Abstract

This article delves into the Czech Republic’s intricate legal framework and ongoing struggle in combating the pernicious issue of illegal waste dumping. From outlining the most pressing challenges plaguing the nation’s waste management system, emphasizing the burgeoning quantity of waste imported from other countries, to dissecting the cornerstone legislative instruments enshrined within the 2020 Waste Act, it describes specific instances of illicit waste management practices, focusing on cross-border waste shipments – a notorious breeding ground for such transgressions. It explores the modus operandi of these perpetrators, the requisite inspection protocols, and pertinent case laws, highlighting the disconcertingly low number of criminal prosecutions stemming from illegal waste dumping. However, a glimmer of hope emerges as the government acknowledges the gravity of the situation and embarks on initiatives to foster enhanced cooperation between administrative and criminal authorities.

Keywords: Czech Republic, waste management, transboundary shipment, administrative sanctions, criminal proceedings, inspections

1. Introduction

The spectre of inadequate waste management looms large over the Czech Republic, with excessive reliance on landfilling of municipal waste posing the most critical challenge. In its 2023 early warning report, the European Commission assessed the nation’s performance in waste management and its trajectory toward achieving the ambitious recycling targets set for 2025 and the crucial landfill objective set for
2035. Although the report acknowledged that the Czech Republic is demonstrably on track to meet the goal of 55% preparation for reuse and recycling of municipal waste by 2025, alongside a laudable 65% recycling target for all packaging waste, concerns were expressed over the material-specific target for aluminium. More concerning was the nation’s significant distance from achieving the objective of limiting municipal waste landfilling to a maximum of 10% by 2035.³

Illegal waste dumping is an issue involving a distinct set of complexities. As subsequent sections will elucidate, this domain is rife with instances of malfeasance perpetrated by industrial operators and the abhorrent practice of waste disposal without the requisite permits. Particularly disconcerting is the growing influx of waste from foreign sources into the Czech Republic. To illustrate this point, data from 2021 reveal an alarming statistic – over 166 thousand tonnes of plastic waste were imported during that year. This trend indicates a worrisome rise in waste imports, while exports concurrently show a concerning decline.⁴

The increasing influx of waste into the Czech Republic could be attributed to multifaceted reasons. One of the significant contributing factors is the transformation of plastic waste into a problematic material following the initial restrictions and subsequent complete ban on its import by China.⁵ Notably, the risk associated with waste imports is demonstrably lower in cases where waste can be incinerated. Such waste is primarily imported for use in cement plants equipped with permits for co-incineration; these facilities are obligated to adhere to stringent environmental guidelines governing waste incineration practices. Notwithstanding, the Czech Republic currently lacks the necessary infrastructure for the effective recovery of, for instance, discarded plastic materials, necessitating continued reliance on landfilling for this particular waste stream. Consequently, indigenous plastic waste is inevitably pushed toward landfills, resulting in a disproportionately high quantity of plastic disposed in them due to the influx of imported waste. While landfill fees are demonstrably on the rise, they remain significantly lower compared to those levied in neighbouring countries and elsewhere within the European Union.

Furthermore, ‘sham recovery’ practices posing enormous risk have emerged in recent times. In such nefarious schemes, waste is ostensibly imported for recovery purposes, but in actuality, it is diverted to clandestine warehouses for backfilling or for directly depositing it in landfills. It is highly likely that the imported waste remains entirely unutilised within the Czech Republic. Even more alarming is the possibility that the Czech Republic is becoming, or has already become, a prime target for organised crime groups seeking to import waste for the sole purpose of dumping or further illicit disposal.⁶

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³ European Commission, 2023
⁴ Ritchie, 2022
⁵ See Trang et al. 2021
In this article, a comprehensive exploration of the legal framework governing waste management within the Czech Republic is conducted, dissecting the (a) complexities surrounding illegal waste management practices, (b) implementation of robust control mechanisms, and (c) imposition of effective sanctions.

2. Legislative framework

The legislative framework governing waste management in the Czech Republic is a relatively recent introduction implemented after the political transformation of 1989. Since its inception, substantial changes have been introduced, primarily to conform to the European Union (EU) directives and to address the practical realities encountered during its application. Despite discussions and attempts in the 1990s and the early 2000s, a unified code of environmental law is yet to be adopted. Consequently, environmental regulations remain fragmented, dispersed across numerous legislative instruments, including those specific to waste management.

The legislative landscape for waste management has been progressively shaped by the enactment of four distinct Waste Acts – in 1991, 1997, 2001, and most recently, in 2020. These core legislative instruments are bolstered by the enforcement of government regulations and decrees issued by the Ministry of the Environment. Collectively, they establish the fundamental principles and obligations pertaining to waste treatment.


The 1997 Waste Act (Act No. 125/1997 Coll.) superseded the 1991 Act and coincided with the enactment of other significant statutes, including the Act on Access to Environmental Information (Act No. 123/1998 Coll.), the Forest Act (Act No. 289/1995 Coll.), and the Act on Protection of the Ozone Layer (Act No. 86/1995 Coll.), among others. 9 However, the 1997 Act proved to have shortcomings that hampered its effectiveness in practice. These flaws were primarily due the absence of robust

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7 | See Kružíková & Petržílek, 2005
8 | See Židek, 2021
9 | See Kružíková & Mezřický, 2005, 209.
economic instruments for municipal waste management and the omission of waste management programmes as a cornerstone tool at all administrative levels. Subsequent amendments proved inadequate in addressing these fundamental issues. The 1997 Act also fell short of achieving full compatibility with the EU directives, considering that the Czech Republic aspired to join the EU at the time. While some EU requirements, such as waste prevention and prioritising waste recovery over disposal, were addressed superficially, others, such as permissions for waste management facilities, were inadequately incorporated. Besides, the Act neglected to enshrine certain crucial EU directives, including those concerning waste management plans, segregated treatment of specific waste streams, and mandatory, regular inspection of waste handlers.

The year 2001 marked a turning point with a new Waste Act (Act No. 185/2001 Coll.) introduced alongside the regulations implemented. This legislative overhaul aimed to achieve full harmonisation with EU waste management directives. Alignments were made to complementary legislations in related areas, including air protection, public health, agriculture, chemicals, and water protection. A significant departure from prior legislation was the introduction of revised definitions for waste recovery and disposal concepts. The former, broad concept of waste disposal was replaced by the more specific and nuanced concept of waste treatment, encompassing both recovery and disposal operations. The adoption of a new waste classification system, aligned with the EU waste catalogue, emerged as a critical unifying element in the national waste management framework.

