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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:**

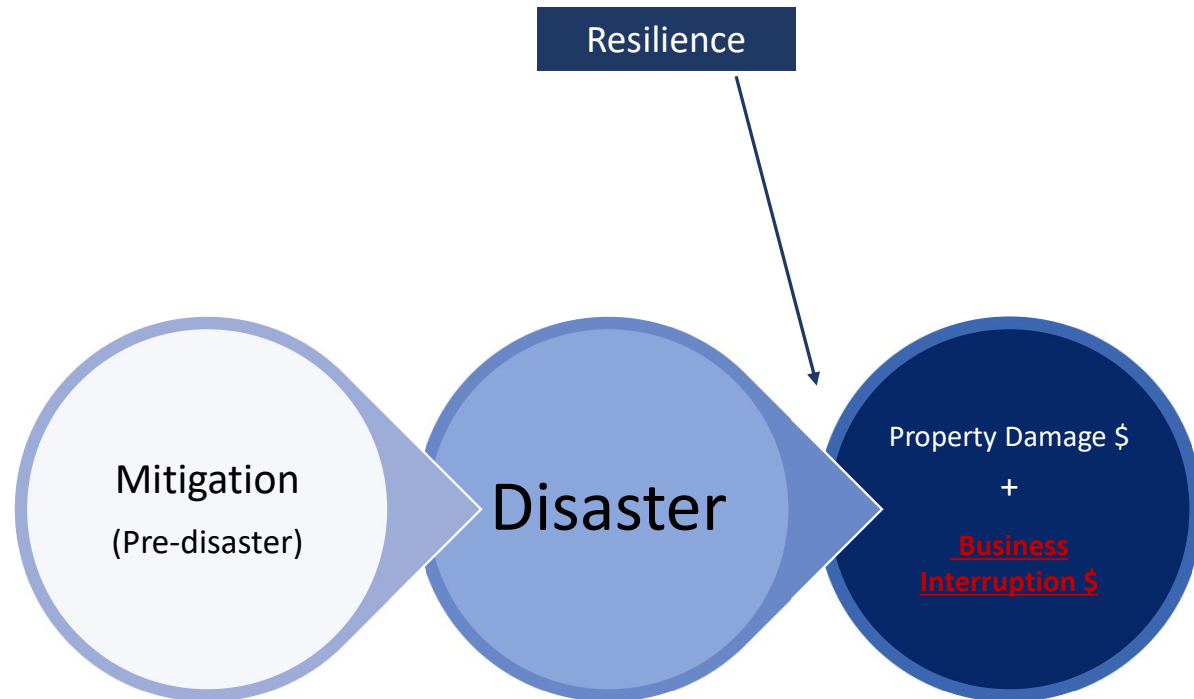
- General: *Ability & speed* of a system to *recover*.
- Economic: *Efficient use of resources over time* for investment in repair and reconstruction, including expediting the process & adapting to change.

- *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

BRC

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%



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