

The following document is supplemental to *NCHRP WebResource 2: Road Usage Charge Guide* (NCHRP Project 19-18, “Transitioning Fuel Tax Assessments to a Road Usage Charge”). The full WebResource can be found at <https://crp.trb.org/nchrpwebresource2/>.

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# Global Road Pricing-Related Program Evaluation

The team researched global road pricing-related programs and activities to inform potential RUC program activities.

## 1.1 Introduction

While RUC pilots and programs are under way throughout the U.S. and around the world, there has not been a program that has universally implemented a mileage-based fee across all vehicles. Existing programs and systems in related fields can provide insight into a range of considerations and implementation steps that will be necessary to transition to a fully actualized RUC program. This task will review programs in the following areas:

- Transportation pricing
- Utilities
- General taxation
- Tax- and transportation-related communication

These fields were chosen because they provide portable lessons for the range of phases in RUC implementation. The transportation pricing field discusses devices, payment processes, and interjurisdictional agreements. The utilities subsection provides examples for ways to effectively bill participants. The general taxation subsection covers a range of topics, including compliance and low-income identification. The tax- and transportation-related communication subsection discusses communication methods that could be utilized with a RUC program rollout.

## 1.2 Transportation Pricing

Pricing mechanisms are the structural backbone of a RUC system. They determine how RUC is quantified, billed to the participant, and paid for. Tolling device distribution, electronic transit payments, and the International Fuel Tax Agreement are discussed in this section because they provide lessons for how to make pricing streamlined for the user.

### 1.2.1 Tolling Device Distribution

The processes used for distributing tolling transponders provide a replicable pathway for a RUC system that utilizes OBD-II plug-in devices. Tolling device technology relies on radio-frequency identification. Drivers are equipped with an electronic transponder that registers with a receiving device at designated toll locations. Typically, these can be acquired by registering online with the tolling entity, which is often associated with a specific state or jurisdiction. These devices are then mailed directly to the registered person. In some states, a customer can acquire a transponder at dedicated customer service centers, Departments of Motor Vehicles, grocery stores, or retailers in their communities. Customers then have to set up their account online.

Tolling agencies have made the barrier to participating in the system lower by providing multiple avenues to obtain an electronic device. This lesson is particularly useful for a RUC system that uses OBD-II plug-in devices. Ensuring that these devices are easy to acquire will help to streamline system adoption. The methods used by tolling agencies may inform how RUC agencies plan to make it easy to acquire a mileage reporting method.

### **1.2.2 Electronic Transit Payments**

Electronic payment in the transit industry has led to the development of the digital wallet, which could be adopted in a RUC program. Transit systems have found success by creating electronic fare media to simplify payment processes for customers. Previous fare systems used to be paper-intensive, requiring a unique token or relying on cash for payment. Electronic fare media allowed for new possibilities regarding fare structures and intersystem compatibility. South Korea's Seoul Bus Transport was the first agency to introduce a prepaid transit card, called Upass. In England, London's Oyster card represents the next iteration of smartcard, allowing for both stored value and time-based passes to be loaded on the same card. Over time, the program evolved to the point that it was the first system to accept contactless credit cards. The Oyster card and many contactless credit cards can be used on nearly all modes of transit in London, allowing for seamless transferring between systems.

The latest generation of transit payment is represented by the OMNY card, which is currently being implemented by New York's Metropolitan Transportation Authority. OMNY is a digital wallet system, which allows for payments with a credit, debit, or designated prepaid card. OMNY readers are contactless, so it also supports payments through Apple Pay and Google Pay via a smart phone or smart watch. Once fully implemented, OMNY will be available for New York City subway, bus, and commuter railroads, along with other neighboring transit agencies that plan to adopt it.

Digital wallets are currently being utilized in Oregon and Utah's RUC systems, allowing for a simple payment mechanism for users. Drivers can link the payment option of their choosing to their RUC account, which automatically withdraws payments at a regular schedule. After setup, this makes payment seamless for both the user and administrator. This would also more easily support flexible payment plans, which will be discussed in greater detail later.