Prior to the 2001 Waste Act, the Czech Republic lacked the requisite professional infrastructure to support the administration of waste management practices at a level comparable to that of developed nations. To address this gap, the introduction of the new Act brought in increased staffing within various institutions, including the Ministry of Health, State Health Institute, regional health stations tasked with public health surveillance and risk assessment, regional and district administrative bodies, and specialist and information centres like the Czech Ecological Institute, Research Institute of Water Management, and the Czech Hydrometeorological Institute. Notably, the Czech Environmental Inspectorate responsible for waste management saw a significant increase in personnel.

The year 2001 witnessed a confluence of significant legislative developments with wider environmental implications. The Act on Environmental Impact Assessment (Act No. 100/2001 Coll.) supplanted the preceding regulation (Act No. 244/1992 Coll.), consolidating the EU requirements for conducting environmental impact assessments (EIAs) and strategic environmental assessments within a single legislative framework. Nevertheless, the EIA process remains distinct from the permitting procedures. If an EIA is deemed necessary for a waste management project, a binding opinion is issued for the permitting procedures under the Waste Act or the integrated permit (IPPC) applicable to large industrial facilities. This process also affords participatory rights to the concerned public. In instances
where an EIA is not required, affected individuals can still participate under the
general provisions for administrative participation outlined in the Administrative
Code (Act No. 500/2004 Coll.). However, the latter route excludes participation by
environmental non-governmental organisations.

Following the 2001 Act, the year 2002 saw the introduction of the modern
Integrated Prevention and Pollution Control Act (IPPC Act, No. 76/2002 Coll.). This
legislation established a single permit system for large industrial installations,
consolidating individual operating permits into a single decision, encompassing
air protection, waste management, and water protection concerns. The Act man-
dates the application of best available techniques to achieve maximum environ-
mental protection. This legislation was amended to comply with the requirements
of the 2010 Industrial Emissions Directive (2010/75/EU) and remains in force even
now, after two decades. Currently, approximately 2,000 installations in the Czech
Republic, including 428 waste management facilities, operate under the IPPC
regime.10

The year 2003 ushered in administrative justice system reforms. The estab-
lishment of the Supreme Administrative Court finally fulfilled a longstanding
constitutional obligation dating to 1993, when the new Constitution envisioned
such a court, but its actual creation was delayed by a decade. Since administrative
courts adjudicate the majority of cases related to waste management and ensure
uniformity in administrative decision-making, this development represented a
significant step forward in enforcing waste and environmental legislation more
broadly. Furthermore, unlike civil or criminal courts, all decisions rendered by
administrative courts are freely accessible online, allowing waste management
facility operators to remain apprised of the evolving interpretation of relevant
legal obligations.

3. The imperatives of the 2020 Waste Act

The 2001 Waste Act, burdened by successive amendments, had morphed into a con-
voluted and opaque legal instrument. Furthermore, it no longer harmonised with
the evolving legislative and technical requirements of both the EU and the Czech
Republic itself. In fact, the 2016 overhaul of the general Czech offence legislation
created significant discrepancies in the area of enforcement and administrative
liability.

To address these shortcomings, the Czech Republic enacted a new Waste Act
(Act No. 541/2020 Coll.) in 2020, which came into force on 1 January 2021. This Act
serves as the cornerstone legislation for waste management, complemented by Act
No. 542/2020 Coll., governing the management of end-of-life products, and Act No.
477/2001 Coll., which regulates packaging waste. The overarching objectives and measures for achieving them are outlined within the national Waste Management Plan and corresponding regional plans.

Concurrent with the development of the 2020 Waste Act, the Czech government formulated and adopted the Strategy for the Prevention and Combating of Waste Crime for the period 2021-2023 (2020 Strategy). This strategic document defines targeted measures to prevent and combat waste-related crime, while identifying the needs of relevant stakeholders, particularly the authorities responsible for environmental law enforcement. The 2020 Strategy prioritises enhancing the capacity of these administrative bodies to address waste-related crime. Its core objectives are to a) foster closer collaboration between environmental enforcement authorities in the waste management sector; b) equip environmental law enforcement authorities with more specialised knowledge and skills pertaining to waste management issues; c) refine the Czech legal framework governing waste management; and d) raise public awareness of waste-related issues. The 2020 Strategy employs a task-oriented approach, assigning each initiative to a specific entity and establishing clear timeframes for completion of a task.

The 2020 Waste Act demonstrably prioritises the principles underpinning the circular economy to a greater extent than did its predecessor. However, it is important to note that the Act’s scope excludes certain materials (such as uncontaminated soil) and specific waste categories. Nevertheless, materials excluded from the Act’s purview are still legally classified as waste – wastewater being a prime example. Section 4(4) of the Act establishes a specific procedure for resolving any ambiguity regarding the classification of a particular material.

The 2020 Waste Act introduces several noteworthy changes compared to the previous legislation, including: (a) Waste Management Taxes: It establishes new regulations for both landfill tax and municipal waste tax. (b) End-of-Waste Status: It defines clearer procedures for determining when waste can be reclassified as a non-waste material. (c) Permit Reviews and Time Limits: It mandates periodic reviews of permits for operating waste management facilities and may impose time limitations on such permits. (d) Waste Trading Regulations: It makes waste trading a separate activity requiring permission.

The 2020 Waste Act specifically addresses the concerning issue of illegally deposited waste, often referred to as ‘black dumps’. Despite existing measures, such as camera traps, prohibition signages, and relatively harsh penalties, apprehending perpetrators remains a challenge. The Act introduces a new procedure

12 | Section 2(3) of the 2020 Waste Act.
13 | Hanák & Vodička 2024, 167.
Desperate, Determined, Dumped: Fight against illegal waste treatment in the Czech Republic

for identifying those responsible for illegally dumped waste and ensuring its removal to a designated waste management facility.14

Significant changes pertaining to waste collection are implemented under this Act. Operators of waste collection facilities are now obligated to install and maintain CCTV systems for a specified period, and the regulations governing mobile waste collection have been considerably tightened. These measures are specifically designed to curb metal-related crime. Data compiled by the Czech Republic Police, Union of Towns and Municipalities, and the Railway Infrastructure Administration reveal widespread criminal activity involving the purchase of stolen metal objects as waste.15 Frequently targeted items include commemorative plaques, religious artefacts, and public utility or industrial equipment components (e.g. mass transit infrastructure, traffic signages, public space and road fixtures, and energy, water, or sewage facilities). Despite existing prohibitions on purchasing such items from individuals, the crime rate remains stubbornly high. Mandatory CCTV recordings introduced at waste management facilities are a valuable tool for enforcement, and the recordings play a crucial role in proving the specific timeframe of waste receipt at the facility, potentially revealing discrepancies between the documented arrival date and the actual duration of waste storage on-site. Additionally, CCTV systems offer a preventative benefit, potentially enhancing security for operators of metal waste collection and processing facilities.

