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The Ownership of the Internet and the World Wide Web in Vermont

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Valuing Common Assets for Public Finance in Vermont

VERMONT COMMON ASSETS TRUST FUND

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Date: 2009

Pay to the order of: **Every Vermont Citizen** **\$1,972.00**

One thousand, nine hundred seventy-two and 00/100 Dollars

For: Payment for use of common assets

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Vermont Green Tax and Common Assets Project

MPA Program and Gund Institute
University of Vermont

November 2008

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Vermont Green Tax and Common Assets Project

This project has the purpose of achieving environmental sustainability, distributional equity, and an efficient economy through the use of market mechanisms like green taxes and common asset payments. We advocate achieving environmental sustainability and a steady-state economy by taxing throughput (depletion, land use, and pollution) more, and value added less. In addition, we promote a new economic paradigm based on the recovery of revenue from privatized common assets, and management of the commons by trustees responsible to current and future generations. Equity can be achieved by charging economic rent on unearned income from enclosure of "the commons", and distributing this revenue directly to everyone in society, as done by the Alaska Permanent Fund.

Director: Gary Flomenhoft

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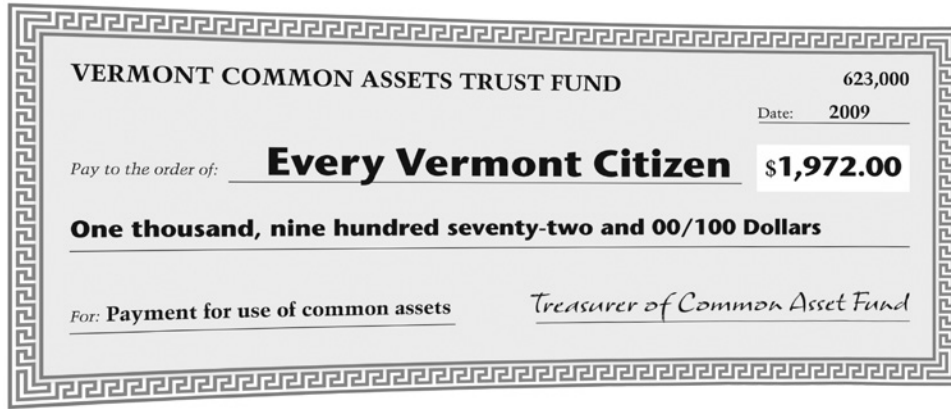
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The Ownership of the Internet and the World Wide Web in Vermont

By Ida Kubiszewski

Introduction

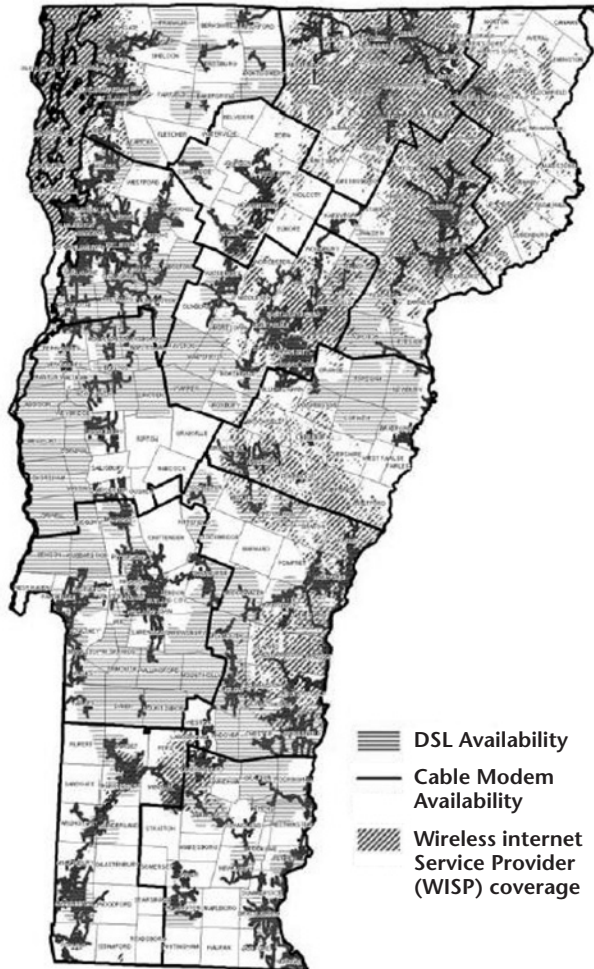
In the past two decades the Internet and the World Wide Web (the Web) have evolved from a small network used primarily by a few universities and the military to a primary means of communication. They have interwoven themselves into practically every aspect of our lives and have become resources which everyone expects to be available, especially in the United States. In Vermont, however, there are still large geographical areas which don't have high-speed access.

