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**INDUSTRIAL SAFETY RISKS IN THE HUNGARIAN BATTERY
INDUSTRY AND RELATED COMMUNICATION**

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Abstract

The paper discusses the industrial safety risks inside and outside the factories, the government's information on the issue and the management of NGO activities. Evidence has been presented that South Korean cell factories and recyclers have committed systematic and recurrent irregularities in Hungary over the past years, leading to worker hazards and accidents. The authorities have been powerless to deal with these effectively. Profit interests of the factories often override health and safety concerns. The risks to industrial safety will continue to increase even under normal operating conditions with the mass influx of Chinese battery factories. Instead of being correctly informed about this, the public receives a central propaganda that uses all the tools of greenwashing, while the authorities try to restrict concerned citizens' groups by various means.

JEL: O25, P28, Q25, Q58

Keywords: battery production, industrial safety, greenwashing, automotive industry

„Our immense technological development has not been accompanied by a development in human responsibility, values and conscience... We stand naked and exposed in the face of our ever-increasing power, lacking the wherewithal to control it. We have certain superficial mechanisms, but we cannot claim to have a sound ethics, a culture and spirituality genuinely capable of setting limits and teaching clear-minded self-restraint... the mentality proper to the technocratic paradigm blinds us and does not permit us to see this extremely grave problem of present-day humanity.”

Pope Francis: Laudate Deum, 24

1. Introduction¹

The government's decision to ramp up battery production and recycling in Hungary, the announcement of more and more factories and the public's acceptance of the new plants makes the analysis actual. Some Hungarian articles on the subject have already been published (Gyórfy, 2023, Czirfusz, 2023), discussing the economic model, added value or the remuneration of workers in the industry. Two aspects that have not been sufficiently discussed so far are now analysed: industry safety and public information. A paper (Éltető, 2024) showed that the development of the domestic battery industry was based on an industry strategy but despite the legal obligation, no strategic environmental assessment of its impact had been carried out. Nor are we aware of any national-level risk analysis, including national security, industrial safety and accident risks. The first part of this paper raises some of these issues and presents the operation of South Korean factories in Hungary. According to the generally accepted definition in the literature (Kátai-Urbán, 2014. p.97) industrial safety protection tasks can be divided into two broad categories: internal and external protection. Internal protection is mainly concerned with protecting the life and health of workers (occupational health and safety, fire protection, occupational health), while external protection is concerned with protecting the public and the environment (material assets). For external protection, there are normal operational and emergency (in the event of an incident) releases. Understandably, internal and external protection are interrelated, since internal safety problems can cause abnormal occurrences that can lead to emergencies and serious external environmental damage. It is therefore essential to inform the public responsibly, correctly and accurately about the risks and emergency procedures related to production and incidents.

The second part of the paper describes the government's related information and communication with the public including the handling of local protests. It can be concluded that there is a lack of correct information on the risks, and instead a pattern of concealment, diversion, denial, lack of information and greenwashing can be observed.

The methodology used is qualitative, mainly documentary analysis. Due to the analysis of official documents, decisions, available governmental and independent media sources, and statements, the paper is descriptive in detail, which provides a more thorough picture of the Hungarian battery industry situation, rather than superficial assessments. In addition to the documents, the paper is based on 21 interviews conducted between March 2023 and September 2024, in person, by telephone or online, with representatives of NGOs, professional organisations, trade unions, environmental, toxicological and academic experts involved in the battery industry. Based on international literature and sources, the paper occasionally looks at the experiences of other countries around the world, but the main aim is to examine the Hungarian experience.

¹ Thank you to Edina Tímár, Andrea T. Szasztkó, Prof. Béla Darvas and Zoltán Bajka for their inspiration. This paper was prepared with the support of the International Visegrad Fund, Visegrad+ Grant No. 22330218, entitled: '*Shift to electric car production: national strategies in Central and Eastern Europe*'; The article was published in *Külgazdaság* in November 2024 in Hungarian. DOI: <https://doi.org/10.47630/KULG.2024.68.9-10.31>

2. Industrial safety risks

Some of the internal industrial safety risks are related to the handling and filtering of large quantities of hazardous chemicals and waste, while others are related to equipment that is not properly functioning or maintained. Toxic and sometimes carcinogenic metal and chemical substances are mainly used in electrolyte, cathode, cell and separator film production, such as lithium, nickel, cobalt and manganese compounds, graphite, reproductive toxic NMP (N-Methyl-2-Pyrrolidone), BYK-LP N 23676 cathode dispersant, CNT (carbon-nano tube) conductive paste, polyvinylidene difluoride (PVDF), D-glucose pentaacetate (DGPA), 1,3,2-dioxathiolane-2,2-dioxide (DTD), dimethyl carbonate, ethyl methyl carbonate, dichloromethane, propane sultone, lithium hexafluorophosphate, butanediol and other additives that affect the electrochemical properties of batteries (Darvas, 2023, Varga, 2024). The additives in electrolyte are sometimes secret, little is known about the physiological effects of the chemicals, and unknown new substances are being generated (Nemes et al. 2023). Technical certificates for equipment are sometimes incomplete, and maintenance or use is inadequate.

