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This brief explores the problems with methane leaks from natural gas pipelines, the obstacles that prevent change, and solutions that have been proposed by New York State and others. While most methane leaks do not pose an immediate threat to safety, they can have serious and sometimes deadly consequences, and methane is a major contributor to climate change.

New York has proposed a Methane Reduction Plan. The plan is a good start to combat the issue, but research reveals additional tools to fight methane leaks from utility company pipelines.

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## Policy Brief

# Methane Leaks from Natural Gas Pipelines: Solutions for New York

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Greenhouse gas emissions are wreaking havoc with the planet's climate. Carbon dioxide accounts for 82% of these emissions, followed by methane at 10%.<sup>1</sup> About 60% of the methane in the atmosphere comes from human activities.<sup>2</sup> Major contributors include oil and gas production, livestock, waste, and coal.<sup>3</sup> In New York State, methane emissions are 9% of the state's greenhouse gas emissions.<sup>4</sup> Of these emissions, 11% are the direct result of leaks occurring through the processing and transportation of natural gas.<sup>5</sup> This brief will explore the problems with methane leaks, the obstacles that prevent change, and solutions that have been proposed by both New York State and others.



Today, natural gas is the leading fuel for power plants, replacing coal, as well as the most common way to heat buildings.<sup>6</sup> Natural gas is carried throughout the United States by transmission and distribution pipelines. Transmission pipelines are high pressure, large lines that transport gas from production fields, storage, facilities, and other sources over long distances to local distribution companies.<sup>7</sup> The local companies then use an extensive network of distribution pipelines to distribute gas within cities to homes and businesses.<sup>8</sup>

The gas flows from these pipelines at a relatively low pressure, and the lines are located two to three feet from the surface.<sup>9</sup>

In 2012, the Environmental Protection Agency Office of Inspector General (OIG) analyzed distribution pipelines in the U.S. and found that methane emissions from the lines are due largely to leaks in the pipes.<sup>10</sup> Leaks are most likely to occur in pipelines made of cast iron and unprotected steel.<sup>11</sup> This is because unprotected steel is prone to corrosion, and after some time iron degrades to softer elements making it susceptible to cracks.<sup>12</sup> Further, the OIG found that of the 1.2 million miles of distribution pipelines in the United States, more than 32,000 miles were made of cast iron, and more than 61,000 miles were made of unprotected steel.<sup>13</sup> New York was among the top four states with the most miles of both types, with 4,417 miles of iron and 6,900 miles of steel.<sup>14</sup>

Most leaks do not pose an immediate threat to safety, but they can have serious long-term consequences. Methane is 80 times more potent than carbon dioxide.<sup>15</sup> Over the course of 20 years, these methane leaks have the same impact on climate change as 240 coal-fired power plants.<sup>16</sup> It is estimated that the gas leaks that occur each year could meet the heating and cooking needs of about 7 million homes.<sup>17</sup> Methane leaks also contribute to smog, which injures everyone, especially those suffering from asthma and other respiratory conditions.<sup>18</sup>

Some leaks have the potential to be quite deadly. In San Bruno, California (pictured here) an explosion, caused by a faulty weld in Pacific Gas and Electric's steel natural gas pipeline killed 8 people in 2011.<sup>19</sup> New Jersey has reported 45 incidents over the last two decades caused by methane leaks, five of which resulted in death.<sup>20</sup> In addition to health and safety risks, methane leaks can have large costs. In Boston, it has been estimated that \$90 million worth of natural gas is lost each year due to leaks.<sup>21</sup> Not only do companies lose revenue, but they also subject themselves to costly regulations and litigation.<sup>22</sup>



## Obstacles

The distribution pipelines are maintained by the utility companies, which are subject to various state regulations.<sup>23</sup> The companies are required by law to inspect the lines for safety and fix issues, but the rules do not require the repair of all leaks.<sup>24</sup> Also, because regulation is in the hands of the states, the federal government has limited power to interfere. Although methane is a significant contributor to climate change, many utility

companies are reluctant to make the necessary changes for cost reasons.

There is little financial incentive for companies to reduce methane leaks because the leaks often do not pose immediate threats.<sup>25</sup> Therefore, some utility companies claim that upgrades are unnecessary and expensive, and that it is hard for them to make major upgrades.<sup>26</sup> In order to increase rates to pay for repairs and upgrades, the companies must obtain permission from the state's public utility commission.<sup>27</sup>



### Methane Emissions in New York

In New York State, 11% of methane emissions are due to leaks released through the processing and transportation of natural gas.<sup>28</sup> One study found that in Manhattan alone, leaks occurred at a rate of 4.25 per mile.<sup>29</sup>

