

Phase 9

# Forecasts of VRS User Demand

VRS Feasibility Study

Mission Consulting

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# CONTENTS

## EXECUTIVE SUMMARY

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<b>1. Overview</b> .....	<b>1</b>
<b>2. Summary Findings</b> .....	<b>1</b>
<b>3. Conclusion</b> .....	<b>7</b>

## RESEARCH SUMMARY

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<b>1. The VRS Feasibility Study</b> .....	<b>8</b>
<b>2. Forecasting VRS Usage</b> .....	<b>9</b>
2.1. Challenges in Accurate VRS Forecasting.....	9
2.2. VRS Forecast Methodology .....	11
<b>3. Canadian VRS Forecasts</b> .....	<b>13</b>
3.1. TELUS VRS Trial Data .....	14
3.2. Canadian VRS Forecast Using United States Data .....	14
3.2.1 Initial Application of U.S. Full Saturation and Usage Statistics .....	19
3.3. Canadian VRS Forecast Using Adjusted U.S. Data .....	19
<b>4. Interpreter Staffing Forecasts</b> .....	<b>22</b>
4.1. VRS Interpreter Staffing Variables.....	22
4.2. VRS Staffing Forecasts .....	23
4.3. Key VRS Interpreter Demand Variables.....	26
4.3.1. The number of VRS consumers may vary .....	27
4.3.2. The average number of VRS minutes per consumer may vary.....	28
4.3.3. The number of hours worked by VRS interpreters may vary.....	29

<b>5. Forecast of Canadian VRS Adoption Rate</b> .....	<b>30</b>
5.1. U.S. VRS Adoption Rate .....	30
5.2. Application of the U.S. Adoption Rate to Canada’s VRS Forecast.....	32
5.3. Effect of the Selection of a VRS Model.....	34
<b>6. Effect of VRS Adoption on Other MRS Modalities</b> .....	<b>36</b>
6.1. Effect of VRS on Other MRS Traffic in the U.S.....	36
6.2. Projected Effect of VRS on Other MRS Traffic in Canada .....	39
<b>7. Potential Effect of Limited Hours of Availability</b> .....	<b>39</b>
7.1. U.S. Call Volume Detail .....	39
7.2. Application of Traffic Variations to a 12 Hour, 5 Day Schedule .....	42
<b>8. Factors That May Affect User Demand</b> .....	<b>44</b>
8.1. Potential VRS Consumer Populations/Demographics .....	45
8.2. Availability of Broadband to the Consumer .....	46
8.3. Availability and Ease of Use of End User Equipment .....	46
8.4. Availability of Interpreters.....	47
8.5. Outsourcing ASL VRS to the U.S. ....	47
8.6. Interpreter Quality of Service.....	49
8.7. Security and Fraud Prevention Measures .....	49
8.8. The Impact of Speech-Reading on VRS Usage .....	50
8.9. The Impact of Video Remote Interpreting on VRS Usage .....	50
8.10. Public Education and Outreach .....	51
<b>9. Summary of Variables, Risks, Impacts and Outcomes</b> .....	<b>52</b>
9.1. Variables .....	52
9.2. Potential Risks, Impacts and Outcomes .....	53
<b>10. Conclusion</b> .....	<b>57</b>

# FORECASTS OF VRS USER DEMAND

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## EXECUTIVE SUMMARY

### 1. Overview

This research summary represents the findings of the ninth of twelve phases of a study commissioned by Bell Canada (Bell). The feasibility study was commissioned by Bell as part of a deferral account proposal. The objective of the feasibility study is to provide information to facilitate informed decisions regarding potential regulations and implementation of Canadian video relay service (VRS). Bell engaged Mission Consulting to conduct an independent and comprehensive study of the feasibility of VRS for Canada. The final feasibility report will draw, in part, on information contained in this research summary.

This Phase 9 research summary, *Forecasts of VRS User Demand*, provides an estimate of the VRS user demand in Canada including:

- Estimates of number of ASL and LSQ VRS users versus population
- Forecasted total VRS traffic (minutes of use)
- Forecasted growth of VRS usage over time
- Correlated VRS interpreter demand
- Potential impact of VRS traffic on TTY-relay and IP-relay traffic
- Potential impact of Video Remote Interpreting (VRI) and other ancillary services
- Impact of selected Quality of Service factors

### 2. Summary Findings

Salient points of this analysis include the following:

#### Challenges in Accurate VRS Forecasting

- Significant challenges make forecasting the potential usage of VRS problematic, including lack of verified statistics on the size of the Canadian signing population.
- The methodology of VRS usage forecasting in this study is primarily based on correlating the U.S. VRS experience to the Canadian environment.
- The VRS usage demand estimates that of approximately 34,000 Canadian sign language users, 15,345 will become consumers of VRS.

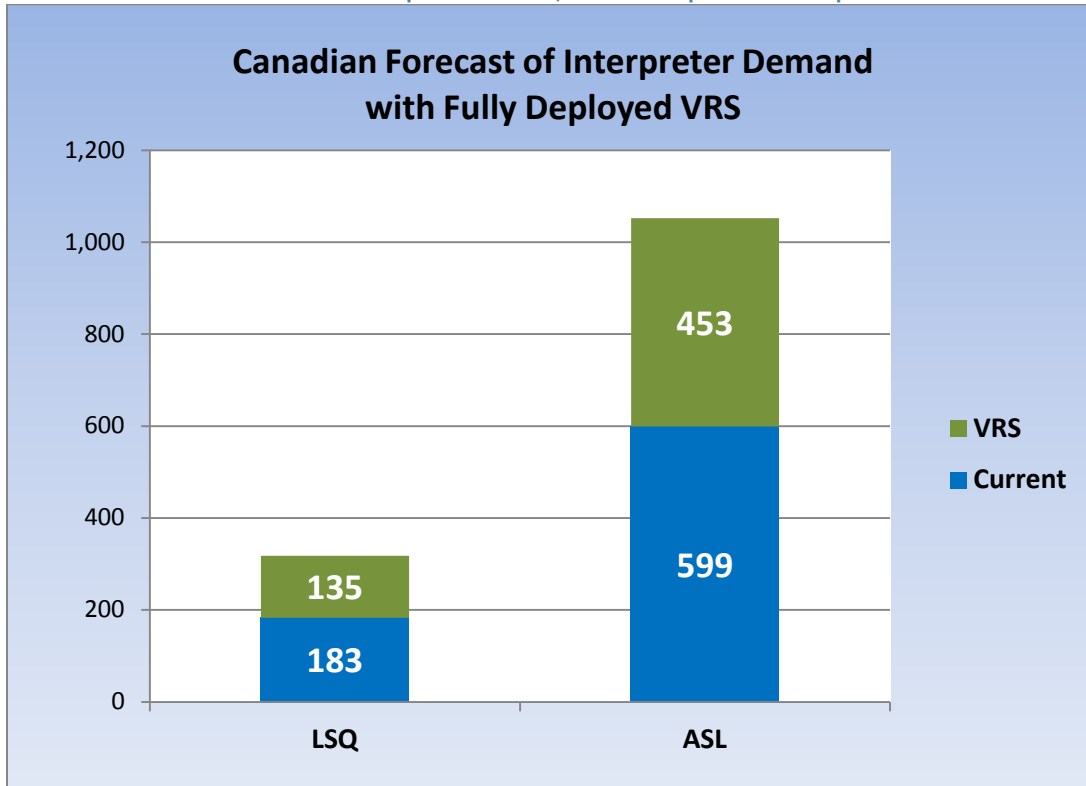
### Usage Forecasts and Variables

- Assuming an average 444.5 minutes per consumer (70 percent of the U.S. usage per person), a fully deployed and subscribed 24 x 7 VRS is forecast to generate approximately 6,820,853 annual minutes of use.
- The key variables that may materially increase or decrease the demand for VRS include the number of VRS consumers and the average number of minutes that they use the service. While U.S. correlations for these variables are used for forecasting Canadian VRS, the numbers assumed as a baseline for the Canadian VRS forecasts cannot be verified.
- Approximately 77% of the VRS traffic will be for ASL/English relay, and 23% will be for LSQ/French relay.

### The Challenge of a Shortage of Interpreters

- There are a number of potential challenges to reaching the forecasted 6,820,853 minutes of use, including lack of available interpreters to work in VRS, potential lack of funding which may constrain the availability of the service, lack of consumer VRS equipment, and other factors. The largest challenge is the lack of the necessary ASL and LSQ interpreters.
- The forecasted numbers of full time interpreters needed for a fully deployed and subscribed VRS are 181 ASL and 54 LSQ. However, due to the demands of the job, the VRS interpreters are expected to only work between 10 and 20 hours a week with a 25% efficiency.
- The numbers of part-time interpreters averaging 15 hours a week that are needed to fulfill the full time VRS positions are 453 ASL and 135 LSQ.
- If the part-time VRS interpreters average more or less than 15 hours a week, or if their efficiency is greater or less than 25%, the needed number of part-time VRS interpreters may be significantly different than 453 ASL and 135 LSQ (see section 4.3).
- Compared to the estimated number of existing interpreters, the additional numbers of qualified VRS interpreters are shown as follows:

Figure 1: Canadian Forecast of Canadian interpreter demand; numbers of part-time interpreters



- The ASL and LSQ Deaf communities report that there are presently not enough interpreters to serve the needs of the communities.<sup>1</sup>
- An estimated one-third of the current ASL interpreters are working for a VRS company providing service to U.S. consumers. Current LSQ interpreters have no standards of proficiency that can be used for qualification to work for VRS.
- Because most of the Canadian colleges and universities are at present unable to increase the size of their interpreter training programs, and since it typically takes at least five years to develop a qualified ASL or LSQ interpreter, the fulfillment consumer demand for VRS will likely be constrained over a period of time as qualified interpreters are developed.

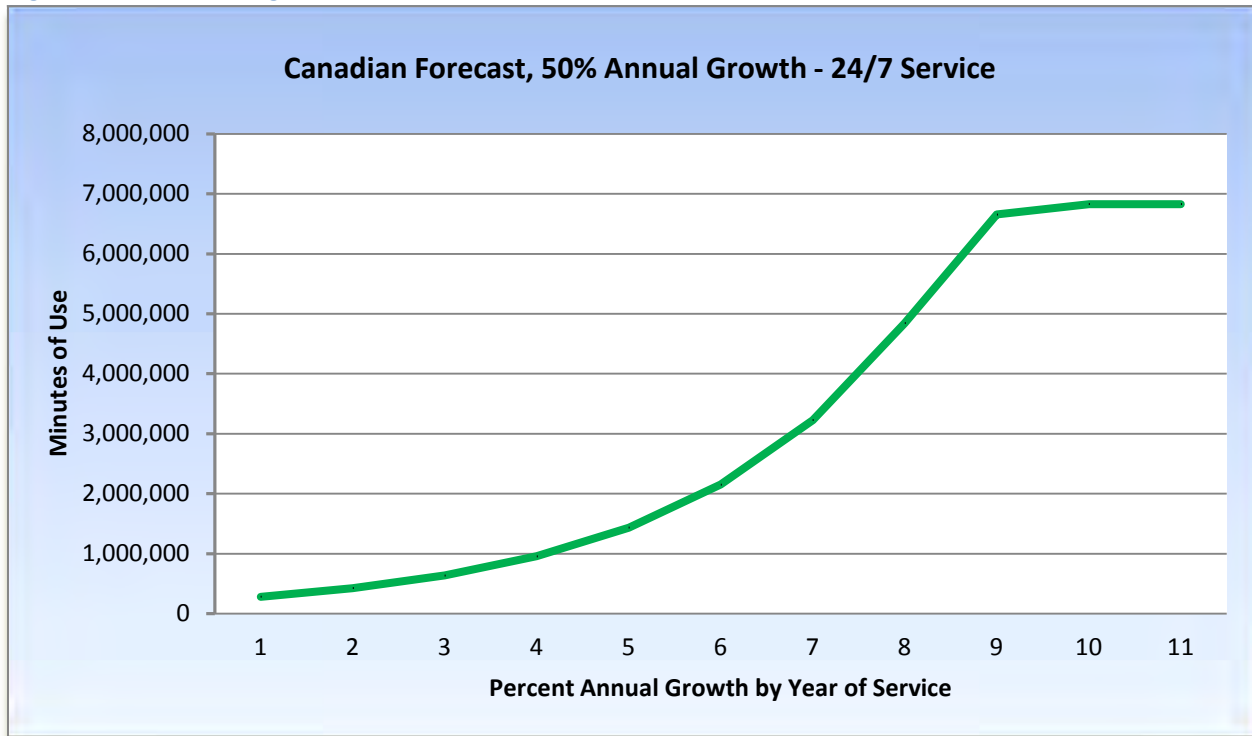
#### Demand Over a Ten Year Period

- Adjusting the forecasts of VRS demand to a ten year period (beginning with 500 users per month and increasing 50% annually; and where the full attainment of the estimated total minutes of use is reached during the tenth year) to allow for interpreter development results in a demand curve as follows:

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<sup>1</sup> See this studies phase 3, *Consumer Interests and Perspectives*.

Figure 2: 50% annual VRS growth, 24/7 service



- The selection of the type of model of VRS for Canada can impact the adoption rate, including potentially starting the service with a higher number of users and minutes in the first year.<sup>2</sup>
- The number of part-time VRS interpreters forecast to be required for the above 50% annual growth rate is as follows:

Table 1: Canadian Forecast of VRS minutes and number of part-time interpreters over 11+ years

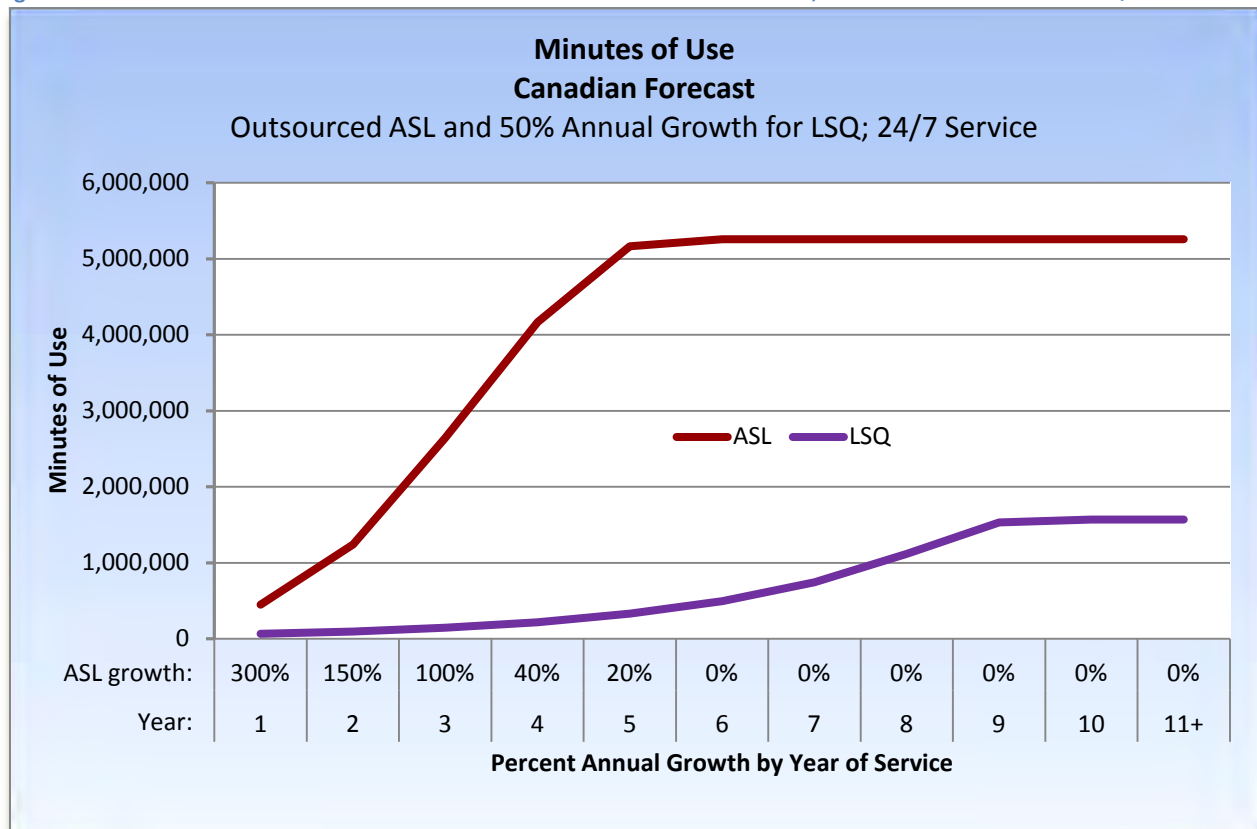
Year	Number of users (at 50% annual growth)	Annual minutes (ASL & LSQ)	Total VRS interpreters required (ASL & LSQ)	ASL VRS interpreters required (at 77%)	LSQ VRS interpreters required (at 23%)
1	751	282,723	24	19	6
2	1,127	424,715	37	28	8
3	1,691	637,388	55	42	13
4	2,537	956,342	82	63	19
5	3,806	1,434,754	124	95	28
6	5,709	2,152,391	186	143	43
7	8,564	3,228,623	278	214	64
8	12,846	4,843,232	418	321	96
9	15,345	6,656,384	574	442	132
10	15,345	6,828,525	589	453	135
11+	15,345	6,828,525	589	453	135

<sup>2</sup> See this study's phase 11, *Potential Canadian VRS Models*.

Other Considerations

- Other restrictions can be implemented that will reduce or delay anticipated consumer usage, including restricting the service to 8:00 AM to 8:00 PM, Monday through Friday, which is estimated to reduce both consumer demand and interpreter demand by about 17%.
- Outsourcing the Canadian ASL VRS to a provider located in the United States will remove the constraint of lack of interpreters on Canadian ASL user demand. LSQ VRS cannot be outsourced since LSQ interpreters are only located in Canada. Forecast usage rates of an outsourced ASL, contrasted with LSQ VRS provided from within Canada, is shown below:

Figure 3: Canadian Forecast – VRS forecast minutes of use for U.S. outsourced ASL, contrasted with Canadian LSQ



- The potential demand for Video Remote Interpreting (VRI) is unknown, and there is little data from other countries that can be used to reliably forecast the effect of including VRI within Canadian VRS.

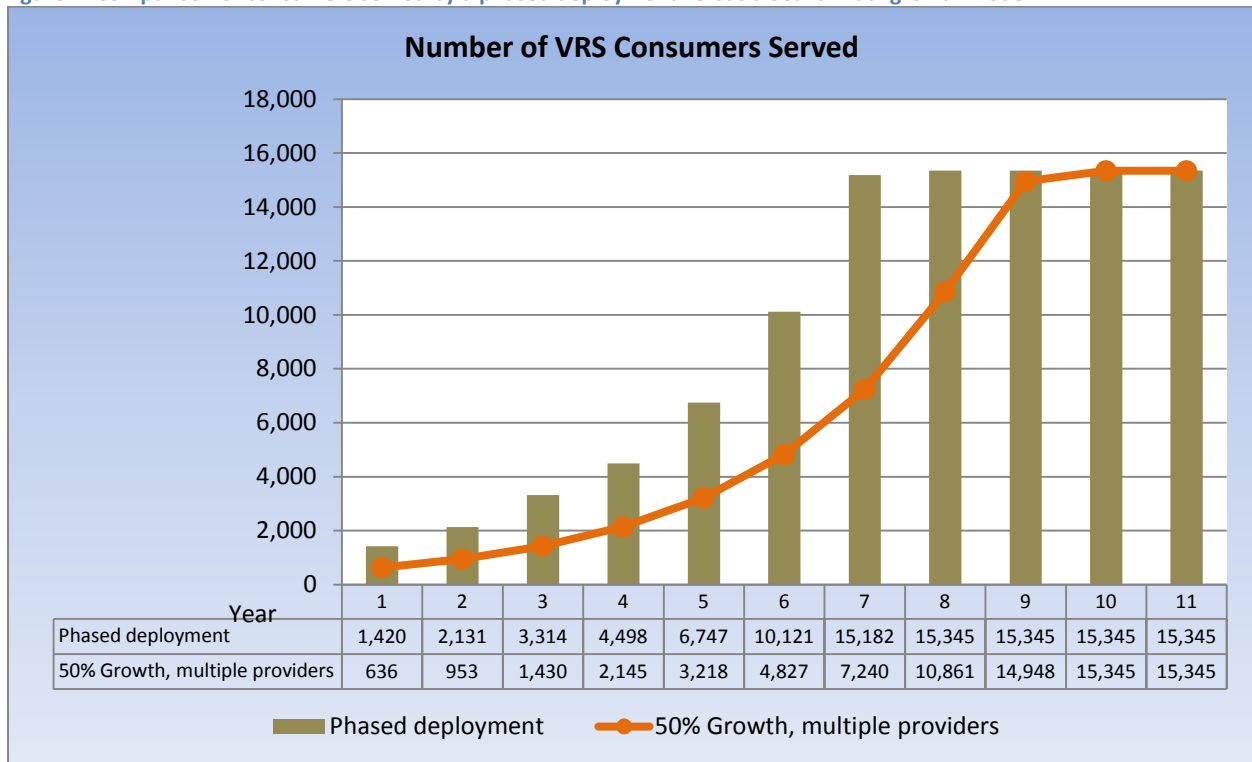
Potential Offsets

- TTY-relay use has been declining due to the availability of other text based communication technologies. A further and continuing decline of TTY-relay as a result of VRS is anticipated but this reduction is not forecast to be proportionate to the expansion of the new VRS services.

