L.R.Kimball℠

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OEM, APCO/NENA Conference Presentation

Review of the Next Generation 9-1-1 Cost Analysis

June 9, 2011

ARCHITECTURE • ENGINEERING • COMMUNICATIONS TECHNOLOGY

AVIATION | CIVIL | CONSTRUCTION SERVICES | DATA SYSTEMS | ENVIRONMENTAL
FACILITIES ENGINEERING | GEOSPATIAL | NETWORKS | PUBLIC SAFETY | TRANSPORTATION

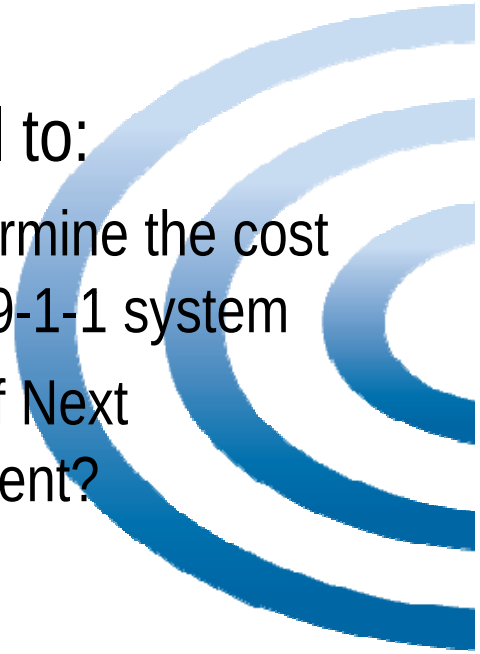
Agenda

- Why is L.R. Kimball Here?
- Current Conditions
- Evolution to Next Generation 9-1-1 (NG9-1-1)
- Funding Analysis
- Cost Analysis
  - Cost Estimate Assumptions
  - Cost Considerations
  - Option One
  - Option Two

Why is L.R. Kimball Here?

- Legislatively directed analysis of the 9-1-1 system in Oregon.

- This is Phase One OEM contracted L.R. Kimball to:
  - Conduct a cost analysis of NG9-1-1 options to determine the cost of transitioning the current OEM program to an NG9-1-1 system
  - In other words: What can Oregon afford in terms of Next Generation 9-1-1 with the current funding environment?



Why is L.R. Kimball Here?

- Looking into the future:
  - Phase 2 will determine REQUIREMENTS of PSAP call taker workstations for Oregon. Kimball will consult with PSAPs during Phase 2
- The report will take into consideration:
  - Population
  - Geography
  - Technology issues
  - Call volume
  - Report estimated to be complete Nov 2011
  - Stakeholder meetings

