

# BofAML's Transforming World Atlas

## Investment themes illustrated by maps

**Bank of America  
Merrill Lynch**

02 March 2016 Corrected

### Maps for navigating a Transforming World

The second edition of our Transforming World Atlas provides fresh perspective on the global investment landscape through a new series of maps highlighting themes and trends within our Transforming World framework:

1. People – the allocation of scarce human resources
2. Innovation – the disruptive role of technology
3. Government – the role of public policy
4. Markets – the allocation of scarce financial capital
5. Earth – the allocation of scarce natural resources

From space exploration to medical innovation, European migration to US immigration, inequality and poverty to the rise of women in the workforce, cyberwars and pandemics to the astonishing interconnectivity of today's world, our Atlas aims to cover a range of themes at the forefront of investors' minds.



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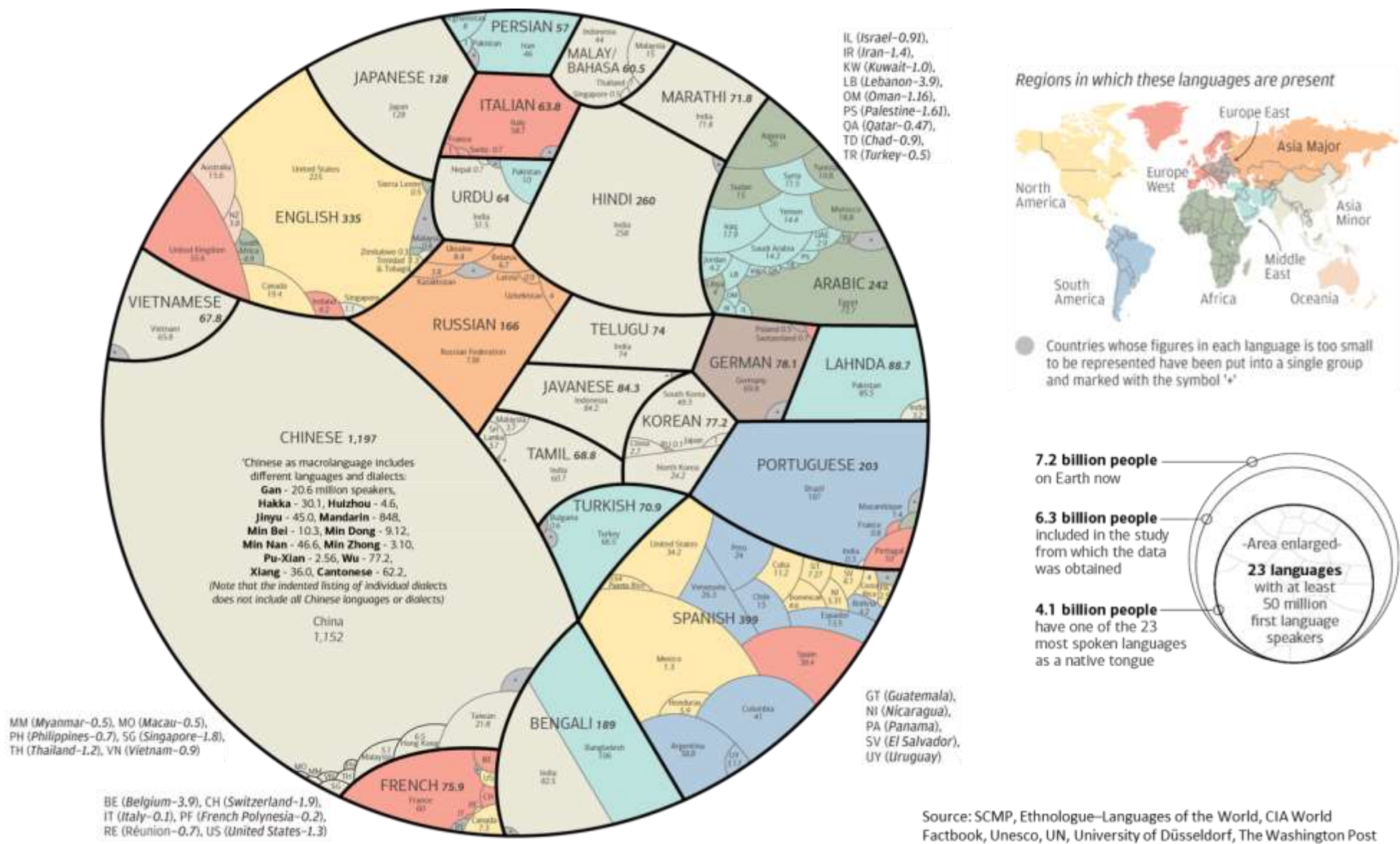
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Health  
Poverty  
Size of Asia  
Race  
Robotics  
Cybersecurity  
The sharing economy  
gaming  
Religion  
Aging  
Clean tech  
Global population size  
Tourism  
Earth  
Innovation  
The sharing economy  
Space exploration  
Asia as a world power  
Migration  
Trade partnerships  
Government  
Geopolitics  
Credit default  
Stock market  
Carbon emissions  
Alternate resources  
Markets



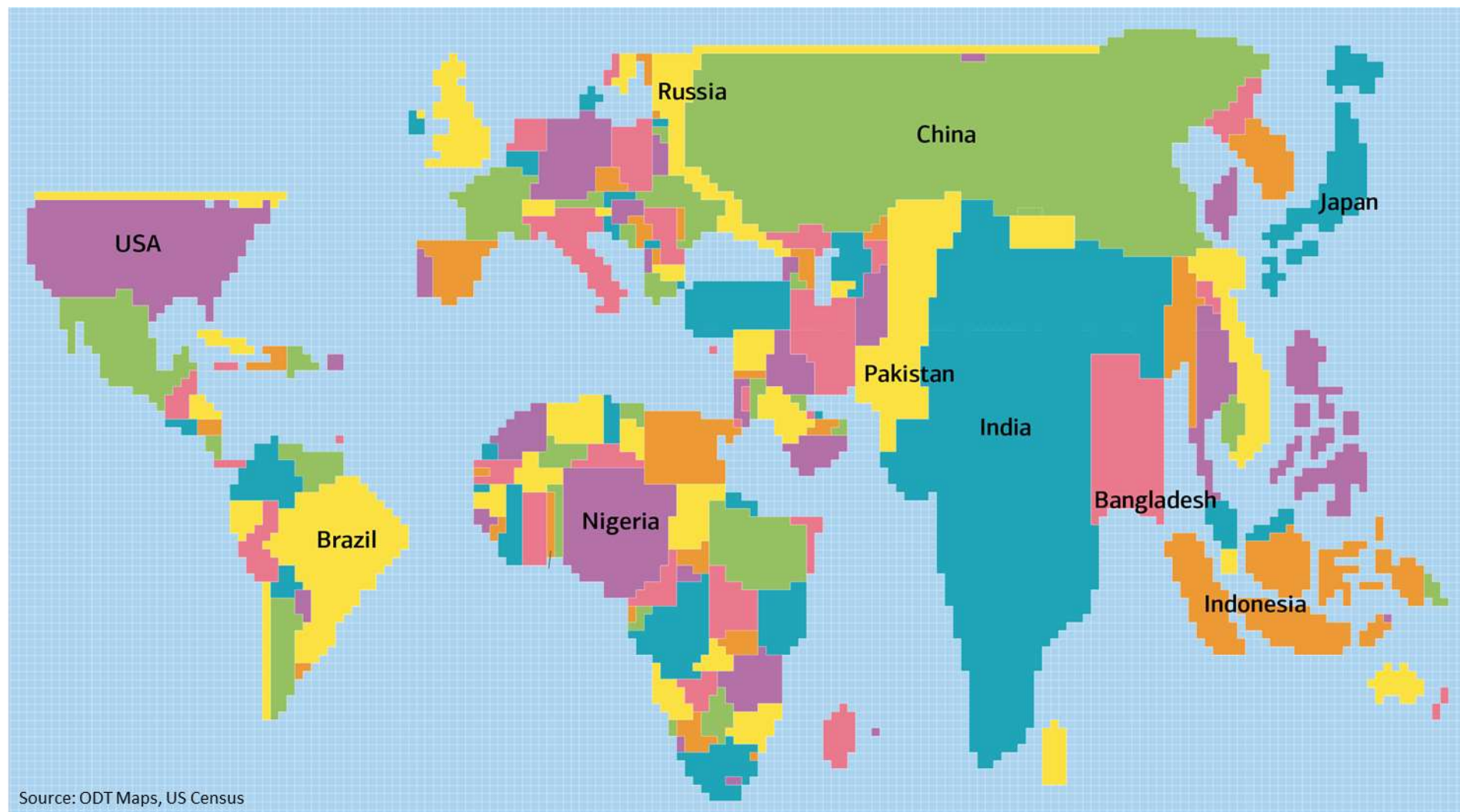
Exhibit 1: A World of Languages



- There are at least 7,102 known languages alive in the world today.
- This map shows the 23 languages that are a mother tongue for more than 50 million people and make up the native tongue of 4.1 billion people.
- The different color of the countries shows how languages, the method of human communication, have taken root in many different regions.

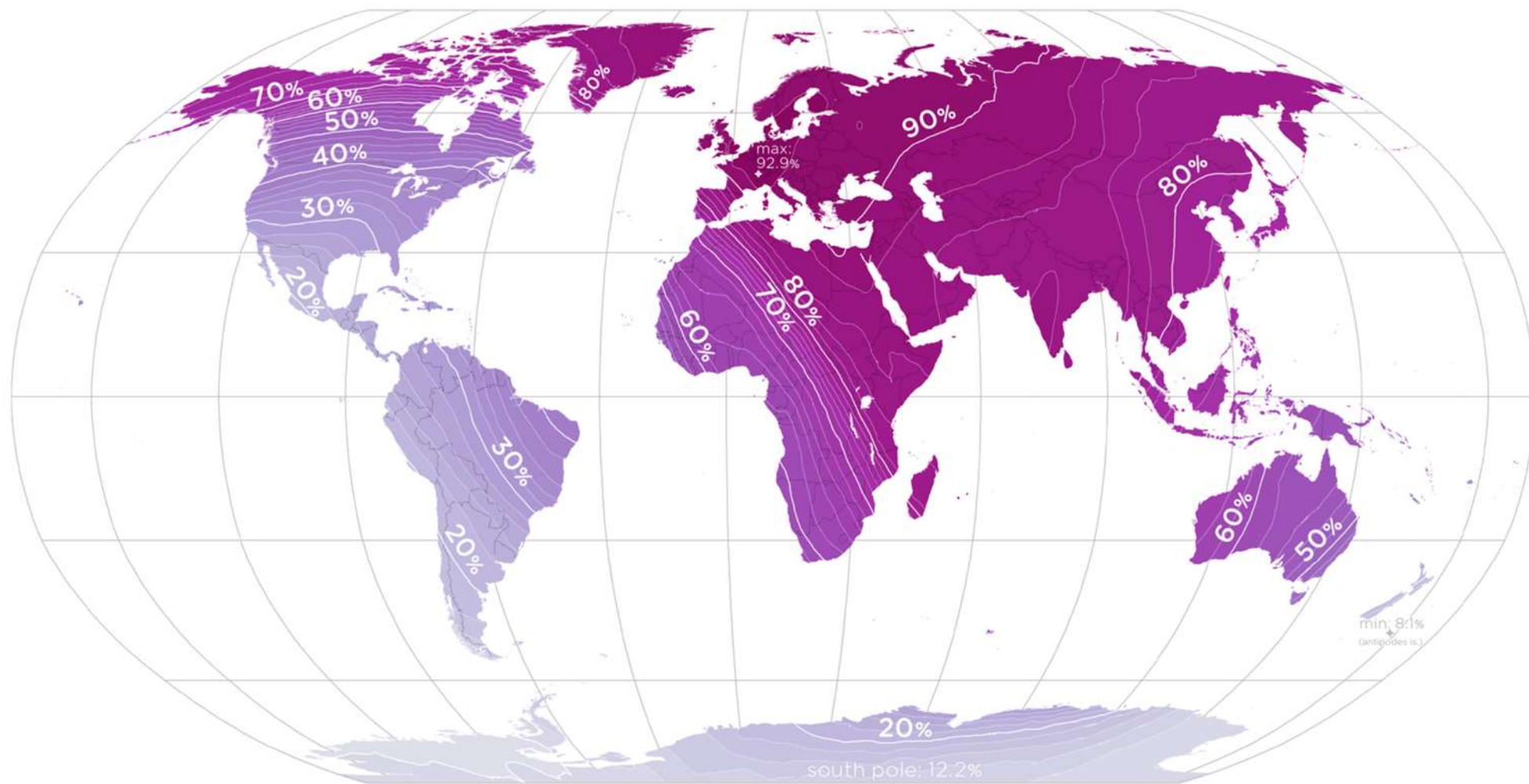


## Exhibit 2: The Population of the World in 2015



- The most important People theme is quite simply people. As of December 31, 2015, there were 7,256,490,000 people on our planet.
- This map of the world is resized by each nation's current population.
- The five most populous nations: China (with 1.37bn people), India (1.25bn), the USA (323mn), Indonesia (256mn) and Brazil (204mn).

### Exhibit 3: How much of Humanity is in your Hemisphere, 2015

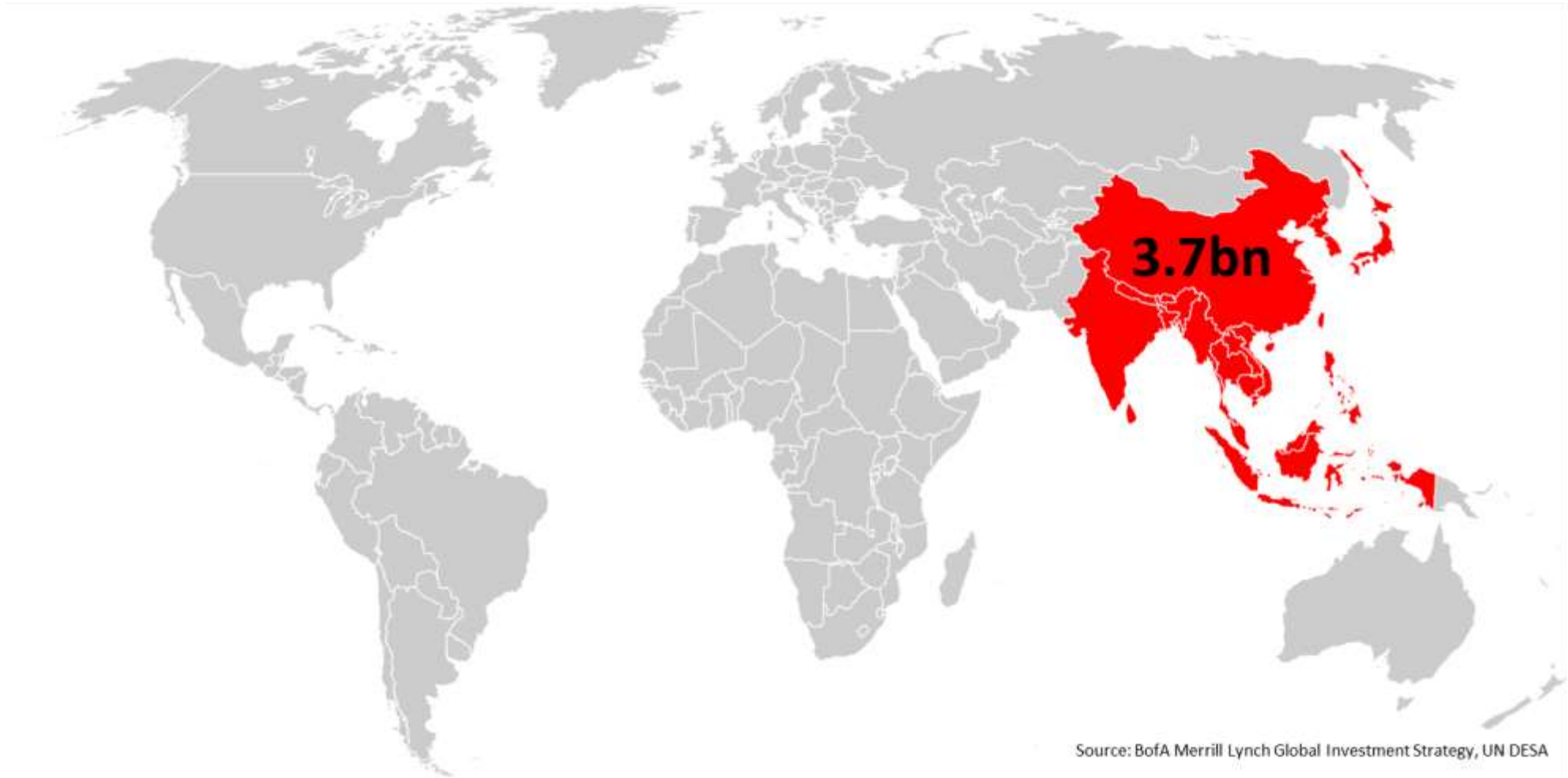


Source: Radical Cartography, Global Rural-Urban Mapping Project

- The world's population will rise from 7.3bn in 2015 to 8.1bn by 2025 and to 9.7bn by 2050 (World Bank).
- This map shows the percentage of the world's population that lives within 10,000km (or half the globe) of each location.
- If you live in London, 93% of humanity lives within your hemisphere; if you live in Sydney it is 50%; if you live in Rio de Janeiro it is 30%.

## Exhibit 4: The Asian Population

**Total Current World Population = 7.26bn**



- Asia dominates the world's population; 3.7 billion people live in the red region depicted in the map above.
- By 2030, Asia is forecast to account for 59% of global middle-class consumer spending (OECD).
- Asia's people and consumption, rather than products and production, will spawn Asia's big investment themes in the future, eg, China and India Healthcare, Infrastructure and Tourism.



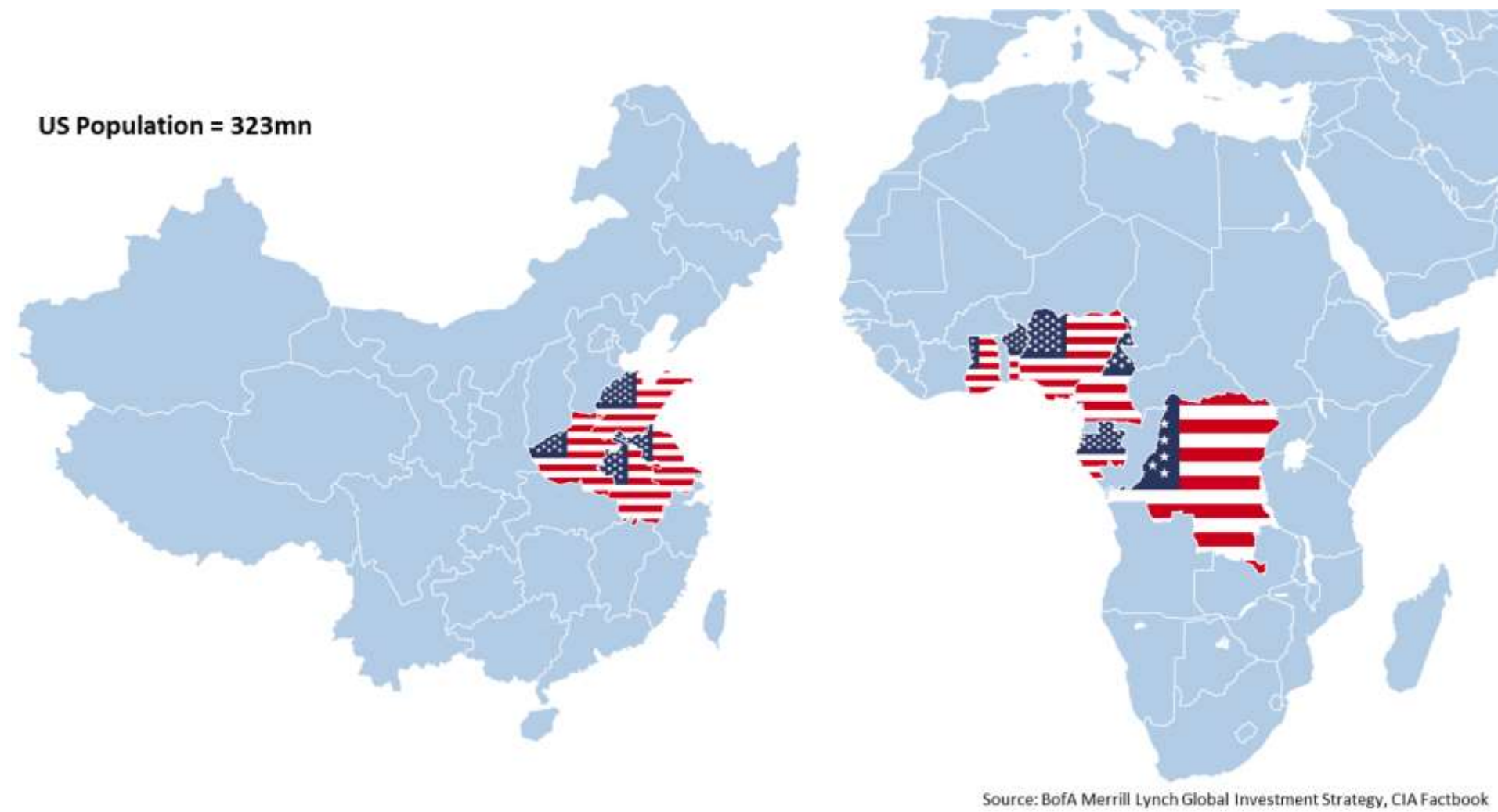
## Exhibit 5: Tokyo vs. New York, Los Angeles, Chicago...



- Corroborating the Asian demographic theme, the Greater Tokyo area (or “Shuto-ken”) is the world’s largest metropolitan area with 38 million inhabitants as of 2014 (UN).
- The population of many US cities including New York, Los Angeles and Chicago, can all fit into the Greater Tokyo area.

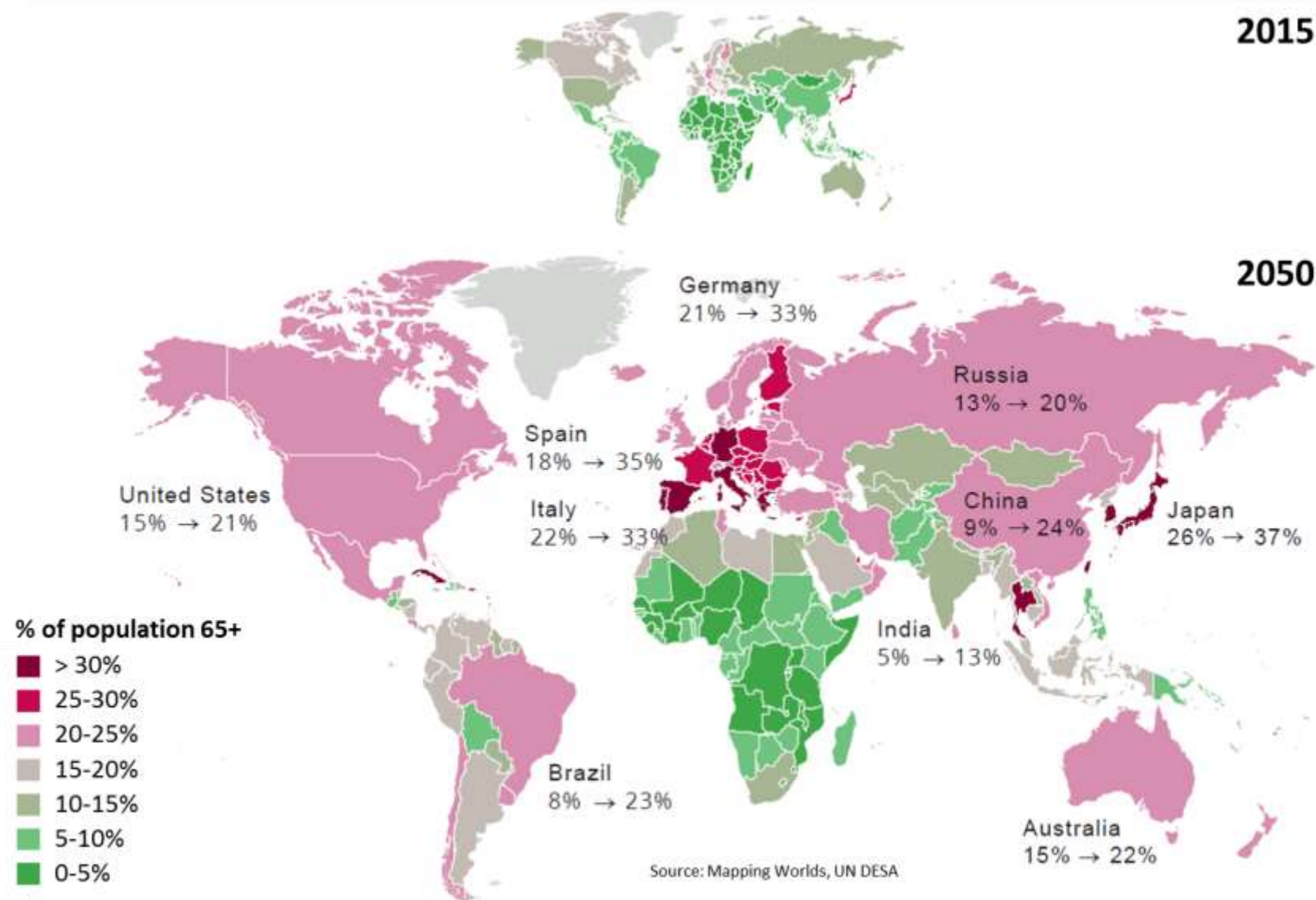


## Exhibit 6: China and Africa vs. America



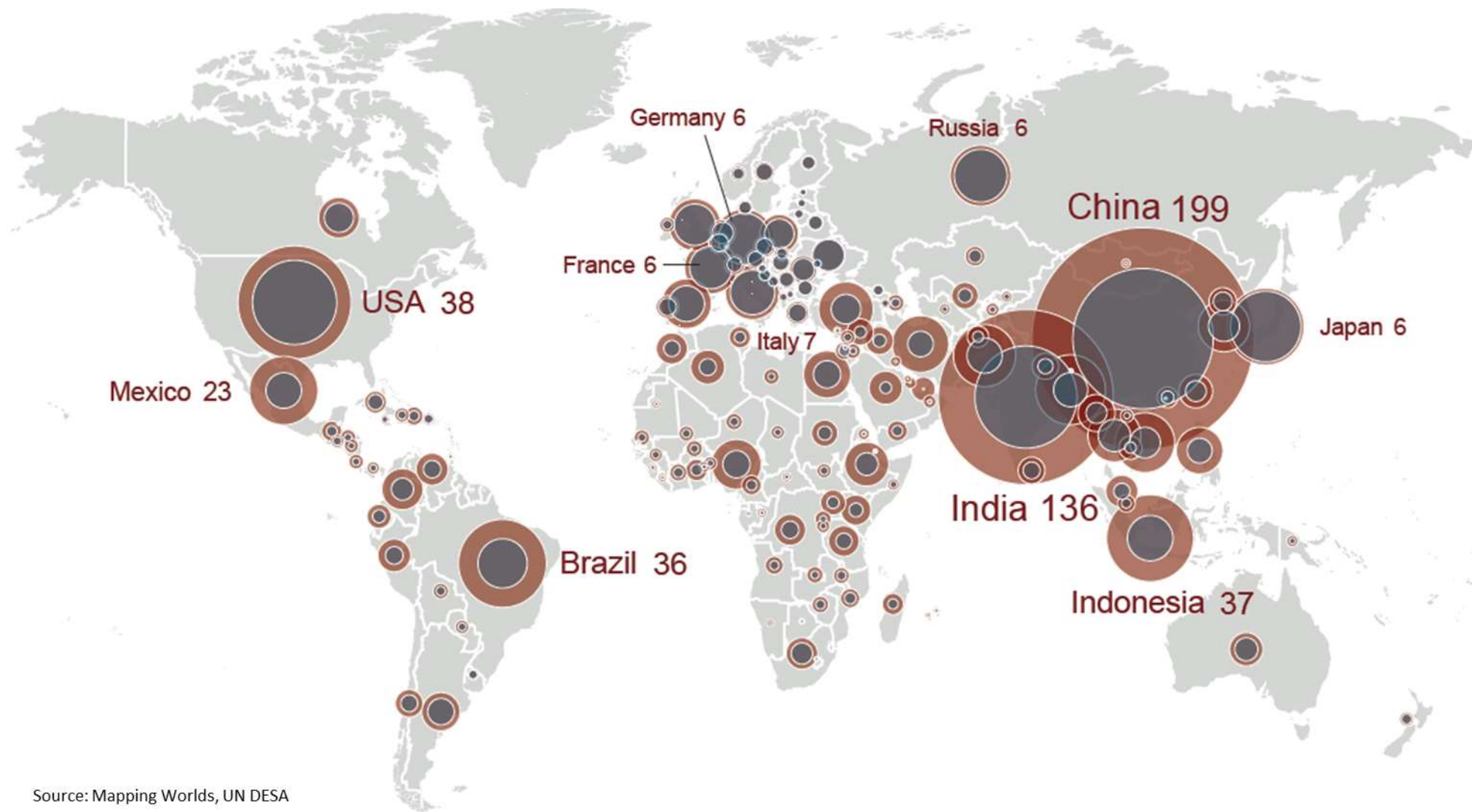
- China's population is so vast that all of the 323 million US residents could fit into just four Chinese provinces.
- Africa's demographics should also be noted: the US population is less than one-third of Africa's 1.1bn population and could fit into six African countries.
- BofAML believes Africa's population has investment implications for consumer spending, solar energy and capital flows.

## Exhibit 7: The Ageing of the World Population



- The ageing of the world population is one of the today's investment themes.
- By 2050, the world's Silver Generation (people aged 65 years and older) of 3.4bn will outnumber children under 14 for the first time in human history (UN).
- This map shows that the countries with the largest proportion of old people in 2050 will be Japan (37%), Spain (35%) and Germany and Italy (33%).