Additional Factors that May Affect Canadian Consumer Demand for VRS

- The consumers’ ability to afford hardware, software and broadband services, as well as possible fees or charges associated with the service.
- The consumers’ technical competence, as well as the age and ability of the consumer to adapt to new technologies.
- Preparation of consumers’ hardware, software and network to ensure adequate video quality and ease of use.
- The successful introduction of the VRS experience to consumers on both sides of the conversation so that they have a positive experience with VRS.
- The model of VRS selected for Canada.<sup>3</sup> For example a two-phased approach with the first phase of VRS provided by interpreter training programs and interpreter agencies is forecast to increase the availability of interpreters and thereby initially serve more consumers. The chart below, compares the number of consumers served by a phased deployment to the number served by the 50% annual growth model:

Figure 4: Comparison of consumers served by a phased deployment versus a 50% annual growth model



<sup>3</sup> Potential models are discussed in this VRS Feasibility Study’s phase 11, *Potential Canadian VRS Models*.

### 3. Conclusion

By applying reliable traffic data from the U.S. and reports from various sources, this research summary estimates the number of likely Canadian VRS consumers and their usage at full VRS saturation. It also estimates the number of video interpreters needed for both ASL and LSQ to respond to the VRS traffic at various stages and at full saturation. These estimates are presented as a ratio of current U.S. data (the U.S. Ratio), and adjusted to accommodate conditions in Canada (the Canadian Forecast).<sup>4</sup> The Canadian Forecast data portrays VRS in Canada at significantly less usage than the U.S. Ratio's equivalents. The Canadian Forecast data assumptions are presented in sections 3.3, 4.0, 5.2, 5.3, 7.2 and 8, and are conservatively estimated, especially when compared to the VRS experiences of non-U.S. countries or the unique Canadian environment. Therefore the Canadian Forecast estimates (provided in this Executive Summary) might still be considered to be higher than may be actually experienced.

Although forecasts for users, traffic and interpreters are provided, achieving the realization of a VRS program will be dependent on its greatest restriction, the availability and quality of ASL and LSQ video interpreters. Other factors, including funding and the consumer experience will also influence user demand.

Nevertheless, consumer interest in VRS is very strong, as demonstrated in this VRS Feasibility Study Report's phase 3, *Consumer Interests and Perspectives*, and usage is expected to be strong if consumers are given the opportunity to access the service.

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<sup>4</sup> The U.S. Ratio data forecasts are not presented in this Executive Summary.

# FORECASTS OF VRS USER DEMAND

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## RESEARCH SUMMARY

### 1. The VRS Feasibility Study

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The twelve phases of the study are as follows:

- Phase 1 Project Confirmation
- Phase 2 Legal Background for Canadian VRS
- Phase 3 Consumer Interests and Perspectives
- Phase 4 VRS Models in Other Countries
- Phase 5 Technologies and their Forecasts
- Phase 6 Interpreter Considerations
- Phase 7 Quality of Service
- Phase 8 Potential Related Services
- Phase 9 Forecasts of VRS User Demand
- Phase 10 VRS Cost Variables and Forecasts
- Phase 11 Potential Canadian VRS Models
- Phase 12 VRS Feasibility Study Report

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## 2. Forecasting VRS Usage

This phase of the VRS Feasibility Study will endeavour to estimate the market for VRS in Canada, in terms of the population of potential VRS users and forecasts of VRS traffic (e.g. minutes of use). Admittedly, forecasts related to any new service are highly speculative.

### 2.1. Challenges in Accurate VRS Forecasting

To arrive at a reliable forecast of VRS user demand requires accurate data regarding the size of the user population. There have been many examples of companies, regulatory agencies and advocacy groups attempting to gather this data, and use it for forecasting VRS potential consumers. In their written reports, these groups vary in their estimates of the user population, and often refer to the difficulty in collecting accurate population data, while offering disclaimers regarding the accuracy of forecasts.

In 2004 the Pelorus Group prepared a report for Bell Canada to examine the feasibility of adding IP relay and VRS to the current Canadian relay services. When analyzing the size of the Deaf Community at that time they stated:

*“There are no official numbers with regard to the size of the Deaf community since all results are self-reporting. Furthermore, the disability of deafness ranges from profoundly deaf to somewhat hard of hearing, limiting a precise definition. As such, any quantifications of size are estimates based on association reporting and statistical analysis.”<sup>5</sup>*

Two years later, in response to the CRTC’s directives Bell Canada submitted a proposal to the Commission related to IP Relay and Video Relay Services. A section of the report related to forecasting the potential usage for these services and the size of the Deaf community. In part, this proposal stated:

*“It is very difficult to find statistics on Deaf and/or Hard of hearing persons in Canada thus even harder on Bell Canada’s territory.”<sup>6</sup>*

In 2008, GoAmerica/Purple Communications (a VRS provider in the United States) responded to the CRTC after a public hearing about VRS in Canada:

*“The above referenced estimates were never meant to be definitive VRS projections and should not be treated as such. The reason is simple – while we have expertise in VRS, nobody can claim to have enough expertise in the Canadian VRS market to make such assertions.”*

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<sup>5</sup> The Pelorus Group; “The Future of Bell Relay Services; prepared for Bell Canada; October 2004; Bell Canada (CRTC) 10Jun08-100c; PN 2008-8\_Attachment 2; Abridged; page 8

<sup>6</sup> Bell Canada; “Bell Canada Deferral Account Proposal for IP Relay and Video Relay Service”; July 2006

*“We do not know how many Deaf Canadians know ASL/LSQ.”*

*“We cannot easily predict the number of minutes each Deaf Canadian will use VRS.”<sup>7</sup>*

About that same time, Canadian telecommunications company TELUS responded to questions from the CRTC about the final stages of implementation of its Canadian VRS trial, stating:

*“TELUS does not have a current estimate as to the cost per minute to provide VRS if the service were to be fully implemented.”*

*“At the present time, TELUS cannot estimate a cost per minute for VRS because TELUS does not know what the market demand of the service will be, how many VRS calling agent interpreters will be needed and the availability of interpreters for LSQ.”*

*“TELUS cannot use the current traditional message relay service usage as estimates for VRS because VRS services are fundamentally different services.”*

*“TELUS does not have estimates as to the migration of minutes from traditional message relay services to each of IP-Relay services and VRS services.”*

*“However, TELUS cannot estimate the extent and the speed of such migration at this time.”<sup>8</sup>*

During a subsequent presentation by the Canadian Council on Disabilities (CCD) to the CRTC there was a question asked in regard to how many Deaf sign language users exist in Canada. CCD states the Canadian Association of the Deaf (CAD) would be in a better position to answer this question:

*“It is the opinion of the Canadian Association of the Deaf that no fully credible census of Deaf, deafened, and hard of hearing people has ever been conducted in Canada.”<sup>9</sup>*

*“CAD submits that it is never going to be able to arrive at a precise estimate [of VRS usage] because the information necessary just does not exist and never will. There is, for example, no accepted data as to how many sign language users there are in Canada and no accepted means to collect such data. There is years of experience in the USA that can*

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<sup>7</sup> Response to the CRTC’s Request for Further Information Following GoAmerica’s November 21, 2008 Presentation at CRTC Public Hearing Telecom Public Notice CRTC 2008-8; Unresolved Issues Related to the Accessibility of Telecommunications and Broadcasting Services to Persons with Disabilities; December 23, 2008; pages 3-5

<sup>8</sup> TELUS Communications Company; CRTC Response to Undertaking PN 2008-8; TELUS Undertaking #1; November 28, 2008; Page 3 of 9

<sup>9</sup> Canadian Association of the Deaf’s Position Paper on Statistics at [www.cad.ca/statistics\\_on\\_deaf\\_canadians.php](http://www.cad.ca/statistics_on_deaf_canadians.php)

*be looked at. There is no reason that the Canadian experience will vary greatly from that in the USA once the catching up process has been completed.”<sup>10</sup>*

## 2.2. VRS Forecast Methodology

Clearly, it is a challenge to provide reliable forecasts for the number of potential VRS users, their initial and long-term traffic estimates, and interpreter requirements.

Nevertheless, it is fortunate that there are sources for related data and consistencies in various reports that, when applied to projections for VRS in Canada, provide the foundation for this analysis. These sources include data from a number of other countries that have provisioned VRS and provide some insight into their differing models, published reports on VRS requested or published by regulators and stakeholders in a number of countries including their estimates of usage, and current and potential VRS providers who have offered proposals and reports related to actual and forecasted average usage.

While all relay providers have proven to be reluctant to share their detailed traffic data and their internal personnel forecasting methodology, the most robust data comes from the U.S., including detailed MRS data that may be used to extrapolate the numbers of users and the impact of IP Relay, captioned telephone services and VRS on traditional MRS traffic.

Ideally, in order to confirm and possibly modify forecasts based on these various sources, this background data should be considered along with the traffic reports and other results of the current limited VRS trial in Canada being conducted and managed by Sorenson Communications of Canada, ULC (Sorenson) and Telus.

This analysis will assess and apply:

- Available Canadian demographic data;
- Estimates of potential user demographics offered by Canadian consumer advocacy groups, educational institutions and other entities;<sup>11</sup>
- Analysis of Canadian MRS volumes;
- Estimates of the number of qualified interpreters in Canada provided by consumer advocacy groups, educational institutions, interpreter agencies, and other entities as reported in this study’s phase 6, *Interpreter Considerations*;
- MRS and VRS data gathered from other countries and reported in this study’s phase 4, *VRS Models in Other Countries*, as well as data made public following the release of that summary;
- The impact of VRS implementation on the MRS and IP-Relay traffic; and

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<sup>10</sup> Canadian Association of the Deaf; CAD; CRTC Public Hearing Telecom Public Notice CRTC 2008-8; Unresolved Issues Related to the Accessibility of Telecommunications and Broadcasting Services to Persons with Disabilities; October 6, 2008

<sup>11</sup> These are described more fully in this VRS Feasibility Study’s phase 3, *Consumer Interests and Perspectives*.

- Data from the Telus-Sorenson VRS trial, if made available

The United States is the only country where fairly unrestricted use of VRS is available<sup>12</sup> on a 24-hour a day, seven days a week, basis. As there is significant volume of related data for the U.S., including TTY, captioned telephone relay services, IP-Relay, and VRS, the relay traffic patterns and implications are the most reliable basis from which to forecast what a full deployment of VRS in Canada might represent.

Additionally, comparisons with similar reports from other countries and their VRS acceptance, growth and volumes were utilized to validate the report's assumptions and calculations.

From that "full deployment model" forecast, estimates are then offered based on a multi-year deployment and acceptance of the 24/7/365 model. As this is being offered without the benefit of knowing which model the CRTC will use if they approve VRS, including variables such as the hours of operation or the future availability of resources such as interpreters, these full deployment forecasts do not incorporate these variables. From these forecasts, projections are also offered for a 12-hour service day, and the relative service availability and required resource implications of a limited schedule.

Therefore, this report has compiled comparable data scenarios that lead to a logical presumption of market size and future usage for VRS in Canada, followed by possible phased deployment estimates. Following the introduction of a widespread VRS service, and as it becomes integrated into the traditional relay offerings, the usage forecasts would be expected to be adjusted to reflect actual deployment rates and calling pattern behaviour.

Before any forecasts were calculated, a baseline of the Canadian VRS market (without VRI or speech reading) was established. There are many opinions about the size of the Deaf population and which of these are likely candidates to use VRS. Section 8.1, *Potential VRS Consumer Populations/Demographics*, provides a review of these issues and the reason certain numbers have been selected. This attempt to reconcile conflicts between the respective numbers of different reporting agencies, service organizations and stakeholders, created the following baseline estimates:

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<sup>12</sup> VRS in the U.S. does not allow VRI when both the user and the hearing party are in the same room. Other limitations include the recent discovery of a VRS-dependent telemarketing company that generated VRS traffic and relay revenue for a particular provider; a practice that has now been ruled inappropriate.

Table 2: Canadian demographic estimates

Canadian Demographic Estimates	
Total 2010 Canadian population	34,100,000 <sup>13</sup>
Total population in Canada with some form of hearing loss	3,400,000 <sup>14</sup>
Total population identified as profoundly deaf in Canada	340,000 <sup>15</sup>
Total sign language users (as primary language, both ASL and LSQ)	34,000 <sup>16</sup>
Total potential ASL VRS users in Canada	26,100 <sup>17</sup>
Total potential LSQ VRS users in Canada	7,900 <sup>18</sup>
Total reported sign language Interpreters in Canada	782 <sup>19</sup>
Total reported ASL interpreters in Canada	599 <sup>20</sup>
Total reported LSQ interpreters in Canada	183 <sup>21</sup>

### 3. Canadian VRS Forecasts

VRS traffic volume, like all relay traffic, varies greatly by time of day, day of the week, day of the month. Traffic forecasts developed and presented in this study are annual projections based on usage in similar circumstances. Where traffic patterns are not available, MRS data may be used to reflect demand peaks of relay services.

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<sup>13</sup> Statistics Canada website, data also cited from Phase 3 report.

<sup>14</sup> Using the formula that 1 in 1,000 of those identified as profoundly deaf use Sign as their primary language. Roots, James, *The Politics of Visual Language* 1999, pg. 5.

<sup>15</sup> Ibid

<sup>16</sup> Ibid

<sup>17</sup> At 77% of total potential ASL VRS users in Canada.

<sup>18</sup> At 23% of total potential ASL VRS users in Canada.

<sup>19</sup> Addition of Reported ASL interpreters and LSQ interpreters (599 + 183 = 782)

<sup>20</sup> AVLIC email correspondence 05/12/2011; data also cited from this study's phase 6, *Interpreter Considerations*, page 27

<sup>21</sup> Ibid; page 29

### 3.1. TELUS VRS Trial Data

At the direction of the CRTC, Telus is currently conducting a video relay service trial in the provinces of British Columbia and Alberta. The trial began in July 2010, and has been extended to run for 18 months, until January 2012. The implementation was approved by the CRTC in Telecom Decision CRTC 2008-1. One of the main goals of the trial is “to provide accurate market information for the Commission to decide whether VRS should be implemented in Canada.”<sup>22</sup>

Efforts to forecast the future VRS traffic patterns and volumes in Canada may benefit from the application of consumer and traffic data generated during the current VRS trial. Unfortunately at the time of this phase of the Feasibility Study, the Telus trial data is unavailable to third parties for calculating forecast demand based on their actual Canadian usage statistics.<sup>23</sup>

Trial data related to the number of participants, their rate of introduction to the service, the number of calls, the average call time, and traffic patterns during approved hours of operation during the trial may be useful. The lessons learned and the challenges identified in the trial should be applied to other attempts to accurately plan for VRS in Canada.

If meaningful trial data is released by the CRTC, Telus, or its VRS contractor (Sorenson) prior to the submission of this VRS Feasibility Study’s Final Report, that information will be analyzed and, if appropriate, incorporated.

### 3.2. Canadian VRS Forecast Using United States Data

While there may be cultural and consumer-preference differences between the services for the Deaf in the U. S. and Canadian markets, their similarities are very strong, particularly for ASL users. The U.S. remains the only country that has deployed VRS on a full time basis, over enough years to provide a reliable full saturation deployment guideline.

There are many reasons why the U.S. market serves as a good example for predicting future usage patterns in Canada, including:

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<sup>22</sup> CRTC Telecom Decision CRTC 2011-384; “TELUS Communications Company – Request for a further drawdown from its deferral account for accessibility initiatives”; June 2011

<sup>23</sup> According to their filings, “TELUS is filing certain information in this answer in confidence with the Commission pursuant to section 39 of the *Telecommunications Act*. This type of information comprises sensitive marketing and costing information, including a breakdown of internal and outsourced costs. These data are consistently treated in a confidential manner by the Company and cannot be disclosed to third parties by nature of the Company’s contractual agreements. In addition, the release of these data would provide TELUS’ competitors with sensitive commercial and cost information not otherwise available to them, causing the Company direct and specific harm. TELUS therefore requests that the Commission neither publish nor reveal the confidential information to any other person.” TELUS Communications Company; Response to Interrogatories; VRS Extension Request; May 3, 2011

- Geographical familiarity - similar by proximity
- Similar philosophy about providing superior services for its citizens with disabilities
- Similar telecommunications platforms and technologies
- Similar cultures for day-to-day relay services and behavioral patterns (calling patterns)
- Both countries aim for 24/7/365 availability for VRS
- Similar regulatory environment for relay services
- Both have used similar mechanisms for funding relay services
- The U.S. provides VRS in three languages (ASL, English and Spanish)

The number of people in the U.S. that use VRS at least once a year is unknown.<sup>24</sup> However, an estimate can be made based on the fact that approximately 239,000 10-digit VRS phone numbers have been assigned to people,<sup>25</sup> and many people in the U.S. who use VRS have multiple 10-digit numbers.

Reasons for having multiple numbers include:

- To distinguish between different video devices, e.g., a videophone, a mobile device, a computer.
- For devices at different locations, e.g., work and home.
- Multiple devices in the same residence, e.g.: in a two-story residence or a one-story residence that is spread out.
- Distinguish between two or more VRS providers (each provider issues its own 10-digit numbers).
- Changing providers, e.g., when leaving Sorenson but keeping the VP200 (most other VRS providers can now accommodate the VP200), the original number from Sorenson is retained even though a new number is obtained from the new provider.)
- Deaf leader/advocates who want to experience more than one vendor in order to be knowledgeable about the various offerings.
- Due to the strong emergence of mobile devices compatible with VRS.

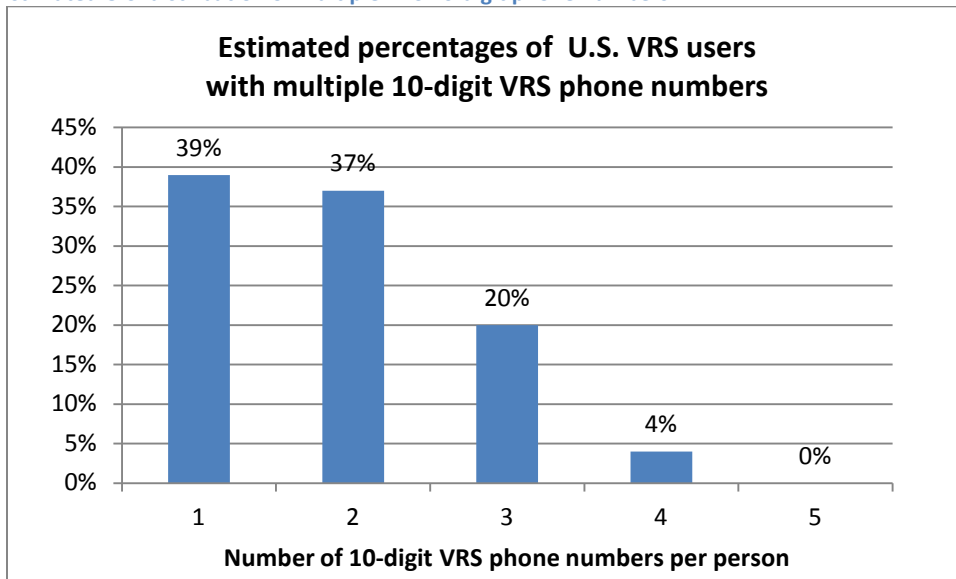
An estimated distribution as shown in the following chart (Figure 5) results in an estimated total of 155,748 people in the U.S. who use VRS, with a ratio of 10-digit numbers to users of about 1.5 to 1, i.e., the average user has 1.5 phone numbers (239,000 VRS phone numbers / 155,748 users = 1.53 numbers per person).