The Ministry of the Environment has outlined plans to implement mandatory textile waste collection starting 2025. This proposed legislation, if adopted, would require waste producers to participate in cost-sharing arrangements with municipalities for collection services. However, the current legal framework mandates only the establishment of collection points, without requiring actual recycling efforts. The proposed mandatory textile recycling initiative is part of a broader legislative discourse, encompassing the implementation of PET (polyethylene terephthalate) bottle recycling laws scheduled to come into force in 2025. This plan envisions the creation of convenient collection points, facilitating returns through retail stores, gas stations, and even online platforms.

However, implementing EU regulations concerning waste management effectively continues to be a key challenge for the Czech Republic. Deficiencies in this

14 | If a landowner becomes aware of illegal concentrated waste deposited on his or her land, he or she is obliged to notify, without undue delay, the municipal authority of the municipality with extended jurisdiction in whose administrative district the waste is deposited. Depending on the action taken by the municipal authority, the owner is then obliged to (a) secure the place where the illegal concentrated waste is located at his or her own expense against further deposition of waste, (b) allow the entry of a person authorised by the municipal authority to ensure that the pollutants do not escape into the surrounding environment, or (c) allow removal of the waste. The landowner is, therefore, not obliged to remove the waste himself. The municipal authority must try to identify the owner of the waste. See Hanák & Vodička 2024, 168–169; Kanický 2022, 46–48.
15 | See Government of the Czech Republic. Resolution of 29 July 2015 No. 611, Comprehensive solution to the problem of negative phenomena in metal waste redemption in the Czech Republic.
area have not escaped the notice of the European Commission, which has initiated and continues to pursue several infringement proceedings against the Czech Republic. Currently, five active procedures are underway, including one concerning urban wastewater treatment and another related to radioactive waste. These ongoing proceedings highlight the critical need for the Czech Republic to address shortcomings in its waste management practices and ensuring their compliance with the EU directives.\textsuperscript{16}

4. The shadowy persistence of illegal waste dumping in the Czech Republic

Illegal waste dumping in the Czech Republic manifests in a multitude of ways. Often, seemingly minor transgressions occur within otherwise legitimate waste management facilities. These include lapses in waste sorting due to employee negligence, failure to properly register and report on waste activities, or neglect in equipping hazardous waste sites with the necessary identification sheets. Furthermore, inaccurate or incomplete data entry regarding hazardous waste shipments can further complicate the process of identifying and exposing such irregularities, especially within complex operations.

Landfills, the predominant method of waste disposal in the Czech Republic, exemplify this complexity. These facilities often function as regional hubs for comprehensive waste management, encompassing activities such as collection, sorting, storage, composting, and alternative fuel production, alongside landfilling itself. The sheer scale and multifaceted nature of these operations can make it difficult to pinpoint and address minor breaches of regulations.

The spectrum of illegal practices extends far beyond minor administrative oversights. More serious transgressions include misclassification of waste, improper labelling of hazardous materials, and even handling specific hazardous waste types without a permit. A particularly concerning area is the management of medical waste, where insufficient domestic thermal treatment capacity poses a risk. This shortage, exacerbated by the volume of waste generated during the COVID-19 pandemic, has led to a rise in the illegal handling of infectious medical waste from healthcare facilities, testing centres, and laboratories.

Financial gain serves as a significant driver for many illegal dumping practices. Operators often seek to bypass landfill or incineration fees, thereby reducing disposal and transport costs. In some instances, the motivation is simply an aversion to navigating the administrative procedures required to obtain permits for landscaping or backfilling activities from the relevant authorities.

Large-scale illegal dumping typically involves transporting waste to abandoned facilities, such as disused warehouses, agricultural buildings, or industrial sheds. These sites become repositories for the dumped waste, with no prospect of proper treatment, potentially leading to surrounding areas becoming contaminated with hazardous substances. Examples include the illegal deposit of construction and demolition waste, unauthorised landscaping practices, and large-scale backfilling activities associated with construction projects, including transport infrastructure and utility networks.

The Czech Environmental Inspectorate spearheads official efforts to combat illegal waste dumping. Their 2022 annual report\(^\text{17}\) details a robust inspection regime, encompassing over 3,000 waste management inspections, a significant portion of which were unplanned responses to public complaints. The Inspectorate’s Waste Management and Chemical Safety Unit processed over 600 complaints in a single year, leading to the initiation of proceedings for illegal activities and the issuance of sanctions. In 374 cases, the inspectors took part in inspections under the IPPC Act. Altogether, 708 proceedings for illegal activities were initiated, and 702 decisions to impose sanctions were issued. The largest number of proceedings fell under the scope of the Waste Act (398 proceedings), while 101 proceedings were initiated in the Chemicals Act. A total of 689 penalty decisions came into force in 2022. Corrective measures were imposed in seven cases. Fines imposed in 2022 reached a record high, exceeding 42 million Czech Koruna (CZK) (approximately EUR 1.7 million). The total amount of fines was 20% higher than that in 2021, but 25% more decisions were issued than in the previous year. The highest final fines imposed were CZK 2 million (approximately EUR 80,000) for breaches of the Waste Act.

The ever-evolving nature of illegal activities is pushing the official authorities to update their technologies and inspection methods. For example, in the case of some landfills, aerial surveys have been conducted by the Inspectorate using drones and detailed aerial photographs to locate and accurately measure the active area of a landfill. The aerial photographs also determine the overlapped (inactive) part of the landfill, the elevation (metres above sea level) of the landfill body for comparison with the permitted elevation marks. The data processed form an important basis for the offence proceedings.\(^\text{18}\)

The 2020 Waste Act distributes the competence in the exercise of the state administration among several authorities: the Ministry of the Environment, the Inspectorate, customs authorities, police, regional authorities, and municipal authorities. This impacts the enforcement of legal requirements. In particular, the regional authorities control how legal entities and natural persons engaged in business comply with the provisions of legislation and decisions in all areas.

