



# Rural Intelligent Communities

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# 1. Executive Summary

Rural broadband access has become increasingly essential to economic growth, healthcare, and education. Every rural community that seeks to take advantage of broadband access must first articulate a vision of what they want their community to be like in five, ten or twenty years. This vision must describe, simply, and clearly what residents and businesses plan to do with broadband to make the community a better place to live and work. A rural community that establishes a vision, and supports projects to achieve it is called a “Rural Intelligent Community”.

The Intelligent Community Forum (ICF) is a non-profit think tank that focuses on the creation of prosperous local economies in the "broadband economy" of the twenty-first century. The ICF conducts research, hosts events, publishes newsletters and presents awards to assist communities to understand both the opportunities and challenges of the emerging broadband economy. The forum has defined five critical indicators that are required for the creation of an Intelligent Community. These indicators provide a conceptual framework for understanding all of the factors that determine a community's competitiveness in the broadband economy<sup>1</sup>.

A Rural Intelligent Community can use these five indicators as a framework to develop their rural broadband vision and related projects. Projects may include: Broadband Connectivity projects, Knowledge Worker projects, Innovation projects, Digital Inclusion projects, and Marketing projects. Rural Intelligent Community projects provide a venue for the community to establish collaborative agreements with partners including private companies, government agencies, school districts, local communication and technology providers, businesses and business groups, and community groups. Collaborative partnerships give the community a structure for organizing, planning, and implementing their intelligent community projects. By thinking, planning, and working together, the individuals and groups that make a community can accomplish goals that neither could achieve alone.

A Rural Intelligent Community initiative will require a significant amount of capital and operating expenditures during and after implementation. It is imperative that the community establish business models for each project and define clearly how they will be funded for the short and long term. A Rural Intelligent Community allocates funding to areas that will have the most impact on the community.

This paper will provide a definition of a Rural Intelligent Community, identify best practices, business models, and illustrate examples of successful Rural Intelligent Community projects. These can be used by rural communities, all levels of government, and rural associations to encourage the development of Rural Intelligent Communities in Alberta and will in turn enable a culture of economic and social development in rural communities.

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<sup>1</sup> Source: [www.intelligentcommunity.org](http://www.intelligentcommunity.org)

## 2. Intelligent Community Forum (ICF)

The Intelligent Community Forum (ICF) is an independent association that conducts research, hosts events, publishes newsletters and presents awards to help communities understand both the opportunities and challenges in the emerging broadband economy. This section of the paper provides an overview of the ICF recommendations and activities and how they may be used by rural communities in the evolution to becoming a Rural Intelligent Community.

### 2.1 Intelligent Community Indicators<sup>2</sup>

The ICF has defined five critical indicators that required for the creation of an Intelligent Community. These indicators provide to a rural community a standard framework for the deployment of a Rural Intelligent Community initiative. The indicators provide a reference model that the rural community may use to initiate projects, establish collaborative partnerships, and develop funding models. These indicators are:

#### 1. Broadband Connectivity

Broadband is the new essential utility, as vital to economic growth as clean water and good roads. Intelligent Communities express a clear vision of their broadband future and craft policies to encourage deployment and adoption.

#### 2. Knowledge Workforce

A knowledge workforce is a labor force that creates economic value through the acquisition, processing and use of information. Intelligent Communities exhibit the determination and demonstrated ability to develop a workforce qualified to perform knowledge work from the factory floor to the research lab, and from the construction site to the call center or Web design studio.

#### 3. Digital Inclusion

As broadband deploys widely through a community, there is serious risk that it will worsen the exclusion of people who live at the margins of the economy and society, whether due to poverty, lack of skills, prejudice or geography. Intelligent Communities promote digital inclusion by creating policies and funding programs that provide “have-nots” with access to digital technology and broadband, by providing skills training and by promoting a compelling vision of the benefits that the broadband economy.

#### 4. Innovation

For business, broadband has become to innovation as fertilizers are to crops. Intelligent Communities work to build the local innovation capacity of new companies, because these produce most of the job growth in modern economies, and invest in e-government programs that reduce their costs while delivering services on the anywhere-anytime basis.

