

# Blue Ribbon Panel on 911 Funding

Report to the National 911 Program



Washington, DC

December 2013



### **About the National 911 Program**

The mission of the National 911 Program is to provide Federal leadership in supporting and promoting optimal 911 services. It was created as a point of coordination for activities among 911 stakeholders and to provide information that can be used to improve the 911 system. We do that by developing a variety of tools and resources including tools that can be used to plan and implement Next Generation (NG) 911.

The National 911 Program is housed within the Office of Emergency Medical Services at the National Highway Traffic Safety Administration (NHTSA) – part of the U.S. Department of Transportation.

### **About NHTSA**

NHTSA'S mission is to save lives, prevent injuries and reduce economic costs due to road traffic crashes, through education, research, safety standards and enforcement activity. The National 911 Program contributes to NHTSA's mission by enabling efficient and effective response to motor vehicle related crashes, thereby reducing death and disability caused by roadway crashes.

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## **Executive Summary**

In an emergency, the public has come to rely on 911 and callers expect the system will function properly anytime and anywhere. The 911 system is credited with saving countless lives each year, and is a lifeline for those people calling at a very difficult moment in their life. Funding the 911 system is an increasing challenge for the state and local governments charged with their operation. Some 911 Authorities and public safety answering points (PSAPs) find that current funding mechanisms may not be adequate to sustain future 911 operation. With the transition to Next Generation 911 (NG911) on the horizon, PSAPs are facing hardware and software changes, equipment upgrades, network replacements, and new training requirements for 911 personnel. In addition, the cultural transition from landline voice telephones to mobile, Internet Protocol (IP)-enabled devices affects how 911 will function.

These new requirements, shifts in technologies and the public's evolving use of communication technologies have often had negative and unstabilizing effects on 911 funding mechanisms and levels. The transition to NG911 fundamentally changes how 911 is funded in many jurisdictions. As a result, new and novel methods of providing consistent funding and oversight may be needed, not only during the implementation of NG911, but as part of a comprehensive solution that supports the 911 system's operation and maintenance. With this in mind, the entire 911 stakeholder community and all levels of government must examine and explore additional funding and oversight opportunities for the nation's 911 system.

Accordingly, this report is intended as a first step, a conversation starter, on the vital issue of future 911 funding options. Implicit in this report is the recognition that sufficient, reliable, and recurring funding for 911 is an essential component of public safety and homeland security in each state and the nation as a whole. In particular, upgrades to our country's aging analog 911 infrastructure are urgently needed to provide the capabilities our citizens expect from modern telecommunications technology. This report explores various approaches to meet the needs of 911 in the twenty-first century.

## **The Role of the National 911 Program**

The mission of the National 911 Program is to provide Federal leadership in supporting and promoting optimal 911 services. It was created as a point of coordination for activities among 911 stakeholders and to provide information that can be used to improve the 911 system. The program meets these responsibilities by developing a variety of tools and resources that can be used to plan and implement Next Generation (NG) 911.

The National 911 Program also coordinates efforts with a number of public and private organizations at the Federal, national, state, and local levels. In this role, the program collaborates with other Federal agencies, including the Federal Communications Commission (FCC). Collaborative activities with the FCC include participation in formal FCC advisory groups, such as the Communications Security, Reliability, and Interoperability Council (CSRIC).

In its final report to the Working Group 4B of the second iteration of CSRIC - CSRIC II made a recommendation that, "the FCC should encourage the National 9-1-1 Program to convene a Blue Ribbon Panel as soon as possible, to address 9-1-1 funding issues and make recommendations for funding construction and maintenance of NG9-1-1 systems." The National 911 Program decided to develop

option paper for local, State and national 911 funding and oversight models that is based on appropriate economic theories and principles and input from a “Blue Ribbon Panel on 911” whose members possess specific, demonstrated expertise in economics.

By sharing the funding ideas such as those within this report, The National 911 Program meets its mission of supporting optimal 911 services. The Program also contributes to the safety mission of NHTSA and the US DOT by enabling efficient and effective response to motor vehicle related crashes, thereby reducing death and disability caused by roadway crashes.

## Methodology

The project team established and convened a Blue Ribbon Panel on 911 Funding to analyze current funding and financing strategies and governance models and explore new possibilities that could be applied at the local, state, or national levels of government. The Panel included experts from the fields of infrastructure finance, government policy, public-private partnerships, 911 technology and public safety operations, and economics. By design, the Panel was not composed of only “traditional” 911 stakeholders, but rather a broad consortium of experts invited to provide their perspectives, insight, and expertise on the challenges and opportunities facing 911 funding and oversight methods nationwide.

The Panel’s discussions generated numerous ideas and suggestions to support the transition to NG911 systems by addressing current challenges and improving upon past successes. The Final Report of the Blue Ribbon Panel on 911 Funding project builds on the ideas and recommendations of the Panel and incorporates further research to provide 911 jurisdictions, policymakers, and other stakeholders with a summary of possibilities and considerations that can support 911 into the future.

## Blue Ribbon Panel Findings

Following a review of current funding and oversight methods and concerns, the Panel discussed and proposed possible funding mechanisms to support the transition to NG911 operations in the near term. Financing methods discussed fell into one of the following three categories:

- **State and/or Local Public Financing**
  - Existing means of current 911 funding (e.g., surcharges on telephone lines),
  - Ideas currently in small trials (e.g., property- or utility-based surcharges, sales tax, etc.),
  - Completely new ideas to the 911 community (e.g., fee for service)
- **Federal Financing**
  - Federal grant programs,
  - Potential Federal infrastructure financing opportunities (such as the National Infrastructure Reinvestment Bank)
- **Private Financing**
  - Public-private partnerships (P3s),
  - Cloud-based hosted or leased solutions,
  - Private grant programs

With more than 6,000 PSAPs nationwide, each 911 operation is unique, suggesting that no single, universal approach to 911 funding and oversight will be successful nationwide. In addition, jurisdictions

are not limited to a single funding approach. Overall, this report identifies three major challenges with regard to funding the transition to NG911:

- Lack of a comprehensive cost estimate for both the transition to NG911 and ongoing operation and maintenance costs
- Existing legislation that excludes new methods for revenue generation for 911, making it difficult to keep pace with the dynamics of the telecommunications user base
- Diversion of revenues collected for 911 services through existing means to other uses.

In addition to funding concerns, governance and operational issues were identified. New needs and possibilities associated with the implementation of NG911 may necessitate reexamination of coordination and education efforts, and funding for these activities needs to be defined. Addressing these issues during the planning and initial implementation phases of NG911 will help ensure a smoother transition. By migrating to NG911, PSAPs become part of an interconnected “system of systems.” This new model may facilitate cost sharing and shared governance, but it also represents a major shift from the current governance structures of most 911 authorities. With the diversity of existing laws and regulations at all levels of government, there may be a need for legislative action to resolve regulatory and statutory issues to facilitate NG911 implementation.

The project team and Panel conducted a broad brainstorming process to identify and assess possible mechanisms for NG911 funding and governance, and gave consideration to the feasibility of each mechanism. They recognized that not all mechanisms are applicable or desirable for any given jurisdiction, but in general, certain approaches may be more feasible than others. The table below summarizes an assessment of select funding mechanisms seen as feasible today and those that might be in the future. A complete review of all mechanisms is included in this document.

**Table ES-1: Overview of Feasibility of Proposed Funding Mechanisms for NG911**

Feasible Today	Possibly Feasible in the Future
• Wireline, Wireless, Prepaid, and VoIP Surcharges	• Auction Revenues
• Property-Based Taxes	• Special Event Permitting Fees
• Fee-for-Service Payments	• Health Insurance Taxes
• Public–Private Partnerships	• User Fees
• Hosted Solutions	• National Infrastructure Reinvestment Bank

From a governance perspective, NG911 will be delivered as a result of partnerships at all levels of government. The Federal Government can act as the catalyst for NG911 transition through coordination of nationwide NG911 implementation, by helping to alleviate funding concerns and by identifying standards, best practices, and sharing lessons learned. The bulk of the effort and authority for NG911 deployment, however, falls to the state and local jurisdictions. Ultimately, it will take coordinated involvement of local, state, and Federal stakeholders for a successful nationwide transition to NG911 to occur, and transition will not occur the same way in every jurisdiction. Regardless of the implementation approach, for the transition to be successful, state 911 agencies require appropriate authority to oversee the operation of the state’s 911 system. Statewide planning that encompasses design and estimating costs also ensures that appropriate state policies are in place.

## Next Steps

The Blue Ribbon Panel on 911 Funding project identified new and novel ideas that have the potential to ensure sustainable 911 funding. Stakeholders concerned about 911 funding and governance are encouraged to consider the research, models and mechanisms provided in this report and determine how they may be applied in their respective jurisdictions. There is an opportunity to champion the needs of the nation's 911 authorities, and to craft plans to adopt innovative and sustainable funding sources and oversight mechanisms for 911, by considering practical methods of implementation. The 911 community and those who support it are encouraged to begin the process of considering alternative funding methods and exploring models from other industries, expand upon the ideas in this document, and identify methods that will achieve their own specific goals and address the specific circumstances within their jurisdiction.



## 1.0 Introduction

This report reviews current and future funding and oversight possibilities for 911 services nationwide based on the ideas generated by the Blue Ribbon Panel on 911 Funding. On April 2, 2013, a meeting of the Blue Ribbon Panel on 911 Funding was conducted in Washington, DC, to begin the process of analyzing current funding and financing strategies and exploring new possibilities.

The objective was to generate ideas for new potential mechanisms for funding and oversight of 911 systems that could be applied at the local or state levels of government. A Blue Ribbon Panel was convened consisting of experts from the fields of infrastructure finance, government policy, public-private partnerships (P3), 911 technology and public safety operations, and economics. It was not a panel of “traditional” 911 stakeholders with only 911 experience, but rather a broad consortium of experts invited to provide their perspectives, insight, and expertise on the challenges and opportunities facing 911 funding and oversight methods nationwide. The Panel’s discussions generated numerous ideas and suggestions to support the transition to Next Generation 911 (NG911) systems by addressing current challenges and improving upon past successes. This report builds on the ideas and suggestions of the Panel by incorporating additional research to present 911 jurisdictions, policymakers, and other stakeholders with a summary of possibilities and considerations that can support 911 into the future.

### In This Section

#### 1.0 Introduction

- 1.1 Overview of the Blue Ribbon Panel
- 1.2 Purpose of the Report
- 1.3 Organization of the Report

### 1.1 Overview of the Blue Ribbon Panel on 911 Funding

The FCC’s CSRIC Working Group 4B was charged with examining and determining what changes or additions in 911-related Voice over Internet Protocol (VoIP) standards and best practices would be required for the migration to an Internet Protocol (IP)-based NG911 system. Working Group 4B also considered technical, operational, and funding issues for public safety answering points (PSAP) in transitioning to NG911. The group was not able to reach consensus on specific recommendations to address the issue of funding, except to recommend that the FCC encourage the National 911 Program to convene a Blue Ribbon Panel “to address funding issues for funding construction and maintenance of NG911 systems.”<sup>1</sup>

The objectives of the Blue Ribbon Panel were to:

- Convene a panel of experts from multiple fields, including finance, business, public policy, public safety, technology, and economics
- Identify the current, nationwide status of 911 funding and oversight
- Evaluate the effect that transitioning to NG911 will have on 911 funding
- Compare 911 funding and oversight models with models from other public-private entities
- Explore novel methods that will provide consistent funding and oversight for the upgrade and maintenance of NG911 systems
- Document funding and oversight models that show promise for state and local NG911 systems.

<sup>1</sup> CSRIC Working Group 4B, *Transition to Next Generation 9-1-1: Final Report*, March 2011. Available at: <http://transition.fcc.gov/pshs/docs/csric/CSRIC-WG4B-Final-Report.pdf> [Last accessed October 21, 2013]

The Panel of subject matter experts<sup>2</sup> was convened with these objectives in mind. To ensure all panelists had a baseline understanding of the topics to be discussed, a Blue Ribbon Panel Research Package and Agenda<sup>3</sup> were developed and distributed to participants. They included an overview of the current state of 911 funding and oversight, a collection of additional 911 funding reference documents, a sample list of discussion questions, and a program agenda. In-depth interviews, an in-person meeting and numerous electronic information exchanges were utilized during the course of the Panel's duration.

During the Panel meeting, a series of general questions were posed and an open discussion period followed. General topics examined included:

- How does implementation of a large-scale critical infrastructure project affect funding, and how does this relate to the transition from legacy 911 to NG911?
- What novel approaches to funding could be applied by 911 stakeholders?
- How do 911 funding and oversight models compare with models from other public-private entities, and how might P3s be leveraged?
- What are the criteria of a successful funding and oversight model?
- Are there any ideas or innovative concepts that could be applied to 911 funding and oversight that may seem difficult or outlandish now, but could be used in the future?

Following the Panel meeting, the project team compiled the information shared by the Panel; conducted further research, which included applying the team's subject matter expertise; held follow-up discussions with panelists for additional input and clarification, and provided a draft report to Panel members for review, to develop this report.

## **1.2 Purpose of the Report**

This report presents the ideas generated by the Blue Ribbon Panel supplemented by additional research and provides an analysis of funding alternatives and their feasibility. It seeks to share lessons learned and ideas generated by the Panel, along with the project team's research, all of which may be useful to the 911 stakeholder community. This report references numerous other reports on funding and oversight (see Appendix B) that may provide greater detail and analysis to support the summary suggestions made in this document. This report focuses on issues and suggestions made by the Panel, provides contextual summaries from supporting references and reports, and highlights research conducted by the project team. It is intended to facilitate further discussion and identify options for local, state, and national 911 funding and oversight mechanisms based on appropriate economic theories and principles.

### **1.2.1 What this Report is**

This report is intended as a first step, a starting point, on the vital issue of future 911 funding options. It is a compilation of ideas offered by a group of subject matter experts, who generously donated their considerable time and expertise in providing suggestions for alternative funding methods for the provision of 911 services. It is one means to encourage local and state jurisdictions to augment current, successful funding methods with ideas not previously entertained. The ideas described and the references included in the document provide information for local or state jurisdictions to use in exploring options for new or supplementary 911 funding.

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<sup>2</sup> A list of participants can be found in Appendix A.

<sup>3</sup> The read ahead materials provided to the panelists can be found in Appendix B.

### 1.2.2 What this Report is not

This document contains no mandates or formal recommendations, nor does it endorse any particular idea or funding model. The Panel was clear in its opinion that there is no “silver bullet” solution for establishing stable funding sources for the provision of 911 services. It is also not a criticism of current funding models, or of any attempts made by local or state jurisdictions to secure adequate funding to provide 911 services to citizens. Many jurisdictions are successfully funding capital and operational expenses in making the transition to NG911. This project was conducted in response to the 911 community’s consensus-based conclusion that, “New methods for funding the next generation of 9-1-1 are necessary for our national communications systems to transition from legacy systems to a next generation network environment that is capable of handling today’s emergency calling needs and provides the kind of communications security Public Safety requires to ensure reliability and interoperability.”<sup>4</sup>

The contents of this report should not be viewed as an exhaustive list of funding options. There are additional ideas to be considered in identifying potential options for 911 funding (e.g., models used in other countries, analogies to other industries such as health care). It is also not an implementation manual. But the 911 community and those who support it are encouraged to begin the process of considering alternative funding methods and exploring models from other industries, expand upon the ideas in this document, and identify additional methods that will achieve their own specific goals and address the specific circumstances within their jurisdiction.

### 1.3 Organization of the Report

The remainder of this report consists of three main sections supported by appendices.

1. Section 2.0, ***Current State of 911 Funding and Oversight***, examines how 911 is funded today, along with the governance structures currently in place.
2. Section 3.0, ***Transition to NG911 and Effects on Funding and Oversight***, provides an overview of both the technical and the operational changes that are part of a full transition to a nationwide NG911 system and examines how these changes will affect the current funding and oversight models.
3. Section 4.0, ***Financing and Funding 911 into the Future***, reviews current and more innovative approaches to funding discussed by the Panel. This section provides some examples of success as well as research on these methods, and examines the potential for private sector involvement in future 911 funding and oversight models, specifically through P3s. The final subsection discusses the feasibility of potential funding methods and how governance and oversight models could interconnect at the various levels of government in the future.

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<sup>4</sup> Federal Communications Commission (FCC), *Working Group 4B Transition to Next Generation 9-1-1: Final Report*, March 2011. Available at <http://www.fcc.gov/encyclopedia/communications-security-reliability-and-interoperability-council-ii> [Last accessed December 23, 3013]

## **1.4 The Role of the National 911 Program**

The mission of the National 911 Program is to provide Federal leadership in supporting and promoting optimal 911 services. It was created as a point of coordination for activities among 911 stakeholders and to provide information that can be used to improve the 911 system. The program meets these responsibilities by developing a variety of tools and resources including tools that can be used to plan and implement Next Generation (NG) 911.

The National 911 Program also coordinates efforts with a number of public and private organizations at the Federal, national, state and local levels. In this role, the program coordinates efforts with other Federal agencies, including the FCC, whose CSRIC advisory group generated the recommendation that led to activities that generated this report.

The National 911 Program is housed within the Office of Emergency Medical Services at the National Highway Traffic Safety Administration – part of the U.S. Department of Transportation. Its activities, this report included, contribute to the safety mission of the agency and the department by supporting and promoting efficient and effective response to motor vehicle related crashes, thereby reducing death and disability caused by roadway crashes.

## 2.0 Current State of 911 Funding and Oversight

State and local jurisdictions currently use numerous methods to administer and fund their 911 systems. Several states (e.g., Vermont<sup>5</sup> and Washington<sup>6</sup>), industry organizations (e.g., National Emergency Number Association [NENA]<sup>7</sup> and Industry Council for Emergency Response Technologies [iCERT]<sup>8</sup>), academic institutions (e.g., East Carolina University<sup>9</sup>) and the National 911 Program itself<sup>10</sup> have conducted studies on this topic. While these studies are referenced, most have a narrow focus on individual states or specific funding options. This section describes economic efficiency and how that the concept applies to 911 services, and takes a broad approach in describing the various funding mechanisms and governance models currently in use across the country.

### In This Section

#### 2.0 Current State of 911 Funding and Oversight

2.1 Economic Efficiency and 911 Services

2.2 Current 911 Funding Mechanisms

2.3 Current 911 Governance Structures

### 2.1 Economic Efficiency and 911 Services

In order to understand the future funding possibilities and financial sustainability of 911 services, a general discussion of economic principles is essential<sup>11</sup>. This discussion provides a basis for policy development and a rationale for pursuing the legislative and regulatory changes required to implement public funding mechanisms to support the provision of 911 services. Given the challenges of funding and financing the current 911 system, as well as the additional technological requirements and capabilities that are on the horizon, the Panel requested further research and analysis to clarify the nature of these challenges as economic issues. With an understanding of both the economic issues and principles, policymakers and stakeholders can better assess current and future opportunities to finance the transition to NG911, as well as sustain the system in the future. This section contains a synopsis of the economic characteristics of 911 services and an analysis of future funding mechanisms. A more comprehensive explanation of relevant economic principles can be found in Appendix C.

<sup>5</sup> James Lipinski, *Emergency 9-1-1 Service Funding Study*, State of Vermont Enhanced 9-1-1 Board, January 3, 2012. Available at: <http://www.leg.state.vt.us/reports/2012ExternalReports/274190.pdf> [Last accessed October 21, 2013]

<sup>6</sup> Washington State Military Department, *Next Generation 9-1-1 Funding Study*, December 2008. Available at: <http://www.emd.wa.gov/e911/documents/RPT090122KRS-WashingtonStateNG911FundingStudy-Final1-29-09.pdf> [Last accessed October 21, 2013]

<sup>7</sup> National Emergency Number Association (NENA), *Funding 9-1-1 Into the Next Generation*, March 2007. Available at: <http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/NGPP/NGFundingReport.pdf> [Last accessed October 21, 2013]

<sup>8</sup> iCERT (formerly the 911 Industry Alliance), *Health of the US 9-1-1 System*, 2008. Available at: [http://www.theindustryCouncil.org/91A\\_Health\\_of\\_US\\_911%20\\_2\\_.pdf](http://www.theindustryCouncil.org/91A_Health_of_US_911%20_2_.pdf) [Last accessed October 21, 2013]

<sup>9</sup> Elaine Seeman, Ph.D., and James E. Holloway, J.D., *A Report on Findings and Recommendations on 911 Costs and Funding Models for the North Carolina 911 System*, North Carolina 911 Board, January 6, 2010. Available at: [https://www.nc911.nc.gov/Board/agenda/Book/20100108\\_Item%2006a%20ECU%20E911-final-report-jan-6-2010.pdf](https://www.nc911.nc.gov/Board/agenda/Book/20100108_Item%2006a%20ECU%20E911-final-report-jan-6-2010.pdf) [Last accessed October 21, 2013]

<sup>10</sup> Next Generation 911 System Initiative, *Final Analysis of Cost, Value, and Risk*. Intelligent Transportation Systems, U.S. Department of Transportation, March 5, 2009. Available at: [http://www.its.dot.gov/ng911/pdf/USDOT\\_NG911\\_4-A2\\_FINAL\\_FinalCostValueRiskAnalysis\\_v1-0.pdf](http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf) [Last accessed October 21, 2013]

<sup>11</sup> A white paper on economic theory as it relates to 911 can be found in Appendix C

### 2.1.1 911 Services as a Public Good

In economic theory, goods can be placed along a continuum ranging from rivalrous (rival) to non-rival.<sup>12</sup> In addition, goods can be characterized as either public or private and excludable or non-excludable. A public good is one that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use, and where use by one individual does not reduce availability to others.<sup>13</sup> In that respect, a non-rivalrous good is able to be enjoyed by multiple consumers at the same time. In economics, a good or service is called excludable if it is possible to prevent people (consumers) who have not paid for it from having access to it. By comparison, a good or service is non-excludable if non-paying consumers cannot be prevented from accessing it. In this respect, private goods are both excludable and rivalrous. Table 1 below demonstrates examples of the rivalry and excludability continuum.

Table 1: Rivalry and Excludability

	Excludable	Non-Excludable
Rivalrous	<b>Private goods</b> <ul style="list-style-type: none"> <li>• Food</li> <li>• Clothing</li> <li>• Cars</li> </ul>	<b>Common goods</b> <ul style="list-style-type: none"> <li>• Fish stocks</li> <li>• Timber</li> <li>• Coal</li> </ul>
Non-Rivalrous	<b>Club goods</b> <ul style="list-style-type: none"> <li>• Cinemas</li> <li>• Private parks</li> <li>• Satellite television</li> </ul>	<b>Public goods</b> <ul style="list-style-type: none"> <li>• Network television</li> <li>• National defense</li> <li>• Lighthouses</li> </ul>

911 services encompass many characteristics of a public good, as benefits are provided to individuals and the community as a whole, and are therefore non-excludable and non-rivalrous. By allowing access to all individuals within the community, public safety emergencies can be identified and dealt with an efficient and expeditious manner. In this respect, 911 services have “positive externalities”; that is, they produce social benefits beyond the benefit provided to the immediate consumer of the good. Thus, for 911 services to maximize individual and societal benefits, they must be non-excludable. Similarly, 911 services must be non-rivalrous to the maximum extent possible. While there is a cap on the extent to which the service can be provided (e.g., the number of available operators is limited by total resources available), services are provided in such a manner so there are adequate call takers to respond to the volume of calls. Thus, the enjoyment or use of the service by one party does not detract from the ability of another party to use the service.

One of the major problems with public goods however, is devising a method of paying for their use. Specifically, as public goods are non-excludable, it is impossible to eliminate potential consumers from

<sup>12</sup> Hess, C., E. Ostrom, *Understanding Knowledge as a Commons: From Theory to Practice*, The MIT Press, Cambridge, Massachusetts, 2006. ISBN: 9780262083577

<sup>13</sup> Samuelson, Paul A. *The Pure Theory of Public Expenditure*. *Review of Economics and Statistics* 36 (4): 387–389. (November 1954) JSTOR 1925895. Available at: <http://www.jstor.org/stable/1925895> and Samuelson, Paul A. *Diagrammatic Exposition of a Theory of Public Expenditure*. *Review of Economics and Statistics* 37 (4): 350–356. (November 1955) JSTOR 1925849. Available at: <http://www.jstor.org/stable/1925849> [last accessed October 30, 2013]

receiving the benefits of the good. The concept of “free-riders” can be introduced as someone who benefits from resources, goods, or services without paying for the cost of the benefit. In the case of 911, services are funded through a variety of taxes and fees; however individuals that do not pay some form of fee or tax for gaining the benefits of 911 services, (e.g., by opting out of traditional communication services), have become free-riders by not contributing to a service from which they enjoy benefits. The standard response to the problem of public good non-excludability and free-riders is to institute a tax of some kind. Thus, if voluntary provision of public goods will not work (i.e., individuals each voluntarily contribute to the provision of a public good), then one solution is to make provision involuntary (mandatory contribution). This prevents each individual’s tendency to be a free rider, while also assuring that no one will be allowed to free ride.

### 2.1.2 The Economics of Public-Private Partnerships

Public-Private Partnerships (P3s) are another economic element that should be discussed as a possibility for funding of 911 services. When P3s are employed, two benefits are typically derived. The first benefit is **Accelerated Delivery**, which can be described as assets and related services becoming available earlier than if delivered by the public sector. Thus, having a modernized 911 project delivered earlier than it would be with conventional government procurement methods means that the benefits can be experienced by the public sooner than before, and therefore increase the present value of those benefits. The second benefit is **Enhanced Delivery**, which refers to improved service as a result of P3, such as applied life-cycle approach and better management of service delivery. Under enhanced delivery, higher-quality service based on developing contractual commitments to defined service standards can result in both better design and higher-quality service delivery.

There are a few potential disadvantages that should be considered when engaging P3s, such as adequately estimating and managing the risk associated with major infrastructure projects. Experience has shown that with P3s, despite contract agreements, the effective risk exposure of the public sector remains very high. In particular, P3 schemes are particularly vulnerable to uncertainty. Capital cost escalation, longer delivery time and even poor customer satisfaction in development and procurement are common outcomes in the P3 projects. Thus, a project which appears viable at one time may not be viable at another time. In direct contrast however, P3s can be justified by the valuation of risk transfer arrangements. Without the assumption of risk by the private sector, there would be no partnership. When the above factors are considered, the difficulty of properly assessing the efficiency or effectiveness of P3 becomes apparent. Thus, while P3 is potentially a viable alternative, the difficulty of properly evaluating risk and the overall uncertainty of P3 makes it challenging to assess the overall effectiveness of this alternative.

## 2.2 Current 911 Funding Mechanisms

Traditionally, 911 has been funded through a mix of state and local taxes, fees, and surcharges added to a wireline subscriber’s monthly telephone bill. This funding method proved effective during the period in which inbound 911 calls were placed using only landline telephones. In the early 2000s, the rise of wireless telecommunication devices resulted in a loss of revenue from wireline sources and an untapped wireless funding source. Jurisdictions responded by developing legislation to collect taxes, fees, and surcharges from wireless subscribers<sup>14</sup>. Today, jurisdictions are considering new legislation as consumers move to voice over Internet protocol (VoIP) communication solutions and prepaid wireless devices. These different taxes, fees, and surcharges are not always equitable, and in some cases, the shift in technologies (without an associated change in funding legislation) has resulted in a decrease in

overall funds collected. As an extreme example of this inequality, in the State of Missouri, legislation permits taxing of wireline service only and does not collect fees from wireless or VoIP customers.

