Kuhkenah Network of Smart First Nations
Demonstration Project

Project # 478789

Final Report for the Project
As of March 31, 2005

In completion of Industry Canada’s
Smart Communities Demonstration Project
(April 2001 - March 31, 2005)

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Summary

The final report of Keewaytinook Okimakanak's Kuhkenah Network of SMART First Nations initiative is an opportunity to celebrate the successes that have been achieved as a result of a unique team of people who came together to create a lot of changes in a very challenging and harsh physical environment over a relatively short period of time. The people involved in helping to make the Kuhkenah Network to be the success it was, came from all sectors, regions and backgrounds across the country and around the world. Indigenous people came together to share and build a unique and thriving network and on-line environment for their children and future generations.

The report attempts to capture some of the gems that were achieved within each of the twelve main deliverables (or activities) listed in the original contract with Industry Canada's Smart Communities Program. Each activity within the project is documented within this report using the same categories listed under accomplishments, benefits, lessons learned, recommendations and migration. The migration section tries to capture some of the changes that are now occurring as a result of the work began within the Kuhkenah Network initiative. These developments and knowledge transfer experiences demonstrate the impact of this initiative has had on others in Northern Ontario, across the country and around the world.

Particular developments must be highlighted to encourage and support the reader to go through the entire document to try and understand the actual results achieved by this small team of people and communities working hard to successfully realize the vision of our leaders. Some of these migration highlights include:

Activity 1: Install and Operate Network
• In 2000, the Kuhkenah Network was originally conceived as a broadband network to serve the needs of the five First Nation members of Keewaytinook Okimakanak, a tribal council in Ontario’s far north. By 2005, the Kuhkenah Network has activated over seventy points-of-presence (POPs) across Canada, mostly in Ontario’s far north with large clusters in northern Manitoba and Quebec. Each of the Kuhkenah partners now owns, operates and manages its own community network which provides services to its members according to the priorities identified by the individual community.
• At least twelve remote First Nations now have community cable networks that deliver broadband services to every home, business and organization. These cable plants are locally managed and operated using the open source tools created by the K-Net team.

Activity 2: Procure, Install and Maintain Community ICTs
• The Kuhkenah Network of Smart Communities was instrumental in the establishment of the Northern Indigenous Community Satellite Network, [NICSN - http://smart.knet.ca/satellite], a partnership between Keewaytinook Okimakanak (Ontario), Kativik Regional Government (Quebec), Keewatin Tribal Council (Manitoba) and Industry Canada to work cooperatively to ensure that the
people of the North have the necessary satellite bandwidth to operate the applications they need to address regional educational, health and economic development challenges. NICSN is a cooperative C-Band satellite network that is now serving 28 Aboriginal very remote communities and by the fall there will be a total of forty Aboriginal communities utilizing this network to carry video, audio and data traffic.

Activity 3: Project Management, Administration and Governance
- E-work and e-management strategies and operations are now being put into place with core staff positions within Keewaytinook Okimakanak being moved to the First Nations where the ICTs are being used for meetings, training, communications and support.
- To ensure that other First Nations in Canada benefit from the knowledge and experience accumulated as a result of SMART, the Kuhkenah Network and FedNor have partnered to pilot the Aboriginal E-Community Program Concept for Industry Canada.

ACTIVITY 4: IP Video Conferencing and Telephony
- By 2005, the Kuhkenah Network has over 200 IP video conferencing units in over 60 First Nations in Ontario and across Canada. People are able to participate remotely in meetings, training and conferences without the cost and trouble of travel. The network team provides bridging, streaming, archiving and technical services for all users.
- IP telephony is now a regular feature of many administration offices, nursing stations and other band agencies located on remote and isolated First Nations communities in Ontario’s far north. Homes, businesses and organizations in Slate Falls First Nation are now connected by a locally owned and operated cable network delivering IP phone service.

Activity 5: Keewaytinook Internet High School (KiHS)
- Growing from the original three First Nation classrooms serving 30 students to its present thirteen First Nation classrooms serving over 140 young people each year to access grade 9 and 10 high school courses, KiHS is an innovative and successful education model that supports local social and economic development.
- Once, one of a handful of First Nation e-learning alternatives in Canada, the KiHS model is migrating across Canada. KiHS is assisting with the development of a variety of Internet high schools in other regions of the province and the country. The Prince Albert Grand Council is opening their virtual high school in the fall of 2005 after visiting Keewaytinook Okimakanak.
- The Grade 8 Supplementary Courses program, funded under Industry Canada’s First Nations SchoolNet program, has delivered its on-line curriculum in more than thirty First Nations across Ontario. The resulting open source e-learning platform first used by this program is now being adapted to address the unique needs of other First Nation virtual classroom environments.
Activity 6: Support Migration of Telehealth Services
• By 2001, Kuhkenah had partnered with the NORTH Network to develop the CHIPP proposal and to pilot telehealth services in the five Keewaytinook Okimakanak First Nations. In 2003, Health Canada funded Keewaytinook Okimakanak to extend these telehealth services across the remaining nineteen remote First Nations in the Sioux Lookout Zone.

Activity 7: Data Warehouse
• The KNEWS database (http://knews.knet.ca) is referenced regularly by national news bodies for local and regional First Nation information. Other organizations are accessing information and resources linked from these news stories. The data warehouse work has drawn attention to the Kuhkenah Network of SMART communities not only from across Canada but from around the world.

Activity 8: Kuhkenah (K-Net) Portal
• The Kuhkenah Portal receives over a hundred million hits a month and over thirty thousand daily visits as a result of the various services available at http://knet.ca. The most popular service is the personal homepages where over eighteen thousand individuals are hosting their own site to share information and stories. There are now thirty-eight thousand K-Net email account holders.

Activity 9: Community E-Centres
• The Kuhkenah Network of SMART Communities built and supported e-Centres in Fort Severn, Poplar Hill, Deer Lake, Keewaywin and North Spirit Lake. The success of the KO E-Centres is inspiring other First Nations to develop similar gathering places that host a variety of IT services for community members.

Activity 10: Engagement and Evaluation
• Keewaytinook Okimakanak’s partnership with the Canadian Research Alliance For Community Innovation And Networking (CRACIN - http://cracin.ca) and its spin-off research consortium, Research on ICT (information and communication technologies) with Aboriginal Communities (RICTA - http://ricta.ca) are direct results of the lessons learned from the community engagement and evaluation work completed under the Kuhkenah Network of SMART Communities initiative.

Activity 11: Communication, Information and Dissemination
• The work of the Kuhkenah Network of SMART Communities has attracted the attention of academics and policy makers around the world. Technicians and community representatives of Keewaytinook Okimakanak (K-Net, KOTH and KiHS) are invited to address organizations on their use of telecommunication tools in telehealth and education in remote and isolated First Nations in Ontario’s far north.

Activity 12: Business Development and Marketing
• The Kuhkenah Network of SMART Communities was instrumental in the creation of the National Indigenous Community Network, a three partner norther
Aboriginal organization including Keewaytinook Okimakanak (Ontario), Kativik Regional Government (Quebec) and Keewatin Tribal Council (Manitoba) which share common goals and objectives with respect to the C-Band Public Benefit.

- First Nation entrepreneur are embracing the web as a means to distribute their products as well as developing local businesses that employ local people and support their ongoing operation through the use of the broadband network.

The Kuhkenah Network of Smart First Nations initiative continues to grow and prosper. The changes and investments made by all sectors to support this initiative have been significant. Individuals and organizations have worked together over the past four years to create a vibrant environment that promises to re-shape much of the landscape that existed a few short years ago across this region. Throughout this journey, we heard over and over again that it will take years to determine the real impact and successes that have occurred from this work. But in hindsight, it is rewarding to examine the work that has been achieved through the efforts of a committed and determined team of people who believe that there are opportunities out there to be grasped and embraced.

First Nations and the aboriginal people have always lead the way as they shared this land that they call Turtle Island. They have opened their doors to others, helping them to survive and teaching them how to prosper on this land. Today, they are once again helping to lead the way as Canadian society explores the new frontiers of these information and communication technologies.
RECOMMENDATIONS:

A number of recommendations for everyone involved in building and sustaining community networks have been identified throughout the development of this final report as well as during the production of the project evaluation report. A list of all the recommendations from the final evaluation report found at http://smart.knet.ca/evaluation is included as Appendix 3 at the end of this report. Included here are some of the highlighted recommendations from both this final project report and the final evaluation report, for everyone’s consideration:

• Government investment in broadband infrastructure is required to ensure ALL First Nations are connected and able to access equitable on-line programs and services. Each remote and rural First Nation across Canada is unique and requires unique telecom solutions to accommodate local and regional opportunities. The goal to bring broadband connections into every community across Canada was initiated with Industry Canada’s pilot of the BRAND program. This goal remains incomplete due in part to inadequate funding. This goal must be reaffirmed by the Government of Canada with adequate resources to complete this task. The basket of “basic” services proposed by the CRTC must now be expanded and supported by the Government of Canada to include access to broadband and open network infrastructure as defined in the National Broadband Task Force report from June 2001.

• Government must commit to purchasing their services from community networks as a vehicle to deliver on-line services with Canadians rather than creating new, parallel private networks that threaten the sustainability of the local community networks. Along with the use of community networks, governments must take a leadership role in the use of ICTs to conduct their business. It is not enough to provide government information on web portals. Government officials need to adopt IP-based information sharing and reporting strategies (voice, images), including internet protocol (IP) videoconferencing and telephone services (Voice over IP - VoIP) to communicate with citizens and clients. The most effective way to deliver a national program to expand connectivity and telecommunications in First Nations across Canada has been the creation of the partnerships involved with Industry Canada’s First Nations SchoolNet program’s Regional Management Organizations (RMOs). The RMO model has been utilized effectively to deliver a variety of national First Nation initiatives. The regional model has been pioneered by government internally to deliver economic development and e-community facilitation across Canada through regional agencies such as Industry Canada’s FedNor initiative.

• For remote regions that want to control and own their networks, it’s practically impossible to build a sustainability strategy based on traditional business and program delivery models. Rather, innovative and cooperative telecom policies and government programs are required to ensure equitable access and sustainable operation to the required infrastructure and applications.
• Technologies like IP-based video conferencing and telephony service can provide much needed revenue while offering residents and subscribers an alternative to traditional independent services. To maximize value and revenue video conferencing must deliver TV quality images, requiring two-way symmetrical services. Watch out for salesmen selling non-symmetrical connectivity products and services that remove limited financial resources from the region.

• Aggregate demand for video, voice, and data services across the community and provide an integrated solution to ensure a cooperative and sustainable local community network operation.

• Establish revenue generating services such as local network management, technical maintenance and assistance, website and portal development and hosting. These services will be valuable to businesses and organizations across the community.

• In order for a network to be sustainable in a small community, the community needs to be involved in all the development phases and ongoing operation as much as possible. This effort will ensure that all the local organizations and service agencies working with the community will be able to contribute to the ongoing operation and maintenance of the local network so everyone in the community can access these on-line services.

• Government policies and programs are required to support the development of local capacity and provide equitable resources for the local operation of these telecom solutions. Developing and sustaining broadband infrastructure and associated services are necessary and essential components for a healthy economic and social environment in all Canadian communities. For the communities where private sector telecom providers will not venture due to inadequate markets, governments must intervene and provide the communities with the resources required to construct and sustain these community broadband networks that will support their required applications. Program processes including funding applications, monitoring and reporting requiring multiple government stakeholders and partners must be streamlined and less onerous for the community applicant and must better reflect the project risks involved to produce successful results with local and regional government support systems (such as FedNor and accounting firms for financial auditing purposes).

• Locally deployed and operated telecom infrastructure and capacity building is essential to drive and sustain these communication tools for supporting local economic and social development opportunities. Investments in local human resource and skills development support the effective use of ICTs and broadband infrastructure by the people they are meant to serve. Strategic investments and supporting government policies and programs supports a healthy and growing environment that benefits all sectors of the Canadian society. These applications are required to support the ongoing operation of the community network and help pay the bills for the local services being provided.
Introduction

The Kuhkenah Network of SMART First Nations represents a unique model of community development that is grounded in traditional First Nations beliefs and effective local control of state-of-the-art telecommunications technology. Prior to the SMART project, many of the remote and isolated First Nations communities in Ontario’s far north did not have residential telephone service let alone access to the Internet using dial-up connections. In the post-SMART era, these same communities employ a variety of Information Communication Technologies (ICTs) including: IP video conferencing with quality of service, VoIP telephony, and other broadband services.

The K-Net web server receives over 110 million hits a month. It hosts over 18,000 personal web pages, the principal form of communication for many in Nishnawbe Aski, and over 30,000 K-Net email addresses.\(^1\) The migration to include other First Nations and individuals continues. Community members tell their stories with a variety of ICTs including personal web pages, digital video and photography. These communities have broadband services that are the envy of many other Canadians in other parts of the country\(^2\) and the world.

The Network is a partnership of many eclectic groups and organizations which includes some of the largest telecommunications companies in Canada and the poorest First Nations communities in Ontario’s far north. It includes private and public sector partners working with First Nations and Aboriginal organizations committed to a community-driven solutions to provide high quality telecommunications to remote and isolated First Nations.

Yet, the very success of the Kuhkenah Network of Smart Communities initiative flies in the face of conventional wisdom concerning connectivity and the growth of telecommunications networks.\(^3\) To understand how the Kuhkenah Network was able to achieve such dramatic growth, it is necessary to see it as a practical application of traditional Oji-Cree values in the management and operation of a scarce resource. These values include a deep rooted sense of sharing, mutual cooperation and respect for local autonomy among the six First Nations which formed the original community partnership that created the SMART project. Historically connected by treaty alliances, trade and family ties, yet geographically isolated, these First Nations have built an electronic super highway to other First Nations, Canada and the world. Fort Severn, Keewaywin, Poplar Hill, Deer Lake and North Spirit Lake are now using broadband to stimulate and manage change at the community level and, most importantly, sharing those lessons with their First Nations neighbours throughout Nishnawbe Aski, across

\(^1\) For more information, click [here](#).


\(^3\) Andrew Clement, Ph.D interviewed by Brian Walmark in (18 Feb 2005).
Canada and with Indigenous peoples around the world.

The broadband network has been described as both a strategy and an outcome, by Brian Beaton, facilitator of K-Net Services. SMART services are being deployed to overcome barriers of distance and isolation, to improve community well-being, enhance learning opportunities, and support skills and knowledge acquisition. During the opening ceremonies of the National Indigenous Community Satellite Network, Grand Chief Arnold Ouskan of War Lake First Nation in Manitoba said, “our communities will always be remote but we will never be isolated again.” The Kuhkenah Network is a touchstone for Keewaytinook Okimakanak First Nations and a promising means for building sustainable communities in the 21st Century.

The phrase, Kuhkenah, is an Oji-Cree expression meaning “for and by everyone.” It captures the fundamental belief among the people of Nishnawbe Aski that broadband like all scarce resources was meant to be shared for the mutual benefit of all. These values continue to be practiced by the people of the Keewaytinook Okimakanak tribal council. Since its inception as 'K-Net', the Kuhkenah Network has grown from a regional bulletin board service to a centre of excellence in First Nations connectivity, telecommunication and community informatics.

Armed with state-of-the-art ICTs such as multi-media work stations, digital cameras, scanners, printers, and video conferencing equipment, First Nations are using these and other broadband tools to share information and communicate with the other people around the world. Access to these new tools are changing the way people think about themselves and their place in the world and are revolutionizing the way community members live, work and do business across the region. They are not merely utilizing software and hardware designed to solve problems in the urban metropolis rather they are shaping these tools to address local challenges in health and wellness, education, and economic development. People are using broadband access to break the chains of dependancy and turn the corner to regain autonomy and control over their lives.

However, it would be a mistake to conclude that putting ICT tools in peoples’ hands was enough. Just as providing a shovel and telling someone to dig a well is not an adequate strategy for effective community development, the Kuhkenah Network of Smart Communities is about more than providing people in remote and isolated First Nations communities with computers and ‘Net access. Rather, it is ensuring that communities have proper connections and adequate bandwidth so that people can shape ICTs to address the historic and contemporary challenges facing their communities.