Internal industrial safety problems in operational factories

So far, the production phases of the Hungarian battery industry have been dominated by South Korean factories. Three large South Korean battery-related companies in particular have been linked to a large number of industrial safety irregularities in Hungary: Samsung SDI, SK Battery (SK ON) cell factories and the recycling company SungEel (with two sites in Szigetszentmiklós and Bátonyterenye). Some of the main types of cases are summarised in Table 1, which also shows that in many cases the irregularities are repeated, with inspectors finding the same problems months later as before.

The main problem areas are: 1. exposure of workers to hazardous substances (toxicity, endangering their health), 2. shortcomings in occupational safety and health, 3. accidents partly resulting from the above (fire, death, injury)

Workers' exposure means that the concentration of various hazardous chemicals formed during the work process, or released into the air through negligence, and that can be inhaled is very high. This can either be detected in the human body in the short term (by laboratory tests) or appear later, accumulating and even causing serious illness.

For example, in the case of Samsung SDI, an air monitoring report from June 2020 showed that in one of its departments "*respirable dust and N-Methyl-2-pyrrolidone levels exceeded the measured limit*"². Due to the serious endangerment of two workers, Samsung was fined to HUF 675 thousand. In the autumn of 2021, a toxic sludge pond was found on the floor of a waste water treatment plant.³ At Samsung, between 2021 and 2023, there were at least a dozen occasions when the limit values for nickel, cobalt, NMP or other toxic

² https://kimitud.hu/request/19795/response/28358/attach/5/1902%203%202021.hat%20rozat.pdf?cookie_passthrough=1

³

https://kimitud.hu/request/19436/response/27779/attach/6/4412%20%20Samsung%20hat%20rozat%20zemzavar%20esem%20nyel%20kapcsolatban%20V%20signed%20sign....pdf?cookie_passthrough=1

substances were found to have been exceeded by 3-5 times in the air at the workplace. Decision PE-06/MV/001271-2/2023 shows that the report and expert opinion of 4 May 2021 already concluded that *the filtration qualities of the fume extraction and separation equipment are not suitable for the effective filtration of fume particulate pollutants (up to 2.4 µm), that the separation of finer particles is inefficient due to the material and design of the filter elements, and that they are not suitable for the effective separation of particles with an actual particle size (0.3 µm)*. Nevertheless, no substantial action was taken until October 2022, and workers' exposure continued for a year and a half. At the time of the inspection, dust deposits were visible in the vicinity of the premises in the area where carcinogens are loaded. In the dust loading area, a 1x1 m plexiglass element on the roof of one of the cabins had been removed, thus eliminating the enclosure. (As we will see later, one of the main claims of government and company propaganda about battery manufacturing is that "it is a closed system") For the above, Samsung was fined HUF 10 million in February 2023 (four months after the inspection), the maximum under the 1993 law (which was increased tenfold only in mid-2024 by an amendment to the law). The penalty was so ineffective that, between January and May 2023, inspections again documented exceedances of carcinogens, but this time on a much larger scale: the lowest exceedance was 39 times, the highest 275 times. The above-mentioned shortcomings of filtration identified in the spring of 2021, have still not been remedied. Several other health and safety problems were also found by the authorities, followed by a fine of HUF 10 million (PE-06/MV/002483-13/2023). Samsung SDI was already putting more than a thousand people at risk at the end of 2022 (Bodnár, 2022)

Workers at SK Battery were also at risk⁴ and the improper storage of hazardous substances can lead to their emission. "*The Operator's safety report did not identify this room as a hazardous waste storage area. An odour characteristic of electrolyte is detectable in the room. The barrels contain jelly rolls filled with electrolyte loaded by hand (SK, 36100/1325-2/2022)*". Workers at SK On's plant in Ivánca became ill from inhaled NCM (nickel, cobalt, manganese) dust at the end of May 2023. No written information about the carcinogenic dust was provided to subcontractors, no warning signs were posted, no air monitoring was carried out and no unauthorised persons were prevented from entering the premises. The authority required the company to prepare a risk assessment, a rescue plan, provide sufficient remedies, monitoring and notify the Occupational Safety and Health Administration that they were working with carcinogens. The company partly complied and partly did not, and the OSH authority imposed a fine of HUF 3.78 million for endangering 14 workers.⁵

SungEel's plant in Szigetszentmiklós asked for doubling its capacity in autumn 2024, but has already received a series of fines for increased exposure (18 people) and serious risks to workers. For example, one decision lists 24 items, with fines of HUF 8.4 million. It reads that the concentration of several hazardous substances in the air was significantly

⁴ "*The employer was unable to ensure the safe working environment required for the entire work process. The workers concerned were staying or carrying out activities in a hazardous atmosphere without protection. ...The machinery/equipment did not have a valid commissioning/commissioning document at the time of the accident...At the time of the incident on 19 January 2022, there was no occupational health service available on site or in the immediate vicinity*" (KEN/01/393-64/2022).

