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COMPATIBILITY OF RUC & TOLLING
IN WASHINGTON STATE

 **WA RUC**



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1 INTRODUCTION

The Legislature directed the Washington State Transportation Commission (WSTC) to examine the concept of road usage charging (RUC) as a potential replacement for state gas taxes in 2012. RUC – which charges drivers based on the distance driven instead of fuel consumed. To oversee the examination of RUC, the Legislature directed WSTC to create a Steering Committee, which has met continuously since 2012, formulating and analyzing questions around the viability of RUC, culminating most recently in the design and launch of a large-scale, statewide, year-long pilot test (“WA RUC”) in January 2018.

Since 2012, the RUC Steering Committee has regularly identified policy issues for further development, including the need to assess the compatibility between a prospective Washington RUC system and the existing state tolling system. The tolling system, branded as *Good To Go!* and operated by the Washington State Department of Transportation (WSDOT), consists of in-vehicle transponders for detection of toll events across several highway and bridge facilities, account management, and customer service. This policy paper represents the output of the compatibility assessment. This report is distinct from the investigation within the WA RUC pilot itself of interoperability between RUC schemes across multiple jurisdictions (Oregon, Idaho, and British Columbia). While there is some conceptual overlap, these two distinct workstreams should not be confused with one another.

The primary output of this paper is a set of high level policy principles. In arriving at these principles, we explore several possible models for compatibility of tolling and RUC in order to validate that the policy principles are achievable and logically sound. We begin this paper by exploring RUC and tolling, their basis for charging, their differences, and their similarities. We then expand on what compatibility can achieve (its objectives) and its potential benefits before exploring the associated challenges. We then set out several models for compatibility and consider them in relation to the benefits and challenges. Finally, based on the analysis of the several models, we derive high-level policy principles for pursuing compatibility between RUC and tolling in Washington.

2 BACKGROUND

2.1 *Good To Go!* and WA RUC

Good To Go! is the electronic toll collection system WSDOT uses on the four current toll facilities in Washington. *Good To Go!* customers prepay a balance into an account, with tolls electronically deducted as users pass through toll collection points. Automated License Plate Recognition (ALPR) captures unregistered transactions and sends a bill by mail to customers. This tolling operation provides a funding mechanism for the specific tolled bridges and express lanes.

RUC, if implemented, would replace the gas tax with a per-mile charge. RUC aims to ensure sustainable, long-term funding of road maintenance while preserving the “user pays” principle embodied by the gas tax.

Despite their technical and policy distinctions between RUC and tolling, drivers may perceive the two systems as the same or similar. Drivers, especially those with existing toll accounts, could perceive RUC as an added inconvenience to the current tolling system. The absence of compatibility between tolling and RUC may reduce the public acceptance of both systems. Likewise, compatibility between tolling and RUC could offer user benefits that increase public and political acceptance. Section 4 describes the differences between RUC and tolling in more detail.

2.2 What is compatibility?

Compatibility refers to the ability of two or more systems to co-exist harmoniously. For users, compatibility could manifest itself in many ways, from the ability to manage and pay tolling and RUC charges with the same payment mechanism to full integration of reporting methods and accounts, potentially including the integration of payment mechanisms for other modes of transport such as parking, ferries, and transit, and even other services.

Interoperability is a closely related term of art adopted in the tolling industry in the early 21st century when it became necessary for tolling technology (e.g., in-vehicle tags and overhead tag readers) and billing systems to interact. Today, interoperability more generally means the ability of motorists to use a single method of payment and reporting for road use across facilities owned by various

authorities. It also tends to involve the reconciliation of revenue from motorists between those collecting the tolls and those entitled to the revenue.

In tolling, the absence of interoperability, and compatibility more broadly, increases the burden on road users who may have to make separate payments to separate entities and who, in some cases, even need multiple in-vehicle devices. The introduction of RUC in Washington will require customers to set up, manage and interact with another service, and for some customers this would be in addition to their existing *Good To Go!* account. To determine whether Washington can avoid non-compatibility between RUC and tolling, we introduce and explore in this paper varying degrees of compatibility that may evolve over time.