\(^{17}\) Czech Environmental Inspectorate 2023
\(^{18}\) Ibid.
covered by the Waste Act, except in areas where the municipal authority is competent to carry out controls. However, the same competence is also vested with the Inspectorate, which acts as a general inspection body with a wide remit in environmental protection. If infringements on regulations other than waste regulations are found, the competence to carry out controls extends to, for example, building authorities or municipal authorities. As a result, individual cases can be dealt with by several different administrative authorities, or by administrative authorities and the police, provided the overlap between administrative and criminal liability is not excluded.

If all the administrative authorities are competent, they do not need to follow a hierarchy in dealing with illegal waste dumping. Arguably, a breach of law should be dealt with at the local level by an authority closest to the substantive dimension of the activity. For example, building authorities are best suited to consider demolition works or landscaping. The Inspectorate or the municipality may step in, but they both lack the relevant experience and knowledge of construction rules.

The competence of the municipalities to deal with illegal waste dumping is often disputed by the inspected entities, but as the courts have suggested, if a municipality ‘has any suspicion that waste is being disposed of in violation of the Waste Act within its territorial jurisdiction, it may, of course, carry out an inspection aimed at confirming or refuting this suspicion’. According to the courts, municipalities conduct inspections ‘with a view to the careful exercise of waste management administration which contributes to the protection of the environment’.

Similarly, when waste management is carried out following a decision issued by the building authority, the inspected parties may dispute the authority of the building authority, or, vice versa, the Inspectorate. In such cases, the courts have held that “the building authority’s inspection powers and the scope of those powers derive from the Construction Act and do not exclude the powers of other inspection bodies, provided that they are exercised within the limits of their statutory powers.”

The nature of waste or waste management must in some cases be addressed by the tax authorities as well, particularly in the context of tax obligations and the conditions for granting subsidies.

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19 | Judgement of the SAC of 16 March 2016, No. 2 As 249/2015-36.
20 | Ibid.
22 | The first category includes, for example, the judgement of 7 January 2015, No. 1 Afs 148/2014-32, in which the SAC considered a decision on the tax assessment of an entrepreneur who suspiciously reported zero stocks of unused textiles on the date of discontinuation of business activities. The entrepreneur claimed that the material of the stock had deteriorated during floods and that the stock had been stored as waste. However, according to the Court, he did not provide sufficient
Such shared and overlapping competence is not always practical and may even undermine the effective enforcement of waste management requirements. For instance, it may result in excessive burden as the administrative bodies need to notify each other and coordinate their actions. This is not an easy task. For example, no general procedure has been defined for informing law enforcement agencies about violation of law that may give rise to a suspicion that a crime has been committed, although state agencies are obliged, pursuant to Sec. 8(1) of the Criminal Code (Act No. 40/2009 Coll.), to immediately inform a public prosecutor or the police of a criminal offence.

Furthermore, shared competence seems to weaken the ability to implement and enforce the environmental liability established by the EU Directive 2004/35/EC, which has been implemented in the Czech Republic by the Environmental Liability Act (No. 167/2008 Coll.). Administrative authorities tend to follow traditional rules on administrative measures and sanctions instead of the cross-sectoral concept of environmental liability, which is completely ignored country-wide. Therefore, for example, none of the cases of illegal management of fallout or wastewater discharge have been sanctioned as environmental damage, and the state has not fined large operators to pay compensation for environmental damage even in the most serious cases. 23

Consequently, such actions of perpetrators are considered from the perspective of preventing air pollution and not under waste management. Such activities may include unauthorised burning of waste on open fires or using inappropriate equipment or boilers and similar containers. Eventually, the perpetrators may escape punishment entirely or partially in areas where competence is exclusive.

Besides specific legislation from other fields of environmental law, exclusive competence applies to even some aspects of illegal waste dumping. For example, the 2020 Waste Act addresses the management of illegal concentration of waste in relation to the owners of the land, an aspect that had been completely overlooked in the previous law. Following the new rules, larger municipalities have been provided competence to deal with small-scale illegal dumps. Complaints about these illegal dumps are subsequently referred by the Inspectorate to the municipalities as they fall outside the competence of the Inspectorate.

evidence of the disposal of the stock in question as unusable waste. The second category includes, for example, the judgement of 18 July 2013, No. 1 Afs 54/2013-36, wherein the beneficiary of a subsidy violated the conditions of the subsidy by, inter alia, depositing construction waste on the landscaping works carried out in the vicinity of a rental hall without the permission of the subsidy provider. Although the SAC concluded that the judgement of the first instance court was partially unreviewable, it ruled that the tax administrator was entitled to carry out a tax audit in addition to the audit of the grant provider and verify the facts that occurred before the payment of the funds. This is significant because, as the Court added, in some situations, the recipient of the subsidy may claim payment of funds awarded on the basis of fraudulent documentary evidence or by projecting a state of affairs contrary to the facts. 23 | See Sobotka 2014, 130.
5. The murky waters of transboundary waste shipments

The stricter regulations imposed by the 2020 Waste Act have demonstrably incen-
tivised the use of domestically generated waste over imported waste in the Czech
Republic. However, this has not entirely eliminated the threat of illegal waste
shipments. The majority of waste entering the country originates from Germany
and Austria, with a recent uptick in imports from Italy. A particularly concerning
instance involved the illegal importation of hazardous waste from Poland.

After a period of relative calm, environmental inspectors are now grappling
with a significant rise in waste imports from neighbouring countries. Customs
officials have intercepted hundreds of tonnes of plastic waste. Operation Plast, for
instance, resulted in the seizure of 17 trucks carrying a combined total of approxi-
mately 400 tonnes of misclassified waste. The true scale of illegal waste dumping
in the Czech Republic is likely far greater, as the authorities lack the capacity to
monitor all shipments. The Inspectorate is continuously engaged in addressing
numerous sites containing illegally imported waste.

The modus operandi of these illegal import operations is often depressingly
straightforward. A foreign truck deposits a significant quantity of mixed, malodor-
ous waste, typically a non-recyclable blend of plastics heavily contaminated with
other materials, such as soiled paper, at a disused industrial facility or storage hall.
This waste closely resembles the residue of municipal waste collection. Subsequent
to the initial truckload, others often follow in quick succession. Once the illegal
nature of the waste is discovered, a chaotic scramble ensues to establish respon-
sibility for its transportation and removal. The party legally obliged to remove the
waste frequently proves impossible to locate. Furthermore, the absence of detailed
information regarding the origin of the waste can complicate efforts to return it to
the country of dispatch.