⁵ <https://24.hu/fn/gazdasag/2023/12/02/ivancai-akkugyarepites-3-halott-1-mergezes-14-serult-1-figyelmeztetes42-millio-forint-birsag/>

above the limit value, the exhaust fan was not maintained, the connecting tube on the external units was missing, workers did not have prior medical certificates of work with carcinogens, they did not wear protective gloves, carcinogenic dust was stored in a way that posed an accident risk, contaminated water dispensers and drinking cups were found by the investigators (PE-06/MV/005528-14/2022 No. decision). The Bátonyterenye site was similarly censured several times: in the summer of 2022, an unauthorised grinder exploded, and in May 2023, a fine of HUF 31 million was imposed for unauthorised and irregularly stored waste (during the March inspection, the inspecting staff also complained of skin rashes and sore throats). In July, the fine was HUF 50 million, and in August 2023, the plant was closed for a while (it was reopened in June 2024). In the light of all this, it is worth noting that back in 2021, at a public hearing on the Bátonyterenye plant, built with 30% state support, a company representative told the public *that "the factory would process batteries in a completely closed system, inside a hall, using crushers, a 'dry' process, without the use of chemicals"* ⁶

People from the authorities who inspect factories are constantly finding **shortcomings in worker safety**. It is important, for example, to protect street clothes from contaminants. For polluting technologies, the so-called black-and-white dressing room system should be applied. The worker takes off his street clothes in the white changing room and puts on his work clothes in the black changing room, in another locker. After finishing work, he takes off his dirty work clothes in the black changing room and goes through the bathroom, unclothed, to the white changing room where he left his street clothes. This did not work in the South Korean battery factories in Hungary. At SK Battery, an OSH inspection carried out on 12-15 and 25 September 2022 found that *"no black and white changing rooms were provided in the factory area, and this deficiency has not been remedied since the start of operation"* (KEN/01/2432-35/2022, p.4) At Samsung SDI, in October 2022, it was found that the black and white changing room was not being used as intended by workers, and the floor in the clean area was also contaminated (PE-06/MV/001271-2/2023).

Occupational safety and health education was generally found to be lacking. For example, at SK Battery: *"Workers received half an hour of preliminary OSH training before starting work. Neither during this training nor during the subsequent practical training were workers informed about the dangers of hazardous substances/mixtures with which they might come into contact during their activities."* (KEN/01/393-64/2022) In many cases workers are not informed that they are working with carcinogenic substances. At the SK factory, which has been operating since 2019, 18 safety and health deficiencies were still found in 2022, several of which were previously reported to the authorities but not resolved.⁷ Also at SK, in April 2022, two bags of material were damaged during forklift handling and a total of 30 kg of NCM dust was spilled, even though the company's safety report states that transport of hazardous materials between buildings by forklift is

⁶ [The activities of SungEel Hitech in Bátonyterenye will not endanger the population - 3100.hu](https://www.3100.hu)

⁷ Examples include operators of lifting equipment not being qualified/authorised, improper storage of materials on transport routes, workers not attending required biological monitoring, machinery certification of compliance being faulty, no risk assessment and chemical risk assessment after accidents, no personal protective equipment, poor maintenance of machinery and no documentation in Hungarian.

prohibited. The woman driving the forklift was not wearing protective equipment (36100/1159-1/2022).

At Samsung SDI, the inspectors also found several health and safety problems on several occasions. *"Only some doors on the winding machine units had safety interlocks installed, and some doors had no protection against entry into the dangerous machine section." "In the Elektrod area, the signs on the control switches of the machines were in English, although Hungarian and Ukrainian native speakers were working there". "In the Assembly area, some of the Plexiglas doors for scrap removal on the machine lines were not equipped with any protection to prevent access to dangerous machine parts during scrap removal."* (PE-06/MV/002483-13/2023).

According to the Hungarian Occupational Safety and Health Act (1993/XCIII, § 54), Samsung SDI should also have a risk assessment at least every 3 years. This must include an assessment of the risks to the health and safety of workers (work equipment, hazardous substances, workloads, workplace design) and identify the likely hazards, the range and extent of those at risk. Samsung produced one in 2019, but it expired in March 2022. The Pest County Government Office issued only one warning to the company in November 2023, more than one and a half years later (PE06/MV/005014-6/2023).

It is easy to see that safety deficiencies **lead to accidents**. If the worker is not properly trained or does not understand the descriptions in a foreign language, trouble can happen. In addition to several injury accidents (such as the explosion of a grinder at SungEel's plant in Bátonyterenye that injured four people), we know of six fatalities, including one where a Hungarian maintenance worker on probation at Samsung was unaware that the production line should be shut down if it was not equipped with a protective cover. He bent over, got trapped and died of his serious injuries after a week. The decision pointed to the very poor health and safety training and risk assessment (which did not even include the production lines) and the lack of technical documentation in Hungarian. The fine was HUF 3 million 75 thousand (7600 EUR) (PE-08/MV/0002316/2022).

In May, 2022 an employee of a Korean construction company died at SK ON's factory in Ivánca after a hydraulic lifting machine he was driving fell over. The on-site inspection revealed that the employer had not provided basic occupational health services, had not prepared personal protective equipment allowances, and had not involved an occupational health specialist in the risk assessment of the equipment. The authority ordered the company to remedy the shortcomings and issued a warning⁸.

There were also deaths in Ivánca in 2023: on 8 January a Slovak man was hit by a forklift truck, and on 13 January a South Korean worker died while laying cables. The labour inspectorate also found labour shortcomings, with conditions for safe working not being met. The cable worker was working on the suspended ceiling without personal protective equipment. The factory had to pay an OSH fine of HUF 442,000 (1100 EUR).

