

# Montserrat's

## National Information & Communication Technology Policy, Strategy & Implementation Plan

2017-2021



e-commerce

e-tourism

e-agriculture

e-health

e-education

e-government

MONTSERRAT IN A DIGITAL WORLD

## *Acknowledgements*

The Government of Montserrat gratefully acknowledges the work of the Caribbean Telecommunications Union in the formulation of this document.



**Caribbean Telecommunications Union**

# National ICT Vision

## Montserrat in a Digital World: Green, Connected & Thriving



### Green

- ♣ Unspoiled, fresh, fertile, lush, environmentally responsible
- ♣ Ample, clean, affordable, renewable energy
- ♣ Productive, sustainable use of natural resources
- ♣ Energy efficient, continuously reducing the environmental footprint
- ♣ High value ecotourism built around an unhurried tranquility

### Connected

- ⊃ Integrated, accessible, inclusive, competitive
- ⊃ Robust on-island ICT infrastructure and access
- ⊃ Seamless access to commercial, cultural, educational and health services and opportunities anywhere in the world, from home
- ⊃ Virtual Montserrat with active involvement of the Diaspora

### Thriving

- ∪ Economic regeneration, enterprising population, expanding markets, flourishing sectors
- ∪ **A healthy and wholesome Montserrat**
- ∪ Limitless possibilities

## List of Abbreviations

B2B	Business-to-Business
B2C	Business-to-Consumer
BPL	Broadband over Power Lines
CANTO	Caribbean Association of National Telecommunications Organisations
CARICAD	Caribbean Center for Development Administration
CARICOM	Caribbean Community
CDB	Caribbean Development Bank
ccTLD	Country Code Top Level Domain
CIGF	Caribbean Internet Governance Forum
CID	Center for International Development at Harvard University
CSIRT	Computer Security Incident Response Team
CSME	Caribbean Single Market and Economy
CTU	Caribbean Telecommunications Union
DFID	Department for International Development
DITES	Department of Information Technology and e-Government Services
DMCA	Disaster Management Coordination Agency
ECTEL	Eastern Caribbean Telecommunications Authority
EGRIP	Electronic Government for Regional Integration Project
EIU	Economist Intelligence Unit
<b>e-LAVA</b>	Environment, Learning, Access, Virtual and Adoption
EMIS	Education Management Information System
EU	European Union
GIU	Government Information Unit
GOM	Government of Montserrat
GPR	Government Process Reengineering
HIPCAR	Harmonisation of ICT Policies, Legislation & Regulation (Caribbean Project)
ICT(s)	Information and Communications Technology(ies)
ICT4PWD	ICT for Persons with Disabilities
IoT	Internet of Things
ISP	Internet Service Provider
ITEC	Indian Technical and Economic Cooperation

ITU	International Telecommunication Union
IXP	Internet Exchange Point
LIME	Landline, Internet, Mobile & Entertainment
MCC	Montserrat Community College
MCRS	Montserrat Customs and Revenue Services
MCWL	Ministry of Communications, Works and Labour
MDC	Montserrat Development Corporation
MICA	Montserrat Info-Communications Authority
MOU	Memorandum of Understanding
MSME(s)	Micro, Small and Medium Sized Enterprise(s)
MUL	Montserrat Utilities Limited
MVO	Montserrat Volcano Observatory
NGO(s)	Non-Governmental Organisation(s)
OECS	Organisation of Eastern Caribbean States
OSILAC	Observatory for the Information Society in Latin America and the Caribbean
PPP(s)	Public/Private Partnership(s)
RBC	Royal Bank of Canada
SBA	Small Business Association
SDP	Sustainable Development Plan 2008 – 2020
SDG(s)	Sustainable Development Goal(s)
TIPA	Trade and Investment Promotion Agency
UN-ECLAC	United Nations Economic Commission for Latin America and the Caribbean
USF	Universal Service Fund
UWI	The University of the West Indies
WEF	World Economic Forum
WSIS	World Summit on the Information Society

# Montserrat's National ICT Policy, Strategy & Implementation Plan 2017 - 2021

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## Executive Summary

The Government of Montserrat (GOM) has been steadfast in the implementation of its Sustainable Development Plan (SDP), guided by the vision to be “**a healthy and wholesome Montserrat...**” by the year 2020. This in part, inspired the development of Montserrat’s first National Information and Communication Technology (ICT) Policy, Strategy and Implementation Plan 2012 – 2016, which was popularised by the uniquely Montserratian acronym **e-lava**. The Plan was formulated in 2012 through the collaborative efforts of the Caribbean Telecommunications Union (CTU), the Commonwealth Secretariat and the Government of Montserrat.

Since 2012, several elements of the National ICT Plan have been implemented and there have been notable changes in Montserrat’s ICT and socio-economic landscapes. The GOM engaged the services of the CTU to assist with the next stage of Montserrat’s ICT journey, which contemplates the period 2017 to 2021. Accordingly, between September 2016 and February 2017 various stakeholder consultations were undertaken to assess Montserrat’s current e-Readiness and to comprehensively review the progress made under the National ICT Plan. The results of these consultations and assessments identified current national priorities and established the basis for updating the National ICT Plan for the new period.

This Plan for the 2017 – 2021 period therefore continues and builds upon the work of the previous Plan, while assessing advances made and including new priorities and projects drawn from local aspirations, current best thinking and international ICT trends, as appropriate. The Plan also updates strategies, programmes and projects appropriate to current environmental, technological, social and economic priorities.

Based on the achievements and implementation experiences of the 2012 Plan, the strategic emphasis of the new Plan seeks to inspire a greater sense of urgency. The new Plan is designed catalyse the implementation of the various programmes and projects as it shifts the strategic focus from the ‘facilitation’ approach to one of ‘acceleration’ for more tangible and timely results.

The national ICT vision of “*Montserrat in a Digital World – Green, Connected & Thriving*” is retained as well as the National ICT Policy pillars (focus areas) represented by **e-LAVA**, with wording slightly refined to reflect the acceleration emphasis, as highlight in the following table.

National ICT Pillar	National ICT Policy Objective
<b>Environment</b>	To <u>establish</u> an enabling legal and regulatory environment that promotes ICT-facilitated activities and development in a secure, ethical, environmentally sensitive and economically sustainable way
<b>Learning</b>	To <u>enhance</u> the capacity and propensity of, as well as opportunities for, the population to effectively and innovatively create and use ICT tools for education, business, social, cultural and leisure purposes
<b>Access</b>	To <u>support</u> universal, open, affordable, wired and wireless access to high capacity, high availability, national and international broadband infrastructure, technology and services
<b>Virtual</b>	To <u>increase</u> the use of ICT tools for establishing and supporting physical and virtual communities and interest groups to preserve and enhance Montserratian cultural identity and values amongst the resident population as well as the Diaspora
<b>Adoption</b>	To <u>drive</u> the early adoption and effective use of ICT by government and businesses for greater internal and external communication, as well as for greater efficiency, visibility, availability and performance.

The strategic thrusts for 2017 – 2021 have been adjusted accordingly to spur the timely realisation of the objectives of the National ICT Policy.

### **E**nvironment

- I. Utilise ICTs to accelerate the sustainable use and management of the natural environment and resources
- II. Establish a robust legal and regulatory framework that enables and supports business, encourages enterprise, and engenders public trust and confidence in ICTs

### **L**earning

- I. Enhance the education experience and its effectiveness through formal and informal channels
- II. Accelerate the development of on-island ICT capability and talent, with a propensity for ICT-based innovation and creativity

### **A**ccess

- I. Ensure pervasive, robust, affordable, on-island and international ICT infrastructure and broadband connectivity
- II. Accelerate the development of a connected population, who routinely and effectively use ICTs in their everyday lives

## Virtual

- I. *Actively include and involve the Diaspora to accelerate the development of Montserrat's virtual population*
- II. *Leverage ICT to accelerate the development of virtual communities and interest groups*

## Adoption

- I. *Accelerate the delivery of, and uptake in, public services*
- II. *Accelerate business development, growth and competitiveness through the use of ICT*

In order to facilitate successful achievement of the strategic thrusts, a detailed Implementation Plan has been prepared, which includes major programmes and timelines associated with each strategic thrust, along with considerations and recommendations for overall governance, funding, change management and stakeholder engagement.

The governance structure for implementation of the Plan will require:

- The Minister of Communications, Works and Labour to assume the role of National ICT Champion while the overall responsibility for the National ICT Plan continues to reside with the Ministry of Communications, Works and Labour (MCWL);
- Maintenance of a Cabinet-appointed, multi-stakeholder, National ICT Council responsible for steering and advising on execution of the National ICT Strategy;
- Creation of a National ICT Unit within the Ministry of Communications, Works and Labour, with functional responsibility for the implementation and execution of the National ICT Strategy; and
- Consolidation of DITES into the National ICT Unit within MCWL in order to serve the broader national ICT mandate, as well as to optimise the availability and use of GOM's limited ICT expertise and resources.

With successful implementation of the National ICT Plan 2017 – 2021 as prescribed herein, some key outcomes and targets to be achieved by the end of the period are as follows -

<b>NATIONAL ICT TARGETS</b>	<b>BY</b>
<b>100%</b> of schools with computers and reliable Broadband Internet access	<b>2018</b>
Functional international submarine fibre connectivity established	<b>2019</b>
<b>75%</b> of the population regularly using the Internet	<b>2021</b>
<b>95%</b> of households with Broadband Internet access	<b>2021</b>
<b>50%</b> of businesses online and realising tangible benefits	<b>2021</b>
<b>50%</b> of Government services available online	<b>2021</b>
<b>50%</b> of the population accessing Government services online	<b>2021</b>

Finally, in recognition of the rapid pace of technological innovation, the Plan identifies emerging technologies that should be considered at the implementation phase to ensure relevance and optimal use of resources in fulfilling the goals of the Plan.

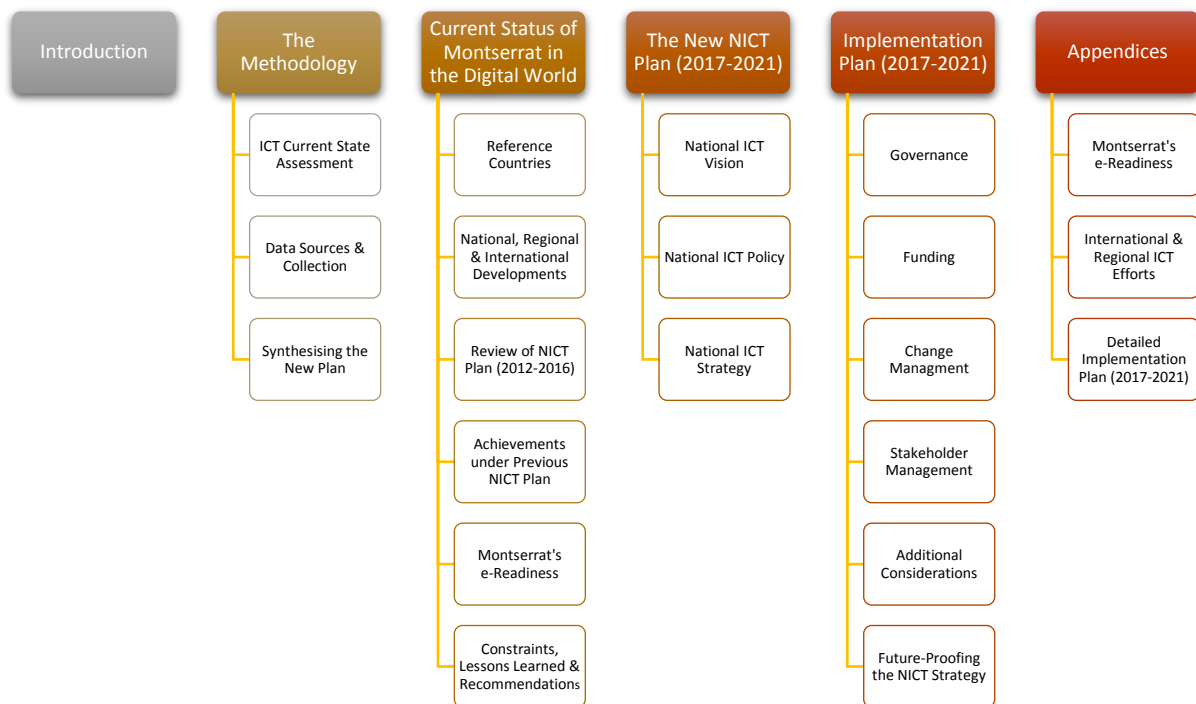
# 1. Introduction

The Government of Montserrat (GOM), through the Ministry of Communications, Works and Labour (MCWL), undertook to update the National ICT Plan (2012 – 2016) for the new period 2017 to 2021, in order to align it with the Sustainable Development Plan and other recent national plans. The GOM engaged the Caribbean Telecommunications Union (CTU) to assist in developing the new Plan. The exercise entailed, but was not limited to:

- Review of the progress made under the National ICT Plan 2012 – 2016;
- Review and update, as appropriate, of the ICT programmes and projects not completed under the National ICT Plan 2012 – 2016;
- Revalidation of the strategic thrusts established in 2012 in the context of current national priorities, the energy policy and emerging ICT trends; and
- Identification of new appropriate, strategic thrusts and relevant ICT programmes and projects consistent with current best thinking and emerging global ICT trends.

This document presents the updated National ICT Plan (2017 – 2021) and is the culmination of work undertaken over the period September 2016 to February 2017. *Figure 1* below highlights the main sections and sub-sections of the document.

*Figure 1 - Document structure highlighting main sections*



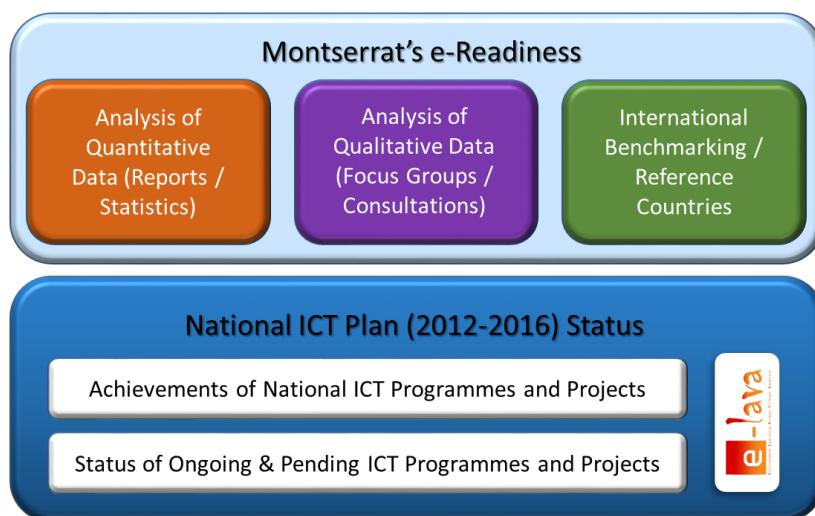
## 2. The Methodology

Any update of the National ICT Plan must effectively build on the foundation established by the previous Plan and incorporate appropriate new strategies to cater for the current and emerging environment. Accordingly, the following approach was used to develop the new Plan for the period 2017 – 2021.

### 2.1. ICT Current State Assessment

In order to assess the current state of ICT in Montserrat, its current e-Readiness was considered and the progress made under the previous National ICT Plan was reviewed. *Figure 2* below illustrates the components and sub-elements of the assessment framework used.

*Figure 2 - Framework for Current State Assessment*



The first component of the current state assessment, Montserrat's e-Readiness, involved analysis of available quantitative data obtained from official reports, published statistics and other appropriate sources as well as qualitative data obtained from focus groups, consultations and interviews. These data sets were complemented with international benchmarking based on established international reports and studies for suitable reference countries.

