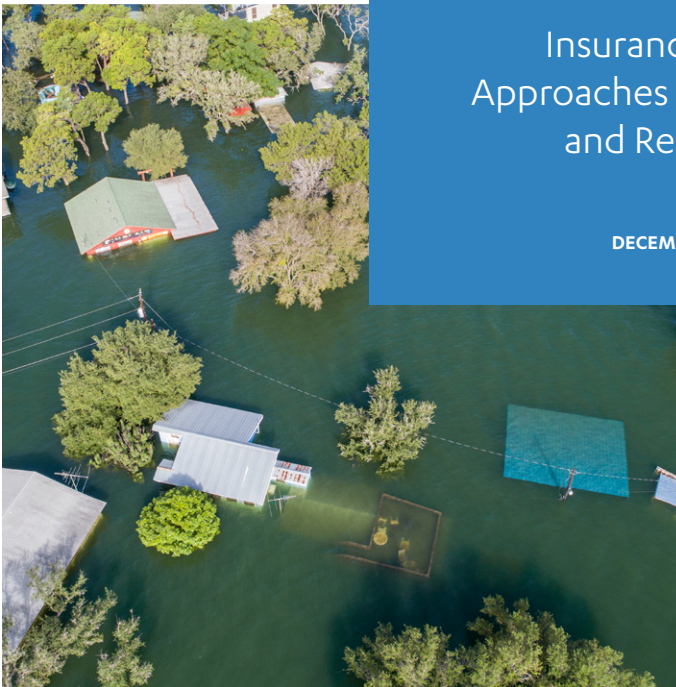




California Climate Risk

Insurance-Based
Approaches to Mitigation
and Resilience

DECEMBER 2019



Introduction

The insurance sector will play an increasingly important role in managing the new and evolving risks that climate change poses for California residents, businesses, and governments. While state leaders pursue policies to mitigate greenhouse gas emissions and build, insurers have the opportunity to address climate-related risks through innovation across their risk management, underwriting, and investment activities. Effectively addressing the risks facing all Californians, as well as those facing the insurance sector itself, will require increased collaboration among insurers, regulators, climate scientists and data modelers, and state and local officials.

To identify needs and opportunities to mitigate these growing risks, California Insurance Commissioner Ricardo Lara convened industry, policy, and research leaders to discuss the intersection of climate change and insurance. The [California Climate Risk Symposium](#) was a partnership between the Califor-

nia Department of Insurance, UN Environment's Principles for Sustainable Insurance, UCLA School of Law's Emmett Institute on Climate Change and the Environment, and UC Berkeley School of Law's Center for Law, Energy and the Environment. This synthesis paper summarizes the key findings and next steps these leaders identified to better engage the insurance sector in addressing the most pressing climate risks facing California, and adds new material

and analysis from the paper's authors reflecting recent developments in the field.

Climate change is increasing the frequency, severity, and unpredictability of natural phenomena including wild-fire, drought, sea level rise, riparian flooding, and extreme heat events—each of which has and will continue to impose human and infrastructure costs on California residents,

businesses, and natural and built infrastructure. Insurance has long served as one of society's primary mechanisms for managing the financial impacts of these events. But as climate change progresses, it will threaten insurers' ability to play this role: physical risks will increase the likelihood of losses, transition risks will increase the volatility of investments as the economy decarbonizes, and liability risks will increase as the incidence of adverse litigation accelerates.

Insurers and insurance regulators are increasingly concerned with these climate-related risks. The greater likelihood of chaotic outcomes and heightened uncertainty of risks due to climate change are a threat to risk managers and their clients. Insurers cannot sus-

tainably offer insurance for risks they cannot predict over time. As a result, the major international insurers (which hold the most risk) are particularly concerned, and are investing heavily in better understanding climate risk. At the same time, insurance provides a potential lever to assess, plan for, and manage the risks posed by a changing climate, as well as to motivate actors throughout the economy to reduce their overall exposure to climate risk.

