

DOWNSTREAM OIL THEFT:

COUNTERMEASURES AND GOOD PRACTICES

By Dr. David Soud

With contributing authors Dr. Ian Ralby and Rohini Ralby





GLOBAL ENERGY CENTER

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Cover: Pipes are pictured at Mexico state oil firm Pemex's Cadereyta refinery in Cadereyta, on the outskirts of Monterrey, Mexico, January 23, 2019. REUTERS/Daniel Becerril

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We extend a special thanks to SICPA for their generous support for this project, without which this report, and those that preceded it, would not have been possible. We also thank SICPA and SGS for making it possible to hold a workshop on this report in Abu Dhabi, UAE, on 10 January 2020, at which experts from around the world shared their reflections on the report as it approached completion. We appreciate all those who gave helpful feedback at that event and through correspondence.

In addition, we express tremendous gratitude for the time, insights and, in some cases, courage, of those who have provided ground truth for this entire series. This report would not have been possible without the generosity of many interviewees from industry, government, and civil society who shared their experiences openly and honestly.

Finally, we thank the Atlantic Council for continuing to prioritize this work on downstream oil theft and for providing the opportunity to examine—in this report—what is working, rather than to just focus on problems.

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Executive Summary

In recent years, downstream oil theft—the criminal exploitation of refined petroleum products—has become a lucrative global industry, posing manifold economic, security, environmental, and social threats that must be effectively addressed. This report examines concrete countermeasures, legal and policy measures, and regional and international measures that can combat downstream oil theft and prevent its revenues from funding far more nefarious activities, including terrorist attacks as well as trafficking in drugs, weapons, and persons.

The first line of defense against downstream oil theft consists of concrete countermeasures: technologies that can be used to gain visibility on both fuel flows and activities in the physical spaces surrounding those flows.

Fuel marking, especially with covert molecular markers that are detected in very low concentrations by sophisticated instruments and can be made impossible to “launder” out of refined products except at prohibitive cost, has proved highly successful in detecting widespread and sometimes overlapping forms of downstream crime, including fuel adulteration, fuel dilution, diversion of subsidized products, and dumping of export or transit fuel. Governments around the world that have implemented molecular marking programs have routinely seen sharp reductions in these crimes and corresponding increases in revenues. Other technologies—including aerial surveillance, Global Positioning System (GPS) tracking, digitized metering, and sophisticated monitoring platforms—offer different, often complementary windows on the downstream sector.

Concrete countermeasures, however, only address the “risk” aspect of criminals’ risk-reward calculus. To confront the “reward” side, a coherent strategy against downstream crime must also include legal and regulatory measures. Price interventions that create distortions in the market are major incentives for downstream crime, and one of the most important policy remedies for fuel theft is fuel subsidy reform, including leveraging technology to change how subsidies are targeted and delivered. Such policy shifts can counter the smuggling and adulteration that fuel subsidies

incentivize. Phasing out fuel subsidies altogether, though likely to reap enormous benefits in the long term, is a far more difficult undertaking. It is, therefore, critical that governments time any reforms, when possible, to coincide with down periods in the oil markets, and that any gradual reductions in subsidies be paired with compensatory social programs. The promotion and enforcement of transparency in the downstream sector through appropriate legal and regulatory frameworks is another critical policy countermeasure.

A great deal of downstream crime crosses borders, and even oceans, and its repercussions are seldom limited to one country. It, therefore, needs to be confronted with countermeasures that involve regional and international mechanisms. Trade agreements and customs unions can serve as frameworks in which states can coordinate their efforts against downstream crime. Signatories to such agreements can share the benefits, including recouped revenues, that come with regionally coordinated efforts to police trade in the downstream sector. There are also a number of national and international legal instruments that can be leveraged against downstream criminals. These range from specific laws to an array of international conventions and other mechanisms against organized crime and corruption.

In areas where maritime fuel smuggling is rampant, coordinated activities such as joint or combined maritime patrols and regional maritime security frameworks have enjoyed striking success. This is all the more important given the intricacies of sovereignty and jurisdiction on the seas; the failure to recognize those legal constraints can undo an otherwise successful operation. Perhaps the most problematic regional and international concern related to downstream crime is the flourishing of conflict economies, in which the proceeds from fuel theft and smuggling help perpetuate large-scale human suffering. Such crises usually defeat most forms of intervention, but the international community must keep working to craft strategies to close off the use of refined products to inflict human misery.


Governments seeking to counter downstream crime should consider the following recommendations:

- Conduct a thorough risk assessment for crime and corruption in the downstream sector;
- Use concrete countermeasures to gain visibility on downstream flows and increase the sense of risk for criminal actors;
- Craft or reform policies, especially those related to fuel subsidies and other pricing mechanisms, to disincentivize some forms of downstream crime;
- Shape laws and regulatory policies so as to explicitly criminalize downstream theft and fraud, and provide sufficiently deterrent penalties;
- Determine how best to leverage both domestic and foreign laws, where applicable, to investigate and prosecute downstream crimes;
- Proactively coordinate with other states in controlling cross-border crime, conducting investigations, and prosecuting transnational downstream criminal operations;
- Pursue stakeholder engagement strategies that alert stakeholders to the destructive effects of downstream crime and the need for concerted action against it; and
- Use data collected from the above activities to refine the suite of countermeasures, track downstream crime as it evolves, and adapt to the changing tactics of criminals.



Goats wander at the fishing quarter in Maputo, Mozambique. Source: Wikimedia Commons/Stevie Mann

Introduction

 Our world runs on refined hydrocarbons. Despite the undeniable reality of climate change and the unfolding transition to renewable energy sources, products such as gasoline, diesel fuel, kerosene, and liquid petroleum gas (LPG) still serve as the scaffolding for most of the global energy platform. As a result, fuel is always in demand, widely distributed, and easily diverted to illicit profit. The scale of downstream (post-refinery) crime—fuel-related theft, smuggling, and various forms of fraud—is impossible to calculate, because it happens mostly in the shadows and in every country on Earth, but estimates place it at hundreds of billions of dollars per year. Those dollars translate into massive revenue losses, often to developing states that need such revenues the most, while generating enormous profits for corrupt officials, unscrupulous traders, criminal syndicates, militant groups, and terrorist organizations. Furthermore, fuel crime often keeps company with trafficking in narcotics, weapons, and persons.

Downstream crime is also perennial. In the months leading up to the publication of this report, a rapidly emerging set of circumstances, including the price war between Saudi Arabia and Russia and the COVID-19 pandemic, sent crude prices tumbling lower than in decades, shrinking margins for both legitimate and illicit traders in crude. But there is always profit in manipulating refined products, and it can be done anywhere.

Nowhere, however, is fuel intrinsically illicit. Unlike narcotics, weapons, or endangered species, fuel is a generally legitimate commodity that can be moved within jurisdictions, across borders, and around the world in plain sight. The invisible supply chains through which criminals generate their profits from fuel often overlap or even merge with legitimate supply chains. Furthermore, fuel-related social and economic policies designed to support low-income populations can also serve to incentivize fuel-related crime. Countering downstream crime, therefore, requires a distinct set of strategies and tools, operating simultaneously at different levels. This report on downstream oil theft, the fourth in a series produced by I.R. Consilium in partnership with the Atlantic Council,

explores countermeasures that can be incorporated into comprehensive strategies for mitigating fuel-related crime.

The report is divided into three sections: concrete countermeasures, legal and policy measures, and regional and international measures. Concrete countermeasures are technologies that can be deployed to detect, document, and deter downstream criminal activity. Since concrete countermeasures can only be effective within a larger legal and policy framework that disincentivizes downstream crime, legal and policy measures form an essential part of a coherent effort to combat such activities. Finally, because so much of the criminality that surrounds refined products crosses borders and has international repercussions, regional and international measures are crucial to any comprehensive strategy.

Our approach in this report has been to combine desk research, field observation, and interviews to provide as comprehensive an exposition of countermeasures as the length of this report permits. In doing so, we have sought to keep the focus narrow, limiting our discussion as much as practicable to tools and policies that have a direct bearing on downstream crime. As indicated in the text, in some places we have deliberately anonymized sources, and certain other information, so as to maintain objectivity and neutrality when discussing the activities of industry players who operate in competition with each other.

Our previous reports—*Downstream Oil Theft: Global Modalities, Trends, and Remedies* (2017), *Downstream Oil Theft: Implications and Next Steps* (2017), and *Oil on the Water: Illicit Hydrocarbons Activity in the Maritime Domain* (2018)—surveyed the breadth and variety of downstream crime and touched on some ways to raise awareness of this global challenge and coordinate efforts against it. This report, with its emphasis on specific tools and strategies for countering downstream crime, is meant to serve as a starting point for concerted action at the national, regional, and international levels. We look forward to seeing those processes, and to participating in some of them as well.

Concrete Countermeasures

US Supreme Court Justice Louis Brandeis famously wrote, “Sunlight is said to be the best of disinfectants; an electric light the most efficient policeman.”¹ The common denominator of both is visibility. Concrete countermeasures are primarily about this sort of visibility, both of the actual flows of legitimate fuel supply chains and of activity in the physical spaces surrounding those flows. These forms of visibility serve a dual purpose. First, they allow regulatory and law enforcement agencies to determine what sort of fuel-related crimes are being perpetrated, at what scale, and in many cases, at what points along the supply chain. Second, by shining a light on the areas in which crime proliferates, concrete countermeasures add considerably to the “risk” side of criminals’ risk-reward calculus. They can be extremely effective deterrents.

Concrete countermeasures can, therefore, serve as a first line of defense against downstream theft,

diversion, and fraud. Though the oil and gas industry already incorporates some sophisticated tools for monitoring and securing its physical infrastructure, most of which fall under the heading of Supervisory Control and Data Acquisition (SCADA), they are largely beyond the scope of this report, though there may be some overlap in the relevant technologies. This first section will address a range of tools, from fuel integrity programs to sophisticated technologies for collecting and integrating data on fuel flows, that can function effectively within a suite of measures countering downstream crime.

Fuel Integrity Programs

Fuel integrity programs are designed to provide as much visibility as possible into fuel stocks and flows in order to counter various forms of tampering and diversion. Though these programs involve a number of components, including



A man sits on a beach with the Petrobras fuel tanks in the background in the Guanabara bay in Rio de Janeiro, Brazil. Source: REUTERS/Pilar Olivares

¹ Louis D. Brandeis, *Other People's Money and How the Bankers Use It*, New York: Frederick A. Stokes Company, 1914, 92, <http://www.gutenberg.org/files/57819/57819-h/57819-h.htm>.

sophisticated data analysis, at their heart rests the technology of fuel marking. Marking fuel so as to identify a particular type and trace its flow through the supply chain—either for commercial brand protection or for regulatory and law enforcement purposes—has been practiced for decades. At the most basic level, dye can be added to fuel so as to mark it visibly; at the most sophisticated extreme, molecular markers can be dosed into refined products and subsequently measured at very low concentrations with portable X-ray fluorescence (XRF) spectrometers or gas chromatographs (GC); portable gas chromatography-mass spectrometry (GC-MS) devices can also be used. Accordingly, there is a continuum of sophistication and cost.

Often, multiple markers can operate simultaneously in layers: one less secure marker for rapid evaluation and a more sophisticated, molecular marker for forensic evaluation, either in the field or in a laboratory. Markers of any kind can be qualitative (simply indicating the presence of a marked product) or, more commonly in the case of molecular markers, quantitative (indicating not only the presence of a product but also its precise concentration, and, therefore, the degree to which the marked fuel has been diluted or adulterated).

While private sector brand protection programs for such high-tax fuels as road diesel and gasoline use launderable markers because there is no incentive for criminals to launder those products, molecular marking programs are the most effective approach from the standpoint of government regulation and law enforcement, particularly in countering crimes involving adulteration and subsidized fuels. The reason for this is that though solvent dyes, fluorescent markers, and even near-infrared fluorescent (NIRF) markers can all be chemically or otherwise “laundered” out of the fuel they mark, molecular markers are not only covert but also effectively impossible to launder out, or even to detect without specialized equipment. In this light, it is important to note that any marker whose detection involves chemical reactivity—including markers linked with kits available to economic operators along the value chain—is, by definition, launderable: if the marker reacts, it can be removed. While, according to one industry expert, with enough sophistication and determination, any marker can eventually be “broken,” a well-designed molecular marker should be effective for about ten years of steady use.²

The basic mechanism for molecular marking is that certain refined products are injected with markers at extremely low but precise concentrations (detectable or even measurable in parts per million or parts per billion), usually at refineries or storage depots prior to distribution; once the marked products have circulated along the supply chain, fuel can be evaluated by self-powered mobile testing systems that deliver near-immediate results, which are then uploaded to cloud-based or central server-based databases for documentation and broader analysis of the data collected. In a fuel integrity program, this secondary analysis is crucial, as it allows not only the monitoring of stocks and flows, but also tracking of where and how criminals are operating, and how they might be adjusting their methods.

All these procedures require expertise, and it is crucial that the providers charged with implementing a fuel integrity program have the necessary credibility. Such reliability is most obviously indicated by an established track record of successful implementation, but it also derives from independence in relation to regulatory and law enforcement authorities as well marker manufacturers. Additionally, the implementation process must itself be credible enough to support the forensic-level precision of the marking technology. This means not only consistent operating standards for all the relevant instrumentation, but also monitoring tools that ensure the program is running as it should, providing sound results and clear visibility of the chain of custody for every sample. In many programs, economic operators witness the entire procedure in which their samples are tested, the sampling and testing processes are videotaped, and test results are pushed directly to central databases without human interference. For all these precautions to add up to an effective program, however, there must be adequate resourcing: enough training, personnel, vehicles, testing units, and transportation infrastructure to provide the necessary coverage. Internal audits, as well as independent security audits, should be undertaken regularly.

A fuel integrity program can be an effective countermeasure against some classic modalities of downstream crime, including illegal arbitrage by diluting the domestic fuel supply with smuggled product, subsidy abuse, fuel adulteration, and dumping of export or transit fuel—fuel ostensibly being shipped through the jurisdiction to another destination, and, therefore, untaxed—into the domestic market. Accordingly,

² Interview, November 2019.

marking becomes a compelling option for governments facing several “red flag” enabling conditions for downstream crime: domestic fuel subsidies, especially those that reduce prices at points of sale; low refinery capacity, which can lead to smuggling into or, in the case of imported fuels, out of the domestic market; high volumes of export or transit fuel, which can be dumped; and lower fuel prices in neighboring states, which incentivize smuggling into the domestic market. The benefits of marking include the detection of smuggling and adulteration, the recovery of lost revenues (and, therefore, increased revenues without the burden of additional taxation), forensic evidence for the prosecution of criminals, and increased confidence among domestic fuel consumers as well as domestic and foreign investors looking for indications of good governance.

Fuel integrity programs, including those that layer molecular markers with other, less secure markers, can be tailored to meet the requirements of any jurisdiction. One option is to mark all fuels, once taxes or duties on them are paid, with an invisible tax stamp, which is usually quantitative so as to indicate adulteration or dilution. Somewhat more narrowly, a government facing the common problem of adulteration of higher-grade or more heavily taxed fuels with low-tax/untaxed or low-grade fuels might wish to mark the latter products qualitatively or quantitatively, depending on how much information it wants to glean from its marking program. Export fuels might be marked before shipment, or transit fuels on entry, so as to detect illegal dumping on the domestic market. More extensively, quantitative markers specific to each type of domestic fuel would identify the extent and kind of domestic adulteration, or the degree to which legitimate fuel has been mixed with smuggled or dumped fuel of comparable grade. Depending on the prevailing modalities of crime and the amount and specificity of data desired, there is room for many variations.

It is important, however, to recognize the modalities of downstream crime for which fuel integrity programs are not a solution. These programs secure the legitimate supply chain; they do not, for concrete reasons, have any application against downstream crimes in which refined products are diverted from the legitimate supply chain and never merged back into it. For instance, fuel smuggled out of a jurisdiction with a marking program will never be subject to the checks that program provides, and fuel diverted from

the legitimate supply chain and distributed and sold entirely on the domestic black market will also escape detection.

In collecting the illustrative material that follows, the authors interviewed personnel from a range of industry entities, many of which operate in competition with each other and all of which have achieved success in countering downstream crime. To ensure neutrality in the report's presentation of fuel marking and related issues, specific information from those interviewees, including the statistics and other documentation they provided, has been anonymized; in some cases, the countries in which these firms have operated are not identified. Generally, however, we would like to thank the following firms for their candid and generous contributions: SICPA and SGS, who sponsored this report, and Authentix, Dow Chemical Company, John Hogg, and Tracerco.

CASE STUDIES AND LESSONS LEARNED

Downstream crime takes many forms, and fuel marking programs generally respond to multiple threats. Most of those threats, however, can be classed under two broad headings: profiteering through fuel adulteration and tax fraud through the introduction of untaxed products into the legitimate, taxed supply chain, often termed “dilution.” Those two categories form a useful point of departure for examining the successes and lessons learned from several fuel marking programs.

Adulteration of road fuels, with lower-grade fuels or even non-petroleum products, is all too common, especially in the developing world. Fuel might be tampered with at individual retail stations, but far more often such illicit activity occurs during the transit link from storage depots to retail outlets, and criminals operating in that stretch of the supply chain can be quite systematic in their approach. As one industry expert indicated, retail stations often have little or no idea what is actually being delivered for them to sell.³ One such example was uncovered through a recently established fuel integrity program in Mozambique, which involved quantitative molecular markers specific to five different fuels and led to a 32 percent increase in fuel-related tax revenues in only six months.⁴ A routine inspection found a reduced concentration of molecular marker in the diesel sold at an established brand's retail site, indicating either

³ Interview, November 2019.

⁴ Mozambique's Ministry of Energy and Mineral Resources and Mozambique Tax Authority, “The Oil Marking Experience” (presentation), Reconnaissance Tax Stamp Forum, Budapest, Hungary, September 11-13, 2019.



A truck passes through customs in Mozambique. Source: Pixnio.com/Lisa Yarmoshuk

adulteration or dilution. Testing revealed that large amounts of kerosene had been added to “stretch” the fuel. When the owner protested his innocence, investigators checked the supply chain leading to the retail station, beginning with the invoice for the previous night’s fuel delivery. They found no record that the truck that had made that delivery had ever been marked, even though the marking facility was at a port only three kilometers away. The inspectors then went to the address printed on the delivery invoice, where they found a bottling plant with several aboveground storage tanks. For years, the distributor had been sending one fleet of trucks to load marked fuel and return to the bottling plant, adulterating the fuel there to stretch it by volume, and then sending the adulterated fuel out for delivery in a separate fleet of trucks.⁵ By targeting such adulteration, the Mozambican fuel integrity program quickly led to a 60 percent drop in kerosene sales—indicating how much kerosene had previously been purchased for use as an adulterant.⁶

The fuel integrity program in Tanzania, launched in 2010, clarifies the impact molecular marking can have on fuel adulteration. As in much of the developing world, one of the main adulterants is kerosene, which is widely used as lighting and cooking fuel by the rural and even the urban poor, and it is, therefore, often subsidized. In consequence, Tanzania’s fuel marking program tags with a quantitative marker all kerosene, diesel, and gasoline products for domestic consumption, providing the means for detecting both adulteration and the introduction of smuggled fuel into the legitimate supply chain.⁷ Official figures indicate that, while in 2007 as much as 78 percent of the fuel sold in Tanzania was adulterated, by 2019 the adulteration rate had been reduced to 4 percent. The University of Dar es Salaam calculated the resulting increase in revenues from 2010 to 2013 alone at more than \$200 million.⁸ According to one industry spokesman, the increase in revenues was nearly immediate, with a 20 percent jump in the marking program’s first year, and

⁵ Interview, November, 2019.

⁶ Mozambique’s Ministry of Energy and Mineral Resources and Mozambique Tax Authority.

⁷ Energy and Water Utilities Regulatory Authority (EWURA), *The Mid and Downstream Petroleum Sub Sector Performance Review Report for Year 2018*, EWURA, Government of the United Republic of Tanzania, 31, <https://www.ewura.go.tz/wp-content/uploads/2019/07/Downstream-Petroleum-Performance-Review-2018-1.pdf>.

⁸ Nelly Mtema, “Tanzania: Fuel Adulteration Cases Decline, Says EWURA,” *allAfrica*, November 4, 2019, <https://allafrica.com/stories/201911040185.html>.

has since increased as trust has accumulated among consumers and other stakeholders.