The second component of the current state assessment, National ICT Plan Status, considered the extent to which stated targets of the National ICT Plan (2012-2016) were met; the success of the programmes and projects implemented and the learning points from implementation, inclusive of governance arrangements. These elements

were essential for ensuring that investments were optimised, that there was continuity in the programmes and that technological developments and trends were fully leveraged. This approach also enabled identification of ICT initiatives for which new programmes and projects, not specified in the previous Plan, had emerged. The assessment was framed within the five (5) established policy areas – *Environment, Learning, Access, Virtual* and *Adoption* – captured by the acronym **e-lava**.

## 2.2. Data Sources & Collection

The previous National ICT Plan sought to capture the thoughts and aspirations of the citizens, businesses, academia and the Government of Montserrat. Similarly, for this update, several strategic consultations with key individuals, entities and groups were convened in order to ensure relevance and maintain a sense of ownership of the new Plan. These consultations were aligned with Government’s desire to continue encouraging and developing a culture of ICT and provided critical insights for the development of the updated Plan.

Where practical, the consultations were structured to achieve economies of scale in terms of time and resources, allowing the “past experiences and observations” as well as the “future aspirations and recommendations” to be simultaneously captured. This approach satisfied the requirements of both the current state assessment and the collaborative aspect of the new Plan’s development.

## 2.3. Synthesising the New Plan

All the data and information inputs thus compiled were subsequently analysed and salient principles and requirements were identified to inform the policy provisions, strategic thrusts, major programmes and projects for the planning period. All of these elements were drafted into a complete National ICT Plan 2017 – 2021, inclusive of the Policy, Strategy, and Implementation Plan with specific recommendations for effective governance of the overall five-year undertaking.



## 3. Current Status of Montserrat in the Digital World

### 3.1. Reference Countries

The more prominent international and regional ICT studies exclude Montserrat because of its status as an overseas territory of a sovereign nation. For this reason, Montserrat is precluded from being directly compared with similar countries in the various international and regional rankings. Notwithstanding, close examination of the respective national ICT plans of reference countries provided useful insights for the National ICT Plan (2017 – 2021). The same reference countries identified for Montserrat’s previous National ICT Plan were selected and their respective current ICT plans and strategies reviewed in detail. The reference countries were selected based on the following considerations:

- Ease of access to publicly available information on the country’s ICT plans and progress;
- Incorporation of the country in major international/regional ICT surveys;
- Focus on the development of ICT as a sector and significant contributor to national GDP;
- Recognition as a leader internationally/regionally in its use of ICT for development and economic growth;
- Geographic proximity to Montserrat; and/or
- Existing or potential strategic relationship with the Government of Montserrat.

The list of reference countries and a snapshot of their individual rankings across five relevant international studies is provided in *Table 1* below. One additional country, St. Kitts and Nevis, is also added to this comparison table given its recent superior showing in 2016 ITU rankings:

Table 1 - International Rankings for Reference Countries

COUNTRY	Networked Readiness Index Ranking 2016	Global Competitiveness Index Ranking 2016-2017	Global e-Government Ranking 2016	ICT Development Index Ranking 2016
Singapore	1	2	4	20
Malta	34	40	30	24
Chile	38	33	42	56
Barbados	39 <sup>(2015)</sup>	72	54	35
Mauritius	49	45	58	73
Trinidad & Tobago	67	94	70	67
Jamaica	83	75	112	99
St. Kitts & Nevis	--	--	94	34
Antigua & Barbuda	--	--	100	75

The specific international studies referenced in the table above are:

- The Global Information Technology Report
  - (2015), *ICTs for Inclusive Growth*, World Economic Forum;
  - (2016), *Innovating in the Digital Economy*, World Economic Forum;
- The Global Competitiveness Report (2016-2017), World Economic Forum;
- Global e-Government Survey (2016), *e-Government in Support of Sustainable Development*, United Nations; and
- Measuring the Information Society Report (2016), Global ICT Development Index (2016), International Telecommunication Union.

The case studies and experiences of these countries, as captured in the surveys referenced, provide unique value for any country seeking to leverage “current best thinking”.

### 3.2. National, Regional & International Developments

The Government of Montserrat continues to take cognisance of the evolving landscape of international and regional initiatives designed to foster the adoption of ICTs for development. Foremost of these are a number of initiatives being driven by the United Nations (UN), including the World Summit on the Information Society (WSIS) Action Lines, the recently finalised Sustainable Development Goals (SDGs) targeted for achievement by 2030, and related initiatives e.g. by the International

Telecommunication Union (ITU) emphasising ICTs as tools for economic development and social inclusion. The UN has also exhorted all countries to have a national broadband policy in place.

In the Caribbean, as part of developing the digital economy regionally, CARICOM is moving forward with the implementation of a Single ICT Space. This has been defined as a harmonised eco-system of ICT policies, legislation, regulations, technical standards, best practices, networks and services, to advance the Community goals of functional cooperation and economic integration. More information on these and other relevant, regional initiatives of the ITU and Caribbean Telecommunications Union (CTU) is provided in *Appendix B: International & Regional ICT Efforts*.

Each of these initiatives has benefited from wide consultation and lessons learned from various regions and countries that have similarly identified ICT as a major catalyst for transforming and sustaining their economies. In formulating Montserrat's new National ICT Plan, a number of these lessons which were found to be relevant to our local circumstances were duly taken into account.



Primarily though, our Sustainable Development Plan has already established several national priorities, for which the new National ICT Plan must serve as *supporter, enabler* and *accelerator*. Foremost of these is the SDP's overall vision for Montserrat to be achieved by the year 2020:

*“A healthy and wholesome Montserrat, founded upon a thriving modern economy with a friendly, vibrant community, in which all our people through enterprise and initiative, can fulfill their hopes in a truly democratic and God-fearing society”*

The new National ICT Plan has also been designed to complement other national priorities and plans inclusive of the following –

- The Montserrat Energy Policy (2016 – 2030)
- Ministry of Communications, Work & Labour Strategic Plan (2016/17 – 2018/19)
- Montserrat Labour Market on-Island Study (2013)
- Montserrat Tourism Master Plan (2015 – 2025)
- Montserrat's Innovation Strategy (2016 – 2020)

### 3.3. Review of NICT Plan (2012 – 2016)

#### National ICT Vision

In 2012, Government formulated a vision statement for ICT development and ICT-supported development based on feedback from extensive public consultation. The resulting National ICT Vision inspired action and focused efforts towards a *green, connected and thriving* Montserrat. The Vision was for Montserrat to actively participate in the digital world.



#### National ICT Policy

The connotations of *green, connected and thriving* – a representation of the aspirations, hopes and concerns of the population, were captured in the **e-lava** concept. The National ICT Policy defined five (5) focus areas for prioritised action in the application of ICT towards achieving the National ICT Vision, namely *Environment, Learning, Access, Virtual* and *Adoption*.



Informed by the basic tenets of ICT-enabled, national transformation and development, these were represented by the uniquely Montserratian acronym **e-lava** as summarised in *Table 2* below.

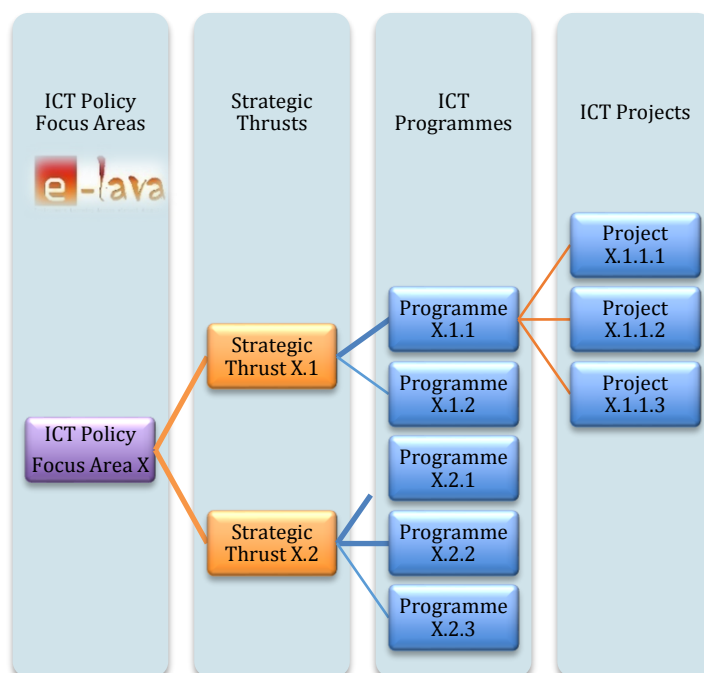
*Table 2 - National ICT Policy: Focus Areas & Objectives (2012 - 2016)*

National ICT Focus Area	National ICT Policy Objective
<b>Environment</b>	<i>To ensure the existence of an enabling legal and regulatory environment that promotes ICT-facilitated activities and development in a secure, ethical, environmentally sensitive and economically sustainable way</i>
<b>Learning</b>	<i>To enhance the capacity and propensity of, as well as opportunities for, the population to effectively and innovatively create and use ICT tools for education, business, social, cultural and leisure purposes</i>
<b>Access</b>	<i>To enable universal, open, affordable, wired and wireless access to high capacity, high availability, national and international broadband infrastructure, technology and services</i>
<b>Virtual</b>	<i>To promote the use of ICT tools for establishing and supporting physical and virtual communities and interest groups to preserve and enhance Montserratian cultural identity and values amongst the resident population as well as the Diaspora</i>
<b>Adoption</b>	<i>To promote the early adoption and effective use of ICT by government and businesses for greater internal and external communication, as well as for greater efficiency, visibility, availability and performance.</i>

## National ICT Strategy

Built on the ICT Policy’s focus areas, as captured by **e-lava**, the National ICT Strategy identified a number of strategic thrusts designed to achieve the Policy’s objectives through related ICT programmes and projects. This framework is illustrated in **Error! Reference source not found.**, below.

Figure 3 - Framework for National ICT Policy & Strategy



Following are the strategic thrusts defined for each focus area in **e-lava**:

### **e**nvironment

- 1) *Utilise ICTs to promote the sustainable use and management of the natural environment and resources*
- 2) *Establish a robust legal and regulatory framework that enables and supports business, encourages enterprise, and engenders public trust and confidence in ICTs*

### **L**earning

- 1) *Enhance the education experience and its effectiveness through formal and informal channels*
- 2) *Develop on-island ICT capability and talent, with a propensity for ICT-based innovation and creativity*

## Access

- 1) *Ensure ubiquitous, robust, affordable, on-island and international ICT infrastructure and broadband connectivity*
- 2) *Develop a connected population, who routinely and effectively use ICTs in their everyday lives*

## Virtual

- 1) *Actively include and involve the Diaspora to establish and develop Montserrat's virtual population*
- 2) *Leverage ICT to promote and develop virtual communities and interest groups*

## Adoption

- 1) *Excel in the delivery of public services*
- 2) *Accelerate business development, growth and competitiveness through the use of ICT*

A full slate of programmes and projects based on to these thrusts was developed and included in the National ICT Plan along with a detailed Implementation Plan identifying relevant time frames and responsible agencies. A governance framework for managing successful roll-out of the overall Plan was also specified.

### 3.4. Achievements under Previous NICT Plan

The achievements of the first Plan and the current ICT landscape in Montserrat were examined within the framework of the National ICT Policy's five focus areas in order to identify the progress made as well as the challenges and issues that would need to be addressed in moving forward.

#### 3.4.1. Environment

The focus area, '*Environment*' represented both the natural environment and the policy and regulatory environment in Montserrat. The emphasis on '*Environment*' was related to green initiatives that gave due attention to the sustainability and management of Montserrat's natural resources. Following are the activities which were undertaken.

- The upgrade of the Brades Power Plant, inclusive of smart technology, for greater efficiency and reliability. Work has commenced, and is well advanced.
- Geothermal exploration. A third well has been completed and holds the promise of a renewable energy supply for Montserrat, along with many of the

attendant benefits. Assuring reliable power for ICT development, the National Energy Policy 2016 – 2030 adopts a long-term perspective on energy through a comprehensive framework that involves population education, modern energy infrastructure and robust governance.

- Environmental studies and disaster management collaboration. Coupled with management of the environment, ICT is also key for disaster management and mitigation, one of the five strategic goals of the SDP. The Disaster Management Coordination Agency (DMCA) and the Montserrat Volcano Observatory (MVO) are the agencies most prominently focusing on this aspect of Montserrat's ongoing development. The MVO has been collaborating with the University of the West Indies (UWI) based on UWI's interest in possible environmental studies and disaster management, noting that there are also provisions for up to five scientists to be provided under contract from UWI.
- A National Incident Command Plan has been drafted by the DMCA.
- Disaster management is supported through the telecommunications service providers, notwithstanding the absence of a formal agreement being in place. They collectively can send messages and alerts to mobile phones and cable subscribers.
- A contract has been awarded for a project to encourage and enable an e-Waste reduction society.

### Insights & Recommendations

- The MVO currently uses several disparate ICT systems in the course of its operations. There is a need for programmers who can analyse the various systems with a view to coding for integration.
- The telecoms providers should give special consideration to the connectivity and bandwidth needs of both the DMCA and MVO.
- Significantly, there has been little progress in the areas of e-Legislation and cybersecurity. This increases the vulnerability of individuals and institutions given the greater use of, and reliance on, ICTs. Greater priority must be given to Montserrat's e-Legislative agenda, for which external assistance and expertise may be most prudent. This considers both the skills and availability challenges observed over the 2012 to 2016 period.



### 3.4.2. Learning

The focus area, '*Learning*' sought to enhance the education experience through the effective incorporation of ICT in schools and the development of the on-island ICT human resource pool. Within the wider context of ICT in education, there has been marked progress in the following areas.

- The administration of education services has been improved through partial implementation of the Education Management Information System (EMIS) in all secondary schools.
- Laptops were distributed in phases to secondary school students between 2013 to 2015 and teachers have been receiving training in the areas of computer usage and curriculum development. The rollout has since been halted partly on account of concerns over the quality of some of the laptops supplied.
- A "Tablets for Students" programme is being discussed as a means for advancing the education agenda. At the same time, there is an interest in exploring the possible use of smart phones as teaching/learning tools in schools.
- Computer labs and Internet access have been provided in all public primary and secondary schools. There are, however persistent complaints about the reliability of the service.
- Applications such as Edmodo<sup>1</sup> are being used in the private education system for enhancing teacher-student engagement and collaboration.
- Efforts are being made to transition from the use of printed textbooks to electronic learning platforms.
- Montserrat's public education has recently benefitted from the Caribbean Development Bank's (CDB) Basic Needs Trust Fund (BNTF<sup>2</sup>), whereby thirty-two (32) primary school teachers received training in the use of Interactive White Boards.
- Montserrat's National ICT Week is now an annual event designed to raise public awareness, interest and literacy in ICT and ICT-related developments. Notably,

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<sup>1</sup> Edmodo is an educational technology offering communication, collaboration, and coaching tools to schools and teachers. The Edmodo network enables teachers to share content, distribute quizzes, assignments, and manage communication with students, colleagues and parents.

<sup>2</sup> The Basic Needs Trust Fund (BNTF) is a Caribbean Development Bank (CDB) grant-funded programme targeted at improving living conditions in poor communities in 10 participating countries, including Montserrat.

some emphasis has been placed on the role of women in ICT through observance of the International Girls in ICT Day 2015 and 2016.

