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before

The Committee on Banking, Housing, and Urban Affairs

June 18, 2019

Chairman Crapo, Ranking Member Brown and Members of the Committee, I appreciate your inviting me to testify on "The Reauthorization of the Terrorism Risk Insurance Program." My name is Howard Kunreuther and I am the James G. Dinan Professor of Decision Sciences and Public Policy at the Wharton School, University of Pennsylvania and Co-Director of the Wharton Risk Management and Decision Processes Center. The Wharton Risk Center was founded in 1985 with a mission to examine alternative strategies for dealing with low-probability, high-consequence events (i.e. extreme events) based on an understanding of the decision processes of individuals, firms and public sector agencies.

Since the terrorist attacks of 9/11, the Wharton Risk Center has focused on the roles of the public and private sectors in providing adequate risk financing against terrorism threats. The Center produced several studies on the 2015 renewal of the Terrorism Risk Insurance Act (TRIA) and how it has performed, in consultation with key interested parties from the private and public sectors and other academic/research institutions.[1] My testimony will focus on the following four questions that I feel should be considered as one determines the specifics of the renewal of TRIA in 2020:

- What are the current risk sharing arrangements associated with TRIA?
- Who bears the cost of losses from a future terrorist attack under TRIA?
- How well are commercial firms protected against TRIA losses through private insurance?
- What modifications to current public-private partnerships should be considered?

[1] See: “A Successful (Yet Somewhat Untested) Case of Disaster Financing: Terrorism Insurance Under TRIA, 2002-2020,” Risk Management and Insurance Review, 2018, 21(1): 157-180; “TRIA after 2014: Examining risk sharing under current and alternative designs,” Wharton Risk Management and Decision Processes Center, University of Pennsylvania, July 2014; “Options Facing Congress in Renewing the Terrorism Risk Insurance Act (TRIA): A Quantitative Analysis,” Wharton Penn Public Policy Initiative, University of Pennsylvania, July 2014; “Enhancing Post-disaster Economic Resilience: Public-Private Partnership for Insuring Terrorism,” chapter 12 in Improving Homeland Security Decisions, Cambridge University Press, 2017.

1. Current Risk Sharing Arrangements

Under TRIA's 2015 renewed design, events certified as terrorism by the federal government and resulting in insured losses greater than a certain trigger in TRIA-eligible lines of business ($100 million in 2015 which is gradually increased up to $200 million over time) would be shared as follows:

- Commercial policyholders would be responsible for paying any losses within their standard insurance policy deductibles under TRIA. If these firms had declined to purchase terrorism coverage for property and business losses they will be fully responsible for their losses from an attack. Commercial insurance companies would then provide coverage for all losses in excess of these TRIA deductibles, provided that total insurance industry losses did not exceed $100 billion.
- Insurers are responsible for covering losses from a TRIA deductible (D*) set equal to 20% of that company's prior year's Direct Earned Premium (DEP) for the lines covered under the program, after which the federal government would then reinsure the commercial insurer's terrorism losses. *D** has increased significantly over time: 1% in 2002, 7% in 2002 and 2003, 10% in 2004, 15% in 2005, 17.5% in 2006, and 20% since 2007 and has remained at that level for the 2015 renewal of TRIA. For large insurers, this TRIA deductible can be significant.
- Losses in excess of each insurer deductible would be shared between the insurance company and the federal government; federal share of compensation was set at 85% of insured losses that exceed insurer deductibles until January 1, 2016. Then the federal share is decreased by 1 percentage point per calendar year until it reaches 80% (Figure 1 shows the 80-20 loss sharing).
- Should total insurance industry losses exceed $100 billion, primary insurers are responsible for reimbursing policyholders only for their proportionate share of losses up to $100 billion and Congress shall determine the procedure and source of any payments for the uninsured losses.

Figure 1 depicts the public-private loss sharing for a representative insurer covering terrorism for its commercial policyholders (either through workers' compensation or property insurance) under the current TRIA arrangement when total insured losses are less than $100 billion. If a terrorism loss incurred by an insurance company (i) is less than its TRIA deductible amount (ID_i), as determined as a percentage of its prior year Direct Earned Premium (DEP) in TRIA-eligible lines, the insurer does not receive any reimbursement from the federal government. This situation is illustrated by an insured loss of L_1 where the insurer's payment is represented by the oblique lines on the left side of Figure 1.