To reduce confusion, we define both the Internet and the Web. The Internet is a "network of networks," creating a global infrastructure allowing for computers to communicate amongst each other. Information can travel over the Internet in certain formats or languages known as standard Internet Protocol (IP). There are a variety of languages that can be used including SMTP (used for e-mail), Usenet (used for news groups), instant messaging, FTP (used for file transfers), and HTTP (used by the World Wide Web). The World Wide Web is a means of accessing and communicating information over the Internet in a language called the Hypertext Transfer Protocol (HTTP). It's a means of publishing and interlinking pages containing hyperlinks.

Various groups have been responsible for the development of both the Internet and the Web, including the government, military,

individuals, non-profits, and large private corporations, and universities. The development of the Internet hardware infrastructure has required large financial investments by all these groups. These investments include manufacturing, purchasing, installing, and maintaining servers, personal computers, and interconnecting cables.

The Web, on the other hand, was initially developed at CERN, where in 1993 it released the software into the public domain, stating: "CERN relinquishes all intellectual property rights to this code, both source and binary form and permission is granted for anyone to use, duplicate, modify, and redistribute it."¹ After that release it was developed into what we use today by the community at large.



Current Status of Access to the Internet

At the national level, internet users are comprised of 24% Digital Subscriber Line (DSL) subscribers, 24% cable modem service, 50% dial-up access, and 1% satellite internet services.² As of December 31, 2005, the Federal Communications Commission (FCC) estimated that there were 88,317 residential high-speed subscriptions and 95,901 high-speed lines in Vermont.

Internet Infrastructure

The internet is made up of a network of computers and cables, creating a worldwide grid. Within the United States, different scales of internet

conduits exist. The backbone of the internet is a nation wide connection carrying large volumes of internet traffic over long distances. These major conduits are usually owned by wholesale internet companies. Internet service providers pay wholesalers for accessing this backbone and connecting their customers to the internet. Depending on the density of the region, ISPs have to pay anywhere between \$10 per Mbps per month (Boston) to \$100 per Mbps per month (Vermont).

Slightly smaller conduits come off the backbone and deliver internet to local networks, this type of connection is known as the 'middle mile.' Depending on the density of the region and size of local companies, the 'middle mile' may be owned by either a wholesaler or one of the ISPs. The final span connects the 'middle mile' to individual homes and is called the 'last mile.' The majority of these are installed and owned by ISP companies, government, or individuals.

Much of Vermont is mountainous and not very densely populated. This increases the cost of providing Internet to rural communities due to the necessity of installing poles and putting in the 'last mile' of cable. The current price for installation of the 'last mile' of cable in Vermont is around \$20,000 per mile³. If the density of homes ranges from 14 to 25 per mile with an area, ISPs are prohibited from charging customers additional fees for the cable line extensions. However, if the density is below this critical density and demand still exists, customers may be charged for the extension. The Public Service Board (PSB) monitors the cost per mile that an ISP charges customers who are responsible for paying for the extension of cable lines.

Creating broadband infrastructure can also be done through telephone lines by providing DSL. Installing DSL requires central telephone serving offices and midrange service areas to be upgraded; this upgrade entails most of the cost since about 95% of Vermonters already subscribe to telephone service. The National Exchange Carrier Association (NECA) recently estimated that such an upgrade costs between approximately \$988

and 1,033 per line⁴.