Similar results were obtained in Zambia, where authorities noticed two “red flags”: legally declared volumes of taxable refined products remained static despite considerable economic growth from 2015 to 2018, and a large number of engine failures suggested widespread adulteration. A molecular marking program was launched, and, according to industry data, quickly revealed that 21 percent of Zambian retail fuel stations were selling untaxed fuel. Multiple compliance audits followed, and the program led to a nearly 18 percent increase in declared domestic fuel volumes, a 50 percent drop in the documented adulteration rate, and increased revenues of \$40-60 million per year. Perhaps most impressively, failed fuel samples fell from the initial 21 percent to 1 percent within a year and a half.⁹

Uganda enjoyed similar success against adulteration: a fuel integrity program led to a drop in fuel

adulteration from just over 29 percent in 2008 to 0.5 percent in 2018.¹⁰ One interesting aspect of Uganda’s program is a “name and shame” policy of publicizing the identities of non-compliant retail stations in the press, ensuring that reputational damage is a key consequence of malfeasance.¹¹

In some cases, a collaborative cross-border approach to fuel marking has succeeded in mitigating smuggling as well as adulteration. In 2002, the government of the United Kingdom (UK) determined that it was losing £1.6 billion per year in fraud and adulteration involving diesel fuel.¹² Not only was low-tax, industrial diesel—known as “red diesel” because it was marked with red dye—being used to adulterate higher-grade, high-tax “white diesel,” kerosene (marked also, with Coumarin) was serving as an adulterant as well.¹³ Despite law enforcement efforts, organized criminal groups on the border between the Republic of Ireland and Northern Ireland continued to engage in large-scale laundering of existing markers so as to profit from “cocktailing” and smuggling fuel. In 2012, the resulting losses



Normally known as the Inland Revenue building, this is the view of HM Revenue and Customs along the Nottingham Canal at Castle Meadow Campus in the United Kingdom. Source: Creative Commons/Alan Murray-Rust

⁹ Internal document, October 2019.

¹⁰ PWKD, “Uganda: Standards Dept Closes Fuel Service Stations,” *Petrolworld*, August 31, 2018, <https://www.petrolworld.com/africa-middle-east/item/30643-uganda-govt-bars-45-erring-fuel-service-stations>.

¹¹ Interview, November 2019.

¹² HM Revenue and Customs, “Combatting Fuel Duty Fraud,” December 2017, http://data.parliament.uk/DepositedPapers/Files/DEP2017-0810/Combatting_Fuel_Duty_Fraud__December_2017_.pdf.

¹³ *Ibid.*

to Northern Ireland's revenue were estimated at £80 million, and the Republic of Ireland's at more than €150 million per year.¹⁴ That year, HM Revenue and Customs and the Irish Customs Commissioners collaborated to establish a joint fuel integrity program, which was launched in 2015. A molecular marker was applied only to low-duty fuels, lowering the cost of the program while targeting tax fraud through adulteration.¹⁵ In the first two years of the program, more than 2.6 million liters of fuel were confiscated; it was found that, though the older markers had been wholly or partially laundered out of much of the illicit fuel, the molecular marker invariably remained. The fuel laundering industry in Northern Ireland declined precipitously, and in 2017, the Republic of Ireland determined that the sale of laundered fuel in retail outlets had been virtually eliminated.¹⁶ That same year, illicit diesel was measured at 6 percent of market share in Northern Ireland, down from 19 percent a decade before.¹⁷ Recently, some criminals have explored more sophisticated attempts to launder diesel, including the highly hazardous method of distillation, as seen in the case of a significant laundering operation broken up in Northern Ireland in January 2019.¹⁸

While most adulteration occurs between the storage depot and retail site, in some countries adulteration occurs mostly at the retail end. This is the case in Brazil, where retail stations have served as arenas for various criminal activities, including money laundering as well as fuel adulteration and the sale of stolen and illegally refined product.¹⁹ Low-tax industrial solvents, including kerosene, benzene, toluene, and hexane, were being used to adulterate retail diesel and gasoline; the practice had led not only to revenue losses of hundreds of millions of dollars, but also to increased pollution and mechanical breakdowns. In 2001, authorities launched an extensive fuel integrity program, involving multiple markers; the results had to be verifiable and secure enough for admissibility as forensic evidence. Millions of liters of solvents were marked each month, and field tests were conducted at the fork-offs of retail stations. The program not only

significantly reduced adulteration but also quickly led to an increase in prosecutions within two years.²⁰

Dilution of the legitimate supply chain generally occurs through three means. Criminals might smuggle fuel from other jurisdictions with lower prices, taking advantage of illegal arbitrage while evading import duties. They might also dump transit fuel into the domestic market. Similarly, they might divert domestically produced fuel intended for export, which is also untaxed, and dump it into the domestic market. In each case, the offenders generate substantial profits while undermining the legitimate market, evading taxes, and depriving the government of revenue.

One example of a fuel integrity program successfully responding to dilution is Serbia, where in 2013 it was found that 37 percent by volume of the diesel consumed in the country was unaccounted for, leading to losses of hundreds of millions of euros per year in revenue. The problem resulted from two modalities of dilution and one of adulteration. The first form of dilution was smuggling into Serbia by criminal syndicates, either across the Drina River from Bosnia to warehouses where it would be sold on the black market or across the Danube from Romania on barges and smaller craft. The second was domestic dumping of Serbian export fuel intended for Kosovo. The adulteration mostly involved base oils.²¹ After establishing an appropriate legal and regulatory framework, the Serbian government started a molecular fuel marking program in early 2014. Gasoline, diesel, and other fuels were marked across every mode of transport in the legitimate supply chain, from railcars to barges. The marking had two layers: an additive pack with an NIRF marker for quick field testing, and a molecular marker for forensic-level results.²² Within the first year, Serbian oil marketing companies (OMCs) saw a notable increase in diesel and gasoline sales while sales of base oils sharply declined, and fuel excise revenues rose sharply.²³

14 Dr. Ian M. Ralby, *Downstream Oil Theft: Global Modalities, Trends, and Remedies*, 2017, *Atlantic Council*, 76, https://www.atlanticcouncil.org/wp-content/uploads/2017/01/Downstream_Oil_Theft_web_0327.pdf.

15 Interview, November 2019.

16 HM Revenue and Customs, "Combatting."

17 British-Irish Parliamentary Assembly, *Final Report from Committee A (Sovereign Matters) on Illicit Trade and the Border*, October 2019, <http://www.britishirish.org/assets/Final-Report-Illicit-Trade-BIPA-Committee-A-October-2019.pdf>, 3.

18 "Suspected 'Multi-Million Pound' Fuel Laundering Raid in Newry," BBC, January 11, 2019, <https://www.bbc.com/news/uk-northern-ireland-46844898>.

19 Gram Slattery and Marta Nogueira, "Brazil's Petrobras Confronts a New Foe: Fuel Thieves," Reuters, September 20, 2019, <https://www.reuters.com/article/us-brazil-oil-crime-focus/brazils-petrobras-confronts-new-foe-fuel-thieves-idUSKBN1W5114>.

20 Interview, November 2019, and internal case study, September 2019.

21 Interview, October 2019.

22 Asian Development Bank, "Fuel-Marking Programs: Helping Governments Raise Revenue, Combat Smuggling, and Improve the Environment," Governance Brief, Issue 24 (2015): 5, <https://www.adb.org/sites/default/files/publication/174773/governance-brief-24-fuel-marking-programs.pdf>.

23 Internal document, n.d.; Interview, September 2019.



Passenger train with Romanian-built diesel engine in Šargan Vitasi station in Serbia. Source: Wikimedia Commons/Herbert Ortner

Though, as mentioned above, Mozambique's recently launched fuel integrity program addresses adulteration, it is also intended to curb rampant dumping of transit fuel, which was the first "red flag" that alerted authorities to the scale of fuel fraud in the country.²⁴ Transit fuel was diverted and either sold directly on the black market or used to dilute the legitimate fuel supply. The resulting discounts to consumers led to serious undercutting of the retail market and the revenues it generated. In one case, diesel connected with a mining operation showed low concentrations of marker, indicating dilution. This led to repeated checks of the fuel in the operation's main diesel tank, which supplied three mines via pipeline. All the tests came back clear until one day an irregular complement of staff led inspectors to a subsidiary tank at a different mine than usual; that tank was found to contain wholly unmarked fuel. The manager of that mine, under pressure to keep costs down, had resorted to buying inexpensive transit diesel on the black market instead of using diesel from the metered main tank.²⁵

LESSONS FROM PRIVATE SECTOR BRAND PROTECTION

Fuel marking programs for brand integrity pursue narrower goals and require different methods than government initiatives, but they offer universally valuable insights into implementing fuel marking. To begin with, brand protection is primarily about ensuring that a company's high-grade fuels are not adulterated or diluted.²⁶ In these programs, therefore, 100 percent of high-end fuels are tagged with quantitative markers, and the markers need not be resistant to laundering as there would be no profit in laundering them out. As a rule, the markers are included with the additive packs that go into the fuels.²⁷

One of the lessons to be drawn from private sector fuel marking is that where a program uses a client's existing testing and reporting infrastructure, it must either adapt effectively to the operational realities on the ground or work around them. One company providing marking for an Asian firm's industrial lubricants found, on implementing the program, that there was a disconnect between the company's business

²⁴ "Mozambique Oil & Gas: Government to Introduce Tightened Fuel Controls," *Mozambique Resources Post*, August 1, 2017, <https://mozambique-mining-post.com/2017/08/01/mozambique-oil-gas-government-to-introduce-tightened-fuel-controls/>.

²⁵ Interview, November 2019.

²⁶ *Ibid.*

²⁷ *Ibid.*

development strategists and the operations people conducting field testing. The company's paper-based documenting and reporting system proved cumbersome, and its production methods presented challenges to precise dosing of markers. The marker provider subsequently provided tablets with access to cloud-based databases in all its marking programs, thereby bringing its own reporting infrastructure to each contract.²⁸ The lesson: know in detail the operational realities on the ground and adjust accordingly before launching a program.

Another case from the private sector illustrates the importance of sustaining momentum in a marking program. In one Asian country with a strong corporate culture of brand protection, a fuel marking program succeeded in protecting a brand's integrity for several years. After a time, complacency set in: the value of the program was not consistently communicated, new management cut the program's budget, and brand damage from off-spec fuels at retail stations soon followed. Recognizing the problem, the company asked the marker provider to run an audit, which revealed that fuel fraud had increased by 12-15 percent. In any fuel marking program, complacency is a recipe for failure, for the straightforward reason that criminals are quick to detect a lack of vigilance and exploit it.²⁹

A third example shows the impact of fuel marking programs on the direct experience of consumers. A brand protection program in a European country detected a cluster of off-spec readings in one small region supplied by the same terminal, which was owned by a company other than the one contracting the marking program. On investigation, it was found that the problem was not fraud but rather a faulty additive system at the terminal, which was promptly fixed. Regardless, consumers at those stations had not been getting the fuel grade they were paying for. The incident underscores the reality that when consumers—and, therefore, taxpayers—have confidence in the fuels available on the retail market, they are less likely to turn to the black market.³⁰ It follows that public awareness campaigns linked with fuel marking programs can have lasting impact.

SHIFTING TERRAIN

As effective as fuel integrity programs often are against a given set of downstream criminal activities, criminals can rapidly adjust, evacuating the areas a program targets and shifting their operations elsewhere. This sort of adaptive criminality highlights the fact that fuel marking alone is not a comprehensive solution to criminal activity in the downstream sector. Closing off an opportunity for illicit profit in one area virtually guarantees a surge in criminality elsewhere, and effective fuel integrity programs may have to sequentially seal off openings for criminal exploitation. Ghana, a country described by one industry executive as “one of the most progressive countries in the world” in taking on downstream crime, exemplifies how a comprehensive and evolving approach to downstream crime links fuel marking with other countermeasures.

The Ghanaian Petroleum Products Marking System (PPMS), introduced in 2013 and run by the National Petroleum Authority (NPA), is fairly complex. At one level, high-grade diesel and low-grade gasoline are tagged in two layers, with both NIRF and molecular markers; as in other programs, the former allows quick field testing and the latter a more precise, forensic-quality assessment in the field or in a laboratory. If an initial screen for the NIRF marker produces a failing result, then NPA personnel can test an additional sample via Gas Chromatography-Mass Spectrometer (GC-MS) in a refinery laboratory. At a second tier, subsidized fuels, including kerosene, low-tax diesel, and premix for the fishing industry, are tagged with different molecular markers to enable their identification if they are used as adulterants.³¹ According to NPA officials, Phase II of the PPMS, launched in February 2020, includes new technology that will allow for real-time securing, encryption, and analysis of marker data, and involve monthly testing of 75 percent of the country's retail sites.³² The PPMS has largely succeeded in mitigating adulteration in Ghana—in February 2020, NPA officials reported that, since its inception, the program had reduced the rate of fuel integrity violations from 32 percent to under 2 percent—but the program's success also led to a shifting criminal dynamic, including a rise in the dumping of export fuel, including untaxed marine diesel intended for foreign vessels but diverted

²⁸ *Ibid.*

²⁹ *Ibid.*

³⁰ *Ibid.*

³¹ Asian Development Bank, “Fuel-Marking Programs,” 4.

³² “Chief of Staff Formally Launches NPA's Phase II Petroleum Product Marking Scheme (PPMS),” Ghana Chamber of Bulk Oil Distributors, February 19, 2020, <https://cbodghana.com/chief-of-staff-formally-launches-npas-phase-ii-petroleum-product-marking-scheme-ppms/>.



The Millennium Challenge Corporation (MCC) has built roads in Ghana to increase access to diesel and electricity.
Source: Flickr.com/US Embassy Ghana

into the domestic road vehicle market.³³ Though all dumped export fuel except high-grade gasoline could be detected via the PPMS, the NPA took additional steps to both deter and disincentivize diversion and dumping. The measures included taxing marine diesel for export at domestic rates; enhancing the NPA's bulk road vehicle (BRV) GPS tracking and monitoring system; sending teams from an export task force to key border crossings; sharply limiting the products, purchasers, and means of transit for fuel exports to key destination countries; and establishing an export bond system that requires fuel exporters to post the equivalent of the domestic tax on each export cargo, refundable only after multiple verifications of delivery abroad. The measures were so effective at countering export dumping that the number of Ghanaian fuel exporting companies declined from thirty to three—a striking indicator of the prior scale of dumping.³⁴

Such a deliberate closing off of avenues to illicit profit is effective, but the challenges faced by fuel integrity programs vary, and overcoming them can require patience, sagacity, and exceptional rigor of execution. As noted above, the design and implementation of

any marking program has to account not only for the predominant modalities of crime to be countered, but also for possible adjustments by criminals, and for the realities of the terrain—in terms of physical geography as well as infrastructure. The fuel integrity program recently launched in the Philippines, for instance, must counter smuggling and adulteration across two thousand inhabited islands with thousands of kilometers of coastline and significant stretches of ocean between them, in a region of mostly archipelagic states that suffer widely from fuel smuggling and related crimes. It is a formidable challenge on a technical level alone: because fuel offloaded from tankers to smaller vessels offshore can bypass landside checks, testing has to go to the vessels themselves, so instruments had to be designed to be seaworthy.

RESISTANCE

At the same time, like most fuel integrity programs, the initiative in the Philippines must overcome resistance from stakeholders in the downstream sector. As one industry executive put it, “There’s always some pushback from somewhere.”³⁵ A series of interviews

³³ Jonathan Donkor, “NPA Vows to Clamp Down on Adulteration of Petroleum Products,” *Ghanaian Times*, February 20 2020, <https://www.ghanaiantimes.com.gh/npa-vows-to-clamp-down-on-adulteration-of-petroleum-products/>; Mabel Aku Baneseh, “Govt Recovers GH¢5.2m from Petroleum Under-Declaration,” *Graphic Online*, May 20, 2019, <https://www.graphic.com.gh/news/general-news/govt-recovers-gh-5-2m-from-petroleum-under-declaration.html>.

³⁴ Sheila Addo, National Petroleum Authority (NPA), interview, October 2019; “Interim Guidelines for the Export and Re-Export of Petroleum from Ghana to the Neighbouring Countries,” official memorandum, NPA, September 8, 2017; “Oil Export Companies Reduce from 30 to 3 Following NPA Measures,” *GhanaWeb*, April 9, 2019, <https://www.ghanaweb.com/GhanaHomePage/business/Oil-export-companies-reduce-from-30-to-3-following-NPA-measures-641654>.

³⁵ Interview, November 2019.

with industry personnel revealed a common array of parties that often, though by no means always, resist fuel marking programs. OMCs may object to perceived costs or slowdowns in operations, though a successful marking program will generally pay for itself through recouped revenues, and marking a large volume of fuel takes perhaps two minutes. Any front-loaded costs can be easily managed; in South Africa, for instance, one fuel integrity program was initially funded with a minimal levy on kerosene, the revenues of which went to refund fuel companies' related expenses.³⁶ At the same time, OMCs, commonly but not exclusively smaller ones, may be implicated in fraud themselves. As one industry executive pointed out, OMCs have been known to under-declare their volumes to evade taxes; since fuel marking providers invoice by the liter or kiloliter marked, marking programs effectively enforce transparent declarations.³⁷ In some cases, OMCs may be involved in dumping transit or export fuel as well.³⁸ Similarly, politically exposed persons (PEPs), especially those entrusted with regulatory oversight, may profit from illicit downstream activities. From their positions within the political class, they may set up obstacles to the successful design, launch, or implementation of a fuel integrity program. Tenders for a program might be written in what one industry expert called "an extraordinarily specific manner," or unexpected technical challenges, such as a change in the required sample volume, might be thrown up as last-minute barriers.³⁹ Where a program's rollout cannot be undermined completely, it can often be delayed. An industry executive described how some parties can "hide behind legislation" while attempting to discredit a new program.⁴⁰ Opposition might also arise from well-organized stakeholder groups that covertly benefit from black market fuel, such as transport providers or shippers.⁴¹

The recently launched fuel integrity program in the Philippines has already met with impressive success in limited implementation, but it has also had to overcome both active resistance from oil companies and red tape from government agencies charged with approving the program. An oil industry group set forth a list of

specific procedural challenges ostensibly based on its member companies' concerns about disruptions in operations and reliability of the marking and testing processes.⁴² One major downstream company drew criticism and even outright suspicion when it asked for an exemption from the program on the grounds that manual injection of the molecular markers was unreliable and unsatisfactory.⁴³ On the government side, the Philippine Department of Energy delayed implementation in order to determine any possible impact of the fuel markers on fuel efficiency or air pollution—questionable grounds given the established science on the composition and effects of current fuel markers.⁴⁴

One remarkable instance of the successful undermining of a fuel integrity program unfolded in a large Asian country. At issue was the abuse of household kerosene subsidies; subsidized kerosene was being diverted both for commercial use and to adulterate road fuels. The existing marker for subsidized kerosene, a blue dye, was launderable, so a program was launched in which a molecular marker was layered beneath the existing dye. The new marker was immediately effective, and adulteration rates, in particular, declined. Resistance emerged in the wake of that success, as OMCs, retail dealers, and even some officials in the relevant ministry began to protest alleged costs and question the reliability of the program's field testing. When the introduction of a new marker led to minor complications in the resulting transition, opposed parties seized the opportunity to escalate their criticism, the program was discontinued, and the government declared that it would issue a new tender for a kerosene marking program. The program was never renewed.⁴⁵

One way to counter at least some of these forms of resistance is through a comprehensive stakeholder engagement strategy. All the actors along the downstream value chain need to understand how a fuel integrity program will benefit them. This approach can be especially effective when it comes to end consumers, who pay a daily price in pollution, mechanical breakdowns, lack of public funds, and the frustration of being defrauded. It is vital to remember that

³⁶ *Ibid.*

³⁷ Interview, October 2019.

³⁸ Interview, November 2019.

³⁹ *Ibid.*

⁴⁰ Interview, October 2019.

⁴¹ Interview, November 2019.

⁴² Ben O. de Vera, "Oil Industry Players Seek Clear-Cut Rules on Fuel Marking System," *Philippine Daily Inquirer*, June 24, 2019, <https://business.inquirer.net/273177/oil-industry-players-seek-clear-cut-rules-on-fuel-marking-system>.

⁴³ Ben Kritz, "Fuel Marking," *Manila Times*, October 31, 2019, <https://www.manilatimes.net/2019/10/31/opinion/columnists/topanalysis/fuel-marking/652215/>.

⁴⁴ Melissa L. T. Lopez, "Random Fuel Mark Tests Start June," *BusinessWorld*, February 28, 2019, <https://www.bworldonline.com/random-fuel-mark-tests-start-june/>.

⁴⁵ Interview, November 2019.



Oil spill aftermath in Nueva Valencia, Guimaras, Philippines, which released the odor of kerosene into the air. Source: flickr.com/Shubert Ciencia

consumers take on significant risk every time they purchase and use fuel they cannot trust not to damage or even ruin a vehicle or generator; in poor communities, especially, there is real potential for devastating losses, including the loss of livelihoods. In areas where adulterated or otherwise illicit fuel is available, consumers as well as criminals must consider a risk-reward calculus, and as enticing as a discount might be, it too often is not worth those risks. Public education on the need for a fuel integrity program, the goals to which the program aspires, and the destructiveness of the forms of criminality it targets, can galvanize political will among officials, and even compel cooperation from resistant private sector actors. It is even possible to enlist end consumers as *de facto* regulators by establishing effective avenues for complaints about fuel quality, including via purpose-designed mobile apps.

