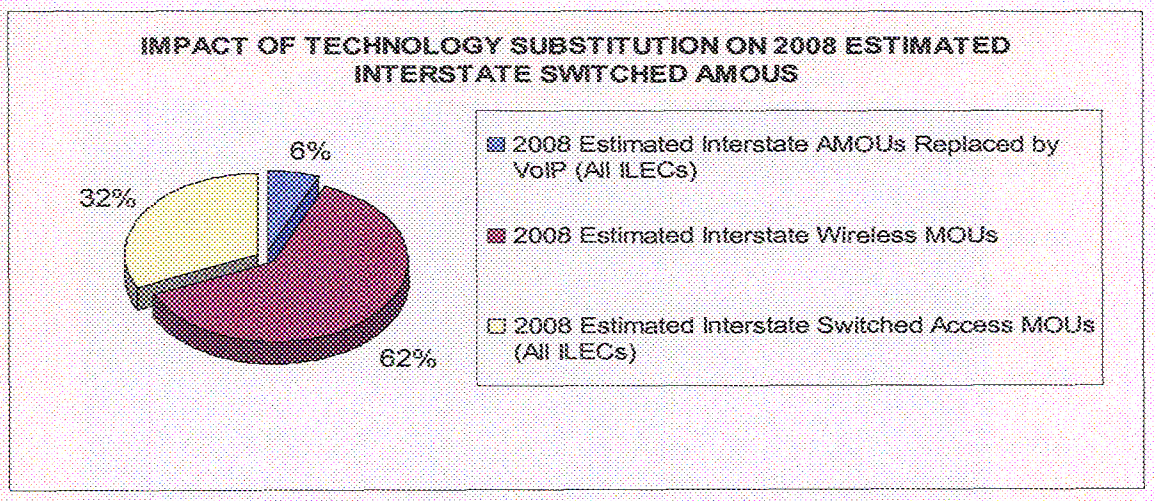
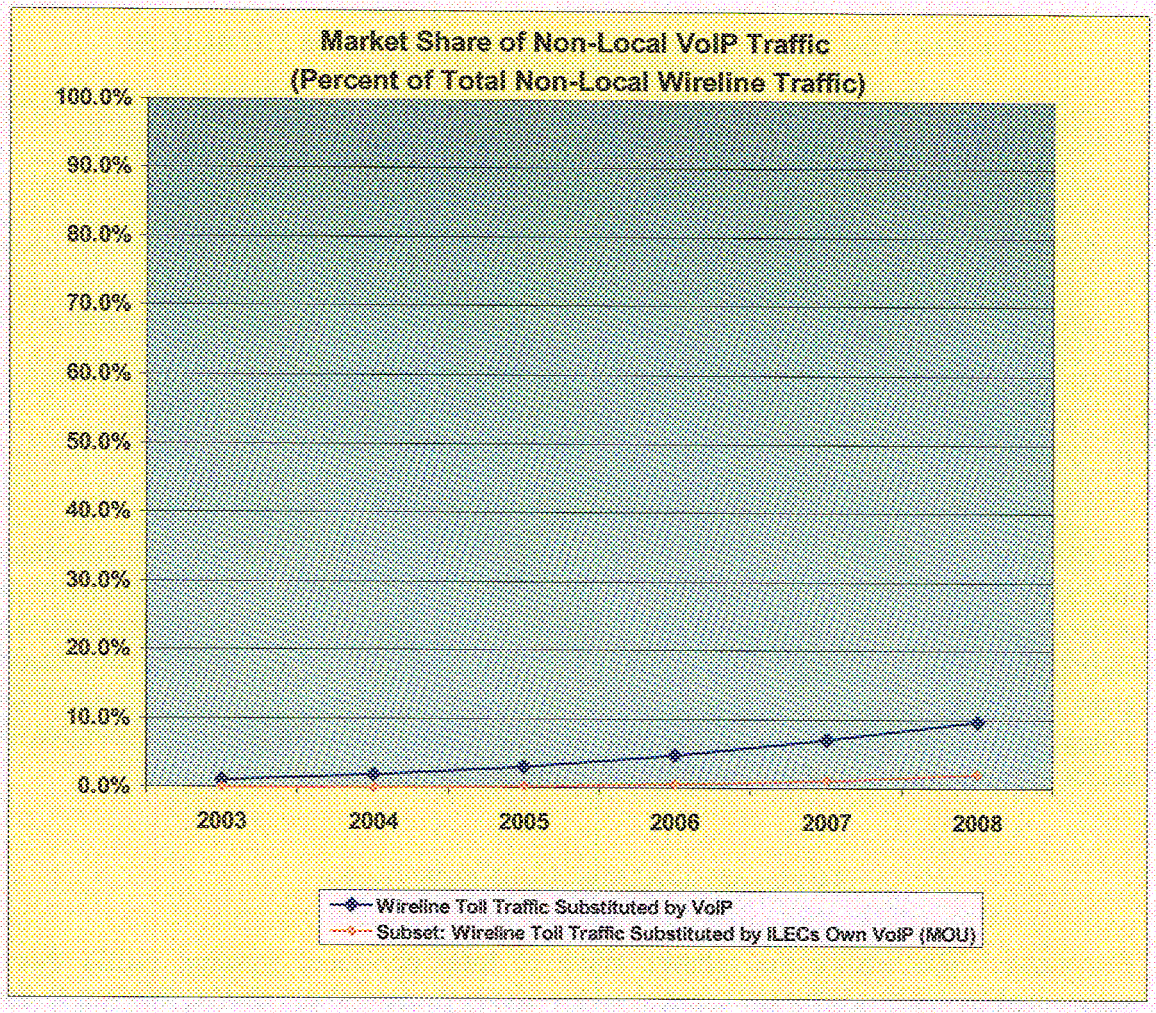



