



# Connecting the Dots

IMPACT OUTLOOK 2021

# Contents

In the following pages you will find progress Giga has made across priority countries and the outlook and plans for each country over the next few years.

This work is broken into: **Critical Insights** to guide our tailored and precise approach for the country;

the support we are now **Looking Ahead** to provide and advance on our pillars of work;

followed by **Country Analyses and Plans** to connect the dots.

[Foreword](#)

[Executive Summary](#)

[What has Giga achieved in 2020?](#)

[Introduction](#)

01 [Critical Insights](#)

02 [Looking Ahead](#)

03 [Country Analyses and Plans](#)

04 [Annex](#)

# Foreword

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Imagine being a young person and connecting to the internet for the first time. Imagine finding at your fingertips all the tools you need to learn, to build skills, to find employment, and to communicate globally.

In 2019, we launched **Giga** – an ambitious initiative to connect every school and its surrounding community to the Internet. By mapping every school’s connectivity and identifying gaps, through Giga we can aggregate demand and collaborate on the financing necessary to connect the disconnected.

Since then, we all experienced our first truly global crisis – one which proved that connectivity is a **must-have**, and that ‘normal’ was never good enough to begin with. This March marks one year since classrooms closed doors to an estimated **1.6 billion students** in over **190 countries**. And over **463 million** of these were children and young people without internet access at home, preventing them from accessing remote learning.

Despite and because of this, we saw remarkable progress in Giga. Ten partners and collaborators joined across Giga’s pillars of work, helping us map over 800,000 schools in 30 countries and raise over US\$15 million — and leverage an additional \$400M — to catalyze our efforts. 17 governments joined and we’re well on our way to connecting over 86,000 schools – and more than 25 million students and teachers.

We are proud to present “**Connecting the Dots**” which summarizes the key accomplishments of Giga in 2020, and our visionary plan for 2021 – the achievement of which requires solidarity across technologies, sustainable models, conducive regulatory environments, and partnerships powered by the global community.

We thank our partners and governments that are already part of Giga and urge others to join us in this unprecedented effort to transform the world through education and technology.

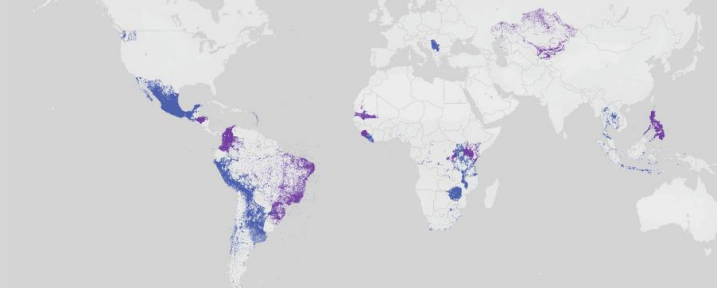


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# Executive Summary



As the COVID-19 pandemic unfolded globally in early 2020, Giga focused on extending immediate and accelerated support to a few priority countries.

In 2020, we mapped over 800,000 schools, welcomed 10 partners and developed work plans in 17 countries. Giga was highlighted as a *Key Way Forward toward Digital Transformation* in the UN Secretary-General's Roadmap for Digital Cooperation, and as a practical step toward extending connectivity in post-conflict, post-disaster settings by the UN Security Council.