#### 5. Marketing and Advocacy

Just as businesses face greater global competition, communities must work harder than ever before to communicate their advantages and explain how they are maintaining or improving their position as wonderful places to live, work and build a growth business. Effective marketing shares this story with the world, while advocacy builds a new vision of the community from within.

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<sup>2</sup> Source: [www.intelligentcommunities.org](http://www.intelligentcommunities.org)

## 2.2 Intelligent Community Awards<sup>3</sup>

Each year, the Intelligent Community Forum presents an awards program for Intelligent Communities and the public-sector and private-sector partners who contribute to them. The awards program has two goals: to salute the accomplishments of communities in developing local prosperity and inclusion in the Broadband Economy, and to gather data for ICF's research programs.

Awards are given to communities or regions that can demonstrate a documented strategy for creating local prosperity and inclusion using broadband and information technology to attract leading edge-businesses, stimulate job creation, build skills, generate economic growth, and improve the delivery of government services. The evaluation of the nominations is based on the five Intelligent Community Indicators.

To be eligible to receive an award, the community must demonstrate that its strategy has produced measurable results in:

- Creation of jobs in fields or clusters expected to prosper in the Broadband Economy
- Attracting new businesses to the community or stimulating their formation through entrepreneurship and a “culture of use”
- Educational programs that equip people of all ages with the skills to perform knowledge work
- New technology infrastructure investment, whether of “hard” assets, services or software
- Innovation in the delivery of government services such as education, administration, law enforcement or citizen participation
- Innovation by local business that creates new products and services and leads to increased competitiveness
- Ensuring access to broadband and IT resources, as well as skills training, for low-income and at-risk populations

Communities are asked by the Intelligent Community Forum (ICF) to submit nominations in June of each year to be selected as the Intelligent Community of the Year. In the fall the first twenty-one (21) finalists are selected from these nominations. This first group is referred to as the Smart21 Intelligent Communities. From the Smart21 group, the top seven Intelligent Communities are selected. From these top seven, the Intelligent Community of the Year is selected. The selection is based on the evaluation of academic experts, research by an independent market research firm, and the votes of an international jury. Two Canadian communities have been selected as the Intelligent Community of the Year in the past: Calgary Alberta, 2002 and Waterloo Ontario, 2007. (Appendix A: ICF Selection Process)

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<sup>3</sup> Source: [www.intelligentcommunities.org](http://www.intelligentcommunities.org)

### **3. Rural Intelligent Communities**

Rural communities are governed by municipal districts and county governments. They provide a number of services including administration, road construction and maintenance, fire protection, emergency services, garbage disposal, planning and development administration, agriculture services, recreation and parks, family and community support services, water and waste water services, and bylaw enforcement. There is no recognized universal definition of a rural community. Alberta Agriculture and Rural Development classify rural communities as having less than 10,000 residents.

Every three years, each rural community elects a new county or municipal district council. The council's responsibilities include:

- Developing and evaluating the plans, policies and programs of the county;
- Making the bylaws and resolutions of the county;
- Ensuring the powers, duties and functions of the community government are appropriately carried out.

In addition, the council is responsible for developing strategic plans that are used to set the pace and direction of economic development in the county. The rural community uses these strategic plans to establish and communicate a vision for the community's future that will inspire elected officials, policy makers and citizens, and enable them to make informed choices to guide growth and set priorities.

A rural broadband deployment strategy is key to the success of the rural communities' short and long term strategic plans. Improving broadband access in rural areas of the province will contribute to improved quality of life and social development, and will increase the potential for innovation and economic development. Broadband is the key to creating rural based industry jobs capable of sustaining Alberta's dying rural communities.