As the chart above shows, by 2008, wireless minutes are projected to overtake wireline as the primary non-local service platform, constituting 62% of the non-local minutes-of-use market (growing from 36% in 2003). PSTN traditional toll minutes are projected to shrink from 63% to 32% of total minutes between 2003 and 2008. VoIP is projected to grow by 5 percentage points (from 1% to 6% of total minutes) between 2003 and 2008. Thus, while VoIP will grow as a percentage of the total market for non-local minutes, the effect of wireless substitution on traditional toll minutes will be much greater.

*Market Share of Non-Local VoIP Traffic*

The chart below shows the relative share of total non-local wireline traffic that is substituted by VoIP traffic (in contrast to the above presented pie charts, this graph does not include wireless minutes in the total pool of toll minutes, thus resulting in higher relative shares of VoIP in non-local traffic). As shown, VoIP market share will gradually increase over the study period, rising from 3% in 2005 to 9.6% in 2008. While the *VoIP Impact Model* has not attempted to separate the impact on the ILECs' intercarrier non-local revenues stemming from the ILECs' own VoIP end users, this graph is making this very distinction. Numerically, we made a very conservative assumption that ILECs will serve 5% of the *DSL-based* VoIP access lines in 2005, growing to 20% in 2008 and calculated the ILECs' share of total non-local VoIP traffic as depicted on the graph.


Market Share of Non-Local VoIP Traffic
(Percent of Total Non-Local Wireline Traffic)
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
2003
2004
2005
2006
2007
2008
Wireline Toll Traffic Substituted by VoIP
Subset: Wireline Toll Traffic Substituted by ILECs Own VoIP (MOU)

Attachment 1
VoIP Impact Model

# QSI Technical Documentation

Document Number: 012605A

# Attachment 1

## *VoIP Impact Model*

Printed Version

Executable Version Available by Request

(see contact information below)

QSI consulting, inc.


Contact Information

2977 Highway K
Box #304
O'Fallon, MO 63366-7862
www.qsiconsulting.com
636.272.4127

QSI consulting, inc.

# TABLE OF CONTENTS

ANALYSIS OF IMPACT OF APPLYING INTERSTATE ACCESS TO NON-LOCAL IP-PSTN IP-ENABLED SERVICES ON LARGE ILEC INTERCARRIER NON-LOCAL TRAFFIC COMPENSATION

PRINT BUTTONS

## Print Entire Workbook

USER-ADJUSTABLE INPUTS TAB IS IN THIS COLOR


| | |
|---|---|
| User Adjustable Inputs | USER-ADJUSTABLE INPUTS |


TAB WITH PRESENTATION CHARTS IS IN THIS COLOR


| | |
|---|---|
| High Level Impact Chart for Presentation Slides | High-Level Impact Chart |


RESULTS / IMPACT HAVE TABS IN THIS COLOR


| | |
|---|---|
| VoIP under Access vs. Reciprocal Compensation Regimes: Impact on ILEC Non-Local Revenue | Results - Impact of Appl. Access |
| VoIP under Access vs. Reciprocal Compensation Regimes: Wireless Impact Considered | Results - VoIP vs Wireless |
| Traditional Toll Traffic Substituted by VoIP | VoIP Traffic as % of Non-Local |
| Impact of Level 3 Petition on Various Call Types | $ IMPACT CALCULATION |
| Breakdown of 2003 and 2008 Interstate MOUs between Access, Wireless and VoIP | Composition of MOUs |


OTHER ASSUMPTIONS AND INTERMEDIATE CALCULATIONS HAVE TABS IN THIS COLOR


| | |
|---|---|
| Estimation of Cellular Phone Usage Impact on 2003 & 2008 Interstate Switched Access Minutes | Wireless Forecast |
| VoIP Line Forecasts (External and Internal) | Forecast of VoIP Lines |
| Calculation of Access MOUs Replaced by VoIP | Calc VoIP Replacement Minutes |
| LEC Access MOU Data | LEC Access MOUs |
| RBOCS and Other Non-Rural Tier 1 and Tier 2 ILEC Interstate AMOU and USF Loops | RBOCs & Non-Rural Tier 1+Tier 2 |
| Calculation of Baseline Access Revenue for Non-Rural ILECs | Baseline Access Revenue 97-03 |
| Calculation of VoIP lines replacing switched access lines of non-rural ILECs, by cable and DSL | Data VoIP Projections |
| Derivation of Trends in Total Switched Access Revenues | Total Sw Access Forecast |


