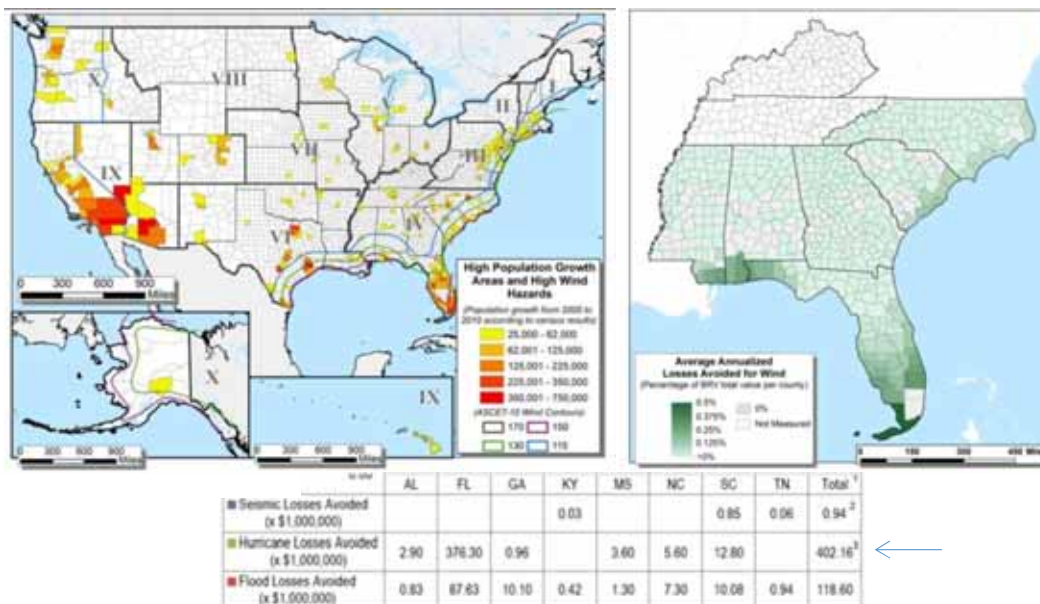


FEMA Building Code Adoption Losses Avoided Studies

To demonstrate risk reduction from disaster-resistant building codes, FEMA assigned AECOM to develop practical losses avoided studies (LAS) using HAZUS, FEMA's popular GIS-based community loss modeling platform. HAZUS quantifies impacts to structures, contents, infrastructure systems and economic sectors for flood, wind and seismic hazards. The engineering basis of HAZUS allows simulation of improved disaster performance from strengthened hazard provisions in the International Building Codes (I-Codes) launched in 2000. Particular structure types and features are modeled for residential, commercial and industrial. HAZUS LAS results quantify how Post-2000 construction under I-Codes reduces community, state and regional risk.

RISK	ACTION	IMPACT	OUTPUT
<p>While building codes in the US have progressively improved disaster resistance provisions over the past two decades, there lacks a way to systematically measure benefits at the community level for dominant flood, wind and seismic hazards. Gaps in hazard maps, documentation of structure type, construction date and code history made detailed community LAS studies cost prohibitive.</p> <p>Each community's unique building portfolio exposure greatly influences the vulnerability of lifeline infrastructure and core community functions. Detailed studies of these unique risk profiles are needed for planning resilient investment and insurance.</p>	<p>Quantitative detailed modeling of building risk reduction by compliance with I-Codes is now possible by rapid geospatial hazard mapping of newly coded assessor parcel data for the 24,000+ jurisdictions in the US. FEMA initiated Phase 1 of LAS modeling with a pilot study using existing HAZUS models to formulate the process.</p> <p>Phase 2, a demonstration study applied scenario hazard maps to Core Logic's private sector database of over 17M parcel assessor data records covering the Southeastern US. Assigning hazard specific I-Code building attribute loss parameters allows modeling "with" and "without" I-Codes to derive losses avoided.</p>	<p>Aggregated LAS results at local, state and regional level can be simplified to terms of Average Annualized Loss (AAL). The primary impact of findings is demonstrating value of I-Codes reducing losses, to inform and aid risk-reduction planning and decision-making.</p> <p>Hundreds of millions of dollars in losses avoided identified in the Phase 2 Regional Study resulted from I-Code use since the 2000 launch. This provides strong incentive for expanded code adoption by all jurisdictions. Modeled higher standards exceeding code provisions pose a sorely needed "new normal" for accelerating risk reduction advocated by the Sendai Framework.</p>	<p>HAZUS building code LAS model outputs includes detailed contoured geographic risk profiles and tabular data analytics of site specific and aggregate dollar and AAL net yields. Each community can determine via geographic distribution, building type and hazard - its relative exposure and losses avoided benefits realized by risk reduction provisions of modern building codes to guide decision making.</p> <p>Communities can visualize and perceive both resilient growth zones or criteria and conversely hotspots of the intersection of high hazards and development providing both carrot and stick incentive. Phase 3 is planned modeling nationwide.</p>