NONDUALISM: THE INSIDER THREAT

A perennial issue in crime related to the extractive industries is nondualism, a term coined by Rohini Ralby to signify the reality that regulatory, security, and law enforcement personnel can function appropriately in their official capacities at certain times, while operating as criminals at other times. This may take the form of official corruption related to licenses, contracts, or enforcement measures, or it may translate more concretely into security personnel moonlighting as lawbreakers. This challenge to governance can take root in fuel integrity programs, where regulators and field operators wield a power not unlike that of customs officials. As one industry expert framed the issue, it is all too easy for an unscrupulous field tester to show up at a retail station with two vials of fuel, one clean and another adulterated, and demand payment for a passing result.⁴⁶ In a slightly different case, fuel inspectors at a Ugandan border checkpoint were

⁴⁶ Interview, October 2019.

themselves siphoning off excessive amounts of fuel from incoming tanker trucks and arranging for its sale on the black market.⁴⁷ Similarly, an official in an industry regulatory authority lamented that while it was possible to ensure good practices within that agency, its enforcement powers did not extend to the agencies responsible for revenue collection, where corruption was far more entrenched.⁴⁸ Such practices not only impair the material effectiveness of fuel integrity programs, they also erode public confidence in both regulatory measures and retail products.

Any program intended to ensure the integrity of a supply chain must demonstrate integrity in its own practices and procedures, and proactively seek to maintain those standards. There are, accordingly, a number of proven countermeasures for “insider threats” that can be applied in the context of marking programs. Paying field operators and laboratory technicians well, rotating personnel in the field, and conducting regular audits are all valuable tools for maintaining a marking program’s integrity. As previously noted, many fuel integrity programs document field tests with both automatic uploads of results and camera footage of each sample evaluation. More broadly, a sense from top management down of sustained commitment and high standards can also do much to ensure professionalism among personnel in sensitive positions.

Closely related to the problem of insider threats is that of marker integrity. Marked fuel is, in practical terms, legitimate fuel, and since markers are used in such minute concentrations, one drum of marker can effectively legitimize the contents of dozens of tanker trucks.⁴⁹ Consequently, markers themselves have tremendous value as potential criminal commodities, and must be safeguarded through their own carefully secured supply chain.

Collecting and Integrating Data on Fuel Flows

While fuel marking can indicate to what extent fuel has been adulterated or diluted, and in some cases point to where along the supply chain such tampering occurs, it provides limited visibility into day-to-day fuel flows. Every link

in the downstream supply chain presents its own opening for criminal activity, but special attention must be paid to product pipelines, storage depots, transit links, and retail sites, where fuel can be easily diverted or tampered with.

TARGETED AERIAL SURVEILLANCE

Downstream pipelines are physically dangerous venues for theft, but in certain places those risks have not deterred criminals, some of whom are highly organized, possess the necessary technical skills, and operate in coordination with OMC personnel. In Mexico, for instance, “milking” fuel pipelines has become a billion-dollar criminal industry and led to destabilizing violence in some parts of the country. Confronted with countermeasures such as shifting the gasoline and diesel supply chain from pipelines to tanker trucks, some cartels have even begun tapping LPG pipelines.⁵⁰ Though, as previously mentioned, the oil and gas industry has an array of technologies and practices geared toward SCADA, including remote monitoring and various sensors that can detect leaks, taps, or even vibrations arising from activity in the vicinity of pipelines, targeted aerial surveillance can also be used by law enforcement as both a cost-effective means of maintaining visibility on high-risk areas and a visible deterrent to theft from pipelines and storage facilities.

Unmanned aerial vehicles (UAVs, or drones) are an increasingly cost-effective means of performing targeted surveillance of downstream sites prone to criminal activity, from pipelines to depots to retail sites. In Mexico, students at the Universidad Tecnológica de Querétaro have actually designed and provided to law enforcement drones for patrolling fuel pipelines in the crime-ridden neighboring state of Guanajuato. The drones, which cost about \$9,000 each, can fly up to forty-minute trips and are equipped with night vision.⁵¹ A broader 2016 Nigerian proposal recommends creating a network of small “cells” or zones along a pipeline (or elsewhere along the supply chain) that can be efficiently covered by small remote-controlled drones mounted with long-range zoom cameras transmitting images in real time to control centers. The drones could be launched quickly in response to an alarm triggered by another monitoring system or after reports of

47 Ralby, *Downstream Oil Theft*, 43-44.

48 Interview, September, 2019.

49 Interview, November 2019.

50 “Argus Analysis: Mexican Fuel Thieves Find New Ways,” World LPG Association, March 7, 2018, <https://www.wlpga.org/mediaroom/argus-analysis-mexican-fuel-thieves-find-new-ways/>.

51 Estrella Álvarez, “Universitarios de Querétaro Fabrican Drones para Detectar Tomas Clandestinas,” *Milenio*, February 14, 2018, <https://www.milenio.com/estados/universitarios-queretaro-fabrican-drones-detectar-tomas-clandestinas>.



A soldier looks on as a tanker truck arrives at the state oil firm Petróleos Mexicanos (Pemex) refinery in Salamanca, in Guanajuato state, Mexico, January 8, 2019. Source: REUTERS/Daniel Becerril

suspicious activity, and could collect and convey vital information, possibly even tracking criminals who leave the vicinity before law enforcement or other personnel can arrive.⁵²

Aerostats are a more persistent form of aerial surveillance, and distinctive in that they not only serve as platforms for cameras and other monitoring equipment but also function as highly visible deterrents to crime. In the latter capacity, they have been found to sharply reduce criminal activity in areas where they are visible, and they can be easily moved so as to frustrate attempts by criminals to operate in the blind spots often left by surveillance towers.⁵³ A fit-for-purpose helium surveillance aerostat from the Brazilian firm Altave, for instance, is often deployed tethered at approximately two hundred meters off the ground, can withstand winds over sixty kilometers per hour, and can remain aloft for sixty days before needing routine checks. These aerostats' surveillance payloads can include wireless-transmitting cameras with

long-range optical and digital zoom, night vision, and infrared sensors, enabling detection of vehicles at thirty-five kilometers and of individual human activity at seven kilometers.⁵⁴ Furthermore, Altave provides a platform in which images are algorithmically analyzed for indicators, and unusual activity triggers alerts. In one case, fuel thieves who had previously tapped a pipeline were identified when an aerostat's surveillance cameras recorded them selling the stolen fuel in the vicinity and their behavior was flagged at the control hub by the system's analytics.⁵⁵

TRACKING SYSTEMS

Given that a great deal of diversion, adulteration, and dilution takes place during the transit link between storage depots and retail sites, another key measure for enhancing downstream visibility is GPS tracking of transport and delivery vehicles. On land, this mainly entails installing GPS transponders on every tanker truck moving refined products, monitoring the trucks'

52 Francis Enejo Idachaba, "Monitoring of Oil and Gas Pipelines by Use of VTOL-Type Unmanned Aerial Vehicles," *Oil and Gas Facilities* (January 2016): Vol. 5, No. 1, https://www.researchgate.net/publication/294735581_Monitoring_of_Oil_and_Gas_Pipelines_by_Use_of_VTOL-Type_Unmanned_Aerial_Vehicles.

53 Interview, November 2019.

54 Altave, "Technology," n.d., <http://www.altave.com.br/en/tecnologia/>; Altave, "Altave Horizonte," n.d., <http://www.altave.com.br/en/produtos/altave-horizonte/>.

55 Interview, November 2019.

movements, and checking those movements against scheduled itineraries. Trucks carrying transit fuel can also be monitored, within one country or through an agreement between neighboring countries. In 2017, for instance, Kenya, Rwanda, and Uganda launched a joint Electronic Cargo Tracking System (ECTS) that triggers alarms in a monitoring center when any fuel truck diverges from its scheduled route or lingers too long at any stop. As one spokesman put it, the goal is “seamless visibility” of transit fuel flows.⁵⁶

It is crucial that, insofar as possible, the GPS transponders are tamperproof. On the most basic level, a transponder should not be easily removed from a truck. In one case in Uganda that was documented in our first report—*Downstream Oil Theft: Global Modalities, Trends, and Remedies*—the ECTS transponder of a tanker truck carrying fuel in transit was detached and transferred to a motorbike, whose rider was paid to follow the tanker’s scheduled route while the tanker dumped the transit fuel on the Ugandan market. The ruse was only uncovered because the

motorcyclist disregarded instructions and failed to follow the scheduled route, setting off an alarm.⁵⁷ A more insidious threat involved GPS spoofing, in which radio signals can be used to mask or alter the apparent location of a transponder. While this was once the province of state actors, effective spoofing equipment can now be purchased commercially for under \$500.⁵⁸ Tracking programs must account for these risks.

METERING

The most obvious window on fuel flows is metering, yet antiquated or poorly maintained metering systems vulnerable to manipulation still operate throughout much of the developing world. One of the most effective concrete countermeasures against downstream crime is, therefore, the installation at refineries, storage depots, and retail sites of accurate, tamper-resistant, digital volume gauges and flow meters that can be remotely monitored. The point is to remove as much as possible of the human element from measuring fuel flows, and to make the resulting readings



A woman working in a construction site moves building material in a section of a new hospital in Hoima town, Uganda, following the discovery of large amounts of oil in Lake Albert, which created an oil-fueled boom in construction and development, April 27, 2015. Source: REUTERS/James Akena

⁵⁶ Neville Otuki, “Joint Kenya, Uganda, Rwanda Real-Time Transit Cargo Tracking Starts in January,” *Business Daily Africa*, October 25, 2016, <https://www.businessdailyafrica.com/magazines/Joint-Kenya--Uganda--Rwanda-real-time-transit-cargo-tracking/1248928-3429736-4atawp/index.html>.

⁵⁷ Rabby, *Downstream Oil Theft*, 45.

⁵⁸ Maria Korolov, “What is GPS Spoofing? And How You Can Defend Against It,” *CSO Online*, May 7, 2019, <https://www.csoonline.com/article/3393462/what-is-gps-spoofing-and-how-you-can-defend-against-it.html>.

accurate and accessible. In some settings, the type of meter itself can make a difference. Singapore, for instance, has recently mandated a transition from volumetric flow meters to mass flow meters for bunker fuel deliveries to ships because it is possible to aerate bunker fuel to increase its volume, disguising a shortfall in actual mass delivered.⁵⁹ In more typical downstream applications, however, volumetric flow meters, such as the common turbine meters that use rotors within pipes to measure flow rates, are adequate.⁶⁰ What enhances visibility is not so much the mechanism itself as the digitization and real-time sharing of measurement. As one industry executive said, “The more you can digitize things, the better.”⁶¹

DATA INTEGRATION PLATFORMS

If a sufficient number of meters and GPS transponders can be monitored remotely from a central hub, regulators can have clear visibility of flows throughout the downstream sector. This visibility can form part of an integrated monitoring system that opens a real-time window on fuel flows. In Ghana, such a function is performed by an Enterprise Relational Database Management System (ERDMS). The ERDMS links with software-backed meters and gauges at both depots and retail sites, and also with the NPA’s bulk road vehicle (BRV) tracking system that monitors the country’s approximately 3,500 fuel trucks, to provide real-time visibility into both the stocks and the flows of the country’s fuel supply.⁶² The ERDMS has since also been linked with the Ghana Customs Management System (GCMS), allowing fuel flows to be instantly cross-referenced with transactions, closing gaps that could be exploited to commit fraud.⁶³

MARITIME DOMAIN AWARENESS PLATFORMS

At the apex of visibility are extremely sophisticated surveillance platforms that can also perform tailored algorithmic analyses of the data they collect. These have so far been developed primarily for maritime

domain awareness (MDA). The maritime space, too often neglected in discussions on oil and fuel crime, is in fact a prime arena for illicit hydrocarbons activity, including downstream crime. In 2019, the global tanker capacity reached 568 million deadweight tons, adding up to more than a quarter of total seagoing trade.⁶⁴ Fuel smuggling at sea, whether it be in the Mediterranean, off West Africa, in the waters of Southeast Asia, or elsewhere, is a massive industry. The sheer scale and complexity of maritime activity, however, means that a comprehensive view of the maritime space poses its own problems; complete visibility generates an overwhelming amount of information, making it almost as useless as zero visibility. What the most sophisticated MDA platforms can do is filter information according to specific goals, serving as what one industry expert called “the narrow end of the funnel.”⁶⁵

One such platform that has been leveraged against fuel smuggling is provided by Windward, a company launched in 2010 that began by tracking piracy and has evolved to develop extremely sophisticated data analytics that use machine learning to detect patterns and conduct behavioral analyses of tankers and other vessels. Fuel smuggling in a given region will often entail ship-to-ship transfers of cargo. Any of the hundreds of tankers transiting the region might engage in several legitimate ship-to-ship transfers; the question is, what tankers need to be watched? Windward’s technology answers that question by filtering out the noise of unrelated activities and identifying high-risk tankers. Nigeria has used Windward’s technology to track maritime activities within its Exclusive Economic Zone (EEZ); another African country, on using Windward’s threat analysis tool to plan its maritime patrols, saw a drop of 66 percent in illicit ship-to-ship transfers in its waters.⁶⁶ Windward has been used by the United Nations Security Council to detect sanctions violations off North Korea, and contributed to the investigation of a Mediterranean fuel smuggling operation by providing critical intelligence about the movements and loads of the tankers involved.⁶⁷

59 Roslan Khasawneh, “Singapore Port Extends Compulsory Use of Flow Meters to Distillate Barges,” Reuters, April 27, 2018, <https://www.reuters.com/article/us-singapore-port-bunker/singapore-port-extends-compulsory-use-of-flow-meters-to-distillate-barges-idUSKBN1HY18U>.

60 J. Paul Guyer, *An Introduction to Petroleum Fuel Facilities: Bulk Fuel Storage*, Course No. P04-001, CED Engineering, 2014, <https://www.cedengineering.com/userfiles/Intro%20to%20Petroleum%20Fuel%20Facilities%20-%20Bulk%20Fuel%20Storage.pdf>.

61 Interview, September 2019.

62 Addo, “Interim Guidelines”; “NPA Launches BRV Tracking Scheme,” *Reporting Oil & Gas*, April 3, 2017, <http://www.reportingoilandgas.org/npa-launches-brv-tracking-scheme/>.

63 “GCNet Partners GRA, NPA to Enhance Revenue Collection in Petroleum Downstream Activities,” Ghana Chamber of Bulk Oil Distributors, August 20, 2018, <https://cbodghana.com/gcnet-partners-gra-mpa-to-enhance-revenue-collection-in-petroleum-downstream-activities/>.

64 Statista, “Capacity of Oil Tankers in Seaborne Trade from 1980 to 2019 (in Million DWT),” 2019, <https://www.statista.com/statistics/267605/capacity-of-oil-tankers-in-the-world-maritime-trade-since-1980/>.

65 Interview, November 2019.

66 *Ibid.*

67 United Nations Security Council, *Report of the Panel of Experts Established Pursuant to Resolution 1874 (2009)*, March 5, 2018, https://www.un.org/ga/search/view_doc.asp?symbol=S/2018/171; Benoit Faucon and Summer Said, “On the Fuel Tanker’s Trail: Cracking Oil Smuggling Could Help Stem Flow of Migrants and Weapons,” *Wall Street Journal*, March 10, 2016, <https://www.wsj.com/articles/smuggling-probe-focuses-on-fuel-tankers-trail-1457576358>.



A Marine with Weapons Company, Battalion Landing Team, 2nd Battalion, 2nd Marine Regiment, 22nd Marine Expeditionary Unit, provides security on the bridge of United States Naval Ship *Robert E. Peary* during a vessel board, search, and seizure training exercise, May 10, 2011. In the training exercise, Marines and Sailors with the 22nd MEU pursued and raided a hostile vessel suspected of illegally smuggling weapons and illicit material in the Mediterranean Sea. Source: MARINES/US Marine Corps photo by Sgt. Josh Cox

Skylight, an MDA platform developed and supported by Vulcan, Inc., is being used by a number of coastal and archipelagic countries. Originally designed to identify and track illegal, unreported, and unregulated (IUU) fishing, Skylight is a data aggregation and analysis platform that uses satellite surveillance and machine learning technologies to identify forms of suspicious activity and issue alerts accordingly. One such indicator is a suspicious rendezvous—the drawing into close proximity of two vessels for a long period of time—indicating a potential ship-to-ship transfer of some kind. If one or both of two such vessels is a fuel tanker, that transfer can be checked by authorities against authorization records and, if necessary, the vessels involved targeted for further investigation. Skylight can detect vessel activities even when one or both of the vessels has turned off its automatic identification system (AIS) transponder or become “dark.” With Skylight’s deep database, vessel histories and ownership networks can be analyzed and provided to appropriate officials, who can then more efficiently deploy enforcement resources.

By providing visibility into fuel flows and activities surrounding the downstream supply chain, concrete countermeasures shrink the shadowy areas where criminals mostly operate in the downstream sector. These criminals’ increasing sophistication and adaptability allow regulatory, law enforcement, and security agencies to gain the information and agility to respond effectively to both discrete incidents and larger criminal trends. To be effective, however, these agencies must match up with the demands of the particular spaces in which they are being deployed. Furthermore, they can only be highly effective within a legal and regulatory framework that both undergirds concrete countermeasures and follows through on what they can accomplish. These larger considerations will be the subject of the next section of this report.

Legal and Policy Measures

While concrete countermeasures are the first and most direct line of intervention in downstream oil and fuel theft, the reality is that they alter only the “risk” portion of criminals’ risk-reward calculus. An effective suite of mitigating practices needs to address the “reward” aspect of that dynamic as well. By altering the policy environment in which criminals operate, a government can decrease the lure of profiteering through adulteration, dilution, or smuggling; within a domestic legal framework that enables effective prosecution and meaningful penalties for downstream crime, the criminal calculus becomes even more problematic.

Fuel Subsidies

There is no more direct way to disincentivize downstream crime than through reforming or dismantling price interventions that incentivize criminal activity. As framed in a 2005 study on illicit downstream activity in Senegal, “distortion in the prices of the various oil products and grades provides the main incentive for the ongoing malpractice in the downstream oil sector.”⁶⁸

Consumer fuel prices reflect a buildup that may include the landed cost of the crude (if domestically refined) or refined products, taxes and fees assessed, and operating costs to downstream operators from refinery to pump. Interventions, including subsidies and other adjustment mechanisms, can be staged at a number of junctures in that supply chain. Fuel subsidies are the most common form of price intervention that encourages downstream crime—especially consumer subsidies, which might either serve end consumers in general or target specific groups, such as low-income households or

small-scale industries. Around the world, fuel subsidies are the prime enabling conditions for illegal arbitrage through smuggling or product dumping, and for profiteering through fuel adulteration. In a recent survey, the Organization for Economic Cooperation and Development (OECD) listed forty countries engaged in such fuel price interventions.⁶⁹

Subsidies are notoriously difficult to define or trace as they take many forms, are often informal and “off the books,” and can be treated by governments with a discretion bordering on secrecy. Few governments publish, at least in any systematic way, data on fuel subsidies.⁷⁰ Furthermore, their effects must be accounted for in combination with other fiscal mechanisms. The intricacies that bedevil any thorough discussion of energy subsidies are, therefore, beyond the scope of this report, and in any case have been examined in some of the policy briefs cited herein. Seldom, however, do those publications emphasize the role fuel subsidies play in downstream criminal activities. The issue of pricing is often so critical in combating downstream crime, both domestically and across borders, that it merits examination in light of this issue alone.

In the most basic terms, fuel subsidies can be divided into pre-tax subsidies, which are limited to addressing supply costs and constitute a small percentage of total subsidies, and post-tax subsidies, which are far broader and make up the vast majority of subsidies, especially consumer subsidies. According to the International Energy Agency (IEA), at a high point in 2013, the global cost of consumer fossil fuel subsidies alone was estimated at \$458 billion.⁷¹ Further distinctions can be drawn between blanket subsidies and targeted subsidies. Blanket subsidies set a uniform price on a given product for all consumers, while targeted subsidies make use of a range of mechanisms

68 Amadou Kane, “Alleviating Fuel Adulteration Practices in the Downstream Sector in Senegal,” ESMAP Technical Paper 079, World Bank, September 2005, https://www.esmap.org/sites/default/files/esmap-files/07905.Technical%20Paper_Alleviating%20Fuel%20Adulteration%20Practices%20in%20the%20Downstream%20Oil%20Sector%20in%20Senegal.pdf.

