# Table of Contents

**THE STATES AND REGIONS ALLIANCE**

01

**FOREWORD**

02

**SECTION 1: INTRODUCTION**

03

THE CHALLENGE .................................................................................................................... 03
THE CLEAN REVOLUTION ........................................................................................................ 03
THE IMPORTANCE OF LEADERSHIP ................................................................................... 04
THE ROLE OF SUB-NATIONAL GOVERNMENTS .................................................................... 04

**SECTION 2: A FRAMEWORK FOR CLEAN REVOLUTION LEADERSHIP**

07

ADOPT THE NEW AGENDA .................................................................................................. 07
Mainstreaming disruptive low carbon innovation

EMBRACE LOW CARBON TECHNOLOGY, POLICY AND FINANCING ...................................... 09
Optimizing low carbon initiatives and natural resource use

REDUCE EMISSIONS NOW .................................................................................................. 13
Achieving immediate emissions reductions

ALIGN CARBON WITH OTHER DRIVERS ........................................................................... 15
Integrating carbon into decision making

OPEN SOURCE YOUR LEADERSHIP ................................................................................... 17
Collaboration and knowledge sharing

**SECTION 3: SUMMARY AND RECOMMENDATIONS**

23

KEY RECOMMENDATIONS ................................................................................................. 24

**ABBREVIATIONS**

26

**ENDNOTES**

27

**ACKNOWLEDGEMENTS**

28

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THE PROVINCE OF KWAZULU-NATAL
THE PROVINCE OF MANITOBA
THE PROVINCE OF ONTARIO
THE PROVINCE OF QUÉBEC
THE REGION OF BRITTANY
THE REGION OF CATALONIA
THE REGION OF ÎLE-DE-FRANCE
THE REGION OF JÄMTLAND
THE REGION OF LA RÉUNION
THE REGION OF RHÔNE-ALPES
THE REGION OF THE BASQUE COUNTRY
THE SCOTTISH GOVERNMENT
THE STATE OF BADEN-WÜRTTEMBERG
THE STATE OF BAVARIA
THE STATE OF CALIFORNIA
THE STATE OF NEW YORK
THE STATE OF NORTH RHINE-WESTPHALIA
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THE PROVINCE OF GUANGDONG (PARTNER)
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THE PROVINCE OF NOVA SCOTIA
THE PROVINCE OF PRINCE EDWARD ISLAND
THE PROVINCE OF SOUTH HOLLAND
THE PROVINCE OF THE WESTERN CAPE
THE REGION OF ARAGON
THE REGION OF PATICK
THE REGION OF FLANDERS
THE REGION OF POITOU-CHARENTE
THE REGION OF TUSCANY
THE REGION OF WALLONIA
THE REGION OF VIENNA
THE STATE OF BAJA CALIFORNIA
THE STATE OF BURGENLAND
THE STATE OF CAMPECHE
THE STATE OF CARINTHIA
THE STATE OF COAHUILA
THE STATE OF CONNECTICUT
THE STATE OF DURANGO
THE STATE OF HIDALGO

POPULATION - 177M

429M = POPULATION OF ENTIRE NETWORK

1 OUT OF EVERY 16 PEOPLE IN THE WORLD
FOREWORD

State and regional governments play a crucial role in catalyzing sustainable development. Responsible in many cases for energy, transport, industrial and land use policies, their efforts to cut emissions will, to a large extent, determine our ability to prevent dangerous climate change.

For seven years, the States and Regions Alliance, in conjunction with The Climate Group, has worked to drive a Clean Revolution – the rapid transition to a low carbon economy. In one aspect or another, member governments of the Alliance are all leading the way in climate policy. And through the Alliance, they have come together to share policy lessons and confront common barriers. In doing so, they have inspired each other to greater ambition, and proved themselves champions for wider action, even beyond their direct spheres of influence.

The territories that make up the Alliance are very different from each other. Some have economies that rival the largest nations in the world. Others have populations of only a few million. Some are well-off, and some are still developing. Some have abundant natural resources, while others are dependent on imports. Yet all share the characteristics that make them leaders of the Clean Revolution. Leadership is rarely easy, so we commend them on their efforts to date, and their commitment to strengthen and build on this ambition.

This report showcases some of most compelling examples of this leadership. They range from aggressive deployment of renewable energy to massive improvements in the energy efficiency of buildings. From creating the infrastructure for electric cars and smart grids, to supporting the investment and skills needed for sustained low carbon innovation. They show that major emission reductions are not only possible, but can also go hand in hand with new good quality jobs, economic growth and lower energy costs.

We are committed to making the Clean Revolution a reality. As this report highlights, we will strengthen our collaboration. We will give information on our successes and challenges to others, so they can learn from them. And we will do all we can to provide the policy certainty necessary for sustained low carbon investment. While this report focuses on the members of the Alliance, we recognize that there are many state and regional governments that can match, or even exceed, the achievements highlighted here. We urge them to share their experiences with us and join us in our efforts to drive carbon out of our economies.

The Climate Group and the States and Regions Alliance believe that sub-national governments can and must act as leaders in the development and implementation of innovative and effective climate policy. We look forward to continuing this partnership: working on transformational solutions and showcasing leadership in the pursuit of a smarter, better, more prosperous world.
SECTION 1: INTRODUCTION

THE CHALLENGE

Governments across the world are now facing a highly complex set of economic, social and environmental challenges. While global population growth is pressurizing markets and resources, the fragility of economies has enforced austerity on governments worldwide, particularly in industrialized countries. Job markets are being squeezed and unemployment has risen. Political uprisings, natural disasters and volatile energy markets are putting the security of energy supplies to the test.

Alongside these socio-economic realities, greenhouse gas emissions (GHGs) are at an historic high, increasing at the fastest rate in history (5.9% in 2010). To have just a 40% chance of not exceeding the politically-agreed temperature increase limit of 2°C, global emissions must peak by 2020. Even if current and proposed policies were enforced to maximum effect, emissions in 2020 would still exceed the 2°C pathway. Addressing this emissions reduction challenge alongside these socio-economic concerns is a daunting prospect. But dangerous climate change can be avoided and economic prosperity restored.

THE CLEAN REVOLUTION

How can we rise to this challenge? We need a Clean Revolution: a swift, massive scale-up of clean technology, green infrastructure, smart design and resource-efficient behavior. This transition will move the world from its current high-carbon, resource-inefficient state, to the inevitable establishment of low carbon, highly resource-efficient systems.

