



Information for Development Program

Request for Expression of Interest

Municipal Broadband Networks – A Study and Toolkit

Country: International

Notice/Contract Number: 1258

Publication Date: July 19, 2005

Deadline: August 9, 2005

Funding Agency: *infoDev*

Implementing Organization: *infoDev*

Eligibility of Bidders: The consulting firm (hereby referred to as ‘consultants’) is expected to have expertise in development of management strategies, deployment of technology, and process services (including management consulting, design and project management) of municipal broadband networks, in developed and/or developing countries. Additionally, consultants with a proven record in the following areas will be considered: in-depth knowledge on public policy issues related to state/local/municipal governance; reputation and expertise in the above field amounting to 5 to 10 years of experience; high research capacity and ability to develop the Study and Toolkit.

Expression of Interest (EOI):

infoDev invites eligible consulting firms (hereby referred to as ‘consultants’) to indicate their interest in providing expert services to develop the **Municipal Broadband Networks Study and Toolkit**. The vision of *infoDev*’s Municipal Broadband Networks or Localized Open Access IP Networks work program is to create a Study and Toolkit that provides information and educational opportunities for developing country policy makers in order that they can make informed future decisions on the use of telecommunications and information technology, at state and local levels, to meet community and economic development goals. A detailed description of the assignment is provided in the attached Terms of Reference.

The assignment is expected to be completed 19 weeks from the date of signing the contract agreement. The assignment is to be completed within the available lump-sum budget of US\$ 90,000, which includes all fees, travel, and other expenses.



Information for Development Program

infoDev now invites eligible consultants to indicate their interest in providing their services. Interested consultants must provide information indicating that they are qualified to perform the services (brochures, description of similar assignments, experience in similar conditions, availability of appropriate skills among staff, etc.). Consultants may associate to enhance their qualifications.

For this assignment we specifically request submission of a five page note outlining how the consultants would conduct this assignment if selected. The note should include the following: (a) an analytical framework and a process by which the research will be conducted; (b) a timeline that demonstrates the consultants ability to meet the deadlines as noted in the Terms of Reference below; (c) a brief narrative on resource allocation; and (d) brief summaries of key personnel to be involved in the work, particularly their experience that directly relates to the needs of this Study. In order to prepare the note, interested consultants should review the Terms of Reference, which are provided below.

We suggest that the EOI, including the five page note and all additional documents, brochures etc. should not exceed 25 pages in length. Electronic submission of the EOI is preferred. The EOI can be submitted either as a Microsoft Word or PDF file. Please send your email submission by August 9, 2005 to rvasudevan@worldbank.org. (Please, cc. Mrs. Samia Melhem, smelhem@worldbank.org and Mr. Charles Watt, cwatt1@worldbank.org).

Selection will be based on the “Consultants Qualifications” (CQ) method (provision 3.7 and 3.8 of the Consultants Guidelines) in accordance with the procedures set out in the World Bank’s Guidelines: Selection and Employment of Consultants by World Bank Borrowers May 2004.

Interested consultants may obtain further information at the address below, from 10:00am – 5:00pm US Eastern Daylight Time.

Rajesh Vasudevan
2121 Pennsylvania Avenue NW
Room: F5P 178
Mail Stop: F5P-503
Washington, DC 20433
Tel: [+1] 202-458- 8337
Fax: [+1] 202 522-3186
Email: rvasudevan@worldbank.org

Note: More information about World Bank procurement processes and guidelines can be found on its Procurement web site at <http://www.worldbank.org/procurement>