- Montserrat has progressed in the area of ICT skills development. In 2015, MCWL approved fourteen (14) local projects covering different aspects of Montserrat's ICT-enabled growth and advancement. The projects illustrate the innovative capacity of the on-island talent pool and extend Montserrat's ICT culture. One of the key derivatives is a cadre of ICT Cadets, equipped with various ICT skills. The fourteen (14) projects<sup>3</sup> are summarised below –
1. Promoting the use of ICTs through programmes such as Girls in ICT Day and National ICT Week.
  2. Establishing a web-based vehicle, driver's license and Ministry of Transport Information Tracking System.
  3. Improving the written driving test to make it electronic and automated.
  4. Providing ICT-based training in the field of modern Broadcasting skills and processes.
  5. Using ICT aids and systems to provide educational support in the areas of conversational Spanish, Geography, Social studies, Principles of Accounts and Principles of Business.
  6. Providing training in new media communication, journalism, public relations and marketing.
  7. Preparing children in the areas of creative writing, playing of musical instruments and performing cultural arts.
  8. Imparting knowledge and design skills to ICT Cadets in basic graphics and printing.
  9. Providing training in professional audio recording, engineering, CD duplication, video and photography production.
  10. Cultivating and enabling the emergence of an e-waste reduction society.
  11. Providing training in screen printing and embroidery.
  12. Providing Cisco certification and training in various areas of ICT and renewable energy.

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<sup>3</sup> Source: DiscoverMNI (2015) *List of Successful ICT Projects*. [Accessed 27 Sept 2016]  
[www.discovermni.com/2015/09/list-of-successful-ict-projects/](http://www.discovermni.com/2015/09/list-of-successful-ict-projects/)

13. Digitizing the manual records at the Montserrat National Trust.
14. Training and employment of target groups in ICT media related fields.

### Insights & Recommendations

- The ICT infrastructure, equipment and services in the public schools are problematic as captured in a recent report<sup>4</sup> commissioned by the Ministry of Education. In particular, there have been persistent issues with the speed and reliability of the Internet and especially so with WiFi access. Given that these are critical foundational components of Montserrat's overarching ICT in Education efforts, these problems need to be addressed with some urgency. Left unattended, they will serve to erode teacher and student confidence in the use of ICTs for an enhanced education experience.
- Focus must continue to be placed on the effective integration of ICTs into the school curricula to support the development of on-island ICT skills and expertise.
- There is a need and the opportunity is there, for more frequent and targeted communication to the public in terms of ICT-related developments and progress. Raising the levels of ICT awareness and sophistication are essential to moving from a download culture to more of an upload culture. This issue is easily observed in the disparity between the download speeds and upload speeds offered by the telecommunications service providers.
- While awareness-building is a collective responsibility, the regulator, Montserrat Info-Communications Authority (MICA) must play a critical role in raising awareness and educating citizens and should also provide information and guidance for online safety. This is especially important as Montserradians are increasingly participating in the digital world. To maximise its effectiveness in this regard, MICA should work together with the appropriate agencies or groups in GOM, private sector and civil society.

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<sup>4</sup> DRAFT Final Report of December 9<sup>th</sup> 2016 – Consultancy Services to Enhance the Integration of ICTs in Primary Schools in Montserrat

### 3.4.3. Access

The focus area, 'Access' considered Montserrat's on-island and international connectivity infrastructure as well as the experience of accessing or connecting to the infrastructure. Consistent with this focus, the following has been achieved:-

- Montserrat's international connectivity is expected to be significantly augmented through a collaborative project with the Department for International Development (DFID) which seeks to install, operate and maintain a subsea fibre optic cable between Montserrat and neighbouring islands.
- DITES received a root server from Packet Clearing House as part of the wider effort to establish an Internet Exchange Point (IXP) in Montserrat. Additional equipment is now needed to commission the IXP, which is expected to be located at the DMCA. However, administrative arrangements between the major service providers, FLOW and Digicel, need to be determined in order to bring the IXP into being.
- Montserrat's country code Top Level Domain (.ms ccTLD) continues to be administered by MNI Networks, for which fees are remitted to the Treasury. MICA, as the local Internet services regulator, is currently leading negotiations with MNI Networks for an updated operational agreement possibly to include redelegation of the ccTLD.
- MICA has primarily been focused on the collection of fees (e.g. license fees, concession fees, amateur fees). In terms of spectrum management, MICA follows the FCC and ECTEL standards.
- With the introduction of Digicel, as a second telecommunications service provider to the incumbent FLOW (formerly LIME), there have been observed shifts in the domestic telecoms market. Digicel offers broadband Internet, TV and GSM services and is currently the only official provider of cable television services in Montserrat. The highest residential Broadband package currently offered by Digicel is 50Mbps down and 10Mbps up.
- The ICT utilisation statistics (see *Table 3*) suggest that some persons have two mobile handsets, i.e. one each with FLOW and Digicel. FLOW has indicated its intention to expand its service offerings, pending the outcome of current developments with Liberty Global<sup>5</sup>.

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<sup>5</sup> Liberty Global acquired Cable & Wireless Communications in 2016 subsequent to the latter's acquisition of Columbus (FLOW) in 2015

Table 3 - Comparative ICT Statistics

	Montserrat (2011)	Montserrat <sup>6</sup> (2015/2016)	Montserrat % Penetration (Households)	Montserrat % Penetration (Population)	ECTEL States (2015) % Penetration (Population)
Population	4922				
Households	2335				
Fixed Line Subscriptions	2,600	2,850	122%	57.9%	24.5%
Mobile Coverage		95%			
Mobile Subscriptions	3,400	6,900	296%	140%	113%
International Internet Bandwidth		1GB			
Broadband Internet Subscriptions	1,200	2,150	92%	43.7%	19.2%
Mobile Broadband Subscriptions				<60%	40.6%

### Insights & Recommendations

- According to MICA, the concept of the Universal Service Fund (USF) is not feasible in Montserrat since there is no place that is not being served, and population size makes any such facility financially burdensome on the telecommunications service providers. However, some type of funding should be considered to cater for specialised services – e.g. ICTs for persons with disabilities (ICT4PWD).
- In terms of total mobile subscriptions, less than 50% of customers have data plans. This may be in part attributable to the demographics of the market, where the average age is over 50 years old. The newness of ‘data’ as a concept combined with the novelty of smart phone technology has been cited as one of the barriers to greater uptake.
- MICA should develop a framework for collecting comparative data from the telecommunications service providers. This is an essential component of MICA’s role in the now competitive telecommunications environment.

<sup>6</sup> Source: Based on 2015/2016 consolidated data from FLOW and Digicel

#### 3.4.4. Virtual

The focus area, '*Virtual*' set out to include all Montserratians, irrespective of where they may be, in the social, cultural and economic life of Montserrat. It related both to the Diaspora's participation in Montserrat affairs and to the residents' collaboration with the Diaspora to secure economic, social and other opportunities within and outside of Montserrat. Consistent with the focus, the following has been achieved -

- Montserrat has made progress in the effective engagement and involvement of the Diaspora. Development of an online Diaspora Registry and Skills Banks has been completed, extending the pool of resources available to Montserrat. Teleconferencing and videoconferencing facilities are now more commonplace and widely used within both public and private sector institutions.
- An archiving project is well underway at the National Trust involving the digitisation of national records. This has positive implications beyond the Trust itself, given the need for such digitisation services in other departments and sectors. These efforts are consistent with preserving Montserrat's heritage online.
- Approximately 50% of Montserrat's communities of interest and communities of practice have an online presence.
- A Land Information System is currently available online, based on GIS technology, and capable of accepting credit card payments through an online merchant account with RBC Royal Bank. Based on other projects approved or underway, it is expected that there will be other instances of ICT-enabled Government services capable of accepting payments online. This is particularly useful for members of the Diaspora community in their interactions with Government.

#### Insights & Recommendations

- The issue of payment remains a constraining factor for Montserrat's e-commerce and e-business efforts. There is still no "card" culture in Montserrat. The banks have indicated that many businesses are unwilling to pay the 3% - 4% fees associated with credit card transactions, and are averse to the 1.5% charge associated with debit card transactions. This has further limitations for visitors to the island, many of whom typically anticipate the availability of credit card facilities. In the context of Montserrat's Tourism Master Plan, this is an important issue.

### 3.4.5. Adoption

The focus area, '*Adoption*' was intended to increase the effective use of ICT by both the Government and the business community. It identified the key role that Government must play as an early adopter in the use of ICT for improving the quality, availability, accessibility and transparency of public services. '*Adoption*' also referred to the way in which Montserratians use ICTs to operate their businesses, provide and/or access goods and services and pursue their social and personal objectives. Consistent with this focus, the following has been achieved –

- All Government offices are now connected to the Government Network which provides email and Internet services, allowing for the secure exchange of information between institutions and agencies within the public sector. Connectivity has been achieved through a mix of wireless and wired technologies.
- Government has used different approaches to achieve greater efficiency and effectiveness in public service delivery. The benefits of hosted solutions are evident through examples such as the Education Management Information System (EMIS) hosted in Canada, the Passport Application/Renewal system hosted through a Consulate, and the e-Procurement platform hosted by CARICOM.
- Several key government services are now available online, such as applying for Tourist Visa, applying for a Resident Permit, and accessing Land Information online.
- Montserrat's Parliament and Cabinet operate in a largely paperless environment, by distributing, accessing and reviewing their various documents electronically.
- Under the ambit of Government Process Reengineering, business process reengineering was undertaken for the Births, Deaths and Marriages Registry, and similarly for the Driver's Licence System.
- Development is underway for online Property Tax and Income Tax applications.

### Insights & Recommendations

- The Government has been striving to make effective use of ICTs. Many Government institutions and agencies have websites, however, many of them are out of date and feature broken links. This is more broadly tethered to the e-Government Strategy for Montserrat developed in 2010 of which several of the



recommendations are still valid (e.g. information/document management). These recommendations offer useful guidance in the interim, pending the availability of an updated e-Government Strategy.

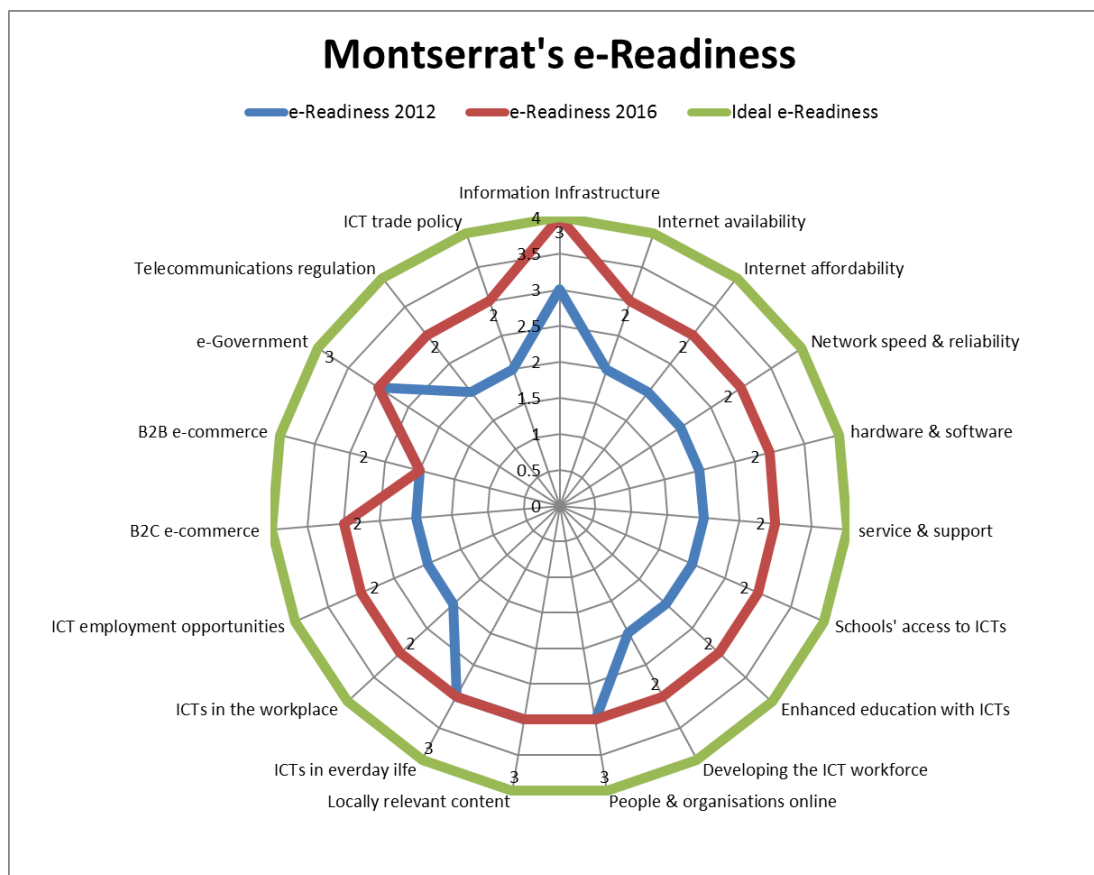
- As Government endeavours to bring more e-services on stream, the notion of a National Electronic ID (single sign-on or e-ID) becomes increasingly relevant. Such an ID would be used to uniquely identify and authenticate individuals and entities when communicating/interacting with Government's various online applications and electronic systems. This has positive implications for supporting electronic transactions and eventual multi-channel service delivery whereby individuals and businesses would be accessing Government services through different public channels (e.g. online, mobile phone, automated self-serve kiosk). Given the prohibitive cost of implementing an e-ID solution for small populations, a shared platform approach might be worth pursuing with other British Overseas Territories.
- In order to ensure that Government, and by extension the people of Montserrat, realise the full value of current ICT investments, it is essential to have companion policies and guidelines. For instance, there should be policies governing the appropriate use of Government's networked services such as email and Internet. Such policies would address the perception that "access" is too restricted, and even withheld, in Government offices. In the absence of clear policy, situations of infrastructure abuse and individual conflict are more likely to occur.
- Greater emphasis needs to be placed on using ICTs for enhanced competitiveness in the private sector. Government must do more to stimulate and encourage businesses to have more of a digital presence in order to effectively extend their market beyond Montserrat's shores. The development of a digital space or online market for business-to-business (B2B) and business-to-consumer (B2C) interactions would act as something of a catalyst in this regard.

### 3.5. Montserrat's e-Readiness

Montserrat's e-Readiness was first assessed in 2012 as a component of the National ICT Plan, using the framework developed by the Center for International Development (CID) at Harvard University. e-Readiness<sup>7</sup> describes the extent to which a society has the necessary physical ICT infrastructure; has incorporated ICTs throughout Government, businesses, communities and in everyday life; has strong telecommunications competition and independent regulation with a commitment to universal access; and has no limits to ICT trade or foreign investment.

The framework considers 19 categories, ranking each by its level of advancement, represented by stages 1 through 4 (1 being the lowest and 4 being the highest). Based on the various achievements of the first National ICT Plan, a comparative e-Readiness assessment of 2012 and 2016 is presented in *Figure 4*. The results indicate progress and growth in multiple areas as Montserrat continues on its ICT journey.

Figure 4 - Montserrat's e-Readiness (2012 vs 2016)



<sup>7</sup> Refers to the definition of an e-Ready society taken from the Center for International Development (CID) at Harvard University.

Notably, there are a few categories with no apparent progress since the 2012 assessment, namely e-Government, B2B e-Commerce, ICTs in everyday life, locally relevant content and people & organisations online. This is not to say that there have been no developments, but rather that progress has not been to the extent that warrants moving to a higher ranking in the respective category. Details of the assessment are included in

## Appendix A: Montserrat's e-Readiness.

### 3.6. Constraints, Lessons Learned & Recommendations

Following are the key observations from the implementation experience over the period 2012 – 2016 which provide additional insight into issues that need to be addressed if the new ICT Plan (2017 – 2021) is to be successful.

- The National ICT Unit, as proposed, was intended to manage and coordinate the implementation and execution of the National ICT Plan. The absence of appropriate fulltime resources meant that the management and coordination function was competing with other priorities and responsibilities.

It would be prudent to identify the key staff and resource(s) required to increase the pace of programme/project implementation and act as the coordinator or intermediary between the various agencies and groups involved.