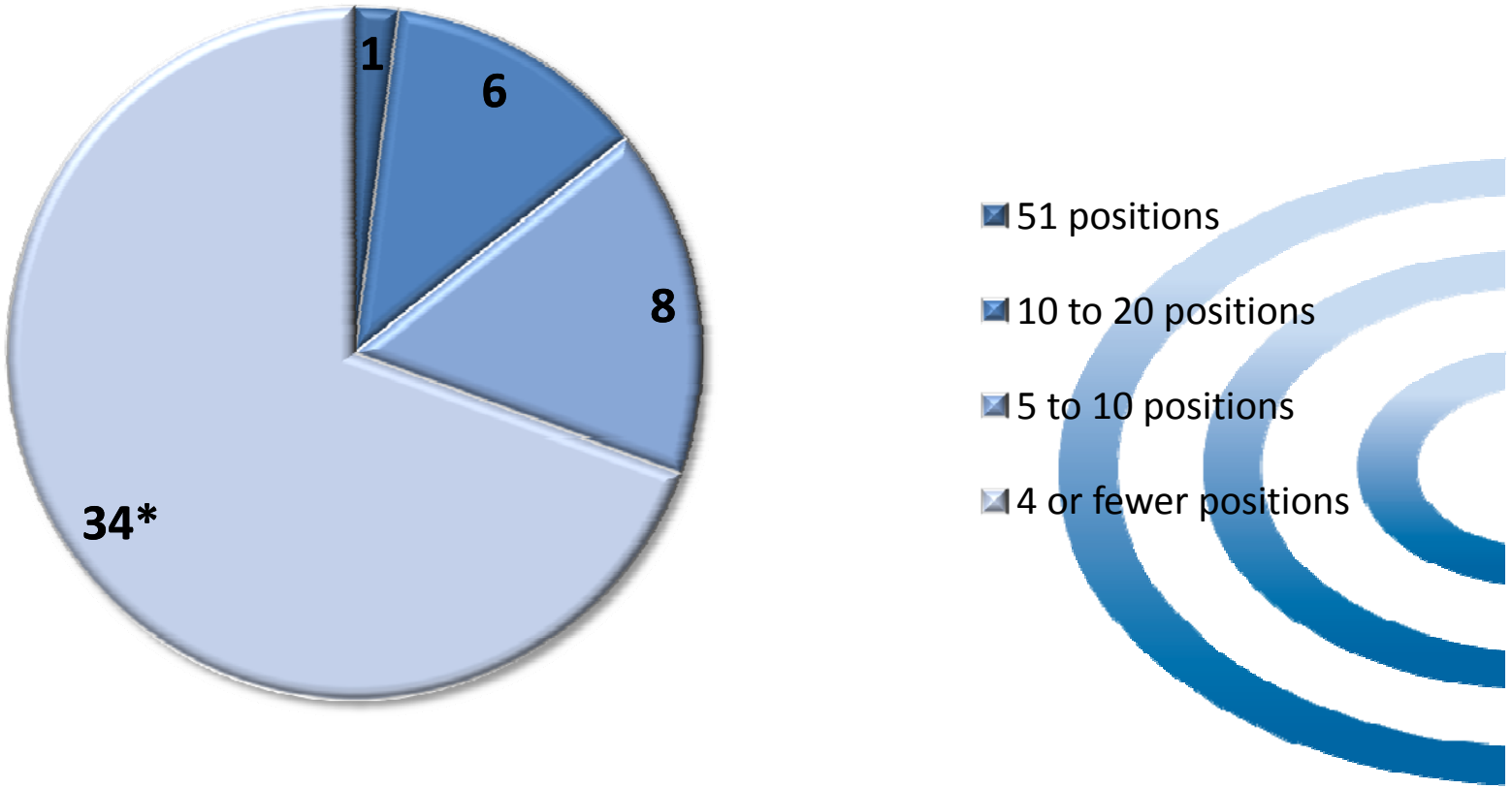
Current Conditions

Overview of the State of Oregon

- System Overview
  - 3.6 million residents
  - 49 PSAPs in 36 counties

Current Conditions - Technology

PSAP Call Taker Workstations



*12 PSAPs have 2 positions

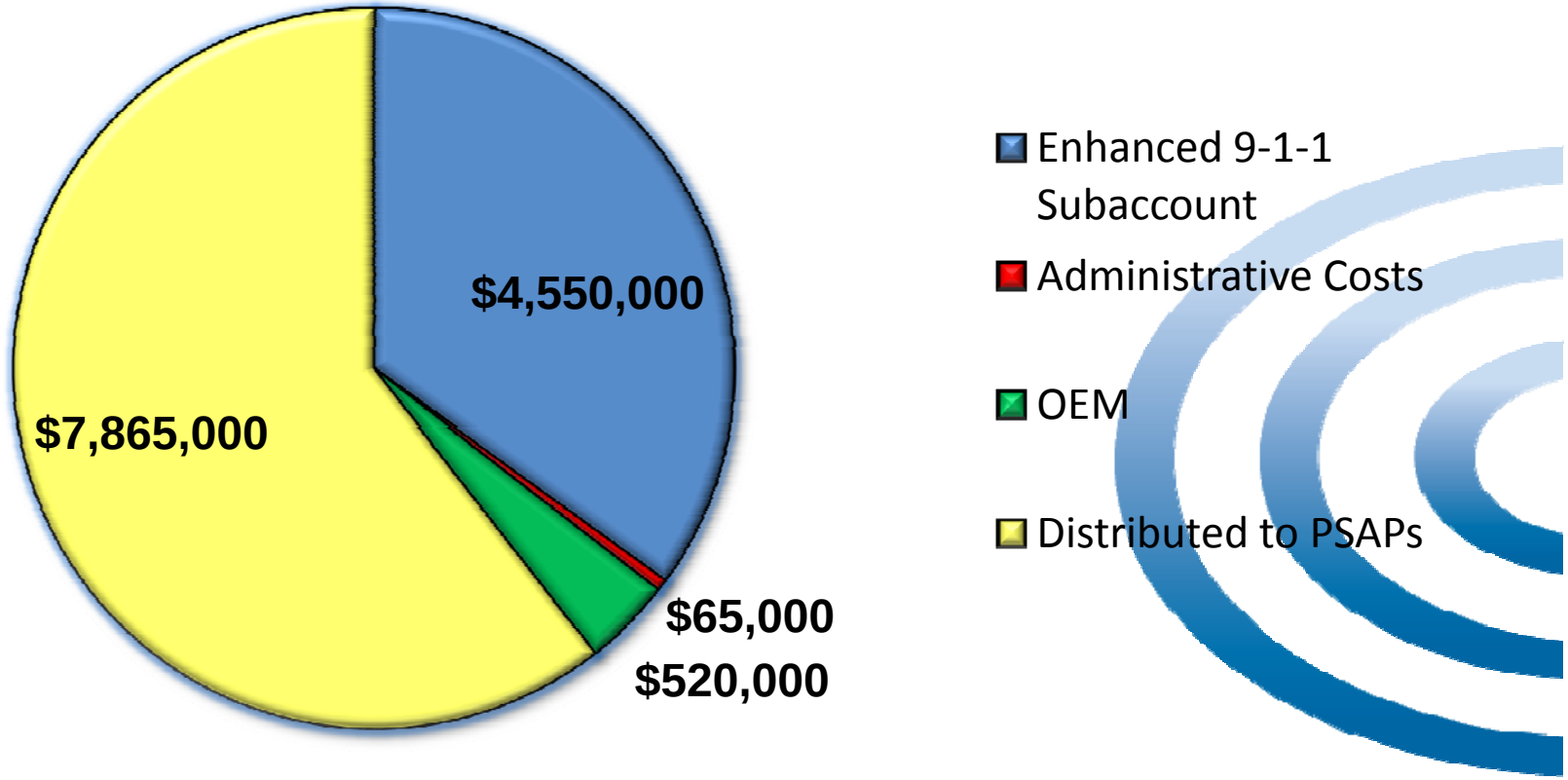
Current Conditions – 2010 Funding

- Emergency Communications Tax
  - State distributes 60.5% of the funds from this tax to the PSAPs
  - 35% into the Enhanced 9-1-1 Subaccount
  - 4% to OEM admin costs
  - Up to .5% DOR admin costs