TERMS OF REFERENCE

Municipal Broadband Networks – A Study and Toolkit

About *infoDev*

infoDev is a multi-donor program, with close ties to the global operational capacity of the World Bank and equally strong relationships with a number of key donors. *infoDev* helps the donor community and developing countries address the opportunities and challenges of ICT for development. Since its creation in 1995, *infoDev* has been a pioneer in promoting innovative uses of ICT as tools for poverty reduction and sustainable development. The grant program supported over 120 such innovative projects, complemented by a diverse program of seminars, workshops, research and publications. Donors and other development partners are now keen to assess the results of these efforts and to learn from *infoDev*'s experience. Its mission today therefore, is to help the international development community to "make sense" of the rapidly changing world of ICT by financing and delivering effective research, and by developing high quality knowledge products and services which support ICT applications as tools of development and poverty reduction. *infoDev* focuses on three broad themes: (i) mainstreaming ICTs as tools of development and poverty reduction; (ii) enabling access for all; and (iii) entrepreneurship, innovation and growth using ICT. Supporting these three thematic areas are selected research and knowledge products in cross-cutting areas such as examining the enabling environment which will aim at ensuring promising approaches are brought to scale, and providing a framework for monitoring and evaluation. (Web Site: <http://www.infodev.org>)

The vision of *infoDev*'s Municipal Broadband Networks work program is to create a Study and a Toolkit for developing country policy makers in order that they can make informed future decisions on the use of telecommunications and information technology, at state and local levels, to meet community and economic development goals.

I. Background:

Overall Context of Internet Protocol (IP) Networks and the Paradigm Shift:

- IP Networks, the transport system for almost anything that can be sent in digital formats, offer direct possibilities for the growth of decentralized intelligent services at the edges of a network.
- The two main market developments shaped by IP Networks, which constitute a 'paradigm shift', include the separation of infrastructure and services, and the availability of a number of disruptive technologies offering cheaper access options to voice and data.
- Looking through the lens of an Open Access approach, optimal operations of IP Networks mandates the separation of the transport layers (physical and logical) from the higher layers (applications and content) to create maximum growth through competition in all other layers. (Many interpretations exist about how many layers there are in an IP Network environment, but for convenience we have grouped them into four, namely physical, logical, applications, and content)

- IP Networks make it possible at the local level to have small-scale ‘plug and play’ operators interconnecting with much larger operators. Local and municipal networks can co-exist as infrastructure providers alongside more traditional operators.

Definitions

- **Broadband Access Technologies:** The six leading groups of broadband access technologies with many specific variations include HFC (Hybrid Fiber Coax), DSL (Digital Subscriber Line), FTTH (Fiber To The Home), Wireless (802.16-2004 WiMax and 802.11 WiFi), BPL (Broadband over Powerline), and Satellite. Today, across developed economies, broadband is provided via cable or DSL modems that supports about a factor-of-10 improvement over traditional dial-up modems offering 50Kbps.
- **Taxonomy For Roles Of Public Sector:** Government as neutral rule-maker (where it adopts or reforms local ordinances); Government as a broadband user (where it indirectly attracts commercial broadband deployment); Government as financier (where it provides subsidies for broadband users or providers); or Government as infrastructure developer (deals with supply side issues, including building dark or lit fiber).
- **Municipal Broadband Networks:** Municipal Broadband Networks are primarily localized open access platforms that have emerged across both developing and developed countries. This has been primarily through public financing or public private partnerships (PPP) of network architecture for successful Open Access as a stimulus to roll-out services more widely.

Localized Open Access Platforms, Municipal Broadband Networks - Some Policy Issues:

- Deploying Next Generation Networks (NGN) will require substantial new investment, but the economic viability of such services is still unproven. Given the anticipated demand by communities for broadband services, substantial new local infrastructure investment will be needed, and as the optimal technologies / deployment strategies will vary by locality, local policymakers are to be central in influencing how local access infrastructure evolves.
- There are many examples of local governments mainly in developed countries making investments in broadband networks. Yet, it is too early for testing the business models for these investments, which include investments in the transport layers (physical and logical layers, mainly infrastructure like duct, dark fiber, tail, co-location facilities) and / or investments in the above layers (where the government enters the application and content layers to create demand through e-government type applications and subcontracting operations to third parties).
- Critics of municipal investments state that municipalities have typically fared poorly at running networks and have been inefficient at providing user-fee based services. Proponents counter this saying that the criticism is based on an assumed scenario, where municipalities operate the network in addition to investing in infrastructure, whereas network management and operation could readily be competitively outsourced.