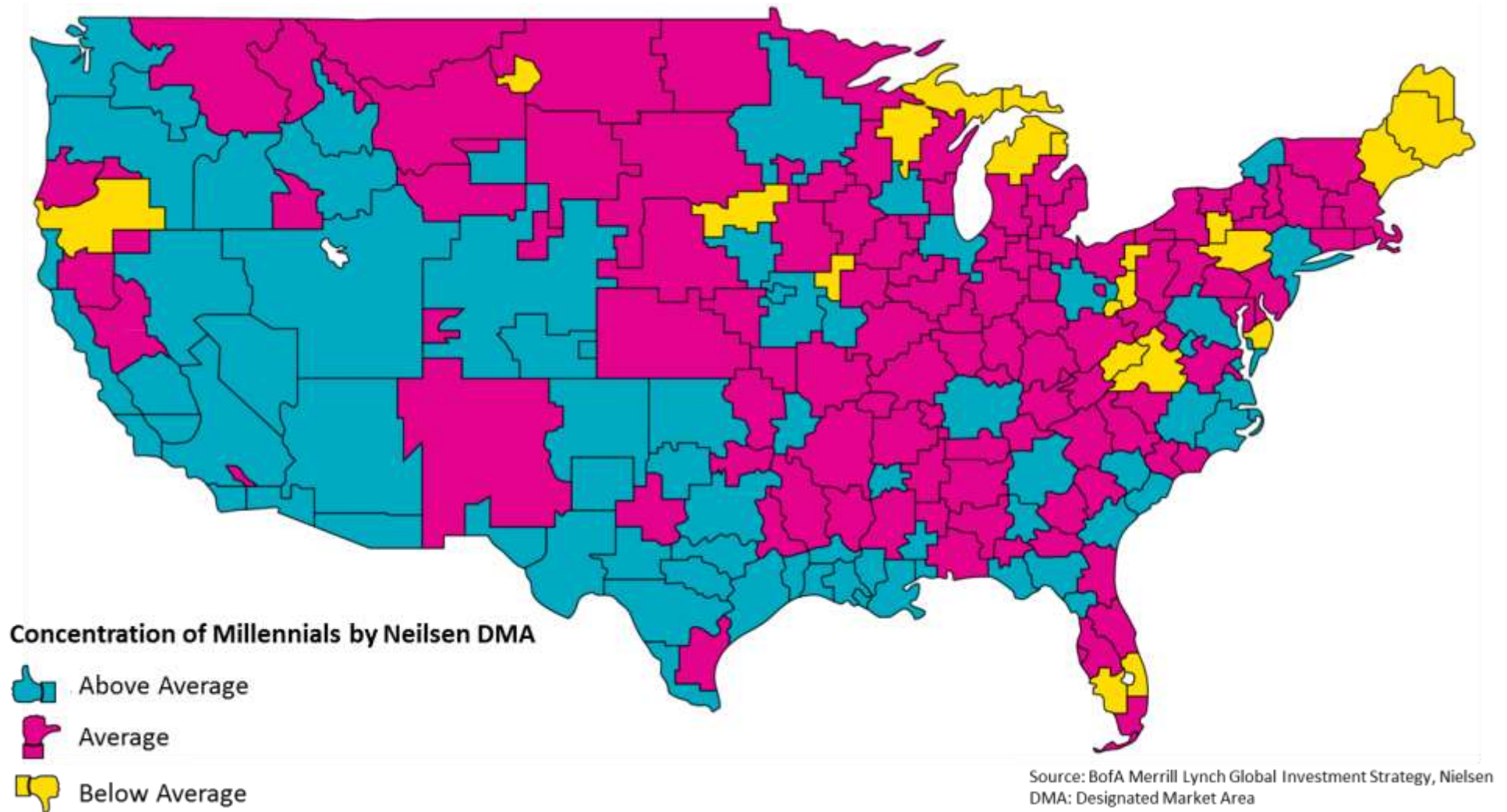
## Exhibit 8: The Silver Generation



- Between today and 2050, the world's Silver Generation will increase by over 885 million, making longevity a huge investment theme.
- This map shows China's Silver Generation will increase by 199 million, India's by 136 million and America's by 38 million by 2050.
- The US longevity sector, covering health, finance, and consumer services, is currently worth \$7.1 trillion.



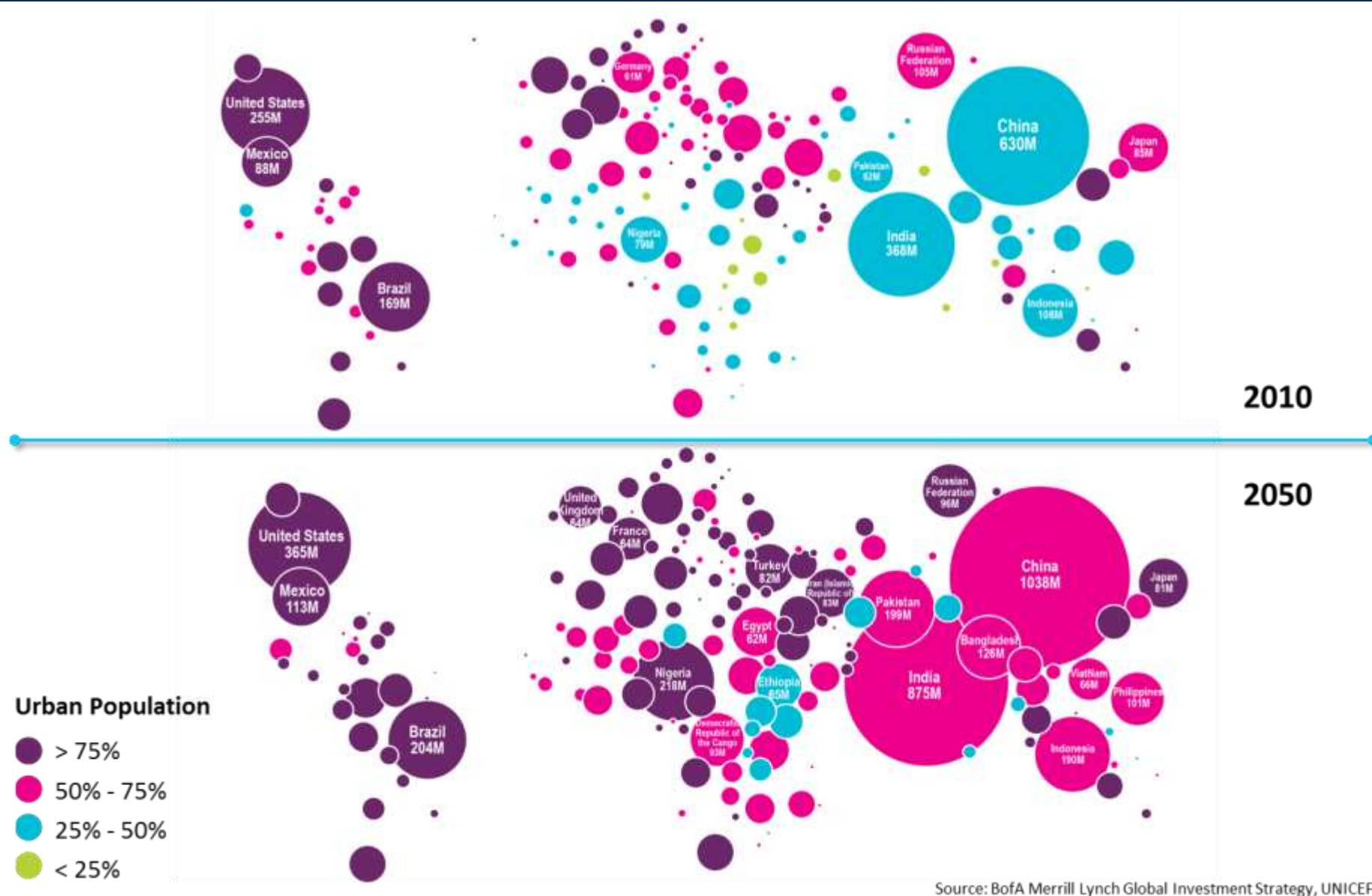
## Exhibit 9: The Millennials



- Another key demographic group is Millennials; people age 18 to 34 years old.
- Their annual income is forecast to reach \$8.3tn by 2025 in the US alone.
- This map shows that Millennials are more concentrated in the western region of the US than in the rest of the country.

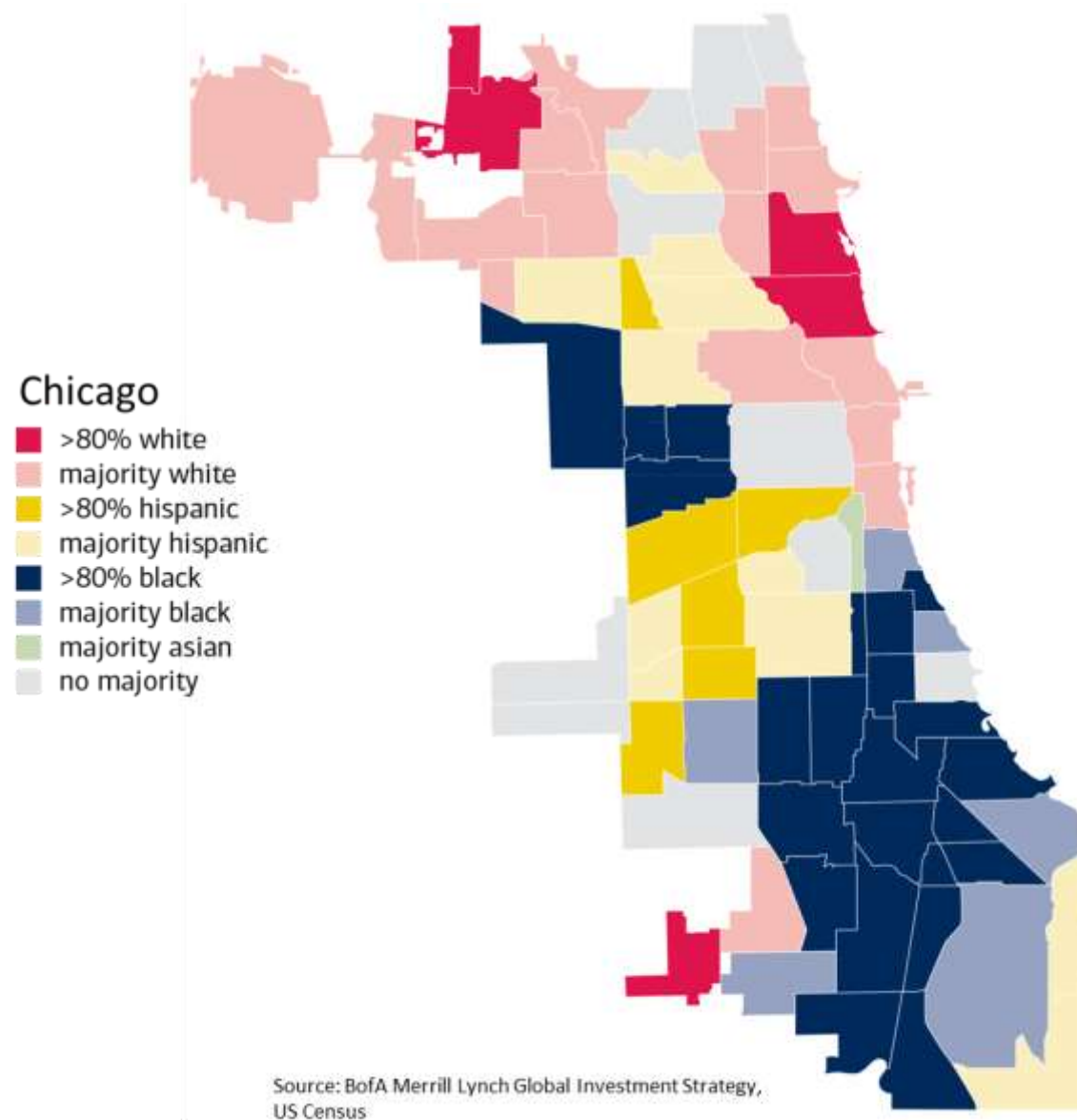


## Exhibit 10: Urbanization



- The world's urban population is set to rise sharply between 2014 and 2050, from 3.9 billion to 6.4 billion (UN).
- The map above illustrates that the countries with the greatest urban populations in 2050 will be China (1bn), India (875mn), USA (365mn), and Nigeria (218mn).
- In the next 10 years, the world's largest 600 cities will comprise nearly 65% of global growth, presenting big investment implications for infrastructure.

## Exhibit 11: Racial Segregation in America, 2010



- Urbanization presents many social challenges, one of which is race.
- This map of Chicago shows how America's third largest city remains highly segregated by race and ethnicity.
- In large swathes of Chicago whites, blacks and Hispanics make up more than 80% of the population.

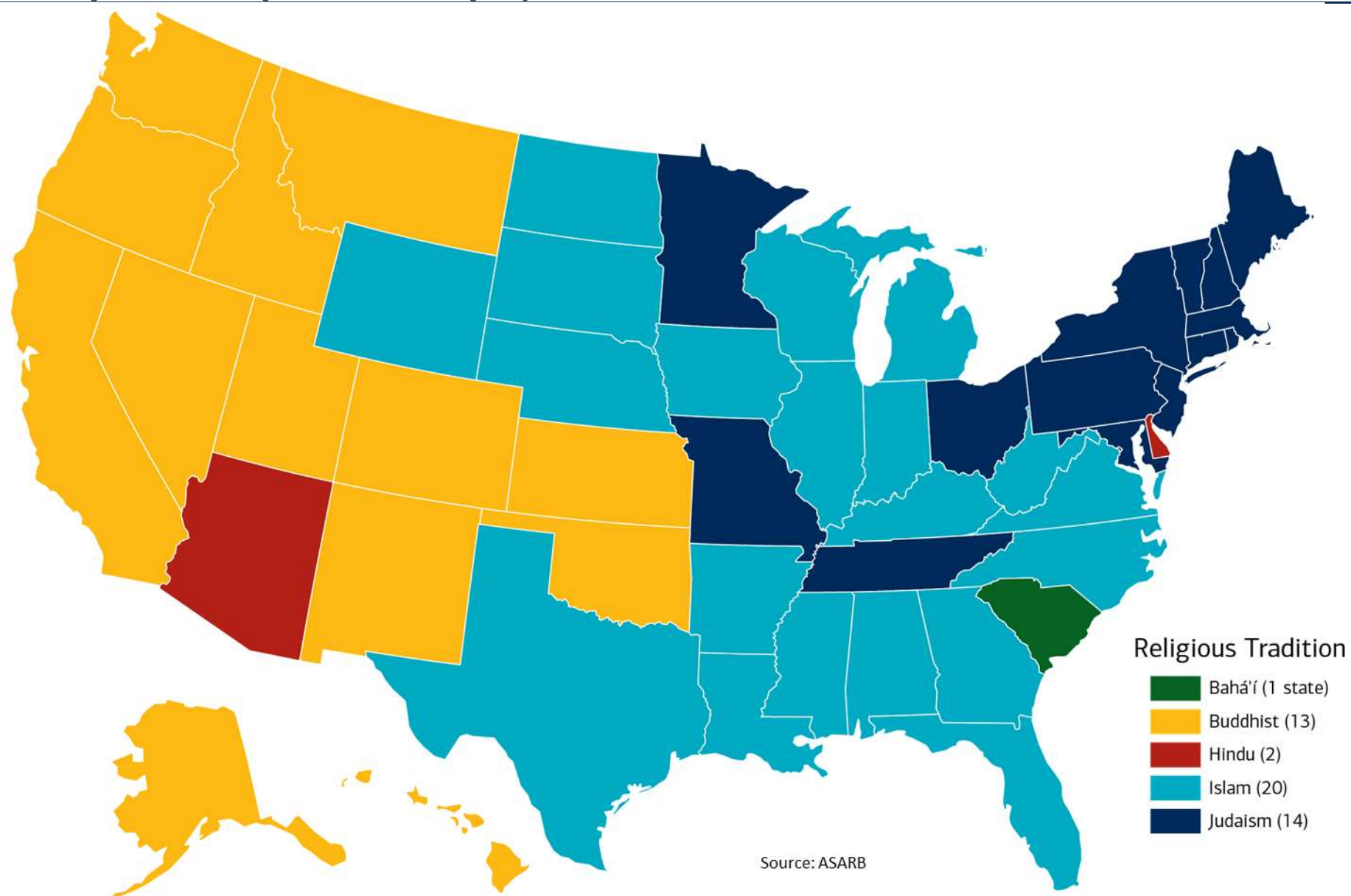
Exhibit 12: Immigration in the US - largest non-Mexican source of immigrants by state, 2012



- Around 500,000 immigrants arrive each year in the US.
- The states with the highest immigrant populations are California, New York, Texas and Florida.
- This map shows that excluding Mexicans, Filipinos are the largest immigrant population in California, Chinese in New York, Indians in Texas, and Cubans in Florida.
- Immigration is a source of population and economic growth, and in 2016, a big US election issue: immigrants number one out of five people in Florida and Nevada, key swing states.



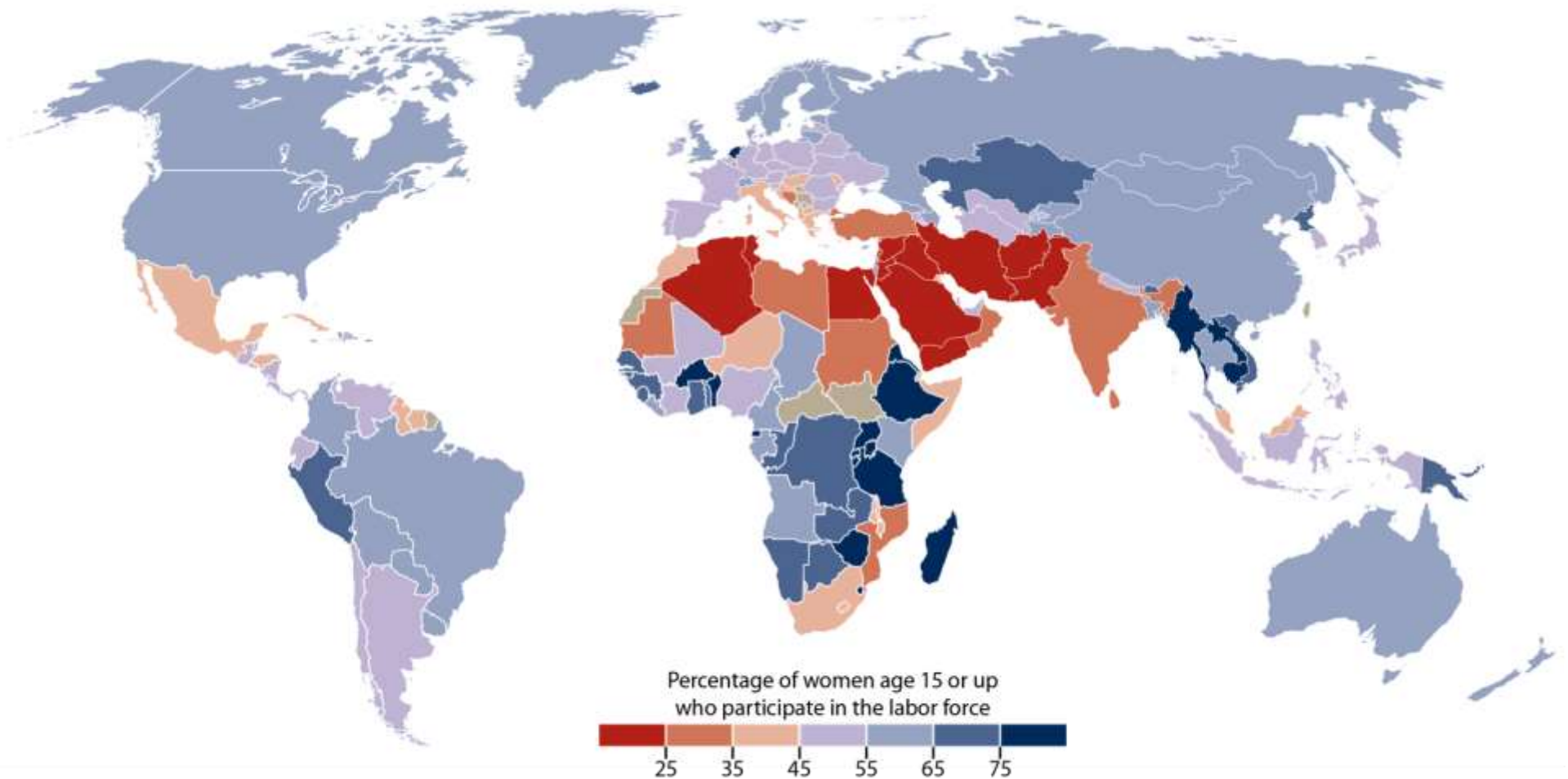
Exhibit 13: Religion in the US - largest non-Christian religion by state, 2010



- Just as Mexico is the source of the largest immigrant population across the US, Christianity remains the largest religion in all 50 states.
- Islam is the second largest religion in 20 states (mostly in the Midwest and South), Judaism in 14 states (mostly in the Northeast), and Buddhism in 13 states (mostly in the West).



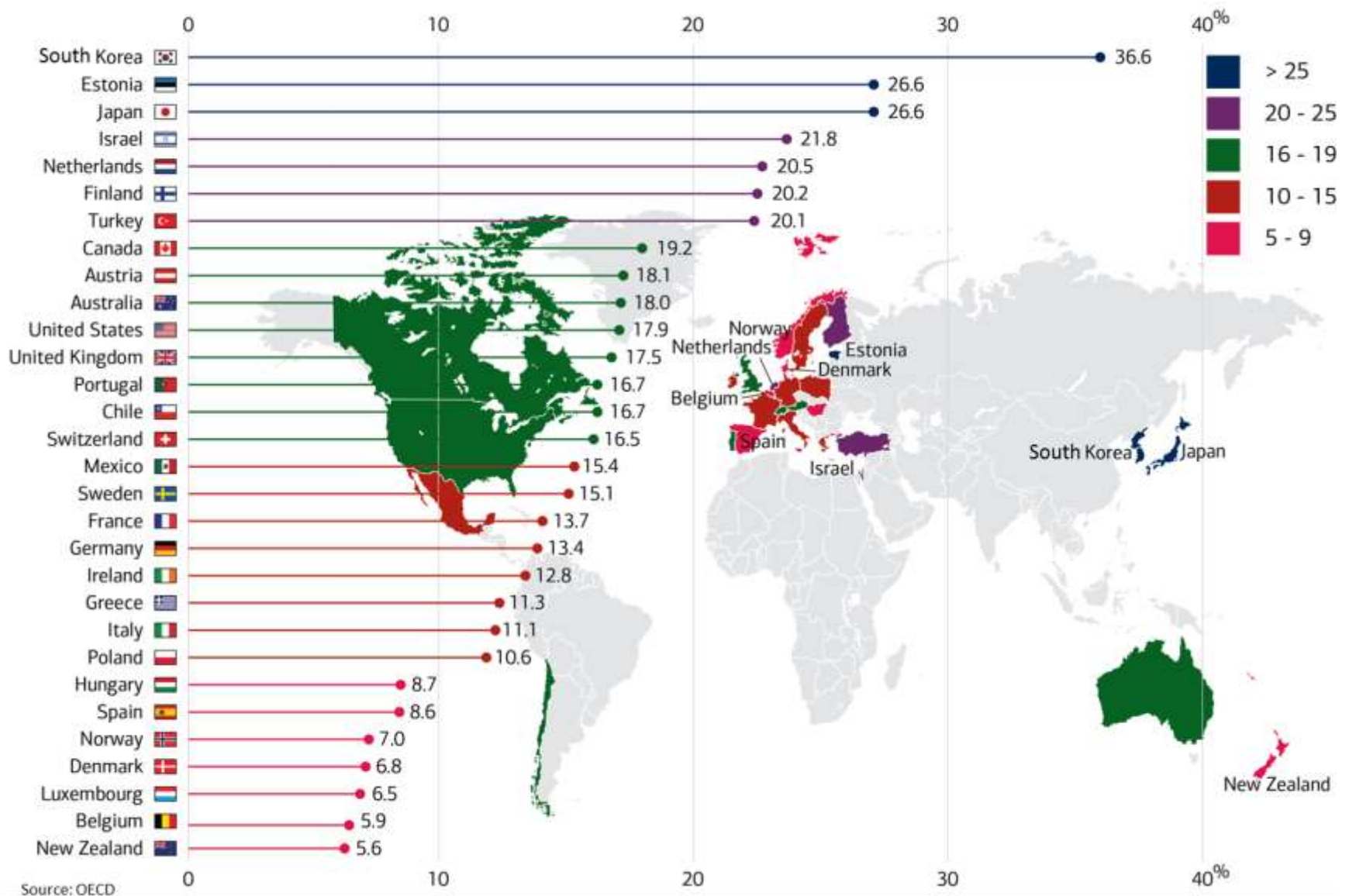
## Exhibit 14: Women in the Labor Market, 2014



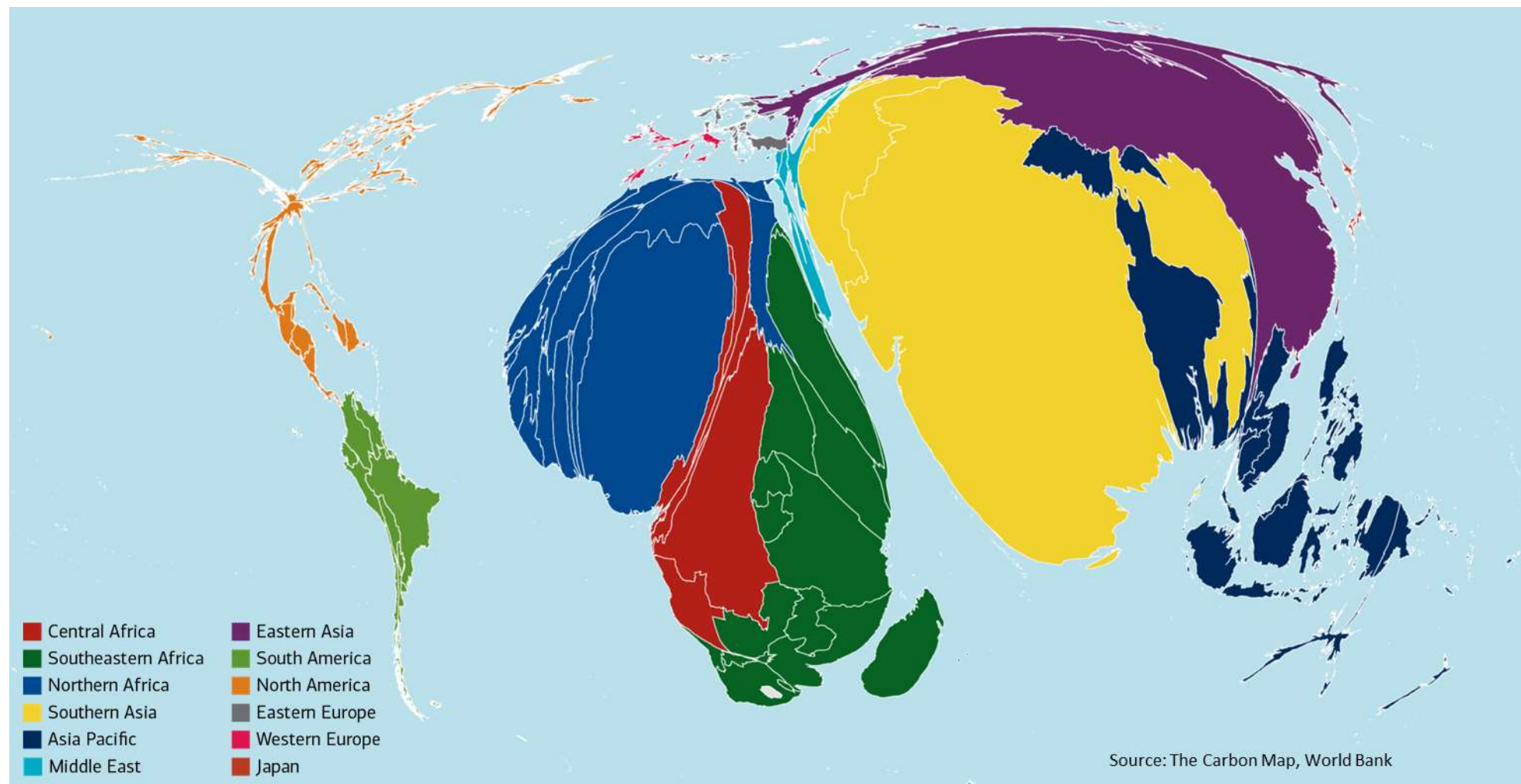
Source: BofA Merrill Lynch Global Investment Strategy, World Bank

- Another key People theme is women.
- Falling fertility rates will increase female participation in the global workforce by 91 million between 2010 and 2030 (UN).
- In 2014, the worldwide labor force participation rate was 50% for women, well below that of 77% for men (World Bank).
- This map shows where female participation in the workforce is high (in the darker blue countries >65%), and where it is low (in the redder countries <35%).

Exhibit 15: Women and Wages, 2015



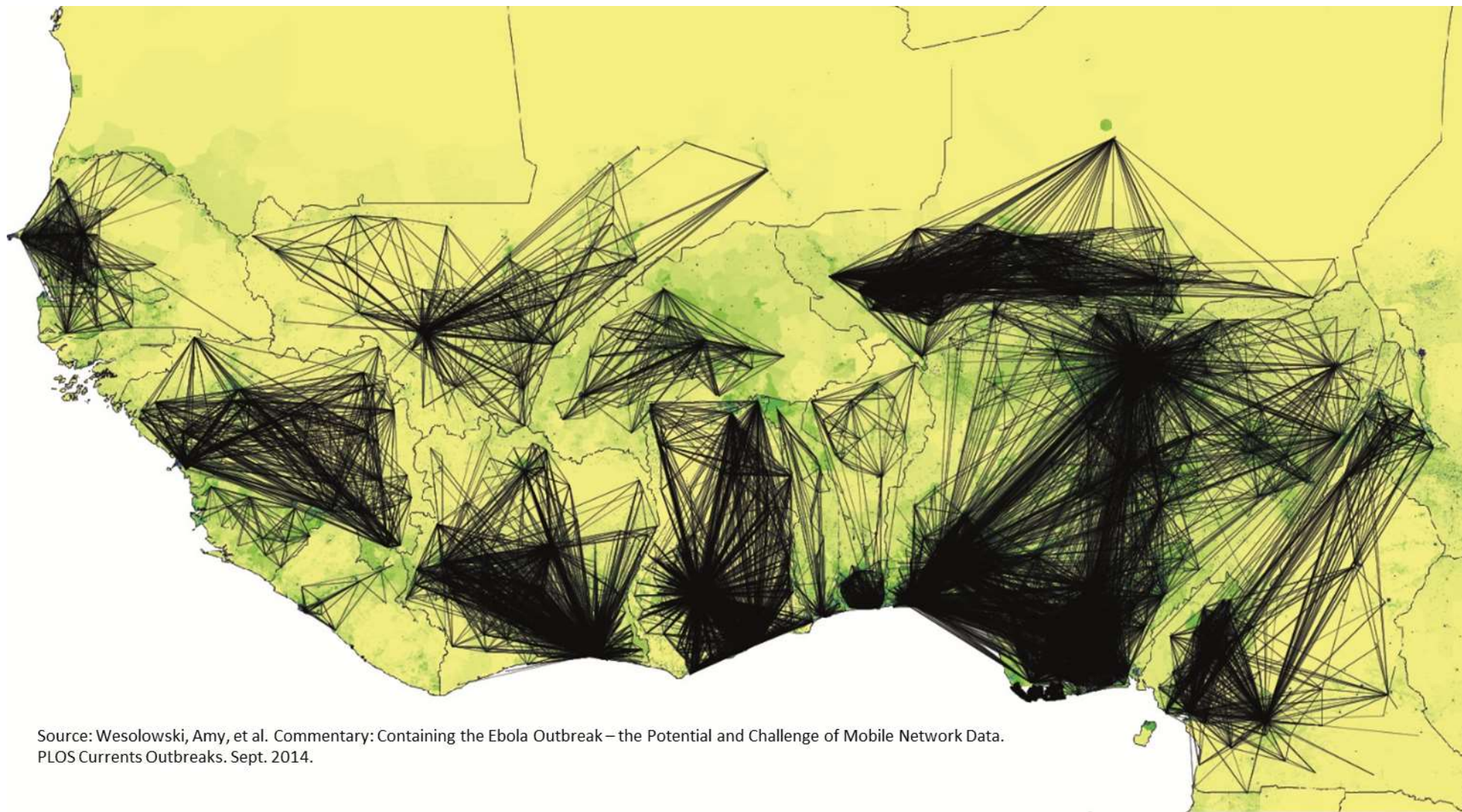
- This map illustrates the difference between male and female wages across the world. From 2011 to 2014, for every \$100 a man was paid, a woman was paid just \$76 (World Bank).
- The countries with the highest paid female employees: New Zealand (where women are paid roughly 5% less than men), Belgium, Luxembourg, Denmark, Norway, and Spain.
- The countries with the worst paid female employees: South Korea (where women are paid roughly 37% less than men), Estonia, Japan, Israel, Netherlands, and Finland.



- This map shows the proportion of each region's population relative to global population that lives in extreme poverty.
- Extreme poverty is defined as those who live below \$1.25/day.
- Poverty rates have been cut by more than half since 1990 (UN).
- BofAML nonetheless estimates that 14% of the world population (roughly 1bn people) still lives in extreme poverty.
- As the Bottom Billions move up the economic ladder, middle-class spending could increase to \$56tn by 2030 and \$84tn by 2050 (vs \$21tn in 2009).



