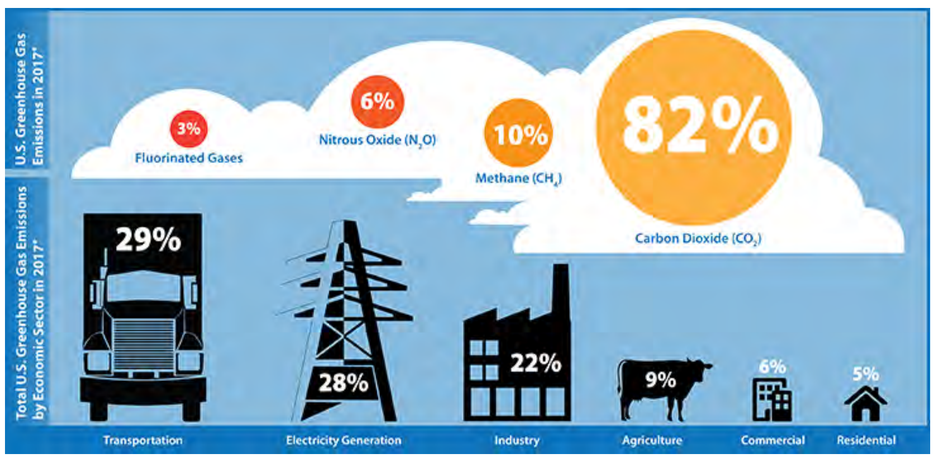
TRANSPORTATION

Background:

Massachusetts' transportation infrastructure spans every part of the state, and includes roads, bridges, tunnels, ferries, subways and commuter and long-distance rail networks. Shifting weather patterns caused by climate change may damage or disrupt this infrastructure and impair our mobility, with far reaching effects on our communities and the state's economy. Nationally, the transportation sector accounts for 29% of all greenhouse gas (GHG) emissions – recently overtaking electricity production as the number one source of GHG emissions. In Massachusetts, transportation accounts for 43% of all emissions and in Berkshire County, 39% of GHG emissions are attributable to transportation habits – the largest source of emissions. Moreover, 93% of Berkshire County's transportation emissions come from gasoline powered vehicles (7% from diesel) – primarily from personal vehicle use.

The Massachusetts legislature signed into law the Global Warming Solutions Act (GWSA) in 2008. The GWSA calls for reducing GHG emissions by 25% by 2020 and 80% by 2050 (using 1990 emission levels as the baseline). MassDOT acknowledges the importance of reducing transportation-based emissions and has set reduction targets. Metropolitan Planning Organizations (MPO), such as the Berkshire MPO, are required to evaluate and track GHG emissions resulting from projects.



General Actions:

- Planning:
  - Incorporate climate change vulnerability assessments and adaptation strategies into transportation plans.
  - Update floodplain mapping using LiDAR and climate models and utilize maps to assess future flood hazard zones for infrastructure.
  - Incorporate climate change projections into siting and design of all new transportation infrastructure and significant retrofits and repairs.
  - Plan for expansion of complete streets that accommodate biking, walking and public transit.
  - Inventory bridges and culverts that should be upsized to accommodate future expected stream flows.
- Management Practices :
  - Formulate risk-based methods to evaluate the service life of infrastructure assets in a changing climate and increase the frequency of routine inspections.
  - Build pipes, culverts, and outfalls with consideration of the potential magnitudes of future storms.
- Nature-Based Solutions (NBS) & Technology:
  - Expand use of green infrastructure such as rain gardens, swales, and porous pavement for stormwater control.
  - Stock up on replacement parts for vehicles and equipment needed for emergency weather.
- Policies / Laws:
  - Coordinate across municipal, state, regional agencies to address the vulnerability of regional infrastructure like rail networks.
  - Consider adopting design standards that account for climate change and provide trainings.
- Research / Monitoring:
  - Research and conduct pilots using resilient materials (e.g. materials that can withstand high heat) for building roads and other infrastructure.
  - Update hydrologic and hydraulic analyses, including engineering methods used in the calculation of peak flood flow rates.
- Funding Options:
  - MVP Grant Program
  - MA Small Bridge Program
  - MA Culvert Replacement Municipal Assistance Grant Program
  - MassWorks Grant Program

Climate Change Impacts & Key Hazards:

- Rising Temperatures/Temperature Fluctuations:
  - Extreme heat may cause heat stress in materials like asphalt and increase the frequency of repairs.
  - As temperature extremes fluctuate from cold to hot, these rapid freeze/thaw cycles can damage road surfaces and including heaving of roads which poses safety and maintenance issues for drivers.
- Changes in Precipitation:
  - Flooding caused by heavier downpours may damage infrastructure like undersized culverts.
  - More nuisance ponding on roads may slow commutes and commerce.
- Extreme Weather:
  - Costly damage to roads, bridges, and rail networks may occur as a result of extreme nor'easters, hurricanes, severe thunderstorms and blizzards.
  - Extensive flood damage to roads and bridges could dramatically affect commerce and public health and safety especially where alternative routes aren't available/
  - High winds could down power lines and poles adjacent to roads and homes.
  - Communities and critical facilities could be cut off after storms.

Key Hazards & Planning Horizons:

Short-term (1 - 3-year horizon):

- Precipitation:
  - Inventory road-stream crossings (culverts) in Great Barrington and identify most critical structures.
  - Begin developing prioritization methodology for addressing culverts and other roadway infrastructure assets.
  - Explore nature-based solutions (NBS) and green infrastructure approaches such as raingardens or bioswales to mitigate stormwater impacts to infrastructure and freshwater streams and rivers.
- Rising Temperatures/Temperature Fluctuations:
  - Identify roads that are susceptible to heaving/cracking due to freeze/thaw cycle.

Medium-Term (3 - 5-year horizon):

- Precipitation:
  - Finalize inventory and surveying of all road-stream crossings in Great Barrington.
  - Refine prioritization method based on priorities and begin to identify and apply for funding programs to repair/replace critical structures.
  - Identify appropriate locations for nature-based solutions and green infrastructure applications, begin exploring funding options, and apply for grant programs and/or apportion municipal budgets to fund projects.
- Rising Temperatures:
  - Develop management plan to address heaving/cracking/degradation of roadway pavement.
- Extreme Weather:
  - Identify actions to mitigate the impacts of wind damage to roads and roadway infrastructure.

Long-Term (10 + year horizon):

- Precipitation:
  - Continue funding replacements of crossing structures while updating priorities to inform decision-making.
  - Expand use of green infrastructure such as rain gardens, swales, and porous pavement for stormwater control.