Main Question:

Low-cost, high-speed, community operated broadband networks are revolutionizing public communications, especially in the United States and Europe. How can developing countries benefit from the lessons learned from the initial trends and find the optimal

blend of this new technology with good public policy to transform telecommunications? The main goals of typical government investments in broadband networks include creating a competitive market, encouraging private investment, reducing data and telecom costs, reducing redundant facilities, and creating local markets for new services.

At the core of the issue of government-provided broadband networks is the question, "Should governments be in the broadband network business?" While there may be a latent demand (assuming regulatory issues, demand stimulation etc are in place), yet the financial barrier to entry can still be too high and so government intervention can reduce operators' capital expenditure through wholesaling capacity. By reducing capex sufficiently, the market may become attractive enough for multiple suppliers to engage with the market, thus in turn increasing demand and reducing prices. By intervening with appropriate open access models, acting as catalysts for municipalities and local government to accelerate local policies such as FDI, Life long Learning, e-Health, and indigenous business competitiveness. The planned activities towards meeting the above objectives include a set of deliverable(s) elaborated in Section II titled Scope of Work.

Projected Deliverables:

- Study
- Workshop and Awareness Raising Event(s)
- Merging the Study into a Web-Based Municipal Broadband Networks Toolkit

Anticipated Outcomes:

- Pilot Projects as proof of concept to answer specific research questions through possible IFC investments and /or *infoDev* grants
- New lending opportunities within infrastructure at sub-sovereign levels
- Policy pieces available for *infoDev* donors

II. SCOPE OF WORK

One of the main motivations behind *infoDev*'s Enabling Access For All research theme is to address the challenge confronting the regulators and policy makers relating to the need to design and implement the second wave of reforms. The objective is to take advantage of a situation created by technological changes to provide access to unserved areas and leverage information and communication infrastructure as a tool for economic growth and competitiveness (Harnessing ICTs to Fight Poverty and Promote Development, An *infoDev* Strategy and Work Program to Promote Development 2005-2007). While on the other hand, access to high quality telecommunications and data networking by a community has become a prerequisite for the community's economic welfare and for the delivery of local government services. And the pressure on local governments increases in those communities where there is a consensus that markets have failed to deliver adequate and affordable broadband.

Given this context, *infoDev* proposes to create a central knowledge resource that will enable *infoDev*'s donors, state and local governments, local communities and businesses across all developing economies / regions to make informed decisions on their future use of information technology. It will fundamentally build on the lessons learned from similar projects from developed economies / regions.

infoDev therefore invites proponents to deliver the following pieces of the planned central knowledge resource: An outside firm or consortium of consultants is being commissioned competitively to build on the *infoDev*'s in-house research, and prepare the **Study** and a web-based **Toolkit**. An international **Workshop** is to be jointly organized by *infoDev* and the selected consultant.

(i) Study: The Study is to serve as systematic data on the nature and status of municipal broadband initiatives, the effectiveness of alternative policies to promote broadband access, its implications for local economic development, private provisioning of infrastructure, and operations of local government. The target audience includes communities in both developing and developed countries that are independently undertaking broadband projects, and developing their own strategy, without the benefit of the accumulated experience that negatively affects the probability of success. The target audience also includes all infrastructure specialists within donor organizations working on multi-sectoral infrastructure financing through public private partnerships. Also included are the different stakeholders involved in any of the activities like feasibility study, vendor assessment and negotiation, lobbying, budgeting and financing, installation, operations and maintenance.

The focus of the Study should be understood in the above context of new technologies and the convergence of telecommunications, building on the knowledge base already created in the areas of horizontal versus vertical regulatory layers; opportunities for developing countries to leapfrog technologies and regulatory practices; impacts of convergence on regulatory policy options; including the challenge to main economic concepts like natural monopoly, market failure, public-private partnerships.

