

# Dominica: ICT Assessment

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# Dominica: ICT Assessment

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## Abbreviations and Acronyms

ACS	Association of Caribbean States
AID Bank	Agricultural and Industrial Development Bank
ASP	Application Service Provider
BTA	Basic Telecommunications Agreement (WTO)
C&W	Cable and Wireless
CAGR	Compound Annual Growth Rate
CANA	Caribbean News Agency
CANTO	Caribbean Association of National Telecommunications Organizations
CARICOM	Caribbean Community and Common Market
CDB	Caribbean Development Bank
CET	Common External Tariffs (CARICOM)
CIC	Community Information Center
CIDA	Canadian International Development Agency
CLAA	Caribbean Latin American Action
DNET	Dominican National Network
DOC	U.S. Department of Commerce
DOMLEC	Dominican Electricity Services
DOT Force	Digital Opportunity Task Force
EC\$	Eastern Caribbean Dollar
ECCB	Eastern Caribbean Central Bank
EC-ICT	Eastern Caribbean Information Communications Technology Initiative
ECLAC	United Nation's Economic Commission for Latin America and the Caribbean
ECTEL	Eastern Caribbean Telecommunications Regulatory Authority (Dominica, Grenada, St. Kitts/Nevis, St. Lucia, St. Vincent/Grenadines)

EU	European Union
FATF	OECD Financial Action Task Force on Money Laundering
FDI	Foreign Direct Investment
FTAA	Free Trade Area of the Americas
G-8	The Group of Eight
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GNP	Gross National Product
IBC	International Business Company
ICT	Information and Communication Technology
IDD	International Direct Dial
IDP	Integrated Development Plan
IDB	Inter-American Development Bank
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunications Union (UN)
kbps	Kilobits per second
Km	Kilometers
LAN	Local Area Network
mbps	Megabits per second
MOC	Ministry of Communications, Works, and Housing
MOE	Ministry of Education, Sports, and Youth Affairs
MFP	Ministry of Finance and Planning
MHz	Mega (million) Hertz (cycles/second)
NTRC	National Telecommunications Regulatory Commission
OECS	Organization of Eastern Caribbean States
NDC	National Development Corporation
NDFD	National Development Fund of Dominica, Ltd.
NGO	Non-Government Organization
PC	Personal Computer
SME	Small and Medium-Sized Enterprise

TA	Technical Assistance
U.K.	United Kingdom
UNCTAD	United Nations Commission on Trade and Development
UNDP	United Nations Development Program
UPS	Uninterruptible Power Supply
U.S.	United States
USAID	U.S. Agency for International Development
UWI	University of the West Indies
VAT	Value Added Tax
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WB	World Bank
W.I.	West Indies
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

# Dominica: ICT Assessment

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## Management Summary

This Information & Communication Technology (ICT) Assessment was undertaken by Carana Corporation in close coordination with, and in support of, the Organization for Eastern Caribbean States (OECS) and the Eastern Caribbean Telecommunications Regulatory Authority (ECTEL). This work was performed under contract with the U.S. Agency for International Development (USAID) as part of its Eastern Caribbean Information Communications Technology (EC-ICT) initiative.

This Report serves as Phase I of a two-phase effort being coordinated by OECS. Phase II of this effort is being launched in March of 2002 and is being carried out by GOPA (under contract and funding from the World Bank). Whereas this first phase is aimed at compiling and assessing ICT-related information for input and recommendations, GOPA's activities are aimed at developing regional policies and strategies based on this, as well as other input to their initiative. This Phase I will also put forward to USAID considerations for possible future development initiatives as part of their Caribbean Regional Program (CRP).

The ICT Assessment was built around four key areas: (1) **Public Sector**—an examination of Dominican Government's use of ICTs and its ICT policy and supporting legal/regulatory framework, (2) **Pipes**—an examination of the current state of telecommunications infrastructure; (3) **Private Sector**—an assessment of the current state of the ICT industry sector and the private sector's use of ICTs, with a focus on growth opportunities, and (4) **People**—a review of the supporting educational systems within the country.

The ICT Assessment defines a number of key opportunities where targeted initiatives can be undertaken that would yield benefits to Dominica in each of the four areas. In summary, these are:

- **Public Sector**—Dominica does not have a national ICT plan or a legal framework to support the widespread deployment and utilization of ICTs. On a broader note, the Government of Dominica is currently in the middle of developing an Integrated Development Plan (IDP), but is not integrating ICTs into this Plan. With the increased emphasis on leveraging ICTs, this planning process provides an excellent opportunity to refine the IDP to include the utilization of ICTs in a wide range of programmatic areas (e.g., economic development, education, e-government initiatives). In addition, a draft National ICT Strategy paper has been developed by the National Telecommunications Regulatory Commission (NTRC) to help define a national direction for ICTs. The Strategy paper identifies key near-term initiatives that include improving the legal and regulatory framework to support online and e-commerce transactions, gaining transparency in the legal system, automating key internal Government functions to gain efficiencies in the public sector, and moving to provide Governmental services over the Internet (e-government) as access to the Internet expands.

- **Pipes**—This area is already being addressed by market liberalization efforts underway via ECTEL and the NTRC. New licenses are currently being issued that will result in additional investments in the telecommunications sector and, ultimately, will lower prices. Key initiatives put forward in this area of the ICT Assessment focus on ensuring that rural areas with lower density and lower income levels are not overlooked, but are provided Internet access via shared-access centers. In this regard, special emphasis is given to leveraging current youth education efforts and expanding/opening up current facilities for delivery of Government services, including business development support, health-related services, adult education, etc.
- **Private Sector**—The private sector's reliance on ICTs is hampered by high telecommunications costs. This issue will in part be addressed by the liberalization of the telecom market throughout the region. There is the need, however, to help Dominica's small and medium-sized enterprises (SMEs) leverage ICTs beyond their internal administrative and "back office" processes and into their core business processes. In addition, there is the need to utilize ICTs to improve Dominica's competitiveness in regional and international markets. This will require providing internationally-oriented business development support, building a regional Caribbean product/service Web Portal, and developing key upstream warehousing and distribution services in target markets. Opportunities also are present for attracting foreign direct investment (FDI) for ICT-enabled businesses such as call centers, data storage operations, data bank development, "back room" data processing, and systems administration services.
- **People**—While the population of Dominica is literate (an estimated 95 percent), and PCs/Internets are now entering secondary schools, there has not been much of a focus in Dominica (or in the region), in building technical skills to support the growth of ICT usage in the public and private sectors. Although distance learning has great potential in this arena, the communication costs are prohibitive. Again, with the promise of a more liberal telecom environment, this situation is expected to change in the near-term. Current youth programs have already demonstrated success in the ICT arena and are candidates for expansion.

The main body of the ICT Assessment report puts forward recommendations for consideration by OECS. These are constructed to provide direct input into the Phase II initiative being undertaken by GOPA. In addition, a separate set of recommendations has been developed for consideration by USAID. These are preliminary and are published under a separate cover, as their value is for USAID's internal use only and are not available to the general public.

The ICT Assessment Team was comprised of Darrell Owen, Senior ICT Adviser, Carana Corporation, and Jody Westby, President, The Work-it Group. The ICT Assessment Team wishes to especially thank Mr. Sylvester Caddet, Director of Telecommunications, Ministry of Communications and Works, and Head of Dominica's NTRC; George James, Telecoms Engineer, Ministry of Communications and staff to the NTRC; and NTRC support staff Cheryl Tavernier and Royette Henderson. They responded on very short notice and provided exceptional support throughout our ICT Assessment activities. In addition, the team wishes to thank those within the various Government

Ministries, donor organizations, NGOs, and private sector firms who were so generous with their time and patient during the course of our conversations. We trust this combined effort will lead toward meaningful ICT-related action that will bring about substantive improvements throughout the OECS region and Dominica.

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## *I. Background/Context*

This Information and Communication Technology (ICT) Assessment was undertaken by Carana Corporation, under contract to the U.S. Agency for International Development (USAID). The Assessment is part of a larger initiative being undertaken by USAID/Carana in support of the Organization of Eastern Caribbean States (OECS), specifically to provide technical assistance to the Eastern Caribbean Telecommunications Regulatory Authority (ECTEL) and the five National Telecommunications Regulatory Commissions (NTRCs).

In summary, the technical assistance being provided to OECS, ECTEL, and the NTRCs, is primarily oriented toward telecommunications market liberalization in the region. However, this is in support of an even larger purpose--that of seeking to leverage ICTs in support of economic growth within the Eastern Caribbean region.

This ICT Assessment reaches beyond the telecommunications issues; it seeks to gain a broader understanding of the overall utilization of ICTs in Dominica and to analyze supporting educational and governmental considerations. The primary purpose of the Assessment is to identify current constraints to and opportunities for advancing ICTs in the region. The ICT Assessment is being coordinated closely with the OECS Secretariat and is considered Phase I of a two phase initiative. Phase II is a regional policy and strategy initiative being carried out by GOPA through World Bank funding. Thus, this ICT Assessment will serve as a precursor to the follow-on GOPA regional policy and strategy work.

This ICT Assessment for Dominica is the second of five ICT Assessments to be carried out for each of the ECTEL countries in February and March 2002. Combined, these five ICT Assessments will provide direct input into the GOPA initiative that is scheduled from March-June 2002.

In addition to providing support to OECS/ECTEL, this ICT Assessment is being carried out in a manner consistent with USAID's focus on leveraging ICTs in developing and emerging economies. In recent years, USAID's increased attention on using ICTs for international development was reinforced by the G-8 Summit that took place in July 2000 at Okinawa, Japan, and the subsequent adoption of the Digital Opportunity Task Force (DOT Force) Agenda in Genoa, Switzerland in 2001.<sup>1</sup>

In large part, this increased global focus is predicated on the growing awareness of the impact that ICTs have had on the U.S. economy over this past decade. While the "dot-com bubble" has created market uncertainties, for the most part, the market has sorted out the excesses. The actual impact on ICTs has been captured and well documented in a series of annual reports prepared by the

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<sup>1</sup>See DOT Force official Web site at <http://www.dotforce.org/about/>.

U.S. Department of Commerce, culminating with the June 2000 report, *Digital Economy 2000*.<sup>2</sup> A brief summary of this report is reflected in Appendix A.

## ICT Assessment Structure/Approach

This ICT Assessment has been structured in such a manner as to provide not only a basic uniformity among the five ICT Assessments being carried out for ECTEL, but also a level of consistency with similar USAID-funded assessments. As such, it relies on a “4- Ps” template in an effort to capture and categorize information from a wide array of sources and to present it to the reader in a readily digestible format. The four “Ps” are as follows, with a section of this report devoted to each:

- 1) **Public Sector**—This section focuses primarily on (a) Government ICT policy and the supporting legal/regulatory framework and (b) the actual use of ICTs by the Government. The coverage of telecommunications policy is minimal due to parallel ECTEL/NTRC work in this area.
- 2) **Pipes**—The thrust of this section is on telecommunications infrastructure, access, and price. It relies upon a core set of information from the International Telecommunications Union (ITU) Development Indicators reports.
- 3) **Private Sector**—This section examines the state of development of the IT industry sector and the use of ICTs by traditional businesses.
- 4) **People**—This section analyzes the education systems relative to producing students and workers with ICT-related skills.

From a methodology perspective, this ICT Assessment was carried out in two parts: (1) research based on a number of prior ICT-related studies and reports produced over the past 2-3 years by various organizational entities, and (2) a one-week on-the-ground assessment during which time a number of interviews were undertaken with individuals from the public, private, and educational sectors. Naturally, with such an abbreviated approach, this ICT Assessment report will not capture all the details.

In this regard, the ICT Assessment is a survey intended to gather sufficient information across a broad array of ICT-related sectors, but it is not designed to be a comprehensive reporting of details (several others have done an excellent job of this in selected areas). This Assessment intends to support recommendations put forward to OECS and USAID regarding potential areas for future engagement. Its purpose is to be a catalyst, not a catalog.

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<sup>2</sup> *Digital Economy 2000*, U.S. Department of Commerce, <http://www.esa.doc.gov/de2k2.htm>

## Prior ICT-Related Studies

The Bibliography, captured in Appendix C, reflects a number of information sources, including earlier studies, which have been taken into account in carrying out this ICT Assessment. Many of these proved to be invaluable resource materials in preparing this report. One of the most recent, and valuable, reports was undertaken in June-August of 2001 by Alwyn Didar Singh on behalf of the Commonwealth Fund for Technical Cooperation. The report, *A Rainbow Technology for a Rainbow People: E-Business Capacity Development for the CARICOM*,<sup>3</sup> incorporated the Harvard Center for International Development's "Readiness for the Networked World" assessment methodology as part of its analysis.<sup>4</sup> As such, the report reflects a country-by-country review of key ICT-related readiness issues using the Readiness Guide's e-readiness framework of:

- ◆ Infrastructure Framework (Connectivity and Cost)
- ◆ Policy Framework (E-Leadership and Participation)
- ◆ Legal Framework (Security and Privacy)
- ◆ Human Capacity Framework (E-enabled Human Capital)
- ◆ E-Business Environment: Enabling Seamless E-Commerce
- ◆ The International and Regional Framework.

This ICT Assessment in no way seeks to duplicate the excellent efforts of this study, but rather intends to help move an ICT agenda forward in key areas of interest to Dominica, OECS, and USAID.

## The Country of Dominica

Dominica is a small island nation within what are considered the Windward Islands of the Caribbean. The country gained its independence from England on November 3, 1978. The island is 754 square kilometers with a population of 76,000. Dominica's capital city is Roseau, with Portsmouth, Grand Bay, and Marigot being the island's secondary cities. Land use is predominantly forests and woodlands (67%), agriculture-cultivation (13%), arable land (9%), permanent pastures (3%), and other (8%).