- Emergency Communications Account
  - Enhanced 9-1-1 Subaccount
  - Eligible Costs
  - Accounting Reports

Oregon Emergency Communications Account

2010 Oregon Emergency Communications Account



Current Conditions - Costs

State 2010 Expenditures From Emergency Comm Account

Expenditure	Cost
Administrative	$190,965.92
CPE	$2,110,737.48
CPE maintenance	$1,123,185.58
GIS/Mapping equipment	$53,319.66
MSAG/GIS maintenance	$803,390.44
Network	$454,588.69
PSAP circuits	$4,893,651.98
PSAP miscellaneous	$6,375.00
UPS and maintenance	$42,560.74
Wireless needs	$2,486,599.75
Total	$12,165,374.94

Current Conditions - Costs

- Available Funds for NG9-1-1 Expenditure
  - The Emergency Communication Tax provides the State of Oregon in the Enhanced 9-1-1 account with available revenue of about $13,857,395 per year
  - Oregon pays expenses totaling about $12,164,374 per year from the Enhanced 9-1-1 subaccount
  - This leaves the State approximately $1.69 million per year available to spend on NG9-1-1 implementation

Evolution to Next Generation 9-1-1

Today's 9-1-1	Next Generation 9-1-1
Virtually all calls are voice callers via telephones over analog lines.	Voice, text, or video information, from many types of communication devices, sent over IP networks
Most information transferred via voice	Advanced data sharing is automatically performed
Callers routed through legacy selective routers, limited forwarding / backup ability	Physical location of PSAP becomes immaterial, callers routed automatically based on geographic location, enhanced backup abilities
Limited ability to handle overflow situations, callers could receive a busy signal	PSAPs able to control call congestion treatment, including dynamically rerouting callers

United States Department of Transportation

NG9-1-1

US DOT: Comparing 9-1-1 to NG9-1-1

NG9-1-1 system infrastructure will enable communications interoperability utilizing voice, data and video

The NG9-1-1 system's purpose is to provide emergency communications and information/intelligence sharing for responding to and managing emergencies of any type and scale

How will NG9-1-1 benefit Oregon?

- The Oregon NG9-1-1 System will allow for improved:
  - Response time
  - Information sharing
  - Functionality
  - Reliability
  - Utilization of financial and human resources
- All in a secure environment

How will NG9-1-1 benefit Oregon?

- Additional benefits in migrating to NG9-1-1 include:
  - Greater opportunities for fiscal and operational efficiencies
  - More accurate location verification via GIS
  - Improved access to persons with disabilities
  - Increased reliability and disaster recovery
  - Policy routing
  - Public expectations met
  - Improved redundancy

Fiscal Advantages to NG9-1-1

- Reduce costs by moving some functionality to the network
  - Mapping
  - Call Routing
- Legacy system costs for OR – $12.1 million per year (three year average)
  - Approximately $1,000,000 will carry forward with the NG9-1-1 network
- NG9-1-1 recurring costs – $7 million per year
- Difference – over $5 million per year
  - Cost are shifted from the PSAP to the core of the network which allows some efficiencies

Legacy Costs to be Considered in NG9-1-1

An estimated $1,000,000 in legacy costs will carry forward after the transition to NG9-1-1 has occurred.

Orange = costs that will continue in an NG9-1-1 environment

2010 EXPENDITURES											
	MSAG/GIS MAINT.	GIS MAPPING EQUIP	NETWORK	PSAP CIRCUITS	CPE EQUIP	CPE MAINT.	Wireless	UPS	PSAP FACILITY	ADMIN	
Q1	$180,812.21	$30,449.88	$149,705.52	$1,127,376.48	$1,129,799.21	$170,620.30	$621,408.64	$3,280.00	$0.00	$4,141.21	***GRAND TOTAL***
Q2,Q3,Q4	$622,578.23	$22,869.78	$304,883.17	$3,766,275.50	$980,938.27	$952,565.28	$1,865,191.11	$39,280.74	$6,375.00	$186,824.41	
TOTAL	**$803,390.44**	**$53,319.66**	**$454,588.69**	**$4,893,651.98**	**$2,110,737.48**	**$1,123,185.58**	**$2,486,599.75**	**$42,560.74**	**$6,375.00**	**$190,965.62**	**$12,165,374.94**

Sub-Total	**$1,096,611.46**

Funding Analysis

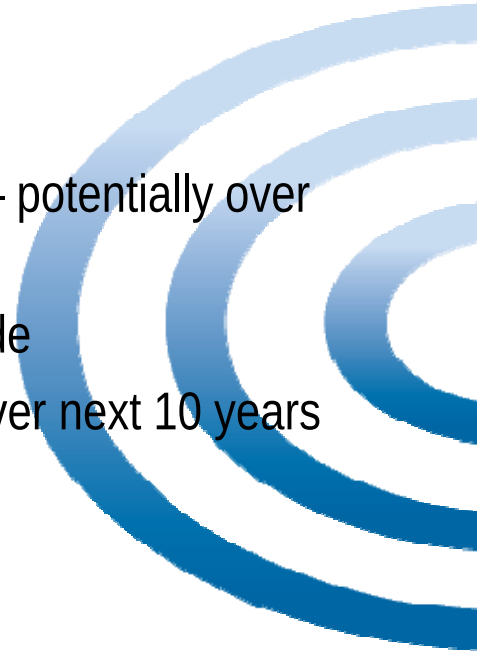
What can Oregon afford with the current funding environment?