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4 For a more information, click here.

5 For more information of about the Northern Indigenous Community Satellite Network (January 19 & 20, 2005, Sioux Lookout), click here.
With the proper connections and adequate bandwidth, communities are now free to choose which applications made sense for their needs. Some are using the technology to build virtual schools where their children can be educated at home. Others are using the technology to “virtually” bring physicians, specialists and other health care professionals into their communities. With the proper connections and adequate connectivity, some community members are now training for new IT employment opportunities and others now have the opportunity to return home to their First Nations and bring their jobs with them. By carefully understanding the opportunities and consequences of proper connections and the need for adequate bandwidth, First Nations are assuming the power to build communities where they can live, work and raise their families in a safe, socially and economically healthy environment.

By doing so, the Kuhkenah Network of Smart Communities overturned conventional IT models. IT technicians and sales representatives were not telling First Nations what they could and could not have. Rather, community members were identifying local needs and challenging technicians to find the necessary IT solutions. Community members were consulted from the beginning and demanded to be part of the decision-making process throughout the entire demonstration project. Such participation not only encourages community ownership, it creates regional champions willing to pursue strategies for its ongoing sustainability even after the project is completed.

The lessons learned during the SMART Project are migrating to First Nations across the Nishnawbe Aski and other First Nations across Canada. Other Indigenous groups around the world are looking at the Kuhkenah project as a model in developing these resources for the benefit of the community. Communities across Ontario’s far north are sharing the broadband resource and creating tools to address their needs.

The Kuh-ke-nuh Network is not simply a window on the world but a door which swings both ways. It both provides us with a way to learn how others live their lives and allows us to tell our stories with own voices. Its empowering for our communities to learn that people around the world are interested in our stories, our experiences, our struggles and our understanding of the land. This exchange is encouraging our people to see and act upon the many opportunities and challenges that face them as they struggle to continue to remain on the land of their ancestors.

More importantly, access to ICTs is changing the relationship between First Nations and the metropolis. In the post-Contact period, a state of dependancy was created as the metropolis assumed the role of service provider and First Nations were transformed into service users. The cities gradually provided more and more services traditionally controlled by the local communities. Teachers, health care professionals and others educated and trained in the urban south replaced local people in virtually every sector of the community. Those in the community who aspired to teach or heal were required to leave their family and friends to be educated in institutions in the south. After years
in urban high schools, colleges and universities, few were prepared to return home to practice their professions or were prepared to heed the traditional values that they left behind years ago. Access to ICTs promises to change the old status quo. With ICTs, community members can access health care professionals without the need to travel. Youth can attend high school classes without leaving the community. Technical and vocational training are available to more people in the community who because of work or family commitments cannot leave the communities. Access to ICTs means that community members can pursue professional designations in nursing, teaching and other careers without the cost or commitment of leaving their First Nations communities. Most importantly, access to ICTs empowers everyone in the community. Each has skills and stories to tell. Everyone has something to share whether its knowledge, skills or arts and crafts. ICTs create a forum where anyone who wishes to reach out can meet other people and forge relationships. It is a forum where First Nations people not only can access information and data but a space where they can share their rich cultural understanding and wisdom about the land with the World. The Kuhkenah Network has demonstrated this over and over again throughout the course of the SMART program and continues to do so in the post-SMART world.

This final report will review the accomplishments, the benefits, and the lessons learned through the twelve deliverables identified in the SMART Project. Furthermore, it will trace the migration of SMART as the Kuh-ke-nuh Network grew as a regional, national and international phenomenon.
Activity 1: Install and Operate Network

Beyond the need to satisfy a deliverable for the five First Nations of the Smart Communities program, the need to install and operate a scalable and interoperable broadband network by Keewaytinook Okimakanak was critical for the creation of a world-class Aboriginal demonstration project. It is the backbone upon which all future applications were built. The operation and maintenance of the Kuhkenah Network empowered communities by putting connectively and state-of-art tools telecommunication tools in the hands of local people who best understand the challenges before them and adapted these tools to address local needs. A summary of Activity 1 (to install and operate the network) is as follows:

Accomplishments - see Appendix 1 Network Description Summary

- Scalable hybrid broadband network existed using a combination of satellite, fibre, wireless, microwave, cable and DSL connections that is serving over forty First Nations, hundreds of First Nation organizations and thousands of individuals.

- Established a C-Band satellite network operations centre (NOC) and network management system (NMS) with the capacity to manage several transponders serving communities across Canada.

- The Kuh-Ke-Nuh Network (K-Net) of Smart Communities (http://smart.knet.ca) has installed, manages and operates a carrier-class network. It is the largest First Nations telecommunications broadband network in Canada that is composed of an eclectic group of partners including some of the poorest First Nations communities, the largest telecommunications companies, small and medium sized businesses, Aboriginal organizations and government agencies. It provides broadband services to remote and isolated First Nations in Ontario’s, Manitoba’s and Quebec's far north. As a First Nations controlled network, Kuh-Ke-Nuh provides quality of service and ensures that remote and isolated communities have access to high band width applications such as tele-health, tele-education, IP videoconferencing, VoIP telephony and other applications.\(^6\)

- The original First Nation community partners which created the Kuh-Ke-Nuh Network of Smart Communities include: Deer Lake, Poplar Hill, Keewaywin, North Spirit Lake, and Fort Severn. Keewaywin and North Spirit had no residential telephone access prior to the development phase of the Kuhkenah Network of Smart Communities initiative. Bell Canada began upgrading their remote northern network to digital just prior to the start of the Smart Communities initiative. Fort Severn posed a particular technical challenge with its need for digital satellite services. In order to provide the members of Fort Severn with the same applications such as telehealth and KiHS, the K-Net team worked with Industry Canada with

\(^6\)The need for a controlled network is documented in an early discussion paper drafted by Keewaytinook Okimakanak. To learn more, click here: http://smart.knet.ca/archive/documents/NETWORK%20SUMMAR.html
respect to the utilization of transponder space and distribution of the C-Band Public Benefit.\(^7\)

- As of August 2003, the **K-Net network** consisted of 20 remote First Nations in northern Ontario linked together via a broadband infrastructure. Other points-of-presence on the network in urban centres across northern Ontario include Timmins (with a local wireless loop connecting First Nation organizations), Thunder Bay (with a local wireless loop running off a 100M service), Sioux Lookout (with a fibre and wireless loop on a 10M circuit) and Balmertown (with DSL and cable service). The hub is located in Toronto co-located at the Education Network of Ontario office complex with a fibre loop to some other Toronto based agencies with our 100M internet connection located from that office.\(^8\) Today there are over 40 First Nation communities being served by K-Net and the Toronto hub site has been relocated to 151 Front Street at the teleco meet-me fibre vault.

- Keewaytinook Okimakanak (KO), is one of seven **Nishnawbe Aski** tribal councils serving First Nations communities in Ontario’s far north. KO operates three sub offices in northwestern Ontario including: Balmertown (Administration and Services), Sioux Lookout (Telecommunications), and Thunder Bay (Research). To better communicate with other First Nations in Canada and to access more services for its partners, the K-Net meet-me hub is located in Toronto. IP telephony is now in place connecting all these offices and the organizations in the KO member communities.

- In order to protect the interests of, and to reduce the costs of telecommunications equipment, the Kuhkenah Network of Smart Communities established a “gold circle” group of ICT equipment suppliers with “best price” sales arrangement. With this equipment purchasing arrangement, K-Net was able to support other First Nation initiatives to secure telecom equipment at reasonable prices.

**Benefits**

- Most of the First Nations communities in Ontario’s far north with a total population of approximately 25,000 population across Treaty 9 now have access to broadband services as a result of the Kuhkenah Network of Smart Communities. In these communities, administration offices, schools, health centres and other band agencies on-reserve have been connected as a result of the SMART project. These broadband services include: access to Internet, IP video conferencing, VoiP telephony and other applications.

- The initial SMART investment by Industry Canada in the Kuh-Ke-Nuh Network has been leveraged in subsequent connectivity projects worth more than $20 million, including:

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\(^7\) [C-Band Public Benefit Study Unpublished Paper (March 2005), 3. or click on](http://research.knet.ca/index.php?module=ContentExpress&func=display&ceid=58)

\(^8\) For more information about the Network, click [here](http://services.knet.ca/network.html) or go to [http://services.knet.ca/network.html](http://services.knet.ca/network.html)
• More than 36 more First Nations communities and Aboriginal agencies in Ontario have been connected to the Kuhkenah Network;

• The expansion of connectivity to First Nations across Ontario has increased access to essential services such as health and education as well as creating new community development opportunities;

• The sharing of best practices and lessons learned by the Kuhkenah Network of Smart Communities to national and international Aboriginal peoples and organizations through face-to-face meetings, videoconferencing, BREEZE presentations and participating both in person and on-line in numerous national and international conferences. These sharing includes network design, construction and community implementation of ICTs;

• The Kuhkenah Network of Smart Communities has organized a number of online international and national conferences including but not limited to the Kuhkenah Smart Fair, (Winnipeg, December 2004), International On-line Gathering, (March 2004) and First Nations Connect Conference (Thunder Bay, February 2002). Throughout 2003, the K-Net team worked with other First Nation organizations to attend different National gatherings across Canada to showcase the work and the benefits of broadband infrastructure and services.

• The Kuhkenah Network of Smart Communities is a member of a number of international research organizations to disseminate its best practices and lessons learned, including the Canadian Research Alliance for Community Networking (CRACIN). It formed a partnership with the National Research Council (NRC) to create the Researching ICTs with Aboriginal Communities (RICTA), a new knowledge cluster funded by the Social Sciences and Humanities Research Council (SSHRC).

• The Kuhkenah Network was a founding partner of the Northern Indigenous Community Satellite Network (NICSN). It is a partnership of Keewaytinook Okimakanak in northern Ontario, the Kativik Regional Government in northern Quebec and Keewaywin in northern Manitoba to work co-operatively to increase bandwidth available for Aboriginal communities in the north;

• The Kuhkenah Network of Smart Communities formed a “gold circle” of pre-approved telecommunications suppliers for subsequent connectivity projects which served to protect the interests of the First Nations communities and ensured the best price for telecommunications equipment.

Lessons Learned
The Kuhkenah Network of Smart Communities has developed a process that could be used to build new networks in other jurisdictions in Canada. This process includes:

• Obtaining good advice on network planning is crucial from external experts such as the Communications Research Centre (CRC) in Ottawa;

• Fostering a community-oriented attitude among the technical, administrative and
managerial staff. Facilitators of services must continually ask themselves how can ICTs best be put to work for the benefit of the communities, instead of only benefitting the institutions that are serving the First Nations;

- Developing a comprehensive vision for ICTs that focuses primarily on community benefit based on community needs identified by the leadership and the people;
- Establishing a high bench mark for bandwidth standard that enables communities to use voice and video application along with high speed data without further costly infrastructure upgrades (ie. installing the scalable and adequate network infrastructure the first time);
- Creating partnerships with people and groups committed to achieving results and avoiding those who only deal with processes and personal aggrandizement or profit;
- Engaging as many people as possible in the communities to plan and run the local network, and understanding the role of the regional network and its services in order to maintain effective partnerships and working relationships;
- Being as transparent as possible by sharing project/network information with network communities, other interested parties, and funding agencies;
- Adopting, creating and sharing open source software to build local capacity and enable adaptations to address local challenges and to create new opportunities.

Recommendations

- Incorporating the Lessons Learned by the Kuhkenah Network of Smart Communities into future community-based telecommunications initiatives.
- Encouraging the Government to take a leadership role in the use of ICTs to conduct business. It is not enough to provide government information on web portals. Government officials need to adopt IP-based information sharing (voice, images), including videoconferencing and Voice over IP (VoIP) to communicate with citizens and clients.
- Government must work with stake holders to find ways to address security issues and other concerns by working with community networks to find solutions mutually acceptable to all.
- Government must commit to using community networks as a vehicle to deliver on-line services to Canadians and not to create new private networks that threaten the sustainability of local community networks.
- Government must adopt policies that encourage community innovation in the effective use of ICTs to address community needs and issues.
- Government must create a stronger environment to empower communities to adopt ICT solutions to meet local needs and challenges as well as improving access to on-line government services.
- Government must launch K-Net’s E-Community proposal, a community-based ICT
capacity building initiative\(^9\) as a national initiative to encourage and support other regions in developing broadband connectivity solutions that meet local needs.

- The most effective way to deliver a national program to expand connectivity and telecommunications to First Nations in Canada is to create partnerships with Regional Management Organizations (RMOs). The RMO model\(^{10}\) has been utilized effectively to deliver a variety of national initiatives such as Industry Canada’s SchoolNet. The regional model has been pioneered by Government internally to deliver economic development across Canada through agencies such as FedNor.

### Migration

- In 2000, the Kuhkenah Network was originally conceived as a broadband network to serve the needs of the five First Nation members of Keewaytinook Okimakanak, a tribal council in Ontario’s far north. By 2005, the Kuhkenah Network has activated over seventy POPs across Canada, mostly in Ontario’s far north with large clusters in northern Manitoba and Quebec. Each of the Kuhkenah partners now owns, operates and manages its own community network which provides services to its members according to the priorities identified by the individual community. The management structure is determined by the local leadership to best address local economic, political and social needs.

- To ensure that these community networks had access to the services that are needed to accomplish local goals, the Kuhkenah Network established partnerships with such like-minded social enterprise organizations as the Education Network of Ontario (ENO) which allowed for the migration of the Network across Canada to reach educational and health networks.

- To ensure that other First Nations in Canada benefit from the knowledge and experience accumulated as a result of SMART, the Kuhkenah Network and FedNor have partnered to develop the Aboriginal E-Community Program Concept for Industry Canada. The E-Community program has been approved by FedNor in July, 2005 to support and encourage other First Nations to develop their broadband community networks.

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\(^{10}\) To see more, click here: [http://knet.ca/documents/SchoolNet-Press-Release.pdf](http://knet.ca/documents/SchoolNet-Press-Release.pdf)
Activity 2: Procure, Install and Maintain Community ICTs

The Kuhkenah Network of Smart Communities has rapidly grown from a handful of First Nations communities in northwestern Ontario to the largest First Nations broadband network in Canada and probably the world. Yet, this migration cannot be explained with conventional community informatics models. It is a decentralized community-driven model that places control at the local level. To respect local autonomy and promote the adoption of connectivity and telecommunications, the Kuhkenah Network developed a number of tools to work effectively to support and promote its community partners. Community consultations were critical from the beginning of the demonstration project. It organized a gold circle of suppliers to ensure the best price for services and equipment for local communities and by doing so leveraged additional goods and services. It also developed partnerships with like-minded Aboriginal and Non-Aboriginal organizations across Canada to better serve community interests, locally and with others in similar circumstances in other regions. Local control encouraged community to take ownership of these new tools to create local opportunities including local employment and entrepreneurship. A summary of Activity 2 (procure, install and maintain community ICTs) is as follows:

Accomplishments

• The Kuhkenah Network of Smart Communities has worked with its partners such as the Educational Network of Ontario (ENO) to establish a “gold circle” of suppliers and advisors to acquire and deploy network and ICT applications equipment. The goal of the “gold circle” was to ensure the best price and best service for communities as well as advice and assistance for a variety of goods including: servers, routers, switches, cable plants, LAN installations, computer terminals, printers, scanners, videoconferencing units, monitors, IP telephones, telemedicine equipment, software, and video bridge.

• Through the “gold circle,” the Kuhkenah Network of Smart Communities levered approximately $6 million in ICT equipment. This included purchasing support cable, fibre, wireless, routers, satellite network equipment with other First Nation communities across Nishnawbe Aski, Grand Council Treaty Number Three and the Union of Ontario Indians in northern Ontario as well as other regions across Canada.

11 The Kuhkenah Network of Smart Communities was based on a series of community consultations from the very beginning of the project. These dialogues continued throughout the project. For more information about the first phase of the consultation process, click here: http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=122&POSTNUKESID=72c48530b020535c8b9f3912360eb603
• The Kuhkenah Network of Smart Communities, as a partner of the Northern Indigenous Community Satellite Network (NICSN), submitted a Notice of Intent for a $45 million contribution from the National Satellite Initiative (NSI) Round 2 for one KO and 40 other remote communities.