While delivering essential emissions reductions, a Clean Revolution will also bring important co-benefits. Through large-scale investment in new energy infrastructure and the productivity gains created by new, more efficient technologies and business models, the Clean Revolution will help create jobs, boost economic growth and provide safe, clean energy in a world of increasing resource volatility and demand.

THE CLEAN REVOLUTION IS A SWIFT, MASSIVE SCALE-UP OF CLEAN TECHNOLOGY, GREEN INFRASTRUCTURE, SMART DESIGN AND RESOURCE-EFFICIENT BEHAVIOR.
In 2011, European sub-national governments were among the most vocal supporters of raising the EU’s collective 2020 emission-reduction target from 20% to 30%. As this report shows, they are often more ambitious than their national governments.

**SECTION 1: INTRODUCTION**

This revolution must be accomplished at an unprecedented scale and pace to create sustainable green economies in the next two decades. Why? To avoid the worst impacts of climate change, and accommodate another two billion global citizens by 2050. To make sure this happens, it’s essential that we create clear and effective policy frameworks and business models, which fully incorporate the cost of carbon into decision-making processes.

**THE IMPORTANCE OF LEADERSHIP**

Such dramatic change can only happen with committed and progressive leadership. This means creating a tipping point in opinion and belief among the most influential political, business and civil society leaders in support of rapid low carbon transformation. Once a critical mass is reached, change becomes inevitable. To make this happen, we need to bring these leaders together, arm them with the right evidence and give them the confidence to take brave decisions and rally others. Sub-national governments are the perfect vehicle for achieving this.

**THE ROLE OF THE SUB-NATIONAL GOVERNMENTS**

State and regional governments are well-positioned to play a key role in making the Clean Revolution a reality.

**The track record**

Since 2005, members of The Climate Group’s States and Regions Alliance have been at the forefront of climate action. Building on shared commitments made in Montreal (2005), Poznań (2008), Copenhagen (2009) and Cancún (2010), Alliance members have often implemented targets, policies and measures ahead of their national governments. In 2011, European sub-national governments were among the most vocal supporters of raising the EU’s collective 2020 emission reduction target from 20% to 30%.

**The right policy level**

Sub-national governments often benefit from working at a level and scale of policy development and implementation that allows for quicker action and greater experimentation. Issues are more local and, at most, regional by definition. Impacts may also be more obvious and immediate, creating a virtuous cycle of growing public support.

**Less politicized**

Shared interests and experience create a collaborative environment among sub-national governments. Unlike international negotiations, geopolitical issues are absent and so do not create a barrier to cooperation.
Necessary jurisdiction
Members of the Alliance have an important but diverse range of competences in areas of climate, energy and fiscal policy. This has allowed these governments to tailor targets, policies and measures to their individual needs, attracting investment and businesses that fit with regional priorities and resources.

Ripple effect
Collectively, the factors above combine to give sub-national governments a degree of influence that can extend far beyond regional or state boundaries. Demonstrative success, for example, can have a ripple effect up to national level policy, down to city level action, and also internationally.

Weight in numbers
Working together, sub-national governments can represent a significant slice of global trade and investment, giving substance and weight to international calls for action.

“MOST INVESTMENTS TO REDUCE GHG EMISSIONS AND ADAPT TO CLIMATE CHANGE – 50-80% FOR MITIGATION AND UP TO 100% FOR ADAPTATION – TAKE PLACE AT THE SUB-NATIONAL AND LOCAL LEVELS.” -UNDP
The Basque government introduced the first climate bill in Spain including a CO₂ emission reduction of 20% by 2020, a huge effort in a region where heavy industry accounts for 40% of GDP.

Harnessing just a third of available offshore renewable energy potential could meet Scotland’s electricity needs seven times over by 2050.
SECTION 2: A FRAMEWORK FOR CLEAN REVOLUTION LEADERSHIP

The rest of this report highlights examples of leading sub-national climate and energy actions, provided by members of the States and Regions Alliance\textsuperscript{9}. These actions are an illustrative, but not exhaustive, list of progressive initiatives currently happening around the world at sub-national government level. The actions have been categorized using a simple framework for Clean Revolution leadership developed by The Climate Group in discussion with a range of business and government experts\textsuperscript{7}. The framework has five categories of action that The Climate Group believes characterize low carbon leadership:

- **Adopt the new agenda**
  - Mainstreaming disruptive low carbon innovation

- **Embrace low carbon technology, policy and financing**
  - Optimizing low carbon initiatives and natural resource-use

- **Reduce emissions now**
  - Achieving immediate emissions reductions

- **Align carbon with other drivers**
  - Integrating carbon into decision-making

- **Open source your leadership**
  - Collaboration and knowledge-sharing

A full description of this (evolving) framework is presented in our ‘Leadership for a Clean Revolution’ report, available at TheCleanRevolution.org.

ADOPT THE NEW AGENDA

Mainstreaming disruptive low carbon innovation

To avoid the most dangerous consequences of climate change, we need to stabilize emissions in the next few years. This means a radical shift in the way society is powered. We need to move away from fossil fuels and towards clean energy sources, meaning large-scale investment in alternative technologies, and consideration of the impact of carbon in all government decision-making. According to the IEA, more than a third of potential CO\textsubscript{2} emissions reductions by 2020 must come from the power-generation sector alone, rising to almost 40% by 2050\textsuperscript{8}. Realizing these potential gains from alternative energy sources, jurisdictions are investing in renewable energy projects. But few are working systematically to make sure the uptake of clean energy is swift, wholesale and effective. Segmented approaches overlook the potential for optimizing the energy system as a whole. The following states are developing ‘whole-economy’ approaches, which disrupt the current reliance on fossil fuels to normalize low carbon energy sources in the mainstream.
When **Scotland** committed to reducing its emissions 42% on 1990 levels by 2020, it immediately started to realize the potential of its abundant green energy resources. The 2009 Scottish Renewables Action Plan and **2011 Renewables Routemap** outline the significant support of onshore and offshore wind, wave and tidal power, as well as investment in grid development and carbon capture and storage. The Routemap commits Scotland to producing 30% new renewable energy and 100% renewable electricity by 2020. To date, Scotland is producing 35% of electricity requirements from renewables.