- The placement, role and responsibilities of DITES are matters for which there are varied views. The Department's documented mandate is somewhat incongruent with the observed reality of its staffing and actual focus. DITES is primarily staffed with computer technicians and does not have the requisite manpower to drive Government's e-services. Administratively, the lines of accountability present a less than optimal approach to governance of the National ICT Plan. MCWL is the agency responsible for Montserrat's National ICT efforts but does not have line responsibility for DITES, which is under the purview of the Office of the Premier. This arrangement allows competing interests and implementation gaps to exist between MCWL and DITES; a situation that is further challenged by the limited, on-island ICT resource pool.
- Several projects under the National ICT Plan involved the procurement or engagement of skills and services external to Government. This is a common, participatory approach to implementation that offers multiple socio-economic benefits, such as developing the local ICT sector and encouraging entrepreneurial innovation. However, there are a few concomitant concerns such as intellectual property rights and ensuring value for Government's investment.

There is a need for early legal involvement in Government's ICT discussions and negotiations. This requires suitable representation from the Attorney General's Office in activities such as the preparation / vetting of ICT procurement documents and the creation of standardised contracts for engaging external ICT services.

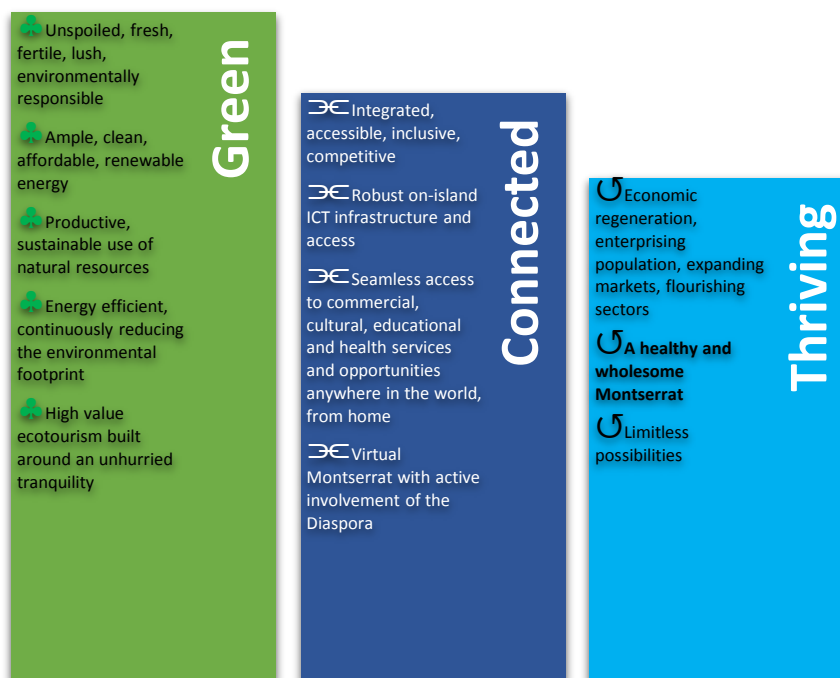
## 4. The New NICT Plan (2017 – 2021)

Our new National ICT Plan for the period 2017 – 2021 builds on the success of the previous Plan and considers the experience of implementing the programmes and projects contained therein. Critical to the success of the new Plan is the effective incorporation of the insights and recommendations gleaned from the previous five years of implementation. Timewise, the Plan is designed to coincide with the culmination of our Sustainable Development Plan in the year 2020, but directs our national ICT agenda to the year 2021. This allows time for new national priorities to be established for Montserrat, which can in turn inform the vision for the next stage of our ICT journey.

### 4.1. National ICT Vision

Montserrat has stayed the course in respect of the ICT Vision, to actively participate in the digital world. The connotations of *Green*, *Connected* and *Thriving* have endured in their representation of the aspirations, hopes and concerns of the population. This Vision is enduring and well suited for the period 2017 – 2021, as illustrated in *Figure 5* below.

*Figure 5 - Connotations of the National ICT Vision*



The existing logo for the National ICT Vision is a compound of the globe and the universal symbol for the “power” button typically found on electronic equipment. The arrows encircling the globe project movement and progress while maintaining the green, environmentally sensitive focus.



#### 4.2. National ICT Policy

The five (5) pillars of the National ICT Policy - *E*nvironment, *L*earning, *A*ccess, *V*irtual and *A*doption are well established and easily communicated through the **e-lava** acronym. In its original depiction, it intended to connote the fluid nature of ICTs and the rapid pace of technological change. Like volcanic lava, once hardened or solidified, the outcomes of the Policy’s five (5) pillars have changed, and will continue to change Montserrat’s socio-economic landscape and claim new territory in the digital world.

In support of this, the logo has been enhanced to reflect the hardening and solidification of Montserrat’s ICT efforts to date, establishing a firm and robust foundation for continued development and transformation. The new logo also conveys a sense of acceleration and speed, while at the same time capturing the power and boldness of a volcano.



Each pillar in **e-LAVA** has a distinct policy objective that is congruent with the National ICT Vision and considers the current state of ICT in Montserrat. Building on the focus areas of the earlier plan, the language has been amended to convey the acceleration of work in each area. These are highlighted in *Table 4* below.

Table 4 - National ICT Policy: Pillars & Objectives (2017 - 2021)

National ICT Pillar	National ICT Policy Objective
<b>Environment</b>	To <u>establish</u> an enabling legal and regulatory environment that promotes ICT-facilitated activities and development in a secure, ethical, environmentally sensitive and economically sustainable way
<b>Learning</b>	To <u>enhance</u> the capacity and propensity of, as well as opportunities for, the population to effectively and innovatively create and use ICT tools for education, business, social, cultural and leisure purposes
<b>Access</b>	To <u>support</u> universal, open, affordable, wired and wireless access to high capacity, high availability, national and international broadband infrastructure, technology and services
<b>Virtual</b>	To <u>increase</u> the use of ICT tools for establishing and supporting physical and virtual communities and interest groups to preserve and enhance Montserratian cultural identity and values amongst the resident population as well as the Diaspora
<b>Adoption</b>	To <u>drive</u> the early adoption and effective use of ICT by government and businesses for greater internal and external communication, as well as for greater efficiency, visibility, availability and performance.

### 4.3. National ICT Strategy

Building on the ICT Policy’s five pillars (**e-LAVA**), the National ICT Strategy identifies two (2) strategic thrusts for each pillar, to be pursued through a related set of programmes and projects. It is noteworthy that in their conception, the strategic thrusts identified in the previous Plan were necessarily nascent in their representation of the early stages of ICT-enabled development. However, based on the progress made and implementation experience, the emphasis has shifted from a ‘*facilitation*’ mindset to one of ‘*acceleration*’ for more tangible and timely results. This seeks to inspire a greater sense of urgency and purpose in more actively and aggressively pursuing the various programmes and projects. The strategic thrusts for 2017 – 2021 have accordingly been adjusted to ensure their continued currency and relevance in best realising the objectives of the National ICT Policy.

Government’s ongoing commitment to transparency and innovation has been strengthened by the incorporation of ‘Open Data’. Our public institutions produce and commission large quantities of data and information. By making this data available, our public institutions become more transparent and accountable to the citizenry. By encouraging the use, re-use and free distribution of this data, we will be promoting business creation and innovative services (including public services) that deliver social and commercial value.



'Inclusiveness' is a basic tenet of ICT-enabled development. In order to ensure that every Montserratian is included, ICT solutions for persons with disabilities (ICT4PWD), including seniors, have also been incorporated into the new National ICT Strategy.

#### 4.3.1. Environment

##### *Natural • Policy • Legal*

'Environment' encapsulates both Montserrat's natural environment and the legal/regulatory environment for ICTs and ICT-related activity. The connotation of 'green' as captured in the National ICT Vision embodies the need for effective management of, and sustainable use of Montserrat's natural resources. The notion of 'clean' is present in terms of renewable energy and proper disposal of electronic waste.

The National ICT Plan requires a supportive legal and regulatory framework. This is necessary to enable business, foster enterprise, and engender trust and confidence among the citizenry in using ICTs securely and routinely in their daily lives. ICT legislation will be non-discriminatory and technology neutral.

Guiding principles for the 'Environment' pillar include the following:

- Effective regulatory oversight for business facilitation that is open and competitive;
- Appropriate legislative framework for enabling secure, electronic transactions;
- Effective ICT framework and infrastructure for coordinated emergency communications as well as the planning for, response to and mitigation of the effects of natural disasters;
- ICTs powered by, and applied for efficient management and delivery of ample affordable, reliable and renewable energy; and
- Effective management and disposal of electronic waste.

The policy objective, strategic thrusts and key programmes developed for 'Environment' are summarised in *Figure 6*.

Figure 6 - Environment: policy objective, strategic thrusts & key programmes

<b>E</b> <i>To establish an enabling legal and regulatory environment that promotes ICT-facilitated activities and development in a secure, ethical, environmentally sensitive and economically sustainable way</i>	<b>ENVIRONMENT</b>	<b>STRATEGIC THRUST #1</b>	Montserrat: Go Green (Powered by ICTs)
		<i>Utilise ICTs to <u>accelerate</u> the sustainable use and management of the natural environment and resources</i>	Disaster Management & Mitigation
			Montserrat Volcano Observatory (MVO)
			e-Waste Management
		<b>STRATEGIC THRUST #2</b>	e-Legislation
		<i>Establish a robust legal and regulatory framework that enables and supports business, encourages enterprise, and engenders public trust and confidence in ICTs</i>	Montserrat CSIRT (Computer Security Incident Response Team)

Each of the key programmes is comprised of specific projects, initiatives or activities to be executed for the ‘Environment’ policy objective to be realised.

**Montserrat: Go Green (Powered by ICTs)** Media and ICT-related initiatives to build population awareness of “green” practices in routine activities.

Expedite completion of the national power supply upgrade to support reliable use of ICT and promote the supply of ample, reliable energy through use of smart and energy efficient ICT solutions.

Promote adoption of ICT solutions for energy and resource efficiency.

**Disaster Management & Mitigation** The planning and dissemination of policies and procedures for emergency use of public and private telecommunications systems and assets for public information, alerts, safety and interaction.

Establish, administer and maintain the national emergency communications infrastructure, plan and procedures.

**Montserrat Volcano Observatory (MVO)** MVO as a nucleus around which skills, including ICT skills, can be developed in support of Montserrat's socio-economic development.

Utilise MVO as a key aspect of Montserrat's tourism product.

Enhance the richness of the data across MVO's various ICT systems through greater integration.

**e-Waste Management** Create policy and legislation to treat with the appropriate disposal of electronic waste (e-Waste).

**e-Legislation** Comprehensive review of the legislative framework to identify and treat with existing gaps.

Update/create key policies, legislation and/or regulations that treat with issues such as:

- Computer misuse
- Electronic transactions (digital equivalence)
- Data protection and privacy
- Cybercrime
- Intellectual property
- Exchequer and Audit (electronic payments)
- Child Protection Policies

Build capacity to enforce cybercrime legislation and deal effectively with related offences (includes detection and prosecution).

**Montserrat CSIRT** Explore the feasibility of creating a local Computer Security Incident Response Team (CSIRT) or partnering with a CSIRT in another appropriate jurisdiction e.g. via OECS, CARICOM or UK.

#### 4.3.2. Learning

##### *Education • Literacy • Development*

'Learning' relates to the effective infusion of ICTs throughout the education system for enhanced teaching, learning and school administration. It envisions the

creation and customisation of education material and a collaborative environment in which parents, teachers and students purposefully interact.

This pillar also considers the ICT literacy of the population and the development of advanced ICT skills within the local ICT sector. As a tool, ICTs must support our desire to build a nation of modern and lifelong learners.

Guiding principles for the '*Learning*' pillar include the following:

- Opportunities for training and qualification/certification in appropriate technologies such as networking, Internet, information security, software development, database administration and computer repair;
- Creation and production of local content; shifting the balance from a “download” to more of an “upload” culture;
- Public education and sensitisation in ICT application and usage, also to include safe Internet usage and online practices; and
- Multi-modal distance education.

The policy objective, strategic thrusts and key programmes developed for '*Learning*' are summarised in *Figure 7*.

Figure 7 - Learning: policy objective, strategic thrusts & key programmes

<p><b>L</b> <b>LEARNING</b></p> <p>To enhance the capacity and propensity of, as well as opportunities for, the population to effectively, innovatively and creatively use ICT tools for education, business, social, cultural and leisure purposes</p>	<p><b>STRATEGIC THRUST #1</b></p> <p>Enhance the education experience and its effectiveness through formal and informal channels</p>	<p>ICT in Education</p>
		<p>ICT Awareness &amp; Impact</p>
		<p>EMIS (Education Management Information System)</p>
		<p>The ICT Channel</p>
	<p><b>STRATEGIC THRUST #2</b></p> <p>Accelerate the development of on-island ICT capability and talent, with a propensity for ICT-based innovation and creativity</p>	<p>ICT Incubation</p>
		<p>ICT Manpower Development</p>

Each of the key programmes is comprised of specific projects, initiatives or activities to be executed for the ‘Learning’ policy objective to be realised.

- ICT in Education** ICT in Education Implementation Plan to cover all ICT in Education elements.

  - ICT Equipment and connectivity for all schools
  - Institutional Strengthening at all schools
  - Integrate ICTs into the curriculum (ICT as a subject) to foster enhanced programming and system integration skills
  - Integration and training of private school teachers/educators in the use of ICTs for education
  
- ICT Awareness & Impact** Maintain an annual “National ICT Week” to coincide with major, on-island ICT events or workshops and promote other regional and international ICT observances. Activities can include:

  - School competitions in ICT innovation;
  - Free public lectures on ICT-related issues;

- ICT features aired on national broadcast channels;
- Demonstrations / exhibitions of ICT equipment (e.g. video-conferencing, 3-D television, etc.); and
- Application of ICT in relevant sectors e.g. agriculture, fishing, tourism, health, education, manufacturing.

Partner with MICA and relevant industry players to sensitise the public about personal safety in using the Internet.

**Education Management Information System (EMIS)** Enhance school administration by effectively leveraging school networks and an integrated portal for connecting Ministry of Education personnel, school principals, teachers, parents and students.

**The ICT Channel** Establish a multimedia communication channel with online and offline access that provides relevant ICT information packaged in an attractive and understandable way.

The ICT Channel will:

- Inform and educate the public on ICT issues that affect their daily lives;
- Raise public awareness and appreciation of the benefits and risks of ICTs;
- Provide a public forum to discuss ICT issues; and
- Feature citizen-produced appropriate content.

**ICT Manpower Development** Partner with relevant local and foreign institutions to ensure the availability of certified and/or recognised ICT training courses in relevant technologies (e.g. web-based technologies, databases, networks, information security, open source technologies).

**ICT Incubation** Develop policies and programmes to encourage ICT innovation, noting that it will require access to grant or concessionary funding and/or business incubator facilities for micro entrepreneurs.

Foster a holistic ICT approach across all Government Ministries/agencies to give incentives for, and spur the development of local ICT expertise.

### 4.3.3. Access

#### *Infrastructure • Connectivity • Inclusiveness*

'Access' considers Montserrat's on-island and international connectivity infrastructure as well as the degree of connectedness. The latter refers to the availability of high-capacity, reliable and affordable broadband services and end-user devices. 'Access' also contemplates the way in which, and the extent to which people access or connect to the infrastructure; that is via fixed or mobile devices and through wired or wireless connections. It seeks to provide users with modes of access with which they are most comfortable and which best serve their individual needs. This includes ICT for persons with disabilities (ICT4PWD) including seniors, which considers accessibility to ICT tools for individuals with special vision, hearing, dexterity, language or learning needs e.g. blind, deaf.

Guiding principles for the 'Access' pillar include the following:

- Pursuing a national broadband strategy;
- Ensuring robust on-island and international infrastructure and connectivity;
- Using ICT to develop, integrate, market and operate tourism sector;
- Providing world-best ICT infrastructure for Little Bay;
- Appropriate cost, capability, quality and accessibility of ICT services; and
- Increased national ICT penetration levels.