Lessons Learned

As the FEMA HAZUS Building Code LAS program continues from the Southeastern US across the nation, computational efficiency can increase, macro patterns can emerge and locally driven model updates can guide statewide and national policy informed by community feedback. Risk reduction trends can incentivize competition between states or counties while respecting community privacy by not publicly disclosing detailed results at the community and parcel level.

BUSINESS CASE

The 2012 flood insurance reform already links the I-Codes to the national flood insurance program creating a national standard and direction for risk reduction focused on benefits. LAS findings provide further incentive for communities not yet adopting I-Code and raises sights to assess benefits of adopting even higher risk reduction standards.

As all US communities assess their individual LAS profile, opportunities emerge to build success focusing capital investment, engineering and development to infrastructure sectors and geographies with outcomes yielding greatest community resilience –the essences of doing more with less.

REPLICATION OPPORTUNITIES

Beyond continuing nationwide rollout of FEMA's HAZUS Building Code LAS program, the method and open source HAZUS platform can be replicated internationally.

A robust HAZUS User Group (HUG) network, and FEMA advisory work is helping develop dozens of HAZUS models for emergency response and recovery loss estimates. These can be adapted to Building Code LAS programs using rapidly developing GIS hazards mapping, census data, insurance, and assessor data recently available for official government use. Opportunities have been identified in Pacific Island Nations, the Philippines and China.

How does the project support the implementation of the Sendai Framework targets?

1	Reduce disaster mortality by 2030	X	Lack of focus on building code benefits and greater adoption is a key reason worldwide growth in disaster risk reduction measures is not outpacing growth in exposure, identified as a critical priority of the Sendai Framework to correct before 2030. HAZUS LAS provides strong incentive beyond original intent of life safety, to leverage complementary large economic and investment risk reduction benefits. Results tailored to individual communities raise awareness where the greatest decision impact opportunity exists. Great benefits observed from 15 years of I-Code adoption in the US can serve as a global develop model for the next 15.
2	Reduce number of affected people by 2030	X	
3	Reduce economic loss by 2030	X	
4	Reduce infrastructure damage and disruption of services by 2030	X	
5	Increase countries with DRR national/ local strategies by 2020		
6	Enhance international cooperation to developing countries		
7	Increase the availability of and access to EWS* and DR information to people by 2030		

How does the project contribute to the ARISE Themes?

1	Disaster Risk Management Strategies	X	The FEMA HAZUS Building Code LAS program provides a robust integrated analysis of highly complex community metadata only recently conceivable, advancing longstanding need for scientific based quantification of resilience indicators and standards development for communities of all sizes. Existing HAZUS models in major cities of the US can integrate LAS findings to link investment with current HAZUS based emergency planning and address trans-jurisdictional disaster risk understanding and strategic planning. Intuitive GIS HAZUS products and training programs serve both officials and communities alike, benchmarking initial demonstration study results.
2	Investment metrics		
3	Benchmarking and Standards	X	
4	Education and Training		
5	Legal and Regulatory	X	
6	Urban Risk Reduction and Resilience	X	
7	Insurance	X	

For More Information



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