Initial results from the July–December 2012 National Health Interview Survey (NHIS)<sup>15</sup> indicate that the number of American homes with wireless telephone service only continues to increase. As wireless technology improves, consumers are eliminating home landlines. The NHIS data showed more than 38 percent of all adults (about 86 million people) lived in households with only wireless telephones. This is an increase of 2.4 percent since the first half of 2012 and a nearly ten percent increase in two years.<sup>16</sup> In addition, nearly 16 percent of all American homes received all or the majority of their calls wirelessly despite having wireline service installed. Figure 1 shows the percentage of people living in homes with only wireless service or no telephone service between 2003 and 2012.<sup>17</sup>

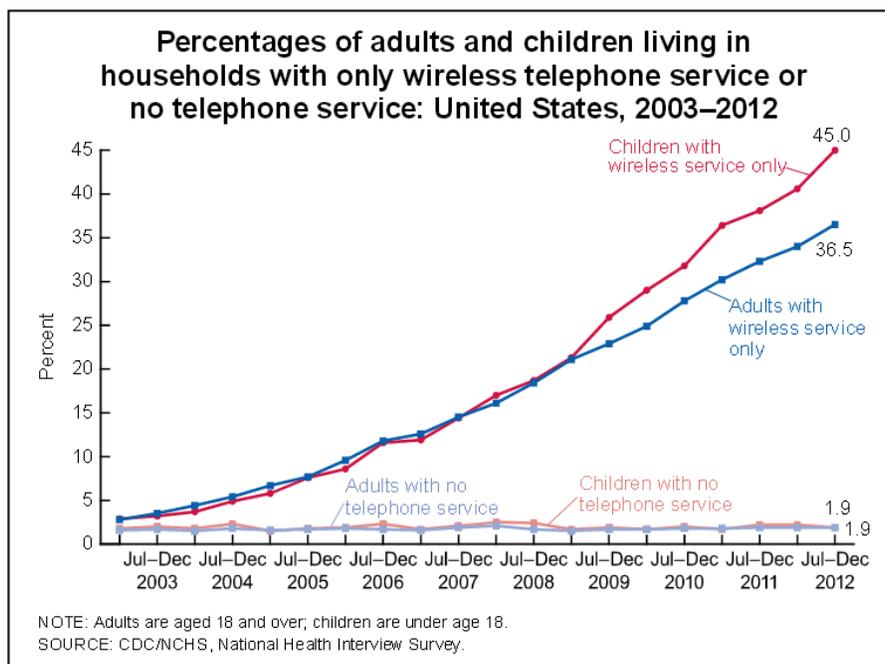


Figure 1: Households With Only Wireless or No Telephone Service (2003–2012)<sup>18</sup>

As a result of growth in the number of wireless households, the number of 911 calls placed using wireless telephones has significantly increased in recent years. A report published by the FCC estimated that about 70 percent of 911 calls are placed using wireless telephones, and that percentage is growing.<sup>19</sup> As these trends continue, a more equitable approach to funding 911 should be considered to

<sup>15</sup> Stephen J. Blumberg, Ph.D., and Julian V. Luke, *Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, January–June 2012*, Division of Health Interview Statistics, National Center for Health Statistics, 2012. Available at: <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201306.pdf> [Last accessed October 21, 2013]

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

<sup>19</sup> Federal Communications Commission, *Guide: 911 Wireless Services*. Available at: <http://www.fcc.gov/guides/wireless-911-services> [Last accessed October 21, 2013]

address the characteristics of the current user landscape. As the public's communication devices continue to evolve, so must 911 revenue sources, in order to maintain a stable source of funding.

Because 911 funding mechanisms have evolved over a span of many years, they vary from jurisdiction to jurisdiction and state to state. In addition to the taxes, fees, and surcharges described, 911 relies on other funding methods, including new and/or expansion of existing taxes, state and Federal grants, and other sources. This is generally the case for 911 telecommunicator salaries and benefits, which are usually paid from a separate revenue source from those mentioned here. The following list outlines the different types of current funding methods in place across the country. In addition, Appendix D lists the legislation behind the taxes, fees, and surcharges in each state.

- **Taxes, fees, and surcharges on wireline telephone subscribers**—These charges are placed on wireline telephone service and are billed monthly to the subscriber. They can be imposed at the local and/or state level. Wireline taxes, fees, and surcharge amounts vary by state, ranging from \$0.08 by the State of Utah to \$6.40 by some counties in West Virginia with typical fees in the \$0.30 to \$1.00 range, and are authorized through state and local legislation. Some fees are percentages of tariff rates (e.g., Arkansas), sales taxes (e.g., Missouri), or other rates. Some fees differ for residential and business lines (e.g., Louisiana). Initially, wireline surcharges for 911 were the only method used to fund 911. All states currently have enabling legislation to assess taxes, fees, or surcharges for wireline subscribers.
- **Taxes, fees, and surcharges on wireless telephone subscribers**—These charges are placed on wireless telephone services and are billed monthly to the subscriber. They can be imposed at the local and/or state level. Wireless taxes, fees, and surcharge amounts vary by state, ranging from \$0.19 by the State of Michigan to \$3.00 by West Virginia with typical fees in the \$0.35 to \$1.00 range, and are authorized through state and local legislation. Currently, only Missouri and Wisconsin have no wireless taxes, fees, or surcharges.
- **Taxes, fees, and surcharges on VoIP subscribers**—These charges are placed on VoIP services and are billed monthly to the subscriber. They can be imposed at the local and/or state level. VoIP taxes, fees, and surcharge amounts vary by state, ranging from \$0.19 by the State of Michigan to \$6.40 by some counties in West Virginia with typical fees in the \$0.35 to \$1.00 range, and are authorized through state and local legislation. Rather than flat fees, some states charge a percentage of bundled rates. These states are permitted to tax only 35.1 percent of VoIP call traffic, in accordance with FCC regulations.<sup>20</sup> Currently, 42 states have VoIP taxes, fees, or surcharges in place.
- **Prepaid cellular charges**—States have various methods in place to capture fees on prepaid cellular device users, such as collecting a tax at the point of sale (POS) or deducting minutes monthly from customer accounts. States that do not collect sales tax (currently Alaska, Oregon, Montana, New Hampshire, and Delaware) may not have a facility in place to collect POS fees. Fees vary from a percentage of the total retail sales price to fixed fees on each retail purchase. Thirty five states now collect the 911 fee at POS on prepaid wireless purchases. In addition,

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<sup>20</sup> Federal Communications Commission, FCC DR FCC 10-185, November 5, 2010. Available at: <https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935704096> [Last accessed October 21, 2013]

some states have reported that monitoring, collecting, and enforcing prepaid fees from national and online retailers can be inconsistent and burdensome.

- **Other taxes**—Some state and local jurisdictions (e.g., Tennessee, Kentucky) have considered funding 911 through a general public tax, such as adding a 911 fee to electric bills or associating a monthly fee on all water meters. In 2012, Kenton County, Kentucky, implemented a new property tax to help fund the county's 911 dispatch services.
- **State and Federal grants**—Federal departments and agencies (e.g., the National 911 Program, National Telecommunications and Information Administration [NTIA], and the U.S. Department of Homeland Security [DHS]) have administered grant programs to support emergency communications in general and E911 and NG911 in particular. These programs can potentially award states millions of dollars to build 911 systems, update hardware and software, or provide training to 911 staff. In 2012, the Middle Class Tax Relief and Job Creation Act of 2012 included language to designate \$115 million in grants from the proceeds of an FCC auction, to help 911 call centers nationwide implement NG911 technologies for this purpose. Funding for this grant program is currently pending the spectrum auction. While funding values can be significant, grants generally provide a single lump sum award and are not considered a sustainable source of funding for the continued operation of 911 systems. They can, however, provide valuable assistance with one-time capital expenditures.

It should be noted that a portion of collected 911 taxes, fees and surcharges is retained by service providers to cover the cost of providing 911 service and to cover the cost of collecting 911 taxes, fees and surcharges. The amount retained varies among jurisdictions

### 2.3 Current 911 Governance Structures

The governance structures overseeing 911 operations vary by location, much like 911 funding structures. Historically, 911 authority has been coordinated and maintained at the local government level with no mandate or requirement to coordinate with other jurisdictions. This local control has many benefits, including the greater likelihood of the use of locally raised 911 funds for local 911 operations, and the coordination and maintenance of dispatch operations through local relationships with police, fire and EMS agencies. As 911 services expanded nationwide and new technologies emerged, coordination among neighboring jurisdictions was technically possible and began to occur. To assist this coordination, many states established state 911 programs and authorities. The authority and responsibilities of state 911 agencies varies greatly. At the national level, a number of Federal agencies and trade organizations support 911 technology and operations, but currently no formal, Federal 911 oversight exists.

Locally, the delivery of 911 service is managed by a local 911 authority or board that collects fees, operates and maintains systems, and manages PSAP staff and facilities. In some cases, 911 operations fall under a local public safety agency (e.g., police department, fire department, or less often, emergency medical services [EMS] agency) or an independent authority. Traditionally, there has been little interaction among jurisdictions, and 911 system architecture and 911 operations have seldom been coordinated. As a result, the original 911 governance model lacks consistency in the authority and management of these programs.

The transition to NG911 enables inter-local, inter-regional and interstate connection of 911 systems. It raises the issue of establishing consistent technology, protocols, and procedures among previously non-connected and non-uniform systems; complicating the move to NG911. To address this lack of

consistency, some jurisdictions are forming regional agreements, such as the Counties of Southern Illinois (CSI),<sup>21</sup> an entity that provides economies of scale through shared capital expenses and consolidation of PSAP technology, while ensuring a common, standardized network infrastructure. Regional agreements such as CSI's provide the benefit of financial savings while leaving the majority of authority with local 911 stakeholders. This coordination helps to improve operations and the quality of the overall 911 system, increases reliability and resiliency, and eliminates unnecessary overhead.

Authority and responsibility also varies from state to state. The majority of states have state-level 911 programs, but the methods of funding, implementation, responsibilities, and management of these programs differ widely. Some state 911 programs are statutorily defined and have comprehensive authority, while others may or may not be statutorily defined but have limited authority or an informal approach to governance. In addition, a few states have no state-level 911 authority. State-level governance is often supported by policy boards made up of 911 stakeholders from different areas of the system and may include representatives of first responder agencies or telecommunications companies in addition to PSAP representatives and state and local government representatives. Those state 911 programs, with responsibility for the full scope of 911 services and activities throughout their state, focus on the administration and management of 911 statewide, while some other state-level 911 authorities focus only on collecting, distributing and overseeing 911 funds to localities. Appendix E outlines in more detail the different models of state governance.

With 911 managed at state and local levels, there is no single Federal department or agency with sole or ultimate authority for 911 governance and oversight. At the national level, multiple Federal agencies and organizations have interest in different aspects of 911. For example, the FCC exercises its regulatory authority over the telecommunications and VoIP carriers who provide telephony services to the public, and whose services deliver emergency calls to the 911 system. The FCC has no authority over state and local jurisdictions that implement telecommunications service or regulate PSAPs. The FCC has however, expressed interest in NG911 in numerous actions, including its recommendation to develop a governance structure as step four of its "Five-Step Plan" to deploy NG911.<sup>22</sup> The FCC is working with state 911 authorities, other Federal agencies (including the National 911 Program), and other governing entities to develop a coordinated approach to NG911 governance.

The National 911 Program is a Federal program charged with facilitating coordination among public- and private-sector 911 stakeholders at the local, state, and Federal levels, but has no authority to mandate state or local policy. A number of Federal agencies address the issues of emergency responders, including the DHS Office of Emergency Communications (OEC), the NTIA, the Office of Emergency Medical Services at DOT, and the Department of Justice (DOJ). As provided through recent legislation, the National Public Safety Broadband Network (NPSBN) is being developed by the First Responder Network Authority (FirstNet) to provide first responders a nationwide interoperable broadband network dedicated to public safety. There are governance considerations associated with FirstNet and how it will be developed, implemented and maintained in concert with NG911 efforts. As FirstNet continues its planning processes, it will be important for stakeholders from both FirstNet and NG911 to cooperate and coordinate to ensure a seamless emergency communication system.

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<sup>21</sup>Jackson County (Illinois) 911, *Next Generation 911 Project*. Available at: <http://www.jc911.org/index.php/nextgen-9-1-1-project> [Last accessed October 21, 2013]

<sup>22</sup>Federal Communications Commission, *Five-Step Action Plan to Improve the Deployment of Next Generation 911 (NG911)*. Available at: <https://www.fcc.gov/document/fact-sheet-five-step-action-plan-improve-deployment-next-generation-911-ng911> [Last accessed October 21, 2013]

### 3.0 Transitioning to NG911 and Effects on Funding and Governance

The transition to NG911 from legacy Enhanced 911 (E911) will require technical and operational changes that will affect current funding and governance structures. Many jurisdictions across the country have begun this transition by deploying IP-based systems and implementing some components of NG911 or by becoming “NG911 ready.” The architectural design for an IP-based 911 system enables states and local jurisdictions to implement the upgraded system using a phased approach and enables a long-term adaptation to a continuously changing technological environment.

#### In This Section

- 3.0 Transitioning to NG911 and Effects on Funding and Governance
- 3.1 Technical Changes
- 3.2 Operational Changes

According to NENA, a NG911 system must meet all the following criteria:

- The system is composed of Emergency Services IP networks (ESInet), IP-based software services and applications, databases, and data management processes interconnected to PSAP premise equipment.
- The system provides location-based routing to the appropriate emergency entity.
- The system uses additionally available data elements and business policies to augment PSAP routing.
- The system delivers geodetic and/or civic location information and the call back number.
- The system supports the transfer of calls to other NG911-capable PSAPs or other authorized entities based on and including accumulated data.
- The system provides standardized interfaces for call and message services; processes all types of emergency calls, including non-voice (multimedia) messages; and acquires and integrates additional data useful to call routing and handling for appropriate emergency entities.
- The system supports all E911 features and functions and meets current and emerging needs for emergency communication from caller to public safety entities.<sup>23</sup>

During the transition to NG911, it will be necessary to continue to operate some legacy elements to bridge the technology gap between today’s 911 capabilities and the IP-based technologies in NG911. This section discusses the technical and operational changes necessary for a 911 system and how these changes will affect 911 funding and governance.

#### 3.1 Technical Changes

With the transition to NG911, several technical changes will occur, both inside PSAPs and within the 911 network’s infrastructure. The current 911 system, which encompasses wireline, wireless, and VoIP devices connected through existing telephone switching and routing technologies, is migrating to an all IP-based environment, in which call processing will include capabilities to receive text messages, pictures, video, telematics, and data from other IP-based technologies. These data will be securely passed through an ESInet with advanced call routing functions, geospatial databases, and gateways that allow legacy systems to interconnect. Figure 2 provides a high-level overview of the NG911 system.

<sup>23</sup> National Emergency Number Association (NENA), *Next Generation 911 Summary Description*. Available at: [http://www.nena.org/?NG911\\_Project](http://www.nena.org/?NG911_Project) [Last accessed October 21, 2013]

# NENA NG911 – i3 Elements

## Simplified Diagram

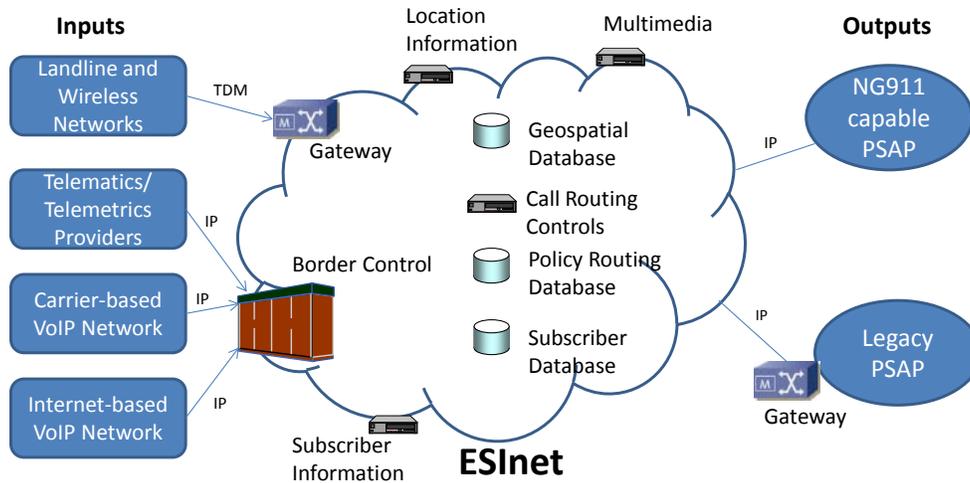


Figure 2: NG911 System Overview<sup>24</sup>

Table 2 describes the changes necessary for the current 911 system to successfully transition to an NG911-compliant system.

Table 2: Technical Changes Required for NG911 Transition

Technical Change	Change Description
<b>Network Integration/ Upgrade</b>	<ul style="list-style-type: none"> <li>• ESInets are scalable IP-based networks potentially connecting a variety of public safety entities, including PSAPs, third-party call centers, telematics service providers, first responders, and medical centers.</li> <li>• ESInet accessibility for multiple entities can promote application and information sharing, leading to an increase in the kinds of data that can be obtained and ultimately improving emergency response.</li> <li>• ESInets will need to interconnect with legacy 911 and E911 networks until full deployment is reached to ensure no disruptions in emergency call routing and processing.</li> </ul>
<b>Hardware and Software Implementation</b>	<ul style="list-style-type: none"> <li>• New hardware will be required, both inside and outside the PSAP, to ensure that the 911 system can properly connect to the ESInet.</li> <li>• Selective router gateways will need to be installed to ensure legacy PSAP systems and Public Switched Telephone Network (PSTN) devices can interconnect with the ESInet.</li> <li>• New call taker terminals and workstations will have to be installed or upgraded to connect to the ESInet inside PSAPs.</li> <li>• Geographic Information Systems (GIS) and updated computer-aided dispatch (CAD) software will allow call takers to receive and process the incoming calls and new types of incoming information (e.g., multimedia, telematics, etc.) quickly.</li> </ul>

<sup>24</sup> This graphic is a modified version of a NENA graphic from the NENA presentation, *NG911 Tutorial*, March 6, 2011. Available at: [http://www.nena.org/resource/resmgr/ng9-1-1\\_project/2011\\_9-1-1\\_tutorial\\_v4.1.pptx](http://www.nena.org/resource/resmgr/ng9-1-1_project/2011_9-1-1_tutorial_v4.1.pptx) [Last accessed October 21, 2013]

Technical Change	Change Description
<b>Technical Standards Development</b>	<ul style="list-style-type: none"> <li>• Many NG911-related technical standards have been developed; however, some are still being written (e.g., standards on security, location identification, and new call type handling).</li> <li>• Standards must support a number of system components, such as scalability, extensibility, reliability, configurability, and interoperability, because NG911 will evolve as new technologies are developed and added.</li> <li>• Standards will be required to interoperate with both current and new systems.</li> </ul>
<b>Advanced Location Determination</b>	<ul style="list-style-type: none"> <li>• Legacy 911 methods of location determination will need to evolve to support the capabilities of NG911, including location-based routing of Short Message Service (SMS), Multimedia Messaging Service (MMS), and other message types.</li> <li>• IP call origination and location information can be determined through more than one mechanism (e.g., Global Positioning System [GPS], Location to Service Translation [LoST] protocol).</li> <li>• More specific location determination (i.e., z-axis locations) is also being developed and tested.</li> <li>• Indoor location determination continues to develop and improve.</li> </ul>
<b>Dynamic Call Routing and Transfer Policies</b>	<ul style="list-style-type: none"> <li>• Dynamic routing of call traffic is a benefit of NG911 because the system recognizes and reacts to the specifics of an incoming call and routes it according to PSAP requirements.</li> <li>• Dynamic routing includes the ability to reroute traffic quickly (according to pre-determined thresholds) without the involvement of an administrator and reduces likelihood of congestion.</li> <li>• All routing and transfer will be based on common nationwide standard protocols, which are under development for NG911 capabilities.</li> <li>• Routing protocols can also be used to replicate data and information, including routing data that can be used by PSAPs to answer out-of-area calls.</li> </ul>

Previous research has indicated that significant upfront capital will most likely be necessary for the technical changes necessary to upgrade the current 911 systems to NG911. While implementation costs previously developed by DOT are estimated in billions of dollars,<sup>25</sup> no in-depth cost model calculating the total cost to implement a nationwide NG911 system has been developed. Some of the technical costs associated with the changes described in the table above are discernible today by looking at the experiences of early adopter states, but with standards still in development and NG911 technologies continually evolving, overall costs are difficult to define. Further, with the instability of current 911 funding mechanisms, it is unclear how states and jurisdictions will fund the considerable capital and sustainment costs required to implement and operate NG911.

### 3.2 Operational Changes

With the transition to NG911, many operational changes will occur both at PSAPs and among all levels of 911 authorities. Technical transition will require operational and policy changes, such as expanded roles and responsibilities of 911 authorities and call takers. Just as it is necessary for technology within 911 systems to keep pace with advances in consumer technology and expectations; operational aspects, such as training, oversight, and legislation and regulations, must keep pace as well. Policymakers will

<sup>25</sup> Next Generation 911 System Initiative, *Final Analysis of Cost, Value, and Risk*. Intelligent Transportation Systems, U.S. Department of Transportation, March 5, 2009. Available at: [http://www.its.dot.gov/ng911/pdf/USDOT\\_NG911\\_4-A2\\_FINAL\\_FinalCostValueRiskAnalysis\\_v1-0.pdf](http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf) [Last accessed October 21, 2013]

need to be well versed in aspects of the operational changes, and it will be essential for them to understand the importance of reviewing current legislation and working to eliminate barriers for a successful transition to NG911. Table 3 outlines operational changes necessary to achieve NG911.

**Table 3: Operational Changes Required for NG911 Transition**

Operational Change	Change Description
<b>Governance and Oversight Considerations</b>	<ul style="list-style-type: none"> <li>• Coordination among PSAP jurisdictions will be required. Policies and mutual aid agreements should be developed to enable coordination.</li> <li>• State-level 911 program planning and coordination are critical to statewide system deployments.</li> <li>• Clear NG911 deployment and operation plans should be developed at the state level.</li> <li>• System-wide ownership of hardware, software, and ESInets should be clearly defined.</li> <li>• Coordination with other public safety organizations should occur, and if the ESInet will be used by non-911 entities, approved policies should be applied.</li> <li>• Current statutes in some states do not permit states and/or local jurisdictions to make the changes required for the transition to NG911; thus both policy and legislation should be reviewed. The National 911 Program has developed <i>Guidelines for State NG911 Legislative Language</i> to assist states in making these changes.<sup>26</sup></li> </ul>
<b>Training Guidelines</b>	<ul style="list-style-type: none"> <li>• Roles will change, and additional responsibilities will be created for 911 call takers, managers, and 911 authorities.</li> <li>• Training must focus on how to receive, manipulate, and use new types of multimedia, such as video, text, and data, as well how to use the new applications and software that will come with NG911.</li> <li>• Existing training programs will need to be updated to incorporate new technology, operating procedures, and skillsets because, currently, few standards or training curricula exist that encompass NG911 system operations.</li> <li>• A nationwide minimum training guideline should be considered to address the collaborative nature of NG911 because calls, data and information will now be shared across jurisdictions.</li> <li>• Universally accepted, minimum telecommunicator training guidelines are important because training inconsistencies have become apparent across jurisdictions, in terms of both technical and operational functions.</li> </ul>
<b>Multimedia Call Processing and Standard Operating Procedures (SOP)</b>	<ul style="list-style-type: none"> <li>• SOPs will need to be developed to ensure common processing of each type of 911 “call” and proper dispatching to the associated responder agency.</li> <li>• Training must be provided on these new standards and SOPs to ensure a consistent level of service across jurisdictions.</li> <li>• Receiving and processing photos and videos could expose call takers to increased stress and traumatic situations, requiring additional critical incident stress management training and support.</li> </ul>

<sup>26</sup> National 911 Program, *Guidelines for State NG911 Legislative Language*, November 2012. Available at: <http://www.nhtsa.gov/staticfiles/nti/pdf/811688.pdf> [Last accessed October 21, 2013]

Operational Change	Change Description
<b>Data Storage, Security, and User Privacy</b>	<ul style="list-style-type: none"> <li>• Policies and procedures discussing storage and retention of NG911 data received via multimedia “calls” are currently being developed.</li> <li>• NENA Standard 71-001<sup>27</sup> describes the use of data available with NG911 (associated with a call, a location, a caller, and a PSAP) that assists in determining the appropriate call routing and handling; however, there are significant gaps in addressing how data are obtained, stored, accessed, secured, and maintained.</li> <li>• Cloud storage would save data in an off-site storage system and would be accessible from any location that had access to the Internet, but security issues would need to be addressed.</li> <li>• Management information systems can effectively manage the copious amounts of incoming data and provide for the analysis of 911 focused metrics which can be leveraged to streamline 911 and NG911 operations.</li> <li>• Liability protections currently incorporate legacy 911 systems, but protections for future technology and services will need to be addressed through state or Federal statutes.</li> <li>• The FCC’s <i>Legal and Regulatory Framework for Next Generation 911 Services</i><sup>28</sup> included recommendations for liability protection for NG911 and handling privacy concerns.</li> <li>• Working Group 1 of FCC’s Communication Security Reliability and Interoperability Council (CSRIC) III performed a gap analysis of current technical standards on “Data Management and Maintenance” and prioritized existing gaps<sup>29</sup>. The National 911 Program is currently updating the status of these standards (expected release of status report – Spring, 2014).</li> </ul>
<b>Public Education</b>	<ul style="list-style-type: none"> <li>• As NG911 components are deployed in different locations, it will be important to keep the public abreast of the current 911 services available to them.</li> <li>• As interim text-to-911 rolls out, “bounce back” messages will be sent to wireless telephones attempting to text 911 in areas where it is not available. Other types of NG911 technology could provide this type of information as they are deployed.</li> </ul>

In addition to the capital costs associated with purchasing equipment to meet the needs of technical requirements, these operational changes could increase operational costs. As the amount of information call takers are expected to process increases, so too will the training necessary to process these data rich calls. States who are early adopters are beginning to provide insight into how these changes will affect costs. These early adopters have the technology in place to accept IP data, but a full implementation of all NG911 features, according to the NENA definition, has yet to be deployed. As standards, SOPs, and operational changes continue to be implemented, and a comprehensive NG911 cost model is developed, NG911 stakeholders will have a better understanding of how these changes will affect the cost of deployment, operation and ongoing maintenance.

<sup>27</sup> NENA 71-001 v1, *NG9-1-1 Additional Data*, September 17, 2009. Available at:

[http://www.nena.org/general/custom.asp?page=NG911\\_AdditionalData](http://www.nena.org/general/custom.asp?page=NG911_AdditionalData) [Last accessed October 21, 2013]

<sup>28</sup> Federal Communications Commission, *Legal and Regulatory Framework for Next Generation 911 Services*, February 22, 2013.

Available at: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-319165A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-319165A1.pdf) [Last accessed October 21, 2013]

<sup>29</sup> Federal Communications Commission, Final Report of Working Group 1, Subgroup 1, of the Communication Security Reliability and Interoperability Council (CSRIC) III, March, 2012 <http://www.fcc.gov/encyclopedia/communications-security-reliability-and-interoperability-council-iii> [Last accessed December 2013]

## 4.0 Financing and Funding 911 in the Future

The Blue Ribbon Panel on 911 Funding discussed and proposed possible funding mechanisms to support the transition to NG911 operations in the near term. As discussed in Section 2.0, it was the Panel’s opinion that current financing strategies are generally insufficient to fully implement NG911. However, in some cases, existing methodologies meet current needs and could possibly be expanded to meet some, or possibly all, NG911 requirements. This section contains an analysis of a range of potential funding approaches that may or may not apply to each component of NG911. The optimal solution for any given jurisdiction is likely not universal, and participants in the Panel suggested many possibilities and considerations.

### In This Section

- 4.0 Financing and Funding 911 into the Future
- 4.1 State and Local Public Financing
- 4.2 Federal Funding
- 4.3 Private Financing
- 4.4 NG911 Funding and Governance Concerns and Feasibility

Current funding for public projects typically comes through a jurisdiction’s general fund from various taxes, fees, and other surcharges that jurisdictions levy within their statutory authorities. Bonds are often issued to finance larger infrastructure projects, such as roads and public facilities, while services are paid for through the regular budgeting process. These financing options are generally available for the delivery of NG911 services as well, and for the most part, are being used to cover current financing requirements. However, as the Panel noted, there are gaps in some instances, and large-scale funding for NG911 implementation may not be available through conventional means.

To some degree, the transition to NG911 is similar to other large-scale, safety-critical infrastructure investments. The financing of public broadband networks, data centers, emergency call or operations centers, and other similar projects can provide useful analogies to address the funding challenges for NG911. The Panel suggested examining projects that provide services or infrastructure quite different from 911, such as toll roads and municipal WiFi. Exploring unrelated but analogous examples could identify alternative forms of financing that could be used by 911.

At a fundamental level, NG911 is the upgrade of a publicly-available, essential service that must be paid for equitably and continuously to ensure its consistent and uniform availability to all citizens. Based on this definition, projects such as public transportation construction or critical infrastructure development may provide useful comparisons for funding mechanisms. In these cases, there are numerous examples of P3s that effectively use private financing for the delivery of a public good. Sections 4.1 and 4.2 discuss more traditional examples of public financing, at the state, local, and Federal levels that may be used for NG911, while Section 4.3 discusses public–private financing possibilities.

### 4.1 State and Local Public Financing

As described in Section 2.0, most current 911 operations are funded through some form of tax or surcharge administered at the local or state level, and in some cases, these funding mechanisms are insufficient to supply adequate capital for implementing NG911. In some cases, however, these strategies have sufficiently financed 911 improvements, E911 deployment and even initial components of NG911. Acknowledging some of the challenges that have been encountered with existing funding mechanisms, this section highlights some examples of jurisdictions effectively using current mechanisms that may be further applied to finance NG911 deployments.