A particularly dry 2010 saw total renewable capacity down 3% on 2009 levels to 24%, as hydro capacity was diminished. This dip highlighted the need for a diverse portfolio of technologies. In the same year, total renewable installed capacity was increased more than 14% on 2009 levels, with wind generation overtaking hydro as a leading renewable source for the first time. This demonstrates that, year-on-year, Scotland is working to diversify its power supplies to replace conventional power supplies with lower carbon alternatives.

Scotland is committed to capitalizing on this abundant clean energy in the long term. Indeed, harnessing just a third of available offshore renewable energy potential could meet Scotland’s electricity needs seven times over by 2050. The net value of this amount of energy, in terms of electricity sales, would be £14 billion by 2050. This sector clearly has an increasingly prominent role to play in the Scottish economy. The Scottish Government is mindful of the fundamental role of the private sector in advancing low carbon energy deployment and is working to make sure all public money invested is matched by significantly more private investment — under current budgets some £303 million is earmarked for renewables projects.

Similarly, **Bavaria’s Energy Innovative** — a mixture of policies to enable the state to tackle climate change, rising energy prices and dependence on fossil fuels — was initiated in 2011. The aim of diminishing reliance on oil and nuclear energy is laudable in a state where nuclear energy currently accounts for over 50% of energy generation. The expansion of renewable sources such as water, wind, solar and biomass is a primary focus of the concept. But this plan is about much more than ramping up renewable energy generation. It also seeks to address the fundamental challenges of energy security and is therefore developing a system which sets clear-cut objectives for powering Bavaria’s future.

The focus of the Energy Innovative program is to challenge current usage patterns. It is concerned with extending energy networks and storage systems. It considers the optimization of heat and energy generation and use, looking to make them as efficient as possible. It is about retrofitting buildings, low carbon mobility and investing in green jobs and climate change adaptation. In short, it is the vision for a state which already has the lowest per capita energy emissions in Germany.

Mainstreaming change, through disruptive low carbon innovation, calls for a holistic, whole-economy approach. And while it is a significant part of the problem, energy is not the only element. Society as a whole must end its dependence on carbon. Cross-sector partnerships will help develop climate strategies and normalize low carbon innovation across the economy.
Section 2: A Framework for Clean Revolution Leadership

Embrace low carbon technology, policy and financing

Optimizing low carbon initiatives and natural resource use

Governments and industry must be creative and innovative in developing new areas of the green economy. We need to use a wide range of measures across society to effectively combat climate change. We have knowledge about what will successfully decarbonize our industrial processes, lifestyles and economy. But it is only through a combination of technological experimentation, supportive policy landscapes and sufficient financial backing we can make an impact at scale. Below are examples of where these conditions have been created and where results demonstrate a recipe for a successful green economy.

South Australia’s Building Innovation Fund (BIF) ticks all of these boxes by financing innovative ways to cut emissions from the state’s building stock. The AUS$2 million BIF offers grants to owners of office buildings, hotels and shopping centers, for retrofitting initiatives that demonstrate new and leading-edge approaches, with the potential to improve a building’s energy use and reduce GHG emissions.

Projects funded through the BIF show a range of emerging low carbon technologies and solutions that are not commonly used by the building sector in Australia. These include:

- a prototype green wall system
- a prototype green roof system
- ceramic fuel cells used in conjunction with a solar array
- an integrated solar façade
- indirect evaporative cooling
- a study into the use of thermography to determine building façade improvement strategies.

One of the key conditions of receiving a BIF grant is that the building owner commits to sharing information from the project across the building sector. As a result, the industry has access to information about the trialled technology’s potential: energy efficiency; carbon abatement; costs; and further adoption by the sector. This knowledge sharing is fundamental to understanding what works and what doesn’t, so that progress can continue and momentum can grow.

Both South Australia and Île-de-France are capitalizing on their natural geothermal resources by integrating it into their broader strategies to reduce GHG emissions. As well as its work on the BIF, by the end of 2010, South Australia had attracted 86% of Australia’s estimated AUS$680 million investment in geothermal exploration and proof-of-concept projects. Twenty five companies applied for 210 Geothermal Exploration Licenses (GELs) in South Australia, representing 55% of the nation’s geothermal license applications. In October 2011, South Australia released its Renewable Energy Plan, which builds further on the state’s leadership in hosting wind, geothermal investment and pioneering support for household solar energy.

Bavaria’s Energy Innovative seeks to address the fundamental challenges of energy security and is therefore developing a system which sets clear-cut objectives for powering the state’s future.
Since the 1980s, Île-de-France has been capturing ground heat using exactly the same technology as the oil industry uses for exploration.

For over a decade, Upper Austria’s state-of-the-art technology companies working in clean energy production have been exporting products across the world and promoting low carbon innovation.

FOR WIND ALONE, AUS$2.8 BILLION HAS BEEN INVESTED TO INSTALL 1,150 MEGAWATTS. THIS ACCOUNTED FOR 26% OF SOUTH AUSTRALIA’S ELECTRICITY GENERATION IN 2010/11 – ONE OF THE HIGHEST RATES IN THE WORLD.

Since the 1980s, Île-de-France has been capturing ground heat using exactly the same technology as the oil industry uses for exploration. Tapping this clean, natural source of power, Île-de-France highlights that technological innovation isn’t just about new ideas, but new applications of existing technology. Between 2008 and 2013, the regional government, along with the French national government, is investing €2.7 million in rehabilitating six of the 30 geothermal installations still in use, and developing six new state-of-the-art plants to boost geothermal energy production in the region.

Also capitalizing on its abundant low carbon energy sources, La Réunion is initiating action in households and industry alike. As well as investing in experimental marine thermal pilot projects, the Regional Council is also giving €3,000 (an “Energy Cheque”) to households for the installation of photovoltaic panels with a smart storage battery. Such batteries optimize the amount of photovoltaic energy in the system. La Réunion has also installed some 2050 smart boxes to help families manage their real-time energy consumption.

It is encouraging that both developing and developed regions are committed to taking action, developing knowledge and capitalizing on areas of established expertise to tackle climate change. For over a decade, Upper Austria’s state-of-the-art technology companies working in clean energy production have been exporting products across the world and promoting low carbon innovation.