When the insured loss from a certified terrorist attack is above the insurer's deductible, as depicted by L_2 in Figure 1, the insurer pays the entire claim and the federal government reimburses the insurer for 83% in 2017, 82% in 2018, 81% in 2019 and 80% of the losses above its deductible starting on January 1, 2020. We consider the 80% loss sharing in Figure 1 as an illustrative example. The horizontal lines on the right side of the figure represent the federal payment. ID_i plays an important role in determining loss sharing between insurers and the federal government and can amount to very large sums for many insurers. Should a terrorist attack occur in 2020, insurers will be responsible for losses equal to 20% of their Direct Earned Premium in 2019.

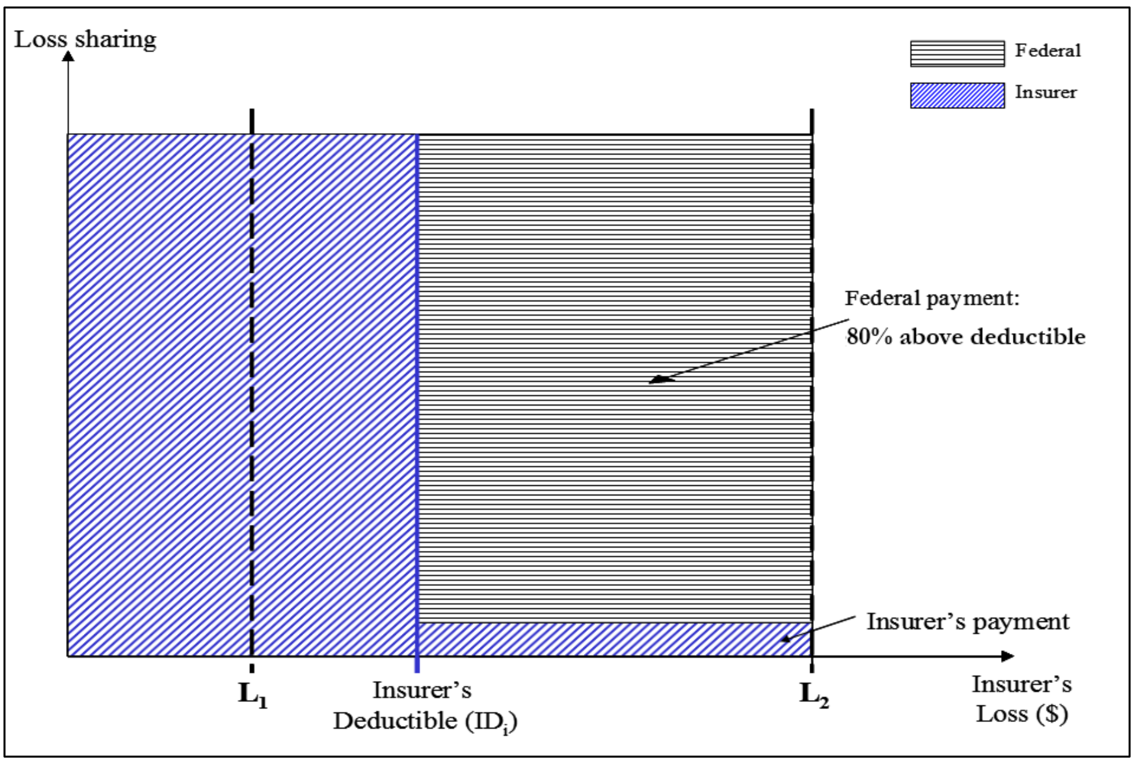

FIGURE 1: LOSS SHARING UNDER TRIA BETWEEN AN INSURER AND THE FEDERAL GOVERNMENT

Note: the loss sharing between the federal government and an insurer was 85-15% in 2015, then 84-16% in 2016, 83-17% in 2017, 82-18% in 2018, 81-19% in 2019 and 80-20% of losses above deductible in 2020.

The federal government recoups its payments between the total insurers' outlays and a mandatory recoupment amount that will by levying surcharges on all commercially insured policyholders (at a 140% rate). Should uncompensated insurer outlays across the insurance industry exceed the mandatory recoupment amount, the U.S. Treasury has the option to collect some or all federal payments over time through a discretionary recoupment mechanism; see Figure 2).