2.3 Longer term vision for integration of mobility services

While this paper deals specifically with the issue of compatibility between RUC and *Good To Go!*, the issue of interoperability between RUC schemes across multiple jurisdictions is also being investigated within the WA RUC pilot. Further still, there are possibilities for Washington to foster collaboration between transport operations within the state and beyond. For example, the possibility of closer integration between *Good To Go!* and ferry operations has been investigated previously and could be extended to include RUC. Transport authorities globally are increasingly looking at how mobility for citizens can be enhanced through integration of a wide range of services, for example through a single payment platform. But, as far as compatibility between RUC and tolling, the purpose of this paper is to enumerate options that respect the distinct policy purpose of each system.

3 OBJECTIVES, BENEFITS AND REQUIREMENTS

3.1 Objectives

The RUC Steering Committee highlighted 13 guiding principles for WA RUC. In relation to compatibility, they stated the following:

Washington road usage charge should strive to be interoperable with systems in other states, nationally and internationally, as well as with other systems in Washington. Washington should proactively cooperate and collaborate with other entities that are also investigating road usage charges.

This is the guiding principle which leads us to investigate the options for and feasibility of compatibility with *Good To Go!*, the tolling system in Washington. Based on an analysis of available documentation and through internal discussions, the following objective for compatibility between RUC and tolling has been identified:

To address an unexplored policy question about RUC by identifying the pathways toward a simplified user experience.

We have linked this objective very specifically to addressing an outstanding issue with RUC although it could equally be stated in terms of enhancing the user experience of tolling customers. Providing a more integrated and easier service to users removes a potential complaint about RUC or tolling, namely, that it represents an additional burden and inconvenience on the public.

3.2 Benefits

In fulfilling the objective above, Washington could achieve the following additional benefits:

- ▶ Improve collection rates for both RUC and *Good To Go!*; and
- ▶ Reduce operational costs for both RUC and *Good To Go!*

Even the simplest forms of compatibility imply account-based user models, web-based contact, and/or automated, electronic payments. These all lead to higher levels of compliance and payment and lower likelihood of costly enforcement than unregistered, manual models. Also, there is less need for human intervention on the part of operators dealing with customer service issues. The availability of a compatible service will also attract users.

3.3 Requirements

The requirements for compatibility are similar to the requirements for RUC and tolling more distinctly. Any system for charging for road usage must be clear, be simple to understand, provide all information that the customer needs, and present information in an easily digestible format. In a compatible system, in particular, users will expect a clear distinction between RUC charges and tolls.

A compatible system must be accurate and reliable in order to instill confidence in its constituent parts and underlying policies, while minimizing the need for corrective action and human intervention. Accuracy is not just about errors in the system, however, but is also about the input data relating to the vehicle, its classification, usage information, and ownership information. Successful compatibility requires that both WA RUC and *Good To Go!* work from consistent information.

There are various other requirements in relation to technology, common business rules and standards, levels of service, security, data privacy, and commercial matters. Each requirement must be addressed to varying degrees, depending on the model chosen, in order to achieve compatibility. We explore challenges to compatibility in the next section.

4 CHALLENGES TO COMPATIBILITY

The desirability of compatibility, having considered its benefits, depends also on the challenges to its implementation. Careful evaluation of ‘for and against’ will support coherent policy.

4.1 Agreements and common rules

There are various entities involved in the process of making two systems compatible, with various interdependencies between them. Parties may rely on each other for payments, the format and quality of information provided to customers, technology standards, levels of service, and more. A tolling agency may need payments at a certain frequency, a transaction hub may require certain interfaces and file formats in order to process transactions, and a service provider may require a particular level of compensation.

In order for this process to be effective and efficient, agreements are required between the various entities so that everyone knows what is required of them and so that each entity can be held accountable for a failure to perform in accordance with the agreements. Where commercial organizations are involved, commercial agreements or contracts are necessary. Where government agencies are involved, memoranda of understanding may suffice. In either case, the following principles should apply:

- ▶ Requirements, responsibilities, and obligations are set out clearly
- ▶ Levels of performance are defined
- ▶ Appropriate remedies are in place for when there is a failure to meet the agreed requirements
- ▶ The nature of the relationship between the parties is not the only determining factor in the form of agreements that are required.

Relationships may be informal where a basic level of collaboration is required while closer interdependencies, particularly of a commercial nature, drive a need for formal contracts.

The process of crafting agreements satisfactory to all parties can be difficult for several reasons. First, the issues addressed may be complex. Secondly, the

interests of the various parties are unlikely to align. Leadership is required to create the contractual apparatus and to bring organizations together to reach compromise. Certain matters may be more appropriately addressed bilaterally while others may require multi-lateral agreements. This is the case, for example, in Ireland where there is a multi-lateral agreement setting out common rules in relation to matters such as information exchange, while there are bilateral agreements dealing with levels of service to be provided by RUC service providers and fees to be provided by toll operators.