Driven by economic development, climate protection and innovation, the Oekoenergie-Cluster (OEC), a network of companies active in renewable energy and energy efficiency, was established in Upper Austria in 2000. Since then, the network has grown to include 160 companies that employ more than 7,300 people. Turnover has grown from €230 million in 2000 to €1.8 billion in 2012, exporting to more than 60 countries worldwide and contributing 4% alone to the state’s GDP – highlighting the significant growth potential of the sector. The OEC fosters innovation and competitiveness of green energy businesses through collaborative activities including R&D, marketing and training. Its role in supporting low carbon technology is fundamental, bringing together the state’s biomass boiler and solar collector manufacturers, installers, Energy Service Companies (ESCs), designers, architects and many other stakeholders to improve products and services.
Québec is delivering a raft of innovative measures to reduce its emissions. Given that 43.5% of all its emissions come from transport, it is not surprising that the province is implementing its Electric Vehicle Action Plan as part of a broader transportation strategy. With the vision of achieving full sustainable mobility in Québec, the Government intends to electrify individual and collective transportation all over its territory.

Rebates of up to CAN$8,000 for purchase or lease of a hybrid or electric vehicle and subsidies of up to CAN$1,000 are being provided for the purchase and installation of home charging stations. By 2020, Québec aims for 25% of new light passenger vehicle sales to be for plug-in hybrids or all-electric vehicles.

Québec is already a leading supplier of batteries, battery materials, electric motors, and light materials used in EVs, and boasts hybrid and EV assemblers like Nova Bus and Précicad. Public education campaigns aim to encourage residents to switch to electric vehicles and new users will be given green license plates. The Government is striving to develop a critical mass of innovative businesses and research centers that will allow Québec to become integral to the new electric vehicle market.

There will also be increased financial support for municipal and metropolitan transit authorities to shift their fleet to electricity – to purchase and test electric buses and to stimulate demand for the technology further afield.

Québec anticipates that its Electric Vehicle Action Plan will, among other deliverables, reduce GHG emissions by 900,000 tons in 2020 (6% of Québec’s total required cuts to attain its targets for that year), and a total of 3.5 million tons by 2030.

Similarly, given that 40% of California’s emissions come from transport and that cars alone constitute a quarter of the state’s total GHG footprint, there is a clear imperative to decarbonize the sector. Part of the state’s response is the Advanced Clean Cars program. It has three primary components: the Low Emission Vehicle (LEV) Program which requires annual fleet-wide GHG reductions; the Zero Emission Vehicle (ZEV) Program which requires increasing numbers of plug-in hybrid, battery electric, and fuel cell vehicles to be sold in the state, increasing to about 15% of new vehicle sales by 2025, and the Clean Fuels Outlet program which requires fuel providers to secure minimum levels of alternative fueling infrastructure, once alternative fuel vehicle sales reach a certain threshold.

The Advanced Clean Cars program is spurring dramatic improvements in battery, fuel cell and related technologies, because they work and must be used. The auto industry is now an active participant in, and supporter of, the state’s clean vehicle policy-making processes and the program integrates tightly with other climate change policies in California.
GUJARAT WAS THE FIRST AND REMAINS THE ONLY INDIAN STATE TO FORM A CLIMATE CHANGE DEPARTMENT IN GOVERNMENT.

MANITOBA HYDRO'S ENERGY CONSERVATION PROGRAMS HAVE ALREADY SAVED OVER 500 MEGAWATT HOURS OF ELECTRICITY, WHILE REMOVING APPROXIMATELY ONE MILLION TONS OF GHG EMISSIONS.
THE NEW RULES REQUIRE THAT ONE OUT OF SEVEN NEW VEHICLE SALES IN CALIFORNIA BE ZERO-EMISSION BY 2025.

Embracing low carbon technologies through supporting policy and innovative financing mechanisms builds the right environment for the technologies to reach the market and thrive.

REDUCE EMISSIONS NOW

Achieving immediate emissions reductions

The ultimate indicator of an effective transformational solution is actual emissions reduction and eventual decarbonization. Governments that have successfully ‘got their own house in order’ and taken early, quick and smart action, can demonstrate immediate results and encourage commitment to further progress. Although long-term strategies for deep emission cuts will be vital, demonstrating that immediate action can deliver emission reductions encourages support for the harder, more disruptive changes to follow. Members of the States and Regions Alliance have been working to enact immediate, short-term emissions reductions for some time. Here is an illustrative selection of work in this area.

Jämtland’s vision to be fossil fuel free by 2030 is befitting of a Clean Revolution. Through efficiency measures and locally-sourced renewables, the state is looking to enhance its current profile – less than 8% of its carbon footprint comes from energy – and none from coal, oil or gas. The state creates substantial profits through exporting excess energy to other parts of Sweden and Europe that represent an impressive 85% of hydropower generated. With increased focus on impactful sectors like transport, Jämtland is well on the way to achieving its aspirational target.

Manitoba is also capitalizing on its abundant hydropower resource which currently delivers 97.4% of the province’s energy. And the province’s primary energy provider – Manitoba Hydro – is striving to ensure that its impact continues to diminish. The company has converted one coal-generating station to cleaner natural gas and is phasing down its one remaining coal-fired generation (which will only be run to support emergency operations).

Manitoba Hydro’s Power Smart plan has established demand-side targets including electricity savings of 644 megawatts and 2,053 gigawatt hours by 2024 - 2025. The company’s energy conservation programs have already saved over 500 megawatts of electricity, while removing approximately one million tons of GHG emissions.

By optimizing the natural resources available, Manitoba and Jämtland have been able to achieve transformational emissions reductions, and prepare for further reductions in the near future. Equally, measures to reduce end-use consumption through efficiency measures show effective leadership on short-term abatement targets.

Similarly Gujarat was the first, and remains the only, Indian state to form a climate change department in government. Through its Jyotigram Yojana (Energy reforms), Gujarat was able to reduce the electricity transmission losses (and subsequent GHG production) from 31% to 22% in four years.

Gujarat was the first, and remains the only, Indian state to form a climate change department in government. Through its Jyotigram Yojana (Energy reforms), Gujarat was able to reduce the electricity transmission losses (and subsequent GHG production) from 31% to 22% in four years.
The favorable natural conditions in states with abundant clean energy potential have enabled ambitious change. However, not all states can capitalize on such resources. Efforts to reduce emissions directly from end-use energy consumption are seen across the Alliance. Indeed, energy-efficiency measures are one of the most effective ways to reduce emissions substantially in the short term. According to the IEA, half of the accumulative CO\(_2\) abatement achieved to 2035 in the 450 Scenario (with policy ambitions consistent with the 2°C target), relative to the New Policies Scenario (with less ambitious policies), comes from energy efficiency measures\(^a\).