## Exhibit 17: Pandemics – Human Mobility and the Spread of Ebola in West Africa

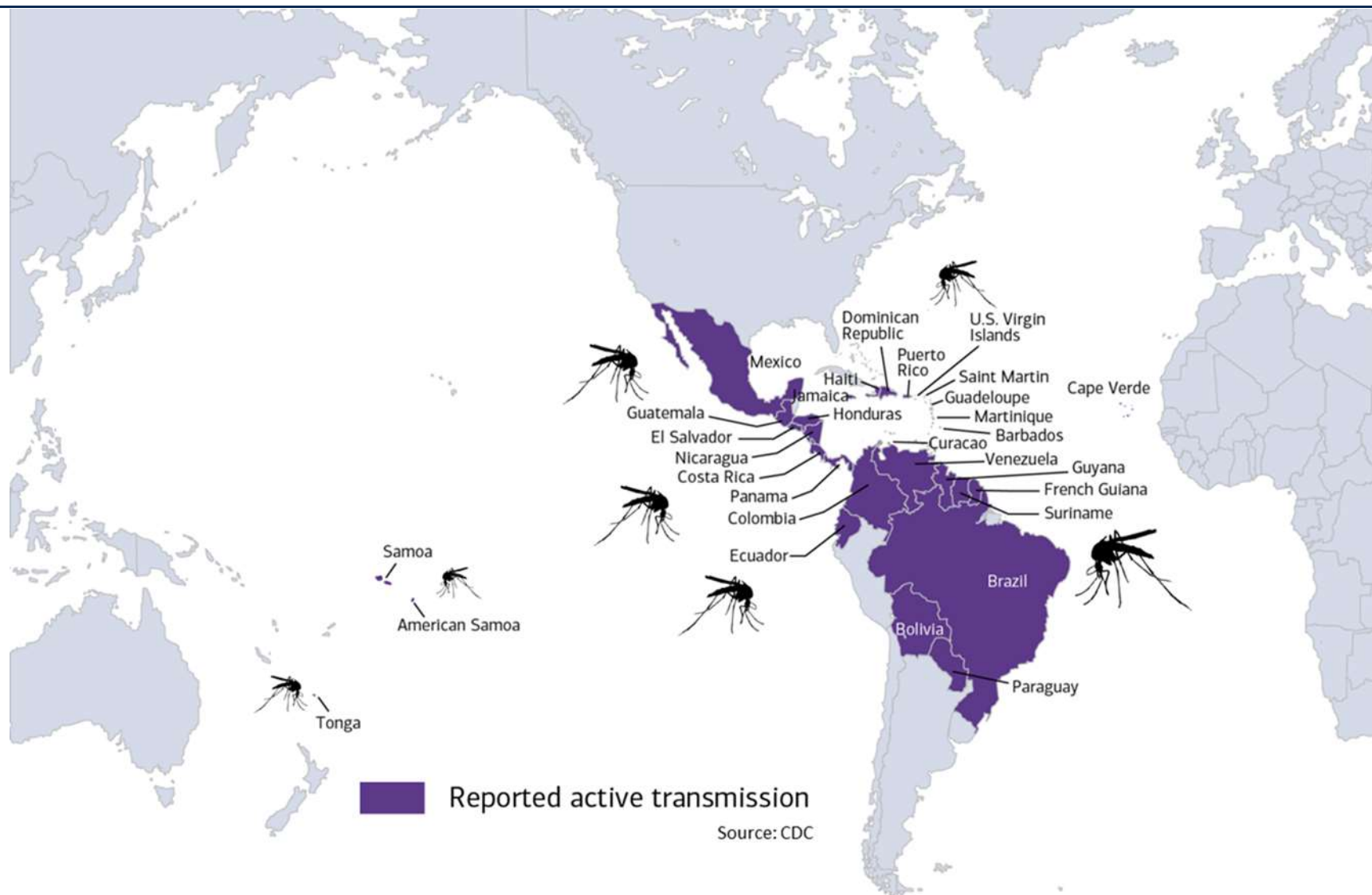


Source: Wesolowski, Amy, et al. Commentary: Containing the Ebola Outbreak – the Potential and Challenge of Mobile Network Data. PLOS Currents Outbreaks. Sept. 2014.

- Health is another big People theme.
- This map attempts to chart the routes by which the 2014 Ebola outbreak spread (using mobile phone network data of travel patterns across Senegal, Guinea and Liberia).
- The map illustrates how spatial data (from the web/mobile phone networks) are being utilized to track, analyze, predict and respond to natural disasters and health epidemics.

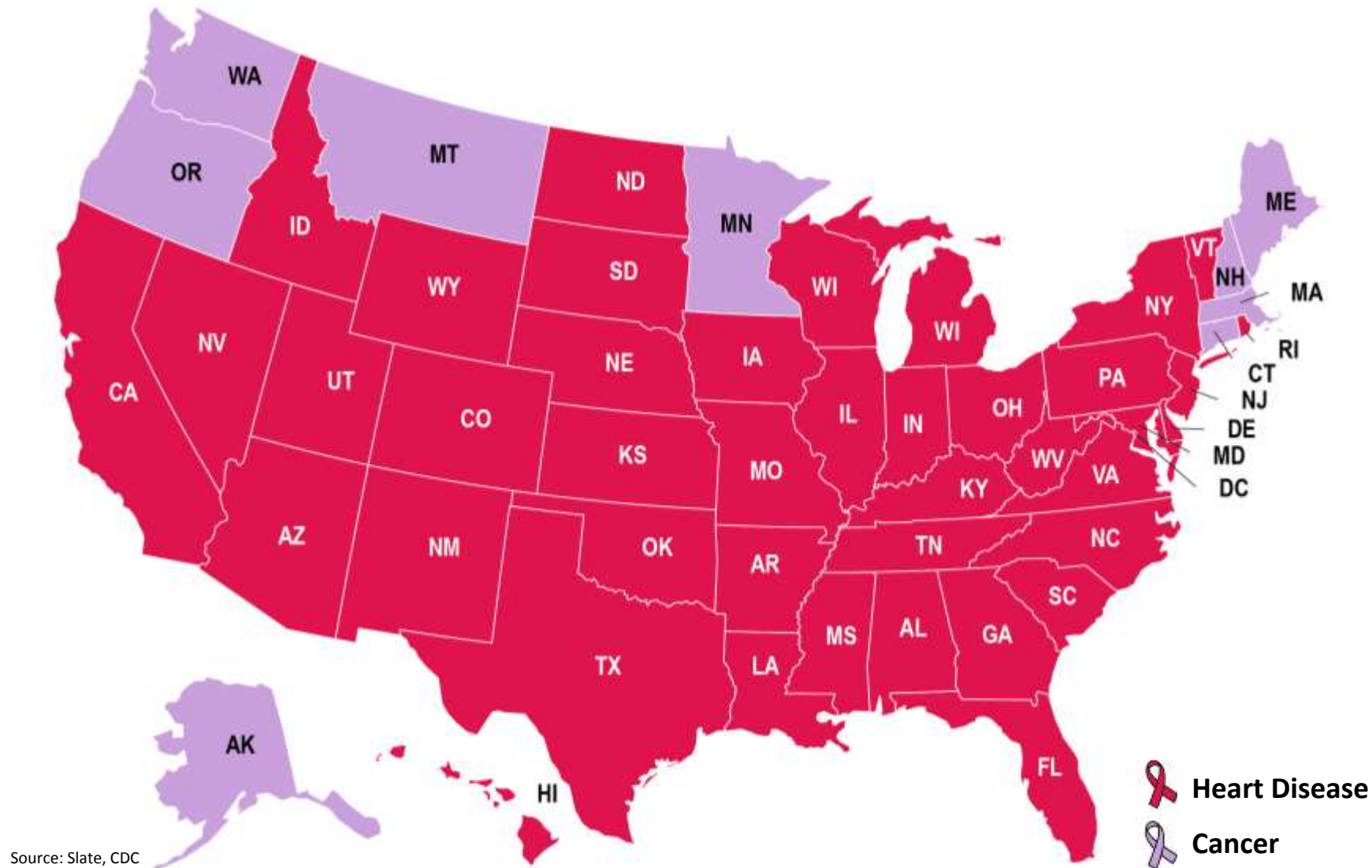


## Exhibit 18: Pandemics – Countries and Territories with Active Zika Virus Transmission

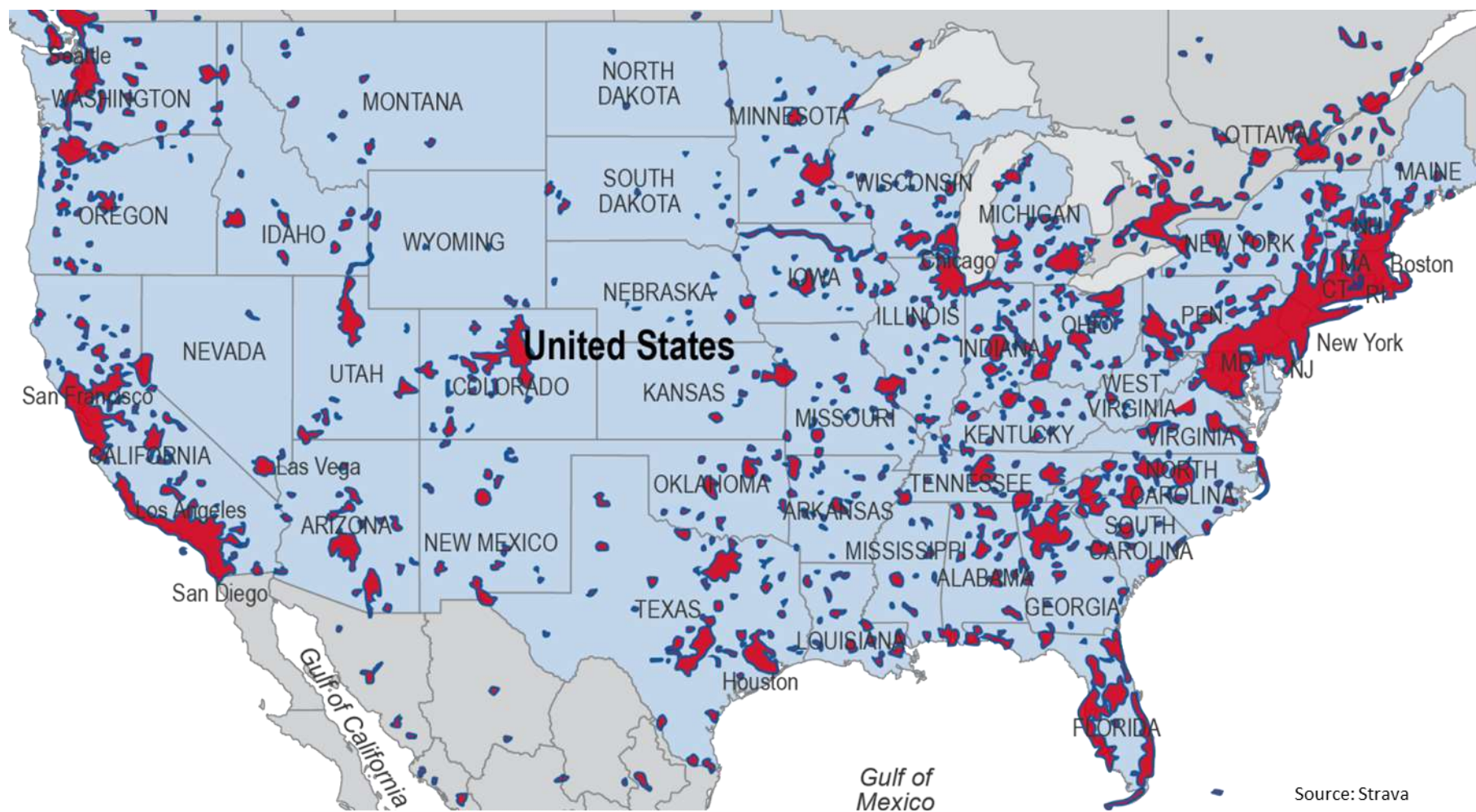


- More recently, the Zika virus has spread across the Americas. As of February 2016, 1.5 million are likely infected in Brazil with additional infections in the Americas reaching 3-4 million over the next year (WHO).
- Mosquito-borne diseases (malaria, dengue, yellow fever) kill over half a million people a year worldwide (Lancet). Climate change, urbanization, entrenched poverty, greater international travel have all aided the spread of mosquito-borne diseases.
- It is estimated (WTCC/Oxford Economics) that the cost of a major global pandemic could be as high as \$2.5 trillion (14% of US GDP) as a severe pandemic reduces demand for transport (air, road, rail, travel agencies), hotels and catering, restaurants, arts and recreation by up to 67-80%.

## Exhibit 19: Globesity



- This map shows that in the vast majority of US states, heart disease is the most common cause of death.
- 610,000 Americans die from heart disease each year...that is one in every four deaths...a fatality from a heart-disease-related event every minute.
- Obesity is a leading contributor to heart disease; globally 2.1 billion people are obese or overweight (Lancet, 2014).

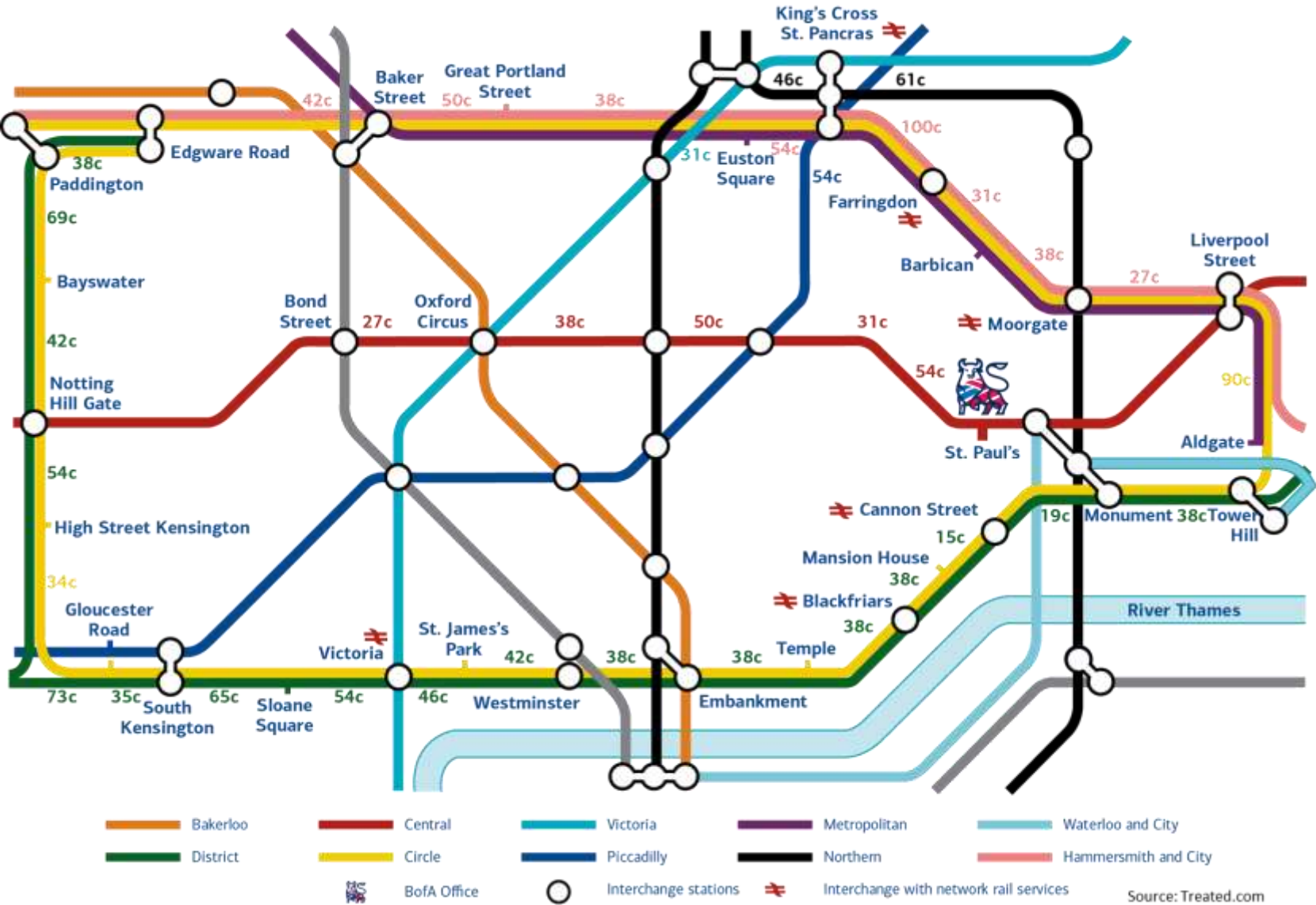


Source: Strava

- This heat map shows 2015 biking and running activity in America. Fitness is today a huge growth industry.
- From January to October 2014, there were 20 million runs and 78 million rides globally (Strava).
- BofAML estimates US consumer purchases of sporting goods rose to \$65bn in 2015, boosting the athletic apparel and footwear sector.



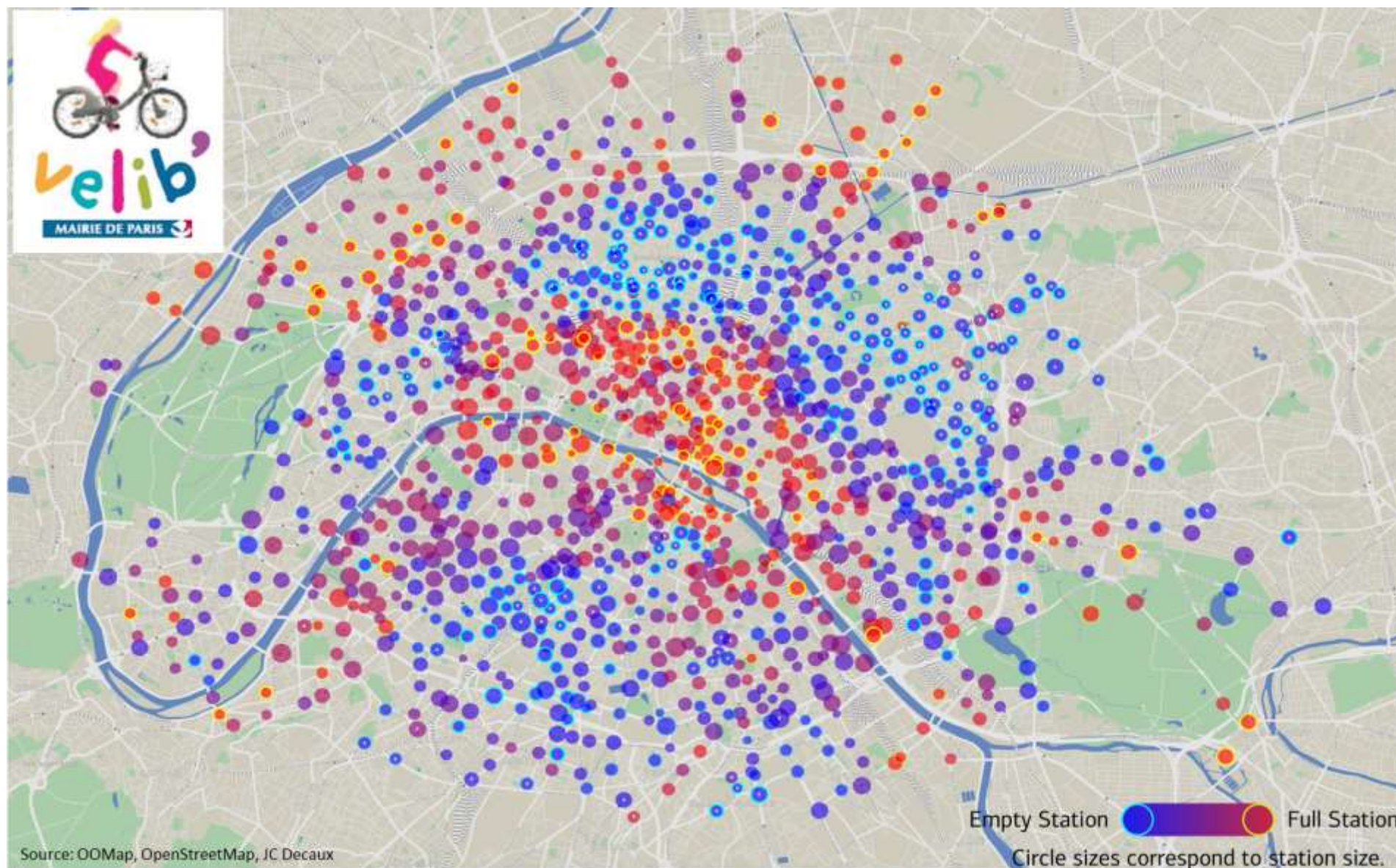
Exhibit 21: Walking the London Underground



- This map shows how many calories would be burned walking between each stop on the London Underground.
- For example, a walk from BofAML's office near St. Paul's station to Bond Street would burn 200 calories.



## Exhibit 22: The Bicycle Culture



- This heat map shows January 2016 usage for the largest bike sharing system in the western world, the 1,230 bicycle stations of the Vélib' in Paris.
- Vélib' is the world's sixth largest bike sharing program by the number of bicycles in circulation, surpassed only by five systems in Chinese cities (as of August 2014).
- More than 600 cities worldwide have a bike sharing program; eg, Hangzhou (2,431 bicycle stations), Paris (1,230), London (746), Shanghai (600), and New York City (508).

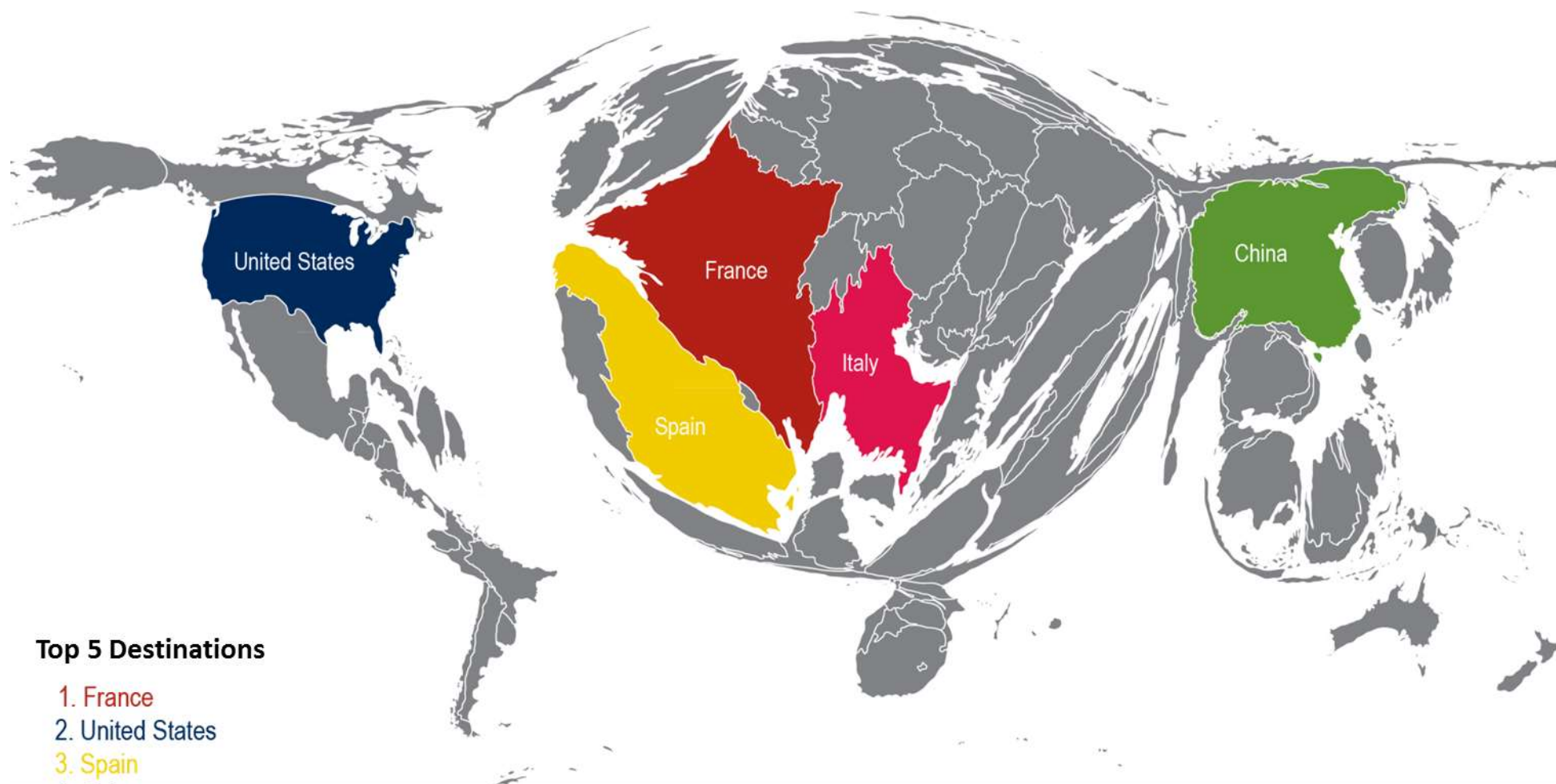




Note: Ranking based on a per capita basis, includes surgical and non-surgical procedures

Source: BofA Merrill Lynch Global Investment Strategy, International Society of Aesthetic Plastic Surgeons (ISAPS)

- An ageing population and improved technology are the driving forces of growth in plastic surgery: worldwide there were 20 million cosmetic procedures performed in 2014.
- This map above shows the top 5 countries for cosmetic surgery as a percentage of its population; in South Korea, one out of every 50 people had cosmetic surgery in 2014.
- BofAML believes spending on Vanity Capital is approximately \$4.5tn, equal to the fourth largest economy in the world.



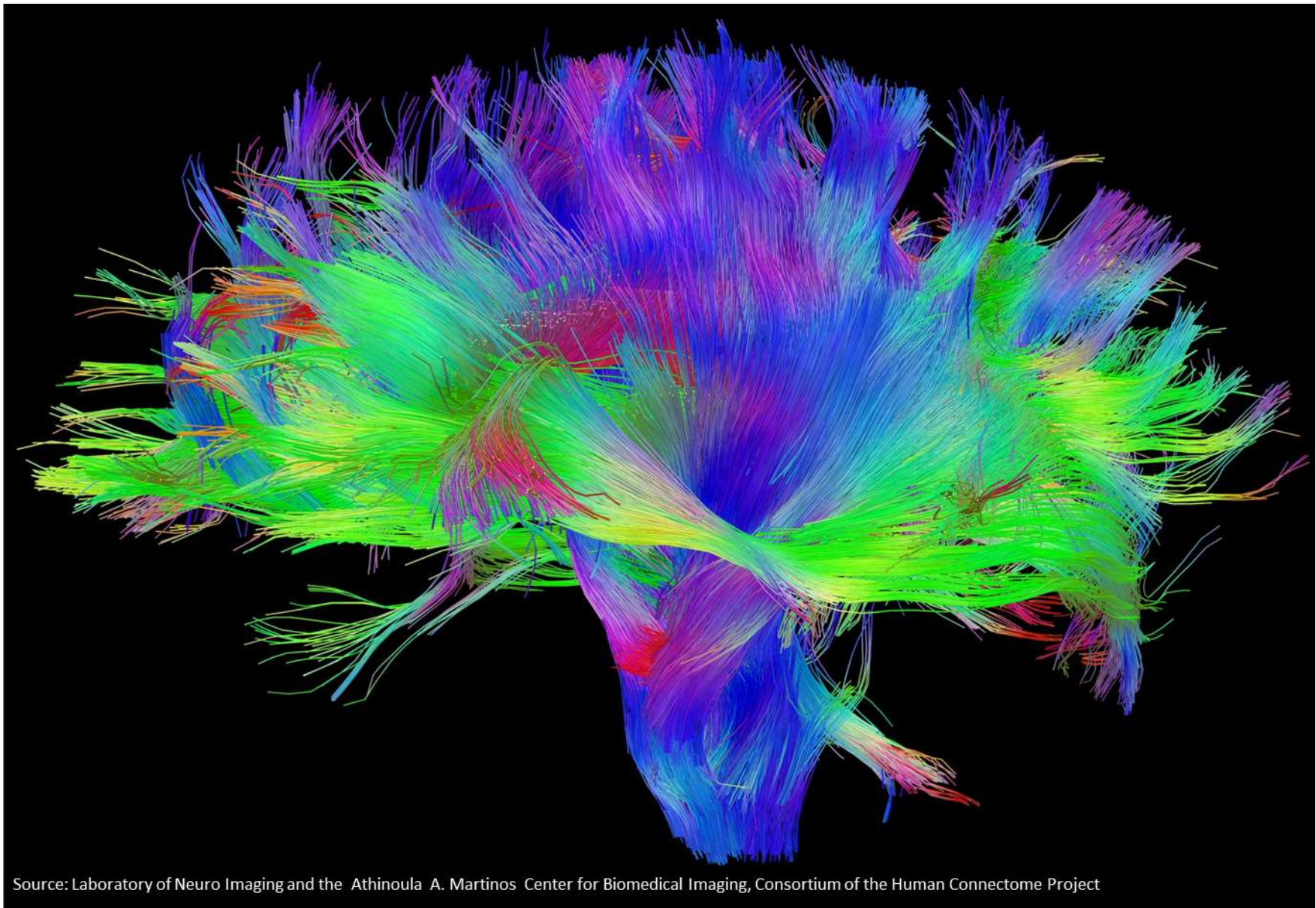
Source: BofA Merrill Lynch Global Investment Strategy, UN World Tourism Organization

- 1.2 billion people traveled overseas as tourists in 2015 (UNWTO); international tourist arrivals rose by more than 4.4% (long-term average) for the sixth consecutive year.
- In 2014, France was the most popular tourist destination (84 million), followed by the US, Spain, China and Italy.
- The share of tourists traveling to emerging economies is forecast to rise from 45% in 2014 to 57% by 2030 (>1 billion tourist arrivals, UNWTO).



Health Poverty Race Robotics The sharing economy Space exploration  
Size of Asia Cybersecurity Innovation Asia as a world power  
People gaming Government  
Religion Aging Clean tech Internet Conflict Migration Trade partnerships  
Sport Global population size Stock market Geopolitics Credit default  
Tourism Earth Carbon emissions Alternate resources Markets

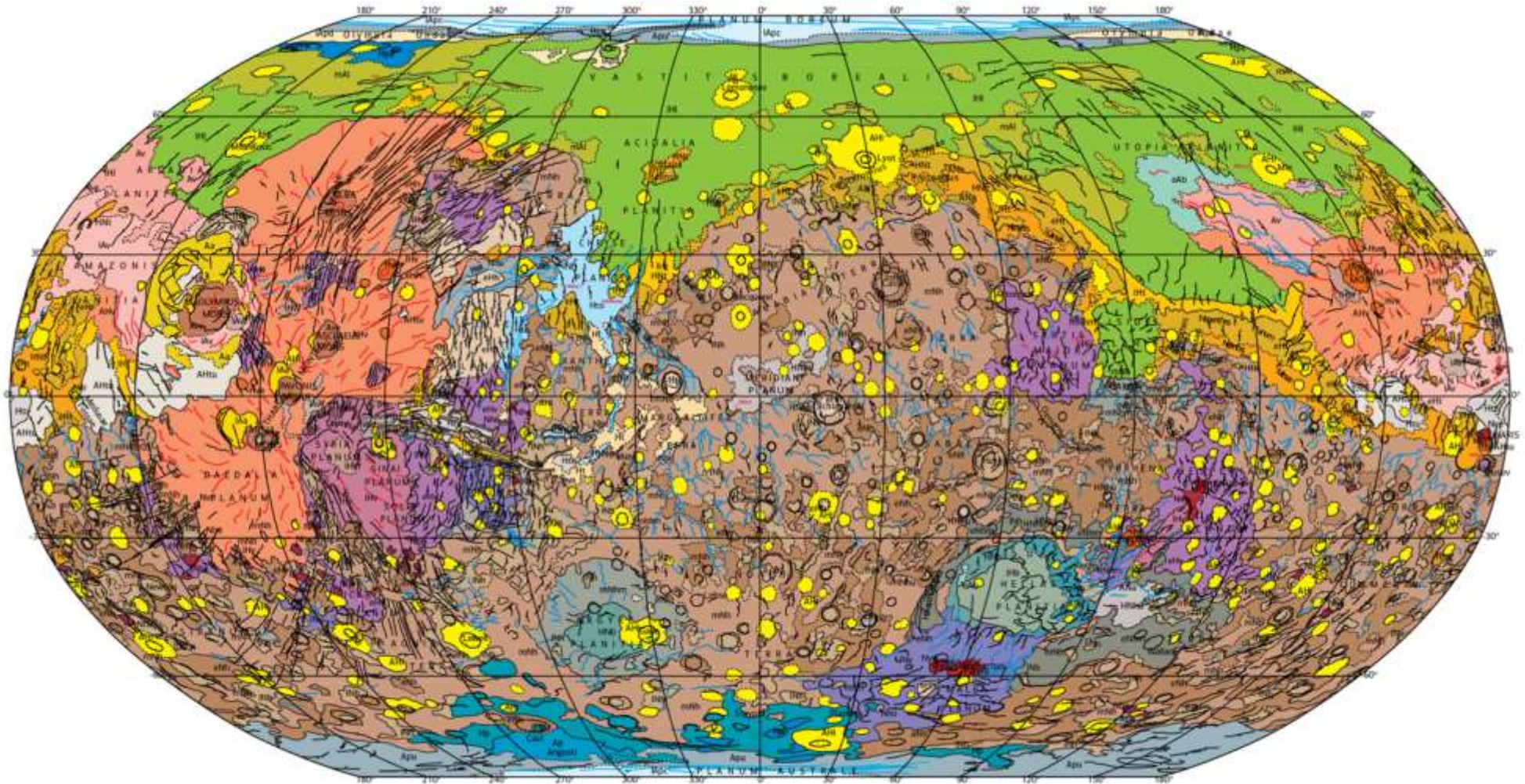
## Exhibit 25: A Map of the Human Brain



- This is a map of the human brain.
- The image illustrates the complex architecture of the human brain, in particular the main neural pathways that link the brain's 500 major regions.
- The ability to image the brain's structure to the smallest detail is an example of how technological innovation is able to aid new discoveries in health and medicine.