69 Organization for Economic Cooperation and Development (OECD)/International Energy Agency (IEA), “Update on Recent Progress in Reform of Inefficient Fossil-Fuel Subsidies That Encourage Wasteful Consumption,” 2019, 14, <https://oecd.org/fossil-fuels/publication/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2019.pdf>.

70 *Fossil Fuel Subsidies in Asia: Trends, Impacts, and Reforms*, Asian Development Bank, 2016, 9, <https://www.adb.org/sites/default/files/publication/182255/fossil-fuel-subsidies-asia.pdf>.

71 Sarabjeet Hayer, “Fossil Fuel Subsidies,” European Parliament Directorate-General for Internal Policies, 2017, 5, [http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595372/IPOL_IDA\(2017\)595372_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595372/IPOL_IDA(2017)595372_EN.pdf).

to attempt to steer subsidies toward specific populations or economic activities; those mechanisms generally include dual or multitiered pricing, often linked with some form of beneficiary registration and allocation. The types of fuel most often subsidized, especially in the developing world, tend to be kerosene (which is widely used for lighting and often cooking by rural and low-income populations), diesel (which not only runs many generators and vehicles but is also crucial for industries that need to limit costs in order to remain competitive), marine fuel (which is essential to the fishing industry), and LPG (which is increasingly being promoted as an alternative to kerosene). Gasoline, however, is often subsidized as well.

INCENTIVIZING DOWNSTREAM CRIME

There is wide-ranging debate over how best to address the complex problem of fuel subsidies; what is not up for debate is their significance in relation to fuel smuggling and diversion. Put simply, fuel subsidies create opportunities for illicit arbitrage and for “stretching” licit products. Fuel that is cheap in one place or for a specific use due to subsidies can be bought at the artificially reduced price and then either sold as-is elsewhere for considerable profit or added to higher-cost products to increase their volume. Blanket fuel subsidies lend themselves to cross-border arbitrage; tiered subsidies often allow for domestic black market arbitrage. Any subsidy on kerosene or low-grade diesel invites adulteration of either higher-grade diesel or gasoline.

CROSS-BORDER ARBITRAGE

Smuggling is the most obvious consequence of fuel subsidies. In many instances, oil exporting countries with substantial subsidies create harmful cross-border spillover, as they effectively extend implicit subsidies into neighboring states, undercutting those countries’ retail markets and, therefore, their tax bases. This effect is, so to speak, bankable, and it occurs in every region. One striking example is Colombia, which sits between two countries that heavily subsidize fuel. Venezuela’s massive fuel subsidies under the governments of first

President Hugo Chávez and then President Nicolás Maduro gave rise to a thriving black market and lucrative smuggling industry along the mostly rugged border with Colombia; much of that trade came under the control of Venezuelan security forces and criminal and militant groups on both sides of the border. In 2016, a smuggler could fill a 40,000-liter tanker truck in Venezuela for \$10 and sell its contents in Colombia for nearly \$20,000, turning a profit of some 200,000 percent.⁷² In 2017, Colombian officials estimated that 400 million gallons of gasoline crossed the border illegally. Much of that gasoline went into the estimated 28 percent of Colombia’s total consumption that is used as a solvent in processing cocaine.⁷³ Sanctions on the Maduro government, however, along with continued mismanagement of Venezuela’s hydrocarbons industry, eventually led to fuel shortages, constraining the smuggling industry. By July 2019, the typical returns for small-scale smugglers, while not nearly as spectacular as two years before, still routinely reached 3,000 percent.⁷⁴ On Colombia’s Pacific coast, fishermen can make more money in one day smuggling subsidized Ecuadoran fuel into Colombia than in a month of fishing. An estimated \$600 million in subsidized fuel has been smuggled annually for at least the last five years from Ecuador into neighboring countries and as far as the United States.⁷⁵

Nigeria’s fuel subsidies, while also intertwined with serious governance issues, have led to decades of smuggling into neighboring states. This smuggling does not primarily involve diesel, for the simple reason that diesel is not subsidized in Nigeria and, therefore, tends to command relatively modest cross-border margins compared to other products. Gasoline, however, is a different story. In October 2019, the price of a liter of gasoline in Nigeria was the equivalent of \$0.40 per liter; in Cameroon, Benin, and Togo the same quantity of fuel sold for \$1.07, \$0.91, and \$0.96, respectively, making for far more lucrative margins.⁷⁶ According to the Nigerian National Petroleum Corporation (NNPC), there are more than 2,200 retail fuel stations along Nigeria’s borders; their storage capacity of nearly 145 million liters far exceeds demand within those areas.⁷⁷ In 2016, then Deputy Minister of Petroleum Ibe

72 Girish Gupta, “Smuggling Soars as Venezuela’s Economy Sinks,” Reuters, January 20, 2016, <https://www.reuters.com/article/us-venezuela-smuggling-insight/smuggling-soars-as-venezuelas-economy-sinks-idUSKCN0UY1IT>.

73 Joshua Collins, “Venezuela’s Oil Crisis Destabilizes Colombia’s Black Markets,” Al Jazeera, June 24, 2019, <https://www.aljazeera.com/ajimpact/venezuelas-oil-crisis-destabilises-colombian-black-markets-190621003555829.html>.

74 “Venezuela’s Fuel Traffickers on the Fringes,” Al Jazeera, July 3, 2019, <https://www.aljazeera.com/programmes/riskingitall/2019/06/venezuela-fuel-traffickers-fringes-190612084802313.html>.

75 Dr. Ian Ralby and Dr. David Soud, *Oil on the Water: Illicit Hydrocarbons Activity in the Maritime Domain*, Atlantic Council, April 2018, 11, https://www.atlanticcouncil.org/wp-content/uploads/2018/04/Oil_on_Water_WEB.pdf.

76 Prices found at GlobalPetrolPrices.com, October 23, 2019.

77 Gabriel Okeowo, “Nigeria’s Petrol Subsidy Regime: Dilemma of the World’s Most Populous Black Nation,” BudgIT, 2019, http://fixouroil.com/wp-content/uploads/2019/03/Nigerias-Petrol-Subsidy-Regime_BudgIT.pdf.



A closure at the Tienditas Bridge border crossing between Colombia and Venezuela. Source: Wikimedia Commons/Voice of America

Kachikwu cast blame for the rampant smuggling on criminal networks of corrupt officials, oil marketers, and transport companies, which divert imported fuel from depots for smuggling into neighboring states.⁷⁸ In early 2018, gasoline consumption in the country outpaced projected domestic demand by twenty million liters a day, a shortfall that NNPC attributed to leakage of subsidized fuel across borders.⁷⁹ The sheer scale of Nigerian fuel smuggling has effectively wiped out Benin's retail gasoline market and subsidized Togolese consumers for as much as 3 percent of that country's GDP.⁸⁰ Wholly apart from Nigeria's own fiscal issues tied to oil and fuel, its smaller neighbors remain mired in tax erosion: if they want to disincentivize the purchase of black market fuel, they have to lower retail prices, which shrinks the tax base, while if they fail to lower prices, the black market eats away at retail sales and erodes the tax base from the other

side. There is no solution apart from pursuing vigorous enforcement measures.⁸¹

Other examples of "subsidy smuggling" abound. The smuggling of Iranian gasoline and diesel into Pakistan and beyond is a chronic issue. Despite reforms in 2010, Iran's fossil fuel subsidies bill of more than \$63 billion remains the world's highest; 14.5 percent of that sum, worth more than \$9 billion, comes from consumer subsidies on diesel.⁸² In October 2019, the price of diesel in Pakistan was nine times higher than in Iran.⁸³ The recent ratcheting up of international sanctions on Iran has further incentivized smuggling as a means of income, creating a toxic mix of shortages, increased unemployment, and weakened currency. One recent estimate placed the quantity of Iranian diesel smuggled into the Baluchistan region of Pakistan as approaching five million gallons per

78 Temitope Omolade, "Five Reasons Why Nigeria Ended Fuel Subsidies," *Deutsche Welle*, May 13, 2016, <https://www.dw.com/en/five-reasons-why-nigeria-ended-fuel-subsidies/a-19255388>.

79 "Baru Raises Alarm Over Activities of Cross-border Petrol Smuggling Syndicates," *Energy Mix Report*, January 24, 2018, <https://www.energymixreport.com/baru-raises-alarm-activities-cross-border-petrol-smuggling-syndicates/>.

80 Montfort Mlachila, Edgardo Ruggiero, and David Corvino, "Unintended Consequences: Spillovers from Nigeria's Fuel Pricing Policies to Its Neighbors," IMF Working Paper WP/16/17, February 2016, 26, 27, <https://www.elibrary.imf.org/view/IMF001/23186-9781475591620/23186-9781475591620/23186-9781475591620.xml?language=en&redirect=true>.

81 *Ibid.* 22.

82 Dalga Khatinoglu, "Subsidies Will Cost Iran \$63.7 Billion in 12 Months," *Radio Farda*, April 18, 2019, <https://en.radiofarda.com/a/subsidies-will-cost-iran-63-7-billion-in-12-months/29890040.html>.

83 According to GlobalPetrolPrices.com, on October 23, 2019, diesel cost \$0.09 per liter in Iran and \$0.81 per liter in Pakistan.

day.⁸⁴ In North Africa, subsidized Libyan fuel has been smuggled at scale into Europe and neighboring states, while the smuggling of subsidized Algerian fuel into Morocco, much of it on donkeys, is a thriving industry.⁸⁵ In Southeast Asia, a vast fuel smuggling industry feeds on subsidies-based arbitrage, as subsidized Malaysian and Indonesian fuel is trafficked into neighboring states. According to one estimate, around three million liters of gasoline and diesel are smuggled overland from Malaysia into Thailand each day; this does not include the large quantities brought in by sea.⁸⁶

BLACK MARKET ARBITRAGE AND MISLABELING

In many cases, subsidies targeted at specific economic activities incentivize black markets and fraudulent sales through mislabeling. In 2008, Malaysia launched a new scheme to subsidize diesel for fishermen; many of the beneficiaries sold subsidized diesel on the black market for a profit of \$0.15 per liter to middlemen who sold the fuel at a profit of \$0.18 per liter, often as part of criminal syndicates that generated billions of dollars from the practice. The black market in subsidized diesel was so lucrative that in 2012, the Malaysian government began enforcing documentation of catches so as to account for fuel consumption by fishermen and mitigate diversion.⁸⁷ In Ghana, premix gasoline for two-cycle engines is subsidized for fishermen by as much as 50 percent off the retail price. The formula for that premix—twenty-nine parts gasoline to one part marine mix—means it can be easily mislabeled and sold as regular gasoline, at nearly 100 percent profit. Through a mixture of heavy fines, a more tightly controlled allocation system, and GPS tracking of delivery vehicles, the Ghanaian National Petroleum Authority (NPA) has succeeded in scaling back the diversion.⁸⁸

FUEL ADULTERATION

Adulteration is another chronic form of fuel subsidies abuse. Any subsidized lower-grade fuel can be used to

“stretch” a more expensive fuel for a handsome profit. One of the most common adulterants is kerosene, which is heavily relied on by rural and low-income communities in much of the world, and, therefore, widely subsidized. The consequences of adulterating diesel or gasoline with kerosene, or high-grade diesel with lower-grade diesel, include not only lost revenues but also increased pollution and damage to vehicle engines.

Kenya is one of many examples of subsidies abuse through adulteration. The practice is so extensive, and so organized, that the Kenyan government estimates that only five million of the thirty-three million liters of kerosene consumed in the country each month are actually used for lighting and cooking; the rest is used for systematic fuel adulteration. The resulting fiscal losses total some \$340 million annually.⁸⁹ In 2018, the government attempted to reduce smuggling by imposing an anti-adulteration tax that raised the price of kerosene by nearly 70 percent. Though the measure was widely criticized as punitive on the poor more than effective against criminals, it did reduce the level of adulteration.⁹⁰

In India, the diversion of subsidized kerosene, much of it for the purpose of adulterating fuel, remains a difficult issue. Roughly 85 percent of kerosene is subject to subsidies targeted toward low-income consumers, who pay roughly half the price of retail. The delivery mechanism begins with monthly state-level allocations determined by the Ministry of Petroleum and Natural Gas; the allocations then extend from India’s three major OMCs through a Public Distribution System (PDS) in which wholesalers who work on commission purchase the kerosene from the OMCs and deliver it to Fair Price Shops (FPSs) administered by the state, which serve as the point of customer sale. The allocation process is rather opaque, and the number of times the kerosene changes hands creates multiple openings for diversion. In 2014, a third of the subsidized, or “PDS,” kerosene was known to be diverted.⁹¹

84 Hamdan Albaloshi, “Iran Sanctions Spur Boom for Pakistani Diesel Smugglers,” Reuters, March 31, 2013, <https://www.reuters.com/article/us-pakistan-iran-smugglers/iran-sanctions-spur-boom-for-pakistani-diesel-smugglers-idUSBRE92U08X20130401>.

85 Jamie Prentis, “Siala Rejects Reports Tunisia Asked for End of Operation Mediterranean Storm,” *Libya Herald*, April 9, 2017, <https://www.libyaherald.com/2017/04/09/siala-rejects-reports-tunisia-asked-for-end-of-operation-mediterranean-storm/>; Marco Militello, “Dirty Oil,” *il Petrolio Dalla Libia Arrivava a Catania Affare Internazionale e Sospetti su Proventi a ISIS*, *Meridio News*, October 18, 2017, <http://catania.meridionews.it/articolo/59734/dirty-oil-il-petrolio-dalla-libia-arrivava-a-catania-affare-internazionale-e-sospetti-su-proventi-a-isis/>; Ralby, *Downstream Oil Theft*, 37–38.

86 Ralby, *Downstream Oil Theft*, 53–54.

87 Christopher Beaton and Kieran Clark, *One Fuel, Two Prices: International Experiences with Dual Pricing of Fuel*, International Institute for Sustainable Development, August 2016, 4, <https://www.iisd.org/sites/default/files/publications/one-fuel-two-prices-international-experiences-dual-pricing-of-fuel.pdf>.

88 Interview, Ghana NPA executive, September 2019.

89 Kennedy Senelwa, “Kenya Loses \$340m Annually to Adulterated Fuel,” *East African*, July 30, 2018, <https://www.theeastafrican.co.ke/business/Kenya-loses-340-million-annually-to-adulterated-fuel/2560-4688368-n4bvh0/index.html>.

90 Ibrahim Oruk, “Tax on Kerosene Has Made Life Difficult, Senators Tell Agency,” *Daily Nation*, August 4, 2019, <https://www.nation.co.ke/business/Tax-on-kerosene-has-made-life-difficult/996-5222430-yf2yfxz/index.html>.

91 Abhishek Jain and Aditya Ramji, *Reforming Kerosene Subsidies in India: Towards Better Alternatives*, International Institute for Sustainable Development, April 2016, 5, <https://www.iisd.org/sites/default/files/publications/reforming-kerosene-subsidies-india.pdf>; Beaton and Clark, *One Fuel*, 10.



A woman carries a jerrycan filled with kerosene oil for cooking on the outskirts of Srinagar, India, December 28, 2016.
Source: REUTERS/Danish Ismail

Fuel adulteration appears to take place largely during transport as only a small fraction of tanker trucks in India are owned by OMCs, and the rest are contracted with minimal regulation or accountability.⁹² A range of countermeasures has so far done little to mitigate the diversion. The longstanding practice of marking PDS kerosene with solvent dye has had negligible impact. In 2015, Prime Minister Narendra Modi's government deregulated the sale of non-PDS kerosene, but the incentivizing price difference between retail and subsidized remained about the same. In 2016, the government began a policy of fortnightly, incremental price increases on PDS kerosene; this measure has had some effect by reducing margins, but the gradual swap of LPG for kerosene is more likely to resolve the issue of kerosene diversion over the long term.⁹³ Regardless, the issue of fuel adulteration in India only begins with kerosene: the illicit industry ranges from small "pop-up" operations and larger kerosene adulteration rackets to extensive, sophisticated schemes in which industrial firms channel chemicals through shell companies to manufacture adulterants.⁹⁴

GOOD PRACTICES IN TARGETING SUBSIDIES

Fuel subsidies tend to incentivize downstream criminal activity to such a degree that the surest approach to mitigation would be to eliminate subsidies altogether—an undertaking fraught with political and economic risks. It is, therefore, vital to understand how countermeasures against fuel subsidy abuse can be built into the subsidy mechanisms themselves, often by leveraging emerging technologies.

In this regard, there are two critical junctures for most consumer subsidies. The first is transport from depot to point of sale. In this context, concrete countermeasures of the sort discussed earlier in this report, such as molecular marking programs, integrated databases for monitoring fuel flows, and GPS tracking of tanker trucks, are the most effective means of mitigating diversion or adulteration. The more problematic of the two junctures is the point of sale to the consumer. Because the point of sale is where the potential illicit profit margins materialize for a large number of

⁹² "Dirty Fuel," DownToEarth.org, June 7, 2015, <https://www.downtoearth.org.in/coverage/dirty-fuel-13661>.

⁹³ Raymond E. Vickery, Jr., "The Pricing of Kerosene in India," *cogitASIA*, April 18, 2019, <https://www.cogitasia.com/the-pricing-of-kerosene-in-india/>.

⁹⁴ Piyush Rai, "Raid Unearths Hoarding of Kerosene in Meerut, 70,000 Litres Seized," *Times of India*, September 8, 2019, <https://timesofindia.indiatimes.com/city/meerut/raid-unearths-massive-hoarding-of-kerosene-in-city-70000-litre-seized/articleshow/71039241.cms>.

purchasers, this is where various forms of diversion and fraud most easily begin. If the delivery of the subsidy can be effectively firewalled off from the actual point of sale of the subsidized fuel, targeting becomes more reliable and profiteering more complicated. The “reward” portion of the risk-reward calculus, therefore, loses at least some of its appeal.

One broad way in which this can be done is by delivering fuel subsidies in the form of compensatory benefits. Jordan in 2005 and Iran in 2010 delivered some of those benefits in cash: a direct cash transfer, either universal or to targeted groups, can effectively cushion the blow of higher fuel prices. While Iran, partly due to geopolitics, still carries a heavy subsidies bill, Jordan has completely done away with fuel subsidies.⁹⁵ The challenge of such a mechanism is its combination of administrative complexity and fiscal bluntness: not only does it require a significant investment in collecting and tracking data on beneficiaries and disbursements, it also writes a blank check to recipients, which

might be spent in ways that offer little benefit to them or their communities.

Another, more highly targeted form of compensatory subsidy disbursement has evolved in Indonesia. In its 2005 fuel subsidy reforms, the Indonesian government avoided the stiff opposition that had hampered its earlier efforts by launching targeted welfare programs. One of them, the cash transfer assistance program (Bantuan Langsung Tunai, or BLT), was a direct cash transfer targeting households below or near the poverty line. Eligible households received payments equaling \$10 over six months to soften the blow of higher fuel prices. This required a great deal of frontloaded administrative investment, including a national survey geared toward fourteen indicators of poverty. The initial assessment identified 15.5 million households, amounting to 28 percent of the country’s total population, as being eligible for the BLT by virtue of having a verifiable income of under about \$17.50 a month. After a reassessment at the end



Aziza Ibrahim carries a cooking gas cylinder to deliver it to a client in Amman, Jordan. She is the first Jordanian woman to operate a cooking gas delivery agency. Source: REUTERS/Ali Jarekji

⁹⁵ David Coady, Ian W.H. Parry, and Baoping Shang, “Energy Price Reform: Lessons for Policymakers,” *Review of Environmental Economics and Policy*, Vol. 12, No. 2 (Summer 2018), 211, <https://academic.oup.com/reep/article/12/2/197/5039946>.

of 2005 that included more than half a million deletions from the beneficiaries list, the total number of eligible households rose to 19.2 million, or just over a third of the population. Beneficiaries received an Energy Compensation Card through which their payments could be disbursed.⁹⁶ In 2007, a similar scheme targeted not only beneficiaries but also the uses to which subsidy payments could be put: the program issued cards through which beneficiaries could spend the balance only on prenatal care, child health care, or education.⁹⁷ The effect was to mitigate opposition to reforms while ensuring not only access to but also use of social services.