In Wales, the \textit{arbed} program is not just about reducing GHG emissions; it also improves the energy performance of homes in some of the most deprived parts of Wales while boosting jobs, skills and regeneration. Phase 1 of \textit{arbed} used its initial £60 million investment from the Welsh Government, social housing providers and energy companies, to provide: solid wall insulation to nearly 2,900 social and private homes; over 1,800 solar PV panels in social housing; solar hot water to 1,000 households including several sheltered housing schemes; and heat pumps and improved insulation levels to 121 households off the gas network. A further £6.6 million has been invested to expand the program and £3 million has been reinvested.

At least 6,000 homes have benefited from \textit{arbed} Phase 1, and this is expected to rise to 7,500. Combined with the Welsh Government’s Home Energy Efficiency Scheme and Boiler Scrappage Scheme, a total of 25,000 Welsh homes were improved and made cheaper to heat in 2010 - 2011.

**UNLOCKING ENERGY EFFICIENCY POTENTIAL**

In partnership with The Climate Group, a report\(^1\) prepared by the Stanford Institute for Economic Policy Research looked at unlocking the potential for energy efficiency financing at the sub-national level. It identifies significant potential to scale-up energy efficiency measures across a number of sectors, in particular in buildings (residential, commercial and municipal) and industry. However, it identifies a number of common barriers to energy efficiency financing which negatively affect private or public sector funding on both the demand and supply side, as divided into three broad categories:

1. Economic – e.g. high transaction costs
2. Institutional – e.g. poor institutional environment and development
3. Informational – e.g. weak understanding of policy options.

Through an analysis of five sub-national governments\(^2\) collectively embodying a diverse set of social, political and economic characteristics, and representing four different continents, the report develops a stepwise energy-efficiency policy framework. This framework creates an effective procedure for policymakers to identify and implement a wide set of policy levers, including:

- technical assistance
- codes and labels
- standardization of contracts
- certification of Energy Service Companies (ESCOs)
- partnership building.

Conclusions asserted that the framework, by building a procedure for analyzing policy options, could measure cost-benefit ratios to optimize sub-national decision-making on energy efficiency policies.

The report went on to say that policy-makers should encourage an integrated approach, looking to optimize efficiency policies by finding synergies:

- at various stages of the supply chain
- between the sub-national and national levels
- that cover entire sectors comprehensively, and even cross sectors.

These conclusions support the call for whole-economy responses and enhanced collaboration between a number of different actors.
This investment has also enabled homes to receive multiple energy efficiency improvements including:

- boiler upgrades and replacements
- window upgrades
- roof extensions
- structural work
- energy-saving advice.

Phase 2 of arbed will invest £43 million over three years. This kind of practical, on-the-ground scheme for the buildings and communities most in need, is evidence that interventions, no matter how simple, can be delivered at scale and bring about significant positive change.

It is not just building stock that has potential to deliver substantial emission reductions through energy efficiency schemes. Through its appliance replacement scheme, the Basque Country has facilitated energy savings in households by providing grants and advertising campaigns to encourage residents to replace old, inefficient appliances with A and A+ category appliances. Since its inception in 2008, around 30,000 old appliances have been replaced every year through the program. This has resulted in energy savings of some 9,012 megawatt hours per year and CO₂ savings of 4,867 tons per year.

The program has been successful due to the commitment to withdraw appliances with lower than A rating from participating shops. This has been coupled with consistent guidance to consumers in choosing energy-efficient appliances. It is this robust approach which has enabled a market transformation towards optimally efficient appliances.

In an attempt to continually improve progress and commitment in this area, many of the Alliance members reconsider and reinvent outdated policies to enhance current efforts to reduce emissions even further. While the provincial government of Ontario took steps in 2006 to promote energy efficiency with its Building Code, in August 2011, Ontario passed a new regulation to reduce the climate impact of its wider operations. The law requires the province’s Broader Public Sector (BPS) (e.g. municipalities, universities, colleges, school and hospitals) to develop and implement energy conservation plans. Under the regulation, BPS organizations are required to report on energy use and GHG emissions beginning July 1, 2013, and develop energy conservation plans beginning July 1, 2014.

**ALIGN CARBON WITH OTHER DRIVERS**

Integrating carbon into decision making

Integrating climate change impacts in governmental decision-making is an epic task. In times of austerity, it is considered easier to maintain and streamline government practice than to consider new, pioneering approaches. But given the imperative to reduce emissions substantially across all sectors of the economy, carbon should be given parity with cost in decision-making across all government departments. It isn’t easy, but it is necessary. We need institutional change and we must establish new, less fragmented processes across government to make sure carbon considerations are prioritized. Here are some examples of efforts to embark on this challenge.

South Australia has taken significant steps to promote wind energy investment. Yet some of its most pioneering work in this area has come from the planning reforms to remove barriers to developing wind farms.

Over 30,000 appliances are replaced through the Basque Government’s Appliance Replacement Scheme, saving some 9,012 megawatt hours and CO₂ savings of 4,867 tons per year.
The intent of the reforms is to reinstate Local Government (rather than the State Government) as the main authority for assessing planning applications for wind farms, while providing new levels of assurance for investors.

The package of reforms includes a number of initiatives to restore certainty to communities, developers and development assessment authorities. The main driver was to unlock green power investment worth AUS$1.8 billion which was on hold pending this reform. Since October 2011, four wind farm development proposals have been submitted to Local Government for assessment, with a total capacity of 543 megawatts.

Accepting that we need institutional change to ramp up clean technology production and use is a fundamental component of the Clean Revolution. We must remove or overcome barriers that allow scale-up – and it is encouraging that South Australia has started to do this. In 2009, São Paulo became the first state from an emerging economy to enact climate legislation and has become a frontrunner in aligning climate change with all government practices. The state has mandated to reduce its GHG emissions 20% on 2005 levels by 2020. While still in early implementation stages, the policy has followed the likes of California’s AB 32 in setting a mandatory CO₂ reduction target and a comprehensive Transportation Plan covering modes, technologies (efficient vehicles) and fuels (bioethanol, biodiesel and hydroelectricity). An Adaptation Plan is also open for public consultation. The state’s basic driver is an alignment with the most ambitious climate policies in the world. It is focused on improving innovation, technologies and competitiveness, plus breaking international climate negotiations’ stalemates through benchmarking best practice at the sub-national level.