#### 4.1.1 Surcharges on Wireline, Wireless, and Voice-Over-IP Services

Historically, service charges, initially in the form of wireline surcharges, have provided the bulk of revenue for the technical operation of 911 services. With the introduction of wireless technology, many statutes governing service charges were revised to include this new technology. In some cases, the advent of wireless technology increased the overall user base for the collection of surcharges, resulting in increased revenues. More recently, VoIP services have proliferated and are beginning to compete with wireline and wireless services. Not all jurisdictions have incorporated VoIP services into their current 911 funding mechanism. With a continually changing consumer market, the funding models for ongoing operations and future system enhancements need to adapt to maintain stable and adequate funding.

Consumer adoption of VoIP services has increased dramatically in recent years, with the FCC's *Local Telephone Competition Status* report indicating a 19-percent compound annual growth rate for VoIP subscriptions from 2009 to 2011.<sup>30</sup> While VoIP presents new difficulties for 911 revenue generation, some states have resolved issues legislatively and have been able to successfully integrate VoIP services into their 911 revenue models. These examples provide useful examples of the possibilities for VoIP inclusion, but speak to the need for jurisdictions to remain aware of changing technologies and telecommunications trends and to be aware of the need to revise statutes on an ongoing basis. Further, it highlights the reactive nature of 911 legislation when addressing consumer telephony, requiring protracted legislative changes when technology changes. "Future proofing" state 911 funding laws with dynamic surcharge imposition definitions that account for technology changes over time could be one way to help ensure current and ongoing funding needs are addressed as technologies change.

##### *State of Tennessee*

A 2010 report by the Tennessee Advisory Commission on Intergovernmental Relations (TACIR) highlights significant successes with 911 service delivery in the State of Tennessee. Tennessee relies entirely on wireline and wireless surcharges to fund 911. Since 2001, wireline subscriptions have continued to decline in the state, but this has been more than offset by the increases in wireless subscribers over the same period. These changes have resulted in a net increase in the state's available funding. In 2011, the state reported more than \$94 million in revenues from 911 surcharges.<sup>31</sup>

Within its framework, the state successfully deployed the first phases of E911 initiatives and has been at the forefront of initiating NG911 implementation efforts. In September 2012, Tennessee was one of the first states to pilot-test text-to-911 technology supported by a statewide ESInet. The Tennessee Emergency Communications Board (TECB) estimates that NG911 implementation will cost more than \$44 million in initial investment costs over 5 years and \$16.5 million in annual operational costs.<sup>32</sup>

If the TECB's estimates are accurate, then implementation of NG911 is feasible within the state's current funding framework, and the state may even realize a surplus, which could be refunded to consumers or appropriated for future maintenance and upgrades. Tennessee currently has one of the highest wireline

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<sup>30</sup> Federal Communications Commission, *Local Telephone Competition: Status as of December 31, 2011*. Available at: [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2013/db0114/DOC-318397A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0114/DOC-318397A1.pdf) [Last accessed October 21, 2013]

<sup>31</sup> Federal Communications Commission, *Report to Congress on State Collection and Distribution of 911 Fees and Charges, December 21, 2012*. Available at: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-318391A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-318391A1.pdf) [Last accessed October 21, 2013]

<sup>32</sup> Tennessee Advisory Commission on Intergovernmental Relations, *E-911 Emergency Communications Funding in Tennessee*, September 2010. Available at: [http://www.tn.gov/tacir/PDF\\_FILES/Other\\_Issues/e911funding\\_2010.pdf](http://www.tn.gov/tacir/PDF_FILES/Other_Issues/e911funding_2010.pdf) [Last accessed October 21, 2013]

and wireless fee structures in the country; however, it is only collecting a portion of the total amount it is authorized to collect under existing statutes. Although some subscribers in the state may be dissatisfied with the relatively high surcharges they must pay, it can be reasonably assumed to be sustainable at the current level.

### *King County, Washington*

Similar to Tennessee, King County in the State of Washington has begun implementing NG911, supported by a public finance system composed of wireline and wireless surcharges. Within this framework, King County was also one of the first to roll out E911 improvements as far back as 1985 and is preparing its system for NG911. Specifically, King County has reported the following successes toward NG911 readiness on its website:

- Upgrade of the E911 Automatic Location Information (ALI) Database System was completed in 2008. King County was the first E911 system in the nation with the advanced database structure needed for NG911.
- Upgrades to the E911 mapping system used to locate 911 callers were completed in 2007. This included adding the latitude/longitude of all addresses in King County to the mapping system and the addition of 3-D orthophotography imagery countywide.
- Several years ago, the E911 call answering positions at the 911 centers were upgraded to computerized displays, and these displays will also serve NG911 needs.
- The E911 backroom equipment on which the 911 trunks terminate was upgraded in 2009 to interface to an IP 911 network.
- The conversion of the E911 network to IP telephony was completed in 2011.
- King County was also one of five 911 centers nationwide selected to participate in the U.S. DOT NG911 Proof of Concept demonstration in 2008.<sup>33</sup>

King County is the 14th most populous county in the country, comprising Seattle and its suburbs, and is home to many telecommunications technology innovators and companies. These factors have lent support to King County's successful efforts to date, but are not the only success factors.

### *Future Funding Analysis*

- Surcharges on telecommunications users (including users of wireline, wireless, and VoIP services) continue to provide the bulk of revenues to support 911 and may continue if statutes, collection frameworks and oversight of collection and spending keep up with user trends and current technology such as VoIP.
- Jurisdictions should update statutes, collection frameworks to include VoIP services, if they are not already included.
- Surcharges should be technology neutral to ensure that future shifts in device or technology do not affect 911 revenues. In the meantime surcharges for all technologies (e.g., wireline, wireless, VoIP) should be consistent.
- Telecommunications surcharges may be insufficient to cover initial investment costs for NG911; jurisdictions could look for other grant or partnership opportunities to fund these investments, or could consider updating current surcharge statutes.

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<sup>33</sup>King County (Washington), *Next Generation 9-1-1 System (NG911)*. Available at: <http://www.kingcounty.gov/safety/E911/NextGeneration.aspx> [Last accessed October 21, 2013]

#### 4.1.2 Prepaid Wireless/Point-of-Sale Collection

During the past few years, mobile prepaid service has been growing significantly. Prepaid services are paid in advance of the use of the telecommunications service, as opposed to post-paid services such as wireline, wireless, and many VoIP services, typically by a customer who does not subscribe to post-paid services. Many jurisdictions have witnessed this growing trend and have begun to explore options to generate 911 revenues from this subscriber base.

At least 15 states have not adopted an approach to collecting such surcharges from retail prepaid telephone customers. Those that have prepaid wireless legislation have enacted a variety of approaches, unique to each state's needs - resulting in a patchwork of surcharge models that is difficult for national retailers to manage. One key challenge is that there is sometimes no agency or facility to collect 911 revenues at the point of sale (POS); post-paid transactions are handled through monthly invoices processed by the service providers, who then remit the fees collected to the relevant jurisdiction. However, most prepaid wireless telephones are sold over the counter by a retailer, rather than a service provider, with no continuous billing relationship with the customer.

A uniform POS collection method was suggested by the Panel and may be feasible for some jurisdictions. Specifically, a single, flat fee would be applied per transaction at the POS, regardless of the amount of prepaid service purchased, for each retail transaction (e.g., Tennessee),<sup>34</sup> or the 911 fee could be set as a percentage of the retail purchase price of the prepaid service (e.g., Texas).<sup>35</sup> The collected fee then would be remitted by the retailer to the jurisdiction in the same manner that sales tax is remitted. A jurisdiction might consider simply charging prepaid service providers a certain fee, which the service provider would then pass on to customers however they chose.

The state of Tennessee has successfully implemented prepaid telephone surcharges for 911 using the POS model.

The experiences of Tennessee and other jurisdictions may be helpful to other states considering methods for dealing with prepaid subscribers. Indeed, the opinion of the Panel and other studies reviewed have concluded that jurisdictions should ensure that statutory language stays current with new forms of telecommunications technology that may be included to help fund 911 services.

#### *Future Funding Analysis*

- Jurisdictions should update statutes and collection frameworks to include POS prepaid services, if they are not already included.
- States that do not collect a state sales tax (Alaska, Oregon, Montana, New Hampshire, and Delaware) may need to devise alternative facilities to collect fees at POS, while other states often leverage existing sales tax facilities.
- Frameworks exist in many states, and best practices should be shared and leveraged where possible (e.g., Tennessee). For example, NENA and NCSL<sup>36</sup> have established model guidelines for drafting statutes or rules for prepaid wireless service.<sup>37</sup>

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<sup>34</sup> Tennessee Advisory Commission on Intergovernmental Relations, *E-911 Emergency Communications Funding in Tennessee*, September 2010. Available at: [http://www.tn.gov/tacir/PDF\\_FILES/Other\\_Issues/e911funding\\_2010.pdf](http://www.tn.gov/tacir/PDF_FILES/Other_Issues/e911funding_2010.pdf) [Last accessed October 21, 2013]

<sup>35</sup> Texas Comptroller of Public Accounts, *Window on State Government: 911 Prepaid Wireless Emergency Service Fee*. Available at: [http://www.window.state.tx.us/taxinfo/911\\_fees/911\\_ppd\\_wireless.html](http://www.window.state.tx.us/taxinfo/911_fees/911_ppd_wireless.html) [Last accessed October 21, 2013]

<sup>36</sup> National Conference of State Legislatures, *Model Legislation*. Available at : [http://www.ncsl.org/documents/standcomm/sccomfc/point\\_of\\_sale\\_model\\_bill2010.pdf](http://www.ncsl.org/documents/standcomm/sccomfc/point_of_sale_model_bill2010.pdf) [Last accessed October 21, 2013]

### 4.1.3 Property-Based Taxes

The majority of current funding methods focus on revenue collection from the consumers of telecommunications services; however, the Panel expressed some concern that this historical approach to funding is not necessarily “future proof”. In particular, with NG911, 911 services will be accessible via other forms of media, such as text messaging, video messaging, etc., or by less-traditional telecommunications devices (e.g., video game consoles, personal computers, portable Internet-enabled devices). Furthermore, 911 services are connected to other public goods and so should not necessarily be funded entirely by a subset of the public (i.e., telecommunications consumers). To this end, the Panel and the project team’s research suggest other types of fees and surcharges that a jurisdiction might reasonably collect to finance NG911.

#### *Lincoln and Garrard Counties, Kentucky*

The counties of Lincoln and Garrard in the Commonwealth of Kentucky implemented an innovative method to collect 911 revenues by placing a flat fee on each local water meter. These counties operate a single PSAP for both counties, and each also owns and manages its own water utility service. The water meter fee system replaced a fee levied against each property title, which had placed the burden entirely on property owners. These counties found that a disproportionate number of 911 calls were placed by property tenants, while the costs were borne exclusively by the owners. To address this disparity, the counties proposed a fee on water meters, collected via monthly water invoices to tenants. This shifted the burden from owners to actual tenants and users of the 911 system. Recently, a lawsuit in reference to this fee was filed, seeking a ruling from the court on the general limits of a jurisdiction’s ability to raise 911 funds. The ordinance was deemed legal by a trial court but is currently before the Court of Appeals for review.<sup>38</sup>

#### *Future Funding Analysis*

- Non-telecommunications-based surcharges, fees, and taxes provide the ability to create a broader revenue base that is possibly more equitable and sustainable.
- Such fees can work where collection frameworks already exist (e.g., Kentucky’s existing municipally owned water utility).
- Surcharges may not be sufficient to meet initial investment requirements.
- Such surcharges may be subject to political and legal scrutiny (e.g., Kentucky’s pending lawsuits).

### 4.1.4 Sales Tax

Another type of tax discussed by the Panel for use in funding 911 is a sales tax. Currently, all but five states have some form of general sales tax where some percentage of the total cost of certain consumer goods and services is collected at the POS and remitted to the government. The Federal Government also imposes sales taxes on certain goods and services (e.g., gasoline, cigarettes, tanning services). Creating an additional sales tax to fund 911 would be possible at the county, state, or Federal level. Should this method be implemented, it would be important that lawmakers be certain that 911 funds are protected from diversion to the general fund or other uses.

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<sup>37</sup> National Emergency Number Association, *NENA Model Baseline Guidelines for Drafting Statutes or Rules Associated with Prepaid Wireless Service and 9-1-1 Emergency Service Fees*. Regulatory/Legislative Information Document 60-601, Version 1, September 24, 2008. Available at: [http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/govaffairs/model\\_guidelines\\_for\\_prepaid.pdf](http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/govaffairs/model_guidelines_for_prepaid.pdf) [Last accessed October 21, 2013]

<sup>38</sup> Kleppinger, Ben. *Lincoln County may have to kick in \$36,000 for 911 service*, The Interior Journal, May 8, 2013. Available at: <http://www.centrankynews.com/theinteriorjournal/news/ij-lincoln-county-ky-may-have-to-kick-in-36000-for-911-service-20130508,0,685503.story> [Last accessed October 21, 2013]

### *Cass County, Missouri*

In 2012, Cass County, Missouri, implemented a half-cent (1/2 ¢) general sales tax to help pay for 911 services in the county.<sup>39</sup> This tax replaced the 11.5-percent landline surcharge. Missouri is currently the only state in the country with a landline surcharge but no cellular telephone surcharge, and with only 25 percent of 911 calls in the county coming from landline telephones, the county and voters approved the increased sales tax measure. The additional half-cent tax will continue until the \$14 million bond to upgrade the 911 system and county radio system, is paid off, which is estimated to take four years. After the bond has been repaid, the sales tax will decrease to an eighth-cent (1/8 ¢) sales tax to fund ongoing 911 operations in the county.<sup>40</sup>

### *Future Funding Analysis*

- POS taxes are currently being collected in most states, so the infrastructure is already in place.
- This method of funding may prove difficult in states that currently have no sales tax in place.
- Use of sales taxes creates a broader user base of taxpayers, especially in a state such as Missouri that has only a wireline surcharge, or states that attract large tourist populations.
- Collecting sales tax may be more equitable than other taxing methods, collecting from visitors and temporary residents that may use 911 services, but contribute to 911 funding in other ways.
- Increasing a jurisdiction's sales tax is often a politically sensitive issue.

#### **4.1.5 Universal Service Fund**

The Panel discussed the Universal Service Fund (USF) concept as currently employed in the State of Vermont. The USF is a funding disbursement system, and its use is based on Vermont's unified statewide 911 operations model. As opposed to local or "hybrid" local-state oversight structures, Vermont's 911 operations are centrally managed. All revenues are collected by the state and administered through the USF. The state provides a stipend to each PSAP based on the number of call-taker positions, and each PSAP manages its own staff, facilities, and operations. Revenues are generated through a surcharge placed on wireline and wireless users.

Disbursement of Vermont's USF fund is not exclusively dedicated to 911, and the state is addressing funding constraints when considering NG911 upgrades. Vermont published a study in 2012 recommending that the state legislature consider raising the current two percent surcharge on wireline and wireless users as well as expanding the surcharge structure to include a fee on prepaid devices.<sup>41</sup>

### *Future Funding Analysis*

- USFs are useful in states where there is a unified oversight and funding system for 911, such as Vermont.
- Thirteen states have their own state universal service fee-type collection mechanism but none, other than Vermont, can currently use it for 911. Delegating such funds to 911 could be accomplished legislatively.
- USFs are a fund distribution system rather than a revenue generator and must be coupled with surcharges or fees generated from other sources

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<sup>39</sup> *Lack of Cellphone Surcharge for 911 Costs Counties*, KCTV 5 News Kansas City, July 21, 2013. Available at: <http://kctv.membercenter.worldnow.com/story/22895098/lack-of-cellphone-surcharge-for-911-costs-counties> [Last accessed October 21, 2013]

<sup>40</sup> Edmonds, Allen, *Tax Issues Litter April 3 Ballot*, The Case Country Democrat Missourian. April 2, 2012. Available at: <http://www.demmo-mo.com/2012/04/02/17476/tax-issues-litter-april-3-ballot.html> [Last accessed October 21, 2013]

<sup>41</sup> Lipinski, James, *Emergency 9-1-1 Service Funding Study*, State of Vermont Enhanced 9-1-1 Board, January 3, 2012. Available at: <http://www.leg.state.vt.us/reports/2012ExternalReports/274190.pdf> [Last accessed October 21, 2013]

- Funding may not be dedicated to 911 and therefore could be subject to periodic fluctuation or diversion.

#### 4.1.6 Fee-For-Service Payments

The 2012 study on the State of Vermont’s 911 funding also discussed the concept of a “fee-for-service” funding model.<sup>42</sup> This concept is not currently employed by any 911 jurisdiction but holds promise. Similar to healthcare insurance, a centralized fund, such as Vermont’s USF, would pay a fixed rate to each PSAP based on the number of individual operations conducted (i.e., caller connections) in a defined period of time (e.g., quarterly, annually). The total amount would be billed to each carrier that based on the percentage of total 911 calls made by its subscribers, and the carrier would have flexibility in how it passed the charges on to its subscribers. Adopting this model would balance the collection of revenues across the state and provide equitable funding based on the number of operations executed by a PSAP in any given period of time. In addition, unlike taxes that are billed to a subscriber’s billing address, a fee-for-service model would remit funds to the PSAP that actually serviced the caller. This is particularly important for PSAPs that serve large colleges or universities, sports arenas, and areas that host large public events.

The 2012 study on Vermont notes three key elements that should be considered in this model:

- Establishment of initial payment rates and a process for payment rate updates.
- Public availability of rates updated periodically to reflect annual fluctuation in per-unit costs.
- An evaluation mechanism established to review payment levels and ensure that 911 is being adequately reimbursed for its services while also keeping costs affordable to the payer.<sup>43</sup>

Although this model holds potential, there are important questions to consider. For example, would the billing mechanism that passes the costs from carrier to subscriber be equitable? Would it be sustainable? What oversight authority must be in place to determine equitable collection of fees as well as equitable distribution of funds? Although the Panel did not discuss this concept beyond citing the Vermont study, it did suggest that jurisdictions considering this path review the study and develop independent analysis to further explore the feasibility and ramifications of a fee-for-service funding system.

#### Future Funding Analysis

- A fee-for-service approach has potential for a more equitable allocation of revenue generation and expenditure for 911 services; however, it is yet untested in the 911 community.
- In this model, there would be no general state 911 fund, preventing diversion of collected funds for non-911 uses.
- Development of a billing infrastructure and potential legislative changes would be needed before implementing this funding approach.

#### 4.1.7 Other Potential Fee-Generating Activities

The Panel also discussed the potential to generate revenues from other types of activities not typically part of current funding options used by 911 authorities. Because of the continuously changing nature of telecommunications and the challenges for jurisdictions to keep statutes and 911 funding strategies current with these changes, jurisdictions may consider other solutions that are not driven by demand for

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<sup>42</sup> Ibid.

<sup>43</sup> Ibid.

telecommunications services. Historically, surcharges on telecommunications end users have provided the majority of funding for 911 services and used a fairly straightforward statutory basis for generating revenues from end users.

As with a property-based method of revenue generation (i.e., those used to fund fire or law enforcement services), it can be argued that 911 services are a universal public good and funding ought to reflect that concept. In addition, with the advent of NG911, call takers will be responding to “calls” from more than just telecommunications devices (e.g., vehicle telematics, home alarm systems, etc.), so it may be necessary to decouple 911 funding from telecommunications. To this end, the Panel brainstormed, with supplemental research from the project team, on a number of possibilities for alternative revenue generation that do not necessarily focus on telecommunications services.

Activities within this section are not directly linked to the use of 911 services, but are otherwise commonly taxed activities that may diversify or expand the pool of resources that could be utilized to deploy NG911. If state and local authorities consider these activities as a possible solution for funding NG911, then they should make careful efforts to protect 911 funding from the annual budgetary process so that 911 services remain sufficiently funded and stable and that NG911 migration is not threatened by political processes.

### *Sumptuary Taxes*

The Panel suggested the possibility of using certain sumptuary taxes, otherwise known as “sin” taxes. These are commonly levied taxes on items such as alcohol, tobacco, gambling, and other activities that, while common, are enjoyed only within a highly regulated environment. The philosophy underlying these taxes is that higher taxes on socially undesirable activities will affect behaviors (i.e., reduce consumption) while acknowledging that these activities remain appealing to enough people that taxing them is also a good source of revenue. In addition, many of the activities that are commonly taxed have a direct impact on the delivery of public safety (e.g., alcohol consumption causes automobile accidents requiring police, fire, and EMS dispatch). Overall, sumptuary taxes are generally excellent sources of revenue for governments and could be used to support 911.

Most jurisdictions already tax activities that fall in this category; therefore, jurisdictions need to examine whether existing taxes can be increased to cover 911 needs. This capability will vary widely among jurisdictions. Another potential issue could be the dedication of funds specifically for 911 use. If existing taxes were increased to support 911, they would have to be isolated somehow from the other revenues collected, so that the funding for 911 was secure. Sumptuary taxes can result in fierce competition among strongly entrenched groups and can have significant political challenges. In addition, if the tax results in a decrease in “undesirable” activities, the result may be a declining source of revenue.

### *Tolls*

Typically, toll revenues are used for the maintenance and operations of roadways, bridges, or other similar infrastructure available to the public, but tolls could also be applied to telecommunications services. In the past, tolls have been charged to telecommunication subscribers when calls made between local telephone exchanges (within a state) results in a toll charge. Toll collection is possible when an asset’s use can be controlled at certain access points where tolls can be collected from users. In this way, it is easier to isolate these revenues from general funds to keep them dedicated for the asset for which they are collected. However, toll revenue alone is typically insufficient to cover the operations and maintenance requirements of an asset, and funding from other sources is required. There is a limit at which a toll can be set before users will seek alternatives to the toll-bearing asset, causing its revenue potential to decline.

In Texas and California, legacy 911 is funded, in part, with explicit assessments against intrastate (predominantly wireline) toll revenue, but the overall use of this model has declined for a number of reasons. The Federal Telecommunications Act of 1996 opened all communications markets to competition; therefore, continuation/expansion of such legacy methodology is neither competitively nor technologically neutral. Owing to wireless and VoIP substitution, tolls are a seriously declining revenue source for service providers. As such, they are an unsustainable source of funding.

### *Health Insurance*

During the Panel brainstorming session, a suggestion was made to consider attaching a fee to health insurance plans. The logic of this idea is that 911 is affiliated with emergency care, as is health insurance. Also, under current national legislation (Patient Protection and Affordable Care Act [PPACA]), everyone is required to carry health insurance (or face penalties), and therefore, it is nearly universal and thus a more equitable means to distribute the costs for 911.

Although the proposal has merit, there are a number of potential challenges. First, healthcare with new insurance-purchasing requirements recently underwent massive reform. This could present an opportunity to interject 911 financing processes; however, this may further complicate an already complex issue and therefore face steep political opposition. Another challenge, as with other financing schemes that are not part of the current framework, is establishing a collection process that ensures that 911 funding is kept dedicated and distinct from other revenue.

### *Auctions*

Governments regularly raise funds through public auctions of excess property or other assets. The Panel suggested these activities as a possible source of funding for NG911 investments. Generally, auctions can be used to raise funds but this opportunity will vary widely by jurisdiction. For example, at the Federal level, the Next Generation 911 Advancement Act of 2012 authorizes \$115 million in 911 grants from the proceeds of auctioning of telecommunications spectrum. By their nature, auction funds are not a consistent funding stream for ongoing maintenance and operations, however, they can be effectively employed to raise funds for initial or capital investments.

### *Special Event Permitting Fees*

Special activity permit fees can help offset peak demands for 911 services during events such as concerts, rallies, and other organized events. By charging organizers with special permitting fees, the local jurisdiction can develop a reserve to offset major expenditures or significant investments, such as NG911. Funds can also be used to cover expenditures across a period of time if revenues from other sources are subject to periodic peaks and drops. Currently, many jurisdictions require public safety support for major events and build police, fire, and EMS support into the event fee, so the inclusion of 911 into this fee would not require a major change.

Economically, such fees may create a disincentive for organizers to host in these areas, depending on the amount, so this source may not generate the type of revenue expected. In some cases, however, namely in large cities or locations that host well-established venues or events, organizers may expect these fees as the “cost of doing business.”

### *User Fees*

The Panel mentioned the collection of user fees or pay-for-service fees collected directly from system users (e.g., 911 callers); however, such financing of 911 systems is undesirable because of the disincentive they may create. Some jurisdictions have implemented such fees in limited cases, mainly to curb unnecessary calls to 911; however, even these well-intentioned proposals are highly controversial.

A recent proposal before the State of Connecticut's legislature aims to ban local ordinances from charging property owners for "nuisance" calls to 911.<sup>44</sup> In these cases, it appears the purpose of such ordinances is not to raise funds per se, but rather to discourage unnecessary calls. Owing to these elements, the Panel did not recommend user fees as a means to generate equitable and sustainable revenue to support NG911.

### ***Future Funding Analysis***

- Sumptuary taxes may be a possibility for some jurisdictions; however, in general, they are already used extensively. Marginal increases for NG911 support would face the challenge of isolating and dedicating funds for NG911.
- Tolls are a declining possibility, due to changes in technology and legislation, and may potentially face similar issues in isolating and dedicating funds.
- Health insurance taxes are a highly-unlikely proposition due to being politically complicated and operationally challenging.
- Auctions and special event permitting fees may be useful to raise initial investment funding for NG911 but are not viewed as viable operational funding sources.
- User fees are not recommended because they could provide a disincentive to dialing 911.

## **4.2 Federal Funding**

In addition to the financing sources discussed in Section 4.1, the Federal Government could provide funds for 911. These funds are usually one-time grants, but other sources may be available as well (e.g., a nationwide 911 fee). Generally, these types of funds are used for large capital expenditures rather than operational costs, because Federal funds do not typically provide a steady stream of funding. This section outlines two potential sources of Federal funding.

### **4.2.1 Federal Grant Programs**

According to Grants.gov, a Federal grant is an award of financial assistance from a Federal agency to a recipient and carries out the public purpose of support or stimulation as authorized by a law of the United States. Currently, 26 Federal agencies offer more than 1,000 grant programs annually in 21 different fields (e.g., disaster prevention and relief, education, community development, health, arts) serving a wide range of people and communities. It is estimated that almost 100 of these grant programs are considered preparedness-related and support the ability to build and improve the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from threats that pose the greatest risk to national security. A Federal grant can be one funding mechanism to support the transition to NG911 operations in the near term.

#### ***Broadband Technology Opportunities Program (BTOP)***

The American Recovery and Reinvestment Act of 2009 (Recovery Act)<sup>45</sup> designated \$7.2 billion for NTIA and the Rural Utilities Service (RUS) to expand broadband services throughout the United States. Pursuant to the Recovery Act, NTIA established the Broadband Technology Opportunities Program (BTOP), the largest grants program NTIA has managed to date. The Recovery Act mandated that NTIA award \$4.7 billion before September 30, 2010, in broadband grants to expand broadband in unserved

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<sup>44</sup> *Conn. Bill Would Ban 911 User Fees*, The Boston Globe, May 4, 2013. Available at: <http://www.boston.com/news/local/connecticut/2013/05/04/conn-bill-would-ban-user-fees/TYJ1vgTLAobjG0FFEJx8UL/story.html> [Last accessed October 21, 2013]

<sup>45</sup> *Recovery Act.gov*, The Recovery Act. Available at: [http://www.recovery.gov/About/Pages/The\\_Act.aspx](http://www.recovery.gov/About/Pages/The_Act.aspx) [Last accessed October 21, 2013]

and underserved areas, expand public computer center capacity, and encourage sustainable adoption of broadband service.

In 2009 and 2010, NTIA invested approximately \$4 billion in 233 BTOP projects. The projects included:<sup>46</sup>

- One hundred twenty-three infrastructure projects totaling \$3.5 billion in Federal grant funds to construct broadband networks
- Sixty-six Public Computer Center (PCC) projects totaling \$201 million in Federal grant funds to provide access to broadband, computer equipment, computer training, job training, and educational resources to the public and vulnerable populations
- Forty-four Sustainable Broadband Adoption (SBA) projects totaling nearly \$251 million in Federal grant funds to support innovative projects that promote broadband adoption, especially among vulnerable population groups where broadband technology traditionally has been underutilized.