## Exhibit 26: A Map of Mars

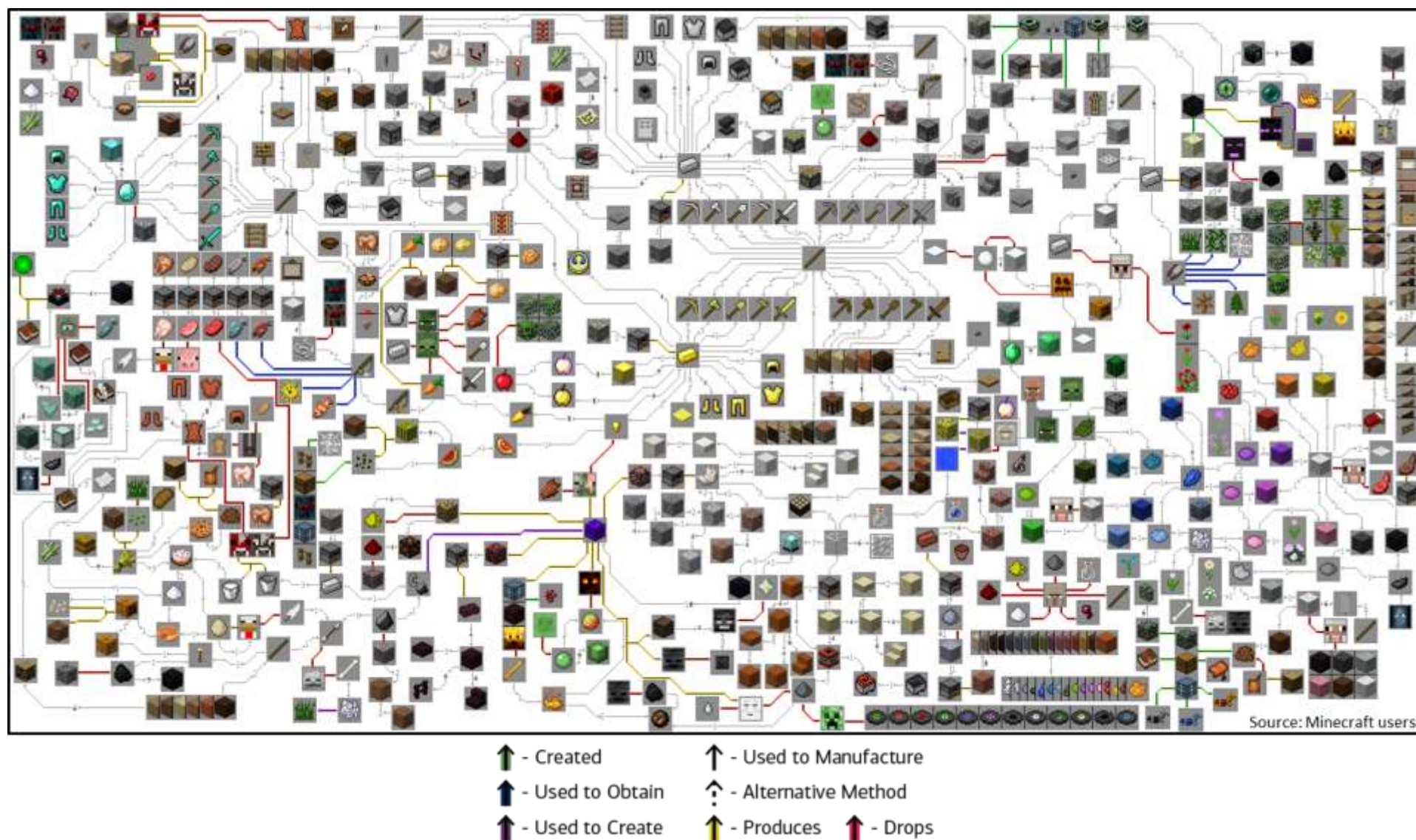


Source: US Geological Survey

- This is a map of Mars created using information about material and terrain gathered by orbiting sensors onboard NASA and ESA spacecraft.
- Green areas represent lowlands, red and purple areas are volcanic, blue areas indicate polar regions, brown areas are highlands, and yellow areas denote impact basins.
- Space X and Tesla CEO Elon Musk is expected to unveil plans later this year for the spacecraft that will send humans to Mars by 2025.



Exhibit 27: The World of Minecraft



- This map exhibits the tools used in the world of Minecraft, an “open world” video game. As of June 2015, Minecraft is the best-selling PC game of all time and the third best-selling video game of all time (70 million copies have been sold).
- Minecraft is an example of a videogame that has blurred the lines between games and social media; it is a popular venue for friends to meet and talk while working collaboratively.
- Virtual reality gaming devices (such as Sony’s Morpheus and Facebook’s Oculus Rift) are expected to be commercialized for the first time this year; by 2025, videogames are expected to be the largest segment in the virtual reality industry.



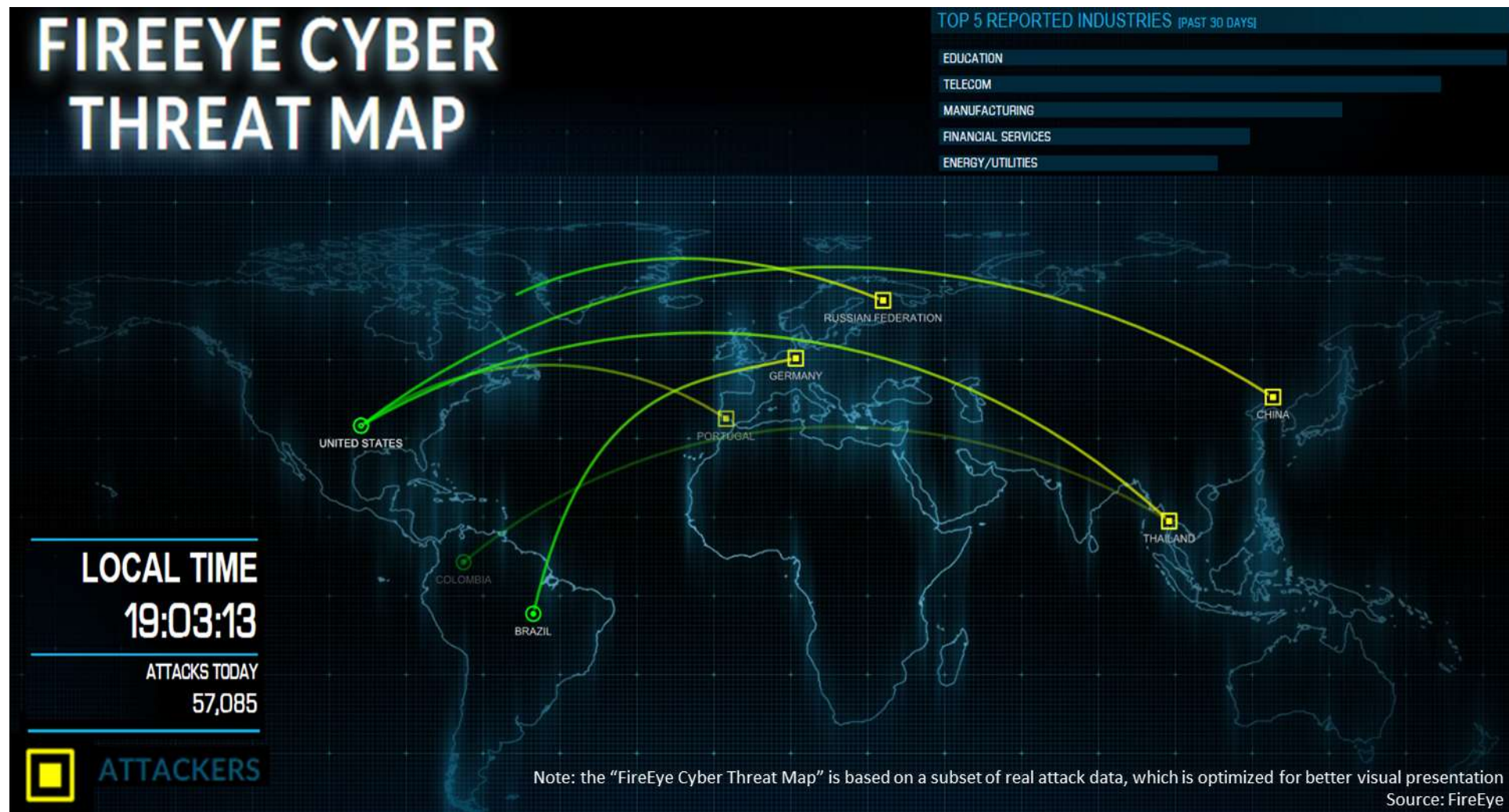
- This is not a map created with a geographic basis; this is an image of the world created purely from data of interconnected Facebook friends.
- Facebook's global reach is massive, with 1.5 billion monthly active users, equal to the current population of China.
- Innovation coupled with social media is at the forefront of the world's interconnectivity; in 1995, less than 1% of the world's population had an internet connection, the number of internet users has increased tenfold from 1999 to 2013; the first billion users was reached in 2005, the second billion in 2010 and the third billion in 2014.



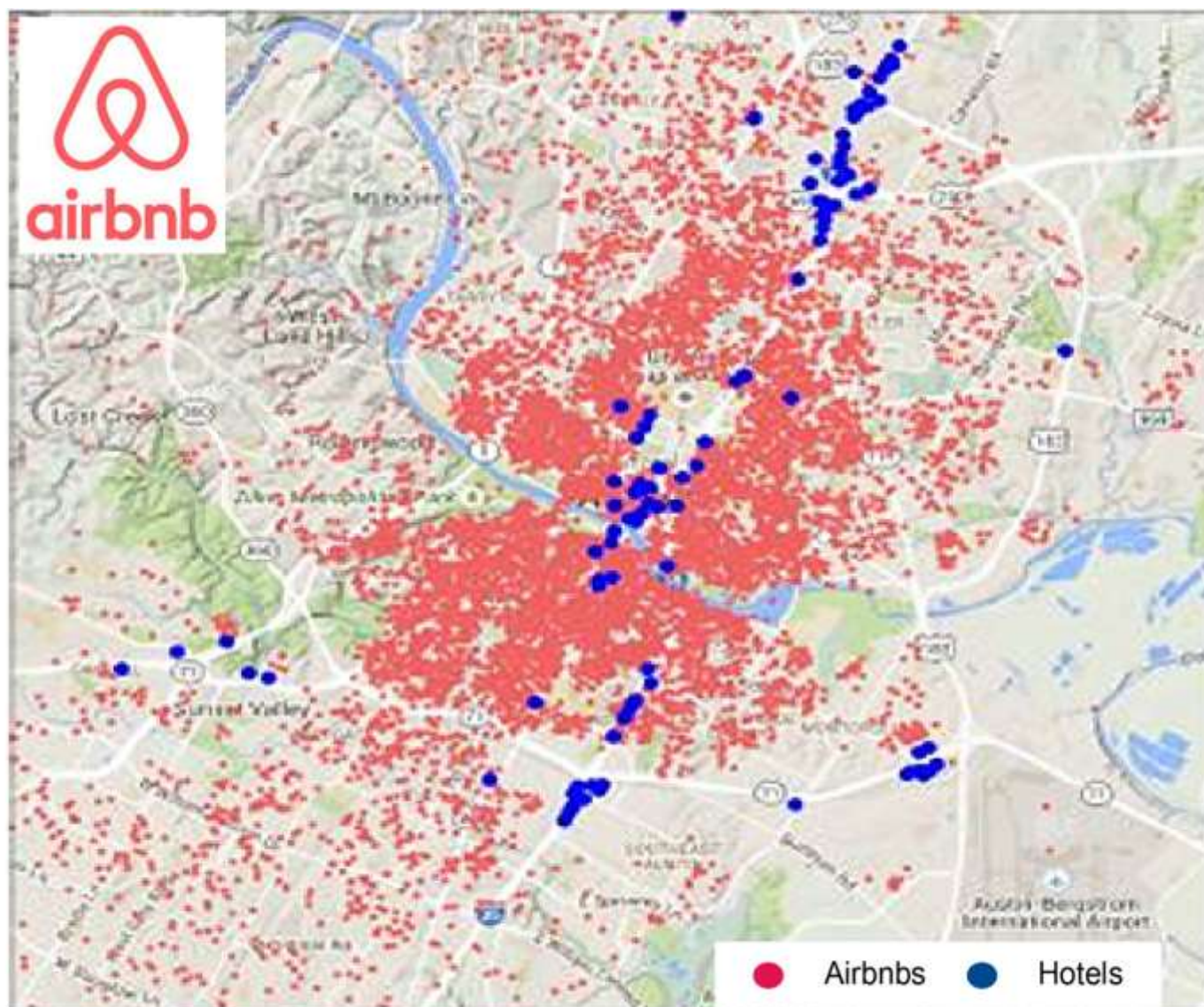


- This is a real time map of Twitter activity on January 29, 2016; note this map captures live public Tweets, which only comprise of 1-2% of all Twitter activity.
- Social media drives “the sharing economy.” BofAML believes the sharing economy is a potential market opportunity of over \$450bn.
- BofAML also believes that the rise of the Internet makes the Internet of Things a potential \$7tn industry by 2020.





- As of 7:03pm EST, there were 57,085 cases of cyber-attacks across the globe on the day of February 19, 2016 (FireEye).
- BofAML estimates there are 80-90mn+ cybersecurity events per year, with close to 400 new threats every minute, and up to 70% of attacks going undetected.
- Global cybersecurity costs are at record levels (up to \$575bn annually); BofAML estimates the global cybersecurity solutions market at \$75-77bn in 2015 and forecast to reach \$170bn by 2020.



Source: Boston University

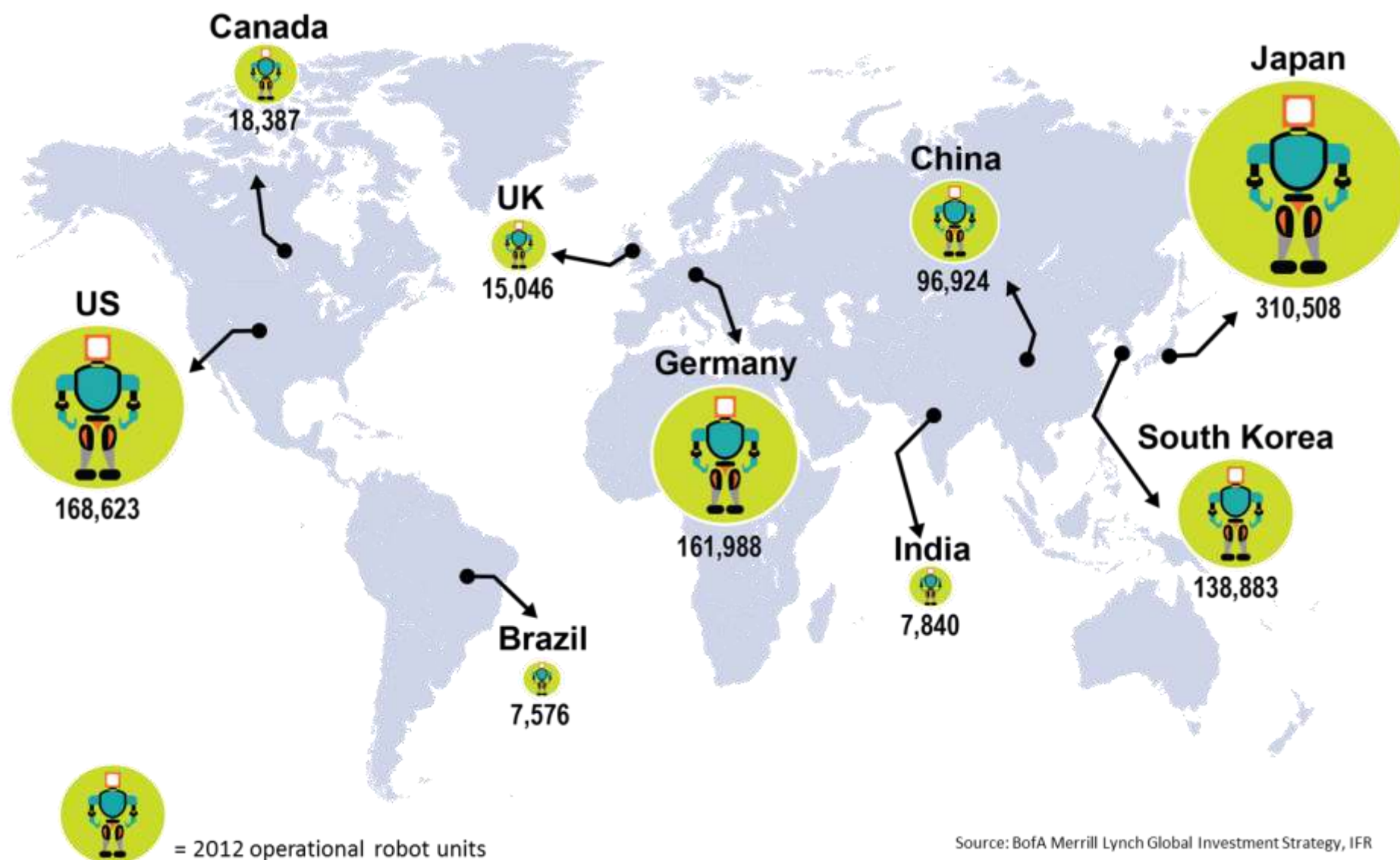
- Technological innovation is having a dramatic impact on the economy in 2016.
- This map of Austin, Texas, shows that the supply of lodging has grown exponentially thanks to disruptive technology, the sharing economy and Airbnb. And the price of lodging has declined: each 10% rise in Airbnb rooms listed in Austin has caused a 0.35% decline in hotel room revenue.
- BofAML estimates that Airbnb's percentage of total global room supply could increase from 0.9% in 2015 to 5.5% by 2020.





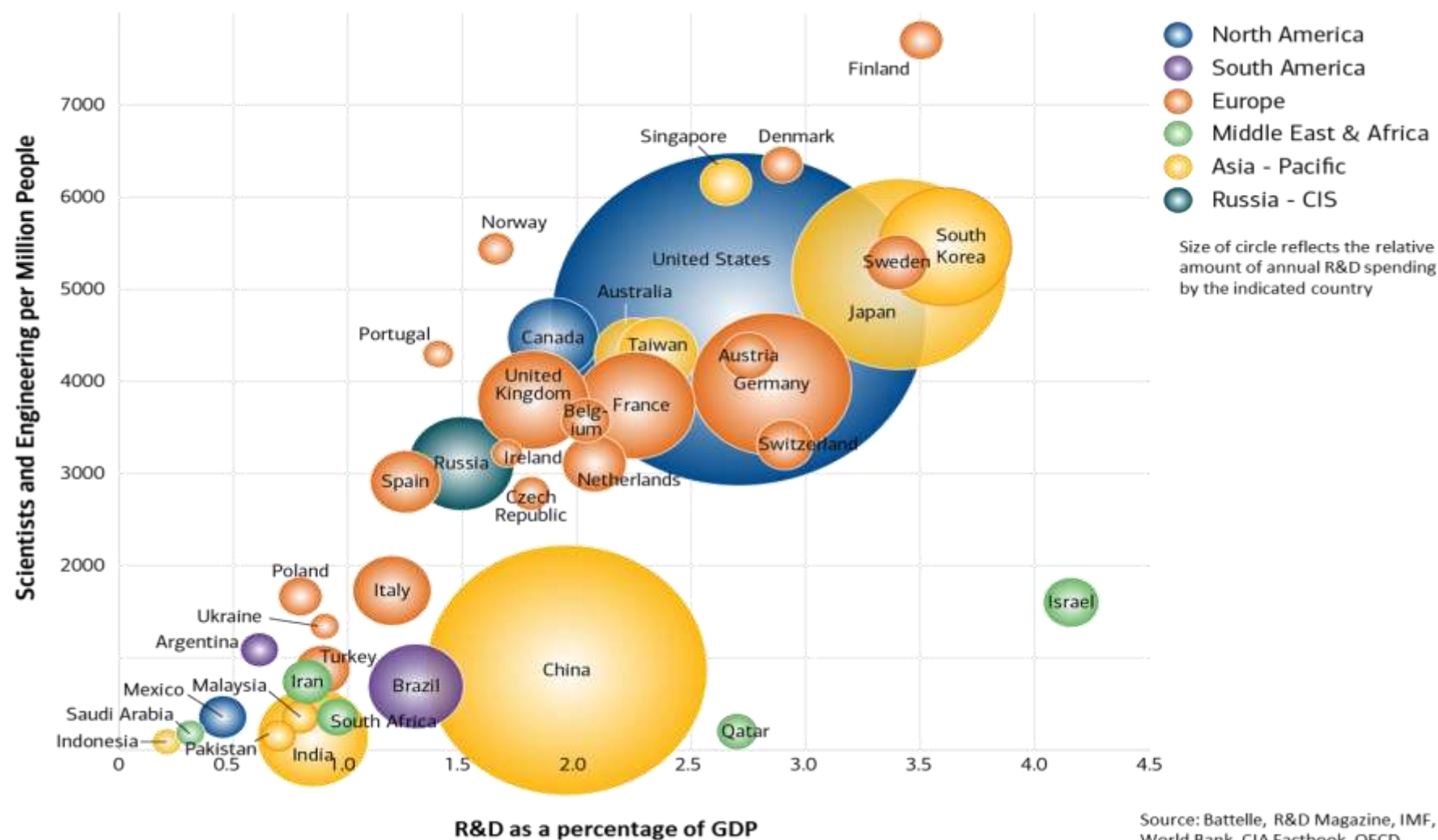
- This map shows where London's bestselling artists or band were born or formed in each London borough.
- David Bowie represents Lambeth, the Rolling Stones represent Sutton, Led Zeppelin Bexley and Coldplay Islington.
- Music has been one of the great "disrupted" industries thanks to technology. BofAML estimates Spotify to have 28 million subscribers & 100 million users as of January 2016.
- And on-demand audio and video streaming activity on outlets like Spotify, YouTube and Apple Music last year were up 93% to a stunning 317.2 billion songs played (Nielsen).





- The world's first hotel staffed almost entirely by robots opened last year in Nagasaki, Japan; a hotel room costs about \$80 per night.
- Japan had the highest number of operational robots at 310,508 in 2012.
- In the last 10 years, the number of global industrial robots has grown 72%, while the number of US manufacturing jobs has fallen 16% (IFR).
- By 2020, about 7mn jobs will be lost and 2mn gained (5mn net loss) in 15 major developed and emerging economies as a result of developments in genetics, artificial intelligence, robotics and other technological change (WEF).

Exhibit 34: The World of R&D, 2013



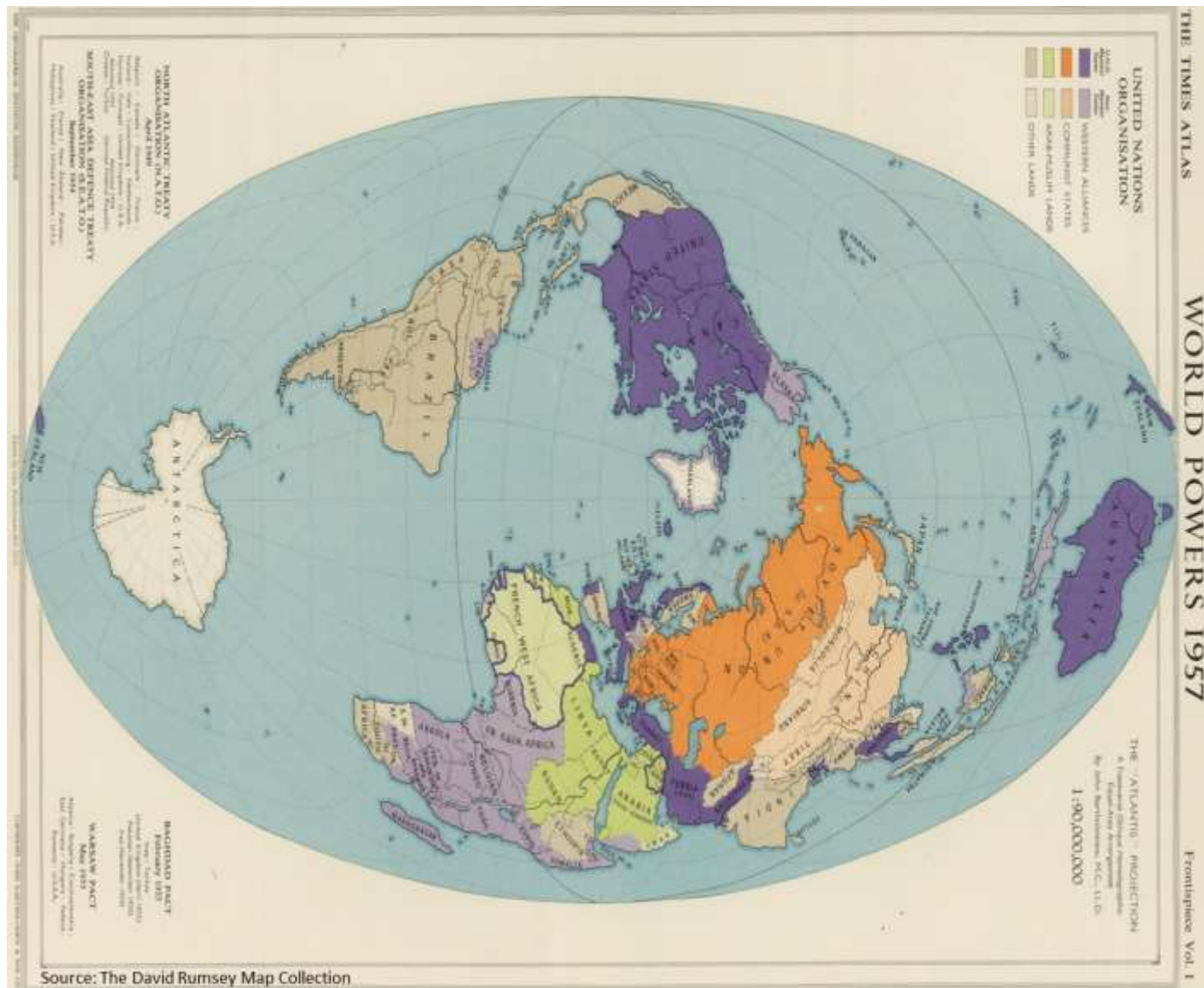
- This map depicts each country's R&D spending as a percent of GDP and its number of scientists and engineers per capita; the size of the sphere reflects the country's relative amount of annual R&D spending. While R&D funding isn't the sole indicator of how a nation will perform, it certainly is an important factor.
- The growth in the number of researchers and the ratio of R&D spending as a share of GDP reveal a convergence among many countries in recent years, particularly in Asia and Europe, to the levels of research intensity sustained by the United States for the last half-century.
- Noteworthy exceptions include China and India, which produce large numbers of scientists and engineers, but the general population is growing at a faster rate. As a result their S/E (scientists and engineers) ratios continue to lag those of the US and European countries.