Funding Analysis of Legacy System

Year	Total Revenue	Total Expenditures on the Current Network	Available Funding
2012	$13,857,395	$12,165,374	$1,692,021
2013	$13,857,395	$12,165,374	$1,692,021
2014	$13,857,395	$12,165,374	$1,692,021
2015	$13,857,395	$12,165,374	$1,692,021
2016	$13,857,395	$12,165,374	$1,692,021
2017	$13,857,395	$12,165,374	$1,692,021
2018	$13,857,395	$12,165,374	$1,692,021
2019	$13,857,395	$12,165,374	$1,692,021
2020	$13,857,395	$12,165,374	$1,692,021
2021	$13,857,395	$12,165,374	$1,692,021

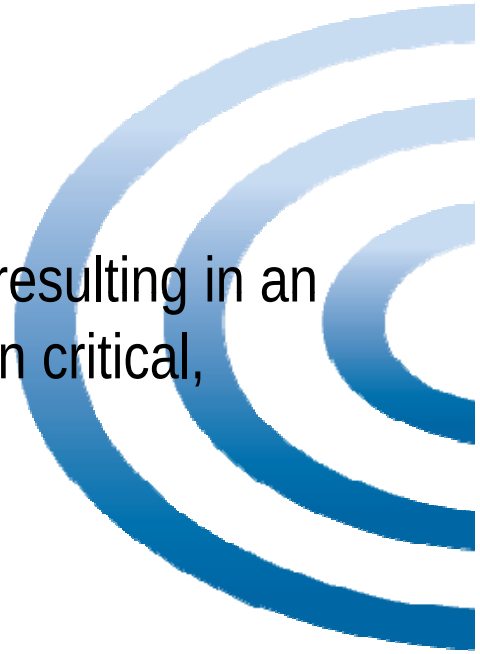
Funding Analysis Conclusion – Considerations for Oregon

- Oregon can choose to continue to maintain the legacy network as it exists today
  - Implications include:
    - Spending money for old technology
    - Passing up the opportunity for cost savings in the future – potentially over $5 million per year in savings
    - Forgoing all of the features a NG9-1-1 network can provide
    - Current legacy equipment maintenance costs will grow over next 10 years



Funding Analysis Conclusion – Considerations for Oregon?

- Options One and Two as described in the NG9-1-1 Cost Analysis Report
  - Transition to NG9-1-1 core network in year two
    - May not have full NG9-1-1 functionality for a few years
  - Transition cost is more money up front
  - Quick transition will save money
  - PSAP workstations will be transitioned to NG9-1-1 resulting in an IP-enabled broadband network that will be a mission critical, secured and private public safety system



Funding Analysis Conclusion

Current revenue conditions in the State of Oregon show that the State must spend money to save money

Cost Analysis

What is the budgetary cost estimate for full implementation of NG9-1-1 in Oregon?

Assumptions used in Cost Estimates

- Costs are based on incurring all non-recurring costs in the first year, and ten years of operation.

- Budgetary estimates for infrastructure were based on replacing the frame relay network that currently exists in Oregon and the need for fiber connections at the larger PSAPs.

- Budgetary pricing of the MPLS (NENA recommended) network was based on analysis of costs in two other states with state contract pricing.

Cost Assumptions

- Budgetary circuit size for a provider MPLS network are based on the number of workstations at each location.
- New equipment, when necessary, will be leased for ten years with zero down and 7 percent interest with no separate maintenance cost.
- Commercial off-the-shelf equipment and retail pricing were used.
- Software maintenance is based on 15 percent of initial purchase prices.

Cost Assumptions

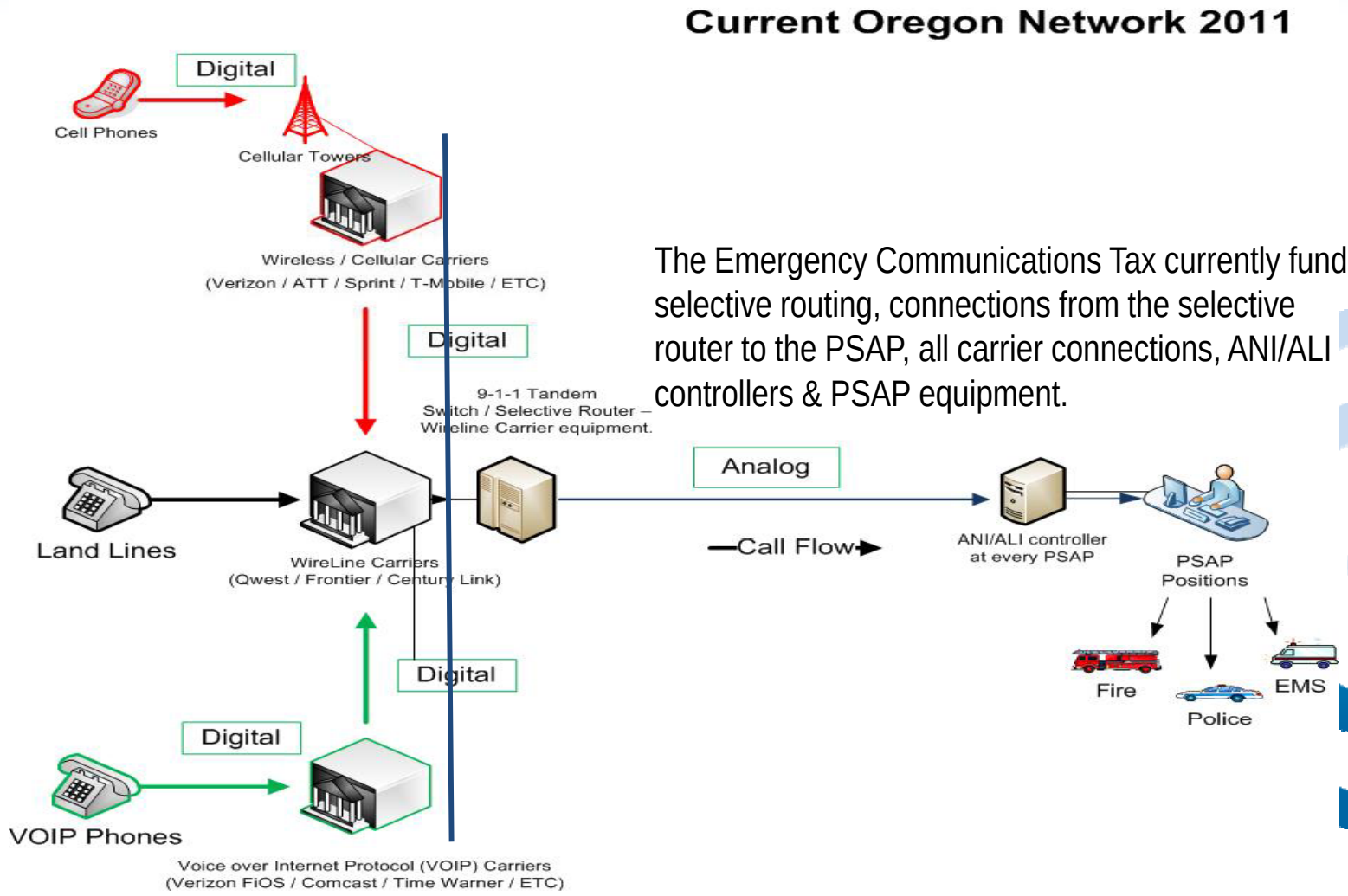
- Staff costs to manage system are not included as it is assumed no FTE at the state or local level will be added.