“As climate change increases flood, storm, drought, and fire risks, we need to become proactive to protect communities against loss. We need to view the insurance sector as a resource for climate change solutions in risk assessment and pre-disaster risk mitigation. ‘Climate insurance’ can use insurance markets and the expertise of the sector to help repair and protect against the damage of climate change.”

– RICARDO LARA
CALIFORNIA INSURANCE COMMISSIONER

In this context, insurance-based climate risk management will play a role of growing importance in California and across the globe. The insurance sector finds itself adapting to the potentially dramatic challenges climate change poses to its underwriting and investment practices over the long term. At the same time, the sector faces an opportunity to develop instruments and incentives that help California residents, businesses, and governments proactively mitigate and adapt to some of the greatest risks of climate change. Policymakers, including elected representatives and executive agencies, will face the challenge of adapting regulatory and public investment frameworks to harness these potential benefits and protect their constituents.

To address these challenges, *California Climate Risk* posed a series of questions central to the development of this new insurance paradigm:

- How will advances in data science and modeling shape insurance and risk assessment in a changing climate, and what does the insurance sector need to succeed in managing risks created or exacerbated by climate change?
- How can natural infrastructure be deployed to reduce climate risks, and what role can insurers play in supporting and driving nature-based solutions?
- How can insurers adapt their investment approaches to minimize their own climate-related risks and maximize their ability to cover policyholders?
- How can policymakers harness the full potential of the insurance sector to build climate-resilient communities and accelerate the transition to a low-carbon economy?

These questions yield few immediate or straightforward answers, but each calls for greater collaboration and information-sharing among insurers, state and local leaders, researchers, and other stakeholders. Integrating insurance and insurance regulation into California climate policy will be both a necessary first step and an ongoing result of this new, more collaborative approach.

Advancing Data Science, Modeling, and Risk Assessment

Among the greatest challenges facing the insurance sector due to climate change is the urgent need to update risk assessment approaches and strategies. Climate catastrophes and slow-building risk events involve complex, correlated, and global stressors, and they require new forms of data science and modeling. For instance, California wildfires are becoming more unpredictable in range and speed, while risk events like 100-year floods that have historically shaped insurers' actuarial assessments are rapidly shifting in unforeseen ways. But advances in data science and modeling have the potential to support proactive climate risk management by transforming how insurers identify and quantify risk.

Evolving wildfire risk will change the shape of both risk assessment and California's built environment.

Warming trends have already begun to impact wildfire patterns in California, as the [record 2017 and 2018 wildfire seasons](#) demonstrate. Continued warming and more frequent and extreme wildfire conditions will continue to elevate risk and unpredictability: warming-related changes in water vapor patterns will create greater contrasts between wet and dry regions in the state; increasingly intense atmospheric rivers and variations in precipitation extremes will accelerate vegetation growth cycles; and deeper droughts will more rapidly convert vegetation into fuel for fire. Stationarity—the tendency of a system to maintain constant variance and correlation over time—is no longer a reliable long-term characteristic of California's wildfire patterns.

Our physical environment and development patterns, however, have been built on assumptions around relatively predictable physical conditions. Individuals, developers, and local governments build infrastructure anticipating a range of vulnerability over a reasonable timeline, typically based on a historical set of conditions and the associated future risk of high-consequence, low-probability events. The evolution of physical risk will require forward-looking modeling and scenario analysis to determine how the risk

of extreme events will change during the lifetime of newly built, upgraded, and existing assets. California’s public and private actors will need to develop new paradigms in governance, land use, planning, construction, and fire suppression, as well as new financial strategies, to adapt to the new risk environment.

Advances in data science and modeling can drive proactive insurance responses and change development patterns and business practices.

Effectively integrating scientific knowledge into risk management is crucial to building resilience to climate risk. Wildfire risks provide a good example: quantifying new wildfire risks requires models that can link the complex physical dynamics of fires with detailed climate, ecosystem, and fuel and vegetation models, and advances in big data and artificial intelligence-driven computing power are already facilitating this linkage. Helping state and local governments use these tools to inform prevention and preparedness efforts will require more data management capacity and enhanced governance. Greater policymaker understanding of these models can, in turn, motivate better decision-making on vegetation management (improving on historical fire suppression-based strategies that increase fuel loads), construction (identifying properties most in need of retrofits and defensible space), ignition source control (assessing where the major ignition risks are and how to better manage them), and land use (determining where new development may be inappropriate or should be limited).