While BTOP was not specifically a 911-focused grant program, the broadband provided to underserved areas via BTOP funds could potentially be used by local jurisdictions as NG911 expansion occurs. In addition, best practices and lessons learned can be taken from BTOP as 911 focused grants from other Federal agencies (e.g., National 911 Program) are awarded. One example of how BTOP funds were used in support of 911 occurred in West Virginia. Part of the \$126.3 million award made to the state was used to upgrade Internet access and connect 53 PSAPs across the state.<sup>47</sup> In addition, the Adams County (Colorado) Communications Center project (ADCOM911) used part of a \$12.1 million BTOP award to 700 megahertz (MHz) wireless broadband network for use by first responders and to interconnect PSAPs to other government agencies.<sup>48</sup>

### *State and Local Implementation Grant Program (SLIGP)*

The Middle Class Tax Relief and Job Creation Act of 2012 (Act)<sup>49</sup> provided up to \$135 million to NTIA to assist state, local, and tribal governments in planning for a nationwide interoperable public safety network. Pursuant to Section 6302 of the Act, NTIA established the State and Local Implementation Grant Program (SLIGP) in an effort to coordinate the broadband network with state preparation activities. The Act mandated that NTIA, in consultation with the First Responder Network Authority (FirstNet) award up to \$135 million in grants to assist state, regional, tribal, and local jurisdictions with identifying, planning, and using existing infrastructure, equipment, and other architecture associated with the nationwide public safety broadband network, in conjunction with fulfilling the wireless broadband and data services needs of individual jurisdictions.<sup>50</sup> Funding will be awarded in two phases, with the first phase focusing on governance consultation with FirstNet, stakeholder outreach, and

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<sup>46</sup> NTIA and Recovery.gov, *Broadband Technology Opportunities Program (BTOP) Quarter Program Status Report*, March 2013. Available at: <http://www.ntia.doc.gov/report/2013/sixteenth-quarterly-status-report-congress-regarding-btop> [Last accessed October 21, 2013]

<sup>47</sup> NTIA, *West Virginia Broadband Internet Project*, BroadbandUSA. Available at: [http://www.ntia.doc.gov/legacy/broadbandgrants/factsheets/WV\\_ExecOfcWestVA\\_FINAL.pdf](http://www.ntia.doc.gov/legacy/broadbandgrants/factsheets/WV_ExecOfcWestVA_FINAL.pdf) [Last accessed October 21, 2013]

<sup>48</sup> ADCOM 911—DIA Regional Broadband Network, BroadbandUSA. Available at: <http://www2.ntia.doc.gov/files/grantees/factsheetcoadcom911.pdf> [Last accessed October 21, 2013]

<sup>49</sup> *Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112–96*, February 22, 2012. Available at: <http://www.gpo.gov/fdsys/pkg/PLAW-112publ96/pdf/PLAW-112publ96.pdf> [Last accessed October 21, 2013]

<sup>50</sup> *Announcement of Funding Opportunity: State and Local Implementation Grant Program (SLIGP)*, NTIA. Available at: [http://www.ntia.doc.gov/files/ntia/publications/sligp\\_ffo\\_02062013.pdf](http://www.ntia.doc.gov/files/ntia/publications/sligp_ffo_02062013.pdf) [Last accessed October 21, 2013]

identification of potential public safety users. The second phase will focus on additional consultations with FirstNet and other data collection activities.

In July 2013, NTIA awarded \$13.1 million in grants to five states to assist in FirstNet planning:<sup>51</sup>

- Colorado received \$2.5 million.
- Connecticut received \$1.4 million.
- Delaware received \$724,613.
- New York received \$4.86 million.
- Ohio received \$3.6 million.

Additional information on grant recipients can be found on the NTIA Web site<sup>52</sup>.

Although SLIGP funding is not specifically targeted for 911, the grant program is relevant because it will directly support activities such as state planning, consultation, and outreach related to the deployment and implementation of the nationwide public safety broadband network (e.g., FirstNet). NG911 will play a significant role for public safety entities using FirstNet, because it will be the first link in the transmission of data between 911 dispatchers and first responders. The cost sharing possibilities among FirstNet, SLIGP, and NG911 should be explored and pursued, especially because these networks will be complementary to one another as well as deployed during similar timeframes. It is incumbent upon the 911 community to make sure its needs are represented in the broadband planning process.

#### ***Ensuring Needed Help Arrives Near Callers Employing 911 Act and Next Generation 9-1-1 Advancement Act of 2004***

In December 2004, Congress created the E911 Implementation Coordination Office (ICO) as a joint effort of the U.S. DOT NHTSA and NTIA. In June 2009, the ICO announced<sup>53</sup> the availability of \$41.325 million in grant funding to assist 911 PSAPs to implement next generation technologies. The grants were authorized under the *Ensuring Needed Help Arrives Near Callers Employing 911 Act of 2004* (ENHANCE 911 Act)<sup>54</sup> and allowed grantees to use funds for hardware, software, training, and/or consulting services directly relating to the upgrade of their 911 equipment and operations. The ENHANCE 911 Act was enacted “to improve, enhance, and promote the Nation’s homeland security, public safety, and citizen activated emergency response capabilities through the use of enhanced 911 services, to further upgrade PSAP capabilities and related functions in receiving E911 calls, and to support the construction and operation of a ubiquitous and reliable citizen activated system.” Through a Memorandum of Understanding (MOU), NHTSA and NTIA agreed to house the administration of the grant program at NHTSA.

The total appropriation for the E911 Grant Program was \$43.5 million.<sup>55</sup> In September 2009, the E911 Grant Program awarded funds to 30 states and territories. These awards ranged from \$200,000 in

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<sup>51</sup> *NTIA Awards \$13.1 Million in Grants to Five States to Assist in FirstNet Planning*, NTIA, July 24, 2013. Available at: <http://www.ntia.doc.gov/press-release/2013/ntia-awards-131-million-grants-five-states-assist-firstnet-planning> [Last accessed October 21, 2013]

<sup>52</sup> *SLIGP Awards*, NTIA. Available at: <http://www.ntia.doc.gov/slignp/slignp-awards>.

<sup>53</sup> Federal Register, *E-911 Grant Program*(74 FR 26965), June 5, 2009. Available at: <https://www.federalregister.gov/articles/2009/06/05/E9-13206/e-911-grant-program> [Last accessed October 21, 2013]

<sup>54</sup> ENHANCE Act of 2004, Public Law 108-494, codified at 47 U.S.C. 942. Available at: <http://www.gpo.gov/fdsys/pkg/PLAW-108publ494/html/PLAW-108publ494.htm> [Last accessed October 21, 2013]

<sup>55</sup> Deficit Reduction Act of 2005, Public Law 109-171. Available at:

American Samoa, to \$5.4 million awarded to Texas, and totaled \$41,325,000. The remaining \$2,175,000, or five percent of the total appropriation, was allocated for costs related to the administration of the grant program. Applicants were required to submit a project budget outlining the proposed expenses allocated for all activities. In addition, 50 percent of the total cost of the project was to come from non-Federal, state-matched funds. During the administration of the program, applicants were required to not divert 911 funds for any other use. The E911 Grant Program was generally a success in meeting the requirements outlined in the ENHANCE 911 Act.

States and territories used grant money to enhance their technology and operations for the benefit of public safety and PSAPs, as well as their citizen callers. Many states upgraded their systems to comply with Phase II wireless E911 requirements, implemented NG911 technologies, and used grant funding to make significant improvements in technology and emergency communications.

*Examples of States Using Federal Grant Funds:*

**State of Texas**<sup>56</sup>: The State of Texas used a Federal grant to fund 50 percent of its ESInet implementation cost. Table 4 identifies the costs associated with the implementation of NG911 as presented as part of testimony to the Texas House Technology Committee by Kelli Merriweather, Executive Director, Commission on State Emergency Communications (CSEC) on February 21, 2012.<sup>57</sup>

**Table 4: Costs for Implementing NG911 in Texas**

<b>ESInet Implementation</b>	\$10.8 million
	- <b>\$5.4 million NG911 Federal Grant</b>
	-\$5.4 million Matching State Funds
<b>ESInet Operation &amp; Maintenance</b>	\$3.3 million requested for 2012–13
	-Revising estimate for 2014–15 Legislative Appropriation Request

**Salt Lake County, Utah**<sup>58</sup>: Trials for NG911 (also called a “proof of concept”) are sometimes funded as part of the path toward a full NG911 upgrade, through grants, 911 funds or other revenue dollars, or a combination of these. Salt Lake County received a \$37,000 state grant, plus \$13,000 in state funding, to build a pilot IP network that ties landlines and wireless 911 trunks and creates a platform for NG911.

**Massachusetts**<sup>59</sup>: Massachusetts used grant funds to build a fiber-optic infrastructure and install hardware and software to connect PSAPs in the central and western part of the state directly to a statewide fiber-optic ESInet. This infrastructure will facilitate the transition to NG911 and enhance PSAP interoperability.

<http://www.gpo.gov/fdsys/pkg/PLAW-109publ171/pdf/PLAW-109publ171.pdf> [Last accessed October 21, 2013]

<sup>56</sup> *Texas Grant Information*, National 911 Program. Available at: <http://www.911.gov/911-grants/grants-tex.html> [Last accessed October 21, 2013]

<sup>57</sup> *Interim Report to the 83rd Texas Legislature*, House Committee on Technology. Available at:

<http://www.house.state.tx.us/media/pdf/committees/reports/82interim/House-Committee-on-Technology-Interim-Report.pdf> [Last accessed October 21, 2013].

<sup>58</sup> *Three Who’ve Done It*, National 911 Program. Available at: [http://www.911.gov/ng911\\_law/threewhodid.html](http://www.911.gov/ng911_law/threewhodid.html) [Last accessed October 21, 2013]

<sup>59</sup> *Massachusetts Grant Information*, National 911 Program. Available at: <http://www.911.gov/911-grants/grants-mas.html> [Last accessed October 21, 2013]

**Michigan**<sup>60</sup>: Funding totaled more than \$1 million for improvements to GIS road centerline data through two local sub-grant programs. Fifty-one jurisdictions within the state received and used the local sub-grant funds to measure road centerline accuracy. These road centerline updates will help to improve the GIS data for today's 911 systems, as well as for future NG911 environments.

**Counties of Southern Illinois**<sup>61</sup>: The CSI 911 Association project is a pilot program for developing and testing an NG911 system as a basis for a 911 network in rural America. The project is partially funded with a \$600,000 Federal grant.

### *Next Generation 9-1-1 Advancement Act of 2012*

Additional Federal grant program funds have been designated to support NG911 upgrades, such as those mentioned the Next Generation 9-1-1 Advancement Act of 2012, signed by President Obama on February 22, 2012. The Act provides an authorization of \$115 million for 911 implementation grants to fund:

- Implementation and operation of 911 services and E911 services, migration to an IP-enabled emergency network, and adoption and operation of NG911 services
- Implementation of IP-enabled emergency services enabled by NG911 services
- Training of public safety personnel.<sup>62</sup>

The funding tied to this grant program would be administered by the 9–1–1 Implementation Coordination Office and is contingent on a wireless spectrum auction to be conducted by the FCC. Of the multiple programs to be funded by this auction, the NG911 grant program is seventh in line to receive funding. While it is impossible to predict the amount of funding that will be produced by the auction, 911 stakeholders remain hopeful.

### **4.2.2 National Infrastructure Reinvestment Bank**

Past proposals for legislation have included the idea of creating a National Infrastructure Reinvestment Bank (NIRB) as an independent financial establishment of the Federal Government to supplement existing programs in funding infrastructure, similar to the Highway Trust Fund. The NIRB has been proposed multiple times in Congress but to date, no law has been passed. President Obama has backed the bill each time it has been presented to Congress, suggesting that the NIRB would borrow \$60 billion of Federal funding to invest in infrastructure over 10 years<sup>63</sup>, while leveraging additional private investment.

Although the focus of bills proposed in the past is transportation infrastructure, NG911 infrastructure could also use these funds. This type of financing has been used to fund 911 systems before; for example, New Jersey funded its original 911 infrastructure through two Certificates of Participation (COP). Each certificate was valid for 14 years, totaling \$94 million, and was used to upgrade to E911

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<sup>60</sup> *Michigan Grant Information*, National 911 Program. Available at: <http://www.911.gov/911-grants/grants-mi.html> [Last accessed October 21, 2013]

<sup>61</sup> *Jackson County (Illinois) 911*, Counties of Southern Illinois Next Generation 911 Project. Available at: <http://www.jc911.org/index.php/nextgen-9-1-1-project> [Last accessed October 21, 2013]

<sup>62</sup> Next Generation 9-1-1 Advancement Act of 2012, Public Law 112–96, February 22, 2012. Available at: <http://www.gpo.gov/fdsys/pkg/PLAW-112publ96/pdf/PLAW-112publ96.pdf> [Last accessed October 21, 2013]

<sup>63</sup> *Obama's Spending Plan*, The Washington Times, February 22, 2008. Available at: <http://www.washingtontimes.com/news/2008/feb/22/obamas-spending-plan/> [Last accessed October 21, 2013]

Phase II via a \$4.7 million line of credit.<sup>64</sup> Although this financing approach is not guaranteed, it is important for 911 stakeholders to continue to monitor the progress of the NIRB bill.

### 4.3 Private Financing

In addition to the Federal, state, and local funding options discussed above, private entities could potentially provide 911 stakeholders with financing. Generally, private entities work in collaboration with the department or agencies they are assisting. This section highlights the financing, funding, and operational options available to 911 stakeholders from private sources.

#### 4.3.1 Public-Private Partnerships

One of the most successful methods employed by other infrastructure-related industries to improve project delivery efficiency, minimize government project risk, increase cost effectiveness, and potentially generate revenues is a P3. In addition to decreasing costs and raising new revenue, P3s can significantly reduce the time and costs required to complete a capital project while reallocating risks from the public to the private sector. The industry term for this benefit is Value-for-Money (VfM).

The success other countries and industries have had in utilizing P3s has led to the recognition of the P3 as an effective financing and delivery method for Federal, state, provincial, and municipal governments. Government assets procured in such transactions have included water and wastewater management, highways, transit, healthcare, airports, seaports, and social services (e.g., education, health).

In addition to government incentive, private sector interest in infrastructure as an investment asset vehicle has increased dramatically over the past decade, with many pension, private wealth, and insurance funds looking for P3 opportunities as a transition from the risk/return profiles of equities and bonds. Sources estimate that more than \$200 billion in private capital is currently available for investment in U.S. infrastructure.<sup>65</sup>

Advantages of P3s include:

- Additional financial capacity
- Lifecycle cost efficiencies met through management and integration of project phases
- Innovation in design owing to private sector expertise
- Redistribution of risk from the public to private sector
- Delivery and construction efficiency driven by market pressures in the private sector
- Ability to contract quality of service through negotiations
- High interest of private sector investors (pension funds, private wealth), operators, and developers in investment and partnership with governments in infrastructure projects.

Concerns pertaining to P3s are as follows:

- Public scrutiny and stakeholder management
- Loss of flexibility of public agency in managing asset

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<sup>64</sup> *New Jersey 9-1-1 Consolidation Study: Profile of the New Jersey E9-1-1 System*, Rutgers University—Heldrich Center for Workforce Development, October 2005. Available at: [http://www.heldrich.rutgers.edu/sites/default/files/content/New\\_Jersey\\_State\\_Profile\\_E9\\_1\\_1.pdf](http://www.heldrich.rutgers.edu/sites/default/files/content/New_Jersey_State_Profile_E9_1_1.pdf) [Last accessed October 21, 2013]

<sup>65</sup> *Benefits of Private Investment in Infrastructure*, Kearsarge Global Advisors, 2010. Available at: [http://www2.vlaanderen.be/pps/documenten/benefits\\_of\\_private\\_investment\\_in\\_infrastructure.pdf](http://www2.vlaanderen.be/pps/documenten/benefits_of_private_investment_in_infrastructure.pdf) [Last accessed October 21, 2013]

- Transaction risk related to complex negotiations and contractual agreements.

In analyzing P3s in infrastructure development, operations, and management, it is essential to understand the fundamental mechanisms of the financing and procurement method. The key to understanding the P3 method is the P3 risk matrix, as illustrated in Figure 3.

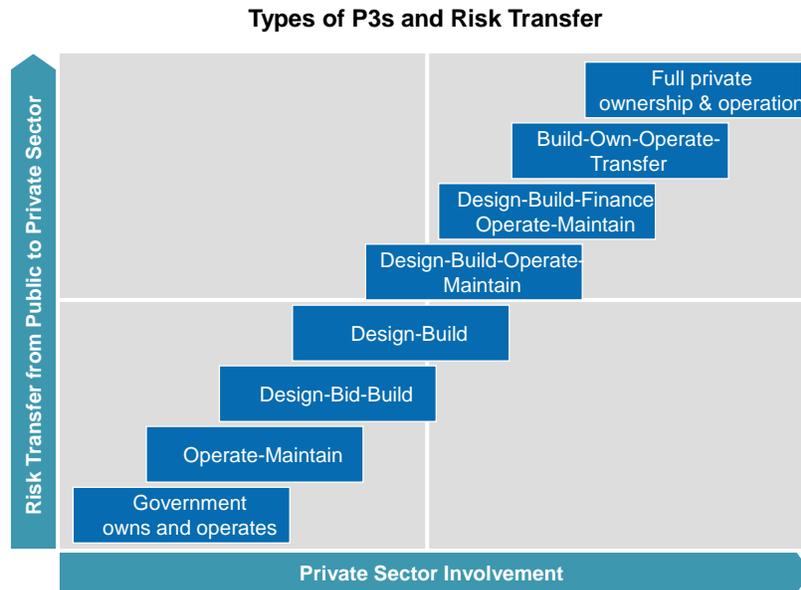


Figure 3: P3 Risk Matrix

As the matrix illustrates, the benefit of the P3 is the allocation of risk from the public to the private sector. As private-sector involvement increases and public-sector involvement decreases, financial risk to the public sector decreases. Through most of the risk allocation matrix, the public sector maintains overall ownership of the asset despite declining risk exposure. Ultimately, the key to a successful procurement for the public sector is to find the most effective level of asset management and responsibility while retaining the ability to increase potential revenues in the system generated by increased efficiency and effectiveness of management. The degree and severity of risks vary by project as do the opportunities to determine who controls the risk factors. Risk factors can affect cost and schedule of project delivery and, ultimately, access to funding. Project risk categories may include:

- Planning, permits, and approvals
- Legislation, regulation, and policy
- Funding and financing
- Ecosystem/Environment
- Right of way (ROW) acquisition
- Design and construction
- Operations and maintenance
- Demand and revenue
- Force majeure.

Traditionally, the value of the project to the public sector, given the identified risks, is determined by calculating the VfM to the public sector—the value of the difference between the traditional

procurement method and the P3 procurement. If there is a VfM, it may be worth creating a P3 to fund the project. A more detailed economic analysis of the P3 model is provided in Appendix C.

In comprehensively and effectively analyzing funding opportunities available for 911, as well as NG911 funding, it is necessary to compare P3 funding strategies in the United States and across the globe. These comparable funding and delivery strategies for infrastructure projects vary across different asset classes and around the world, and offer perspective on major funding and delivery issues faced by NG911, such as project financing costs and risk, operations and maintenance risk, political and regulatory risk, as well as stakeholder risk.

### *Highway Public-Private Partnership Procurement Development*

The most extensive use of P3s in the United States has been in highway procurements and financing. In projects performed by/for state and Federal transportation agencies, the United States has managed many large-scale highway procurements both intra- and interstate, and serves as a potential benchmark for the development of NG911 funding models.

The impetus for the development of P3 highway delivery was necessity. Because it was built in the 1950s, the National Interstate Highway System is reaching the end of its lifecycle. With increased population and highway utilization, and decreased Federal and state funding from traditional sources, such as the Highway Trust Fund and municipal bond financing, the need for alternative financing for transportation construction and improvement became apparent.

U.S. DOT and the Federal Highway Administration (FHWA) responded to the issue by providing states and local governments with a series of financing tools including:

- **Private Activity Bonds (PAB)**—a bond issuance that allows private developers of transportation projects to participate in the municipal market and issue debt in the lower interest rates provided traditionally to state and local authorities
- **SEP-15 Program**—an experimental process for FHWA to identify, for trial evaluation, new P3 approaches to project delivery
- **Transportation Infrastructure Finance and Innovation Act (TIFIA)**—a loan program to provide Federal debt financing assistance to nationally or regionally significant surface transportation projects, including highway, transit, and rail.

These programs are designed to fill market gaps and leverage substantial private co-investment by providing projects with supplemental or subordinate debt.

With programmatic support from the Federal Government, state and local transportation agencies have been able to continue to meet the highway needs across the country. U.S. DOT and the FHWA continue to develop guidance documents, initiatives, and technical support programs (e.g., U.S. DOT's Project Finance Center [PFC]) on how to procure and analyze risk for P3 projects. The precedent set by U.S. DOT in the continued funding, financing, and development of highway projects serves as a great example to the 911 community. The establishment of a nationwide 911 system has already been compared to the National Interstate Highway System in terms of interstate collaboration and Federal coordination, perhaps allowing further comparison of funding mechanisms. While some policy changes may be required, implementing P3s to fund 911 infrastructure could greatly reduce the cost and risk associated with system build-out. Concurrently, private sector organizations could be attracted to 911 via lucrative incentives. The success that has been achieved in managing the interests of Federal, state, and local entities, providing appropriate financing mechanisms that involve and provide incentives for private

participation, and ultimately continuing to develop successful projects, represent the opportunity that P3s may provide NG911 in its future efforts.

### *Non-Highway/Toll Road Public-Private Partnerships*

Although P3s are a relatively new financing model in the United States for infrastructure projects beyond toll roads and highways, two significant P3s stand out because of their comparability to the issues facing a potential NG911 upgrade regarding scope, technical upgrade requirements, and governance dynamics. These projects are the Virginia Department of Transportation (VDOT) Traffic Management Services P3 and the Arizona Flagstaff Facilities project. Examining funding governance and delivery requirements of these projects may clarify the options provided by the P3 model, to overcome financial challenges facing the 911 community.

#### **VDOT Traffic Management Services**

To increase efficiency and integrate and innovate road transportation by providing traveler information on road conditions, as well as coordinate congestion management and incident response via cameras and other technology, VDOT, in coordination with the Virginia Office of Transportation Public-Private Partnerships (OTPP), issued a Request for Interest (RFI) to seek information from the private sector. The RFI sought information on developing and implementing a strategy to restructure the operations and maintenance of five Transportation Operations Centers (TOC) into a single traffic management center, and to manage related field communications and intelligent transportation system infrastructure across the Commonwealth. VDOT narrowed bidders to four companies (Telvent, URS, Serco, and Parsons Brinckerhoff) to bid on a contract to provide services to monitor traffic conditions, provide information on road conditions, and coordinate congestion management and incident response. A single respondent, Serco, was selected as the private operator responsible for restructuring and enhancing the TOC system.

The project was procured using the Virginia Public Procurement Act (VPPA), which was employed in this transaction by the Commonwealth to develop a strategy to solicit proposals to operate and invest in the transportation control centers. The contract has a 6-year base period valued at \$355 million and three 2-year option periods. Serco also will be allowed to test new products and services in the market.

The VDOT TOC Project is expected to create efficiencies in transportation management over the next 6 years by restructuring the five centers in the Commonwealth while focusing financial, operational, and maintenance capabilities on pertinent core functions. It would seem to be in the interest of the private sector to provide these services at the highest level and most efficient cost, ensuring that the Commonwealth receives quality in price and service for the project.

In securing the necessary funds for this project through traditional means, including Design-Build procurement and possibly transportation fund or state bond financing, the Commonwealth determined that there was VfM in engaging in a P3. For NG911, a P3 procurement may provide similar benefits to PSAP system upgrades and maintenance. It will be important to continue to observe and analyze the progress of the VDOT TOC Project throughout its lifecycle.

This project is especially relevant to NG911 because it represents a statewide procurement of traditionally segregated regional functions within a state to create cost and operational efficiencies, as well as enhance capabilities. Many PSAPs are co-located with TOCs and have similar operational needs. For example, the Fairfax County (Virginia) 911 Communications Center is located within the McConnell Public Safety and Transportation Operations Center (MPSTOC) in Fairfax, Virginia. The MPSTOC is a nerve center of integrated systems of advanced technologies, including computer software, traffic

cameras, lane control strategies, ramp meters, reversible control gates, and high-occupancy vehicle (HOV) lane restrictions.<sup>66</sup> In addition to the 911 Center, this location houses the County's Office of Emergency Management, Emergency Communications Center, the Virginia State Police, and dispatchers, all working in close proximity.

Along with this project and its OTP3, VDOT itself is viewed nationally as a leader in funding and delivering P3s, thus serving as an excellent example.

### **Arizona Flagstaff Facilities**

Facing financial strain, and requiring the removal and replacement of old facilities to extend roadways, the Arizona Department of Transportation (ADOT) executed the first P3 in the State of Arizona in February 2013. The project was initiated in early 2012 with the call for Statements of Qualification (SOQ) from private sector firms for services to remove and replace the old facilities. Three consortia of architecture, design, and development firms responded to the SOQ, from which a single consortium, Vintage Partners, was selected in the state's first P3. Vintage Partners will be contracted to develop a new Flagstaff facility under the supervision and cooperation of ADOT. Traffic improvements and efficiencies in the growing region will be pivotal factors. Contract award is currently being negotiated.

The project was procured by ADOT in direct coordination with the local agencies in Flagstaff, Arizona, for ROW acquisitions, stakeholder outreach, and other efforts. The procurement was developed with the following goals in mind:

- Provide ADOT with all or most of the funds needed to relocate into new facilities. This could include developing a new property or using existing buildings.
- Provide the City of Flagstaff with the property needed to realign and enhance traffic circulation.
- Provide an opportunity for a developer to develop the remaining property for business and commercial purposes as approved by the City of Flagstaff.

The bidder is responsible for the successful design, build, financing, operations, and maintenance of the facility. The services provided by the contractor will be compensated by ADOT through an availability payment, which is defined as a negotiated regular payment to be made to the contractor, based on the successful provision (availability) of the facility.

Arizona Flagstaff Facilities P3 is viewed as a model project for the state, creating cost savings for the state and serving as its first P3. Subsequent projects are expected to follow this one, creating additional efficiencies while meeting growing transportation needs for the state through private participation and investment. The Flagstaff P3 highlights extensive coordination of multiple layers of government agencies and entities, along with the private sector, to achieve specific goals of cost savings, transportation efficiency, and facilities management. Further, projects like this provide an additional example of how NG911 facilities can be constructed and financed. The P3 procurement strategy may be able to provide ideas for efficiencies in upgrading efforts by involving private participation while reducing the financial strain on state and local governments.

### ***Comparison with International Emergency Service Funding P3 Models***

There are many international examples of using P3s to fund emergency services that demonstrate best practices applicable to domestic jurisdictions. Australia and Western Europe appear to have the most

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<sup>66</sup> VA Department of Transportation MPSTOC. Northern Virginia ITS Architecture. Available at: <http://www.vdot-itsarch.com/html/elements/el136.html> [Last accessed October 21, 2013]

experience with emergency project funding and delivery through P3s. Greenfield, or newly built projects, make up the majority and represent the development of new infrastructure similar to NG911 (also qualifying as a new build/greenfield). These projects provide very interesting profiles relevant to the research for this Panel and potentially provide helpful roadmaps to 911 funding and NG911 financing models.

#### **Australia—Emergency Alerting System P3 in Victoria**

The Emergency Alerting System P3 project included the design, construction, operation, and maintenance of 228 communication sites and towers, as well as transmission equipment and handheld messaging devices for more than 40,000 emergency services personnel in the Country Fire Authority, State Emergency Services, and Ambulance Victoria.

The Australian Government funded the upgrade of their national emergency warning system, Emergency Alert, to deliver warnings to mobile telephones. They implemented a national warning system to deliver warnings based on the location of the handset, in addition to the billing address, of mobile telephones. The project included funding by the Federal government of \$1.35 million AUD to the Victoria state government to investigate the capability on behalf of all states and territories. This was part of more than \$26 million AUD that has been provided by the Australian Government to establish a national telephone-based emergency warning capability, including \$15 million AUD for Emergency Alert. Since Emergency Alert became operational in December of 2009, it has been used over 500 times and has issued more than 7 million messages.

The Australian Government has also contributed \$33.2 million toward establishment of the location-based text message enhancement to the Emergency Alert system. The location-based capability sends SMS text warnings at the time of an emergency, to mobile telephones based on the last known location of the handset. This is designed to occur in addition to the original Emergency Alert system, which sends voice warnings to landlines and SMS text warnings to mobile telephones based on the registered service address of the handset. The location-based enhancement was rolled out to the networks of a private entity, Telstra, in November 2012, and will be launched on Vodafone and Optus networks in November 2013.<sup>67</sup>

#### **4.3.2 Hosted Solutions**

Private companies can provide web-hosted solutions with facilities that enable counties and localities to access PSAP software online. Hosted solutions provide PSAPs with centralized infrastructure and management, while transferring some operational risks to the service provider. Rather than purchasing equipment that provides all of the functionality a PSAP needs, a PSAP subscribes to a single provider's solution, and all of the necessary functions occur "in the cloud" that call takers access via a web browser. This eliminates a large portion of the capital costs of implementing a NG911 solution, converting those capital costs into recurring operating (i.e., subscription) costs. Many jurisdictions find it easier to fund recurring costs than capital costs. Hosted solutions have the following additional benefits:

- **Transfer of Operations and Maintenance Risk**— PSAP that operate their own systems incur additional costs and risks associated with maintenance of software. These ongoing operational costs could be significant owing to costs such as server installation fees, product upgrades,

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<sup>67</sup> *Emergency Warnings*, Australian Emergency Management. Available at: <http://www.em.gov.au/Emergency-Warnings/Pages/default.aspx> [Last accessed October 21, 2013]

bandwidth provisioning, maintenance fees, support personnel, etc. Costs for hosted software solutions typically include implementation of software upgrades and maintenance fees.