If the entire insurance industry suffers terrorism losses on their U.S. portfolio that requires the government to cover a portion of their claims, then these outlays shall be fully or partially recouped *ex post*, as described above. Insurers levy this surcharge against all commercial property and casualty policyholders, whether or not they had purchased terrorism insurance, and transfer the collected funds to the Treasury.

Figure 2 depicts the repayment schedule between all the insurers whose policyholders suffer an insured terrorist attack (the area depicted by oblique lines), all commercial policyholders (solid area) and the taxpayers (area depicted by horizontal lines) after the federal government has reimbursed all insurers for their share of their claims payments above their individual TRIA deductible level.

In the example considered here, since the total insured loss L for the entire insurance industry is greater than the industry retention (set at $27.5billion in 2015, and increased by $2 billion a year until it reaches $37.5 billion) but total losses retained by insurers within their deductibles (D_i) and coinsurance requirements are below the market aggregate retention of $37.5 billion (assuming as an example this is the threshold the year the attack occurs), a portion of the federal outlays are subject to the mandatory recoupment.

Should the federal government elect to exercise its authority to levy a discretionary recoupment surcharge against commercial policyholders to fund federal outlays not covered by the mandatory recoupment mechanism, there would be a 1-for-1 reallocation of loss from taxpayers to commercial policyholders. For our analysis, we do not allocate losses to the discretionary recoupment mechanism as it reflects one of many alternatives by which the federal government could fund uncompensated federal outlays.

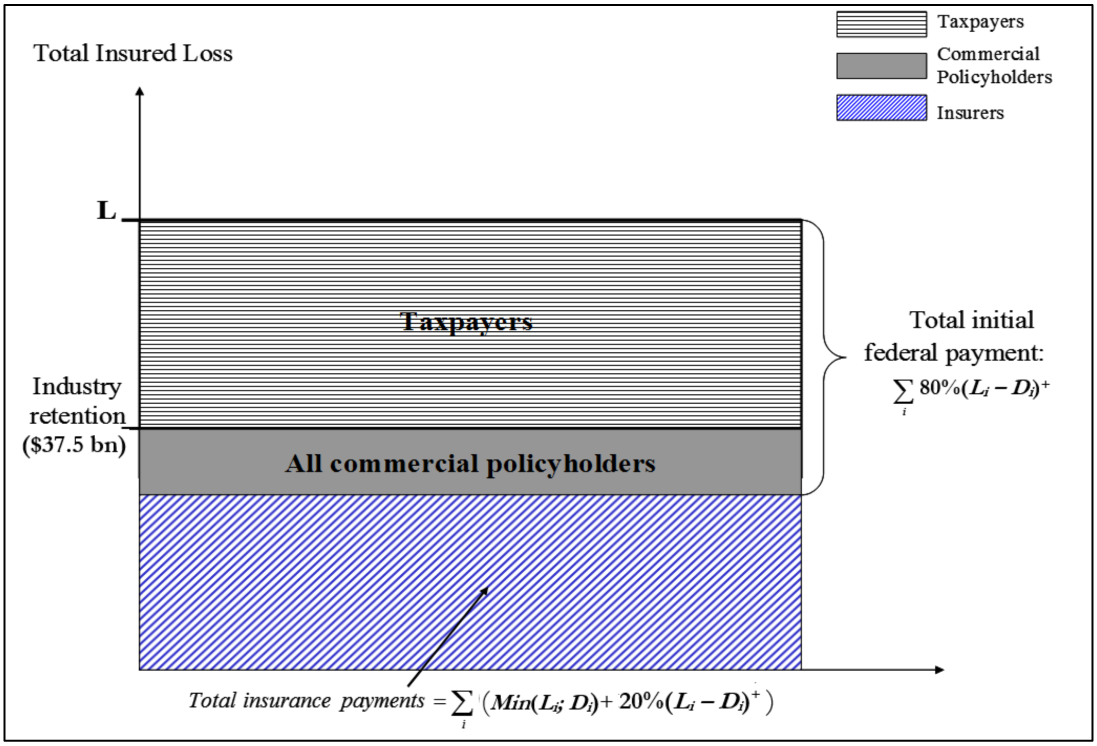

FIGURE 2: OVERALL LOSS SHARING UNDER TRIA

2. Analysis of Loss Sharing under 2015 TRIA Legislation

How would losses from such terrorist attacks be distributed across insurers, commercial policyholders and the federal government?