These new modeling capacities can also inform insurers’ work to assess with greater accuracy the risks of living in the wildland-urban interface (WUI) and the mitigation benefits of home hardening and smart vegetation practices by individual property owners. Access to advanced data will

also allow communities to invest in communal protective measures and help local governments to take actions that could result in community rating-based insurance benefits (as is allowed under the [National Flood Insurance Program](#)). Insurers may need to collaborate with regulators and legislators to facilitate these new mechanisms.

Similarly, enhanced information gathering and analysis is

already facilitating better risk management of climate-related changes to flood and storm surge risk. Private flood insurers largely fled the U.S. residential market in the mid-20th century because of massive, correlated losses at unpredictable times from hurricanes and other coastal hazards. These storm events made insurers view flood risk as uninsurable. The National Flood Insurance Program, which was created to fill the gap left by private insurers, is essential for high-risk communities but is also fraught

with actuarial concerns. Nevertheless, private flood insurance availability is improving as insurers develop more and better information about coastal risks through advanced research, modeling, and data analysis, and as planners and infrastructure managers actively work to address those risks. Better information and analysis about emerging risks, and evidence of community-scale risk mitigation planning, have enabled insurers like [Munich Re](#) to start underwriting flood risk again. And insurers’ decisions to offer or refuse coverage may also serve as an important signal of what management practices are sufficient or where new investment should be avoided.

State and local governments are beginning to engage in proactive risk mitigation.

State and local government land-use, sustainability, and resilience initiatives are vital measures to mitigate climate risk and will interact increasingly with insurance decision-making. Los Angeles County, for example, has

“We need to be ready after disaster events, when availability bias is highest, to create policymaking opportunities. We need to move from the current system of climate bailouts to a system of risk mitigation.”
– ALICE HILL,
COUNCIL ON FOREIGN RELATIONS

developed a county-wide [sustainability plan](#) that coordinates climate resilience needs and initiatives across the county’s land-use, public works, public health, and other authorities. This type of planning can support innovative risk mitigation measures that help address California’s new climate risk environment.

Instruments like transfer of development rights, long used to redistribute density in urban environments, can be rethought to shift density away from high-risk areas while limiting concerns about unconstitutional takings or public funding. Public health officials can coordinate regionally to account for population-specific effects of heat events, cities as diverse as [Milan](#) and [Medellín](#) are developing urban forest initiatives, and [Paris](#) is using pumped water to fight heat without air conditioning. And participation in climate adaptation collaboratives, such as the [Southern California Resilience Initiative](#), could be a

strategic avenue for local government leaders to propose and test leading-edge solutions for the new urban risks those localities may face. These efforts will be necessary and complementary to similar efforts by non-governmental actors to address climate risk.

Insurers and governments will face a continually expanding set of new risks and considerations.

Climate change impacts on the physical environment will call into question basic assumptions that have driven land-use and insurance decision-making for decades in California. Local governments may raise concerns about climate-related disclosures and assessments because of the perception that these actions could affect property values (and, in turn, tax revenues). Design profession-

als are at risk of facing liability for building infrastructure in increasingly vulnerable areas, while tension may arise between defensible space requirements and urban forestation projects designed to fight heat island effects and absorb carbon. And individual efforts to harden properties can fail to prevent losses if neighboring properties do not follow suit. At an international level, new forms of climate-related geoen-

engineering—such as atmospheric aerosol injection—will, if deployed, only deepen the complexity of insurance sector assessments.

At the same time, nearly half of Californians rent their homes. These residents face entirely different insurance considerations from owners, are more likely to be underinsured, and more often come from minority and low-income communities. Insurers and regulators will need to take significant steps to ensure these Californians’ lives and possessions are adequately covered as well.