- **Value**—Availability, reliability, and resiliency of the implemented hosted solution are likely to be more advanced than what could be provided by the PSAP itself if it chose to purchase and implement a full NG911 hardware/software package.
- **Scalability**—Features desired by the PSAP can be customized to meet local needs. If, in the future, requirements change and additional features are required, changes could be made by the host and implemented transparently to the PSAP, requiring no additional hardware.
- **Interoperability**—Hosted solutions provide standards-based services for more multiple jurisdictions, resulting in all subscribers to be using similar or identical systems. By establishing appropriate agreements, information and resources can natively be shared with other jurisdictions using the same hosted provider.
- **Return on Investment**—Hosted solutions shorten time-to-value by eliminating implementation costs associated with typical IT hardware and software projects. Instead, the primary focus is meeting subscriber requirements, training users, and quickly implementing a production system.
- **Security**—Most hosted solutions vendors have infrastructure and resources devoted entirely to staying up-to-date with the latest software/hardware security issues and resolving potential issues quickly. Because they are providing a specific service, it is in their highest interest to make sure that the data accessed and provided is protected.

There are several vendors who provide hosted solutions to PSAPs (e.g., Intrado<sup>68</sup>, Solacom<sup>69</sup>), and the list of services provided by these vendors is quite extensive. When selecting a hosted solution, a PSAP can implement the most current technology available with the most up-to-date standards with little or no capital costs. It is incumbent upon 911 managers and Authorities to understand the services their system needs and exactly how their needs will be met by hosted services. Understanding the details and expectations of contractual relationships (e.g., extra charges, accessing and utilizing PSAP data stored by host services, etc.) is essential to ensuring the PSAP and its community, receive the services they require. Services available via hosted solution providers include GIS, telematics, data services, call routing and processing, CAD, streaming video, medical and HAZMAT integration, and text-to-911.

#### 4.4 NG911 Funding and Governance Concerns and Feasibility

There is no single specific approach to funding and oversight that will be universally successful nationwide, and jurisdictions are not limited to a single funding tactic. While a hybrid approach of the funding models listed in the previous sections can be used in different jurisdictions across the country, a well-defined and understood governance structure at each level of government needs to be in place to effectively manage the 911 system. The following sections examine issues related to funding and governance recommended during the transition to NG911.

##### 4.4.1 NG911 Funding Issues and Concerns

Overall, the Panel identified three major issues with regard to funding the transition to NG911:

- A comprehensive cost estimate for both the transition to NG911 and ongoing operations and maintenance costs has not been developed.

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<sup>68</sup> *Public Safety—NG911*, Intrado Services. Available at: <http://www.intrado.com/solutions/PSAP> [Last accessed October 21, 2013]

<sup>69</sup> *A state of the art NG9-1-1 system—with no tradeoffs*, Solacom. Available at: <http://www.solacom.com/public-safety/hosted-solution.aspx> [Last accessed October 21, 2013]

- Existing legislation can exclude new methods for revenue generation for 911, making it difficult to keep pace with the dynamics of the telecommunications user base.
- Revenues collected for 911 services through existing means are diverted to other uses.

The Panel reached general agreement on these issues and recognized that resolving them is key to the successful transition to NG911.

Although there have been studies on current 911 costs and future NG911 requirements, none has estimated the detailed or line item costs required to transition to NG911 or to operate an NG911 system at a national level. Therefore, while some jurisdictions have undertaken assessments at a state or local level, there are no reliable measures to assess the adequacy of funding under current mechanisms, nor what specific adjustments to current policy must be made to account for the transition, that are universally applicable. Within the Next Generation 911 Advancement Act of 2012, Congress tasked the National 911 Program to analyze and determine the detailed costs for specific NG911 service requirements and specifications; however, funding has not been available to develop this report.

Some states already have NG911 pilot systems in place or are in the process of implementing NG911-ready components, but it is uncertain whether the costs incurred by one state will be the same as those for another state because of the difference in legacy systems being replaced, the different NG911 components being implemented, and different project timelines/requirements. The modification or replacement of legacy systems will vary depending on the governance structure in place, degree of NG911 technology and enhancements deployed, and availability of funding. In most cases, parallel operations will persist for a period of time, increasing costs and the complexity of deployment. Those states that have conducted individual cost studies<sup>70</sup> may assist other states transitioning to NG911 in assessing the technical investment and operational costs for planning and to inform funding decisions. A number of state studies are referenced in this report, and stakeholders are encouraged to review the original reports for further information.

Some states have successfully updated statutes to account for new telecommunications users as technology evolves. Some others have not, causing 911 funding to become unstable as users switch to wireless, prepaid, or VoIP telephone services. More than 15 states do not collect surcharges on prepaid cellular devices, and nine do not currently collect from VoIP users. In addition, a legal challenge to the application of surcharges to VoIP users led to a court decision limiting states' ability to tax to a maximum of 35.1 percent of VoIP charges. The court decision stated that only 35 percent of VoIP charges can be attributed to intrastate commerce and therefore only that amount of VoIP charges are subject to state fees.<sup>71</sup> The Panel recommends that states and 911 jurisdictions adopt a forward-looking revenue model for 911 services that accounts for all current, and possibly future, telecommunications technology and user groups capable of connecting with or transmitting calls and/or data to 911. In many cases, this means updating statutes to include wireless and VoIP technology, and considering the most suitable means of including prepaid services.

Finally, regardless of the amount of revenue collected, the Panel and many within the 911 community are concerned about the diversion of funds from 911 to other uses, as has been experienced in some jurisdictions. There are numerous examples where monies collected under 911 revenue statutes are

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<sup>70</sup> A review of past cost studies can be found in Appendix F of this report.

<sup>71</sup> Federal Communications Commission, FCC DR FCC 10-185, November 5, 2010. Available at: <https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935704096> [Last accessed October 21, 2013]

diverted to state general funds and are diverted to non-911 uses. Pursuant to the New and Emerging Technologies 911 Improvement Act of 2008 (NET 911 Act)<sup>72</sup>, the FCC releases a yearly report on the state collection of 911 revenue in its *Annual Report on State Collection and Distribution of 911/E911 Fees*.<sup>73</sup> In the 2012 release of this report, six states reported using 911 fees for other purposes, and nine states did not provide a response to the question.<sup>74</sup> Some Federal grant regulations have attempted to discourage this fund diversion practice by including stipulations requiring applicants to certify that 911 fees have not been used for non-911 purposes in the six months prior to the grant application as well as during the grant period. This requirement had limited success in keeping states from diverting 911 funds. Unfortunately, in today's difficult fiscal environment, the loss of 911 grant funding has not provided sufficient disincentive to prevent the use of 911 fees for non-911 purposes.

According to New Jersey public documents, from 2009 to 2012, the state collected \$150 million a year in 911 fees, none of which has been distributed to the county PSAPs. This money went to the New Jersey State Police, which operates and maintains the selective routing system, but a large portion of the money has funded other communications systems outside of 911.<sup>75</sup> However, the 2012 FCC report to Congress lists New Jersey as not having used 911 funds for other purposes.<sup>76</sup> The Panel highlighted these issues and suggested that stakeholders further examine the consequences and impact on NG911 deployment.

In a report published in April of 2013, the U.S. Government Accountability Office (GAO) concluded that, "According to data collected by the Federal Communications Commission (FCC), all 50 states and the District of Columbia reported collecting--or authorizing local entities to collect--funds for wireless E911 implementation, and most states reported using these funds for their intended purpose." The GAO also concluded that the methodology used by the FCC to collect state data limits its usefulness, lacks written guidelines for interpreting states' responses, and misses an opportunity to provide more detailed aggregated information that would be useful to decision makers<sup>77</sup>. In response to the GAO, the FCC sought input from the states for its annual report, "...to generate a more accurate and specific picture of what programs states and other reporting entities define as being in support of 911/E911."<sup>78</sup> Release of the FCC's annual report is anticipated in early 2014.

#### 4.4.2 NG911 Governance Issues and Concerns

Governance issues and opportunities raised by the possibilities of transitioning to NG911 are an important aspect for consideration. New levels of coordination, education, oversight and funding need

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<sup>72</sup> NET 911 Act, Public Law 110–283, enacted July 23, 2008. Available at: <http://www.gpo.gov/fdsys/pkg/PLAW-110publ283/pdf/PLAW-110publ283.pdf> [Last accessed October 21, 2013]

<sup>73</sup> Federal Communications Commission, *Report to Congress on State Collection and Distribution of 911 and E911 Fees and Charges*, December 21, 2012. Available at: [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2013/db0114/DOC-318391A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0114/DOC-318391A1.pdf) [Last accessed October 21, 2013]

<sup>74</sup> Ibid.

<sup>75</sup> Bischoff, Glenn, "Yet another 911 funding tale of woe." *Urgent Communications*, June 13, 2013. Available at: <http://urgentcomm.com/blog/yet-another-911-funding-tale-woe> [Last accessed October 21, 2013]

<sup>76</sup> Federal Communications Commission, *Report to Congress on State Collection and Distribution of 911 and E911 Fees and Charges*, December 21, 2012. Available at: [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2013/db0114/DOC-318391A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0114/DOC-318391A1.pdf) [Last accessed October 21, 2013]

<sup>77</sup> U.S. Government Accountability Office (GAO), *Most States Used 911 Funds for Intended Purposes, but FCC Could Improve Its Reporting on States' Use of Funds*, April 2013. Available at: <http://www.gao.gov/products/GAO-13-376> [Last accessed December 23, 2013]

<sup>78</sup> Federal Communications Commission, *FCC Seeks Public Comment on Fourth Annual Report to Congress on State Collection and Distribution of 911 and Enhanced 911 Fees and Charges*, January 14, 2013 [Last accessed December 23, 2013]

to be defined or redefined to enable 911 managers and Authorities to engage in these activities, and operate the 911 system in a manner that realizes the full capabilities of NG911. Addressing these concerns during the planning and initial implementation phases of NG911 may help ensure a smoother transition from the current 911 system. By migrating to NG911, PSAPs become part of an interconnected “system of systems.” This new model will enable and facilitate cost sharing and shared governance, representing a major shift from the governance structures of most 911 authorities today.

Existing 911 systems are managed by each jurisdiction, often at the local government level, and the level of state coordination varies from state to state. Federal oversight is limited as well and extends mostly to the telecommunications carriers and VoIP providers. Achieving optimal benefits of NG911 relies on a model in which PSAPs are connected regionally, at the state level, and across the nation via secure IP networks. Implementing NG911 in this manner increases overall system resiliency and redundancy and provides an enhanced level of service to citizens. This interconnectivity requires a new governance structure to oversee and manage the system and to achieve nationwide coordination. Jurisdictions across the country are at different levels of NG911 technology implementation, and are also at varied levels of governance.

In September 2009, the National E911 Implementation Coordination Office’s *A National Plan for Migrating to IP-Enabled 911 Systems* identified options to address governance and policy barriers:

- Clarify jurisdictional frameworks and responsibilities and identify the coordination required at each level of government to make IP-enabled 911 possible
- Consider developing model state legislation that would address update of regulations, legislation, and other policies to reflect modern communications and IP-enabled 911 system capabilities
- Assign clear responsibility and authority for ensuring the availability of 911 within specific geopolitical boundaries by statute or administrative rule
- Factor IP-enabled 911 network considerations into national broadband planning, especially as they relate to extending high-speed Internet access to currently underserved areas.

With the diversity of existing laws and regulations at all levels of government, there may be a need for legislative action, mostly at the state level, to resolve regulatory and statutory issues to permit NG911 implementation. These issues include, but are not limited to:

- Collection and eligible use of 911 funds
- State 911 program authority
- 911 system definition
- Technology and interconnection requirements
- Rules concern access and sharing of 911 related data<sup>79</sup>

NG911 policy development will facilitate and guide the technical and operational design, acquisition, implementation, operations, and maintenance of NG911 systems. The 911 stakeholder community at all levels should seek opportunities to foster and support effective NG911 partnerships and to implement appropriate statutory and regulatory policies, ensuring the general public is aware and involved the deployment process.

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<sup>79</sup> National E-911 Implementation Coordination Office, *A National Plan for Migrating to IP-Enabled 911 Systems*. Available at: [http://www.911.gov/pdf/National\\_NG911\\_Migration\\_Plan\\_FINAL.pdf](http://www.911.gov/pdf/National_NG911_Migration_Plan_FINAL.pdf) [Last accessed October 21, 2013]

#### 4.4.3 Feasibility of NG911 Funding and Governance Options

While the project team and Panel used a broad brainstorming process to identify and assess possible models for NG911 funding and governance, participants were also very concerned with the feasibility of each possibility. They recognized that not all possibilities are applicable or desirable for any given jurisdiction, but in general, certain approaches may be more broadly feasible than others. Table 5 summarizes the Panel’s assessment of each funding mechanism presented in this report.

Table 5: Feasibility of Proposed Funding Mechanisms for NG911

Funding Mechanism	Feasibility	Notes
Surcharges on Wireline, Wireless, and VoIP Services		<ul style="list-style-type: none"> <li>• Provide the majority of current 911 funding</li> <li>• Should be equitable across all technologies to avoid shifts in funding as old technology is replaced</li> <li>• Have proven to provide sufficient funding for operating costs and some capital improvements in some states (e.g., Tennessee)</li> </ul>
Prepaid Wireless/Point of Sale Collection Surcharges		<ul style="list-style-type: none"> <li>• Should be equitable to surcharges on post-paid services</li> <li>• Require states without POS collection facilities to devise alternative facilities to collect; most states can leverage sales tax collection facilities</li> </ul>
Property-Based Surcharges		<ul style="list-style-type: none"> <li>• Provide a broader revenue base, which is possibly more equitable and sustainable</li> <li>• Connects payment for the service to users of the service more directly and equitably</li> <li>• Surcharges may not be sufficient to meet initial investment requirements</li> <li>• Some surcharges may be subject to political and legal scrutiny</li> </ul>
Sales Tax		<ul style="list-style-type: none"> <li>• Uses infrastructure already in place in most states because POS taxes are currently already being collected</li> <li>• Creates a broader users base of tax payers, especially in a state such as Missouri with only a wireline surcharge</li> <li>• May be more equitable than other taxing methods, collecting from visitors and temporary residents who use 911 services</li> <li>• Raising sales tax could be a politically sensitive subject</li> </ul>
Universal Service Fund		<ul style="list-style-type: none"> <li>• Are useful in states where there is a unified oversight and funding system for 911 (e.g., Vermont)</li> <li>• Cannot dedicate funding to 911 and therefore subject to periodic fluctuation or diversion</li> <li>• Serves as a fund distribution or payment system rather than a revenue generator; therefore is coupled with surcharges or fees from other sources</li> </ul>
Fee-for-Service Payments		<ul style="list-style-type: none"> <li>• Has potential for more equitable allocation of revenue generation and expenditure for 911 services but is yet untested in the 911 community</li> <li>• Could prevent diversion of collected funds for non-911 uses.</li> <li>• Requires development of a billing infrastructure and potentially legislative changes before it could be implemented</li> </ul>
Sumptuary Taxes		<ul style="list-style-type: none"> <li>• May be a possibility in some jurisdictions, however, generally, are already extensively used</li> <li>• If marginally increased for NG911 support, would face the challenge of isolating and dedicating funds for NG911</li> </ul>
Tolls		<ul style="list-style-type: none"> <li>• Are a declining possibility, due to changes in technology and legislation</li> <li>• May also potentially face issue of isolating and dedicating funds for NG911</li> </ul>

Funding Mechanism	Feasibility	Notes
Health Insurance Taxes		<ul style="list-style-type: none"> <li>Highly-unlikely proposition due to being politically complicated and operationally challenging</li> </ul>
Auction Revenues		<ul style="list-style-type: none"> <li>May be useful to raise initial investment funding for NG911, but are not viewed as viable operational funding source</li> <li>Are likely insufficient for most jurisdictions</li> </ul>
Special Event Permitting Fees		<ul style="list-style-type: none"> <li>May be useful to raise initial investment funding for NG911, but are not viewed as viable operational funding sources</li> <li>Likely are insufficient for most jurisdictions</li> </ul>
User Fees		<ul style="list-style-type: none"> <li>Not recommended because they could provide a disincentive to dialing 911</li> </ul>
Federal/State Grants		<ul style="list-style-type: none"> <li>Are a useful source of funding for capital expenditures</li> <li>Typically cannot be used to sustain ongoing operations and maintenance</li> <li>Are unpredictable and subject to political decisions</li> </ul>
National Infrastructure Reinvestment Bank		<ul style="list-style-type: none"> <li>While only a remote possibility discussed for many years, offers the potential opportunity to fund large infrastructure projects, like NG911</li> </ul>
Public-Private Partnerships		<ul style="list-style-type: none"> <li>Can significantly reduce the time and costs required to transition to NG911, while redistributing risks from the public to the private sector</li> <li>Risks related to complex negotiations and contractual agreements exist</li> <li>Allows jurisdictions to access private capital to enhance the service</li> </ul>
Hosted Solutions		<ul style="list-style-type: none"> <li>As a type of P3, transfers the capital costs associated with transitioning to NG911 into operating costs</li> <li>Shortens time-to-value by eliminating implementation costs associated with typical IT hardware and software projects</li> </ul>
 Mechanism is feasible today  Mechanism could be feasible today  Mechanism is not feasible today but could be in the future		

The transition to NG911 will be delivered as the result of a partnership among all levels of government. The Federal Government can act as the catalyst for NG911 transition through coordination of nationwide NG911 implementation by facilitating coordination among all stakeholders, developing resources (e.g., guidelines for state 911 legislative language), and by identifying standards, best practices, and sharing lessons learned. The bulk of the effort and authority for NG911 deployment, however, falls to the state and local jurisdictions. Ultimately, it will take coordinated involvement of local, state, and Federal stakeholders for a successful nationwide transition to NG911 to occur, and transition will not occur the same way in every jurisdiction.

Regardless of the implementation approach, state 911 authorities that are empowered to oversee 911 operations and systems in their state are more likely to be successful in implementing NG911 and providing its full benefit to the citizens they serve. Multiple studies on the topic (e.g., U.S. DOT NG911 Initiative<sup>80</sup>, NENA's Next Generation Partner Program<sup>81</sup>, iCERT<sup>82</sup>, and others) agree that empowered

<sup>80</sup> U.S. DOT NG911 Initiative, *Final Analysis of Cost, Value, and Risk*, March 5, 2009. Available at: [http://www.its.dot.gov/ng911/pdf/USDOT\\_NG911\\_4-A2\\_FINAL\\_FinalCostValueRiskAnalysis\\_v1-0.pdf](http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf) [Last accessed October 21, 2013]

<sup>81</sup> NENA Next Generation Partner Program, *Next Generation 9-1-1 Transition Policy Implementation Handbook*, June 2011, Available at: <http://www.nena.org/?page=NGPPPPolicyTransHndbk> [Last accessed October 21, 2013]

<sup>82</sup> iCERT (formerly the 911 Industry Alliance), *Health of the US 9-1-1 System*, 2008. Available at: [http://www.theindustryCouncil.org/91A\\_Health\\_of\\_US\\_911%20\\_2\\_.pdf](http://www.theindustryCouncil.org/91A_Health_of_US_911%20_2_.pdf) [Last accessed October 21, 2013]

state 911 oversight bodies, coordination at the local level and coordination among states is most likely to result in the timely, efficient and effective completion of a nationally coordinated 911 system.

## 5.0 Conclusion

Identifying a larger range of funding and oversight strategies for 911 is important in making NG911 a reality. As jurisdictions express concerns about the decreased effectiveness of current funding and oversight methods in supporting today's 911 systems, new and novel approaches must be considered. Today's funding approach has traditionally relied upon on taxes, fees, and surcharges, primarily from wireline and wireless subscribers. Many states have been successful in obtaining revenues from VoIP and prepaid cellular service subscribers; however some states have yet to access this funding source. In addition, oversight of 911 varies significantly across 911 systems. A few states have a strong, state-run 911 system, while others have no state-level organization responsible for 911 oversight, leaving 911 funding, governance, and operations up to the individual locales. There is wide variation in the states' authority to oversee revenue collection and the use of 911 funds. Most states, however, have a state 911 function that provides statewide geographic planning, coordination, and some level of funding responsibility for the statewide provision of 911 services. At the national level, there is no single Federal department or agency with sole or ultimate authority for 911 governance and oversight. However, multiple Federal agencies, including the U.S. DOT's National 911 Program, FCC, DOJ, and DHS, maintain an interest in different aspects of 911. As the nation makes the transition to NG911, concerns of funding and governance will be magnified.

In an effort to address these issues, the National 911 Program convened a Blue Ribbon Panel on 911 Funding. The Panel brought together experts in the fields of infrastructure finance, government policy, P3s, 911 technology and public safety operations, and economics. These subject matter experts, some with only limited ties to traditional 911 stakeholder groups, brainstormed novel approaches to funding 911 in the future, funding the transition to NG911, and the approach necessary to make changes to the governance structure required by these changes. The discussion conducted by the Panel supplemented the research of the Blue Ribbon Panel project team and provided the content for this report. The knowledge shared from both a 911 perspective and a general financing standpoint was instrumental in identifying the funding approaches described herein.

The 911 community is full of industrious stakeholders who have developed creative solutions for funding 911 as it exists today. The community will need to be creative as it implements funding methods for the transition to NG911. There is no "one size fits all" solution for this problem. State and local jurisdictions should not limit themselves to a single solution discussed in this document. It is likely that a hybrid approach of the ideas in this document will meet the needs of communities across the country.

The wide range of backgrounds of the panelists involved in the Blue Ribbon Panel on 911 Funding should serve as an example for state and local 911 authorities and encourage them to expand their outreach and coordination efforts within their own communities. Engagement with other stakeholder groups will be key to the successful implementation of NG911. For example, local and state 911 authorities can reach out to universities in their state to initiate funding studies. State 911 authorities can coordinate with their state's chief technology officers and chief information officers to look for intersections with ongoing projects, especially with other public safety initiatives, like FirstNet. The experiences of other agencies in funding large infrastructures can be analyzed for their applicability to funding the deployment of NG911. Involving people with working knowledge of economic theory and principles may be essential to determining the risk associated with specific funding ideas, as well as exactly how ideas would be practically implemented at the state, regional or local level.

The 911 community should consider each of the methods proposed in this document to determine their feasibility within their own jurisdiction, looking for ways to implement one or more funding approach. Using the research and studies referenced in this report, 911 authorities and state coordinators should

leverage the lessons learned by earlier NG911 adopters to implement effective and efficient solutions within their own organizations.

While this project was limited to a single, short-term effort, the 911 community is urged to not lose any of the momentum the Panel has created. This report should be widely distributed to stakeholders throughout the 911 community and beyond. There should be an open forum among 911 stakeholders at all levels of government to talk about promising practices for funding 911 and how best to implement a governance structure that ensures the long-term success of all stakeholders. The 911 community as a whole is urged to continue to identify opportunities and ideas for improving funding and oversight that will facilitate the transition to a nationwide NG911 system.

## Appendix A: Blue Ribbon Panel on 911 Funding Panelists

The National 911 Program would like to thank the following participants for their efforts in making the *Blue Ribbon Panel on 911 Funding* a success. Without their generous donation of time and expertise, this report would not be possible.

Name	Organization
<b>Joan Ballweg</b>	<i>Wisconsin State Representative; Chairwoman, Special Committee on 911 Communications</i>
<b>Chad Brown</b>	<i>Council Staff for Rep. Ballweg, Wisconsin State House of Representatives</i>
<b>Jo Anne Bourquard</b>	<i>Senior Fellow, National Conference of State Legislatures (NCSL)</i>
<b>Ed Crooks</b>	<i>Vice President, Booz Allen Hamilton</i>
<b>Robert Dove</b>	<i>Managing Partner, Carlyle Group Infrastructure Fund</i>
<b>Jerry Eisner</b>	<i>Public Safety Group Director, Red Sky Technologies</i>
<b>Cherian George</b>	<i>Managing Director, Fitch Ratings</i>
<b>Todd Haggerty</b>	<i>Fiscal Affairs Program, NCSL</i>
<b>George Heinrichs</b>	<i>Cofounder &amp; President, Intrado</i>
<b>James Holloway</b>	<i>Professor, Department of Finance, East Carolina University(ECU)</i>
<b>Tom Jankowski</b>	<i>Director Public Policy, AT&amp;T</i>
<b>Brian Josef</b>	<i>Assistant Vice President, Regulatory Affairs, CTIA, The Wireless Association</i>
<b>John Letchford</b>	<i>Chief Information Officer &amp; Assistant Secretary for Information Technology, Commonwealth of Massachusetts</i>
<b>Bernie O'Donnell</b>	<i>Treasurer &amp; Former Eastern Region President, National Association of State Technology Directors</i>
<b>Barry Ritter</b>	<i>State 911 Coordinator, Indiana Wireless 911 Board</i>
<b>Lewis Solomon</b>	<i>Professor of Law, George Washington University(GWU)</i>
<b>David Tuerck</b>	<i>Professor &amp; Chairman, Department of Economics, Suffolk University</i>
<b>Ron Villa</b>	<i>Chief Financial Officer, San Diego Police Department</i>

## Appendix B: Blue Ribbon Panel on 911 Funding Read Ahead Materials



### Blue Ribbon Panel on 911 Funding Agenda

April 2, 2013 1:00 – 4:00 PM (EDT)

#### Objectives for Session:

Brainstorm approaches to the oversight and funding of Next Generation 911 (NG911)

- Determine the effect of implementing a complex, nationwide technology system would have on traditional telecommunications funding streams
- Explore novel methods that would provide consistent funding and oversight for large-scale, critical infrastructure projects, like NG911
- Compare funding and oversight models from public and private entities that could be applied to 911

1:00 pm to 1:30 pm	<p><b>Welcome to the meeting of the Blue Ribbon Panel on 911 Funding</b></p> <ul style="list-style-type: none"> <li>• Roll Call of participants</li> <li>• Ground rules</li> <li>• Objectives</li> <li>• State of current 911 oversight and funding</li> </ul>
1:30 pm to 1:45 pm	<p><b>Impact of Transition</b></p> <ul style="list-style-type: none"> <li>• How would implementation of a large-scale critical infrastructure project affect funding?</li> <li>• What are the opportunities?</li> </ul>
1:45 pm to 2:30 pm	<p><b>Open Brainstorming Round Robin</b></p> <ul style="list-style-type: none"> <li>• Round 1: How should we approach oversight for NG911 systems?</li> <li>• Round 2: Explore novel methods that will provide consistent funding</li> </ul>
2:30 pm to 2:45 pm	<p><b>Break</b></p>
2:45 pm to 3:20 pm	<p><b>Digging Deeper</b></p>
3:20 pm to 4:00 pm	<p><b>Closing Comments Round Robin</b></p> <ul style="list-style-type: none"> <li>• What one or two ideas do you feel need to be explored further?</li> <li>• What advice would you give to the 911 community on how to move forward with these funding ideas?</li> </ul>
4:00 pm	<p><b>Official Closing</b></p>

## Blue Ribbon Panel on 911 Funding Discussion Topics

- What effect would the implementation of a complex, nationwide technology system have on traditional telecommunications funding streams?
- What general funding models could be applicable to the 911 community?
- From the read-ahead materials on current funding mechanisms, did a particular model stand out which could fit multiple state and local funding structures?
- Specifically what role could public-private partnerships (P3s) provide in determining tangible strategies for funding models?
- How can funding models encompass not only the transition to Next Generation 911, but also be sustainable for maintaining the system's life cycle costs?
- What challenges do you see in developing a sustainable funding model?
- Should 911 funding models be structured in such a way to discourage the diversion of 911 fees for other purposes?
- How can the base of contributors to 911 fees be broadened?
- How can governance and finance models be structured to meet the needs of 911 call centers in diverse areas (such as urban vs. rural, etc.)?
- What factors would incentivize private investment for the financing and funding of Next Generation 911. What are the potential financial, operational and political risks/drawbacks of investment participation?
- As an investor, what potential revenue streams for 911 could be expanded or refined?