Benefits
• On-line traffic on the Kuhkenah Network of Smart Communities continues to grow.\(^\text{12}\) The various on-line services provided on the Kuhkenah Network of Smart Communities (K-Net) continues to show a monthly increase in usage on the traffic monitoring graphs that can be seen at [http://linux.knet.ca/~tech/monitoring/webalizer/](http://linux.knet.ca/~tech/monitoring/webalizer/)
• One of the most popular sites, especially for First Nations Youth in Ontario’s far north is [MyKnet.org](http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1412&POSTNUKESID=2e6ebc04ad8ba95ce5422335b1104aa8). Traffic on these personal web sites continues to push the boundaries on traffic. In May 2005, MyKnet.org receive over a 110 million hits.\(^\text{13}\)
• Information, specifically, about Network operations can be found at [http://tech.knet.on.ca/](http://tech.knet.on.ca/)
• In order to develop local capacity, the Kuhkenah Network of Smart Communities created a community support system that includes First Nations computer and Network technicians who provide advice and assistance on a [help desk](http://help.knet.ca) or click on help.knet.ca.
• The installation and maintenance of Community ICTs have created employment on-reserve on each of the SMART partner communities.

Lessons Learned
• “Gold Circle” system of purchasing proved effective for First Nations to access technology and other ICT services. It is a system that is analogous to the Government’s “vendor of record / standing offer” system.
• The Network made efforts to deal with local suppliers where possible which could provide technical support for effectively for First Nations partners.
• Local community members were trained and engaged to install and maintain equipment to develop community capacity and local control. Some of these

\(^\text{12}\)Click [here](http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1412&POSTNUKESID=2e6ebc04ad8ba95ce5422335b1104aa8) or go to:
\(^\text{13}\)For more information about the 110 million hits on the MyKnet.org personal web pages, click [here](http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1369&POSTNUKESID=2e6ebc04ad8ba95ce5422335b1104aa8) or go to:
technicians have been hired to do work within the community by the administration offices, nursing stations, and other First Nations agencies as well as by external organizations such as Health Canada and others to conduct repairs and regular maintenance on computer and network equipment.

- The Kuhkenah Network of SMART Communities established strong relationships with other groups to facilitate the sharing of lessons and accessing expertise, such as the Education Network of Ontario (ENO) and other open-source software centres of knowledge.

**Recommendations**

- Industry Canada should launch a specific initiative to connect and equip administration offices and aboriginal service organizations with ICTs under the E-Community proposal. Once this initiative is well established, Industry Canada should transfer the responsibility for the maintenance of this program to the Department of Indian Affairs.

- Equipment and services should be purchased as locally as possible to ensure availability of support and to build capacity for self-reliance even if it increases costs. This would not be a unique policy. The Government of Nunavut pays a premium to consultants and contracts who include local and Inuit suppliers in their proposals.\(^{14}\)

**Migration**

- The Kuhkenah Network of Smart Communities was instrumental in the establishment of the Northern Indigenous Community Satellite Network, (NICSN), a partnership between Keewaytinook Okimakanak (Ontario), Kativik Regional Government (Quebec), and Keewatin Tribal Council (Manitoba) to work cooperatively to ensure that the people of the North have the necessary bandwidth to operate the applications they need to address regional educational, health and economic development challenges. NICSN is a cooperative C-Band satellite network that is now serving 28 Aboriginal very remote communities and by the fall there will be a total of forty Aboriginal communities utilizing this network to carry video, audio and data traffic.

- Leveraging the benefits and partnerships of the “Gold Circle” resulted in Keewaytinook Okimakanak being able to purchase hardware and services for all the community network development initiatives undertaken throughout the Smart Communities initiatives. This work alone leveraged over $1 million in contributions / savings from the private sector for the hardware and software acquired and being utilized on the network.

\(^{14}\)To learn more about the policy of Nunavut to encourage consultants and contracts to hire local people and Inuit, click [here](http://www.gov.nu.ca/Nunavut/policies/) or go to [http://www.gov.nu.ca/Nunavut/policies/](http://www.gov.nu.ca/Nunavut/policies/)
Activity 3: Project Management, Administration and Governance

The leadership of the Kuhkenah Network of SMART Communities adopted telecommunications as a means to address the many historic and contemporary challenges facing their communities. While they recognized the potential of these tools, they decided early in the process that they would adapt these tools to their needs rather than allow technicians and experts in the south to tell them what they could have and at what price. This shaped from the beginning how the Aboriginal SMART project would be managed, administered and governed. It ensured that community members would be trained to use IT in their daily lives, that some community members would be offered the opportunity to become network and computer technicians and that the leadership would be able to identify opportunities and challenges to the sustainability of community networks. More importantly, community networks would be created that would be managed, administered and governed at the local level.

Accomplishments

- The board of the Kuhkenah Network of SMART Communities, the elected leadership of the member First Nations who compose Keewaytinook Okimakanak, the Northern Chiefs Tribal Council, created the K-Net team.\(^{15}\)
- Consistent with the traditional values of community control and respect for local autonomy, the Kuhkenah Network of SMART Communities created a business plan that was rooted in a distributed business management model and supported by sound financial operating practices.
- The Kuhkenah Network of SMART Communities identified the economic development opportunities associated with connectivity and telecommunications. The board recommended that salaries were paid to E-Centre managers, local technicians and the multi-media producers.
- The conversion of the financial management system from a DOS-based Newviews program to the windows-based AccPac system enabled the administration to obtain timely and accurate financial data, operate the system on a distributed basis (payroll was completed from Fort Severn) and supported the transition to a financial system that is now being modeled in the First Nations.
- The introduction of broadband services required funding for human resource development. On-the-job training, participation in meetings and conferences was provided for all workers involved in the SMART Project.
- As a first nations organization, a series of audits were required. The last one was completed on March 31, 2004. The Kuhkenah Network of SMART Communities utilizes a cost-recovery model.

\(^{15}\)To learn more about the K-Net Team visit http://smart.knet.ca/smart2002/smartko.html
• The K-NET Team achieved all objectives identified in the SMART Project and delivered them under budget. With the approval of the funders, the surplus was reallocated to other activities.

• Coordination of a distributed office and management operation with staff located in the five participating Keewaytinook Okimakanak First Nations as well as in Balmerton, Sioux Lookout and Thunder Bay (a region the size of France) was effectively demonstrated and is now being further expanded upon.

• A regional accounting firm audited each quarterly financial report and provided the lead project officer and Keewaytinook Okimakanak with a summary report creating local development (the CA working with the accounting firm decided to move to Red Lake and work full-time with Keewaytinook Okimakanak).

Benefits

• The distributed management model provided for a greater degree of distributed responsibility. This ensured greater capacity development at the community level and the more successful transfer of technology and technological knowledge by First Nations members at the community level.

• During the project, the Kuhkenah Network of SMART Communities emphasized the building of local capacity in all phases including implementation. As a result, the Network evolved as a social enterprise.

Lessons Learned

• Flexibility is required for all reporting schedules. There is a need to identify a variety of reporting mechanisms that suit the needs and the capacities of all partners including ones that speak to the priorities of community members such as photo albums and news items.

• Training plans must be incorporated into all operational/project plans in order to support local community members in their efforts to attain ICTs skills to accomplish personal objectives and project deliverables.

• Community networks which are owned, managed and operated at the local level are more sustainable than networks that are imported from outside the community. Investing in local networks and capacity building supports local social and economic development.

Recommendations

• Industry Canada must work with its partners to develop better reporting and evaluation mechanisms, including developing an evaluation at the beginning of all projects. IC must show flexibility and recognize the value of other types of reporting tools such as web sites and video and must recognize that academics are divided
as to whether the impacts of broadband services on communities can be measured quantitatively.

- Industry Canada must develop greater capacity in the use of living documents such as web sites for evaluation and reporting.
- Industry Canada should take a leadership role in streamlining the on-line reporting and evaluation of projects to promote innovation. Reporting and evaluation should not stifle projects but be creative tools for improvement and assist with the completion of project goals.
- For large projects, Industry Canada should contract local Chartered Accountants to audit all project claims. By doing so, IC would support the local economy and create regional efficiencies for the Department. The PSB preferred the external claim audit to Industry Canada’s finance claim process on the SMART project and this same process can be applied to all large projects.
- Much valuable information on-line has been lost due to a variety of funding challenges faced by the not-for-profit sector as Canada moves towards a paperless bureaucracy. To ensure that this does not happen with this project, Industry Canada should allocate resources to Keewaytinook Okimakanak to preserve the content found on the Aboriginal Smart Communities website.

**Migration**

- First Nations communities across Ontario’s far north have adopted the community network model pioneered by the Kuhkenah Network. These communities are setting their own priorities and addressing them with broadband which they have purchased from the Kuhkenah Network at wholesale prices.
- E-work and e-management strategies and operations are now being put into place with core staff positions within Keewaytinook Okimakanak being moved to the First Nations where the ICTs are being used for meetings, training, communications and support.
ACTIVITY 4: IP Video Conferencing and Telephony

IP video conferencing and telephony are two applications made possible by the demonstration project which may well have had the greatest impact on the day to day lives of First Nation peoples in Ontario’s far north. Video conferencing means leaders can travel less and still participate actively in important meetings with other representatives of First Nations, the public and the private sectors. A growing number of consultants including lawyers are being directed by communities to present their work via video conference. Academics and students hear briefings about the status of health, education and economic development from front line workers rather than from tribal technical staff.\textsuperscript{16} Political leadership and senior bureaucrats can take virtual tours of First Nations and First Nation community leaders can discuss local problems directly with decision makers.\textsuperscript{17} Training sessions are provided to First Nations and non-Aboriginal community-based health care team members via IP video conferencing and archived in streaming video for those who cannot attend scheduled sessions.\textsuperscript{18} The KO health manager use video conferencing as a tool to bring community health directors together to discuss issues of mutual concern. Elementary school children in First Nations schools are learning about their history by listening to people who are shaping

\begin{itemize}
  \item A growing number of academics and their students have been exposed to the challenges of living in remote and isolated communities via IP video conferencing. Several universities including Guelph, Laurentian, Manitoba, Concordia, Toronto and Lakehead have participated in video conferences with community champions across the Kuhkenah Network. To see photos, click here: http://research.knet.ca/modules.php?set_albumName=album38&id=LU_Aboriginal_Education_Faculty_visit_2005_04_06_004&op=modload&name=gallery&file=index&include=view_photo.php&POSTNUKESID=092f1eb8ef1e46cfd43ebc33ea3b7dd
  \item Carolyn Bennett, the Minister of State for Public Health visited Sioux Lookout in November 20\textsuperscript{th}, 2004. She participated in a video conference that linked several sites including Thunder Bay and KO communities. She is only one of several cabinet ministers and other senior government officials who visited Sioux Lookout or Balmertown who were able to “extend” their visits to a larger audience in the North as a result of IP video conferencing. For more information, click here: http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1159&POSTNUKESID=8f8e98788ebd629839478177161b7741
  \item KO Telehealth provides an on-going sessions of training sessions via video conferences for its Community Telehealth Coordinators (CTCs) as well as health care professionals working in remote and isolated communities. The list of topics is impressive and ranges from technical training to preventative medicine. For more information, click here: http://telehealth.knet.ca/index.php?module=ContentExpress&func=display&ceid=231&POSTNUKESID=d3463c504fd64a8ad0807a28d8c90cbf
\end{itemize}
the political landscape such as Elijah Harper who halted the Meech Lake Accord until Native rights were recognized in the agreement.\textsuperscript{19} Video conferencing allows students attending First Nations schools to participate in a full range of educational opportunities that until now was available to urban classrooms in the urban south. Furthermore, some of these students are using digital video and multi-media work stations as a means to tell their own stories and share them with others across the Kuhkenah Network.\textsuperscript{20} Young people are being trained in the uses of video conferencing and other ICTs and are finding employment and entrepreneurial opportunities in their home First Nations communities.\textsuperscript{21} The following outlines the major accomplishments of the Kuhkenah Network of Smart Communities in the adoption and use of video conferencing and IP telephony:

**Accomplishments**

- By choosing the right connectivity options and getting the right connections that can accommodate IP video and audio traffic with Quality of Service (QOS), First Nations have the capacity, flexibility and scalability to provide a wide range of heavy bandwidth applications such as tele-medicine and tele-education.
- Prior to the demonstration project, there were First Nations in Ontario’s far north which did not have residential telephone service. There was no business case to provide it. By embracing the traditional values of respect for local decision-making and the pooling of scarce resources (in this case bandwidth), the Kuhkenah Network of Smart Communities was able to provide people in Ontario’s far north with video conferencing and IP telephony. North Spirit Lake had their residential phone service operating in April 2000. In December 2000, Keewaywin receives telephone service

\textsuperscript{19}To see photos, click here: http://research.knet.ca/modules.php?set_albumName=album12&op=modload&name=gallery&file=index&include=view_album.php&POSTNUKESID=092f1eb8ef1e46cfcd43ebc33ea3b7dd

\textsuperscript{20}Students in Akwesasne have driven the use of digital video in their schools. In order to access the video conferencing equipment, the digital video equipment and other ICT tools, the students in Akwesasne formed a multi-media club. They have produced a series of videos on topics such as the dangers of smoking, drinking and driving and diabetes prevention. To see photos of the club members, click here: http://firstnationschools.ca/modules.php?set_albumName=album64&id=Kanatakon_School_at_Akwesasne_web_con_workshop_25_26_March_2004_006&op=modload&name=gallery&file=index&include=view_photo.php

\textsuperscript{21}To learn more about the YESOP program, click here: http://yesop.firstnationschools.ca
as well as the capacity to provide video conferencing with the other First Nations members of Keewaytinook Okimakanak.  

• Video conferencing is a dynamic tool for First Nations communities created as a result of the Kuhkenah of Smart First Nations. It bridges benefits of face-to-face interaction with the power of telecommunications. Colleagues, experts and other resource people can meet quickly, easily and at a fraction of the cost and time involved in travel. Video conferencing has been embraced by remote and isolated First Nations communities as a way to connect with one another and the outside world. As part of the demonstration project, video conferences have been conducted between KO members, between members of Nishnawbe Aski, and Chiefs of Ontario as well as with across Canada and around the world. In addition to meetings, video conferencing has been used as a method to teach and train. KO Telehealth (KOTH) uses video conferencing extensively as part of its on-going training program for its Community Telehealth Coordinators (CTCs). KOTH also uses video conferencing as a means to facilitate the professional development of the staff of the nursing stations and the Community Health Representatives (CHR). Beyond its strengths as a training tool, video conferencing has proven to be a powerful tool in bridge building between the various people often working in isolation in remote and isolated communities in Ontario’s far north.

• During the Project, the Kuhkenah Network of Smart Communities moved from a low bandwidth router production utilizing old M-Sat technology to the broadband application of IP video and telephony.

• Specifically, during the demonstration project, the Kuhkenah Network of Smart Communities accomplished the following:
  > Over fifty communities have 138 video conferencing units
  > Twenty-four health clinics in remote and isolated First Nations communities in the Sioux Lookout district have video-based telehealth
  > Thirteen First Nations communities in northwestern Ontario have Keewaytinook Internet High School (KiHS) classrooms using video conferencing units capacity to support and deliver industry-standard video conferencing and telephony service.

• The Kuhkenah Network of Smart Communities provided the first telephone service to the original First Nations partners. The MSAT phone service was part of the Direct PC project to provide POPs at First Nations schools in Keewaytinook Okimakanak.

Benefits

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• IP Telephony and video conferencing offer a host of benefits for the Network of SMART Communities. There are significant cost savings in terms of travel costs associated with meeting face-to-face. In addition to scheduled meetings both internal and external, video conferencing provides the Network of SMART communities to benefit more fully as public and private officials “drop in” in any one of KO’s sub offices in Balmertown, Sioux Lookout and Thunder Bay. Team leaders can be brought into informal discussions quickly and early in the decision-making process. This is especially true effective at the community level where the various directors (education, health, economic development and social services) can initiate, participate or provide direction to technical staff on a variety of issues using video conferencing. This is a competitive advantage for remote and isolated communities which because of geography cannot conduct the kind of networking with decision makers in Toronto or Ottawa that others may enjoy.