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<sup>24</sup> In a Mission Consulting conversation with the FCC on October 21, 2011, FCC staff stated they did not know the number of U.S. VRS users; <http://fjallfoss.fcc.gov/ecfs/document/view?id=7021739255>.

<sup>25</sup> As of February 2011 there were approximately 239,000 10-digit numbers and 210,000 unique resource identifiers per TRS Advisory Council minutes of April 14, 2011, at <http://www.r-l-s-a.com/TRS/AdvisoryCouncilMinutes4-11-2011.pdf>.

Figure 5: Estimated U.S. distribution of multiple VRS 10-digit phone numbers<sup>26</sup>



The resulting 155,748 U.S. VRS users represent approximately 39% of the Deaf ASL population in the U.S.<sup>27</sup> While there are no available statistics to corroborate the percent of people who prefer sign language as their primary language choice that also use VRS, the FCC has indicated that it considers that the number of people who use VRS is “low” compared to the number who could be using it.<sup>28</sup>

*Finally, we seek information about other reasons why potential users do not actually use VRS. What factors, including practical, economic, or informational, contribute to the apparently low adoption rate?<sup>29</sup>*

When the ratios of the total population to the number identified as the Deaf population in the respective baselines from Canada and the U.S. are compared the results are similar. Therefore, aside from possible cultural and consumer-preference variables, an argument can be presented to use existing

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<sup>26</sup> Although there is no available statistical data to support the distribution shown in this chart, a reasonable attempt to quantify distribution as depicted herein provides a more accurate estimate of the number of people who use VRS in the United States, than would be the case without any distribution or adjustment for multiple phone numbers.

<sup>27</sup> This percentage is in line with the percentage of VRS users of the signing population experienced in other VRS countries such as Denmark, Sweden, Finland, Norway, and Germany, where usage typically ranges from 10% (Denmark) to 50% (Sweden). See the study’s phase 4, *VRS Models in Other Countries*.

<sup>28</sup> The “low” usage rate only applies to relayed video calls (using an interpreter), not to point-to-point video calls which occur about five times more than relayed calls. (Mission Consulting private correspondence with U.S. VRS providers.)

<sup>29</sup> At paragraph 47 of FCC Notice of Inquiry, In the Matter of Structure and Practices of the Video Relay Service Program, document 10-111 released June 28, 2010, at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-10-111A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-111A1.doc).

VRS usage patterns in the United States to extrapolate and forecast data applicable to the introduction of VRS in Canada. This approach would include projections for numbers of users and minutes of use, as well as forecasting the number of required interpreters at full deployment.

To further compare the two countries, a statistical baseline for the United States must be established. As significant data exists for reporting on U.S. relay services, this information is included in the baseline. With consideration for the accuracy of conflicting data sources, the following baseline estimates are used in this forecast.<sup>30</sup>

**Table 3: U.S. demographic estimates**

<b>United States Demographic Estimates</b>	
Total 2010 U.S. population	310,877,000 <sup>31</sup>
Total Deaf ASL user population in the U.S.	400,000 <sup>32</sup>
Total number of VRS users in the U.S.	155,748 <sup>33</sup>
Total identified sign language interpreters in U.S.	15,500 <sup>34</sup>

At this time, the FCC does not require U.S. relay providers to submit detailed VRS reports on hourly or daily traffic activities, unlike the detailed MRS traffic reports required by certain individual states. Furthermore, very little independent validation and verification was required by the FCC for U.S. VRS providers in conjunction with their invoices for services provided. Therefore when considering the total U.S. VRS traffic volumes and average speed of answer (ASA) performance, these are highly averaged statistics. As such they often do not reflect possible service level variations, such as long wait times in high volume periods or in low volume languages (i.e. Spanish). However, for forecasting total VRS volumes and averages, this data is as accurate as is publically available.

The baseline to which this analysis endeavors to initially forecast is the full saturation of VRS in Canada, similar to the adjusted penetration ratios and current traffic patterns documented in the U.S. VRS market.

<sup>30</sup> See this study’s Phase 4, *VRS Models in Other Countries*.

<sup>31</sup> United States Census Bureau; 2011 Update; U.S. National Census Data 2010

<sup>32</sup> Note that this estimate is without statistical basis: “...misunderstandings and misrepresentations of what is known about the demography of deafness and ASL use in the Unites States are widespread. ...there has never been a true study of ASL use in the general U.S. population... no statistics exist.” From [How Many People Use ASL in the United States? Why Estimates Need Updating](#), Ross E. Mitchell, Travas A. Young, Bellamie Bachleda, and Michael A. Karchmer, Gallaudet Research Institute Gallaudet University at [http://research.gallaudet.edu/Publications/ASL\\_Users.pdf](http://research.gallaudet.edu/Publications/ASL_Users.pdf).

<sup>33</sup> See section 3.2, above.

<sup>34</sup> [www.RID.org](http://www.RID.org); Registry of Interpreters for the Deaf website; about RID; Interpreters

This forecasting methodology was also recently employed by Ofcom in a VRS feasibility study published on July 28<sup>th</sup> 2011 for VRS in the UK. The Ofcom report utilized almost identical points of data from the U.S. for their calculations that are being applied in this analysis to forecast the “full saturation model” in Canada.<sup>35</sup>

From our Canadian *full deployment* projection, phased introduction models are postulated. These “take-up” or adoption projections, for the gradual introduction of VRS in Canada, are highly dependent on many variables. These include:

- A strategic plan to expand the service *within* the likely limitations of the number of qualified interpreters and available VRS provider facilities
- The consumers’ preexisting experience with point-to-point video and broadband services
- The consumer’s ability to afford hardware, software and broadband services, as well as possible fees or charges associated with the service
- The consumer’s technical competence, as well as the age and ability of the consumer to adapt to new technologies
- Preparation of consumers’ hardware, software and network to ensure adequate video quality
- Outreach to inform users of reasonable expectations from the service
- The successful introduction of the VRS experience to consumers on both sides of the conversation so that they have a positive experience with VRS
- Communication preferences of the consumers and whether those preferences are offered<sup>36</sup>
- A commitment to fund the service if it grows at a higher than anticipated rate
- The VRS model selected for Canada<sup>37</sup> - for example some models may allow for a more rapid initial deployment than are projected in section 5.2 of this phase 9.

Also, as perhaps may have been experienced in the Telus VRS trial, the initial volume of traffic and perceived consumer adoption rate can be impacted by the number of users allowed into the program, by issues such as limitations in equipment distribution/installation, and by registration requirements.

Notwithstanding restrictions as described above, once an initial level of traffic is determined, the longer term forecast can be revised by applying estimated growth rates onto the Canadian initial (such as the first year’s) deployment statistics.

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<sup>35</sup> Ofcom; UK communications regulator; “Review of Relay Services”; July 28, 2011, at [http://stakeholders.ofcom.org.uk/binaries/consultations/review-relay-services/summary/relay\\_services\\_final.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/review-relay-services/summary/relay_services_final.pdf).

<sup>36</sup> For further detail regarding communication preferences, see this study’s phase 3, *Consumer Interests and Perspectives*.

<sup>37</sup> See this study’s phase 11, *Potential Canadian VRS Models*.

### 3.2.1 Initial Application of U.S. Full Saturation and Usage Statistics

A compilation of estimated U.S. and forecast Canadian VRS demographics are presented below.

Table 4: U.S. Population and VRS usage

U.S. Population and VRS Usage	
Total population	310,877,000
VRS users	155,748 <sup>38</sup>
VRS users as a percentage of total population	0.050% <sup>39</sup>
Actual reported 2010 VRS traffic minutes	98,836,425 <sup>40</sup>
Estimated average annual VRS minutes per user	635 <sup>41</sup>

Table 5: Canada forecasts at VRS usage saturation, using U.S. Ratios

Canada Forecasts at VRS Usage Saturation using U.S. Ratios	
Total population	34,100,000
Forecast ASL & LSQ VRS users (at 0.050% of population)	17,050
Forecast number of ASL VRS users (at 77% of users)	13,128
Forecast number of LSQ VRS users (at 23% of users)	3,922
Estimated average annual VRS minutes per user	635
<b>Forecast of Canadian VRS annual minutes</b>	<b>10,826,750</b>

### 3.3. Canadian VRS Forecast Using Adjusted U.S. Data

Although forecasting Canadian VRS numbers as presented above from the U.S. data as it is offered by NECA and FCC results in 17,050 total users and 10,826,750 annual minutes, there are a few important reasons why these numbers may be too high for Canadian VRS.

<sup>38</sup> See section 3.2.

<sup>39</sup>  $155,748 / 310,877,000 = 0.000501$

<sup>40</sup> Actual 2010 annual VRS traffic of 98,836,425 minutes; NECA Video Relay Service Terminating Call/Minute Summary July 2009 – June 2010.

<sup>41</sup> Calculation of 98,836,425 minutes divided by 155,748 users = 634.6 minutes per user.

First, recent discussions with the FCC indicate that the number of minutes of fraudulent VRS calls experienced in the U.S. may not yet have been sufficiently dealt with, and that there likely is still a significant number of minutes that may be due to fraud or misuse of VRS.<sup>42</sup> An estimate of the percent of minutes that may still be attributed to fraud and misuse was not provided by the FCC, except to say that the approximately 10% decline in VRS minutes in 2009-2010 potentially represents only a minor portion of the number of minutes that may still be inappropriately being billed to VRS. Assuming that Canada does not adopt a high reimbursement rate and payment scheme that encourages such fraud and misuse, it would therefore be reasonable to assume that the total number of minutes forecast for Canada should be based on a number of U.S. VRS minutes that is further reduced from the current U.S. experience.

The question is what level of further reduction is appropriate for forecasting purposes? A ten percent further reduction would seem to be conservative if the current reduction only represents a small portion of the actual fraud that is occurring. A twenty percent reduction might be more realistic. However, for conservative estimating purposes only a 10% reduction will be used. This means that due to potential continuing U.S. fraud and misuse, the 10,826,750 annual minutes of VRS forecast above for Canadian VRS should be adjusted downwards by 10%, to 9,744,075 minutes.

Second, an argument can be made that because the U.S. does not require interpreters for VRS to be RID certified, and because the VRS providers hire many individuals who are not RID certified (because they are available and they are less expensive than RID certified interpreters), the quality of the interpreting may be less than if only RID certified interpreters were used. Reduced quality of interpreting results in slower conversations from repeating signs, finger spelling of words that should be signed, slow signing, more time trying to understand and confirm understanding of each party, etcetera. This slower conversation time results in calls that are longer than would have been experienced with more skilled interpreters. However, because Canada has very few ASL certified interpreters and no LSQ certification, and since it is not yet known what level of proficiency Canadian VRS may or may not require, no adjustment in the number of minutes based on longer calls than necessary due to poor interpreter skills will be made at this time for forecasting purposes.

However, there are two more factors that suggest that the number of users and the number of minutes experienced in the U.S. are disproportionately higher than will be experienced in Canada. The next (or third) factor is that in the U.S., the very high reimbursement rates based on what the providers claimed, together with the model that allows any company that meets minimal conditions to be reimbursed at these high rates, led to very aggressive marketing campaigns (including free consumer equipment and setup) on the part of the U.S. VRS providers. Providers applied enormous emphasis and resources toward getting people to sign up and to use their VRS devices. Thus the total percentage of VRS users recruited in the U.S. and their number of minutes may be significantly higher than the percentage in Canada if Canada does not adopt a similar model that encourages the VRS vendors to engage in such aggressive marketing, product placement, and usage.

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<sup>42</sup> See <http://fjallfoss.fcc.gov/ecfs/document/view?id=7021739255>.

The last reason the number of users and the number of minutes may be higher using only the U.S. data is based on timing. When VRS was introduced in the U.S., other efficient forms of text communication had not yet been adopted by both the Deaf and hearing populations. There was a greater need for VRS at that time. This was also the case in Sweden where VRS began to be available in the late 1990's. In both countries, this also resulted in high VRS adoption rates. However, in countries that have adopted VRS after the prevalence of cell phone texting, email, and IP chat became popular, such as Denmark, Finland, Norway and Germany, these countries have experienced a significantly lower percentage of VRS users and few VRS minutes per user. This has been the case even though in many of these countries VRS has been a free public service, often with free consumer devices. Discussions conducted as part of the research for this study relative to usage in these countries suggest that typical VRS users are mostly between the ages of 30 and 50, and that people below 30 generally prefer to use the prevalent text modes of communication indicated above instead of VRS.<sup>43</sup> (This is similar to young hearing people in most developed countries today preferring text over voice.)

Without the aggressive marketing and pressure imposed by vendors to use VRS, and considering the general adoption of texting in lieu of voice across all strata of society today, and considering that many people who are Deaf and sign have never adopted an accommodation of the voice telephone culture and may prefer to continue to rely upon texting instead of VRS (unlike in the U.S. where the early availability of VRS and the lack of text communication encouraged many people to adopt VRS), the adoption of VRS and average usage per person are expected to be significantly less than in the U.S.

Therefore, it is reasonable to expect the Canadian adoption rate to not be as high as in the U.S. This is also presently being experienced with the much slower adoption rate than forecast for Canadian IP-relay, potentially for the same reason.<sup>44</sup> Combining the above factors suggests that the adjusted number of users and minutes should be further reduced for a more accurate forecast. A recommended further reduction of 10% of users and 30% of minutes per user is recommended,<sup>45</sup> resulting in a total of 15,345 people who will eventually use VRS [17,050 x 0.9], and a total of 6,820,853 annual minutes [9,744,075 x 0.7], with an average of 444.5 annual minutes per person (37 minutes per person per month).<sup>46</sup>

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<sup>43</sup> A market survey is expected to be conducted in 2012 in Sweden, Norway and Finland to examine the patterns of usage, age groups, etc.

<sup>44</sup> While Deaf advocates have stated that the low take up rate for IP-relay may be due to the program design that requires consumers to have an account with the telephone company that offers the IP-relay service, Bell Canada has stated that even among customers who have both Bell telephone and IP services, the IP-relay adoption is far below forecasts.

<sup>45</sup> Approximately 10% reduction in minutes due to a 10% reduction in users, plus 20% reduction of overall minutes due to the comparative effect of aggressive U.S. marketing resulting from high rates, and due to the timing of VRS.

<sup>46</sup> A forecast average of 37 minutes per user per month may still be high, when compared with Sweden, which is currently experiencing 23 minutes per month per user (calculated the same way as the average number of minutes is calculated in this study: 1,120,000 annual minutes divided by 4,100 people who use the service at least once a year). Actual *monthly* usage in Sweden is 1,200 people using VRS at least once during the month with an average of 43 minutes per user. This reflects that many Swedish people only use VRS a few times a year. This is in an

*[footnote continues on next page]*

The above numbers of this Canadian Forecast are shown in Table 6 below:

Table 6: Canada forecasts at VRS usage saturation, using Canadian Forecast

Canada Forecasts at VRS Usage Saturation using Canadian Forecast	
Total population	34,100,000
Canadian Forecast of ASL & LSQ VRS users (equates to 0.045% of population)	15,345
Forecast number of ASL VRS users (at 77% of users)	11,816
Forecast number of LSQ VRS users (at 23% of users)	3,529
Estimated average annual VRS minutes per user	444.5
<b>Forecast of Canadian VRS annual minutes</b>	<b>6,820,853</b>

The forecasts in the remainder of this analysis will depict numbers (shown as “U.S. Ratio”) that are based on the U.S. equivalent forecasts from section 3.2, *Canadian VRS Forecast Using United States Data*, and also numbers (shown as “Canadian Forecast”) that are based on the revisions provided in this section 3.3, *Canadian VRS Forecast Using Adjusted U.S. Data*. **The “Canadian Forecast” represents the most probable forecast for Canada for a fully deployed 24 x 7 VRS at an eventual maximum usage rate.** The “U.S. Ratio” numbers are shown for comparative purposes only.

## 4. Interpreter Staffing Forecasts

### 4.1. VRS Interpreter Staffing Variables

Forecasts for the number of interpreters required to support VRS are dependent on many variables. These include:

- The types of approved services supported - such as only sign language versus also including other service modalities like speech reading or Video Remote Interpreting (for individuals within the same room).
- Reductions in hours of operation – such as offering VRS only during a set number of hours a day and not on a 24-hour basis, or reduced hours of operation on certain days of the week.

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environment in which Sweden provides videophone equipment to all VRS users for free, and has had VRS longer than in the U.S. (people have learned and accommodated the voice telephone culture.)

- Constrictions on user access to VRS – such as limiting the consumers to a fixed number of minutes of use per week or month, or restricting use to only governmental and business applications.
- The natural inefficiencies when all interpreters are not qualified to answer all calls – such as the reasonable and anticipated equal access for both LSQ/French and ASL/English service, even though there will be times when one language service is very busy and the other may have interpreters waiting for calls.
- The skill level of the interpreter and their individual ability to efficiently set-up a call understanding the consumers’ individual requests and needs.
- The policies of the relay provider – such as the number of minutes an interpreter may be required to engage in VRS calls per hour, or the frequency and length of breaks.
- The availability and deployment of interpreters fluent in ASL/English and LSQ/French.
- The use of full time and part time personnel.
- Limitations on other provider personnel resources – such as limitations on the number of installers who may be required to set-up consumers’ equipment before relay services may begin.

## 4.2. VRS Staffing Forecasts

Without the benefit of applying historical VRS traffic patterns for Canada, the individual skills of the interpreters, the policies of the selected providers, and the other considerations presented above, the number of interpreters required for VRS are estimated below. Ratios and assumptions are based on prevalent VRS and interpreter experience in the U.S., using figures of the dominant U.S. VRS provider’s projections for VRS in the United Kingdom (U.K.).

VRS has been deployed in the U.K. since 2004, but as a limited service available only to the workplace.<sup>47</sup> The U.K. Office of Communications (Ofcom) is the regulatory agency over public relay, and is in the process of assessing the potential of a public VRS for the U.K. Ofcom has published a report titled, *Review of Relay Services* (Ofcom report) in which it forecasts VRS usage and costs.<sup>48</sup> As part of the influence and debate on this topic, the Ofcom report references a separate report titled *Video Relay Service in the UK*. This latter report was written by a firm called Europe Economics and paid for by Sorenson Communications (the EE/Sorenson report).<sup>49</sup> While Ofcom disagrees with a significant part of the economic benefit analysis of the EE/Sorenson report, the report does provide significant information

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<sup>47</sup> VRS in the U.K. is a limited commercial service funded by a government “Access to Work” program, and also charged to some public agencies that use the service. See this study’s phase 4, *VRS Models in Other Countries*.

<sup>48</sup> Ofcom, *Review of Relay Services*, July 28, 2011, available at: [http://stakeholders.ofcom.org.uk/binaries/consultations/review-relay-services/summary/relay\\_services\\_final.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/review-relay-services/summary/relay_services_final.pdf).

<sup>49</sup> Available at <http://www.vrstoday.com/wp-content/uploads/Revised-Final-Europe-Economics-Report.pdf>. “VRStoday.com” is a website hosted by Sorenson to ostensibly represent U.K. sign language users’ views regarding the need for VRS in the U.K.

in its forecasts for the U.K. concerning interpreter demand forecasts. For the most part the report uses interpreter data based on the U.S. experience.<sup>50</sup>

For the U.K., the EE/Sorenson report forecasts that 1,080 full time equivalent (FTE) VRS interpreters are needed to handle 31,008,000 annual minutes of VRS, or about 29,000 VRS minutes per FTE VRS interpreter (VI) per year for a free VRS operational 24/7 without access restrictions. Applying 29,000 VRS minutes per FTE VI to the U.S. Ratio (high forecast) of 10,826,750 total annual minutes of Canadian VRS, results in a total requirement of 373 total FTE VIs each working 37.5 hours a week. Applying 29,000 VRS minutes per FTE VI to the more probable Canadian Forecast of 6,820,853 total annual minutes of Canadian VRS, results in a total requirement of 235 total FTE VIs each working 37.5 hours a week.

However, the EE/Sorenson report points out that in the U.S., eighty percent of the interpreters do not work full time for VRS. It states that U.S. interpreters typically work between 10 and 20 hours a week with an interpreter efficiency of 25%. Ofcom uses an average of 15 hours a week in its projections and an interpreter efficiency of 28%. These numbers are corroborated by Mission Consulting from past confidential VRS research assignments and experience within the VRS industry. Video interpreting is a physically and mentally very intense activity, and few VIs choose to work within VRS for a long period. Most VRS firms employ VIs in shifts of 4 hours or less, and as stated above, usually only 10 to 20 hours a week. Therefore, for the purpose of determining how many additional interpreters will be needed for Canadian VRS, it is necessary to assume that VI's will be employed part-time as is common industry practice. Using an average of 224 eight-hour work days in a year (applying adjustments for holidays, vacations, sick time, and training) for an average 34.5 hour work week, and an average of 15 hours per week per VI, the percent of work time per VI is 43.5% resulting in a factor of 2.5 for the number of actual interpreters needed to fulfill each FTE position.<sup>51</sup> Thus, for the equivalent U.S. Ratio (high forecast), 933 fully trained sign language interpreters (each interpreting an average of 11,600 annual VRS minutes) are needed in Canada in order to provide staffing equivalent to 373 FTE VIs.<sup>52</sup> For the more probable Canadian Forecast, 588 fully trained sign language interpreters (each interpreting an average of 11,600 annual VRS minutes) are needed in Canada in order to provide staffing equivalent to 253 FTE VIs.

