US Infrastructure at Risk

by

Phil Rasmussen

> The FBI issued a warning that China has successfully accessed companies throughout the US energy, telecommunications, water, and gas/oil pipeline industries.

What do we mean when we talk about the US Infrastructure? According to FEMA, infrastructure is "the basic physical systems of a business, region, or nation and often involves the production of public goods or production processes." While not a very good definition, FEMA gives examples of infrastructure that include: transportation systems, communication networks, sewage, water, and school systems. Investopedia provides a discourse which better defines the term and its attributes. Included is a discussion that differentiates between hard and soft infrastructure.

Examples of Hard Infrastructures	
Transportation • Airports • Air traffic control • Heliports • Ground support facilities • Bridges – beam, cable, arch, railroad • Trains – tracks, lines, stations • Tunnels/subways • Roads • Tunnels • Bus transit Telecommunications • Telephone wires, cable, and poles • Internet • Satellites • Mobile network towers • Radio/television broadcast systems Power and energy • Electric power grid networks • Nuclear plants • Gas/oil pipelines	Waste management • Landfills • Treatment plants • Recycling facilities • Storage facilities • Solid and hazardous waste transport • Wastewater facilities Recreation facilities • Public parks and playgrounds • Public beaches • Historical sites • Nature reserves • Public bathrooms • Picnic areas • Public parking areas Ports, and harbors • Breakwaters • Quays and wharves • Navigation • Cargo handling systems • Docks and berths

- Gas, oil, and coal power plants
- Renewable energy (hydro-electric, wind, biofuels, and solar power) power plants

Water

- Main water lines
- Wells
- Pumping stations
- Treatment plants
- Septic tanks
- Storm water control systems
- Roadside gutters
- Dams and levees

Waste management

- Landfills
- Treatment plants
- Recycling facilities
- Storage facilities
- Solid and hazardous waste transport
- Wastewater facilities

Recreation facilities

- Public parks and playgrounds
- Public beaches
- Historical sites
- Nature reserves
- Public bathrooms
- Picnic areas
- Public parking areas

Ports, and harbors

- Breakwaters
- Quays and wharves
- Navigation
- Cargo handling systems
- Docks and berths
- Piers
- Channel Harbors
- Terminal and intermodal transportation
- Cranes
- Piers
- Channel Harbors
- Terminal and intermodal transportation
- Cranes
- Storage and warehouses
- Tug and maintenance boats

Health and welfare

- Mechanical systems
  - Electrical systems
  - HVAC
  - Water distribution systems
  - Waste management
  - Oxygen and gas systems
  - Fuel storage and distribution
- Information technology
  - Digital and data infrastructure
  - Digital healthcare
  - Remote monitoring
  - Telehealth
  - Integrated technologies
  - Mobile health.
- Medical equipment
  - Medication handling and distribution
  - MRIs, CT
  - Surgical rooms
  - Diagnostic equipment
- Sustainable supply sources
- Flexible facilities
- Infection Control
  - Isolation units
  - Negative pressure rooms
  - Digital communications
  - HVAC
- Pharmacy
  - Ventilation
  - Waste disposal
  - Security systems
- Integrate automation for daily tasks
- Building
  - Wind damage
  - Water infiltration
  - Roofing, walls, windows

• Storage and warehouses • Tug and maintenance boats <u>Water</u> • Main water lines • Wells • Pumping stations • Treatment plants • Septic tanks • Storm water control systems • Roadside gutters • Dams and levees	○ Transportation facilities ○ Security systems ○ Utilities • Water ○ Potable and sterile water ○ Medical equipment ○ Hand washing stations • Patient care ○ Mobility systems ○ Hazmat & waste control ○ Isolation systems ○ Suicide prevention systems

Soft infrastructure includes non-physical systems. These typically involve the human capital necessary to maintain certain services to the population but also include other identifiable systems such as software and monetary systems. This type of infrastructure includes:

- Healthcare workers
- Law enforcement officers
- Teachers
- Construction workers
- Social welfare systems
- Financial & monetary system
- Computer programs

For decades, we have been warned that the US infrastructure is in need of repair. The warnings have exponentially increased since the World Wide Web was initiated in 1993. Until recently, most of the warnings have called for upgrading our physical infrastructure.

As early as 2009, state enemies of the US (Iran, North Korea, Russia, China, etc.) and terrorist groups have incorporated cyber warfare in their efforts to destroy America. Cyber warfare is the use of computer network systems to intentionally disrupt, damage, or destroy any segment of a nation's infrastructure. [Fortinet] As American infrastructure grew and new technology was introduced to manage it, the private and government sectors did not recognize the importance of securing both physical and technological aspects as single entities. In other words, the physical security of facilities and computer security were not integrated. This is the reason why hackers have been so successful in attacking US infrastructure.

Since most of the nation's critical infrastructure is privately owned and, to a limited degree, overseen by government, there needs to be seamless cooperation between both sectors. In addition to increased cooperation, computer network systems need to be separated with limited access to other systems. For example, there should not be any Internet connection available on any system used to control water supply systems. Also systems need to be segregated. For example, water supply systems need to be separate from waste water processing systems, or if combined, have no external access beyond what the combined system controls.

While cyber warfare is the current focus for protecting our infrastructure, it should not be the only focus. Natural disasters such as hurricanes Katrina, Helene, and Milton had seriously impacted regional infrastructure. Similarly, wildfires, earthquakes, other climatic events and man-made disasters such as train derailments and collapsing bridges, have also impacted regional infrastructure.

While natural and man-made disasters have a great impact on the hard infrastructure regionally and nationally, the soft infrastructure is also at risk with uncontrolled population increases due to illegal migration and increased availability of illegal drugs and crime. Just as enemy states and terrorist groups use cyber warfare to attack America, they also use these other means to attack the wellbeing and soul of our American people.

There is no doubt that our nation and its people are under attack on all physical and social fronts. There is also no doubt that our government is woefully unprepared combat these threats and attacks. And there is no doubt that our enemies are not only working outside our nation but also within.

According to the Council of Foreign Affairs, the quality of our infrastructure has been falling for the past couple of decades and ranks at the bottom of the G20 countries. While politicians keep promising to upgrade our infrastructure little has been done. This is not only the fault of politicians but also the fault of the people. For example when people refuse to vote for infrastructure repair and advocate for social programs that affect some small group, the monies are redistributed accordingly. For example, in one area of the country, the public continuously voted against removing the underbrush in valleys and other places in order to reduce or better control wildfires, and instead voted for social reforms that did little. And then were amazed at how big the wildfires got and the damage they caused, all of which could have been minimized or eliminated.

There are two paths ahead. . .

The path not taken for ages—revitalizing US infrastructure — will require courage and compromise. But it leads toward renewal, prosperity, and security.

The current path—neglecting US infrastructure — is easy and dangerous. It leads toward unpreparedness, fragility, and decline.

The choice is simple: the city on the hill can shine again, or the world can watch as its lights go out.

Jonathan Hillman