⁸ <https://24.hu/fn/gazdasag/2023/12/02/ivancai-akkugyarepites-3-halott-1-mergezes-14-serult-1figyelmeztetes-42-millio-forint-birsag/>

In another case, two workers died at SungEel's plant in Szigetszentmiklós because one of them cut a hole in a clogged battery-grinding machine with a flex and the spark caused the machine to explode. There was inadequate occupational safety training and a deficient risk assessment, the decision said, imposing a (maximum) HUF 10 million (25 000 EUR) fine on the company (PE06/MV002056-38/2023). The accident occurred on 14 March 2023, the company was ordered to prepare a major incident response plan on 29 March, SungEel submitted the response plan on 6 June, it was checked on 10 July 2023 and found to be flawed in 12 areas. The permit for the Szigetszentmiklós site was temporarily withdrawn (30300/1108-13/2023).

Accident prevention is also hampered if the employer does not build a protection system or does not keep adequate equipment. In 2021, batteries were charged at Samsung SDI (manufacturing battery cells for three years then) and 36 of them caught fire. The firefighters were unable to disconnect the power because the investor had not installed the main switch, which significantly delayed the firefighting. The fire safety compliance of the building and the fire training of the staff could not be certified and the fire extinguishing systems were not working⁹.

In January 2022, 14 people were hospitalised after an accident at the SK battery factory in Komárom (the company gave no information). According to several sources, there was a leak of hazardous material due to a burnt-out cell¹⁰. The decision on the incident describes that although the employer provided a unit pack per area in case of an emergency, there was no such pack in the entire B03 building.¹¹

Table 3: Some accidents, violations in battery cell factories and recycling plants in South Korea

Factory	Event	Location	Date, decision number
Samsung SDI	fire, 36 battery module catches fire	Göd	2021.05.08 36300/1887-5/2021
	death, 27-year-old Hungarian maintenance worker	Göd	2021.11.3. PE-08/MV/000231-6/2022

⁹

https://kimitud.hu/request/19436/response/30078/attach/5/36300%201887%206%202021%20lt.pd?cookie_passthrough=1

¹⁰ <https://24.hu/fn/gazdasag/2022/01/20/komarom-akkumulatorgyar-baleset-uzemzavar-veszelyesmaterial-sivargas-tuz-robbanas/>

¹¹ "Only a powder extinguisher was available to neutralise the damaged cell burning without a flame, not a special extinguisher to suppress the burning of the lithium-containing cell. The personal protective equipment against the release of gas/vapour combustion products of unknown composition, which should be included in the decontamination kit, was not specified. The factory fire brigade was not set up on the factory premises, and there were no workers trained to deal with the fire incident." (KEN/01/393-64/2022)

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Factory	Event	Location	Date, decision number
	increased exposure, exceedance of limit values, mass exposure of workers	Göd	2021.03.09 2021.06. 2022.01.11 2022.04.11 2022.06. 2022.08. 2022.09.08 2022.10.11 2022.10.26 2023.01.30 2023.03.09 2023.05.04 PE-06/MV/001271-2/2023 PE-06/MV/002483-13/2023
	lack of risk assessment	Göd	2023.09.26 PE-06/MV/005014-6/2023
	amputation of disjointed fingers, 1 person	Göd	2023.10.17 PE-06/MV00423/2024
	insufficient electrical contact protection, lack of risk assessment	Göd	2023.11.15 PE-06/MV00422/2024
SK Battery	battery module fumes, next day sickness, 14 people hospitalised	Komárom	2022.01.18-19 KEN/01/393-64/2022
	toxic NCM dust spillage	Komárom	2022.04.06 36100/1159-1/2022
	fire	Komárom	2022.09.20 KEN/01/2639/2022
	starting, reaching into a running machine	Komárom	2022
SK ON	death, lifting machine falls on worker	Ivánca	2022.05.
	death of a Slovak worker	Ivánca	2023.01.08
	South Korean cable worker dies	Ivánca	2023.01.13
	12 workers got sick	Ivánca	2023.05.30

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Factory	Event	Location	Date, decision number
SungEel	Unlicensed cell-grinder explodes, 4 injured	Bátonyterenye	2022.07
	careless storage of dangerous substances, pungent smell, respiratory complaints from inspectors	Bátonyterenye	2022.12.08 2023.03.30 NO/HGO/1297-1/2023.
	unauthorised storage of large quantities of dangerous substances	Szigetszentmiklós	2019.09.19 36300/3014-3/2019
	surplus hazardous material storage	Szigetszentmiklós	2022.06.22 36300/2662-3/2022
	nickel, cobalt (exposure)	Szigetszentmiklós	2022.04.28-05.06 2022.08.01 2022.08.09. 2022.10.19 PE-06/MV005528-25/2022
	2 deaths, grinder catches fire	Szigetszentmiklós	2023.03.14 PE-06/MV002056-38/2023