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<sup>50</sup> The proprietary operational data provided in the report is referred to as based on the "general U.S. experience". However since Sorenson is estimated to handle 80 to 85 percent of all U.S. VRS traffic, "general U.S. experience" may be considered almost synonymous with the experience of Sorenson Communications.

<sup>51</sup> Actually a factor of 2.3 adjusted for the difference in work week (37.5 vs. 34.5 hours) resulting in a factor of 2.5.

<sup>52</sup> 11,600 annual minutes also represents a 25% efficiency for a 15 hour work week. At 28% (the Ofcom estimate) the number of annual minutes would be about 13,100 per VI. The 25% rate can be used for a 24x7 service, while the 28% rate can be used for a service that does not operate on the weekends and at night. See section 7 of this paper. Minutes of use throughout this feasibility study represent minutes of relayed conversation time. Non relay time is spent on required breaks, waiting for calls, call set up, call wrap up, training, and other duties.

The EE/Sorenson report suggests that for the U.K., the total number of needed VRS part-time interpreters will be supplied in large part by the existing pool of interpreters.<sup>53</sup> However in Canada this is not a practical assumption. There are presently 599 ASL Canadian interpreters (members of AVLIC); however an estimated one-third of these are already employed by Sorenson providing VRS for U.S. consumers. The result is a present significant shortage of ASL interpreters. Requests for community interpreting are not being met.<sup>54</sup> While some percentage of the existing interpreters may end up working in VRS, more interpreters are needed to provide more community interpreting to meet the current demand. Likewise, the need for LSQ community interpreters is also not satiated. While LSQ interpreters are not working for U.S. VRS, the LSQ interpreter environment has the challenge that there are no LSQ interpreting standards, and the training program reports that many students do not complete their interpreting curriculum because they can get interpreting work without a training certificate. Thus LSQ faces the double challenge of not enough community interpreters and no established interpreter certificate or proficiency standard.<sup>55</sup> In Canada's community interpreting environment, it would likely be a significant hardship if there was a depletion of skilled interpreters who are currently servicing the Canadian Deaf population. For these reasons neither the existing ASL or LSQ interpreter pools should be expected to diminish the number of interpreters necessary for Canadian VRS.

Statistics Canada and other sources cite 20.1% to 24.8% ratio of French speakers to the total population.<sup>56</sup> We have applied a 23% LSQ and 77% ASL ratio to this study, including the relative percentage of needed LSQ and ASL interpreters. Applied to the existing numbers of LSQ and ASL interpreters, the total of each to support VRS is shown in the following chart. Like all forecasts, this will need to be confirmed as the service is deployed, in the event that there may need to be a higher (or lower) ratio of VRS interpreters for each language group.

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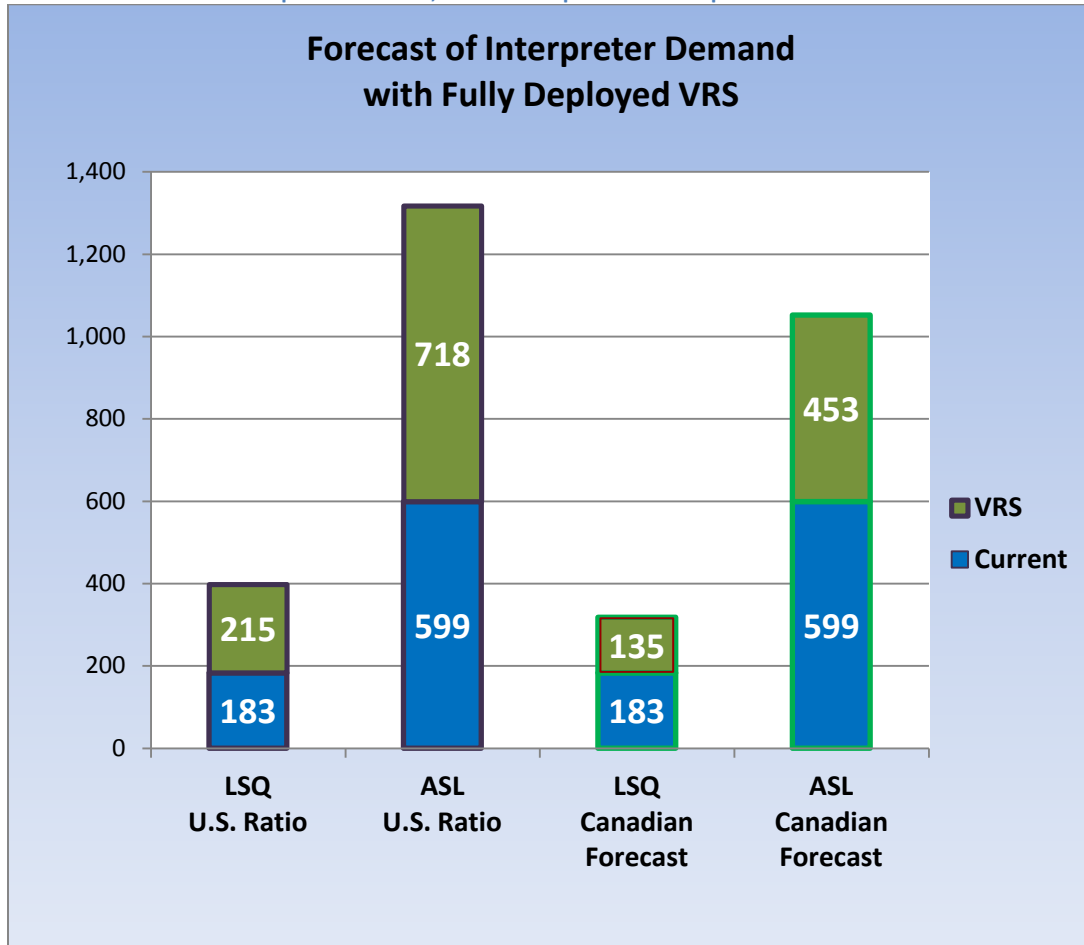
<sup>53</sup> Paragraph 2.29 of the EE/Sorenson report states that VRS in the U.K. will be supplied by the existing pool of 519 certified British Sign Language interpreters and by a larger unknown pool of uncertified interpreters that Sorenson claims are available but not working due to lack of demand (interpreting jobs). At paragraph 2.36 the EE/Sorenson report states that these uncertified and non-working interpreters only need interpreter training supplied by the VRS provider in order for the uncertified interpreters to be able to adequately interpret in a VRS setting. Ofcom does not address the Sorenson assumption that such minimal training is sufficient. For its Canadian VRS trial Sorenson initially used this approach, hiring interpreters that were not AVLIC members and thus had not graduated from a university sign language program. VRS trial users interviewed by Mission Consulting for this study reported that during this period the interpreting quality was so bad that they would often disconnect and call back multiple times until they obtained an interpreter with sufficient skills. It has been reported that Sorenson has subsequently changed its practice and currently only hires AVLIC members for the trial.

<sup>54</sup> The Canadian Hearing Society (CHS), which provides extensive community interpreting, reports that 30% of the requests that it receives for interpreting services cannot be met due to a shortage of interpreters. Gary Malkowski, CHS communication with Mission Consulting, 9/28/2011. Also see this study's phase 6, *Interpreter Considerations*.

<sup>55</sup> See this study's phase 6, *Interpreter Considerations*.

<sup>56</sup> This matches the data gathered by IPSOS when they conducted an online survey of 1,299 Deaf and hard of hearing people for this study's phase 3, *Consumer Interests and Perspectives*. Within the survey the ratio of ASL/English to LSQ/French was in the range of 4 or 5 to 1 (25% or 20%). However, the survey was not randomized.

Figure 6: Forecast of Canadian interpreter demand; numbers of part-time interpreters



For the equivalent U.S. Ratio (high forecast) an additional 933 interpreters are estimated to be needed (215 for LSQ and 718 for ASL) for a fully mature VRS serving 17,050 sign language users 24 x 7 at an average of 635 annual minutes per user.<sup>57</sup> For the more probable Canadian Forecast an additional 588 interpreters are estimated to be needed (135 for LSQ and 453 for ASL) for a fully mature VRS serving 15,345 sign language users (3,529 LSQ and 11,816 ASL) 24 x 7 at an average of 444.5 annual minutes per user.<sup>58</sup> These numbers are for a fully deployed and fully adopted VRS.

### 4.3. Key VRS Interpreter Demand Variables

The demand for LSQ and ASL interpreters to fulfill the needs of a potential Canadian VRS is dependent upon a number of factors as suggested in section 4.1. However, three variables are key to the demand

<sup>57</sup> The numbers of full time equivalent (FTE) interpreters represented by these numbers for the U.S. Ratio (high forecast) are 372 total: 86 LSQ and 287 ASL.

<sup>58</sup> The numbers of full time equivalent (FTE) interpreters represented by these numbers for the Canadian Forecast (probable forecast) are 235 total: 54 LSQ and 181 ASL.

estimates. The first is that the number of VRS consumers may be higher or lower than the number of users forecasted. The second is that the average number of annual minutes per user may be larger or smaller than that forecasted. The third is that the average number of VRS hours worked per part-time VI may be more or less than the 15 hours per week forecasted. All of these variables will be shown below compared to the two baseline forecasts (U.S. Ratio and Canadian Forecast) previously used. Of the two, the Canadian Forecast baseline is presumed to represent the probable baseline for Canada. Potential combinations of these variables are not depicted.

#### 4.3.1. The number of VRS consumers may vary

The interpreter demand forecast for a 24 x 7 fully subscribed service is based on the assumption that there will be 15,345 VRS users in the Canadian Forecast, (or 17,050 users in the U.S. Ratio forecast). However, as described in this study's phase 3, *Consumer Interests and Perspectives*, there are no reliable statistics on the number of sign language users in the U.S. or Canada. The forecasted number of Canadian VRS users is based on the best estimates available, as well as comparing an estimated U.S. Deaf population with the calculated (estimated) number of VRS users. The actual number of Canadian VRS users may differ from the 15,345 (or 17,050) forecast. The difference will affect the total number of VRS minutes, and therefore will affect the demand for VRS interpreters.

The following table depicts the forecasted number of part-time VRS interpreters needed, associated with potential changes in the number of VRS users. The baseline forecast is shown in bold.

**Table 7: U.S. Ratio – Changes in interpreter demand for variances in the number of VRS users of a 24x7 VRS**

Percent change in number of VRS users	Number of VRS users	Total Annual Minutes	Total VRS interpreters needed (LSQ & ASL)	LSQ VRS interpreters needed (at 23%)	ASL VRS interpreters needed (at 77%)
-20%	13,640	8,661,400	746	172	574
-10%	15,345	9,744,075	840	194	646
<b>0%</b>	<b>17,050</b>	<b>10,826,750</b>	<b>933</b>	<b>215</b>	<b>718</b>
+10%	18,755	11,909,425	1,026	237	790
+20%	20,460	12,992,100	1,120	258	862

**Table 8: Canadian Forecast – Changes in interpreter demand for variances in the number of VRS users of a 24x7 VRS**

Percent change in number of VRS users	Number of VRS users	Total Annual Minutes	Total VRS interpreters needed (LSQ & ASL)	LSQ VRS interpreters needed (at 23%)	ASL VRS interpreters needed (at 77%)
-20%	12,276	5,456,682	470	108	362
-10%	13,811	6,138,768	529	122	408
<b>0%</b>	<b>15,345</b>	<b>6,820,853</b>	<b>588</b>	<b>135</b>	<b>453</b>
+10%	16,880	7,502,938	647	149	498
+20%	18,414	8,185,024	706	162	544

#### 4.3.2. The average number of VRS minutes per consumer may vary

In the U.S. Ratio forecast, the average number of minutes per VRS consumer is forecast at 635 annual minutes, or 53 minutes a month. In the Canadian Forecast, the average number of minutes per VRS consumer is forecast at 444.5 annual minutes, or 37 minutes a month. Both forecasts are for a fully subscribed service with maximum usage. However, the Ofcom report for potential VRS in the U.K. offers three widely varying projections: 30 minutes per month per user, 50 minutes, and 100 minutes. While this study's forecast for Canadian VRS is based on the average U.S. consumer's usage rate or an adjustment to it, an increase (or decrease) in VRS minutes actually used by Canadian consumers of VRS will make a proportional increase (or decrease) in interpreter demand.

The forecast of the demand for the number of part time VRS interpreters based on the U.S. Ratio average of 635 annual minutes of VRS use per average consumer are shown below in Table 9 for a 24 x 7 VRS servicing 17,050 consumers, each averaging: 735 annual minutes, the baseline estimate of 635 annual minutes, and 535, 435 and 335 annual minutes. A similar forecast of part time VRS interpreters for the Canadian Forecast is shown in Table 10 with a different range of annual minutes. In both tables the two baseline forecasts are shown in bold font.

**Table 9: U.S. Ratio – Changes in interpreter demand for variances in minutes per user, for 17,050 users, 24x7**

Average Annual Minutes per User	Average Minutes per Month	Total Annual Minutes	Total VRS interpreters needed (LSQ & ASL)	LSQ VRS interpreters needed (at 23%)	ASL VRS interpreters needed (at 77%)
335	28	5,711,750	492	113	379
435	36	7,416,750	639	147	492
535	45	9,121,750	786	181	605
<b>635</b>	<b>53</b>	<b>10,826,750</b>	<b>933</b>	<b>215</b>	<b>718</b>
735	61	12,531,750	1,080	249	831

**Table 10: Canadian Forecast – Changes in interpreter demand for variances in minutes per user, for 15,345 users, 24x7**

Average Annual Minutes per User	Average Minutes per Month	Total Annual Minutes	Total VRS interpreters needed (LSQ & ASL)	LSQ VRS interpreters needed (at 23%)	ASL VRS interpreters needed (at 77%)
235	20	3,602,023	311	71	239
345	29	5,288,077	456	105	351
<b>445</b>	<b>37</b>	<b>6,820,853</b>	<b>588</b>	<b>135</b>	<b>453</b>
545	45	8,353,629	720	165	555
645	54	9,886,405	852	196	657

While the above tables are illustrative of the effect of potential differences in consumer usage, they may also be used to gauge the effect of potential restrictions on consumers' usage that may be imposed by policy in order to limit or control the need for VRS interpreters.

### 4.3.3. The number of hours worked by VRS interpreters may vary

Based on the typical VRS staffing experience in the U.S. stated by Sorenson in the EE/Sorenson report and adopted by the Ofcom report, the forecasted number of hours worked per week by the typical Video Interpreter is 15 hours at an average VI efficiency of 25% resulting in approximately 11,600 annual minutes of VRS per part-time interpreter. However the Canadian experience may be that the average interpreters engaged in VRS may work more or less than 15 hours a week, and therefore may relay more or less than the 11,600 annual minutes. An increase or decrease in the average working hours can have a dramatic impact on the overall number of interpreters needed for a full 24 x 7 fully subscribed VRS experiencing 10,826,750 (U.S. Ratio, Table 11) or 6,820,853 (Canadian Forecast, Table 12) annual minutes of use, at 25% interpreter efficiency, as shown in the tables below. The baseline forecasts are shown in bold.

**Table 11: U.S. Ratio** – Number of part-time interpreters needed for different hours worked per week; 10,826,750 annual minutes

Average hours worked per week	Annual minutes relayed per part-time VI	Total VRS interpreters needed (LSQ & ASL)	LSQ VRS interpreters needed (at 23%)	ASL VRS interpreters needed (at 77%)
10	7,733	1,400	322	1,078
<b>15</b>	<b>11,600</b>	<b>933</b>	<b>215</b>	<b>718</b>
20	15,467	700	161	539
25	19,333	560	129	431

**Table 12: Canadian Forecast** – Number of part-time interpreters needed for different hours worked per week; 6,820,853 annual minutes

Average hours worked per week	Annual minutes relayed per part-time VI	Total VRS interpreters needed (LSQ & ASL)	LSQ VRS interpreters needed (at 23%)	ASL VRS interpreters needed (at 77%)
10	7,733	882	203	679
<b>15</b>	<b>11,600</b>	<b>588</b>	<b>135</b>	<b>453</b>
20	15,467	441	101	340
25	19,333	353	81	272

## 5. Forecast of Canadian VRS Adoption Rate

The preceding sections present VRS forecasts when all forecasted consumers are using VRS and are doing so at a forecasted maximum average use per consumer. This section discusses the fact that due to constraining factors this maximum forecast usage is not expected to be reached for a number of years, if ever.

A reasonably large amount of data on VRS usage and traffic patterns are available for the U.S. market from the FCC and its administrative contractors, and information on other countries' VRS has also been referenced in published reports and in research conducted for this feasibility study's phase 4, *VRS Models in Other Countries*. As the amount of data is most extensive for the U.S. market, that data will be used and adjusted as appropriate to create the basis of Canadian VRS adoption forecasts. The information from other countries is also used to reflect consistency in usage patterns and adjustments to the forecasts as applicable.

### 5.1. U.S. VRS Adoption Rate

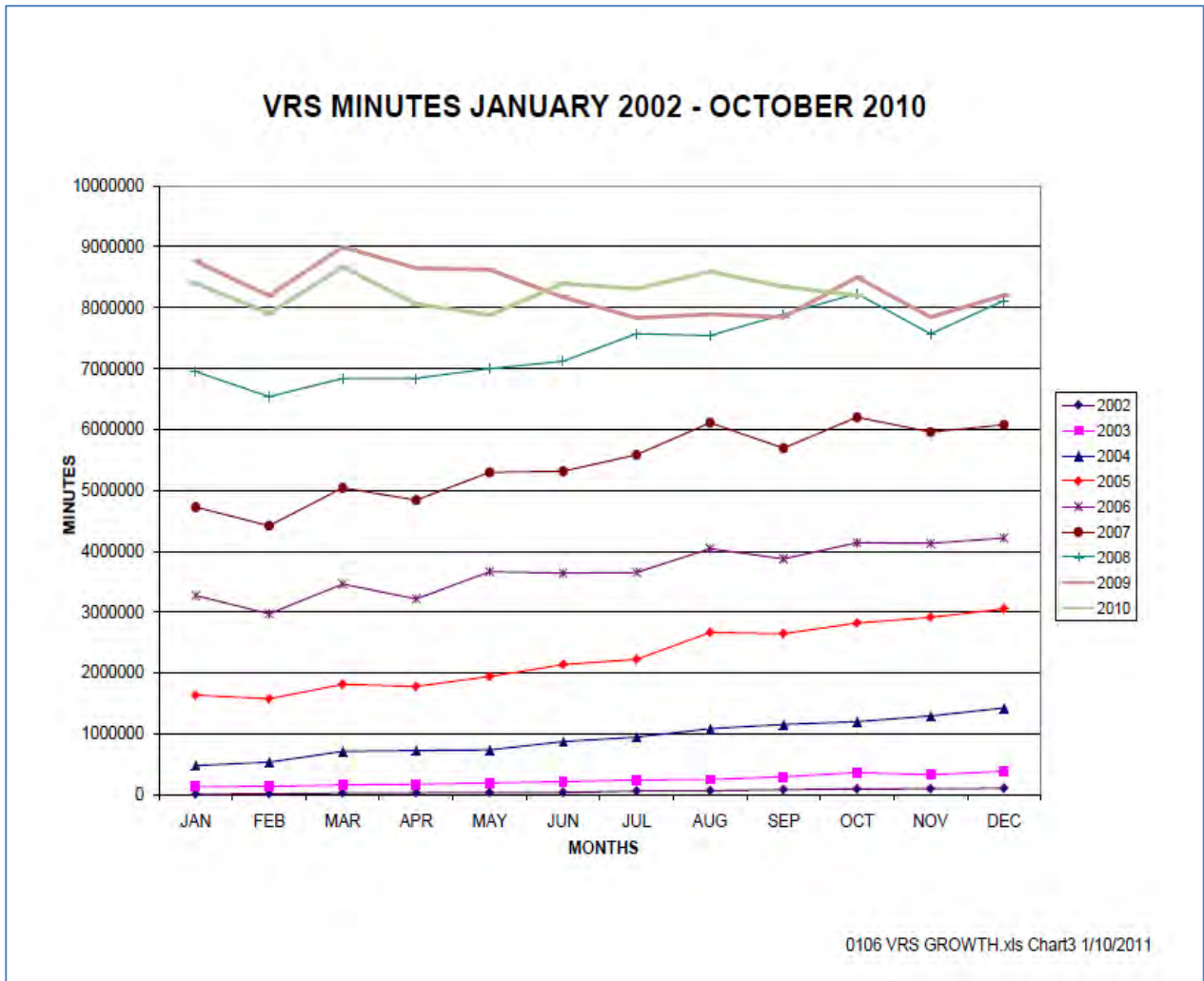
Technical trials of video relay services began in the United States in the mid 1990's in Texas. However it was not until the FCC approved the service for payment from the TRS Interstate Fund in 2000 that VRS became a national program. In 2002 the FCC reimbursement rate was increased to \$17 USD per service minute, and this encouraged many MRS providers and others to enter into the VRS business. The initially very high FCC reimbursement rates to vendors and a virtually unlimited fund source resulted in aggressive consumer marketing and deployment by U.S. VRS vendors, and a high rate of consumer adoption of the service. As stated in this study's phase 4, *VRS Models in Other Countries*, the high level of the FCC's funding helped create a highly competitive market with providers promoting their individual services as users transitioned from text-based TTY and IP relay.