The Government is a Parliamentary Democracy, with the President serving as the Chief of State, and the Prime Minister serving as Head of Government. There is a Cabinet that is appointed by the President (on the advice of the Prime Minister). The Legislative Branch consists of a unicameral House of Assembly with 30 seats—9 appointed senators and 21 elected by popular vote (each serving a five-year term). Administratively, Dominica is divided into 10 parishes.

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<sup>3</sup> Alwyn Didar Singh, *A Rainbow Technology for a Rainbow People: E-Business Capacity Development for the CARICOM (draft 15.0.01)*, Report of Diagnostic Mission, Commonwealth Fund for Technical Cooperation, Commonwealth Secretariat, London, June-August 2001 (hereinafter "*Rainbow Report*").

<sup>4</sup> "Readiness for the Networked World," <http://www.readinessguide.org>

Dominica has a Gross Domestic Product (GDP) of approximately US\$165.99 million (2000), with a GDP per capita of US\$2,143. The growth rate has been flat to negative in recent years due to the leveling off and recent decline in tourism and the gradual elimination of banana price supports.

The currency of Dominica is the Eastern Caribbean dollar (EC\$), which has an exchange rate of EC\$2.7 to US\$1. Major trading partners are its neighboring CARICOM countries, the United Kingdom (U.K.), the U.S., the Netherlands, and Germany. The labor force has approximately 33,500 workers. The population is highly literate (estimated at between 85-98%), with English as the dominant language.

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## *I. Public Sector*

A critical component of this ICT Assessment was an evaluation of the Government of Dominica's position relative to ICTs. Specifically, this focused on two key areas:

- 1) The Government's policy and legal/regulatory framework pertaining to the areas that directly and indirectly impact the widespread deployment and utilization of ICTs within Dominica (specifically with regard to telecommunications and e-commerce); and
- 2) The Government's actual use of ICTs to provide e-government services and benefits to citizens and to automate and streamline key Ministries and the functions/activities that they carry out.

### **Summary/Analysis**

#### National Plan

At present, the Government of Dominica has no national plan or strategy for the deployment and utilization of ICTs. It is, however, in the final phase of developing an Integrated Development Plan (IDP) that will set forth a 10-year national plan for Dominica. The first phase of the IDP involved a series of meetings with key stakeholders, including industry, non-governmental organizations (NGOs), and public officials. The input from this collaborative process is being distilled by a committee of experts into a final plan that will be completed in June 2002. The responsibility for development of the IDP rests with the Ministry of Finance and Planning (MFP). A local consulting entity, The Development Institute, chaired by Atherton Martin, is assisting in the process.

The IDP plan is intended to function as the roadmap for guiding the country through major economic change in the "post-preference era" following the end of European Union (EU) subsidies on bananas in 2003. Although the Permanent Secretary of the MFP stated that ICTs are a priority for the country, there is no real incorporation of ICTs into the Integrated Development Plan, primarily due to the lack of ICT expertise within the IDP expert committee working on the plan. The committee indicated that immediate ICT technical assistance to help them factor ICTs into the IDP is highly desired and would be valued. Indeed, the Permanent Secretary hopes the IDP will serve as the foundation for the policy framework critical to the deployment of technology and e-commerce. She considers ICTs a "first action item" for the Government and believes they are essential to Dominica's ability to (a) realize economic growth and attract domestic and foreign investment, and (b) develop more efficient Government operations and provide e-government services to citizens. Although working within a tight timeframe, donor organizations could significantly contribute to the outcome of this important plan by immediately providing some ICT technical assistance (TA) to the IDP expert committee.

Overall, the lack of Government leadership in the ICT arena is apparent. There is no Government ICT "czar" or designated office providing Government commitment and leadership to the deployment and utilization of ICTs in Dominica. Additionally, there appears to be a genuine lack of understanding by senior Government officials regarding the benefits of ICTs. Although the director of the National Telecommunications Regulatory Commission (NTRC) has taken the initiative to draft a National ICT Strategy paper, he does not have the necessary Government resources and authority to further refine and implement it. An inter-Ministerial committee was established by the Ministry of Communications to address ICT issues and coordinate public sector ICT usage, but it lacked sufficient support and quickly became ineffective.

The country is crying for top-level leadership and support for ICTs. It is clear that an Inter-Ministerial Task Force chaired by the Prime Minister and staffed by a key person designated by him would significantly advance the possibility of widespread deployment and utilization of ICTs in Dominica. Such a Task Force, however, should also include selected private sector participants from industry (including multinational corporations), academia, NGOs, and donor organization representatives.

The Diaspora are playing an increasingly important role in Dominica's development. A number of them are currently engaged in various initiatives to advance ICTs in Dominica. For example, one Diaspora has obtained the commitment of Cisco to establish an Academy in Dominica and has worked through all the logistical details. The only remaining action to be taken involves the approval of the Ministry of Education, Sports and Youth Affairs (MOE). Funding was not required. Despite repeated attempts by this highly experienced Diaspora, the Minister has yet to sign the document that has been in his office for over a year. During this ICT Assessment, Cisco was again contacted by this Diaspora and indicated their continuing interest in the project. This lack of action by the MOE is especially troubling because it better understands ICTs than other Ministries and has developed a five-year (2000-2006) comprehensive plan for utilizing technology to educate students and more efficiently perform its own operations.

### Legal and Regulatory Framework

There is essentially no legal or regulatory framework to support the use of ICTs. There are no laws pertaining to electronic transactions, electronic signatures and certificate authorities, cybercrime, protection of data, economic espionage, consumer protection, personal privacy, online activities, or e-procurement. Intellectual property laws are on the books, but only the copyright law is in the process of being updated. Without question, the lack of an adequate legal framework will inhibit the use of technology and will certainly deter foreign direct investment (FDI) for call centers, "back room" data processing, data bank development and data storage operations. Due to the upcoming Doha GATT round and recent focus on e-commerce in the Free Trade Agreement of the Americas (FTAA) countries, it is imperative that any legal initiatives be undertaken in a manner consistent with the global developing legal framework for ICTs.

The International Business Companies Act (IBC Act) actually deters foreign investment rather than attracts it due to its high registration and annual fee requirements. The Act provides a company with exemption from "the payment of taxes, duties, and similar charges for a period of twenty years from the date of incorporation."<sup>5</sup> The initial registration fee is \$90, but before a company can begin operations it must (a) submit an application to the International Business Unit, (b) sign an agreement with the Government of Dominica, (c) undertake to contribute to an environmental, health, or educational project, and (d) pay *additional* registration fee of US\$10,000 (US\$15,000 for online gaming or gambling companies) and annual fees amounting to US\$50,000 or 5% of gross revenues.<sup>6</sup>

The overall legal and regulatory framework, however, for conducting business is generally favorable. There are no extremely burdensome licensing and administrative requirements and the tax structure is reasonable. Tax concessions are freely given to foreign and domestic investors upon request. Small businesses get no regulatory breaks, but the enactment of bankruptcy laws would help promote small and medium-sized enterprise (SME) development. Presently, there are no bankruptcy laws, and debts are carried until they are either paid or written off by the lending institution. Even countries with stringent bankruptcy laws have found that overly strict rules hinder entrepreneurship and innovation; having no avenue to start over presents all businesses with a daunting barrier.

Getting new laws is not easy. The Ministry of Legal Affairs has only two legal draftsmen. Thus, many laws get drafted by outside stakeholders or other Ministry personnel and are enacted without the benefit of comments and input by stakeholders. There is no required transparency of legislative and regulatory processes. Draft bills are occasionally dispersed to selected entities or individuals for comment, but there is no central point for the public to view proposed laws and regulations or to submit comments.

The Dominican statutes were last published in 1990, with annual supplements covering amendments and new laws. A Consolidated Index of Statutes and Subsidiary Legislation is prepared for several Caribbean countries, including Dominica, by the faculty of the law library of the University of the West Indies through funding by USAID. The country indices are available, however, only in hard copy upon payment of the required fee – this applies even to the governments that provide the data for the indices. An online capability to access the indices for all countries and view their statutes would significantly boost all legal systems in the region and encourage harmonization of laws.

### Ministry of Communications and NTRC

The National Telecommunications Regulatory Commission (NTRC) is under the Ministry of Communications, Works and Housing, although it maintains separate offices away from the Ministry. It is responsible for the implementation of the newly enacted Telecommunications Act and the licensing

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<sup>5</sup> Section 109(1) of International Business Companies Act. *See also* Henderson B. Holmes, *Situational Analysis on the Information Technology Sub-Sector and Matters Related Thereto in the Commonwealth of Dominica*, National Development Corporation of Dominica, Aug. 2000 at 27 (hereinafter "Holmes Report").

<sup>6</sup> Holmes Report at 28.

and regulation of communications providers. Although newly established, it is working hard to advance ICTs in Dominica. It is clear, however, that additional technical assistance and training would strengthen the agency's operations. Specifically, training for administrative and support personnel would foster a better understanding of NTRC functions, instill professionalism within the NTRC, and enhance communications with the private sector. Relations and communications with ECTEL and OECS also need to be strengthened.

A few areas of the newly enacted Telecommunications Act have already been identified as problematic. One involves confusion over the treatment of customer premise equipment and whether it applies to home or office connections. The other concerns single site international resale. The process for clarification or modification of the Act also seems uncertain. The resale issue is especially difficult for competitors because it requires an individual license instead of a class license. Additional concerns exist over the licensing requirement for Internet Service Providers (ISPs). Unlike the legal frameworks of most industrialized nations, ISPs must apply for and receive a class license from NTRC before establishing operations. This also encompasses Internet cafes and injects an unnecessary obstruction to the widespread deployment and utilization of ICTs.

Domain name issuance was clearly identified as a significant barrier to the advancement of e-commerce in Dominica. A private contractor was granted exclusive rights to the issuance of domain names, including top-level names. An interview with this contractor was not possible, but it was clear through numerous interviews with both public and private sector entities that there were serious problems with the issuance of domain names. Requests for domain names are simply not being processed, thus local merchants desiring to establish a Web site or e-mail address with a .dm suffix are unable to do so. The issuance of root domain names is a function that should rest with the Government.<sup>7</sup> The NTRC would be a likely entity to handle this. Then, pursuant to a competitive process, multiple contracts could be awarded for simple domain name issuance. This would foster a competitive environment, assure satisfactory service, and provide an income stream to the Government.

### Government Use of ICTs

The only e-government application planned for the immediate future is NTRC's intention to make telecommunications licensing forms and corresponding instructions available online. For the most part, a few PCs are sprinkled around Government offices, with little or no networking. They are used primarily for word processing and spreadsheet work.

Government use of ICTs is hindered across the board due to lack of funding, space, hardware, and software requirements. The Court Registry of the Ministry of Legal Affairs, Immigration and Labour is currently involved in a project to put court documents online. Although the hardware was provided through OECS funding, each government must purchase the various software modules. At present, Dominica only has civil filings for 2001-2002 online. They have not, however, been able to

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<sup>7</sup> A recent report on e-business in the CARICOM region noted, "All Caribbean countries should ensure that their domain registry is nationally owned and managed in a transparent manner." *Rainbow Report* at 20.

reimburse the OECS Court of Appeals for the cost of the software (EC\$60,000). Included in this software is a module for probate records, but the Court Registry does not have the necessary system hardware to use it. The only corporate registrations that are online are those for International Business Companies (IBCs). No laws, regulations, legal indices, or proposed legislation or rules are online. The courts are currently operating under the cumbersome system of judges recording the proceedings by hand, causing delays and backlogs in the court system. The court registrar has obtained transcription equipment and software and trained two court reporters, and has plans to train two more. The implementation of this system was held up due to the perceived lack of office space for transcription. This problem has recently been corrected.

The Ministry of Education, Sports and Youth Affairs (MOE) is the most advanced in the utilization of ICTs. It plans to (a) network the country's three colleges, secondary and primary schools, (b) integrate ICTs into the curricula, and (c) utilize ICTs extensively in its internal operations. The Youth Development Division of MOE has established five centers in Dominica for youth training. Two more are planned, with one partially completed. The Ministry's Education Planning Unit worked with IBM over the course of the past year to develop a plan for networking the secondary schools. The plan has not been implemented, however, due to lack of funding. There is approximately US\$12 million available through OECS funds and a World Bank loan for wiring and networking the schools. Other funding, however, for training, hardware, and software has not been secured. The Ministry has been training teachers in the use of ICTs and how to service and maintain them as part of an effort to create an "ownership environment." The Ministry is considering training students in this area. As in Grenada, however, the Ministry only has one professional person on staff responsible for system and hardware maintenance. Therefore, at any one time several PCs are inoperable.

The Dominica Agricultural Industrial Development Bank (AID Bank) is probably the next most active proponent of ICTs. The AID Bank has a Microsoft Certified Systems Engineer on its staff as Technical Services Coordinator who has developed a Loan Management Portfolio Software package (Dpac) that is being utilized by its clients and other development banks. The AID Bank created a subsidiary, Financial Data Systems, Ltd., to upgrade, distribute and license this software to other development banks regionally and globally. This is a worthy project capable of bringing regional leadership to Dominica and advancing development bank activity in the region.

The Post Office, which is a separate Governmental entity located within the Ministry of Communications, Works and Housing, has not been corporatized. None of the 29 postal agencies or 35 post offices has been automated. Although the General Post Office's 2000-2001 Corporate Plan listed "Introduce and offer e-mail and other internet services," as a priority for the Postal Department, at present, there is only one computer in the entire postal operations. The Postmaster General is quite supportive of ICTs and has endeavored to obtain the technology necessary to participate in the international Express Mail Service. However, she has been unable to receive the necessary funding. All postal revenues are remitted to the general Ministry fund and little or no monies have been allocated for any ICT purchases or initiatives.