Fortunately for Washington, the entities involved in tolling are the same entities most likely to be responsible for RUC, and they already work together: WSDOT, WSTC, and the Department of Licensing (DOL). With legislative direction and a framework for compatibility spelled out in statute, the necessary parties can build on their collaboration to date on tolling and RUC to achieve the necessary inter-agency agreements and common operating rules.

4.2 Operational

Some inherent features of RUC and tolling will lead to operational differences in how the respective services are provided. Such differences will limit the potential for compatibility between the two systems.

- ▶ Tolling is based on discrete transactions where RUC is based on continuous usage. They are likely, therefore, to have different payment models, while the interaction between users and their service provider will also differ, particularly in relation to disputes.
- ▶ RUC may be post-paid, with the user getting invoices for the distance traveled in a given period. Tolls, on the other hand, are often paid via auto top-up, with deductions from a stored card on the account for each transaction. Such differences can prove confusing for customers and lead to a greater level of inward contact in the form of queries and disputes to the call centers.
- ▶ The enforcement processes may also be different. A tolling operator is likely to engage with users in order to recover toll payments and ensure that fines are paid. They may choose to exercise some leniency in so doing. However, non-payment of fees could be considered a form of tax

evasion and is therefore likely to be approached more severely. The enforcement process itself and how the customer service and account management functions interact with the enforcement service are also likely to result in different operational practices.

- ▶ RUC and tolling must work off consistent information in relation to users and their vehicles. This will very likely involve a look-up to the DOL vehicle registry, which WSDOT already has in place for tolling. The manner of this interface for tolling and RUC should be similar, both to ensure that customers receive a common experience with consistent information portrayed about their accounts with DOL, tolling, and RUC, and also to minimize the level of effort and complexity on DOL.

The extent to which differing operational processes affect compatibility depends on the degree of compatibility sought. Under a model with a single service provider taking payments for both RUC and tolling and providing an integrated customer service, the effect of these differences will be more acute and will demand a higher level of operational performance than would be the case where RUC and tolling remain as distinct services.

4.3 Legal

The legal processes for RUC and tolling will be different. Again, this particularly relates to enforcement and failure to pay. This could be in relation to anything from the standard of evidence to be provided or the steps to be taken when issuing legal proceedings. Whatever form compatibility takes, particular care will be needed to ensure strict adherence to what are likely to be different legal processes.

4.4 Governance

In an interoperable environment where there are interdependencies and associated contracts and agreements between various entities, it is necessary that governance is provided at the right level to provide the necessary oversight and control. This will help to ensure that the ecosystem functions effectively. Processes will need to be established to ensure that risks are managed, issues are communicated and escalated, disputes are resolved and guidance and

direction is provided. It will also require representation from the various entities involved in interoperability.

4.5 Technology

The current technology used to capture RUC transactions in the pilot program includes:

- ▶ Pre-paid mileage permits reconciled with odometer readings via remote image capture
- ▶ Post-paid odometer readings via remote image capture
- ▶ Post-paid OBD-II mileage reporting
- ▶ Smartphone app mileage reporting

The specific applications being tested are not currently capable of capturing toll events, and the technology used to capture toll events is not capable of capturing the distance traveled necessary for RUC. *Good To Go!* currently uses RFID technology (and ALPR for unregistered users) to capture vehicle passages. For the moment, two separate mechanisms are required to capture the journeys but, in the future, opportunities for the use of a single device, such as an RFID tag embedded in a GNSS module could be explored. It is feasible, particularly with the OBD-II option and possibly with smartphone, for RUC devices to identify tolling facilities and, effectively, to capture toll events. While this may require some adaptations to the technology, it presents the opportunity to allow users a single device to capture both distance travelled for RUC purposes and toll events for toll purposes. In fact, some OBD-II devices (including one of the devices being tested in the WA RUC pilot), and smartphone applications are used for reporting toll events in several jurisdictions around the U.S. The opportunity to integrate RUC measurements with such technologies is promising and merits further exploration.

Whether peer-to-peer or peer-to-hub-to-peer, compatibility may require the exchange of data between IT systems or back offices of both tolling and RUC. This will create the need to establish interfaces, decide file formats, and establish security and privacy standards. There is no obvious downside to designing a RUC system to accommodate data exchange with *Good To Go!*, or, indeed, other systems.