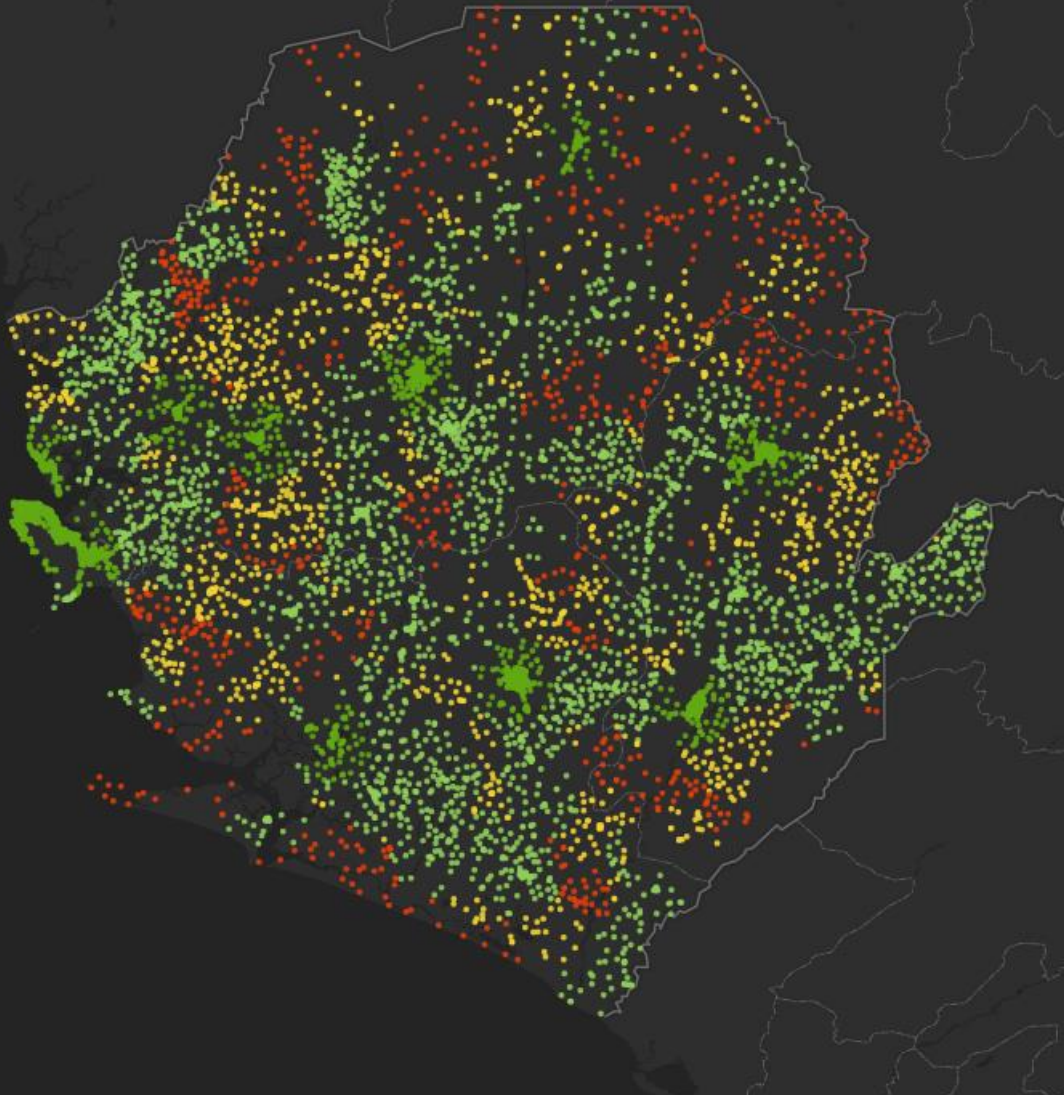
Over 2021 and beyond, we plan to provide effective support to scale connectivity in these 17 countries, based on 5 key insights.

- The key areas of support needed to achieve universal connectivity in these 17 countries are:
  - **Financing** of US\$453M of upfront capital expenditure for last-mile connectivity and US\$305M of annual operational expenditures
  - Increasing **transparency and accountability**
  - Promoting healthy **market competition**
  - Taking advantage of **new technologies**
  - Developing **sustainable models** for innovative financing of long-term connectivity

- Ensuring conducive regulatory environment can accelerate connectivity expansion and foster market competition.
- Every country is different, but some are different in similar ways. We have put them into clusters to develop tailored support.
- Giga needs to work with a new and existing set of partners – from tech startups to venture capitalists to new technology providers while ensuring inclusion, affordability and sustainability.
- Connectivity needs to connect to something meaningful. Governments want to see the better education and digital learning systems to improve skills for their young people – and initiatives such as UNICEF's Reimagine Education provide us with a valuable partner in making those links.

Giga will continue to make progress on the mutually identified priorities with national governments described in the pages that follow. We invite you to join us in globally establishing meaningful connectivity and a sustainable system for digital learning.