“The unique land-use challenge of climate change is that hardening existing homes may ultimately leave them at risk—we need to retreat from certain areas and develop differently in others. Determining what infrastructure can stay and what has to go is incredibly difficult.”

– SEAN HECHT, UCLA SCHOOL OF LAW

Developing and Insuring Nature-Based Solutions

As climate change risks proliferate and evolve, natural infrastructure will become an increasingly valuable instrument to protect populations from the worst impacts. Afforestation and reforestation projects can reduce extreme heat impacts, limit erosion, and absorb atmospheric carbon, while coral reefs and coastal wetlands can protect populated areas and natural landscapes against storm events and sea level rise. Permeable pavement, swales, and other infrastructure design features can strengthen water supplies and reduce flood risk. Building, rebuilding, and maintaining

these natural and built assets will be an essential element of California’s climate resilience policy in the coming decades. Local governments and businesses, in collaboration with insurers, may have an opportunity to develop innovative mechanisms that support and expand these assets.

Insurers, governments, and businesses are pioneering innovative nature-based infrastructure and insurance solutions to mitigate risk.

There is growing interest in the ability of insurance products to align environmental and financial incentives among local governments, private businesses, and insurers to support nature-based infrastructure and climate resilience. The [Coastal Zone Management Trust](#), a collaboration between the Mexican State of Quintana Roo, Swiss Re, leaders in the local tourism industry, and The Nature Conservancy, offers an example of how these products may be able to develop.

Quintana Roo lies at the northern end of Mexico’s Yucatán Peninsula, home to a beachfront tourism industry that drives a significant portion of the economy. The region is highly vulnerable to hurricanes and storm events that will worsen with climate change; it is also protected by the Mesoamerican Reef, which limits storm surges and coastal erosion. The Trust employs tourism tax revenue both to continuously maintain the reef and to purchase a “parametric” insurance policy: upon the occurrence of a specific parameter—a category 4 or 5 hurricane, which significantly decreases the likelihood of natural reef recovery—the policy pays out to fund reef recovery activities. The parametric policy has the potential to provide a full range of mutual benefits: the local government has immediate access to recovery funds and ensures that those funds are spent on natural infrastructure recovery;

the local resort owners reduce their risk of beach erosion and lost income; and the insurer cultivates an innovative new market at a measurable risk level.

Parametric reef insurance is only [one model](#) for tying resilience and mitigation measures into risk transfer mechanisms. Insurance-linked securities like [catastrophe bonds](#) offer similar parametric payouts, passing risks through to

capital market participants seeking to diversify risk. Insurers can also partner with policyholders to finance essential resilience measures by offering policy premium reductions in exchange for investment in those measures, expanding on a long-standing insurer practice to incentivize proactive climate risk reduction while maintaining a potential insurance payout if disaster occurs. And multiple, diverse jurisdictions subject to the same set of risks—for example, municipalities vulnerable to Mississippi River flood-

ing—could assemble natural infrastructure projects that promote complete ecosystem resilience while cross-subsidizing each other’s insurance coverage.

California insurers and policymakers can collaborate to increase the availability of innovative products.

Insurance products that directly support climate-resilient infrastructure have the potential to offer significant mitigation and adaptation benefits in California. For example, instruments linking resilience and insurance could help drive investments in coastal wetlands to protect against sea-level rise in the Bay Area, cooling infrastructure, and urban forestation to protect against extreme heat events in Southern California and Central Valley cities, and advanced

“Nature-based solutions can protect against and delay the most severe impacts of climate change and reduce our greenhouse gas emissions by sequestering carbon. They provide an opportunity to bridge existential fear and hopeful possibilities.”

– DEBORAH HALBERSTADT, UC DAVIS COASTAL AND MARINE SCIENCES INSTITUTE

vegetation strategies to limit wildfire in WUI areas. But these climate-resilient insurance concepts are still developing, and government and insurance leaders will need to actively support them to create a robust market.