Health  
Poverty  
Size of Asia  
Race  
Robotics  
Cybersecurity  
The sharing economy  
Innovation  
Space exploration  
Asia as a world power  
People  
gaming  
Religion  
Aging  
Clean tech  
Internet  
Conflict  
Migration  
Trade partnerships  
Government  
Geopolitics  
Credit default  
Global population size  
Tourism  
Earth  
Carbon emissions  
Alternate resources  
Markets



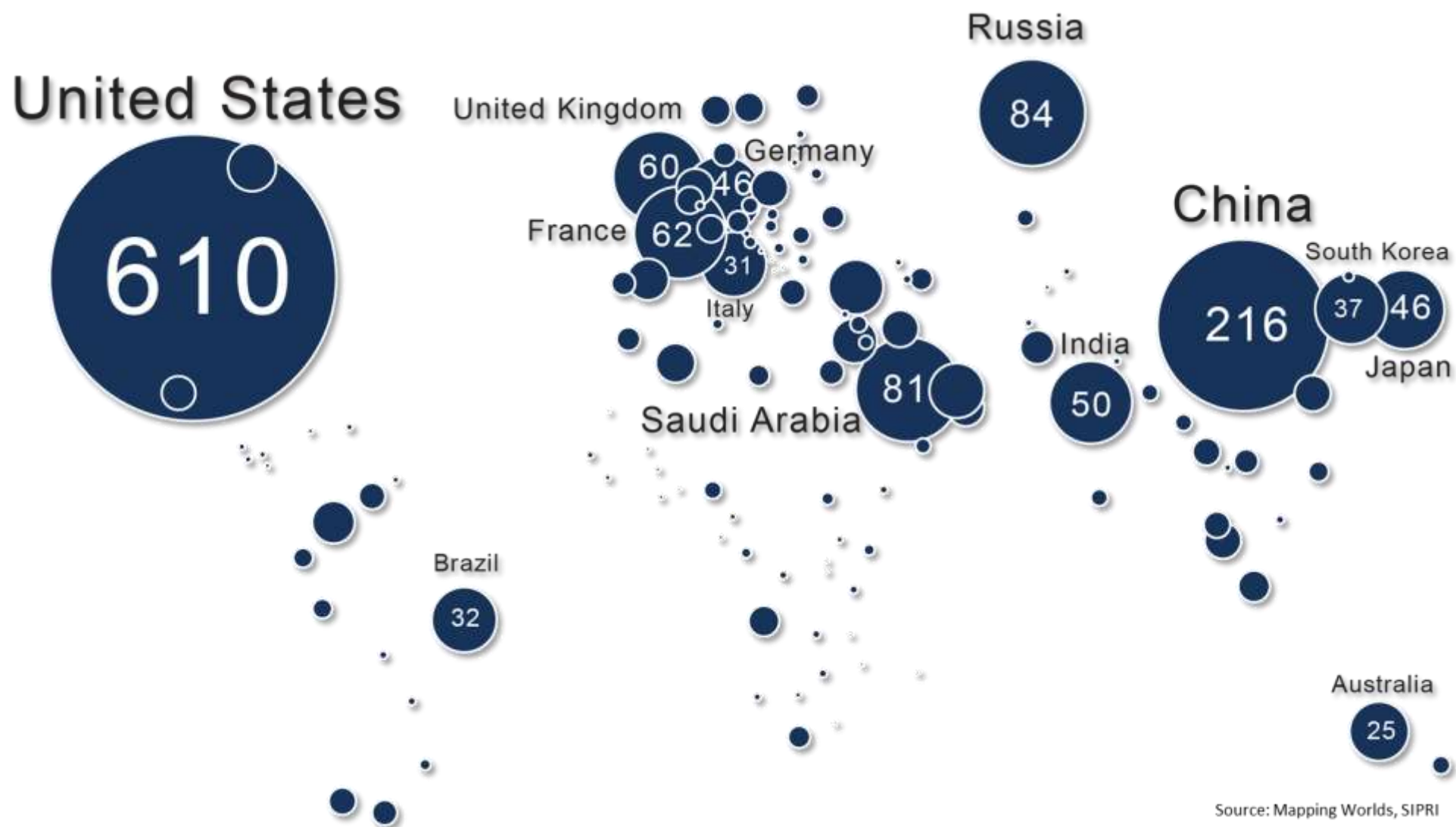


## Exhibit 35: The World Powers in 1957 at the height of the Cold War



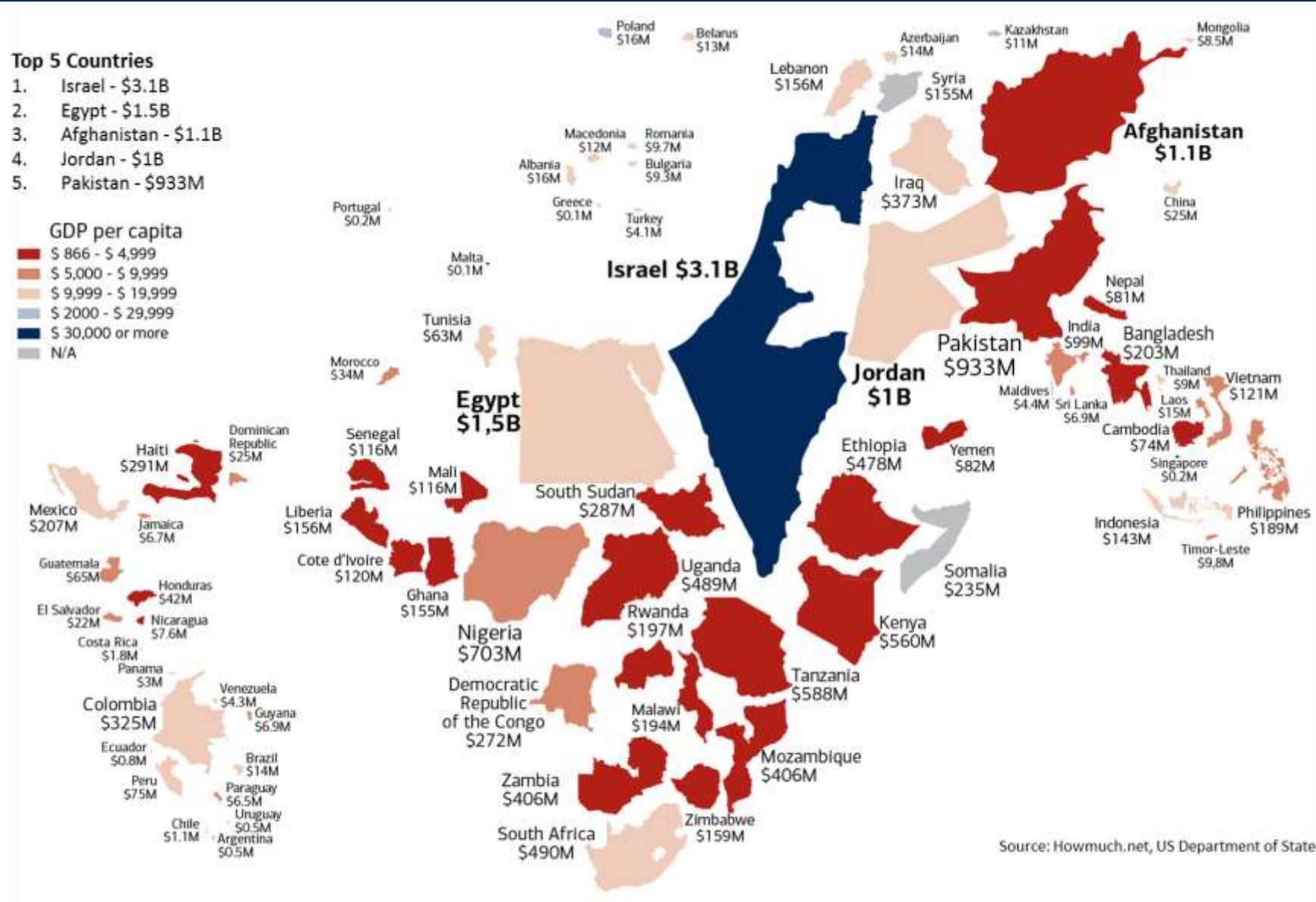
- This 1957 map shows the world powers at the height of the Cold War.
- The purples of the Western Allies ring the oranges of the world's Communist States during a historic period of great antagonism between the world power blocs, following the establishment of NATO (1949), SEATO (1954), the Baghdad Pact and the Warsaw Pact (1955).
- 60 years later, investors in stocks, bonds, commodities and currencies remain hostage to geopolitical risks in Europe, the Middle East, and between the US, China and Russia.

Exhibit 36: America as Superpower - the **world's largest defense budgets** in 2014, \$bn



- The US spends more on its defense budget than the next 15 countries (excl. China) combined (SIPRI). US population as a percentage of world population is 5%; US military spending as a percentage of world spending is 50% The US Pentagon spends more than is spent on health, education, welfare, and safety by all 50 US states combined.
- Military spending and technological superiority make the US today's sole global superpower, providing both geopolitical clout but also great expectations that America will act as a global policeman.

### Exhibit 37: American Economic Aid, 2014



- This map rescales the world by the size of received aid from the US: the top 5 recipients of economic aid from the US are Israel, Egypt, Afghanistan, Jordan and Pakistan.
- The US provided approximately \$35bn in economic aid in over 140 countries in fiscal year 2014 (DoS), funding health programs, military financing, economic development programs and boosting the US ability to shape local and regional politics.



## Exhibit 38: If the Mongol Empire Reunited

- Its Largest City, Shanghai, would Have a Population of 24,257,000, #1 in the World.
- It Would Have 9.7 Million Active Military Personnel, #1 in the World.
- It Would Have a GDP of \$29.7 Trillion (Current International Dollar, PPP), #1 in the World.
- It Would Have an Area over 33 Million Km<sup>2</sup>, #1 in the World.
- It Would Have a Population of 2.2 Billion, #1 in the World.

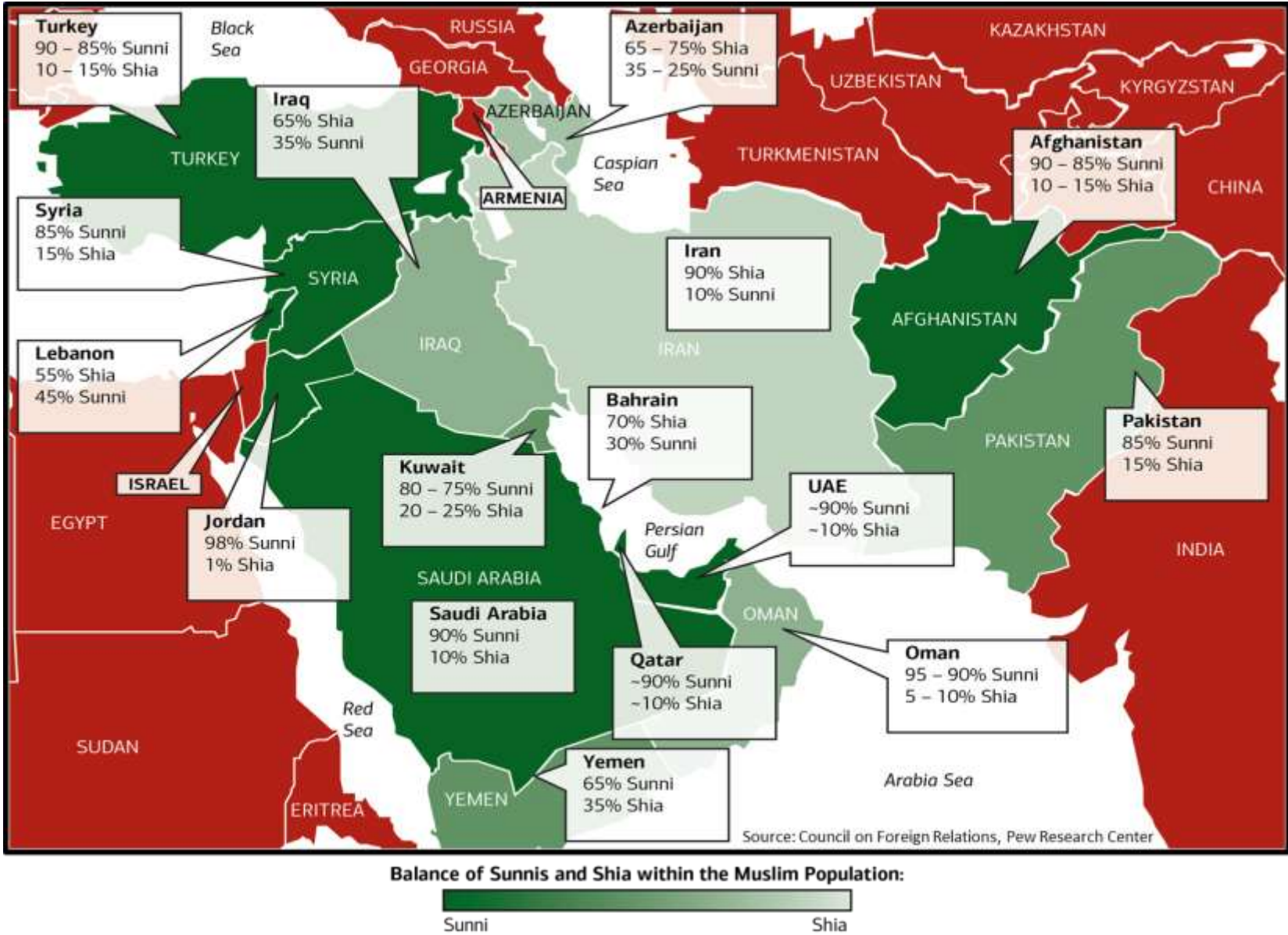


Note: Based on modern day borders

Source: BofA Merrill Lynch Global Investment Strategy, Bloomberg, CIA Factbook, World Bank

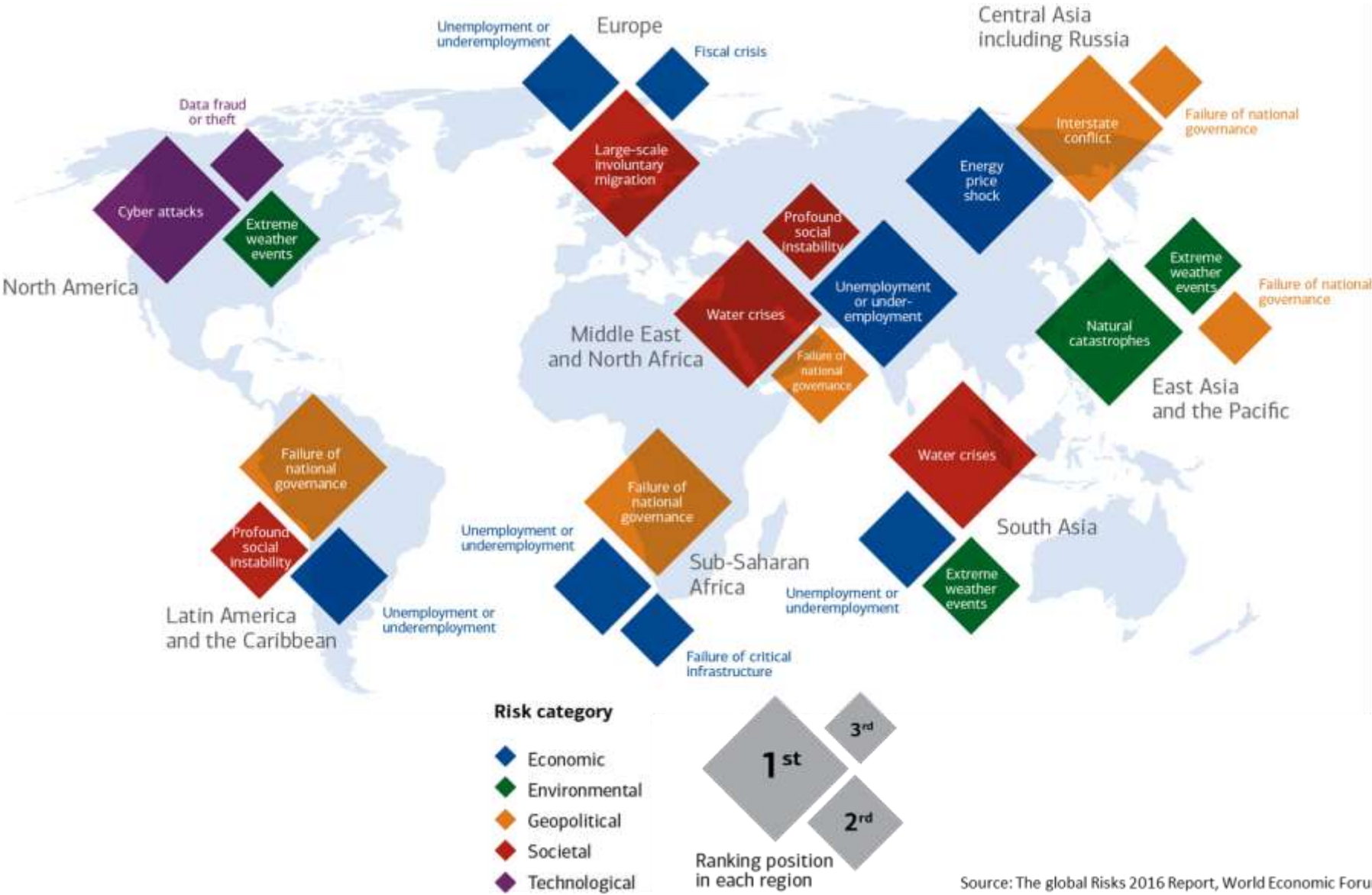
- The United States' two biggest geopolitical rivals are China and Russia, both of which were once upon a time part of the Mongol Empire.
- This map depicts how dominant the Mongol Empire – which, at its peak, encompassed China, Russia as well as large parts of Mongolia, Turkey, Iran, Iraq and Ukraine – would be today were it to reunite under modern borders.

Exhibit 39: The Sunni-Shia Schism in the Middle East, 2016



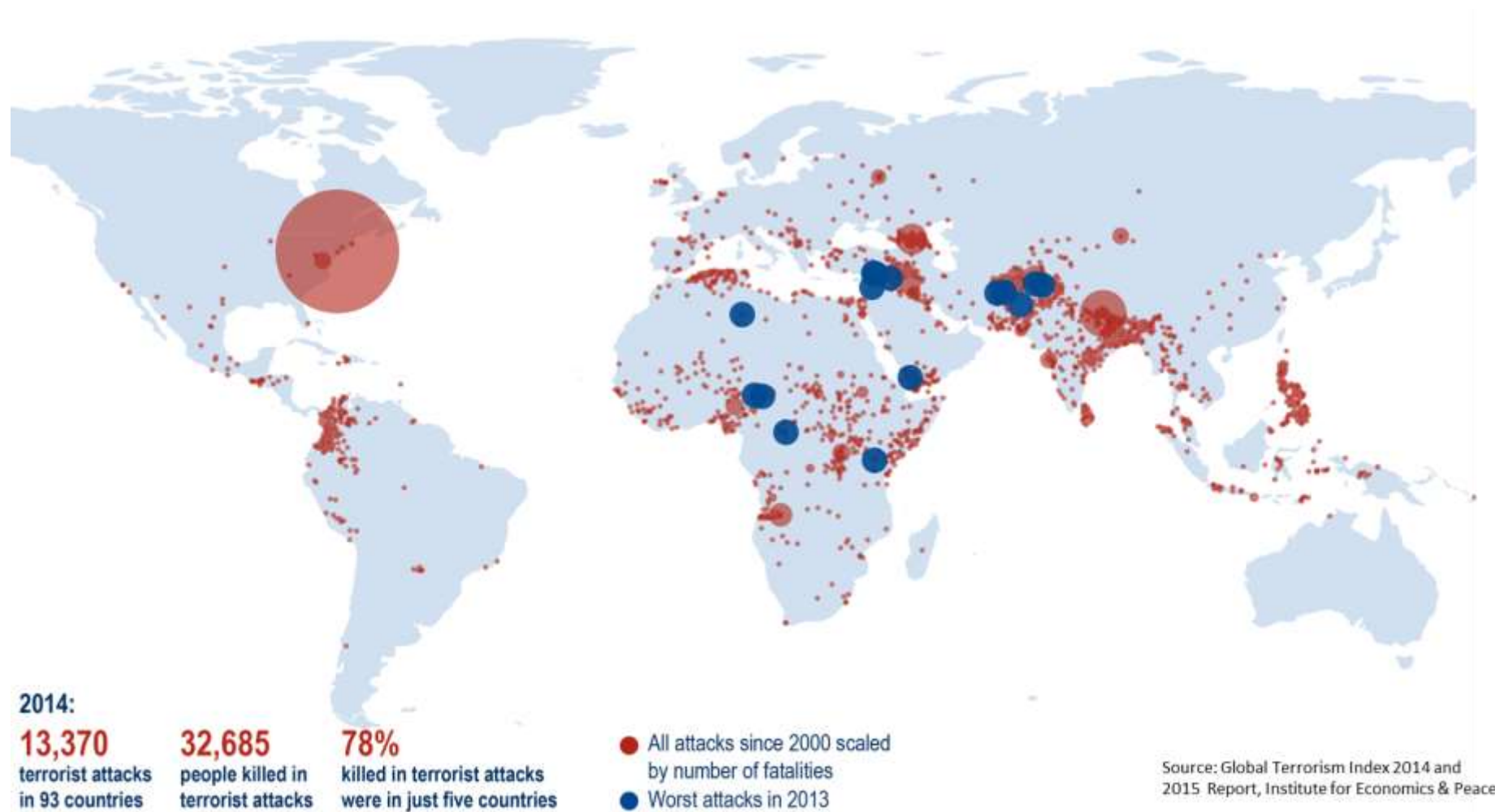
- Throughout history, the Middle East has been a global crossroads of trade and religion. In recent decades the regional dominance in global oil production has caused the Middle East to be a major influence on global growth, inflation and capital flows.
- Instability in the Middle East is caused by the Sunni-Shia schism in the region's Islamic religion, as the map above illustrates. The dominant regional powers of Saudi Arabia (90% Sunni) and Iran (90% Shia) often take opposing sides in regional conflicts.

Exhibit 40: Global Risks in 2016



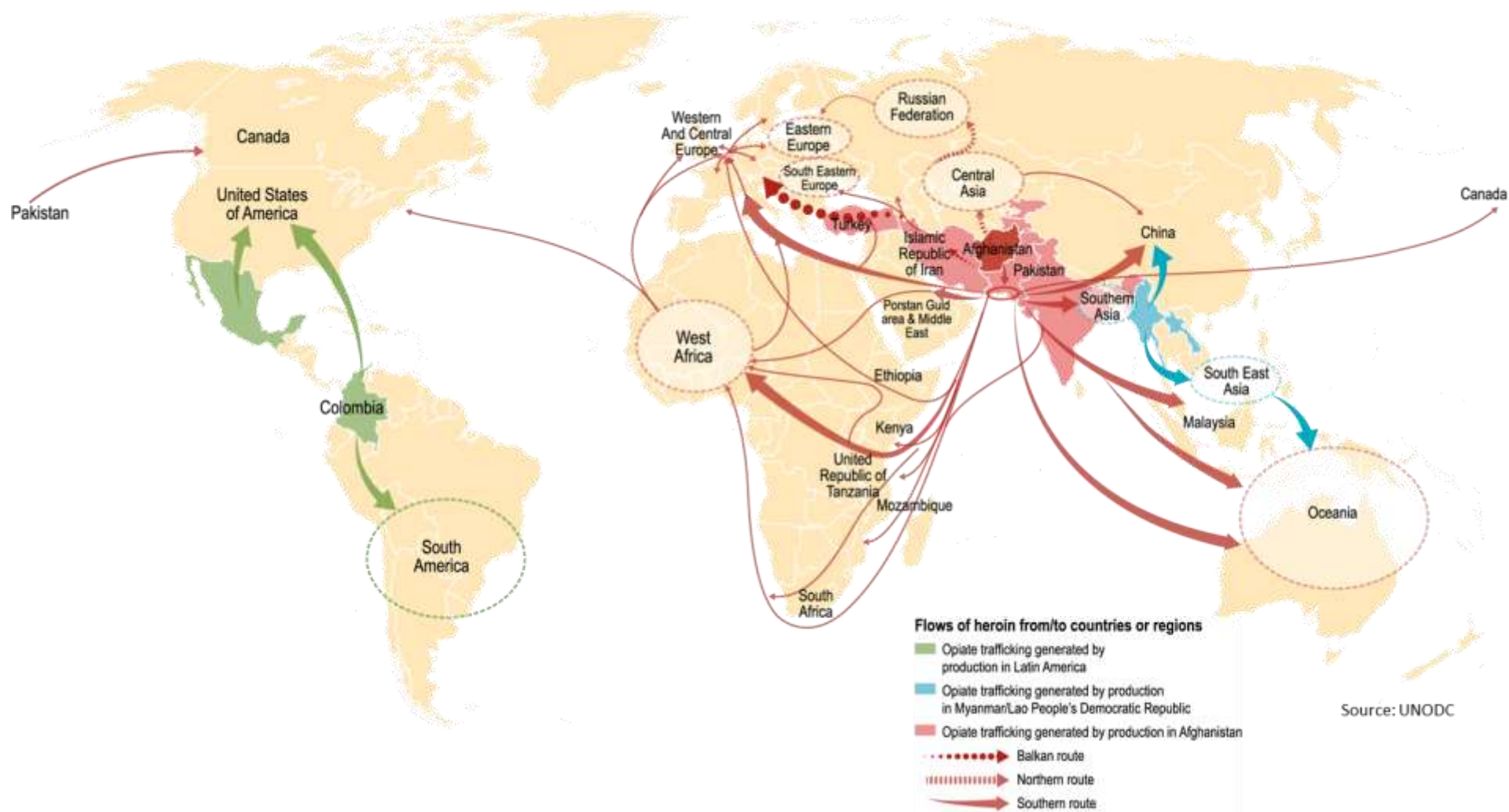
- This map ranks the top 3 risks most likely to occur in each region of the world, according to the World Economic Forum of 2016.
- The greatest risks: technological for North America, social and economic for Europe and the Middle East, geopolitical and environmental for Asia, Africa and Latin America.





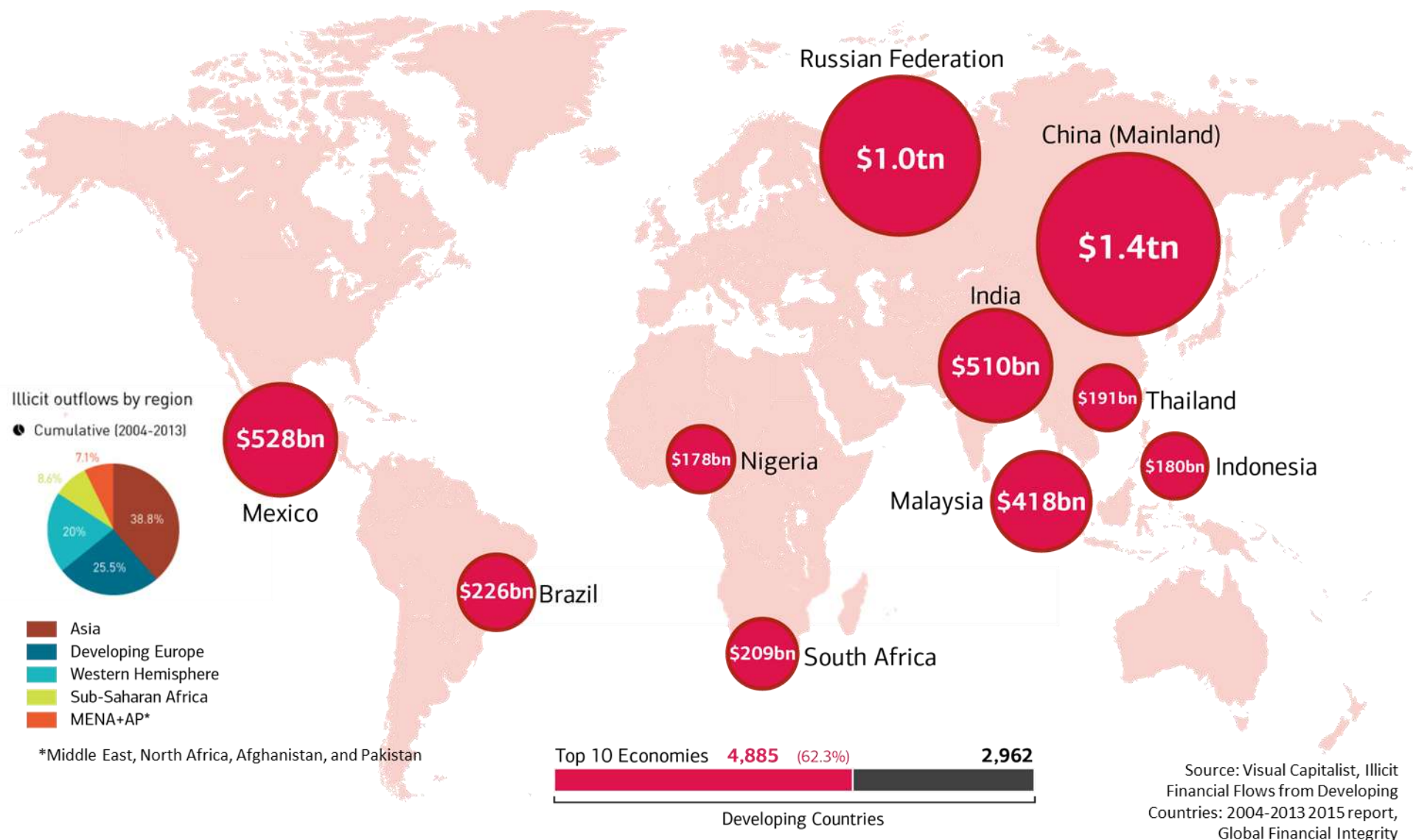
- This map shows the number of terrorist attacks across the world in 2000-2013 and the number of fatalities associated with these attacks.
- Since 2000, the number of deaths from terrorism has increased tenfold, from 3,361 in 2000 to 32,685 in 2014.
- In 2014 alone, there were 13,370 terrorist attacks and 32,685 people killed in those attacks; unsurprisingly the economic cost of terrorism reached a new high in the same year, calculated to be \$52.9 billion (Institute for Economics & Peace).

## Exhibit 42: The War on Drugs



- The flow of illegal opiates around the world also has geopolitical consequences.
- The production and trade of illegal drugs has links with failed states, black economies and regional instability.
- Afghanistan remains the center of illicit opiate production.

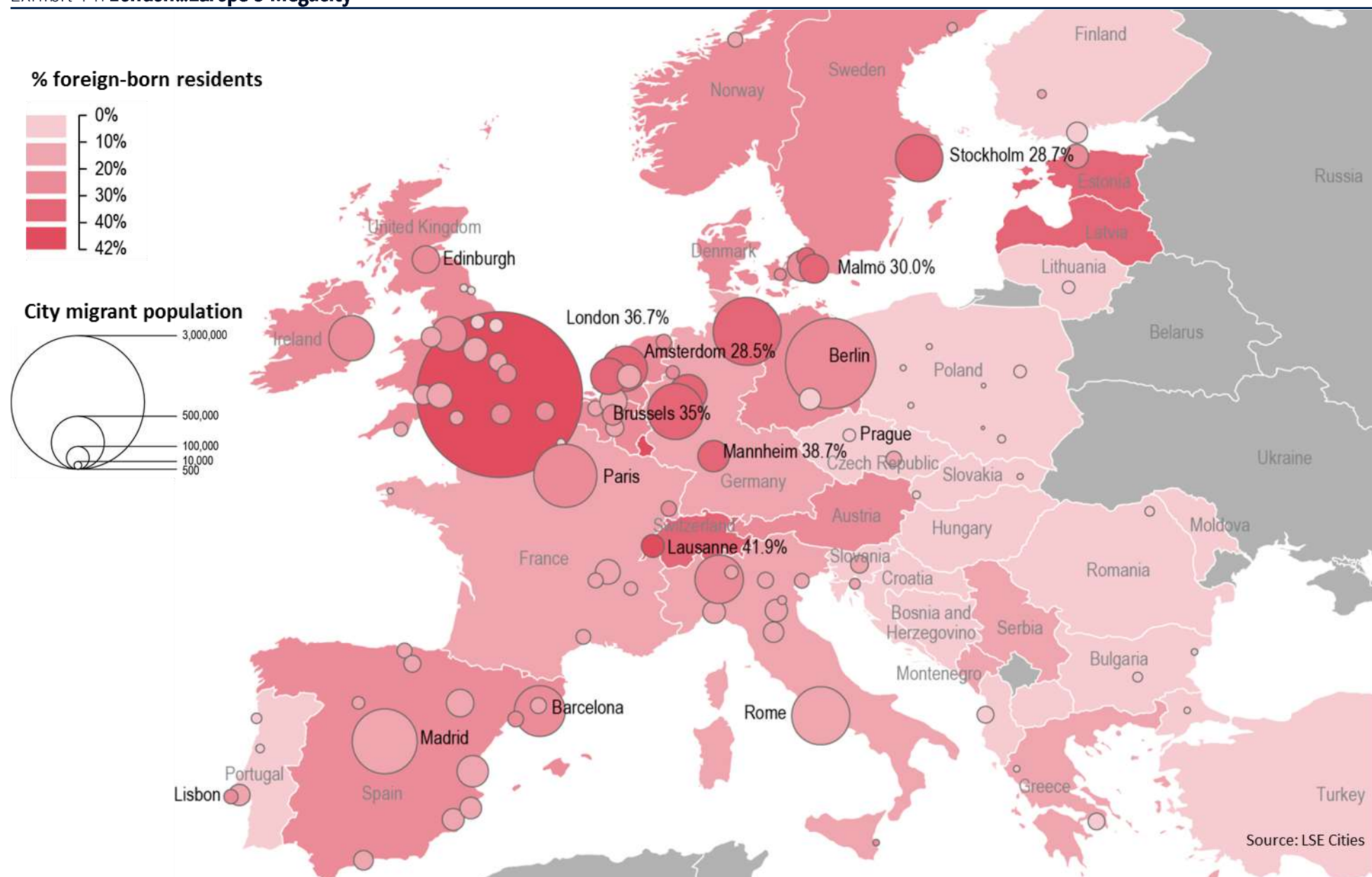
Exhibit 43: **The World's "Hot Money"**



- This map depicts the amount of money flowing out of emerging markets via illegal activities (tax evasion, crime, corruption...).
- From 2004 to 2013, developing countries lost \$7.8tn in illicit outflows; the 2013 figure was \$1.1 tn. China and Russia experienced the largest outflows.