The Environmental Defense Fund (EDF) conducted its own study of pipelines in various cities, including Staten Island and Syracuse. In Staten Island, a leak was found for every mile driven; more than 25% of the lines were made of corrosive materials; and more than

half of the lines were over 50 years old.<sup>30</sup> In Syracuse, similar leaks were found every 2 miles, and more than 30% of the pipelines were composed of corrosive materials.<sup>31</sup>

New York has committed itself to reducing greenhouse gas emissions by 40% by the year 2030, and 80% by 2050;<sup>32</sup> and the State has proposed a Methane Reduction Plan to address the issue of methane emissions in the state. The plan targets the three largest sources: oil and gas, landfills, and agriculture.<sup>33</sup> Regarding oil and gas, the plan has three target areas: (1) reducing leakage and addressing emission sources, (2) enhancing reporting requirements, and (3) improving regulation consistency.<sup>34</sup>

In order to combat emissions, the plan focuses on evaluating the best technologies and methods to identify the leaks.<sup>35</sup> Since natural gas is invisible and usually odorless, it makes detection difficult. One idea to reduce emissions is to require the addition of an odorant to the gas.<sup>36</sup> The proposed policy changes to require the odorant would encourage enhanced safety and methane monitoring.<sup>37</sup> Many emissions in New York are due to leaks in oil and gas storage tanks, abandoned wells and other pieces of infrastructure that are under-regulated because they are not direct emission sources.<sup>38</sup> The plan proposes proper plugging of abandoned wells; increased inspection of active wells; and research on additional technology to detect leaks.<sup>39</sup>

The Methane Reduction Plan looks at distribution pipelines and bestows upon the Department of Public Service (DPS) the responsibility for prioritizing leak repairs.<sup>40</sup> The DPS will provide incentives to utilities so that they will maintain a low backlog of leaks and replace leak prone pipes. Additionally, the agency must identify alternative funding that does not rely solely on rate payers.<sup>41</sup> The plan calls for tax reform as well, by establishing new policies that limit rate pressure on infrastructure replacement.<sup>42</sup> In order to increase public awareness, New York State hopes to increase educational outreach about methane leaks and install stationary methane detection devices for residential methane detection.<sup>43</sup> Finally, the plan seeks to improve consistency across the state by sending out a Memorandum of Understanding that requires utilities to comply by using similar actions and equipment.<sup>44</sup>

## Recommendations

The Methane Reduction Plan is a step in the right direction; however, there are some concerns. For one, it does not provide for the replacement or upgrade of existing pipes. The EDF found that over half of the pipes in Staten Island and Syracuse were over 50 years old. Many of the pipelines across the state are also old and made of materials prone to deterioration. Although the Plan provides incentives for utilities to replace leak prone pipes, there is no full explanation of what that will entail. However, some states have

implemented leak detection technology that hones in on the worst spots.

Until recently, measuring methane used to be quite difficult because technology did not exist to quantify values with precision.<sup>45</sup> In 2010, Picarro Inc. created a special sensor, known as a "cavity ring down spectrometer", that can detect atmospheric concentrations of greenhouse gases with more precision.<sup>46</sup> The EDF has used this technology to detect methane leaks by equipping Google Street View cars with the sensors. The sensors allow the EDF to trace emissions back to the source and hone in on the highest risk pipes. Public Services and Enterprises Group, the public utility company for New Jersey, recently worked with the EDF to upgrade its pipelines. Initially, Public Services estimated that it would need \$1.6 billion to upgrade 800 miles of pipeline, which was denied funding by the state.<sup>47</sup>



However, using its Google Street View cars, the EDF was able to narrow the project to 570 miles, costing \$905 million over 3 years.<sup>48</sup> This plan was approved. Now while that may still seem pricey, not all changes made to pipelines

need to be. Replacing control devices on gas storage tanks can cost as little as \$3,000.<sup>49</sup> Additionally, service companies that inspect and repair pipeline themselves at a reduced cost are becoming more accessible to utility companies.<sup>50</sup>

Large energy companies are also realizing the necessity for more methane controls. The nation's biggest producer, Exxon, has announced its commitment to developing and deploying new and efficient technology.<sup>51</sup> It is planning a 3-year effort to phase out gas powered controls and replace them with compressed air. Also, the company is looking into using planes, satellites, and drones to detect leaks before they become serious. The third largest natural gas producer, South Western Energy, has taken steps to combat

methane emissions as well. So far, it has upgraded its pumps and compressors, deployed new tanks to capture surges of gas, and replaced leaky gas-powered controls with gear powered panels and fuel cells, apparently with good results.<sup>52</sup>

## Conclusion

Methane leaks from natural gas pipelines cause significant damage to the environment by increasing the amount of greenhouse gases in the atmosphere. New York has created a plan to combat the issue, but that is just the beginning. The State should investigate and make use of additional technologies and policies to address this significant threat.

## Sources

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