## A Survey of Available Reference Materials on 911 Funding

<u>Title</u>	<u>Description</u>
<a href="#"><u><i>A Report on Findings and Recommendations on 911 Costs and Funding Models for the North Carolina 911 System</i></u></a>	This report was prepared for the North Carolina 911 Board by East Carolina University in an effort to examine current costs of the North Carolina 911 system and propose alternative PSAP funding models. The research team collected North Carolina 911 cost data, surveyed the state's PSAPs, and collected information from current state funding models to compile the resulting recommended alternative funding models.
<a href="#"><u><i>Communications Security, Reliability and Interoperability Council Working Group 4B Report: Transition to Next Generation 911</i></u></a>	The FCC's Communications Security, Reliability and Interoperability Council's (CSRIC) Working Group 4B report addressed the transition to NG911 by investigating and determining what changes or additions in VoIP standards and best practices are required for the evolution to an IP-based NG911 environment. This report also examines technical, operational, and funding issues for PSAPs.
<a href="#"><u><i>Costs of Providing Emergency Call Answering Services</i></u></a>	The European Emergency Number Association (EENA) Operations Document gives a detailed overview of the distinctive types of costs incurred by European PSAPs. The objective of this document is to provide a framework under which the efficiency of these costs can be assessed, as compared with other public services.
<a href="#"><u><i>E911 Emergency Communications Funding in Tennessee</i></u></a>	A study on Tennessee's 911 emergency communications funding system in regard to the impacts recently implemented regulations, such as an increase of the monthly wireless service charge, reallocations of the service charge, and the distribution of an additional 5% of the revenue to emergency communications districts. The report provides findings and recommendations relating to those impacts.
<a href="#"><u><i>National Broadband Plan</i></u></a> (link to Chapter 16: Public Safety)	The FCC's National Broadband Plan was released in March 2010, and was intended to ensure every American has access to broadband capability. Congress required this plan include a detailed strategy maximizing the use of broadband to advance public safety applications in an effort to allow first responders to send and receive critical voice, video, and data. The plan also ensures citizens receive access to emergency services, as well as the capabilities to send and receive vital information.
<a href="#"><u><i>State of Illinois 911 Future Technology and Financial Needs Study</i></u></a>	The State of Illinois hired a consultant to conduct a specialized assessment regarding the future technological needs of 911, as well as a financial analysis of past, current, and future costs and revenues for 911 systems in the state. This study surveyed all systems in the state and attempts to find solutions to the issue of how to upgrade and fund the existing technology of today's 911 systems.
<a href="#"><u><i>Vermont Emergency 911 Service Funding Study</i></u></a>	A study by the Vermont E-911 Board that urged their legislature to explore a new funding model, such as an experienced-based, call-share reimbursement model. This model that would assign a "per call" rate and would be based on the annual costs to operate the 911 system and the projected number of 911 calls for the upcoming year, with carriers remitting payments to the state 911 fund.
<a href="#"><u><i>Washington State Next Generation 911 Funding Study</i></u></a>	In 2008, the Washington state legislature requested the Military Department's E911 Program Office recommend a funding mechanism for the implementation of NG911. A consultant conducted a study and made recommendations to address the costs of transitioning, as well as ongoing maintenance of a NG911 system. The resulting recommendations involve changes to legislation that would incorporate a technology neutral platform on current and future devices.

## Appendix C: White Paper on the Economic Theory Behind 911

### Economic Efficiency and 911 Services

In order to understand the future funding and financial sustainability of 911 services, a general discussion of economic principles is necessary. Given the challenges for funding and financing the current system and the additional technological requirements and capabilities, further research and analysis was needed to clarify the nature of these challenges as an economic issue. With this understanding, policy-makers and stakeholders can better assess current and future opportunities to finance the transition to NG911 and sustain the system into the future. This section explores the economic characteristics of 911 services and introduces the analysis of future funding mechanisms presented in Section 4.0.

### 911 Services as a Public Good

911 services have many of the characteristics of a public good. In economic theory, a public good is one that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.<sup>83</sup> In economics, rivalry (something referred to as “subtractibility”) is a characteristic of a good. Specifically, goods can be placed along a continuum ranging from rivalrous (rival) to non-rival.<sup>84</sup> A good that is rival or subtractable is one whose consumption by one consumer prevents another potential consumer from consuming that good. For example, a glass of orange juice is a rivalrous good. If one consumer drinks a glass of orange juice another consumer cannot drink that orange juice. A non-rivalrous good is able to be enjoyed by multiple consumers at the same time. For example, a single piece of digital music can be downloaded and enjoyed by multiple consumers simultaneously.<sup>85</sup>

A good is considered non-rival (non-subtractable) if, for any level of production, the cost of providing it to a marginal (additional) individual is zero.<sup>86</sup> This does not mean that the total production costs are low, but that the marginal production costs are zero. In reality, few goods are completely non-rival as rivalry can emerge at certain levels. For instance, a public road (or internet) use is non-rival up to a certain capacity, after which congestion means that each additional user decreases speed for others. After this point additional marginal costs will be incurred to expand capacity. Thus, in reality rivalry is a continuum where most public goods are somewhere between the two extremes of completely rival and completely non-rival.<sup>87</sup>

The other characteristic of a public good is “non-excludability”. In economics, a good or service is called excludable if it is possible to prevent people (consumers) who have not paid for it from having access to it. By comparison, a good or service is non-excludable if non-paying consumers cannot be prevented from accessing it. The classic example of a non-excludable good is a lighthouse. Once the lighthouse is built and operational, it is impossible to stop ships from benefiting from the service it provides (i.e., warning ships that rocks are present through shining a light).

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<sup>83</sup> Samuelson, Paul A. 1954. *The Pure Theory of Public Expenditure*. Review of Economics and Statistics 36 (4): 387–389. doi:10.2307/1925895. JSTOR 1925895 and Samuelson, Paul A. 1955. *Diagrammatic Exposition of a Theory of Public Expenditure*. Review of Economics and Statistics 37 (4): 350–356. doi:10.2307/1925849. JSTOR 1925849

<sup>84</sup> Hess, C., E. Ostrom. 2006. Introduction. C. Hess, E. Ostrom, eds. *Understanding Knowledge as a Commons: From Theory to Practice*. The MIT Press, Cambridge, Massachusetts

<sup>85</sup> David L. Weimer; Aidan R. Vining. *Policy Analysis: Concepts and Practice*. Pearson: Prentice Hall. p. 72. Fourth Edition.

<sup>86</sup> Cornes, R., T. Sandler. 1986. *The theory of externalities, public goods, and club goods*. Cambridge University Press

<sup>87</sup> Leach, J. 2004. *A course in public economics*. Cambridge University Press: 155-156

Typically the difference between these different types of goods is shown in a simple two-by-two matrix (see Table 6). As can be seen in Table 6, private goods are both excludable and rivalrous. Property rights can secure access to a single consumer and the enjoyment of the good is limited to the owner. Club goods are excludable but non-rivalrous.<sup>88</sup> For example, a cinema can show a film that can be enjoyed by multiple consumers but cinema owners are able to limit access to the theater. Common goods or common property resources (CPR) are rivalrous but non-excludable. CPR are natural or human-made resource system (e.g. an irrigation system or fishing grounds), whose size or characteristics makes it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. Unlike pure public goods, CPRs face problems of congestion or overuse, because they are subtractable. A CPR typically consists of a core resource (e.g. water or fish), which defines the stock variable, while providing a limited quantity of extractable fringe units, which defines the flow variable. While the core resource is to be protected or nurtured in order to allow for its continuous exploitation, the fringe units can be harvested or consumed.<sup>89</sup> Finally, a common good has the characteristics of being both non-excludable and non-rivalrous. That is, it can be used by a large number of consumers simultaneously and, if it is to function as designed, access to the good cannot be blocked to potential consumers. In reality few goods fall easily into this classification scheme. However, it forms a useful construct for thinking about different goods and the challenges of using market mechanisms to set the price for different types of goods.

**Table 6: Rivalry and Excludability**

	<b>Excludable</b>	<b>Non-Excludable</b>
<b>Rivalrous</b>	<b>Private goods</b> food, clothing, cars	<b>Common goods or Common-pool resources</b> fish stocks, timber, coal
<b>Non-Rivalrous</b>	<b>Club goods</b> cinemas, private parks, satellite television	<b>Public goods</b> Free broadcast television, national defense, lighthouses

In theory, 911 services have many of the characteristics of a public good. 911 services provide benefits to individuals and the community as a whole. That is, by allowing access to all individuals within the community public safety emergencies can be identified and dealt with an efficient and expeditious manner. If 911 services were a pay-for-service system where individuals contracted into the service then the benefits would only be shared by that group of individuals. Crimes and fires could go unreported, or their report would be delayed, if they occurred to individuals that were non-parties to the service and greater potential harm could be done to the community as a whole. For example, a fire not reported immediately to 911 might spread to surrounding structures and a robbery not reported quickly might lead to the robber escaping and committing more crimes. In this sense, 911-service is like the police or fire department. That is, if pay-for-service was instituted only some consumers would pay for the service

<sup>88</sup> Suzanne Scotchmer, 2008. *Clubs*, The New Palgrave Dictionary of Economics, 2nd Edition.

<sup>89</sup> Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press.

and the overall result would be a sub-optimal level of protection for everyone (even those that paid for the service). In economic terms, 911 services have “positive externalities”; that is, they produce social benefits beyond the benefit provided to the immediate consumer of the good. Thus, for 911 services to maximize individual and societal benefits, they must be non-excludable.

Similarly, 911 services must be non-rivalrous to the maximum extent possible. While there is a cap on the extent to which the service can be provided (e.g., the number of available operators is limited by total resources available), services are provided in such a manner as there is adequate operators to be able to respond to the volume of calls. Thus, the enjoyment or use of the service by one party does not detract from the ability of another party to use the service.

### Public Goods and the “Free-Rider” Problem

One of the major problems with public goods is devising a method for paying for their use. Specifically, public goods are non-excludable, it is impossible to eliminate potential consumers from receiving the benefits of the good. Thus, pay-for-use systems, and therefore market mechanisms, do not work. Specifically, under the conditions of perfect competition, a market will be allocatively efficient as long as firms in a market produce where the price (P) of the good produced by that market equals the marginal cost (MC) to produce. Thus, from a societal point-of-view, allocative efficiency is a point where marginal benefit is equal to marginal cost (MB=MC).<sup>90</sup> At this point the social surplus is maximized with no deadweight loss, or the value society puts on that level of output produced minus the value of resources used to achieve that level.

In this sense price acts as a signal from buyers to sellers through which the seller communicates their willingness to produce at a particular price. If the price consumers pay for a product is greater than the marginal cost to firms of producing it, then the message being sent to producers is that more output is demanded. In the pursuit of profits, more resources will be allocated towards the production of the product until the marginal cost and the price are equal. For example, if a theater offers tickets at \$20 per seat for a particular show but consumers are prepared to pay \$50 to see the show (as shown by their willingness to buy tickets from scalpers), the theater owner can raise the price of the tickets to \$50 or put on more performances until the price of secondary market tickets falls to \$20. In each case, the revenue for the producer (the theater owner) and the benefit of the consumer will be maximized and  $P=MC$ . Thus, at the  $P=MC$  point firms maximize their profits and resources are said to be efficiently allocated.

Figure 4 shows this concept by comparing private and public goods. For a private good, market price is an efficient mechanism to balance production cost and demand. In the example below, the equilibrium price is shown by the line  $P=MC$  (i.e., price equals marginal cost) on demand curve  $D_t$ . At this price, Consumer 1 (shown by the demand curve  $D_1$ ) consumes Quantity 1 ( $Q_1$ ) and Consumer 2 (shown by the demand curve  $D_2$ ) consumes  $Q_2$ . The total revenue generated by each consumer is shown by the shaded areas.

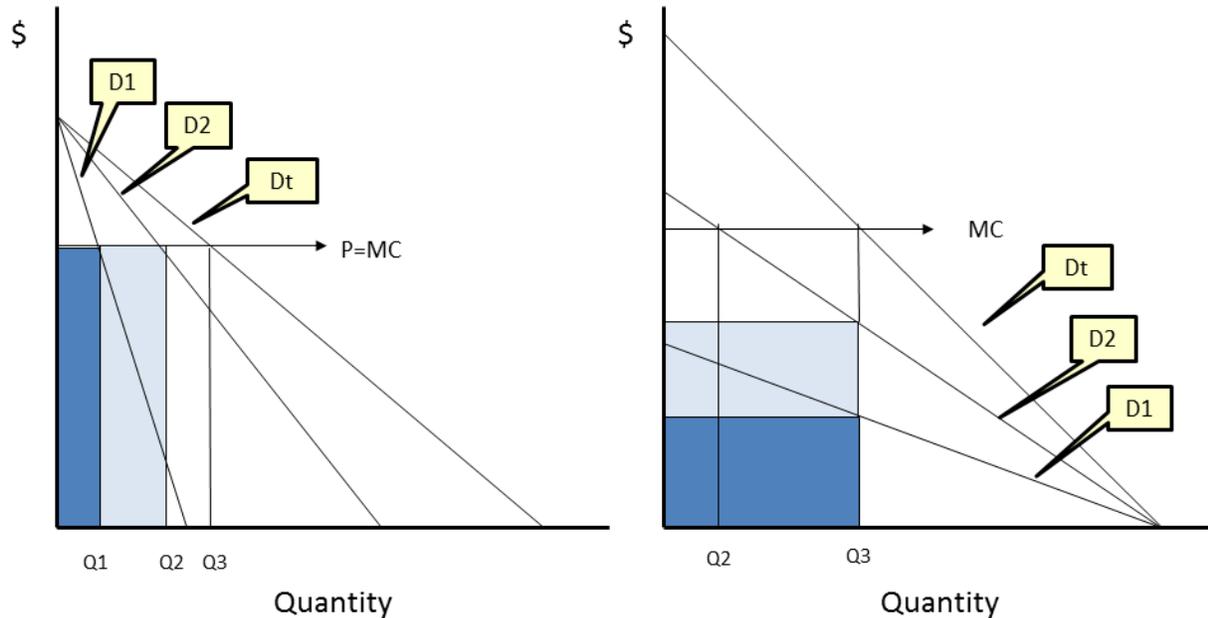
For a public good, the market price is not an efficient mechanism (i.e., equilibrium price cannot be  $P=MC$ ). Consumer 1 enjoys their benefits at below  $P=MC$  and has no incentive to pay for any additional benefits and thus will contribute zero dollars to reaching the production threshold of  $P=MC$ . Consumer 2 will only pay to  $Q_2$ . Thus, at the efficient price where price equals marginal production costs neither party will

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<sup>90</sup> See Markovits, Richard. 1998. *Matters of Principle*. New York: New York University Press and Markovits, Richard. 2008. *Truth or Economics*. New Haven: Yale University Press.

pay. This occurs because the good is non-excludable. That is, unlike the private good, both Consumer 1 and Consumer 2 can consume as much as they want without paying the  $P=MC$  price.

Figure 4: Demand, Price and Marginal Costs for Public and Private Goods



This illustrates the concept of “free-riders”. A free rider refers to someone who benefits from resources, goods, or services without paying for the cost of the benefit. Free riding may be considered as a free rider problem when it leads to under-provision of goods or services, or when it leads to overuse or degradation of a common property resource.<sup>91</sup> Thus, in case of 911 individuals that do not pay of service through some tax or fee in one jurisdiction are free-riders as they benefit from the service (even if they do not use it) without paying.

The standard response to the problem of public good non-excludability and free-riders is to institute a tax of some kind. Thus, if voluntary provision of public goods will not work (i.e., individuals each voluntarily contribute to the provision of a public), then one solution is to make their provision involuntary. This saves each of us from our own tendency to be a free rider, while also assuring us that no one else will be allowed to free ride. In this model government imposes a tax to fund the production of public goods. Thus, in our example of the lighthouse, because everyone benefits from lighthouses (i.e., lighthouses generate positive externalities), the government funded their development through taxation.

This is the solution that has been developed for 911-services. As discussed above, 911-services are funded via a variety of taxes and fees. However, the move toward new technologies (e.g., VOIP, connected vehicles, wireless) is introducing a number of issues vis-à-vis traditional funding mechanisms, which is discussed further in Section 5.0. Those individuals that do not pay some form of fee or tax for gaining the benefits of 911-services by opting out of traditional communication services have become free-riders not contributing to a service from which they enjoy benefits (either as direct uses or as

<sup>91</sup> Baumol, Willaim (1952). “Welfare Economics and the Theory of the State”. Cambridge, MA: Harvard University Press

individuals that experience the positive externalities of the service). Furthermore, the extent to which current funding mechanism channeling funds from the jurisdiction where the costs of maintaining 911 services are experienced to the jurisdiction where the communication device is registered further complicates the problem. Thus, the cost of providing the service and the benefits of service are experienced by two different populations. From the point-of-view of equity and efficiency this is a bad thing in that ideally those that benefit from a public good should be those that pay for it. That is, 911-services have distributive efficiency; that is, goods and services are received by those who have the greatest need for them

### **Distributive Efficiency and Public Goods**

Situations are considered to have distributive efficiency when goods are distributed to the people who can gain the most utility from them. Many economic models Pareto efficiency as their efficiency goal. According to this measure of social welfare, a situation is optimal only if no individuals can be made better off without making someone else worse off. If economic allocation in any system is not Pareto efficient, there is potential for a Pareto improvement; that is, an increase in Pareto efficiency through reallocation where improvements can be made to at least one participant's well-being without reducing any other participant's well-being.<sup>92</sup>

This state can only come about if four criteria are met:

- The marginal rates of substitution (i.e., the rate at which a consumer is ready to give up one good in exchange for another good while maintaining the same level of utility) in consumption are identical for all consumers. This occurs when no consumer can be made better off without making others worse off.
- The marginal rate of transformation (i.e., the rate at which one good must be sacrificed in order to produce a single extra unit (or marginal unit) of another good, assuming that both goods require the same scarce input) in production is identical for all products. This occurs when it is impossible to increase the production of any good without reducing the production of other goods.
- The marginal resource cost is equal to the marginal revenue product for all production processes. This takes place when marginal physical product of a factor must be the same for all firms producing a good.
- The marginal rates of substitution in consumption are equal to the marginal rates of transformation in production, such as where production processes must match consumer wants.

To determine whether an activity is moving the economy towards Pareto efficiency, two compensation tests have been developed; the Kaldor Criterion Test and the Hicks Criterion Test.<sup>93</sup> Both of these tests emerge from the idea that any change in the production of some goods will make some people better off while making others worse off, so these tests ask what would happen if the winners were to compensate the losers. These two tests provide mechanisms to judging whether a system is efficient.

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<sup>92</sup> Barr, Nicholas (2012). *Economics of the Welfare State* (5th ed.). Oxford University Press

<sup>93</sup> See Hicks, John (1939). "The Foundations of Welfare Economics". *Economic Journal* (The Economic Journal, Vol. 49, No. 196) 49 (196): 696–712 and Kaldor, Nicholas (1939). "Welfare Propositions in Economics and Interpersonal Comparisons of Utility". *Economic Journal* (The Economic Journal, Vol. 49, No. 195) 49 (195): 549–552.

Using the Kaldor Criterion Test, an activity will contribute to Pareto optimality if the maximum amount the gainers are prepared to pay is greater than the minimum amount that the losers are prepared to accept. Thus, if a winner (i.e., an individual that benefits from a policy change) is prepared to pay \$100 in fees and a loser is prepared to accept \$50 in compensation, then the change can be said to be moving towards Pareto optimal.

Under the Hicks Criterion Test, an activity will contribute to Pareto optimality if the maximum amount the losers are prepared to offer to the winners in order to prevent the change is less than the minimum amount the winners are prepared to accept to forgo the change. Thus, if the loser are prepared to offer \$50 to prevent the change and the winners will only accept \$60, then the system is moving towards Pareto Optimality.

The Hicks compensation test is from the losers' point of view, while the Kaldor compensation test is from the gainers' point of view. If both conditions are satisfied, both gainers and losers will agree that the proposed activity will move the economy toward Pareto optimality. This is referred to as Kaldor-Hicks efficiency or the Scitovsky criterion.<sup>94</sup> Under this criterion, an outcome is more efficient if those that are made better off could in theory compensate those that are made worse off, so that a Pareto improving outcome results. For example, a 911-funding mechanism that benefited some jurisdiction over another would be a Kaldor-Hicks improvement if the residents of that jurisdiction were prepared to compensate those that lost service as a result of the funding mechanism.

The key difference is the question of compensation. Kaldor-Hicks does not require compensation actually be paid, merely that the possibility for compensation exists, and thus need not leave each at least as well off. Thus, under Kaldor-Hicks efficiency, a more efficient outcome can in fact leave some people worse off. Pareto efficiency requires making every party involved better off (or at least no worse off). Therefore, while every Pareto improvement is a Kaldor-Hicks improvement, most Kaldor-Hicks improvements are not Pareto improvements although have greater flexibility and applicability.

It should be emphasized that distributive efficiency is not necessarily concerned with equity or "fairness". Rather it is concern that public policies should be structured in such a way as to deliver the maximum social benefit. Thus, a policy that made some individual better off but more worse off would be inefficient in that it lowered the overall social benefit (assuming not compensation). Thus, the transfers envisioned by Kaldor-Hicks and other criteria are less driven by equity than they are by a desire to increase overall social benefit. For example, it is possible to conceive of a government policy that produced massive benefits for a few individuals and hurt a large number of individuals. If the overall benefit was greater than the loss, redistributive policies give the opportunity for these benefits to be more widely experienced. The question is less one of equity but more how one measures total benefits. For example, does one count overall dollar benefits for an entire society or dollars benefits per actual person impacted? Depending on how one counts benefits different evaluations of the overall benefit can be estimated. Thus, conceptual tools such as Kaldor-Hicks allow us to consider this issues but still focus on overall social benefit.

These concepts can be used as a test to explore the efficiency of different proposed funding mechanisms for public goods. For example, considering what is known about potential funding challenges for 911-systems we can identify two forms equity issues: (1) Geographic Distributive

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<sup>94</sup> See Scitovsky, Tibor (1941). "A Note on Welfare Propositions in Economics". *Review of Economic Studies* (The Review of Economic Studies, Vol. 9, No. 1) 9 (1): 77-88

Efficiency; and (2) Technology Distributive Efficiency. For example, from an economic point of view, the simplest mechanism would be some form of national tax on any communication device capable of using 911-services with grants provided to individual 911-service providers. In this case, the cost of the 911-services would be shared equally across all potential users of the service. However, it could be argued that this is inequitable and inefficient as the benefits of 911-services are intrinsically local and individuals in low 911-service use areas would be subsidizing high use areas. For example, a communication device user in a small town with little 911-service use would be subsidizing 911-service use in a highly densely populated city (assuming there is a relationship between density of population and 911-service use). In effect low-user area residents would be paying a high risk premium against the possibility that they would one day travel to high-use area and experience the positive benefits of a fully funded 911 service. Furthermore, it is possible to conceive of an individual with multiple devices that is paying a tax or fee for every device (thus paying an excessive fee) or service or users of technologies not subject to fees (e.g., VoIP) avoiding payment altogether and becoming a free-riders. Thus, the individual living in low-use areas or with a high number of devices would experience a deadweight loss (also known as excess burden or allocative inefficiency) while the uncovered device user would be a free-rider. In this case the outcome would become inequitable and there would be a loss of economic efficiency as some users overused the service (relative to their payments in) or experience a deadweight lost. That is, the equilibrium for a good or service is not Pareto optimal. In other words, there is a situation where people have either more marginal benefit than marginal cost or more marginal cost than marginal benefit.

The concept of deadweight loss is best illustrated by reference to how demand for goods and services change with a tax. Figure 5 shows a theoretical supply and demand curve for two technologies: (1) Technology A – a non-taxed 911-service technology; and (2) Technology B – a taxed 911-service technology. For the sake of this example, we will assume the same number of devices is used for technologies. As can be seen, both have an equilibrium price set by supply and demand. The price for Technology B is lower than the price for Technology A (i.e.,  $P_2$  compared to  $P_1$  with the price difference equally  $P_1 - P_2$ ) as the supply is greater (presumably because costs are lower) but the demand is the same for both products (i.e., the demand for telecommunication systems is indifferent to device in this example).

Now let us assume that a tax or fee is levied to fund 911-services in that area and that the tax is levied exclusively on Technology B. Figure 6 shows the result. As can be seen, for Technology B, The effect of this is similar to an increased marginal cost. As a result, the supply function shifts from  $S_2$  to  $S_3$ . The new equilibrium for Technology B is  $P_3$  and  $Q_3$ . Consumers of Technology B see a price rise from  $P_2$  to  $P_3$  (note, this is less than the tax (i.e.,  $T$ )) while producers of Technology B see the post-tax unit revenues fall from  $P_2$  to  $P_4$  (which is also less than  $T$ ). Furthermore, as price have changed for Technology B and it is functionally the same as Technology A, customers will migrate to Technology A (increasing the demand to  $D_3$ ) which will cause a price rise to  $P_5$  (less than  $P_3$ ) and producers will their revenues per unit increase. The result is to benefit the producers of Technology A and penalize the producers and consumers of Technology B.

Figure 5: Equilibrium Price for Technologies A and B

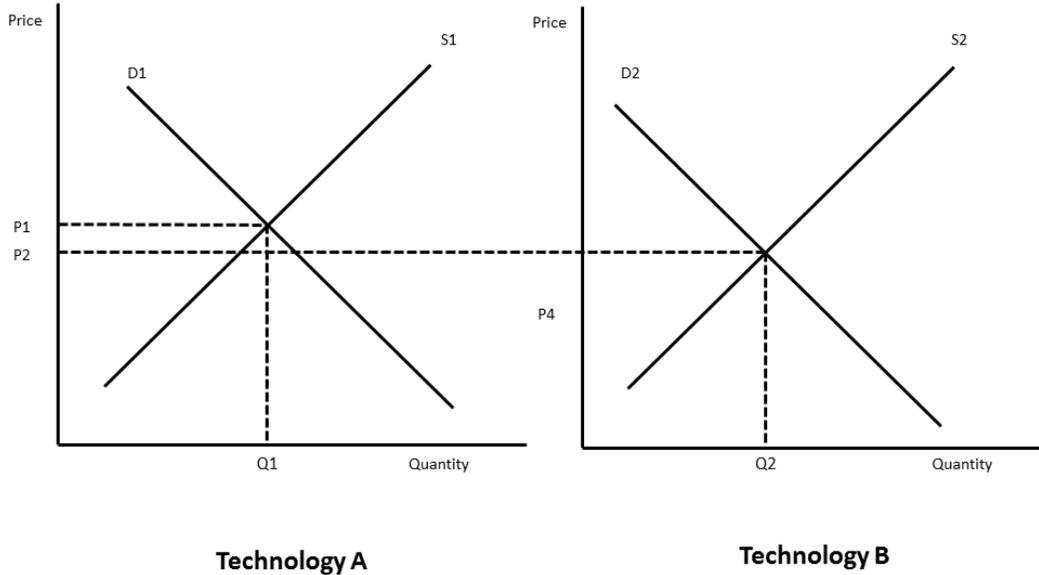
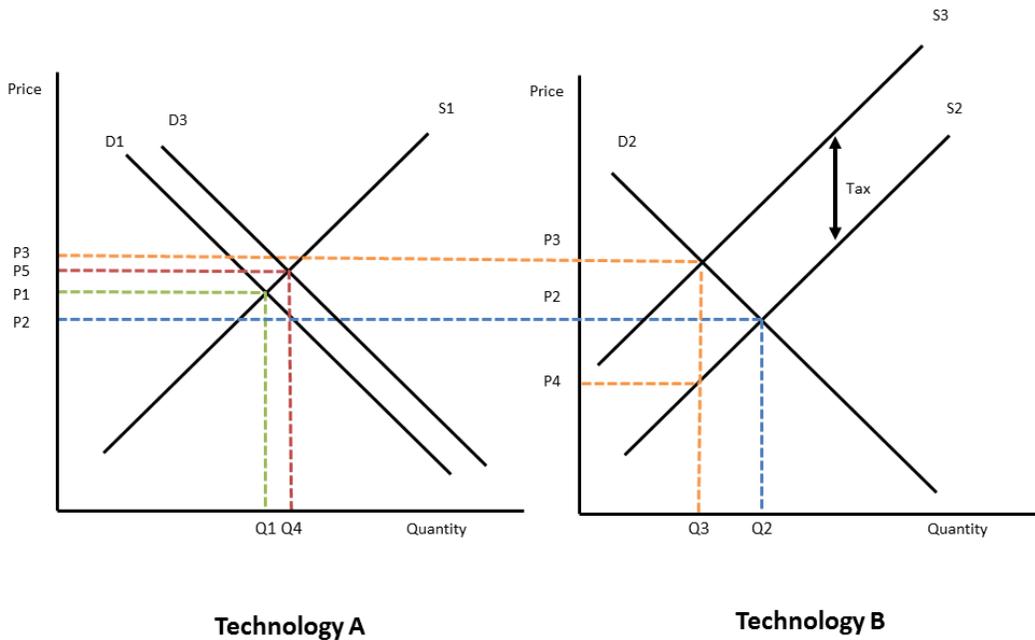


Figure 6: Impact of Tax on Demand and Supply for Technologies A and B

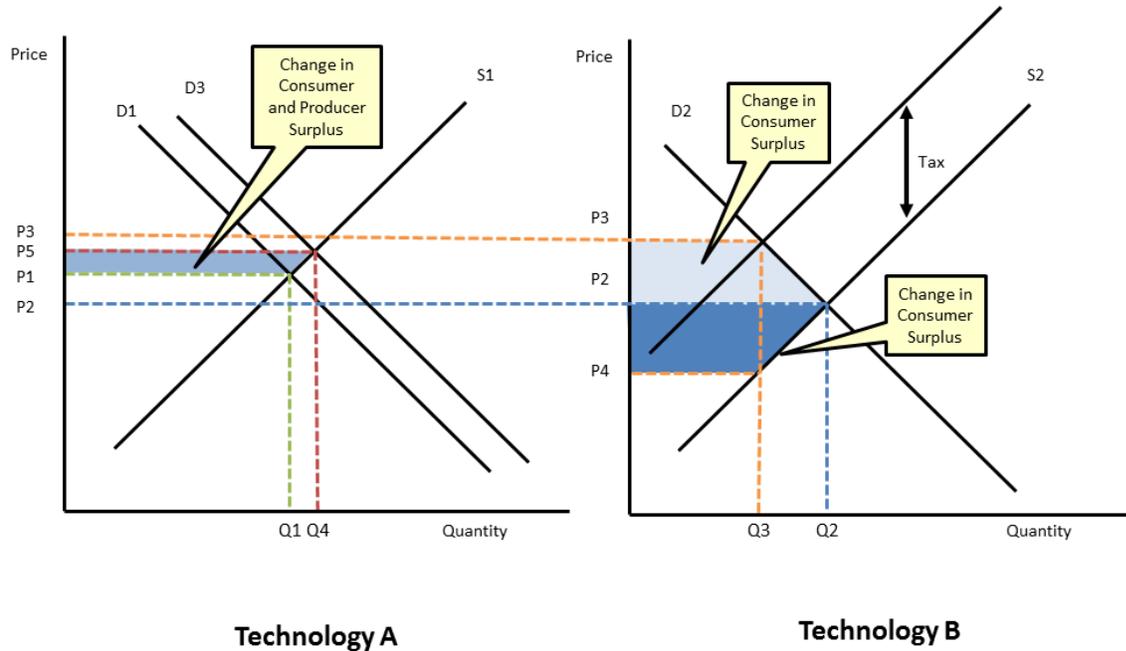


It should be noted that in most cases consumers do not bear the full burden of a tax. Some of it is absorbed by producers. The proportion absorbed by producers and hence the portion passed on to consumers depends on the relative elasticities of the demand and supply functions.