# 2020 Milestones



These dots are every school in **Sierra Leone**

- 2G coverage
- 3G coverage
- 4G coverage
- No Service

**\$15M+**  
raised  
in 2020

from global partners including Ericsson and Dubai Cares

**800,000+**  
schools  
mapped

across 30 countries

**First 100+**  
pilot schools  
connected

in Kenya with similar pilots planned in Rwanda and Kazakhstan in early 2021

**10 partners**  
joined

World Bank, EIB, IsDB, ADB, and AIIB, GSMA, Liquid Telecom, NIC.br, Ericsson

**17 countries**  
joined

to connect over 86,000 schools and more than 25.8 million students and teachers

**\$400M+** fundi  
ng mobilized

to governments and UNICEF Country Offices to accelerate connectivity



## INTRODUCTION

**Here we present Giga's work in 2020 and strategic plans for 2021 and beyond for these 17 countries:**

Kyrgyzstan, Kenya, Niger, Rwanda, Sierra Leone, Zimbabwe, El Salvador, Honduras, and 9 member states of the Organisation of the Eastern Caribbean States (Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines).

We analyzed the current connectivity situation, and identified relevant national goals, regulations and policies, to ensure that Giga provides the precise support needed to expand quality, safe, and meaningful connectivity.

We estimated the financial needs for the extension of connectivity.

We identified non-financial “levers” — the activation of which would accelerate progress in connecting schools.

In 5 countries – Kenya, Kyrgyzstan, Niger, Rwanda, and Sierra Leone – we conducted additional virtual workshops with relevant government stakeholders to build country plans for Giga in 2021-2022.

In all countries, these plans were validated by relevant government stakeholders.



# 01

## Critical Insights

We identified and gathered key insights in 5 areas which have shaped Giga's work plans for and with each country.

- A. Levers for Connectivity
- B. Regulatory Impact
- C. Tailored Approach
- D. Principles for Partnerships
- E. Collaboration with Other Platforms

## CRITICAL INSIGHTS

# Levers for Connectivity

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### A Lever Example: CapEx And OpEx

CapEx: US\$**454m\*** in upfront capital expenditure is needed for last-mile connectivity in these 17 countries. This includes only last-mile costs (e.g. receivers, routers, repeaters, last-mile fiber) and not the high costs for new national backhaul infrastructure such as a fiber.

OpEx: US\$**1.53b\*** is needed in these 17 countries for operating expenses over the next 5 years to provide quality service to all 86,000 schools.

In this case, costs for last-mile CapEx can be reduced by increasing investment in national broadband infrastructure. Costs for OpEx can be reduced by working with providers, providing cheaper data to them, creating incentives for lower costs for certain services and schools, and more.

Both CapEx and OpEx have “levers” that can be pulled, and if done correctly, can reduce the total costs for a country, or for the entire project.

*\*These are only pre-feasibility estimates developed at a high level. We plan to conduct feasibility studies to further refine our understanding of the financial needs and will continue to update the estimates as more accurate information becomes available.*  
Be in touch with our partners · [www.gigaconnect.org](http://www.gigaconnect.org)

Categories of non-financial support or "levers" that are potentially high-impact actions and would help reduce capital and long-term costs, improve affordability, and bring connectivity to remote or hard-to-connect areas are:

#### Transparency and accountability

Increasing transparency in procurement and transactions with real-time monitoring to confirm service levels and report on current coverage

#### Competition

Supporting increased market competition through regulatory reform and support to small and medium local providers

#### New technologies and innovative solutions

Exploring new and innovative solutions for last- and middle-mile connectivity for remote and hard-to-reach areas while supporting enabling policy and regulatory environments

#### Sustainability

Developing innovative models for financing ongoing internet service for schools



# Regulatory Impact

Some regulatory areas with potential for improving conditions for connectivity are:

1. Leveraging public funding mechanisms for connectivity such as the establishment and use of Universal Service Funds (USFs), and promoting their utilization, potentially for funding school connectivity.
2. Improving competitiveness of the ICT sector by encouraging measures such as ease of market entry, transparency of spectrum access, effective spectrum management, infrastructure sharing/open access, and innovative regulation.
3. Establishing procurement mechanisms such as tender processes allowing for transparent equipment/bandwidth/service purchase and use of blockchain for the tendering process.
4. Establishing child online protection policies and related measures - having a national strategy in place, creating a responsible agency, and establishing non-discriminatory inclusive use policy.
5. Improving policy and laws on data protection and privacy.

**Several countries have already taken a lead** in putting in place best practices. Honduras, Kenya, Niger, Rwanda, Sierra Leone and Zimbabwe have established operational Universal Service Funds (USFs), which provide financing for telecommunications infrastructure in remote or low-income areas. A total of US\$187M has been allocated or disbursed so far from these funds in all priority countries combined (excluding Anguilla, Antigua, British Virgin Islands, and Montserrat).