Source: official decisions

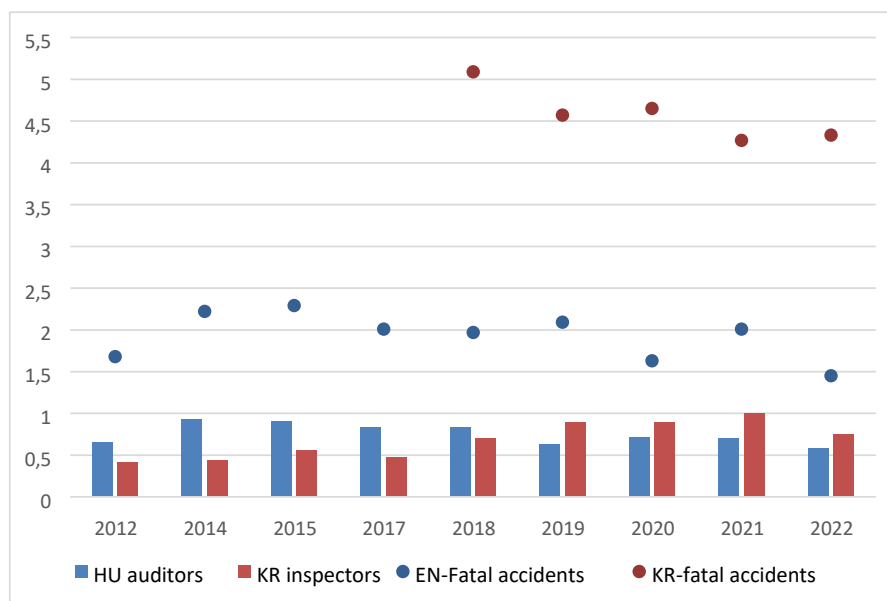
A trade union interviewee pointed out that the conditions of workers depend on the attitude of the management of the company and that there are differences even between companies in South Korea. SK has a union and some kind of wage negotiations and communication with management, while SungEel and Samsung SDI do not (the latter has about 75% of its workers from abroad). In general, the "reputation" of the company is not of much interest to Korean management, the main concern seems to be profit. The internal organisation of work reflects the fact that collectivism does not function with "outsiders" in Korean corporate culture, but rather egoism and individualism, and communication is difficult (Cho and Yoon, 2001).

If we want to know how these South Koreans operate outside their own country, there is not much experience, as SK and Samsung have plants only in Hungary so far. SungEel planned to invest in Złotoryja in Silesia in early 2021 for mechanical processing (grinding) of batteries and transport of the resulting powder to South Korea. This led to significant public protests over environmental and health concerns. In addition to the dust pollution from NMP and NCM, locals have complained that the company has not taken into account the risk of accidental events (such as storms) and the risk of waste transport through the city.¹² SungEel abandoned the project and in 2022, built the plant in Bukowice. Working conditions are described here in a forum so: *"The fluctuation of Polish*

¹² [Ej Atlas](#)

employees is so high that recruiters cannot keep up with it. The Korean culture is to treat an employee worse than a mop on the floor. Half of the workers are unskilled manual workers from Indonesia and Bangladesh, they do not speak any foreign languages. You will neither develop nor earn money here, but you will get sick. The Asians in Indonesia are no better, they come for 2 years, but you can see on their faces that they don't like this job"¹³. SungEel is also planning to build a recycling plant in Germany, but, due to public protests, this seems to be failing in the second city. In Rudolstadt, in March 2023, the company withdrew its application after hundreds of objections were submitted to the environmental authorities by Germany's largest environmental organisation, Naturschutzbund Deutschland, and the local NGO community protesting against the plant¹⁴. In 2024, in another Thuringian town, Gera, tempers flared after protests and nearly 8,000 expert and public comments were processed by the German authorities, delaying the public hearing by six months.¹⁵

Figure 1: Number of labour inspectors per 10 000 employees and fatal accidents per 100 000 insured persons



Source: ILO statistics: <https://ilostat.ilo.org/topics/safety-and-health-at-work/>

In the US, Samsung and SungEel are both planning to open factories, but there is one South Korean battery factory already operating: SK Battery in Commerce, Georgia, with 3,000 employees. The experience here is somewhat similar to that in Hungary: worker hazards, careless handling of hazardous materials. In April 2024, the US Occupational Safety and Health Administration (OSHA) fined SK Battery America for the second time (70 and 77 thousand dollars) for multiple violations of health and safety regulations. Already in the case of the lithium battery fire here in October 2023, the company was found to have failed

¹³ https://www.gowork.pl/opinie_czytaj.24075098

¹⁴ <https://atlatszo.hu/kornyezet/2023/04/21/nemetszagban-a-helyiek-tiltakozasa-miatt-nem-epit-akkufeldolgozot-a-nalunk-tobbszor-megbirsagolt-ceg/>

¹⁵ <https://atlatszo.hu/kornyezet/2024/06/25/turingiaban-ezerrel-tiltakoznak-a-sungeel-akku-feldolgozokanakletesitese-ellen/>

to develop an emergency response plan, failed to adequately train workers, and exposed workers to excessive levels of copper, cobalt, nickel and noise¹⁶. SK in the US has also illegally tried to dispose of its scrap batteries on several occasions, causing a fire at a waste dump.¹⁷ The waste management company sued, which resulted in a fine for the Korean company (\$33,000).

The question arises: what is the situation in the home country? Between 2017 and 2019, there were nearly 28 serious battery fire accidents in South Korea. The Ministry of Industry has launched an investigation and other studies have been carried out to investigate the causes. It revealed that social environmental factors such as inadequate regulation, naïve use of technology, miscommunication, profit-seeking and lack of risk awareness, and false sense of safety contributed to fires in Korea (Dong-Hyeon-Chung, 2023). South Korea has also generally lagged behind internationally in terms of internal industrial safety, with a high number of fatalities (Figure 1 shows Korean data from 2018, but in the early 2000s, about 1,000 accidents per year were recorded in Korea. Injury accidents were regularly unreported by companies, which instead made the worker pay his own social security bill, claiming the accident as a home accident¹⁸. Due to industrial safety problems, a new law on the Serious Accident Punishment Act (SAPA) for companies with more than 50 employees came into force in January 2022, which makes company managers and owners liable to imprisonment.¹⁹ In June 2024, however, there was an explosion and fire at the Aricell lithium-ion battery factory that killed 22 people, most of them temporary guest workers from China and Laos²⁰. Although the company denies it, survivors say escape routes were blocked and there was inadequate occupational safety training.