SUPPORTING CALCULATIONS, RAW DATA AND ANCILLARY CALCULATIONS HAVE TABS IN THIS COLOR (not used directly by the model)


| | |
|---|---|
| Graphs of RBOC Net Revenue Gain from DSL vs. Access Revenue Loss | RBOC DSL Graphs |
| Compilation of RBOC DSL & Access Line Statistics and Corresponding Net Revenue Change | RBOC DSL Analysis |
| Calculation of Switched Access Revenue Per Line from ARMIS Data | Access Revenue Per Line |
| RBOC Switched Access Lines From ARMIS 43-08 (1997 - 2003) | RBOC Access Lines - 43-08 |
| RBOC Access Revenue From ARMIS 43-04 (1997 - 2003) | RBOC Access Revenue 43-04 |
| Analysis of Interstate AMOU Stimulation as Toll Prices Decline (1985 - 2002) | Price Stimulation of AMOU |
| POTS vs. VoIP Price Comparison | POTS vs VoIP Price Comparison |

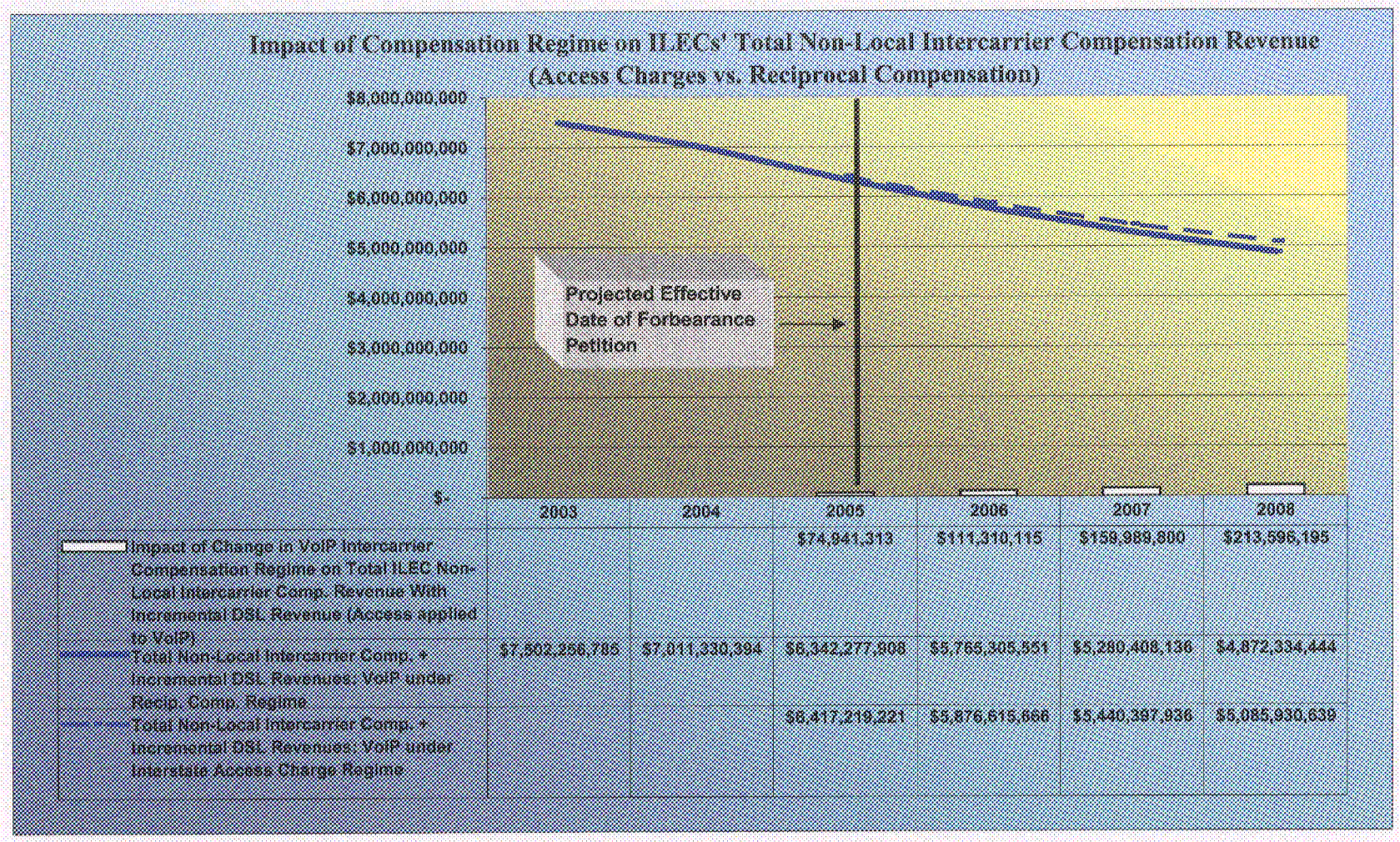
QSI consulting, inc.