A fiber-optics infrastructure has the greatest initial capital investment requirement, but it also provides the best long-term affordability. There are three main expenses with providing broadband through fiber optics: fiber distribution network, main hub or central office, and connection from the road to a residence or business. Burlington Telecom estimates an average cost of \$3,000 per subscriber in urban areas and \$4,000 in rural areas.

In Vermont, as a means of encouraging broadband deployment, pole owners are regulated to charge rates proportional to the amount of space being used on

Estimated Residential Broadband Availability in Vermont
As a Percentage of Population—2006*

County	Cable Modem Availability	DSL Availability	WISP Availability**	Total Broadband Service Availability
Addison	50%	83%	0%	90%
Bennington	78%	60%	10%	86%
Caledonia	59%	50%	57%	85%
Chittenden	89%	82%	29%	97%
Essex	21%	20%	28%	41%
Franklin	58%	60%	41%	78%
Grand Isle	0%	63%	92%	97%
Lamoille	54%	25%	32%	68%
Orange	33%	33%	14%	62%
Orleans	52%	44%	69%	86%
Rutland	76%	86%	0%	95%
Washington	73%	76%	11%	94%
Windham	64%	67%	3%	78%
Windsor	66%	75%	31%	89%
Statewide	68%	69%	24%	87%

* Availability is based on map and other information reported to the state by service providers. Cable information is based on availability as of the end of year 2005. DSL and WISP information is based on information reported at various times by companies between August and mid-December 2006. In some counties, cable modem, WISP, or overall broadband availability shown is lower than that reported in prior PSD reports. This does not reflect an overall reduction in actual broadband availability in any county, but instead revised reports on the extent of existing broadband availability by WISPs or cable companies, or the correction of errors in prior reports.

** Not all WISPs operating in Vermont have submitted service availability information suitable for inclusion in these estimates by the time of publication. Zero percent availability of WISP services shown for Rutland and Addison Counties does not reflect the availability of services from WISPs believed to be operating in these counties.

Source: Understanding Broadband Deployment in Vermont

the pole. The city of Burlington owns 33% of the poles and partially owns the rest (55% ownership) with Verizon owning the remaining percentage.⁵ This requires Burlington Telecom to negotiate with Verizon if additional cables are required on poles. However, due to the 1996 Telecommunication Act, Verizon is required to lease any lines they have already installed to competitors at wholesale rates. Even with this act in place, small competitors are still unable to afford such an investment in rural areas but it may make competition somewhat more viable in urban areas. Such a barrier to entry limits the competition and eliminates the potential for an open and free market within the ISP industry.

Regulations

The Federal Communications Commission (FCC) has designated internet services as interstate information services, limiting Vermont's authority. The Federal Cable Act also prohibits Vermont from requiring specific infrastructure investments by the Internet Service Providers.⁶ To encourage the ISPs to extend their availability, in 2006 the public service board of Vermont allowed Verizon leeway in determining the type of technology to be used and the areas it will provide converge; in exchange, Verizon agreed to provide 80% availability by 2010.⁷

To encourage the development of independent companies, Vermont companies are part of the National Exchange Carrier Association (NECA) which helps independent companies pool their costs and revenues, making transition between carriers simpler. The NECA is mostly for phone companies, but broadband internet often is provided by telephone companies.

Public ISP Revenue, Expenses, and Net Profit

Many towns around the country are establishing their own telecommunication services. Most often these are privately financed but for public use. A fiber optic network was put in place by the Vermont Telephone Company in Springfield, VT. Burlington has also begun providing its residents with internet, phone, and television cable services. These networks are free for use by any other company wishing to provide competing services. "This is similar to a City providing public roads while also providing basic bus service as well. Citizens and businesses can use the bus service or they can use the roads to provide their own transportation."⁸ Communities like Montpelier and Rutland are negotiating joining the Burlington network as a means to reduce their own initial costs.