While in South Korea the relative number of labour inspectors has increased since 2017, in Hungary the opposite is the case (Figure 1). The decrease (in contrast to the increase in the number of battery chain plants to be inspected) is expected to continue, because from 1 October 2024, fire and industrial safety specialists from the disaster management sector will also be transferred to government agencies, with less income and holiday, and a wave of resignations has started.²¹

Although this article deals with the battery sector, it should be mentioned that health and safety problems occur in other industries, even in Hungarian companies, such as Csaba Metal, where 66 workers "were seriously endangered in their health and physical integrity, who were exposed to harmful fumes, gases and vapours generated during welding activities"²². In the battery industry, the question is whether it is worthwhile to bring in many more Asian companies with such high occupational safety and accident risks, and whether these can be expected to decrease significantly... There is no internal

¹⁶ <https://www.healthandsafetyinternational.com/article/1868171/osha-fines-sk-battery-america-again-healthhazards-georgia-plant>

¹⁷ <https://www.fox5atlanta.com/news/recycling-center-owner-blames-sk-battery-fire-destroyed-businessSK Battery fined after recycling centre fire - Best Magazine>

¹⁸ https://english.hani.co.kr/arti/english_edition/e_business/749921.html

¹⁹ <https://www.thekoreanlawblog.com/2023/10/korean-industrial-accident-crimes.html>

²⁰ <https://sg.news.yahoo.com/search-continues-missing-worker-fire-061857353.html>

²¹ https://hvg.hu/itthon/20240919_Ezer-embert-es-evi-tobb-tizezer-hatosagi-engedelyezesi-ugyet-vennenek-at-a-kormanyhivatalok-a-katasztrofavedelemtol-ebx

²² <https://telex.hu/belfold/2023/08/21/csaba-metal-szeghalom-hegesztes-krom-nikkel-mergezes-munkavedelem>

experience of industrial safety and occupational health at the Chinese factories being built in Hungary, but some external risks may be posed by the properties of lithium-ion batteries.

External industrial safety risks in the factories being set up

In addition to the internal safety and health problems during production illustrated above, ignition can also occur during battery storage, which can pose external industrial safety risks. If a battery is mechanically damaged, an electrical internal short circuit can develop or if overheated, a thermal runaway (thermal heat release, thermal runaway) can occur (Nemes-Pomázi, 2024). This is a chain reaction where the temperature inside the battery triggers a chemical reaction. This chemical reaction produces more heat, which further increases the temperature and triggers further chemical reactions that produce even more heat. In such a thermal runaway, the temperature of the battery cells rises incredibly quickly (in milliseconds), suddenly releasing energy and causing an explosion. (For example, there were battery warehouse fires in Normandy in early 2023²³, in Viviez in early 2024²⁴, and at CATL's subsidiary in China in 2021.²⁵ At the end of May 2024, a battery energy storage building near San Diego burned for 6 days, and even later caught fire, and the population had to be evacuated. On 29 September 2024, a fire in a building at CATL's factory in Nende lasted 10 hours.²⁶ On 30. October 2024 a battery recycling plant exploded in Missouri.²⁷) Moreover, experts say that the cause of thermal runaway is not fully understood, because it occurs even in newly manufactured, undamaged batteries (Varga, 2024). There is no quick and safe way to extinguish the fire (Pántya, 2023) and the burning releases toxic gases,²⁸ which makes it even more dangerous to approach and contain a fire. Combustion occurs very quickly and with a high intensity flame, and the battery can burn again days later. Burning batteries can be cooled with water, but they emit toxic substances when turning into steam.

In the safety reports of the factories in Hungary, the risk of accidents is analysed and modelled using various software tools, and the zone of impact is defined. In the case of Samsung, the industrial safety authority has not been involved in the designation of the legally required hazard zone for the last six years, despite the fact that the factory has been expanding and growing²⁹.

Most of the battery factories and related plants that are being built and will be set up in the future in Hungary are Chinese-owned. CATL is the largest, but other Chinese cell manufacturers (EVE Power, Sunwoda) are also coming to Debrecen and Nyíregyháza.

²³ <https://www.reuters.com/article/bollore-fire/fire-at-bollores-lithium-battery-warehouse-in-france-containedauthorities-idINL8N3421JT/>

²⁴ <https://www.france24.com/en/france/20240218-major-fire-breaks-out-at-french-plant-housing-lithiumbatteries>

²⁵ <https://www.hazardonthenet.net/article/182837/Explosion-kills-one--injures-20-at-battery-recycling-plantin-China.aspx>

²⁶ <https://hu.euronews.com/2024/09/30/tuz-utott-ki-a-debrecenben-epitkezo-catl-egyik-kinai-akkumulatorgyaraban>

²⁷ <https://abc7chicago.com/post/lithium-plant-explosion-critical-mineral-recovery-battery-recycling-explodes-fredericktown-missouri-injuries/15492084/>

²⁸ <https://eepower.com/news/100-toxic-gases-from-li-ions-its-not-just-about-fires/>

²⁹ <https://atlatzo.hu/orszagszerte/2024/09/26/elfejtettek-veszelyessegi-ovezeteket-kijelolni-a-godi-samsung-gyar-korul/>