According to a recent Worldwatch Institute report, Guangdong province, as one of 13 pilot regions selected by the Chinese Government, is becoming a low carbon pioneer in China. In January 2012, the ‘Strategic Emerging Industries’ Development Plan in 12th Five Year Plan Period’ became the only one so far approved by the Chinese Government. Although this plan has not been made public, it appears to be based around eight strategic areas:

- High-end emerging electronics and IT
- New energy vehicles
- LEDs
- The biology industry
- High-end equipment manufacturing
- Energy saving and environmental protection
- New energy
- New materials

Although the details remain vague, these actions appear to be headed in the right direction. Meanwhile, the goals of Guangdong’s low carbon plan are very much in line with the Central Government’s plan: to reduce “carbon intensity” (CO₂ emissions per unit of gross domestic product) 19.5% by 2015, relative to the 2010 level; and to reduce carbon intensity more than 45% by 2020, relative to 2005 levels.

While in line with the Central Government plan to reduce carbon intensity, Guangdong’s 2015 goal is by far the most ambitious regional target – 2.5% higher than the national average. The province’s 2020 goal also reflects the higher end of the national target, which is set to achieve a 40% to 45% decrease in carbon intensity between 2005 and 2020.

São Paulo and Guangdong have taken the lead in demonstrating that industrializing states and regions are also committed to tackling their impact and developing innovative policy to do so. The states above show early signs of attempting to align carbon considerations with their decision-making DNA. Now other states must follow suit.
OPEN SOURCE YOUR LEADERSHIP

Collaboration and knowledge sharing

Working together is fundamental to delivering a low carbon society, not just across government departments and levels, but more broadly. Partnerships and collaborations across sectors bring together the people, finances, expertise and resources needed to achieve the Clean Revolution. While many of the programs highlighted in previous sections demonstrate partnership approaches, next we showcase some pioneering collaborations in member jurisdictions which are addressing climate change across a host of diverse areas.

The positive legacy of hosting COP16 and 17 respectively spurred both the states of Quintana Roo and KwaZulu-Natal into decisive action to reduce emissions and confront pressing development challenges in their own jurisdictions.

Quintana Roo is working in collaboration with land owners, NGOs and research institutes and other government levels on a REDD+ Vision. The Yucatan Peninsula was established by the National Forestry Commission at COP 16 as an early initiative area – it is the second-most heavily deforested area in Latin America. Subsequently the states of Campeche, Yucatan and Quintana Roo signed an agreement on a collaborative REDD+ Strategy for the Peninsula. Quintana Roo is implementing this strategy in four municipalities (Othón. P. Blanco, Bacalar, Felipe Carrillo Puerto and Jose María Morelos). It encourages the development of sustainable forests while combining agriculture and livestock activities. As there has never been sustainable ecosystems management in Mexico, the strategy is one of the first efforts to combine tropical forest management with the promotion of agriculture, livestock, forestry, beekeeping, alternative tourism and the use of non-timber. It is a strategy to meet deforestation reduction goals as well as social development goals, as it provides economic and environmental benefits to the communities that own the land.

Following extensive consultation with business, statutory bodies, civil society and research institutions – the ‘Community of Innovation’ – KwaZulu-Natal is developing a comprehensive Green Economy Strategy to guide action made on a local and provincial scale. As part of the strategy, the province will leverage green economy initiatives by developing a Green Procurement Policy that favors purchasing from green companies, with special interest to SMMEs. A Renewable Energy Work Group made up of different spheres of Government has been established and areas of focus for the strategy include: increasing resource use efficiency in business and Government infrastructure; increasing the supply of renewable energy; securing the supply of eco-system services from the province’s natural assets; and reducing environmental and climate-related risks. The Government aims to create ‘enabling conditions’ for the development of the green economy. Such holistic thinking in government planning should be considered across the Alliance.

EFFINERGIE is a project initiated by eight founding members of the Alliance, including Rhône-Alpes. It is based on a shared and consensual objective: to create a voluntary label for the certification of new, low carbon buildings. An action group of industries, trade unions, federations of building professionals, associations, research and technical centers, banks, state agencies and French regions convened to create a label which was three times more demanding than national regulation. The label is responsible for a revision of national regulations, highlighting the political impact that proactive partnerships can deliver. As well as building competences of workers in the sector and the implementation of new technologies and practices, the project also allowed the development and structuring of new markets.

São Paulo and Guangdong have taken the lead in demonstrating that industrializing states and regions are also committed to tackling their impact and developing innovative policy to do so.

The positive legacy of hosting COP16 and 17 respectively spurred both the states of Quintana Roo and KwaZulu-Natal into decisive action to reduce emissions and confront pressing development challenges in their own jurisdictions.
SÃO PAULO BECAME THE FIRST STATE FROM AN EMERGING ECONOMY TO ENACT CLIMATE LEGISLATION AND SET A 20% EMISSION REDUCTION TARGET BY 2020.

NEW YORK STATE’S $1 MILLION ELECTRIC VEHICLE READINESS GRANT HAS PROVIDED THE NORTHEAST ELECTRIC VEHICLE NETWORK WITH THE INVESTMENT NECESSARY TO UNDERTAKE ITS INITIAL PLANNING ACTIVITIES.
New York has been collaborating with its neighboring states on emission reduction for many years now. Since 2003, New York has participated in the development and implementation of the Regional Greenhouse Gas Initiative (RGGI), the nation’s first cap and trade program collaborating alongside eight partner US states and Canadian provinces. More recently, New York helped launch the Northeast Electric Vehicle Network, which is comprised of transportation, energy and environment officials from ten northeastern US states and the District of Columbia. The Network promotes clean vehicles and fuels, and electric vehicle-charging stations and related infrastructure, as part of an existing collaboration through the Transportation Climate Initiative (TCI).

Thanks to the $1 million Electric Vehicle Readiness Grant provided by the New York State Energy Research and Development Authority (NYSERDA) on behalf of TCI, the network has the investment necessary to undertake its initial planning activities.