The Wharton Risk Center utilized data on 764 insurers that comprised virtually 100% of the terrorism insurance market placed with U.S. licensed primary insurance carriers with respect to TRIA-line direct earned premiums at the end of 2012. Property insurance lines have been separated from workers' compensation (WC) lines. Analyzing the entire spectrum of possible losses from zero the $100 billion, the amounts paid by the relevant stakeholders as a function of losses to New York City from a terrorist attack are depicted in Figure 3. (Analyses undertaken for Chicago, Houston and Los Angeles produced similar findings.) The following key findings emerge:

- Insurers will always pay more than any other stakeholder.
- The federal government will not be responsible for any payments under TRIA 2015 until the total insured and uninsured losses from a terrorist attack exceed $60 billion. At this level of loss, insurers would pay $25.5 billion, commercial policyholders $16.85 billion; the remaining $18 billion would be uninsured.

- When total insured and non-insured losses reach $100 billion, insurers will ultimately be responsible for approximately $33.15 billion in payments, taxpayers almost $30.75 billion, the commercial policyholders over $6.1 billion (through mandatory recoupment at a 140% rate); the remaining $30 billion would be uninsured.
- Commercial policyholders would almost always pay some post disaster governmental recoupment. The maximum they would pay – $18.5 billion – is reached when losses are $55 billion.

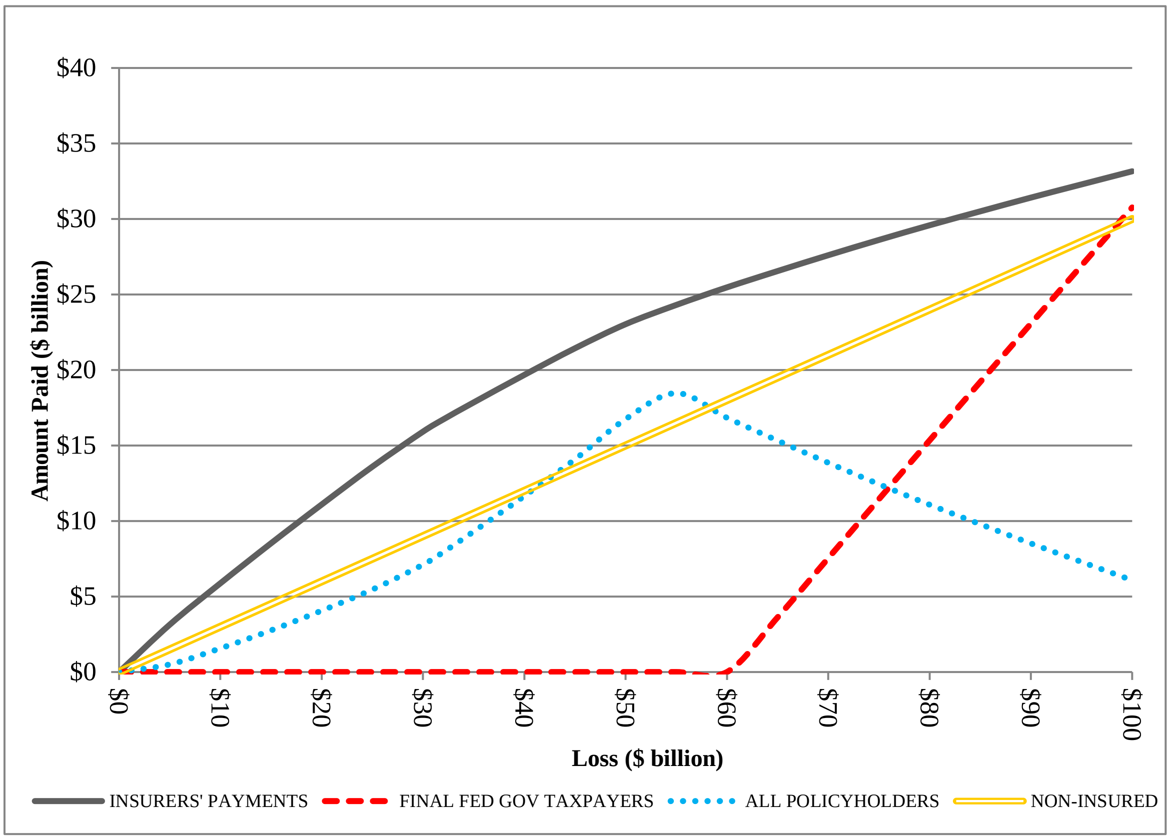

FIGURE 3: AMOUNT PAID BY STAKEHOLDERS FOR DIFFERENT LOSS AMOUNTS FROM TERRORIST ATTACKS IN NEW YORK CITY UNDER THE 2015 TRIA LEGISLATION