• The above applications require quality of service to be effective and as a result of the limitations of technology, a managed network which K-Net manages and operates on behalf of the KO SMART Communities. Such application drive demand for additional bandwidth

• The Kuhkenah Network of Smart Communities have facilitated the migration of IP telephony throughout many remote and isolated First Nations communities in Ontario’s far north. Administration offices, nursing stations, schools and other band agencies are serviced by VoIP telephony. In some communities such as Slate Falls, VoIP has made it possible for residential telephone access for the first time.

• Video conferencing was a critical tool for the training of web site construction and maintenance for First Nations schools in Ontario. This application made it possible to share lessons learned and best practices developed during the Kuhkenah Network of Smart Communities with First Nation students, teachers and community members across the province.

Lessons Learned

• Current technology requires a managed network with sufficient bandwidth to provide quality of service standards when planning connectivity projects in order to allow for applications such as video conferencing. Without a managed network, there is no quality of service and results may be poor depending on the levels of traffic.

• The introduction of video conferencing equipment into a community must be carefully facilitated. Appropriate documentation and training are necessary to ensure that the technology is used effectively and the bandwidth used efficiently.

23 The First Nations SchoolNet RMO (Ontario) facilitated a series of web site construction workshops for First Nations schools across Ontario. To see a photo of the use of video conferencing during the workshop in Six Nations, click here: http://firstnationsschools.ca/modules.php?set_albumName=album60&id=Six_Nations_0_26&op=modload&name=gallery&file=index&include=view_photo.php
• Community consultation from the beginning and carried on throughout the implementation phase is critical for success.

Recommendations

• Governments have a major role to play in advancing the use of telecommunications especially video conferencing as the principal tool for conducting meetings with clients, especially those who are connected in Ontario’s far north. Many face-to-face meetings could be better facilitated via video conference at a significant reduction in costs to the public purse. It would also assist with the long term sustainability of community networks if government took a lead role in the use of videoconferencing as a tool to consult with First Nations in remote and isolated communities. Industry Canada has a special responsibility to lead other federal departments in this area after its investment in SMART, C-Band Public Benefit, and other initiatives.

• As a matter of policy and practice, Industry Canada should adopt IP-enabled video-conferencing and abandon the slower and more expensive ISDN solution.

Migration

• In 2000, the Kuhkenah Network was originally conceived as a broadband network to serve the needs of the five First Nation members of Keewaytinook Okimakanak, a tribal council in Ontario’s far north. By 2005, the Kuhkenah Network has activated over 200 IP video conferencing units throughout First Nations in Ontario and across Canada. People are able to participate remotely without the cost and trouble of travel.

• The Keewaytinook Okimakanak Research Institute (KORI) was contracted by the First Nations School Net Regional Management Organization (Ontario) to facilitate a series of video conference workshops between a selected group of First Nations schools in Ontario within the Youth Employment and SchoolNet On-Line Presentations Initiative (YESOP). Since the RMOs were created, First Nations SchoolNet (Ontario) has migrated connectivity and telecommunications to First Nations schools on-reserve across the province. Many First Nations schools in Ontario as a result of the RMO have access to broadband services including IP video conferencing. To facilitate the use of broadband applications, the RMO has provided its partner schools with multi-media workstations so students and community members can use these tools to tell their stories on-line. The goal of YESOP was to identify, train and empower on-reserve youth in the uses of various ICTs and use this knowledge to tell the story of their communities on-line in a series of video conferences. With this new found knowledge, it is believed that these ICT workers will either be employed by their respective bands or create local IT businesses.

• One of the most successful applications of video conferencing has been by the Regional Management Organizations (RMOs) of Industry Canada’s First Nations
SchoolNet. Although, the RMOs continue to conduct an annual face-to-face meeting, most of the meetings are conducted via video conference.

- IP telephony are now a regular feature of many administration offices, nursing stations and other band agencies located on remote and isolated First Nations communities in Ontario’s far north.

- Residential telephone service was not available to remote and isolated First Nations such as Slate Falls prior to the Kuhkenah Network of Smart Communities. Yet, even though Slate Falls was not a member of Keewaytinook Okimakanak, the catalyst of the Kuhkenah Network, the community now has residential telephone service as a result of knowledge and experience gained as a result of the demonstration project.

- Researching ICTs with Aboriginal Communities (RICTA), a knowledge cluster funded by the Social Sciences and Humanities Research Council (SSHRC) held its founding meeting in Deer Lake First Nation and Balmertown, Ontario, the sub office of Keewaytinook Okimakanak (March 11, 2005). Over twenty academics from across Canada and the United States traveled to northwestern Ontario to participate in the face-to-face meeting. However, another forty academics, First Nations community champions and government officials across Canada were able to participate via video conference, streaming video and the BREEZE Platform.\textsuperscript{24}

- Following its participation via video conferencing in the RICTA conference, the Akwesasne multi-media club plans to link with other students attending First Nations schools in Ontario as a virtual cultural exchange.

- KO Telehealth uses video conferencing as a training tool for Community Telehealth Coordinators, community-based nurses and other health care professionals. These are regularly scheduled sessions which are archived in streaming video for future use.

- To ensure that other First Nations in Canada benefit from the knowledge and experience accumulated as a result of SMART, the Kuhkenah Network and FedNor have partnered to develop the Aboriginal E-Community Program Concept for Industry Canada. The E-Community program has been approved by Industry Canada in July, 2005.

- The legacy of Kuhkenah Network of Smart Communities is the people who have learned how to operate and adapt ICT applications to address local needs. A group of K-Net technicians, all First Nations youth trained as a result of the demonstration project, set up and broadcast a streaming video feed from the Treaty #9 Centennial Commemoration from Mishkeegogamong First Nation, a remote community 500 kilometers northwest of Thunder Bay, Ontario.\textsuperscript{25} In spite of numerous technical

\textsuperscript{24} To see the workshop report, click here: http://www.ricta.ca

\textsuperscript{25} To see the streaming video of the Treaty #9 Centennial Commemoration, click here:
challenges, the K-Net team captured on digital videotape the speeches of the various dignitaries representing Nishnawbe Aski, the Province of Ontario and Canada and shared them with the many people who could not participate in the festivities face to face. Their work has been archived for posterity.

• The migration of community ICTs can best be seen during the Centennial Commemoration of Treaty Nine in Mishkeegogaming First Nation in July 2005. The event was recorded on digital video and broadcast on streaming video to the many people who could not afford the time and expense of traveling to tiny St. Joseph Island, 350 air kilometers northwest of Thunder Bay, Ontario. In the weeks prior to the ceremony, the K-Net team applied their experience gained from the demonstration project to ensure that the proper connections were there to bring the event to the world via broadband. Dan Pellerin, the K-Net Network Manager, and the company Mishkeegogaming contracted to install the wireless network worked all day on the Saturday before the event to get the connections working. They chopped down trees, hung radios and ran cable. And, tested all of the connections and applications. During the event, the K-Net team worked tirelessly to ensure that the afternoon session was webcast live from the meeting site on St. Joseph Island, the original site of Mishkeegogaming where the treaty was signed one hundred years ago. K-Net team members, Jamie Ray and Jeannie Carpenter worked to get the wireless connections working in spite of the extreme heat and equipment failure. The event provided an opportunity for the K-Net team to successfully "field test" new radios for carrying IP video, data and audio traffic with quality of service. To learn more about the work of K-Net team, click here. 26 Many digital photos were taken during the commemoration including one where a NAN member is using an IP phone on site. The Chronicle Journal, a daily newspaper serving Northwestern Ontario, received photos of the event over the Internet. Without the experience and knowledge gained during the Kuhkenah Network of Smart Communities, few people outside of the participants would have known about the Treaty commemoration.

http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1477&P OSTNUKESID=020379306824d783f7a79823b31ec262

26 To learn more about the efforts of the K-Net team and their work to establish the proper connections and test the applications during the Treaty 9 Commemoration Ceremony in Mishkeegogaming First Nation, click here: http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1463
Activity 5: Keewaytinook Internet High School (KiHS) - see http://kihs.knet.ca

Historically, First Nations children and youth were taken from their home communities to attend high school in the urban school. The impacts of the residential school system are well documented. Alcoholism, substance abuse, violence and suicide are residual impacts of this policy of forced assimilation. Although the last of the Church managed / federally supervised residential schools were closed in the 1970s, many First Nations youth continue to leave their friends and families to attend high school in large urban centres in the south such as Sioux Lookout and Thunder Bay. The disruption to individuals, families and the communities continue to cause great social dislocation. The system at best produces academic failure well documented in various national and regional evaluations. Telecommunications has been used by the Kuhkenah Network of Smart Communities to challenge the status quo.

Accomplishments

• The Kuhkenah Network of SMART Communities adapted telecommunications to address both the desire of the leadership to keep their youth at home and yet provide them with a high quality education. The Network’s solution was to create the Keewaytinook Internet High School (KiHS). KiHS is a network of 13 classrooms in First Nations across northern Ontario. Like a conventional junior high school, each of the member communities has an accredited teacher / specialist who provides instruction to all of those students across the KiHS network enrolled in any particular course. When not giving instruction, the teacher is a tutor and mentor for the students in her community classroom.

• With contributions from FedNor, new KiHS classrooms were built in the five Keewaytinook Okimakanak First Nations. The Department of Indian Affairs is providing annual funding of over a $1 million for a five-year pilot program to determine the relative strengths and weaknesses of this model of education. Under the agreement, KiHS has agreed to cap its growth to thirteen First Nations communities and limit its instruction to a variety of courses in the grades nine and ten curriculum although other communities are requesting to become partners in the Keewaytinook Internet High School.

• KiHS originally used the Wildcat Bulletin Board System (BBS) and then in its second year of operation moved to WebCT as its educational platform, an expensive and propriety software. It was replaced with Zed, its own open-source e-learning platform that was created within the Smart Communities initiative. KiHS is currently migrating to the Moodle platform, another open-source e-learning environment. The Kuhkenah Network has shared its experiences and its e-learning platforms with a variety of tribal councils which have indicated an interest in creating their own Internet high schools. In addition to e-learning environments such as Moodle, KiHS employs the macromedia Breeze presentation software as well as video conferencing along with video bridging services and Starbak webcasting tools.
• The expansion of the KiHS initiative to include Grade 8 (http://g8.firstnationschools.ca) classes across Ontario using a similar on-line delivery model helps to prepare First Nation students to successfully move into either a local grade 9 or to attend grade 9 within an urban environment.

Benefits

• The benefits of KiHS are extensive. Up to one-hundred and forty students per year have attended KiHS classrooms in northwestern Ontario who would otherwise been forced to attend conventional high schools in the south. Overcoming initial skepticism from the Ontario Ministry of Education, KiHS was the first private Internet high school to deliver Ontario-accredited curriculum. KiHS is forcing teachers and administrators to rethink traditional assumptions about the delivery of credit courses and embrace innovation. The Faculty of Education at Lakehead University is exploring ways to include the use of ICTs in its curriculum to better prepare future teachers for KiHS and other teaching opportunities using the Internet.

• More importantly, KiHS is strengthening communities by helping to support young people to remain at home during those important formative years. The economic and social spin-offs of having young people remain in their communities. The economic and social spin-offs of having young people remain in their communities provides many more opportunities for local development (recreation, social support systems, employment and business opportunities, etc.) Never before have the participating First Nations been able to plan for these facilities and resources in their communities because their young people were always leaving the community after Grade Eight.

• KiHS is creating new educational opportunities and providing a gateway to new educational resources. It is providing a portal for students and parents to gain at greater capacity with ICTs. It has provided a foundation for other educational and training opportunities for those at the community level who want to graduate from high school, college or university or improve changes for employment. More over, KiHS attracts $1.2 million a year in education funding which largely remains in member communities rather than flowing to the south.

• The flexibility to accommodate local and individual needs is an important aspect of KiHS. For example managing a shortened course semester, ie students being able to take 2 courses over an 8 week semester supported the students and their families because the student is able to earn 2 credits at a time, then they are able to go out on the land to trap, hunt etc and then return to school for another semester to obtain additional high school credits.

Lessons Learned

• A number of challenges face KiHS which need to be addressed. Currently, all KiHS teachers participate in a one-week orientation at the beginning of the academic year. While this is enough training for teachers to operate in this environment, it is
not enough to challenge those to creatively use the technology to its greatest potential. Education students require additional experience and learning opportunities to better integrate ICTs into their classroom curriculum.

• Faculty of Education students are not taught about the challenges and opportunities associated with e-learning. KiHS should not only be an object of collective interest by community and academic researchers but an environment where future generations of teachers can hone their skills.

• Currently, there are three First Nations teachers employed by KiHS at the community level. There is no overall strategy to encourage more community members to consider careers in teaching specifically junior intermediate as the first step towards creating a pool of qualified First Nations KiHS teachers in the north.

• The curriculum used by KiHS is entirely prescribed by the Ontario Ministry of Education. In other jurisdictions, First Nations have developed curriculum that is rooted in the goals and values of the community. In those communities such as Akwesasne, the students preform at or beyond the provincial / state standards.

Recommendations

KiHS is providing students with alternative to private First Nations schools and schools operated under the jurisdiction of the public and Catholic school boards in Ontario. It provides students who have dropped out of the mainstream educational institutions and have returned to their home communities with the opportunity to achieve Ontario Ministry of Education credits. It could do much more. Nevertheless, it has accomplished much with the resources that it has been allocated. To reach its full potential, government needs to support KiHS by:

• promoting open-source solutions in e-learning over expensive proprietary software;

• reducing the ratio of computers to students and staff;

• creating the community-based social, recreational and economic support systems required to assist teens, their families, the parents and the community to effectively cope with having young people remaining in their community;

• expanding the program to include other communities and grade levels as the capacity and opportunities develop;

• establishing e-learning as a respected and mainstream method of program delivery for secondary school programs (ie. changing the attitude that it is an alternative form of education for those who are not successful in the traditional classroom);

• supporting funding programs and government agencies to identify adequate funding levels and support systems for the development and delivery of community-based, e-learning opportunities.

• one of the most pressing challenges will be to document the impacts of ICTs on academic achievement. In California, recent studies indicated that residential access to broadband is a greater predictor of high school graduation rates than
either ethnicity or income levels. Community-centred research needs to be conducted to determine if these findings hold true for remote and isolated communities in Ontario’s far north. Studies indicate that the average First Nations student in Grade Eight is functioning at the Grade 6.5 level. The Kuhkenah Network of SMART Communities have accessed broadband services for at least three years. A comprehensive study is needed that compares the academic achievement of those in the north with access to broadband with those who do not.

Migration

• KiHS is attracting regional, national and international attention. KiHS administrators and faculty have conducted presentations on the Internet high school at workshops and conferences across Canada.

• KiHS introduced a classroom to Bearskin Lake in 2004 after closing a conventional highschool program the year before. Bearskin has a First Nations teacher. There is a waiting list of First Nations communities which wants a KiHS classroom. However, the Department of Indian Affairs has capped the number of sites where KiHS can operate.

• Members of RICTA, a knowledge cluster funded by SSHRC, toured a KiHS classroom in Deer Lake First Nation in March 2005. A sub group of these researchers are currently working on a proposal to create a more culturally-relevant curriculum for KiHS. KiHS also figured prominently in the work of CRACIN researchers and has been the focus of papers and presentations at numerous national and international conferences.

• KORI and members of the Lakehead University Faculty of Education are developing a proposal with KiHS to develop a culturally relevant curriculum for the Internet high school.

• KiHS has received funding from the Department of Indian Affairs to conduct an evaluation of its program.

• Once, one of a handful of First Nation e-learning alternatives in Canada, the KiHS model is migrating across Canada. KiHS is assisting with the development of a variety of Internet high schools in Grand Council Treaty #3 and the Union of Ontario Indians as well as Internet schools in Quebec and northern Saskatchewan.