India's recent efforts to effect a "subsidy swap" between kerosene and cleaner-burning LPG created an opening to revamp the entire subsidy mechanism in such a way as to mitigate diversion and fraud. The government's solution was to establish a Direct Benefits Transfer scheme (DBT), which in due course became the world's largest. The DBT effectively isolates subsidy payments from the consumer point of sale. Prior to the launch of the DBT, LPG was subsidized according to a dual pricing model that distinguished between a subsidized price for household use and a market price for commercial use. Predictably, large quantities of household LPG were diverted for commercial use, and wealthier Indians bought the lion's share of LPG cylinders. The result was an outsized subsidy burden for the state. In 2014, the government overhauled the subsidy scheme by mandating that all LPG be sold at the market price, with eligible consumers receiving the difference between the market price and the subsidized price via direct bank transfer. The number of cylinders purchased was limited to twelve per year per household. As the supply of LPG cylinders on the black market dwindled, commercial sales surged—the surest indicator that the DBT had largely eliminated abuse of the LPG subsidy.⁹⁸ Since its launch, the DBT has been further refined. A systematic coordination of databases led to the elimination of thirty-five million "ghost" beneficiaries by the end of 2017, a "Give It Up" promotional campaign had moderate success in encouraging higher-income Indians to relinquish their LPG subsidies, and individuals who declare income

above the equivalent of \$15,000 per year have been excluded from the scheme.⁹⁹

One of the more obvious criticisms of such benefit transfer schemes is the reality that many of the world's poor, especially the rural poor, do not have bank accounts. While this is a legitimate concern, the use of mobile phones as banking instruments has spread throughout much of the developing world. Even in the absence of such banking channels, highly targeted subsidy payment schemes can still be put into practice with precisely this technology. In El Salvador, the choice was made not to firewall off the subsidy payment from the point of sale, but to leverage mobile technology to monitor and control the point of sale. More than ten thousand officially recognized distributors of LPG have been given mobile phones loaded with official software and trained in their use. Heads of households eligible for the subsidy are issued biometric identity cards and unique PINs. During a sale, the distributors use their phones to link with a central database that requires the beneficiary to enter the PIN into the distributor's phone. The sale can then be completed and registered at the subsidized price. Afterward, the distributor will receive the differential in the form of a transfer to an official debit card. By transferring the complexity of the transaction away from beneficiaries, who need only have their identity card and remember their PIN, this system overcomes a lack of banking capacity in rural areas.¹⁰⁰

GOOD PRACTICES IN PHASING OUT FUEL SUBSIDIES

As noted above, ending fuel subsidies is a precarious venture. Especially in the developing world, there are compelling incentives to institute or maintain fuel subsidies, regardless of the economic drag they create. Often, subsidies effectively serve as a social safety net in the relative absence of other support programs for the poor. This dynamic is acute in some oil-rich developing states, as subsidies are perceived by much of the population as their share in the resource wealth.¹⁰¹ For such states, however, both high and low market prices can become what one Nigerian consultant termed "a

96 Christopher Beaton and Lucky Lontoh, *Lessons Learned from Indonesia's Attempts to Reform Fossil-Fuel Subsidies*, International Institute for Sustainable Development, October 2010, 17-18, https://www.iisd.org/sites/default/files/publications/lessons_indonesia_fossil_fuel_reform.pdf.

97 "Indonesia's Effort to Phase Out and Rationalise Its Fossil-Fuel Subsidies: A Self Report on the G-20 Peer Review of Inefficient Fossil Fuel Subsidies That Encourage Wasteful Consumption in Indonesia," Ministry of Energy and Mineral Resources and Ministry of Finance, Republic of Indonesia, 2019, 28-29, <https://www.oecd.org/fossil-fuels/publication/Indonesia%20G20%20Self-Report%20IFFS.pdf>.

98 Vandana Hari, "Fuel Pricing and Subsidy Reforms in Asia After 2014 Oil Price Crash: a Comparative Study of Strategies," S&P Global Platts, November 2016, 37-40, https://vandainsights.com/static/wp-content/uploads/2017/07/SPGlobal_Fuel_Pricing_Reforms_2016-11-09.pdf.

99 Abhinav Soman et al., *India's Energy Transition: Subsidies for Fossil Fuels and Renewable Energy, 2018 Update*, International Institute for Sustainable Development, December 2018, 11, <https://www.iisd.org/library/indias-energy-transition-subsidies-fossil-fuels-and-renewable-energy-2018-update>; OECD/IEA, "Update," 11.

100 Beaton and Clark, *One Fuel*, 13.

101 OECD/IEA, "Update," 20.

double-edged sword,” noting that “When oil prices go down, government revenues go down and it becomes difficult to get foreign exchange . . . When oil prices go up, while there is usually an increase in government revenues . . . the big issue is that for refined products like fuel and diesel, the prices go up and [then] . . . the subsidy bill goes up.” In Nigeria in April 2017, when oil prices had rebounded to about \$70 a barrel, the annual subsidy bill reached the equivalent of a quarter of the previous year’s total government revenues; in May, when crude reached \$77 a barrel, the Nigerian National Petroleum Corporation (NNPC) had to fill the gap with \$245 million for that month alone.¹⁰²

That vulnerability to market price fluctuations is only one reason fuel subsidies are widely regarded as hazardous to a country’s fiscal health. Common criticisms, grounded in research, include that most subsidies disproportionately benefit the wealthy, who consume more fuel; encourage wasteful and environmentally damaging consumption; and siphon off funds that could be put to far better long-term use. International obligations also come into play: signatories to the Paris Climate Accord, for instance, must meet carbon mitigation standards, and fuel subsidies make that effort more of a challenge as they encourage consumption and, therefore, increase greenhouse gases. The reality that reducing or eliminating fuel subsidies can open up valuable fiscal space has gained considerable traction, especially since the oil crash of 2014. When Indonesia scrapped its gasoline subsidy and sharply cut its diesel subsidy, the fuel subsidy bill dropped from 13.5 percent of total government expenditure to about one percent, allowing for some \$20 billion to be invested in other initiatives.¹⁰³ Between 2014 and 2017, India took advantage of low oil prices to reform its consumer fuel subsidies such that its oil and gas subsidy bill dropped from more than \$26 billion to \$5.5 billion; about half that reduction came from the elimination of diesel subsidies.¹⁰⁴

Any effort to phase out fuel subsidies can expect to meet with serious and often well-organized opposition, especially from lower-income groups and sectors that rely on subsidized prices, such as public transportation and some forms of manufacturing. Opposition will also come from groups that surreptitiously benefit from subsidy abuse. Still, efforts to reform fuel

subsidies around the world have given rise to some valuable lessons about how to manage that process, which requires considerable political will on the part of a variety of stakeholders.

The first and most obvious good practice is that of timing. The best time to effect fuel subsidy reforms is, of course, when market prices are low and likely to remain so for some time. The oil crash of 2014 opened a window that some governments exploited effectively. For instance, the government of President Joko Widodo in Indonesia came to power in 2014 on the back of a pledge to institute reforms, and immediately took advantage of the precipitous drop in oil prices to scale back fuel subsidies. After an initial price increase of more than 30 percent, consumer subsidies for both gasoline and diesel were eliminated completely as of the beginning of 2015. Thanks to the continued oil slump, the price of unsubsidized gasoline in early 2015 was actually lower than that of subsidized gasoline a month before.¹⁰⁵ The sharp decline in crude prices in the first quarter of 2020, precipitated first by the Russia-Saudi Arabia price wars and then deepened by a drastic drop in demand due to the COVID-19 pandemic, may present another window for major reform, though in the near term the pandemic itself may make enacting and enforcing such a complex shift in policy more challenging.

Market-related openings for fuel subsidy reform can seldom be predicted, so in most cases timing takes the form of how gradually, and in what order, fuel subsidies are scaled back. One approach involves capping the quantities of subsidized fuel consumed while gradually increasing prices above that consumption level. In 2010, Iran first established three price points of gasoline: retail, semi-subsidized, and subsidized, with prices for the latter two tiers rising at least 400 percent. To cushion that shift, motorists were allowed to purchase up to sixty liters of fully subsidized fuel per week. Only after three years was this basic framework eliminated, having served its purpose of acclimating consumers to the reality of higher prices.¹⁰⁶ As part of its broader energy reforms, in 2017, Saudi Arabia initiated a gradual phaseout of its fuel subsidies, which, among other issues, were incentivizing smuggling into neighboring countries with much higher pump prices, such as Jordan and the United

¹⁰² Neil Munshi, “Nigeria’s Fuel Subsidies Bill Set to Soar on Rising Oil Price,” *Financial Times*, October 8, 2018, <https://www.ft.com/content/8094bfd4-ca29-11e8-9fe5-24ad351828ab>.

¹⁰³ Keith Benes et al., “Low Oil Prices: An Opportunity for Fuel Subsidy Reform,” Columbia University Center on Global Energy Policy, October 2015, 7-8, https://energypolicy.columbia.edu/sites/default/files/Fuel%20Subsidy%20Reform_October%202015.pdf.

¹⁰⁴ Soman et al., *India’s Energy*, 6, 22.

¹⁰⁵ Benes et al., “Low Oil,” 12-13.

¹⁰⁶ Beaton and Clark, *One Fuel*, 6.



Caption: General view of Saudi Aramco's Ras Tanura oil refinery and oil terminal in Saudi Arabia.
Source: REUTERS/Ahmed Jadallah

Arab Emirates. Initially, gasoline was to be completely tied to international prices by 2020; with the rise in oil prices over the following two years, the targets were adjusted. Currently, Saudi gasoline is to be gradually transitioned to international benchmarks by 2025, and by the same year diesel is to be 90 percent linked to international prices. Saudi natural gas prices, originally set to be fully linked in this way by 2020, are now set to be 75 percent linked by 2021.¹⁰⁷ While those figures may seem to indicate a tentative approach to reform, the reality is that Saudi gasoline prices rose 227 percent between 2015 and 2018.¹⁰⁸ This sort of sensitivity to the shifting commodities terrain is also good practice—as long as it does not lead to inertia.

Gradually phasing out subsidies comes with its own risks of incentivizing criminal activities. Poorly considered sequencing of subsidies elimination, or the creation of tiered pricing, can invite diversion. Liberalizing motor fuels while maintaining large subsidies for kerosene, for instance, will virtually guarantee a surge in adulteration; when such a step is unavoidable due to the sensitivity of kerosene as an essential commodity for lower-income households, it is best linked with concrete countermeasures that combat adulteration. Creating tiered pricing can invite an increase in adulteration as well, but it can also result in straightforward noncompliance. When India began its campaign to end diesel subsidies in 2014, it first liberalized the market only for bulk users rather than retail consumers; as a result, bulk users simply drained the retail supply.¹⁰⁹

¹⁰⁷ "UPDATE 1-Saudi Arabia Slows Phasing Out Energy Subsidies Under Budget Plan," Reuters, December 20, 2017, <https://af.reuters.com/article/africaTech/idAFL8N1OK2PQ>.

¹⁰⁸ "Largest Gasoline End-Use Price Increases, 2017" IEA, <https://www.iea.org/data-and-statistics/charts/largest-gasoline-end-use-price-increases-2017>

¹⁰⁹ Beaton and Clark, *One Fuel*, 9.

Linked with a sound sense of timing and momentum is the need for skillful and well-orchestrated communication with stakeholders, especially end consumers. Above all, fuel subsidy reform should ideally not happen in isolation but be folded into a larger package of reforms that offer compensatory benefits demonstrating how the recovered fiscal space will be turned over to the public good. This is the successful course Indonesia has taken since 2005: each rise in pump prices has been linked with compensatory benefits in other areas, not only softening the economic impact but also showcasing the larger vision and strategy of which subsidies reform is one part.¹¹⁰ If there is no roadmap, or at least if the existing roadmap is not communicated to stakeholders, public confidence in subsidies reform may not materialize. In Nigeria in 2011, Indonesia in the 1990s, and Ecuador in 2019, fuel subsidy reform met with ferocious opposition largely because it was introduced without adequate, programmatic communication of its benefits.¹¹¹ In Ecuador, the protest largely involved indigenous groups who represent a disproportionate percentage of the poor and had been given no reason to believe that the government would do anything to compensate for the elimination of subsidies, which more than doubled the price of diesel as part of an austerity plan meant to secure \$4 billion in emergency financing from the International Monetary Fund (IMF).¹¹² In contrast, Morocco took two years to communicate its subsidies reform strategy, called “decompensation,” before uneventfully closing out its diesel subsidies in 2015.¹¹³

EXCEPTIONS TO THE DYNAMIC

As pernicious as fuel subsidies can be in encouraging downstream criminal activity, there are rare occasions when the reverse effect holds, and it is worth mentioning two such situations. In Colombia, where the aforementioned smuggling of subsidized fuel from Venezuela and Ecuador has been a thriving industry for years, one measure the government has taken is to subsidize fuel only in the states that border those countries as a way of mitigating the smuggling, however slightly, by shrinking its profit margins. The policy has proved controversial, not least because a portion of the subsidized gasoline, along with smuggled

product, is diverted by cartels for use as a solvent in processing cocaine.¹¹⁴ While the logic of the policy is clear, its overall effectiveness, especially in light of the security situation along the Venezuelan border, is questionable.

Another instance of a reverse subsidy effect has unfolded in Mexico, where the energy sector reforms launched by the government of then President Enrique Peña Nieto in 2014 not only ended Pemex’s monopoly but also phased out fuel subsidies. As a result, even during the global oil crash, Mexican pump prices rose by almost 25 percent. While the subsidies reform initially served its purpose of attracting foreign investment, it also opened the door to criminal exploitation of the strain placed on consumers. This is one cause of the rampant, often violent, billion-dollar industry of fuel theft in Mexico, which has become a major income stream for the country’s criminal cartels.¹¹⁵ The rise in prices, coupled with many Mexicans’ distrust of the government, has allowed criminal organizations to set themselves up as public service providers, even as they exploit communities for gain.

Unexpected turns such as these serve to underline the reality that fuel subsidies, often complex and opaque in themselves, can have complex and unanticipated second and third-order consequences in terms of criminal activity.

Downstream Transparency and Governance

In recent decades, a more or less concerted international movement promoting transparency in the extractive industries has had considerable impact. Such organizations and initiatives as the Extractive Industries Transparency Initiative (EITI), Transparency International, Publish What You Pay, and Revenue Watch have turned a spotlight on the interface between governments and the extractive industries. These initiatives, however, have primarily focused on upstream operations, with special attention to the allocation, licensing, and revenues connected with that portion of the supply chain. In some cases, the oil industry may not be a focus at all. In Ghana, for instance, where an extensive legal

¹¹⁰ “Indonesia’s Effort,” 27.

¹¹¹ Coady, Parry, and Shang, 208-9, “Energy Price.”

¹¹² Gonzalo Solano and Michael Weissenstein, “Ecuador Crisis Weakens President, Strengthens Indigenous,” Associated Press, October 14, 2019, <https://apnews.com/a8cba045f3784dfe9ffa017ef8af30a1>.

¹¹³ Benes et al., “Low Oil,” 10.

¹¹⁴ “Venezuela’s Fuel Gap Driving Up Colombian Demand,” Argus Media, May 28, 2019, <https://www.argusmedia.com/en/news/1910802-venezuelas-fuel-gap-driving-up-colombian-demand>.

¹¹⁵ Gabriel Stargardter, “Special Report: Mexico’s Drug Cartels, Now Hooked on Fuel, Cripple Nation’s Refineries,” Reuters, January 24, 2018, <https://www.usnews.com/news/top-news/articles/2018-01-24/mexicos-drug-cartels-now-hooked-on-fuel-cripple-nations-refineries>.



A US Coast Guardsman participates in a joint boarding with a Senegalese boarding team to support the African Maritime Law Enforcement Partnership. Source: US Coast Guard/Petty Officer 2nd Class Etta Smith

framework has been erected around the oil industry, the legal support for the EITI is grounded in mining law, and a lack of resourcing has kept that narrow focus from being broadened.¹¹⁶ That said, the EITI can be extended downstream to better trace both financial and product flows, though this is a complex process that may require a significant investment in both money and expertise.¹¹⁷

Establishing and regulating transparency in the downstream sector is further complicated by the number and variety of actors within the space, especially in developing countries with incomplete or poorly enforced regulatory regimes. As a 2005 study in Senegal confirmed, the variety and prevalence of illicit activities tends to increase toward the retail end of the supply chain.¹¹⁸ Larger companies that dominate upstream, including globally integrated refiners (GIRs), often have international reputations to

protect, which can be a powerful if not always effective disincentive to downstream malfeasance. Smaller downstream companies, with their relative agility, minimal reputational risks, less developed internal controls, and short profit horizons, are more prone to illicit activity. Local content requirements can further complicate this picture; if not run according to rigorous, consistent standards, such regulations can incentivize patronage, kickbacks, and other forms of misconduct.¹¹⁹

The most effective policy measures to ensure downstream transparency include due diligence requirements and a mandatory, standardized reporting process for all private sector downstream operators. Additionally, governments can establish objective, risk-based criteria for tax audits, linked with mechanisms by which tax auditors can report suspected malfeasance to the appropriate authorities.¹²⁰ Companies

¹¹⁶ Peter Quartey and Emanuel Abbey, *Ghana's Oil Governance Regime: Challenges and Policy Solutions*, Centre for Research on Peace and Development, Working Paper No. 70, Katholieke Universiteit Leuven, December 2018, 13, <https://soc.kuleuven.be/crpd/files/working-papers/crpd-no-70-quartey-abbey-full.pdf>.

¹¹⁷ Anwar Ravat and Sridat P. Kannan, eds., *Implementing EITI for Impact: A Handbook for Policy Makers and Stakeholders*, World Bank, 2012, 35, <http://documents.worldbank.org/curated/en/951461468170969547/pdf/NonAsciiFileName0.pdf>.

¹¹⁸ Kane, "Alleviating," 19.

¹¹⁹ Organization for Economic Cooperation and Development (OECD), *Corruption in the Extractive Value Chain: Typology of Risks, Mitigation Measures and Incentives*, OECD Development Policy Tools, OECD Publishing, 2016, 62, <http://www.oecd.org/dev/Corruption-in-the-extractive-value-chain.pdf>.

¹²⁰ OECD, *Corruption*, 80-81.

themselves should have anti-corruption policies, backed up with the deterrent of targeted internal anti-corruption audits.¹²¹ Such measures should be matched by revenue transparency on the government side. This, of course, necessitates both an independent regulatory body and a legal and regulatory framework that has been updated to accommodate current international standards and domestic market realities.

THE ENVIRONMENTAL, SOCIAL ACTION, AND GOVERNANCE (ESG) LEVER

In the private sector, countering downstream crime can be folded into what has become a defining trend of recent years: the increasing emphasis on environmental, social action, and governance (ESG) considerations in corporate culture. ESG is now being embedded in the cultures and expectations of financial institutions, and institutional investors have made it clear that they are wary of firms, especially in the extractive industries, that have not adequately addressed those concerns.

The 2019 Edelman Trust Barometer included a special report on institutional investors; more than six hundred were surveyed, each of whom had to represent a firm operating in at least six markets.¹²² The results of the survey were striking: in 2019, 61 percent of respondents' companies increased their investment share in companies regarded as strong on ESG, 74 percent of investors took care to review environmental and social action factors across the entire value chain, and more than 85 percent of respondents indicated that their firms would be fine with lower returns if investing in enterprises that demonstrated a commitment to sustainability and social impact.¹²³ According to one Edelman executive, it is "no longer optional" not to prioritize ESG considerations.¹²⁴

This trend can be leveraged to encourage private sector downstream actors to take on governance and transparency practices that militate against fuel crime, and to support government initiatives to counter it. ESG's rise to prominence signals a transforming business environment—certainly an evolving investor mindset—that will reward transparency, good governance, and environmental stewardship, and withhold

investment from companies that fail to put those values into concrete action. If sufficient numbers of both public and private sector actors vocally and rigorously foreground ESG, both to the business community and to consumers, it can serve as a pressure point for encouraging transparency in the downstream sector.

STATE-OWNED ENTERPRISES OPERATING DOWNSTREAM

Within the broader international trend toward greater transparency, state-owned enterprises (SOEs), especially national oil companies (NOCs), have come under increasing scrutiny. One reason for the recent emphasis on upstream transparency is that many NOCs mainly operate at that end of the supply chain. Some NOCs, however—Mexico's Pemex, Nigeria's NNPC, and Malaysia's Petronas are among the more substantial ones—have significant downstream operations, and face some of the same structural challenges there that incentivize illicit activities upstream.

Lack of public transparency is endemic among NOCs. The 2017 Resource Governance Index prepared by the Natural Resource Governance Institute indicated that 62 percent of the fifty-two NOCs surveyed showed at best "weak" performance in this arena. Such fundamental questions as an NOC's economic role, its strategy, its operational expenses, and its management of revenues are often difficult if not impossible to ascertain; in some cases, the NOC's role is undefined, making it impossible to set clearly defined benchmarks and key performance indicators and creating an informational fog that can conceal misconduct. Furthermore, downstream operations generally add to costs and shrink margins—sometimes operating at a loss due to fuel subsidies or other price controls.¹²⁵ For many exporting countries—with their recent emphasis on mid- and downstream expansion, Saudi Arabia and the United Arab Emirates are two notable exceptions—the big money is generally seen as happening upstream. This dynamic can lead to less regulatory attention downstream—which, given the relative ease with which refined products can be variously diverted or tampered with and laundered into the legitimate supply chain, further incentivizes illicit activity.

