools that support understanding)
- Concept testing is recommended (possible structures) to determine the level engagement, motivators, and barriers
- We should look to Puget Sound, Ontario, and France as our best-in-class communication strategies and billing presentment examples

Implications for Sample Plan (who we need to hear from)

- While informed and opinion leaders will be important (as they will likely have the most positive view), lower income and diverse groups must be included.
- Internal SMEs should be included

Implications *(continued)*

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Implication for Topics Explored

- Billing was a key part of understanding alternative rate structures; bill presentment is a significant topic
- There is a disconnect between reputation impact and operational impact (behaviour does not always mean engagement). We will have to understand and explore what motivates adoption as well as positive sentiment
- Simpler versions of TOU appear to make the most significant difference vs. highly granular (i.e., hourly) and may show more promise (test appeal)
- Voluntary opt-in and customer control are key themes to explore
- While EV owners in all successful pilots and jurisdictions were most likely to opt in, solar consumers are increasing and should be included as well
- France's colour coding and Ontario billing could be tested

Appendix

Appendix: Other jurisdictions conducting reviews and explorations also assessed

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State	Alternative Rate Structure Implemented	Involved Entities	Status / Source
California, USA	Time-of-Use (TOU)	CPUC (government), Utilities (SCE, PG&E, SDG&E), Regulator	Successfully deployed as the default rate for most customers; delivered measurable peak demand reductions https://rmi.org/wp-content/uploads/2017/04/A-Review-of-Alternative-Rate-Designs-2016.pdf
California, USA	Real-Time Pricing (RTP)	CPUC, Utilities, Regulator	Active pilots; limited broader deployment; mixed but promising results https://www.brattle.com/wp-content/uploads/2023/07/Time-Varying-Rates-are-Moving-from-the-Periphery-to-the-Mainstream-of-Electricity-Pricing-for-Residential-Customers-in-the-United-States.pdf
Michigan, USA	Mandatory TOU rates (default for all residential)	Investor-Owned Utilities, Regulator	In Review: Reduced peak energy demand by 3–4%; successful rollout https://www.brattle.com/wp-content/uploads/2023/07/Time-Varying-Rates-are-Moving-from-the-Periphery-to-the-Mainstream-of-Electricity-Pricing-for-Residential-Customers-in-the-United-States.pdf
Illinois, USA	Opt-in TOU and Real-Time Pricing	Investor-Owned Utilities, Regulator	In Review: Ongoing programs; modest customer participation (about 2% for RTP) https://rmi.org/wp-content/uploads/2017/04/A-Review-of-Alternative-Rate-Designs-2016.pdf
Georgia, USA	TOU with off-peak incentives (esp. for EV owners)	Utility, Regulator	Approved for rollout; EV-targeted program https://www.brattle.com/wp-content/uploads/2023/07/Time-Varying-Rates-are-Moving-from-the-Periphery-to-the-Mainstream-of-Electricity-Pricing-for-Residential-Customers-in-the-United-States.pdf
Maryland, USA	Peak Rewards and Rebates-based TOU	Baltimore Gas & Electric, Regulator	Popular: over half of residential customers enrolled https://rmi.org/wp-content/uploads/2017/04/A-Review-of-Alternative-Rate-Designs-2016.pdf
Massachusetts, USA	Basic TOU (delivery portion); time-based rates	National Grid, Regulator	https://rmi.org/wp-content/uploads/2017/04/A-Review-of-Alternative-Rate-Designs-2016.pdf
Fort Collins, Colorado, USA	Two Time-of-Day (TOU) Rates	Utility, Regulator	https://www.publicpower.org/system/files/documents/Moving-Ahead-Time-of-Use-Rates.pdf
Nova Scotia, Canada	Modernized Utility Regulation/TOU as part of reform	Government, Utility Regulator, Utilities	https://ecologyaction.ca/resources-media/position-statements/eacs-statement-energy-reform-2024-act

Understanding People

It’s what we do.

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