### **1.2.3 International Fuel Tax Agreement**

The International Fuel Tax Agreement provides a roadmap for jurisdictional cooperation, which will be crucial for bordering states that have RUC programs. The International Fuel Tax Agreement is a tax collection agreement among the 48 contiguous U.S. and the 10 Canadian provinces that border the U.S. This agreement provides a uniform administration of motor fuel taxation laws for qualified motor vehicles, which are heavy-duty trucks that operate in more than one state or province. The main benefit to joining the International Fuel Tax Agreement is that it streamlines tax payments to all jurisdictions in which a truck driver operates. Prior to the International Fuel Tax Agreement, trucks needed individual decals for each state they operated in. With the International Fuel Tax Agreement, licensees only need one set of decals for their trucks, and they only need to file one tax return per quarter and make one tax payment or refund. The International Fuel Tax Agreement program then distributes these tax payments to the states in which the truck driver operated by the mileage they drove in given states. While International Fuel Tax Agreement is a more streamlined system than the previous structure, it took over 10 years for all states and provinces to agree to join.

International Fuel Tax Agreement processes answer the question for how to track, pay, and refund tax payments that are due to multiple jurisdictions. Motor vehicle operators are required to track mileage, fuel acquired, and fuel taxes paid in the jurisdictions they operated in. A national RUC program and cooperative state RUC programs will likely need to create a program that utilizes principles and processes that are present in the International Fuel Tax Agreement. Vehicles that drive to multiple states will need to have a record of how many miles they drove in each state, and thus, how much their RUC payment will

be. Without a program like the International Fuel Tax Agreement that streamlines this payment, drivers will be faced with a complicated payment process. A RUC system will need to be able to function in multiple jurisdictions and be able to assign mileage by jurisdiction to appropriately bill users. The system that the International Fuel Tax Agreement has put together could address this concern when implementing RUC. There is even the possibility that the International Fuel Tax Agreement's scope could serve this purpose for heavy-duty vehicles.

#### **1.2.4 Utilities**

Because RUC treats roadway provision as a utility, utilities are a valuable industry from which to draw lessons. In particular, industry billing practices can inform how a RUC system bills its participants.

Utility billing practices have already been adopted for existing RUC programs in the form of driving statements. Issued monthly or quarterly, these statements display road usage and RUC owed during the statement period. They are typically distributed by email, though print versions could be created for those that desire them. If payment is tied to statement issuance, as it may be on post-pay systems, statements become invoices.

RUC programs have found inspiration from utility invoicing, both in form and process. Figure 16 shows a sample electric bill that serves as a good model for a driving statement. The bill contains the customer's name and account information, a clear breakdown of the amount due, and the history of usage over time.

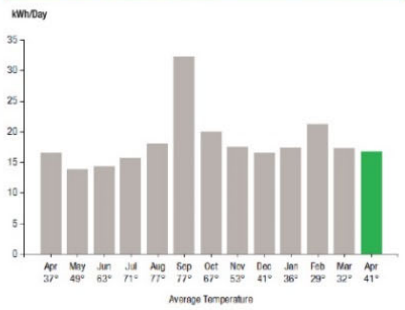
Figure 1: Sample Electric Utility Bill

**EVERSOURCE**

Account Number: 0000 000 0000  
 Statement Date: 04/05/19  
 Service Provided To:  
 JOHN J CUSTOMER

<b>Total Amount Due by 04/30/19</b>	<b>\$117.17</b>
Amount Due On 04/05/19	\$133.48
Last Payment Received On 04/04/19	-\$133.48
Balance Forward	\$0.00
Total Current Charges	\$117.17

**Electric Usage History – Kilowatt Hours (kWh)**



**Current Charges for Electricity**



**Electric Usage Summary**

This month your average daily electric use was **16.8 kWh**. This month you used **1.8% more** than at the same time last year.

**News For You**  
 Join us at the Eversource Walk for Boston Children's Hospital on Sunday morning, June 9 at the Hatch Shell in Boston. The annual walk raises funds to support the critical research, patient care and community health programs of the hospital. Visit [BostonChildrens.org/WalkWithUs](http://BostonChildrens.org/WalkWithUs) to register.

Remit Payment To: Eversource, PO Box 56007, Boston, MA 02205-6007

EM\_190403.TXT

**EVERSOURCE**

Account Number: 0000 000 0000

Please make your check payable to Eversource or to make your payment today visit [Eversource.com](http://Eversource.com).  
 If mailing your payment, please allow up to 5 business days to post to your account.