The policy objective, strategic thrusts and key programmes developed for 'Access' are summarised in *Figure 8*.

Figure 8 - Access: policy objective, strategic thrusts & key programmes

<p style="font-size: 2em; color: #0056b3; margin: 0;">A</p> <p style="color: #0056b3; margin: 0;"><b>ACCESS</b></p> <p style="color: #0056b3; margin: 0;"><i>To support universal, open, affordable, wired and wireless access to high capacity, high availability, national and international broadband infrastructure, technology and services</i></p>	<b>STRATEGIC THRUST #1</b>	National Broadband Strategy
	<i>Ensure pervasive, robust, affordable, on-island and international ICT infrastructure and broadband connectivity</i>	Enhanced ICT Infrastructure & Info-Communication Services
		International Fibre Connectivity
		Governance of Internet Resources
	<b>STRATEGIC THRUST #2</b>	Two-to-One (2-to-1)
	<i>Accelerate the development of a connected population, who routinely and effectively use ICTs in their everyday lives</i>	ICT4PWD

Each of the key programmes is comprised of specific projects, initiatives or activities to be executed for the ‘Learning’ policy objective to be realised.

- National Broadband Strategy** Develop a national broadband strategy with input from service providers and other stakeholders to define relevant services, technology options and localities.
- Define end-user broadband service (i.e. minimum download speed of x Mbps).
  - Determine the architecture for robust and resilient national, high bandwidth infrastructure and redundant international connectivity.
- Consider the use of wired and pervasive wireless connectivity to support economic priorities such as tourism, agriculture, fisheries, etc.
- Enhanced ICT Infrastructure & InfoComm Services** Facilitate new market entrants or public/private partnerships (PPPs) to drive the build out of telecoms facilities, and enhance service choices and affordability (e.g. availability of



long-term financing for enhanced viability of business cases, periodic review of service operator fees).

Establish and maintain a national framework for assuring the quality of network and customer service delivered by ICT service providers, including regulatory provisions for periodic reporting of service delivery metrics by service providers and customer complaint handling and escalation mechanisms.

**International Fibre Connectivity** Expedite and drive the re-establishment of international fibre connectivity to Montserrat.

Pursue development financing/funding or, if necessary, private/public partnerships (PPPs) to overcome financial and commercial challenges.

**Governance of Internet Resources** Effective regulatory oversight to maintain technically and administratively viable operation of Montserrat's '.ms' country code Top Level Domain (.ms ccTLD).

Encourage local Internet traffic exchange and/or prompt the development of a national Internet Exchange Point (IXP).

**Two-to-One (2-to-1)** Achieve a ratio of 2 suitable Internet connectivity devices (e.g. laptop, desktop, tablet computer, smart phone, e-reader, etc.) to every 1 household or business. Based on need and intended use, the types of devices would vary from household to household or business. Supporting considerations include:

- Institute appropriate tax and duty incentives to encourage investment, moderate the prices of consumer devices and enhance usage; and
- Eliminate or reduce duties on smart phones, laptops, tablets and consumer networking devices.

**ICT4PWD** Promote standards-based and innovative solutions to enable access to ICTs for persons with disabilities through:

- Awareness building of accessibility needs and solutions;
- Accessibility policy development; and
- Accessibility solutions provision.

#### 4.3.4. Virtual

##### *Society • Community • Culture*

'Virtual' endeavours to engage and involve all on-island and off-island Montserratians in the social, cultural and economic life of Montserrat. It considers both the Diaspora's participation in Montserrat's affairs and the residents' collaboration with the Diaspora to secure economic, social and other opportunities within and outside of Montserrat.

A key strategy to securing Montserrat's viability in the face of its geographical and demographic constraints is to leverage its virtual population. This foresees the challenges of limited local expertise and resources being mitigated through initiatives such as teleworking to access off-island knowledge and skills.

Guiding principles for the 'Virtual' pillar include the following:

- Actively and effectively integrating the Diaspora;
- Fostering online communities of interest (culture, heritage, fishing, tourism, farming, current affairs, events, etc.);
- Providing fully connected, ICT-friendly, on-island spaces;
- Stimulating local content creation, production, distribution and archiving;
- Digitising our national archives; and
- Enabling cross-border knowledge work.

The policy objective, strategic thrusts and key programmes developed for 'Access' are summarised in .

Figure 9 - Virtual: policy objective, strategic thrusts & key programmes

<p><b>V</b> <u>VIRTUAL</u> To increase the use of ICT tools for establishing and supporting physical and virtual communities and interest groups to preserve and enhance Montserratian cultural identity and values amongst the resident population and the Diaspora</p>	<p><u>STRATEGIC THRUST #1</u> Actively include and involve the Diaspora to <u>accelerate the development</u> of Montserrat’s virtual population</p>	Virtual Montserrat
	<p><u>STRATEGIC THRUST #2</u> Leverage ICT to promote Montserratian heritage and <u>accelerate the development of virtual communities and interest groups</u></p>	Montserrat Heritage Online
		Montserrat Community Values
		Montserrat Communities Online

Each of the key programmes is comprised of specific projects, initiatives or activities to be executed for the ‘Virtual’ policy objective to be realised.

- Virtual Montserrat** Maintain an active online Diaspora registry and skills bank to enlist the Diaspora in local business operations through use of ICT solutions such as teleworking and videoconferencing. This may be especially useful in cases such as finding suitable directors for board membership, international marketing facilitation and representation at international fora.
- Facilitate online access to, and electronic payment for Government and locally supplied services of interest to the Diaspora.
- Facilitate the creation of opportunities to derive economic value from the Diaspora such as business development incentives or public/private partnerships (PPPs) for online store fronts for Montserrat-based businesses.

- Montserrat Heritage Online** Digitise local media content and archives.  
Establish platforms for electronic access to Montserratian heritage content. This can either be on a commercial or non-profit basis. For instance, a Virtual Museum of Montserrat could be developed with secure, on-island and off-island repositories for digital assets.
- Montserrat Community Values** Optimise the use of Government and private sector media resources for promoting wholesome Montserratian values and activities.
- Montserrat Communities Online** Create and manage online collaboration spaces to support virtual communities of interest (residents and non-residents) such as:
- Montserrat news;
  - Community focus;
  - Special events coverage (e.g. festivals);
  - Volcano or other reports from the MVO, DMCA; and
  - Sector-based communities (e.g. Tourism, Agriculture, Fishing).
- Utilise the facilities of the ‘.ms’ Registry to establish .ms as Montserratians’ home on the Internet.

#### 4.3.5. Adoption

##### *Government • Businesses*

‘Adoption’ seeks to ensure that the national ICT efforts and investments redound to tangible benefit of the Government, the business community and indeed, all of society. It recognises the significant role that Government must continue to play in embracing ICT for all its attendant benefits. Through effective use of ICT, Government can improve the quality, availability, accessibility and transparency of public service delivery. The concept of Open Data holds the promise of reducing data duplication and promoting innovation within the public and private sectors. This may also have positive implications for revenue generation and revenue collection by way of enhanced or new services.

'Adoption' also encapsulates the way in which Montserratians use ICTs to operate their businesses, provide and access goods and services, and live their daily lives. Notably, such businesses will typically be Micro, Small and Medium-sized Enterprises (MSMEs) and will require guidance and support in adopting and applying ICT effectively.

Guiding principles for the 'Adoption' pillar include the following:

- Accelerating the development and delivery of Government e-Services;
- Driving public uptake in Government e-Services;
- Leveraging ICTs for greater public engagement and interaction;
- ICT to develop, integrate, market and operate tourism sector;
- Promoting 'open' online datasets for enhanced transparency and e-business development;
- Stimulating content creation and production;
- Expediting e-Commerce infrastructure, including national e-payment; and
- Attainment of the United Nations Sustainable Development Goals.

The policy objective, strategic thrusts and key programmes developed for 'Access' are summarised in *Figure 10*.

Figure 10 - Adoption: policy objective, strategic thrusts & key programmes

<p><b>ADOPTION</b></p> <p><b>A</b> To drive the early adoption and effective use of ICT by government and businesses for greater internal and external communication, as well as for greater efficiency, visibility, availability and performance</p>	<p><b>STRATEGIC THRUST #1</b></p> <p><i>Accelerate the delivery of, and uptake in, public services</i></p>	<p>Modern &amp; Model Government</p> <hr/> <p>Government e-Procurement</p> <hr/> <p>e-Democracy</p> <hr/> <p>Open Government Data</p>
	<p><b>STRATEGIC THRUST #2</b></p> <p><i>Accelerate business development, growth and competitiveness</i></p>	<p>Montserrat: Open for e-Business</p> <hr/> <p>Online Market (B2B, B2C)</p> <hr/> <p>ICT: Go Local</p>

Each of the key programmes is comprised of specific projects, initiatives or activities to be executed for the ‘Adoption’ policy objective to be realised.

**Modern & Model Government** Pursue a multi-channel service delivery approach to making Government services available to the public (e.g. online, telephone hotline, mobile phone, self-serve automated kiosks).

Ensure effective execution and coordination of the programmes and projects identified in the e-Government Strategy.

Complete the Government Process Reengineering (GPR) efforts in select departments to optimise key Government processes for greater efficiency, transparency and measurement.

**Government e-Procurement** Use an ICT platform (website / portal) to procure goods and services from the domestic and international markets.

Use the e-Procurement platform for the issue of Government tenders / requests for proposals.

**e-Democracy** Use Internet technologies for more effective and transparent public engagement, consultation and interaction (including the Diaspora) on matters of national policy and priority.

**Open Government Data** Develop and pursue the implementation of a Government-wide Open Data Policy which promotes the sharing of data across public service entities and opens public data for use by private organisations and the general public, to the extent that it is allowed by law.

**Montserrat: Open for e-Business** Complete a gap analysis to determine all impediments to facilitating online trading of goods and services (e.g. from supplier to customer including shipping, electronic payment, consumer complaints, etc.).

Introduce tax concessions for businesses that acquire and deploy ICTs to improve their efficiency and effectiveness, as well as for companies pioneering new markets in the ICT sector (e.g. manufacturing, cyber-security, software development).

Promote Montserrat to the rest of the world as being “Open for Business”.

**Online Market (B2B, B2C)** Establish the business-to-consumer (B2C) and business-to-business (B2B) Online Market as a single, digital trading space where buyers and sellers of goods produced in/for/by Montserrat can transact securely and conveniently.

Promote the use of the Online Market to encourage all businesses to participate in putting their “products” online. For instance, Government can consider procuring certain goods through the Online Market such as stationery and other office essentials)

**ICT: Go Local** Encourage and support the development of the domestic ICT industry through deliberate efforts to involve Montserratian ICT manpower in Government's ICT efforts.

Include a requirement for local ICT sector participation in all International ICT tenders in order to provide opportunities for employment and knowledge transfer.

Invite and encourage the local ICT sector to respond to Government's ICT needs that fall below an agreed threshold (e.g. complexity, cost, duration).



## 5. Implementation Plan (2017 – 2021)

The successful implementation of the programmes and projects contained within the National ICT Strategy must take into consideration the relationships, interdependencies and lines of separation between the various functions and activities. A governance framework has been developed to enable appropriate oversight, coordination, monitoring and general administration of the ICT Strategy's programmes, projects and initiatives.

The Implementation Plan includes timelines for the completion of key programme elements by the appropriate agencies in order to guide the sequencing of implementation. The Plan also addresses the issues of funding, stakeholder engagement and considerations for the future, given their actual and/or potential implications for the ongoing success of the ICT Strategy's undertakings.

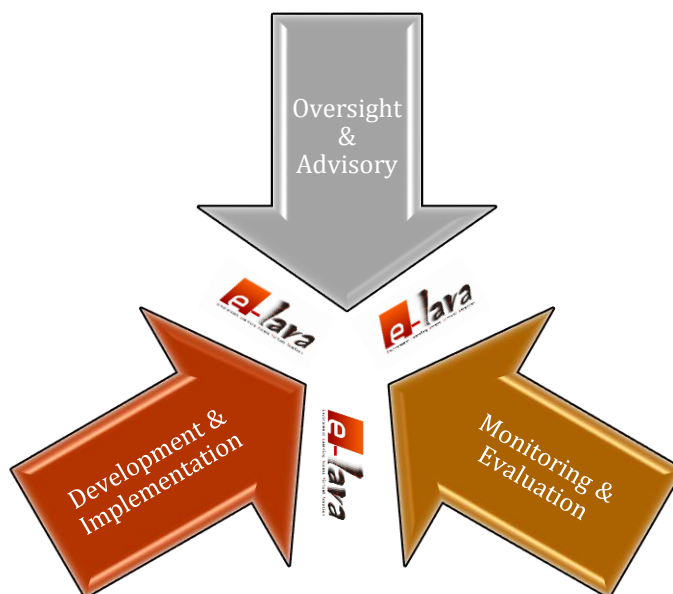
A detailed Implementation Roadmap, including targets, timelines and executing agencies for each of the National ICT Strategy's programmes/projects, is included in *Appendix C: Detailed Implementation Plan (2017 – 2021)*

### 5.1. Governance

A three-pronged governance framework (*see **Error! Reference source not found.***) is recommended to ensure the effective implementation of the National ICT Strategy. The framework comprises the three key responsibilities that must be appropriately and concurrently managed, namely:

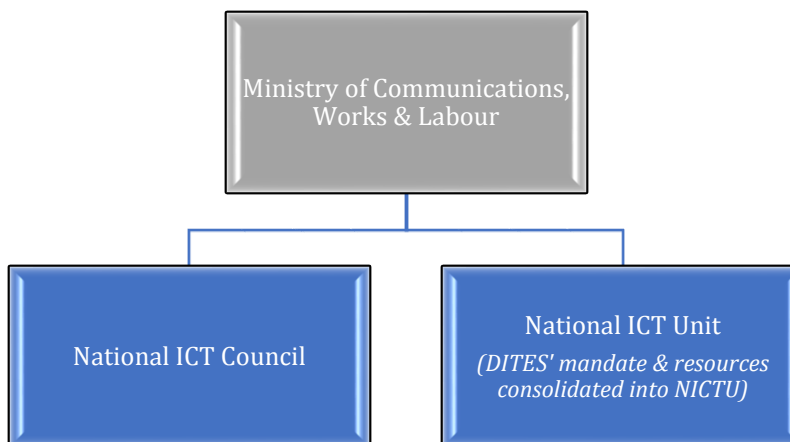
- i. Oversight and Advisory;
- ii. Development and Implementation; and
- iii. Monitoring and Evaluation.

Figure 11 - Three-Pronged Governance Framework



Institutionally, these responsibilities will be managed through the National ICT Council and a new National ICT Unit (NICTU) under the purview of the Ministry of Communications, Works and Labour (MCWL). The proposed configuration consolidates the Department of Information Technology and E-Government Services (DITES) into the National ICT Unit within MCWL in order to serve the broader national ICT mandate, as well as to optimise the availability and use of GOM’s limited ICT expertise and resources. A diagrammatic view of these relationships is presented in *Figure 12* below.

Figure 12 - Governance Relationships



## ***ICT Oversight and Advisory***

### ***The Minister of Communications, Works and Labour***

The National ICT Strategy is a transformational undertaking that requires active participation and support from all sectors and societies in Montserrat in order to be successful. The Minister of Communications, Works and Labour is the ICT Champion, and will continue to ensure effective sponsorship and coordination of the National ICT Strategy and give a regional voice for Montserrat's ICT interests.

### ***The Ministry of Communications, Works and Labour***

Overall responsibility for the National ICT Strategy and ICT policy formulation resides with the MCWL which will continue to undertake the successful implementation and execution of the National ICT Strategy, and provide regular status updates to Cabinet in this regard. MCWL will work closely with the Office of the Premier on matters of ICT policy formulation and formalisation.