Chinese recycling, and solvent regenerating plants, cathode and other factories will be established too. (CATL's factory in Germany had a battery fire in April 2024, with three minor injuries, and³⁰ their Chinese factory had a fire in September 2024 in a part of a building). In terms of external industrial safety in Hungary, one specific case of contamination by a Chinese plant was recorded by inspectors during an unexpected inspection on 25 January 2024: water contaminated with metal shavings and oily emulsion (HAK 16 10 01* hazardous substance) was discharged into the public sewer from the Halms Hungary site in Debrecen. The company produces aluminium alloy components for electric car batteries and control units. The official decision on the incident, issued in May and made public in June, describes that a follow-up inspection was carried out without notice on 23 February, one month after the incident, and that the changes previously required had not been fully implemented (e.g. no hazardous substances signs had been posted, no designated workplace collection point had been set up, etc.), the fine imposed under Government Decree No. 271/2001 (maximum HUF 24,000 – EUR 60 - basic fine multiplied) is HUF 1,980,000 (EUR 5 000, HB/17-HGO/00957-6/2024).

Generally speaking, China has tried to improve industrial safety within companies and to reduce the previously serious environmental pollution, but the primary focus remains on industrial development (Szunomár et al. 2023). The development and enforcement of corporate safety in China also largely depends on the management of the given company. In the case of the Chinese chemical industry, Chen-Reniers (2020) conducted a comprehensive analysis of safety problems and found that the main causes of accidents are human error, poor safety culture, low safety awareness among employees, insufficient safety investments and lack of safety supervision. They found that company managers pay little attention to building a safety culture within the company, safety education and communication. 62.2% of accidents in the chemical industry were linked to operational and maintenance errors, loading and unloading of raw materials, and non-compliance with regulations. In China, the chemical industry has developed faster than industrial safety regulation. In order to achieve economic benefits, companies always refuse to shut down production, even when recommended by the authorities to improve safety.

In China, despite the positive rhetoric, the issue of environmental protection is controversial. The negative health impacts of particulate matter (PM)_{2.5} are huge (Bai et al, 2024), and water, soil and other pollution forced the Chinese government to acknowledge the existence of 'cancer villages' a few years ago.³¹ The sources of very serious soil pollution include radioactive materials, heavy metals, waste, fertilizers, herbicides, these have caused largely irreversible damage and the environmental monitoring and management system is deficient (Ye, 2024). Although 'green' policies have gained more prominence in recent years, China continues to exemplify a model of state-driven, authoritarian environmentalism, with political and economic power concentrated under the centralised leadership of the Communist Party. The tools of state-

³⁰ Fire at CATL in Thuringia - three slightly injured | MDR.DE

³¹ <https://www.scmp.com/news/china/article/1155528/environmental-watchdog-admits-cancer-villagephenomenon>

directed environmental protection include centralised and targeted allocation of R&D funding, support for state-owned enterprises, and controlled media programmes on environmental protection, which are censored if they challenge state authority. Environmental NGOs and scientists are forced to cooperate if they are to survive. China's clean energy revolution (solar panels, wind farms, batteries) has led many to see it as 'developmental environmentalism', following the example of Asian developmental states (Ricz, 2020), but China's environmental successes have mostly been achieved through top-down coercion, sometimes at the expense of citizens' rights (Li-Shapiro, 2020).

Safety risks of battery recycling and "second life"

At the beginning of battery cell production, until production lines are set up to exact requirements, the scrap rate is very high (minimum 50%). Later it decreases, but it depends on the manufacturer: the average is about 5-10%, at CATL only a few percent, at SK at least 20%.³² There are thousands of materials and processing parameters that need to be optimised to achieve profitable yield on the production line. Any one of these individual factors can fail, at which point the battery must be discarded. In Samsung SDI's waste management plan, a further reason for scrapping is given: until the customer car manufacturer approves the product, all batteries, even good quality ones, must be scrapped (Samsung SDI, 2023). Each cell manufacturer produces batteries according to the specific needs of the car manufacturer to which it is contracted, and if a surplus is created, it will not be taken over by another car manufacturer. At the moment, therefore, the basis for battery recycling is scrap EV batteries, with used ones only appearing in mass quantities at a later stage.

Because of the specific needs of car manufacturers, there is no standardisation, and because of the very wide variety of batteries that were not designed for a second life, other uses (e.g. energy storage) are labour-intensive and risky. Internal changes in the batteries during ageing and charging make second use dangerous. An example is the formation of dendrites (Láng, 2024). If a low-temperature battery is charged at high current, metallic lithium is formed and deposited on the anode. Its tiny spikes pierce the separator layer and grow to the cathode, causing a short circuit that can ignite the battery. Analysts say that such risks and costs will marginalise the secondary use of batteries in Europe (Zambon, 2024)

The general problems of recycling are described by Gyórfy (2023). In Germany, Sweden, Norway and Italy there are some energy-intensive pyrometallurgical recycling (incineration) plants, but there are hardly any hydrometallurgical plants, the largest being the Finnish Fortum in Harjavalta, which can process the black mass to extract lithium, cobalt, nickel and other materials that would be reused in production. This method works on the principle of acid leaching, requires water and chemicals and produces large amounts of waste water. It is worth mentioning here the BAFS plant in Schwarzheide, Germany, which was inaugurated last June and which also uses hydrometallurgical