The Ministry of Health has developed an IT plan for the country's main hospital, even though it was built a few years ago void of any cabling for utilizing technology. Today, the Ministry recognizes the need for broad usage of ICTs throughout public health services, and its IT plan calls for applications to handle medical records, accounting, patient admission/discharge, and pharmacy functions. Public health officials urgently need a health "surveillance" system to help detect and report on epidemiological outbreaks, such as dengue fever, and develop databases. They would also like to use technology for public education on health issues, such as diabetes and AIDS/HIV prevention and care. Implementation of these plans will be costly. At present, the Ministry has seven health districts, each with a PC at its main "Type 3" clinic (staffed with a physician), but they are not connected to the Internet. There are a total of 51 clinics and two cottage hospitals in addition to the main hospital in Roseau.

The National Development Corporation (NDC) is charged with attracting domestic and foreign investment. Although NDC received numerous inquiries in 1998-1999 regarding potential ICT operations, today inquiries are flat and there are no active ICT marketing efforts. NDC assistance is based upon the number of rooms a business requires. The floor for foreign companies is 10 rooms, while local companies only have a 5-room requirement. NDC has an office in New York, but it has no ICT expertise or ongoing marketing activities. NDC has a relatively weak Web site that offers only very basic information. There is very little use of ICTs in NDC's operations and, overall, NDC appears to be ineffective.

### **Identified Areas for Further Pursuit**

The above reflects a scattered commitment on the part of the Government of Dominica to leverage ICTs to bring about improvements in the public, private, and social sectors in Dominica. The following represents a few priority "Public Sector" issues where additional attention is warranted:

- A. National IDP Planning Support**—At present, there is a growing level of awareness within the Government for the need to place increased focus on ICTs. An effort is currently underway to develop an Integrated Development Plan (IDP), with the effort just having completed a stakeholders' focus as Phase I, and is now moving into Phase II, which will actually develop the Plan. There is the need to support this effort with ICT technical assistance to the expert committee preparing the plan, as there are few resources within the country to draw upon. This process will be running until June 2002, so the timing is urgent. The target result is to ensure the national ICT focus is captured in this IDP plan to enable subsequent planning by the Ministries, agencies, etc., to build upon the IDP direction with the inclusion of ICTs. If funding is not provided prior to the IDP plan being completed, a follow-on effort could amend it to factor in the utilization of ICTs.
- B. National ICT Plan and Strategy**--The Government needs to work with the private sector to develop a national ICT plan and strategy that can serve as a guidepost for various ICT efforts across the public and private sectors. This likely requires pulling together a crosscutting Working Group consisting of senior level representatives from various Government Ministries, private industry (including multinational corporations), NGOs, and

the donor community. The draft National ICT Strategy recently developed by the NTRC offers a good starting point. This need is not inconsistent with what was found in Grenada (although they are further along) and raises the potential for a regional initiative to support the ECTEL countries in their similar efforts.

- C. ICT Training for senior Government Officials**—There is the need to develop and undertake a comprehensive series of management seminars aimed at educating the mid-to-high level Government officials on ICT-related issues. Leadership by and within the Government is essential to the widespread deployment and utilization of ICTs. Whereas the ICT Planning would chart the course, there is the complementary need to ensure that those in charge are embracing ICTs and their use in their respective Ministries and departments on a daily basis. Ultimately, this would likely lead to the development of a Chief Information Officer (CIO) function being established in the Prime Minister’s office, and supported with similar CIO functions established in each Ministry—not unlike the CIO Council model in the U.S.<sup>8</sup> Collectively, this Inter-Ministerial CIO Council would guide the public sector’s ICT direction, not only internally within their respective Ministries, but also with respect to delivery of services and benefits to citizens (e.g., delivering health care, growing the private sector, delivering educational services, etc.). In addition, it would form the basis for determining how the Government will plan for and provide ongoing ICT support for its own operations (at present there is no central organization to do this). Here again, the need for this education is likely to be needed across the region and would be most effectively provided through a regional program.
- D. E-Business Legal and Regulatory Reform**—Consistent with other ICT Assessments, one of the key missing ingredients is the need to develop the legal infrastructure to support e-commerce/e-business in Dominica. At present, there are no such provisions that adequately address the issues of privacy, encryption, cyber crime, electronic transactions, authentication/certification, rules of evidence pertaining to electronic records, etc. The development of the legal/regulatory framework needs to be in harmony with the developing global ICT legal framework since Dominica is well positioned for servicing international operations. Ideally, e-business laws should be developed in a collaborative regional initiative in much the same manner as was undertaken for telecommunications via ECTEL and the country NTRCs, where model laws/provisions are drafted for the region (perhaps at the OECS level), with each country then localizing them to the degree needed to meet their country’s legal structure.
- E. Transparency and Access to Legislative Bills, Laws, and Regulations**—There is the need to augment the University of West Indies Law School annual indexes of laws and regulations by (a) leveraging ICTs to develop a Web site to post country indexes and pending legislation and regulations, and (b) possibly make full texts of laws electronically available throughout the region. Draft legislation, orders, and regulations are now prepared using word processing and are submitted to the UWI electronically. Expanding these services via a regional Web site, placing the materials on this Web site, and enabling a full-

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<sup>8</sup> See U.S. Government’s CIO Council Web site at <http://www.cio.gov>.

search index would be an important value-added service to the countries themselves, their respective judicial systems, to local attorneys and businesses, and to the private sector seeking to become engaged in the region.

**F. Targeted ICT Government Initiatives**—There are several areas where the specific application of ICTs in Government operations could have a significant and wide-based impact. These are quite consistent with the findings of parallel Assessments, indicating the need is common among the ECTEL countries.

One area needing immediate attention is the Government's various registry functions. At present, a variety of efforts are already underway in the Court Registry's office. Considerable efficiencies would be realized through automated processes for recording births, land deeds, business/commercial registrations, and court administration and case management.

Another key area needing ICT support is in the area of public health services, including administrative services, hospital operations, and the delivery of health care to those living in the rural areas. Specific areas needing attention include:

- Hospital financial/accounting systems. At present, the hospital lacks the ability to effectively bill and collect accounts. Financial and accounting systems would immediately enable the Government to generate additional income through more efficient billing.
- Patient records. Dominica, as with other islands in the region, operates on a "patient-held" record system, i.e., the patient is given his/her record upon leaving a medical facility. Such records are not automated and copies are not retained by the public health entities. Therefore, patient records are frequently lost or not available throughout Dominica's health care system, which includes a central hospital, two cottage hospitals, seven health centers ("Type 3" with doctors), and 51 clinics around the island.
- Health "surveillance" or disease incident collection/reporting. Whether it is HIV/AIDS, Dengue Fever, or other communicable diseases, there is no public health system to collect, monitor, and assess this type of health information for purposes of prevention, education, or improved treatment.

With the increasing use of the Internet, including the planned expansion of telecenters in the rural areas, there is the opportunity to move key Government services online via an e-government initiative. Any effort in this arena, however, would have to first look at making improvements within the Government, as automation is limited and there is no central architecture that would enable the use of central "Intranet" services such as a common e-mail system, document sharing, etc.

**G. Regional Videoconference Centers**—During the course of this ICT Assessment, one of the observed themes has been the focus within Dominica to work closely with the other OECS/ECTEL countries in coordinating their efforts. This requires numerous trips by key Government officials to sessions held around the islands on various topics. Naturally, cost

restricts the numbers of those attending these sessions. One potential use of ICTs that would have direct support for improving the regional interaction between the island governments and their personnel is the establishment of video conferencing facilities in each country. This would allow for more frequent exchanges, increased participation, and potentially lower costs. Use of this technology would not eliminate conferences, but would allow more to participate—thus improving the dialog. If done properly, the facilities could also be used by the private sector for fees. They could also support educational initiatives and be linked directly with similar capabilities already available at the World Bank and other support institutions.

One of the underlying components increasingly recognized as critical to the development of any nation is the communications infrastructure. In recent years, this has become even more important as globalization expands and nations increasingly rely upon ICTs to participate in the global marketplace (e.g., e-commerce and e-business).

This section of the ICT Assessment examined the in-country communications environment from several perspectives and levels, including:

- 1) Summary/findings of the communications infrastructure in Dominica, and
- 2) Key observations from 1999 International Telecommunications Union (ITU) data.

### Summary/Findings

#### Current Situation

Dominica enjoys a well-developed communications infrastructure, with a considerable amount of fiber optic spread across the island, including fiber and cable access into rural and underserved areas. There remain, however, some areas without connectivity or access to desired services.

Cable & Wireless (Dominica) Ltd. (C&W) is the primary communications provider. Unlike other Caribbean islands, Dominica has allowed three competitors into the communications market. Marpin Telecommunications and Broadcasting Co. Ltd. is the second largest provider, offering cable TV, cable modem Internet service, local and international cable telephone service, dedicated leased lines/circuits (T1/E1), Frame Relay, and Digital Subscriber Lines (DSL). SAT Communications and Carabiss are the other new entrants. Each offers multiple communication services, largely to customers in areas that were either not serviced or under serviced by C&W.

Marpin has aggressively competed against C&W and is responsible for significant decreases in the cost of Internet access and telephony. According to July 2001 information, weekday telephone and fax rates for international direct dial calls to the U.S. and Canada were US\$1.20 per minute for C&W and US\$0.75 per minute for Marpin. Business leased circuit access at 256 kbps cost US\$5,221.03 monthly for C&W while dedicated access to DSL 256 kbps cost US\$170 monthly from Marpin. Marpin also was the first provider to offer unlimited Internet access for US\$28.09 (less US\$9.37 for

telephone allowance), compared to C&W's cost of US\$16.56 for the first 20 hours, and US\$33.13 for 60 hours, with charges of US\$1.00 to \$1.50 thereafter.<sup>9</sup>

Current entrants have reapplied for licenses under the new Telecommunications Act. Confusion and uncertainty reigns, however, regarding the licensing process and whether current providers will be able to continue offering the same range of services to their customers. This situation must be addressed quickly lest the country risk the confidence of these new entrants and other potential investors. There appears to be a lack of communication between NTRC and the private sector, in part due to the fact that they are newly established and have not implemented their administrative procedures and adequately trained their staff. They have asked for technical assistance to improve this situation.

Another troubling situation involves efforts by a group of Diaspora to help the Government of Dominica build and operate its own network, the Dominican National Network, or DNET. A feasibility study for the network is underway and funded by the Canadian International Development Agency (CIDA). The network may be made available to other users, which would essentially make the Government a provider. The intention is to lower costs of communication for the Government. This is contrary to the goals of liberalization, however, and should be achieved through the licensing of new entrants and the regulation of a fair and level playing field, not through the construction of another national network that would deter other private sector investors from investing in the Dominican market.

#### ITU Telecommunications Information - 1999 Statistics

Each year the International Telecommunications Union (ITU) publishes a *World Telecommunications Development Report (Development Indicators Report)*<sup>10</sup> that provides statistical data for all countries. Its most recent comprehensive report, issued in March 2001, included an expanded set of data that, for the first time, included data on mobile cellular. In addition to this worldwide report, the ITU periodically publishes regional-specific reports with more detailed discussions on a given geographical region. In April 2000, an *Americas Telecommunications Indicators 2000* report was published that provided useful data for this Assessment.<sup>11</sup>

The ITU-compiled data provides a rich resource that is helpful in understanding the dynamics taking place in telecommunications. While there are several acknowledged weaknesses in the reports (such as timing, accuracy, and incompleteness), they still remain the best set of normalized data from which trends can be identified and macro-level regional/country comparisons made.

For purposes of this ICT Assessment, selective 1999 data (the most recent available from the ITU) has been extracted from the 2000-2001 *Development Indicators Report* for the ECTEL countries, plus a few other Caribbean islands (Barbados, Jamaica, and Trinidad/Tobago). Combined,

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<sup>9</sup> *Dominica Investment Information Checklist*, Dominica National Development Corporation, July 12, 2001 at 6-7.

<sup>10</sup> *World Telecommunications Development Report 2000-2001-- World Telecommunications Indicators*, ITU, Geneva, March 2001.

<sup>11</sup> *Americas Telecommunications Indicators 2000*, ITU, Geneva, April 2000.

this data provides a basis for grasping the current telecommunications situation in the ECTEL countries, including Dominica.

The following key observations were derived from reviewing and analyzing these sets of data. For actual data from which these were prepared are contained in Appendix B of this report.

### Basic Indicators

- The populations of the ECTEL islands are small (typically less than 100,000), but relatively concentrated (with between 100 to nearly 300 people per square kilometer, due to the small size of the islands); Dominica has 102 people per square kilometer.
- The economies of the ECTEL islands are relatively small (between US\$300-600 million annual GDP), but on a per capita basis, they are relatively high (between US\$2,400-6,000 per capita GDP), placing most ECTEL countries in what is considered the Upper-Middle income band). Dominica's GDP is US\$300 million with US\$3,391 GDP per capita.
- Relative to the world average for Upper-Middle income countries, the ECTEL countries have a higher than average teledensity (ranging from 28-52 whereas the average is 20). St. Vincent/Grenadines is a Lower-Middle income country, but here too, it is above the average of similar countries (teledensity of 21 versus an average of 12).

### Main Telephone Lines

- With the exception of St. Kitts/Nevis and St. Lucia, the growth in main lines and teledensity between 1995 and 1999 is less than the world averages for similar income level countries. Dominica's compound annual growth rate (CAGR) was 4.6 compared to 9.1 for Upper-Middle income countries.