- In many cases, software is new or still in development; additional features may be needed in the future, which may increase the cost. Texting is an example.

Cost Considerations – Non-Recurring Transition Costs

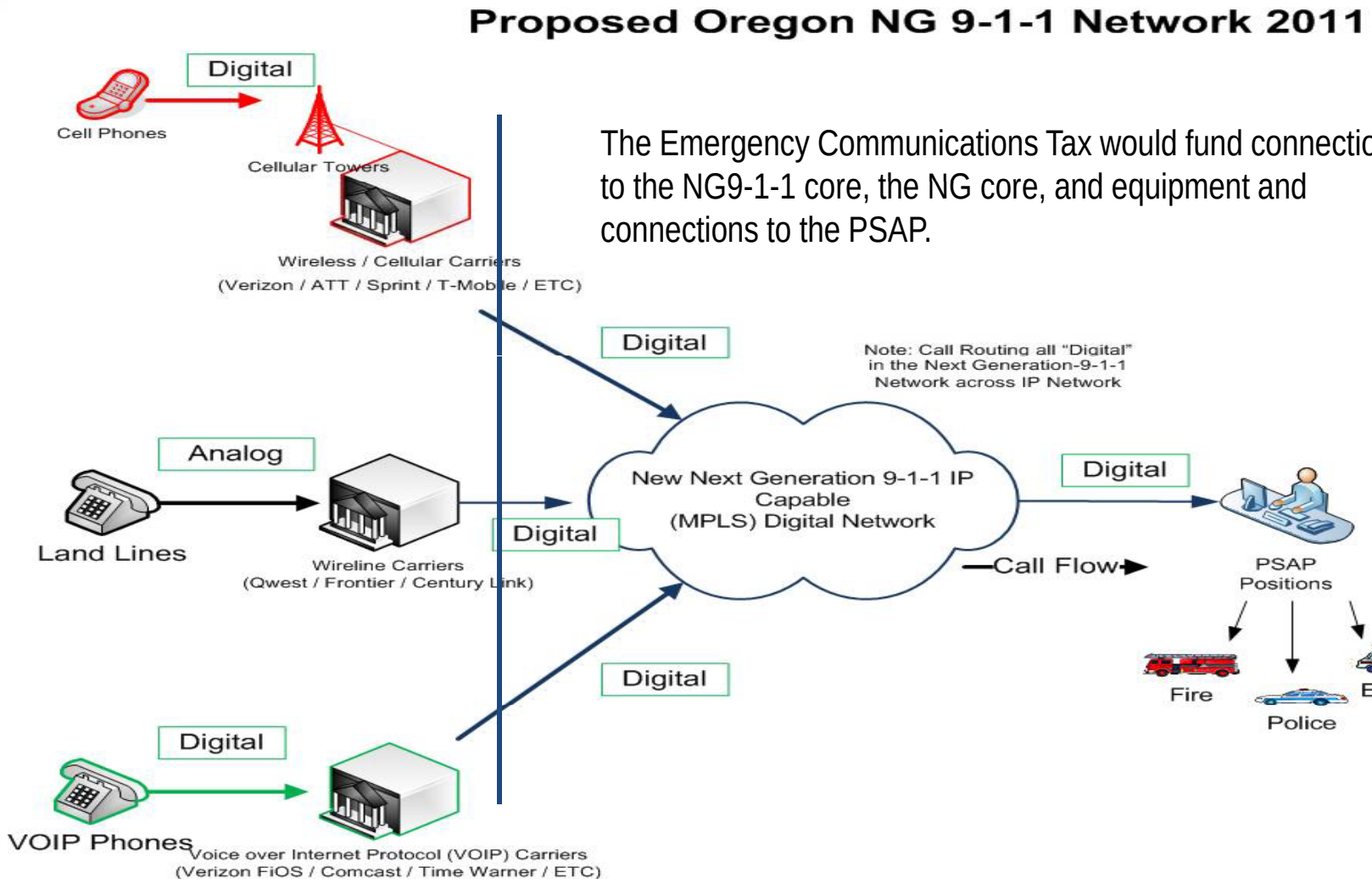
- The costs for items below were NOT factored into the pricing estimate, but must be considered in decision making process:
  - Period where necessary to pay current costs and costs of NG9-1-1
  - Public education and outreach
  - Stakeholder outreach
  - Telecommunicator new system training
  - Administrative costs
  - Security services