<b>Total Amount Due by 04/30/19</b>	<b>\$117.17</b>
<b>Amount Enclosed</b>	

JOHN J CUSTOMER  
 ANY STREET  
 ANY TOWN MA 00000-0000

Eversource  
 PO Box 56007  
 Boston, MA 02205-6007

00000000000000 0000000000 0000000000

Driving statements that model utility invoices are simple and user-friendly. Designing such simple and user-friendly statements is, however, not trivial. RUC programs and pilots have found that the following variable information is useful to include on RUC statements:

- A header with the participant's name and address, and a total of miles and charges for all vehicles
- Attention-grabbing text or graphics on the envelope that draw attention to the invoice

- Per-vehicle information that includes the following:
  - Miles driven (with details on both in-state and out-of-state miles) and corresponding charges
  - If fuel tax credits are provided, details of fuel usage and corresponding credits
- Details of the associated electronic wallet, if applicable
- A simple frequently asked questions (FAQ) list about values
- A field for inserting any urgent messages for the participant, such as “Your bill is overdue” or “Your device is unplugged”

The driving statements is, for many participants, the greatest single touch point they have with the RUC program, as it is a monthly or quarterly reminder of program usage. Thus, in addition to including the above information, statements should be designed to create a good user experience.

Some utilities require a deposit when people sign up. This practice is designed to protect the utility in case a customer fails to pay their final bills and leave the property without paying; the deposit can be used to cover some or all of the funds that are owed. This process can be utilized by a RUC system to serve the same purpose.

### **1.2.5 General Taxation**

This section focuses on tax-related mechanisms that can be applied to specific RUC operations. Payment plans and low-income identification processes will be required to provide an equitable system. Electronic payments will be necessary to make RUC current with contemporary expectations. The Internal Revenue Service provides a model for an enforcement system based on voluntary compliance.

#### **1.2.5.1 Payment Plans**

RUC programs could provide a higher level of customer service by taking inspiration from public agencies that have adopted payment plans. Payment plans allow customers to pay off balances over a predetermined amount of time without accruing interest. This can make completing payments easier for users, particularly for low-income populations.

The San Francisco Municipal Transportation Agency provides two payment plan tracks for people who incur parking or transit citations. Anyone can enroll in the standard payment plan that allows 12 weeks to pay a fine that is less than \$500 and 16 weeks for those that are greater than \$500. The low-income payment plan gives 24 months to pay any fines that are owed, no matter the amount. Both plans have set minimum monthly payment amounts.

#### **1.2.5.2 Low-Income Identification**

To effectively account for equity considerations, a RUC program will need to be able to identify eligible participants. The San Francisco Municipal Transportation Agency defines low-income customers as those with a gross annual income at or below 200% of the Federal poverty index, which is a result of the high cost of living in the Bay Area. Eligibility must be proven when applying for the low-income payment plan. This can be corroborated by providing a copy of an electronic benefit transfer card, unemployment benefits letter or evidence of participation in other California-specific aide programs. The applicant can also authorize the San Francisco Municipal Transportation Agency to verify that the customer is receiving an income eligible service from the San Francisco Department of Human Services. If a customer is not

participating in these programs, the customer can certify that they meet the income requirements and San Francisco Municipal Transportation Agency can request copies of recent tax returns. Customers must respond to these requests to stay in the payment plan.

A similar identification process could be followed by a RUC program. Most of the options put the onus of proof on the applicant, which is less customer-friendly. That said, it would likely make abuse less prevalent as it requires multiple dishonest steps for relatively little gain. A more customer-friendly approach would be for the program operator to do the legwork of confirming an applicant meets specified low-income requirements. This could be done through collaboration with taxation bodies such as the Internal Revenue Service for gathering income information.

### 1.2.5.3 Electronic Payments

Though many government agencies and related industries support paying in person or by mail, electronic payment is now the standard. Electronic payments can be made by credit card or transmittal through a bank account. The Internal Revenue Service describes its Electronic Federal Tax Payment System as “the easiest way to pay all your federal taxes.” Utility companies recommend electronic invoicing and payment and offer automatic payment if their scheduled bills are static. However, it is important to offer cash or check payment mechanisms to support unbanked users. This can be done by providing physical locations for payment to be collected.

### 1.2.5.4 Compliance and Enforcement

The Internal Revenue Service employs a range of processes for pursuing compliance with tax law. Table 1 describes these mechanisms.