### Local Telephone Network

- Used switching capacity across all ECTEL countries is 61-83 percent; the world average is 81.4 percent and the average for Upper-Middle income countries is 84.4 percent. Dominica and St. Vincent/Grenadines fall significantly below this rate, with only about 61 percent of switching capacity used.
- All the switching capacity for the main telephone lines is 100 percent automatic and digital.
- The percentage of main telephone lines that are residential is higher than countries with comparable income levels (76-85 percent versus an average of 75 percent for Upper-Middle income countries). Eighty-five percent of Dominica's lines are residential.
- While the data is not available for all ECTEL countries, the faults per 100 main lines appears significantly less than other Lower-Middle and Upper-Middle income countries (no doubt due in part to the digital switching and a more concentrated user base). Dominica has 9 faults per 100 main lines per year, compared to an average of 19.8 for Upper-Middle income countries.

### Teleaccessibility

- The percentage of households with phones throughout the ECTEL countries is considerably higher than the world averages for the Lower-Middle and Upper-Middle income countries (70->100 percent compared to 38-58 percent; Dominica has 77.5 percent residential main lines per 100 households).
- The ECTEL countries' use of public telephones per 1000 inhabitants is quite close to the world average for their respective income level, however, as a percentage of main telephone lines, they are somewhat lower than the world average (likely due to the high level of phone lines that exist in households). Dominica has 4.20 public telephones per 1000 inhabitants, which is close to the Upper-Middle income average of 4.22.

### Largest City Main Lines

- With the exceptions of Dominica and St. Vincent/Grenadines, the percentage of the population of the ECTEL countries living in the largest city is considerably higher than comparable income level countries, but likely consistent with small island nations.
- Teledensity of the largest ECTEL cities appears to be quite high (53-82 compared to 28 for Upper-Middle income countries) but, again, this is likely due to the nature of island nations. However, some data is missing for several of the islands. Dominica's largest city teledensity is 82.22 compared to an average of 27.87 for Upper-Middle income countries.
- There is a significant disparity between the teledensity of the largest city and the rest of the country (e.g., for Dominica, the largest city which contains only 13.5 percent of country's population has a teledensity of 82.22, whereas the rest of the country has a teledensity of 17.37). This is an extreme situation, but reflects the disparity, even though in most cases this is not as exaggerated.

### Telephone Tariffs

- Connection rates for linking up telephone service are typically less in ECTEL countries than in countries with similar income levels (for both residential and businesses). For Dominica, the connection costs for residential and businesses are US\$20, compared to Upper-Middle income averages of US\$82 for residential and US\$129 for business connections.
- Monthly subscription costs for Dominica were the lowest of Upper-Middle income countries (for residential, US\$2.70 compared to the average US\$8.10; and for business, US\$7.50 compared to the average US\$15.60). It should be noted that this is 1999 data, and rates have since been reduced due to competition in Dominica's communications market.
- Dominica's and St. Kitts's Telephone Tariffs as a percentage of GDP are the lowest of all the listed Caribbean islands (1.0 and 0.6 percent respectively, compared to the average of 1.8 for all Upper-Middle income countries).

### Cellular Subscribers

- Cellular/Mobile data for ECTEL countries is sketchy and, therefore, its use is limited in drawing conclusions.

- It is clear that the entry of Cellular/Mobil has been late in coming to the ECTEL countries, and that, across the board, the growth rate between 1995 and 1999 has been considerably less than the growth in countries of similar income levels (24-60 percent on a very small base, whereas the average growth rate for the Upper-Middle income level is nearly 85 percent for this same period).
- Teledensity of Cellular/Mobile as of 1999 is considerably less than countries with comparable income levels (teledensity of Cellular/Mobil of ECTEL being between 1 and 2 whereas the average for Lower-Middle is over 2, and for Upper-Middle income countries it is over 13). Dominica's teledensity of Cellular/Mobile is .86.
- Cellular/Mobile as a percentage of the total teledensity is considerably less than averages for comparable countries (3-6.5 percent compared to 16-40 percent). This is due to a late start, but also likely influenced to some degree by the relatively high main line telephone teledensity. The total teledensity for Cellular/Mobile subscribers in Dominica is 3.1 percent.

#### International Telephone Traffic

- The outgoing international traffic from the ECTEL islands on a per inhabitant basis is completely “off the charts” relative to comparable income level countries (88-333 minutes per inhabitant for ECTEL countries compared to an average for Upper-Middle income countries of 16). Dominica's outgoing international minutes per inhabitant is 94.8.
- On a per subscriber basis, this comparison is equally significant (333-652 minutes compared to 79 for Upper-Middle income countries). Dominica has 340.1 outgoing international minutes per subscriber.
- These disparities are most likely due to the nature of a tourist-based economy, but are also likely to be partially due to island Diaspora and students living in the U.S., U.K., and Canada.
- The extremely high outgoing international traffic is a real “cash cow” for the incumbent telecommunications provider and emphasizes the importance of resolving the single international reseller issue. This issue will require serious attention during market liberalization.

#### Telecommunications Staff

- Across the ECTEL countries, it is quite clear that between 1995 to 1999, the current telecommunications provider (C&W) has been undergoing cost-reduction efforts, including dropping staff (0.3 – 7.2 reduction in staffing for this period).
- The number of main lines per telecommunications employee has naturally grown over this same period, but for the Upper-Middle income countries, ECTEL countries are still considerably below the world averages (107-130 lines per employee compared to an average of 179 for Upper-Middle income countries and a world average of 154). For St. Vincent/Grenadines, the comparison is favorable (142 compared to an average for Lower-Middle income countries of 92). Dominica has 130 main lines per employee.

#### Telecommunications Revenue

- While information is sketchy for the ECTEL countries, on a per inhabitant basis, telecommunications revenue is considerably higher than the average for similar income countries (US\$219 compared to

US\$31 for Lower-Middle income countries and US\$175-713 compared to US\$146 for Upper-Middle income countries). Dominica has US\$175 telecommunications revenue per inhabitant.

- There is also considerably higher revenue for the ECTEL countries on a per line basis as well as on a per employee basis (US\$628-1,512 compared to US\$733 for Upper-Middle income countries and US\$256 for Lower-Middle income countries). Dominica has US\$628 telecommunications revenue per main line.
- Telecommunications revenue as a percentage of GDP is also very high for the ECTEL countries (5.1-10.4 percent compared to an average of 2.1 percent for Lower-Middle and 2.9 percent for Upper-Middle income countries). In Dominica, telecommunications revenue accounts for 5.1% of GDP.

#### Telecommunications Investment

- The ITU report does not provide sufficient information on the ECTEL countries to detect much in the way of telecommunications investments other than to say it appears to be within the averages relative to population, but lower than average relative to telecommunications revenue.

#### Information Technology

- Overall, the number of Internet hosts in the ECTEL countries is considerably below the averages for similar income countries. Dominica, while still under the average, is at least close (excluding Dominica, the range is .3-2 hosts per 10,000 population whereas the average for Upper-Middle income countries is 37; Dominica is 24).
- The number of Internet users in 1999 is very low, with 2,000-3,000 per country. The number of Internet users per 10,000 population ranges between 195-516 in ECTEL countries compared to the average for Upper-Middle income countries of 461; Dominica has 261 users per 10,000 population.
- There is a high percentage of PCs per 100 population for ECTEL countries compared to other countries of similar income levels (6.5-15.5 per 100 compared to 2.6 for Lower-Middle and 5.8 for Upper-Middle income countries). Dominica has 6.54 PCs per 100 population.
- The relatively high availability of PCs and the comparatively low use of the Internet is likely a direct result of limited access and costs (but mostly costs, since there are a high number of main lines per household across the ECTEL countries).

#### Network Growth

- Growth in the number of main lines taking place between 1998-1999 in the ECTEL countries is close to the averages for similar income countries, with Dominica and Grenada being slightly less (Dominica's compound annual growth rate (CAGR) is 6.3 and Grenada's is 7.1); the average for Upper-Middle income countries is 9.4.
- With the exception of St. Vincent/Grenadines, the growth in Cellular/Mobile for ECTEL countries is well below the growth rates for countries with comparable income levels (43-60 percent compared to 85 percent for Upper-Middle income countries; St. Vincent/Grenadines had an 89 percent

growth in 1999 and Grenada had a 42.7 percent growth rate). Dominica's growth rate was not available.

- Growth in Internet hosts throughout the ECTEL countries is also well below comparable averages, but data is insufficient to make any additional observations.

### **Identified Areas for Further Pursuit**

The foregoing paints a picture of “Pipes” that is on the verge of significant dynamics due to near-term telecommunications market liberalization, which will have a profound impact over the next few months and extending for several years. The following, however, are a few isolated “Pipes” issues where additional attention is warranted now:

**A. Rural Access**—As Dominica pursues a liberalized telecommunications market, it is important to address the “digital divide” issue within country. Simply put, in remote, low-density, and low income areas of the island, even a liberalized market may not be adequate. Ultimately, universal service provisions will establish a form of cross subsidization for providing access to those living in these areas. However, regardless of the funding source, there is the need for initiatives that get underway early to ensure that as the market matures in richer areas, there are not populations in less attractive areas of the island, left behind.

At present, there are a few rural ICT centers. The most significant of these are the five Youth Enterprise Centers that are equipped with PCs and provide training in ICTs, specifically to out-of-school youth. These Centers have between 12-15 PCs each, but are not networked or connected to the Internet (with one or two exceptions). Plans to add two Centers with PCs are on hold due to lack of funding. Other plans call for opening all of these Centers in the after-hours to the community on a fee-for-access basis. Donor assistance with the Youth Enterprise Centers could have an immediate, direct impact.

A similar opportunity exists for providing community access via the PC labs within the secondary schools. These currently exist in five of the 15 secondary schools, but just one or two of the labs have progressed to the point where they are open to the public after school hours. Here again, support in this area could advance ICT training for the youth of Dominica while at the same time provide community access for a wide variety of purposes (e.g., health care information, SME development, adult education, etc.)

**B. Shared Distance Education Facility**—Dominica, like many of the Eastern Caribbean islands, has a non-campus University of West Indies (UWI) distance education program. This is currently limited to two-way voice, due in large part to costs. Two areas of expansion are needed to advance ICTs in Dominica: (1) expand the courses to include ICT-specific courses and programs (e.g., UWI's computer science degree), and (2) upgrade the delivery of course content from audio to video (now possible via more liberalized market and lower costs). If done well, this expanded access could enable Dominica to tap into a broad-array of North American university distance education courses. This would have the distinct advantage of allowing students to remain in the

Caribbean while lowering their cost of education and minimizing the chances they will go to school in the U.S. and not return to contribute to the local economy. This video capability could be collapsed into the public sector recommendation of establishing a video conferencing capability within Dominica.

# Dominica: ICT Assessment

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## ***III. Private Sector***

Ultimately, it is the private sector that must generate the business activity that establishes and maintains economic growth and improves the living standards of the citizens. This third area of the ICT Assessment focuses on two key areas relative to leveraging ICTs in Dominica:

- 1) Determining the strength and potential of the ICT-related sector in domestic and international markets; and
- 2) The utilization of ICTs by the local business community in an effort to improve the productivity and efficiency of their operations and, where appropriate, to potentially become more competitive in the regional and global marketplace.

### **Summary/Analysis**

#### National Economy & Private Sector Industries

Overall, the economy in Dominica is suffering from the downturn in tourism and the diminishing banana subsidies. There seems to be broad acceptance that the country is in for a decade of economic reform that will require refinement and development of industry sectors. Any definition of what that means, however, is missing. While the Government planners talk about a “post-preference era,” they struggle to understand what shape it will take. Certainly, eco-tourism, organic agriculture, the fishing industry, and micro specialty products, such as Dominican coffee, are potential candidates. The Japanese have already made investments in commercial fish processing facilities, and the highly desired tuna, dolphin, and king fish caught in the Caribbean have North American, European and Japanese markets. The island support for Japanese whaling, however, could undercut efforts to boost eco-tourism. Both the public and private sectors recognize they need expert technical assistance to sort through these issues, identify industry sector potential, develop competitive strategies, and target foreign direct investment (FDI).

The decline in FDI has clearly impacted domestic private sector growth and has contributed to rising unemployment. Although several online gaming companies are located in Dominica, they have a negligible impact on the national economy, account for only a small portion of Government revenues, and enjoy little support from Dominican citizens. Attracting FDI in targeted industries should become a national priority.

Although the legal framework is generally favorable, businesses have an uphill climb in other areas. Communication costs remain the single largest barrier to widespread business use of technology. Shipping costs are another common complaint, although one local entrepreneur has begun a bundling

service for businesses' small shipments. Banks are reluctant to open business accounts<sup>12</sup> or merchant accounts for credit card transactions out of fear of "charge-backs,"<sup>13</sup> interest rates are high (even from development banks), and venture and equity capital are difficult to obtain. Small businesses have some support from public and private institutions, but it is minimal, and there is very little training or information available to SMEs on the use of ICTs in business operations. One private, non-profit organization, the National Development Foundation of Dominica (NDFD), is interested in functioning as a small application service provider (ASP) by providing small businesses access to business software applications through their Web site. The pressing Government debt load and current financial crisis may also have repercussions on the private sector in the form of cutbacks on tax concessions that are now freely handed out to both domestic and foreign companies, the possible imposition of value-added taxes (VAT), or other tax increases on certain goods or income.

The lack of communication between the OECS islands is a common theme. As one local attorney noted, "I turn on my TV and get all kinds of information about what is going on the States. I know more about Ohio than my neighboring islands."<sup>14</sup> Part of this is due to the lack of uplink capabilities on the islands. A shared public/private video uplink and conferencing facility would greatly facilitate inter-island communications, information exchanges, and trade.