• The political and technical leadership of the Prince Albert Council visited Balmertown and conducted a virtual tour of KiHS in March 2005 and are now establishing their own virtual high school to serve their member communities in Northern Saskatchewan.
Activity 6: Support Migration of Telehealth Services - see http://telehealth.knet.ca

The member First Nations of Keewaytinook Okimakanak have adopted telehealth as both a means to improve health care access for the residents of remote and isolated communities in Ontario’s far north and as a way to ensure the sustainability of the Kuhkenah Network. Although the actual SMART investment was relatively small, the partners were able to leverage those dollars dramatically. KOTH provides telehealth services to First Nations across northern Ontario and is poised for expansion.

Accomplishments

• The Kuhkenah Network of Smart Communities is being recognized as a leader and as an innovator in the delivery of telehealth services in remote and isolated First Nations communities in Ontario’s far north.

• Established as one of the activities under the SMART Project, KO Telehealth (KOTH) originally provided services to the following First Nations: Deer Lake, Fort Severn, North Spirit, Keewaywin and Poplar Hill. It is currently serving a total of sixteen communities and will reach the final eight communities in the Sioux Lookout Federal Hospital by July 2005. Health Canada is engaged in discussions with KOTH to assume the role of telehealth integrator for First Nations and First Nations health access centres across northern Ontario.

• With the original $80,000 investment from SMART, the Network has leveraged over $8 million in subsequent funding from other sources to develop and expand telehealth services in northwestern Ontario. One of the most significant outcomes of the SMART investment was the establishment of a 100Megfibre connection with Sunnybrook Hospital, the principal office of the NORTH Network. The NORTH Network connects over 80 hospitals in northern Ontario with physicians and specialists in the south. As a result, patients in remote and isolated communities in the Sioux Lookout zone can access a wide range of primary care services with less need for travel out of their communities.

• More importantly, the Network has developed a First Nations community-driven model of telehealth, unique in Canada. Central to the KOTH model is the Community Telehealth Coordinators (CTCs). The CTC is responsible for the maintenance, delivery and promotion of KOTH at the community level. However, unlike other models of telehealth in Canada, the CTC is a community member who usually speaks the local language and understands the realities of life in the north. In addition to operating and maintaining the telehealth workstation, the CTC acts as a broker between the patient in the community and the health professional in the city. The CTC plays a significant role in the acceptance of telehealth as a primary health tool and in championing community ownership of telehealth. In May 2005, KOTH facilitated over 200 patient consults largely due to the role of the CTCs.
Benefits

The benefits of the Network’s work in telehealth are significant. Video-based telehealth is a large bandwidth application that if adequately funded ensures in part the sustainability of the community Internet networks and reasonably priced Internet access. Since it requires significant bandwidth, it means that a host of other applications, which are not available by other solutions, are available for even the smallest remote and isolated community. Other benefits of telehealth include:

- improved access to primary care services for individuals through scheduled access to physicians and specialists via video-based telehealth
- expanded health education including emergency medicine, adolescent psychiatry, diabetes management, health worker training and pediatric rounds
- cost savings for travel as a growing number of primary care services are available in the community via telehealth.
- growing confidence of nurses and other health care professionals in the use of telehealth especially for consultations in emergency situations
- telehealth diagnostic equipment improves the effectiveness of local health care delivery
- new services are added to the primary health care mix available at the community level including: a new tele-radiology pilot project, a portable ophthalmology unit used for retinal screening for signs of diabetes-related blindness and a digital ultrasound service. None of these pilot projects would be possible without the broadband network created as a result of the Project. New services such as home care programs are in the development phase.
- expanded opportunities for training for CTCs and mental health workers who have been able to use the telehealth equipment for professional development and treatments
- expanded opportunities for preventative health care education
- growing employment opportunities for community members who can now receive health care and technical training without the additional costs of travel. These new employment opportunities include a new education facilitator and a new technical administrator to manage the telehealth service and who is mandated to increase employment and training opportunities in each participating community
- With this growing list of benefits, it is not surprising that KOTH has attracted regional, national and international attention.
- The most significant benefits involve quality of life issues. With telehealth, patients can reduce travel significantly especially for follow-up consultations with health care

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27Ernie Del Grande, “Why should first nations and inuit communities be interested in telehealth,” Aboriginal Nurse (December 1999) or click here: http://www.findarticles.com/p/articles/mi_qa3911/is_199912/ai_n8868126
professionals. Patients can recover from illness or injury at home around friends and family rather than in hospital wards in the south.

Lessons Learned

If First Nations communities in other parts of Canada are going to adapt ICTs to address the challenges of living in remote and isolated communities, sufficient bandwidth must be allocated for a managed Network that ensures that users enjoy quality of service. These factors must be considered when planning any connectivity projects.

- Too often, technical consultants make recommendations based on the cheapest or easiest method to deliver applications, web casting for instance instead of web-based video conferencing. However, if First Nations accept less than the industry standard they will not have the flexibility to offer the full spectrum of applications necessary to address the challenges created by colonialism and geography.

- One of the challenges faced by the Kuhkenah Network of Smart Communities in the delivery of telehealth is managing the relationships with the public sector. The delivery of telehealth involves many agencies and organizations within the bureaucracy, each with its own priorities and jealous of its own prerogatives.

- Furthermore, there are specific problems raised such as Internet security which needs to be resolved. Government agencies at both the federal and provincial level remain reluctant to pay for access to broadband services from social enterprises. This is a critical factor that must be addressed if the local networks are to remain sustainable in the long term.

- Large government bureaucracies need to develop ways to transfer costs savings as a result of the migration to telehealth back to the First Nations communities which need these dollars to build local health and wellness strategies. There are a variety of examples of this challenge including Health Canada which has not developed a vehicle to transfer significant cost savings in travel back to the First Nations.

- Health Canada moreover must work more closely with the Ontario Ministry of Health if First Nations in the province are going to fully benefit from telehealth. Senior government officials in the bureaucracy need to listen and learn from the experiences of those in the field. Health Canada, for example, sees telehealth as an opportunity to provide those living in remote and isolated communities with access to specialists and fund certain telehealth programs accordingly. However, it is the experience of the Network that telehealth can also provide remote and

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isolated communities with primary care and emergency care, consistent with the original vision of the First Nations communities which formed the Kuhkenah Network of Smart Communities. Central governments need to listen and adapt their policies to the realities of those who live in remote and isolated communities. Government officials should be encouraged to have face-to-face encounters in remote and isolated First Nations communities.

Recommendations

• The Kuhkenah Network of Smart Communities have demonstrated though telehealth how a strategic investment from Industry Canada could be leveraged by the community to create a tool to improve the quality of primary care and emergency care delivery. Such investments assist community-based organizations to form partnerships with service providers such as the NORTH Network. The full potential of telehealth will not be realized until policy issues are addressed at the highest levels of government. Governments must show flexibility and tear down road blocks that prevent funding from flowing to the community and must redirect cost savings from telehealth back to the communities.

Migration

• In 1997, the founding members of the Kuhkenah Network of SMART Communities began to explore the opportunities created by tele-medicine. In 1998, the first of many funding proposals were submitted to Health Canada. In 1999, a pilot telepsychiatry project was launched by the Keewaytinook Okimakanak Health team. In 2000, Health Canada began working with the Kuhkenah to be part of a regional telehealth consultation process. By 2001, Kuhkenah had partnered with the NORTH Network to develop the CHIPP proposal to migrate telehealth services across the remaining First Nations in the Sioux Lookout Zone. In the first year of the pilot project, KOTH migrated to six new First Nations communities. By year two, eleven more were connected. The remaining six will be connected by July 2005. Discussions are taking place to migrate telehealth to northern Manitoba and northern Quebec on the Northern Indigenous Community Satellite Network (NICSN).

• KOTH managers, staff and CTCs have conducted presentations on telehealth to a variety of health organizations and agencies across Canada including Health Canada, Canada Health Infoway and the Aboriginal Healing and Wellness Strategy.

• Canada Health Infoway has funded Keewaytinook Okimakanak to document KOTH as a model to expand telehealth to First Nations across Canada.
Activity 7: Data Warehouse

The Kuhkenah Network of SMART Communities have created a large data warehouse of electronic files that document its dramatic growth from a Wildcat Bulletin Board System (BBS) to a managed broadband network in less than a decade. The Keewaytinook Okimakanak team is utilizing a variety of database systems and open source tools to share information with the communities served. Using the network to distribute information and to communicate with others is critical for the Nishnawbe Aski because of their remoteness and isolation. Effective and meaningful data warehouses containing information that is referenced and accessed regularly is a clear demonstration of the value of these ICT tools for people living and working in remote and rural communities. Doing this work in an open, cost effective and transferable manner supported the growth and utilization of these resources. The warehouse includes photo albums and personal home pages (to identify the most popular) for community members as well as those utilized by the various departments of Keewaytinook Okimakanak. It includes community and personal “stories” captured in a variety of electronic formats including digital photography and digital video. These databases include narratives on the whole spectrum of interests, priorities and concerns of the people and community partners of the Kuhkenah Network. The data warehouse is available to all who have access to the ‘Net and is a means by which the Kuhkenah Network shares its experiences, challenges and lesson learned with other Indigenous peoples across Canada and around the world.

Accomplishments

• The Kuhkenah Network of SMART Communities have created a series of applications using “open source” software. A wide variety of open source applications have been created, including: photo albums, personal home pages, the Keewaytinook Internet High School (KiHS), GIS applications, the cable user management system, K-Net news service, SchoolNet database, SMART video archive, arts and crafts, language preservation and videoconferencing bridge scheduling tool.

• The Kuhkenah Network of SMART Communities has migrated accounting from a DOS-based system to industry standard AccPac Windows application.

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29 The Kuhkenah portal is populated with photo galleries and photographs that depict people and events of importance for community members. Cameras, digital video equipment and multi-media workstations are in the hands of members in each of the First Nations communities. They are used to tell their stories and placed on the portal to share them with other people around the world. The photo galleries are also used by the various departments of Keewaytinook Okimakanak to report activities back to communities members.
• The platform used by KiHS to deliver grade nine and ten courses is an excellent example of how the Kuhkenah Network explores the open-source environment and adapts it to the specific needs of the communities. KiHS has used several open source educational platforms and after years of testing and development are utilizing Moodle\textsuperscript{30}.

• K-Net users are creating their own applications and databases of resources that are shared on the various application portals. For example, the Grade 8 Supplementary program (http://g8.firstnationschools.ca) has a library of educational resources for teachers. The Ontario Regional Management Organization supporting First Nation Schools has a great on-line reference library of First Nation educational resources for students, teachers, parents and community members (http://firstnationschools.ca). Two volunteer managed sites, the Turning Point portal (http://turning-point.ca) and the K-Net Help (http://help.knet.ca) lists resources and membership information from peers.

Benefits

• Community capacity has been developed in data access and management. First Nations communities post their own documentation on the web including: photos, video clips and narrative information. Community-based researchers search the web for information to address local issues and improve the quality of life for band members.

• This deliverable has been used to leverage $3.5 million for school connectivity and ICT equipment over the life of the SMART project under the First Nations SchoolNet initiative.

Lessons Learned

• Open source applications have been embraced by community members because it promotes transparency and access to decision-makers. These tools provide communities, organizations, and individuals tools with cost-effective software.

• There is a need for alternative funding mechanisms to provide support for proprietary software. Some open source applications such as myknet.org are popular with individual. Other applications, such as GIS require a lot more resources to be able to develop and sustain meaningful applications.

• Adopting easy-to-use, open source data warehouse tools and models encourages and supports individuals, local organizations and communities to undertake the development and ownership of their own on-line creations.

\textsuperscript{30}To learn more about how the K-Net team adapted the Moodle Learning Environment for KiHS, click here: http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1249&P OSTNUKESID=aa353d482557806e46b08e94aaf5a549
Recommendations

• Like Brazil, Canada should support the development and use of open-source applications. Government must promote innovation over concerns over network security and other issues that keep technology out of the hands of those who require these services the most, i.e. people living and working in remote First Nations.

• Industry Canada must work with its regional partners to develop strategies to ensure that the lessons learned in one project or department are shared across the country.

• Industry Canada must become a champion of and investor in on-line innovation. It must do so by committing itself to a culture of change, flexibility and support for community innovation.

Migration

• The Assembly of First Nations is now posting all their Chief resolutions on-line and presenting this information in an accountable manner during their assemblies. This open and transparent governance model is now being considered by other levels of First Nation governments (regional bodies - Chiefs of Ontario, treaty organizations - Nishnawbe Aski Nation and Treaty 3, tribal councils and the individual First Nations).

• The KNEWS database (http://knews.knet.ca) is referenced regularly by national news bodies for local and regional First Nation information. Other organizations are accessing information and resources linked from these news stories. The data warehouse work has drawn attention to the Kuhkenah Network of SMART communities not only from across Canada but from around the world.
Activity 8: Kuhkenah (K-Net) Portal - visit http://knet.ca

The creation of the regional portal, local community web portals, personal homepages is now an accepted practice across northern Ontario and the country. The Kuhkenah Network of SMART Communities developed a web-based access system that provides a means by which First Nation communities can access information about education, health, economic development and other priority areas of Keewaytinook Okimakanak and its telecommunications department, K-Net Services. The portal provides a means by which local, regional, national and international Indigenous peoples and communities can learn about how SMART communities have shaped ICTs to address the challenges faced by those living in remote and isolated communities in Ontario’s far north.

Accomplishments

• The Kuhkenah (K-Net) Portal provides a means by which the First Nations peoples who live in Ontario’s far north can tell their stories, share their photos and videos with people around the world. They populate the portal with documents created with a variety of ICT tools such as personal web sites, digital cameras, digital video cameras and multimedia workstations.

• During the SMART Project, traffic on the portal has increased dramatically. The main portal receives over five million hits per month and hosts over eighteen thousand personal web pages on http://www.myknet.org/. Collectively, the portal receives over one hundred million hits per month. The portal has archived over thirteen thousand photos.

• The portal has inspired many First Nations and Aboriginal agencies to create and maintain information website that document local priorities for community members and outsiders alike.

• To facilitate community ownership, K-Net Services has purchased the rights to web address domains including: knet.ca, firstnation.ca, firstnationschools.ca, and myknet.org. K-Net Services hosts web pages for First Nations, Aboriginal agencies and fellow travelers across Canada, many of which could not afford to have web sites without the support of K-Net Services.

• K-Net Services has the capacity to provide web development, hosting services and training for other organizations on a fee for service basis.31

Benefits

• First Nations people in remote and isolated regions of Ontario’s far north for the first time have the opportunity to learn how to use ICTs, develop new applications and explore new ways to tell their stories as a result of the Kuhkenah Network of Smart

31 To see the services provided by K-Net, click here: http://services.knet.ca
Communities. This comprehensive skills development has been opened to all people using K-Net Services on-line training web sites and face-to-face learning sessions that respects the needs and aspirations of learners. By empowering people with these new tools, the Network has promoted literacy, creativity, and technical expertise including the use of digital cameras, digital video cameras, personal web sites and multi-media tools.

- The building of the Kuhkenah Network has stimulated economic activity among the partner First Nations by creating employment for managers, technicians and others, however, the portal has proven to be a vehicle by which other First Nation communities have learned about the power of broadband which has encouraged the accelerated growth in demand for these services by other First Nations in Ontario’s far north.

- The portal has created opportunities for artists and crafts people to reach a larger market as a result of the arts and crafts page.

- The portal is also creating employment opportunities for digital video producers trained during the SMART Project. These community members have been hired to shoot film for a number of documentaries including, “Turning the Corner: Using Broadband Effectively in Canada’s North” (2005). This documentary was previewed by senior officials in Ottawa including the Honourable Joe Comuzzi, the Minister of State Responsible for FedNor. 32 Other video clips can be seen throughout the portal.

- The portal promotes peer-to-peer teaching and learning on-line. It plays a critical role in the dissemination of technical expertise about broadband services especially by the youth through the personal web pages.

- The portal plays an important social function as more and more community members in Ontario’s far north are adopting various ICT tools to overcome geography and climate to remain in contact with members who leave to attend school, to seek employment or health and social services. ICTs are being used by people to strengthen family and community ties.

- On-line resources are being used by people to raise awareness of issues, promote understanding and conflict resolution when necessary in social and professional life.

- While it can never be quantified, nevertheless there is strong anecdotal evidence that attempted suicides were prevented by timely interventions by those who recognized danger signs posted on the personal web pages.

