Lessons Learned from Creating a Climate Resilience Scorecard

Kara Angotti, Sr. Sustainability Manager

29 July 2019

Assessing Amtrak's Resilience

- ***What***: Wharton and members of Amtrak's Climate Resilience Committee developed and ranked a list of 21 business processes affecting Amtrak's short and long-term resilience.
- ***Why:*** The metrics framework can be used as a guide for tracing Amtrak's resiliency over time, particularly after a major weather-related disruption.
- ***Outcome:*** The study helped Amtrak begin to understand the breadth of vulnerabilities across numerous functions of the organizations and identify opportunities for resiliency planning.

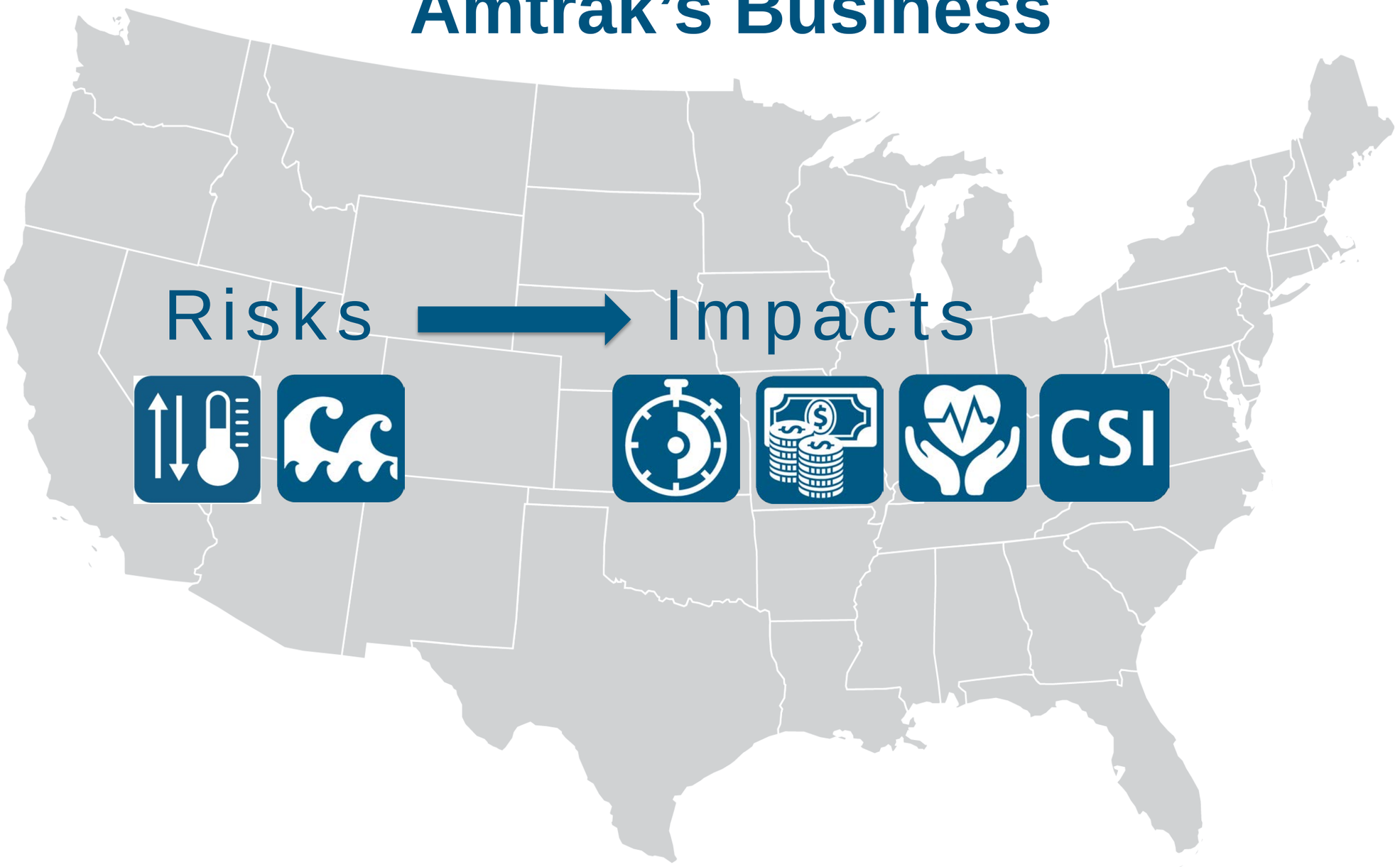
Wharton
University of Pennsylvania

AMTRAK

Resilience Categories and Actions

Physical	Organizational Preparedness	Organizational Leadership
• Maintenance (day to day) • Vulnerability assessment • Resilience design criteria	• Warnings (general public) • Communication systems • Sensors • Weather data • Backup critical information • Risk assessment and business continuity • Joint/external planning • Understanding emerging threats and new stressors • Training/drills	• Insurance coverage • Insurance information gathering • Defined response staff • Capital availability for resilient infrastructure • Operational funding for resilience • Resilient integration • Information sharing • Defined roles, responsibilities, and authorities • Leadership engagement with staff

Evaluating Risks and Impacts to Amtrak's Business



Amtrak's Climate Risks

Hazard	Risks
Extreme heat	• Track expansion • Equipment overheating • Track work bans during hot weather
Extreme cold	• Brittle or fractured tracks • Track work bans during cold weather
Heavy precipitation	• Flooding of tracks, stations, tunnels, yards, and equipment • Bridge scouring • Landslides
Winter precipitation	• Broken rail • Ice/snow accumulation on tracks • Switch failure
Wind	• Speed restrictions • Falling trees on railway and/or catenary
Sea level rise	• Long-term/ permanent track flooding

Resilience Categories and Actions

Physical	Organizational Preparedness	Organizational Leadership