### ICTs and the Private Sector

Although there is no established ICT industry sector per se in Dominica, there is an active private sector in communications, ICT training, and hardware/software sales and services. Several Diaspora are also actively engaged in promoting an ICT industry sector in Dominica. Their leadership should be encouraged. Unlike most of the OECS islands, Dominica already has three communications providers offering an array of services against Cable & Wireless, who still occupies a monopoly share of the market. These companies have been very effective in lowering prices and bringing services to rural and underserved areas.

Overall, businesses in Dominica primarily use ICTs for word processing, accounting functions, and routine administrative business processes. There is little use of ICTs for core business activities. Business use of technology is hampered by the shortage of expertise in hardware and system support plus there are no local capabilities in IT consulting and business analysis for more advanced applications. In any institution, whether public or private, it is not unusual to find up to 30-50% of the PCs out of order. Poor service from Dominica Electricity Services (DOMLEC) and continual power interruptions and voltage fluctuations also pose grave risks to IT systems that are not supported by adequate Uninterruptible Power Supply (UPS) systems. One investor reportedly lost \$167,000 worth of equipment due to these electricity problems.<sup>15</sup> These power issues must be addressed if Dominica can

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<sup>12</sup> Holmes Report at 37.

<sup>13</sup> *Rainbow Report* at 34.

<sup>14</sup> Interview with Henry Schillingford, Esq., Roseau, Mar. 15, 2002.

<sup>15</sup> Holmes Report at 36.

reasonably hope to build ICT capabilities, attract offshore ICT operations, and further the deployment of technology in businesses.

Just what an ICT industry sector might look like in Dominica needs refinement. The tendency is to believe that another Bangalore can be developed by providing software training and grabbing some offshore accounts. Although Dominica enjoys good intellectual capital, it lacks the strong engineering and educational capabilities that were at the root of Bangalore and its operating costs are considerably higher than those in India. There are ICT opportunities, however, in call centers, “back room” data processing, data bank development, and data storage operations – *provided there is an adequate legal framework to support these operations and protect their data*. Dominica has ready talent for these industries and offers geographical, language, and time zone advantages. Donor technical assistance could help Dominica target potential investors and market itself as a viable option for these operations. Such an undertaking would require the cooperation of the Government to create suitable facilities, streamlined procedures, and incentive packages for domestic and foreign investors.

The lack of adequate office space for these companies is a critical issue. The existing industrial park in Roseau has one data entry company with only four employees, a few online gaming companies, and other types of industry. Any space that would be occupied for ICT purposes in this park would require considerable upgrading. Presently, there are three industrial estates:

- (1) the Canefield Industrial Estate consisting of about 14 acres situated approximately two miles from Woodbridge Bay Port and next to the Canefield Airport;
- (2) the Picard Industrial Estate consisting of 33.596 acres situated next to Portsmouth Harbor, but 27 miles from Woodbridge Bay Port, 25 miles from Canefield Airport and 25 miles from Melville Hall Airport,
- (3) the Hertford Industrial Estate consisting of 12.413 acres and located in Jimmit, just 6 miles from Woodbridge Bay Port, 4 miles from Canefield Airport, and 24 miles from Melville Hall Airport.

All are owned by the Government of Dominica.<sup>16</sup>

The Government is considering developing an industrial park in Portsmouth for ICT companies and has issued a tender for the feasibility study. The AID Bank is currently evaluating contractor proposals. The attractiveness of such a park for technology companies, however, will in part depend upon how it is outfitted. AID Bank’s industrial space usually consists of basic, constructed shells with unfinished walls and floors and no ceiling<sup>17</sup> – a far cry from the requirements of an ICT operation. If the ICT industrial park goes forward, however, it would be a nice complement to the MOE Youth Development Division’s center in Portsmouth that focuses on ICT training.

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<sup>16</sup> *Dominica Investment Information Checklist*, Dominica National Development Corporation, July 12, 2001 at 4.

<sup>17</sup> Holmes Report at 21.

The cost of labor in Dominica is attractive, with the minimum wage set at US\$0.75 per hour and the average rate running at US\$1.20 to \$1.50 per hour. Overtime follows the U.S. track of one and one-half times the hourly rate for overtime beyond the eight hour workday and two times the hourly rate for Sundays and holidays. Social security costs employers 7% of the wage to a maximum of US\$129.63 per month. There are 12 public holidays. One negative for employers may be a vacation entitlement of two weeks per year for up to five years of service and three weeks per year thereafter. Administrative salaries generally run US\$300-700 per month. Productivity is measured at 80%, with absenteeism averaging 3-5%.<sup>18</sup>

### **Identified Areas for Further Pursuit**

The foregoing paints a very brief picture of the “Private Sector” in Dominica, with a focus on leveraging ICTs and identifying possible opportunities for using ICTs for economic development. Dominica’s ICT opportunities will be boosted by the market liberalization of telecommunications that is currently underway. Lowered communication costs – especially international costs – will be a critical factor. Nevertheless, there are several areas where donor attention to “Private Sector” issues is warranted:

- A. Support Loan Portfolio Management System**—Several years ago, the Dominican Agricultural and Industrial Development Bank (AID Bank) created a development bank loan portfolio software system known as Dpac. The Financial Data Systems Limited (FDSL) was incorporated in 1994 to develop, refine, and support this initiative. The system is currently used in seven locations throughout the region, with more coming online in the near future. Efforts are underway to significantly upgrade the current package, taking into account requirements from the user base, new releases of Windows, and relational data base management systems technology. A business plan has been developed that sets forth required funding for upgrading the system, including adding features and a new technology platform. The project holds considerable promise on several dimensions: (a) it builds on a current success, (b) it provides support to a critical component in the region, i.e., improved management of the various development banks’ portfolios, (c) it has market potential well beyond the region and could generate revenue in excess of the redevelopment costs, and (d) it provides Dominica with a specialized software package for the international market.
- B. Improve Leveraging Diaspora**—As Dominica (and other Caribbean countries) seeks to expand their economies and improve delivery of social services to their citizens, there is an opportunity to leverage the Dominican Diaspora living the U.K., Europe, the U.S., and Canada. Informally, this is already taking place, but on an individual, and non-focused basis. The potential exists to build on the networks and capabilities of the Diaspora and to seek their engagement in expanding the private sector. At a minimum, the Diaspora represents a potential offshore market for local products/services. However, they could provide more direct, value-added contributions to the socio-economic growth of the region.

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<sup>18</sup> *Dominica Investment Information Checklist*, Dominica National Development Corporation, July 12, 2001 at 3.

The experiences of Ireland in using the Diaspora to build their ICT sector and the recent successes of a similar approach being undertaken in Armenia offer excellent examples of how Diaspora hold substantial promise for increasing FDI and business growth in Dominica and the region. There are Diaspora organizations to build on, but these efforts would need to be better supported and/or augmented. This should perhaps be undertaken as a regional effort utilizing the Internet, enabling each country to have its own Web site targeting its specific Diapora population.

**C. Explore Potential for Expanding ICT Enabled Industries**—The Caribbean Development Bank (CBD) is currently reviewing a proposal for constructing an ICT Park at Picard, along with factory sheds at the Canefield and Hertford Estates. A public tender has been issued and proposals for a feasibility study and designs are currently being evaluated. This type of facility has the potential to attract ICT business opportunities. Without such a facility, there is little likelihood that firms will seriously consider Dominica as a place to locate a call center, a data storage center, or the like. With a workforce in Dominica of 30,000 and an estimated 20 percent unemployment, any one, or a combination of, investments that could employ 500-1,000 employees would have a significant impact on the local economy and the well-being of Dominica's citizens. Perhaps the most important component of such an ICT Park initiative, beyond the current phase of the feasibility study, is obtaining the anchor tenants that will occupy the facility and generate the initial income/employment. These efforts should be initiated immediately, possibly by conducting an ICT-oriented Investment Seminar in the U.S. or the U.K.

**NOTE:** the following are the same as originally developed as part of the ICT Assessment for Grenada. They are repeated here in the context of Dominica as the need is the same and the initiatives are best addressed regionally.

**D. Business Development Services**—There is a need in Dominica (similar to Grenada) for an effective array of new or upgraded business development services to assist local firms expand their markets and grow. For the most part, this will mean helping businesses gain access to larger offshore markets for their products in the Caribbean region and in countries such as the U.S., U.K., Canada, and the EU countries. In order to be successful in these markets, local companies must (a) improve the quality and consistency of products, packaging, labels, etc., (b) enhance business management and marketing knowledge/skills, (c) gain access to venture capital, and (d) develop a sound business expansion plan for entering new markets, including all the details for marketing, advertising, distribution, payments, etc. For SMEs, this is a formidable task and will require some collective expert assistance.

With respect to ICTs, there is the need for expanding training to support higher-value consulting services. At present, businesses are relying on ICTs for “back office” support of payroll, personnel, accounting, and general office automation. Few companies are applying ICTs in their core business functions, nor is there adequate local ICT technical support to do so. With assistance, Dominica could build capacity in local businesses, including the

development of consulting capacity that readily translates into commercial services/sustainability.

**E. International Internet Portal**—A few companies in Dominica have developed Internet Web sites for their products and services. As a rule, these are in the tourism sector, but some of the larger local businesses are also advertising their products on the Internet. However, businesses are both hesitant and unable to take orders and credit card payments over the Internet due to inadequacies in the legal framework and conservatism on the part of the banks, thereby limiting their ability to turn their Internet investment into revenue and expanded market share. In addition, as a general rule, small businesses with individual Web sites rarely attract sufficient Web traffic to their sites to be successful in the e-commerce arena. The whole issue of “branding” in this virtual Internet space is problematic even for the largest U.S.-based firms, and is behind the failure of many of the smaller “dot-com” companies.

However, it does appear there is the opportunity to undertake an initiative that would create a country – and preferably a regional – portal or marketplace on the Internet whereby costs could be shared, and a “branding” of Caribbean products could be achieved. Shared services such as credit-card validation/banking could be put into place so enable purchasers to make payments to a trusted entity. This would create something akin to a virtual “Shop Carib” or “Caribbean Mall” that would enable the small and medium-sized companies in the Caribbean to collectively market their products/services on the Internet (much like a local Saturday market). Collective advertising, hosting, development, shopping carts, banking services, etc., would keep costs to the individual company low, while increasing the potential for generating traffic to the Web site – and the region.

**F. Shared Upstream Services**—Collective support capabilities are also needed to help businesses get their products and services into targeted markets. When individuals buy over the Internet, they also want quick delivery—it is simply part of the customer expectation and the value-added of the Internet. Unless a company has warehousing facilities in the target market, it is difficult to satisfy this need for quick turnaround. It is also very expensive to ship small shipments from Dominica to the U.S. or Canada, or the EU. Here again, in manner similar to the above International Internet Portal, there is the need to establish, on a collective basis, a warehousing facility in each market country. This could be limited to a simple warehousing operation, but, ideally, would include the actual marketing of Caribbean products to a network of outlets in the target markets. This could be a value-added complementary set of services to the in-country business development services discussed above.

# Dominica: ICT Assessment

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## ***IV. People***

The widespread deployment and utilization of ICTs is directly dependent upon the ability of a population to become ICT proficient. Whereas the public sector can set ICT strategy and policy, and the private sector can bring together opportunities and needed financial resources, both are dependent upon the intellectual capital of a nation and the ability of its people to provide the requisite skills and human capabilities. In the end, the ultimate change agent is a nation's citizens.

This section explores the intellectual resources of the people of Dominica, their educational background, their capabilities and potential from an ICT-related perspective, and their desire and willingness to develop an ICT industry sector and use ICTs. There are a few countries that serve as development models of success and useful case studies for countries to emulate. Ireland and India are two of the more prominent. Ireland used about a third of its EU infusion money to develop education and human resources that in turn developed knowledge industries, like IT.<sup>19</sup> This section examines Dominica's school systems, private training institutions, and employer training initiatives that are each in their own way critical to supporting the country's potential for increased utilization of ICTs.

### **Summary/Analysis**

#### Education System

The bedrock of any nation's intellectual capital is its education system. Dominica provides formal education through grade 7 (age 12). Students then take a Common Entrance Examination to gain entrance to secondary school. The number of positions is limited, and students who do not pass the examination can remain in primary school or drop out. The country has a goal for all students to be admitted to secondary school by 2005. Secondary schools have vocational/technical and academic departments. Students must pass the Caribbean Examination Council (CXC) examination to graduate from secondary school and be admitted to tertiary level schools. Dominica's three tertiary schools are the Dominican Teachers College, the Nursing College, and the Clifton Dupigny Community College. The University of West Indies (UWI) offers an associate degree through the Nurses College.

Overall, Dominica is a nation with very good intellectual capital and a solid foundation for developing an ICT industry sector. All the islands, however, would be wise to change the long-held dividing line between primary and secondary schools. In an information technology driven world, it no longer makes sense to turn 12 year-olds out of school. There is a common complaint throughout the islands – and Dominica is no exception – that the CXC examination is out-of-date and secondary students who pass the exam are not prepared for the workplace and have low or no ICT skills.

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<sup>19</sup> *Business Central Europe*, September 2000, p. 19.

Educational professionals are working on both of these issues. The business community, however, should also engage in a dialogue with educators to better explain their needs and the skills they require.