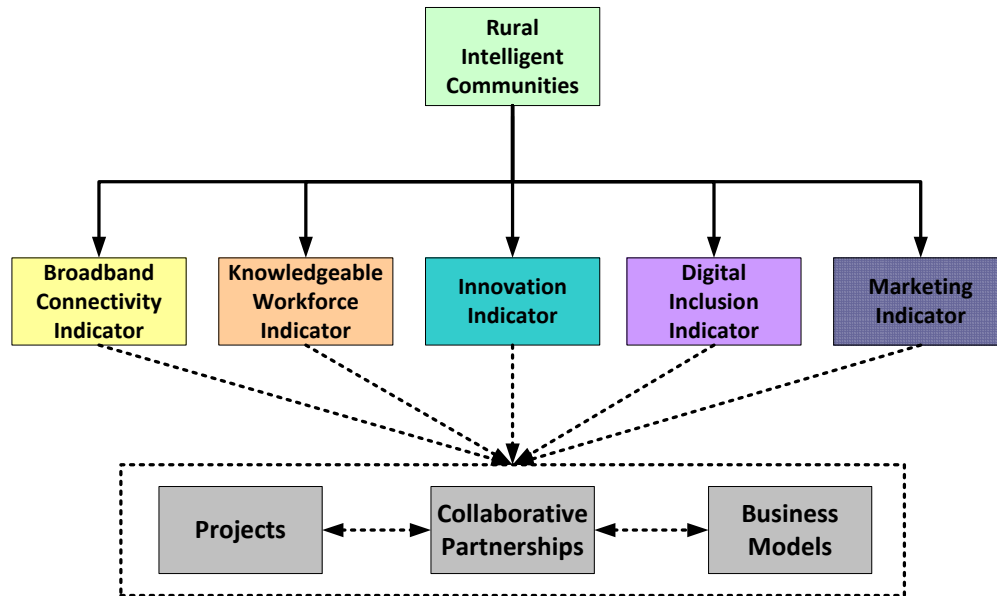
Managing the deployment of rural broadband is in the hands of the rural community to facilitate the deployment and management of a rural broadband network. These types of initiatives are relatively new to most counties and municipal districts. The framework for the deployment and management of services such as water distribution or emergency services are well understood and have been in place for years. This is not the case for rural broadband deployments.

#### **3.1 Rural Intelligent Community Framework**

The Rural Intelligent Community framework is based on the Intelligent Community Forum's five indicators. The framework can be used by rural communities to:

- Provide a vision of where the community will be in five, ten, and twenty years;
- Initiate projects that support the five intelligent community indicators;
- Establish collaborative partnerships;
- Create business models that support the community's initiatives.

Graphic 1: Rural Intelligent Community Framework



Many Alberta rural communities may have already implemented projects including broadband deployment, education, business mentoring, and community-based projects. These projects are generally initiated by special interest groups within the rural community. Examples of these projects are:

- To ensure adequate broadband coverage a rural municipality would select and fund one or more Internet Service Providers (ISPs) to provide broadband access services (e.g. Beaver County);
- Rural school division may implement a video conferencing project to provide training between disparate schools within the rural community (e.g. Yellowhead County);
- A rural municipality may arrange for adult education or business mentoring programs to be presented in local school or county office (e.g. Vulcan County).

Rural communities may or may not have a framework or guide that provides them an overall insight to all the possible rural broadband projects, collaborative partnerships, and business models. The Rural Intelligent Community framework can be used by communities that have already initiated projects or by communities looking for assistance in beginning the deployment of rural broadband projects.

The Rural Intelligent Community framework will include metrics that can be used by the community to determine their progress in becoming a Rural Intelligent Community. The metrics are based on the Intelligent Community Forum’s five indicators. Table 1 contains examples of Rural Intelligent Community metrics.