In 2005 VRS volumes jumped dramatically and continued to have exponential growth until mid-2009. For example, the FCC reported 869,003 minutes of VRS use for June 2004, and a year later it reported 2,136,657 minutes of use in June 2005, a one year increase of 246%.<sup>59</sup> This spike in traffic is attributed by the FCC to be in part due to fraudulent activities, which then became highly publicized as the FCC sought to tighten controls over the regulations governing VRS. Figure 7 on the next page reflects the initial adoption rate and the annual growth of VRS in the U.S.

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<sup>59</sup> FCC, "Reminder That Video Relay services (VRS) Provides Access to Telephone System Only and Cannot Be Used as a Substitute for In-Person Interpreting Services or Video Remote Interpreting (VRI); Summary of Commission's document DA 05-2417, in CG Docket No. 03-123; Notice dated 10/12/2005

Figure 7: Adoption rate of VRS minutes of use 2002 – 2010, U.S.<sup>60</sup>



Comments on Figure 7, above:

- VRS minutes expanded steadily for the first six years of service.
- Monthly totals each year exceeded the same month in the previous year by 1 to 2 million minutes.
- In 2009 and 2010 VRS traffic appears to plateau at approximately 8 million minutes per month.
- The December 2008 level for VRS is similar to December 2009 and 2010.

<sup>60</sup> NECA, TRS Fund, VRS terminating call/minute summary 2010

## 5.2. Application of the U.S. Adoption Rate to Canada's VRS Forecast

Discounting the first year (2002), it took approximately six years for the U.S. market to achieve a stable full saturation in a 24/7 service. After reaching market maturity around 2008, additional increase in U.S. VRS minutes of use were largely due to fraudulent activities of certain VRS providers that the FCC has identified in its recent rulings. As indicated in section 3.3, some additional portion of the growth of VRS in the U.S. can be attributed to fraud and abuse. Unfortunately it is not possible to confirm the actual amount of fraud that impacted the minutes of use reported by NECA from 2000 to 2010.<sup>61</sup>

The primary factors that delayed the growth of VRS in the U.S. over this time period were:

- Lack of universal access to sufficiently fast broadband services
- Insufficient development of appropriate user technologies (video phones, software, etc)
- Insufficient numbers of qualified interpreters

All three of these issues improved over time to the degree that after six years, these restraints were effectively non-existent. Note that VRS program funding was not a restrictive factor in the deployment of VRS in the United States. In fact, the initially very high FCC reimbursement rates to vendors and a virtually unlimited fund source resulted in aggressive consumer marketing and deployment by U.S. VRS vendors.

In Canada today, only the last of the three U.S. restrictive factors exists:

- Insufficient numbers of qualified interpreters

Additionally funding may also be a factor that may constrain the availability of the service. At the point of this study, CRTC authorized funding of VRS in Canada has not yet been determined.

Nevertheless, the lack of interpreters is a significant constraint. Since it takes a minimum of five years to develop an ASL or LSQ interpreter, and since the Canadian college and university programs currently graduate only a small number of interpreters, and since almost all such programs have indicated that they are presently not able to increase the size of their programs (expand to graduate more students), it is therefore assumed that it will take at least ten years to develop the number of interpreters required for full VRS adoption, (i.e., to serve all forecast VRS users).<sup>62</sup> For Canada to reach this maturity of VRS users, an annual growth factor of 50% (applied and compounded monthly) is applied to the first month of service beginning with an estimated 500 users.

Using the U.S. Ratio (high forecast) data of an average of 635 minutes of use per user, the average number of 11,600 VRS minutes per part-time (15 hours per week) Video Interpreter, and the application

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<sup>61</sup> The National Exchange Carriers Association (NECA), the U.S. interstate relay fund administrator at that time.

<sup>62</sup> Ten years was established as the most reasonable expectation with the advice and unanimous concurrence of this study's VRS Advisory Committee members.

of a 50% growth rate up to the maximum forecasted number of 17,050 VRS users, the total annual minutes of use, and the number of part-time interpreters required for a 24/7 VRS in Canada are shown in the table below.<sup>63</sup>

**Table 13: U.S. Ratio – VRS minutes and number of part-time interpreters over 11+ years**

Year	Number of users (at 50% annual growth)	Annual minutes (ASL & LSQ)	Annual ASL minutes (at 77%)	Annual LSQ minutes (at 23%)	Total VRS interpreters required (ASL & LSQ)	ASL VRS interpreters required (at 77%)	LSQ VRS interpreters required (at 23%)
1	751	403,437	310,646	92,790	35	27	8
2	1,127	606,055	466,662	139,393	52	40	12
3	1,691	909,532	700,339	209,192	78	60	18
4	2,537	1,364,668	1,050,794	313,874	118	91	27
5	3,806	2,047,346	1,576,456	470,890	176	136	41
6	5,709	3,071,389	2,364,970	706,420	265	204	61
7	8,564	4,607,137	3,547,495	1,059,641	397	306	91
8	12,846	6,911,128	5,321,569	1,589,560	596	459	137
9	17,051	10,063,004	7,748,513	2,314,491	868	668	200
10	17,051	10,827,385	8,337,086	2,490,299	933	719	215
11+	17,051	10,827,385	8,337,086	2,490,299	933	719	215

Using the Canadian Forecast (probable forecast) data of an average of 444.5 minutes of use per user, the average number of 11,600 VRS minutes per part-time (15 hours per week) Video Interpreter, and the application of a 50% growth rate up to the maximum forecasted number of 15,345 VRS users, the total annual minutes of use, and the number of part-time interpreters required for a 24/7 VRS in Canada are shown in the table below.

**Table 14: Canadian Forecast – VRS minutes and number of part-time interpreters over 11+ years**

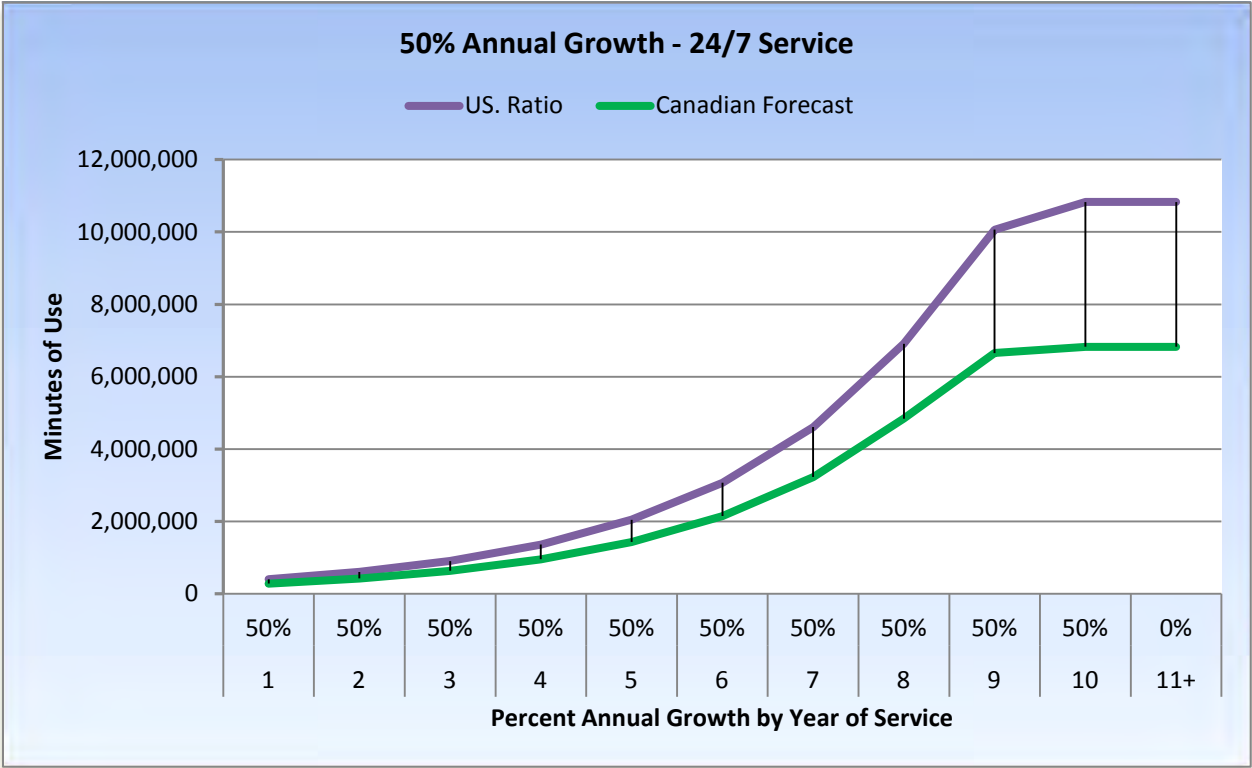
Year	Number of users (at 50% annual growth)	Annual minutes (ASL & LSQ)	Annual ASL minutes (at 77%)	Annual LSQ minutes (at 23%)	Total VRS interpreters required (ASL & LSQ)	ASL VRS interpreters required (at 77%)	LSQ VRS interpreters required (at 23%)
1	751	282,723	217,697	65,026	24	19	6
2	1,127	424,715	327,031	97,685	37	28	8
3	1,691	637,388	490,789	146,599	55	42	13
4	2,537	956,342	736,383	219,959	82	63	19
5	3,806	1,434,754	1,104,761	329,993	124	95	28
6	5,709	2,152,391	1,657,341	495,050	186	143	43
7	8,564	3,228,623	2,486,040	742,583	278	214	64
8	12,846	4,843,232	3,729,288	1,113,943	418	321	96

<sup>63</sup> For simplicity of presentation, the tables and figures in this study's phase 9 and 10 reports that forecast adoption over time depict the increasing number of people that will use VRS each year, and use a fixed average number of annual minutes of use per person. However, actual growth will be more complex, with many users not reaching their average maximum usage (number of minutes) until about the third year after signing up for the service. Nevertheless, these forecast adoption tables and figures present workable estimates of total minutes (and in phase 10, costs) and associated VRS interpreter resources.

Year	Number of users (at 50% annual growth)	Annual minutes (ASL & LSQ)	Annual ASL minutes (at 77%)	Annual LSQ minutes (at 23%)	Total VRS interpreters required (ASL & LSQ)	ASL VRS interpreters required (at 77%)	LSQ VRS interpreters required (at 23%)
9	15,345	6,656,384	5,125,416	1,530,968	574	442	132
10	15,345	6,828,525	5,257,964	1,570,561	589	453	135
11+	15,345	6,828,525	5,257,964	1,570,561	589	453	135

The rates of usage (total annual minutes) in the above two tables are depicted graphically as follows:

Figure 8: 24/7, 50% annual VRS growth



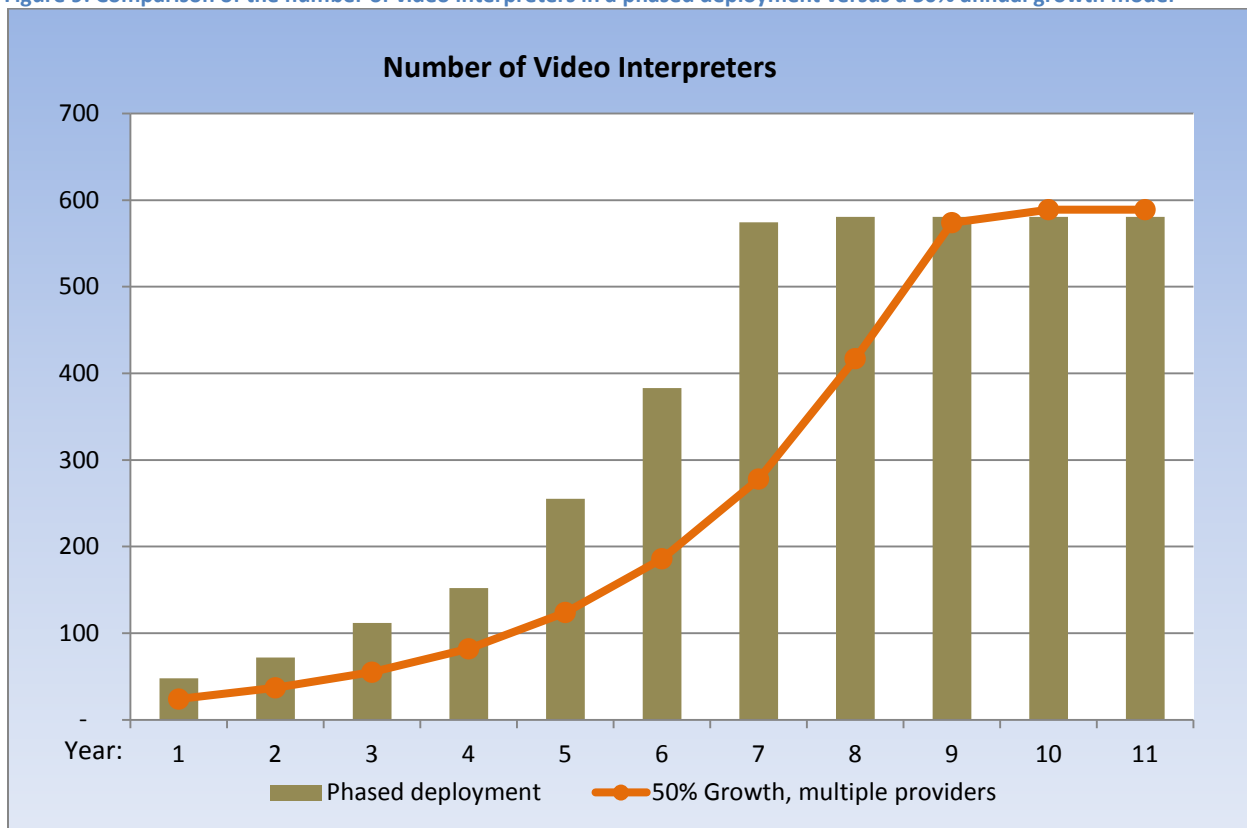
Once the service becomes established a regular review of the actual traffic versus forecasted traffic levels is recommended to ensure that adjustments can be made that reflect actual usage patterns and current actual restrictions.

### 5.3. Effect of the Selection of a VRS Model

The above forecasts of VRS adoption over time may be significantly influenced by the various VRS model components actually selected for implementation, as discussed in this study’s phase 11, *Potential Canadian VRS Models*. For example, an adequately funded initially controlled phase of implementation may result in more interpreters being available for VRS at the beginning of the service (and therefore more allowed users and minutes) than is depicted in the above tables and charts.

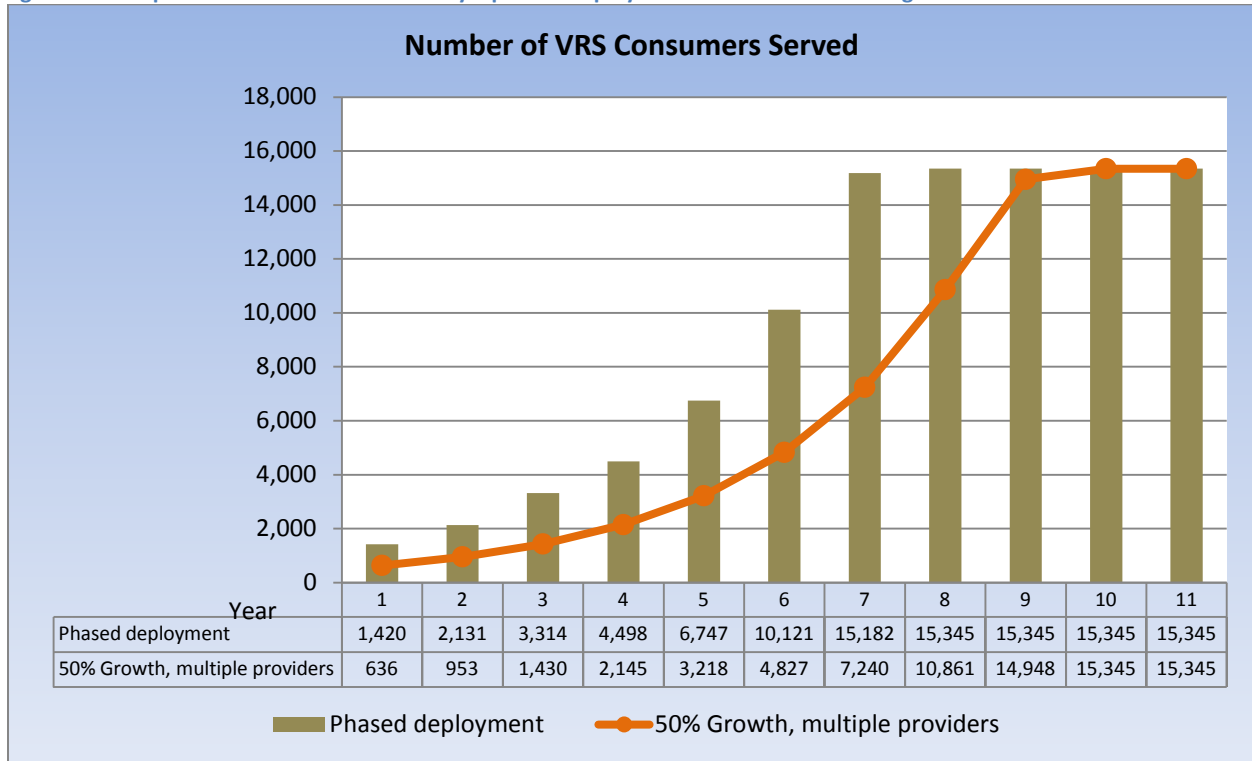
In phase 11<sup>64</sup> such analyses and recommendations are provided that state that after an initial set up period, this type of two-phased deployment centering on interpreter training programs and interpreter agencies will increase the availability of interpreters and VRS. Based on the detailed assumptions of this approach in phase 12, sections 7.2 and 7.3.3, the two graphs below contrast the number of interpreters or number of consumers served by the recommended two-phased approach compared to the equivalent numbers of the 50% growth scenario.

Figure 9: Comparison of the number of video interpreters in a phased deployment versus a 50% annual growth model



<sup>64</sup> Phase 11, sections 4.2.1, 4.3, 16.2.3 and 16.3.