Current 9-1-1 Network



The Emergency Communications Tax currently funds selective routing, connections from the selective router to the PSAP, all carrier connections, ANI/ALI controllers & PSAP equipment.

Proposed NG9-1-1 Network



The Emergency Communications Tax would fund connections to the NG9-1-1 core, the NG core, and equipment and connections to the PSAP.

Option 1 Cost Analysis

- Complete overhaul of 9-1-1 system as it currently exists
- Assumes that legacy call taker equipment in all 49 PSAPs (279 positions) will be replaced with new equipment
- Assumes a ten-year lease option for replacing each PSAP workstation hardware and software
- The cost analysis factors in the following:
  - PSAP connections
  - Call processing
  - Call access services

Option One Funding Analysis

Objective – transition to NG9-1-1 network as soon as possible to reduce the amount of legacy costs being paid. A complete overhaul of 9-1-1 system as it currently exists.

Year	Total Revenue	Legacy Costs	Option One	Available Funding	Difference
2012	$13,857,395	$12,165,374	$11,286,208	$1,692,021	-$9,594,187
2013	$13,857,395	$12,165,374	$7,061,208	$1,692,021	-$5,369,187
2014	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187
2015	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187
2016	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187
2017	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187
2018	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187
2019	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187
2020	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187
2021	$13,857,395	$1,000,000	$7,061,208	$12,857,395	$5,796,187

Option One Costs

	2012	2013 - 2021
Call Access Services – Non-recurring	$800,000	-
Call Access Services – Recurring	$434,940	$434,940
Core Connections – Non-recurring	$1,500,000	-
Core Connections – Recurring	$2,349,984	$2,349,984
PSAP Connections – Non-recurring	$1,925,000	-
PSAP Connections - Recurring	$4,276,284	$4,276,284
Non-recurring Costs – Total	$4,255,000	-
Recurring Costs - Total	$7,061,208	$7,061,208
TOTAL	$11,286,208 for 2012	$7,061,208 per year

Call Access Services

Item	Description	Assumptions	Notes	Cost
Border Control Equipment	Equipment Installation, Configuration, and Setup of Firewall	$800,000/One-Time Fee	Non-recurring	$800,000
IP Routing	Redundant Routers / Legacy Gateway (10-year Plan/Lease)	2 @ $200,000 ($400,000)	$4645/month recurring	$55,740
CAMA Gateways	Gateway to CAMA Trunks	25 @ $300	recurring	$90,000
ALI Circuits and Gateways	Connection to 7 ALI Circuits	6 @ $1,000	recurring	$72,000
Commercial Internet Access	DS-3 Internet Connection | Two Data Centers ($ Cost / month)	$7,000	recurring	$84,000
Firewall Capabilities	Firewall Management | Two Data Centers ($ Cost / month)	$1,000	recurring	$12,000
Data Center Hardware	(2) Data Center Border Control Access ($ Cost / month)	$2,100	recurring	$25,200
Border Control Maintenance	System Monthly Maintenance Fee ($ Cost / month)	$8,000	recurring	$96,000
Total				$434,940

Core Connections – ESRP Call Routing

Item	Description	Assumptions	Notes	Cost
Vendor Services	Professional Services/Installation	$1,500,000 (One time fee)	Non-recurring	$1,500,000
Routing Servers	Hardware	$2,200,000 (10-year Plan/Lease)	$25,544/month	$306,528
Routing Servers	Software	$1,100,000 (10-year Plan/Lease)	$12,772/month	$153,264
Vendor Software	Software	$3,300,000 (10-year Plan/Lease)	$38,316/month	$459,792
Call Routing Infrastructure	2 Racks at two locations	2 @ $2,100		$50,400
Network Interconnection	2 DS3 connections to Data Centers	2 @ $5,000		$120,000
Call Routing Vendor Software	Software Licenses ($ Cost / month)	$15,000		$180,000
Call Routing Vendor Software	Maintenance ($ Cost / month)	$55,000		$660,000
Call Routing Hardware	Maintenance ($ Cost / month)	$35,000		$420,000
Total				$2,349,984

Notes on Core Connections Recurring Costs: 10-year Plan/Lease – L.R. Kimball took the Recurring Cost and added 10 % to that final Costing value. Lease assumptions: 10 years, 0 down, 7% Interest, 0 PMI