The objectives of the Study specifically include the following:

- Assess models existing for Municipal Broadband specifically looking at appropriate levels of market engagement
- Trace the regulatory environment, barriers to entry, and the policy changes their creation and existence have entailed, where applicable
- Describe types of financing model they operate (PPP, BOT, concessions, etc.)
- Describe the ownership structures and management and operation roles utilized
- Define the revenue models and assumptions underlying their operation
- Identify technologies used (Wireless, DSL, Fiber, BPL, Satellite)
- Describe the types of services they provide and the customer segments
- Assessment of preliminary success given its location specificities, and lessons learned

Indicative Table of Contents: The following, indicative table of contents is meant to illustrate the scope and complexity of the present Study. The final table of contents will be determined by discussions between *infoDev* and the selected consultant. The consultant will focus on the production of benchmarks, text boxes, tables, case studies and examples and good practice notes wherever appropriate. The consultant will propose metrics, models, and tools to help state and local governments in their operational work.

Chapter 1: Policy Note on Public Financing Of Infrastructure

- Definition of broadband and the technology options
(Wireless, DSL, Fiber, BPL, Satellite)
- Service model for open access transport infrastructure (for non-specialists)
(Layers of IP Network environment - Physical, Logical, Applications and Content)
- Policy and regulatory environment and the rationale for public financing of infrastructure through public private partnerships

Chapter 2: Taxonomy of Municipal Broadband Networks

- Table 2.1: Divide all open access networks into 5 categories
 - Regional (state and province)
 - Citywide networks for public access
 - Citywide networks for public safety and municipal use
 - City hotzones (less than citywide)
 - Planned projects

Under each of the above 5 categories have disaggregated information on

- **Name of the country, state, region**
(State or province, Urban area, Small / mid-size towns, Rural area)
- **Geographic, demographic and socio-political details**
(Include all aspects related to locational and site-specificity)
- **Policy and Regulatory Environment, Scope of Network, and Leadership Strategy**
(Scope of broadband network and Policy changes their existence have entailed)
- **Business Models and funding strategies in the IP networks layers**
(Community network, public utility, private consortium, cooperative wholesale etc)
- **Ownership Structures of the Networks**
(Investment in networks, responsibilities for operations of networks)
- **Technology options as a response to the community needs**
(Identify technologies used - Wireless, DSL, Fiber, BPL, Satellite)
- **Vendor information**
(Details of the equipment, software, and services used)
- **Costs that include both the capital expenditure and operating expenditure**
(Includes equipment, services, maintenance, backhaul)
- **Services, applications and customer segments**
(User profiles of applications - institutional, business, government, consumers)
- **Subscribers take rates, RoI, Triple play price range**
(Internet, video, voice, pre and post creating the network)

Chapter 3: Experience and Lessons Learned in developed and developing countries

- Policy and Regulatory Environment - Barriers to entry, Policy changes effected for their creation, existence and service delivery
- Typical responsibilities of municipalities to create a high quality carrier class network
- Methods to develop coalitions and coordination for spectrum usage
- Methods used to leverage existing infrastructure including rights of way
- Methods to attract tenants with longer term contracts to use bandwidth made available

Chapter 4: Comparative study of Business Models, Funding Strategies, and Public Private Partnerships

Identify and research the empirical strengths and shortcomings of all the different types of business models including community networks, public utility, private consortium, cooperative wholesale. This chapter could also include some recommendations through a matrix with several independent variables (population density, throughput, etc) on what is the most appropriate model under what circumstances.

Chapter 5: Creating Revenue Streams from Municipal Broadband Networks

The question relates to how owners / operators (public / private) can fill up the bandwidth that they make available at decent margins. In other words, how can owners /or operators have tenants with defined contracts, performance indicators etc? Does the municipal demand for high speed networking create new revenue opportunities for service providers, or could it also be perceived as a threat when the municipalities choose to own their networks and provide competitive broadband services? What are the methods by which carriers could understand the municipal objectives and turn threats into opportunities?