**USER-ADJUSTABLE INPUTS (IN YELLOW): Use Hyperlinks To Go To Worksheet Where Input is Used**

| # | Purpose of Adjustment Factor | 2003 Value | 2004 Value | 2005 Value | 2006 Value | 2007 Value | 2008 Value | Comment | Application of Values | Discussed in Detail in Referenced Section of Model Description and See Its Narrative for Discussion |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | % of VoIP lines attributable to customers who have already replaced wireline service with wireless service (or "cut the cord") | 5% | 5% | 5% | 5% | 5% | 5% | Removes from VoIP line forecast those lines that are added by "wireless only" customers, which would not reduce the switched access revenues of ILECs. | | III.A, IV.A |
| 2 | % of VoIP lines attributable to business customers already having substituted special access for switched access lines | 39% | 37% | 35% | 33% | 31% | 30% | Removes from VoIP line forecast Special lines lost to VoIP, as this substitution effect would not have an impact on the terminating switched access revenues of the ILECs. Values for 2004 and 2008 were calculated as a mid point between zero and industry estimates for the percent of enterprise customers in total VoIP lines. Values for 2003 and 2005-2007 are estimated to achieve a downward sloping pattern that reflects industry forecasts predicting that the percent of non-enterprise VoIP customers will grow over the period. | | III.A, IV.A |
| 3 | % Switched Access Lines that are CLEC Lines (not ILECs) | actual: 13.9% | 14.9% | 14.9% | 14.9% | 14.9% | 14.9% | Removes from switched access line counts those lines served by CLECs UNE and self-provisioned lines, since substituting CLEC switched access lines would not affect ILEC switched access revenue. The percentages for 2005 - 2008 were kept at the 2004 actual percentage. | | III.A, IV.A |
| 4 | Suppression of VoIP Line Growth if VoIP traffic is priced at access rates (factor) | | | 0.80 | 0.80 | 0.80 | 0.80 | Adjusts VoIP line forecasts for the scenario where VoIP traffic is charged interstate access rates. Assumptions: (1) current forecasts are based on the current practice of charging reciprocal compensation; (2) transition to access regime will happen in 2005. | Value of 0.8 means that "output" line counts are reduced to 80% of "input" line counts. | IV.C |
| 5 | Factor by which VoIP customers exceed average originating toll patterns | 2 | | | | | | Applies to forecast volumes of customer who switch to VoIP to recognize that VoIP customers are high-usage customers and will originate more traffic than the average toll customer. | Value of "2" means that people who switch to VoIP make toll calls 2 times more than an average ILEC end user (i.e., 200% of average) | III.A, IV.B |
| 6 | Factor by which VoIP customers exceed average terminating toll patterns | 1.5 | | | | | | Applies to forecast volumes of customer who switch to VoIP to recognize that VoIP customers are high-usage customers. Since VoIP customer does not have special price incentives to terminate traffic, the terminating factor has been set at a lower level than the originating factor. | Value of "1.5" means that people who switch to VoIP receive toll calls 1.5 times more than an average ILEC end-user (i.e., 150% of average). | III.A, IV.B |
| 7 | Stimulation of VoIP Originating Traffic due to lower prices when VoIP is under RECIPROCAL COMPENSATION regime (factor) | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | For Call Types B1 and B2. Applies to volumes originating on VoIP only. Recognizes that VoIP customers will make more calls due to lower-priced, often flat-rated long distance service offerings provided by VoIP. Also considers lower VoIP provisioning costs than PSTN long distance. | Value of "1.1" means that people -- after switching to VoIP -- make 1.1 times more calls than they did before the switch. | III.B, IV.C |
| 8 | Stimulation of VoIP Originating Traffic due to lower prices when VoIP is under INTERSTATE ACCESS regime (factor) only rather than both interstate and intrastate access rates | | | 1.05 | 1.05 | 1.05 | 1.05 | For Call Types B1 and B2. Applies to volumes originating on VoIP only. Recognizes that VoIP customers will make more calls due to lower-priced long distance service offerings provided by VoIP. Assumes that if interstate access rates only apply to VoIP calls, end-user prices will be: (a) lower than end-user prices of PSTN long distance and (b) higher than under scenario where reciprocal compensation rather than access applies to VoIP traffic. Also considers lower VoIP provisioning costs than PSTN long distance. | Value of "1.05" means that people -- after switching to VoIP -- make 1.05 times more calls than they did before the switch. | III.B, IV.C |
| 9 | Incomplete "migration of calls to VoIP": VoIP customers who retain ILEC line continue to receive incoming calls on the ILEC line (factor) | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | Recognizes that a portion of VoIP customers such as multi-line small business or residence customers will retain the ILEC line when adopting VoIP (e.g., consumer may have concerns related to, for example, service quality and access to emergency services) and will continue to receive incoming calls on the ILEC line, while using the VoIP line to make outgoing calls. | Value of "0.8" means that VoIP customers migrate 80% of their incoming calls to the VoIP line (and continue receiving 20% of calls on the ILEC line) | III.A, IV.A |
| 10 | Difference in VoIP Adoption between RBOC/non-rural other ILECs and Non-RBOC Rural Territories (factor) | 1 | 1 | 1 | 1 | 1 | 1 | This factor is used to refine aggregation of non-rural VoIP lines covered by Level 3's Petition from rural VoIP lines not covered by Level 3's Petition. A factor less than one assumes that rural territories are slower relative to non-rural territories in adopting VoIP, meaning that more VoIP replacement minutes should be attributed to non-rural ILECs. A factor equal to one assumes no refinement: rural territories adopt VoIP proportional to their access line counts. | A factor less than one assumes that rural territories are slower relative to non-rural territories in adopting VoIP, meaning that more VoIP lines should be attributed to non-rural ILECs compared to POTS lines. A factor equal to one assumes no refinement: rural territories adopt VoIP proportional to their access line counts. | III.A, IV.B |
| 11 | Probability that Locally Dialed Call to VoIP is Terminated Non-locally | 20% | 20% | 20% | 20% | 20% | 20% | For Call Types A1 and A2. Reduces volumes from POTS to VoIP to those covered by the Petition (i.e., locally dialed). See, Level 3 Petition at 6. | | III.B, IV.C |
| 12 | % DSL-based VoIP Lines Where DSL is Ordered Because of VoIP Availability | 15% | 15% | 15% | 15% | 15% | 15% | Applies to total DSL-based VoIP lines and is used to quantify the incremental positive impact on ILEC DSL revenues resulting from VoIP availability. Recognizes that the availability of VoIP service (and the savings available via VoIP) will encourage customers to upgrade their PSTN or wireless line, substitute dial-up internet access or cable service for DSL service. It is assumed that broadband internet access is a prerequisite to VoIP. | | III.E, IV.E |
| 13 | Assumed Monthly DSL End-User Revenue (per DSL customer) | $ 30.00 | $ 30.00 | $ 30.00 | $ 30.00 | $ 30.00 | $ 30.00 | Assumed monthly recurring rate to the end-user for DSL service. | | III.E, IV.E |