121 EY, "Managing Bribery and Corruption Risks in the Oil and Gas Industry," EY 2014, 15, [https://www.ey.com/Publication/vwLUAssets/EY-Managing-bribery-and-corruption-risk-in-the-oil-and-gas-industry/\\$FILE/EY-Managing-bribery-and-corruption-risk-in-the-oil-and-gas-industry.pdf](https://www.ey.com/Publication/vwLUAssets/EY-Managing-bribery-and-corruption-risk-in-the-oil-and-gas-industry/$FILE/EY-Managing-bribery-and-corruption-risk-in-the-oil-and-gas-industry.pdf).

122 Daniel J. Edelman Holdings, Inc., *2019 Edelman Trust Barometer Special Report: Institutional Investors*, December 2019, 40, <https://www.edelman.com/sites/g/files/aatuss191/files/2019-12/2019%20Edelman%20Trust%20Barometer%20Special%20Report%20-%20Investor%20Trust.pdf>.

123 *Ibid.*, 12, 16, 20.

124 Jennifer A. Kingdon, "A 'Wake-Up Call' to Corporate Executives," *Axios*, December 6, 2019, <https://www.axios.com/wakeup-call-corporate-executives-social-environment-dd4d66cf-6dd3-46b4-a352-e2359ff0c2e9.html>.

125 Patrick R.P. Heller and David Mihalyi, *Massive and Misunderstood: Data-Driven Insights into National Oil Companies*, National Resource Governance Institute, 2019, 7, 60, 48, <https://www.nationaloilcompanydata.org/api/publications/content/BWEOxwI3qpbpPk5RkZmWr3g5TEvNgLD4LD21foHP.pdf>.



Pemex station at Montevideo and Misterioso in Mexico City, across from the main entrance to Basilica of Our Lady of Guadalupe. Source: Wikimedia Commons/Daniel Case

Allegations of downstream corruption and fraud, a few borne out by subsequent investigations, have plagued some troubled NOCs. In 2011, Nigeria's NNPC became the subject of an investigation in the Nigerian House of Representatives after revelations of massive subsidies fraud. The official report found "a deliberate understanding" among agencies in the petroleum industry not to maintain mandatory databases, that massive subsidy payouts had no connection to gasoline consumption, and that "NNPC was found not to be accountable to any body or authority."¹²⁶ Despite several subsequent government commitments to transparency, a 2018 report by the Natural Resource Governance Institute revealed how a range of NNPC's midstream and downstream contracts—from "Direct Sale Direct Purchase" (DSDP) oil-for-fuel swaps to inter-company contracts and domestic spot contracts

for refined products—remained opaque and unpublished despite the huge sums involved.¹²⁷ It remains to be seen whether more recent initiatives, such as a joint committee linking NNPC and the Nigeria Extractive Industries Transparency Initiative (NEITI), realize NNPC's professed goals.¹²⁸ In another example, Pemex executives were alleged to have orchestrated the theft of vast amounts of fuel by duplicating, many times over, documents authorizing the shipment of a tanker load of fuel from a storage depot; afterward, discrepancies could be papered over or criminal cartels blamed for the loss.¹²⁹

The broader practices to mitigate criminality and promote transparency in NOCs have been widely studied and documented, but it is worthwhile to mention a few here. One is to mandate consistent financial reporting

¹²⁶ Report of the Ad-Hoc Committee "To Verify and Determine the Actual Subsidy Requirements and Monitor the Implementation of the Subsidy Regime In Nigeria," Resolution No. (HR.1/2012), House of Representatives of the Republic of Nigeria, 2012, 4-6, <http://www.sahara-group.com/docs/hrr.pdf>.

¹²⁷ Rob Pitman and Anne Chinweze, *The Case for Publishing Petroleum Contracts in Nigeria*, National Resource Governance Institute, Briefing, March 2018, 11-12, <https://resourcegovernance.org/sites/default/files/documents/the-case-for-publishing-petroleum-contracts-in-nigeria.pdf>.

¹²⁸ Harrison Edeh, "NNPC, NEITI Set Up Joint Committee to Strengthen Transparency," *Business Day*, November 23, 2019, <https://businessday.ng/top-stories/article/nnpc-neiti-set-up-joint-committee-to-strengthen-transparency/>.

¹²⁹ Seth Harp, "Blood and Oil: Mexico's Drug Cartels and the Gasoline Industry," *Rolling Stone*, September 6, 2018, <https://www.rollingstone.com/culture/culture-features/drug-war-mexico-gas-oil-cartel-717563/>.

and other disclosures—pricing policies, governance structure, operations, etc.—consistent with international standards. Such policies could be backed by annual independent audits.¹³⁰ Downstream reporting could include independently verifiable indicators such as refinery availability and performance, supply of refined products for both domestic consumption and export, refined product imports, volumes of different products transported, and related tax revenues.¹³¹ Another measure would be to ensure the independence of related regulatory bodies, subjecting nominees for leadership positions to legislative vetting based on their professional qualifications. This shift, however, can require structural political change—as it would in Ghana, where the president has the power to appoint the directors and board of the Economic and Organized Crime Office, which would be tasked with investigating corruption related to Ghana’s petroleum industry.¹³²

Many of these measures are impossible to articulate and implement without a legal framework that clearly defines the role and mission of an NOC, establishes an independent regulatory body, and reflects the current realities of fossil fuel technologies, evolving international standards, and domestic patterns of consumption. This is especially an issue in the developing world. A 2011 IMF report on sub-Saharan downstream markets advises that legislation be updated, if necessary, to define and delimit the role of government in relation to the downstream sector, establish ground rules that promote transparency and healthy competition, create a framework for adopting and adapting international standards, and establish regulations with sufficient clarity to promote compliance.¹³³ Also essential is the express criminalization of corruption, which may include ratification of the OECD Anti-Bribery Convention and/or the United Nations (UN) Convention against Corruption, which will be discussed in more detail in the next chapter.¹³⁴

Establishing such a viable legal framework, especially when it entails dismantling machinery that has lent itself to the criminal enrichment of influential parties,

can be difficult, but it is not impossible. In the wake of its 2019 elections, Nigeria appears much closer to passing a new Petroleum Industry Bill (PIB) after nearly twenty years of delays. The PIB, which would be based on the recent, narrower Petroleum Industry Governance Bill (PIGB), would unbundle the NNPC and, among other measures, establish a new regulatory body, the Nigerian Petroleum Regulatory Commission (NPRC), which would be wholly independent of the minister of petroleum resources and be managed by a governing board nominated by the president and subject to Senate approval. While this process would not immunize the NPRC from politicization, it would be a significant step forward in terms of clear governance. The NPRC would have a broad array of regulatory powers, including most key aspects of downstream operations.¹³⁵

A more gradually and consistently evolving legal framework can be found in Ghana. While one set of laws governs the upstream sector, where the Ghana National Petroleum Company (GNPC) operates as an NOC, the National Petroleum Authority (NPA) Act of 2005 establishes the NPA as the regulatory body over the downstream sector. The act reflects Ghana’s adaptation of the widely recommended Norwegian governance model, in which commercial and regulatory functions are walled off from each other. In 2015, an amendment to the act effectively formalized the liberalization of fuel prices in Ghana.¹³⁶ In 2019, the NPA launched a campaign to further amend the act to stiffen penalties for illicit downstream activities.¹³⁷ A second, broader regulatory body, the Public Interest and Accountability Commission (PIAC), has provided still further visibility into both the GNPC and the NPA.¹³⁸

Other governments have recently moved to restructure their NOCs and establish new regulatory bodies. In 2019, the Indonesian government made progress toward passing a long-delayed series of reforms in which two separate regulatory bodies, one each for upstream and downstream, would be merged into one, which would be under the direct authority

¹³⁰ OECD, *Corruption*, 20.

¹³¹ “Guide to Extractive Sector State-Owned Enterprise Disclosures,” Natural Resources Governance Institute, January 2018, 16–17, https://resourcegovernance.org/sites/default/files/documents/guide-to-extractive-sector-state-owned-enterprise-disclosures_0.pdf.

¹³² Quartey and Abbey, *Ghana’s*, 11.

¹³³ *Petroleum Product Markets in Sub-Saharan Africa: Comparative Efficiency Analysis of 12 Countries*, IMF, 2011, 8–9, <http://documents.worldbank.org/curated/en/767991468202165845/pdf/611260ESW0whit1Efficiency0Study0121.pdf>.

¹³⁴ OECD, *Corruption*, 18.

¹³⁵ “The Petroleum Industry Governance Bill,” KPMG, June 2017, 1, <https://assets.kpmg/content/dam/kpmg/ng/pdf/tax/ng-kpmg-newsletter-on-the-petroleum-industry-governance-bill.pdf>.

¹³⁶ Quartey and Abbey, *Ghana’s*, 9.

¹³⁷ Interview, NPA executive, September 2019.

¹³⁸ Heller and Mihalyi, *Massive and Misunderstood*, 57.

of the president.¹³⁹ In a more dramatic reform, the Angolan government, after organizing a task force that included not only government entities but also oil majors and other stakeholders, instituted in 2018 a series of reforms that included stripping NOC Sonangol of its regulatory role and establishing an independent regulatory body, the National Oil and Gas Agency.¹⁴⁰ In both cases, the effort to streamline processes and invite investment has been tied to a drive toward transparency.

NOCs that have been tainted by scandal can voluntarily engage in good practices that heighten transparency and promote public trust. One such example is Petroperú. In 2016, the de facto Peruvian NOC was forced to revisit its 2008 “Petroaudios” scandal—in which Petroperú’s then vice president was recorded apparently discussing bribes connected with offshore licenses—when the defendants in the case were acquitted after key evidence was deemed inadmissible. Shortly thereafter, Petroperú was caught up in the massive Odebrecht scandal, in which the Brazilian construction firm was found to have engaged in massive bribery of public officials across Latin America and beyond. In August 2019, Petroperú’s leadership publicly committed to the International Standardization Organization (ISO) 37001:2016 standard for anti-bribery policy and adopted a new complaint response plan involving independent investigators. More strikingly, Petroperú announced that it would pursue its rigorous anti-corruption policy in partnership with Proética, the Peruvian branch of Transparency International.¹⁴¹ This highly public commitment to independent scrutiny may go a long way toward restoring public confidence in the company.

CUSTOMS SYSTEMS AND PRACTICES

States that rely heavily on imported refined products face a distinct set of enabling conditions for diversion and adulteration of fuel, some of which involve customs. Customs abounds in incentives for illicit activity; not only do customs officials themselves exercise

considerable control as gatekeepers, delays and inefficiencies in customs procedures can tempt shippers, importers, and receivers to cut costs by cutting corners.¹⁴² Hiring, training, and supervision of customs officers, potentially including external performance audits, is critical given their exposure to incentives for misconduct. To take only one example, a 2012 investigation implicated customs personnel along the border of Nigeria and Benin, where fuel smuggling is a major industry, in routine bribe-taking and other forms of collusion in fuel smuggling. Much of Nigeria’s mostly imported fuel is smuggled into Benin, where some 80 percent of consumers buy fuel on the informal market. According to one source, it is generally accepted that a rise in fuel prices in Benin without a corresponding rise in the pump prices in Nigeria simply means that customs officials are collecting more money to look the other way.¹⁴³

One simple principle to apply as good practice is that the greater the complexity of the clearance process, the more openings for illicit activity. The more a balance can be struck between streamlining clearance procedures and ensuring rigorous and consistent checks, the fewer gaps for bad actors to exploit. More stringent checks on fewer required documents and more transparent processes can support that balance. Additionally, the human element in a process often beset with human weaknesses can be reduced by digitizing documentation, automating much of the clearance process to limit direct interpersonal contact between customs officials and importers, using sophisticated cargo scanning technologies, regularly rotating staff, and conducting rigorous audits.¹⁴⁴

One particularly challenging issue involving customs is how to deal with free trade zones (FTZs). Far too often, the phrase “outside the Customs territory” in the Revised Kyoto Convention is effectively regarded as meaning outside the jurisdiction of customs, when this is not the case.¹⁴⁵ The resulting leniency or ineffectiveness of customs oversight can lead to blind spots in the supply chain that can be used to divert,

139 Fergus Jensen and Wilda Asmarini, “RPT-Indonesia Embarks on Overhaul of Oil, Gas Law to Halt Output Slide,” Reuters, January 24, 2019, <https://www.reuters.com/article/indonesia-energy-lawmaking/rpt-indonesia-embarks-on-overhaul-of-oil-gas-law-to-halt-output-slide-idUSL3N1ZO47C>; Stefano Reinard Sulaiman, “Nearly Decade Old Oil and Gas Bill Still Moving at Snail’s Pace,” *Jakarta Post*, January 17, 2019, <https://www.thejakartapost.com/news/2019/01/17/nearly-decade-old-oil-and-gas-bill-still-moving-at-snails-pace.html>.

140 “Deep Petroleum Industry Reforms Set Angola on Path to Growth in 2019,” *World Oil*, December 21, 2018, <https://www.worldoil.com/news/2018/12/21/deep-petroleum-industry-reforms-set-angola-on-path-to-growth-in-2019>.

141 Petroperú, “Petroperú Strengthens Anti-Corruption Policy with Transparency and Efficiency”, press release, August 21, 2019, <https://www.petroperu.com.pe/english/petroperu-strengthens-anti-corruption-policy-with-transparency-and-efficiency>.

142 EY, “Managing,” 8.

143 Brice Houssou, Jean-Baptiste Attisso, and Daouda Aliyou, “Fuel Smuggling in Nigeria, Benin and Togo: An Intractable Illicit Trade,” *Nigeria Infos*, April 26, 2013, <https://nigeriainfos.blogspot.com/2013/04/fuel-smuggling-in-nigeria-benin-and.html>.

144 OECD, *Corruption*, 63.

145 Revised Kyoto Convention, Specific Annex D, Chapter 2, http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/conventions/pf_revised_kyoto_conv/kyoto_new.aspx.



Trucks wait at a Border Information Center, which the United States Agency for International Development (USAID) has opened at the borders of Ghana and Togo; Ghana and Burkina Faso; and Benin and Nigeria, in order to transport goods and commodities across borders more easily. Source: flicker.com/USAID in Africa

misdeclare, or otherwise tamper with fuel. In many cases, the authority in an FTZ does not integrate its data with those of customs, and many of the systems used to manage FTZs are characterized by a mix of digital and paper documentation, leaving significant openings for falsification.¹⁴⁶ One of the most troublesome gaps to close may involve leakage of fuel or other refined products from an FTZ into the host country's territory. This has been the case, for instance, in the Subic Bay Freeport Zone in the Philippines, where customs officials have allegedly colluded with fuel importers in smuggling hundreds of millions of liters of fuel; the FTZ remains a hotbed of smuggling in general.¹⁴⁷ This sort of activity can be countered more effectively if customs and the FTZ operator integrate data, and customs undertakes rigorous checks on the products being moved through or stored within FTZs.¹⁴⁸

Filling Gaps and Imposing Penalties

It is, of course, not enough to establish a legal framework that expressly criminalizes downstream theft and fraud; the relevant laws must be tied to meaningful penalties and accorded regulatory and prosecutorial follow-through. Noncompliance with regulations mandating transparency, due diligence, and quality control should result in fines that exceed the likely profits unscrupulous actors might gain by skirting those regulations. Explicitly criminalizing not only outright theft but also tax fraud through product dumping and adulteration is essential, but then law enforcement must be supported in investing time and hours in pursuing those offenses. If, as was the case in Senegal some years ago, police officers arrest downstream criminals only to see them

¹⁴⁶ Financial Action Task Force, *Money Laundering Vulnerabilities of Free Trade Zones*, FATF Report, 2010, 16-20, <https://www.fatf-gafi.org/media/fatf/documents/reports/ML%20vulnerabilities%20of%20Free%20Trade%20Zones.pdf>.

¹⁴⁷ Paolo Romero, "2 Subic Firms Face Probe on Fuel Smuggling," *Philstar*, August 21, 2007, <https://www.philstar.com/nation/2007/08/21/14361/2-subic-firms-face-probe-fuel-smuggling>; Malou Dungog, "SBMA, BOC Join Hands to Fight Smuggling in Port of Subic," Philippine News Agency, February 2, 2018, <https://www.pna.gov.ph/articles/1023936>.

¹⁴⁸ International Chamber of Commerce, "ICC Recommendations on Illicit Trade in Free Trade Zones (FTZs)," June 2017, 1-2, <https://iccwbo.org/publication/icc-recommendations-illicit-trade-free-trade-zones-ftzs/>.



Ivorian sailors participate in an anti-piracy hostage rescue scenario with the Ghanaian Navy in order to enhance the collective capabilities of Gulf of Guinea and West African nations to counter sea-based illicit activity. Source: Wikimedia Commons/Commander, US Naval Forces Europe-Africa/US 6th Fleet

released uncharged within hours or days, the relevant laws will be worthless and even the pretense of enforcement will drain away.¹⁴⁹ On the other hand, if, as in the case of Kenya's Energy Act of 2019, downstream crimes can be punished with forfeiture of operating licenses, large fines, and imprisonment, and that threat is backed up with highly publicized raids and arrests, the risk-reward calculus for criminals becomes more challenging.¹⁵⁰

Where legal frameworks lack statutes that might deter the most problematic forms of downstream crime in a jurisdiction, prosecutors can sometimes leverage other laws to impose stronger penalties. Environmental laws can serve this purpose well. In Brazil, where under current law fuel thieves are likely

to face little more than community service, prosecutors have found that convictions for environmental crimes, which can lead to up to five years in prison, can be pursued in cases where criminal activity results in even modest spills.¹⁵¹ The only alternative is to enact laws that encompass downstream crime, as Nigeria did through its 2019 Suppression of Piracy and Other Maritime Offences Act. In the Gulf of Guinea, oil and fuel theft are intimately linked with piracy and armed robbery at sea; accordingly, the act not only criminalizes harmful maritime oil and fuel spills but explicitly allows for the interdiction, arrest, and prosecution of anyone who "receives by any means directly or indirectly, or either keeps or sells [or] transfers or aids in concealing of any money, cargo, or property, ransom or proceeds of piracy or an unlawful act, whether or

¹⁴⁹ Kane, 25.

¹⁵⁰ Elizabeth Kivuva, "State Losing Millions in Illicit Fuel Trade Nairobi – Regulator," *Star*, June 26, 2019, <https://www.the-star.co.ke/business/2019-06-26-state-losing-millions-in-illicit-fuel-trade-nairobi-regulator/>.

¹⁵¹ Rodrigo Viga Gaier, "Brazil's Black Market Pipeline: Gangs Hijack Petrobras' Oil, Fuel," Reuters, April 4, 2017, <https://www.reuters.com/article/us-brazil-petrobras-theft/brazils-black-market-pipeline-gangs-hijack-petrobras-oil-fuel-idUSKBN1760C7>.

not used to carry out any offence under this Bill.”¹⁵² While the real test of such a law lies in its enforcement, the Suppression of Piracy Act can serve as a model for how to incorporate provisions that allow for the aggressive countering of downstream crime into a larger or overlapping piece of legislation.

An Unresolved Issue: Commodity Traders

Independent international commodity traders constitute a portion of the international supply chain that is as opaque as it is extensive. Though they mostly operate upstream and midstream, some traders have undertaken extensive downstream operations, including their own distribution networks and retail outlets. As this expansion downstream poses predictable risks, it is essential that traders continue to be subject to the same transparency requirements as other players in that sector.

Another intersection of commodity traders and the downstream sector that is especially prone to illicit activity is oil-for-fuel swaps, which have been used to ensure a sufficient domestic fuel supply in countries that produce oil but have limited refining capacity. Because no money changes hands in these arrangements, which are often conducted according to closely guarded contracts, the likelihood is high of corruption at a key juncture where large quantities of fuel enter a jurisdiction.¹⁵³ The most widely known instance of such corruption was the Offshore Processing Agreement (OPA) entered into by Nigeria during the administration of then President Goodluck Jonathan; the opacity of the swaps involved led to massive fraud. The case of Duke Oil, a trading subsidiary of NNPC, gained particular notoriety in that the company was found to have lifted \$24 million worth of crude onto tankers without delivering a drop of refined product. An EITI audit uncovered that in one year alone abuses of the OPA cost the Nigerian government \$732 million, not counting nearly \$500 million lost to under-delivery of promised fuel.¹⁵⁴ Mandating transparency from both the government and any traders with which it enters into such deals is essential.