As Figure 7 shows, for Technology B, from welfare economics point-of-view the consumer surplus (i.e., resources available to consumers) is the area under the demand curve between the two price horizontals (shaded light blue). Producers' surplus (i.e., resource available to producers) is the area to the left of the supply function between the changes in producer prices (shaded dark blue). Thus, the overall impact is that both consumers and producers of Technology B see a decline in their surplus while

producers of Technology A see an increase and the consumers of Technology A see a decline. Overall then the tax has distorted the market and disadvantaged consumers and suppliers (although Technology A supplies have benefited).

Figure 7: Consumer and Producer Surpluses after Tax



Using these and other concepts, we can explore the potential funding mechanism identified in this report and assess them from a distributive efficiency point-of-view. Table 7 applies this criterion to each of the proposed funding mechanisms. As can be seen, many systems have distributable efficiency depending on how they are structured. In general any system based on some form of funding that was state or local levels (ideally local levels) based around potential use of the system that does not discriminate between technologies would be an efficient system from the point-of-view of distributive efficiency. In these systems, those that benefit from the service would pay the cost of the system directly and introduce a minimum of distortion into the market. Under-investment could then be made up with by Federal Grants or bonds that would represent a Kaldor-Hicks compensation mechanism from the “winners” in such a system to the “losers”.

Other systems (e.g., user fees) should not be considered at all as they are likely to discourage use of 911-service and therefore will be accompanied by an overall decline in social benefits (including positive externalities). Others such as infrastructure banks, taxes on health insurance and special events taxes, could discourage resources from flowing to more beneficial social outcomes. The specific impact of these proposed funding methods would require a detailed analysis of the specific proposal rather than the general concepts covered in this report. One of the most interesting funding mechanisms is public-private partnerships (P3). The issues surrounding these, from an economic point-of-view, are discussed in Table 7.

Table 7: Distributed Efficiency and Proposed Funding Mechanisms

Funding Mechanism	Distributive Efficiency of Mechanism
<b>Surcharges on Wireline, Wireless, and VoIP Services</b>	<ul style="list-style-type: none"> <li>• Does not discriminate against users of particular technologies and jurisdictions</li> <li>• All revenue should be returned to jurisdiction experiencing the costs or compensated by transfers (e.g., Federal grants) if the system favors jurisdictions (i.e., costs greater than payments)</li> </ul>
<b>Prepaid Wireless/Point of Sale Collection Surcharges</b>	<ul style="list-style-type: none"> <li>• Does not discriminate against users of particular technologies and jurisdictions</li> <li>• All revenue should be returned to jurisdiction experiencing the costs or compensated by transfers (e.g., Federal grants) if the system favors jurisdictions (i.e., costs greater than payments)</li> </ul>
<b>Sales Tax</b>	<ul style="list-style-type: none"> <li>• Does not discriminate against users of particular technologies and jurisdictions</li> <li>• All revenue should be returned to jurisdiction experiencing the costs or compensated by transfers (e.g., Federal grants) if the system favors jurisdictions (i.e., costs greater than payments)</li> </ul>
<b>Property-Based Surcharges</b>	<ul style="list-style-type: none"> <li>• Does not discriminate against users of particular technologies and jurisdictions</li> <li>• All revenue should be returned to jurisdiction experiencing the costs or compensated by transfers (e.g., Federal grants) if the system favors jurisdictions (i.e., costs greater than payments)</li> </ul>
<b>Universal Service Fund</b>	<ul style="list-style-type: none"> <li>• Very equitable system – does not discriminate against users of particular technologies and jurisdictions</li> <li>• Should address under-investment issues</li> </ul>
<b>Fee-for-Service Payments</b>	<ul style="list-style-type: none"> <li>• Equitable system – does not discriminate against users of particular technologies and jurisdictions</li> <li>• Should address under-investment issues</li> <li>• Serves as a fund distribution or payment system rather than a revenue generator and therefore is coupled with surcharges or fees from other sources</li> </ul>
<b>Sumptuary Taxes</b>	<ul style="list-style-type: none"> <li>• Does not discriminate against users of particular technologies and jurisdictions</li> <li>• All revenue should be returned to jurisdiction experiencing the costs or compensated by transfers (e.g., Federal grants) if the system favors jurisdictions (i.e., costs greater than payments)</li> </ul>
<b>Tolls</b>	<ul style="list-style-type: none"> <li>• Does not discriminate against users of particular technologies and jurisdictions</li> <li>• All revenue should be returned to jurisdiction experiencing the costs or compensated by transfers (e.g., Federal grants) if the system favors jurisdictions (i.e., costs greater than payments)</li> </ul>

Funding Mechanism	Distributive Efficiency of Mechanism
<b>Health Insurance Taxes</b>	<ul style="list-style-type: none"> <li>• As long as does not discriminate against users of particular technologies and jurisdictions will be equitable</li> <li>• May discourage other social beneficial activities that are taxed – i.e., increasing costs for health insurance at a time when the Federal Government is attempting to encourage adoption</li> <li>• All revenue should be returned to jurisdiction experiencing the costs or compensated by transfers (e.g., Federal grants) if the system favors jurisdictions (i.e., costs greater than payments)</li> </ul>
<b>Auction Revenues</b>	<ul style="list-style-type: none"> <li>• Depend on the type of auction and structure of disbursement allocations schemes</li> </ul>
<b>Special Event Permitting Fees</b>	<ul style="list-style-type: none"> <li>• Depend on the type of auction and structure of disbursement allocations schemes</li> <li>• May discourage other social beneficial activities that are taxed</li> </ul>
<b>User Fees</b>	<ul style="list-style-type: none"> <li>• Leads to underinvestment in public goods and failure to achieve full social benefits – including positive externalities</li> </ul>
<b>Federal/State Grants</b>	<ul style="list-style-type: none"> <li>• Very equitable system – does not discriminate against users of particular technologies and jurisdictions</li> <li>• Should address under-investment issues</li> </ul>
<b>National Infrastructure Reinvestment Bank</b>	<ul style="list-style-type: none"> <li>• May divert investment from the private sector and reduce overall productivity</li> <li>• Depends structure of the bank and disbursement allocations schemes</li> </ul>
<b>Public-Private Partnerships</b>	<ul style="list-style-type: none"> <li>• Risk/uncertainty associated with quality of service and costs make the system very difficult to judge from an economic point of view (see below)</li> </ul>
<b>Hosted Solutions</b>	<ul style="list-style-type: none"> <li>• Depend on how the system is structured</li> </ul>

## The Economics of Public-Private Partnerships

A more complex issue arises when public-private partnerships (P3) are considered. In terms of how P3 and traditional procurement approaches might differ in terms of costs and benefits, benefits from P3 projects typically fall into the following categories:

- **Accelerated Delivery:** This term refers to the benefits of having an asset and related services available earlier than if it was delivered by the public sector (normally because the public sector lacks the resources to spend on an asset) (see Figure 8). Thus, having a modernized 911-system project delivered earlier than it would be with conventional procurement methods means that the benefits can be experienced by the public sooner than before, increasing the present value of those benefits.

- Enhanced Delivery:** This term refers to improved service as a result of P3 (e.g., applied life-cycle approach, better management of service delivery). Ensured maintenance that derives from contractual commitment to maintenance results in better asset conditions and higher residual values. Furthermore, high service quality based on developing contractual commitments to defined service standards results in both better designed and higher-quality service delivery (see Figure 9). Clearly defined governance structure lead to increased external scrutiny and due diligence by lenders and investors. Enhanced delivery applies only to marginal improvements of the project as a result of P3 and should not be construed to mean a change of scope in the project resulting from P3.

Figure 8: How P3 Provides Accelerated Benefits

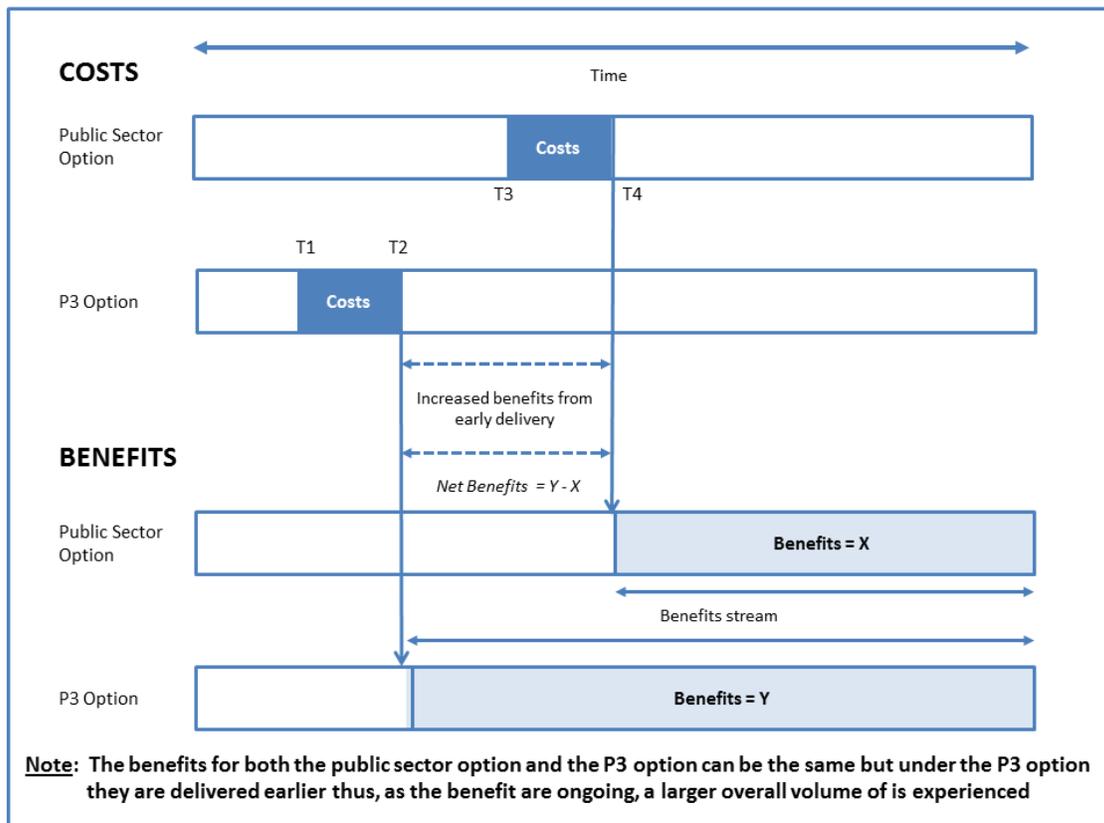
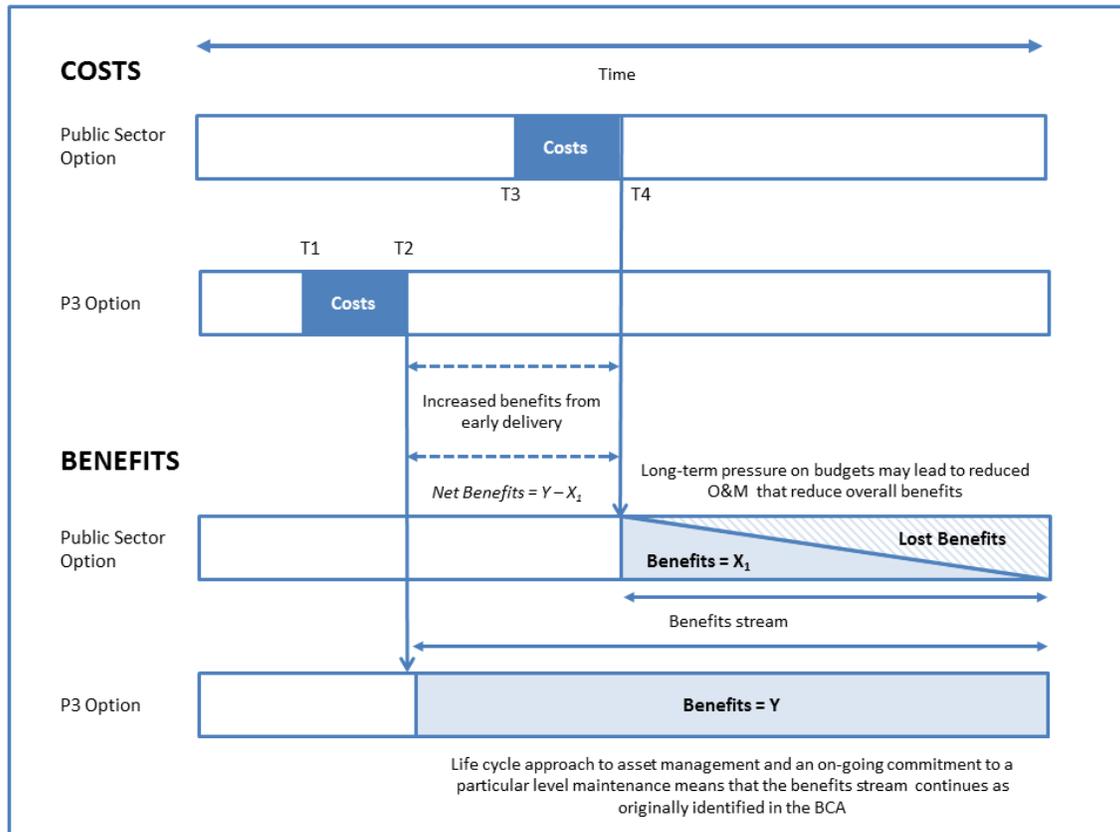


Figure 9: How P3 Can Deliver Enhanced Benefits by a Private-Sector Commitment to Life-Cycle Asset Maintenance and an Ongoing Commitment to Maintenance



Although there has been much focus on the benefits of P3, it should also be noted that there are a number of potential social costs or disbenefits that might exist with P3. These disbenefits more theoretically under developed, difficult to conceptualize from a pure BCA-paradigm, are generally less well articulated and tend to focus on the failure or potential failure of P3 projects and on potential problems in financial arrangement.<sup>95</sup> However, they also apply to any consideration of the broader social costs and benefits of P3 as a procurement option.

For example, critics of P3 projects argue that the track record of P3 projects shows that the public and private sectors are not able to adequately estimate and manage the risk associated with major infrastructure projects. P3 supporters argue that the traditional design-bid-build model including public ownership, operation, and maintenance, exposes the state to risks that threaten to inflate the cost of a project. Proponents of the P3 model claim that, by handing a project's finance, construction, and other phases over to private parties for a pre-determined price, the public transfers over these risks as well.

However, opponents of P3 argue that experience shows that despite contract agreements the effective risk exposure of the public sector remains very high. For example, when the project is financed by user fees there is a risk that assumptions made about traffic flow may be over optimistic. In this case,

<sup>95</sup> For example see: "Highway Robbery" Darwin Bondgraham, "Dollars and Sense: Real World Economics, November/December 2012, at <http://www.dollarsandsense.org/archives/2012/1112bondgraham.html> [Last accessed October 21, 2013]

revenue may fail to meet expectations and ultimately the private parties involved may declare bankruptcy to avoid obligations and leave the public sector with the responsibility of maintaining the road. Figure 10 illustrates this concept.

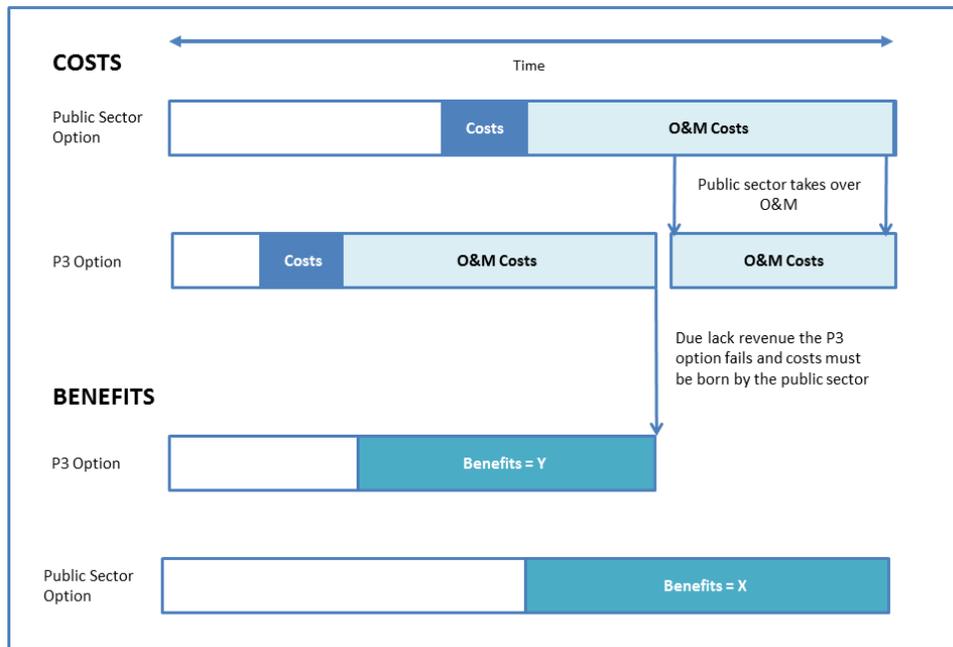


Figure 10: Potential Disbenefits of P3 from Risk

The central element of VfM appraisal is the standard investment appraisal technique based on the comparison of the discounted cash flows of different options. In the comparison, it aims to select the one that offers the greatest financial benefits, although affordability and public service obligations should also be considered.<sup>96</sup> This implies a number of assumptions:

- **Benefits assumed to be same:** Current VfM analysis does not provide appropriate methods to account for the differences of benefit along the different procurement routes especially from the aspect of social benefit. An example is the inclusion of a non-compete clause in the toll road project. If this clause is a part of the contract then the public agency loses its right to build a new highway in the same area even if the demand requires more highways. This would mean that even if the toll road is congested people will have no option but to use the congested toll road. If the same toll road is in the hands of public agency or does not include a non-compete clause, and then the public agency will be able to provide more facilities to the public. This implies that the toll road developed through partnership does not offer the same social benefits as the public agency can offer.
- **No external benefit from P3 procurement:** During the VfM analysis, the public agency has limited information about the private partners. The agencies do not know which companies will form the consortium, who will bid and, last, who will win the bid. In such conditions, the task of estimating project benefits becomes difficult. Lack of details about the private partner hinders

<sup>96</sup> Shaoul, J. "A critical financial analysis of the Private Finance Initiative: selecting a financing method or allocating economic wealth?" *Critical Perspectives on Accounting* 16 (4)(2005) : 441-471.

the agencies from estimating and accounting the private partner's actual potential of earning revenues. Actually, private sectors can leverage their other business by developing the PPP project. For instance, advertising business, real estate, local businesses, corporate businesses and similar other businesses are likely to get direct benefits from infrastructure developments. These positive external effects improve their earnings from their primary toll road business. Nonetheless, these benefits are difficult to estimate and are not considered a part of current VfM analysis.

- **Successful transfer of Risk:** When the VfM is conducted it is assumed that the risks will be transferred or retained by the Agencies and the private parties as considered during the analysis. However during the procurement phase the negotiations may change the risk allocation arrangement considered during the analysis. For example, in terms of demand risk, in almost all P3 projects this major risk is transferred to the private sector during VfM analysis since the private sector is believed to have better control over this risk. However during the procurement phase the private sector negotiates with the public agency and pushes the non-compete clauses or minimum revenue guarantee in the project. Such clauses get the public agency locked in a commitment even if the future traffic demand experience drastic changes in the future. In this case risks are not smoothly transferred as planned in the analysis.

However, to date little work has been done to analyze the theoretical rationale and demonstrate the potentiality of benefit and efficiency from the P3. For example, based on a critical analysis of the economic rationale for P3s, Fourie and Burger concluded that P3s do have the potential to improve the efficiency and effectiveness of delivery of certain government services.<sup>97</sup> At the same time, a number of critical conditions like: the requirement of sufficient of risk transfer and the presence of sufficient performance incentives and discipline etc. are needed for successful P3 design and implementation.

In particular, P3 schemes are particular vulnerable to uncertainty. Existing studies have shown the criticality of uncertainty in Value for Money of P3 projects. In fact, the VfM framework may not produce a consistent result because of the uncertain circumstances that potentially affects VfM with the progress of project.<sup>98</sup> Capital cost escalation, longer deliver time and even poor customer satisfaction in development and procurement are common outcomes in the P3 projects. Thus, a project which appears viable at one time may not be viable at another. For example, VfM is assumed to be measured using the concept of net present costs, a variant of the net present value technique. Unfortunately, net present value technique will neither ascertain whether or not the private finance provider will deliver the project on time and within the budget, nor will it be able to measure the quality of the bid. Therefore, the basic metric at the core of the analysis may be flawed.

P3s are heavily justified by the valuation of risk transfer arrangements. Without this assumption of risk by the private sector, there would be no partnership. However, VfM requires careful calculations of all cost factors which are set by risk allocation, an incredibly difficult task. Any risk that is unaccounted for in analysis has the potential to threaten a project's viability and public appeal.

A further consideration in assessing proper risk transfer is ensuring that both the public and private sector partner have full and accurate information. All requirements of a desired project or program need

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<sup>97</sup> Fourie, F and Burger, P, 2005, “- An Economic Analysis and Assessment of Public - Private Partnerships (PPPs)”, South African Journal of Economics, 68- 4.

<sup>98</sup> Henjewe, C., Sun, M. and Fewings, P. (2011) Value for money optimization and sustainability in PFI projects. In: Egbu, C. and Lou, E. C. W., eds. (2011) Proceedings 27th Annual ARCOM Conference. Association of Researchers in Construction , pp. 65-72.

to be disclosed to potential bidders so that they can adequately price their proposals. Bids that are substantially lower or higher than others should be analyzed closely to determine whether the contractor has adequately priced all appropriate levels of risk into their proposals. As such, most literature cautions public managers to avoid selecting P3s based on cost alone. Low-cost P3s do not always deliver the best VfM.

When these factors are considered the difficulty of properly being able to assess the efficiency or effectiveness of P3 becomes apparent. Thus, while P3 is potentially a viable alternative, the difficulty of properly being able to evaluate risk and the overall uncertainty of P3 makes it difficult to assess the overall effectiveness of this alternative.

## Appendix D: 911 Surcharges by State for Funding 911 Systems

Table 8 provides details of specific legislation by state under which surcharges are collected on devices capable of calling 911 (currently wireline, wireless, VoIP and prepaid telephones). The research also calls attention to the organizational structure and that there does not appear to be linkage between oversight methods and fee structure. For example, some states collect surcharges from wireline, wireless, Voice over Internet Protocol (VoIP), and prepaid usage, while other states collect fees only from wireline and wireless usage. Correcting these funding disparities so that all devices capable of reaching 911 provide some revenue would help equalize revenues. (Where possible, the state name has been hyperlinked to provide access to the actual statute).

Table 8: 911 Surcharges by State

State	911 Funding Information
<a href="#">Alabama</a>	Under <b>Title 11, Chapter 98, Code of Alabama</b> , a surcharge is collected and divided among the Alabama Wireless 911 Board, the wireless provider, and local districts providing E911 service. The current surcharge is \$0.70 for wireless and prepaid. VoIP varies per exchange access facility, and wireline usage surcharges are up to 5 percent of the maximum tariff rate. Counties with a population of fewer than 25,000 may charge up to \$2.00 or the 5-percent tariff rate. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<a href="#">Alaska</a>	Under <b>Alaska Statute 29.35.131.—911 Surcharge</b> , a municipality can impose an enhanced 911 surcharge to fund anticipated enhanced 911 system needs. The current surcharge for wireless and wireline usage can range up to \$2.00. There is no surcharge for VoIP or prepaid usage. The organizational structure is local.
<a href="#">Arizona</a>	Under <b>Title 42, Article 6: Telecommunications Services Excise Tax</b> , a surcharge is levied for each wireline and wireless service account to finance emergency telecommunication services. The current surcharge is \$0.20 for wireline, wireless, and VoIP usage. There is no surcharge for prepaid users. The organizational structure is state fee/oversight and local.
<a href="#">Arkansas</a>	Under the <b>Arkansas Public Safety Communications Act of 1985 (Act 683 of 1985, Arkansas Code §12-10-303)</b> , a service charge for 911 funding was established. The current surcharge is \$0.65 for wireless users, while wireline users are subject to a 5- to 12-percent tariff rate. There is no surcharge for VoIP or prepaid usage. The organizational structure is local for wireline and state fee/oversight & local for wireless
<a href="#">California</a>	Under the <b>California Revenue and Taxation Code Sections 41001–41176</b> , the State of California 911 Emergency Communications Office manages and reimburses agencies for 911-related equipment and services. The current surcharge for wireless, wireline, and VoIP usage is .50 percent of intrastate calls. There is no surcharge for prepaid usage. The organizational structure is state fee/oversight and local.
<a href="#">Colorado</a>	Under <b>§ 29-11-104</b> , a 911 surcharge is imposed to pay for costs of emergency telephone service, such as equipment and installation. The current surcharge for wireless, wireline, and VoIP usage (every billed service user) is up to \$.70 or higher with Public Utility Commission approval. Prepaid is 1.4 percent at point of sale. The organizational structure is local.