In Giga's efforts to provide affordable internet, we will work with national counterparts to target the effective use of public funding mechanisms as well as help in defining a funding strategies and increased utilization.

Rwanda has a national strategy for child online protection and a dedicated agency within the government.

Honduras, Kenya and Rwanda have established regulatory structures to allow ICT regulators more autonomy from the government.



## CRITICAL INSIGHTS

# Tailored Approach

We have grouped countries into three cohorts: 'Emerging' are provided the broadest support in all four focus areas, while 'Advanced' are provided tailor-made support to enhance existing national efforts, and support for 'Established' falls in between.

Status of the country's school connectivity strategy		EMERGING	ESTABLISHED	ADVANCED
<b>Type</b>		End-to-end	Selected	Adapted
	<b>Map</b>	<b>Mapping enables formal planning</b> - broad planning and monitoring	<b>Mapping fills knowledge gaps</b> - planning and monitoring focus	<b>Mapping augments existing tools</b> - ongoing real-time monitoring focus
	<b>Connect</b>	<b>Holistic support for creating a connectivity roadmap</b> - helping shape enabling regulatory conditions, providing knowledge and insights, and identifying appropriate connectivity solutions according to each country's reality	<b>Targeted support</b> - helping optimize conditions and undertaking pilot projects ahead of wider rollout programs	<b>Limited support</b> - helping adapt appropriate solutions to existing conditions
	<b>Finance</b>	<b>Growing CAPEX and OPEX</b> - a focus on resource mobilization	<b>Topping up CAPEX and OPEX</b> - a more efficient way to fill gaps	<b>Cheaper CAPEX but OPEX focus</b> - upgrades and ongoing cost focus
	<b>Empower</b>	<b>Linking to Reimagine Education, Generation Unlimited and Digital Public Goods Alliance to ensure meaningful connectivity</b> - near term focus on deploying world-class digital education and skilling solutions and scaling Open Source solutions in country. Longer term focus on building local ecosystems.		
<b>Examples:</b>		<b>Niger, Sierra Leone</b>	<b>Rwanda, Kenya</b>	<b>Kyrgyzstan</b>

## CRITICAL INSIGHTS

# Principles for Partnerships

Giga will work with a new and existing set of partners – from tech start-ups to venture capitalists to connectivity providers, while making the case for a principled approach to ensure inclusion, affordability and sustainability. Giga and its partners will help achieve universal connectivity adhering to the **Principles of Digital Development**.

**Inclusion:** Disadvantaged groups such as girls, rural populations, persons with disabilities, ethnic minorities, refugees, forcibly displaced persons and out-of-school children, are often left out of solution development. The poorest schools are almost always the least connected. This has to change.

**Affordability:** Connectivity is not a luxury service and needs to be cheaper to be affordable by all. Giga is focusing on identifying financing modalities that could support reduction of upfront costs and create an environment for lower service costs.

**Sustainability:** Solutions cannot connect a school for one year and then vanish. Giga works to create investment opportunities that can provide returns over multiple years thus ensuring continuity of quality and affordable connectivity.



## CRITICAL INSIGHTS

# Collaboration with Other Platforms

Access to internet connectivity is simply a system enabler. In order to meaningfully connect schools and communities, related challenges such as sufficient devices, proper teacher training and vetted, relevant, high quality educational content need to be addressed.

Giga collaborates closely with global actors that are key to ensuring meaningful connectivity. Giga works with UNICEF's [Reimagine Education](#) initiative aiming to radically scale up digital learning solutions for the most marginalized children and young people.

Giga links with [Generation Unlimited](#), a global multi-sector partnership, to ensure that the largest generation of young people in history is prepared for the transition to work and engaged citizenship; and with [Generation Connect](#), an ITU led initiative to engage global youth as equal partners of today's digital change.

The [Digital Public Goods Alliance](#) is a critical partner in developing and scaling the Open Source digital solutions that can be used once connectivity is established.

Giga is not only noted as a way to implement the [UN Secretary-General's Roadmap for Digital Cooperation](#), we also work with all the stakeholders involved in advancing the 8 action areas identified and a safer, more equitable digital world.

The [Broadband Commission for Sustainable Development](#) offers another platform for Giga through the working groups on School Connectivity and Digital Learning. The outcomes of Giga's work led to the production of the report on [The Digital Transformation of Education: Connecting Schools, Empowering Learners](#).