Brittany is also opting to secure its electricity supply between now and 2020 by using a partnership approach. Through the Breton électrique Agreement (Pacte électrique breton – PEB) – a joint cross-sector initiative between the Regional Council of Brittany, RTE (national electricity transport facility), ADEME (national energy agency) and ANAH (national housing agency) – the region is committing to cut growth in energy consumption by a third. All partners have agreed to work together to identify stakeholders and link key initiatives. Green Tech Clusters, Energy Savings Certificates, the EcoWatt program and the ‘Info-energy’ network will deliver these reductions. ADEME and Brittany alone have invested €3 million in local energy schemes. PEB is engaging with householders and farmers through projects targeted at increasing energy performance. In the same timescale, PEB partners will also produce 3,600 megawatts of renewable energy, including solar, marine, wind and biomass.

There are some emerging patterns within the States and Regions Alliance demonstrating that innovative ideas are being shared and replicated across jurisdictions. Such willingness to ‘open source’ leadership ideas and lessons learned evolves knowledge on successful approaches to decarbonization. Both North Rhine-Westphalia (NRW) and Baden-Württemberg in Germany have developed Energy Agencies to deliver climate and energy solutions within their respective states.

The EnergyAgency.NRW offers energy-related advisory services to companies and administrative bodies. It also provides information and training for specialists and the general public. The EnergyAgency.NRW manages the energy economy cluster called EnergyRegion.NRW and the energy research cluster called CEF.NRW. It has contributed to the state’s 13% reduction in emissions since 1990. This is a snapshot of activities and collaborations delivered through EnergyAgency.NRW since 2007:

- **Wood pellets** – By the end of 2011 around 20,000 households in NRW were heated by wood pellets.
- **Fuel cells** – About 400 mostly medium-sized companies and research institutes constitute the ‘Fuel Cell and Hydrogen Network NRW’.
- **Electromobility** – The Electromobility Model Region Rhine-Ruhr North Rhine-Westphalia is one of the first large model regions for sustainable mobility in Europe.
- **Energy refurbishment of buildings** – As part of the joint action My House Saves, more than 1,200 buildings in the region were awarded the Energy Saver NRW plaque from 2006 to 2011, and around 1,800 individual plaques were presented.
- **Energy-efficient construction** – The 50 Solar Housing Estates in NRW show the possibilities for solar energy use to generate heat and electricity on the estate level. 37 new and existing estates are finished with 14 more under consideration.
— Geothermal energy – In NRW, the geothermal sector creates 4,000 to 5,000 jobs.
— Heat pumps – In 2011 around 11,000 heat pumps were installed in NRW.
— Wind energy – In NRW, just under 2,900 wind turbines were turning in 2011, providing an installed capacity of around 3,070 megawatts.

Through consolidating action across the state’s sectors and actors in one place, NRW has a coordinated, ambitious and effective model for achieving impressive results. This ensures that environmental considerations, strategic advantages, financial opportunities and stakeholder values can be included in all decisions around regional climate action.

Taking a slightly different approach, Baden-Württemberg has opted for the formation of 32 Regional Energy Agencies (REA) across the state, giving each €100,000 seed funding. The state-owned Climate Protection and Energy Agency (KEA) took the lead and shared its knowledge on capacity building at the regional level. The KEA motivated regional political decision makers to support the project.

Centrally important to the Energiewende, or the transition towards renewable energies, is to spread local knowledge. This is the rationale for focusing on the grassroots and feedback. The REAs give Baden-Württemberg’s communities the opportunity to convene consumers, craftsmen, banks and citizens’ groups, creating networks to support joint effort.

The REAs collect and share specific knowledge on renewable energies, alternative energy technologies, efficient use of energy – especially in modernizing of HVAC systems – and the insulation of buildings. They create awareness to change consumer patterns and help establish citizens’ solar power plants or wind power plants.

REGIONAL ENERGY AGENCIES ARE CRUCIAL BUILDING BLOCKS FOR THE ENERGY TRANSITION IN BADEN-WÜRTTEMBERG. THE CITIZENS NEED TO BECOME A PART OF THE TRANSITION, AS ENERGY EFFICIENCY IS CRUCIAL FOR A SUCCESSFUL TRANSITION TO A LOW CARBON SOCIETY.

Similarly in Catalonia, the Basque Country and South Australia, voluntary agreements between business and the government have been developed to promote collaboration.

In Catalonia, the Voluntary Agreements Programme for reducing GHG emissions is open to diverse organizations (companies, institutions, public administrations, associations and foundations) and has four basic principles: commitment, volunteering, rigor and transparency. Currently there are 59 participating organizations from a range of sectors.
These are the aims of the Voluntary Agreements:

— To become a key mitigation tool in public climate policy
— To support and recognize organizations leading the way in climate action
— To raise public awareness of the need to take immediate action for the climate, its benefits and the great potential for collective action
— To share experience and best practice in reducing GHG emissions
— To provide a rigorous, credible and effective institutional response to the significant number of voluntary reduction and offsetting initiatives.

The commitment to monitor emissions and enact reduction measures is beyond that required by legislation. The voluntary nature of the actions is acknowledged and displayed using a program label. Information on each organization is also provided on the internet, adding value to the actions of the organizations and demonstrating the transparency of the scheme.

In the Basque Country, two schemes are functioning: one for voluntary reductions in industrial and services companies and another for the Local Agenda network. More than 40 companies are involved in the scheme for industry, and there are almost 200 municipalities with Local Action Plans.

South Australia has also established 21 sectoral agreements between industry and the State Government. These voluntary agreements between Government and various industry or community groups cover sectors as diverse as urban development, technology, tertiary education and regional development.

Using a similar approach but applying it in unique ways demonstrates that collaboration and sharing can allow for policies or initiatives to be tailored to suit regional contexts. This is an important point to consider. While Alliance members and sub-nations generally have diverse geographic, topographic, economic, social and political systems, the most effective ideas can be pooled and will work across contexts. This is why utilizing collaborative networks to share information is a fundamental pillar of the Clean Revolution.
Sub-national governments, such as those represented by the States and Regions Alliance, are well-placed to provide the leadership and inspiration to drive the Clean Revolution.
SECTION 3: SUMMARY AND RECOMMENDATIONS

The purpose of this report is to showcase the range of leading climate and energy initiatives taking place at the sub-national government level. These efforts are examples of the type of action which, if scaled-up globally, will help drive a clean industrial revolution that can combat climate change and create a better, smarter, more prosperous future for all.