Figure 10: Comparison of consumers served by a phased deployment versus a 50% annual growth model

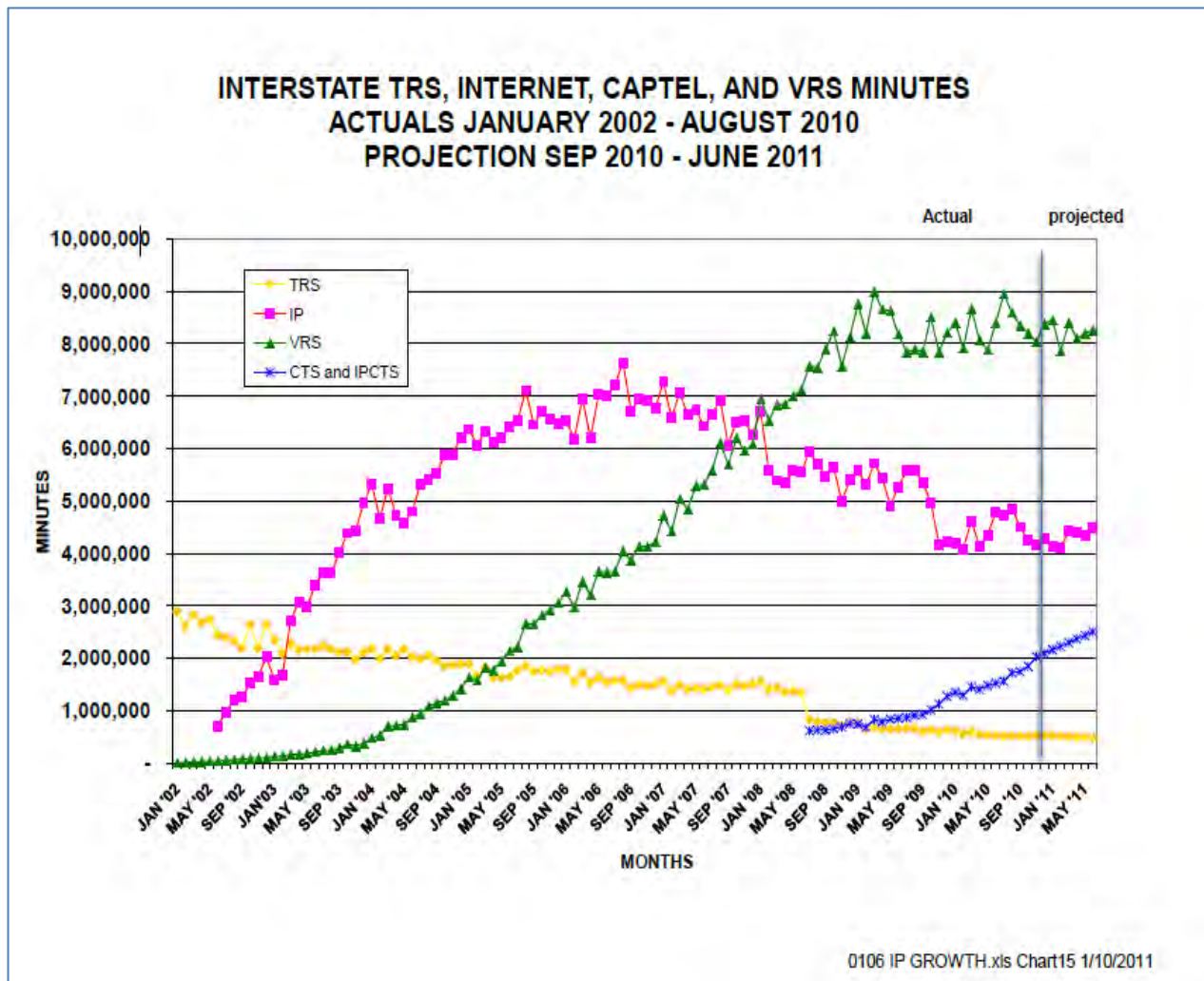


## 6. Effect of VRS Adoption on Other MRS Modalities

### 6.1. Effect of VRS on Other MRS Traffic in the U.S.

In the U.S. the dramatic growth of VRS, as well as the introduction of IP-relay and Captioned Telephone Service, effectively reduced the user demand for traditional TTY MRS (TRS) usage, as reflected in Figure 11 and Figure 12 below:

Figure 11: Comparison of different modes of relay, U.S.<sup>65</sup>

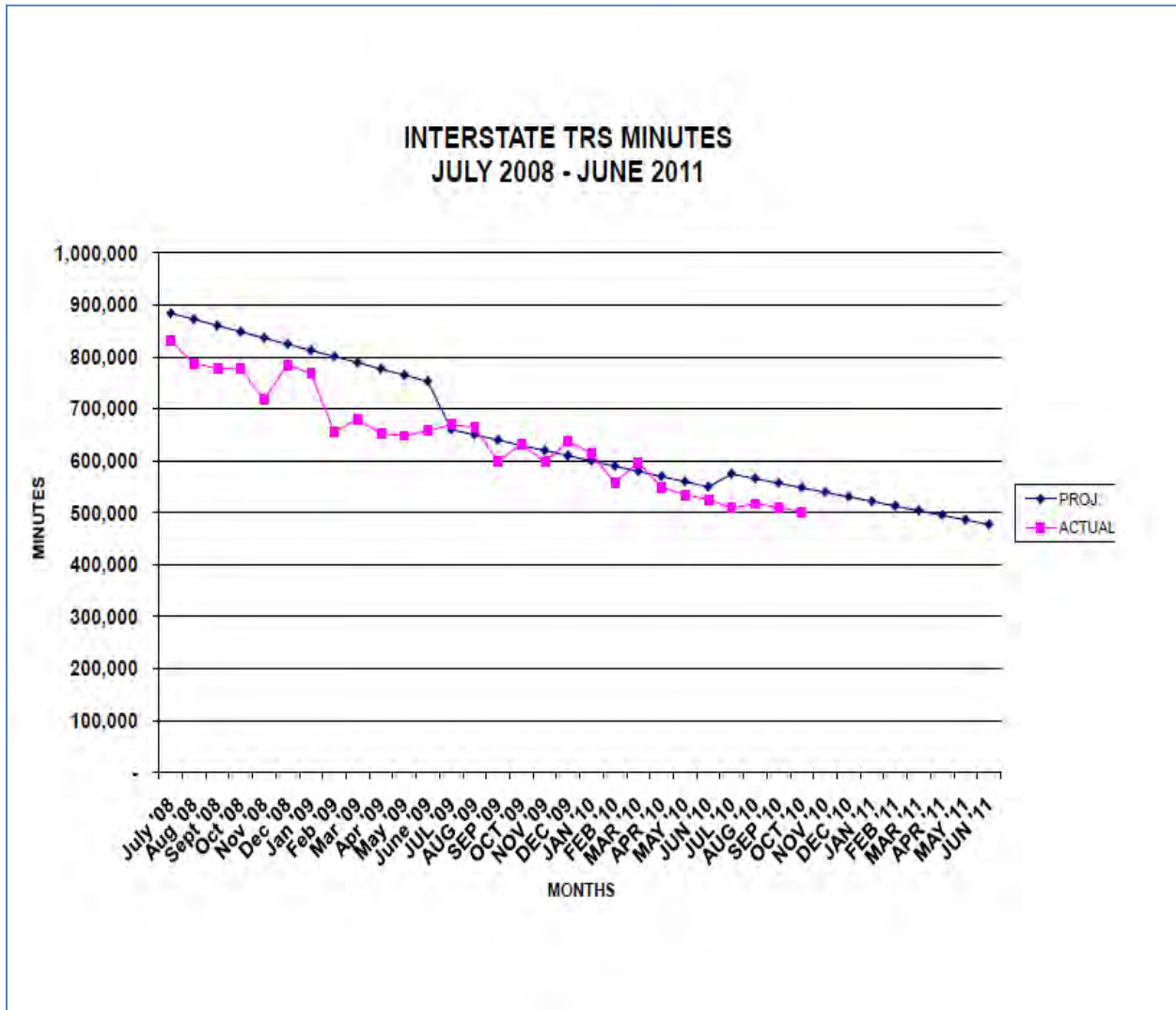


Comments on Figure 11, above:

- Different technologies have affected the volumes in other sectors as they progress from introduction to maturity.
- Traditional TRS volume declines as users migrate to new technologies.
- Growth of VRS and IP-Relay far exceed the previous TRS usage or its relative decline.
- Both IP relay and VRS use had steep increases in the first few years after introduction and then appeared to level off or decline.
- Total TTY traffic declined from 2002 to 2011 by 83 percent due to the combined adoption of IP-relay, VRS, captioned telephone relay; and other non-relay forms of communication between Deaf and hearing people (email, texting, etcetera.)

<sup>65</sup> NECA TRS Fund Interstate TRS, Internet, CapTel, and VRS minutes 2010

Figure 12: Decline in interstate TTY-relay minutes<sup>66</sup>



Comments on Figure 12, above:

- The chart shows the continued decline of TTY-relay that is depicted in Figure 11, but at a more readable scale.
- Although the chart only shows inter-state traffic (not intra-state traffic), it clearly depicts the trend of declining traditional TTY-relay TRS traffic volumes.
- July 2008 demand ≈ 840,000 minutes. July 2011 projection ≈ 450,000 minutes. This represents a 46% decline in only three years.

<sup>66</sup> NECA TRS Fund Interstate TRS minutes 2010

## 6.2. Projected Effect of VRS on Other MRS Traffic in Canada

Although a reduction in TTY-relay and IP-relay usage in Canada is expected as VRS is adopted, this reduction is not forecast to be proportionate to the expansion of the new VRS services. TTY-relay usage may eventually decrease to about a quarter of current levels.<sup>67</sup> As a new service, IP-relay will continue to grow, but should not grow at as high a rate or reach as high a total usage, due to VRS usage supplanting IP-relay usage. Using the data from the U.S. decrease in MRS traffic, a forecast is provided reflecting compounding reductions in traditional TTY MRS traffic of approximately 18% per year. See this study's phase 10, *Cost Variables and Forecasts*, for an expanded discussion of the effect of VRS on traditional TTY-relay costs.

## 7. Potential Effect of Limited Hours of Availability

In order to understand the implications of a potentially partial or limited service schedule for Canadian VRS, examination of the daily and weekly traffic cycles is useful. In the United States, where the service is available at all times, very clear traffic patterns emerge.

### 7.1. U.S. Call Volume Detail

Figure 13 reflects typical U.S. VRS traffic by time of day. Figure 14 shows typical U.S. VRS call traffic by day of the week. The ebb and flow of VRS traffic generally mirrors the patterns documented for MRS.

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<sup>67</sup> This decline in TTY-relay usage will also be due to the adoption of IP-relay, as well as VRS.

Figure 13: VRS hourly call volume, U.S.<sup>68</sup>

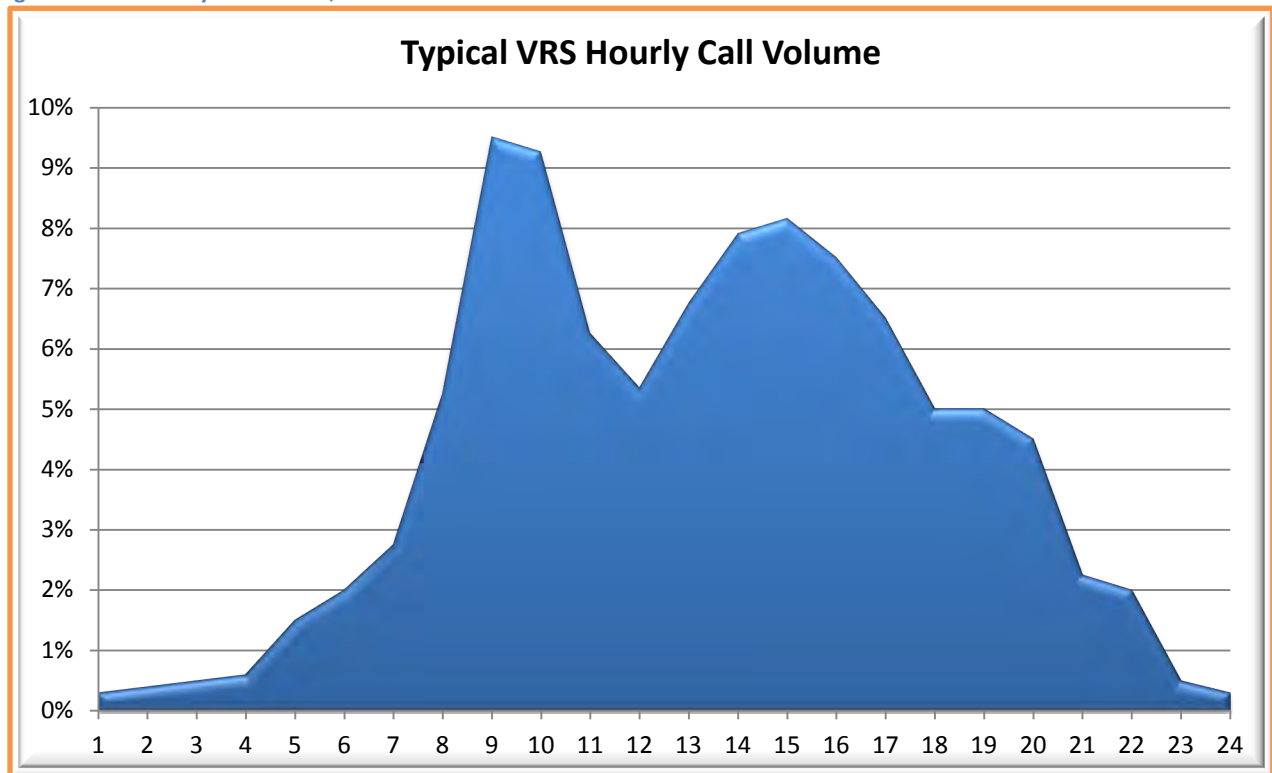


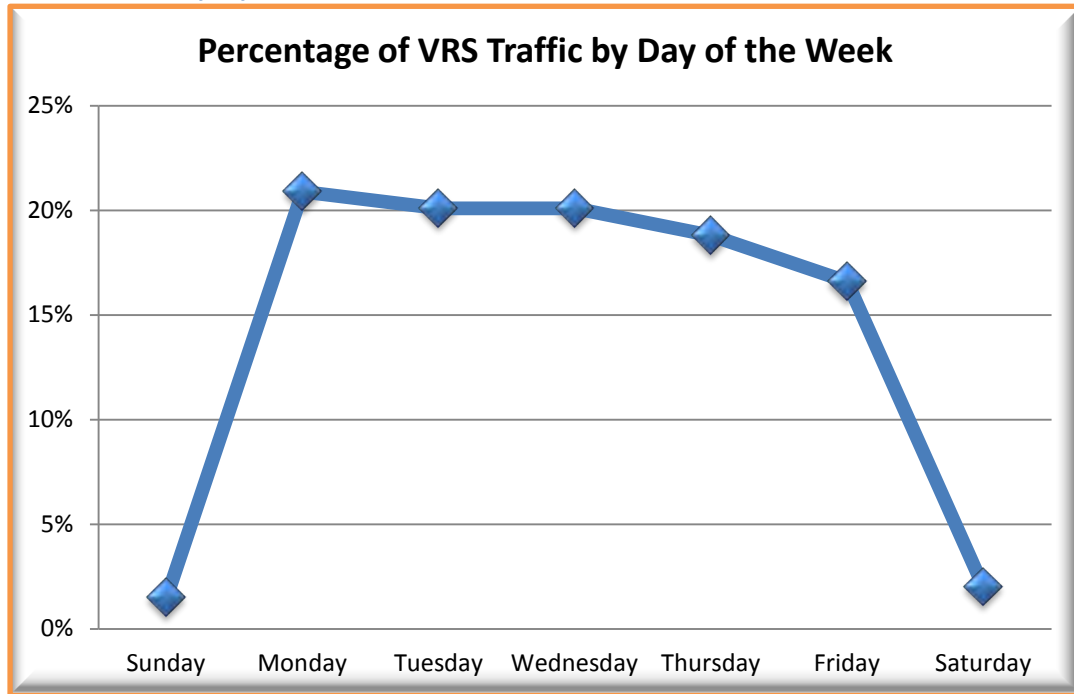
Figure 13 shows the VRS call distribution pattern throughout the day using actual data recently obtained from one of the main VRS providers in the United States. The daily usage for VRS in the United States is comparable to VRS usage in other countries. To confirm this constancy, similar charts were produced for a 2010 VRS study for France, which show similar usage patterns for VRS in Germany, Sweden and France.<sup>69</sup>

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<sup>68</sup> Compiled from actual VRS traffic from a confidential U.S. provider during other project work; further validated from similar traffic charts from ARCEP, Autorité de Régulation des Communications Électroniques et des Postes; “Évaluation des besoins des personnes sourdes ou malentendantes en matière d’accessibilité des services téléphoniques”; Final Report; March 1, 2010

<sup>69</sup> ARCEP, Final Report, March 1, 2010

Figure 14: VRS traffic volumes by day of the week, U.S.<sup>70</sup>



This VRS call distribution pattern throughout the week again uses actual data obtained from a VRS provider in the United States. Like the time of day report, weekly usage for VRS in the United States is comparable to that of other countries.

VRS call traffic peaks on Mondays and gradually tapers off through Friday. This calling pattern reflects the usage concentration for work and commerce-related calls (banks, medical, retail, etc.) during the week. The traffic is reduced significantly over the weekend. Again, the charts produced for France's VRS study show similar usage patterns for VRS in Germany, Sweden and France.<sup>71</sup> The primary difference between Figure 14 and those for the French report is that the French report does not reflect any Sunday call traffic, even though Germany and Sweden both offer VRS service on Sunday.

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<sup>70</sup> Compiled from actual VRS traffic from a confidential U.S. provider during other project work; further validated from similar traffic charts from the ARCEP Final Report, March 1, 2010

<sup>71</sup> ARCEP, Final Report, March 1, 2010

## 7.2. Application of Traffic Variations to a 12 Hour, 5 Day Schedule

A consideration under discussion has been the possibility of an initial Canadian VRS schedule that might provide service for less than 24 hours a day. Approximately 79% of VRS call traffic is generated between 8 AM to 8 PM, Monday through Friday. A significant portion of the potential 21% of VRS traffic that occurs outside of these hours may be satisfied by point-to-point video, text messaging, IP relay and TTY MRS. For example if 20% of the evening and weekend traffic was redirected by users to occur during VRS operational hours of 8 AM to 8 PM Monday through Friday, and 80% of the evening and weekend traffic used alternative forms of communication, then the overall amount of VRS traffic occurring during the 8 AM to 8 PM Monday through Friday operational hours would be 83% of total unrestricted 24 x 7 demand.

VRS providers, like MRS providers, are also correct in their observations that there is a lack of staffing efficiency in off-peak hours. However, as they have a significantly reduced staff in slow periods, the overall inefficiency is relatively minor compared to their total cost for provisioning a relay service.