Change can be costly and disruptive and this needs to be considered when evaluating compatibility. The degree of change will depend on the design of the systems, the form of compatibility to be pursued and the degree of willingness of the parties involved.

4.6 Cost

Expanding on the issue of cost, achieving and maintaining compatibility will have costs that will vary depending on the degree of compatibility that exists. If we envisage compatibility as a process through which tolling and RUC operate independently but with co-operation on certain initiatives and sharing of information, there is little cost involved but with some benefit. On the other hand, deeper integration of operations, through something like the ‘one service’ model described below, will be more expensive to implement and maintain but may, potentially, result in financial savings over time. It is important that, whatever form of compatibility is chosen, there is careful consideration of the costs and benefits. It is also worth reflecting on the costs and benefits from a broader transportation perspective rather than focusing on the narrower effects on tolling or RUC individually.

4.7 User perception

WA RUC is addressing the broad issue of user acceptance of RUC, including the various challenges that come with the concept of RUC. Despite the very distinct policy purposes and operational statuses of tolling and RUC, the very notion of compatibility may heighten sensitivities among users or stakeholders that tolling and RUC are synonymous. Users may feel that they are simply being charged more for the same thing. Of course, this perception also depends on the model of compatibility ultimately pursued: communicating tolling and RUC charges distinctly, along with the purpose of the two charges, could help ameliorate concerns.

Compatibility introduces some risks to data privacy, through the exchange of data between different entities. Perceptions of privacy risks have had an impact on RUC acceptance at the state level. In participant recruitment and follow up surveys of participants in Washington, privacy is almost always noted as a top concern. Robust measures are required to ensure that data protection

requirements are adhered to and that data security is maintained and these matters need to be addressed holistically in an interoperable ecosystem. These measures are essential but, irrespective of how robust they are, there is still a risk that the public will be concerned about unauthorized sharing and use of their personal data.

5 OPTIONS

Compatibility can take many forms. The degree of realization of benefits as described in Section 3 and the ability to overcome challenges as described in Section 4 depends on the form of compatibility Washington policymakers choose to create. We present four models in this Section, ranging from minimal compatibility to full service integration.

5.1 Do nothing

The default approach to RUC and tolling is to maintain them as separate functions, with separate purposes and distinct operations. *Good To Go!* users will be required to set up and manage a second account used solely for RUC. This would be the easiest option for WSDOT. It simplifies the process of “standing up” the RUC operation, a process that, it could be argued, is already challenging enough without complicating it further by trying to make it interoperable. It has been observed that it is in the early days of a tolling or road user charging operation that the greatest challenges arise, the most contact, and complaints and disputes by customers are made. It has also been seen that this “teething” stage is not just a case of having a rough ride for a few months before getting to grips with the operation. There can be long-lasting damage to user perception, rates of compliance or payment and operational costs if the operation is not run well from the start. Such an outcome is not pre-ordained, however, but it will require more rigorous planning to start up an interoperable operation than a non-interoperable one.

Against this, the benefits of lower overall operational costs and higher overall revenue that may arise with interoperability will not be realized in the do-nothing scenario. Also, providing interoperability as an option to users helps ensure it is not an additional burden or inconvenience on users.

The question of whether or not to be interoperable with tolling could also be seen as a question of timing. There is an option to become interoperable at a later stage when the RUC operation has become more stable and is better positioned to deal with potential turbulence in transitioning to tolling interoperability. At such a future point, there may in fact be a demand from the public for tolling interoperability,

which could be seen as a better starting point than having to persuade the public of its benefits.

We suggest that if interoperability with tolling is to be pursued, it should be done from the start. This will add some complexity to the planning for RUC but will allow the benefits of interoperability to be realized from day one and will be less disruptive than migrating to interoperability at a later stage.

5.2 Collaboration

We can envisage a level of compatibility that could be achieved by means of a basic process of collaboration. This could take the form of regular meetings between RUC and *Good To Go!* representatives, sharing of information and pursuit of certain common objectives. At a very basic level, both systems should work off the same DOL vehicle registry, for example. We could envisage efforts to establish a common look and feel to websites and other contact channels, consistent operational procedures and links between websites. Indeed, even creating the sense among customers, if they contact the wrong contact center, that their issue is being addressed in a consistent way is a small but important measure. These might seem like trivial matters but they can make a big impact. And they can be achieved with minimal investment, but with a strong sense of common purpose and close co-operation and co-ordination. The spirit of collaboration is something that needs to be nurtured at every level within the respective organizations and needs to be something that staff feel is valued and rewarded.