**Table 1: Internal Revenue Service Compliance Mechanisms**

Action Group	Action	Process	Purpose
No Review of Books and Records	Automated Underreporter Program	Computer systems match income reported by a taxpayer with returns provided by third parties. The taxpayer will receive a letter if there is a difference and Internal Revenue Service staff will work with the taxpayer to resolve the issue.	Catch and address unintentional discrepancies.
No Review of Books and Records	Math error notices	Taxpayers are sent these when it appears that they have made a calculation or clerical error on their tax return, such as incorrectly adding two lines together.	Catch and address clerical errors on a tax return.
No Review of Books and Records	Automated Substitute for Return	Enforces tax compliance for individuals who have not filed tax returns, but whose income shared with the Internal Revenue Service indicates an income tax liability.	Ensure proper reporting of income and corresponding tax payment.
No Review of Books and Records	Compliance check	A letter is sent to a taxpayer asking them a few questions to determine whether the taxpayer is meeting their information reporting requirements.	Ensure a taxpayer is correctly self-reporting.

Action Group	Action	Process	Purpose
Review of Books and Records	Correspondence examination	A narrower examination (or audit) of a taxpayer's records.	Obtain additional information about limited issues on a return.
Review of Books and Records	In-person examination	Depending on the case, this audit can review multiple years of returns in conjunction with the taxpayer's records. The taxpayer can visit an Internal Revenue Service office or vice versa. These can result in the taxpayer owing additional taxes or the Internal Revenue Service refunding the taxpayer.	Obtain additional information about issues on one or several returns.
Letters	"Soft" letters	A letter that serves as a nudge to a taxpayer to address a probable issue before advancing to an audit. An example would be a foreign corporation that has done business in the U.S. but has not completed an income tax return.	Provide a taxpayer the opportunity to address an issue before advancing to an examination.
Letters	Educational letters	A letter that informs taxpayers about changes in the law that are relevant to them.	Could prevent future errors on tax returns.
Criminal Investigation	Criminal Investigation	An investigation of taxpayers that intentionally fail to pay their taxes or are suspected of engaging in illegal behavior.	Deter those who refuse to comply.

The Internal Revenue Service enforcement system relies on voluntary compliance by individuals and businesses. The agency emphasizes that its guiding mission is to help taxpayers and treat them fairly and respectfully. Most Internal Revenue Service compliance processes are communicative efforts that help taxpayers properly adhere to rules.

A RUC program likely will not be as complex as the U.S. tax code, but there are lessons to be learned from the Internal Revenue Service enforcement system. Preventing accidental noncompliance through educational outreach and automated reviews are appropriate first steps. The "soft" letter mechanism is a good tool to bring users into compliance before advancing to more serious measures. There is not an appropriate direct comparison for the examination phase, so it is likely that criminal investigation would be the next and final step. While a criminal-level prosecution for tax issues is very serious and is only used for extreme circumstances, criminal enforcement of RUC noncompliance would not be nearly as grave, but may need to be used more often. These enforcement mechanisms could take the form of traditional traffic violations that require the user to backpay their owed RUC as well as a small fine. This enforcement could be performed by a dedicated adjudicative system that is administered by the umbrella agency in charge of the RUC program.

A range of compliance and enforcement processes are discussed in Section 2.6 of the literature review.



### 1.2.5.5 Estimated Tax Payments

A RUC program can use lessons learned from the estimated tax payment system used by the Internal Revenue Service and other state tax collection agencies. Estimated tax payments are designed for taxpayers who earn income that is not automatically withheld by their employer. Taxpayers determine how much tax they expect to owe and can pay on a quarterly basis.

This structure is similar for how to implement a prepaid odometer-based RUC system. For example, a participant could pay for 12,000 miles of RUC at the beginning of the year and submit a photo of their odometer. At the end of the year, the participant submits their odometer reading to show how much they actually drove. If the participant only drove 10,000 miles, then they can get 2,000 miles worth of credit for the next season. Likewise, if they drove 14,000 miles, then they would owe an additional 2,000 miles worth of RUC on their next annual prepayment.

### 1.2.6 Tax- and Transportation-related Communication Efforts

Communication is critical to engendering public trust in an agency or program. These efforts focus on educating the public, providing day-to-day information as well as providing direction during unexpected incidents. RUC communications can look at tolling and traffic safety communications for guidance. Tolling and traffic safety communication efforts provide models for both the system rollout and continual messaging for a mature program.