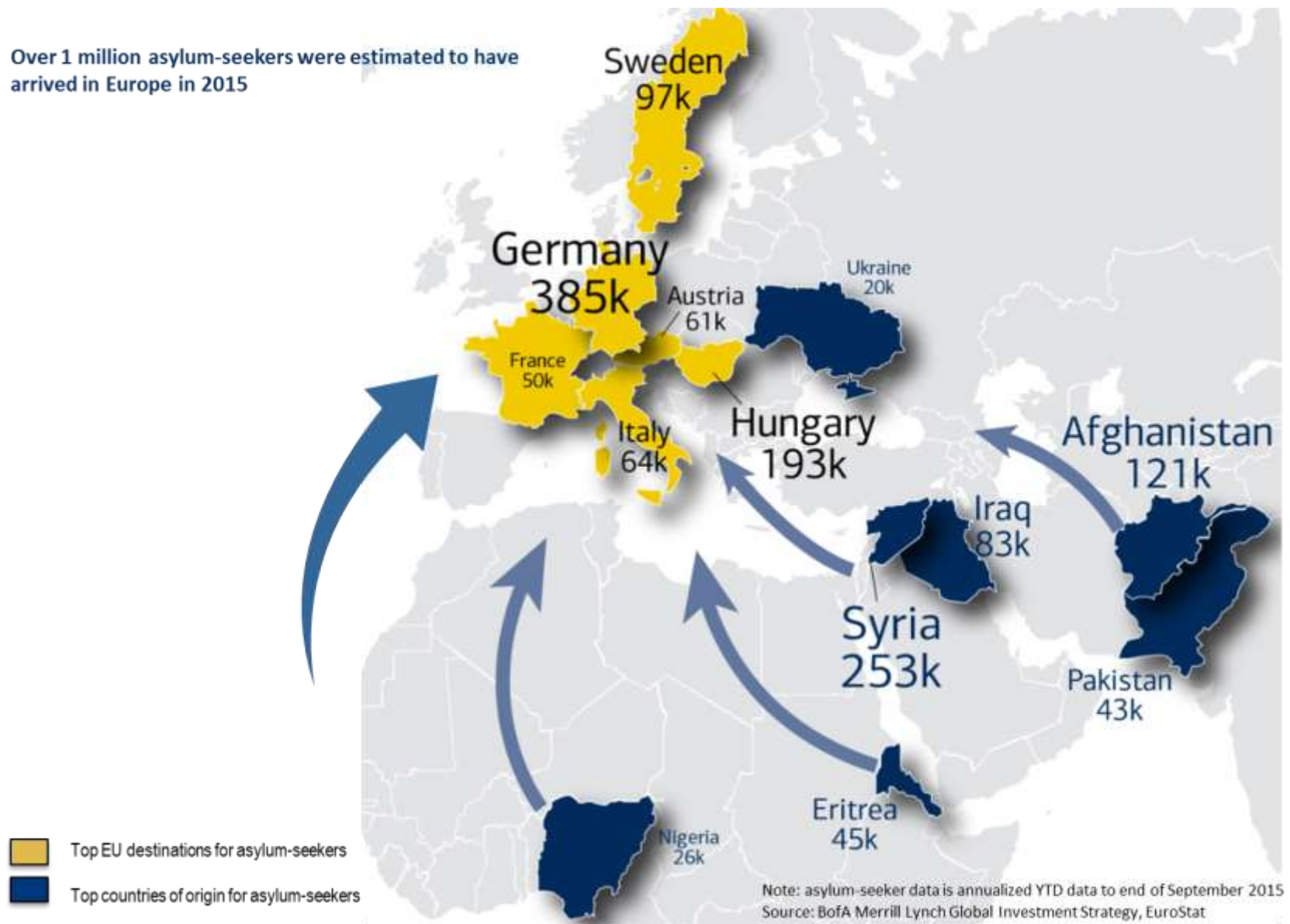


## Exhibit 44: London...Europe's Megacity



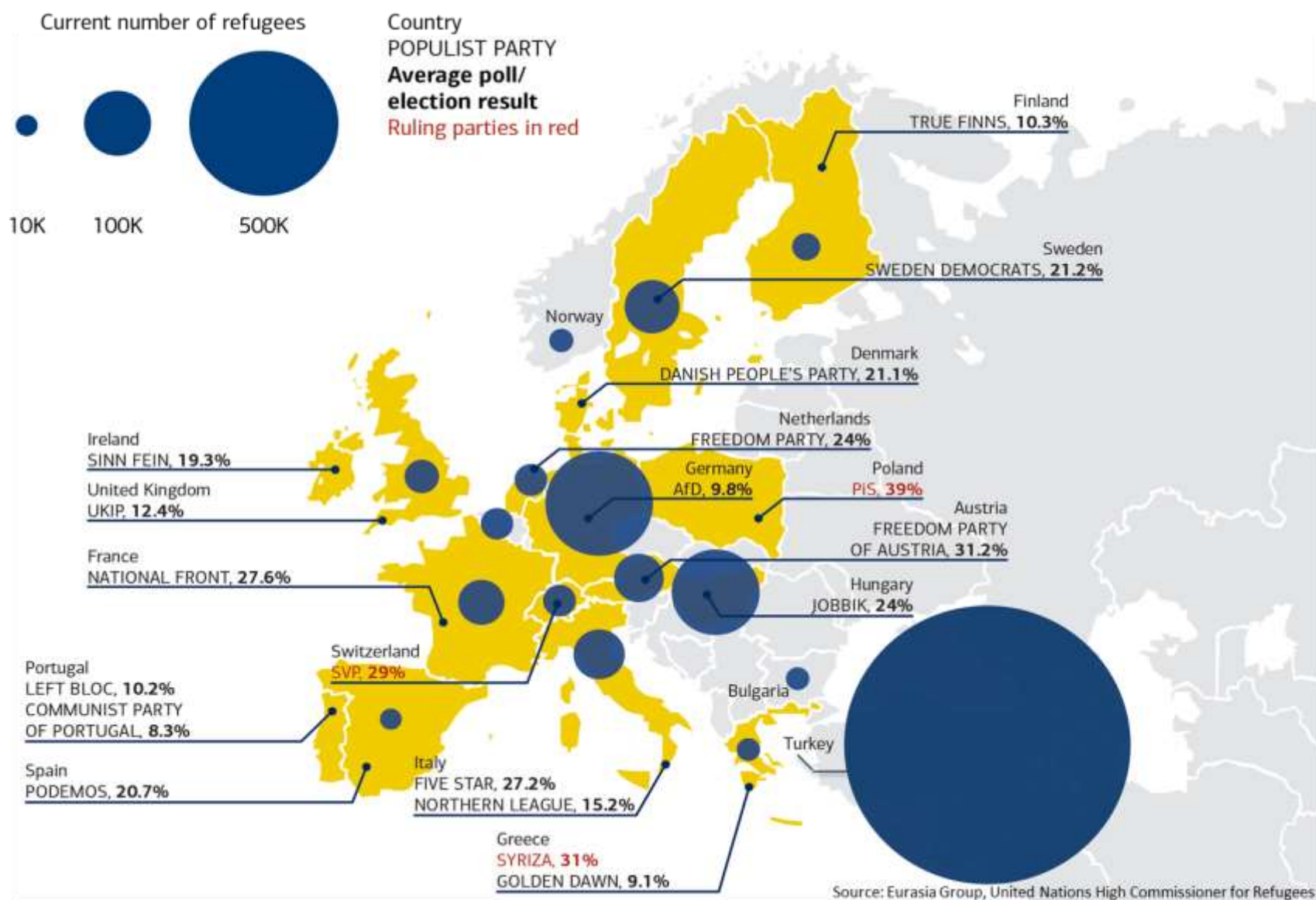
- London is Europe's megacity, the region's capital for economic growth, finance, wealth and people.
- London has by far the largest foreign-born population in Europe with 2.84 million in 2013, up from 1.99 million in 2001; 36.7% of London residents are foreign born.
- Immigration as well as sovereignty, security and the economy of both the UK & Europe, will be key issues in June's BREXIT referendum on UK membership of the European Union.

## Exhibit 45: The European Migrant Crisis



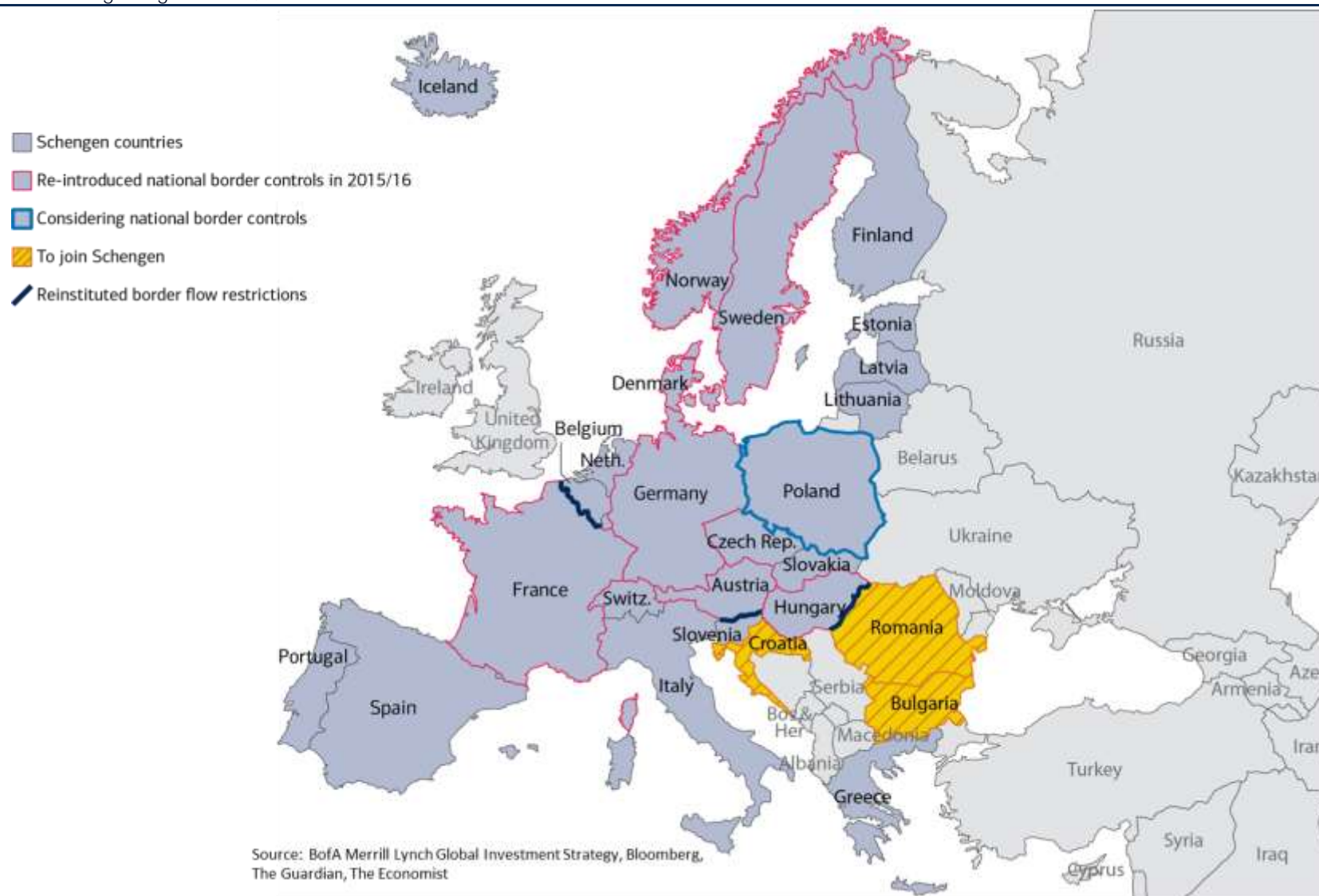
- One of the great government challenges in 2016 is the European migrant crisis.
- Over 1 million asylum-seekers entered Europe in 2015; Syria was the main origin of asylum-seekers; Germany the main destination.
- The massive surge in asylum-seekers arriving in Europe is causing political and social upheaval, and is expected to have a significant impact on Europe's labor market.

Exhibit 46: The Rise of Political Populism in Europe



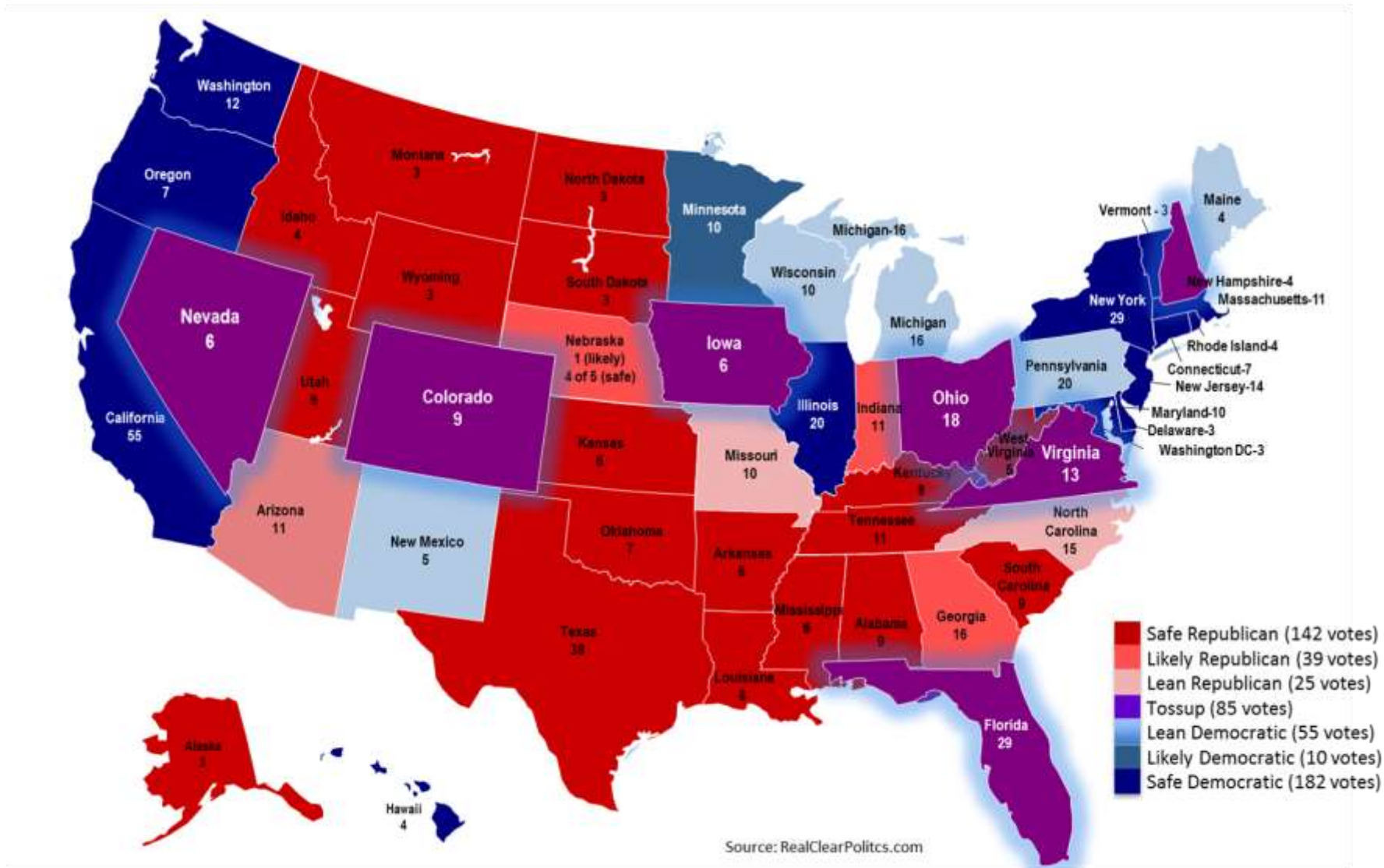
- In many European countries, populist political parties, from both the far right and the far left, are polling well over 20%.
- In Europe, migration pressures have coincided with rising populism; globally labor market inequality and insecurity are boosting the rise in political populism.
- Note there are currently >1 million refugees in Turkey, mostly originating from Syria and Iraq.





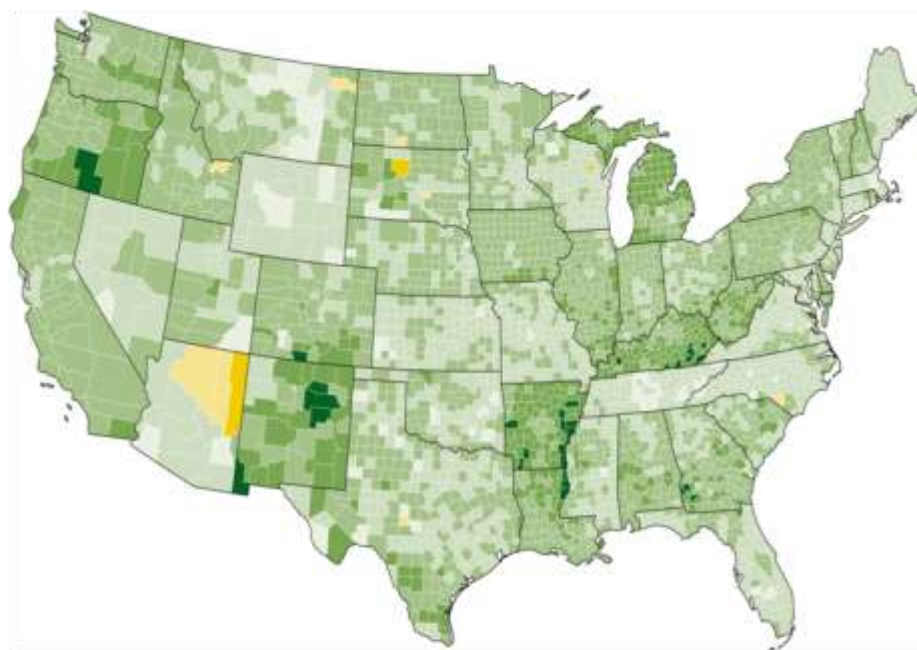
- The Schengen Agreement is a 1985 European Union treaty that eliminated border controls between its EU signatories. It has led to a common visa policy for 26 countries and was considered a key step in the creation of a federal Europe.
- Europe's economic crisis, the rise of nationalist political parties and the large increase in the number of asylum seekers caused country borders to be reestablished in 2015-16, as shown in the map above, and led to requests for a redesign of the Schengen Agreement.
- The reintroduction of border controls would be likely to reduce European GDP (eg, the German Chamber of Commerce & Industry forecasts an initial burden of €10bn or 0.3% of German GDP on the German corporate sector).

Exhibit 48: The US Presidential Election Map

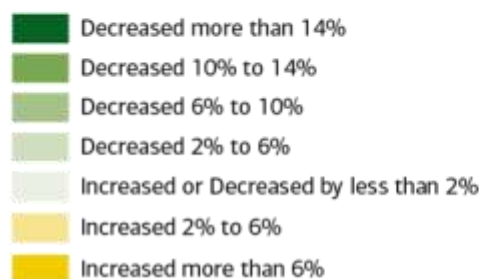


- On November 8, 2016 the US will elect its 45th president. The US electoral map is shown above.
- The states that will decide the US election are as follows: leaning Republican are Missouri (10), North Carolina (15); leaning Democrat are Wisconsin (10), Pennsylvania (20),
-

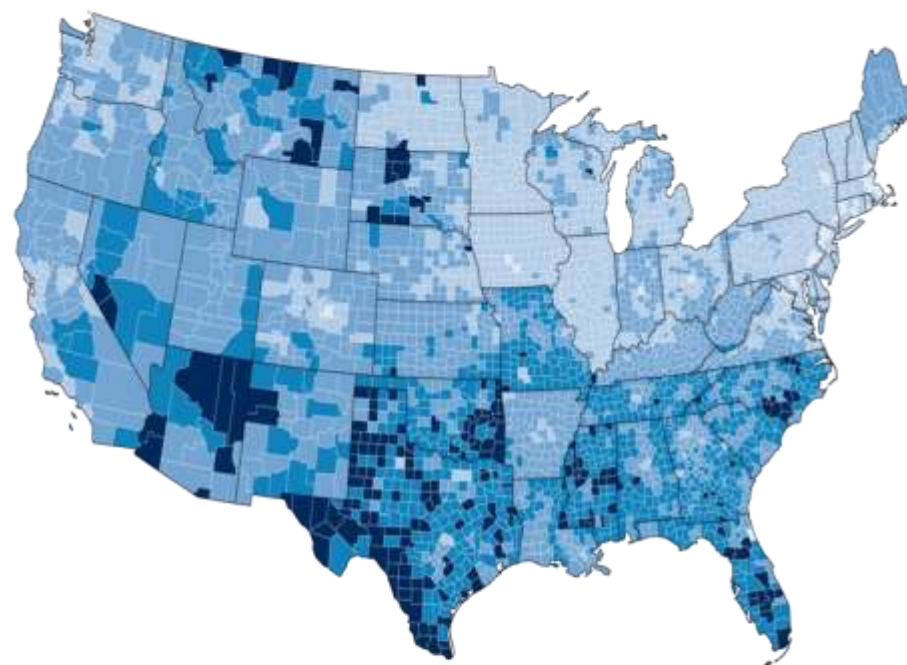
## 2013-2015 Change in Uninsured Rates



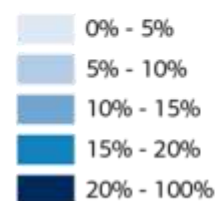
Change in Uninsured Rates from 2013 to 2015



## 2015 Uninsured Estimates



2015 Uninsured Rates



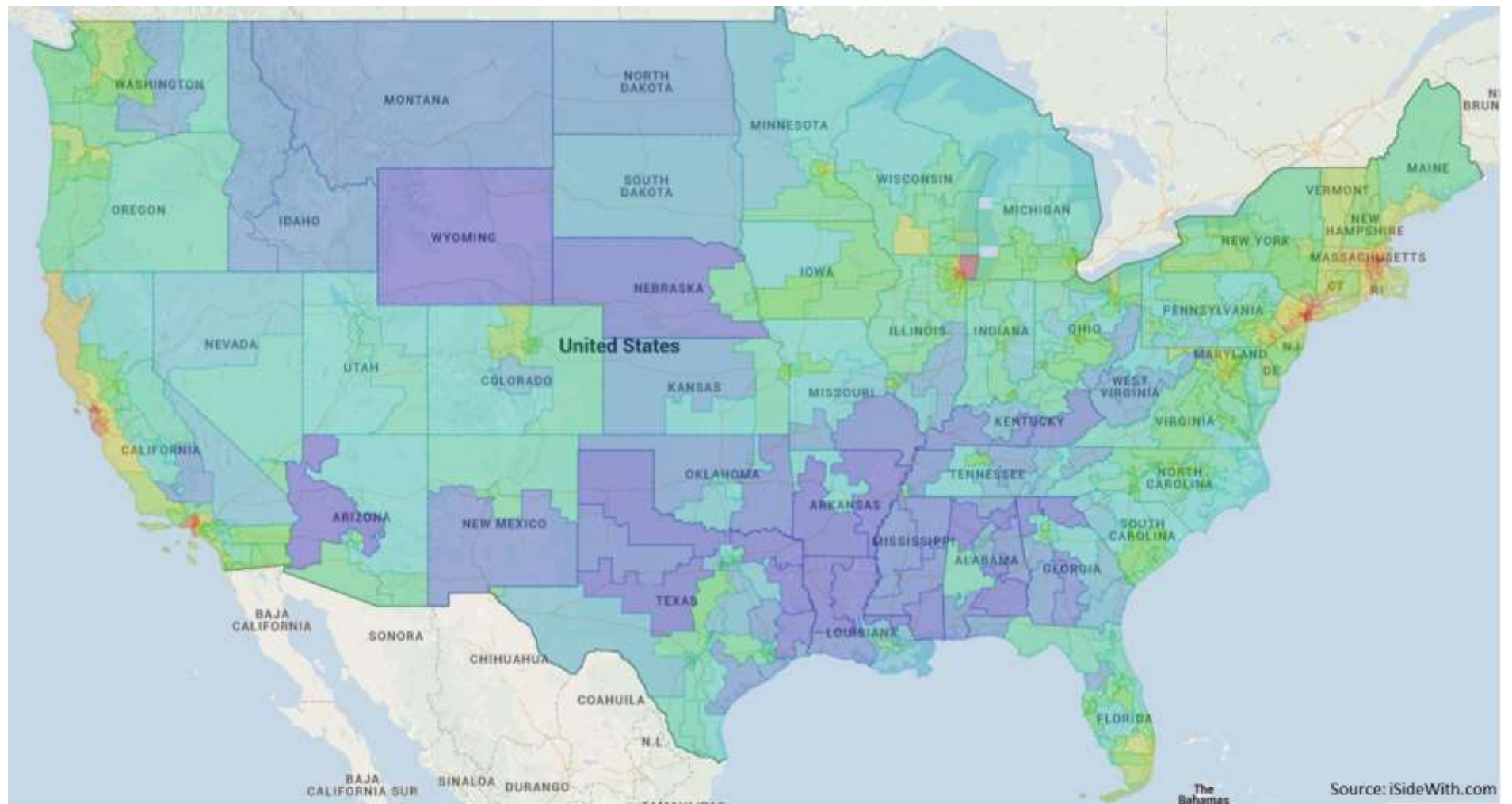
Note: Uninsured Rates = estimated non-elderly adult uninsured rates  
Change in Uninsured = estimated pct. pts. change in non-elderly adult uninsured rate (i.e., 2013 rate less 2015 rate)

Source: Enroll America, Civis Analytics

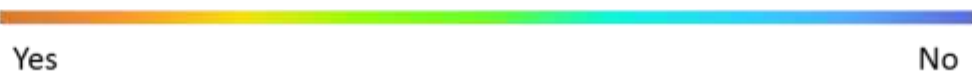
- In 2010, the Affordable Care Act (aka Obamacare) was signed into law.
- The left hand map shows that uninsured rates have fallen in most regions of the US from 2013-2015, particularly (>10%) in rural Arkansas, southern Texas, large swathes of New Mexico and Kentucky, and inland Oregon. Overall, roughly 17.6 million additional people now have coverage due to the ACA (CMS).
- BofAML sees healthcare reforms catalyzing many changes for the industry, including revenue opportunities from coverage expansion.
- The right hand map, however, depicts the estimated 2015 uninsured rates across the US; in many parts of the country the number of uninsured remains >15% of the population.



Exhibit 50: Guns in America



Congressional District results from 1,724,182 voters between  
10/21/15 - 1/21/16 for the question: "Do you support increased gun control?"



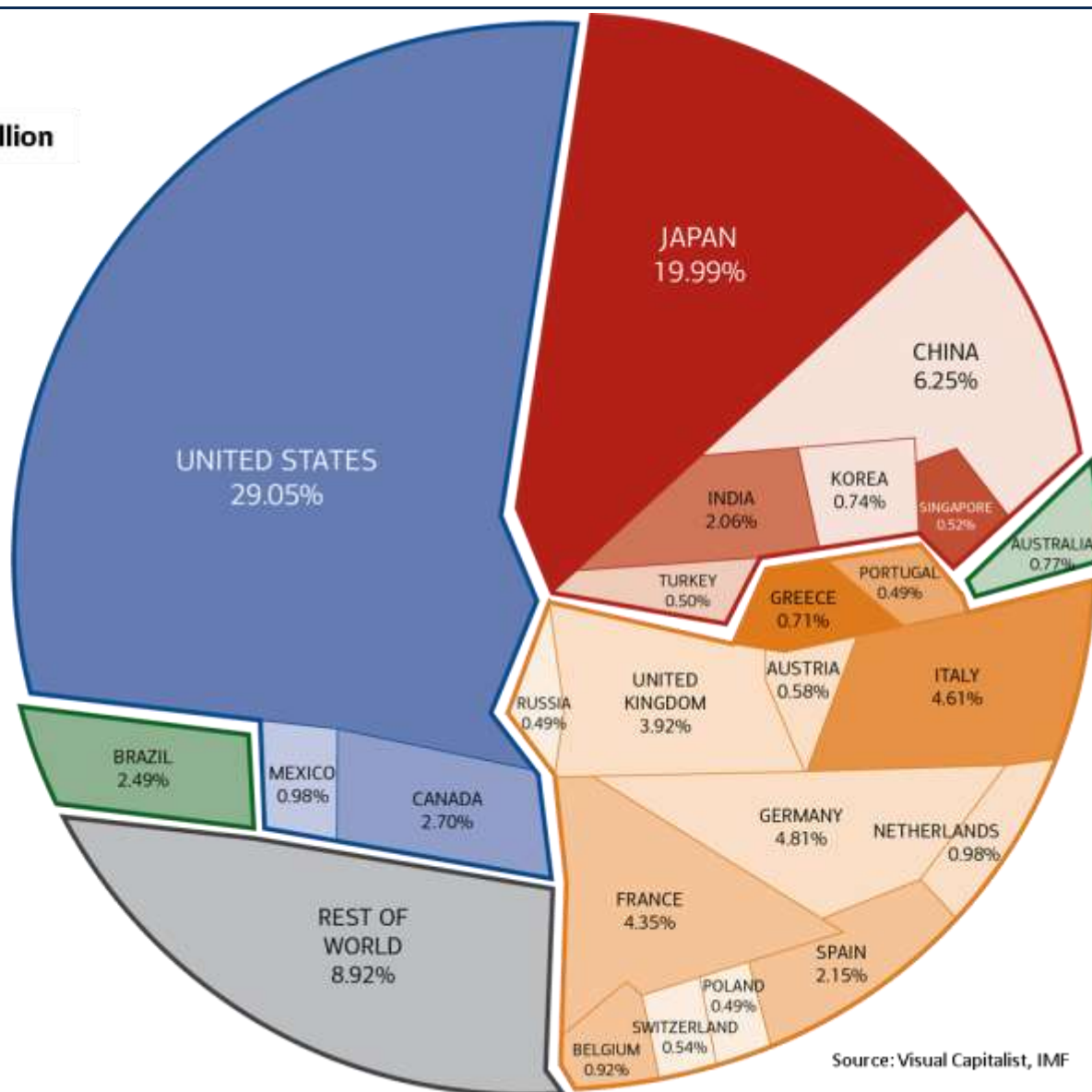
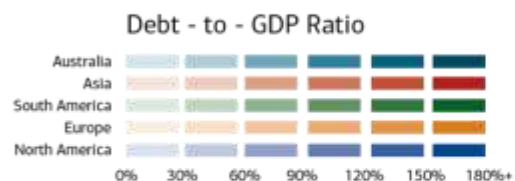
- Few issues split America as conclusively as the Second Amendment to the US Constitution, which protects the right of the people to keep and bear arms.
- In July 2015, 50% of Americans said it is important to control gun ownership, and 47% said it is more important to protect the right of Americans to own guns (Pew).
- The map above shows the divide in public opinion on expanding gun control, favored greatly by the metropolitan coasts, opposed with determination by the rural middle.