Chapter 6: Developing a Project Finance Approach

On the basis of the above chapters, a project finance approach is to be developed. This approach should base itself on actual projects and create a template that documents the financial or technical capabilities of public and private sponsors, the risks associated with the project and how they were shared, and also the core competencies of sponsors and how they complimented each other in terms of capabilities to achieve economies of scale. Such an approach should include information on the financial structure including PPP schemes, risks and guarantees brought to bear, all aspects of financial engineering, concessionary credit, tax treatment, bonds, guarantees, equity, government financing, and development aid etc. Within this, the operational implications and opportunities for different donor organizations are also to be explored.

Chapter 7: Bibliography

The bibliography must include a comprehensive list of resources and build on the in-house research of *infoDev*

(ii) Toolkit: This web-based Municipal Broadband Toolkit is to be derived from the above Study, presenting the content in a predefined methodology (see below for an indicative format). **The purpose of the Toolkit is to provide access to representatives of local governments, municipalities, private sector operators and donor organizations to the findings of the Study, including its related policy / operational options, experiences, and precedents.** The aim is to enable a non-linear learning experience reflecting on all relevant aspects and contain original content that elaborates on issues presented in the Study. The Study that includes chapters 1, 2, 3, 4, 5, 6 & 7 is planned as a core document, whereas the Toolkit is to be a dynamic and an organic tool, constantly enriched with relevant up-to-date experience.

The Toolkit itself is considered an independent product to the extent that it will offer a number of features and additional content that is not covered by the Study. The toolkit will offer (a) core documents; (b) secondary documents; (c) practice notes and (d) reference documents. Especially the latter two will be derived from and linked to the intellectual framework that is set by the Study, but will clearly present additional material that is beyond the Study's scope of work.

infoDev has already developed a standard format for a web-based Toolkit and the consultants will be expected to develop content according to this format. In preparing the Toolkit, the consultants will work closely both with *infoDev* and the web-design firm commissioned by *infoDev* to develop the common information architecture, look & feel and functionalities. The consultant will:

- Develop the web-based module based on the above Study and develop logical content / theme linkages and references between different sections
- Use developing country examples (where possible) and case studies, while balancing the choice of country and regional examples to provide a global overview of Municipal Broadband Networks 'good practice' that reflects a range of perspectives;
- Communicate progress regularly with relevant *infoDev* staff and adapt the module according to inputs from *infoDev*. An *infoDev* Task Manager has been assigned to ensure close cooperation with the selected consultant;
- Conduct review meetings with *infoDev*, taking into account comments, suggestions, and feedback offered on form and substance during the review meetings;
- Present the findings of the Study as a set of four different document formats for the online-Municipal Broadband Networks Toolkit:
 - **Core Document** – The core document is a revised version of the main Study. It will provide a high level summary of the process and issues related to policy aspects of municipal broadband networks and serve as a framework for online content from which more detailed information will be hyperlinked.
 - **Secondary Documents** – Secondary documents will open as separate pages on the web-site, hyperlinked from the core document or other content. These secondary documents will contain more detailed discussion or examples of issues (in text and graphical format) than that contained in the core document. Some of the content will come from text boxes, tables and more detail-oriented sections in question.
 - **Practice Notes** – Practice notes will also open as separate web pages. Practice notes are short Case Studies summarizing for the reader good practice. Practice notes will provide summaries, context and practical advice regarding reference documents and other content. They will often be intermediary steps to reading reference documents. For example, by clicking a link to a certain municipal network, the reader may first be guided to a practice note that describes the municipality, and that gives the socio-economic-political background, context and practical advice on its network's use.
 - **Reference Documents** – Reference documents will contain documents and other data selected by the consultant as representative of good practice and precedents.
- The documents will be hyperlinked to a database that provides practical examples, and commentary on the practices and issues discussed. Final decisions about where such a database will be maintained, by whom, with what criteria to screen content for inclusion, and related quality control issues will be decided by *infoDev*.

