NOAA's National Climatic Data Center Sectoral Engagement Fact Sheet

CIVIL INFRASTRUCTURE

OVERVIEW

Infrastructure systems, such as buildings, schools, roads, bridges, water lines, sewage systems, communication systems, and power plants, are a fundamental part of daily life. Both rapid and gradual climate changes can affect these systems and have significant impacts on society. Extreme weather events, such as floods, droughts, hurricanes, and tornadoes, can heavily damage infrastructure, creating large clean-up and rebuilding costs. Heavy rains can overwhelm sewer and storm-water systems. Droughts can cause water shortages. Gradually changing temperatures can affect energy costs and air quality, as well as water quality and availability over time. A rising sea level will affect how and where new infrastructure is built in low-lying coastal areas and whether existing infrastructure needs to be relocated or redesigned. Facilities and systems can be designed, built, operated, and regulated to withstand, manage, or harness the impacts of weather and climate. Areas with high winds may be ideal for wind farm construction. Many different groups are involved in setting and regulating standards, designing and constructing various buildings and systems, operating and managing these facilities and systems, and providing insurance. Having access to pertinent long- and short-term weather and climate information is critical for these purposes.

KEY STAKEHOLDERS

NOAA's National Climatic Data Center (NCDC) works with various groups, both as an information provider and as an applied research partner, to examine the effects of weather and climate on civil infrastructure. This type of information can help engineers and decision makers within the civil infrastructure sector make practical decisions in order to adapt to climate changes and variations and to mitigate possible effects. There are many different government and non-governmental organizations, and public and private groups and businesses that can benefit from using relevant climate and weather-related information. Some major groups include:

- Federal regulatory, environmental, and water resources agencies
- State natural resource and transportation departments
- State environmental agencies
- County and city governments
- Academia and other researchers
- Insurance companies
- Corporations that contribute in various ways to infrastructure facilities and systems
- Professional societies and trade groups

SECTOR NEEDS

Climate information is often available only as raw observations or in the form of tables, graphs, or written summaries, which may be difficult for users who are not well-versed in climate science to fully interpret. To bridge this gap, NCDC is partnering with groups within the industry to translate climate data into accessible, useful, and accurate products; and to leverage NCDC's climate expertise to better understand what the information means and how it can be used most effectively.

Climate information can be used in a variety of ways. Some examples are listed below:

- Using climate data to design and construct buildings to withstand hurricane-force winds.
- Using historic precipitation data to build roads above potential flood levels.
- Using maximum precipitation data for designing and constructing dams.
- Using hourly and daily temperatures to determine averages and frequency distributions, such as cooling and heating degree days, to design appropriate heating, cooling, and refrigeration systems.
- Using ice thickness (due to freezing rain) for structural design consideration.

NCDC DATA AND PRODUCTS

There are many different types of useful climate information available. Some examples include:

- Surface observations made at thousands of locations across the globe, for hourly, daily, and monthly averages.
- Summaries produced from data, such as temperature frequency distributions.
- *Dynamic Normals*, which provides daily and monthly averages and extremes for a given location.
- The *Air Freeze Index*, a measure of how much and how often air temperatures are above and below freezing during the winter, useful for determining if Frost-Protected Shallow Foundations (FPSF) should be utilized.
- CD-ROM/DVDs, such as the *International Station Meteorological Climate Summary* (ISMCS), which contains climatic data summaries from thousands of weather stations around the world, and *Integrated Surface Data*, which contains climate information dating as far back as 1901 for about 10,000 weather stations.
- Publications, including *Local Climatological Data* (provides a monthly summary of daily observations), *Climatological Data* (provides annual average values), *Comparative Climatic Data* (provides average and extreme values), and *Storm Data* (provides monthly reports of damaging weather).

Collaboration between climate scientists and the civil infrastructure community is essential in helping to build the necessary bridges that will transform climate science into information that is relevant and credible. Having NOAA membership on selected committees has proven to be an excellent way to improve communication and information use. Ongoing communication is important to ensure that the information that NCDC provides is appropriate and relevant to civil infrastructure needs. As climate changes in the years ahead and the effects become more noticeable, new information needs will emerge. NCDC will work closely with this sector, attending trade meetings and sponsoring future workshops and conferences, in order to better understand, address, and anticipate these needs.

Additional details about available NOAA products and the economic benefits of these products are provided at:
http://www.economics.noaa.gov

For further information on obtaining NCDC climate services and products related to civil infrastructure please contact:

Customer Services Branch
NOAA's National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801-5001 U.S.A.

828-271-4800 • TDD 828-271-4010
Fax 828-271-4876
E-mail: ncdc.info@noaa.gov
http://www.ncdc.noaa.gov

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NOAA Satellite and Information Service
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