State	911 Funding Information
<a href="#">Connecticut</a>	Under the State Statute for the <b>E911 Telecommunications Fund, Connecticut General Statutes, Section 28-30a Regulations of Connecticut State Agencies, and the Enhanced 911 Telecommunications Fund Regulations, Sections 28-24-1 through 28-24-11</b> , E911 is funded by the state’s 911 surcharge, which is \$0.50 for wireline usage and \$0.67 for wireless usage, VoIP (per line) usage, and prepaid (point of sale) usage. The organizational structure is state fee/oversight.
<a href="#">District of Columbia</a>	Under <b>District of Columbia Code § 34-1803</b> , the surcharge for wireline (per exchange access line), wireless, and VoIP (line, trunk, path with access to 911) usage is \$0.76. Prepaid is 2 percent of the point of sale. The organizational structure is DC Government Oversight
<a href="#">Delaware</a>	Under <b>Delaware Code—Section 10103: E-911 Emergency Reporting System Fund</b> , the Emergency Reporting System is supported by a monthly surcharge of up to \$0.60 cents per month for wireline, wireless, and VoIP (per access line) usage. There is no surcharge for prepaid usage. The organizational structure is state fee/oversight and local.
<a href="#">Florida</a>	Fee established in <b>Florida Statute 365.171: Emergency Communications Number E911 Act</b> . The current surcharge is \$0.50 for wireless and VoIP (per service number) usage, while the wireline usage surcharge is \$0.50 in all but three counties. Prepaid is included in the legislation and the surcharge is \$0.50. The organizational structure is state fee/oversight and local
<a href="#">Georgia</a>	Under <b>Part 4, Article 2, Chapter 5 of Title 46 of the Official Code of Georgia Annotated</b> , a 911 surcharge provides for the Emergency 911 Assistance Fund. The current surcharge ranges from \$1.00 to \$1.50 for wireless usage, \$0.75 for prepaid usage, and \$1.50 for wireline and VoIP usage. The organizational structure is local.
<a href="#">Hawaii</a>	Under <b>Hawaii Revised Statutes 138-4</b> , a monthly wireless enhanced 911 surcharge is imposed on each commercial mobile radio service connection. The current surcharge is \$0.66 for wireless and VoIP usage and \$0.27 for wireline usage. There is no surcharge for prepaid usage. The organizational structure is bill and keep for wireline service and state fee/oversight and local for wireless service.
<a href="#">Idaho</a>	Under <b>Title 31, Chapter 48 Emergency Communications Act</b> , Idaho has a wireless surcharge to provide for 911 services directly related to establishing, maintaining, or enhancing a 911 emergency communications service. The current surcharge is \$1.00 (max) for wireless, wireline, and VoIP usage. There is no surcharge for prepaid usage. The organizational structure is local with state advisory.
<a href="#">Illinois</a>	Under <b>50 ILCS 753</b> , the Wireless E911 Surcharge ensures that funding for 911 service is maintained throughout the state. The current surcharge is \$0.73 for wireless usage, 1.5 percent of sales for prepaid usage and \$0.30 to \$5.00 for wireline and VoIP usage. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<a href="#">Indiana</a>	Under <b>Senate Bill 345</b> , the 911 surcharge placed on wireline and VoIP is 3 to 10 percent of the monthly access charge. The current surcharge is \$0.90 for wireless usage. The surcharge for prepaid usage is \$0.50 at the point-of-sale. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.

State	911 Funding Information
<a href="#">Iowa</a>	Under Iowa Code <b>34A.7A Wireless Communications Surcharge Fund</b> , a monthly surcharge is imposed on each wireless communications number provided in the state. The current surcharge is \$0.65 for wireless and VoIP usage and up to \$1.00 for wireline usage. There is a \$0.33 surcharge for prepaid usage per retail transaction. The organizational structure is state fee/oversight and local.
<a href="#">Kansas</a>	Under the <b>Kansas 911 Act</b> , funding for emergency communications is provided by the current surcharge of \$0.53 for wireless, wireline, and VoIP (per number) usage, while prepaid usage is 1.06% of retail sales. The organizational structure is state fee/oversight
<a href="#">Kentucky</a>	Under <b>Revised Statute 65.760, Establishment of 911 emergency telephone service by city, county, or urban-county government—Funding</b> , all funds are disbursed for the establishment, operation, and maintenance of the 911 emergency communications system. The current surcharge is \$0.70 for wireless usage and \$0.39 for prepaid usage, while the surcharge for wireline and VoIP (per access line) usage varies by county (current range is \$0.50 to \$4.50). The organizational structure is local for wireline service and state fee/local and oversight for wireless service.
<a href="#">Louisiana</a>	Under <b>House Bill No. 782—Prepaid Wireless 911 Service Charge</b> , the proposed surcharge for prepaid usage is 2 percent of retail sales. The surcharge for wireless usage is \$0.85, the surcharge for VoIP usage varies per wireline structure, while the surcharge for wireline usage is 5 percent of tariff rates. The organizational structure is local.
<a href="#">Maine</a>	Under <b>Maine Revised Statutes Title 25: Part 8: Chapter 352, Section 2927</b> , funding mandates are provided by the 911 telephone surcharge, which is currently \$0.45 for wireless, prepaid (point of sale), wireline, and VoIP usage. The organizational structure is state program.
<a href="#">Maryland</a>	Under <b>Maryland Code Public Safety Title 1—Definitions, General Provisions; Subtitle 3—911 Emergency Telephone System Section 1-310—911 surcharge</b> , the 911 surcharge is remitted to the 911 Trust Fund. The current surcharge is \$1.00 for wireless, wireline, and VoIP (per all local access lines) usage. There is no surcharge for prepaid usage. The organizational structure is state fee/oversight and local.
<a href="#">Massachusetts</a>	Under <b>Chapter 223 of the Acts of 2008</b> , the state imposes a surcharge to be used for expenses associated with the lease, purchase, upgrade, or modification of primary and regional PSAP equipment; network development, operation, and maintenance; and training of 911 telecommunicators regarding the use of enhanced 911. The current surcharge is \$0.75 for wireless, wireline, and VoIP (per access line) usage. Prepaid retailers can either collect a monthly surcharge from the subscriber or calculate and remit the surcharge monthly. The organizational structure is state program.
<a href="#">Michigan</a>	Under <b>Senate Bill 410</b> , the 911 surcharge provides for the installation, operation, modification, and maintenance of universal emergency 911 service. The current surcharge for wireless, wireline, and VoIP (per access point or line) usage is a \$0.19 state fee and \$0.00 to \$3.00 by county. The surcharge for prepaid (monthly state fee) usage is \$0.90. The organizational structure is state and local for wireline service and state fee/oversight and local for wireless service.
<a href="#">Minnesota</a>	Under <b>House Bill 441</b> , the surcharge helps to maintain the 911 emergency network throughout Minnesota. The current surcharge is \$0.80 for wireless, wireline, prepaid, and VoIP (per number) usage. The organizational structure is state fee/oversight and local.

State	911 Funding Information
<a href="#">Mississippi</a>	Under <b>Senate Bill 2938</b> , the Enhanced 911 surcharge is \$1.00 for wireless usage and \$0.85 to \$2.05 for wireline usage. There is no surcharge for VoIP or prepaid usage. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<a href="#">Missouri</a>	Under <b>Senate Bill 966</b> , Missouri's 911 surcharge provides public agencies with a source of revenue for costs of establishing, upgrading, operating, and maintaining an emergency telephone system. There is no surcharge for wireless, prepaid, or VoIP usage. The surcharge for wireline usage is 15 percent of the tariff rate or \$0.75. The organizational structure is local.
<a href="#">Montana</a>	Under <b>Montana Code Annotated 10-4-21</b> , the surcharge covers administrative costs for basic and enhanced 911 emergency telephone service accounts. The current surcharge is \$1.00 for wireline, wireless, and VoIP (all accessible 911 service) usage. There is no surcharge for prepaid usage. The organizational structure is state fee/oversight and local.
<a href="#">Nebraska</a>	Under <b>Nebraska Revised Statute 86-435</b> , the surcharge pays for 911 services. The current surcharge is \$0.50 to \$0.70 for wireless usage and \$0.50 or higher (under certain conditions) for wireline usage. There is no surcharge for VoIP or prepaid usage. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<b>Nevada</b>	No 911 state level surcharge legislation could be obtained for Nevada. The surcharge for wireline and wireless usage is \$0.25 or tax base. There is no surcharge for VoIP or prepaid usage. The organizational structure is local.
<a href="#">New Hampshire</a>	Under <b>House Bill 388</b> , surcharges are deposited in the enhanced 911 system fund. The current surcharge is \$0.25 for wireless and wireline usage. There is no surcharge for prepaid and VoIP usage. The organizational structure is state program.
<a href="#">New Jersey</a>	<b>Senate Bill 1716</b> imposes an "Emergency Preparedness and 911 System Assessment" surcharge used for replacing the current 911 infrastructure with a state-of-the-art enhanced 911 system. The current surcharge is \$0.90 for wireless, wireline, and VoIP (per access line) usage. There is no surcharge for prepaid usage. The organizational structure is state program.
<b>New Mexico</b>	No 911 state level surcharge legislation could be obtained for New Mexico. The surcharge is intended to cover annual debt service charges on all outstanding enhanced 911 bonds. The current surcharge is \$0.51 for wireless and wireline usage. There is no surcharge for prepaid and VoIP usage. The organizational structure state fee/oversight and local.
<a href="#">New York</a>	Under <b>NY Code—Article 6, Section 303</b> , a surcharge is imposed to pay for the costs associated with obtaining, operating, and maintaining the telecommunications equipment and telephone services needed to provide enhanced 911. The current surcharge is \$0.35 or \$1.00 for wireline usage and \$0.35 to \$1.25 for wireless usage. There is no surcharge for prepaid or VoIP usage. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<a href="#">North Carolina</a>	Under sections <b>62A-43 of the General Statutes of North Carolina</b> , a surcharge is imposed to pay for the costs of operating a 911 system. The current surcharge is \$0.60 for wireless, wireline, and VoIP (per access line) usage. There is a \$0.70 surcharge for each transaction of prepaid wireless usage. The organizational structure is state fee/oversight.

State	911 Funding Information
<a href="#">North Dakota</a>	Under <b>Chapter 645 of the 1985 Session Laws</b> , the surcharge is used for infrastructure, such as new radios, telephones, or system upgrades, as well as training and related travel. The current surcharge is \$1.00 to \$1.50 (maximum) for wireless, prepaid, wireline, and VoIP (per access line) usage. The organizational structure is local.
<a href="#">Ohio</a>	Under <b>House Bill 360</b> , wireless customers throughout Ohio pay a surcharge to fund enhanced wireless 911 capabilities. The current surcharge is \$0.28 for wireless usage and property tax and/or fee up to \$0.50 for wireline usage. There is no surcharge for prepaid or VoIP usage. The organizational structure for wireline service is local and state fee/oversight and local for wireless service.
<a href="#">Oklahoma</a>	Under revised <b>Senate Bill 2252</b> , the surcharge imposed is intended to pay for 911 services. The current surcharge is \$1.50 for wireless usage and varies up to 15 percent of tariff rates for wireline usage. Surcharge for VoIP usage varies per wireline structure, and there is no surcharge for prepaid usage. The organizational structure is local.
<a href="#">Oregon</a>	Under <b>ORS 403.100–(403.380)</b> , surcharges are used to fund the statewide 911 program. The current surcharge is \$0.75 for wireless, wireline, and VoIP (per telephone exchange access lines and channels) usage. There is no surcharge for prepaid usage. The organizational structure is state fee/oversight and local.
<a href="#">Pennsylvania</a>	<b>Act 56</b> , which further amended <b>Act 78</b> , allows for the collection of a surcharge per device and is remitted to the State Treasury. Cities and counties must use those funds to develop and maintain an integrated wireless E911 system. The current surcharge is \$1.00 for wireless and VoIP (any number that has outbound calling capability) usage and \$1.00 to \$1.50 for wireline usage.
<a href="#">Rhode Island</a>	Under <b>Section 39-1-62 of the General Laws in Chapter 39-1 entitled "Public 2 Utilities Commission"</b> the surcharge and is intended to be used for operating and maintaining state-of-the-art equipment in public safety agencies. The current surcharge is \$0.47 for wireline, wireless, and VoIP usage. There is no surcharge for prepaid usage. The organizational structure is state program.
<a href="#">South Carolina</a>	Under <b>South Carolina Bill 4551</b> , a 911 charge is imposed. The current surcharge is \$0.62 for wireless and prepaid (at point of transaction) usage, and \$0.50 to \$1.00 for wireline and VoIP usage based on the number of access lines per jurisdiction. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<a href="#">South Dakota</a>	Under <b>South Dakota Codified Laws, Chapter 34-45</b> , the Legislature approved an increase in the traditional surcharge from the current \$0.75 per month to \$1.25 per month for wireless and wireline usage. The surcharge for prepaid usage is 2 percent at point of sale. The organizational structure is state fee/oversight and local.
<a href="#">Tennessee</a>	Under <b>Tenn. Code Ann. § 7-86-128</b> , retailers must collect an E911 surcharge from consumers on each retail transaction for the purchase of prepaid wireless telecommunications. The current surcharge is \$0.53 on every prepaid transaction, \$1.00 to \$3.00 for wireless and VoIP usage, and the surcharge for wireline usage is up to \$1.50 (residential) and up to \$3.00 (business). The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<a href="#">Texas</a>	Under <b>Texas Health &amp; Safety Code, Section 771.071</b> , a 911 surcharge is set to fund the provision of 911 emergency telecommunications services. The current surcharge is \$0.50 for wireless, wireline, and VoIP (per local exchange service switched access line) usage. The surcharge for prepaid usage is 2 percent of sales.

State	911 Funding Information
<a href="#">Utah</a>	Under <b>House Bill 36</b> , a surcharge per month is collected to ensure all areas are served by Enhanced 911 and to implement Phase II wireless service. Enacted in 2011, under <b>HB 303</b> , the collection of a prepaid wireless 911 service charge from a prepaid wireless customer is now at the point of retail sale. The current surcharge is a \$0.61 local surcharge plus \$.08 state for wireless, wireline, and VoIP (per access line) usage. The surcharge for prepaid usage is 1.9 percent at point of sale. The organizational structure is local for wireline service and state fee/oversight and local for wireless service.
<a href="#">Vermont</a>	Under <b>Title 30: Public Service Chapter 87: Enhanced 911 Emergency Response System</b> , there is no set surcharge (Universal Service Funding is enforced). The funds cover the purchase of network equipment and software, development of databases, and provision of training and public education regarding enhanced 911. The organizational structure is state program.
<a href="#">Virginia</a>	Under <b>56-484.17</b> , 60 percent of the Wireless E911 Fund is distributed on a monthly basis to PSAPs. The current surcharge is \$0.75 for wireless, wireline, and VoIP usage. The surcharge for prepaid usage is \$0.50 per retail transaction. The organizational structure for wireline service is state and state fee/oversight and local for wireless service.
<a href="#">Washington</a>	Under <b>Chapter 82.14B of the Revised Code of Washington</b> , the E911 system is funded through a state rate of \$0.25 cents per month, with a local surcharge of \$0.70 for wireless, wireline, and VoIP usage. There is no surcharge for prepaid usage. The organizational structure is state fee/oversight and local.
<a href="#">West Virginia</a>	Under <b>HB 3208</b> , the bill redistributes 911 funding among West Virginia's 55 counties, with all counties receiving an equal percentage of the funding distribution. The current surcharge is \$3.00 for wireless usage, varies by county for wireline and VoIP usage, and is 6 percent at point of sale for prepaid usage. The organizational structure is local.
<a href="#">Wisconsin</a>	Under <b>Wis. Stat. § 256.35(3)</b> , the 911 statute permits funding to be disbursed for 911-related telephone network expenses. The current surcharge for wireline usage varies, and there is no surcharge for wireless, VoIP, or prepaid usage. The organizational structure is local.
<a href="#">Wyoming</a>	Under section <b>16-9-103</b> of the <b>Wyoming Statutes</b> , a monthly 911 emergency surcharge is imposed to pay for the costs of operating a 911 system. The current surcharge is \$0.25 to 0.75 for wireless, wireline, and VoIP usage. There is no surcharge for prepaid usage. The organizational structure is local.

## Appendix E: State Governance Levels by State

Table 9<sup>99</sup> outlines the level of authority of the state 911 body by state.

Table 9: State Governance Levels of Authority

States	Level of Authority	Governance Characteristics
DC	The 911 authority owns or operates a single district-wide system with a single, state-operated PSAP.	
CT, DE, MA, ME, NJ, VT,	State-level 911 authority owns/operates a single statewide system, and funds and operationally supports PSAPs.	Vermont operates independently. In Maine, Massachusetts, Delaware, <sup>100</sup> Connecticut, and New Jersey, the 911 authority is part of another state agency.
AL, AK, AZ, CA, FL, GA, HI, ID, IL, IN, KS, MD, MI, MN, MT, NH, NM, NY, NC, OK, OR, PA, RI, SC, SD, TN, UT, VA, WA, WV, WY	There is state-level 911 authority with statewide geographic planning, coordination, and funding responsibility for the full scope of 911.	Only 1 of the 31 state 911 programs in this category operates as a completely independent state agency or function. The remainder are part of another state agency, although beyond that there is a great deal of diversity. For most states in this category, the 911 function is a full-fledged organizational component of another state agency and works within the context and authority of that agency. However, a few state programs are simply attached to another state agency for administrative support and otherwise operate independently. In some cases, there is also a separate board or commission that sets policy and exerts decision authority.
TX	There is a state-level 911 authority with less than statewide geographic planning, coordination, and funding responsibility for full scope of 911.	Texas is the only state in this category, and operates as an independent state agency. In those parts of Texas outside of the state program's geographic responsibility, regional and/or local 911 authorities have independent responsibility.
AR, IA, KY, MS, NE, OH, WI	There is a state-level agency or board with statewide responsibility for a limited aspect of 911 (generally wireless service).	Mississippi and Arkansas reflect independent agencies or boards of this sort while Nebraska, Ohio, Iowa, Kentucky, and Wisconsin are part of a larger state agency.

<sup>99</sup> This is a modified table from the National 911 Program's "Model State 911 Plan." The original can be found on page 12 of the *Model State Plan*, which is available at: <http://www.nhtsa.gov/staticfiles/nti/pdf/811369.pdf> [Last accessed October 21, 2013]

<sup>100</sup> Responsibility for 911 in Delaware is divided between an independent board that provides oversight and funding for locally operated PSAPs; and the State's Department of Information and Technology, which is responsible for state technology procurements, including the 911 system.

States	Level of Authority	Governance Characteristics
CO, ND	No formal state-level 911 focus, some coordination mechanisms among local jurisdictions	Two states fall into this category. North Dakota and Colorado.
LA, MO, NV	No state-level 911 focus or coordination mechanism	Three states fall into this category: Missouri, Louisiana, and Nevada.

## Appendix F: Previous 911 Funding Studies

Multiple studies and reports about challenges with 911 funding have been developed at the Federal, state, and industry levels over several years. An assessment of available resources has been conducted to summarize current challenges and funding needs, governance, and analyses of alternative funding methods in an effort to create a more sustainable model for the transition to and ongoing operation of Next Generation 911 (NG911). Incorporating the findings from a combination of these resources will help paint the current picture of 911 funding and ensure a duplication of effort does not occur. In addition to assessments of current funding models, it is also important to understand the lessons learned from NG911 early adopters. These early adopters can provide the 911 stakeholder community with a snapshot of costs, including equipment and operating expenses, as well best practices for transition, operation, and maintenance. As future adopters model and adapt their 911 systems to resemble states with similar infrastructure, trends in cost savings and alternative methods will reveal themselves. Moving forward, these studies will be integral to the successful funding and implementation of NG911. The following sections describe the studies conducted at the Federal, state, and industry levels.

### Federal Studies

Federal agencies have conducted studies and developed reports that have assessed the approximate cost for a transition to NG911, funding issues, and have made recommendations. The Federal Communications Commission (FCC) and the U.S. Department of Transportation (DOT) have reported on 911 fee structure, current levels of funding, funding challenges, and the proposed framework for NG911. These and other reports are vital to understanding the current challenges facing public safety answering points (PSAP) and 911 authorities nationwide.

From 2006 to 2009, U.S. DOT's National 911 Program conducted the NG911 Initiative, a research and development effort focused on outlining the architecture required for a NG911 system capable of voice, data, and video transmission to PSAPs. One of the outcomes of the NG911 Initiative was the *Final Analysis of Cost, Value, and Risk*,<sup>101</sup> a document that assessed the current 911 operating environment, analyzed and compared the current 911 environment with NG911, and provided a summary of value, costs, and risks across the current and NG911 scenarios.

In 2009, U.S. DOT's National E-911 Implementation Coordination Office (now known as the National 911 Program) released *A National Plan for Migrating to IP-Enabled 911 Systems*<sup>102</sup> to define and document a vision for NG911 system. Key funding recommendations included:

- Ensuring NG911 upgrades are considered a fiscal priority
- Transforming the current funding mechanisms to resolve the diminishing revenue base
- Funding models for shared resources
- Ensuring 911 funds are preserved for 911 and emergency communications systems.

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<sup>101</sup> U.S. DOT NG911 Initiative, *Final Analysis of Cost, Value, and Risk*, March 5, 2009. Available at: [http://www.its.dot.gov/ng911/pdf/USDOT\\_NG911\\_4-A2\\_FINAL\\_FinalCostValueRiskAnalysis\\_v1-0.pdf](http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf) [Last accessed October 21, 2013]

<sup>102</sup> National E-911 Implementation Coordination Office, *A National Plan for Migrating to IP-Enabled 911 Systems*, September 2009. Available at: [http://www.911.gov/pdf/National\\_NG911\\_Migration\\_Plan\\_FINAL.pdf](http://www.911.gov/pdf/National_NG911_Migration_Plan_FINAL.pdf) [Last accessed October 21, 2013]

In 2011, the FCC's Public Safety and Homeland Security Bureau published a white paper on NG911 network connectivity costs: *A Basis for Public Funding Essential to Bringing a Nationwide Next Generation 911 Network to America's Communications Users and First Responders*.<sup>103</sup> This cost study examines two cost models for funding the construction and ongoing costs for nationwide NG911 network connectivity and call routing between the PSAP and the commercial service provider. It does not address other costs that PSAPs or carriers may incur in migrating to NG911, such as new systems located within the PSAP or upgrades to service provider networks to support NG911. This is one specific aspect of the overall funding needs for implementation of NG911.

The mission of the FCC Communications Security, Reliability, and Interoperability Council (CSRIC)<sup>104</sup> is to: "provide recommendations to the FCC to ensure, among other things, optimal security and reliability of communications systems, including telecommunications, media, and public safety." Within the CSRIC Working Group 4B, the Funding Subgroup investigated and evaluated currently available funding models related to 911 and E911 for effectiveness and attempted to identify gaps, including challenges related to implementation of best practices and models by stakeholders within the 911 system. The CSRIC Working Group 4B's Final Report<sup>105</sup> describes its efforts in more detail. Selected recommendations of the Funding subgroup include:

- Existing surcharges and taxes alone may no longer be adequate to fund both a legacy 911 system and a transition to next generation services, and as such, new and existing funding models should be evaluated.
- Funding sources must be predictable and sustainable and not reliant on one specific service type.
- Fund diversion or raiding should be prohibited. Sound account management practices call for transparency and accountability in the collection of funds by the government.
- A comprehensive next generation plan and strategy must be developed in sufficient detail to provide direction to states and to establish the framework at a national level and to ensure that the transition to NG911 is effective.

The FCC also submits an *Annual Report on State Collection and Distribution of 911/E911 Fees*<sup>106</sup> to Congress that examines whether 911 fees are being properly used for 911 related activities or are being diverted for unrelated purposes (e.g., diverted to the state's general fund). The 2012 report found that 45 states and Puerto Rico indicated fees were used exclusively for 911 purposes, while 5 states and Guam reported they used at least some 911 fees for other purposes/programs. Compared with previous

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<sup>103</sup> Federal Communications Commission, *Report to Congress on State Collection and Distribution of 911 Fees and Charges, December 21, 2012*. Available at: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-309744A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-309744A1.pdf) [Last accessed October 21, 2013]

<sup>104</sup> More information on FCC CSRIC II is available at: <http://transition.fcc.gov/pshs/advisory/csric/> and CSIRC III at: <https://www.fcc.gov/encyclopedia/communications-security-reliability-and-interoperability-council-iii> [Last accessed October 21, 2013]

<sup>105</sup> The CSRIC Working Group 4B report is available at: <http://transition.fcc.gov/pshs/docs/csric/CSRIC-WG4B-Final-Report.pdf> [Last accessed October 21, 2013]

<sup>106</sup> Federal Communications Commission, *Report to Congress on State Collection and Distribution of 911 and E911 Fees and Charges, December 21, 2012*. Available at: [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2013/db0114/DOC-318391A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0114/DOC-318391A1.pdf) [Last accessed October 21, 2013]

iterations of this report, this is a reported reduction in the number of states diverting 911 fees.<sup>107</sup> It was also indicated that 33 states allow 911 fee distribution to support NG911 implementation.

## Industry Studies

The National Emergency Number Association's (NENA) Next Generation Partner Program (NGPP) and the Industry Council for Emergency Response Technologies (iCERT) (formerly known as the 911 Industry Alliance) have both produced a number of reports related to 911 funding. Gaining insight from 911 experts at NENA and iCERT is necessary to gain perspectives and recommendations from the industry and non-government entities.

In 2007, NENA produced a report, *Funding 911 into the Next Generation*,<sup>108</sup> which examined a number of funding models related to funding E911 and NG911. Options for funding models included:

- Fixed amount surcharge on all calling services
- Surcharge on companies providing access to communications infrastructure
- Universal service user fees
- A general fund tax.

The paper concluded that a combination of these funding methods should be adopted, as well as ensuring technological advancements are continuously reflected.

In 2008, iCERT (known then as the 911 Industry Alliance) carried out a study on the *Health of the Emergency Communications Network*<sup>109</sup> to analyze issues affecting the 911 system such as technology, governance, and funding. Key findings included:

- Consumer technology has surpassed current 911 capabilities
- Current 911 fees are often diverted for other general purposes
- Current funding models may be insufficient
- State coordination and leadership in legislating, budgeting and planning is necessary.

Report recommendations stated that 911 services must be better aligned with the expectations and demands of consumers and citizens, a viable funding strategy for achieving NG911 must be a priority for policymakers, and greater oversight should be used to monitor fund collection and diversion.

## State Studies

State studies on cost data and alternative funding models for E911 and NG911 have also been conducted. As mentioned above, early adopters are extremely important to the implementation of NG911 moving forward, because they provide models that can be adjusted to fit each state's individual needs. They can also serve as models for lessons learned and best practices, especially relating to expenditures and deployment.

With prevalent 911 revenue disparities, some states have been proactive in determining new funding models. A case study in North Carolina was conducted in 2010 when the state directed East Carolina

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<sup>107</sup> The FCC also opened a public comment period: see announcement at: <https://www.fcc.gov/document/fcc-seeks-comment-net-911-fee-report> [Last accessed October 21, 2013]

<sup>108</sup> National Emergency Number Association (NENA), *Funding 9-1-1 Into the Next Generation*, March 2007. Available at: [http://www.nena.org/?NGPP\\_911FundingRpt](http://www.nena.org/?NGPP_911FundingRpt) [Last accessed October 21, 2013]

<sup>109</sup> iCERT (formerly the 911 Industry Alliance), *Health of the US 9-1-1 System*, 2008. Available at: [http://www.theindustrycouncil.org/publications/download\\_report.cfm](http://www.theindustrycouncil.org/publications/download_report.cfm) [Last accessed October 21, 2013]

University to recommend a funding model for its 911 and NG911 systems. The resulting recommendation<sup>110</sup> was a move from separate wireline and wireless fees to a single fee for all wireless, wireline, and Voice over Internet Protocol (VoIP) devices. This novel approach to funding has already proven to be a success in the state, with the state being able to **decrease** its monthly 911 service charge to \$0.60.

In 2012, the Vermont Enhanced 911 Board released an *Emergency 911 Service Funding Study*,<sup>111</sup> which urged the Vermont Legislature to explore the creation of a new funding model, such as an experienced-based, call-share reimbursement model. This model that would assign a “per call” rate and would be based on the annual costs to operate the 911 system and the projected number of 911 calls for the upcoming year, with carriers remitting payments to the state 911 fund.

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<sup>110</sup> Elaine Seeman, Ph.D., and James E. Holloway, J.D., *A Report on Findings and Recommendations on 911 Costs and Funding Models for the North Carolina 911 System*, North Carolina 911 Board, January 6, 2010. Available at: [https://www.nc911.nc.gov/Board/agenda/Book/20100108\\_Item%2006a%20ECU%20E911-final-report-jan-6-2010.pdf](https://www.nc911.nc.gov/Board/agenda/Book/20100108_Item%2006a%20ECU%20E911-final-report-jan-6-2010.pdf) [Last accessed October 21, 2013]

<sup>111</sup> James Lipinski, *Emergency 9-1-1 Service Funding Study*, State of Vermont Enhanced 9-1-1 Board, January 3, 2012. Available at: <http://www.leg.state.vt.us/reports/2012ExternalReports/274190.pdf> [Last accessed October 21, 2013]