## USER-ADJUSTABLE INPUTS (IN YELLOW): Use Hyperlinks To Go To Worksheet Where Input Is Used

| # | Purpose of Adjustment Factor | 2003 Value | 2004 Value | 2005 Value | 2006 Value | 2007 Value | 2008 Value | Comment | Application of Values | Discussed in Detail in Referenced Section of Model Description File. See tab Narrative for Document |
|---|---|---|---|---|---|---|---|---|---|---|
| 14 | BLENDED ACCESS RATE CALCULATION | | | | | | | Access rates and % interstate factor can by changed by the user to facilitate sensitivity analyses. Interstate and Intrastate access rates taken from the Ex Parte Brief of the Intercarrier Compensation Forum (CC Docket No. 01-92), October 15, 2004, Appendix C, Page 2. A "blended" interstate/intrastate rate has been calculated because existing PSTN toll traffic is exchanged at interstate and intrastate rates depending on the jurisdiction of the toll call (see, tab 5 Impact Calculation, Call Types A1, A2, B1, B2 toll scenarios). | | |
| | Large ILEC Average Interstate Access Rate (per minute of use) | $ 0.0060 | | | | | | | | III.C |
| | Large ILEC Average Intrastate Access Rate (per minute of use) | $ 0.0250 | | | | | | | | III.C |
| | % of Access MOUs that are Interstate (source: Dial Equipment Minutes reported by NECA in 2000, see, tab LEC ACCESS MOUS) | 57.18% | 57.18% | 57.18% | 57.18% | 57.18% | 57.18% | | | III.C |
| | Assumed Annual Change in Interstate Access Rate | <actual> | 0% | 0% | 0% | 0% | 0% | Recognizes the ongoing effort by state and federal regulatory agencies to remove implicit subsidies from intrastate and interstate access rates. | | III.C, IV.C |
| | Assumed Annual Change in Intrastate Access Rate | <actual> | 0% | -5% | -5% | -5% | -5% | | | III.C, IV.D |
| | Forecasted Large ILEC Interstate Rate - CALCULATED | $ 0.0060 | $ 0.0060 | $ 0.0060 | $ 0.0060 | $ 0.0060 | $ 0.0060 | | | |
| | Forecasted Large ILEC Intrastate Rate - Affects Access Baseline Only - CALCULATED | $ 0.0250 | $ 0.0250 | $ 0.0238 | $ 0.0226 | $ 0.0214 | $ 0.0204 | | | |
| | Forecasted Blended Large ILEC Average Access Rate - Affects Access Baseline Only - CALCULATED | $ 0.0141 | $ 0.0141 | $ 0.0136 | $ 0.0131 | $ 0.0126 | $ 0.0121 | | | |
| 15 | Reciprocal Compensation rate | $ 0.0007 | $ 0.0007 | $ 0.0007 | $ 0.0007 | $ 0.0007 | $ 0.0007 | Default value assumes that the ILEC elects the ISP Remand Order rate for ISP-bound traffic, and that VoIP traffic is then exchanged at that rate. | | |
| 16 | % DSL lines that are ILEC DSL (not CLEC or IXC) | <actual: 93%> | 93% | 93% | 93% | 93% | 93% | Removes from the total DSL line counts those DSL lines attributable to non-ILEC providers (CLEC and IXC). | | IV.E |
| 17 | % VoIP Lines that are ILEC VoIP (out of all DSL-based lines) | 0% | 0% | 5% | 10% | 15% | 20% | Used in a secondary Graph to demonstrate that some of the "lost access" traffic is caused by ILECs VoIP. | | IV.E |




| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Impact of Change in VoIP Intercarrier Compensation Regime on Total ILEC Non-Local Intercarrier Comp. Revenue With Incremental DSL Revenue (Access applied to VoIP) | | | $74,941,313 | $111,310,115 | $159,989,800 | $213,596,195 |
| Total Non-Local Intercarrier Comp. + Incremental DSL Revenues: VoIP under Recip. Comp. Regime | $7,502,256,785 | $7,011,330,394 | $6,342,277,808 | $5,765,305,551 | $5,280,408,136 | $4,872,334,444 |
| Total Non-Local Intercarrier Comp. + Incremental DSL Revenues: VoIP under Interstate Access Charge Regime | | | $6,417,219,221 | $5,876,615,666 | $5,440,397,936 | $5,085,930,639 |

