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A DEPARTMENT OF HOMELAND SECURITY CENTER OF EXCELLENCE

The Business Resilience Calculator (BRC)

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Economic Resilience

- **Static Resilience:**

- General Definition: *Ability of a system to maintain function* when shocked.
- Econ Definition: *Efficient use of remaining resources* at a given point in time to produce as much as possible.

- **Dynamic Resilience:**

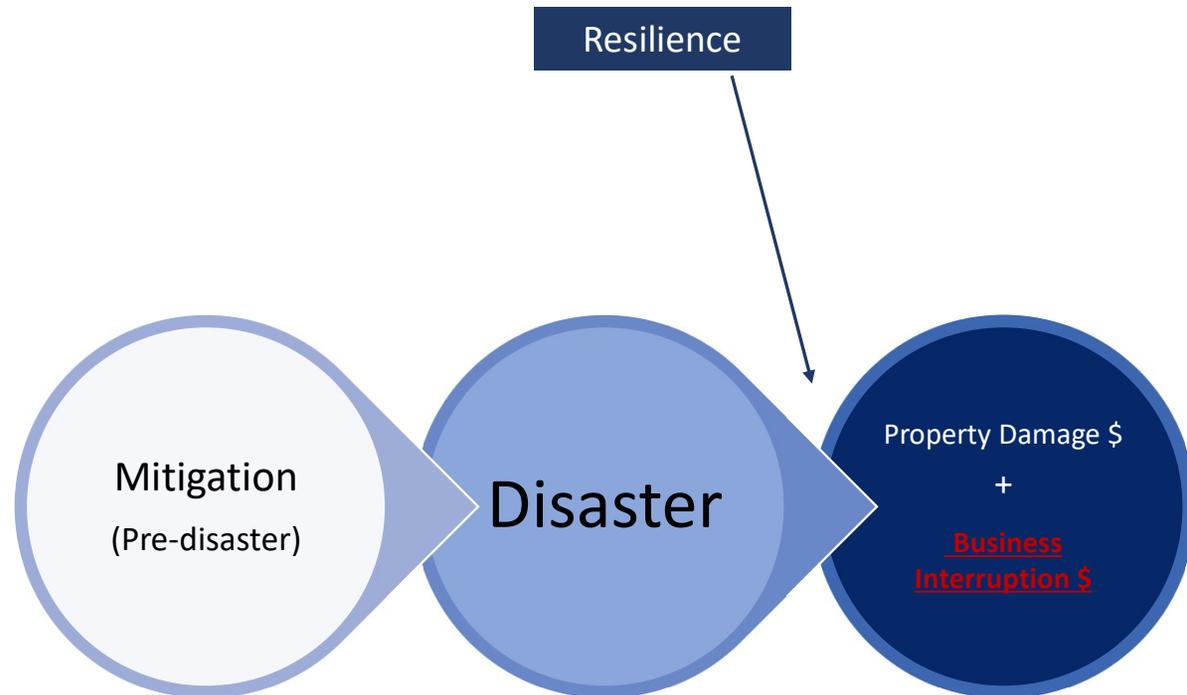
- General: *Ability & speed* of a system to *recover*.
- Economic: *Efficient use of resources over time* for investment in repair and reconstruction, including expediting the process & adapting to change.

- *Resilience* essentially synonymous with *efficient business continuity*

- *Metric*: losses avoided by using a resilience tactic as % of potential losses without it

Key Distinctions: 'Mitigation,' 'Resilience,' & 'BI'

- Resilience: Often refers to *any action* that reduces hazard losses
- But there's a perfectly good word for actions taken *before* the event – “mitigation”
- Best use of “resilience” – actions taken *after* an event
 - can build up resilience capacity beforehand – it's a process
 - (inventories, resource agreements, identify back-up locations)
 - but these tactics are *not implemented until after* the event
- Can only prevent property damage before the event, but can reduce *business interruption* afterwards
- BI begins when the disaster strikes & continues until recovered
- Measured in terms of lost sales revenue, GDP, employment



Why BI Matters

September 11 World Trade Center Attacks

- property damage (PD): \$25 Billion
- business interruption (BI): \$100 Billion

Hurricane Katrina

- PD: \$75B
- BI: >\$100B

ShakeOut San Andreas Fault Earthquake Simulation

- PD: \$100B
- BI: \$68B



Resilience Tactics (Actions)

Resilience Tactic	Definition (Activities Involved)
Conservation	Maintaining intended production using lower amounts of an input or inputs
Resource Isolation	Modifying a portion of business operations to run without a critical input
Input Substitution	Replacing a production input in short supply with another
Inventories	Continuing business operations using emergency and ordinary stockpiles
Excess Capacity	Using idle plant or equipment idle in place of a damaged ones
Relocation	Moving some or all of the business activity to a new location
Management Effectiveness	Improving the efficiency of business operations in the aftermath of a disaster
Import Substitution	Importing needed production inputs when not available from local suppliers
Technological Change	Improvising the production process without requiring a major investment
Resource Pooling	Recontracting, selective exchange of resources, creating new partnerships
Production Recapture	Making up for lost production by working overtime or extra shifts

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Business Resilience Calculator

The BRC

- ❑ *What:* Data-driven decision-support software tool
- ❑ *Purpose:* To safeguard business continuity in a cost-effective manner
- ❑ *Users:* private enterprises, as well as HSEs (including FEMA), SBA, NIST, Emergency Managers
- ❑ *Knowledge Gap:* Primary data & statistical analysis for business resilience decisions
- ❑ *Underlying Research:* Primary source survey data professionally collected from firms impacted by Superstorm Sandy and Hurricane Harvey
 - Not simulation or model
 - ❑ *Research Results:*
 - ❑ Firm's resilience tactics are cost-effective with an average benefit-cost ratio of >\$4.50:1
 - ❑ Business interruption exceeded property damage by >900%

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Results

Of the 3 tactics you chose, **Input Substitution** is likely to yield the greatest benefit-cost ratio (BCR) in a hurricane.

Production Recapture | \$8.15 | \$0.90 | \$21.10 |

Typical firms like your avoided \$8.15 for every dollar spent on this tactic. The sector median benefit-cost ratio for this tactic is \$0.90. Best performers avoided \$21.10 for every dollar spent on this tactic.





Software Demo