3. Protecting Firms against Losses from a Terrorist Attack

TRIA's most important success has been to significantly increase the demand for terrorist coverage by commercial firms and to stabilize the cost of coverage.

Take-up Rates of Terrorism Coverage

Based on the recent Marsh *2019 Terrorism Risk Insurance Report* (May 2019) around 60% of firms purchased terrorism coverage during 2014-2018. According to the Marsh report, education institutions, media organizations, financial institutions, and real estate companies were the most frequent buyers of terrorism coverage in 2018 while transportation and hospitality and gaming companies spent the most on terrorism as a percentage of their total premium spend due to their perceived vulnerability

The remaining 40% should not necessarily be interpreted as totally uninsured, as firms can purchase stand-alone terrorism insurance coverage for all their U.S. and foreign operations that is not dependent on TRIA. Firms can also be self-insured through the use of dedicated captives and/or structured debt (e.g., warrants, convertible and forgivable debt) and contingent capital (i.e., financing that is contingent on the occurrence of specified events). Moreover, a number of smaller companies may be insured without utilizing these larger insurance brokers.

According to the Marsh report, a higher percentage of companies in major cities in the northeastern United States purchased property terrorism insurance in 2018 than in other parts of the country presumably because they feel they are at a higher risk of a future terrorist attack. New York City and Chicago had the largest percentage of firms with coverage (80%) followed by Atlanta (79%), San Francisco (70%), Los Angeles (63%) and Houston (61%).

Costs of Terrorism Coverage

As indicated in the Marsh report, in 2018, larger firms with greater than $1 billion in Total Insured Value (TIV) paid about 4.5 times less on average ($14 per million dollars of coverage) than the smaller firms with less than $100 million in TIV ($62 per million dollars of coverage). This reflects insurance pricing patterns: larger companies typically purchase more insurance which leads to lower average rates per dollar of coverage compared to rates for smaller companies.

4. Modifying TRIA Public-Private Partnerships

The TRIA risk-sharing arrangement between private insurers, commercial policyholders and the general taxpayer recognizes the importance of a public-partnership for providing terrorism insurance to commercial firms. There are several areas where Congress should consider a role that the federal government could play in providing protection against risks that are currently viewed as uninsurable, and in incentivizing commercial enterprises to invest in cost-effective mitigation measures for reducing losses from terrorist attacks.

In developing proposals to take steps now to reduce future losses, it is useful to understand individuals' decision processes. A large body of cognitive psychology and behavioral decision research over the past fifty years has revealed that decision-makers are often guided by emotional reactions and simple rules of thumb that have been acquired through personal experience. Decision errors can be traced to the effects of six biases summarized in Box 1. These intuitive thought processes do not work well for making choices with respect to undertaking protective measures for extreme events such as terrorism where the insurer and firm has limited or no past experience.

Box 1. Biases that Characterize Intuitive Thinking

Myopia: The tendency to focus on overly short future time horizons when appraising immediate costs and the potential benefits of protective investments

Amnesia: The tendency to forget too quickly the lessons of past disasters

Optimism: The tendency to underestimate the likelihood that losses will occur from future hazards

Inertia: The tendency to maintain the status quo or adopt a default option when there is uncertainty about the potential benefits of investing in alternative protective measures

Simplification: The tendency to selectively attend to only a subset of relevant facts when making choices involving risk

Herding: The tendency to base choices on the observed actions of others

Source: Meyer, R. and Kunreuther, H. (2017) *The Ostrich Paradox: Why We Underprepare for Disasters.* Wharton School: Wharton Digital Press

Below, I consider several areas where the key stakeholders concerned with terrorism protection could develop proposals that address these biases in ways that encourage long-term thinking.