02

# Looking Ahead

## LOOKING AHEAD

Over 2021, Giga will map more than a million schools, and connect up to 1000 schools\* in each of the priority countries.

### **Giga will continue to make progress in 2021 and beyond. We will:**

- map over one million schools across the world
- conduct in-depth feasibility studies to further refine cost estimates
- connect up to 1000 schools\* as part of Giga Accelerate in each priority country
- explore approaches for sustainability and community access
- set up an Interim Advisory Group for global Giga governance

## LOOKING AHEAD

For countries in an early stage, we will continue to identify precise connectivity needs through mapping **over a million schools** on our global platform – [Project Connect](#).

In each of our priority countries, we will **connect** up to **1000 schools** under Giga Accelerate to pilot technology and partnerships, and **test models and approaches** for extending connectivity to the community while reducing the cost burden of ongoing connectivity service on schools.

We will conduct further in-depth **feasibility studies** to further refine our CapEx and OpEx estimates.

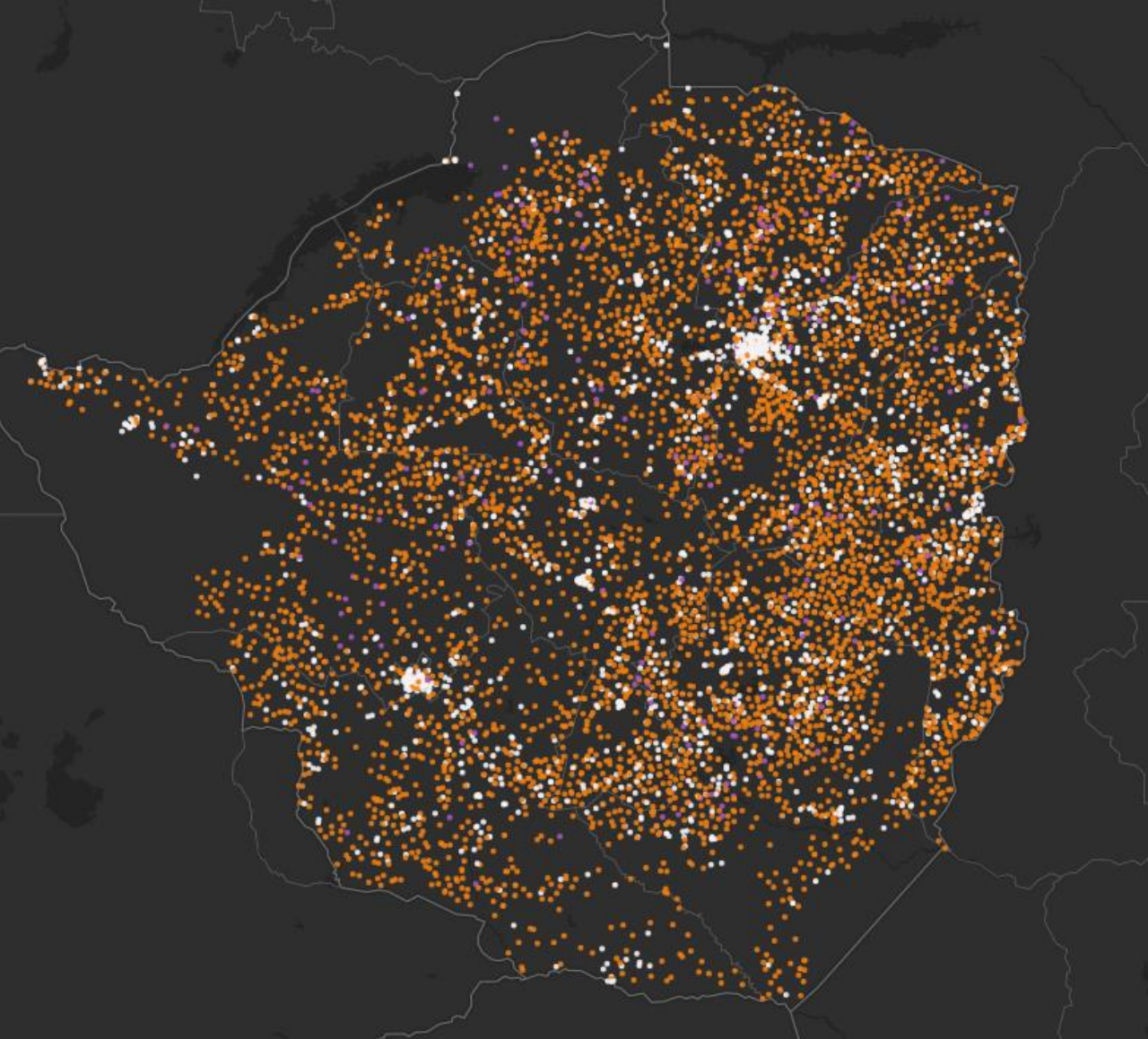
Giga will constitute an **Interim Advisory Group** which will