### State of Technology and Training in Ministry and Schools

Dominica has a strong Ministry of Education, Youth and Sports and is blessed with some talented, energetic people. An excellent survey of the state of the hardware, software and infrastructure in the Department of Education and the primary, secondary, and tertiary schools was completed in December 2001.<sup>20</sup> The survey provides a complete picture of the state of technology within the schools and Department. Overall, the infrastructure is inadequate, requiring upgrades to power lines, electricity management controls, ventilation and dust control. Dial-up lines at 56 kbps are available to 44% of primary schools and all secondary and tertiary schools. No power management appliances (line conditioners, UPS units, etc.) are used in any of the schools, except for two secondary schools.

Although the Department of Education has 480 computers, only 30% are less than two years old, while 42% are more than five years old. There are networks in three secondary schools and plans call for connecting five primary schools. Of the 146 computers in primary schools, 62 of these are reserved for staff use and principals. There are 263 computers in secondary schools, with only 27 reserved for staff use. Contrary to reports from the business community regarding the low ICT skills of secondary school graduates, the Department of Education claims that forty-five percent of secondary students receive some form of ICT training. There are only 31 computers in the three tertiary schools but 8 of these are reserved for staff. The Department has 40 computers in various offices and typing pools. Significantly, the Department owns no licensed software and relies upon the pre-installed software provided on the hardware. Maintenance of the hardware and software is a continuing problem. There is only one qualified person to perform these functions within the entire Department. Some teachers have been trained in servicing computers, but this “solution” commonly results in overburdened faculty and broken down equipment that eventually needs professional attention.

The survey provides a complete picture of the state of technology within the Department of Education. The Senior Planning Officer of the Education Planning Unit and his staff have used this survey to put together a three-phase plan to link the three tertiary schools through a Local Area Network by September 2002. In late 2001, the Department received a comprehensive proposal from IBM to wire and computerize all 15 secondary schools for approximately US\$750,000, using mostly wireless technologies. The proposal was not accepted due to lack of funds.

The Youth Development Division of the Ministry has managed to develop one of the region’s most advanced and successful training programs for youths not in school. Graduates of secondary schools who have passed the CXC exam are their primary targets. The Youth Division has five centers, mostly in rural areas, offering training in computer skills. They have 12-15 PCs in each center, training 2

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<sup>20</sup> *The State of Information and Communications Technology in the Department of Education of the Commonwealth of Dominica*, Education Planning Unit, Ministry of Education, Youth Affairs and Sports, Dec. 2001.

shifts per day running from 8:00 – 11:00 a.m. and 1:00 – 4:00 p.m. over a course of three months. Only one center is networked. In the past year, 300 students were trained and most of them found jobs in short order. One training module focuses on maintenance of computers. The Youth Division is currently finishing another center in Portsmouth and has a seventh center planned. The U.S. Peace Corps is also working with the Youth Division and has volunteer staff in two centers. Other plans call for networking all the centers, opening and staffing them for evening use as cyber cafes, and hiring a maintenance support person to service the computers and software. The Youth Division is also working to expand ICTs into their training in traditional areas. For example, they currently offer an introductory computer course to woodworking students. Despite the outstanding accomplishments of the Youth Division, there remains a need for increased youth access and distance learning capabilities, especially in rural areas.

The MOE and Youth Division's clear understanding of the importance and impact of ICTs, however, does not reach the upper levels of the Ministry. One example is telling. Over one year ago, a Diaspora had obtained Cisco's agreement to put in one of their technical Academies in Dominica. The last step required was the signature of the Minister of Education on associated paperwork. No funding from the Government was requested. At the time of this report, the paperwork had languished on the Minister's desk for over one year. Hopefully, this issue can soon be resolved, as Cisco has expressed their continuing interest. The mere presence of a Cisco Academy would go a long way toward validating the Dominican workforce as technically capable. It would also help address a concern that permeates every island, including Dominica – brain drain. Most students that go to the U.S. for their tertiary education do not return home. Educators and business leaders alike would like to find educational programs and opportunities attractive enough to either keep their youth on the island or lure them back home.

Several local institutions offer ICT training and their own certificates. There were scattered complaints regarding quality, but these could not be verified, although some of the students went on to take the Microsoft Certified Systems Engineer examination and passed. Market forces usually crowd ineffective institutions out of business. Regardless of what ICT training is currently offered by any of the educational programs in Dominica, there is clearly a lack of adequate training programs in hardware and system support and advanced programming and systems engineering. Dominica, like many of the islands, is quickly becoming overpopulated with broken PCs and nonfunctional software.

Clearly, educational opportunities exist through linkages with the medical school and North American universities and colleges. Although a private medical school is in Portsmouth, it seems to be disconnected from the public sector and Dominican citizens. Its students are primarily American. There may be potential for some relationship between the Youth Division's new center to open soon in Portsmouth and the medical school.

## Readiness of Workforce

For the most part, computers used in the public and private sector workplaces are used for word processing or basic spreadsheet applications. Few computers are networked and there is very little use of ICTs for core business functions. Therefore, most of the workforce today is not computer literate. Some employers provide some basic training on the job or pay for short courses. Telecenters for adult access is very limited. Some community centers could perhaps house a telecenter for Internet access and offer basic training and SME computer support services. These could be especially valuable in rural areas and would enable citizens to have better access to Government data or forms that could be put online.

Dominica's workforce is well positioned for targeted ICT industry development, such as call centers, "back room" functions, data entry, and data bank development. More advanced functions, such as data storage operations, may be less suitable, not due to lack of ability in the workforce, but due to inadequate facilities. It remains to be proven, however, that Dominican students possess the skills to move into these positions. Technical assistance to match skills with ICT opportunities will help put some definition on development of the ICT sector and will help determine where adjustments need to be made within the education system to meet specific ICT job requirements.

### **Identified Areas for Further Pursuit**

The following are a few "People" issues where additional attention is warranted and where donor assistance could make a substantial difference in helping boost the widespread deployment and utilization of ICTs in Dominica:

- A. Improve PCs and IT support to Secondary Schools**—At present, not all of the secondary schools have PCs, with only five of fifteen having complete computer labs. Likewise, primary schools are also inadequately equipped. A World Bank project is making funding available to several OECS countries, including Dominica, to install computers in schools. Hopefully, this will allow Dominica to expand the number of PCs in schools. Beyond this, however, it is essential that the IT support for maintenance and operations of the computer labs in the secondary schools be addressed as soon as possible. The reliance on school faculty to trouble shoot/fix/repair the PCs/networks/Internet access is simply not sustainable. Possibilities worth exploring include seeking support from the U.S. Peace Corps or Canada's Global Net Corps. Under Canada's innovative program, local youth are trained to provide ICT-related support and, in return, commit to providing in-country support in the form of community service for 6-9 months. Similar to the U.S. Peace Corps, a small stipend is provided while they are in the program. Potentially, there could be a linkage between this type of program and the IT training within the Youth Division program for out-of-school youth. This approach has the advantage of providing needed on-the-job skills to the individual and community, while also providing students an opportunity to gain workplace acumen and skills/knowledge for employment after they leave the program.

- B. UWI Computer Science Offering**—With the region’s increased focus on leveraging ICTs for economic development and the University of West Indies (UWI) being the regional provider of an array of educational offerings (with some courses offered via distance learning), consideration should be given to expanding UWI’s current offerings to include a degreed Computer Science program via distance education. This may require shared infrastructure, as discussed earlier in the “Pipes” section of this report. As the region builds its reliance on ICTs, it is essential that Dominica focus on expanding the requisite ICT skills/knowledge base. Every effort should be made to link UWI courses or other programs to the ICT-related activities currently in place or planned by the local community colleges.
- C. CISCO Academy**—This last year, considerable work was done by a Diaspora to establish a CISCO Academy in Dominica. This included dialog and a plan/commitment to pursue such an action. However, the Ministry of Education failed to sign the paperwork required by CISCO to enable them to move forward. The option still appears to be on the table, but without action by Dominican Government, this will be a lost opportunity to participate in a very successful program aimed at developing skilled IT network professionals.
- D. Pursue Links with U.S. and U.K. Universities**—With the proper expansion of network facilities, the potential exists to deliver world-class, accredited university curricula to the Caribbean. A growing number of universities provide distance learning over the Internet, and in some situations, via two-way video. While the region does have the UWI, expanded distance learning capabilities would make it possible for local students to get their degrees out of the U.S. or Europe, without having to leave Dominica, or any of the Caribbean Countries. This could result in (a) lower costs to the student, (b) possible scholarships from donor organizations or private foundations, and (c) increased probability that the student will remain in country and contribute to the local economy. To take advantage of this on a broad scale will require the establishment of a broadband network to provide access to course material at a reasonable cost. Video-based education will need access to a video-enabled classroom, but this could be a shared facility with UWI and the local community colleges. This approach, while more costly than distance learning over the Internet, has the critical advantage of classroom dynamics and interaction for a more rich and rewarding learning experience.

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## Appendix A – Digital Economy 2000

On June 5, 2000, the U.S. Department of Commerce (DOC) issued its third annual report on the information technology revolution and its impact on the U.S. economy, titled “Digital Economy 2000.”<sup>21</sup> This series of reports has been critical to providing a more comprehensive understanding on the direct and indirect role/impact of the information technology (IT) sector within the U.S. In introducing the report, then-Vice President Gore presented several key highlights from the report:

- IT accounts for half or more of the gains in U.S. productivity since 1995. The U.S. enjoyed a 2.8 percent productivity growth from 1995 to 1999—double the 1.4 percent rate of 1973 to 1995. Improved productivity has lowered inflation and raised real wages.
- IT is lowering inflation. Falling IT prices have directly pulled down overall average inflation by 0.5 percentage points a year. In addition, by raising productivity, IT lowered inflation of other industry sectors.
- The IT sector is rapidly creating jobs at high wages. IT jobs average \$58,000 a year, 85 percent higher than the average for the private sector. Between 1994 and 1998, employment in IT industries expanded by 30 percent, from 4.0 million to 5.2 million jobs. IT occupations that pay the best and require the most education have been growing most rapidly.

Former Secretary of Commerce, William M. Daly, writes in the Report’s preface:

*“What we can see clearly are expanding opportunities. To meet these opportunities, we will have to ensure a stable and conducive economic and legal environment for continuing innovation in information technology and e-commerce. We need to encourage the building of a broadband infrastructure that allows all Americans to have access to the advanced services that support the Internet, and take the steps necessary with respect to privacy, consumer protection, security, reliability, and intellectual property rights that will inspire confidence in the Internet. To realize the full potential of this digital economy, every person and every business must be able to participate fully and make their own unique contribution to its development.”*

The Executive Summary of the Report provides a strong message regarding the impact of ICTs on the U.S. economy. In addition to the above highlights, these include:

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<sup>21</sup> *Digital Economy 2000*, U.S. Department of Commerce, <http://www.esa.doc.gov/de2k2.htm> .

- The Internet in particular is helping to level the playing field among large and small firms in business-to-business e-commerce.
- There is growing evidence that firms are moving their supply networks and sales channels online and participating in the new online marketplaces.
- Advances in information technologies and the spread of the Internet are also providing significant benefits to individuals.
- The vitality of the digital economy is grounded in the IT-producing industries—the firms that supply the goods and services that support IT-enabled business processes, the Internet, and e-commerce.
- Although IT industries still account for a relatively small share of the economy’s total output—an estimated 8.3 percent in 2000—they contributed nearly a third of real U.S. economic growth between 1995 and 1999.
- IT industries have also been a major source of new R&D investments.
- New investments in IT are helping to generate higher rates of U.S. labor productivity growth.
- Growth in the IT workforce accelerated in the mid-1990s, with the most rapid increases coming in industries and job categories associated with the development and use of IT applications.
- Analysis of the computer and communications industries in particular suggests that the pace of technological innovation and rapidly falling prices should continue well into the future.
- Businesses outside the IT sector almost daily announce IT-based organizational and operating changes that reflect their solid confidence in the benefit of further substantial investments in IT goods and services.

While the above reflects dynamics taking place in the U.S. economy relative to the ICT sector and its broader impact on the economy, it also reflects the potential value of ICTs in other economies—including developing and transitioning economies. This is of specific relevance the OECS/ECTEL countries as they seek to grow their economies, not so much by their reliance on traditional agricultural and tourism base, but by expanding their reliance on ICTs for growing their service, information, and knowledge-based sectors.

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## Appendix B – 1999 ITU Statistics

Each year, the International Telecommunications Union (ITU) publishes a *World Telecommunications Development Report*<sup>22</sup> that provides statistical data for all countries. Its March 2001 report included an expanded set of data that, for the first time, included data on mobile cellular. In addition to this worldwide report, the ITU periodically publishes regional-specific reports with more detailed discussions on a given geographical region. In April 2000, an *Americas Telecommunications Indicators 2000* report was published.<sup>23</sup>

The ITU-compiled data serves as rich resource material for understanding the dynamics taking place in telecommunications. While there are several acknowledged weaknesses in the reports (such as timing, accuracy, and incompleteness), they are still the best set of normalized data whereby trends can be identified and macro-level regional/country comparisons made.

For purposes of this ICT Assessment, selective 1999 data (the most recent available from the ITU) has been extracted from the *World Telecommunications Development Report 2000-2001* for the ECTEL countries and a few other Caribbean Islands (Barbados, Jamaica, and Trinidad/Tobago), along with selected income-level data. Combined, this data provides a quick snapshot of the current telecommunications situation in the ECTEL countries, including Dominica.

The following tables provide more details of the situation in Dominica. Following each table are keynotes clarifying some of the data on the tables, as well as short comments with respect to what one may conclude from the data.

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<sup>22</sup> *World Telecommunications Development Report 2000-2001-- World Telecommunications Indicators*, ITU, Geneva, March 2001.

<sup>23</sup> *Americas Telecommunications Indicators 2000*, ITU, Geneva, April 2000.