### ***National ICT Council***

The National ICT Council will maintain its oversight and advisory functions. Appointed by Cabinet, and reporting to the Minister of Communications, Works and Labour, the National ICT Council functions as the steering committee for the implementation and execution of the National ICT Strategy. The Council also serves as an advisory body to the Minister of Communications, Works and Labour on matters of ICT policy and priority. The Council may assist in seeking funding and/or financial support for the Strategy's many initiatives and incubation-type activities.

The composition of the National ICT Council takes into account the need for effective coordination between key agencies, groups and stakeholders. It represents a collaboration between suitable persons from the public sector, private sector and civil society, who together provide the level of expertise and experience necessary for effective oversight of the National ICT Strategy.

The National ICT Council's recommended membership is presented in

*Table 5 below:*

Table 5 - National ICT Council Membership

#	Agency/Stakeholder/Group	ICT Council Member	Rationale/Justification for Membership
1	Ministry of Communications, Works and Labour	Permanent Secretary (CHAIR)	Represents the Ministry responsible for Government's ICT function.
2	Office of the Premier	Permanent Secretary	Represents the interests of the Honourable Premier
3	Montserrat Info-Communications Authority	Executive Manager	Responsible for regulation and welfare of the telecommunications sector.
4	Government Information Unit	Director	Responsible for Government communication and media. Provides insights into the use of social media for enhanced public engagement.
5	Business Community – Banking / Financial Services	Representative	Brings the perspective from the banking / financial community. Provides insights for electronic payment and various financing considerations.
6	Business Community – Small Business Association	Representative	Represents the interests of Montserrat's MSME sector and doing business <u>in</u> Montserrat.
7	Academic Community	Representative	Considers the broader issues of knowledge and skills development.
8	Diaspora Community	Trade Economist – Office of the Premier	Represents the Diaspora and concerns related to international trade and doing business <u>with</u> Montserrat.
9	National ICT Unit	National ICT Director (ex-officio)	Responsible for the implementation and execution of the National ICT Strategy, and the provision of secretariat support to the National ICT Council.

## ***ICT Development and Implementation***

### ***National ICT Unit***

A dedicated team of ICT specialists is required to coordinate and manage the implementation and execution of the National ICT Strategy. This National ICT Unit (NICTU) will be established within the Ministry of Communications, Works and

Labour, and at a minimum will incorporate staff with the following capabilities/expertise:

- ICT generalist skills;
- ICT project management;
- ICT procurement and contract management;
- ICT policy formulation/drafting; and
- ICT monitoring and measurements.

In the context of the National ICT Strategy's implementation and execution, NICTU will be responsible for:

- Managing the suite of programmes and projects identified in the National ICT Strategy;
- Creating the necessary Expressions of Interest, Terms of Reference and Requests for Proposals relevant to Government procurement processes;
- Managing and evaluating the performance of ICT suppliers / vendors / consultants / service providers under contract;
- Creating and revising ICT policies and standards; and
- Tracking Montserrat's ICT progress according to select national ICT measurement frameworks, such as those developed by the ITU, Observatory for the Information Society in Latin America and the Caribbean (OSILAC), World Economic Forum (WEF) and the Economist Intelligence Unit (EIU).

Significantly, the consolidation of DITES into NICTU means that NICTU will be responsible for developing and implementing intra-Governmental ICT initiatives. This requires additional knowledge and/or skills in the following areas:

- Business analysis / business process reengineering;
- Information management;
- E-Services delivery; and
- Government networks.

In addition to the aforementioned substantive duties, which are not exhaustive, NICTU will also provide secretariat support to the National ICT Council.

## ***ICT Monitoring and Evaluation***

### *National ICT Council*

The responsibility for monitoring and evaluating the implementation of the National ICT Strategy resides with the Cabinet-appointed National ICT Council. The National ICT Unit will prepare and submit reports to the National ICT Council, bi-monthly (or as otherwise determined), with details such as the projects underway; the status of each project; the concerns and related measures to be taken, if any, for each project; and the measure of the indicators used to gauge the progress and success of each project.

The Council will be responsible for evaluating the effectiveness of the approach to implementation and execution, as well as the success of the outcomes for each of the ICT Strategy’s programmes/projects.

### *National ICT Targets*

The following targets (*see Table 6*) have been set for the National ICT Plan and provide a concise means of communicating progress based on indicators that are standard, measurable and comparable with other countries.

*Table 6 - National ICT Targets*

<b>NATIONAL ICT TARGETS</b>	<b>BY</b>
<b>100%</b> of schools with computers and reliable Broadband Internet access	<b>2018</b>
Functional international submarine fibre connectivity established	<b>2019</b>
<b>75%</b> of the population regularly using the Internet	<b>2021</b>
<b>95%</b> of households with Broadband Internet access	<b>2021</b>
<b>50%</b> of businesses online and realising tangible benefits	<b>2021</b>
<b>50%</b> of Government services available online	<b>2021</b>
<b>50%</b> of the population accessing Government services online	<b>2021</b>

## 5.2. Funding

Government will establish a central ICT fund to enable the successful implementation and execution of the various programmes/projects identified in the National ICT Strategy. The fund will be managed by MCWL (with input from the National ICT Council as appropriate), given its role in the oversight, direction and prioritisation of national ICT efforts.

Additionally, Government will continue to seek financial support and assistance from regional and international agencies. The finalisation of this National ICT Plan update will serve to increase the likelihood of a favourable response from potential donor and lending agencies.

## 5.3. Change Management

The National ICT Strategy does not focus on technology itself but rather on how the technology might be utilised to transform business processes for the efficient and effective delivery of business and Government services to customers and citizens. The introduction of technological solutions will therefore be accompanied by actual reengineering of the ways of doing things as opposed to essentially just automating existing “paper” processes. It should also be noted that anachronistic processes which are incompatible with the potential of technology will be discarded and new processes which take advantage of the potential of technology will be developed. Implementations must seize opportunities for cost, resource and time savings as well as service delivery improvements through proper forward planning of the new technology-enhanced processes. Timely and appropriate training and capacity building for staff and delivery support personnel will be key activities in the implementation of all programmes and projects.

## 5.4. Stakeholder Management

This National ICT Strategy is meant to bring value to all aspects of Montserratian life, including business, leisure, education, Government and the engagement of the Diaspora. Its short and long term success requires the support and involvement of Montserratians everywhere. This will be achieved through the development and

coordination of an effective Communication Plan that seeks to regularly engage, inform and appropriately involve all key stakeholders.

The Communication Plan will also include provisions for the dissemination of relevant and timely information to international stakeholders and interest groups. This ensures that key developments and achievements/successes associated with the National ICT Strategy are communicated in a way that will ultimately benefit the people of Montserrat.

### 5.5. Additional Considerations

Implementation of the National ICT Strategy will be further supported, facilitated and/or enhanced by considering the following:

- Possible alignment with the ITU and OSILAC measurement frameworks for ICT. This would allow Montserrat to more effectively compare its own progress with other countries.
- Establishing and/or strengthening relationships with organisations such as the CTU, CANTO, Commonwealth Secretariat, UN-ECLAC, ITU, CDB, CTO, and EU in order to leverage their wealth of knowledge and resources.
- Exploring the possibilities for assistance through the existing Memorandum of Understanding (MOU) between the Government of Montserrat and the Government of India. For instance, India's ITEC programme may potentially place technical expertise in some critical ICT areas. Access to Chinese funded Caribbean initiatives might also be investigated.
- Pursuing a strategic relationship with a suitable territory (e.g. Memorandum of Understanding with the Government of Malta) in order to draw on their experience with national ICT development and ICT-enabled development.
- Reaching out to some of the multi-national ICT organisations that may have an interest in providing assistance to Montserrat, as part of their corporate social responsibility.
- Identifying 'Quick Wins' (initiatives that can be completed within six months to one year) through an inventory of existing ICT initiatives, with a view to recognising and celebrating their individual achievements. These can serve to



build traction and demonstrate value during the early stages of the National ICT Plan's implementation.

- Considering the use of shared platforms and infrastructure with neighbouring countries or other British Overseas Territories (BOTs) where economies of scale and scope can be exploited. In the specific case of BOTs, it may be possible to attract funding for projects that can be replicated across the various territories – e.g. development of a National e-ID solution.
- In order to accelerate the availability of Government e-Services, Government of Montserrat can explore the availability of the systems already in existence within the UK Government. This brings into focus the possibilities of Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS) and Infrastructure-as-a-Service (IaaS). This approach might be particularly attractive where Government's requirements are closely aligned with, or are sufficiently similar to those of the UK Government – e.g. vehicle licensing, tax administration.

## 5.6. Future-Proofing the NICT Strategy

Many believe that we are in the early stages of the fourth industrial revolution, characterised by a fusion of technologies in a way that is rapidly blurring the lines between the physical, digital and biological worlds. With respect to our national ICT efforts, the pace of technological advancement suggests the need for an approach to implementation that is flexible enough to respond to future developments. Therefore, no prescription is herein being made concerning the use of any specific technologies but rather, the emphasis is placed on staying abreast of the implications of evolving technologies and appropriately seizing relevant potential benefits as we pursue our National ICT Strategy. Some specific current trends and technological developments which could be incorporated to enhance effective implementation of the national strategy over the five-year period are described below.

### 5.6.1. Internet of Things (IoT)

There has been an explosion in the number of devices that are now connected to the Internet, other than the typical fare such as computers and smartphones. Consumer products, durable goods, vehicles, industrial components, sensors and many other everyday objects are being combined with Internet connectivity in a way that is transforming the way we work, live and play. Collectively referred to as the Internet of Things (IoT), there are significant technical, social and economic implications.

Projections for growth suggest that there will be over 24 billion<sup>8</sup> connected IoT devices on earth by the year 2020. The dialogue is rapidly changing from that of a ‘connected world’ to that of a ‘hyperconnected world’ and the many attendant opportunities. At the same time, challenges are emerging in areas such as security, privacy, user rights and interoperability standards.

With respect to our National ICT Strategy’s five pillars, IoT should be considered in terms of its likely impact on *Environment* (e.g. legislative concerns around privacy, security and user rights), *Access* (e.g. increased demands for reliable and pervasive Internet connectivity) and *Adoption* (use of IoT to enhance service delivery).

### 5.6.2. Big Data

It comes as no surprise that the amount of data in the world has been growing exponentially. This has been caused in part by the increasing volume and detail of information captured by organisations, the rise in social media and the Internet of Things. ‘Big data’ refers to both the structured and unstructured data sets that are too large to be processed or analysed by traditional systems. There is, however, wide recognition of the potential intelligence to be gleaned from proper analysis of the data and the positive implications for decision-making and competitive advantage.

Within the context of our National ICT Strategy’s pillars, Big Data should be considered in terms of *Environment* (e.g. legislative concerns around privacy, security and data sharing), *Learning* (e.g. developing on-island capability for analysing large data sets) and *Adoption* (e.g. public and private sector use of the available data for improved decision-making and competitiveness).

### 5.6.3. Mobile Money & Cryptocurrency

Technology is being used to create new financial services that address some of the perceived gaps in the world’s formal financial systems. Mobile Money and cryptocurrency are two methods of paying for goods and services, both of which have attracted considerable interest and attention.

Mobile Money is akin to an electronic wallet service which allows money to be stored, sent and received through the use of mobile phones. Kenya’s M-Pesa is

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<sup>8</sup> Source: Business Insider ([www.businessinsider.com](http://www.businessinsider.com))

perhaps the most widely cited implementation of a mobile money service and has been lauded for giving millions of people access to a formal financial system in otherwise largely cash-based societies (i.e. low instances of debit card and credit card usage).

Cryptocurrency is a type of digital currency, secured by cryptography, which is not tied to a particular country so its value is not controlled by a central bank. Bitcoin is considered the best-known cryptocurrency and is synonymous with pioneering 'decentralised' digital currency. In its application, cryptocurrency offers its users several advantages over traditional 'centralised' currencies such as lower fees, immediate settlement and fraud prevention.

In considering the potential benefits of mobile money and/or cryptocurrency in our national ICT context, multiple strategic pillars are relevant - *Environment* (e.g. legislative concerns), *Learning* (e.g. sensitising all sectors and persons to develop understanding and acceptance), *Virtual* (e.g. greater financial opportunity and involvement from the Diaspora and the international community) and *Adoption* (e.g. public and private sector incorporation of such financial instruments for improved accessibility and effectiveness).

#### 5.6.4. Broadband Internet Technologies

The telecommunications sector globally has continued to aggressively research and invest in the delivery of faster, more accessible, more reliable and more affordable broadband Internet services. Policy makers and regulators have been focused on the most effective use of spectrum while at the same time exploring innovative ways to ensure connectivity to the unconnected areas, notwithstanding the lack of commercial appeal to the service providers in many instances. Montserrat's topography and demography present somewhat unique challenges for both the regulator and the telecommunications service providers in this regard.

As an emerging technology, White Space broadband leverages the unused television broadcasting frequencies in the wireless spectrum and has been proven to travel up to 10 kilometres through buildings, vegetation and other obstacles. Considered by some to be the next Internet disruption, this is one example of a technology that may have particular applicability for Montserrat (in terms of our National ICT Strategy's *Access* pillar), given its reach and lower cost of deployment. There are, however, examples of previous broadband technologies which failed to go mainstream, such as Wi-Fibre and Broadband over Power Lines (BPL).



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## Appendix A: Montserrat’s e-Readiness

The **Center for International Development** (CID) at Harvard University, a highly acclaimed institution in e-Readiness research, defines an ‘E-Ready’ society is one that has the necessary physical infrastructure (high bandwidth, reliability, and affordable prices); integrated current ICTs throughout businesses (e-commerce, local ICT sector), communities (local content, many organisations online, ICTs used in everyday life, ICTs taught in schools), and the government (e-government); strong telecommunications competition; independent regulation with a commitment to universal access; and no limits on trade or foreign investment.

The CID framework systematically organises the assessment of numerous factors that determine the Networked Readiness of a community in the developing world. It examines 19 different categories of indicators, ranking each by levels of advancement in Stages 1 through 4 (1 being the lowest and 4 being the highest). The framework is not intended to provide an overall score, but rather to offer broad insights for ICT planning. It is held that a community should not concentrate solely in any one area, but must give due consideration to each.

The 19 said categories fall within the following five groups:

<b>Network Access:</b>	What are the availability, cost and quality of ICT networks, services and equipment?
<b>Networked Learning:</b>	Does the educational system integrate ICTs into its processes to improve learning? Are there technical training programs in the community that can train and prepare an ICT workforce?
<b>Networked Society:</b>	To what extent are individuals using information and communication technologies at work and in their personal lives? Are there significant opportunities available for those with ICT skills?
<b>Networked Economy:</b>	How are businesses and governments using information and communication technologies to interact with the public and with each other?
<b>Network Policy:</b>	To what extent does the policy environment promote or hinder the growth of ICT adoption and use?

Consistent with the CID assessment guide, Montserrat’s e-Readiness was determined as per the five groups and 19 categories therein, with the following results:

### **ACCESS**

The minimum necessary condition for Readiness is access to adequate network infrastructure. Without access to global communications networks, no community can participate in the Networked World.

*'Access' considers the availability, cost and quality of ICT networks, services and equipment.*

<b>CATEGORY</b>	<b>INDICATOR</b>	<b>STAGE (2012)</b>	<b>STAGE (2016)</b>
<b>ACCESS</b>	Information infrastructure	3	4
	Internet availability	2	3
	Internet affordability	2	3
	Network speed and quality	2	3
	Hardware and software	2	3
	Service and support	2	3

### **LEARNING**

Without an educated, ICT-savvy populace, no community can fully participate in the Networked World. To foster this resource, ICTs must be incorporated into the learning system.