Europol’s observations on the perpetrators of illegal waste trafficking are
particularly insightful. While large-scale operations may involve mafia-like
structures, Europol also identifies the involvement of smaller organisations that
 collaborate with legitimate businesses operating in financial services, import/
export, and metal recycling sectors. One such instance involved a company
acting as a waste consignee that repeatedly participated in the illegal trans-
boundary movement of several thousand tonnes of rubber and plastic waste from
Germany. This waste was destined for a facility incapable of processing it in the
required manner. The company was further sanctioned for other breaches of
waste legislation, including the submission of inaccurate and incomplete facility
reports. The company was initially fined CZK 350,000 (approximately EUR

24 | See Customs Administration of the Czech Republic, 2019
25 | Europol, 2011
14,000), which was subsequently reduced to CZK 300,000 (approximately EUR 12,000) on appeal in 2022.  

The Inspectorate employs preventative measures to intercept foreign waste before it is dumped. These include mandatory, scheduled inspections of waste trading establishments. Customs authorities also conduct regular road checks, focusing particularly on former border crossing points. The Ministry of the Environment fosters international cooperation and strives to strengthen collaboration among the Inspectorate, customs authorities, law enforcement agencies, and the judiciary. Despite these efforts, the Czech authorities continue to face significant challenges in tackling this crime.

The Court of Justice of the European Union (CJEU) has also addressed the issue of transboundary waste shipments concerning the Czech Republic, albeit in a case focused on the export of materials. Case C-399/17 Commission v Czech Republic centred on a substance known as TPS-NOLO (or Geobal) that had been shipped from the Czech Republic to Poland. The Czech government argued that the substance did not constitute waste because it was registered under the REACH Regulation (Regulation No 1907/2006) and utilised as fuel. The CJEU ultimately ruled that the Commission had failed to demonstrate that the shipment in question comprised waste, and therefore did not qualify as an illegal shipment under the relevant regulation. The CJEU further noted that while the mixture may have been incorrectly registered under the REACH Regulation, this did not definitively confirm its status as waste. The Court emphasised that the registration of a substance under the REACH Regulation is a relevant factor when determining whether a substance has ceased to be waste, but it is not a definitive indicator. The CJEU concluded that the relevant circumstances for assessing whether the shipped mixture constituted waste are those prevailing at the time of shipment, not before or after that date.

6. The scrutinising eye: Inspections in combating illegal waste disposal

The illegal accumulation and mismanagement of waste poses a significant financial and environmental burden. It consumes vast quantities of manpower and financial resources for collection and remediation, while simultaneously endangering wildlife and public health. Implementing effective controls and inspections serves as a cornerstone strategy not only to deter illegal dumping but also to penalise such transgressions and prevent further environmental degradation.

The initiation of an inspection hinges on a suspected instance of illegal waste management. The SAC established that such a suspicion can arise from various...

26 | Czech Environmental Inspectorate, 2023
27 | See also the CJEU Case C-358/11 Lapin luonnon-suojelupiiri.
sources. Complaints lodged by citizens regarding recurring odours of burning materials\textsuperscript{28} or a municipal authority’s concerns about a suspected scrapyard operating within its jurisdiction can both trigger inspections.\textsuperscript{29} Inspections can also be conducted on a random basis,\textsuperscript{30} and specific legislation, such as the IPPC regime, mandates compulsory periodic inspections.

Prior notification of an inspection is not a requirement. The SAC emphasises the importance of surprise inspections, ‘so that the inspected person cannot frustrate the purpose of the inspection’\textsuperscript{31} in particular by ‘quickly ‘retouching’ the actual state of affairs before it is discovered, and thus avoiding a possible sanction foreseen by law’.\textsuperscript{32} This could involve hastily altering the actual state of affairs to evade potential legal repercussions, such as swiftly ‘tidying up’ the waste site before its discovery.\textsuperscript{33} The potential manipulation extends to falsifying records associated with waste management.\textsuperscript{34} In essence, unannounced inspections are essential to ensure the integrity of the evidence collected during the inspection process.

The Inspectorate’s personnel are presumed to possess the necessary expertise to assess the nature of the waste under scrutiny.\textsuperscript{35} Therefore, engaging external specialists is generally not considered necessary. If an inspected party contests the characterisation of the waste on the grounds of insufficient expertise, such objections may be dismissed if the waste’s properties are readily apparent even to a layperson.\textsuperscript{36}

Professionalism and proportionality are paramount during inspections. Inspectors are not obligated to provide a meticulous description of the inspected material if a general or approximate description adequately conveys its nature (e.g. demolition waste,\textsuperscript{37} stabiliser,\textsuperscript{38} or distillation stillage\textsuperscript{39}). Similarly, if the

\textsuperscript{28} See the judgement of the SAC of 28 March 2018, No. 6 As 91/2017-32.
\textsuperscript{29} See the judgement of the SAC of 16 March 2016, no. 2 As 249/2015-36.
\textsuperscript{30} See, for example, the judgement of the SAC of 24 January 2014, no. 5 As 112/2012-44.
\textsuperscript{31} Judgments of the SAC of 21 October 2010, No. 9 As 46/2010-97, of 2 March 2017, No. 7 As 237/2016-40.
\textsuperscript{32} Judgement of the SAC of 27 September 2006, No. 2 As 50/2005-53.
\textsuperscript{33} Judgement of the SAC of 23 February 2012, No. 1 As 3/2012-34.
\textsuperscript{34} Judgement of the SAC of 8 January 2004, No. 6 A 99/2002-52.
\textsuperscript{35} See the judgement of the SAC of 31 July 2014, No. 6 As 93/2014-33.
\textsuperscript{36} See, for example, the judgement of the SAC of 24 January 2014, No. 5 As 112/2012-44: “If the complainant claims that this state of affairs is only temporary and that the vehicles will be able to participate in road traffic again, this claim is completely unreliable and obviously purposeful with regard to the state of the ‘vehicles’. This assessment of the condition of the ‘vehicles’ at the complainant’s facility (establishment) does not even require specialist knowledge in view of their condition, since it must be obvious even to a layman that the corroded body shell without engine, steering wheel, wheels, seats, etc. is not fit for any kind of operation and cannot be ‘repaired’ or ‘made operational.’”
\textsuperscript{37} See the judgement of the SAC of 19 March 2009, No. 6 As 68/2007-74.
\textsuperscript{38} See the judgement of the SAC of 8 January 2004, No. 6 A 99/2002-52.
\textsuperscript{39} See the judgement of the SAC of 23 February 2011, No. 7 As 6/2011-63: “...none of the terms ‘distillation stills’, or ‘stills from the production of alcohol by distillation’, etc. could, in the present case, lead to any confusion or contradiction in the definition of the subject-matter of the proceedings. The Regional Authority did not define the subject-matter of the proceedings merely by the words ‘distillation stills’ but...
inspected party submits statements or documents that serve as sufficient primary evidence, additional empirical measurements of the waste are not required. However, inconclusive records make it impossible to definitively determine the waste quantity or retrospectively verify its handling in accordance with relevant regulations.

