

# Terms of Reference (ToR): Broadband Strategies Toolkit: Preparation and Delivery of Module 5: Technologies to Support Deployment of Broadband Infrastructure

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## 1 Summary

With funding from the Korean Trust Fund (KTF) on Information and Communication Technology for Development (ICT4D), *infoDev* and the ICT Sector Unit of the World Bank have been creating a Broadband Strategies Toolkit ([www.broadband-toolkit.org](http://www.broadband-toolkit.org)) for developing countries. The work has been proceeding in three phases:

- Phase 1 of this project was initiated in 2010 and completed in 2011, with Telecommunications Management Group, Inc. (TMG) selected as project coordinator. The main deliverable of the first phase was a Broadband Strategies Handbook, which comprises extended summaries of all seven chapters. In addition, the first phase saw the delivery of three full online modules of the Toolkit (1, 2 and 7: see detailed Table of Contents in the Annex). In addition, a website has been launched and seven country case studies illustrating developing countries from different regions have been completed: Brazil, Kenya, Morocco, Sri Lanka, St Kitts and Nevis, Turkey and Vietnam.
- Phase 2 will see the completion of the remaining modules of the Toolkit (3, 4, 5 and 6) as well as further development of the website. Additional material will also be prepared in the form of country case studies, thematic case studies, practice notes, statistics and reference materials.
- Phase 3 will focus on dissemination including the preparation of teaching materials, based on the toolkit, and a self-assessment toolkit.

**To carry this project forward, the Bank is looking to hire an individual consultant consulting firm (henceforth ‘Consultant’) to prepare the extended Module 5, covering *Technologies to Support Deployment of Broadband Infrastructure*.** In principle, the content of this module should follow the draft Table of Contents prepared in Phase 1 (see Annex) and should draw upon material prepared for the extended summary of this module and the country case studies. However, we would welcome suggestions for additional material and issues that should be covered in this module, particularly reflecting recent policy and regulatory developments and additional case study material.

The Consultant will be hired through a two-stage international competitive bidding process and will be responsible for developing the modules. As such, this assignment is critical to the implementation of the larger body of work and will require close collaboration with consultants working on other modules and the World Bank/*infoDev* team. The aim is to provide important resources to developing country regulators and policy-makers at a critical juncture in planning their own national broadband strategies.

## 2 Background

### 2.1 Objective

The long-term objective of this project is to develop a Broadband Strategies Handbook, seven online modules and training materials on strategies for the implementation of broadband networks and services (collectively referred to as the “Broadband Strategies Toolkit”) focused on developing countries. This will create a modular global knowledge-product that:

- (1) demonstrates how broadband enables economic and social development; and
- (2) provides developing country policy-makers and regulators with the tools to create strategies, design policies, and implement programs that expand the reach and increase the use of broadband ICTs so as to reap the developmental benefits they facilitate.

The Broadband Strategies Toolkit is intended to:

- Build on existing and on-going analytical and operational work carried out by the World Bank Group;
- Have an operational orientation and provide detailed information, self-assessment tools and guidelines that will help developing countries in implementing broadband strategies, with emphasis on implementation instruments;
- Become a useful knowledge resource both taken as a whole or in parts, i.e. both as an overall report and website, and as a series of separate modules and reference material;
- Help illuminate the details of how policies, regulatory frameworks, investment programs can actually be implemented in different country situations;
- Draw lessons from initial applications of the toolkit to operational work carried out at the Bank and by other agencies (who use the toolkit); and
- Be deployed as quickly as possible, in three phases, with increasing detail in each phase.

The Broadband Strategies Toolkit follows the model of the successful ICT Regulation Toolkit ([www.ictregulationtoolkit.org](http://www.ictregulationtoolkit.org)). Development of that toolkit began in 2000 with the release of the Telecommunication Regulation Handbook and continued in 2004, with the elaboration of the full online toolkit. The final module was posted in early 2009. Its website now attracts around 800 unique visitors per day and it is the most downloaded knowledge product for the World Bank’s ICT work. That toolkit and Telecommunications Regulation Handbook, which was reissued in 2010, have been widely recognized by practitioners for their accessible and practical treatment of complex policy and regulatory issues.