Health  
Poverty  
Size of Asia  
Race  
Robotics  
Cybersecurity  
The sharing economy  
Innovation  
Space exploration  
Asia as a world power  
People  
gaming  
Religion  
Aging  
Clean tech  
Internet  
Conflict  
Migration  
Trade partnerships  
Government  
Geopolitics  
Credit default  
Sport  
Global population size  
Tourism  
Earth  
Carbon emissions  
Alternate resources  
Markets



Exhibit 51: A World of Debt, 2015

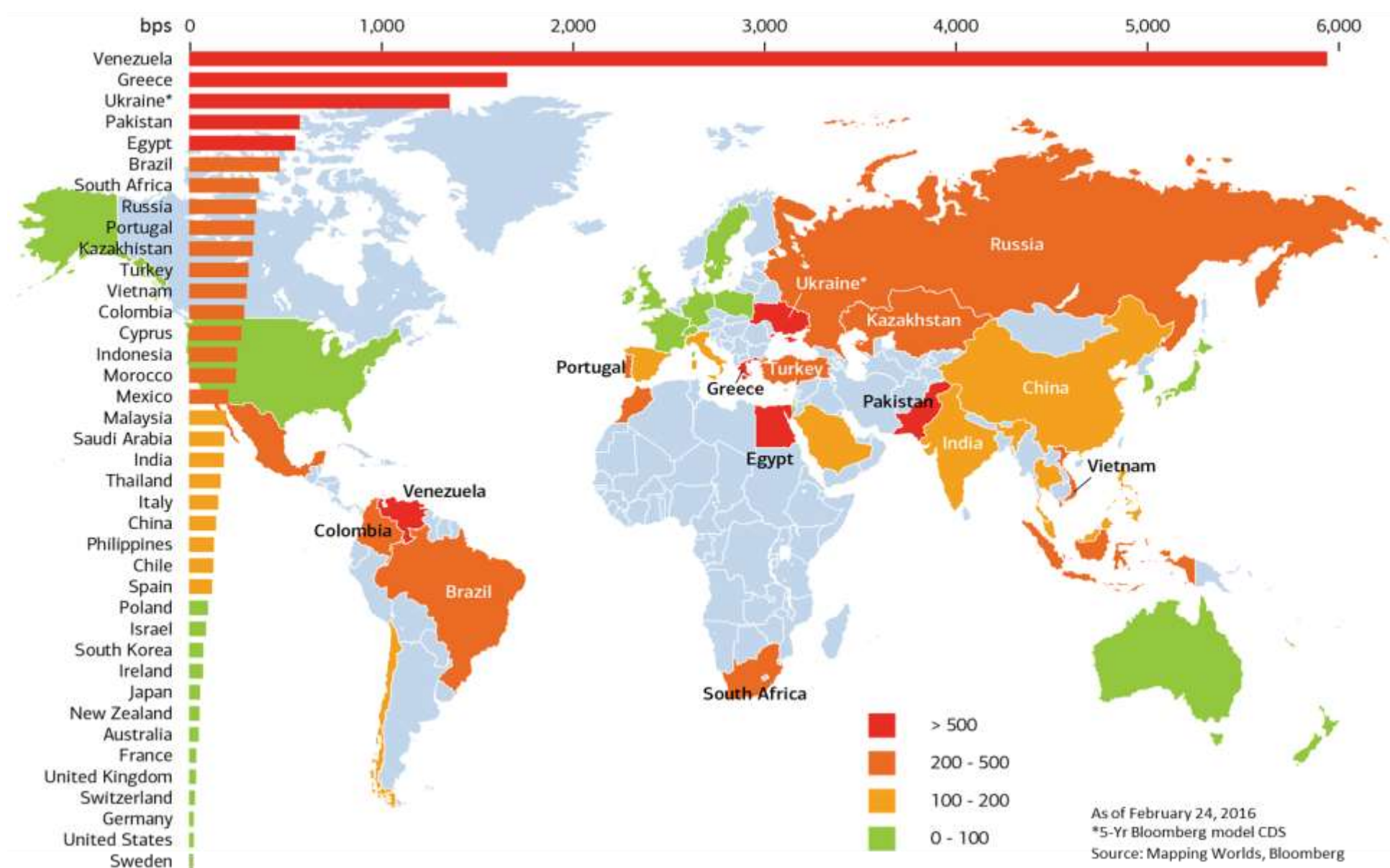
**Total Global Public Govt. Debt: \$59.7 trillion**



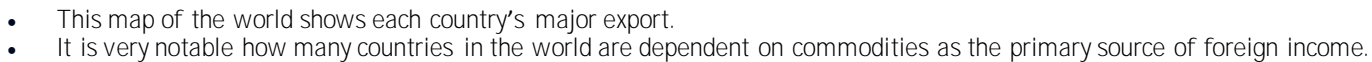
- Debt, deleveraging, tech disruption and ageing demographics are all responsible for the deflationary price action in financial markets and historically low interest rates.
- There is currently \$60tn of public government debt outstanding; the US is responsible for 29%, Japan 20%, and China 6% as shown above.
- As of 2Q15, total global debt (private and public sector) was \$208tn or 325% of global GDP (BIS).



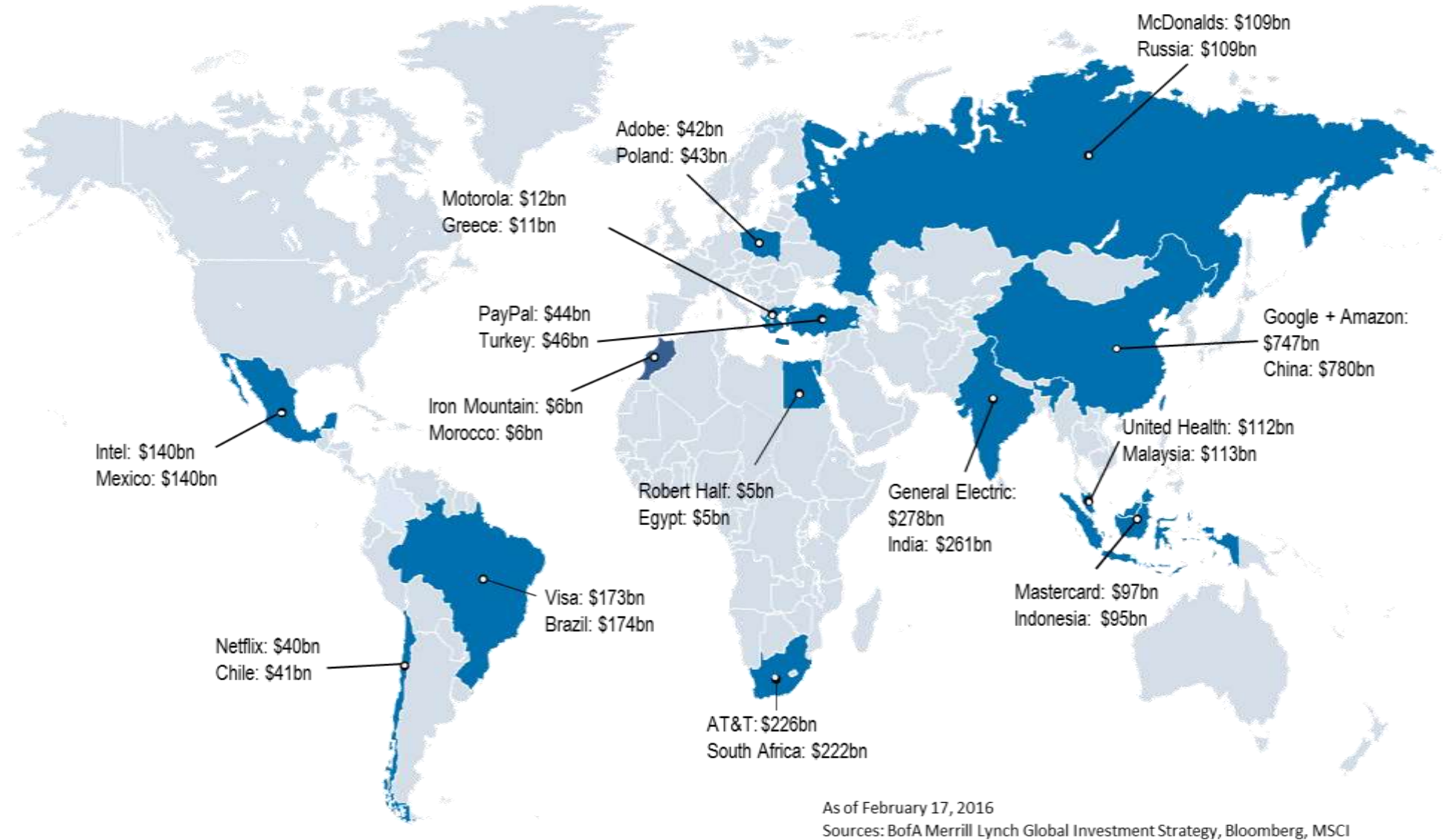
Exhibit 52: Risk (as measured by sovereign CDS spreads)



- Sovereign Credit Default Swaps (CDS) are financial contracts that measure the risk of default on sovereign debt: the higher the spread, the greater the risk of default.
- Currently, Venezuela in the Americas, Greece and Ukraine in Europe, and Pakistan in Asia have the greatest sovereign credit risk in their respective regions.



## Exhibit 54: A Map of Hubris and Humiliation



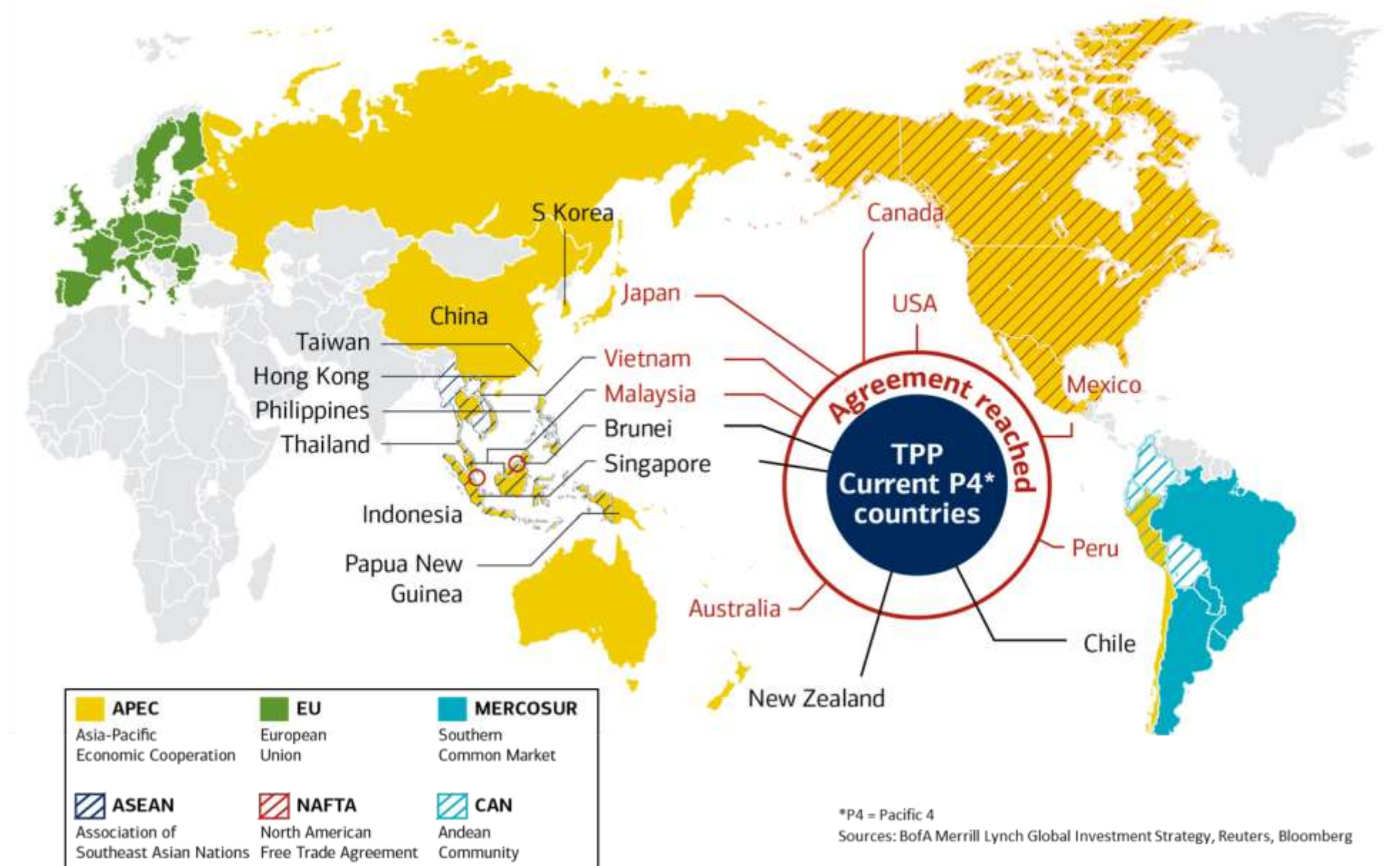
- This map illustrates the “humiliation” of Emerging Market stocks in comparison to “hubristic” valuations of US companies, particularly tech companies.
- The map shows the free-float market cap of many emerging markets (eg, China) barely exceeds the current market cap of individual US companies (eg, Amazon and Google).





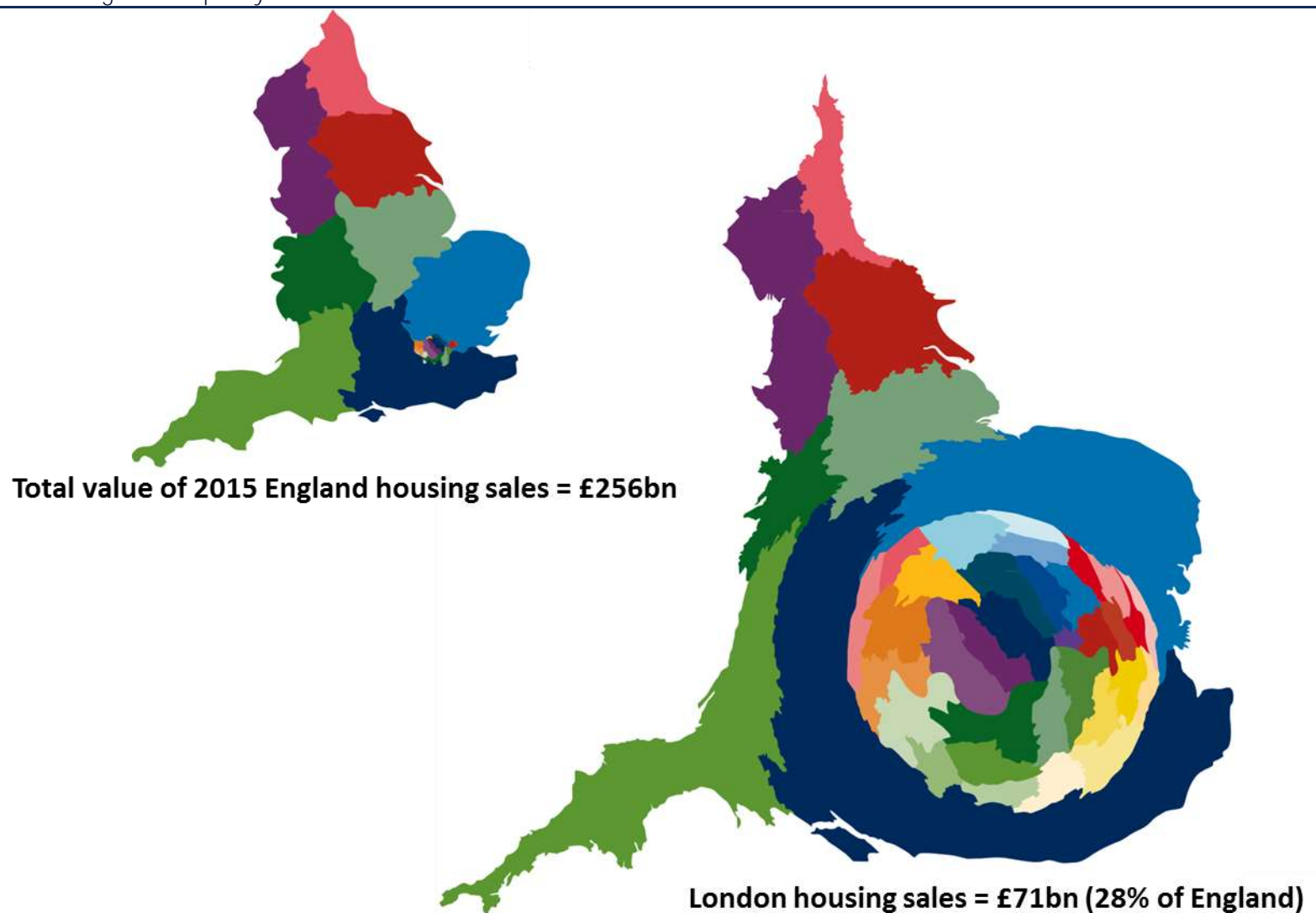
- This map illustrates the dominance of the US stock market.
- The capitalization of the US market is \$17.9tn (MSCI) as of January 29, 2016, and it currently represents 53.4% of world market capitalization, the highest since November 2003.
- The next largest equity markets are Japan, UK, France, Switzerland, Germany and China.

Exhibit 56: The Trans-Pacific Partnership (TPP) and other trade agreements, 2016



- The Trans-Pacific Partnership (TPP) is a trade agreement among 12 Pacific Rim countries signed in 2016 after seven years of negotiations.
- The TPP is the latest in a series of trade agreements in recent decades (EU, NAFTA, APEC, MERCOSUR) the impact of which has been to boost trade and capital flows, and reduce the power of labor.

## Exhibit 57: The Age of Inequality



Note: 2015 = annualized YTD data to end-Nov'15; actual England = £234.8bn; Actual London = £64.7bn

Source: Worldmapper.com, UK Land Registry

Data produced by Land Registry © Crown copyright 2015

- This map shows England resized by the value of residential property transactions in 2015.
- London accounted for 28% of all English housing sales despite accounting for just 1-2% of the total land area.
- Megacities today enjoy a disproportionate amount of wealth due to significant real estate appreciation. The value of London's housing stock increased by 143% between 2004 and 2015; UK housing stock rose by 74% over the same period.



## The most expensive homes on the tube...



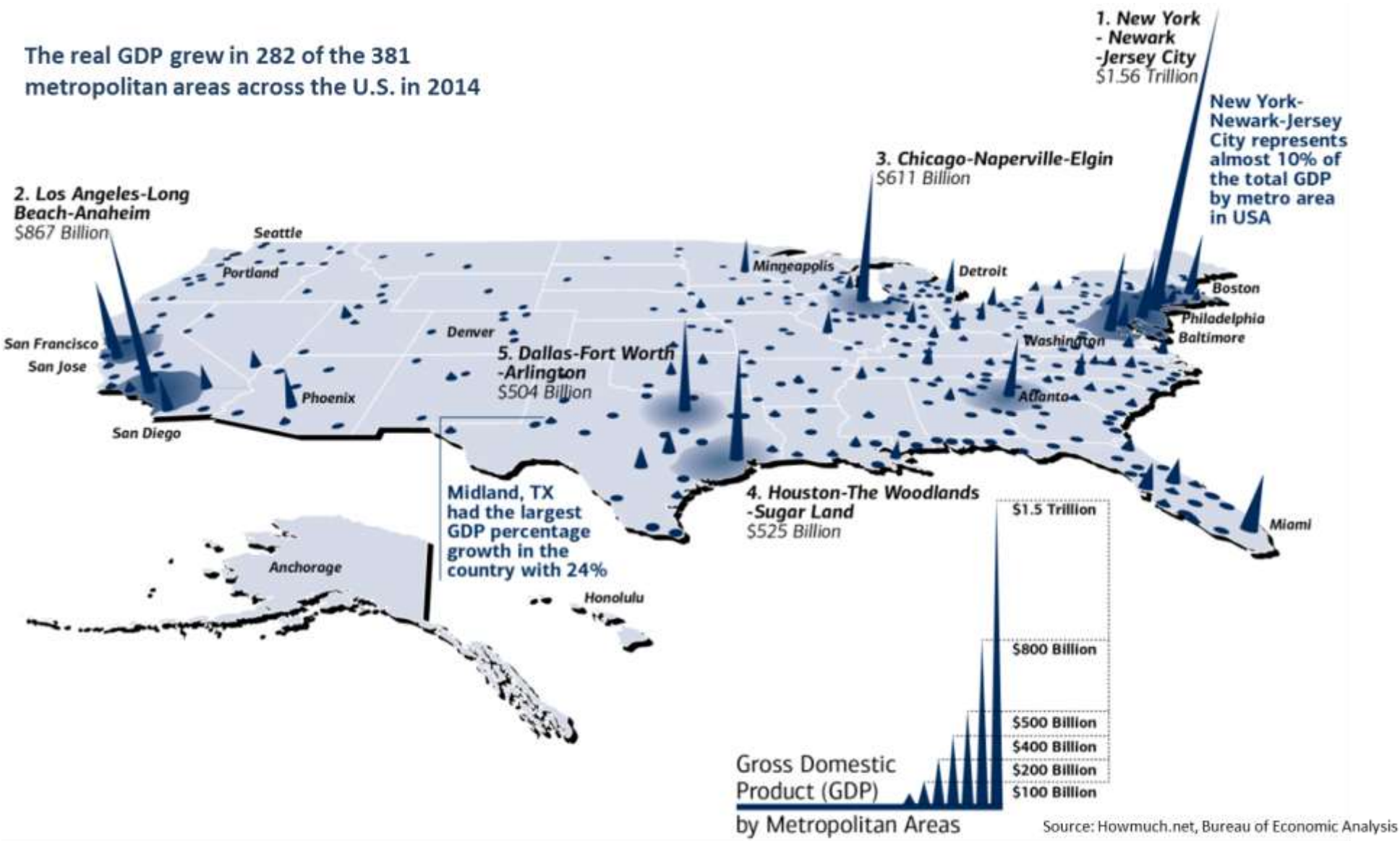
## ...and the least expensive homes on the tube



Note: Housing prices reflect average local property price for live listings  
Source: eMoov, Zoopla

- Asking price data (Zoopla) allows the London Underground map to be annotated with average real estate price by station.
- The most expensive average homes are at (£2.6bn) Piccadilly Circus & (£2.6bn) High Street Kensington; the most expensive suburb is Richmond (£945K); and the cheapest homes on the tube (around £240K) are out to the east of London in Barking, Becontree, and Dagenham.

Exhibit 59: The GDP of US Cities



- This map portrays US metropolitan areas by share of GDP in 2014.
- Note how the recent oil boom allowed Midland, TX to have the largest GDP growth of any US city in 2014, a stunning 24%.



## Exhibit 60: Stock Market Heat Map



Source: BofA Merrill Lynch Global Investment Strategy, FinViz

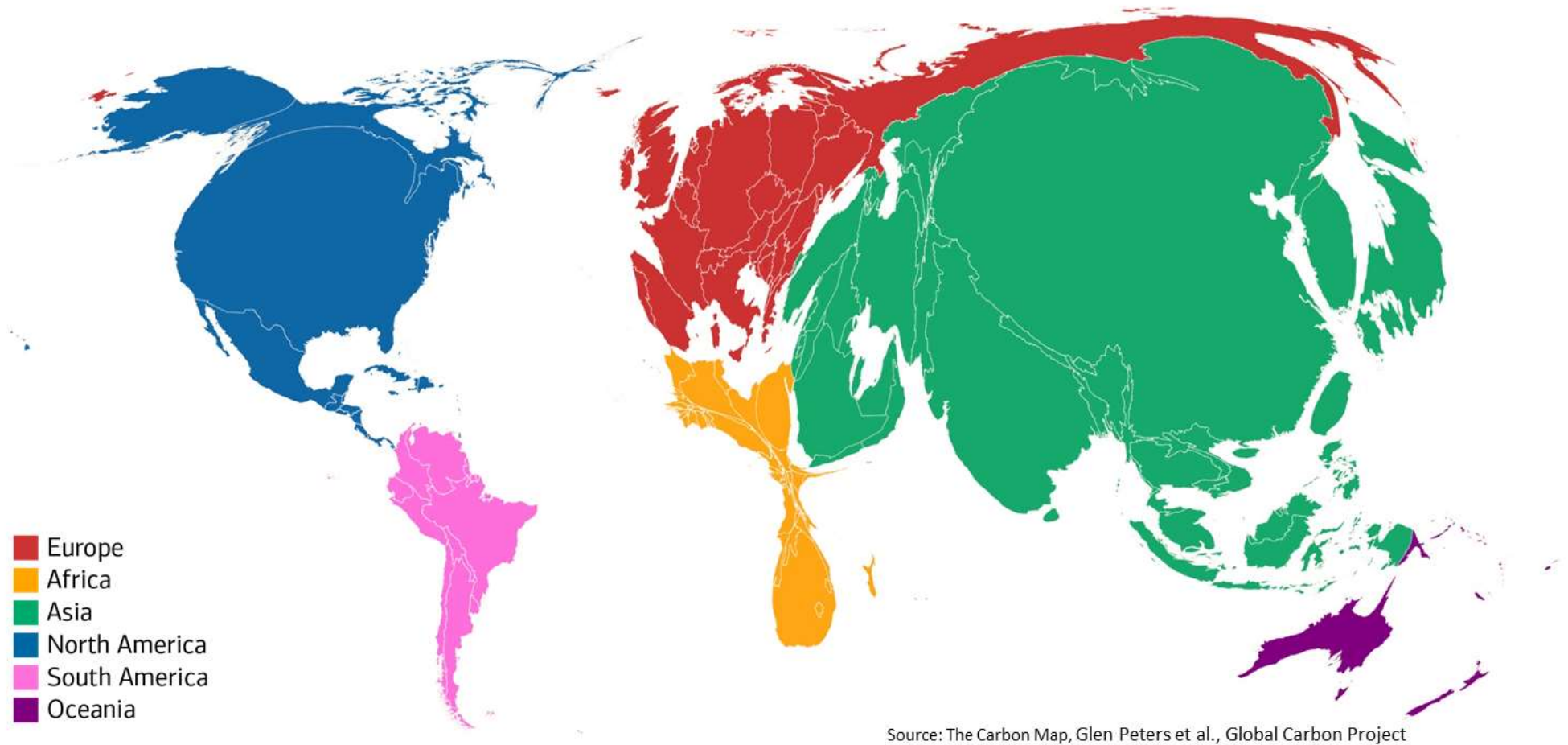


As of February 25, 2016. Note: Size of the boxes represents the size of the company market capitalizations

- The Stock Market Heat Map shows 2016 YTD returns for the sectors and companies in the S&P 500 index, as of February 25, 2016.
- The seven companies with the largest impact on the S&P 500 index YTD in 2016 are Amazon, Apple, Exxon, Chevron, Intel, Disney and Google.



Health Poverty Race Robotics The sharing economy Space exploration  
Size of Asia Cybersecurity Innovation Asia as a world power  
People gaming Government  
Religion Aging Clean tech Internet Conflict Migration Trade partnerships  
Sport Global population size Stock market Geopolitics Credit default  
Tourism Earth Carbon emissions Alternate resources ity Markets



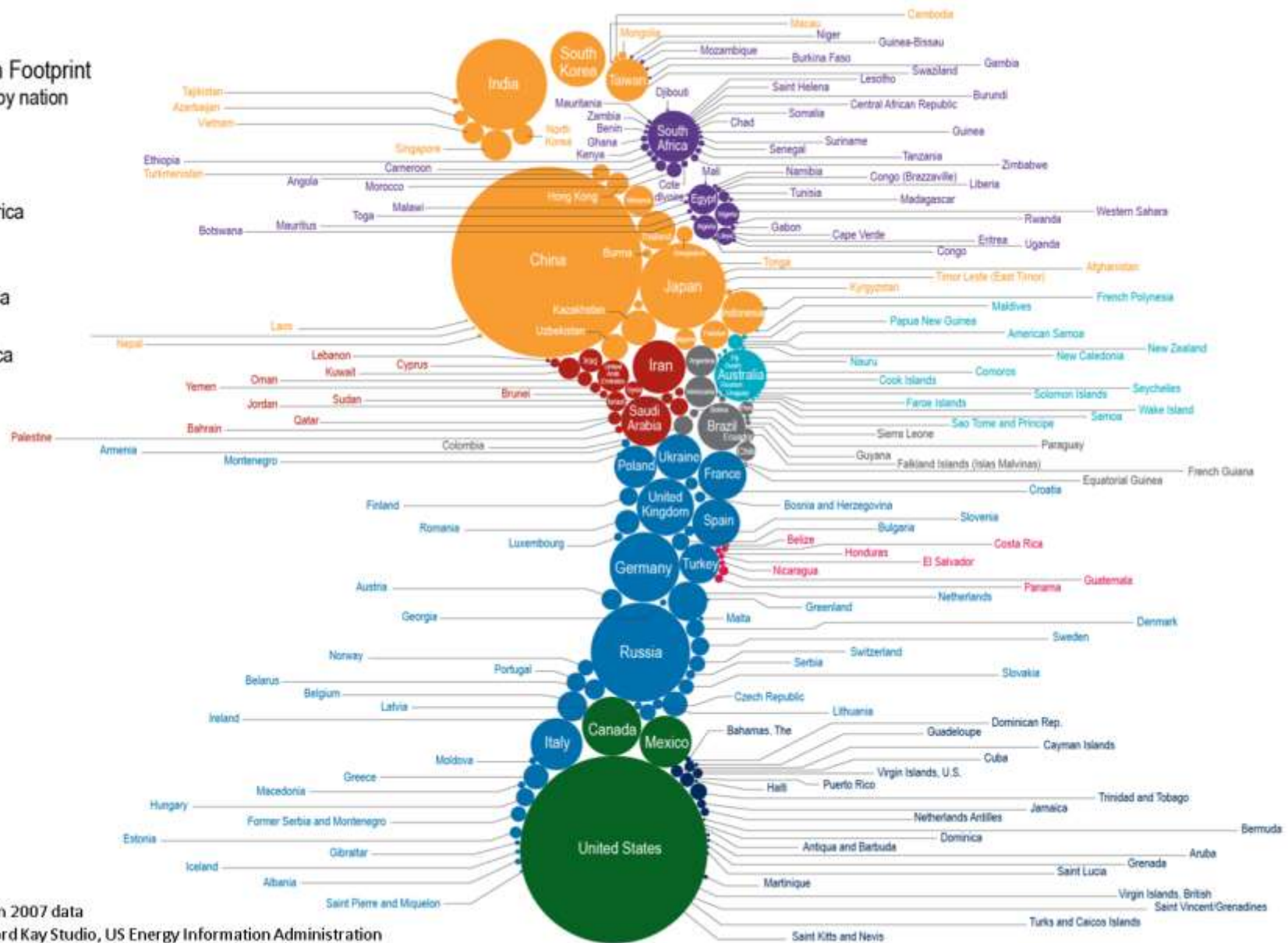
- This map resizes each country to show their annual CO<sub>2</sub> emissions in 2013.
- In recent decades, carbon dioxide emissions and climate change have become major political, social and environmental issues; weather-related economy-losses have averaged \$200bn p.a. in the past 10 years.
- Renewables are likely to take the lion's share (65%) of the \$12.2tn global investment in energy in the next 25 years; solar is expected to account for \$3.7tn (30%), wind \$2.4tn (20%) and fossil fuels \$2.6tn (a much-reduced 21% share).