The SAC determined that for substantial quantities of controlled material, a calculated weight estimate, along with a well-founded approximation of the quantity, suffices if it is appropriately documented. The exact weight of the waste may not be established, but a general characterisation is deemed sufficient from a practical standpoint, considering the potentially vast size and weight of waste piles, which often amount to tens of thousands of tonnes and tens of metres in dimension. Conversely, the precise location of the land where the waste is handled is of critical importance. As the SAC highlighted in a 2018 judgement, “the importance of the precise marking of the site is reinforced by the fact that the obligation set out in Section 12(2) of the Waste Act is breached if waste is managed in facilities that are not designated for this purpose under the Waste Act.”

On-site sample collection can be crucial to the inspection outcome. Without proper analysis, the properties of the material under examination cannot be determined easily. Ideally, the administrative authorities’ legal reasoning regarding the inspected party’s actions should be grounded in such analysis.

For mixed materials, the properties requiring inspection vary across locations. Therefore, specific sampling sites hold particular significance, especially when identifying hazardous substances that influence the level of any potential fines. The inspection is not mandated to employ completely random sampling but can leverage its experience regarding the typical locations of hazardous substances.

by ‘distillation stills which are a by-product of the production of alcohol’. It is clear from the foregoing that it is the distillate which is a by-product of the production of alcohol which is at issue. Moreover, the inspection report of 1 March 2007 describes and photographically documents the process of creating these stills, and the connection between the initiation of the administrative procedure in question and this inspection is more than obvious.”

40 | See the judgement of the SAC of 17 April 2015, No. 4 As 236/2014-85.
41 | See the judgement of the Municipal Court in Prague of 29 March 2018, No. 6 A 186/2014-50.
42 | See the judgement of SAC of 9 August 2018, No. 9 As 277/2017-28.
43 | See the judgement of the SAC of 10 February 2016, No. 3 As 103/2015-69.
44 | Judgement of the SAC of 24 January 2018, No. 2 As 325/2017-39.
45 | See the judgement of the SAC of 23 February 2017, No. 6 As 6/2017-105: “However, the administrative authorities did not offer the necessary reasoning here either, and it is the complainant who is trying to fill in the gaps in the reasoning of their decision in the cassation complaint. It is only here that the reasoning appears that the landscaping on parcel no. 1854/1, 1854/2, and 1854/3 is illegal because it fundamentally deviates from the declared purpose, i.e., that the builder established a construction waste dump in place of the motocross track, which is also reflected in the material composition of the embankment (the builder himself declared in the documentation for the individual building consents that the soil would not be contaminated by waste or debris or large stones). However, not even a hint of such a consideration is noted in the contested administrative decisions, let alone that it was supported, for example, by probes into the body of the landscaping in order to assess its composition. Similarly, as regards the exceeding of the agreed amount of landscaping, no reasoning is contained in the contested administrative decisions.”
within the waste pile to strategically select sampling points. The onus falls on the inspected party to refute the accuracy of the sampling. This would involve convincingly demonstrating, with concrete evidence, that the sampling occurred in entirely different locations than from where the material was extracted.\(^{46}\) However, samples of only a portion of non-homogeneous material may not be conclusive in establishing the overall nature of the waste.\(^{47}\)

7. A two-pronged approach: Criminal and administrative liability for waste mismanagement

The Czech Republic's legal framework regarding unauthorised waste management carves out a distinct distinction between criminal and administrative liability. While the former is narrowly defined, adhering closely to the requirements of the EU Environmental Crime Directive (2008/99/EC), the latter approach casts a wider net, encompassing a diverse range of transgressions outlined within the Waste Act. Notably, judicial interpretations of waste management obligations tend to be expansive, offering limited room for offenders to exploit legal loopholes. For instance, a recent court case concerning the mandatory on-site sorting of waste established that the absence of specific legislative dictates regarding the number or placement of designated bins does not absolve the waste producer from liability for non-compliance.\(^ {48}\)

The principal apparatus for imposing administrative penalties for regulatory offences is enshrined in Act No. 250/2016 Coll., commonly known as the Offence Act. This Act serves as a foundational framework for administrative penalties and is applied subsidiarily to specific legislation that defines particular offences. The

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\(^{46}\) | Judgement of the SAC of 25 March 2015, No. 6 As 149/2013-41: “The SAC therefore considers that taking samples from areas with a higher concentration of presumably non-hazardous material could not in any way affect the legitimacy of the finding of the ČIŽP that, according to the result of the analysis, there were other places in the haul where material containing supercritical amounts of the monitored elements or compounds were lying.” In this case, a total of 66 subsamples were taken from 21,000 tonnes of waste generated from the reconstruction of tracks and switches.

\(^{47}\) | This conclusion follows from the judgement of 28 June 2007, No. 4 As 87/2006-81, in which the SAC dealt with the fine imposed for piling construction waste on various plots of land. The complainant argued, among other things, that everyone was obliged to use the waste in the first place before disposing of it, which he did, and therefore he should have been given a commendation for using the waste as construction material. The court, however, concluded that this was an illegal dumping of waste. On the nature of the material, the SAC stated: “However, on the facts found, the plaintiff had not only taken over stones from V, but also rubble. However, no sample was taken of that material and, given that the waste material in question was not homogeneous, it is necessary to agree with the defendant that even a sample of part of that rubble would not have been indicative of the characteristics of the stored waste material as a whole and that, given the nature of the waste in question (not homogeneous), no expert opinion could be objective.”