The Broadband Strategies Toolkit will have two orders of impact:

- First, it will serve as a resource for developing countries and support the roll out of broadband ICTs (on both fixed and mobile platforms). Countries are increasingly looking for advice and support to expand the reach and increase the use of broadband ICTs and the toolkit will serve as a practical resource for policy-makers and regulators, primarily in developing countries, who are keen to support the expansion of broadband ICTs in their jurisdictions.
- Second, the increased access to and use of broadband ICT will have a positive impact on economic and social activity, providing developing countries have appropriate absorptive

capacity. As indicated above, developing countries are hoping to realize the benefits of increased access to and use of broadband ICT, as a key tool to achieve global competitiveness.

The Broadband Strategies Toolkit will emphasize implementation and will serve as a “how to” guide for policy-makers and regulators. In this way, the Toolkit will help developing countries spur the growth of broadband penetration, helping realize the development impact of advanced ICT.

The primary sources of funding for this project are the Korean Trust Fund of ICT for Development, which awards grants to World Bank projects and activities submitted along crosscutting strategic themes, and the UK Department for International Development (DFID). Other sources of funding are welcome to help expand the scope of the Toolkit and help with dissemination.

## 2.2 Structure of the project

This project will be implemented in three phases, the second phase of which is covered in this invitation to tender.

- (1) Phase 1 resulted in the development of the **Broadband Strategies Handbook**. During the first phase, Modules 1, 2 and 7 of the Toolkit were developed in full, drawing upon work already carried out within the World Bank Group;
- (2) Phase 2, covered in this TOR, will develop the additional four modules in full to complete the full **Broadband Strategies Toolkit**, as an online resource;
- (3) Phase 3 will focus on dissemination and will see the development of **training materials** based on the Toolkit, including a self-assessment tool.

Collectively, the three phases (Handbook, Toolkit and Training Materials) are referred to as a single product, the “Broadband Strategies Toolkit”.

## 2.3 Toolkit contents

In designing the broadband toolkit, there are five main components to consider:

1. Rationale and development impact of broadband (the “why”);
2. Strategy development that defines objectives, the vision statement, and the overall program; (the “what, when, where, and for whom”);
3. Policy and regulations that create an enabling environment that closes market gaps (the “how” – making markets work) ;
4. Programs to promote connectivity and extend coverage to close the access gap (the “how” – supply side promotion); and
5. Demand-facilitation for applications that will help to close the “adoption gap” (the “how” – demand side promotion).

Each of these components will be included in the final toolkit. However, not all of them will have to be developed exclusively for it. Much of the knowledge on broadband policy and regulation is already available in the ICT Regulation Toolkit and in other resources of the World Bank Group and its partners.

Much analytical work and a range of operations have already been carried out by the ICT Sector Unit of the World Bank and *infoDev* and this has led to the creation of a significant existing body of knowledge and material related to connectivity and coverage. This includes:

- Qiang, Christine Zhen Wei and Rossotto, Carlo (2009) “Economic impacts of Broadband”, which appears as chapter 3 in World Bank (2009) “[Information and Communication for Development: Extending Reach and Increasing impact](#)”;
- Qiang, Christine Zhen-Wei (2009) “[Broadband Infrastructure Investment in Stimulus Packages: relevance for developing countries](#)”;
- Kim, Yongsoo; Kelly, Tim and Raja, Siddhartha (2010) “[Building Broadband: Strategies and Policies for the Developing World](#)”;
- The Broadband Strategies Handbook, and the initial set of case studies, available at [www.broadband-toolkit.org](http://www.broadband-toolkit.org).
- World Bank (2012) “Information and Communications for Development 2012: Maximizing Mobile.

The seven toolkit modules are as shown below.

- Module 1. Building Broadband (completed)
- Module 2. Policy Approaches to Promoting Broadband Development (completed)
- Module 3. Law and Regulation for a Broadband World
- Module 4. Extending Universal Broadband Access and Use
- Module 5. Technologies to Support Deployment of Broadband Infrastructure
- Module 6. Driving Demand for Broadband Networks and Services
- Module 7. Global Footprints: Stories from and for the Developing World (completed)

A more detailed table of contents for Module 5 is shown in Annex A. The extended summary is available as part of the Broadband Strategies Handbook (see above).