### Basic Indicators

Country	Population – 1999		GDP – 1998		Main Phone Lines	
	Total (Millions)	Density (per km)	Total (US\$ B)	Per Capita (US\$)	Totals (000s)	Teledensity (per 100)
<b>ECTEL Countries</b>						
Dominica (U-M)	0.08	102	0.3	3,391	21.3	27.88
Grenada (U-M)	0.09	271	0.3	3,635	29.4	31.51
St. Kitts/Nevis (U-M)	0.04	148	0.3	6,840	20.1	51.76
St. Lucia (U-M)	0.15	250	0.6	3,815	44.5	28.93
St. Vincent/Gr (L-M)	0.11	291	0.3	2,395	23.6	20.88
Barbados (U-M)	0.27	626	2.3	8,731	115.0	42.71
Jamaica (L-M)	2.56	224	6.9	2,707	509.6	19.91
Trinidad/Tobago (U-M)	1.29	252	6.1	4,726	278.9	21.58
Lower-Middle Income Total/Avg.	861.83	24	1,341.0	1,621	103,294.4	11.99
Upper-Middle Income Tot/Avg.	634.96	27	2,945.1	4,705	126,649.4	19.95
High Income Tot/Avg.	891.52	26	23,263.6	26,288	521,516.1	58.50
Americas Tot/Avg.	814.62	20	11,413.4	14,207	271,006.1	33.27
WORLD	5,980.91	44	29,686.5	5,111	906,713.6	15.16

**NOTES:**

1. Calculations for GDP vary considerably based on source and calculations used. Here, GDP figures are presented utilizing ITU's methodology and normalized across all countries in a consistent manner.
2. Teledensity is the number of phones per 100 inhabitants

**Observations:**

- The populations of the ECTEL islands are small (typically less than 100,000), but relatively concentrated (with between 100 to nearly 300 people per square kilometer, due to the small size of the islands; Dominica has 102 people per square kilometer.
- The economies of the ECTEL islands are relatively small (between US\$300-600 million annual GDP), but on a per capita basis, they are relatively high (between US\$2,400-6,000 per capita GDP), placing most ECTEL countries in what is considered the Upper-Middle income band). Dominica's GDP is US\$300 million with US\$3,391 GDP per capita.
- Relative to the world average for Upper-Middle income countries, the ECTEL countries have a higher than average teledensity (ranging from 28-52 whereas the average is 20). St. Vincent/Grenadines is a Lower-Middle income country, but here too, it is above the average of similar countries (teledensity of 21 versus an average of 12).

### Main Telephone Lines

Country	Main Telephone Lines			Teledensity		
	1995 (000)	1999 (000)	CAGR % 1995- 1999	1995	1999	CAGR % 1995-1999
<b>ECTEL Countries</b>						
Dominica (U-M)	17.8	21.3	4.6	24.13	27.88	3.7
Grenada (U-M)	23.2	29.4	6.1	26.02	31.51	4.9
St. Kitts/Nevis (U-M)	14.4	20.1	8.6	36.32	51.76	9.3
St. Lucia (U-M)	30.6	44.5	9.8	21.02	28.93	8.3
St. Vincent/Gr (L-M)	18.2	23.6	6.7	16.46	20.88	6.1
Barbados (U-M)	90.1	115.0	6.3	34.53	42.71	5.5
Jamaica (L-M)	291.8	509.6	15.0	11.67	19.91	14.3
Trinidad/Tobago (U-M)	209.3	278.9	7.4	16.78	21.58	6.5
Lower-Middle Income Total/Avg.	76,081.5	103,294.4	7.9	9.94	11.99	6.7
Upper-Middle Income Tot/Avg.	89,505.5	126,649.6	9.1	14.90	19.95	7.6
High Income Tot/Avg.	460,053.5	521,516.1	3.2	52.81	58.50	2.6
Americas	221,402.5	271,006.1	5.2	28.71	33.27	3.7
WORLD	691,601.0	906,713.6	7.0	12.15	15.16	5.7

**NOTES:**

1. CAGR = Compound Annual Growth Rate

**Observations:**

- With the exception of St. Kitts/Nevis and St. Lucia, the growth in main lines and teledensity between 1995 and 1999 is less than the world averages for similar income level countries. Dominica's compound annual growth rate (CAGR) was 4.6 compared to 9.1 for Upper-Middle income countries.

### Local Telephone Network

Country	Main Telephone Lines - 1999				Faults per 100 Main Lines/year 1999
	Capacity Used (%)	Automatic	Digital (%)	Residential (%)	
<b>ECTEL Countries</b>					
Dominica (U-M)	61.1	100.0	100.0	85.0	9.0
Grenada (U-M)	83.0	100.0	100.0	81.0	1.1
St. Kitts/Nevis (U-M)	---	100.0	100.0	77.0	---
St. Lucia (U-M)	---	100.0	100.0	76.0	---
St. Vincent/Gr (L-M)	61.6	100.0	100.0	78.0	9.4
Barbados (U-M)	---	100.0	100.0	67.0	---
Jamaica (L-M)	---	100.0	100.0	---	---
Trinidad/Tobago (U-M)	72.1	100.0	100.0	82.3	75.0
Lower-Middle Income Total/Avg.	82.5	99.2	51.7	79.0	31.9
Upper-Middle Income Tot/Avg.	84.4	99.5	84.2	75.3	19.8
High Income Tot/Avg.	89.5	100.0	95.9	69.6	10.6
Americas	87.8	99.8	91.9	67.8	14.1
WORLD	81.4	99.8	89.6	73.1	24.8

**NOTES:**

**Observations:**

- Used switching capacity across all ECTEL countries is 61-83 percent; the world average is 81.4 percent and the average for Upper-Middle income countries is 84.4 percent. Dominica and St. Vincent/Grenadines fall significantly below this rate, with only about 61 percent of switching capacity used.
- All the switching capacity for the main telephone lines is 100 percent automatic and digital.
- The percentage of main telephone lines that are residential is higher than countries with comparable income levels (76-85 percent versus an average of 75 percent for Upper-Middle income countries). Eighty-five percent of Dominica's lines are residential.
- While the data is not available for all ECTEL countries, the faults per 100 main lines appears significantly less than other Lower-Middle and Upper-Middle income countries (no doubt due in part to the digital switching and a more concentrated user base). Dominica has 9 faults per 100 main lines per year, compared to an average of 19.8 for Upper-Middle income countries.

### Teleaccessibility - 1999

Country	Residential Main Lines		Public Telephones		
	Total (000s)	Per 100 Households	Total (000s)	Per 1000 Inhabitants	As % of Main lines
<b>ECTEL Countries</b>					
Dominica (U-M)	15.9	77.5	0.31	4.20	1.67
Grenada (U-M)	23.8	76.9	0.20	2.17	0.69
St. Kitts/Nevis (U-M)	12.0	>100.0	0.17	4.23	1.07
St. Lucia (U-M)	30.7	69.7	0.42	2.88	1.26
St. Vincent/Gr (L-M)	18.4	73.7	0.21	1.87	0.90
Barbados (U-M)	77.0	81.1	0.87	2.13	0.50
Jamaica (L-M)	---	---	2.07	0.82	0.59
Trinidad/Tobago (U-M)	229.5	66.5	2.15	1.66	0.77
Lower-Middle Income Total/Avg.	76,538.6	38.3	943.04	1.15	0.93
Upper-Middle Income Tot/Avg.	93,147.3	58.5	2,662.24	4.22	2.13
High Income Tot/Avg.	348,714.4	106.1	4,282.43	4.85	0.83
Americas	182,027.6	78.5	3,644.01	4.54	1.35
WORLD	618,042.5	51.2	11,577.02	2.02	1.31

#### Observations:

- The percentage of households with phones throughout the ECTEL countries is considerably higher than the world averages for the Lower-Middle and Upper-Middle income countries (70->100 percent compared to 38-58 percent; Dominica has 77.5 percent residential main lines per 100 households).
- The ECTEL countries' use of public telephones per 1000 inhabitants is quite close to the world average for their respective income level, however, as a percentage of main telephone lines, they are somewhat lower than the world average (likely due to the high level of phone lines that exist in households). Dominica has 4.20 public telephones per 1000 inhabitants, which is close to the Upper-Middle income average of 4.22.

### Largest City Main Lines - 1999

Country	Largest City			Teledensity	Rest Of Country	Overall County Teledensity
	Population as % of Total	Main Lines				
		(000s)	% of Total			
<b>ECTEL Countries</b>						
Dominica (U-M)	13.5	7.4	39.5	82.22	17.37	25.23
Grenada (U-M)	21.4	10.7	36.2	53.30	25.58	31.51
St. Kitts/Nevis (U-M)	54.2	---	---	---	---	---
St. Lucia (U-M)	35.2	---	---	---	---	---
St. Vincent/Gr (L-M)	14.3	4.3	18.0	26.28	19.98	20.88
Barbados (U-M)	43.0	---	---	---	---	---
Jamaica (L-M)	29.7	---	---	---	---	---
Trinidad/Tobago (U-M)	26.0	6.27.2	24.1	19.95	22.15	21.58
Lower-Middle Income Total/Avg.	13.2	26,618.2	27.3	25.06	9.17	11.71
Upper-Middle Income Tot/Avg.	16.0	27,558.3	24.9	27.87	16.15	18.04
High Income Tot/Avg.	10.4	29,676.1	15.2	60.97	52.23	53.40
Americas	13.4	17,537.8	33.1	20.01	9.29	11.29
WORLD	7.8	96,758.1	18.1	24.56	9.00	10.16

**NOTES:**

**Observations:**

- With the exceptions of Dominica and St. Vincent/Grenadines, the percentage of the population of the ECTEL countries living in the largest city is considerably higher than comparable income level countries, but likely consistent with small island nations.
- Teledensity of the largest ECTEL cities appears to be quite high (53-82 compared to 28 for Upper-Middle income countries) but, again, this is likely due to the nature of island nations. However, some data is missing for several of the islands. Dominica's largest city teledensity is 82.22 compared to an average of 27.87 for Upper-Middle income countries.
- There is a significant disparity between the teledensity of the largest city and the rest of the country (e.g., for Dominica the largest city which contains only 13.5 percent of country's population has a teledensity of 82.22 whereas the rest of the country has a teledensity of 17.37). This is an extreme situation, but reflects the disparity, even though in most cases this is not as exaggerated.

### Telephone Tariffs - 1999

Country	Residential (US\$)		Business (US\$)		Local Calls US\$	% GDP per Capita
	Connection	Monthly Subscription	Connection	Monthly Subscription		
<b>ECTEL Countries</b>						
Dominica (U-M)	20	2.7	20	7.5	---	1.0
Grenada (U-M)	85	14.1	85	40.7	---	4.6
St. Kitts/Nevis (U-M)	2	3.0	27	3.7	0.02	0.6
St. Lucia (U-M)	---	---	---	---	---	---
St. Vincent/Gr (L-M)	37	6.3	37	14.8	0.09	3.2
Barbados (U-M)	49	15.5	49	42.4	---	2.1
Jamaica (L-M)	16	2.7	23	5.8	0.06	1.5
Trinidad/Tobago (U-M)	11	4.6	22	27.8	0.04	1.2
Lower-Middle Income Total/Avg.	107	4.0	163	7.6	0.05	3.5
Upper-Middle Income Tot/Avg.	82	8.1	129	15.6	0.07	1.8
High Income Tot/Avg.	106	11.5	116	16.6	0.10	0.7
Americas	100	7.9	134	16.3	0.06	3.3
WORLD	94	6.5	128	10.4	0.08	5.6

**NOTES:**

- The % **GDP per capita** column is the subscription cost as a percent of GDP per capita and is calculated based on 1998 GDP and population data.

**Observations:**

- Connection rates for linking up telephone service are typically less in ECTEL countries than in countries with similar income levels (for both residential and businesses). For Dominica, the connection costs for residential and businesses are \$20, compared to Upper-Middle income averages of US\$82 for residential and US\$129 for business connections.
- Monthly subscription costs for Dominica were the lowest of Upper-Middle income countries (for residential, US\$2.70 compared to the average US\$8.10; and for business, US\$7.50 compared to the average US\$15.60). It should be noted that this is 1999 data.
- Dominica's and St. Kitts's Telephone Tariffs as a percentage of GDP are the lowest of all the listed Caribbean islands (1.0 and 0.6 percent respectively, compared to the average of 1.8 for all Upper-Middle income countries).

### Cellular Subscribers

Country	Cellular Mobile Subscribers					As % of Total Telephone
	Subscribers (000s)		CAGR % 1995-1999	Teledensity 1999	% Digital 1999	
	1995	1999				
<b>ECTEL Countries</b>						
Dominica (U-M)	---	0.7	---	0.86	100.0	3.1
Grenada (U-M)	0.4	2.0	49.8	2.15	---	6.4
St. Kitts/Nevis (U-M)	---	0.7	---	1.81	---	3.4
St. Lucia (U-M)	1.0	1.9	23.9	1.25	---	4.5
St. Vincent/Gr (L-M)	0.2	1.4	60.3	1.25	7.0	5.7
Barbados (U-M)	4.6	30.0	59.7	11.14	90.0	20.7
Jamaica (L-M)	45.2	144.4	33.7	5.64	---	22.1
Trinidad/Tobago (U-M)	6.4	38.7	57.1	2.99	---	12.2
Lower-Middle Income Total/Avg.	2,719.3	19,670.2	64.0	2.28	25.6	16.0
Upper-Middle Income Tot/Avg.	7,526.5	85,097.6	83.4	13.4	66.1	40.2
High Income Tot/Avg.	76,404.0	36,904.8	44.9	37.79	70.6	39.2
Americas	40,257.2	135,128.8	35.3	16.59	10.8	33.3
WORLD	90,719.8	491,342.5	52.6	8.22	70.2	35.2

#### Observations:

- Cellular/Mobile data for ECTEL countries is sketchy and, therefore, its use is limited in drawing conclusions.
- It is clear that the entry of Cellular/Mobil has been late in coming to the ECTEL countries, and that, across the board, the growth rate between 1995 and 1999, has been considerably less than the growth in countries of similar income levels (24-60 percent on a very small base, whereas the average growth rate for the Upper-Middle income level is nearly 85 percent for this same period).
- Teledensity of Cellular/Mobile as of 1999 is considerably less than countries with comparable income levels (teledensity of Cellular/Mobil of ECTEL being between 1 and 2 whereas the average for Lower-Middle is over 2, and for Upper-Middle it is over 13). Dominica's teledensity of Cellular/Mobile is .86.
- Cellular/Mobile as a percentage of the total teledensity is considerably less than averages for comparable countries (3-6.5 percent compared to 16-40 percent). This is due to late start, but also likely influenced to some degree by the relatively high main line telephone teledensity. The total teledensity for Cellular/Mobile subscribers in Dominica is 3.1 percent.

