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Infrastructure and the resilience dividend

Even the best planning can't always stave off an infrastructure failure when a major disruption hits. But building in resilience can help infrastructure withstand shocks or fail safely.

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In the days after Superstorm Sandy, which left unprecedented damage across New York and New Jersey, government officials and urban planners were surprised to find an exception to the devastation: Arverne by the Sea, a 308-acre housing development on the Rockaway Peninsula a few miles south of John F. Kennedy International Airport, had weathered the storm almost completely unscathed. Arverne's local supermarket—and the electricity to power it—was functioning within days of the storm, while nearby communities went without either for weeks.

It wasn't just good luck. The project's developers had taken the possibility of a storm as powerful as Sandy seriously and factored the impact of

climate change and rising sea levels into their planning and infrastructure development. From energy-absorbing boardwalks and storm-water systems to underground electric lines, Arverne by the Sea was built to fail more safely and rebound more quickly.

In a century when shocks like Sandy would seem to be growing fiercer and increasingly routine, we need to build more developments like Arverne by the Sea, with resilient infrastructure integrated into the design and planning of not just houses but entire cities. And we need to act quickly. In less than 30 years, more than six billion people will call a city home, two billion more than today, putting more strains on existing infrastructure

and more people in the way of rising coastal waters and increasing weather events.

But to ensure that cities can imagine, finance, and plan the infrastructure needs of tomorrow, we need to change the mind-set around infrastructure from “keeping all bad things out” to creating new kinds of capacity to respond to the challenges that will inevitably come.

The first step is to move away from responding only to the last disaster and instead anticipate future threats and changes. In 2010, for example, designers in Portland, Oregon, revisited their plans for a light-rail bridge spanning the Willamette River to ensure it could withstand higher and more rapid waters. These were costly changes, but now the bridge will be ready for whatever may come and stands as the first transportation project in Oregon’s history to be conceived and planned with future storms and weather-related incidents in mind.

No matter how much we plan for and predict major disruptions, however, infrastructure failure is sometimes unavoidable given the increasing severity of shocks and stresses to our systems. Thus the second step is to build in mechanisms for infrastructure to fail safely, minimizing the disruption that can ripple across systems. We saw this need in New York City during Superstorm Sandy. The electric grid was too networked, so when one part of the system went down in a fantastic explosion, the entire lower half of Manhattan went with it. As a cochair of the New York State 2100 Commission, our recommendations to New York governor Andrew Cuomo included smart-grid technology, which is designed to decouple and delink parts of the electric grid. Now, the local utility

Consolidated Edison is installing this kind of technology, including smart switches, which can isolate areas where a disruption occurs and limit widespread failure during future outages.

The third step to adopting more resilient capacity is to expand the expectation of who pays for infrastructure. Traditionally, this has been viewed as solely the realm of government. But the resilience of a business, and indeed an entire sector, is intertwined with the resilience of its community. The private sector has a clear interest and responsibility to put skin in the game.

One way to attract more private-sector capital is through infrastructure banks, like the one Mayor Rahm Emanuel has implemented in Chicago. Farther west, a partnership of government, community, business, and nonprofit groups from Washington, Oregon, California, and British Columbia has established the West Coast Infrastructure Exchange, aimed at strengthening financing for public–private projects that cross jurisdictions. The Rockefeller Foundation has supported both initiatives.

Another way is to better integrate infrastructure projects for public good with the needs of the private sector. To this end, we teamed up with the White House, the US Conference of Mayors, and innovators in the private sector to fund an initiative called RE.invest, which is supporting eight US cities to establish a new form of public–private partnerships that will help them package portfolios of investments aimed at building more resilient infrastructure. With the help of leading engineering, law, and finance firms, the cities will be able to use public resources more efficiently to leverage private investments—for example, in better storm-water infrastructure.

In this way, infrastructure investments can achieve multiple wins, or what we call the “resilience dividend.” Simply stated, this means financing, planning, and implementing solutions that help cities, systems, institutions, and people rebound more quickly from disaster if and when it hits and help spur economic development, job creation, environmental sustainability, and social cohesion between shocks. For example, the effort to create and maintain green infrastructure will necessarily spur the expansion of education and employment opportunities for a new generation of highly skilled workers.

To help more cities realize the resilience dividend, The Rockefeller Foundation launched the 100 Resilient Cities Centennial Challenge in 2013. Some 400 cities applied to become one of the first

to be selected, showing a clear appetite for these solutions. The cities will receive access to a suite of services and support to develop a resilience plan and hire a chief resilience officer to implement it. Infrastructure will be a central component, and the foundation’s platform will help cities access private-sector financing for resilience-infrastructure projects as part of their strategy.

If the recent series of disasters, from superstorms to typhoons to earthquakes, has a lining, it’s not silver, but gray and green—the colors of the infrastructure that must be built and supported in order to weather the shocks and stresses of this century. By changing our mind-sets, we can ensure that the survival of Arverne by the Sea is no longer an exception to the rule, but a harbinger of things to come. ○