\(^{48}\) | See the judgement of the SAC Court of 19 October 2023, No. 4 As 317/2022-49.
2020 Waste Act then elaborates on the individual elements constituting these offences.

Consider the scenario of illegal waste trafficking. According to Section 117(1) (s) of the 2020 Waste Act, a natural person commits an offence by failing to comply with the stipulated conditions outlined in Regulation No. 1013/2006 or Sections 49, 51, or 52(1) of the aforementioned Act if involved in a transboundary transportation of waste. The potential penalty for such an offence for a natural person can reach CZK 1,000,000 (approximately EUR 40,000). In contrast, legal persons or natural persons engaged in business activities who breach the conditions set forth in a decision issued by the Ministry of the Environment pursuant to Regulation No. 1013/2006, or the relevant sections of the 2020 Waste Act, during a transboundary waste shipment fall under Section 121(2)(m) of the Act and face potential fines of up to CZK 25,000,000 (approximately EUR 1 million).

These transgressions are all adjudicated by the Inspectorate, acting as the competent administrative authority. The responsibility for collecting and enforcing the imposed fines is on the customs office. It should be noted, however, that the imposition of an administrative penalty may be waived if the statutory conditions are met, as follows from Sec. 125 of the 2020 Waste Act: the offender must ensure that (a) the consequences of the infringement are eliminated, (b) factual measures are taken to prevent the continuation or renewal of the unlawful situation, and (c) the imposition of an administrative penalty would be disproportionately harsh in view of the cost of the measures taken.

Section 116 of the 2020 Waste Act empowers authorities to impose remedial measures in instances of non-compliance with the obligations stipulated in Regulation No. 1013/2006 and the Act itself. Unlike previous legislation, these measures can be implemented without the imposition of a fine. The designated timeframe for executing the remedial measures is reasonable. Specific examples of such measures, as outlined in Section 116(1)(a) to (d) of the Act, include securing waste against leakage, deterioration, or theft. Additionally, Section 116(1)(e) provides a catch-all clause for the administrative authority, allowing them to impose ‘other appropriate measures’ to prevent negative environmental or human health impacts, ensure adequate environmental or human health protection, and facilitate monitoring of the imposed measures’ implementation.

The 2020 Waste Act introduces a novel provision concerning the legal succession of obligations arising from imposed remedial measures. However, it precludes the imposition of such measures based on legal succession on a non-entrepreneurial natural person. Furthermore, the administrative authority conducting proceedings on the remedial measure is obligated to promptly inform other relevant administrative authorities with the jurisdiction to impose the remedial measure or an administrative penalty related to the measure.

Criminal liability for unauthorised disposal of waste set in Sec. 298 of the Criminal Code (Act No. 40/2009 Coll.) focuses on two types of behaviour: (1)
Violation of other legal regulations governing waste management by transporting waste across state borders without notification or consent of the competent public authority, or providing false or grossly distorted information or withholding material information in such a notification or request for consent or in the accompanying documents, and (2) Violation of other legal regulations governing waste management, even negligence, by disposing of waste or depositing, transporting, or otherwise handling waste, and thereby causing damage to or endangering the environment, the cost of which is significant. The perpetrator in both cases may be a non-entrepreneurial natural person, an entrepreneurial natural person, a natural person representing a legal person, or a legal person.

In the first case, the criminal shall be punished by imprisonment for up to one year or by prohibition of activity; in the second case the criminal shall be punished by imprisonment for up to two years or by prohibition of activity. More severe penalties can be imposed if other conditions are met. The offender shall be sentenced to imprisonment for a term of six months to three years or to prohibition of activity if (a) he commits the offence as a member of an organised group, (b) he obtains a substantial benefit for himself or another by such an act, or (c) he commits such an act repeatedly. The offender shall be liable to a term of imprisonment of between one and five years or to a fine if he or she (a) obtains a large benefit for himself or herself or for another by committing the offence, or (b) where such an act relates to hazardous waste.

Waste is also associated with petty crime due to its availability and interest value. Paper picking from containers is common, most often, from freely accessible municipal waste containers, less often from containers of other generators, as these are usually located on fenced property or inside buildings. Recently, an increase in textile waste (used clothing) and electrical equipment containers have been noted, even though these containers are better secured (more difficult to access their contents), often leading to serious health consequences. Sometimes the collection container itself is stolen. It is not rare for the container to be damaged or the lock securing it to be destroyed. Another case is of setting fire to a container, which is more an act of vandalism. In practice, these cases are usually dealt with as misdemeanours, as they do not cause damage exceeding CZK 10,000 (approximately EUR 400).

49 | Criminal liability for waste trafficking does not depend on the quantity or type of waste, which is a welcome difference from the previous legislation that applied only to hazardous waste.
50 | The costs are significant: at least CZK 1,000,000 (approximately EUR 40,000) according to Section 138 of the Criminal Code.
51 | Hanák 2024, 171–172.
8. The paradox of sanctioning in waste mismanagement cases

An analysis of criminal proceedings involving waste-related violations handled by prosecutors between 2012 and 2021 reveals a meagre total of 19 cases reaching law enforcement agencies and potentially reaching the courts.52

A closer examination, however, paints a more concerning picture. Only three instances of illegal waste management have resulted in criminal convictions over this ten-year period. These convictions involved: (1) A legal entity establishing an illegal dump containing oil-contaminated waste, leading to soil pollution (penalty: an eight-year ban on waste disposal of any kind). (2) A legal entity responsible for the unlawful deposit of demolition and construction waste, including landfill waste and asbestos, and for damaging a watercourse (penalty: forfeiture of the land on which the landfill was situated). (3) A natural person who illegally dumped waste on a former landfill site, incurring the cost of removal (approximately EUR 285,000) and receiving a suspended ten-month prison sentence (suspended for 18 months).

The remaining cases expose further shortcomings. Five are stuck in the initial stages of criminal proceedings, with investigations or preparatory actions yet to be completed. One case involving the unauthorised handling and improper storage of hazardous waste, with leakage of hazardous substances into the environment and a remediation cost of approximately EUR 4 million, is currently in the prosecution phase. Two cases are undergoing retrial: one involving individuals who failed to secure waste during building demolition, and another concerning an individual’s attempt to illegally export used tyres from the Czech Republic to Guinea-Bissau via Hamburg, without proper notification. Five cases were ultimately dropped due to unidentified perpetrators or insufficient evidence.