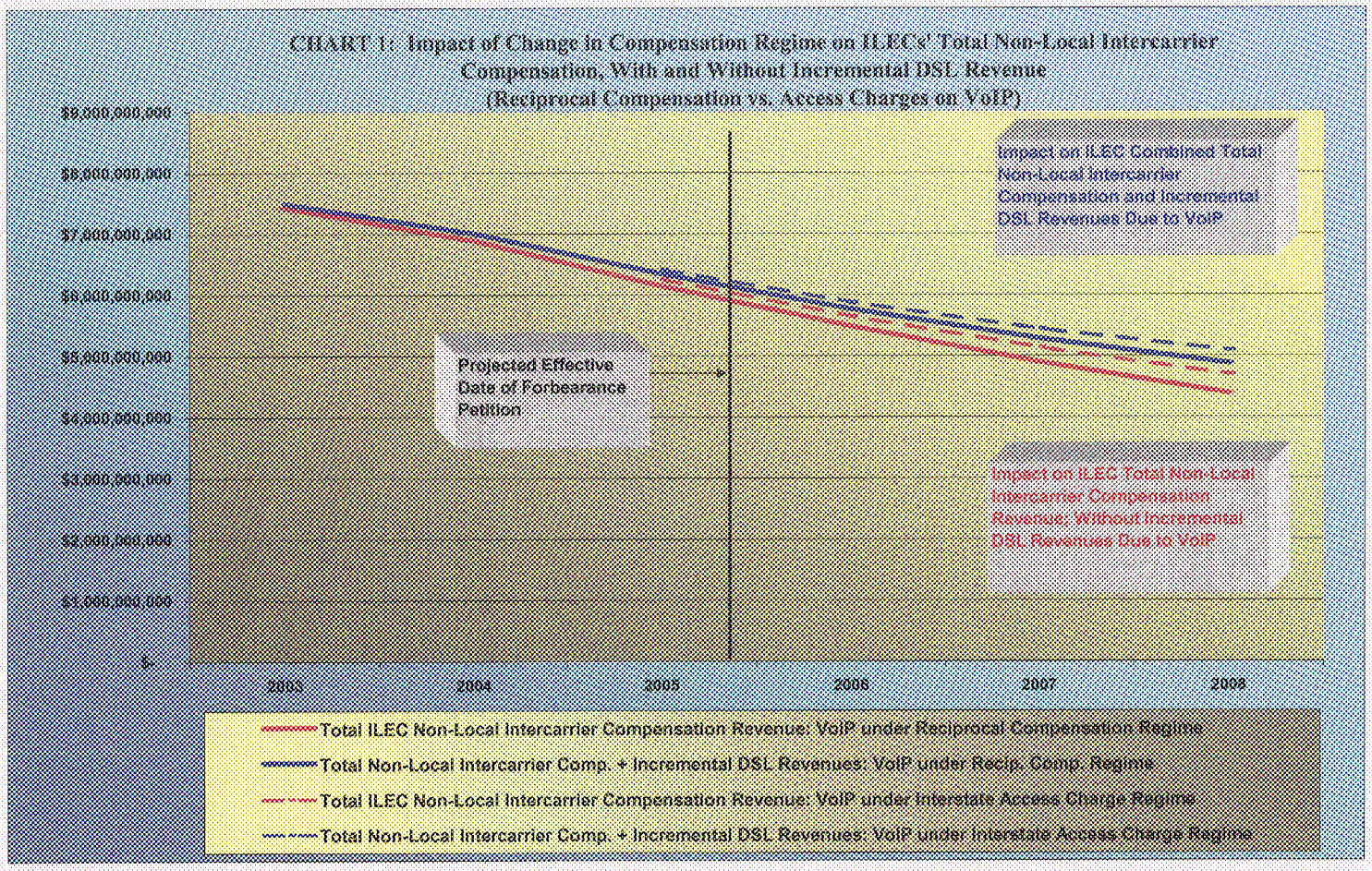


CHART 1: Impact of Change in Compensation Regime on ILECs' Total Non-Local Intercarrier Compensation, With and Without Incremental DSL Revenue
(Reciprocal Compensation vs. Access Charges on VoIP)
$9,000,000,000
$8,000,000,000
$7,000,000,000
$6,000,000,000
$5,000,000,000
$4,000,000,000
$3,000,000,000
$2,000,000,000
$1,000,000,000
$-
2003
2004
2005
2006
2007
2008
Impact on ILEC Combined Total Non-Local Intercarrier Compensation and Incremental DSL Revenues Due to VoIP
Projected Effective Date of Forbearance Petition
Impact on ILEC Total Non-Local Intercarrier Compensation Revenue, Without Incremental DSL Revenues Due to VoIP
Total ILEC Non-Local Intercarrier Compensation Revenue: VoIP under Reciprocal Compensation Regime
Total Non-Local Intercarrier Comp. + Incremental DSL Revenues: VoIP under Recip. Comp. Regime
Total ILEC Non-Local Intercarrier Compensation Revenue: VoIP under Interstate Access Charge Regime
Total Non-Local Intercarrier Comp. + Incremental DSL Revenues: VoIP under Interstate Access Charge Regime

QSI consulting, inc.