5.3 One bill

Under this model, RUC and tolling transactions are calculated separately but combined into one bill or statement for the customer to pay. This would require the setting up of a separate system to which both providers feed in their charges and which would generate a single invoice for the user.

From a customer perspective, this would allow for all charges to be displayed in a single source and increase the transparency of where and when the charges were incurred, allowing for a total payments view. In this model, the customer would still hold two separate accounts, with two separate account providers and would pay

them both separately for the charges incurred. Nonetheless, there is some convenience from a user perspective.

There is some benefit for *Good To Go!* in that it shares some of the costs of invoicing with RUC. It is possible, however, that this model could result in increased operational costs due to users making payments to RUC that should have gone to *Good To Go!* and vice versa and of contacting the wrong operator in the event of an issue. Under more integrated models, where users simply make a single payment which is allocated between the relevant entities in the background, this is less likely to happen.

The systems for both *Good To Go!* and RUC will require an interface with a single invoice-generating back office to allow for the billable transactions to be consolidated for the user. This back office will need to be designed to accept transaction files from *Good To Go!* and RUC and some changes to the design of the *Good To Go!* and RUC systems may be required in order to allow such transaction files to be processed.

One of the challenges with compatibility is securing agreements between the various entities between whom there are interdependencies. This challenge is less pronounced under the “one bill” model than with other models of compatibility. One of the issues to be addressed relates to the sharing of information on customers and transactions. This will include obligations to notify the operating agencies of changes in customer details¹. It will also require agreement in relation to information security and data protection standards with which to comply. Agreement will be required to ensure collaboration in the event of miss-allocation of payments and other errors. Finally, a level of performance will be demanded from the entity responsible for generating invoices.

From a customer perspective, a single bill does not remove the administrative burden of having two accounts for what they may perceive to be the same function – paying for use of roads. It will, however, remove any ambiguity relating to what the customer is paying and who they are paying it to. All risk of non-payment will

¹ Both *Good To Go!* and RUC should receive the same information on ownership details from the DOL.

remain with the individual operators as they are each responsible for the customer.

5.4 One account

Under this model, the user has a single account provider but continues to make separate tolling and road usage payments and WA RUC and *Good To Go!* remain individually responsible for retrieving payments and engaging with users. If there is a single device used to capture both toll events and road usage, such a device could be provided by the account provider under this model.

This model is an advancement on the One Bill model insofar as it helps to address the issues relating to inconsistency of customer and ownership information. The account provider could be a *Good To Go!* account provider or a RUC account provider. 3rd party fleet management companies are already behaving like account providers, having established a single account with *Good To Go!* and individual accounts with their subscribers and levying management charges on their customers for this service. Based upon the information gathered for this paper, there seems to be no reason why this model couldn't be expanded to include RUC.

The one account model would simplify the process of registration for users who would only have to register once for both RUC and tolling services. Users who are already registered with *Good To Go!* would have to sign up for having their RUC charges being reflected on their *Good To Go!* account and invoices. Customers contacting their account providers may need to be redirected to either WA RUC or *Good To Go!* in the event that an issue is not within the responsibility or power of the account provider to resolve. This could lead to some frustration on the part of the user who may want to interact with a single account provider for all matters relating to road usage – essentially the One Service model described below. Again, adopting some of the simple measures described under the 'Collaboration' option above will help to address some of these customer service issues.

5.5 One service

In the One Service model, customers would see all road charges, tolling and RUC, as being delivered by a single service. It would provide both for One Bill and One

Account but could additionally provide for a single payment portal through which payments are made. Such payments could either be made separately for RUC and tolling or could be bundled into a single payment that is allocated by the account provider towards WA RUC or *Good To Go!*. The user would engage with a single account provider who would provide a 'one stop shop' for all road usage related matters. This would be of significant benefit to users.

The account provider could either be the *Good To Go!* account provider or a RUC account provider. Indeed, the question arises as to whether the fleet account model that prevails on *Good To Go!* at present could be extended to provide something akin to the 'one service' model.

Tracking of road usage could either be provided in-house (by a state agency) or outsourced to a contractor or service provider, for example to the provider of the OBD-II device. Outsourcing of this function would allow the account provider to focus on a core competence in customer service and account management but may involve some additional contractual complexity.

