WATER RESILIENCY

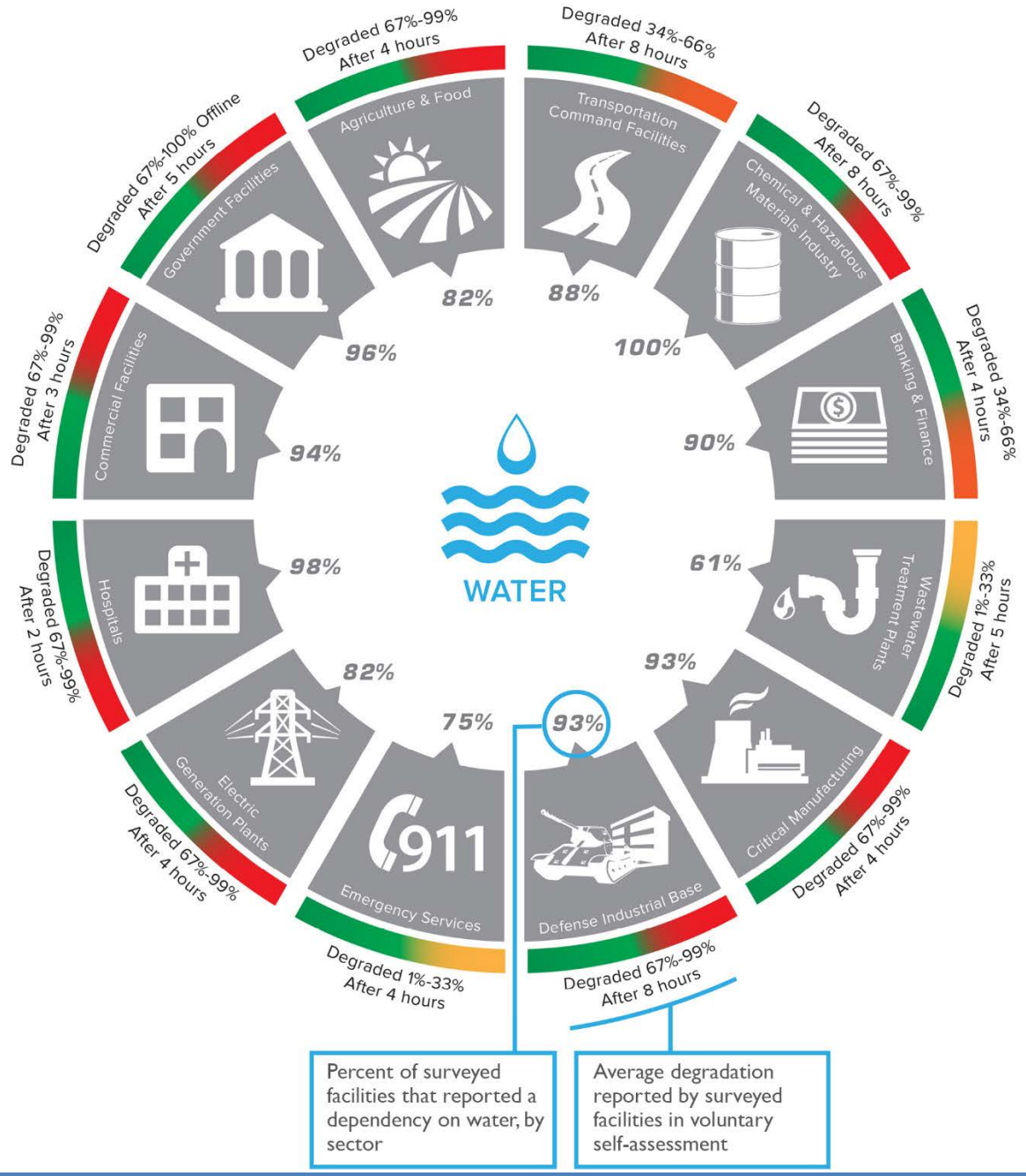
1/17/2019

Mission of National Infrastructure Advisory Council

- NIAC was created by President Bush after 9/11 to bring key infrastructure sectors together to assess vulnerabilities, and identify solutions.
- Joan McDonald was appointed in August 2015 by President Obama to the council.
- In 2016 the White house asked NIAC to undertake a water resiliency study
- The goals of the study were to:
  - Assess security and resiliencies in the water sector
  - Uncover key water resiliency issues
  - Identify potential opportunities to address issues

Challenges of the Water Sector

- Community water systems are not typically connected to adjacent systems, unlike electricity and transportation infrastructure, which are interconnected into national networks.
- Roughly 85% of all water and wastewater systems are publicly operated by municipalities and most are small; more than 80% of community water systems and publicly owned treatment works serve populations of less than 3,300.
- Most state and municipal decision-makers are constrained by long-held expectations by customers for water as a low-cost, affordable service that does not account for true life-cycle costs.
- Nearly all water infrastructure assets are out of sight and historically reliable.
- Like other sectors, water has an aging infrastructure that requires massive reinvestment. The estimated national investment gap ranges from about $400 billion to nearly $1 trillion to maintain current levels of water service.
- Unlike the Energy and Transportation Sectors, which each have a Federal department and Cabinet position dedicated to their sectors and infrastructure, water has no corresponding Federal department dedicated to its sector.


