



State of Alaska  
Governor's Climate Change Sub-Cabinet

Adaptation Advisory Group Meeting  
Meeting #7

Public Infrastructure TWG

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## Public Infrastructure

A SYSTEM TO REDUCE THE IMPACTS OF CLIMATE CHANGE ON ALASKA'S PUBLIC INFRASTRUCTURE

"The essential facilities and utilities under public, cooperative or private ownership that deliver goods and services to communities."

## PI TWG Recommendations

**A. Introduction to the PI TWG System**

**B. PI TWG Recommended State Action**  
7 Actions, 3 of which are immediate next steps

**C. Overview PI TWG Vision & Policies**

## Infrastructure is vulnerable to threats from:

- Increased flooding and erosion
- Decreased duration (cold season) and extent (warm season) of shore fast sea ice
- Increasing freeze/thaw cycles
- Changing wind and precipitation
- Increased storm frequencies and duration
- Warming and thawing permafrost
- Increased fire risk

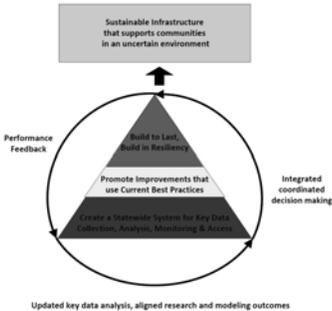
## PI TWG Vision

**Sustainable Infrastructure that supports Communities in an Uncertain Environment**

- ❖ Infrastructure is the platform upon which our society functions.
- ❖ To optimize investment opportunities, and demonstrate that the return on investment for Alaska's current and future infrastructure provides good value for the state and the nation...

**An on-going, aligned statewide effort to monitor, analyze and proactively adapt to our changing environment is required.**

## Public Infrastructure Systems Approach



Sustainable Infrastructure that supports communities in an uncertain environment

Build to Last, Build in Resiliency

Promote Improvements that use Current Best Practices

Create a Metrics System for Key Data Collection, Analysis, Monitoring & Alerts

Performance Feedback

Integrated coordinated decision making

Updated key data analysis, aligned research and modeling outcomes

## A Vision & 3 Integrated Policies - That Together Create a System

Policy	Title
Vision	Sustainable Infrastructure that supports Communities in an Uncertain Environment
PI - 1	Create a Statewide System for Key Data Collection, Analysis, Monitoring and Access
PI - 2	Promote "Current Best Practices" Improvements
PI - 3	Build to Last. Build Resiliency into Alaska Public Infrastructure. Vision

## WHAT IS THE PI TWG ASKING THE STATE TO DO?

7 recommended actions, 3 of which are immediate next steps

## 3 Immediate Next Steps

1. Designate a lead entity to integrate overall efforts, whether it is an existing or new state agency/body.
2. Focus on public infrastructure improvements that add value, regardless of future climate change (i.e. "best practices").

## 3 Immediate Next Steps – cont'd

3. **Start (continue) systematic data collection, sharing and use (hazard analysis and vulnerability assessment; trend analysis).**
  - A. Gather climatic and other relevant environmental data.
  - B. Use it to update and run prediction models to yield more accurate erosion, flood, permafrost thaw and other rates.
    - > Model predicted rates on a regional basis.
    - > Distribute results to: a) infrastructure designers and engineers, and b) municipal/tribal governments, state/federal agencies and NGOs.
  - C. Use climatic data and updated erosion (and other) rates to run regional hazard analyzes and create updated vulnerability assessments.
    - > Distribute vulnerability assessment, in usable format to municipal/tribal governments, state/federal agencies and NGOs.