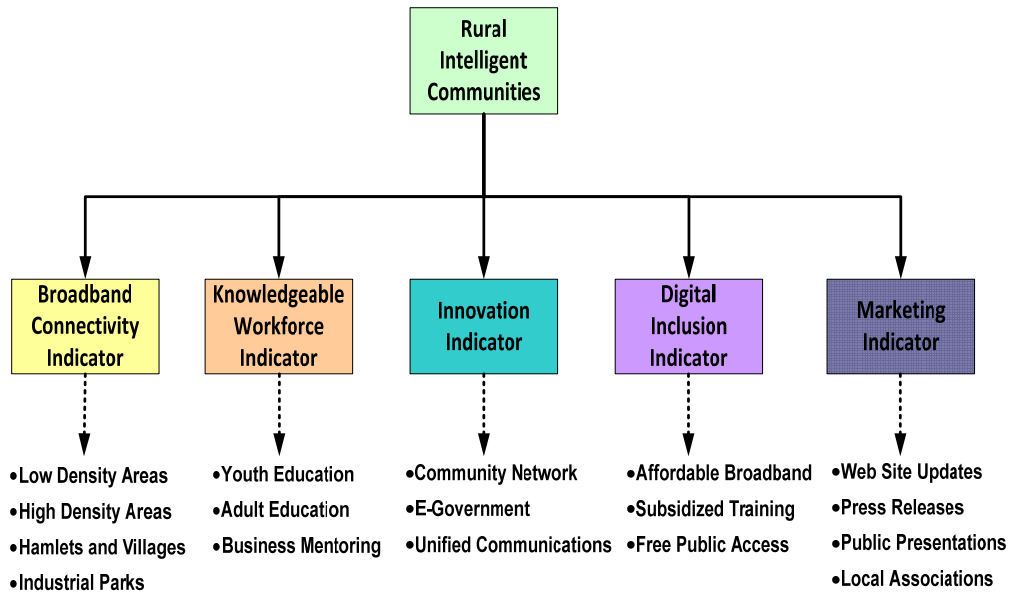
Table 1: Rural Intelligent Community Metrics

Key Indicator	Metric	Y/N
Broadband Connectivity	90% Coverage	
Knowledge Worker	Business Mentoring Programs	
Innovation	e-Government services	
Digital Inclusion	Free Access	
Marketing	Newspapers/Web Site Updates	

## 4. Rural Intelligent Community Projects

A Rural Intelligent Community may initiate one or more projects that specifically support the five intelligent community indicators. A Rural Intelligent Community strategic plan should encompass more than just a physical rural broadband infrastructure deployment. The Return On Investment (ROI) to the community is measured by indirect benefits such as economic growth and community building. Indirect benefits are realized through the initiation of knowledge worker and innovation projects.

Graphic 2: Rural Intelligent Community Projects



### 4.1 Broadband Connectivity Projects

A rural community is comprised of different economic areas including: Low Density, High Density, Hamlets and Villages, and Industrial Parks. Residents and businesses within each of these areas may have different broadband connectivity requirements. In most rural broadband projects, service providers start by recommending a specific broadband access technology such as fixed wireless access. The right broadband access technology is dependent upon the coverage, service, and requirements of the area. These requirements may be supported with multiple access technologies such as fixed wireless access, digital subscriber line (DSL), and fiber optic. A rural intelligent community must initiate separate projects for each market, analyze the coverage, service, and requirements for each, and then select the appropriate access technology.

Broadband connectivity projects must be cost effective. The common assumption that there is no sustainable business case for the provisioning of ubiquitous broadband access to rural communities arises from the traditional telecom business model in which the providers deploy a network infrastructure and recoup their capital expenditures through the sale of services. This is referred to as the “Service Model”. The key is to decouple the underlying network infrastructure from the services deployed so that the network can be funded as a long-term investment. The network is then operated on an open non-discriminatory basis that enables full competition at the services level. A structurally-separated open access broadband network provides supports separation between the backbone provider and the retail suppliers. Such an approach ensures no conflict in the value chain and provides the best competition, choice and prices for the end customer.

Traditionally it has been shown that public interest is best served when the same company that owns and manages the backbone does not also control the retail access market. This is referred to as the “Utility Model”.

Implementing an open access network will maintain competition in high density areas, ensure that medium to low density areas receive adequate service, will give residences and businesses a choice in broadband services, and will ensure that broadband access services are able to meet the community's coverage and capacity requirements.

The advantages of the utility model are:

- Public funds are spread throughout the community;
- Municipality maintains control of backbone infrastructure;
- Market forces are maintained in the local access market;
- Stimulates innovation in the local economy;
- Reduces cost of market entry and capital expenditures (Capex) for local ISPs.

It is essential that broadband connectivity projects support the open access utility model.

(Appendix B: Open Access Networks)

## **4.2 Knowledgeable Workforce Projects**

A knowledge workforce is a labor force that creates economic value through the acquisition, processing and use of information. A knowledge workforce can, in many cases, make the difference between success and failure of a rural intelligent community. In some rural communities capital may be plentiful, but the people with the ability to leverage broadband access may be scarce. This is due to a lack of formalized training. The lack of training leads to rural communities where the underlying broadband network is underutilized and there is little or no Return On Investment. It is important to remember that people create and use information, not computers and networks.