Legal and policy countermeasures can be used to impact both sides of criminals’ risk-reward calculus. Throughout much of the world, pricing reform, including subsidies reform, is perhaps the single-most effective measure for disincentivizing downstream crime. Sustained, deliberate efforts to encourage and then require transparency, and laws that provide both adequate frameworks for enforcement and meaningful penalties, can also have significant impact. The point of these measures, which exercise a wider scope than concrete countermeasures, is to alter the operating environment from one in which downstream criminals thrive to one in which theft, smuggling, and fraud become less and less worth the risk. In the case of downstream crime, however, that environment often extends across borders. Accordingly, the next section of this report deals with regional and international mechanisms for making that larger environment less hospitable to illicit activity.

¹⁵² *An Act to Provide for the Suppression of Piracy and Other Maritime Offences, Give Effect to the Provisions of the United Nations Convention on the Law of the Sea (UNCLOS), 1982 the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (SUA) 1988 and It's [sic] Protocols, and for Related Matters 2019 (HB.1571)*, National Assembly of the Federal Republic of Nigeria, <https://placng.org/wp/wp-content/uploads/2019/05/An-Act-to-provide-for-the-Suppression-of-Piracy-and-Other-Maritime-Offences.pdf>.

¹⁵³ OECD, *Corruption*, 86.

¹⁵⁴ Ralby and Soud, *Oil on the Water*, 14.

Regional and International Measures

While downstream oil theft and fraud often occur domestically in the form of diversion, subsidy abuse, and adulteration, a large portion of downstream crime crosses borders, and some even involves transcontinental trafficking. Wherever a legitimate supply chain exists, an invisible supply chain of illicit trade in the same commodities is likely to take root, and as commerce has globalized, so has transnational organized crime.¹⁵⁵ Increasingly, the illicit trade in refined products takes place alongside other forms of trafficking, and involves systematic efforts from organized criminal groups, corrupt officials, and beneficiaries at the distribution and retail end of the supply chain. Furthermore, the security, socioeconomic, and environmental effects of these activities do not respect borders.

Accordingly, purely domestic efforts to combat downstream crime can only go so far. Regional and international coordination and cooperation are essential to disrupting the invisible supply chains that maximize the profits of criminal syndicates, militants, and terrorist groups. In many cases, much can be accomplished by leveraging existing diplomatic and trade arrangements or international instruments, but doing so effectively requires domestic investment in the groundwork that can put those mechanisms—customs unions, shared security frameworks, treaties, and provisions for mutual legal assistance—to effective use. This sort of coordination, which can be seen by participating states as ceding some measure of national sovereignty, is not easy to achieve, especially in the developing world, where all too often that sovereignty has been won within living memory, and after arduous or even traumatic struggle. It is essential, though, in taking the fight to the criminals.

Customs Unions and Trade Agreements

Where downstream crime takes the forms of illicit arbitrage or theft and smuggling, customs unions can play a critical role in coordinating member states' responses. This coordination can take the form of managing tariffs so as to limit opportunities for arbitrage, sharing information for more effective interdiction of smuggling and fraud, or even undertaking joint customs operations that target downstream criminal activities.

The Association of Southeast Asian Nations (ASEAN) offers a glimpse into how such measures might begin to take shape in the developing world. Under the ASEAN Free Trade Agreement (AFTA), in order for goods to qualify for the Common Effective Preferential Tariff (CEPT), member states must establish that at least 40 percent of the value of a given shipment has been sourced within ASEAN.¹⁵⁶ To verify that regional content, an exporter has to get an electronic document ("Form D") from its national government; the form is then submitted to the customs authority of the destination country. The CEPT scheme altered the flows of crude oil and refined products into and within the region; in a representative result, between 2014 and 2015, Vietnam quadrupled the amount of fuel it imported from Singapore, the chief refining hub in ASEAN.¹⁵⁷ The visibility provided to customs officials under the CEPT scheme has been further enhanced by the ASEAN Single Window initiative, through which the customs agencies of participating member states can electronically share an expanding range of documentation related to cross-border trade within the region.¹⁵⁸ While these developments do little to inhibit the black market fuel smuggling incentivized by continuing cross-border price differentials across ASEAN,

155 Dr. Ian Ralby, Dr. David Soud, and Rohini Ralby, "Defining the Invisible Supply Chain," *EnergySource*, March 20, 2019, <https://www.atlanticcouncil.org/blogs/energysource/defining-the-invisible-supply-chain/>; Dr. Ian Ralby, Dr. David Soud, and Rohini Ralby, "Mapping the Invisible Supply Chain," *EnergySource*, March 28, 2019, <https://atlanticcouncil.org/commentary/mapping-the-invisible-supply-chain/>; Dr. Ian Ralby, Dr. David Soud, and Rohini Ralby, "Addressing the Invisible Supply Chain," *EnergySource*, April 8, 2019, <https://www.atlanticcouncil.org/blogs/energysource/addressing-the-invisible-supply-chain/>.

156 US-ASEAN Business Council, "Common Effective Preferential Tariff (CEPT)," <https://www.usasean.org/regions/asean/afta/common-effective-preferential-tariff>.

157 Jessica Jaganathan, "Vietnam Diesel Imports from Singapore Surge After Trade Deal," Reuters, April 29, 2015, <https://www.reuters.com/article/vietnam-oil-imports-singapore/vietnam-diesel-imports-from-singapore-surge-after-trade-deal-idUSL4N0XJ30A20150429>.

158 Association of Southeast Asian Nations (ASEAN), "ASEAN Single Window," 2019, <https://asw.asean.org/>.



Former Argentine President Cristina Fernández de Kirchner looks at a present given to her by a girl during the Southern Common Market (MERCOSUR) trade bloc annual presidential 47th summit in Parana, north of Buenos Aires, December 17, 2014. Source: REUTERS/Enrique Marcarian

they could be leveraged to make certain forms of fraud, including laundering illicit fuel into the legitimate supply chain, more challenging, as shared electronic documentation, including certification of origin, offers increased visibility into product flows.

In some cases, a free trade agreement can become a mechanism for facilitating cross-border law enforcement. While Mercosur—the Southern Common Market, comprising full members Argentina, Brazil, Paraguay, and Uruguay (Venezuela has been suspended) as well as several associated and observer states in Latin America—has yet to establish a customs union, in July 2019, its members' security ministers agreed in principle to allow law enforcement personnel to cross

member states' borders in pursuit of criminals. The baseline extent of incursion is one kilometer, but it can be extended by each state. The agreement also included a range of other law enforcement cooperation measures. While the agreement must be ratified domestically, it offers another instance of how trade agreements can serve as the foundation for combating the sorts of cross-border crime that can involve smuggling fuel.¹⁵⁹

The European Union (EU) confronts various forms and avenues of highly organized smuggling and sophisticated tax fraud schemes, some of which involve fuel. One recent characteristic example was the dumping in Poland of large amounts of fuel supposedly

159 "Mercosur Nations Agree to Let Police Cross Borders in Pursuit of Criminals." *Buenos Aires Times*, July 11, 2019, <https://www.batimes.com.ar/news/latin-america/mercotur-nations-agree-to-let-police-cross-borders-in-pursuit-of-criminals.phtml>.

in transit from Latvia to Germany.¹⁶⁰ In response to such activities, the EU has developed perhaps the most extensively elaborated system of shared border enforcement. Its most promising practice in relation to downstream crime is its orchestration of Joint Customs Operations (JCOs). One such initiative is the Operation WAREHOUSE series, begun in 2013 and periodically reiterated, which has partly targeted fuel smuggling. The first such operation, which involved all then-twenty-eight EU member countries as well as the European Anti-Fraud Office (OLAF), included the seizure of about 140,000 liters of illicit diesel in Lithuania; in 2016, Operation WAREHOUSE III, which involved twenty-six EU member countries as well as Europol, targeted goods in transit being diverted or dumped in Finland.¹⁶¹ Such operations can be extremely effective, but they require established lines of communication and protocols for cooperation; much can be gleaned by other regional bodies from what the EU has learned in developing its JCOs.

Europol, the EU police force, has also been a linchpin in regional efforts against downstream crime. Most notably, in 2018, Europol coordinated a monthslong operation involving twenty-three EU member states and, reportedly, both Maltese customs officers and local police, to crack down on the smuggling of Libyan fuel into Europe. The investigation involved the shared expertise of investigators and other experts who meticulously mapped the invisible supply chains and their operators; it culminated in the arrest of more than twenty suspects and the seizure of 2.2 million kilograms of illicit fuel in various locations throughout the EU as well as the confiscation of a considerable number of related assets.¹⁶² The successful operation highlights the importance not only of suitable frameworks for international coordination but also the importance to such undertakings of a central authority and shared expertise across a range of fields.

Such cross-border coordination is vastly preferable to sweeping unilateral moves, such as Nigeria's October 2019 closure of its land borders to trade. Though that protectionist move, ironically undertaken just months after Nigeria signed the African Continental Free Trade Agreement, was mainly intended to inhibit

illicit trade in agricultural products, it seems to have further incentivized fuel smuggling out of Nigeria, as gasoline deliveries within the country dropped by 20 percent after the border closure.¹⁶³ More collectively, in November 2019, the governments of Benin, Niger, and Nigeria committed in principle to a joint border control initiative. According to the official communiqué, the project's first step would consist of "a joint border patrol team comprising the police, customs, immigration, navy, and state security services of the three countries."¹⁶⁴ While this initiative is still in its infancy and faces formidable challenges, with sufficient political will it might serve as a valuable precedent for future cross-border cooperation against fuel smuggling.

International Legal Instruments and Mutual Legal Assistance

One of the challenges that has long hampered efforts to mitigate downstream crime is the difficulty of conducting investigations across borders, or of successfully prosecuting criminals whose offenses may have involved criminal activities extending across multiple jurisdictions. When resource-related crime is a major income stream for highly organized transnational groups, it is vital that key players know how best to facilitate international coordination and cooperation among law enforcement agencies and prosecutors. A number of international legal instruments, introduced in recent decades and increasingly leveraged in criminal cases, should be included in the arsenal of authorities confronting fuel smuggling, excise fraud, corruption linked to the diversion of fuel, and other downstream crimes with cross-border implications.

The most widely enforced of these is the United States' Foreign Corrupt Practices Act (FCPA), which prohibits the "supply" side of bribery on the part of US firms or US nationals doing business abroad. Notably, the FCPA does not address the "demand" side of bribery—that is, those who are soliciting or accepting such payments—and it makes an important exception for local sovereignty, such that payments construed as legitimate gifts under local law or custom cannot be

160 Rik Simpson, "According to the Polish Tax Administration at the End of Last Week a Criminal Group Was Prevented Near Lodz," *NewsPool*, <https://newspool.ie/?p=1557>.

161 European Anti-Fraud Office (OLAF), "Operation WAREHOUSE," n.d., https://ec.europa.eu/anti-fraud/policy/joint-customs-operations/operation-warehouse_en; Enforcement Department of Finnish Customs, *Finnish Customs Enforcement 2017*, <https://tulli.fi/documents/2912305/4898005/Finnish%20Customs%20Enforcement%202017/9f35b47e-6ff0-4a54-af9d-776b270da7aa>.

162 Ivan Martin, "Fuel Smugglers Off Maltese Coast Targeted in EU-Wide Crackdown," *Times of Malta*, October 1, 2018, <https://timesofmalta.com/articles/view/fuel-smugglers-off-maltese-coast-targeted-in-eu-wide-crackdown.690446>.

163 Abraham Ichirga and Libby George, "Nigeria's Land Borders Closed to All Goods - Customs Chief," *Reuters*, October 16, 2019, <https://af.reuters.com/article/idAFKBN1WV006-OZABS>.

164 Camillus Eboh, "Nigeria to Form Border Force with Neighbors Benin and Niger to Fight Smuggling," *Reuters*, November 14, 2019, <https://www.reuters.com/article/us-nigeria-trade/nigeria-to-form-border-force-with-neighbors-benin-and-niger-to-fight-smuggling-idUSKBN1X02JD>.

treated as bribes.¹⁶⁵ The FCPA takes the additional step of including bribes effectuated through proxies of any kind, including partners in a joint venture; the importance of this provision becomes clear on considering that 90 percent of FCPA prosecutions have involved third parties.¹⁶⁶ While its scope is, therefore, relatively narrow, and it clearly tilts toward the upstream activities of licensing and allocation, the FCPA can be invoked in any situation in which a US firm may be guilty of corrupt practices in relation to downstream activities, including importation and distribution contracts.

More recent, and more forceful if less widely applied than the FCPA, is the UK's Bribery Act 2010. Not only does the act apply to both companies based in the UK and those domiciled elsewhere but with a presence in the UK, it also explicitly criminalizes both the "supply" and "demand" sides of bribery, as well as failure to prevent bribery due to inadequate anti-corruption procedures. Under the act, bribery committed outside the UK, involving one or more entities that are not based in the UK but only have a footprint there, can be prosecuted.¹⁶⁷ It is the most stringent international anti-corruption law currently in place—arguably to a fault, given that it fails to distinguish between bribery committed purely for advantage and payments surrendered under corporate duress, when a "bribe" is essentially extorted from a company whose critical assets or prospects are being held hostage by self-seeking officials. Given the breadth of its applicability, however, the act can be leveraged as a means to prosecute in UK courts any entity operating downstream, anywhere, that has a business presence in the UK and commits acts punishable under that law.

Apart from those two specific laws, there are international conventions that can serve as broad frameworks for international cooperation in criminal investigations and prosecutions involving modalities of fraud that can be perpetrated in the downstream sector. These include, among others, the OECD Anti-Bribery Convention, the UN Convention against Corruption (UNCAC), and the Inter-American Convention against Corruption (IACAC).

The FCPA served as the foundation for the OECD Anti-Bribery Convention, which similarly requires its signatory states to establish laws criminalizing the payment of bribes in foreign jurisdictions but not the solicitation or acceptance of them. The compliance of those signatory states, which include the thirty-seven OECD countries as well as Argentina, Brazil, Bulgaria, Costa Rica, Peru, Russia, and South Africa, is monitored by the OECD's Working Group on Bribery, a peer-review council that issues periodic monitoring reports.¹⁶⁸

Ratified by the Organization of American States (OAS) in 1996, the IACAC doubles the remit of the FCPA and the OECD Convention, focusing on both the "supply" and "demand" sides of bribery and other forms of corruption. Participating governments are required to impose binding ethical codes on public officials, who are mandated, for instance, to disclose their assets and explain any questionable gains. The IACAC thus targets the sort of official corruption and organized criminality that inhibits economic development.¹⁶⁹

A globalized and expanded version of the IACAC is the UNCAC, which was adopted in 2003 and entered into force in 2005. The UNCAC is universally legally binding—its 140 signatory states must meet peer-reviewed benchmarks—and, like the IACAC, its scope extends beyond bribery to influence peddling, abuses of office, and other forms of corruption. The UNCAC also mandates international cooperation, information sharing, and asset recovery.¹⁷⁰ The only enforcement mechanism provided by these and similar conventions is formalized peer pressure; their true value lies in their status as mechanisms for mutual legal assistance (MLA) among states, and the initiatives they have inspired.

MLA is the process through which different states can coordinate the investigation and prosecution of crimes that extend across their jurisdictions; it is, therefore, key to countering transnational crime, including fuel smuggling and other cross-border downstream crime. Article 46.1 of the UNCAC reads, "States Parties shall afford one another the widest measure of mutual legal assistance in investigations, prosecutions and judicial proceedings in relation to the offences covered

165 Elizabeth K. Spahn, "Implementing Global Anti-Bribery Norms: From the Foreign Corrupt Practices Act to the OECD Anti-Bribery Convention to the UN Convention against Corruption," *Indiana International and Comparative Law Review*, Vol. 23, No. 1 (2013), 14, 8-11, <http://journals.iupui.edu/index.php/iiclr/article/view/17871/17838>.

166 EY, "Managing."

167 Transparency International UK, "The Bribery Act," n.d., <https://www.transparency.org.uk/our-work/business-integrity/bribery-act/>.

168 Spahn, "Implementing," 12; OECD, "OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions," n.d., <http://www.oecd.org/corruption/oecdantibriberyconvention.htm>.

169 Spahn, "Implementing," 28-30.

170 UNODC, "United Nations Convention against Corruption," n.d., https://www.unodc.org/documents/treaties/UNCAC/Publications/Convention/08-50026_E.pdf, *passim*.

by this Convention.”¹⁷¹ The same language is used in the UN Convention against Transnational Organized Crime (known informally as the Organized Crime Convention).¹⁷² While such a mandate is not essential for MLA, the UNCAC and other conventions have helped establish a set of good practices whereby MLA can be efficiently and effectively pursued, especially where relevant bilateral agreements are lacking. Specifically, Article 46 of the UNCAC and Article 18 of the Organized Crime Convention identically call for the establishment of a central authority as a clearinghouse for MLA requests, define the broad scope of assistance and the accommodations for domestic laws, provide a universal format for such requests, and elaborate the grounds for denial of a request. While the point is to provide a framework for clear and efficient formal communication, those conventions also indicate that MLA can be guided by the long-established diplomatic principle of reciprocity.¹⁷³ Another avenue is through established law enforcement networks linked with liaison officer programs.¹⁷⁴ More ambitiously, Article 49 of the UNCAC and Article 19 of the Organized Crime Convention provide for the establishment of Joint Investigative Teams (JITs), with personnel including investigators, prosecutors, and in some cases, even judges and other authorities. A JIT obviates the need for any MLA requests, expediting a case considerably; as such, JITs constitute a “rapid-response mechanism” that better matches the agility of the sort of organized criminal groups that engage in large-scale fuel smuggling and downstream fraud.¹⁷⁵

More informally, the UNCAC and the Organized Crime Convention encourage informal information sharing among law enforcement agencies.¹⁷⁶ Critical to such spontaneous cooperation, as to more formal initiatives, are clear communication and procedural rigor, such that no missteps in relation to one state or another’s domestic law compromise the case. Other “light touch” frameworks for MLA can be arranged expeditiously through executive agreements or letters of exchange.¹⁷⁷ Countries can also arrange memoranda of understanding (MOUs), such as the one signed by

Italy and Libya that includes cooperation in the interdiction of fuel smuggling as well as human smuggling and other forms of trafficking between the two countries.¹⁷⁸ The MOU, signed in February 2017, facilitated a coordinated investigation that resulted in the breakup later that year of a major fuel smuggling ring in which eighty million kilograms of low-grade diesel had been ferried by small boats from Libyan coastal refineries to waiting tankers that had switched off their automatic identification system and would subsequently, after ship-to-ship transfers and the provision of falsified certificates of origin, deliver the oil to Sicily, where it would evade Value Added Tax (VAT) and then be fraudulently distributed through multiple countries to unsuspecting drivers who thought they were paying for higher-grade fuel.¹⁷⁹

The Maritime Space

Much of the world’s refined products transit the maritime space. Both legitimate and criminal supply chains employ tankers and smaller vessels, and countless ship-to-ship transfers involve the sale or laundering of illicit fuel. The world’s seas present a daunting set of challenges to any authority seeking to mitigate downstream crime; doing so requires access to expertise in the intricacies and ambiguities of maritime law, as well as the ingenuity and will to create legal and security frameworks that can operate effectively in the maritime space. In areas where maritime fuel smuggling is rampant, such as the Gulf of Guinea, the waters of Southeast Asia, and more recently the Caribbean, little can be done without effective coordination and cooperation among regional states.

The first principles to take into account when strategizing against maritime downstream crime are those of sovereignty. In the most basic sense, one cannot overstate the importance of the facts that a coastal or archipelagic state’s territorial waters extend twelve nautical miles from the shoreline; that its contiguous zone, where it can enforce laws related to finance,

171 *Ibid.*, 33.

172 UNODC, “United Nations Convention against Transnational Organized Crime and the Protocols Thereto” (Organized Crime Convention) n.d., 19, https://www.unodc.org/documents/middleeastandnorthafrica/organised-crime/UNITED_NATIONS_CONVENTION_AGAINST_TRANSNATIONAL_ORGANIZED_CRIME_AND_THE_PROTOCOLS_THERE_TO.pdf.

173 UNODC, Organized Crime Convention, 19-25.

174 UNODC, *Manual on Mutual Legal Assistance and Extradition*, 2012, 66, https://www.unodc.org/documents/organized-crime/Publications/Mutual_Legal_Assistance_Ebook_E.pdf.

175 OECD Anti-Corruption Network for Eastern Europe and Central Asia, *International Co-Operation in Corruption Cases*, OECD, 2017, 54-55, <https://www.oecd.org/corruption/acn/OECD-International-Cooperation-in-Corruption-Cases-2017.pdf>.

176 UNODC, Organized Crime Convention, 20.

177 OECD Anti-Corruption Network for Eastern Europe and Central Asia, *International*, 18.

178 “Memorandum of Understanding on Cooperation in the Fields of Development, the Fight Against Illegal Immigration, Human Trafficking and Fuel Smuggling and on Reinforcing the Security of Borders Between the State of Libya and the Italian Republic,” *Odyseus Network*, 2017, https://eumigrationlawblog.eu/wp-content/uploads/2017/10/MEMORANDUM_translation_finalversion.doc.pdf.