*'Learning' considers the degree to which ICTs are integrated into the education system and processes to improve learning.*

<b>CATEGORY</b>	<b>INDICATOR</b>	<b>STAGE (2012)</b>	<b>STAGE (2016)</b>
<b>LEARNING</b>	Schools' access to ICTs	2	3
	Enhancing education with ICTs	2	3
	Developing the ICT workforce	2	3

### **SOCIETY**

Readiness depends upon the community's incorporation of ICTs into the fabric of its activities in order to maximise the gains of joining in the Networked World.

*'Society' considers how individuals use ICTs at work and in their personal lives. It also looks at ICT employment opportunities.*



CATEGORY	INDICATOR	STAGE (2012)	STAGE (2016)
SOCIETY	People and organisations online	3	3
	Locally relevant content	3	3
	ICTs in everyday life	3	3
	ICTs in the workplace	2	3

### ECONOMY

Businesses and governments that are able to effectively employ ICTs find more sophisticated and efficient ways of managing their external relationships and communications.

*'Economy' considers how businesses and government are using ICTs to interact with the public and with each other.*

CATEGORY	INDICATOR	STAGE (2012)	STAGE (2016)
ECONOMY	ICT employment opportunities	2	3
	B2C electronic commerce	2	3
	B2B electronic commerce	2	2
	e-Government	3	3

### POLICY

Public policy can be a help or a hindrance to the networked economy. The favorable climate that public policy can create for Internet use and e-commerce encourages communities, organisations and individuals to invest in and use ICT.

*'Policy' considers whether the ICT environment hinders or promotes growth of ICT adoption and use.*

CATEGORY	INDICATOR	STAGE (2012)	STAGE (2016)
POLICY	Telecommunications regulation	2	3
	ICT trade policy	2	3

## Appendix B: International & Regional ICT Efforts

### International ICT Efforts

#### *World Summit on the Information Society (WSIS) Forum*

The United Nations, in its attempts to bridge the global digital divide, organised the World Summit on the Information Society (WSIS) 2003 - 2005. The essence of WSIS is to build an inclusive Information Society; to put the potential of knowledge and ICTs at the service of development; to promote the use of information and knowledge for the achievement of internationally agreed development goals; and to address new challenges of the Information Society, at the national, regional and international levels. In the last decade, WSIS has spawned the annual WSIS Forum, advertised as the largest annual gathering of the “ICT for development” community. This forum continues to promote implementation of the various WSIS Action Lines for using ICT to facilitate achievement of the Sustainable Development Goals.

#### *Sustainable Development Goals (SDGs)*

The United Nations has articulated 17 Sustainable Development Goals (SDGs) for achievement by 2030. Summarily these are to:

- 1) End poverty in all its forms everywhere;
- 2) End hunger, achieve food security and improved nutrition and promote sustainable agriculture;
- 3) Ensure healthy lives and promote well-being for all at all ages;
- 4) Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all;
- 5) Achieve gender equality and empower all women and girls;
- 6) Ensure availability and sustainable management of water and sanitation for all;
- 7) Ensure access to affordable, reliable, sustainable and modern energy for all;
- 8) Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;
- 9) Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
- 10) Reduce inequality within and among countries;
- 11) make cities and human settlements inclusive, safe, resilient and sustainable;

- 12) Ensure sustainable consumption and production patterns;
- 13) Take urgent action to combat climate change and its impacts;
- 14) Conserve and sustainably use the oceans, seas and marine resources for sustainable development;
- 15) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;
- 16) Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels; and
- 17) Strengthen the means of implementation and revitalise the global partnership for sustainable development.

### Regional ICT Efforts

#### *eLAC2018 (e-Latin America & the Caribbean)*

The United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) is driving eLAC2018, a strategy which aims to develop a digital ecosystem in the region. This strategy has been developed specifically for the Latin American and Caribbean region in alignment with the SDGs and WSIS Action Lines. It identifies some 23 objectives covering the following 5 areas of action:

- 1) Access and Infrastructure;
- 2) Digital Economy, Innovation and Competitiveness;
- 3) E-Government and Citizenship;
- 4) Sustainable Development and Inclusion; and
- 5) Governance for the Information Society.

#### *CARICOM Single ICT Space*

The Caribbean Community (CARICOM) Secretariat is actively pursuing development of the digital economy in the region towards the achievement of “*An inclusive regional knowledge society, driving sustainable development*”. Key to this effort is the establishment of a CARICOM Single ICT Space, a Road Map which was approved by CARICOM Heads of Government in February 2017. This Single ICT Space would harmonise ICT policies, legislation, regulation, best practices, networks and services

in the region to advance Community goals of enhanced functional cooperation and economic integration. It proposes to use ICT and other appropriate technologies to leverage and strengthen the Caribbean region's resources, through high-speed ICT networks and trained human resources, and within good governance and sound operating partnership networks; in order to add social and economic value, for the benefit of the region.

#### *CARICOM eGovernment Strategy 2010-2014*

The Caribbean Centre for Development Administration (CARICAD) compiled the CARICOM eGovernment Strategy 2010 – 2014 based on collaboration with several CARICOM member states and regional institutions. The Strategy aimed to accelerate sustainable improvements in public service delivery within the CARICOM region, through the use of ICTs. It identified seven strategic initiatives, namely: organisational capacity development; eGovernment framework; program management; common ICT procurement; interoperability; ICT-enabled service delivery channels; and eCommerce environment. Its goals are still relevant to today's developmental objectives in most CARICOM States.

#### *Electronic Government for Regional Integration Project (EGRIP)*

The Organisation of Eastern Caribbean States (OECS) completed in 2014 its Electronic Government for Regional Integration Project (EGRIP). EGRIP sought to promote the efficiency, quality and transparency of public services through the delivery of regionally integrated e-Government applications that take advantage of economies of scale. The reports and output products from this project are currently informing e-Government initiatives in the OECS.

#### *Caribbean Internet Governance Forum (CIGF)*

The Caribbean Telecommunications Union (CTU), through the Caribbean Internet Governance Forum (CIGF), is engaging regional stakeholders for the development of an appropriate framework of policies and structures for Internet governance in the Caribbean. The 12<sup>th</sup> edition of this annual forum was held in Belize in August 2016 and reviewed the impending version 3.0 of the Caribbean Internet Governance Policy Framework.

#### *Caribbean Spectrum Management*

The CTU's Caribbean Spectrum Management project is actively building spectrum management expertise in the Caribbean and harmonising policy approaches to spectrum management in the region. A Caribbean Spectrum Management Strategic

Plan was approved by the CTU Conference of Ministers in September 2016 addressing areas such as frequency harmonisation, cross border interference, digital broadcasting and spectrum pricing. The plan will be used to promote a regional environment of regulatory certainty that encourages private sector participation and investment and ensures that spectrum is utilised efficiently, economically and rationally in keeping with the rapid evolution of wireless technologies and services.

*Harmonisation of ICT Policies, Legislation & Regulatory Procedures (HIPCAR)*

The International Telecommunication Union (ITU), in collaboration with the CARICOM Secretariat and the CTU, supported Caribbean countries in improving their competitiveness through the reports and model policies and legislation developed under the project for harmonisation of ICT policies, legislation and regulatory procedures (HIPCAR). CARICOM considers this to have a major role to play in developing and further integrating its member states, especially in the context of the CARICOM Single Market and Economy (CSME).

## Appendix C: Detailed Implementation Plan (2017 – 2021)

### **e**environment

*ICT Policy Objective: To establish an enabling legal and regulatory environment that promotes ICT-facilitated activities and development in a secure, ethical, environmentally sensitive and economically sustainable way.*

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
1. Utilise ICTs to accelerate the sustainable use and management of the natural environment and resources	<b>Montserrat: Go Green (Powered by ICTs)</b>	SG 1	Media and ICT-related initiatives to build population awareness of “green” practices in routine activities.	Develop media plan and activities to ingrain “green” into the national psyche	2017 and annually	<b>MCWL</b> , GIU, MUL, Office of the Premier
		SG 3				
			Expedite completion of the national power supply upgrade to support reliable use of ICT and promote the supply of ample, reliable energy through use of smart and energy efficient ICT solutions.	More efficient diesel plant in place	2017	<b>MUL</b> , MCWL
				Utilise smart grid technology solutions to minimise energy wastage	2018 - 2020	<b>MUL</b> , MCWL
			Evaluate the feasibility of power generation, based on renewable energy sources (geothermal, solar), with potential for selling excess to the public grid		2017 - 2020	<b>MUL</b> , MCWL

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
				Renewable energy generation plant in service to meet 100% of energy needs	2020	<u>MUL</u> , MCWL
			Promote adoption of ICT solutions for energy and resource efficiency.	Publish guidelines for GOM and other commercial entities to monitor and schedule energy consumption to minimise peak load on system	2017 and annually	<u>MUL</u> , MCWL
				Automated monitoring and scheduling of water storage and supply to schedule and control pumps on the distribution network.	2018	<u>MUL</u> , MCWL
	<b>Disaster Management &amp; Mitigation</b>	SG 3	DMCA to coordinate planning and dissemination of policies and procedures for emergency use of public and private telecommunications systems and assets for public information, alerts, safety and interaction.	Finalise and maintain comprehensive overarching disaster mitigation plan (Including National Disaster Response Plan and provisions for continuity of Government and general operations, the role of amateur radio	2017 and annually	<u>DMCA</u> , Red Cross, all emergency services, ICT service providers, broadcasters, MICA, MCWL

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
			Establish, administer and maintain national emergency communications infrastructure, plan and procedures.	operators and use of any free-to-air TV station).  Maintain tactical communication platforms (HF, VHF etc.) to support emergency response coordination	Ongoing	<b>DMCA</b> , Info-Comms service providers
			Review, implement & maintain required redundancy enhancements in national disaster management communication systems	Review, implement & maintain required redundancy enhancements in national disaster management communication systems	2017 and ongoing	<b>DMCA</b> , NICTU, Info-Comms service providers
			Integrate GIS maps into disaster management plan systems and documents	Integrate GIS maps into disaster management plan systems and documents	2017 - 2020	<b>DMCA</b> , Physical Planning Unit, MCWL
			Commission server to enable simultaneous alerting / messaging across multiple communications platforms (sirens, emergency radios, broadcast media, Internet)	Commission server to enable simultaneous alerting / messaging across multiple communications platforms (sirens, emergency radios, broadcast media, Internet)	2017 - 2018	<b>DMCA</b> , NICTU



STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
				Improve capability to disseminate through a common alerting protocol	2018 - 2020	<b>DMCA</b> , NICTU
	<b>Montserrat Volcano Observatory (MVO) – ICTs used to enhance contribution of the MVO to Montserrat’s economy and raise Montserrat’s international profile</b>	SG 1	MVO as a nucleus around which skills, including ICT skills, can be developed in support of Montserrat’s socio-economic development	As contracted with UWI and in consultation with the Education Ministry, implement plan for enhancing academic work activities and revenues at the MVO:	2017 and ongoing	<b>MVO</b> , UWI, DMCA, MCC, Ministry of Education, MCWL
		SG 3		<ul style="list-style-type: none"> <li>- Special programmes in volcanology, geology, environmental studies and disaster management involving distance learning</li> <li>- Niche collaborations / internships with foreign institutions</li> </ul>		
				Enhance and maintain appropriate bandwidth and reliability of Internet connectivity at the MVO to meet current and development needs for operations, academic initiatives, backups etc.		

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
			Utilise MVO as a key aspect of Montserrat's tourism product. Enhance the richness of the data across MVO's various ICT systems through greater integration	Develop a tourism product which incorporates MVO data and media assets and ICT connectivity - Media promotion of MVO tourism, education hub - Online sales of memorabilia - Volcano Interpretation Centre at MVO - Virtual video tours	2017 and ongoing  2017 and ongoing  2017  2017  2018	<b>Ministry of Tourism</b> , Office of the Premier, MVO, NICTU, Local ICT stakeholders / developers
	<b>e-Waste Management</b>	SG 3	Create policy and legislation to treat with the appropriate disposal of electronic waste (e-Waste).	e-Waste policy developed  e-Waste legislation passed	2018  2020	<b>MCWL</b> , MHSS (Waste Mgmt.)  <b>MHSS</b> , MCWL, Attorney General
2. Establish a robust legal and regulatory framework that enables and supports business, encourages enterprise,	<b>e-Legislation</b>	SG 2 SG 4	Review of the legislative framework to identify and treat with existing gaps.  Update/create key policies, legislation and/or regulations that treat with issues such as: • Computer misuse • Electronic transactions (digital equivalence)	e-Legislation Gap analysis completed  Key policies identified and formulated to address e-legislation gaps and guide legal drafting	2017  2017-2018	<b>Attorney General</b> , Financial Services Commission, RMPS (Police), NICTU, MICA

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
and engenders public trust and confidence in ICTs			<ul style="list-style-type: none"> <li>Data protection and privacy</li> <li>Cybercrime</li> <li>Intellectual property</li> <li>Exchequer and Audit (electronic payments)</li> <li>Child Protection Policies</li> </ul>	Legislation and regulations put in place, as appropriate  <i>(Targets for respective polices to be set and approved by Cabinet)</i>	2018-2020  TBD	
			Build capacity to enforce cybercrime legislation and deal effectively with related offences (includes detection and prosecution)	Specialised enforcement agencies identified and established with adequate trained staff and expertise	2017 - 2020	<b>RMPS</b> , Financial Services Commission, MCWL
	<b>Montserrat CSIRT (Computer Security Incident Response Team)</b>	SG 2 SG 4	Explore the feasibility of creating a local Computer Security Incident Response Team (CSIRT) or partnering with a CSIRT in another appropriate jurisdiction e.g. via OECS, CARICOM or UK.	Feasibility study completed  CSIRT provisions / arrangement in place (guided by feasibility study)	2017  2018	<b>NICTU</b> , RMPS, Financial Services Commission, MICA, .ms ccTLD Administrator

## Learning

*ICT Policy Objective: To enhance the capacity and propensity of, as well as opportunities for, the population to effectively, innovatively and creatively use ICT tools for education, business, social, cultural and leisure purposes.*

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
1. Enhance the education experience and its effectiveness through formal and informal channels	ICT in Education	SG 2	ICT in Education Implementation Plan to cover all ICT in Education elements	BNTF Consultant's recommendations approved for: - School connectivity - School ICT equipment - Institutional strengthening	Q2 2017	<b>Ministry of Education</b> , MCC, UWI, NICTU, MCWL, Vendors
			ICT Equipment and connectivity for all schools	Equipment and broadband connectivity in place with functional technical support arrangements	2017 and annually	
			Institutional Strengthening	Professional development and training of teachers and administrative staff in the use of ICT for education enrichment	2017 and annually	
				ICT-facilitated learning for students (textbooks, laptops/tablets, research, assignments, interactive study)		

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
			Integrate ICTs into the curriculum (ICT as a subject) to foster enhanced programming and system integration skills	Curriculum revisions determined and made  Plan formulated	2017 - 2018  2017	
			Integration and training of private school teachers/educators in the use of ICTs for education	Training ongoing	2017 and ongoing	
	<b>ICT Awareness &amp; Impact</b>	SG 2	Maintain an annual “National ICT Week” to coincide with major, on-island ICT events or workshops and promote other regional / international ICT observances.  [Activities can include school competitions in ICT innovation; free public lectures on ICT-related issues; ICT features aired on national broadcast channels; demonstrations / exhibitions of ICT equipment (e.g. video-conferencing, 3-D television, etc.); application of ICT in relevant sectors e.g. agriculture, fishing, tourism, health, education, manufacturing]	Hosting of the National ICT Week  Observances: - ITU World Telecommunications and Information Society Day (WTISD) - Girls in ICT Day	2017 and annually  2017 and annually	<b>MCWL</b> , NICTU, GIU, MICA,
			Partner with MICA and relevant industry players to sensitise the public about personal safety in using the Internet.	Launch of public communication programme supported by print and electronic media	2017 with ICT Week and ongoing	<b>MICA</b> , MCWL, Service Providers, Diaspora