Nevertheless, for a comparative analysis, the implications for interpreter demand due to a 17% reduction in overall minutes of use for a 12-hour service 5 days a week is estimated over 11+ years at a 50% growth rate, and using a 28% interpreter efficiency factor, the forecast of minutes of use and the demand for interpreters is depicted in Table 15 and Table 16, below:

**Table 15: U.S. Ratio – Reduction in minutes and numbers of part-time interpreters for a 12 hour 5 day a week service**

Year	Annual minutes (ASL & LSQ at 83%)	Annual ASL minutes (at 77%)	Annual LSQ minutes (at 23%)	Total VRS interpreters required (ASL & LSQ)	ASL VRS interpreters required (at 77%)	LSQ VRS interpreters required (at 23%)
1	334,852	257,836	77,016	26	20	6
2	503,025	387,329	115,696	38	30	9
3	754,911	581,282	173,630	58	44	13
4	1,132,674	872,159	260,515	86	67	20
5	1,699,297	1,308,459	390,838	130	100	30
6	2,549,253	1,962,925	586,328	195	150	45
7	3,823,923	2,944,421	879,502	292	225	67
8	5,736,237	4,416,902	1,319,334	438	337	101
9	8,352,293	6,431,266	1,921,027	638	491	147
10	8,986,730	6,919,782	2,066,948	686	528	158
11+	8,986,730	6,919,782	2,066,948	686	528	158

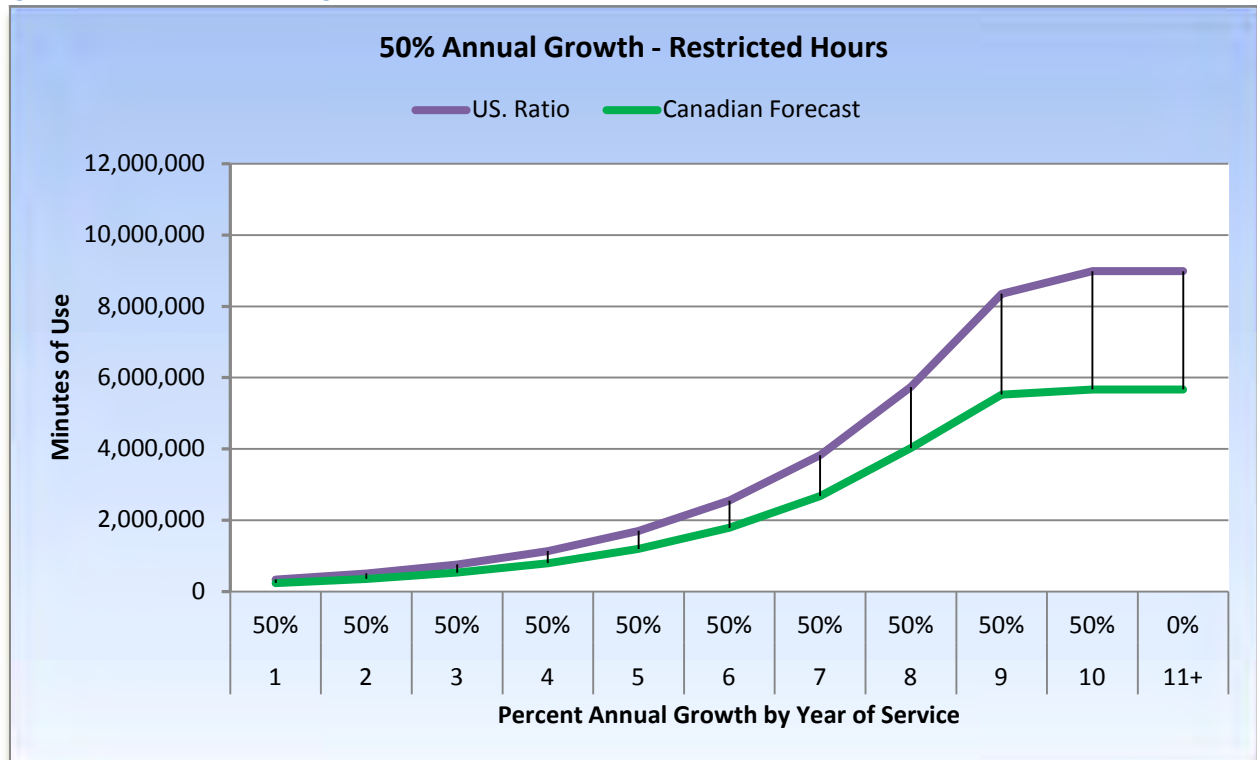
A similar table for the Canadian Forecast is shown below:

**Table 16: Canadian Forecast – Reduction in minutes and numbers of part-time interpreters for a 12 hour 5 day a week service**

Year	Annual minutes (ASL & LSQ at 83%)	Annual ASL minutes (at 77%)	Annual LSQ minutes (at 23%)	Total VRS interpreters required (ASL & LSQ)	ASL VRS interpreters required (at 77%)	LSQ VRS interpreters required (at 23%)
1	234,660	180,688	53,972	18	14	4
2	352,514	271,436	81,078	27	21	6
3	529,032	407,355	121,677	40	31	9
4	793,764	611,198	182,566	61	47	14
5	1,190,846	916,951	273,895	91	70	21
6	1,786,484	1,375,593	410,891	136	105	31
7	2,679,757	2,063,413	616,344	205	158	47
8	4,019,882	3,095,309	924,573	307	236	71
9	5,524,799	4,254,095	1,270,704	422	325	97
10	5,667,676	4,364,110	1,303,565	433	333	100
11+	5,667,676	4,364,110	1,303,565	433	333	100

The rate of usage (total annual minutes) in the above two tables are depicted graphically as follows:

**Figure 15: Restricted access VRS growth**



## 8. Factors That May Affect User Demand

From the Canadian *full deployment* projection, the phased ten year adoption projections are postulated for the gradual introduction of VRS in Canada. The ability to achieve such this schedule is dependent on many variables. In part, these include:

- Availability of qualified interpreters.
- The consumers' preexisting experience with point-to-point video and broadband services.
- The consumers' ability to afford hardware, software and broadband services, as well as possible fees or charges associated with the service.
- The consumers' technical competence, as well as the age and ability of the consumer to adapt to new technologies.
- Preparation of consumers' hardware, software and network to ensure adequate video quality and ease of use.
- The successful introduction of the VRS experience to consumers on both sides of the conversation so that they have a positive experience with VRS.
- Communication preferences of the consumers and whether those preferences are offered.
- Attractiveness and availability of ancillary services like Video Remote Interpreting (VRI) and Video Mail.
- Education and outreach to inform users of reasonable expectations from the service.
- The model of VRS selected for Canada.<sup>72</sup>
- The availability of program funding.
- Potentially restricted hours of VRS availability.

Also, as perhaps may have been experienced during the current Telus VRS trial, the initial volume of traffic and perceived consumer adoption rate can be greatly impacted by the number of users that are accepted into the program, by issues such as limitations in equipment distribution/installation or registration procedures.

This section of the report will briefly review some of the more significant factors that can alter the forecast of user demand for VRS in Canada. These factors are all common to the deployment of video relay service and not necessarily unique to Canada.

Detailed discussions of these topics are found in this VRS Feasibility Study's phases 3, 4, 5, 6, 7 and 8; and are only referenced herein in summary as they pertain to potential effects on user demand.

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<sup>72</sup> Potential models are discussed in this VRS Feasibility Study's phase 11, *Potential Canadian VRS Models*.

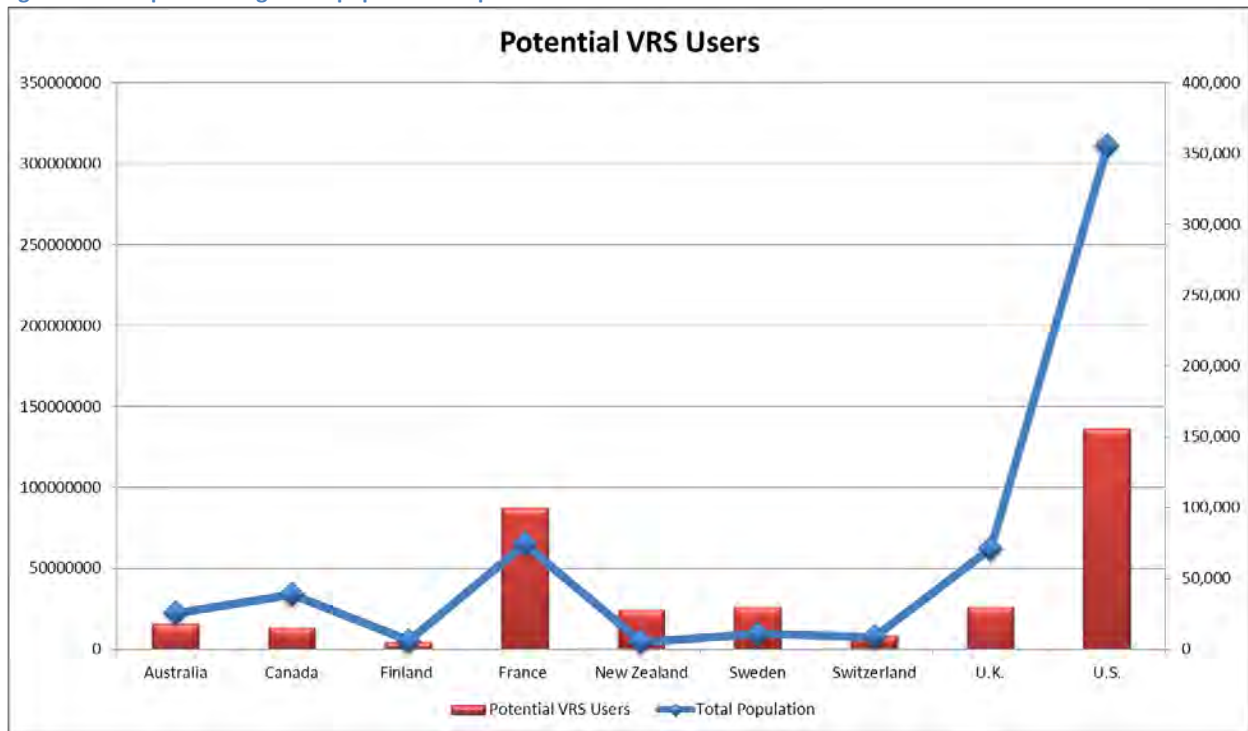
## 8.1. Potential VRS Consumer Populations/Demographics

A significant challenge to forecasting VRS demand is the variation of opinions and data regarding the potential populations of VRS users. What is unique to Canada is the need to accurately count two different demographic groups, one for ASL users and one for LSQ users. These numbers become even more complex as one tries to account for subsets (such as which users are hard of hearing, do not know ASL or LSQ and yet may benefit from using video relay service if speech reading is offered as a mode of communication).

Accurate statistics of the Canadian Deaf population are historically difficult to obtain, as is trying to discover how many of these individuals use signed language as their primary form of communication. The Canadian census does not include statistics for Deaf, hard of hearing, ASL or LSQ users. An in-depth discussion of the populations of potential VRS users is included in this study's phase 3, *Consumer Interests and Perspectives*. Comparative population and VRS user data is also found in this study's phase 4, *VRS Models in Other Countries*.

Figure 16 compares total population numbers and potential VRS users of various countries as reported in this study's phase 3 for Canada and phase 4 for other countries. This figure illustrates that the numbers of potential Canadian VRS users identified in this study is consistent with ratios in other countries. Variances in ratios are due in part to dissimilar methods of measurement used in different countries.

Figure 16: Comparison of general population to potential VRS users in other countries



## 8.2. Availability of Broadband to the Consumer

The availability of broadband services is another factor that could impact the accuracy of forecasted demand volumes. Broadband technology is necessary for the sign language VRS consumer to access the VRS provider's call center interpreters. It is important that a majority of the user population have the ability to connect to video relay services through some form of high-speed Internet (DSL, cable, Wi-Fi, 3G or 4G wireless, or satellite). Although virtually 100 percent of Canada's population has access to broadband at speeds that support VRS, as stated in this study's phase 5, *Technologies and Their Forecasts*, approximately 80% of the general population are presently subscribed to VRS compatible broadband services.<sup>73</sup> The broadband subscription rates of the Deaf are however unknown. Regardless of the current Deaf subscription rate, it should increase when VRS becomes available. Consumer access to VRS should only be a problem from a cost perspective; if some Deaf consumers cannot afford broadband, then broadband subscription and usage costs will represent a barrier to VRS usage. At present there is no valid data available to estimate the degree of this potential barrier.

## 8.3. Availability and Ease of Use of End User Equipment

VRS compatible end user equipment is widely available in various forms: stand-alone videophones, computers with web cams, and mobile devices. Equipment costs vary from about \$150 to a few hundred dollars. Client software, either downloaded on a consumer's existing computer or as a website function, is usually provided by VRS vendors at no charge. In some countries' VRS models equipment costs are subsidized in whole or in part, either by the VRS vendors or by a government agency. However, most VRS models cannot provide end-users with a computer or laptop on which to install the VRS software. Similarly, smartphone devices or mobile tablets and their associated cellular and data service plans are usually the financial responsibility of the Deaf user. At present there is no valid data available to estimate the degree that this potential consumer cost barrier may affect VRS user access and therefore demand.

Many potential VRS users may require individual assistance in setting up their equipment to access VRS and additional instruction in how to use the VRS interface software application. Therefore user equipment could also be artificially unavailable by insufficient end user support installation and customer service support. Again, no data is available regarding this potential barrier, except that as demonstrated by its converse, Sorenson has acquired about 80 to 85 percent of the U.S. VRS consumer market in principal part by providing the VRS equipment at no charge, installing it in Deaf consumers' homes for free, and simultaneously providing instruction by a trained Deaf installer.<sup>74</sup> As noted in this

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<sup>73</sup> See this study's phase 5, *Technologies and their Forecasts*.

<sup>74</sup> Sorenson also achieved this high rate by installing most of its consumer equipment in a proprietary mode that only allowed consumers to use the equipment with Sorenson, and with other VRS consumers who were customers of Sorenson.

study's phase 5, *Technologies and Their Forecasts*, many Deaf consumers will require technical assistance with their end user equipment.

#### **8.4. Availability of Interpreters**

The availability of qualified sign language interpreters is perhaps the most significant factor that may limit VRS adoption and usage volumes in Canada. Without interpreters available to handle the volume of incoming calls, the overall VRS program service is affected. Every VRS user that initiates a "call" into the service is routed through a queue to the "next available interpreter". When all interpreters are busy and the queue starts adding up, the queue time extends and wait times become unacceptable. This is the point where a frustrated consumer may end the call and look for alternative options. This would represent a change in the forecast as user behavior is altered when there are not enough interpreters.

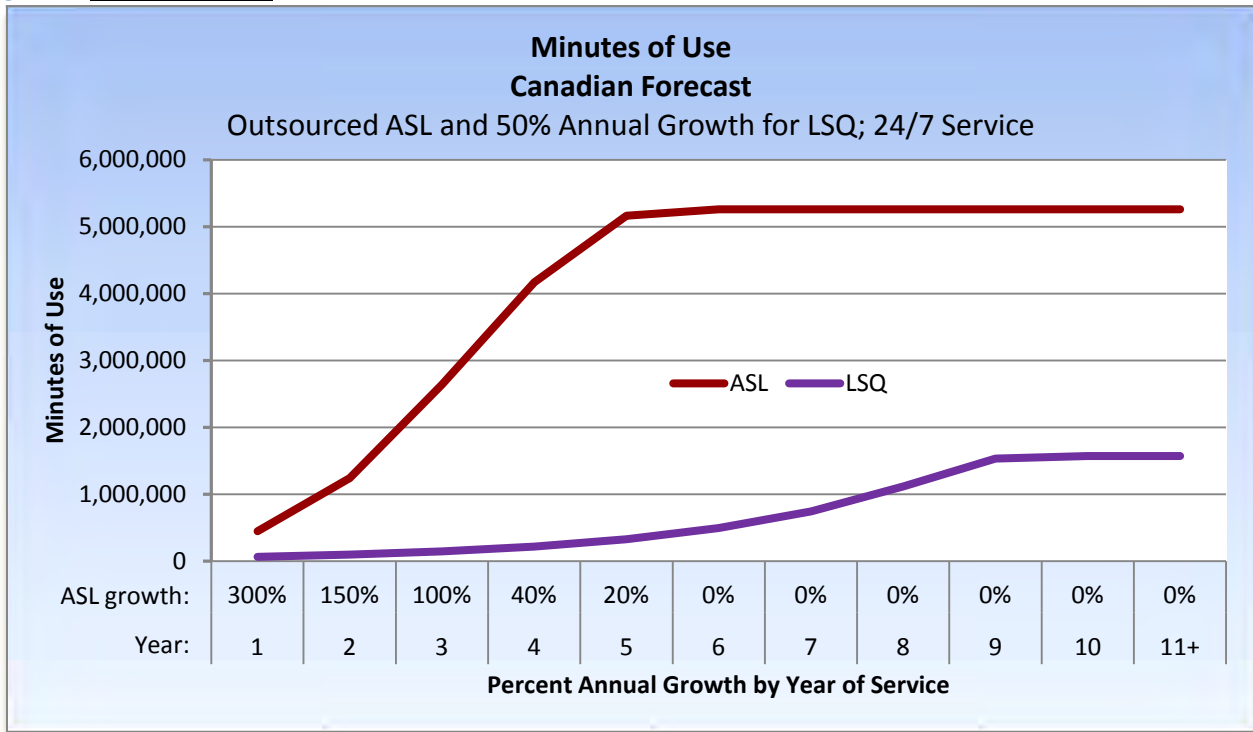
Although estimates of how the change is quantified are too difficult to ascertain, there are some general factors that can help understand the impact. To begin with, an initial ramp-up does not represent a full traffic load on the program during the early phases of deployment. As detailed in this study's phase 6, *Interpreter Considerations*, it typically takes at least five years of university study and practice for an ASL or LSQ interpreter to achieve qualified proficiency, the Canadian interpreter teaching programs provide only a small number of annual graduates, and most programs are not in a position to easily expand. The ten year adoption rate presented in section 5.2 is predicated on the current unavailability of VRS interpreters in Canada, and the time that may be required to develop interpreters through expanded Canadian university or college training programs.

The VRS model that is chosen for Canada can also impact the availability of interpreters. If a 24/7 model is chosen the demand for interpreters will be greater than in a limited schedule. A model that uses ASL interpreters located in the United States also deflects much of this constraint for ASL consumers, but not for LSQ consumers.

#### **8.5. Outsourcing ASL VRS to the U.S.**

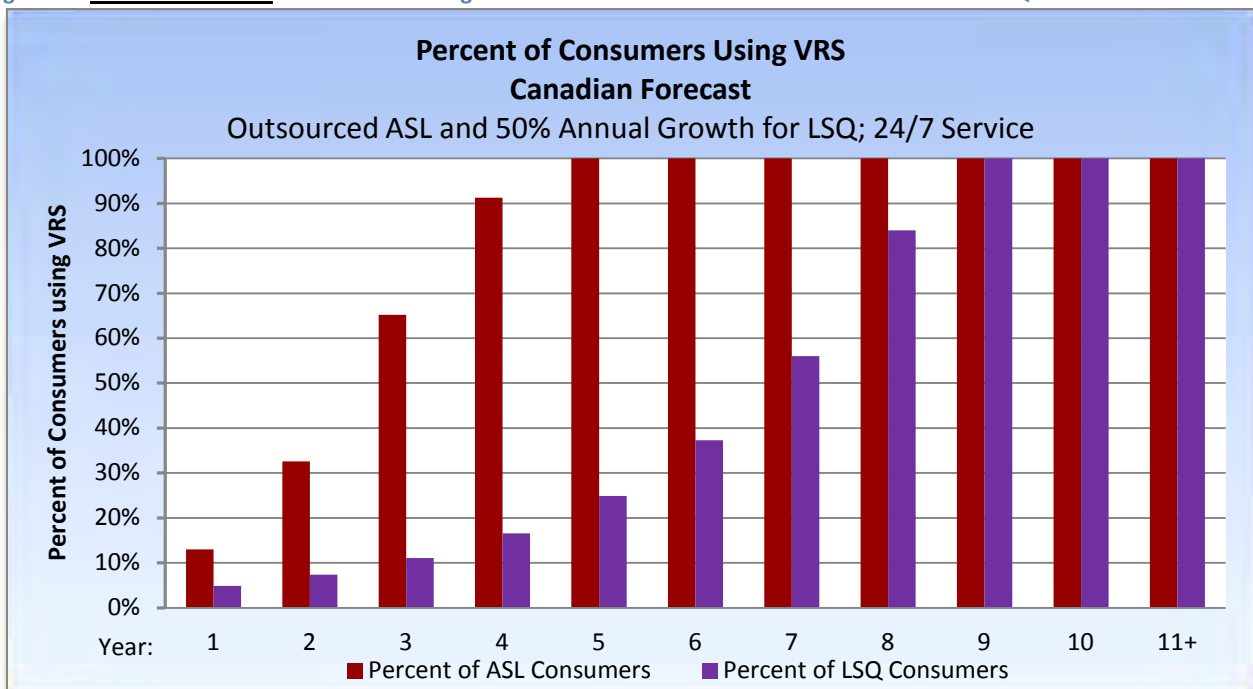
If Canadian ASL VRS were outsourced to a VRS provider located in the United States, the primary factor limiting Canadian ASL VRS usage, the shortage of interpreters, would be removed. In this case a more aggressive adoption rate for ASL VRS would be expected, particularly in response to the pent up demand from Canadian Deaf who have been waiting for a long time for VRS. A suggested resulting ASL VRS adoption shown over eleven years is provided below.

Figure 17: Canadian Forecast – VRS forecast minutes of use for U.S. outsourced ASL, contrasted with Canadian LSQ



The same adoption model for outsourced ASL again contrasted with a 50% annual growth rate for LSQ is shown in the following figure as the forecast percentage of the estimated total number of ASL consumers (11,816), and the forecast percentage of the estimated total number of LSQ consumers (3,529) that would use VRS, by year.

Figure 18: Canadian Forecast – VRS forecast usage for U.S. outsourced ASL contrasted with Canadian LSQ



The above two charts are based on Table 17, below.

**Table 17: Canadian Forecast – Outsourced ASL forecast adoption rates**

Year	ASL Annual Growth Rate	ASL Number of Users	Percent of ASL Consumers	ASL Minutes of Use	LSQ Annual Growth Rate	LSQ Number of Users	Percent of LSQ Consumers	LSQ Minutes of Use
1	300%	1,540	13%	449,784	50%	173	5%	65,081
2	150%	3,850	33%	1,242,218	50%	260	7%	97,826
3	100%	7,700	65%	2,641,298	50%	390	11%	147,073
4	40%	10,780	91%	4,168,908	50%	585	17%	220,609
5	20%	11,816	100%	5,165,968	50%	878	25%	330,858
6	0%	11,816	100%	5,258,120	50%	1,317	37%	496,546
7	0%	11,816	100%	5,258,120	50%	1,976	56%	744,856
8	0%	11,816	100%	5,258,120	50%	2,964	84%	1,117,469
9	0%	11,816	100%	5,258,120	50%	3,529	100%	1,532,432
10	0%	11,816	100%	5,258,120	0%	3,529	100%	1,570,405
11+	0%	11,816	100%	5,258,120	0%	3,529	100%	1,570,405

## 8.6. Interpreter Quality of Service

The quality of the VRS interpreters’ skills and knowledge will affect the consumers’ experiences and may therefore affect forecasted usage. If the quality of the VRS communication is lacking, some consumers may prefer other communication methods.