## 2.4 The target audience and parties involved

The target audience for this work is principally regulatory agencies and policy-makers in developing countries. A secondary audience is likely to be other market players within the broadband arena (e.g., network operators, equipment manufacturers, application developers, service providers, users, etc).

A number of parties may be involved in Phase 2 of the Broadband Strategies Toolkit, each with different roles in implementation:

- The Module Authors, hired through these terms of reference, shall prepare all draft and final text content for the online module, including Practice Notes and Reference Documents to be included in the online module.
- The World Bank team, comprising principally staff from *infoDev* and the World Bank’s ICT Sector Unit, who have overall project management responsibility and who will also contribute to the content of the Toolkit, including additional resources. The World Bank team will draw upon other resources within the World Bank Group, including private sector expertise within IFC;

- The peer reviewers, both internal and external to the Bank, who have the role of advising on the conduct of the project and providing quality assurance.
- Other contributors and advisors, including policy-makers and regulators around the world, academics, civil society, other interested parties etc, that may provide content for the Toolkit, for instance in the form of practice notes, project documentation, case studies, data, reports etc. They could include:
  - Other consultants;
  - The World Bank Group’s partners, especially other international organizations such as ITU, UNESCO and OECD, as well as charitable foundations and NGOs;
  - The World Bank Group’s clients, especially policy-makers and regulators from developing countries with an interest in developing national broadband strategies;
- The web development team (CaudillWeb), which has been appointed through a separate tendering process, who will be responsible for further developing the online presence for the Toolkit, including a portal for user-generated content.

### 3 Scope of work

#### 3.1 Tasks to be undertaken by the Module Author (Consultant)

The role of the Module Author (Consultant) is to work under the supervision of the World Bank team to:

1. Research, draft and publish this module of the Toolkit in full. This will involve combining existing work, prepared inside the Bank and elsewhere, with new material, commissioned or written directly by the Author, to provide a comprehensive tool for the target audience of policy-makers and regulators in developing countries.
2. Identify, collect, index and display relevant resources that can provide added value to the Toolkit in its electronic form, and/or which can be summarized, for instance to provide boxes and featured material in the printed handbook (see description of the layers below).
3. Liaise with the web development team, to ensure that there is an early online presence of the module and that, over time, the module becomes an integral part of the Toolkit which is aimed at becoming a widely used, easily accessible, reliable reference source for the target audience. The Author will help in identifying and creating content for the website, while the web developer will implement it, from a technical angle. This will require particular attention to Level 5 content (see below).
4. Other tasks, as identified by the World Bank team, that prove to be essential for the successful completion of the overall objective of the creation of the Toolkit.

In line with experience from the ICT Regulation Toolkit, the online version of the Broadband Strategies Toolkit comprise several levels:

- Level 1: Executive Summary - framework of each module and a summary of the full content of the module. The Executive Summaries have been completed and together constitute the full text of the Handbook;
- Level 2: Full module – expanded discussion of main topics, with live links to material in the other levels. This will exist mainly as an online tool but users will be able to download PDF versions of the full text of each module. Modules 1, 2, and 7 have been completed;
- Level 3: Practice Notes – summaries, discussion and/or examples of good practices. This could, for instance, include country case study material (in full or in summary), technical annexes (for instance describing broadband technologies in more detail), step-by-step guides

etc. The practice notes should, in particular, draw upon the experience of the World Bank and its clients;

- Level 4: Reference Documents – additional related documents and information. These could include, for instance, examples of national broadband strategies, sample procurement documents, technical standards etc.
- Level 5: User-generated content – including for instance blogs, comments from users, documents proposed to uploading by users, updates to the material contained in the toolkit, discussion forums etc.

## **4 Conduct of the assignment**

### **4.1 Selection process**

The Module Author will be hired through a competitive tendering process. Suitably qualified Consultants are invited to submit their CV, and a statement of interest letter explaining their qualifications and approach. Although the award is to a single named individual, proposals may include additional researchers working under the guidance of the consultant. It is anticipated that this assignment will require between 80 days of effort.