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
	<b>EMIS (Education Management Information System)</b>	SG 2 SG 4	Enhance school administration by effectively leveraging school networks and an integrated portal for connecting Ministry of Education personnel, principals, teachers, parents and students	EMIS up and running effectively in all primary and secondary schools	2017	<b>Ministry of Education</b> , NICTU
	<b>The ICT Channel</b>	SG 2	Establish a multimedia communication channel with online and offline access that provides relevant ICT information packaged in an attractive and understandable way.  The ICT Channel will: <ul style="list-style-type: none"> <li>• Inform and educate the public on ICT issues that affect their daily lives;</li> <li>• Raise public awareness and appreciation of the benefits and risks of ICTs;</li> <li>• Provide a public forum to discuss ICT issues; and</li> <li>• Feature citizen-produced appropriate content</li> </ul>	Initial weekly programme on ICT topics and impacts aired on GOM TV channel and online  Citizens' indigenous local content featured on Channel  ICT channel developed online and on TV as content is built up	2017-2020  2017 - 2020	<b>GIU</b> , Ministry of Education, MCC, UWI Open Campus

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
2. Accelerate the development of on-island ICT capability and talent, with a propensity for ICT-based innovation and creativity	<b>ICT Manpower Development</b>	SG 2	Partner with the relevant institutions (local and foreign) to ensure the availability of certified ICT training courses in relevant technologies (e.g. Internet technologies, databases, data analytics, big data, networks, information security, open source technologies).	Popular ICT certifications available for study in Montserrat (e.g. A+, Network +, CISCO, Microsoft etc.)	2017 - 2020	<b>MCC</b> , UWI Open Campus, Ministry of Education, Course providers
	<b>ICT Incubation</b>	SG 1 SG 2	Develop policies and programmes to encourage ICT innovation. This may require access to grant or concessionary funding and / or business incubator facilities for micro entrepreneurs.  Foster a holistic ICT approach across all Government Ministries/agencies to give incentives for, and spur the development of local ICT expertise.	Funding identified annually for financing of local initiatives	2018 and annually	<b><u>Office of the Premier (Project Management Unit)</u></b>

## Access

*ICT Policy Objective: To support universal, open, affordable, wired and wireless access to high capacity, high availability, national and international broadband infrastructure, technology and services.*

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
1. Ensure pervasive, robust, affordable, on-island and international ICT infrastructure and broadband connectivity	National Broadband Strategy	SG 1	Develop a national broadband strategy with input from service providers and other stakeholders to define relevant services, technology options and localities.	Broadband Strategy developed through consultation	2017	<b>MCWL</b> , MICA, NICTU, Ministry of Finance, Service Providers
			<ul style="list-style-type: none"> <li>Define end user broadband service (e.g. minimum of xMbps).</li> <li>Determine architecture for robust and resilient national, high bandwidth infrastructure and redundant international connectivity (including possible use of emerging technologies e.g. white space).</li> </ul>	National Broadband Policy approved by Cabinet	2017 - 2018	
			Consider use of wired and pervasive wireless connectivity to support economic priorities e.g. tourism, agriculture, fisheries, etc.	Identify applications for use of municipal wi-fi and deploy appropriately e.g. in Little Bay development plan etc.	2017 - 2020	



STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
	Enhanced ICT Infrastructure and Info-Communications Services	SG 1	Facilitate new market entrants or public/private partnerships (PPPs) to drive the build out of telecoms facilities, and enhance service choices and affordability (e.g. availability of long-term financing for enhanced viability of business cases; periodic review of service operator fees).	Underground ducting extended to all major routes island-wide.	2017 - 2020	<b>MCWL, MICA</b>
			Establish and maintain a national framework for assuring the quality of network and customer service delivered by ICT service providers, including regulatory provisions for periodic reporting of service delivery metrics by service providers and customer complaint handling and escalation mechanisms.	A competitive, vibrant Info-communications sector achieved through strategic facilitation of service provider proposals	2017 and ongoing	<b>MICA, MCWL</b>
				Elements of national QOS framework determined	2017	<b>MICA, ICT service Providers</b>
				Operational procedures implemented per QOS framework	2017 - 2019	
	International Fibre Connectivity	SG 1	Expedite and drive the re-establishment of international fibre connectivity.  Pursue development financing/funding or private/public partnerships (PPPs) to overcome commercial challenges.	International fibre in place undersea, with new cable landing station in Montserrat	2018	<b>MCWL, NICTU, MICA</b>

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES	
	Governance of Internet Resources	SG 1	Regulatory oversight to maintain technically and administratively viable operation of the “.ms” country code Top Level Domain (.ms ccTLD).	Continually efficient ccTLD operation	Ongoing	<u>MICA</u>	
		SG 4		Encourage local Internet traffic exchange and/or prompt the development of a national Internet Exchange Point (IXP).	Local peering or IXP as appropriate.	2018 and ongoing	<u>MICA</u>
2. Accelerate the development of a connected population, who routinely and effectively use ICTs in their everyday lives	Two-to-One (2-to-1)	SG 1	Achieve a ratio of 2 suitable Internet connectivity devices (laptop, desktop, tablet computer, smart phone, e-reader, etc.) to every 1 household or business. Based on need and intended use, the types of devices would vary from household to household or business. Supporting considerations include:	Policy position determined	2017	<u>MCWL</u> , Office of the Premier, DITES	
		SG 2		<ul style="list-style-type: none"> <li>Institute appropriate tax and duty incentives to encourage investment, moderate the prices of consumer devices and enhance usage.</li> <li>Eliminate or reduce duties on smartphones, laptops, tablets and consumer networking devices.</li> </ul>	Incentives determined consistent with policy	2017	<u>Ministry of Finance</u>
		SG 4			Revised duties implemented consistent with policy	2018 - 2020	
	ICT4PWD (ICT for persons with disabilities)	SG 1 SG 2 SG 4	Promote standards-based and innovative solutions to enable access to ICTs for persons with disabilities:	ICT4PWDs included in National ICT Week activities	2017 and ongoing	<u>MCWL</u>	

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
			<ul style="list-style-type: none"> <li>- Awareness building of accessibility needs</li> </ul>			
			<ul style="list-style-type: none"> <li>- Accessibility policy development</li> </ul>	Accessibility policy developed in consultation with the user community	2017	<u>MCWL</u> , MATHLE
			Accessibility solutions provision	Support projects to apply and innovate accessibility solutions	2017 and ongoing	<u>MCWL</u> , MATHLE

## Virtual

*ICT Policy Objective: To increase the use of ICT tools for establishing and supporting physical and virtual communities and interest groups to preserve and enhance Montserratian cultural identity and values amongst the resident population and the Diaspora.*

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
1. Actively include and involve the Diaspora to accelerate the development of Montserrat's virtual population	Virtual Montserrat	SG 1	Maintain an online Diaspora registry and skills bank to enlist the Diaspora in local business operations through use of ICT solutions such as teleworking and videoconferencing. This may be especially useful in cases such as finding suitable directors for board membership, international marketing facilitation and representation at international fora.	Diaspora skills bank updated, operational and maintained	2017	<b><u>Office of the Premier (Diaspora affairs)</u></b> , NICTU, Tourist Board
		SG 4		Functional Online skills database/registry	2017 and ongoing	
		SG 5		Technology in place for secure, remote collaboration (e.g. tele/videoconferencing,)	2017 and ongoing	
			Facilitate online access to and electronic payment for Government and locally supplied services of interest to the Diaspora.	Extension of online and electronic payments for all feasible Government services	2017 - 2020	<b><u>Ministry of Finance (Treasury)</u></b> , NICTU
			Facilitate the creation of opportunities to derive economic value from the Diaspora such as business development incentives or public/private partnerships for	Investment/business opportunities formally advertised/published to the international community (e.g. Diaspora)	2017 – 2018	<b><u>Office of the Premier (Diaspora Affairs)</u></b> , NICTU, Economic Dev. & Trade

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
			online store fronts for Montserrat-based businesses.	Montserrat Market e-commerce platform (private sector or Government facilitated)	2017 - 2020	<b>Office of the Premier (Project Management Unit)</b> , Economic Development & Trade
2. Leverage ICT to promote Montserratian heritage and accelerate the development of virtual communities and interest groups	<b>Montserrat Heritage Online</b>	SG 1	Digitise local media content and archives.	Digitisation plan identifying and prioritising high value content, storage modalities and annual budget/resource requirements	2017	<b>GIU</b> , Montserrat Public Library, Montserrat National Trust, Museum
		SG 2				
		SG 3				
		SG 5				
			Establish platforms for electronic access to Montserratian heritage content (on a commercial or non-profit basis) – e.g. Virtual Museum of Montserrat - with on and off-island secure repositories for digital assets	Research report identifying options for enabling content access, with recommendations	2017	<b>GIU</b> , Montserrat Public Library, Montserrat National Trust, Museum
				Content access system and functionality developed	2017 - 2020	
	<b>Montserrat Community Values</b>	SG 2 SG 3 SG 5	Optimise use of Government and private sector media resources for promoting wholesome Montserratian values and activities	Implement plan for consolidation of Government media resources	2017 - 2020	<b>MCWL</b>

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
				Public/private partnerships for training private sector groups in media usage, writing, production development	2017 - 2020	<b>GIU</b> , Media Houses, NGOs, Churches, Gov't Ministries
	<b>Montserrat Communities Online</b>	SG 1 SG 2 SG 3 SG 4 SG 5	Create and manage online collaboration spaces to support virtual communities of interest (residents and non-residents): - Montserrat news - Community focus - Special event coverage e.g. Festival - Volcano or other reports from the MVO, DMCA - Sector communities – Tourism, Agriculture, Fishing, etc.	Implement plan to increase quantity and frequency of content from Montserrat's government information unit, private/citizen sources, community news and media houses: - Weekly video content sharing with other media  Training for private sector and community groups in web tools and social media	2017 - 2020  2017 - 20203	<b>GIU</b> , Ministries, media houses  <b>Gov't Ministries</b> , GIU, Media Houses, NGOs, Churches
			Utilise the facilities of the .ms Registry to establish .ms as Montserratians' home on the Internet.	Online Yellow Pages style directory of .ms web sites	2017 and ongoing	<b>Ministry of Tourism</b> , Economic Development & Trade, .ms Registry

## Adoption

*ICT Policy Objective: To drive the early adoption and effective use of ICT by government and businesses for greater internal and external communication, as well as for greater efficiency, visibility, availability and performance.*

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
1. Accelerate the delivery of, and uptake in, public services	Modern and Model Government	SG 2	Develop a multi-channel framework for delivering Government services to the public (e.g. online, telephone hotline, mobile phone, self-serve automated kiosks).	One-stop service windows	2017 - 2020	<b>NICTU</b> , MCWL, Ministry of Finance
		SG 4		Online and electronic payment of property taxes, drivers' license, birth and death certificates	2017	
				Online visa application for travel into Montserrat (source of revenue)	2017 and ongoing	<b>NICTU</b> , Foreign Affairs Ministry
			Effective execution and coordination of the programmes and projects in the e-Government Strategy.	Review / update e-Government Plan	2017	<b>NICTU</b> , respective Ministries/Agencies in which the services reside
			NICTU (currently DITES) resourced to deliver on priority e-Government Strategy elements, including: <ul style="list-style-type: none"> <li>Document management</li> </ul>	2017 - 2020		

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
			Undertake Government Process Reengineering (GPR) in departments not completed to optimise key Government processes for greater efficiency, transparency and measurement.	<ul style="list-style-type: none"> <li>• Smartstream HR module</li> <li>• Property tax online</li> <li>• Income tax online</li> <li>• Registrar functions</li> <li>• GIS enhancement</li> <li>• GOM web portal</li> </ul>		
				Full implementation of the e-Government Strategy programmes	2020	<u>NICTU</u> , respective Ministries/Agencies using the services
				Appropriate capacity building programme in GPR:	2017 - 2020	<u>Office of the Premier (PMU)</u> , GOM HR, NICTU, respective Ministries/Agencies in which the services reside
				Framework developed for business improvement / process reengineering using GPR tool kit	2017	
				Successful implementations achieved by appropriately trained personnel	2017 - 2020	
	<b>Government e-Procurement</b>	SG 1 SG 4	Use an ICT platform (website / portal) to procure goods and services from the domestic and international markets.	Additional functionality developed on Government web site platform	2017 - 2020	<u>Ministry of Finance</u> , NICTU



STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
			Use the e-Procurement platform for the issue of Government tenders / requests for proposals.			
	<b>e-Democracy</b>	SG 2 SG 4 SG 5	Use Internet technologies for more effective and transparent public engagement, consultation and interaction (including the Diaspora) on matters of national policy and priority.	Additional functionality on Government's Internet portal  Feedback mechanism maintained on all Government web sites	2017-2020  2017 – 2020	<b>GIU, NICTU</b>
	<b>Open Government Data</b>	SG 1 SG 2 SG 3 SG 4 SG 5	Develop and pursue the implementation of a Government-wide Open Data Policy which promotes the sharing of data across public service entities and opens public data for use by private organisations and the general public, to the extent that it is allowed by law.	Government open data policy to enhance availability of Government-produced data in open data sets/formats  Government open data portal	2018  2019	<b>NICTU, GIU, Gov't Ministries</b>

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
2. Accelerate business development, growth and competitiveness through the use of ICT	<b>Montserrat: Open for e-Business</b>	SG 1	Complete a gap analysis to determine all impediments to facilitating online trading of goods and services (from supplier to customer including shipping, electronic payment, also exploring mobile money and cryptocurrencies, consumer complaints, etc.)	Report identifying impediments and recommended corrective action/legislation	2018	<b><u>Office of the Premier (Trade Dep't)</u></b> , MDC, Financial Services Commission, Montserrat Customs and Revenue Services (MCRS), Small Business Association
			Introduce tax concessions for businesses that acquire and deploy ICTs for the purpose of improving their efficiency and effectiveness, as well as for companies pioneering new markets in the ICT sector (e.g. manufacturing, cyber-security, software development)	Automated customs system fully operational	2018 and ongoing	
			Promote Montserrat: Open for Business	Creation of a GOM policy to guide / inform how these concessions can be applied / granted	2017	
				Policy implemented and in effect	2018 - 2020	
				Setup of the Trade and Investment Promotion Agency (TIPA)	2018	
	Use of appropriate new media technologies for promotion	2018 and ongoing	<b><u>Tourist Board</u></b> , UK Office, Montserrat Associations in US and UK,			

STRATEGIC THRUSTS	KEY PROGRAMMES	SDP Goal	KEY PROGRAMME ELEMENTS	TARGETS	TIMELINES	KEY AGENCIES
	<b>Online Market (B2B, B2C)</b>	SG 1	Establish the business-to-consumer (B2C) and business-to-business (B2B) Online Market as a single trading space online where buyers and sellers of goods produced in/for/by Montserrat can transact securely and conveniently.	Implementation driven by Government (vs. business community) with market regulated in a self-sustaining way (i.e. no real need for GOM involvement)	2017 - 2020	<b>SBA</b> , Economic Development & Trade, Trade Department, Tourism Board
			Promote the use of the online Market to encourage all businesses to participate in putting their “products” online.	Businesses registering and actively using the Online Market to transact with consumers	2017 and ongoing	
	<b>ICT: Go Local</b>	SG 1	Encourage and support the development of the domestic ICT industry through deliberate efforts to involve Montserratian ICT manpower in GOM’s ICT efforts.	Policy position adopted by Cabinet and in effect	2017 - 2020	<b>NICTU</b> , Ministry of Finance, Office of the Premier (PMU), MCWL
		SG 2				
		SG 4				
	Invite and encourage the local ICT sector to respond to Government’s ICT needs that fall below an agreed threshold (e.g. complexity, cost, duration).	Policy position adopted by Cabinet and in effect to encourage local ICT sector development through Government ICT initiatives	2017 - 2020			