WATER
Agriculture & Food
82%
Degraded 67%-99%
After 4 hours
Transportation
Command Facilities
88%
Degraded 34%-66%
After 8 hours
Chemical & Hazardous
Materials Industry
100%
Degraded 67%-99%
After 8 hours
Banking & Finance
90%
Degraded 34%-66%
After 4 hours
Wastewater
Treatment Plants
61%
Degraded 1%-33%
After 5 hours
Critical Manufacturing
93%
Degraded 67%-99%
After 4 hours
Defense Industrial Base
93%
Degraded 67%-99%
After 8 hours
911
Emergency Services
75%
Degraded 1%-33%
After 4 hours
Electric
Generation Plants
82%
Degraded 67%-99%
After 4 hours
Hospitals
98%
Degraded 67%-99%
After 2 hours
Commercial Facilities
94%
Degraded 67%-99%
After 3 hours
Government Facilities
96%
Degraded 67%-100% Offline
After 5 hours
Percent of surveyed facilities that reported a dependency on water, by sector
Average degradation reported by surveyed facilities in voluntary self-assessment

WATER SECTOR SNAPSHOT

ASSETS & INFRASTRUCTURE

Water Supply

There are approximately **153,000 Public Water Systems** (PWSs) in the United States. PWSs provide **water for human consumption** through pipes and other constructed conveyances.

Community Water Systems (CWS)

A CWS is a PWS that provides residential water. **Less than 20% of CWSs serve 92% of the population that receive water from CWSs.** The remaining 8% of the population are served by CWSs that serve less than 3,300 people. The majority of CWSs are publicly owned. About 16% are privately owned and about 2,000 government entities contract with private companies. **There are more than 51,000 CWSs in the United States.**

Non-Transient Non-Community Water Systems

Schools, factories, office buildings, and hospitals that have their own water systems fall under this category. There are more than 18,000 of these systems.

Transient Non-Community Water Systems

Gas stations, campgrounds, or other places where people do not remain for long periods of time. There are approximately 84,000 of these systems.

Wastewater

Wastewater is predominantly treated by publicly owned treatment works. There are a small number of private facilities such as industrial plants.

Publicly Owned Treatment Works (POTW)

There are more than 16,500 POTWs in the United States. These systems provide wastewater service and treatment to more than 227 million people. POTWs are generally designed to treat domestic sewage, but some receive wastewater from industrial users. 79% of POTWs treat less than 1 million gallons per day and provide treatment to less than 23 million people (approximately 10% of the population served by POTWs).

Combined Sewer Systems (CSSs)

CSSs collect stormwater, domestic sewage, and industrial wastewater in the same pipe to transport it to a wastewater treatment facility. In general, CSSs have not been constructed since the mid-20th century and many existing CSSs are looking for ways to separate stormwater and wastewater. **CSSs serve approximately 40 million people in 772 communities.**

ELEMENTS OF WATER SERVICES

Water and wastewater utility assets can be characterized as physical, cyber, and human. The extent of these assets varies dramatically by utilities.

Physical

- Pipes and Related Components for Collection and Conveyance
- Treatment Facilities
- Distribution/Discharge Systems
- Sensors and Monitoring Systems

Cyber

- Industrial Control Systems
- Process Systems and Operational Controls
- Enterprise Systems

Note: Individual drinking water utilities will differ in the types of components used;

Human

- Personnel Availability and Capabilities
- Workforce Training and Education
- Vendors and Contractors

NIAC Water Study Findings

- Poor Understanding of the Criticality of the Water Sector
- Inadequate Valuation of Water Services
- Wide Disparity of Capabilities and Resources
- Significant Underinvestment in Water Sector Resilience
- Fragmented and Weak Federal Support for Water Resilience
- Regional Collaboration Not Broadly Applied

Recommendations

- The Council recommends the following steps to improve resilience in the Water Sector:
  - Analyze and map the complex risks of major water disruptions and develop mitigations.
  - Fortify Water Sector response and recovery capabilities
  - Increase Federal funding, investment, and incentives to improve water infrastructure resilience.
  - Increase technical and financial resources and expertise available to the Water Sector.
  - Strengthen Federal leadership, coordination, and support for Water Sector resilience.