### **4.2 Consultant qualifications**

The Consultant should have expertise and first-class research capacity in ICT/telecommunications economics, policy, and regulation with a specific capability on broadband development in developing countries. The Consultant should be able to demonstrate a proven record of publishing policy and regulatory analysis, either directly or for clients. The Consultant should also have a capability for online content development and use of online tools, and have some knowledge of eLearning Instructional Design.

In responding to the EOI, Consultants should highlight their capabilities to conduct the assignment, evidence of similar assignments, and their experience in particular in developing broadband strategies for developing countries. Experience of working in developing regions is essential. Experience of developing toolkit-type materials, or “how-to guides” would be helpful, but not essential, as would experience of having developed training materials and led training courses.

### **4.3 Deliverables**

The main deliverables expected from Consultants, as outlined in section 3 above, are as follows:

- (1) Prepare all draft text content for the online module, outline all Practice Notes to be included, and develop an indicative list of Reference Documents. The Author is expected to draw upon existing work already produced by the Bank as well as drafting/identifying additional materials, as required.
- (2) There will also be several rounds of draft, review, and revision—involving the various parties identified in Section 2—before publication.
- (3) Draft all Practice Notes and include Reference Documents. Revise all draft and final text content for the online module as necessary.

- (4) Finalize module content at all levels, taking into account comments from reviewers under the supervision of the World Bank's internal project team, under the general direction of the task team leaders from *infoDev* and the ICT Sector Unit.
- (5) Develop a plan and schedule for uploading draft and final content for the module to the Broadband Strategies Toolkit online content development website.
- (6) Implement the plan using established format and procedures in consultation with content development website manager. Once the content has been uploaded onto the development website, reviewed, revised, finalized and approved, the module will be migrated by the World Bank's internal project team over to the public Broadband Strategies Toolkit website.
- (7) Working closely with the web development team to produce an initial online version of the module. The Toolkit has been structured according to the five levels outlined in section 3.1 above.

## 5 Timetable and payment schedule

The intention is to prepare, finalize and deliver each module and related materials over a period of approximately nine months. All deliverables will be produced in English. The proposed timetable is put forward to guide the conduct of the assignment:

<b>Contract award plus</b>	<b>Deliverable</b>	<b>Payment schedule (% of total contract amount)</b>
1 month	Inception report, with agreed approach on work plan, module outline, and quality assurance.	+10%
3 months	Delivery of first draft of module, including draft text content for the online module, outline of all Practice Notes to be included, and an indicative list of Reference Documents.	+30%
4 months	Draft content of all Practice Notes and complete list of Reference Documents	
Months 3-6	Progressive improvement of the online version of the Toolkit, adding new and pre-existing material	+30%
6 months	Preparation of materials and conduct of interim review with peer reviewers for quality assurance of the outputs from first phase	
8 months	Final round of reviews to receive final comments on module (and eliminate overlap with other modules).	+30%
9 Months	Delivery and uploading of the final module	

Please note that the payment schedule is indicative and consultant should bill on the basis of days worked and deliverables.

## **Annex A: Extended Table of Contents**

### **Module 5: Technologies to Support Deployment of Broadband Infrastructure**

- 5.1 Introduction
- 5.2 Overview of Broadband Networks
  - 5.2.1 The Broadband Supply Chain
  - 5.2.2 The Transition to All-IP Networks
- 5.3 Basic Technologies for Broadband Connectivity
  - 5.3.1 Fiber Optic
  - 5.3.2 Satellite
  - 5.3.3 Microwave
  - 5.3.4 Copper
- 5.4 International Connectivity
  - 5.4.1 International Links
  - 5.4.2 Internet Links
  - 5.4.3 Implementation Issues for International Connectivity
- 5.5 Domestic Backbone
  - 5.5.1 National Links
  - 5.5.2 Internet Exchanges
  - 5.5.3 Implementation Issues for Domestic Backbone Networks
- 5.6 Metropolitan Connectivity
  - 5.6.1 Regional/Metropolitan Links
  - 5.6.2 Implementation Issues for Metropolitan Connectivity
- 5.7 Local Connectivity
  - 5.7.1 Wireline Access Technologies
  - 5.7.2 Wireless Access Technologies
  - 5.7.3 Implementation Issues for Local Connectivity