This model is technically more complex than the One Account model and requires the processing of road usage and toll transaction data, the translation of this into amounts due, the processing of payments and customer contact. The system will need to provide full traceability to ensure that transactions, usage and payments are correctly allocated. In any case, this model may require some adaptation of the *Good To Go!* system, will add some complexity to the RUC system and is generally more technically challenging than the other models. Nonetheless, it is not a new concept and there are many systems worldwide that provide this kind of integrated service today.

Where an account provider is contracted to WA RUC and *Good To Go!*, it is essential that the full scope of services is reflected and that there are appropriate levels of service included, penalties in the event of failure to provide a service and appropriate incentives and remuneration considering the service being provided. This approach does lend itself to being a true service model whereby the account provider can be contracted to provide a full end to end service and whereby WA RUC and *Good To Go!* can demand levels of service that are more aligned with

the outcomes they seek rather than specifying more detailed technical requirements that may not ultimately lead to the level of service required.

6 ASSESSMENT

Table 1 below presents a simple assessment of the various degrees of compatibility. The evaluation criteria reflect the benefits listed under Section 3.2 and the challenges listed under Section 4 in relation to each of the compatibility models. The scores presented do not reflect the level of complexity and the true impact of the issues under consideration. Equally, the criteria themselves have not been weighted in order to reflect legislative, WSTC, or Steering Committee priorities. This evaluation is designed to stimulate thought and reaction. We have also shown in Section 5 above how the models are not strictly defined and some of them could be combined.

	Model A	Model B	Model C	Model D	Model E
User Experience					
Improved Collections					
Operational Efficiency					
Contractual Complexity					
Operational Complexity					
Governance					
Technical Complexity					
User Perception					
Cost of Implementation					

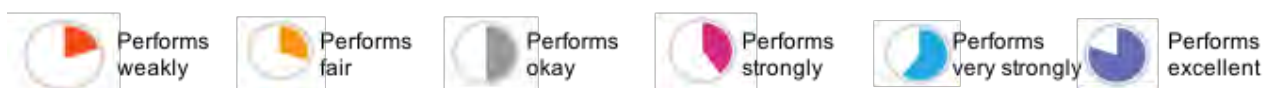


Table 1: Evaluation of Compatibility Approaches

7 POLICY PRINCIPLES

We have outlined benefits, challenges, and several prospective approaches to achieving or pursuing compatibility between RUC and tolling in Washington.

Washington can achieve compatibility between RUC and tolling at various levels of integration, depending on the appetite for such integration and the willingness to invest in it from the start. Even with minimal compatibility, Washington can achieve one fundamental objective: improve the user experience, by reducing confusion, reducing steps, increasing understanding of user requirements to comply, and clearly communicating the purposes of RUC and tolling.

To support further developing an approach to compatibility of RUC and tolling, we set out some high-level policy principles to consider below, should the legislature pursue RUC as a revenue mechanism.

- ▶ At least minimal compatibility between RUC and tolling should be pursued from the start of RUC rather than introducing it at a later stage.
 - > Detailed planning should be undertaken to ensure that any additional complexity arising from the introduction of an interoperable service, does not jeopardize the launch of RUC.
 - > A minimum condition for pursuing compatibility is that the type and degree of compatibility must deliver customer ease of use far superior to that of two distinct, non-compatible systems.
 - > RUC and tolling should co-ordinate their activities so that users are given a sense of a consistent service even if the two operations remain separate.
- ▶ There will be challenges, costs, and benefits to RUC and/or tolling in achieving a given compatibility model. The broader benefits to transportation in Washington may be far greater and may justify the investment needed to bring about compatibility. With this in mind, the following factors should be considered.
 - > Maintaining a collaborative relationship between RUC and tolling.
 - > Ensure there is full transparency in terms of costs and benefits.
 - > Ensuring that there is appropriate allocation of responsibility and compensation for RUC and tolling agencies.

- ▶ The legislature should define a governance framework for compatibility between RUC and tolling.
- ▶ Compatibility between WA RUC and *Good To Go!* can grow over time to include possible use of an interoperability hub and broader collaboration with RUC systems in neighboring states and other transport services. Technology should be designed in such a way that interoperability with other transport systems is feasible, i.e., it should be based on an 'open architecture' concept and be 'future-proofed'.