In Canada, only 9 percent of ASL AVLIC members have passed a standardized certification test. No other Canadian national proficiency tests exist for ASL or LSQ interpreters. See this study’s phase 6, *Interpreter Considerations*, for details of this issue, and the current adaptation to this problem undertaken by the interpreter agencies and training programs. However, in general VRS interpreting is more demanding than in-person community interpreting. Some training can be expected to be provided by VRS provider firms, but only as a supplement to a solid interpreter training program from a university and associated community interpreting experience.

The degree that this issue may potentially impact VRS usage in Canada is unknown.

## 8.7. Security and Fraud Prevention Measures

Fraud or misuse of VRS impacts the overall program traffic levels. It can affect the availability of network and interpreter resources, as well as result in lost funds for the VRS program. The United States VRS environment has had a high incidence of fraudulent call volumes and costs; other countries have not reported any VRS fraud or misuse. This does not necessarily mean that other countries are exempt from this type of activity; the nature and volume of fraud may be such that they are not being reported or are not triggering changes in regulatory oversight. However, it is likely that the for-profit

nature of VRS in the United States, the very high reimbursement rates, the initial relaxed regulatory environment, and the government's effort to protect the rights of the consumers all combined to create a market conducive to fraud.

The United States model is an example of why this category can be so important to the overall forecast of services. As evidenced in the recent declarations and rulings by the FCC, this can be a complex issue that does not necessarily have one simple solution. However, the effect of fraud in the U.S. has been significantly increased VRS use (making services correspondingly unavailable for normal consumer VRS use), and higher program costs, wasting millions of dollars of program funds.

Steps to prevent VRS fraud should be implemented within the regulations and contracts for VRS in Canada or increased VRS usage and costs may result.

### **8.8. The Impact of Speech-Reading on VRS Usage**

VRS is used for many different visual languages around the world. As identified in this study's phase 3, *Consumer Interests and Perspectives*, and phase 8, *Potential Related Services*, VRS also has the potential to provide telecommunications access to people who use other forms of visual communication besides ASL and LSQ. The primary additional form is "speech reading" (also called "lip reading") used mainly by people who are hard of hearing or who became deaf after learning to speak and do not sign, typically later in life.

While there are no known reliable statistics on the number of speech reading individuals in Canada, the online survey conducted as part of the phase 3 research, indicate a very low prevalence of speech reading individuals, even through a generally accepted estimate is that one-tenth of the general population is hard of hearing. Out of 1,299 respondents, only 2.8 percent (n=37 people) used speech reading without the support of a visual language (e.g., ASL). Of these 37 speech readers, 13 percent (n=5 people) stated they would use VRS less than ten times per month, and only 9 percent (n=3 people) stated they would use VRS more than ten times per month. Thus forecast usage for speech reading is negligible, with no apparent measurable impact upon VRS usage. Furthermore, as indicated in this study's phase 6, *Interpreter Considerations*, no extra skills are needed by interpreters to provide speech reading VRS functionality.

### **8.9. The Impact of Video Remote Interpreting on VRS Usage**

Video Remote Interpreting (VRI) is similar to VRS except that it provides interpreting services between two or more individuals who are together in the same room or venue.<sup>75</sup> VRI is generally not considered a telecommunications or message relay service and therefore is outside the jurisdiction of the CRTC. The inclusion of VRI within VRS (that is, as an allowed service reimbursed as VRS minutes) is therefore unlikely. As discussed in the phase 8 report, VRI can operationally be offered within VRS, but it is also

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<sup>75</sup> VRI is discussed in this study's phase 8, *Potential Related Services*.

dependent upon the availability and training of VRS Interpreters. VRI is only offered in a couple other countries as part of VRS. There is little available VRI usage data from these few constrained examples.<sup>76</sup> At this time it is not possible to determine what the impact of including VRI in VRS would be on minutes of use and interpreter resources. The potential increase of usage of VRS, if VRI was included within the definition of VRS, could potentially be very high.<sup>77</sup> The only way to effectively determine its potential impact would be through an initial implementation research phase in which VRI was measured.

## 8.10. Public Education and Outreach

While outreach to potential VRS Deaf users may affect the adoption rate, education of Deaf users of the equipment requirements and set up, service access, and communication protocols will affect adoption and traffic more. Correspondingly it will be important to educate the hearing public about the new VRS program, and to not hang up on a VRS interpreter calling on behalf of a sign language user.

Both of these types of public education and outreach are important for a smooth roll out and satisfactory adoption of the service. Poor education and outreach may potentially negatively impact VRS usage. The degree of negative impact may not be noticed however if the access to the service is significantly less than consumer demand; for example in a multi-year rollout constrained by lack of interpreters or program funding.

Different models of service accomplish or neglect public education and outreach differently. Of the countries researched for this study's phase 4, *VRS Models in Other Countries*, Sweden has clearly demonstrated an outstanding VRS education and outreach program. Other countries, such as the U.S., let outreach to potential Deaf users be managed by the VRS providers with few mandated requirements, while essentially neglecting all outreach to the hearing population. While some outreach budget information is available from some countries, e.g., Australia, no cost or other data exists that can be used to meaningfully forecast the potential impact of public education and outreach on VRS usage. Potentially this information may be available if public education and outreach is incorporated within an initial implementation research phase.

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<sup>76</sup> VRI is offered in France, but not as a free service. Norway reports that 25% of its VRS calls (not minutes) are VRI.

<sup>77</sup> Although VRI may be presently funded in part by some provincial governments, for the purpose of this study the usage and cost of VRI is only being considered as potentially part of the allowed services that are approved for reimbursement as VRS.

## 9. Summary of Variables, Risks, Impacts and Outcomes

### 9.1. Variables

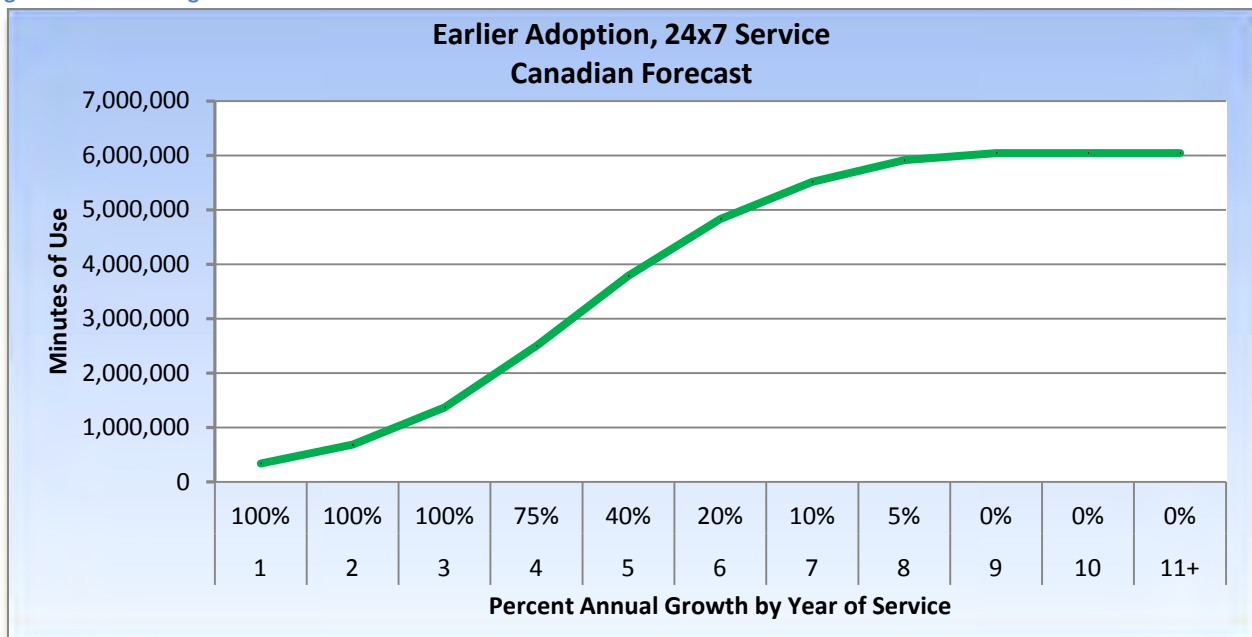
There are many variables that will potentially affect VRS usage rates. Some of these variables are the assumptions described in this phase 9 study, others cannot be quantified at this time. Some variables pose significant impact to potentially changing usage, while others represent less impact. The outcomes of each variable will affect overall realized usage. Some of these variables could be quantified through a carefully planned initial implementation research phase that is specifically designed to measure these and other factors. However the effect of some variables will be unknown, even with such initial research, until regular service is experienced over time.

In this study, VRS usage rates have been presented in four scenarios:

- 1) A fully subscribed 24/7 service (maximum expected usage)
- 2) A 24/7 service in which maximum usage is achieved over ten years of 50% annual growth
- 3) The ten year projection diminished by 17% due to restricted hours of availability (8 AM to 8 PM, Monday through Friday)
- 4) A 24/7 service in which the ASL portion is outsourced to the U.S., and the LSQ portion is retained within Canada

How the variables are actually applied will determine what the adoption/usage rates will look like over time. For example, another possible growth scenario where the adoption rate is higher in the earlier years of service may look like that shown below.

Figure 19: Modified growth curve



## 9.2. Potential Risks, Impacts and Outcomes

Table 19 summarizes a number of significant variables that may affect adoption or usage of VRS, their potential level of impact, the likelihood of occurrence, and the potential effect or outcome. Most of these variables have been discussed elsewhere in this VRS Feasibility Study and are therefore listed in an abbreviated format.

Usage variables that have the following combinations of potential impact and likelihood are color coded for risk value as follows:

Table 18: Color codes for risk values

RISK VALUE	Potential Impact on Usage	Likelihood of Occurrence
LOW	Low	Low
LOW	Low	Medium
LOW	Low	High
LOW	Medium	Low
MEDIUM	Medium	Medium
MEDIUM	Medium	High
MEDIUM	High	Low
HIGH	High	Medium
HIGH	High	High

The final adoption/usage rate of VRS will be determined by how all of the variables actually combine.

Table 19: Table of VRS usage variables

Principal VRS Usage Variables	Potential Impact on Usage	Likelihood of Occurrence	Potential Effect on VRS Usage (Outcome)
<b>Legal</b> (study phase 2)			
The CRTC may elect to not require VRS interoperability and may restrict consumers to only access VRS provided by their telephone company.	Medium	Low	Consumer demand for VRS will remain high, although the adoption rate may be somewhat slowed
Relayed access to 9-1-1 through VRS may be mandated 24/7	High	Low	The requirement to staff and operate a 24/7 call center will increase the need for interpreters in a VRS that is otherwise restricted by time of day.
<b>Consumers</b> (study phase 3)			
The ASL and LSQ populations may be different than estimated.	High	Medium	May increase or decrease overall demand
The ratio of ASL to LSQ populations may be different than estimated.	Medium	Low	May increase or decrease demand in one group

Principal VRS Usage Variables	Potential Impact on Usage	Likelihood of Occurrence	Potential Effect on VRS Usage (Outcome)
The adoption rate of (actual demand for) VRS by the ASL or LSQ populations may differ (one group may adopt at a higher rate than the other).	Low	Low	May increase or decrease demand in one group
Canadian consumers may be more knowledgeable about VRS and ready for the service than initial U.S. consumers were.	High	Medium	The adoption rate may be higher than forecast if other constraints do not prevail
Canadian consumers may have a more pent up demand for VRS than initial U.S. consumers were.	High	High	The adoption rate may be higher than forecast if other constraints do not prevail
<b>Technical (study phase 5)</b>			
Technical assistance to VRS consumers may be insufficient or not in an accessible format.	Medium	Medium	May reduce the adoption rate but only minimally impact the eventual total adoption
Automated digital interpreters (avatars) of sufficient quality for VRS may be used in place of live video interpreters	High	Low	Because this technology is not anticipated to be available in the near term, it will have no impact on VRS for the foreseeable future
<b>Interpreters (study phase 6)</b>			
The overall number of available and qualified interpreters may be less than estimated.	High	Medium	Will decrease the ability of VRS to meet the demand for service; hence usage will be reduced
The number of available and qualified ASL or LSQ interpreters willing to work in VRS may be different than estimated.	Medium	Medium	The availability of VRS will be disproportionate for the ASL and LSQ communities. Usage will be related to VI availability
Availability of ASL interpreters may be greater than LSQ interpreters, in the beginning and over time.	Medium	Medium	Usage of LSQ VRS will lag behind ASL VRS
The number of interpreters will not support the VRS adoption or demand forecasts	High	High	VRS traffic will be restricted to the availability of VIs. VRS usage will be less than forecast.
Interpreter training programs (colleges) may not be able to develop interpreters fast enough to meet the consumer demand for VRS.	High	High	Availability will need to be artificially restricted or there will be excessively long wait times
There is negative public reaction to too many interpreters being removed from community interpreting for employment with VRS.	High	High	CRTC may decide to restrict VRS usage in order to balance interpreter availability between VRS and the community
Interpreter quality may not be sufficient to meet the needs of the consumers.	Medium	Medium	Usage demand may be lessened. Call durations may be lengthened resulting in fewer calls handled
<b>Quality of Service (study phase 7)</b>			
Consumers may experience long answer times (they may be forced to wait a long time before they reach a video interpreter).	High	Medium	The number of calls serviced may be fewer, depending on how long it takes to reach a video interpreter

Principal VRS Usage Variables	Potential Impact on Usage	Likelihood of Occurrence	Potential Effect on VRS Usage (Outcome)
Consumer education (particularly to hearing users) may be insufficient.	Low	High	Usage may be somewhat lessened if consumers' VRS calls are frequently hung up on by the hearing party
VRS fraud and misuse may be a significant occurrence	Low <sup>78</sup>	Low	High levels of fraud and misuse will take away interpreter and funding resources that should be available for legitimate VRS calls
VRS interpreter work schedules (length of shift, amount of call time, etc) may be different than estimated. (The number of minutes per hour VIs are expected to relay varies by provider.)	Medium	Medium	The amount of VRS traffic (minutes of use) that can be relayed will increase or decrease depending upon work schedules
Quality of Service feedback mechanisms may be insufficient or there may be a lack of administrative and consumer oversight of QoS.	Low	Medium	If ongoing QoS is not addressed, the consumers' experience and usage will be diminished.
<b>Potential Related Services (study phase 8)</b>			
Video Remote Interpreting (VRI) may be made a part of VRS services. (This is unlikely because VRI is not considered a telecommunications relay service and therefore is outside the jurisdiction of the CRTC.)	High	Low	VRI demand is unknown, but potentially could be quite high; thereby significantly increasing VRS usage, the need for VRS interpreters, and program costs <sup>79</sup>
The VRS platform could be made available to VRS providers for VRI use, but paid for by the VRS providers and VRI consumers	Low	High	Would lessen the demand for VRI and its outcomes described above <sup>80</sup>
Other potential services, such as video mail, other modes of visual communications (e.g., speech-reading), availability of specialized interpreters, French-ASL and English-LSQ translations, and interfacing with 9-1-1, may not be included within VRS.	Low	Medium <sup>81</sup>	The unavailability of these services will not lessen the demand for VRS, but will make VRS less complete
<b>Forecasts of VRS User Demand (study phase 9)</b>			
Canadian VRS users may average more or less than the forecast 444.5 VRS minutes per user per year.	Medium	Low	Usage will increase or decrease relative to changes in demand

<sup>78</sup> The impact and likelihood of fraud and misuse in Canadian VRS is dependent upon the controls put in place by the CRTC and the contracting authority. If few controls are implemented, then the potential impact and the probability of fraud and misuse will both be "High".

<sup>79</sup> VRI could potentially relieve demands for community interpreters, while simultaneously providing more on-site (virtual) interpreting.

<sup>80</sup> Same as previous footnote except to a lesser degree.

<sup>81</sup> Some of these other services are likely to be included, while others are not. This "Medium" rating represents a blend of probabilities. See this study's phase 8 for more information.

Principal VRS Usage Variables	Potential Impact on Usage	Likelihood of Occurrence	Potential Effect on VRS Usage (Outcome)
The number of actual Canadian VRS users may be different than forecast.	Low	Low	Since potential differences are not expected to be significant, impact on costs should be minimal
<b>Cost Variables and Forecasts (study phase 10)</b>			
The CRTC may not authorize enough funds to pay for a full-service 24/7 VRS. If enough funds are not available, either VRS will not be approved, its availability will need to be constrained, or it will need to be paid for in part by consumers	Medium	Low	Reduced availability of funds will likely result in reduced VRS hours rather than non-approval of VRS or the requirement that consumers pay its costs
Usage costs may be partially paid for by the consumers instead of by VRS program funding	Medium	Low	May significantly reduce the demand for VRS, depending on how much of the cost is borne by consumers
End user VRS equipment may cost the consumer, instead of subsidized or paid for by others	Low	High	May slightly reduce the adoption rate but only minimally impact the eventual total adoption
End user broadband service may cost the consumer, instead of subsidized or paid for by others	Low	High	May slightly reduce the adoption rate but only minimally impact the eventual total adoption
<b>VRS Models (study phase 11)</b>			
The adopted Canadian model may initially be less than a full 24/7 service.	Medium	High	Approximately 17% fewer calls will be made
Canadian ASL VRS may be provided by companies located in the U.S.	High	High	If other constraints do not prevail, the availability of ASL VRS to Canadian consumers and their adoption rate could be very high
Consumers may be required to register before they can use VRS. (Registration may be used as a means to regulate usage – restrict who is approved to use VRS, limit minutes of use per consumer, and/or share costs by consumers). <sup>82</sup>	Low	Medium	May restrict usage to the degree that registration is used as a tool to limit consumer access to VRS or modify consumer behaviour
The CRTC may not approve an open market for providers (multiple providers competing for customers)	Low	Low	Adoption rates may be less than those experienced in the U.S.
VRS providers may be precluded from offering point-to-point video calling for free (since point-to-point is not relay). <sup>83</sup>	High	Low	Consumer demand for VRS may be lessened, significantly reducing the adoption rate
The CRTC may elect to begin offering VRS through a well planned multi-year initial implementation research phase. <sup>84</sup>	High	Medium	May decrease or regulate usage during the research, but may facilitate the ability to thereafter accommodate higher demand

<sup>82</sup> May also be used as one means to respond to potential fraud or misuse.

<sup>83</sup> Point-to-point video calling without the use of an interpreter is estimated to represent about 80 percent of the call traffic carried by the VRS provider's systems, but without significant cost to the provider or the VRS program.

## 10. Conclusion

By applying reliable traffic data from the U.S. and reports from various sources, this research summary estimates the number of likely Canadian VRS consumers and their usage at full VRS saturation. It also estimates the number of video interpreters needed for both ASL and LSQ to respond to the VRS traffic at various stages and at full saturation. These estimates are presented as a ratio of current U.S. data (the U.S. Ratio), and adjusted to accommodate conditions in Canada (the Canadian Forecast). The Canadian Forecast data portrays VRS in Canada at significantly less usage than the U.S. Ratio's equivalents. The Canadian Forecast data assumptions are presented in sections 3.3, 4.0, 5.2, 5.3, 7.2 and 8, and are conservatively estimated, especially when compared to the VRS experiences of non-U.S. countries or the unique Canadian environment. Therefore the Canadian Forecast estimates might still be considered to be higher than may be actually experienced.

Although forecasts for users, traffic and interpreters are provided, achieving the realization of a VRS program will be dependent on its greatest restriction, the availability and quality of ASL and LSQ video interpreters. Other factors, including funding and the consumer experience will also influence user demand.

Nevertheless, consumer interest in VRS is very strong, as demonstrated in this VRS Feasibility Study Report's phase 3, *Consumer Interests and Perspectives*, and usage is expected to be strong if consumers are given the opportunity to access the service.

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<sup>84</sup> All countries except the U.S. have entered into VRS via a measured trial period. While the CRTC has authorized a VRS trial currently conducted by Telus/Sorenson, an initial VRS implementation research phase could address issues pertinent to how VRS may best be implemented on a full scale, rather than to answer the question whether or not VRS is technically feasible.