support a Board and other effective governance structures for Giga, enabling Giga to support large capital deployments and engage all key stakeholders across the UN, government, and private sector. This interim body will guide the design of Giga until more permanent governance structures are in place.

Giga will continue to further strengthen **local ownership** and ensuring sustainability with national and regional steering committees chaired by the host country governments.

We look forward to realizing our plans with our partners and supporters in 2021! If you would like to join us, reach us at [info@giga.partners](mailto:info@giga.partners) or through our website [www.gigaconnect.org](http://www.gigaconnect.org).





**These dots are every school  
in Zimbabwe**

- with Internet
- no Internet
- no data

## LOOKING AHEAD

# Tools for Connectivity

### Project Connect

Using high-resolution satellite imagery and applying Deep Learning techniques, Project Connect aims to map real-time connectivity of every school in the world. This map, hosted on an open data platform, will serve as a foundation to work with governments and service providers to connect every school to the internet and eliminate the digital divide. To date, over 800,000 schools in 30 countries have been mapped and are viewable live on [projectconnect.world](https://projectconnect.world).

### Supporting Tools: Last Mile Connectivity Toolkit and ITU Broadband Maps

The [Last-Mile Internet Connectivity Toolkit](#) aims to drive new collaborative strategies to extend connectivity to those at the bottom of the social pyramid, and to enable key stakeholders to take a more holistic approach towards broadband.

The [ITU Broadband Infrastructure Maps](#) provide a global data platform for policy makers, regulators and industries to connect the unconnected. By layering school data from Project Connect with ITU connectivity maps, Giga has been able to show the schools that are without mobile coverage and their distance to connectivity nodes, as well as to estimate the costs of extending connectivity to disconnected schools.



# 03

# Country Analyses and Plans

- A. [El Salvador](#)
- B. [Honduras](#)
- C. Kenya
- D. [Kyrgyzstan](#)
- E. [Niger](#)
- F. [Organisation of Eastern  
Caribbean States \(OECS\)](#)
- G. [Rwanda](#)
- H. [Sierra Leone](#)
- I. [Zimbabwe](#)

## COUNTRY ANALYSES AND PLANS

# El Salvador

- El Salvador has significantly expanded mobile connectivity and has policies in place to promote future broadband expansion.
- 29.7% of schools are connected (1,647); however, they have coverage below 10Mbps, with the remaining schools (3,893) unconnected. In partnership with the Government, Giga has identified activities to support the cost-effective connection of these schools; full school location and connectivity is currently being mapped.
- \$34M of CapEx funding and \$15M of annual OpEx funding will enable all schools to be connected, bringing 0.84 million students and teachers online and bring connectivity to 2.7 million in their local communities, potentially enabling up to \$1.4B (+2.4%) in GDP growth.

[See detailed Country Analysis and Plan-->](#)



## COUNTRY ANALYSES AND PLANS

# Honduras

- Honduras has expanded 4G coverage by adding to its national fiber backbone, but there still exists a coverage and usage gap, resulting in a large portion of its population (68%) remaining unconnected.
- 16,445 schools (more than 96%) primary and secondary schools lack access to the Internet. In partnership with the Government, Giga has identified activities to support the cost-effective connection of these schools.
- \$85M of CapEx funding and \$47M of annual OpEx funding will enable the connection of all schools, bringing 1.8 million students and teachers online and to the 4.9 million people in their local community, potentially enabling up to \$1.3B (+2.3%) in GDP growth.

[See detailed Country Analysis and Plan →](#)



## COUNTRY ANALYSES AND PLANS

### Kenya

- With significant investments into the National Backbone, most of the population is covered; however, 70.7% face affordability and electrification challenges and 3.5 million Kenyans have no coverage yet.
- The Government of Kenya's National Broadband Strategy aims to reach 100% connectivity of all schools by 2030, with 50% coverage of primary schools by 2022. Giga will prioritize connecting the 23,300 public primary schools.
- \$124M of CapEx funding and \$67M of annual OpEx funding will expand connection to these 23,300 schools, bringing 8.5 million students and teachers online and connecting 12.8 million people in their local communities, potentially enabling up to \$3.3B (+1.4%) in GDP growth.