• Maintenance (day to day) • Vulnerability assessment • Resilience design criteria	• Warnings (general public) • Communication systems • Sensors • Weather data • Backup critical information • Risk assessment and business continuity • Joint/external planning • Understanding emerging threats and new stressors • Training/drills	• Insurance coverage • Insurance information gathering • Defined response staff • Capital availability for resilient infrastructure • Operational funding for resilience • Resilient integration • Information sharing • Defined roles, responsibilities, and authorities • Leadership engagement with staff

Example Metrics

Resilience Activity	Description	Measurement Scale	Cost	eCSI	Safety	Org Dev	OTP
Design - Vulnerability Assessment	Vulnerability assessment has been conducted to identify if asset(s) is exposed to climate-related hazards (e.g. flooding and extreme heat.)	4 – Vulnerability assessment carried out for all climate related hazards and documentation available 3 – Vulnerability assessment carried out for all climate related hazards 2 – Vulnerability assessment carried out for some climate related hazards 1 – No vulnerability assessment carried out for any climate related hazard	X	X	X		X
Resilient Integration	Capital spending projects are systematically reviewed for potential to improve resilience.	4 - Documented and demonstrated review of resilience benefits of capital spending projects 3 - Documented review with inconsistent application 2 - Process not defined and may or may not be included in review 1 - No review of resilience benefits	X			X	

Activity by Rating

	Number of resilience activities by rating			
Outcome	Low	Medium	High	Total
Cost	5	5	4	14
Customer Satisfaction Index	2	4	2	8
Safety	3	7	6	16
Organizational development	3	5	0	8
On-time performance	3	4	2	9

Process:

Identify input metric(s) with inadequate scores → Take action to improve metrics score(s) → Improved Outcomes

Example:

18 - Resilient Integration: Capital spending projects are systematically reviewed for potential to improve resilience

20- Defined Roles, Responsibilities, and Authorities: Defined responsibilities and roles for resilience planning with regular meetings and documented process

Action: Implement capital expenditure resilience review process

Cost outcomes improved:

- Lost revenue
- Operating expenses

Kara Angotti, Senior Sustainability Manager
Kara.Angotti@Amtrak.com