179 Militello, “Dirty Oil.”



Guided-missile destroyer United States Ship (USS) *Truxtun* (DDG 103) approaches a dhow in the Gulf of Aden to conduct joint counter-piracy operations in the Red Sea, Gulf of Aden, Somali Basin, and Arabian Sea. Source: US Navy/Mass Communication Specialist 2nd Class Tony D. Curtis

immigration, sanitation, and customs (FISC), extends twelve miles farther; and that its Exclusive Economic Zone (EEZ), where it can only enforce laws related directly to the extraction of marine resources, extends to two hundred nautical miles from shore. As established by the United Nations Convention on the Law of the Sea (UNCLOS), only three crimes can be interdicted in international waters as universal offenses: piracy, slavery, and illegal broadcasting.¹⁸⁰

Law enforcement and security agencies must be mindful of those limits. In January 2018, Nigerian authorities arrested “a Swiss-flagged tanker, under suspicion of engaging in illicit ship-to-ship transfers of diesel. The seizure took place thirty-two nautical miles offshore—outside territorial waters and the contiguous zone, but within Nigeria’s EEZ. The vessel, along with its cargo and four Ukrainian crew members, remained in Nigerian custody until the International Tribunal for the Law of the Sea (ITLOS) could issue a ruling in the case. The ruling, which arrived in July

2019, determined that Nigeria had overstepped its sovereignty and must release the *San Padre Pio* on the provision of a \$14 million bond by the Swiss government; the question of whether or not Nigeria was criminally liable under international law was to be resolved in a separate proceeding.¹⁸¹ Had the tanker been within Nigeria’s territorial waters, or within the contiguous zone and engaged in FISC-related criminal activity, or outside those waters but within the EEZ and engaged in criminal extraction of resources, Nigeria would have had jurisdiction to arrest it. Nigerian authorities would have done well to consult legal expertise, which might have informed them that a case precedent, that of the *M/V Virginia G*—a tanker seized in the EEZ of Guinea-Bissau in 2009 for fueling ships engaged in illegal fishing, and whose arrest was later determined to be illegal by ITLOS—stood to thwart their seizure of the *San Padre Pio*.¹⁸² The incident is a reminder that even decisive action on the water, grounded in evidence, can still go awry if sufficient maritime legal expertise is not available for consultation and put to good use. A state

¹⁸⁰ United Nations Convention on the Law of the Sea, 63, https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf.

¹⁸¹ “Switzerland to Sue Nigeria over Seized Oil Tanker,” Swissinfo, March 31, 2019, https://www.swissinfo.ch/eng/international-spat_switzerland-to-sue-nigeria-over-seized-oil-tanker/44863116; “Maritime Tribunal Orders Nigeria to Release Swiss Oil Tanker,” Swissinfo, July 6, 2019, https://www.swissinfo.ch/eng/international-spat_maritime-tribunal-orders-nigeria-to-release-swiss-oil-tanker/45081090; “The M/T ‘San Pedro Pio’ [sic] Case (Switzerland v Nigeria),” Centre for Maritime Law, National University of Singapore, 2019, <https://law.nus.edu.sg/cmclcmidatabase/mt-san-pedro-pio-case-switzerland-v-nigeria>.

¹⁸² “Contribution to the Report of the Secretary-General on Oceans and the Law of the Sea,” United Nations General Assembly, 2014, https://www.un.org/depts/los/general_assembly/contributions_2014_2/ITLOS.pdf.

must have enforcement jurisdiction under the law to take action in such cases.

Maritime security, however, can also be meaningfully enhanced by appropriate frameworks for coordination and cooperation. In such cases, a balance must be struck between legal exigencies and operational realities. In the Gulf of Guinea, where oil and fuel-related piracy (outside the territorial sea) and armed robbery at sea (within the territorial sea) are chronic issues, and illicit trade in fuel flourishes in international waters and along the maritime borders between states, the Yaoundé Architecture for Maritime Security (YAMS), established in 2013 by the Code of Conduct Concerning the Repression of Piracy, Armed Robbery against Ships, and Illicit Maritime Activity in West and Central Africa (Yaoundé Code of Conduct), has gradually emerged as an increasingly, if not yet consistently, effective mechanism against maritime crimes, including fuel smuggling and piracy. According to Article 2 of the Yaoundé Code of Conduct, “the Signatories intend to co-operate to the fullest possible extent in the repression of transnational organized crime in the maritime domain, maritime terrorism, IUU fishing, and other illegal activities at sea.”¹⁸³ Accordingly, the signatories have divided themselves into five maritime security zones, with one regional coordination center each for West Africa and Central Africa, and an overarching international coordination center as an apex hub. While the individual zones have developed their coordination at varying rates, the Yaoundé Architecture has already achieved some notable successes, including the coordinated tracking and boarding of the hijacked *M/T Maximus* in 2016. A more recent incident revealed both the Yaoundé Architecture’s emerging strengths and its lingering weaknesses. On December 17, 2018, the regional coordination center for West Africa notified the navies of Ghana and Côte d’Ivoire that a previously pirated and recovered tanker, the *M/T Anuket Amber*, was engaging in suspicious and systematic ship-to-ship transfers in a previously disputed area along the maritime borders of the two countries. The next day, one of the ships with which the *Anuket Amber* had engaged in those transfers, the *MSC Maria*, entered a port in Côte d’Ivoire and was promptly arrested. After securing political

cover, both navies set out to arrest the *Anuket Amber* on December 21; Ghana arrived first and detained the vessel in Tema port—only to release it shortly thereafter having determined no legal grounds to hold it, and thereby undoing any case the Ivorians could have had against the *Maria*. Within seven months, Zone F, consisting of Ghana and Côte d’Ivoire as well as Burkina Faso, Guinea, Liberia, and Sierra Leone, had drafted and signed an MOU that effectively provided proactive authorization for hot pursuit across borders within the zone. The incident involving the *Maria* was an operational success followed by a legal breakdown that led to more effective coordination within the security framework.¹⁸⁴

Another promising initiative in maritime coordination has begun in Southeast Asia, where fuel smugglers have long exploited the seams between territorial waters. For example, in September 2018, Indonesian maritime security forces detained a Mongolian-flagged tanker, the *M/V Eastern Glory*, carrying five thousand metric tons of illicit high-grade diesel; the tanker had secured the fuel through a ship-to-ship transfer in waters along the Indonesia-Malaysia maritime border.¹⁸⁵ In 2016, Indonesia, Malaysia, and the Philippines issued a joint declaration establishing maritime security coordination against threats, including transnational crime. That initial step has led to a series of ongoing measures, including conducting joint patrols and establishing direct communication links to expedite coordination. By 2018, the Trilateral Cooperative Agreement (TCA) had been formalized, allowing for air as well as maritime joint patrols and joint operational hubs in all three countries. The trilateral commitment goes some way toward sealing off one way criminals can evade existing bilateral joint patrols by the Philippines and Indonesia: by retreating into Malaysian waters. In August 2019, the TCA expanded to incorporate joint land exercises.¹⁸⁶ This establishment of effective working relationships within a clear operational framework creates formidable obstacles for fuel smugglers who have in the past relied on disconnects in regional maritime security.

If those instances underscore the importance of developing effective regional maritime security

183 “Code of Conduct Concerning the Repression of Piracy, Armed Robbery against Ships, and Illicit Maritime Activity in West and Central Africa,” International Maritime Organization, 5, http://www.imo.org/en/OurWork/Security/WestAfrica/Documents/code_of_conduct%20signed%20from%20ECOWAS%20site.pdf.

184 Dr. Ian Ralby, “Learning from Success: Advancing Maritime Security Cooperation in Atlantic Africa,” Center for International Maritime Security (CIMSEC), September 17, 2019, <http://cimsec.org/learning-from-success-advancing-maritime-security-cooperation-in-atlantic-africa/41517>.

185 Wahyudi Soeriaatmadja, “Indonesia Detains Vessel for Suspected Fuel Smuggling,” *Straits Times*, September 12, 2018, <https://www.straitstimes.com/asia/se-asia/indonesia-detains-vessel-for-suspected-fuel-smuggling>.

186 Lucky Wuwung, “A Quest for Best Practices: Trilateral Cooperation on Maritime Security in the Celebes Sea,” *Diplomat*, May 14, 2016, <https://thediplomat.com/2016/05/a-quest-for-best-practices-trilateral-cooperation-on-maritime-security-in-the-celebes-sea/>; Prashanth Parameswaran, “What Did the New Sulu Sea Trilateral Land Exercise Accomplish?” *Diplomat*, August 13, 2019, <https://thediplomat.com/2019/08/what-did-the-new-sulu-sea-trilateral-land-exercise-accomplish/>.

cooperation in regions where illicit fuel travels by water, another example reveals what can happen when existing arrangements are discontinued. In 2006, just as sophisticated criminal groups were advancing their operations into Ecuador, Rafael Correa was elected the country's president. In keeping with an apparent promise to militant groups operating out of Colombia, he promptly closed the US military base in the port of Manta and adopted a largely hostile posture to the United States as a partner in anti-trafficking and regional security. Ecuador has since become a drug trafficking hub; a wide range of small vessels depart its northern coast shipping cocaine northward to Central America and as far as the United States. Because the small boats generally take a long route around the Galapagos Islands to avoid US patrols, a thriving industry of trafficking in heavily subsidized Ecuadorian fuel has emerged, in which boats ferry the product out to smuggling vessels at considerable profit—and significant risk.¹⁸⁷

An Unresolvable Issue: Conflict Economies

In Iraq and Syria, in Libya, and now in Venezuela, scenarios have unfolded since the turn of the century in which breakdowns in the rule of law have given rise to conflict economies, where organized criminal groups commandeer extensive, sometimes global, illicit trade in commodities, incentivizing the perpetuation of war and suffering. The Syrian civil war and the conflict with the Islamic State of Syria and al-Sham (ISIS) led to large-scale smuggling of oil and fuel, much of it into Turkey but some to other destinations. As one result, groups operating along the Syria-Lebanon border have a vested interest in continued chaos in Syria, as it provides cover for their lucrative diesel-smuggling operations.¹⁸⁸ In Libya, the disorder in the wake of the fall of Muammar al-Qaddafi's regime in 2011 led to the hemorrhaging of a third of the country's refined fuel through theft and smuggling, which formed only one lucrative income stream in the portfolios of



Archaeological remains in Nineveh, Iraq, following destruction and looting by ISIS. Photograph taken during a United Nations Educational, Scientific, and Cultural Organization (UNESCO) mission in April 2017. Source: Wikimedia Commons/UNESCO

¹⁸⁷ James Bargent, "Ecuador: A Cocaine Superhighway to the US and Europe," InsightCrime, October 30, 2019, <https://www.insightcrime.org/news/analysis/ecuador-a-cocaine-superhighway-to-the-us-and-europe/>.

¹⁸⁸ Ralby, *Downstream Oil Theft*, 67-8; "What Drives the Spread of Fuel Smuggling in the Arab Region?" Future for Advanced Research and Studies, October 26, 2017, <https://futureuae.com/m/Mainpage/Item/3386/what-drives-the-spread-of-fuel-smuggling-in-the-arab-region>.

militias and other criminal groups, including European mafias.¹⁸⁹ The slow-motion collapse of Venezuela, and accompanying economic sanctions, have reached a point where the country with the world's largest oil reserves now suffers from such a shortage of fuel that that the once-thriving industry of smuggling fuel into Colombia, part of a conflict economy that finances militant groups and criminal cartels as well as corrupt Venezuelan elites, has suffered serious decline.¹⁹⁰

The challenges posed by such crises, in which domestic law has been undermined and international law is difficult to impose, defeat most attempts at intervention. In the absence of any such scaffolding, countermeasures can at best take the form of containment where possible, or sanctions on offending governments, or tracing and interrupting the illicit financial flows that fuel the criminal, militant, and terrorist organizations that thrive on conflict economies. Even more problematic, however, are situations in which fuel itself can be weaponized, especially through environmental vandalism. Beyond some domestic legislation, there is little in the way of legal infrastructure to combat

transnational environmental crime. Consequently, both regional and global communities are ill-prepared to address the crime of environmental vandalism through sabotaging or destroying of downstream as well as upstream infrastructure so as to create environmental crises. This is an especially challenging problem, and it requires a systematic and careful response from the international community.

An increasingly effective suite of regional and international measures has evolved to counter downstream crime. As ever, though, organized criminal groups, unburdened by legal and regulatory restrictions, can and will respond to these strategies and tactics with agility, creativity, and efficiency. Only by continuing to coordinate countermeasures, share and refine data and other information, and build relationships of trust and collaboration across jurisdictions can authorities hope to respond with comparable effectiveness. Countering organized downstream crime effectively requires being at least as organized, collaborative, creative, and proactive as the criminals themselves.



Gasoline smugglers fill tanks with gasoline on the Colombian side at the border between Colombia and Venezuela. Source: REUTERS/Carlos Garcia Rawlins

189 Andrea Backhaus, "These Gangs Don't Care If They Smuggle Gasoline Or People," Zeit Online, March 5, 2019, <https://www.zeit.de/politik/ausland/2019-02/libyen-oelproduktion-benzin-kriminalitaet-mustafa-sanalla-mineraloelgesellschaft-english>.

190 "Venezuela Subsisting on Trickle of Gasoline," Argus Media, October 25, 2019, <https://www.argusmedia.com/en/news/2003177-venezuela-subsisting-on-trickle-of-gasoline>; Joshua Collins, "Venezuela's Oil Crisis Destabilizes Colombian Black Markets," Al Jazeera, June 24, 2019, <https://www.aljazeera.com/ajimpact/venezuelas-oil-crisis-destabilises-colombian-black-markets-190621003555829.html>.

Conclusion

Downstream crime encompasses a wide range of modalities, crosses borders, and even travels the globe generating profits that finance even more destructive criminal activities. It, therefore, requires a multi-pronged and coordinated response. Governments seeking to counter it should think in terms of a suite of countermeasures, each of which supports the others. Concrete countermeasures provide both visibility on fuel flows and a deterrent effect on criminals; legal and policy measures disincentivize fraud, promote transparency, close loopholes, and provide for sufficient penalties; and regional and international coordination inhibits transnational criminal operations and allows for more effective investigations and prosecutions. Each government must evaluate its downstream criminal threats, study the available countermeasures, and craft a strategy that is both comprehensive and adaptable.

Accordingly, we offer the following recommendations:

- **Conduct a thorough risk assessment for crime and corruption in the downstream sector.** This includes identifying current and emerging modalities of illicit activity, examining dynamics that incentivize crime and corruption, and evaluating both supply chain security and the training and capacity of law enforcement agencies.
- **Use concrete countermeasures to gain visibility on downstream flows and increase the sense of risk for criminal actors.** Governments should assess how best to implement such countermeasures as fuel integrity programs, while also investing in technologies that will upgrade the monitoring of stocks and flows, ideally in real time. Such initiatives must be adequately resourced and accompanied by well-crafted communications strategies.
- **Craft or reform policies, especially those related to fuel subsidies and other pricing mechanisms, to disincentivize some forms of downstream crime.** It is crucial that each country's legal and policy environment be made less habitable for downstream crime. Countries with fuel subsidies, especially consumer fuel subsidies, should leverage technology to better target and deliver consumer subsidies in ways that close off existing openings for fraud.
- **Shape laws and regulatory policies so as to explicitly criminalize downstream theft and fraud and provide sufficiently deterrent penalties.** Even the most comprehensive countermeasures will accomplish little without sufficient regulatory requirements, penalties for malfeasance, and legal follow-through. Just as the supply chain must be secured from end to end, the regulatory and legal processes surrounding the downstream sector must be secure and reliable across the board.
- **Determine how best to leverage both domestic and foreign laws, where applicable, to investigate and prosecute downstream crimes.** Judges and prosecutors must be educated in how existing laws, both domestic and international, might be applied to downstream crime. Law enforcement personnel must be trained in how to investigate these illicit activities accordingly.
- **Proactively coordinate with other states in controlling cross-border crime, conducting investigations, and prosecuting transnational downstream criminal operations.** Downstream crime seldom respects borders, so states must collaborate through established mechanisms or craft their own agreements to coordinate their efforts against transnational hydrocarbons crime.
- **Pursue stakeholder engagement strategies that alert stakeholders to the destructive effects of downstream crime and the need for concerted action against it.** To galvanize the political will to take on this challenge, governments must systematically raise public awareness of how downstream crime impacts ordinary citizens, and engage with industry entities to clarify their stake in countering downstream crime and demonstrate good governance.
- **Use data collected from the above activities to refine the suite of countermeasures, track downstream crime as it evolves, and adapt to the**

changing tactics of criminals. Criminal organizations, both large and small, are unencumbered by laws and regulations and, therefore, able to adapt quickly to shifting terrain. By collecting and analyzing the data provided by a suite of countermeasures, governments will be far better positioned to take on criminals where they are operating now and anticipate where they will move in the future.

The domestic, regional, and global threats posed by downstream crime are undeniable. By recognizing them and adopting this proactive and systematic approach to combating downstream oil theft, governments can recover lost revenues, increase confidence in markets, and constrict the income streams that contribute to even more nefarious activities. With increased regional and international coordination, downstream crime can be curtailed in all its modalities. These efforts require political will and long-term commitment, but they are more than worth the investment.

About the Author



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Dr. David Soud is head of Research and Analysis at I.R. Consilium, LLC, a family-owned firm that consults globally in matters of maritime security, resource-related crime, transnational organized crime, and strategies for addressing emerging security challenges. In this role, he co-authored *Oil on the Water*, I.R. Consilium's report for the Atlantic Council on illicit hydrocarbons activity in the maritime domain.

Previously, he served as a contributing author, conducting extensive research, writing, and editing for I.R. Consilium's seminal *Downstream Oil Theft* reports, including taking main responsibility for several case studies. In addition to being considered a leading authority on illicit hydrocarbons activity, Dr. Soud has also investigated and published regarding other resource-related matters, including illegal mining; illegal, unreported, and unregulated fishing; and the nexus between resource-related crime and transnational organized crime.

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Dr. Ralby is a recognized expert in maritime security, international law, hydrocarbons crimes, private security oversight, and countering transnational crime. He works closely with governments and international organizations on maritime law and security issues around the world, leading a number of initiatives on addressing evolving and emerging threats in the maritime domain. He also frequently works on energy-related matters, both on land and offshore, particularly with regard to hydrocarbons theft and criminal or terrorist involvement in oil and gas supply chains.

From strategic protection of offshore oil and gas infrastructure to human rights concerns regarding the use of private security companies by the extractive industry to approaches to interdicting the theft, smuggling, adulteration, and illicit refining of oil, Dr. Ralby has addressed a wide range of energy issues for government and private clients. Examples of his work include advising on or drafting energy security and critical national infrastructure strategy, legislation and policy for sovereign states; advising on approaches to countering fuel smuggling and fraud; drafting national and international accountability instruments for private security oversight; advising companies on legal considerations for protection of oil and gas infrastructure or supply chains; and, most notably, the in-depth investigation into global oil theft that has led to a series of seminal publications with the Atlantic Council.

In addition to his work with the Atlantic Council, Dr. Ralby is CEO of I.R. Consilium, the firm that has led this effort on downstream oil theft. He also spent three years as a Maritime Crime Expert with the United Nations Office on Drugs and Crime's Global Maritime Crime Programme; and four years as an

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Dr. Ralby has a BA in Modern Languages and Linguistics and an MA in Intercultural Communication from the University of Maryland, Baltimore County; a JD from William & Mary Law School, where he was a Jack Kent Cooke scholar; and both an MPhil and a PhD from the University of Cambridge, where he was a Gates scholar.



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Rohini Ralby brings to bear the deep knowledge and strong action she has developed over decades of experience as a martial artist, head of security for Swami Muktananda Paramahansa, and mentor to a range of clients, from corporate executives to security professionals to energy sector experts. She provides expert counsel in strategic planning, adapting to rapidly changing environments, and realizing strategic goals. Her extensive training in a monastic environment, which she has refined and applied for many years, allows her extraordinary insight into underlying forces, probable outcomes, and possible courses of action, as well as an ability to discern the motivations, strengths, and weaknesses of the agents involved.

A superb crisis manager, Ms. Ralby cuts to the heart of complex situations, discerning both the relations among their constituent elements and the decisive information that can lead to effective action with lasting results. Further, she is an expert in pre-conflict resolution: seeing how to resolve a potential problem before it manifests. Her insight and direction have been fundamental to I.R. Consilium's *Downstream Oil Theft* series for the Atlantic Council, as well as to advising a number of clients around the world on challenging business and security matters. Ms. Ralby has an AB in Sociology from Washington University in St. Louis and an MA in Dance from Mills College.

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