Knowledge workforce projects support community development initiatives that help rural communities remove barriers to community development and economic growth. Through these projects residents and businesses can begin to understand how to leverage broadband access to improve their lifestyle and initiate economic initiatives. The end result is a revitalized rural community that is better for the people who live and work in them. Rural community governments play a key role in solving the knowledge divide problem by identifying new skills, developing training and learning programs, and delivering training to the community.

### 4.3 Innovation Projects

Rural Intelligent Communities should initiate innovation projects that leverage the innovation of local residents and businesses, invest in e-government programs, and lower costs and improve community services.

Innovation projects provide the rural community a long term Return On Investment in rural broadband. The total number of innovation projects is only limited by the community's imagination and resistance to discovering new methods of reducing costs and improving services. Described in this section are some examples of innovation projects.

#### 4.3.1 Community Network Projects

Community networks can knit together the diverse elements of a community, provide access to and information about local government, stimulate public education, foster communications among the residents, and enhance civic participation. It does this in a number of ways:

- By bringing together members of a community and promoting debate, deliberation and resolution of shared issues;
- By organizing communication and information relevant to the communities' needs and problems on a timely basis;
- By engaging and involving the participation of a broad base of citizens, including community activists, leaders, sponsors, and service providers, on an ongoing basis;
- And, most importantly, by representing local culture, local relevance, local pride, and a strong sense of community ownership.

Rural communities are generally comprised of dispersed physical communities. A community network brings together these communities into a single virtual community. An example of a virtual community network is MalarNetCity ([www.malarnetcity.se](http://www.malarnetcity.se)). MalarNetCity is an Internet hub for the city of Vasteras Sweden. Residents of Vasteras effectively belong to two communities; a physical community and a virtual community. Both communities provide opportunities for the residents to interact to promote community events and economic development.

Graphic 3: MalarNetCity Community Network



### **4.3.2 e-Government Projects**

The term e-Government is used to define the use of Information and Communication Technology (ICT) to provide and improve government services, transactions and interactions with citizens, businesses, and other arms of government. e-government projects provide the following benefits:

- Increase in customer satisfaction and better service integration;
- Increase in service satisfaction by developing a single portal providing a range of packaged and single services in ways that make sense to customers;
- Branding a rural community as a model user and bringing its citizens into the digital world;
- Putting the rural community ahead of its class, and so increasing its competitive position for attracting trade and investment;
- Reducing the Total Cost of Ownership (TCO) of managing government services

### **4.3.3 Unified Communication Projects**

Unified communications is a “Strategy”. It is not a single technology or product. Unified communications includes a group of technologies that integrate voice with other features, such as email, instant messaging, presence, and videoconferencing. Using these technologies, unified communications can improve a rural community’s workflow by supporting more effective internal communications. Unified communications signals the beginning of the convergence of voice and data applications. It is this convergence that allows communications to fundamentally transform existing business processes, and maximize the business value of an investment in a broadband network. The largest single value of unified communications is in its ability to reduce the inefficiencies of person-to-person communications using e-mail and voice mail. Unified communications provides benefits to the bottom line, through faster first contact resolution and comprehensive business-value reports – reducing costs, improving customer service and enhancing response time.

## **4.4 Digital Inclusion Projects**

Rural communities might view the broadband network as a new revenue opportunity. They believe that they can balance their budgets by raising the monthly fees for their backbone and access partners to use the network. Private companies look at broadband access only in terms of the bottom line and will pass the higher fees directly to the rural community’s residents and businesses. High user fees will slow down a rural community’s economic development.

The Organization for Economic Cooperation and Development (OECD) is an international multilateral organization composed of 30 member countries, representing approximately 60% of the world economy, 70% of world trade, and 20% of the world’s population. In a recent study Canada ranked 27<sup>th</sup> out of 30 broadband countries at \$28.14 for an average monthly price per advertized megabit per second. The OECD reported that this has become an economic disadvantage to Canada. The goal of digital inclusion projects is to improve services, lower user rates, and provide free public access.

Examples of projects include:

- Affordable broadband projects;
- Subsidized training projects;
- Free public access projects.