Revenue

Burlington has approximately 18,000 homes and 2,500 businesses. As of August 2007, approximately 1,800 Burlington subscribers signed up for Burlington Telecom,

with businesses making up 14% of potential customers. Taking the average revenue of \$77 from residents and \$243 from business per month, and using the percentage of potential subscribers, we find that Burlington Telecom makes approximately \$61,236 from businesses and \$119,196 from residents each month, for a total of \$2,165,184 annually. The rate of growth at the time was approximately 40 new subscribers per week.

Expenses

The Burlington Telecom project was split up into four distinct sections. The first phase deployed a 16.5 fiber optic system at a price of \$2.6 million, where \$1 million was used on start up and operation costs, while \$1.6 million was used on equipment. This phase primarily connected government offices. Phase two added a few large businesses to the network. The total cost of phase two was only \$750,000 due to the fact that the selected businesses were near the existing network. Phases three and four expand the network to smaller businesses and residences. Burlington took out a fifteen-year loan for approximately \$28 million to cover the costs.

Besides the initial \$31 million in capital, Burlington pays approximately \$2 million in debt servicing and \$2 million in operating costs each year.

Net Profit

By extrapolating from its current revenue and knowing its future expenses, Burlington estimates that the net income from the telecommunication services can eventually provide, once the debt is paid off, more than 20% of the city's general fund. This equals approximately \$15 million/year.⁹

Springfield, Vermont, the only other town to have a public fiber-optic telecommunication network installed, had a population of approximately 9,000 in the year 2000. Using the populations we can estimate that Springfield will have a net income of about \$3.5 million per year.

Private ISP Revenue, Expenses, and Net Profit

Revenue

Knowing the population sizes of the United States and Vermont and the amount of internet users in the U.S. in 2005, we were able to determine that there are approximately 425 thousand internet users in Vermont in that year. Using data from the U.S. Census Bureau, we know the total revenue of Internet Service Providers (ISP) in the United States in 2006 was \$18.5 billion, and using the percentage difference between U.S. and Vermont populations, we were able to determine that the revenue made by ISPs from Vermont users was approximately \$39 million.

This revenue includes internet access service, online

	United States	Vermont
Population	299,093,237	623,908 ¹⁰
Internet users	203,824,428 ¹¹	425,177
Revenue	\$18,576,000,000 ¹²	\$38,749,505

(Numbers in italics were calculated)

advertising space, internet backbone service, internet telephony, website hosting services, information technology design and development services, and other operating revenue.

Expenses

There are two major initial expenses when an ISP is introducing internet to a region. First is the initial investment into the infrastructure to provide the availability to each home and business. ISPs, in certain circumstances, have to put in the “middle mile” to provide access to a region and then place the “last mile” of cables. Installation of the “last mile” may also require buying or renting pole space or putting up new poles. The other cost is hooking up the “middle mile” to the backbone conduits since ISPs must buy access to the backbone from the wholesalers. Depending on density of a region and competition amongst ISPs, infrastructure costs are occasionally passed on to customers. An influx of ISPs in recent years decreased the price of high-capacity Internet access delivered to locations in Vermont from \$300 per Mbps per month to about \$100.

Long terms expenses are primarily made up of maintenance of cables and customer services, but others may include personnel costs, materials and supplies, purchased software, electricity and fuels, lease and rental payments, repair and maintenance, advertising and promotional services, and governmental taxes and license fees. In 2006, United States Internet Service Providers had a total of almost \$16 billion in expenses. This translates to almost \$32 million in expenses in Vermont.

This financial structure will change significantly as private companies begin utilizing the freely accessible publicly installed fiber cable infrastructure.

Net Profit

Using the total revenue and expenses of the United States Internet Service Providers, we can determine the net income ISPs make off Vermonters to be approximately \$6 million per year.

Economic rent exists due to the high primary barrier of entry for an ISP company into the

market. These barriers are the high initial infrastructure costs or rental costs of cables already owned by other private ISP companies.

The economic rent will increase significantly as private companies begin to freely utilize the fiber-optic network put into place by the government. This will reduce all of the initial infrastructure costs or rental costs usually associated with introducing service into an area.