Economic Impact Analysis	Has the rationale and justifying for the investment met? What is the take-up rate?	Develop a design matrix for a results based management that traces outcomes and impact
--------------------------	--	--

Additional Resources

- Departments of international donors and consulting firms for technical assistance
- Upcoming and Past Conferences (Bilbao 2005, Digital City Expo 2005, F2C)
- Bibliography to include a comprehensive list of resources used that builds on the in-house research of *infoDev*

(iii) Workshop: The planned Workshop is part of the overall quality assurance process and is scheduled to be held in Washington DC. It is designed to serve as a formative evaluation of the Study and will help identify and incorporate into the Toolkit, those grey areas that have not yet been included in the Study. In addition to the Conference, the Consultants will also present the Study and Toolkit at *infoDev*'s Symposium at the World Summit on the Information Society (WSIS), November 16-18, 2005. The consultants will integrate final comments on Toolkit as derived from this event.

(iv) Develop Training Materials: In order to facilitate the dissemination of the results of the work, the consultant will provide a training module with detailed comments and explanations. The purpose of the training material is to enable *infoDev* staff present the Study's findings to representatives of local governments, municipalities, private sector operators and regulators of both the developed and developing economies. The training module will be integrated into a generic powerpoint presentation format to be used by *infoDev* staff to disseminate the Study results. Details in the organization of review meetings will be proposed to the Consultant at the beginning of the assignment. While developing the Study, Toolkit and the Training Materials, the consultants should emphasize to the use of tools with minimum complexity, that require a minimum of resources and that are operational in the specific environment and circumstances in which most developing country stakeholders have to function.

III. ORGANIZATION OF WORK

Resources: The selected consulting firm will use in-house *infoDev* research as a starting point for the Study, but are expected to identify all resources (projects, papers, books etc.) necessary for completion of the work.

Timing: The assignment is expected to be completed within 19 weeks of commencement. The assignment is to be completed within an available lump-sum budget of US\$90,000, which includes all fees, travel, and expenses, etc. The project funds will be disbursed in 4 tranches. The release of each tranche will be further conditioned upon *infoDev* being satisfied with each of the deliverables before proceeding to the next.

Conduct of the Assignment: In undertaking this assignment, the consultants will take the lead under the general direction of a Task Manager from *infoDev*, who will be closely involved in reviewing reports submitted and providing guidance as necessary.

Consultant qualifications: The consulting firm is to have expertise in development of management strategies, deployment of technology, and process services (including management consulting, design and project management) of municipal broadband networks, in developed and / or developing countries. Additionally, consultants with a proven record in the following areas will be considered:

- In-depth knowledge on public policy issues related to state/local/municipal governance
- Reputation and expertise in the field amounting to 5 to 10 years of experience
- High research capacity and ability to develop the Study and Toolkit.

Timeline and Deliverables

Tranche	Deliverable	Indicative Due Date
Tranche 1 (10 %) (US\$ 9,000)	The first tranche will be paid by <i>infoDev</i> to enable the consultant to start developing the Study and Toolkit blueprint.	Late August 2005
Tranche 2 (20%) (US\$18,000)	Workshop/Presentation: First Draft of Study and a Toolkit blueprint as well as proposed, additional content materials for the Toolkit.	Late September 2005
Tranche 3 (30%) (US\$27,000)	Workshop/Presentation: Final version of the Study and the draft version of Toolkit to <i>infoDev</i> . Presentation of Draft Training/Presentation Material in the Conference organized in Washington DC.	Late October 2005
	Presentation of Study and Toolkit at WSIS. Integrate final comments on Toolkit as derived from WSIS.	November 16-18, 2005
Tranche 4 (40%) (US\$36,000)	Presentation of Final Study, Toolkit and Training Materials	End of December 2005

Contact Information:

Rajesh Vasudevan
 2121 Pennsylvania Avenue NW
 Room: F5P 178, Mail Stop: F5P-503
 Washington, DC 20433
 Tel: [+1] 202-458- 8337
 Fax: [+1] 202 522-3186
 Email: rvasudevan@worldbank.org