## 4.5 Marketing Projects

Rural Intelligent Communities must communicate their advantages and explain to how they are maintaining or improving their position as wonderful places to live, work and build a growth business. Marketing projects are used to share the community’s vision within the community and the rest of the world. Marketing projects include:

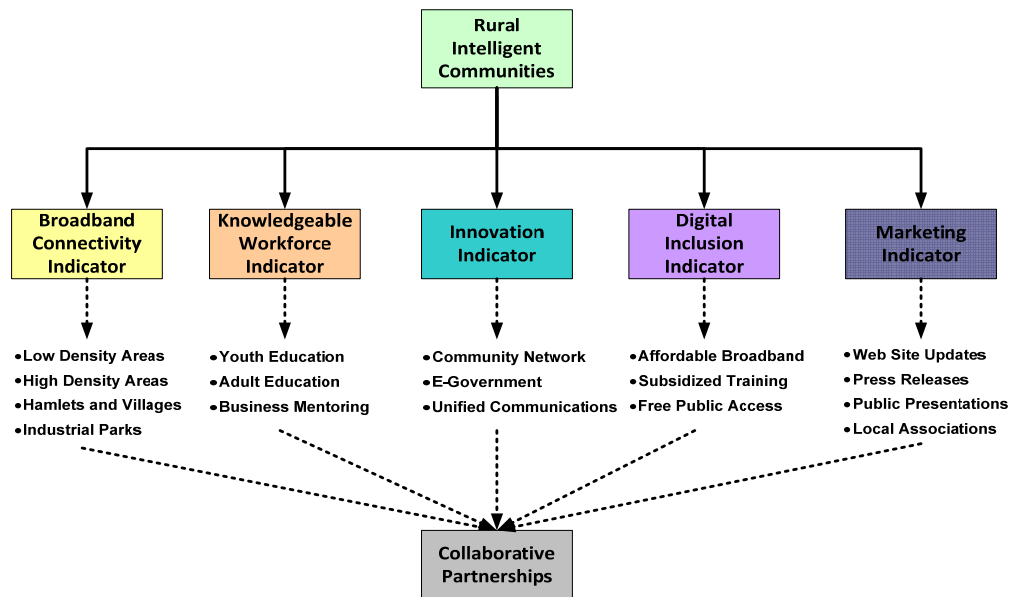
- Rural community web site updates;
- Press releases released by the rural community’s administration;
- Public presentations;
- Presentations to local associations.

For community members to understand what the Rural Intelligent Community projects offer they must have easy access to information that describes the benefits of the project to them and the community.

## 5. Rural Intelligent Community Partnerships

Successful rural intelligent communities create a high degree of collaboration among a broad range of partners: private companies, government agencies, school districts, local communication and technology providers, businesses and business groups, and community groups.

Graphic 4: Rural Intelligent Community Partnerships



Collaborative partnerships give the rural community a structure for organizing, planning, and implementing the Rural Intelligent Community projects. By thinking, planning, and working together, the individuals and groups that make a community can accomplish goals that neither could achieve alone.

The process of building collaborative partnerships includes:

- recognizing opportunities for change;
- mobilizing people and resources to create changes;
- developing a vision of long-term change;
- seeking support and involvement from diverse and non-traditional partners;
- choosing an effective group structure;
- building trust among collaborators;
- developing learning opportunities for partners.

Examples of collaborative partnerships are:

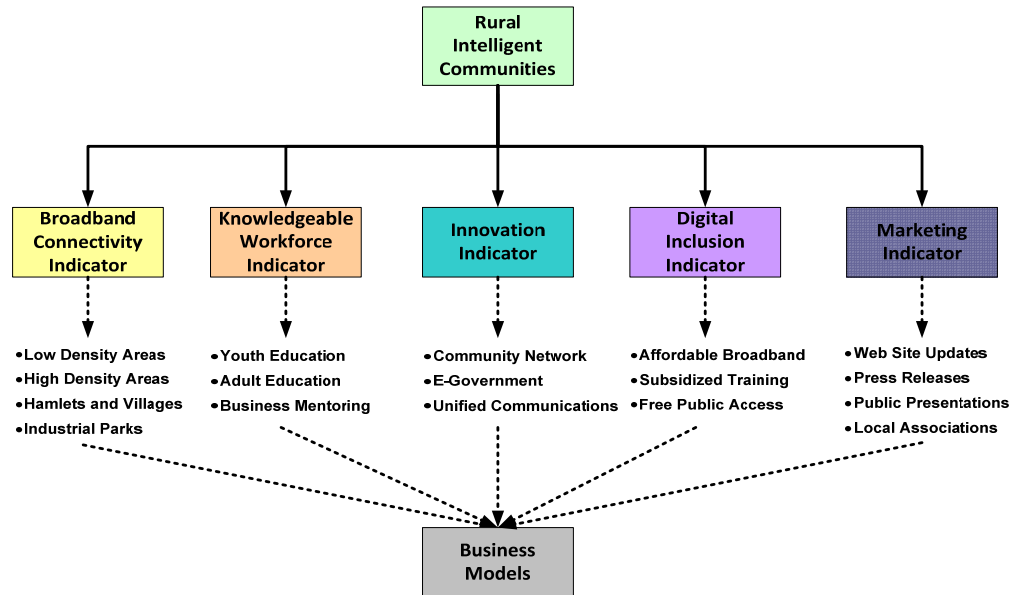
- Broadband Connectivity: Public/Private Partnerships (P3s)
- Knowledgeable Workforce: Public Education Partnerships  
Business Association Partnerships
- Innovation: Community Network Partnerships  
e-Government Partnerships  
County and Municipality Partnerships
- Digital Inclusion: Post-Secondary Education Partnerships  
Sponsorship Partnerships
- Marketing: Community Association Partnerships

Collaborative partnerships are the mechanism for designing comprehensive strategies that strength the Rural Intelligent Community projects and their outcomes.

## 6. Rural Broadband Business Models

A Rural Intelligent Community initiative will require a significant amount of capital and operating expenditures during and after the implementation. It is imperative that the rural community establish how each of the projects will be funded for the short and long term.

Graphic 5: Rural Broadband Business Models



There are three rural broadband business models:

- Private Sector Model
- Municipal Model
- Public/Private Partnerships (P3)

### 6.1 Private Sector Model

Traditional private sector providers such as TELUS and Bell are profit driven. Private sector providers only make infrastructure investments in rural communities where there is a reasonable return on investment within a short period of time to support stockholder value. There is very little financial incentive for service providers to upgrade or extend their infrastructure in many rural communities.

### 6.2 Municipal Model (100% Owned and Operated)

Municipal governments get involved in the provision of broadband services when the private sector fails to deliver or when the cost of service is appreciably higher than in other locations. Municipalities attempt to fill the gap by leveraging community resources such as right of ways, infrastructure, and other government property. The municipality builds, owns and operates the network to deliver broadband service to customers within the community's geographical boundary. The municipality owns the Internet Service Provider (ISP) and competes directly with the private sector. Municipal owned broadband networks face problems associated with high startup costs and low population

densities. Municipalities find it difficult to amortize the cost of facilities and make the return on investment necessary to sustain and upgrade the network.

### **6.3 Public Private Partnership (P3) Model**

Public-Private Partnerships' (P3s) are defined as a contracting arrangement in which a private party, normally a consortium structured around a Special Purpose Vehicle (SPV), takes responsibility for financing and long term maintenance or operation of a facility to provide long term service outcomes. This may involve the private entity taking responsibility for the design and construction of a component of new infrastructure; and/or taking over a long-term lease or concession over existing assets; and/or the development of a new long term contract to operate and manage the infrastructure.

There are two types of rural broadband public-private partnerships:

#### **1. Single Partnership Model**

The municipality uses the Request For Proposal process to select a single service provider. Their role is to provide to the Internet Service Provider adequate funding to provide a specified coverage throughout the community. Public funds may also be used to fund all or part of the project. Using this model the municipality uses public funds to give a single ISP a significant advantage over other ISPs serving the community. Public funds should be directed to the creation of true public infrastructure that may be used by all rather than the provision of commercial/retail services that are best left to the competitive application services sector.