Incentivizing Cost-effective Mitigation Measures by Firms

One of our greatest weaknesses as decision-makers is that our intuitive planning horizons are typically shorter than those that are needed to appreciate the long-run value of protective investments. Controlled experiments and field surveys with respect to investment decisions reveal a ***myopic bias***. While decision makers in firms might recognize the need for a safer facility with respect to a terrorist attack, the immediate upfront costs of investments loom large compared to the potential for reduced losses in the next few years, not to mention the impact this expenditure will have on the firm's bottom line.

Proposal: Based on the Federal Emergency Management Agency (FEMA) program for encouraging property owners to invest in mitigation measures that reduces natural disaster losses, the federal government could offer firms long-term loans to spread the cost of risk reduction measures for reducing terrorism-related losses. Insurers should consider providing premium discounts reflecting their estimates of lower claim payments to firms that invest in these protective measures. If mitigation investments are cost-effective, then the annual premium reductions will be greater than the cost of the annual loan so that firms will have a short-term economic incentive to invest in protection now.

Federal Protection against Catastrophic Losses

Following the 9/11 events, insurers were concerned that catastrophic losses from future terrorist attacks would have a severe negative impact on their surplus and possibly lead to insolvency. Empirical evidence provided by experts on terrorism threats supports their concerns. Attacks using nuclear, biological, chemical and radiological (NBCR) weapons have the potential to inflict very large insured losses, especially on workers' compensation and business interruption lines. For this reason, it is important for Congress to explicitly address their role in covering losses from NBCR in the renewal of TRIA rather than exhibiting an ***optimism or amnesia bias*** by feeling that it will not happen in the United States because it has not occurred to date. Other countries (for example the United Kingdom and France), have included NBCR in coverage provided by their national terrorism (re)insurance program.

Proposal: The federal government should cover NBCR losses from future terrorist attacks and recoup their expenditures under TRIA in a similar fashion as they currently do.

Behavior of Insurers and Congress after a Terrorist Attack

Since 9/11, there has not been a terrorist attack in the United States, thus enabling insurers to build up considerable surplus in providing this coverage to many commercial firms. Should there be a severe terrorist attack in the future that causes significant losses, it is unclear what action insurers will take immediately following the event. Will premiums significantly increase and future coverage decrease because insurers exhibit the ***simplification bias*** by focusing on their severe losses rather than also considering the likelihood of a future terrorist attack? What will Congress do if insurers significantly raise their premiums so that many commercial firms feel they cannot afford to purchase terrorism protection?

Proposal: Insurers should consider offering multi-year commercial insurance that includes terrorism coverage where the premium remains the same for two or three years. They can charge a slightly higher premium for the two- or three-year coverage than their annual policy premium to protect themselves against a few firms canceling their policies after one year. Reinsurers would also need to provide multi-year reinsurance policies to protect insurers against severe losses. Controlled experiments have revealed that there is increased demand for two-year policies, even when the premium is somewhat higher than an annual policy, to avoid having a much higher premium following a severe disaster.

Dealing with Interdependencies

One of the challenges facing private insurers is dealing with problems of interdependencies due to the ***herding bias***. The vulnerability of an organization depends to some extent not only on its own choice of protective investments, but also on the actions of other firms. Failures of a weak link in a connected system could have devastating impacts on all parts of it. As a result, there may be suboptimal investment in the individual components. A current example of this type of interdependency is cyber risk where compromising one computer network can cause losses to many others in the interconnected system. The existence of such interdependencies provides challenges to insurers in determining whether to offer protection against this risk in their terrorism coverage and if so what premium to charge.

***Proposal*:** The Department of the Treasury should interact with private insurers to determine what interdependent risks (e.g. cyber) would be included under the TRIA backstop.

5. Conclusion

In developing proposals for public-private partnerships, Congress and other key stakeholders should examine how other countries cope with the terrorism risk to determine whether these approaches merit consideration for the United States. For example, the public and private sectors could provide economic incentives in the form of lower taxes, subsidies, lower insurance premiums, multi-year reinsurance policies and other risk transfer instruments such as catastrophe bonds. These policy tools will encourage those at risk to adopt higher security and loss reduction measures. It also is likely that there will be a need for well-enforced regulations and standards that complement these incentive programs.