Ultimately, insurers will begin to offer innovative products only if they can assess the underlying risks within an acceptable level of uncertainty. Parametric insurance linked to the occurrence of a single phenomenon like a level 4 hurricane requires relatively traditional risk assessment for an insurer, facilitating creation of an affordable product. But climate impacts like wildfires—or even coral reef damage from ocean acidification, warming, and pollution trends—involve far more complex risk dynamics that challenge the feasibility of a stand-alone insurance product. Insurers will need to collaborate with willing local leaders to pilot more nature-based instruments, and state leaders will need to create regulatory conditions to support them. Measures like [Senate Bill 30](#) (Lara, Chapter 614, Statutes of 2018), which created a working group to assess these new possibilities, offer a promising start.

Adapting Investment Strategies, Underwriting, and Regulation to a Carbon-Constrained Future

The investment implications of climate change for insurers are dual: as investors of trillions of dollars in assets, insurers face significant financial vulnerability from economic shocks and transitions; and at the same time, they have significant opportunity to use this capital to drive markets toward sustainability. Regulators like the California Department of Insurance (CDI)

have begun to recognize this, with [groundbreaking efforts](#) cataloguing insurers' fossil fuel investments and conducting scenario analyses of insurers' potential climate risk. Under UN Environment's [Principles for Sustainable Insurance](#), insurers holding over one quarter of global premiums have taken on voluntary commitments to transition their investment portfolios away from fossil fuels; integrate environmental, social, and governance (ESG) concerns into their entire decision-making frameworks; partner with policymakers to further develop ESG management; and enhance disclosure of their environmental performance. Insurers are also beginning to consider vulnerability of fossil fuel assets in their underwriting. Financing and underwriting an orderly transition to a low-carbon economy presents significant risks, but also comes with ample opportunities for innovation.

“As a business, we see mitigation as an opportunity to deploy capital responsibly. Success is providing resilience products in a profitable manner. It takes time to get there, but our mandate is to bring that convergence to fruition.”

– DAVID BURTONPERRY, SWISS RE

Scenario analysis is becoming an essential tool for insurers to evaluate their climate risk.

Scenario analysis of insurers' investment portfolios seeks to evaluate a range of physical risks (e.g., impacts of climate-related weather events on the real estate assets of their holdings) and economic transitions (e.g., rapid versus gradual decarbonization of the economy). While climate risk is inherently unpredictable, scenario analysis can nonetheless expose likely future trends with sufficient certainty to drive insurers toward more sustainable investments. Scenario analyses of investments by California insurers have found, for example, that approximately one third of thermal power plants in those investment portfolios will be exposed to severe water scarcity, and a similar proportion of coal mines will be exposed to wildfire risk. But this exposure varies widely across individual insurers, as do the feasibility of rapid divestment and the price of action (or inaction). At the same time, an orderly economic transition will rely not only on divestment from the most carbon-intensive companies, but also on maintaining holdings

in companies that are able to shift their business models and proactively investing in the most sustainable businesses.

Given the difficulty of understanding complex climate risks, a variety of overlapping and complementary responses will benefit markets. Grasping a complete range of economic and climatic scenarios will be essential to developing these responses.

Insurers and investors are more directly integrating climate risk considerations throughout their operations.

Insurers and other companies are starting to take more comprehensive steps to address climate risk beyond rearranging investment portfolios. These steps include both top-down approaches that involve establishing board-level corporate climate policies and goals, and bottom-up approaches that involve rethinking personnel recruitment, executive compensation, and links to academia. Moreover, some insurers now are considering fossil fuel transition risk in their underwriting practices; for example, [Chubb announced](#) in July 2019 that it will “no longer underwrite the construction and operation of new coal-fired plants or new risks for companies that generate more than 30% of their revenues from coal mining or energy production from coal.” Underwriting practices will, over time, reflect the sector’s assessment of strategic risks from continuing to invest in fossil fuel infrastructure, resulting in outcomes more likely to support climate change mitigation. And broader corporate and investor actions that reflect the full extent of climate risks may help drive market transformations.

Regulators and supervisors can play an active role in driving smart insurer and investor strategies while protecting communities against inequities in insurance availability.