**EFFECT OF CHANGES IN INTERCARRIER COMPENSATION REGIME FOR VOIP ON LARGE ILECS' INTERCARRIER VOIP-RELATED NON-LOCAL COMPENSATION REVENUE WITH AND WITHOUT INCREMENTAL DSL REVENUE DUE TO VOIP AVAILABILITY**

| LINE | DESCRIPTION | | REVENUE IMPACT BY YEAR | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| 1 (for reference) | Hypothetical Access Revenues on VoIP Replacement Minutes (Assuming VoIP does not exist) Blended Access Rates | | $ 125,843,578 | $ 208,294,318 | $ 323,320,606 | $ 456,278,236 | $ 620,252,107 | $ 788,675,707 |
| 2 | Intercarrier Compensation on VoIP Minutes: Reciprocal Compensation Regime | 1 | $ 3,082,392 | $ 5,376,461 | $ 8,472,312 | $ 12,377,675 | $ 17,513,043 | $ 23,311,268 |
| 3 | Intercarrier Compensation on VoIP Minutes: Interstate Access Charge Regime | | | | $ 122,529,148 | $ 179,631,245 | $ 253,541,656 | $ 334,989,035 |
| 4 | Incremental DSL Revenues due to VoIP: VoIP under Reciprocal Compensation Regime | | $ 63,639,047 | $ 118,489,000 | $ 195,577,600 | $ 279,717,275 | $ 380,164,052 | $ 490,807,858 |
| 5 | Incremental DSL Revenues due to VoIP: VoIP under Interstate Access Charge Regime | | | | $ 156,462,080 | $ 223,773,820 | $ 304,131,250 | $ 392,726,286 |
| 6 = 2 + 4 | VOIP-Related ILEC Intercarrier Comp. and Incremental DSL Revenues: Reciprocal Compensation Regime | | $ 66,721,349 | $ 123,865,461 | $ 204,049,912 | $ 292,094,950 | $ 397,683,196 | $ 514,119,126 |
| 7 = 3 + 5 | VOIP-Related Intercarrier Comp. and Incremental DSL Revenues: Interstate Access Charge Regime | | | | $ 278,991,228 | $ 403,405,065 | $ 557,672,906 | $ 727,715,321 |

Note (1): Today VoIP is compensated at reciprocal compensation rates.

**IMPACT OF CHANGES IN INTERCARRIER COMPENSATION REGIME FOR VOIP ON LARGE ILECS' INTERCARRIER NON-LOCAL COMPENSATION REVENUES, WITH AND WITHOUT CHANGES IN INCREMENTAL DSL REVENUES DUE TO VOIP AVAILABILITY**

| | | Actual - Baseline | Projected Access Revenues (2004 - 2008) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | |
| 8 = calculation | Forecasted Access Revenue Decline (Based on User-Adj Inputs for Access Rates and actual MOU trends) | | -7.37% | -10.88% | -10.83% | -10.79% | -10.74% | |
| 9 = calculation | Access Revenues (RBOC + Non-Rural Other ILECs) per ARMIS 43-04 | $ 7,435,535,436 | $ 6,887,464,933 | $ 6,138,227,995 | $ 5,473,210,601 | $ 4,882,735,030 | $ 4,358,215,318 | |
| 10 = 9 + 2 | Total ILEC Non-Local Intercarrier Compensation Revenue: VoIP under Reciprocal Compensation Regime | $ 7,438,617,738 | $ 6,892,843,414 | $ 6,146,700,308 | $ 5,485,588,276 | $ 4,900,244,074 | $ 4,381,426,586 | red line |
| 11 = 9 + 3 | Total ILEC Non-Local Intercarrier Compensation Revenue: VoIP under Interstate Access Charge Regime | | | $ 6,260,757,141 | $ 5,652,841,846 | $ 5,136,256,687 | $ 4,693,204,353 | dashed red line |
| 12 = 10 + 4 | Total Non-Local Intercarrier Comp. + Incremental DSL Revenues: VoIP under Recip. Comp. Regime | $ 7,502,256,785 | $ 7,011,330,394 | $ 6,342,277,908 | $ 5,765,305,851 | $ 5,280,408,126 | $ 4,872,334,444 | blue line |
| 13 = 11 + 5 | Total Non-Local Intercarrier Comp. + Incremental DSL Revenues: VoIP under Interstate Access Charge Regime | | | $ 6,417,219,221 | $ 5,876,815,666 | $ 5,440,387,936 | $ 5,085,930,639 | dashed blue line |
| 14 = 3 - 2 | Impact of Change in VoIP Intercarrier Compensation Regime on Total ILEC Non-Local Intercarrier Comp. Revenues (Assuming VoIP Incremental DSL Revenues Are Unaffected) | $ | | $ [illegible] | $ [illegible] | $ [illegible] | $ [illegible] | dashed and dotted red line |
| 15 = 14 / 10 | | % | | [illegible] | [illegible] | [illegible] | [illegible] | |
| 16 = 14 + 5 - 4 | Impact of Change in VoIP Intercarrier Compensation Regime on Total ILEC Non-Local Intercarrier Comp. + Incremental DSL Revenues (Assuming VoIP Incremental DSL Revenues Are Affected) | | | $ [illegible] | $ [illegible] | $ [illegible] | $ [illegible] | dashed and dotted blue line |
| 17 = 16 / 12 | | | | [illegible] | [illegible] | [illegible] | [illegible] | |