- The portal also provides a forum which allows youth to discuss and debate issues of importance to them without the mediation of those with power such as teachers and other authority figures.

32To see more about the K-Net presentation in Ottawa, click here:
http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1426&P OSTNUKESID=a4dd0987559e5f5283c8c102adf48a0c
• **Turning Point**, is a forum which promotes cross-cultural discussions between First Nations and Mainstream Canadians located on the portal. Although it is new, it is gathering growing interest from many circles.

**Lessons Learned**

• First Nations people living in remote and isolated communities are poor and do not have the disposable income to purchase expensive propriety software. These tools are designed for the needs of an urban population not necessarily those on the fringes of power. Open source applications are critical not only because they are affordable but because people can shape applications to address their local needs and challenges. It is important that Government champion the use of open source software as a means to put ICT applications into the hands of the poor and the disenfranchised.

• Open source software empowers communities because local people can shape on-line tools to address their needs. It is not necessary for every community member to have the technical skills to create a KiHS for the community to take ownership of this application. Knowing such expertise exists in the community encourages many to explore ways of using these tools such as creating and maintaining web pages and using email.

• The Portal is an excellent tool to be used by community members and KO technicians as a visual aid during presentations to outside groups to explain the work conducted through the Kuhkenah Network. Guided on-line tours provide guests with a unique opportunity to learn about the people, the communities and the opportunities that exist across this largely unknown part of Canada.

**Recommendations**

• Public and private funding organizations must acknowledge and respect the benefits of encouraging the development of local of web-based communication tools even when its more expensive to do so. This includes promoting the utilization of these tools, research and development and the on-going financial support of this environment.

• Government must promote regional and local portal development as better reflecting the nation’s diversity and community. Centralized portal development does not encourage dialogue or understanding. Local and regional voices are lost in centralized portals which place priority on production values over opinion and consensus over the voice of the individual.

• Portals must be created and supported so users can contribute easily to the content and the development of the on-line environment. Information and corporate web sites are useful for clients and access to shared resources but these on-line pages are the responsibilities of their owners. Community portals are owned by the people who require accessibility and support to contribute to their ongoing value and
content. Portals are living and dynamic on-line environments that require public resources for maintenance and operation.

Migration

- The Kuhkenah Portal provides the opportunity for dialogue between the First Nations partners and to others, both Indigenous and those who are not, across Canada and around the world. These discussions have been facilitated through the Portal through web streaming and other applications as well as through Internet searches. Through the Portal, the First Nations communities have been invited by such organizations as CRACIN, Canada Health Infoway and others to partner in a variety of projects of mutual interest.

- The Portal is instrumental in the development and rapid growth of Researching ICTs with Aboriginal Communities (RICTA - http://ricta.ca), a SSHRC Knowledge Cluster composed of academics, government policy makers and community champions in the areas of health and wellness, education and economic development. The Portal hosts the RICTA website.
Activity 9: Community E-Centres

The Community E-Centres have become important spaces for sharing, training and accessing telecommunications in the founding First Nations partners of the Kuhkenah Network of SMART Communities. The E-Centres provide a place where community members can access their email, participate in IP video conferences or seek up to date information from the on-site staff. Even as more and more community members are enjoying residential access to the ‘Net, the E-Centres continue to play an important role in the servicing and maintenance of the community networks as well as place where people can seek assistance with technical problems associated with telecommunications. The E-Centre concept is growing in popularity. At least one First Nation outside of the founding partners has established its own E-Centre.

Accomplishments

- Working with communities to develop and establish E-centres in each of the five First Nations communities of Keewaytinook Okimakanak. This included new capital construction in three and renovations in two remote and isolated communities in Ontario’s far north. Monies to complete these facilities were leveraged with funding from FedNor.

- Community consultation throughout the Project ensured that local needs and challenges were address, ensuring a high level of community ownership.

- The K-Net team has become a Center of Excellence for working with communities to develop, establish and support of community e-centres.

- Local community members were hired and trained to manage the E-Centres. The capital construction of new E-Centres were completed over this past year in Deer Lake, Keewaywin and North Spirit Lake. The e-Centre in Fort Severn is a fully renovated and expanded radio station that serves as a hub for the telecommunication services for that community. Poplar Hill invested in a new, multi-purpose business centre that hosted the e-Centre and the telecom services that serve the community.

Benefits

- The E-Centres provide each community access with access to broadband internet resources including: high speed Internet, IP telephony and video conferencing and technical support.

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34To learn more about the process, click here or click here: http://smart.knet.ca/keewaywin/ecenter.html
• The E-Centres provide training and promote skill-building in the use of ICT tools including: the Internet, IP video conferencing, digital video production, and multi-media production (imaging and printing).

• The three-person E-Centre team acts as the local resource that provides a central community point-of-presence that coordinates the roll-out of broadband services across the community. These services include: training and technical support.  

• As a result of the E-Centres, community members can participate in workshops and conferences on-line without the extraordinary costs of travel as a result of the E-Centres such as the Ontario Library Services North (OLSN) First Nations Public Library Conference in Sudbury which identified strategies for establishing and operating local public libraries in May 2002.

Lessons Learned

• E-centres must accommodate the needs of the community. E-Centres hours must be flexible to accommodate the different sectors of the community including Elders, youth and women. It must also reflect the different learning styles that respect the various groups in the community.

• Leadership play a key role in the acceptance of the new technologies in the communities. In Fort Severn, the Chief and Council attended workshops and seminars in various ICT topics including using email, web design and other applications.

• The E-centres need to be accessible and comfortable. Facilities are essential for supporting and promoting community engagement. The E-Centre must be in a central location with heat and running water. Free coffee is an incentive to visit the E-Centre for the first time.

• Community members must be confident that their E-Centre has access to the quality equipment and connectivity. First Nations people have endured a long history of making due with alternatives and substitutions that would unacceptable to Mainstream Society. The success of the E-Centres in Keewaytinook Okimakanak is largely due to insistence in state-of-the-art technology controlled and managed by local communities which have shaped these technologies to address local needs and challenges.

Recommendations

• Recognizing the special challenges to working with rural/remote projects (same occurred with CAP program), requiring flexible funding arrangements and support

35For more information about the training conducted by the E-Centre team, click here or go to http://smart.knet.ca/smart2002/centre.html.
• Funding agencies must be better able to work together to ease the burden of applying for funding and reporting on results, e.g. develop a common reporting format that accepts different modes of presenting information.

• E-Centres should be integrated as much as possible with library services; they could be seen as a future evolution of libraries in so far as they can facilitate public access to information.

Migration

• The Kuhkenah Network of SMART Communities were required to build E-Centres in Fort Severn, Poplar Hill, Deer Lake, Keewaywin and North Spirit Lake. The success of the KO E-Centres inspired the creation of another in Weagamow Lake First Nation, a member of Windigo Tribal Council.\(^{36}\)

• The availability of the E-Centres is changing the way people conduct politics. The E-Centre in Fort Severn hosted the community’s first digital band meeting in 2004. Bad weather and frequent polar bear sightings prevented many Elders and young families from attending band meetings. In response, the Chief and Council hosted a band meeting using all of the telecommunications equipment in the community’s E-Centre. The Chief and Council using the IP video conferencing unit in the E-Centre fielded questions from community members who called in from their residences equipped with IP telephones. The questions and answers were broadcast live over the community cable TV station. Community members stated it was one of the best band meetings they had yet participated in.\(^{37}\)

• The Keewaytinook Okimakanak Research Institute (KORI) hires on a contract basis members of the E-Centres as community-based researchers. The E-Centre staff in Deer Lake hosted members of RICTA, a knowledge cluster funded by the Social Sciences and Humanities Research Council (SSHRC) who conducted a community visit in March 2005. The E-Centre staff arranged for tours of the KiHS classroom and the KOTH work station.

• KORI hired E-Centre staff to provide support and assistance for summer researchers who were mandated to gather data for a young offender study. The E-Centre staff briefed the researchers on local protocols, arranged meetings with Chief and Council, arranged interviews with key stakeholders including Elders and Youth and organized community meetings and sharing circles. They also provided technical support during the community visits.

• Under contract from Canada Health Infoway, K-Net Services is producing a series of videos for a documentation project about KO Telehealth. Community footage for

\(^{36}\)To read more about the Weagamow’s innovations with satellite access, click here or go to: http://smart.knet.ca/satellite/weagamow.html

\(^{37}\)“Community ICT Stories: Fort Severn” or click here: http://smart.knet.ca/satellite/fortsevern.html
the videos will be shot by E-Centre staff trained in digital video during the SMART demonstration project.
Activity 10: Engagement and Evaluation - visit http://smart.knet.ca/evaluation

“Community-driven” is a concept that too often is in danger of becoming cliche but not with the Kuhkenah Network of SMART Communities. The community engagement and project evaluation work that took place from the beginning and continued throughout the project is the model of the community driven ideal. Community leaders and members were engaged in the process from the start and their ideas, thoughts and concerns were integrated at all stages of the project. It included community workshops, gatherings and feasts. The engagement and evaluation respected traditional practices and incorporated traditional values into the development of the Kuhkenah Network. Such an approach ensured that the goal of eliminating the need for outside consultants and replacing them with trained and experienced community facilitators would be achieved. This local capacity is easily transferred to other projects envisioned by the community.

Accomplishments

- Community engagement is central to all of the activities of the Kuhkenah Network of SMART Communities. It is deeply rooted in the traditional values of Fort Severn, North Spirit, Keewaywin, Poplar Hill and Deer Lake First Nations and remains a driving force throughout the SMART Community project.

- Facilitators were engaged to run community workshops in 1999 to determine the needs and goals of the First Nations. In the first year of the SMART Communities project, these same facilitators traveled to each First Nation to host community planning and engagement workshops. In subsequent years, the communities conducted their own consultations and review of work completed with technical support from the K-Net team.

- The K-Net team conducted annual community surveys working with local First Nation staff to document changes created by the introduction of connectivity and telecommunications as a result of SMART.

- The elected leadership of Keewaytinook Okimakanak, the Chiefs of the five SMART communities and the K-Net staff were fully engaged via regular meetings. The KO Chiefs acted as the board of directors of the Smart project.

- Community gatherings and feasts were held in each year of the project to celebrate accomplishments and facilitate planning and information gathering for the development of the Smart projects.

- In the third year of the project, the external program evaluators worked with the K-Net team to capture video materials and local stories that were then used in a variety of innovative productions. Community members participated in a week long video production training workshop as part of this data collection process.

- Production of a comprehensive external evaluation report is available on-line in an html presentation format and as a complete document in various formats. The
Recommendations and Unanticipated Outcomes sections of the report provide a rich demonstration of community driven ICT effective use.

- The Engagement and Evaluation work lead the Keewaytinook Okimakanak leadership to support the establishment of their own Research Institute which is now actively supporting the leaders, the communities and the organization in conducting community-based research, engaging research partners from around the world and publishing documents about the innovative IT work being conducted in First Nations.

Benefits

- The community engagement work required the training and support of community members to act as facilitators. Experience from this project has generated capacity to conduct engagement work for future projects.

- Local ICT workers were engaged in all aspects of research and development including: information gathering, analysis and creating strategic plans. These local workers included: E-Centre managers, multimedia producers, computer and network technicians and youth workers.

- The KO Chiefs established the Keewaytinook Okimakanak Research Institute (KORI) to build upon the base of community research developed during the SMART Project. It was recognition by the KO Chiefs of the importance of the land-based research and evaluation.

Lessons Learned

- Information Communication Technologies (ICTs) serve people not the other way around. During the Kuhkenah Network of SMART Communities, the needs of the member First Nations as articulated during the community engagement process drove the development of ICTs. Telecommunications and applications were tools to address community priorities which in turn facilitated adoption of the ICT tools by community members.

- Evaluation must be integrated as a formal part of projects from the beginning. Job descriptions must be drafted before people are hired and staff must be evaluated annually and on an on-going basis.

- Data gathering must be conducted throughout projects to determine short and medium term impacts. Data must be collected in a consistent way to ensure measurable results. The leadership and grassroots members must be fully briefed and consulted on the needs for data to ensure sustainability of community ICT projects.

Recommendations

- National objectives can only be achieved by regional delivery in Canada. Funders must work with regional officials who can engage with local project directors and
leaders who understand local needs and who understand the necessary strategies to create change at the local level. Regional officials are better situated to bridge the needs of the communities with the requirements of funders.

- Evaluation team strategies must be created at the beginning of ICT projects. They must identify what questions need to be answered and what data is necessary to answer them. The Evaluation team must be flexible enough to accommodate unanticipated outcomes and problems. Yet, supportive of the project team to achieve the goals and objectives of the project.

Migration

- The Keewaytinook Okimakanak Research Institute (KORI - http://research.knet.ca) and KO Telehealth Health (KOTH - http://telehealth.knet.ca) has adopted the principals of engagement and evaluation developed and practiced by the Kuhkenah Network of SMART Communities. This community-based engagement and evaluation approach is now being successfully repeated with the multi-million dollar telehealth initiative involving 24 remote First Nations.

- KORI applied this approach when it sent two youth researchers to gather data for a feasibility study in 2005. The data collected was uncorrupted and although the researchers were relatively inexperienced with field work, there were no complaints from the community to the managers of Keewaytinook Okimakanak.

- KOTH required confidential community data from Health Canada to complete its evaluation of the telehealth pilot project for the Sioux Lookout Zone. At the last minute, Health Canada required additional authorization from the First Nations to release the data to the KOTH Evaluation Advisory Committee. Since the principals of engagement and evaluation developed and practices by the Kuhkenah Network of Smart Communities are well established and deeply ingrained in the telehealth pilot project, the necessary authorization was granted by the First Nations communities in a timely manner so that the analysis could proceed.

- Keewaytinook Okimakanak’s partnership with the Canadian Research Alliance For Community Innovation And Networking (CRACIN - http://cracin.ca) and its spin-off research consortium, Research on ICT (information and communication technologies) with Aboriginal Communities (RICTA - http://ricta.ca) are direct results of the lessons learned from the community engagement and evaluation work completed under the Kuhkenah Network of SMART Communities initiative.
Activity 11: Communication, Information and Dissemination

Keewaytinook Okimakanak supports the principles of an open and transparent organization. From K-Net’s humble beginnings as a bulletin board system, the leadership of the organization has always been supportive of sharing information and resources with other First Nations. Workshops and conferences were always well attended by interested community members. Newspaper stories, published articles and on-line activities have been picked up and used by people from around the world. The Kuhkenah Network of Smart Communities has used its web portal as a tool for transparency and accountability. News and articles, many with photographs and links, are posted on K-Net News on the home page of the website. Archiving this massive database of news and announcements is an ongoing activity. The archive is current and even the oldest posted items are easily accessible to Indigenous people and others across Canada and around the world.

Accomplishments

• The Kuhkenah Network of Smart Communities has used its web portal as a tool for transparency and accountability. News and articles, many with photographs and links, are posted on K-Net News on the home page of the website. Archiving this massive database of news and announcements is an ongoing activity. The archive is current and even the oldest posted items are easily accessible.

• While K-Net News provides news relevant to First Nations communities in Ontario’s far north, the Smart.knet.ca website documents the lessons learned and best practices of the Kuhkenah Network as well as proposals, reports, digital videos and photographs of the SMART activities on-line.

• Not relying only for people to explore the portal, the Kuhkenah Network of Smart Communities organized several key information conferences and workshops as well as utilizing a variety of on-line tools to share our experiences and resources.

• The launch of the Smart Communities initiative in July 2001 was a special event that attracted a large live and on-line audience (http://grandopening.knet.ca). As well, the launch of the Keewaytinook Internet High School in January 2001 (http://kihs.knet.ca/grandopening) set the tone for all the subsequent gatherings for the innovative use of ICTs for engaging and including people from around the world in this work.

• In Feb 2002, the Kuhkenah Network hosted the First Nations Connect Conference, a regional event to bring together and brief the forty-nine First Nations of Nishnawbe Aski on connectivity and telecommunications growth in Ontario’s North. Demonstrations were made on the various applications made possible by the project such as KiHS and KO Telehealth.

• In April 2002, the C-Band Satellite workshop (http://smart.knet.ca/satellite) attracted people and projects from across Canada to discuss partnerships and share
information about utilizing these Industry Canada resources for broadband applications.