#### 1.2.6.1 Tolling

Tolling system rollouts, such as introducing a new tolling system or implementing a new tolling technology, may share many similarities with starting up a RUC program. The following steps are identified best practices:

- 1. Build relationships.** This begins years before the implementation date and focuses on educating the public about all facets of the new toll mechanism. Gather input from the public through a variety of outreach methods and incorporate public concerns into plans. Reaching out to the business community is another crucial aspect of building relationships.
- 2. Brand the Project and Educate the Public.** Conduct ongoing branding work during the prior phase. One year from implementation, public education becomes crucial, so make sure to align all branding and messaging. Because social and digital media channels have overtaken traditional communications, use these media to disseminate information to the public and build support for the project. In addition, build a clear and informative website. Remember that this is the time is when the toughest questions will come in, so train staff to be prepared with answers.
- 3. Manage Expectations & Timing.** It is important for drivers to have a basic understanding of the complexity of the toll system. If drivers have been made aware of this, they will be more understanding of initial hiccups and any contacts with customer service will be less hostile. Communicate any schedule changes to the public as soon as possible.

Communication efforts do not cease after a toll road or toll technology is implemented. It is important to maintain a small marketing and communications staff going forward to maintain contact with customers. This staff should conduct surveys and focus groups to understand customer satisfaction and needs. The agency should also maintain a consistent communications strategy with clear goals and objectives. Maintaining a social media presence will sustain this connection and provide an avenue to communicate quickly during unexpected incidents.

These lessons are directly portable to a RUC program, both in the leadup to implementation and for ongoing day-to-day operations. RUC will be a new concept to most drivers, so it will be critical to clearly explain the system to as many people as possible. A RUC program will also have significant impacts on the business community, particularly commercial trucking; these groups will need to understand how the program affects their operations and have opportunities to be heard. Once a program is implemented, it will be important to stay contact with drivers and provide them with many ways to give feedback. Maintaining an understanding of the driving base through surveying is recommended as it could provide insights about how to improve the program.

### **1.2.7 Traffic Safety**

This field has been maturely developed to address a range of traffic safety issues. Traffic safety communications focus on wide-reaching campaigns to encourage awareness of specific driving behaviors, including drunk driving, safety around rail crossings, speeding prevention, and motorcycle safety. These marketing campaigns are targeted to specific issues and seek to spread awareness and reduce incidences of the chosen issue. They function as an advertisement campaign for a product, utilizing mediums such as television commercials, billboards, and social media.

Traffic safety marketing could be a tool that a RUC program uses to raise public awareness. A comprehensive advertisement program could provide key pieces of information and direct drivers to a fully built out website. Embracing social media would be particularly important, as some safety campaigns have built their marketing materials to try and go viral, which leads to increased free publicity.

## Global Road Pricing-Related Programs References

### Transportation Pricing

Czako, Josef, "Where is tolling tech taking us?", ITS International. Available:

<https://www.itsinternational.com/its1/feature/where-tolling-tech-taking-us>

"About E-ZPass", E-ZPass Group. Available: <https://www.e-zpassag.com/about-e-zpass/how-does-it-work>

"About OMNY", OMNY. Available: <https://omny.info/about-omny>

"About Us", IFTA. Available: <https://www.iftach.org/Aboutus.php>

### Utilities

"FAQ – OReGO Invoice", Emovis. Available: <https://orego.emovis.us/faq/OReGO-Invoice/>

"Understand Your Electric Bill", Eversource. Available: <https://www.eversource.com/content/ema-c/residential/account-billing/manage-bill/about-your-bill/understanding-my-bill/sample-electric-bill>

### General Taxation

"Payment Plan", San Francisco Municipal Transportation Agency. Available: <https://www.sfmta.com/getting-around/drive-park/citations/payment-plan>

"How the IRS Ensures Compliance with the Tax Laws", Internal Revenue Service. Available: <https://www.irs.gov/about-irs/how-the-irs-ensures-compliance-with-the-tax-laws>

### Communications

Hicks, Mark, "A Tolling Agency's Guide to A Successful Marketing Strategy," RS&H. Available: <https://blog.rsandh.com/keys-to-successful-communications-with-your-toll-paying-customers>

O'Loughlin, Christine, "How Communication Strategy Can Make or Break a Toll Road," RS&H. Available: <https://blog.rsandh.com/how-communication-strategy-can-make-or-break-a-toll-road>

"Traffic Safety Marketing", U.S. Department of Transportation. Available: <https://www.trafficsafetymarketing.gov/>