### International Telephone Traffic – 1999

Country	Outgoing Telephone Traffic					International Circuits (000)
	Million Minutes		CAGR % 1995-1999	Minutes Per Inhabitant	Minutes Per Subscriber	
	1995	1999				
<b>ECTEL Countries</b>						
Dominica (U-M)	7.5	7.3	-0.8	94.8	340.1	0.4
Grenada (U-M)	7.8	10.3	7.4	110.5	350.7	0.6
St. Kitts/Nevis (U-M)	8.0	13.1	12.9	337.3	651.7	---
St. Lucia (U-M)	12.7	13.4	1.9	88.3	332.5	---
St. Vincent/Gr (L-M)	---	11.6	---	102.5	491.1	0.4
Barbados (U-M)	32.0	45.0	8.9	167.1	391.3	---
Jamaica (L-M)	62.0	70.1	3.1	27.4	137.5	---
Trinidad/Tobago (U-M)	58.6	67.8	3.7	53.5	243.2	1.9
Lower-Middle Income Total/Avg.	4,149.4	5,558.2	7.2	6.6	54.2	141.0
Upper-Middle Income Tot/Avg.	6,313.3	10,005.1	12.1	15.8	79.0	150.5
High Income Tot/Avg.	50,164.3	81,451.7	12.9	91.4	156.3	599.3
Americas	22,343.8	39,319.9	15.1	48.3	145.1	256.0
WORLD	63,416.6	100,805.4	12.2	17.2	111.4	1,014.8

**NOTES:**

**Observations:**

- The outgoing international traffic from the ECTEL islands on a per inhabitant basis is completely “off the charts” relative to comparable income level countries (88-333 minutes per inhabitant for ECTEL countries compared to an average for Upper-Middle income countries of 16). Dominica’s outgoing international minutes per inhabitant is 94.8.
- On a per subscriber basis, this comparison is equally significant (333-652 minutes compared to 79 for Upper-Middle income countries). Dominica has 340.1 outgoing international minutes per subscriber.
- These disparities are most likely due to the nature of a tourist-based economy, but are also likely due in part to island Diaspora and students living in the U.S., U.K., and Canada.
- The extremely high outgoing traffic naturally is a real “cash cow” for the incumbent telecommunications provider and emphasizes the importance of resolving the single international reseller issue. This issue will require serious attention during market liberalization.

### Telecommunications Staff - 1999

Country	Telecommunications Staff			Main Lines per Employee		
	(000s)		CAGR % 1995-1999	1995	1999	CAGR % 1995-99
	1995	1999				
<b>ECTEL Countries</b>						
Dominica (U-M)	0.2	0.2	-7.2	81	130	12.7
Grenada (U-M)	0.3	0.3	-0.3	85	109	6.4
St. Kitts/Nevis (U-M)	0.2	0.2	-5.0	70	119	14.3
St. Lucia (U-M)	0.4	0.4	-0.9	79	107	10.7
St. Vincent/Gr (L-M)	0.2	0.2	-5.7	87	142	13.2
Barbados (U-M)	1.0	1.1	2.2	90	105	4.0
Jamaica (L-M)	4.3	3.2	-7.4	67	160	24.1
Trinidad/Tobago (U-M)	2.7	2.8	0.4	77	100	7.0
Lower-Middle Income Total/Avg.	1,112.1	1,114.7	0.1	68	92	7.9
Upper-Middle Income Tot/Avg.	642.9	700.9	2.2	139	179	6.5
High Income Tot/Avg.	2,359.5	2,550.5	2.0	195	2.4	1.2
Americas	1,316.9	1,574.1	4.6	168	172	0.6
WORLD	5,357.4	5,843.3	2.2	129	154	4.7

**NOTES:**

**Observations:**

- Across the ECTEL countries, it is quite clear that between 1995 to 1999, the current telecommunications provider (C&W) has been undergoing cost-reduction efforts, including dropping staff (0.3 – 7.2 reduction in staffing for this period).
- The number of main lines per telecommunications employee has naturally grown over this same period, but for the Upper-Middle income countries, ECTEL countries are still considerably below the world averages (107-130 lines per employee compared to an average of 179 for Upper-Middle income countries and a world average of 154). For St. Vincent/Grenadines, the comparison is favorable (142 compared to an average for Lower-Middle income countries of 92). Dominica has 81-130 main lines per employee.

## Telecommunications Revenue

Country	Telecommunication Revenue - 1999				
	Total (M US\$)	Per Inhabitant (US\$)	Per Main Line (US\$)	Per Employee (US\$)	As a % of GDP
<b>ECTEL Countries</b>					
Dominica (U-M)	13.4	175.0	628	81,650	5.1
Grenada (U-M)	---	---	---	---	---
St. Kitts/Nevis (U-M)	27.8	712.6	1,512	168,350	10.4
St. Lucia (U-M)	---	---	---	---	---
St. Vincent/Gr (L-M)	24.8	219.3	1,050	149,487	9.0
Barbados (U-M)	191.9	712.6	1,669	174,453	8.1
Jamaica (L-M)	462.6	180.7	908	145,066	6.6
Trinidad/Tobago (U-M)	226.9	175.6	814	81,679	3.1
Lower-Middle Income Total/Avg.	25,590.9	31.1	256	23,030	2.1
Upper-Middle Income Tot/Avg.	92,6045	145.9	733	138,086	2.9
High Income Tot/Avg.	682,740.4	766.1	1,310	268,690	2.7
Americas	344,154.7	427.8	1,276	220,233	2.8
WORLD	841,921.1	144.5	934	147,222	2.6

**NOTES:**

**Observations:**

- While information is sketchy for the ECTEL countries, on a per inhabitant basis, telecommunications revenue is considerably higher than the average for similar income countries (US\$ 219 compared to US\$31 for Lower-Middle income countries and US\$175-713 compared to US\$146 for Upper-Middle income countries). Dominica has US\$175 telecommunications revenue per inhabitant.
- There is also considerably higher revenue for the ECTEL countries on a per line basis as well as on a per employee basis (US\$628-1,512 compared to US\$733 for Upper-Middle income countries and US\$256 for Lower-Middle income countries). Dominica has US\$628 telecommunications revenue per main line.
- Telecommunications revenue as a percent of GDP is also very high for the ECTEL countries (5.1-10.4 percent compared to an average of 2.1 percent for Lower-Middle and 2.9 percent for Upper-Middle income countries). In Dominica, telecommunications revenue accounts for 5.15% of GDP.

## Telecommunications Investment

Country	Telecommunication Investment - 1999				
	Total (M US\$)	Per Inhabitant (US\$)	Per Main Line (US\$)	As % of Revenue	As a % of GFCF
<b>ECTEL Countries</b>					
Dominica (U-M)	---	---	---	---	---
Grenada (U-M)	---	---	---	---	---
St. Kitts/Nevis (U-M)	3.1	79.5	200	12.6	4.8
St. Lucia (U-M)	---	---	---	---	---
St. Vincent/Gr (L-M)	4.1	36.0	172	16.4	5.5
Barbados (U-M)	28.1	104.3	244	14.6	5.5
Jamaica (L-M)	135.8	53.0	266	29.4	6.6
Trinidad/Tobago (U-M)	69.7	54.3	264	32.8	4.5
Lower-Middle Income Total/Avg.	7,557.5	9.5	77	30.3	3.0
Upper-Middle Income Tot/Avg.	28,087.5	46.0	229	32.1	4.8
High Income Tot/Avg.	127,612.9	143.4	245	18.7	2.5
Americas	47,807.6	61.0	178	14.0	5.1
WORLD	188,486.6	33.0	210	22.6	2.9

**NOTES:**

- GFCF = Gross Fixed Capital Formation

**Observations:**

- The ITU report does not provide sufficient information on the ECTEL countries to detect much in the way of telecommunications investments other than to say it appears to be within the averages relative to population, but lower than average relative to telecommunications revenue.

## Information Technology

Country	Internet - 1999				Estimated PCs	
	Hosts		Users		Total (000)	Per 100 Pop
	Total	Per 10K Pop	Total	Per 10K Pop		
<b>ECTEL Countries</b>						
Dominica (U-M)	181	23.66	2.0	261.44	5	6.54
Grenada (U-M)	3	0.32	2.5	267.70	11	11.78
St. Kitts/Nevis (U-M)	8	2.06	2.0	516.10	6	15.48
St. Lucia (U-M)	13	0.85	3.0	195.18	21	13.66
St. Vincent/Gr (L-M)	---	---	3.0	265.09	11	9.72
Barbados (U-M)	68	2.53	6.0	222.82	21	7.80
Jamaica (L-M)	367	1.43	60.0	234.35	110	4.30
Trinidad/Tobago (U-M)	4,852	37.54	30.0	232.14	70	5.42
Lower-Middle Income Total/Avg.	376,585	4.28	6,593.6	78.84	19,516	2.57
Upper-Middle Income Tot/Avg.	2,347,283	36.97	29,297.5	461.50	36,291	5.80
High Income Tot/Avg.	69,150,849	775.65	186,099.3	2,088.05	309,641	34.80
Americas	56,005,148	687.50	94,407.6	1,158.92	170,532	21.50
WORLD	72,005,852	120.46	235,449.42	398.44	389,890	6.84

**NOTES:**

**Observations:**

- Overall, the number of Internet hosts in the ECTEL countries is considerably below the averages for similar income countries. Dominica, while still under the average, is at least close (excluding Dominica, the range is .3-2 hosts per 10,000 population whereas the average for Upper-Middle income countries is 37; Dominica is 24).
- The number of Internet users in 1999 is very low, with 2,000-3,000 per country. The number of Internet users per 10,000 population ranges between 195-516 in ECTEL countries compared to the average for Upper-Middle income countries of 461; Dominica has 261 users per 10,000 population.
- There is a high percentage of PCs per 100 population for ECTEL countries compared to other countries of similar income levels (6.5-15.5 per 100 compared to 2.6 for Lower-Middle and 5.8 for Upper-Middle income countries). Dominica has 6.54 PCs per 100 population.
- The relatively high availability of PCs and the comparatively low use of the Internet is likely a direct result of limited access and costs (but mostly costs, since there are a high number of main lines per household across the ECTEL countries).

### Network Growth

Country	New Telephone Lines Added (1998-1999)		New Mobil Subscribers Added (1998-1999)		New Internet Hosts Added (1998-1999)	
	Total (000)	CAGR %	Total (000)	CAGR %	Total (000)	CAGR %
<b>ECTEL Countries</b>						
Dominica (U-M)	1.3	6.3	---	---	---	22.3
Grenada (U-M)	1.9	7.1	0.6	42.7	35.8	41.4
St. Kitts/Nevis (U-M)	1.7	9.2	0.3	59.1	---	60.0
St. Lucia (U-M)	4.1	10.1	---	---	---	-43.5
St. Vincent/Gr (L-M)	2.6	12.3	0.7	89.3	---	---
Barbados (U-M)	2.0	1.7	18.0	150.0	---	54.5
Jamaica (L-M)	39.3	8.4	65.8	83.6	---	14.0
Trinidad/Tobago (U-M)	14.8	5.6	12.4	47.0	2.9	147.6
Lower-Middle Income Total/Avg.	6,729.7	7.0	8,453.7	75.6	17.4	5.0
Upper-Middle Income Tot/Avg.	10,883.9	9.4	39,033.5	84.9	1,078.1	84.9
High Income Tot/Avg.	13,213.6	2.6	102,211.4	43.6	27,283.8	65.2
Americas	11,686.4	4.5	38,894.7	40.5	23,905.9	74.5
WORLD	58,626.8	6.9	172,045.8	53.9	28,460.4	65.4

**NOTES:**

**Observations:**

- Growth in the number of main lines taking place between 1998-1999 in the ECTEL countries is close to the averages for similar income countries, with Dominica and Grenada being slightly less (Dominica's compound annual growth rate (CAGR) is 6.3 and Grenada's is 7.1); the average for Upper-Middle income countries is 9.4.
- With the exception of St. Vincent/Grenadines, the growth in Cellular/Mobile for ECTEL countries is well below the growth rates for countries with comparable income levels (43-60 percent compared to 85 percent for Upper-Middle income countries; St. Vincent/Grenadines had an 89 percent growth in 1999 and Grenada had a 42.7 percent growth rate). Dominica's growth rate was not available.
- Growth in Internet hosts throughout the ECTEL countries is also well below comparable averages, but data is insufficient to make any additional observations.

# Dominica: ICT Assessment

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# Dominica: ICT Assessment

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