Domain name registration and other related services

Process

A domain name registrar is a company accredited by the Internet Corporation for Assigned Names and Numbers (ICANN) to register Internet domain names.¹³ ICANN is a non-profit corporation which oversees various internet related industries on behalf of the U.S. government, specifically the Internet Assigned Numbers Authority (IANA). Currently, approximately 1,000¹⁴ accredited domain-name registrars exist. However, ICANN contracts out the management of the .net and .com domains to VeriSign, a company out of California.

Under the Shared Registration System (SRS), a user chooses which registrar they use for their domain name, and may switch any time. The domain names which are under the management of ICANN and that a registrar register are: .aero, .biz, .cat, .com, .coop, .edu, .gov, .info, .jobs, .mobi, .mil, .museum, .name, .net, .org, .pro, and .travel.¹⁵

Revenue

Due to lack of available data, a total number of Vermont registered domain names in 2007, was not reported. However, the number of .com domains in Vermont in July of 2001¹⁶ and the number of registered domain (.biz, .info, .org, .net, .com) names in the world in 2001 and 2007¹⁷ was attainable.

Number of registered domain names				
		Total	Com	Coms % of total
In World:	7/14/2001	30,089,731	22,845,079	75.9%
	10/15/2007	96,946,506	73,433,353	75.7%
In USA:	7/2001	25,030,006	19,003,575	
	10/2007	80,644,510	61,085,201	
In Vermont:	7/2001	46,527	35,325	
	10/2007	149,907	113,549	
Growth Rate		222%	221%	

(Numbers in italics were calculated)

This allowed us to determine the number of total domain names registered in Vermont in 2007 to be approximately 150,000.

Other related internet services include business process and data management, web site hosting, collocation, IT design and development, IT technical support, IT technical consulting, software publishing, information and document transformation services. The revenue for registration of domain names and these other services is approximately \$70 billion in the United States. Taking the proportion of domain names registered in Vermont, we can determine that the sale of domain names and other related services generates \$130 million per year from Vermont customers.

Expenses

Each ICANN-accredited registrar pays a fixed fee of US\$4,000 plus a per-registrar variable fee totaling US\$3.8 million divided among all registrars. For every .com registered for a user by a registrar, the registrar has to pay an annual fee of US\$6.00 to VeriSign and US\$0.25 administration fee to ICANN. Other expenses outside of fees that the registrars have include daily operation costs such as personnel costs, hardware and supplies, purchased services, and others.

Other related services have less governmental taxes and fees. Other expenses include personnel costs, equipment and materials, software purchases, electricity and fuels, rental payment, repair and maintenance, advertising and promotional services, and other operating expenses. Within the entire United States industry, these expenses equal \$60 billion per year. Using the proportion of registered domain names in the U.S. versus Vermont, we find that the expenses from Vermont are \$112 million per year.

Net Profit

Looking at the difference between the total revenue and expenses that these companies have, we can determine that approximately \$18.5 million per year is made off domain names registered in Vermont.

Rent

The contents of the Web and the Internet have evolved out of the collective knowledge of our entire society and have become a commons of information. There are, however, various corporations which make a substantial profit off connecting people to the Internet and providing services related to the Web. These companies are making a profit by utilizing a resource they do not own, a resource that was developed by a collective whole and not through the resources of single entity.

A portion of those profits should be given back to the public due to the fact that portions of the Internet and the entire Web were created by everyone and belong to

everyone. Rent also presents itself through the lack of free market within the ISPs. The barriers to entry are too high for any individual to start their own ISP, mostly due to the expense and regulations surrounding the “last mile.”

Some may also argue that the ISPs are crucial to the development the Web and the Internet and hence provide significant positive externalities. These externalities include improved communication, telecommuting which saves energy, social networks, etc. However, this does not detract from the fact that corporations are making a profit off someone else’s intellectual resources and community and should be in part returned to those that developed it.