Interestingly, one case resulted in an acquittal – that of a municipal mayor and a commercial company director accused of operating an illegal waste dump. In another instance, the police redirected the case to the Inspectorate for consideration as an administrative offence (the case concerned the establishment of an unauthorised landfill on someone else’s property).

Two cases stand out for their lack of apparent connection to waste management: one concerns a general environmental damage and endangerment offence (though the perpetrator’s actions involved violating the Air Protection Act), while the other pertains to herbicide spraying on maize and wheat crops (dropped by the police).

The vast majority of waste-related violations are addressed by administrative authorities through the imposition of administrative penalties. However, this does not equate to a perception of leniency. A substantial administrative fine can be
viewed as considerably harsher than, for instance, a suspended prison sentence handed down by a criminal court. Additionally, penalties for the criminal offence of illegal waste disposal are demonstrably lower compared to those for other property crimes. For example, illegal waste importation resulting in a gain exceeding CZK 5 million (approximately EUR 200,000) attracts a prison sentence of one to five years. In contrast, theft, embezzlement, or fraud with the same financial gain can lead to a ten-year imprisonment term.

An imbalance between sanctions imposed in an infringement or administrative procedure and in criminal proceedings has been identified by the 2020 Strategy: the sanctions imposed in the criminal proceedings are disproportionately low compared to the sanctions imposed in the infringement or administrative procedure, which makes them more acceptable for an offender; this lacks any logic in respect to the position and importance of the criminal proceedings within the Czech legal system.

While administrative authorities hold the power to reduce fines upon imposing them, this option is rarely exercised. Setting fines for misdemeanours falls within the realm of administrative discretion. Judicial review of such discretionary power by the courts is only possible if the administrative authority has exceeded the statutory limits of this discretion, deviated from them, or abused its power. Consequently, substituting judicial discretion for administrative discretion is feasible only if the imposed fine is manifestly disproportionate. Courts, therefore, lack broad scope in assessing the simple proportionality of the imposed sanction. 53

Perpetrators often argue that the imposed fine is disproportionate. However, such claims lose weight when the fine amount falls within the range of hundreds of thousands of Czech crowns (usually between EUR 6,000 and 20,000), considering that the legislation allows for significantly higher fines (up to EUR 2 million). 54 In such cases, it is sufficient for the administrative authority to provide adequate and clear reasoning for the imposed fine amount, along with a commentary on the potential liquidating nature of the fine. 55

Case law suggests that objections based on the commonality of the waste’s use 56 or the absence of an environmental threat do not justify a fine reduction. The actual occurrence of environmental damage or threat is not a prerequisite. 57 Notably, long-term neglect of obligations (adherence to operational rules, maintaining continuous records, waste reporting, truthful information provision in

53 | See judgements of the SAC of 7 November 2019, No. 1 As 63/2019 33, and of 14 December 2020, No. 4 As 230/2020-45.
54 | See the judgement of the Municipal Court in Prague of 28 April 2023, No. 3 A 120/2020-67.
55 | See the judgement of the SAC of 23 March 2023, No 9 As 76/2021-26, or the judgement of the Municipal Court in Prague of 31 August 2023, No. 17 A 97/2022-38.
56 | See the judgement of the SAC of 23 March 2023, No 9 As 76/2021-26.
57 | See the judgement of the SAC of 11 August 2016, No 10 As 123/2016-90.
transboundary shipments) may be deemed severe and factored into the imposed sanction amount.\textsuperscript{58}

The obligation to consider the personal and financial circumstances of the offender falls on the administrative authority only if it is clear from the information provided by the offender and the amount of the fine that can be imposed could be of a liquidating nature. Otherwise, the administrative authorities do not need to consider the personal circumstances of the offender.\textsuperscript{59} The onus is therefore on the offender to prove his financial circumstances, even more so if he considers that the amount of the fine has a significant impact on his budget or future activities.\textsuperscript{60}

\section*{9. Conclusion: A web of challenges in combating illegal waste management}

The Czech Republic finds itself at the forefront of the fight against illegal waste management, particularly in the face of a growing influx of waste from abroad. This escalating struggle exposes vulnerabilities within the law enforcement system, characterised by a lack of structured and regular information exchange between various administrative and police authorities. The absence of a permanent inter-agency team further exacerbates these issues, hindering the exchange of information on specific cases and leading to inconsistencies between administrative and criminal sanctions. The fragmented nature of waste-related matters, with numerous agencies involved, creates additional challenges. While nascent efforts have been made toward establishing efficient cooperation, they remain underdeveloped.

Crucially, the competencies related to waste management, such as authorisation, control, imposing corrective measures, and punishment, are dispersed across a multitude of bodies. This fragmented structure can create situations where, for instance, the authority empowered to order remediation lacks the budget to do so, rendering certain remedies unlikely to be implemented when necessary.

Establishing connections at the local level between the various bodies, such as the Inspectorate, other administrative authorities, and the police, is of paramount importance. Additionally, a system for information and feedback sharing between investigative units needs to be established. Joint inspections specifically targeting illicit cross-border waste movement would be a crucial step in tackling these problems comprehensively.

Furthermore, sentences for the criminal offence of waste misuse are demonstrably lower compared to those for other property crimes. Neither criminal

\textsuperscript{58} See the judgement of the Municipal Court in Prague of 14 September 2023, No. 6 A 4/2023-54.
\textsuperscript{59} See the resolution of the extended chamber of the SAC of 20 April 2010, No. 1 As 9/2008-133.
\textsuperscript{60} See the judgement of the Municipal Court in Prague of 28 April 2023, No. 17 A 108/2022-44.
nor administrative law appears to have a well-developed remedial function. The limited number of criminal cases surrounding illegal waste disposal has resulted in a dearth of established case law. Consequently, a lack of clear guidance on issues such as the distinction between administrative offences and criminal acts is another drawback. This low volume of criminal cases also translates to a lack of specialised or experienced prosecutors dedicated to these issues.

Finally, the situation in the Czech Republic underscores the significant influence of regional and global waste management trends on the fight against illegal dumping. Even developed nations can be substantially affected by these broader dynamics.

61 | For legislation on a similar situation in Slovakia, see: Maslen, 2023, pp. 73–90.
62 | On trends in environmental criminal law in the European Union, which is also adopting global trends, see: Udvarhelyi, 2023, pp. 159–170.
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