Financial regulators have begun to incentivize greater investment sustainability through a variety of actions, such as encouraging voluntary disclosure under the framework of the [Task Force on Climate-related Financial Disclosures](#) and undertaking scenario analysis on behalf of insurers (as CDI has done). In some cases, like California’s [Senate Bill 964](#) (Allen, Chapter 731, Statutes of 2018) and recent actions of the [Australian Prudential Regulatory Authority](#), legislatures and regulators are actively requiring insurers and public pension funds to undertake climate risk assessments.

However, insurance regulators must shape these efforts to align with their primary concerns: supporting the solvency of insurers and the affordability, availability, and adequacy of coverage. Sustainability of investments and availability of insurance are inextricably linked in the long run because of the strategic threat climate change poses to the insurability of major assets. At the same time, limiting protection gaps as climate change evolves will be essential to ensure equity for more vulnerable communities as governments plan for resilience. Insurers have been declining to renew policies in some wildfire risk-prone areas of California, creating pressure on the state’s residual Fair Plan and raising costs for these homeowners. In response, the Department of Insurance just announced, on December 5, 2019, a one-year moratorium on non-renewals in wildfire disaster areas, pursuant to [Senate Bill 824](#) (Lara, Chapter 616, Statutes of 2018). Because a lack of insurance and the

“To achieve sustainable development, we need to have a sustainable global economy underpinned by a sustainable global financial system. We need to make sure that insurance, investment and financing activities support sustainable activities. As risk managers, insurers, and investors, the global insurance industry has a key role to make this happen.”

– BUTCH BACANI, UN ENVIRONMENT’S PRINCIPLES FOR SUSTAINABLE INSURANCE

most severe climate-related harms will both disproportionately affect less-privileged communities, it is essential for the insurance sector to adapt to climate change with equity as a top priority. Developing an agreed (or possibly regulator-provided) set of frameworks for scenario analysis, stress testing, and disclosure, and requiring insurers to utilize those frameworks regularly—while simultaneously paying close attention to potential inequitable impacts—can help to align the push for sustainable markets with the ongoing need for insurance. It can also drive a shift toward understanding climate change as a central concern for regulators and insurers alike.

Building a New Climate and Insurance Policy Framework

Promising developments in modeling and risk assessment, nature-based solutions, and sustainable investment and underwriting highlight the ways in which the insurance industry and its regulators are building the capacity and incentives to proactively manage climate risk. California policymakers will play an integral role in fostering these developments and bringing innovative products to consumers around the state, which is one of the largest insurance markets in the world. In addition, policymakers face the challenge of fully integrating insurance and insurance regulation into the state's broader climate policy framework. California is a global leader in emission reduction policies, and state and local leaders are beginning to develop comprehensive climate adaptation and resilience plans. In the coming years, it will become increasingly important to incorporate components into climate policy that ensure a viable insurance market and facilitate solutions that promote physical and financial resilience—and ultimately, insurance will take an increasingly prominent role in California's climate policy framework.

Proactive climate resilience investments will provide insurance benefits.

While insurers are developing innovative products to support key natural infrastructure, direct investments in that infrastructure can also support the continued affordability and availability of traditional insurance coverage in California. Forest and meadow restoration can reduce rapid snowmelt

and erosion and improve water quality; improved vegetation management can mitigate wildfire risks; wetland restoration can protect coasts against flooding; and urban greening can limit extreme heat events. Public investment in these natural resources directly benefits California insurers, residents, and businesses by managing some of the worst climate risks facing the state. In addition, state and local leaders have the capacity to incentivize or require community-wide resilience measures, which may become necessary to limit the worst flood and fire risks. Working closely with insurers and insurance regulators to identify actions most likely to mitigate major losses will help maintain affordable coverage throughout California, particularly in the most vulnerable areas.

Land-use planning reform may be necessary for long-term resilience and insurability.