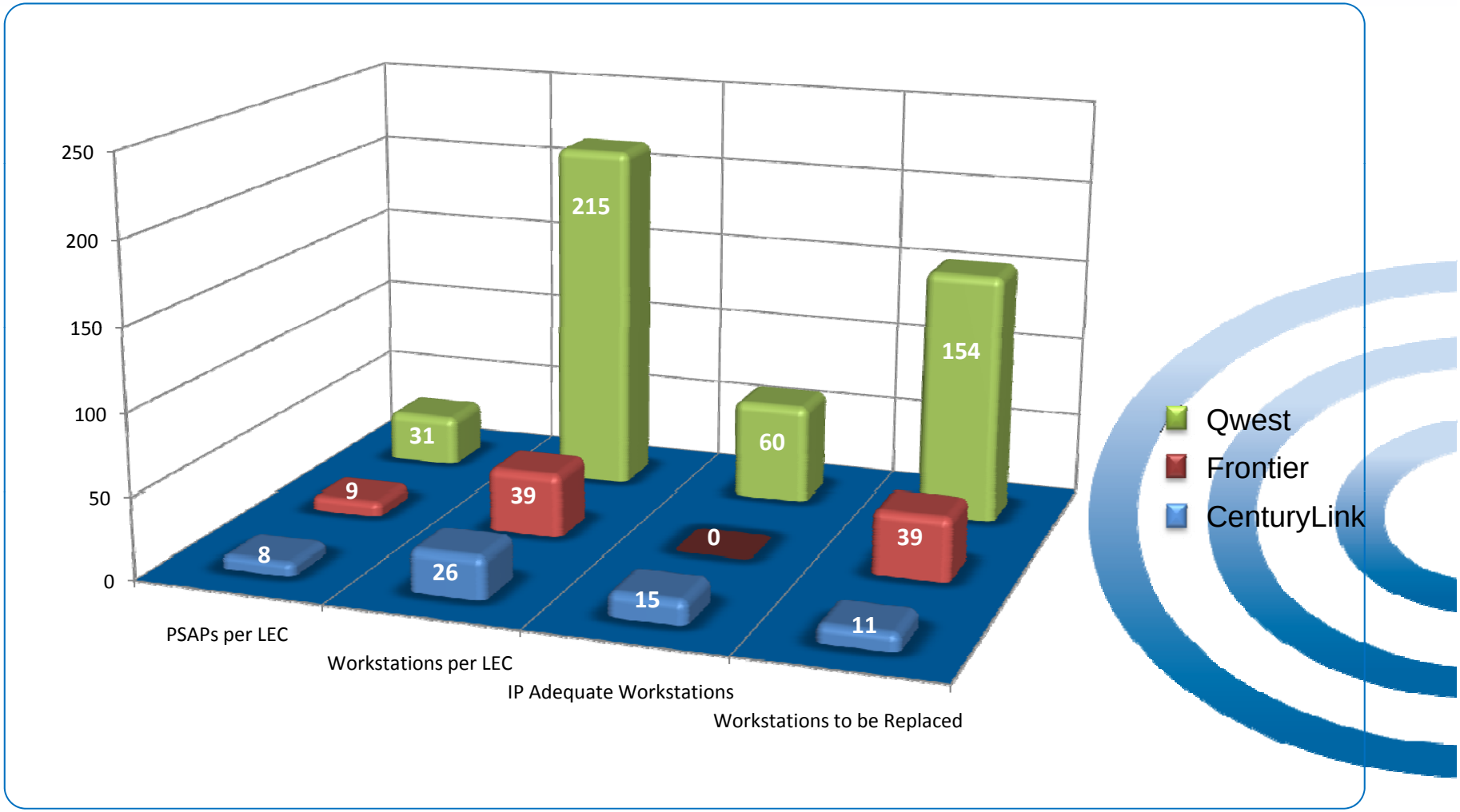
PSAP Connections

Item	Description	Assumptions	Notes	Cost
PSAP Workstations	Installation/Professional Services (One Time Fee)	$1,925,000	10 year plan w/vendor management & leases	$1,925,000
PSAP Workstations	Workstation Hardware (10-year Plan/Lease)	$3,850,000	$44702/month	$536,424
PSAP Workstations	Workstation Software (10-year Plan/Lease)	$2,750,000	$31930/month	$383,160
DS-1 PSAP	Connection to an estimated 49 PSAPs. Each will have Two DS-1 Core Network with One DS-1 to neighbor | Six Sites of DS3 Backup require 4 DS-1 (or 24 DS1s)	150 @ $1,100		$1,980,000
DS-3 PSAP Redundancy	7 Sites DS3 to those PSAPs, 1 Site with DS3 Redundancy	8 @ $5000		$480,000
End Site Router	24 Ports with POE	49 @$ 250		$147,000
End Site Firewall	Managed Firewall for each end site with 48 port switch	49 @ $650		$382,200
Site Maintenance	Maintenance on 49 sites	49 @ $625		$367,500
Totals				$4,276,284

Option 2 – Some Upgradable Equipment

- This option assumes:
  - Some call taker equipment in the PSAPs is upgradeable to NG9-1-1 capabilities and complete equipment replacement is not necessary
  - The same factors that were used to determine pricing for Option 1
  - $4,000 per year for maintenance on existing workstations
  - Approximately $24,000 to replace workstations with a ten-year lease
  - All equipment upgraded between 2008 – 2010 will integrate into the NG9-1-1 system

Current Equipment Status 2010



Equipment Needed by CLEC

204 workstations will require replacement in order to be SIP-capable. The cost for the new equipment is approximately $24,000 per workstation with a ten-year lease.

CLEC	Quantity	Cost
CenturyLink	11	$264,000
Frontier	39	$936,000
Qwest	154	$3,696,000
Totals	**204**	**$4,896,000**

Option Two Funding Analysis

Objective – transition to NG9-1-1 network as soon as possible to reduce the amount of legacy costs being paid. Some call taker equipment in the PSAPs is upgradeable to NG9-1-1 capabilities and complete equipment replacement is not necessary.