- Throughout the second year of the project (2002-03), members of the K-Net team participated in over ten national First Nations events to demonstrate and disseminate the Smart project experience. Video conferencing facilities were located at the conference sites and broadband connections back to the First Nations were established for participants to experience the value and importance of these ICTs. Through these conferences and the on-line portal created for archiving these events (http://smart.firstnation.ca), First Nation K-Net team members shared the use and benefits of ICT tools to other First Nations and other people across Canada.

- In Dec 2003, the Kuhkenah Network organized the Aboriginal Smart Fair in Winnipeg. The K-Net team shared lessons learned and best practices with First Nations and Non-Aboriginal peoples from across Canada. Live demonstrations of web casting, on-line chats, VoIP phones and other applications took place throughout the fair. The E-Centres played a prominent role linking the participants on site in Winnipeg with the community members back at home. The highlight of the event was an IP video conference with sites across Canada that linked the KO First Nations with a United Nations summit in Vienna.

- In 2004, the Kuhkenah Network organized and hosted the SMART International Gathering. The Gathering was an opportunity to showcase the progress of the connectivity and telecommunications by First Nations in Ontario’s far north with Aboriginal and Non-Aboriginal people across Canada and around the world. Participants heard presentations on-line from practitioners from Canada, the United States, Central and South American and Australia.

- The Kuhkenah Network of Smart Communities developed local capacity in the use of low-cost videoconferencing, a powerful tool that not only reduces the need to travel but brings people together to share ideas in ways not possible even five years ago.

- In spite of the unprecedented growth of connectivity in Ontario’s far north, many people remained unconnected to the ‘Net. To ensure that everyone had the opportunity to learn about the power of broadband services, the Kuhkenah Network contracted Wawatay News, the regional Aboriginal news organization to research and write a series of human interest / community based stories about people and communities using the ‘Net and other applications to improve the quality of life in their First Nations. In total, seventy-five (75) stories were published on the Kuhkenah page in the 25 issues between February 2003 and March 2004. The collection of stories are available in one publication at http://knet.ca/documents/Kuhkenah-Wawatay-news-stories.pdf

- Numerous papers, presentations and articles were published about the work being undertaken by the K-Net team. See appendix 2 - Some ON-LINE RESOURCES the Kuhkenah Network (K-Net).
Benefits

• By presenting at conferences, the K-Net team was able to empower other First Nations and Aboriginal organizations to the opportunities created by connectivity and telecommunications. Engagement was fostered through a training strategy that encouraged workshop participants to learn about the technology by using it. It proved to be an effective way to breakdown some of the anxieties that many experience prior to exposure to new technologies.

• These conferences provided an opportunity for networking. The Aboriginal Smart Fair brought together the Keewaytinook Okimakanak (KO), Kativik Regional Government (KRG) and the Keewatin Tribal Council (KTC) project together, the nucleus of the Northern Indigenous Community Satellite Network (NICSN).

• By investing in the time, effort and travel necessary to participate in the many conferences, the K-Net team accelerated the engagement of First Nations and Aboriginal organizations to adopt ICTs as a tool for social reform. As a result, a growing number of First Nations communities came to utilize the firstnation.ca web domain name.

• National aboriginal leaders such as Phil Fontaine, the National Chief of the Assembly of First Nations, refer to the success of the Kuhkenah Network and want government to support the migration of connectivity and telecommunications to all First Nations in Canada.  

• In order to facilitate community-based research and build bridges to the academic community, the Kuhkenah Network created the Keewaytinook Okimakanak Research Institute (KORI).

• Academic leaders in Canada, the United States and Mexico cite the K-Net experience as a model for community networks, as a champion of open-source software applications and as a recognized leader in the technological transfer of tools and knowledge. The Network was invited to join the Canadian Research Alliance For Community Innovation And Networking (CRACIN) and, with the National Research Council (NRC) founded Researching ICTs with Aboriginal Communities (RICTA), a knowledge cluster funded by the Social Sciences and Humanities Research Council (SSHRC).

• The Kuhkenah Network facilitated migration of connectivity and telecommunications development to First Nations and Aboriginal organizations across Canada and around the world.

• The rapid growth of the Network and the accelerated acceptance of its model stands as a testament to the power of ICTs to disseminate faster, transparent, and accessible information to a variety of often desperate groups such as First Nations communities, government agencies and academics.

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38 For more information, click here: http://knews.knet.ca/modules.php?op=modload&name=News&file=article&sid=1430
• By celebrating local experiences through such vehicles as the portal, K-Net News and other applications, the K-Net team was able to encourage other First Nations and Aboriginal organizations to engage in the process to migrate ICTs to their communities as a tool for social change.

Lessons Learned
• Traditional means of research do not serve First Nations communities well. The “rules of engagement” must be changed if First Nations communities are going to find answers to the questions relevant to them. Participatory Action Research (PAR) offers First Nations communities with the opportunity to work with fellow travelers in the university community who understand that the traditions of the ivory tower must change.

• Governments, academics and funding agencies must learn to respect the work of community-based researchers who live in and understand the realities of life in remote and isolated First Nations in Canada.

• Government must explore with communities alternative methods of data collection and reporting mechanisms that speak to the priorities and aspirations of communities. The use of photographs, video and story telling are culturally-relevant methods of reporting community progress that need to be respected and acknowledged.

• Government at all levels must learn to show respect, recognition and honour for all of those participants who contribute to a project.

• Government must learn to respect the local communities and work together to build trust and positive relationships.

Recommendations
• Government agencies must be open to working with regional networks if it wants to facilitate two-way communication with its citizenry. Centralized portals act more like conventional broadcasters which produce information but not receive it effectively. By fully embracing the potential of the ‘Net, Government will have the opportunity to be more in tune with the concerns of its citizenry. Unfortunately instead of removing barriers, Government is creating new ones on the new by focusing on so-called IT security concerns. This is a missed opportunity which further isolated Government from the People.

• Government funding should be directed to build local and regional networks that reflect the communities they serve. This will empower communities and increase capacity in connectivity and telecommunications at the local level. By centralizing control, Government creates portals that are relevant to few outside of its circles. The Government of Canada’s Aboriginal Portal is such an enterprise which is roundly praised by those in Ottawa and virtually unknown and unused by the First Nations peoples in Canada.
• In order to better serve First Nations people, the Government must partner with local community service organizations to deliver programs such as health, education, economic development and connectivity, to name but a few. The policy of Canada to transfer funding for programs necessary for the well being of First Nations communities to Aboriginal political organizations has been disastrous.

• Libraries have traditionally housed materials critical for the intellectual well-being of the community. Many First Nations communities have never been able to establish and sustain a functioning library. On-lines offers new hope for these communities. Government must support the establishment and sustainability of local virtual libraries which contain culturally relevant material of importance to communities.

• Utilizing ICTs to effectively facilitate gatherings and engagement of everyone, every place requires a major shift in funding, lifestyles and priorities, away from traveling and consuming limited natural and financial resources to developing effective communication skills and on-line tools that support the same level of interaction and participation from everyone involved in any conference or workshop. New skill sets, delivery and learning strategies must be created and supported by government to ensure these tools are used and innovation can be encouraged.

Migration

• The work of the Kuhkenah Network of SMART Communities has attracted the attention of academics and policy makers around the world. Technicians and community representatives of KOTH and KiHS are invited to address organizations on their use of telecommunication tools in telehealth and education in remote and isolated First Nations in Ontario’s far north. Staff from K-Net Services are invited by communities to share their experiences in extending connectivity and applications to even the most challenging locations. Officials from Keewaytinook Okimakanak are invited to speak on various telecommunications to boards, agencies and government officials on a wide range of topics in health and wellness, education and economic development.

• Public agencies are providing KO with funding to document the rapid growth of the Kuhkenah Network such as Canada Health Infoway which contracted KORI to tell the KO Telehealth story.

• First Nations and Aboriginal organizations are recognizing the effectiveness of the Kuhkenah Network of SMART Communities to communicate messages to their people. The hundredth anniversary of the signing of Treaty #9 was reaffirmed in Mishkeegogaming First Nation in July 2005. The gathering was digitally documented by K-Net technicians who worked to provide connectivity to the remote community and provided Internet access for the participants. During his keynote speech, Grand Chief Stan Beardy acknowledged areas of expertise where NAN members were assuming leadership roles. He identified law, education, health care and telecommunications as four areas where NAN members were achieving success critical for the future of Nishnawbe Aski.
Activity 12: Business Development and Marketing

The Kuhkenah Network of Smart Communities is a social enterprise that has rapidly grown to become a national leader in First Nations connectivity and telecommunications. The Network supports the construction and operation of community-owned broadband networks across Ontario’s far north. As a wholesaler of bandwidth to the community networks, the Kuhkenah Network negotiates with national and international telecommunications companies to provide the best price available for bandwidth and telecommunications equipment. In doing so, it provides the community networks with the opportunity to benefit from economies of scale. The Kuhkenah Network also facilitates negotiations between private and public organizations which want to provide their services via broadband. The lessons learned from one experience becomes the best practices of all. Unlike telecom companies which are in the business to provide bandwidth and connectivity, the Kuhkenah Network is driven by a social needs agenda that is more clearly seen in its development of applications in health, education and in the ways in which community members shape telecommunications to address personal and community challenges of life in remote and isolated communities in Ontario’s far north.

Accomplishments

- The Kuhkenah Network of Smart Communities is a national leader in First Nations connectivity and telecommunications. The Network supports the construction and operation of community-owned broadband networks across Ontario’s far north. As a wholesaler of bandwidth to the community networks, the Kuhkenah Network negotiates with national and international telecommunications companies to provide the best price available for bandwidth and telecommunications equipment. In doing so, it provides the community networks with the opportunity to benefit from economies of scale. The Kuhkenah Network also facilitates negotiations between private and public organizations which want to provide their services via broadband. The lessons learned from one experience becomes the best practices of all.

- The Kuhkenah model provides new employment opportunities for remote and isolated First Nations communities in Ontario’s far north. First Nations members are hired to maintain and operate the community network. Each is trained to meet local ICT service needs. “On the job” training ensures employment and on-going professional development as local people are hired not outside contractors to run fibre, trouble shoot problems and do routine maintenance. As these technicians develop more skills their value to the community and to outside agencies such as the Department of Indian Affairs and Health Canada increase. Federal agencies are hiring these local workers to complete routine maintenance rather than flying in outside technicians from Winnipeg or Thunder Bay.

- Like network and computer technicians, the Kuhkenah Network of Smart Communities has trained and employed a group of talented First Nations artists as web designers who are in constant demand whether they live in communities such
as Sioux Lookout or remote and isolated First Nations.

- Local control of the community networks provide Band Councils with the power to develop appropriate business models appropriate to the economic, social and cultural needs of the community. In some communities, a local entrepreneur operates the provision as a business. In others, it is run as a cooperative or as a public utility. However, in all cases, the community Internet Service Providers (ISPs) are social enterprises.

- The Kuhkenah Network of Smart Communities is the largest First Nations ISP in Canada with a national and international profile.

Benefits

- Local First Nations members who have been trained as ICT technicians as a result of the Kuhkenah Network are respected members of their communities who are recognized for their value to their communities
- Local people trained in ICTs are able to remain in their communities as contributing members of society or they are able to return home and remain gainfully employed.
- The entire community benefits as there is new capacity to manage and operate business accounting systems, a requirement to obtain additional funding from the Department of Indian Affairs.
- The managers of the E-Centres have developed the capacity to maintain and operate multi-line telecommunications businesses. Over the term of the Smart project, they have developed the skill sets to become a local application service provider as a social enterprise for the community.
- Local and regional initiatives such as the E-Centres are most cost effective than centrally-managed programs. They respond more quickly to local needs and they stimulate the local economy with new services and employment opportunities.

Lessons Learned

- In order for the community to take ownership, local people need to be trained for employment in the new ICT sector. These technicians become respected members of their First Nations who are recognized for their value to their communities
- If local people can find meaningful employment as a result of the migration of connectivity and telecommunications, more people will resist the need to leave their communities for jobs in the urban centres and those who have left have the opportunity to return home knowing that they can seek out these new jobs or bring their jobs with them.
- Connectivity solutions are necessary to address the growing appetite of the Department of Indian Affairs for documentation and reporting requirements. The training of local people in the management and operation of business accounting systems increases the capacity of the community to undertake larger and more
complex projects.

- Technical skills are not enough. Local people must be trained in management if local communities are expected to sustain their networks as social enterprises.

- Local and regional initiatives such as the E-Centres must be supported by Government not only because they are more cost effective than centrally-managed programs but because they stimulate the local economy with new services and employment opportunities.

**Recommendations**

- The full economic impact of broadband services on remote and isolated communities has not been fully explored. The priority for First Nations communities has been to use these tools to improve health access and educational opportunities. Still, it is unrealistic to expect that every member of a First Nations community will become an IT worker once connectivity is established. However, broadband services permit skilled individuals to access the global market and work with clients remotely. It also provides the opportunity for those with technical skills to assist those without to use ICTs to reach markets otherwise unavailable to them. A skills craftsman does not need to know how to post photographs of his wares on the ‘Net. He only needs to know who in the community can assist him.

- Conventional business cases do not work in small remote and isolated communities. Business predictions are usually based on assumptions rooted in the needs of an urban market. Nevertheless, such business cases can serve to reveal the potential costs and revenues of providing these services in remote and isolated communities.

- To provide the broadband services that First Nations members have come to expect from the Kuhkenah Network, K-Net Services has grown to become a “carrier-class” service provider, capable of controlling the flow of Internet traffic.

- Government must overcome its reluctance to purchase IT services from community Internet Service Providers if these social enterprises are to be sustainable.

**Migration**

- The Kuhkenah Network of SMART Communities was instrumental in the creation of the National Indigenous Community Network, a three partner norther Aboriginal organization including Keewaytinook Okimakanak (Ontario), Kativik Regional Government (Quebec) and Keewatin Tribal Council (Manitoba) which share common goals and objectives with respect to the C-Band Public Benefit.

- The Keewaytinook Okimakanak Research Institute is exploring opportunities with Montana-based First Nations to train and mentor on-line business enterprises on the Network.
APPENDIX 1: Network Description - June, 2005

IP Video Conference Locations on K-Net's Network

The map of Canada shows the urban sites with video conferencing connections and facilities that now have Quality of Service (QoS) for their video and audio traffic over the Kuhkenah Network. The next image shows the First Nation communities connected into this broadband network and how the traffic flows to each community to ensure video, audio and data traffic is managed.
Summary:

Keewaytinook Okimakanak's K-Net Services is working in partnership with First Nations and other indigenous communities across Canada along with the public and the private sectors to develop and sustain a Wide Area Broadband Network. The Kuh-ke-nah Broadband Network (K-Net) provides support for band office programs, health and education services along with other applications in each participating community. The network supports the development of broadband applications that combine video, voice and data services requiring high speed connectivity solutions.

The long term objective is to establish local community networks linked across the country to other networks that share and distribute broadband services and programs that benefit the local community. Several examples of these interconnected networks are now in place including the First Nations Education Council in Quebec, the Atlantic Canada’s First Nations Helpdesk Videoconferencing Network and the Kativik Regional Government. Others are now under construction and will soon be in operation.

K-Net staff develops different broadband applications and appropriate open source communication tools (ICTs) for Keewaytinook Okimakanak staff and services to support First Nation leaders, administrators and program staff in the use of their ICT equipment and programs. Various scalable community broadband applications in the areas of health, education, datawarehousing, portals, IP video conferencing and telephony, community and regionally based networks are in operation today and can be viewed on-line at http://knet.ca.

Keewaytinook Okimakanak is a not-for-profit, publicly funded, tribal council organization working with six remote First Nations to deliver second level support services and community capacity building. The Kuhkenah Network (K-Net) is a program and service developed and maintained by the KO team. Funding partners involved in developing and supporting the ongoing operation of K-Net include the First Nation communities and their organizations, Industry Canada (FedNor, Smart Communities, Community Access Program, First Nations SchoolNet, National Satellite Initiative, BRAND), Health Canada, Indian and Northern Affairs Canada, Human Resource Development Canada, Northern Ontario Heritage Fund Corporation and several other programs that provided program development funds over the past ten years.