Climate change impacts have begun and will continue to manifest throughout California. However, certain regions, particularly areas near low-lying coast and along the WUI, will face the greatest risk of direct loss from anticipated changes in the environment, including sea-level rise and increasingly dangerous wildfires. For some jurisdictions in these areas, insurance—even proactive, climate-smart insurance backed by low-carbon investment—may not be sufficient to mitigate risk in a sustainable fashion. As the state faces a critical housing shortage, with many existing urban areas proving prohibitive for development or unaffordable for a significant proportion of residents, new building continues in high-risk WUI areas. But adequately limiting the human and financial cost of the climate events to come will require coordinated land-use planning—likely a combination of limiting new development in high-risk areas, hardening existing communities in certain areas, and building affordable housing more densely in lower-risk environments.

Governor Newsom's Strike Force on Addressing Wildfire Risk has [recognized](#) these housing and land-use planning mechanisms for improving climate resilience as a priority, as have countless land-use, housing, and climate science experts. Addressing these concerns via existing policy mechanisms, however, is a different order of challenge. California's long history of suburban and exurban residential development, extensive single-family zoning, pervasive car culture, and strong presumption of [local control](#) all serve to limit the state and

regional authority to shape development patterns. The centrality of development-linked property taxes as a source of revenue for local governments further cements the issue.

Insurers have the ability to drive new development away from high-risk areas through the market signals of insurance affordability and availability, but state and local leaders must take active steps to make sure these signals are received when they are relevant—before individuals purchase homes, and ideally before developers begin construction. Insurers’ leadership in assessing and quantifying risk can also offer policymakers the data they need to update local budgets and development plans to reflect the long-term fiscal realities of climate change. Ultimately, however, state leaders may need to explore new authorities and incentives to drive local governments, developers, and residents toward planning and building decisions that minimize California’s overall risk profile, to simultaneously maintain insurance availability throughout the state, address housing affordability issues, and steer development toward areas where it is safest and most needed.

Integrating insurance policy and climate policy will rely on a comprehensive set of approaches.

Developing resilient land-use practices may be the most significant challenge for building a climate and insurance policy framework, but California leaders can employ a number of other legal and regulatory levers to address

pressing needs. A [package of bills](#) signed into law by Governor Newsom in October 2019 may substantially aid this effort, including measures supporting community resilience, utility risk mitigation, and emergency planning. State legislators can further work with local authorities to require

enhanced home-hardening and defensible space measures in vulnerable areas, building on legislation like [Senate Bill 901](#) (Dodd, Chapter 626, Statutes of 2018). They can develop statewide disaster funds and tie participation to risk mitigation measures, using mechanisms like those created by [Assembly Bill 1054](#) (Holden, Chapter 79, Statutes of 2019) for electric utilities. And they can increase funding for ongoing data collection and advanced modeling to strengthen the state’s risk assessment capacities.

Insurance regulators can explore ways to incentivize insurers to offer community-level coverage, while legislators can consider linking [redevelopment funds](#) to climate mitigation. Conducting fiscal and social vulnerability analyses to assess California’s long-term climate liability will help

develop the factual baseline necessary to support some of these new policies and will help residents understand the coming risks to life, property, and communities. And continuing state policies that support markets in renewable energy, energy efficiency, and low-emitting transportation technologies can help insurers along the investment pathway to a low-carbon economy.

“This is a tripartite problem for California: climate change is increasing the severity of wildfires, more residents are moving into wildfire-prone areas because they are affordable, and utilities need to serve those residents. At the same time, wildfire is also putting utilities’ finances at risk, the fires are counteracting many of our emissions reductions to date, and people moving farther from cities increases vehicle emissions further.”

– KATE GORDON, GOVERNOR’S OFFICE OF PLANNING AND RESEARCH

Conclusion

As one of society's primary tools for assessing and minimizing risk, insurance has the potential to play a leading role in assisting California with building resilience to both the economic and physical impacts of climate change. Developing proactive risk mitigation strategies, nature-based solutions, and community-scale approaches will all help

further integrate insurance and insurance regulation into climate policy. Policymakers and industry actors will need innovation throughout the sector's product development, underwriting, investment, and data analysis practices—and in how policymakers and regulators approach the role of insurance in climate solutions—to drive this evolution. ■

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