Year	Total Revenue	Legacy Costs	Option Two	Available Funding	Difference
2012	$13,857,395	$12,165,374	$10,823,503	$1,692,021	-$9,134,482
2013	$13,857,395	$12,165,374	$7,115,976	$1,692,021	-$5,423,955
2014	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419
2015	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419
2016	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419
2017	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419
2018	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419
2019	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419
2020	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419
2021	$13,857,395	$1,000,000	$7,115,976	$12,857,395	$5,741,419

Note: A little over one-third of workstations are capable of NG9-1-1 and do not need replacement.

Option 2 Costs

	2012	2013 - 2021
Call Access Services – Non-recurring	$800,000	-
Call Access Services – Recurring	$434,940	$434,940
Core Connections – Non-recurring	$1,500,000	-
Core Connections – Recurring	$2,349,984	$2,349,984
PSAP Connections – Non-recurring	$1,407,527	-
PSAP Connections - Recurring	$4,331,052	$4,331,052
Non-recurring Costs – Total	$3,707,527	-
Recurring Costs - Total	$7,115,976	$7,115,976
TOTAL	$10,823,503 for 2012	$7,115,976 per year

Call Access Services

Item	Description	Assumptions	Notes	Cost
Border Control Equipment	Equipment Installation, Configuration, and Setup of Firewall	$800,000/One-Time Fee		$800,000
IP Routing	Redundant Routers / Legacy Gateway (10-year Plan/Lease)	2 @ 200,000 ($400,000)	$4645/month	$55,740
CAMA Gateways	Gateway to CAMA Trunks	25 @ $300		$90,000
ALI Circuits and Gateways	Connection to 7 ALI Circuits	6 @ $1,000		$72,000
Commercial Internet Access	DS-3 Internet Connection | Two Data Centers ($ Cost / month)	$7,000		$84,000
Firewall Capabilities	Firewall Management | Two Data Centers ($ Cost / month)	$1,000		$12,000
Data Center Hardware	(2) Data Center Border Control Access ($ Cost / month)	$2,100		$25,200
Border Control Maintenance	System Monthly Maintenance Fee ($ Cost / month)	$8,000		$96,000
Total				$434,940

Notes on Gateway Services Recurring Costs: 10-year Plan/Lease – L.R. Kimball took the Recurring Cost and added 10 % to that final Costing value. Lease assumptions: 10 years, 0 down, 7% Interest, 0 PMI

Core Connections

Item	Description	Assumptions	Notes	Cost
Call Routing ESRP Functions	Professional Services/Installation	$1,500,000 (One time fee)		$1,500,000
Routing Servers	Hardware	$2,200,000 (10-year Plan/Lease)	$25544/month	$306,528
Routing Servers	Software	$1,100,000 (10-year Plan/Lease)	$12772/month	$153,264
Vendor Software	Software	$3,300,000 (10-year Plan/Lease)	$38316/month	$459,792
Call Routing Infrastructure	2 Racks at two locations	2 @ $2,100		$50,400
Network Interconnection	2 DS3 connections to Data Centers	2 @ $5,000		$120,000
Call Routing Vendor Software	Software Licenses ($ Cost / month)	$15,000		$180,000
Call Routing Vendor Software	Maintenance ($ Cost / month)	$55,000		$660,000
Call Routing Hardware	Maintenance ($ Cost / month)	$35,000		$420,000
Total				$2,349,984

PSAP Connections

Item	Description	Assumptions	Notes	Cost
PSAP Workstations	Installation/Professional Services (One Time Fee)	$1,407,527	204 workstations	$1,407,527
PSAP Workstations	Workstation Hardware (10-year Plan/Lease)	$2,816,000	$32696 / month	$392,352
PSAP Workstations	Workstation Software (10-year Plan/Lease)	$2,024,000	$23500 / month	$282,000
PSAP Workstations	Maintenance Fees for workstation not replaced	75 @ $4000		$300,000
DS-1 PSAP	Connection to an estimated 49 PSAPs. Each will have Two DS-1 Core Network with One DS-1 to neighbor | Six Sites of DS3 Backup require 4 DS-1 (or 24 DS1s)	150 @ $1100		$1,980,000
DS-3 PSAP Redundancy	7 Sites DS3 to those PSAPs, 1 Site with DS3 Redundancy	8 @ $5000		$480,000
End Site Router	24 Ports with POE	49 @ $250		$147,000
End Site Firewall	Managed Firewall for each end site with 48 port switch	49 @ $650		$382,200
Site Maintenance	Maintenance on 49 sites	49 @ $625		$367,500
Total				$4,331,052

Funding Analysis Conclusion – The Reality

1. There is a potential cost savings in the quicker migration to NG9-1-1

2. System costs will increase during the transition phase

3. Once the transition period is complete, the State will recognize approximately $5 million per year in savings in an NG9-1-1 environment

Funding Analysis Conclusion

- Phase 1 of this report indicates that the State cannot afford to transition all 49 PSAPs (279 workstations) to NG9-1-1 based upon current levels of revenue and expenditures of the legacy system
- Both *Option One* and *Option Two* describe an environment where more funds will have to be expended initially to save money in the future
- The options describe a short transition period to minimize the amount of money being spent to support both networks
- There are ways in which Oregon could complete the transition to NG9-1-1 over a longer period of time, but these options would need to be examined in further detail in Phase Two

Thank you!

Questions?