#### **2. Utility Partnership Model**

The utility partnership model provides structural separation between the backbone provider and the retail suppliers. Such an approach ensures no conflict in the value chain and provides the best competition, choice and prices for the end customer. Traditionally it has been shown that public interest is best served when the same company that owns and manages the backbone does not also control the retail access market. Open access in a rural area means affordability, availability, and accessibility. Implementing an open access network will maintain competition in high density areas, ensure that medium to low density areas receive adequate service, will give residences and businesses a choice in broadband services, and will ensure that broadband access services are able to meet the community's coverage and capacity requirements. The advantages of a utility partnership model are:

- Municipality maintains control of the backbone infrastructure
- Public funds are spread throughout the community
- Market forces are maintained in the local access market
- Access ISPs are able to compete equally on cost and service

Rural communities should not build its own network in competition with the private sector. No community should rely solely on the private sector to meet its broadband needs. Communities have to discover the economic model that makes business sense and is highly conservative in its revenue and expenses.

## Appendix A: ICF Selection Process<sup>4</sup>

### Selection Process

The Smart21, Top Seven and Intelligent Community of the Year honorees are selected in a process overseen by the Chairman of the Forum involving four separate teams:

- An internal review by ICF executives and advisors selects the Smart21 from among hundreds of short form nominations submitted each year.
- The Smart21 complete detailed questionnaires, which are analyzed by researchers at Laurentian University. Their report forms the basis of selection of the Top Seven.
- A knowledge process outsourcing firm headquartered in Mumbai, India, conducts in-depth research interviews with the Top Seven communities and provides a quantitative analysis of each community using the Wharton School's Analytical Hierarchy Method.
- ICF's Correspondents - a select group of thought-leaders, officials, corporate executives, consultants and educators on each continent review profiles of the Top Seven and rank the candidates via a vote.

The final selection of the Intelligent Community of the year is based on a weighted average of the interviews and Correspondent rankings. This multi-stage, multi-input process ensures an unbiased outcome.

### Annual Theme

The selection of the Smart21 and Top Seven Intelligent Communities is guided by an annual theme. In 2009, our theme is "culture of use." ICF invites nominees to discuss how their community helps citizens and organizations to make broadband applications a part of their daily lives and thereby create the digital experiences and digital engagement that make them unique Intelligent Communities. Becoming "instinctive users" of broadband helps citizens and organizations increase their efficiency, expand their knowledge and improve living standards.

Examples of how communities create a local culture of use include:

- Developing or expanding broadband networks
- Educating citizens of all ages on the use of computers, the Web and Web-based applications
- Putting government functions and civic life online
- Celebrating digital experiences and engagement through local events, conferences, promotion through special events and local media campaigns

Other strategies that demonstrate the value of broadband in economic, social and cultural life.

### Intelligent Community Visionary of the Year

Awarded to an individual or an organization whose work promotes the development of broadband as an engine of economic growth, social inclusion and human progress. This individual or organization must have a proven track record in envisioning and creating change and must be recognized by peers as an expert field based on the development of new products, services or methods, written works or other documented activity. The Intelligent Community Visionary is selected by ICF management in consultation with its research partners and international jury. No nominations are accepted.

### Founders Awards

Presented to individuals, applications, organizations and innovations within Intelligent Communities that are transforming life in the Broadband Economy for the common good. Three Founders Awards are presented each year, based on selections by ICF management.

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<sup>4</sup> Source: <http://www.intelligentcommunity.org>

## Appendix B: Open Access Networks

Urban and rural areas that have implemented open access broadband networks:

- Paris
- Amsterdam
- Athens
- Barcelona
- San Francisco
- Philadelphia
- Stockholm
- Salt Lake City
- Reykjavik
- Pirai\*
- Vasteras
- Vienna
- Loma Linda
- Djursland\*\*

\* = Urban open access wireless network  
\*\* = Rural open access wireless network

### Djursland Denmark

A rural open access wireless network was implemented at Djurslands Denmark in 2006. Djursland is 1.491 km<sup>2</sup> and has a population density of 57.6 people per km<sup>2</sup>. Djurslands.net is decentralized into 10 local landscape nets, which all together provides each of about 7000 households, firms and institutions with wireless Internet access at 4 to 10 megabit bandwidth for 1/3 of the average commercial urban price with all costs calculated over a 4 year period.