## 2 "Ongoing Actions"

4. **Determine what action to take for existing infrastructure at risk.**
  - A. Assess the structure and determine whether to move or protect it.
  - B. Each case is different, but the process is the same. Use benefit/cost analysis to evaluate each alternative to determine the most attractive solution to provide resilience to withstand extreme weather events and a changing environment.
  - C. Need to coordinate this decision-making rather than leave it up individual project managers without guidelines or policy.
5. **Build and expand data collection effort.**

## 2 "Next Step" Actions

6. **Amend engineering codes so new infrastructure can be designed to withstand new forces.**
  - A. Sufficient climatic data to improve predictive models predicting conditions and expected erosion, flood, thaw and other rates.
  - B. To evaluate existing infrastructure to identify common failure modes and routinely transmit this information into the engineering design and code creation process.
  - C. Research and testing to identify which foundation types perform better in permafrost areas than others and are more resilient to climate change.
7. **Use coordinated information-sharing and decision-making to determine where to locate new infrastructure and how it should be designed and engineered.**

**PI-1. CREATE A STATEWIDE SYSTEM FOR KEY DATA COLLECTION, ANALYSIS, MONITORING AND ACCESS**  
[STEP 1: Gather Data]

- A. Standardize information to be gathered.
- B. Establish a baseline and benchmarks so that data comparison and analysis is possible....
- C. ....over time, regional geographic areas, and across agencies/parties.

**PI-1. CREATE A STATEWIDE SYSTEM FOR KEY DATA COLLECTION, ANALYSIS, MONITORING AND ACCESS**  
[STEP 2: Create & Share Information]

- A. Local hazard analysis based on up-to date regional climate data.
- B. Vulnerability assessments to rank the risk level, or vulnerability, of existing infrastructure for each region.
- C. Actionable format to facilitate sharing and use of this data by municipal/tribal governments, state/federal agencies, NGOs.

**PI-1. CREATE A STATEWIDE SYSTEM FOR KEY DATA COLLECTION, ANALYSIS, MONITORING AND ACCESS**  
[STEP 3: Plan Review]

- A. Gather and review planning documents for proposed public infrastructure.
- B. Analyze plans to eliminate conflicts for renovation, retrofit, replacement, or relocation of existing infrastructure.

**PI-1. CREATE A STATEWIDE SYSTEM FOR KEY DATA COLLECTION, ANALYSIS, MONITORING AND ACCESS**  
[STEP 4: Feedback & Improvement]

- A. Use a performance feedback loop to identify measures to adapt design criteria for public infrastructure.
- B. Use modeling to improve data alignment, scenarios, and assumptions for future infrastructure policies and plans.

**PI-2: Promote Improvements that Use Current Best Practices**

- **Focus on public infrastructure improvements that add value, regardless of future climate change.**
- **Use existing technology and data to:**
  - Protect and extend design service life of infrastructure
  - Reduce operating costs and complexity
  - Promote sustainability in the development design and construction of new infrastructure.

Standing still while waiting for improved forecasts of climate change impacts on infrastructure is not an option, therefore... promote use of current best practices.

## Examples

- The use of existing technology such as adjustable and/or mobile building foundation systems,
- Building foundations that use thermosiphons or thermopiling,
- Protecting facilities from flood or erosion damage, or
- Providing energy conservation upgrades.
- Long-term planning and preparedness,
- Building local capacity for operations and maintenance,
- Promoting energy-efficient technologies,
- Using alternative energy sources,
- Using water conservation and reuse upgrades, or
- Building with better materials.

## Actions of IAWG also exemplify this approach

### In the case of each of the 6 imperiled communities, the IAWG:

- Brought parties together, that had authority and funding, to collaborate on solutions.
- Completed overall vulnerability assessment for communities.
- Recommended a series of infrastructure improvements, tailored to each community's situation and needs, to integrate into near term plans to protect and/or extend the service life of each town site.
- Implementation of these recommendations has begun

## PI-3. BUILD TO LAST; BUILD RESILIENCY INTO ALASKA'S PUBLIC INFRASTRUCTURE

### Build Resiliency By These Measures:

1. Meet or exceed infrastructure design life.
2. Optimize life cycle costs/asset management practices.
3. Build structures to withstand extreme weather events and a changing environment. Build structures that use best science and appropriate building codes and engineering standards.

## PI TWG is recommending the State take Action Now to:

1. Designate a lead entity to integrate overall efforts, whether it is an existing or new state agency/body.
2. Focus on public infrastructure improvements that add value, regardless of future climate change (i.e. "no regrets").
3. Start (continue) systematic data collection, sharing and use (hazard analysis and vulnerability assessment; trend analysis).



*Thank You!*

<http://www.climatechange.alaska.gov/>