Note (2): The change in VoIP traffic intercarrier compensation when interstate access rates are applied vs. reciprocal compensation rates.

Note (3): The sum of the change in VoIP traffic intercarrier compensation and the change in incremental DSL revenue attributable to VoIP stimulation when VoIP traffic pays interstate access rates. Incremental DSL revenue is suppressed due to suppression of VoIP subscribership when higher prices must be charged to cover cost of interstate access rates.

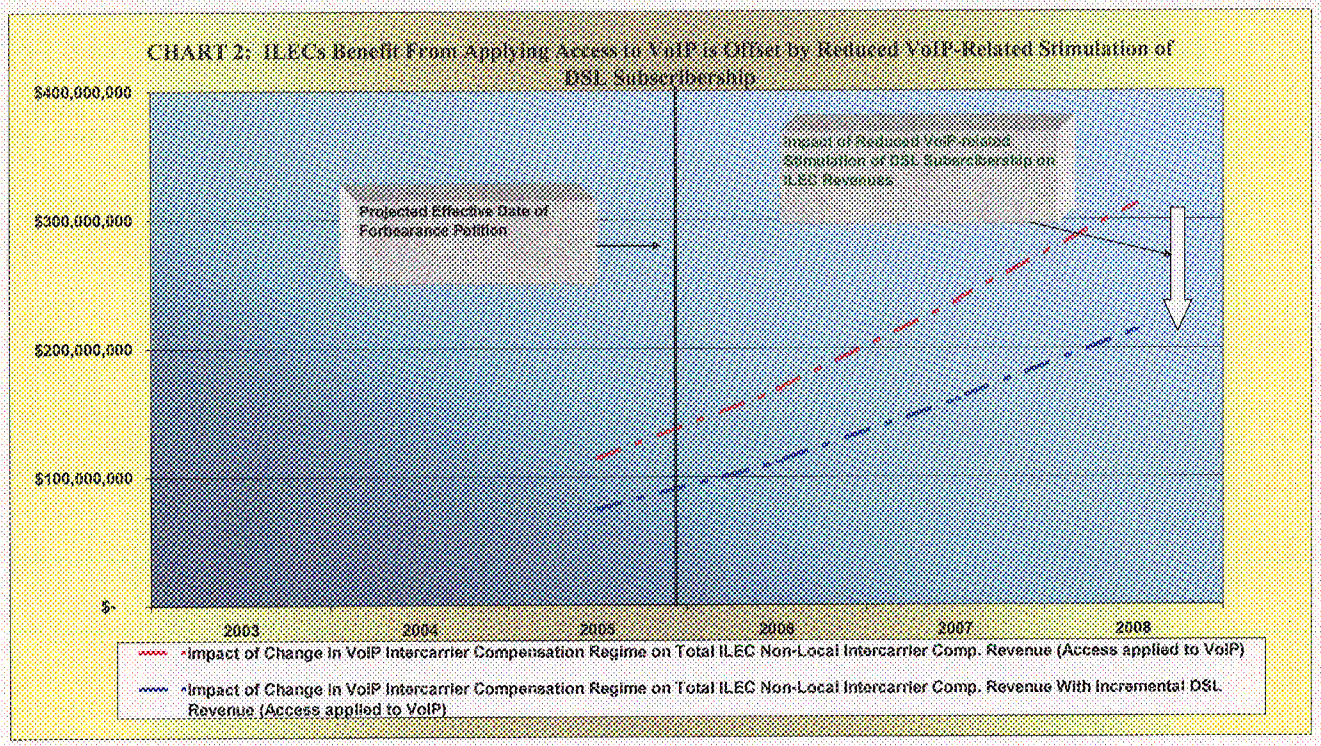


CHART 2: ILECs Benefit From Applying Access to VoIP is Offset by Reduced VoIP-Related Stimulation of DSL Subscribership
$400,000,000
$300,000,000
$200,000,000
$100,000,000
$-
2003
2004
2005
2006
2007
2008
Projected Effective Date of Forbearance Petition
Impact of Reduced VoIP-Related Stimulation of DSL Subscribership on ILEC Revenues
Impact of Change in VoIP Intercarrier Compensation Regime on Total ILEC Non-Local Intercarrier Comp. Revenue (Access applied to VoIP)
Impact of Change in VoIP Intercarrier Compensation Regime on Total ILEC Non-Local Intercarrier Comp. Revenue With Incremental DSL Revenue (Access applied to VoIP)

**PAGE IS INTENTIONALLY BLANK**