Exhibit 62: **The World's Carbon Footprint**

**Global Carbon Footprint**

Total emissions by nation

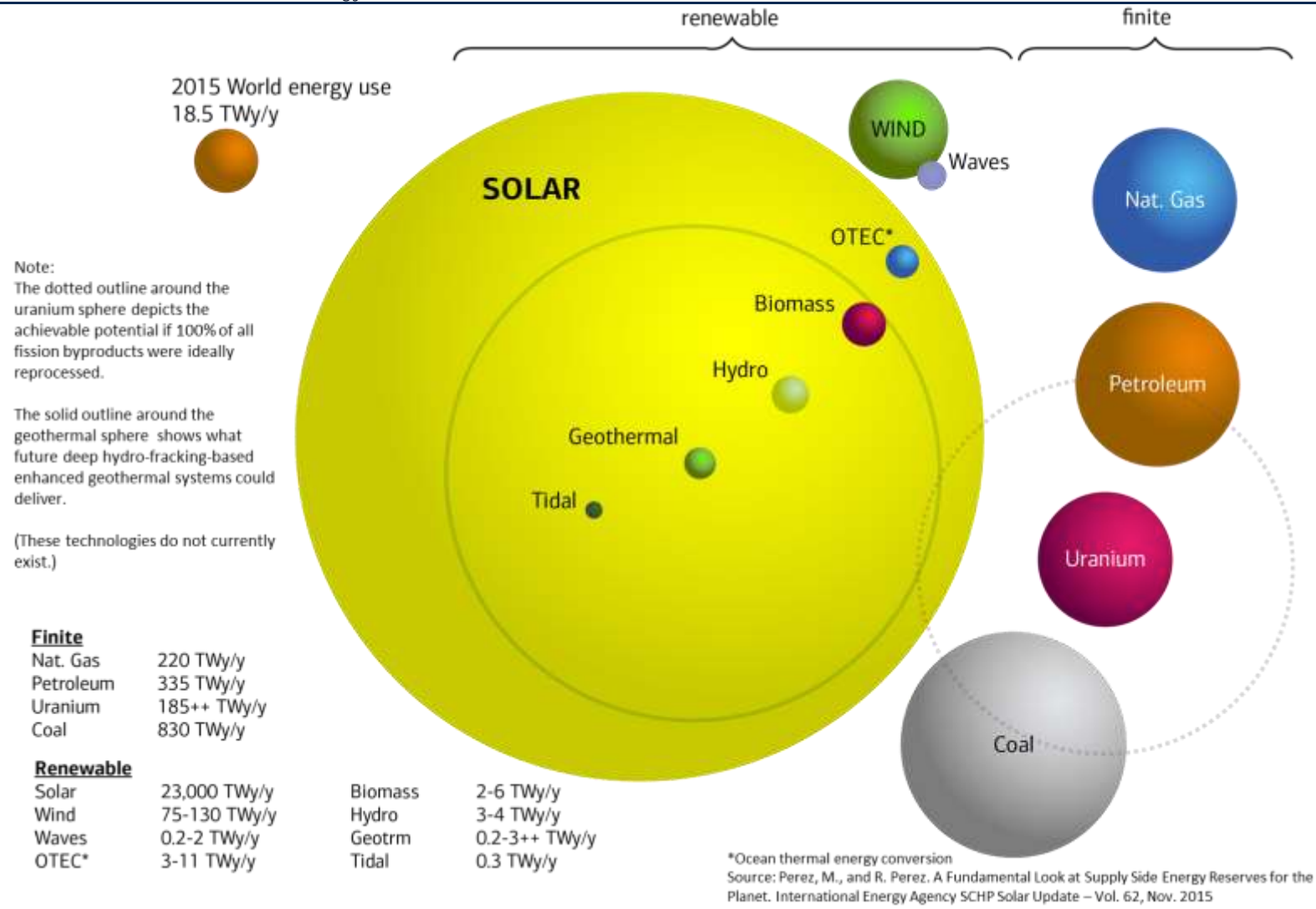
- Africa
- Asia
- Caribbean
- Central America
- Europe
- Middle East
- North America
- Oceania
- South America



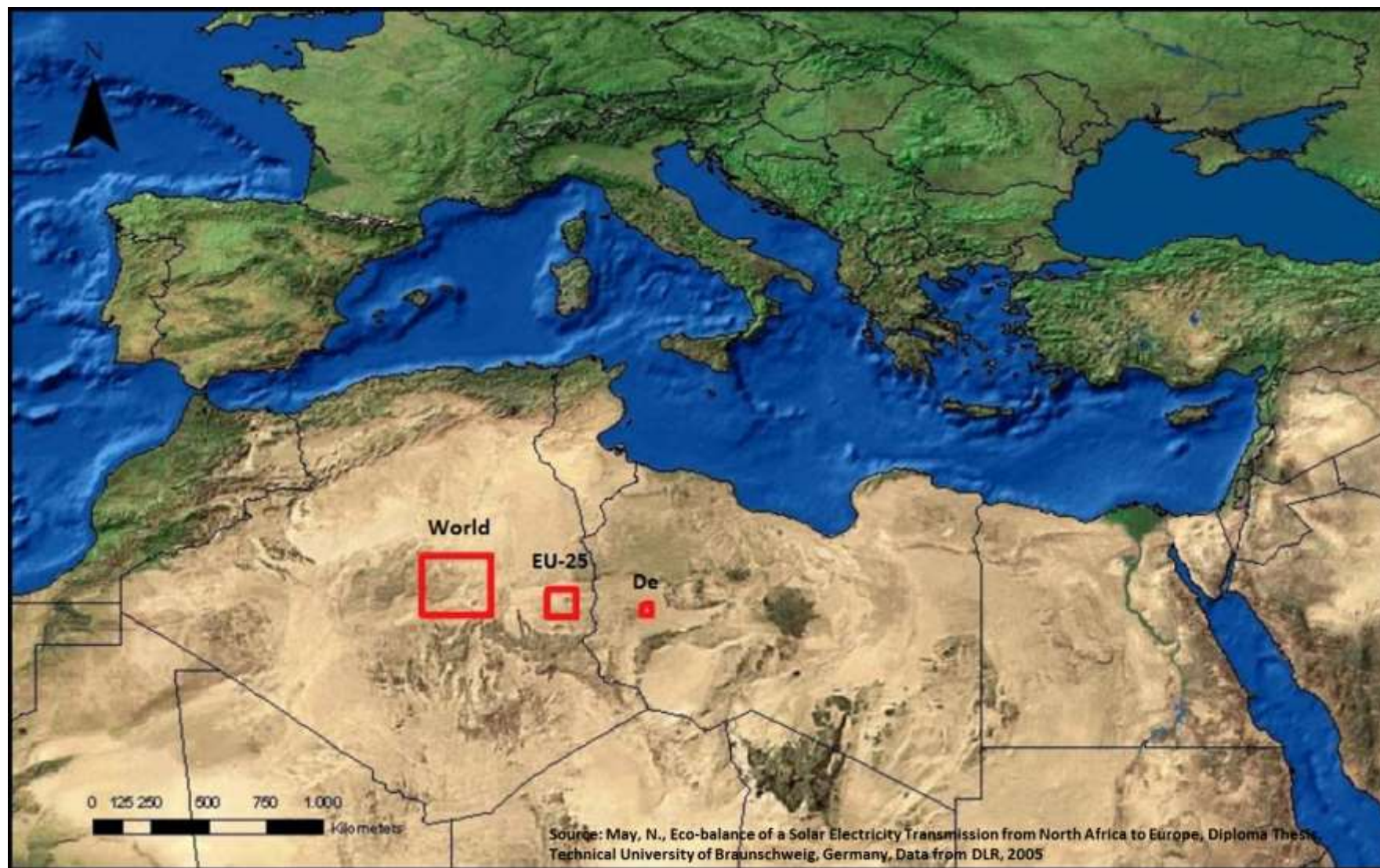
- Half of all carbon dioxide emissions from fossil fuels have occurred since the mid-1980s.
- In 2014, China was the largest producer of carbon dioxide emissions at 27.5% of the global total, followed by the US at 16.9%.
- BofAML estimates the sectors most at risk longer term from climate change are: agriculture, energy, financial services, insurance, and travel and tourism.



Exhibit 63: Renewable vs. Non Renewable Energy, 2015



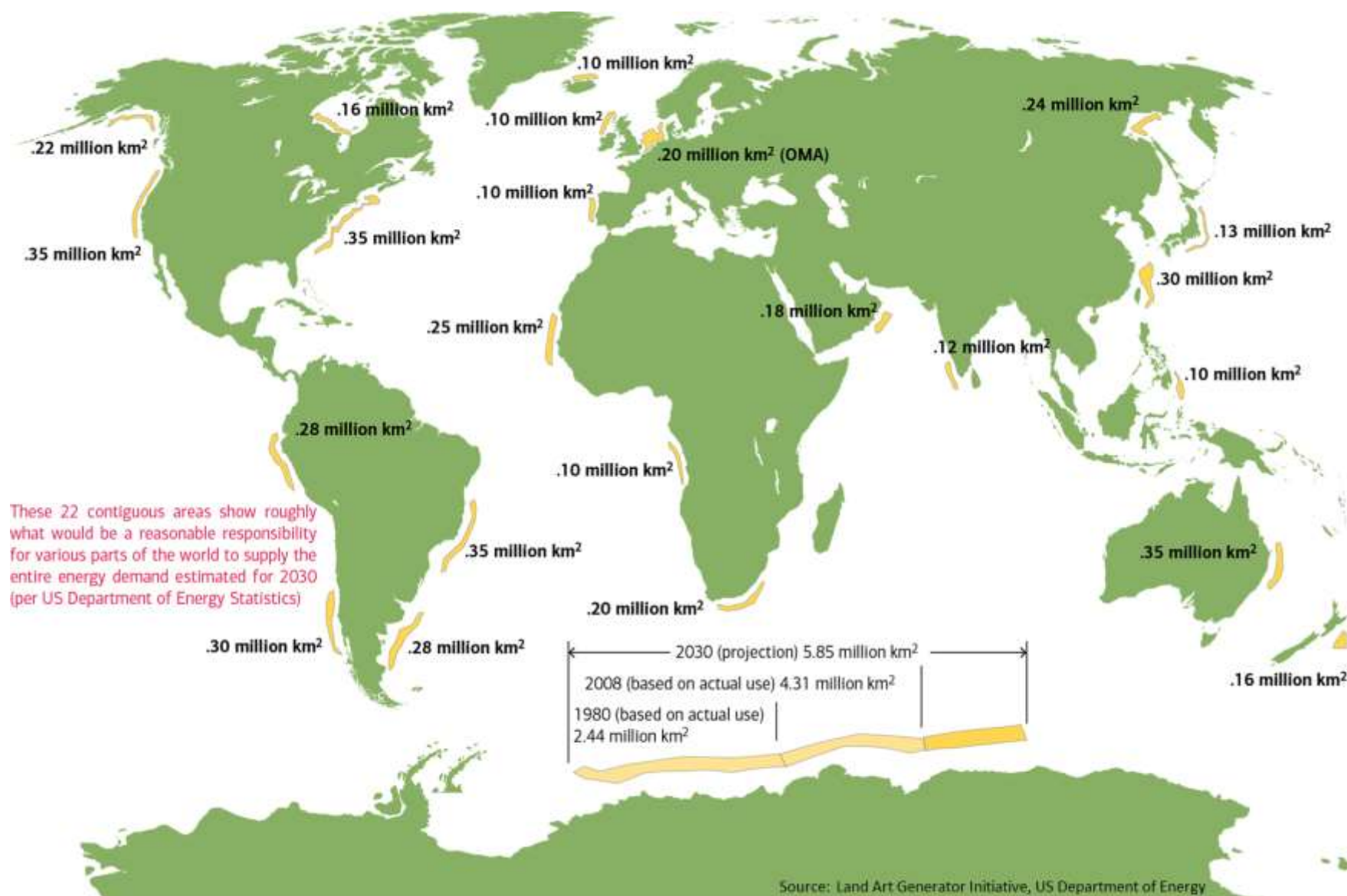
- Solar potential is vast compared to the energy reserves of the planet: the deployable potential of solar is larger than all other energy resources combined, both renewable and finite.
- This map compares the current annual energy consumption of the world to both the known reserves of finite fossil and nuclear resources and the annual potential of renewable energy sources; the volume of each sphere represents the total amount of energy recoverable from the finite reserves and the energy recoverable per year from renewable sources.
- BofAML estimates renewable energy now accounts for 50% of all new power generation and will represent 70-80% of capacity additions from 2015 to 2030; indeed by 2030, BofAML estimates low carbon energy will account for 60% of the global energy mix while fossil fuels decline to 40%



- This map shows how little space we would need to power the entire world with solar panels; the area in the red box is about 25,000 square miles, slightly larger than the state of West Virginia – the smaller red squares shows the space required to meet Europe and Germany’s demand for energy, respectively.
- BofAML forecast at least \$13.5tn in low carbon energy investments to 2030 and highlights nine entry points for investors wishing to play the climate change and low carbon solutions theme: 1) Energy Efficiency; 2) Wind; 3) Solar; 4) YieldCos; 5) Nextgen Vehicles, Batteries & Storage; 6) Nuclear; 7) Hydro; 8) Diversified Cleantech; and 9) Other Cleantech.



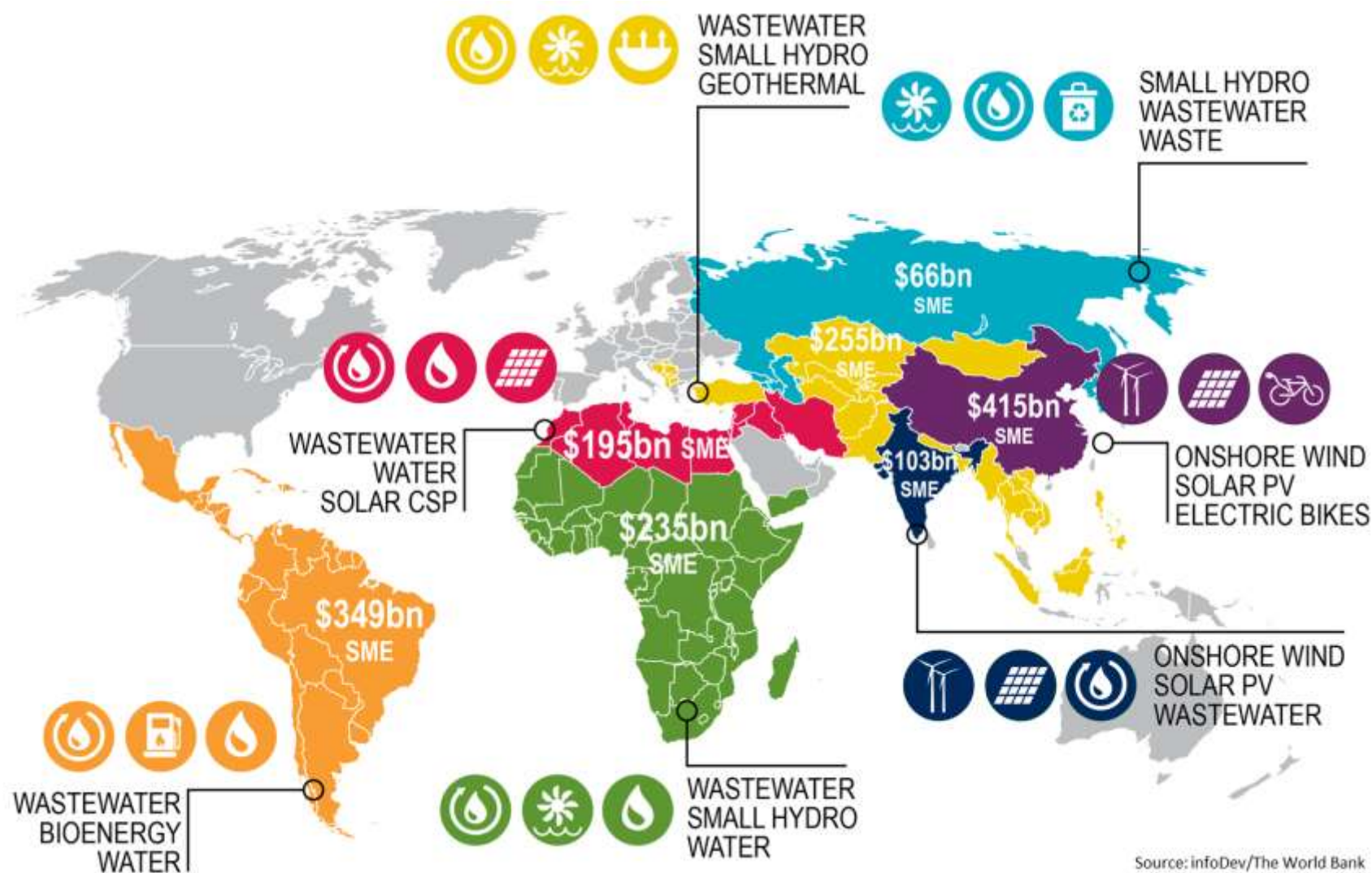
## Exhibit 65: Wind Energy



- This map shows 22 contiguous surface areas that if harnessed for offshore wind energy could supply the entire global energy demand estimated for 2030.
- The share of wind in total electricity generation has ample room to rise. In 2014 the wind share in total electricity generation output was 10% in Germany, 8.4% in Sweden, 7.2% in the UK, 4.4% in the US, 3% in China, India & France, and 1.3% in Brazil.

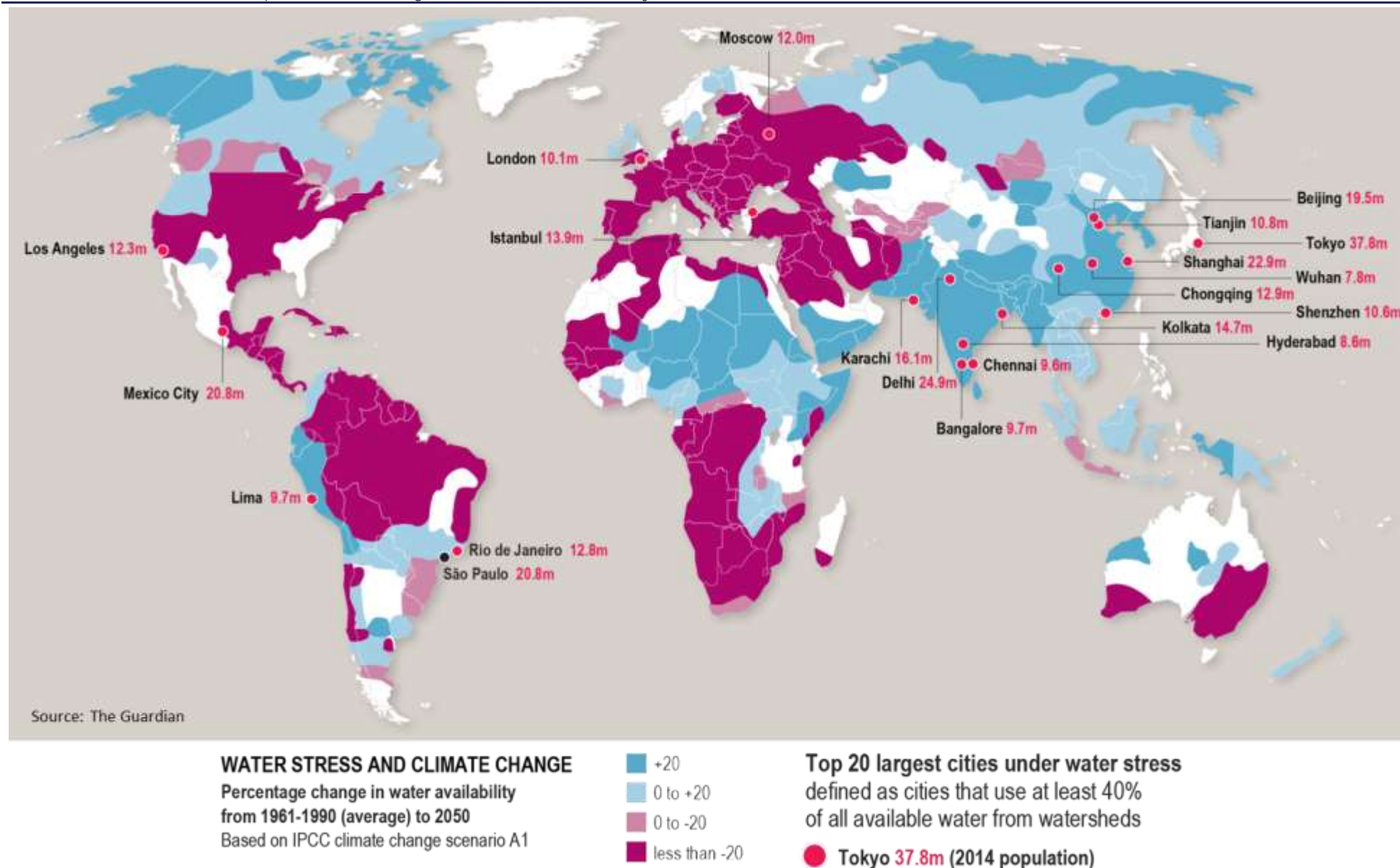


Exhibit 66: Energy Efficiency in Emerging Markets



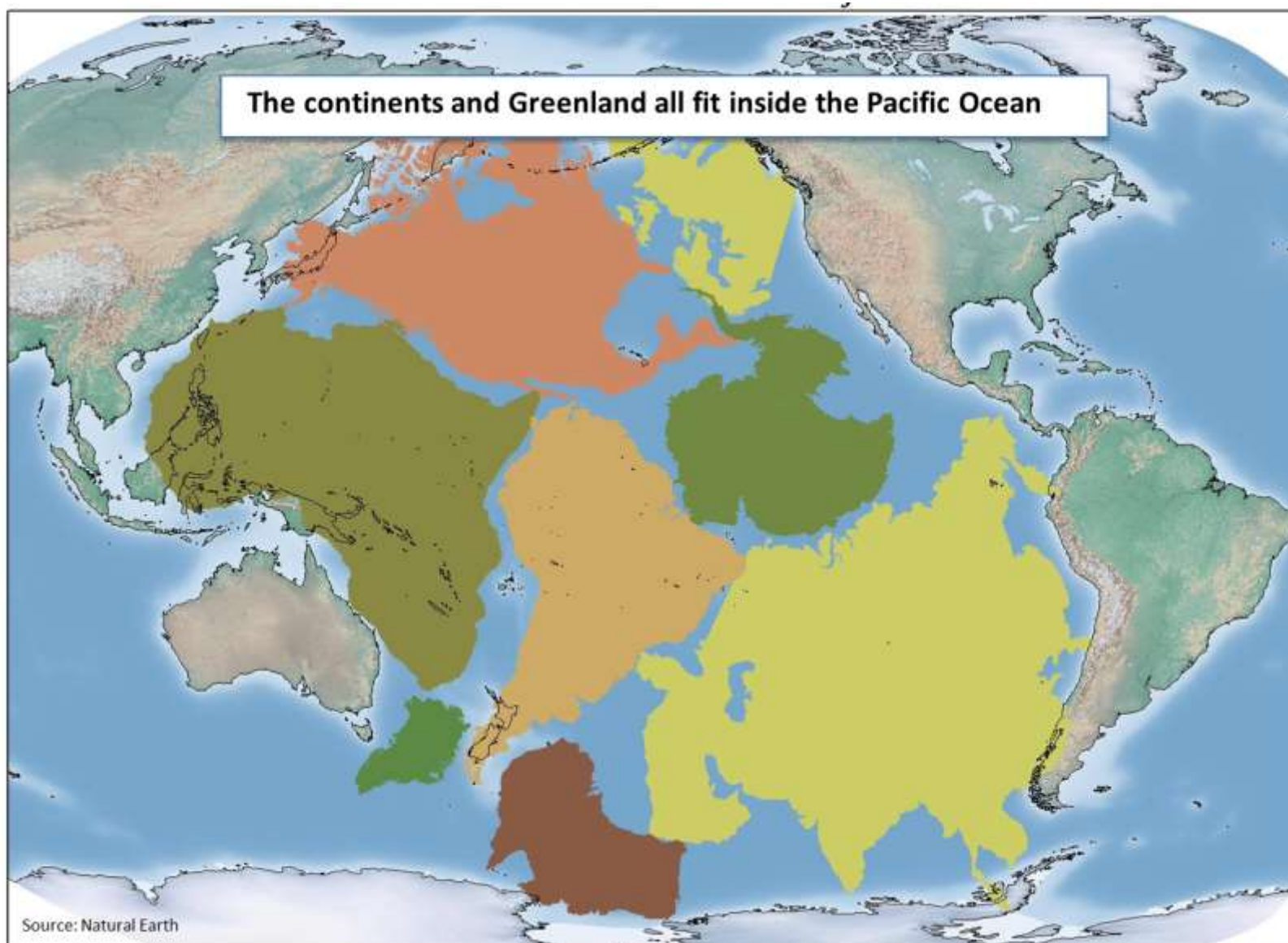
- Clean technology helps reduce carbon emissions (and reliance on the Middle East for energy supply) while technological costs are declining.
- This map shows the three fastest growing clean technologies by Emerging Market regions.
- China boasts the highest clean technology investments at \$415bn via electric bikes, wind, and solar.
- Globally, BofAML estimates clean wind and solar technology will account for 70-80% of capacity additions from 2015-2030.

Exhibit 67: Water Stress – Top 20 Cities Facing Greatest Water Stress by 2050



- Shown above are the regions and top 20 cities facing the greatest water stress in coming decades.
- BofAML forecasts that global water demand is set to exceed supply by 40% in coming decades; by 2050, 3.9 billion people could be living under “severe” water stress.

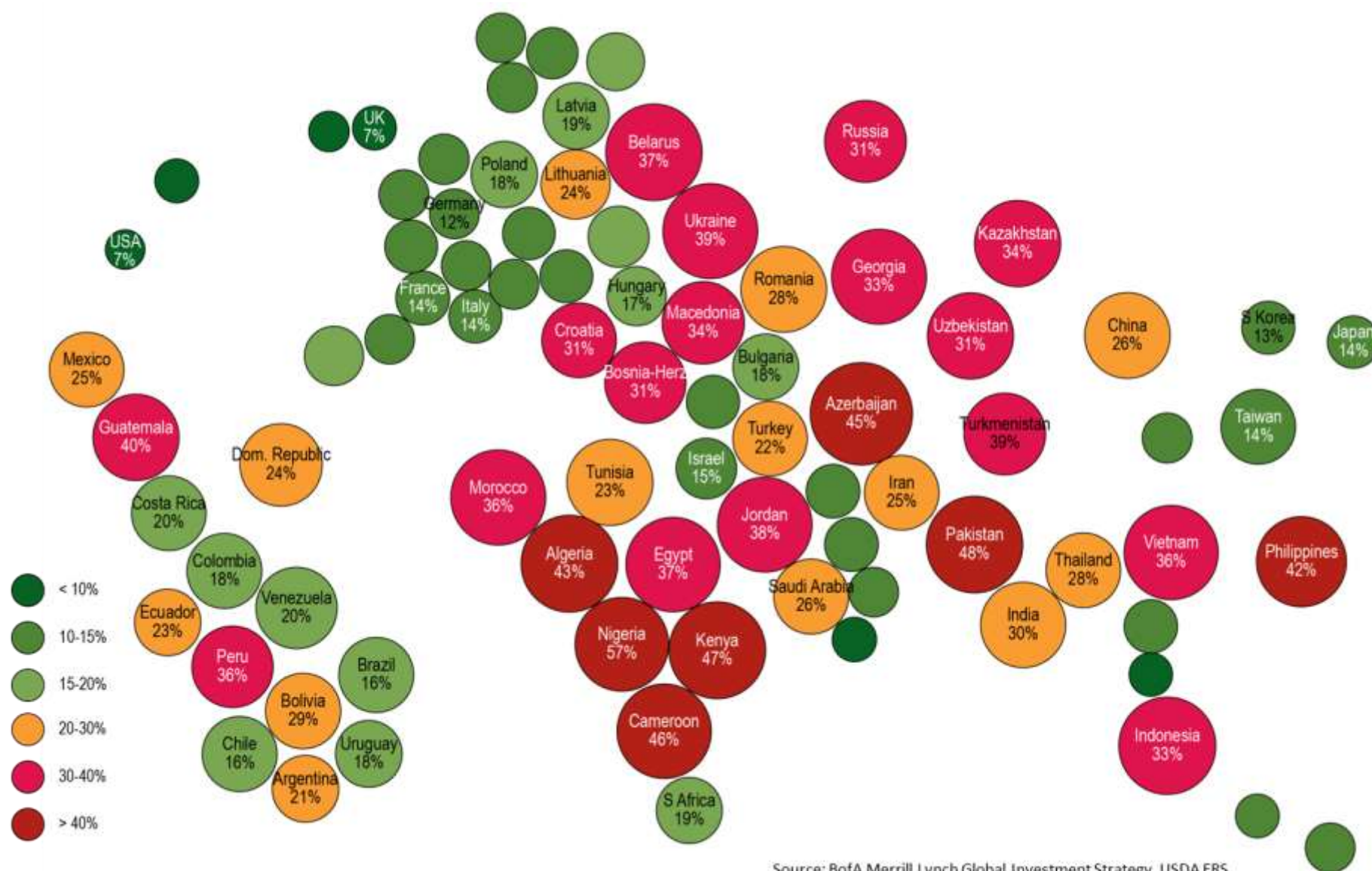




- We live in an aqueous world, with more than two-thirds of its surface covered by oceans; all of the world's continents can fit inside the Pacific Ocean.
- Forty percent of the world's population lives within 100km of a coast: smart water grids and nanotech solutions for desalination could help reduce water stress in the future.
- The UN calculates that an average annual global investment of \$198bn by 2030 could help water use become more efficient, increasing agricultural, biofuel and industrial production.

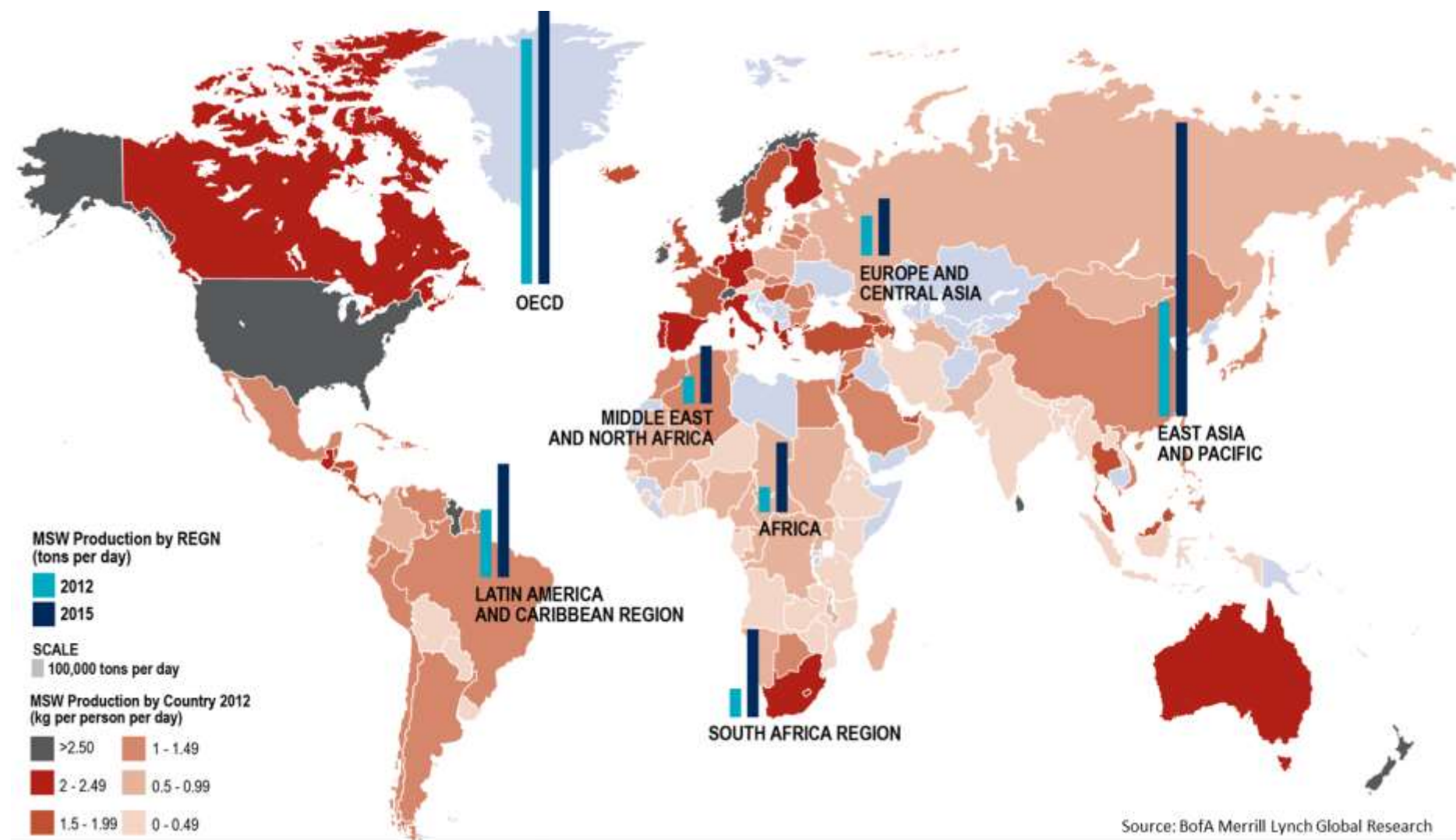


## Exhibit 69: Food Security



- Increased water stress reduces the supply of food and thus raises its cost, which is bad news for 805 million people who are already chronically undernourished.
- Populous countries such as Nigeria, Pakistan and Kenya spend a staggering 47-57% of their household expenditures on food.
- New technologies in agriculture and biotechnological advances like gene editing may enable increased production levels and yields, while enhancing global food security.

Exhibit 70: Waste – Municipal Solid Waste Production, 2012 and 2015



- Waste is another Earth theme; municipal solid waste has risen everywhere in recent years; and yet only 25% of the 11 billion tons in waste collected annually is recycled or recovered.
- Americans generate 21.5 million tons of food waste each year; composting that food would reduce the same amount of greenhouse gas as taking 2 million cars off the road.

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