As this report shows, sub-national governments, such as those involved in the States and Regions Alliance, are well-placed to provide the leadership and inspiration to drive the Clean Revolution. Although differing in size, resources and economic profile, sub-national governments share some common features, such as sitting at the right policy level to implement solutions effectively and efficiently. Strengths such as these have enabled them to set policies and targets that are often among the world’s most ambitious.

But having the right conditions for success is no guarantee of it. What this report strives to demonstrate is that leadership – and a particular type of low carbon leadership – is a key determinant of success. The low carbon success stories in this report illustrate at least one of the five characteristics that The Climate Group believes define a Clean Revolution leader. From greater collaboration to mainstreaming carbon-related impacts into decision-making processes, governments from the States and Regions Alliance are demonstrating the kind of behavior that must become commonplace at all levels of government over the next ten years – and ideally sooner.

But even today’s leaders need to do more. As laid out in our introduction, there is still a gap between global policy commitments to emissions reductions and the level of reductions needed to maintain the 2°C pathway. Sub-national governments must play a role in bridging this gap.

Indeed, if all sub-national governments implemented policies like those in this report – from large scale investment in renewable energy as seen in Scotland and Bavaria, through the low carbon infrastructure support provided by Upper Austria, North Rhine-Westphalia and California, to the maximization of energy efficiency potential as demonstrated by Wales and the removal of governance barriers enabling action to go further as in South Australia – the gap between where we are and where we need to be in emission reduction would swiftly narrow and eventually close. Similarly, if ambitious, collaborative approaches to solving complex problems such as those developed by Quintana Roo and KwaZulu-Natal were employed on a wider scale, this would facilitate a huge step towards the Clean Revolution.

The following recommendations describe actions that governments can take now to catalyze more ambitious climate and energy policy.
SECTION 3: SUMMARY AND RECOMMENDATIONS

KEY RECOMMENDATIONS

1

Resolute implementation.
Governments need to ensure that target-setting does not become an end in itself. They need to make a commitment to creating detailed targets and implementing subsequent policies to make sure there is clarity in who is doing what and when, to deliver concrete, on-the-ground action.

2

Increased transparency.
Transparency and disclosure of government information and data can create “information marketplaces” for non-government stakeholders to positively exploit. For example, access to public data allows businesses and social entrepreneurs to create new emission reduction solutions (e.g. smart phone travel apps) that can help governments meet their climate and energy targets. Transparency and disclosure also encourage greater collaboration (see below).

3

Greater policy certainty.
Governments must look beyond election cycles and create cross-party consensus to embed carbon considerations in long-term decision-making processes. This policy certainty stimulates confidence among the investors, businesses and consumers who finance, create and consume the low carbon goods and services that underpin the Clean Revolution.

4

Continued collaboration.
As a key driver of policy evolution and successful implementation, collaboration needs to be front and center of decision makers’ minds. Collaboration needs to be holistic. It must include full inter-departmental consultation in government so that key sectors and solutions do not operate in silos. It must cover civil society and business engagement; and it must also include collaboration with other sub-national governments, as well as other levels of government.
EACH OF THESE LOW CARBON SUCCESS STORIES ILLUSTRATES AT LEAST ONE OF THE FIVE CHARACTERISTICS THAT THE CLIMATE GROUP BELIEVES DEFINE A CLEAN REVOLUTION LEADER.
ABBREVIATIONS

°C  Degrees Celsius
AB 32  Assembly Bill 32 (California Global Warming Solutions Act of 2006)
BIF  Building Innovation Fund
BPS  Broader public sector
CO₂  Carbon dioxide
CO₂e  Carbon dioxide equivalent
COP17  17th Conference of the Parties
ESCOs  Energy service companies
EU  European Union
GELs  Geothermal Exploration Licenses
GHG  Greenhouse gas
GSP  Gross state product
Gt  Gigatons
HDV  Heavy-duty vehicle
HVAC  Heating, ventilation and air conditioning
IEA  International Energy Agency
KEA  Climate Protection and Energy Agency of Baden Württemberg
LDV  Light-duty vehicle
LEV  Low-emission vehicle
NRW  North Rhine-Westphalia
NYSERDA  New York State Energy Research and Development Authority
OEC  Oekoenergie-Cluster
OECD  Organization for Economic Cooperation and Development
PEB  Pacte électrique Breton (Breton Electric Agreement)
ppm  Parts per million
R&D  Research and development
RD&D  Research, development and deployment
REA  Regional Energy Agencies
REDD  Reducing Emissions from Deforestation and Degradation
RGGI  Regional Greenhouse Gas Initiative
SMME  Small, Medium and Micro-Enterprises
TCI  Transportation Climate Initiative
UNEP  United Nations Environmental Program
ZEV  Zero-emissions vehicle
3. Deutsche Bank Climate Change Advisors. “Global Climate Change Policy Tracker”. April 2012. p. 9
4. According to UNEP’s Working Definition of a Green Economy as ‘a system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long-term, while not exposing future generations to significant environmental risks and ecological scarcities.’
6. The Climate Group is grateful for the submissions made by Alliance members for this report. The information received enabled The Climate Group to select and showcase exemplary cases occurring across each leadership characteristic outlined in this report. Efforts were taken to ensure that these examples were balanced across members within the limited space available. This information has played an important role in building the evidence base for the Clean Revolution.
7. Main headings represent The Climate Group’s proposed indicators for a diverse set of Clean Revolution leaders: highly influential individuals, businesses and governments. Subtitles indicate characteristics that are specific to governmental leadership.
10. IEA. “World Energy Outlook 2011”. 2011. p. 214. The 450 scenario refers to the maximum ppm GHG build-up in the atmosphere that would limit us at 2 degrees. The 450 scenario is the ambitious IEA roadmap to limit warming to two degrees, as compared to the NPS, which is the less ambitious IEA roadmap based on current policies and announced governmental targets (from explanation on p. 54).
12. These governments are California, USA; North Rhine Westphalia, Germany; New South Wales, Australia; Gujarat, India; and Guangdong, China.
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THE CLIMATE GROUP

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Founded in 2004, The Climate Group has operations in Australia, China (Beijing and Hong Kong), Europe, India and North America.

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*All of our government members are also members of the States and Regions Alliance

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