Overview of K-Net Services:

K-Net Services is an agent for the development of community based networks. Its
mandate includes working with First Nations and other indigenous communities to enable them to control the ownership of their local and regional terrestrial or satellite broadband networks. K-Net believes that in order for a network to be sustainable in a small community then the community needs to be involved in all the development phases and ongoing operation as much as possible. This effort will ensure that all the organizations and service agencies, both local and regional groups, working with the community will be able to contribute to the ongoing operation and maintenance of the local community network. This collaborative effort supports everyone from residents and small operations in the community to be able to access these on-line services.

Support for these community networks was adopted in the **NAN Chiefs in Assembly Resolution 03/49: SUPPORT FOR THE DEVELOPMENT OF THE NAN BROADBAND REGIONAL NETWORK FOR FIRST NATIONS** which among other things directs government programs and services along with other regional agencies to utilize and contribute to local community networks.

As of January 2005, the K-Net network consists of 22 remote First Nations in Northern Ontario that are linked together via a broadband infrastructure. Also 14 satellite served Inuit communities in Northern Quebec are part of this network. An additional 11 road access First Nations in Ontario have points-of-presence on the network. Five organizations (Regional Management Organizations) located across Canada are also on the network accessing the video conferencing services available on K-Net. Other First Nation organizations on the network are located in urban centres across Northern Ontario include Timmins (connected with a local wireless loop), Thunder Bay (with a local wireless loop running off a 100M service), Sioux Lookout (with a fibre and wireless loop on a 100M circuit), Geraldton (looking to upgrade to a 10M service from a T1), Sudbury (a 100M service shared with ENO) and Balmertown (with DSL and cable service). The Toronto hub is co-located at the Education Network of Ontario office complex with a fibre loop to other Toronto based agencies with our 100M internet connection located from that office. These communities are included on the network diagram attached to this presentation. Additional First Nations are also presently accessible on this network from the Atlantic Canada’s Helpdesk Videoconferencing Network (21 First Nations) and the First Nations Education Council’s Videoconferencing Network in Quebec (7 First Nations are presently on-line). Construction is now being planned for an additional 14 First Nations in Northern Manitoba (10) and Northern Ontario (4) with other First Nations being identified and supported to be included on the Kuhkenah Network.

Various broadband applications and services are being delivered out of Keewaytinook Okimakanak offices in Sioux Lookout and Balmertown, including a major regional telehealth initiative and the internet high school. As well other K-Net partners’ sites located across the country are now expanding and developing their own regional broadband networks that are modeling the K-Net development process.

Agreements are continually being completed to add other communities to the network.
The communities are being served by terrestrial and satellite connectivity solutions depending on the community telecommunications infrastructure access. Bandwidth varies from 768K to 100 megabit depending on existing facilities and local needs.

At the community level K-Net works with local technicians and suppliers to create a local ISP and to help in the local connectivity solutions. K-Net supports the local technicians in the remote First Nations who take on the responsibility for the community portion of the network. This arrangement lessens the requirements for managed service contracts and reduces the time for local repairs and network maintenance.

K-Net networking personnel are in place in Sioux Lookout, Balmerton, and Toronto. K-Net's arrangements with Bell Canada help desk services allows it to purchase Bell resources as needed. K-Net staff are delivering help desk services for the NORTH Network in this region and for Industry Canada's First Nations SchoolNet program across Ontario. We work closely and support developments in the other Industry Canada First Nation regional management organizations.

K-Net has experience in both satellite and terrestrial networks as well as different technologies such as DOCSIS cable installations, wireless (900 and 2400 megahertz) installations, HDSL and ADSL technologies. K-Net also has experience building embedded computers for various applications such as the K-Net router and the K-Net remote access server.

The K-Net System Today:

* K-Net is a comprehensive, reliable, secure and scalable network that is operational today providing broadband connectivity between over 50 rural and remote Aboriginal communities and other major centres across the province as well as across Canada (partner sites in Sydney - Nova Scotia, Wendake - Quebec, Winnipeg and Thompson - Manitoba, La Ronge - Saskatchewan, Vancouver -B.C.);
* A VPN tunnel is in place on the network today providing a connection to the telemedicine network's (NORTH) VPN concentrator which provides access to more than 70 hospitals located across Ontario and to the Health Science centre in Winnipeg;
* The pricing for the network and network services is shared among all the different network users thus aggregating the bandwidth costs and supporting local community economic development efforts involving the “smart” use of ICTs;
* A fibre optic municipal network in addition to a local wireless loop is in operation in Sioux Lookout connecting the First Nation organizations and service providers to the First Nation communities on the network;
* A wireless broadband loop is in place in Thunder Bay and Timmins to connect First Nation organizations and other partners to the network in those centres;
* High speed data, IP telephony and IP videoconferencing services are all being delivered and supported over the present network;

* A multi-point video Accord bridge, an ISDN / PRI gateway and an Cisco IP audio Call Manager are in place to handle multiple sites for both video and audio IP multi-point conferencing connections;

* C-Band broadband satellite services utilizing Industry Canada’s public benefit transponder with a locally supported Network Management System and Operations Centre is in place in Sioux Lookout that is managed and supported in partnership with the Kativik Regional Government in northern Quebec;

* Experienced and knowledgeable staff are in place supporting the use of the network along with helpdesk services for NORTH Network (with a Service Level Agreement in place) and Industry Canada’s First Nations SchoolNet program.

Today, we are able to provide the different agencies and organizations across the region with the same level of connectivity and support that can be expected from any carrier class provider. As well, there are some entry level solutions that any group can use to “grow to” so additional applications are included on their community network as their needs and capacity develop to support such developments. K-Net can provide these groups with the following levels of service:

* Basic connectivity to all sites in the SL district that K-Net services for a fixed cost per month. This includes the satellite served sites.

* If required, K-Net can install VPN clients and concentrator for secure VPN tunnels for sites to connect into the organization’s network. Internet access can be done through the group’s own network if required. This would be the beginnings of a scalable broadband network for the organization to be able to support different applications and services.

* CIR can be purchased to support specific applications such as Video conferencing, realtime applications (voice over IP), SAP and others.

* Service level agreements can be negotiated to provide a required level of managed services and support.

* This approach ensures that upgrades will not require any infrastructure rebuilds but simply an increase in bandwidth and services.

Some additional considerations and potential savings that K-Net has become aware of through the development work with different partners include:

* Existing connectivity solutions can be migrated over to the K-Net Network for a major cost savings from their present locations because of the “best price” arrangements with K-Net network partners. The price for this service would have to be determined depending on needs and traffic patterns.

* IP telephony services within the different organizations serving the First Nations on
the Kuhkenah Network create additional savings for these organizations which go
towards local First Nation economic development initiatives. K-Net presently has IP
telephones operating very successfully in several First Nations across the region.
* IP video conferencing services that support the development of telemedicine
applications are presently being delivered and can be accommodated across the
region (a comprehensive business case is being funded by Health Canada to deliver
this telemedicine service in all 24 First Nation health centres across the Sioux
Lookout region).

Each of these services are scalable and the prices are intended to ensure the
sustainability of the network. As well, the support required to help it grow to include
other communities across Nishnawbe Aski Nation, as well as other communities across
Canada is also in place and being shared among all the partners.
APPENDIX 2:

Some ON-LINE RESOURCES the Kuhkenah Network (K-Net)

Last updated June, 2005

Turning the Corner with First Nations Telehealth position paper


DVD - video production “Turning the Corner – Using Broadband Effectively in Canada’s North”. The content of the DVD is available on-line at …
http://streaming.knet.ca/turning_the_corner_high.wmv


KIHS information video http://streaming.knet.ca/KiHS/KiHS_300k.wmv

Keewaytinook Okimakan Telehealth (KOTH) information video
http://streaming.knet.ca/telehealth/TH-Evaluation_300k.wmv

DVD video entitled "The K-Net Story ... Weaving the Networked Economy in Kuhkenah First Nation Communities" …
Introduction 13:04 - http://streaming.knet.ca/fednor/intro_300k.wmv
Economic Development 2:36 - http://streaming.knet.ca/fednor/economic_300k.wmv
Partnerships 9:51 - http://streaming.knet.ca/fednor/partnerships_300k.wmv
Building the Network 2:36 - http://streaming.knet.ca/fednor/network_300k.wmv
Education 5:58 - http://streaming.knet.ca/fednor/education_300k.wmv
Health 3:29 - http://streaming.knet.ca/fednor/health_300k.wmv


http://www.ciresearch.net/conferences/viewabstract.php?id=85&cf=4
http://knet.ca/documents/Jesse-Fiddler-Prato-Italy-Paper.doc

http://knet.ca/documents/FiserCIRN04DC.doc

http://www.asis.org/Chapters/europe/news/FERREIRA%20RAMIREZ.pdf

http://knet.ca/documents/Ferreira-Ramirez-Brighton-Paper.doc

A History of Policy Change – Backgrounder on the First Nations SchoolNet RMO Transition – Adam Fiser, Phd candidate, UofT, September 2004

The K-Net Smart Communities Best Practices (links to many of the deliverables achieved during the Smart Communities demonstration project) -
http://smart.knet.ca/smart2002/practices.html (click on FEDNOR VIDEOS to see the collection of on-line video information)

NORTH Network Final Evaluation Report for HC CHIPP project – http://www.northnetwork.com


On-line Multi-Media Presentation …
* Series of Case Studies produced for the Institute for Connectivity in the Americas (ICA) entitled “Harnessing ICTs: A Canadian First Nations’ Experience” (December 2003) –
http://smart.knet.ca/kuhkenah_flash.html
– contains the PDF files along with video footage for five case studies including:


Some reports and research documentation ….
* http://www.knet.ca/kss/KIHSEVALFIN.html
* http://kihs.knet.ca/Evaluation00-01.pdf

Some on-line articles from other sources about Kuhkenah
Some presentations made at different conferences …

Some papers created for presentations …
* "Traveling the Winter Roads of CMC: A College Course for Isolated Learners via Computer BBS" by Margaret Fiddler, EdD candidate, U of Toronto (Ontario, Canada) - 1997

Some published articles and documentation that have information about K-Net …
* http://knet.ca/documents/OECD-finalKO.doc

The PACTS study documentation completed in March 2000 by Drs. Don Richardson and Ricardo Ramirez at Guelph University
* http://knet.ca/documents/PACTS/K-Net.PDF

Ricardo Ramirez’s Doctoral Thesis (with a lot of references to K-Net and ICTs in rural and remote communities)

Newspaper Articles and Stories about K-Net’s work …
* http://photos.knet.ca/kuhkenah11?&page=3

K-Net’s On-line News Archives contains articles and links to additional information and resources being created to document the K-Net story – http://knews.knet.ca


The K-Net Smart Communities Best Practices (links to many of the deliverables achieved during the Smart Communities demonstration project) -

Published Papers by Ricardo, Don and the TDG team who are partnering with K-Net in researching these telecom opportunities and ICT impacts in rural and remote communities ….
(see http://www.telecommons.com/reports.cfm)


Ramírez, R. and Richardson, D. Measuring the impact of telecommunication services on rural and remote communities. Telecommunications Policy.


ERLINKhttp://smartcommunities.ic.gc.ca/best/bp-pm-intro_e.asp
http://smartcommunities.ic.gc.ca/best/bp-pm-intro_e.asp

http://smartcommunities.ic.gc.ca/best/bp-engagement_e.asp


School of Rural Extension Studies, University of Guelph. www.uoguelph.ca/~res/pacts
APPENDIX 3: LIST OF RECOMMENDATIONS
From the Project Evaluation Report: [http://smart.knet.ca/evaluation](http://smart.knet.ca/evaluation)

**Donor agency and regulatory environment**

- Leaders of isolated communities should invite government and corporate leaders involved in telecommunications to visit their communities. Unless they experience the reality of a remote and isolated community it is impossible for them to appreciate the physical realities faced by people in the communities.

- Work with funding programs that understand the importance and value of true broadband connectivity in small communities. If it weren't for FedNor, the federal regional economic development initiative in Northern Ontario, and other funding partners, along with their understanding and commitment to providing these communication tools across the region, the Kuh-ke-nah Network and the millions of dollars invested in this region by both the private and public sector would probably not have taken place.

- An ongoing advocacy effort has been required to lobby federal regulators to develop policies that serve rural and remote communities. Lobby government agencies to ensure that they use the community network to deliver their services throughout the region.

- Harness a number of government programs to achieve a multiplier effect in terms of technology, costs and skills development

- Engage the private sector to respond to rural and remote conditions

**Project governance, management, role of community, partnerships**

- Getting communities involved in the planning and implementation of broadband connectivity solutions and applications supports local innovation and capacity building. These communities will be better prepared to be the providers of online services and resources making them owners of their local networks and producers of local socio-economic opportunities.

- Include and involve members of isolated communities as early as possible when designing and implementing programs or plans to provide telecommunications services in those communities.

- Ensure that your organization is made up of champions/visionaries working on behalf of the communities.

- Train people in the community and give them a profile.

- Ensure local control of the entire network, including the end devices. Partner with firms and organizations that share a vision of local community ownership.
• Have the communities drive the network growth. Have them identify the needs and take ownership of the network as much as possible.

• Ensure that everyone, including business owners, recognize that business needs are different from community or social needs and work within that recognition rather than opposing it.

• Have a long-term vision and plan locally. Keep up with changes locally and nationally that can impact on your network, both positively and negatively.

• Start by linking those who share a need. Community needs and demands drive technology and network infrastructure development. It is critical to maintain community participation and stay focused, especially as the network develops and needs to be sustained with paying customers.

• Aggregate the needs of each community by finding the main community users and their immediate bandwidth requirements.

• The organization should be constantly evolving to keep pace with technology, policies and community demands, while at the same time influencing how the technology is adapted, how policies are formulated, and how community demands are channeled.

Technical, capacity-building, reporting and communication
• Highlight and recognize the value of unique technology applications and solutions in isolated communities. These represent potential opportunities for other communities in Canada and internationally that will otherwise be missed.

• Learn about the technology – if you don't learn it yourself, you will become dependent on consultants and vendors.

• Use flexible open source software products. These can be adapted to suit organizational and community needs, and allow the community to control evolution of the software services. Avoid dependencies in hardware and software solutions. Purchase technology to meet the needs and skill levels, not the other way around.

• Train your staff, not the consultants. Support local capacity building opportunities and resources (e.g. training projects, cooperative education, library services, public access sites) to ensure that youth, employment and business development initiatives experience growth and successes.

• Develop financial and management capacity at the executive level to match project management needs - but also at the community level.
• Listen to the community – find out how they have communicated in the past. Did they use HF radio? Is there a tower you can still use? Can you send them an antenna and a laptop and get them connected – even through a narrow bandwidth? Use the technology that is available, and build from that. That first connection is the key; from then on, the challenge to bring more bandwidth has to do with dollars, skills and management.

• Invest in local connectivity solutions and business initiatives that will contribute to community development and well-being.

• Share experiences and resources with other neighbouring communities with similar challenges and visions to ensure growth and strength in numbers.

• Establish two-way communication to mentor community technicians as you become more knowledgeable.

**Sustainability**

• For remote regions that want to control and own their networks, it’s practically impossible to build a sustainability strategy based on traditional business and program delivery models. Rather, innovative cooperative telecom policies and programs are required to ensure equitable access to the required infrastructure and applications.

• Technologies like IP-based video conferencing and telephony service can provide much needed revenue while offering residents and subscribers an alternative to traditional independent services. To maximize value and revenue video conferencing must deliver TV quality images, requiring two-way symmetrical services. Watch out for salesmen selling non-symmetrical connectivity products and services that remove limited financial resources from the region.

• Aggregate demand for video, voice, and data services across the community and provide an integrated solution.

• Establish revenue generating services such as technical assistance, website and portal development and hosting. These services will be valuable to businesses and organizations across the community.

• In order for a network to be sustainable in a small community, the community needs to be involved in all the development phases and ongoing operation as much as possible. This effort will ensure that all the local organizations and service agencies working with the community will be able to contribute to the ongoing operation and maintenance of the local network so everyone in the community can access these on-line services.