To calculate rent, we looked at the profits of the Fortune 1000 companies in the United States in 2007 and found an average of 7% net income. If we consider this 7% percent real profit and the remaining economic rent, we are able to determine the amount of profit that can be distributed to the public, in theory, without affecting price.

In the case of public telecommunication, where income is made by the cities of Burlington and Springfield, Vermont, and is placed into a general city fund, from there to be used as the city deems necessary. We suggest that only 7% of the profit be placed in the general fund, as earned income by the city, while the rest be placed into an established trust. The total income derived from both towns equals approximately \$18.5 million. This would allocate \$1.5 million back to the cities (Burlington getting \$1.2 million and Springfield getting about \$300 K), and \$17 million into this trust.

When calculating the real profit and economic rent within private ISPs, we can use the cross industry standard for real profit as well. Currently, private ISPs make approximately \$6 million off Vermont users. This is approximately 15% of their total \$38.7 million revenue from this area. If they were to keep the standard 7% and the rest be placed into a trust, they would be adding approximately \$3.3 million per year.

Doing a similar calculation for corporations which sell domain names and provide other related internet services, we find that their revenue from within Vermont is approximately \$130 million while their net income is \$18.4 million, a 14% profit. If we leave 7% as real profit, we find that the economic rent owed to the Vermonters would be \$9.3 million per year.

Totaling up all the economic rent, we find that economic rent owed to Vermonters is approximately \$30 million per year. Instead of dividing this money into equal dividend of about \$50 per person, which promotes consumption and encourages the investment into private goods, the money would be placed into a trust with the primary purpose of supporting and furthering research and intellectual development in an open forum.

The spending of the trust money would be decided by

the trustees. Some potential uses of trust money would include the support of research done on a collaborative basis and in which all knowledge will be released to the public, buying out expired patents and opening them to the public, or supporting and encouraging initiatives promoting collaboration on patents and copyrights. The most significant criteria of support will be that all information and research must be placed openly on the Web.

Conclusion

Portions of the Internet and the entire World Wide Web were developed by individuals working to improve society's intellectual richness, creating an intellectual commons. With the exception of certain aspects of the Internet, the two have become resources owned by everyone. Various corporations have found ways to make a profit off this commonly owned resource, a resource they did not create. Although these corporations are needed for the continual development, portions of their profits should be in some way returned either directly or indirectly to the people.

With the establishment of a trust which encourages further intellectual development within the public domain, the money would be returned to the public and used for the public good. It would support continual development of the Web and Internet, improving those commons.

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- ¹⁶ Zook, Matthew. Internet Intelligence. ZookNic. URL: <http://www.zooknic.com/Domains/alpha.html>
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Estimate of Total Revenue Potential from Common Assets in Vermont

Asset	Current Revenue (Million \$)	Potential New Revenue (Million \$)	Increase (Million \$)	Source
Air/transport	209	7-153	7-153	carbon permits
Air/heating	17	4-93.6	4-93.6	carbon permits
Air (total)	0	25.9	25.9	carbon permits
Fish and Wildlife	14.7	10.4	10.4	fees
Forests	Net loss	3.2	3.2	depletion fees
Ground Water	~0	107.9	107.9	bottlers
Internet	~0	30	30	ISPs & domains
Spectrum	~0	375	375	annual auction
Minerals	3.7	9.7	6	royalties
Surface Water	~0	31.2	31.2	user fee
Land	741	1071	330	land rent
Wind	.75	5.5	4.75	progressive rent
Speculation*	(capital gains?)	269	269	.25% Tobin tax
Seignorage*	~0	35.7	35.7	1% of loans
TOTAL NEW REVENUE		\$1.229 billion/year		
PER CAPITA DIVIDEND		\$1972 each/year		

* Note: The Stock and commodities markets are socially created common assets, as is the monetary system. The right to create money is a government privilege granted to the private banking system, which creates 93% of the money in the US through loans. Potential revenue from speculation and monetization (seigniorage) were estimated in a previous UVM study. A Tobin tax of .25% was applied to all financial speculation. Economic rent of 1% was applied to all bank loans, which represent money creation.

Vermont Green Tax and Common Assets Project

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