[See detailed Country Analysis and Plan →](#)

### Kyrgyzstan

- With Giga's support, Kyrgyzstan has provided basic broadband to 99% of its 2150 schools, with only 21 mountainous schools remaining unconnected. The Ministry of Education and Science is currently connecting some of those schools, as well as expanding connectivity to 720 schools that pay more for slower, less reliable coverage.
- \$206k of CapEx funding and \$210k annual OpEx funding will enable Kyrgyzstan to achieve universal school connectivity, extending high quality connectivity for over 440,000 students and teachers and the 860,000 members of their local communities and unlocking up to \$274M in GDP growth. By connecting the countries 11 remaining mountainous schools, we can close the digital divide.

[See detailed Country Analysis and Plan →](#)



## COUNTRY ANALYSES AND PLANS

### Niger

- The Government of Niger is aiming to drive economic growth through digitization with universal access to connectivity; however, few Nigerien schools are connected to the Internet, and there is limited information on both school location and coverage status.
- Working with the Government, Giga has identified several activities to support the cost-effective connection of 19,355 schools, including using mapping and monitoring technologies to support the Smart Villages initiative and developing innovative financing methods.
- \$104M of CapEx funding and \$96M annual OpEx funding will enable Niger to connect all schools, bringing 3.5 million students and teachers – along with the 7.2 million members in their local communities – online. This can potentially enable over \$525M (+1.8%) in GDP growth.

[See detailed Country Analysis and Plan →](#)

### Organisation of Eastern Caribbean States (OECS)

- Recent progress has led to many schools across 9 Member States to have connectivity. With annual OpEx funding of \$1.7M, we can ensure improved service quality in 460 public and government-assisted schools, improving learning outcomes for over 129,000 students and teachers and connecting a further 250,000 underserved members in their local communities.
- Giga is supporting the OECS to ensure regional harmonisation and sharing of best practices, and has identified some priority areas for collaboration, including monitoring in real time school internet connectivity and seeking funding and pricing discounts for digital education services.

[See detailed Country Analysis and Plan →](#)



## COUNTRY ANALYSES AND PLANS

### Rwanda

- The Government of Rwanda is aiming to grow the digital economy and public services through universal broadband usage by 2024, and has achieved universal coverage; however, internet penetration lags behind, and given the country's geography, significant investment is needed for last-mile connections.
- Nearly all Rwandan schools are within reach of its fiber network and within mobile broadband coverage, but 1,796 schools (43%) remain unconnected.
- \$11M CapEx funding and \$5M annual OpEx funding will enable the connection of these schools, bringing 1.3 million students and teachers online and reaching a further 2 million members in their local communities, enabling up to \$400M in GDP growth.

[See detailed Country Analysis and Plan →](#)

### Sierra Leone

- While 80% of Sierra Leone's 11,200 schools are within 3G/4G coverage, only 205 schools are connected.
- Giga is working with Sierra Leone to accelerate school connectivity and leverage its position as a founding member of the Digital Public Goods Alliance. Some priority areas are augmenting school mapping to refine the school investment strategy and mobilize funding appropriately.
- \$59M of upfront investment and \$34M of ongoing annual service fee funding will enable Sierra Leone to connect 10,995 schools, bringing 2.1 million students and teachers online and extending connectivity to their 3 million local community members, potentially enabling \$0.3B (+2.2%) in GDP growth.

[See detailed Country Analysis and Plan →](#)



## COUNTRY ANALYSES AND PLANS

# Zimbabwe

- The Government of Zimbabwe is aiming to make digitally enabled education a reality, but only 31% of Zimbabwe's primary and secondary schools have internet access; and 75% of the 6,611 unconnected schools are primary schools.
- \$36M CapEx funding and \$40M annual OpEx funding will connect these schools, bringing reliable internet to 2.6 million students and teachers and their 3.5 million local community members, potentially enabling up to \$0.6M (+1.4%) in GDP growth.
- Giga has identified several activities to support the Government to connect schools, including mapping schools and refining investment needs, supporting the design of policies and regulatory strategies, and designing a partnership and funding strategy.

[See detailed Country Analysis and Plan →](#)



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