³² <https://www.portfolio.hu/gazdasag/20230210/egy-magyar-akkumulatorgyartbol-meghokkento-problemakbuktak-felszinre-596206>

technology³³. Battery recycling is a widespread practice in Asia, and it is no coincidence that most of the black mass (the result of pyrometallurgy) is shipped from Europe to South Korea and China. The Hungarian recycler SungEel has also been granted a licence to ship a total of 11400 tonnes of black mass by road and sea to South Korea during 2024 (PE/KTFO/308-2/2024 and 42-6/2024). Black mass itself can be diverse in composition and its classification is not uniform across EU countries (hazardous or non-hazardous), so neither are the conditions for transport and storage.³⁴ Black mass is flammable and contains binder degradation products, electrolyte and separator foil residues (e.g. PVDF). In the mechanical and thermal treatment during recycling, Hu et al (2022) identified 46 types of gas generation, which were formed by electrolyte evaporation, electrolyte degradation and pyrolysis of organic separator and binder.

According to a statement by the Hungarian Ministry of National Economy, since the EU's 2023 regulation makes battery producers responsible for the collection and recycling of all battery waste, but we still have hardly any recycling plants, this sector needs to be developed³⁵. After travels in South Korea, the Minister of Economy has persuaded several such companies in China to invest in Hungary. Recycling plants are also needed because of the large amount of scrap left over from production (otherwise it will be illegally dumped in abandoned warehouses)³⁶. According to the government's amendment to the law, the location of battery recycling plants will be designated by the Minister, with an environmental assessment to follow only after that.³⁷ However, the public is not prepared for what to do if, for example, an explosion occurs and toxic gases are released into the air. This brings us to the issue that characterises all government communication on domestic battery production.

3. Informing the public

As the push to boost battery production is a priority for the Hungarian government, central propaganda uses a variety of means to influence the public in this field too. The companies themselves are joining in, either by withholding certain information or by creating an exclusively positive image.

Lack of information, ignoring questions is the first characteristic feature. In public hearings, the public did not get enough information even when they could be present. A public hearing was held in September 2020 on the Dongwha electrolyte plant's public safety report of only 18 pages, where residents objected to the confidentiality of detailed

³³<https://www.iwr.de/ticker/standort-schwarzheide-basf-erhaelt-foerderung-fuer-batterierecycling-anlage-in-brandenburg-artikel6802>

³⁴ <https://www.fastmarkets.com/insights/european-battery-regulations-to-restrict-black-mass-exports/>

³⁵ National News Agency - Márton Nagy met with the world's leading battery recyclers in China (mti.hu)

³⁶https://vilaggazdasagi.blog.hu/2024/05/17/nem_mindig_lathato_de_rengeteg_vezelyes_hulladekok_az_akkumulatorgyarakban

³⁷ https://nepszava.hu/3253297_alig-10-15-perces-vita-utan-atment-a-gazdasagi-bizottsagban-az-a-torvenymodosito-javaslat-amely-a-hazai-akkumulatorhulladek-feldolgozok-letesiteset-erinti

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information.³⁸ Despite this, the electrolyte plant received a construction permit on 24 September 2020.³⁹

In Komárom, in January 2023, at the public hearing on SK, *"not a single question was answered that really addressed important issues"*⁴⁰ "The questions and answers of the five-hour forum in Göd on 31 January 2023 are also a good example of this (Éltető, 2023): at what price and under what contract does the factory receive the electricity? Answer: *contracts cannot be issued*. How many cubic metres of water does the factory use per day, and what hazardous substances does the industrial waste water come into contact with? Answer from a Samsung representative: *"We do not have specific figures for the production."* The 5 new monitoring wells promised by Samsung are licensed to test for substances in the soil at a depth of only half a metre. Samsung's reply: *"I don't have it in front of me now, but clearly we will dig to where the groundwater is."* Asked where the noise map could be viewed, the factory representative said it was being produced by Samsung itself and that *they did not think it necessary to publish it at the moment*.

In Debrecen, the mayor of Debrecen went to the public hearing on 9 January 2023, which lasted six hours, and the next day he said that he would support the project even if the people of Debrecen did not.⁴¹ The second public hearing in Debrecen on 20 January 2023 (with an indignant atmosphere) was part of the environmental permit application for the CATL factory and lasted 10 hours. The county governor and Hungarian and Chinese representatives of the factory were present, but not the mayor of Debrecen.

Since the government decree of April 2023 allowed "public hearings" without the physical presence of the public, these are already held online, with some questions being sent in advance. In October 2023, Bamo Ltd. held another public information forum in Ács, where many questions were not answered. Bamo submitted its application for an environmental permit on 1 March 2024, but the environmental impact assessment for the factory was not published by the municipality of Ács and was only briefly available for download from the government office's website. Here too, the mandatory public hearing was held without personal participation. The company was granted a single environmental use permit on 3 May and a construction permit on 21 May. (The fact that the Association of Great Lakes and Wetlands filed a lawsuit against the Komárom-Esztergom County Government Office regarding the environmental use permit for the project has no suspensive effect⁴². As with the Samsung and CATL permit lawsuits, the authority has also involved Bamo in the lawsuit, whose lawyers are stalling by questioning the plaintiff's right to sue. In the meantime the factory is being built.)

Apart from public hearings, there is no other forum where citizens can voice their opinions and concerns to the authorities, companies or governments. In the Parliament, the Sustainable Development Committee held a meeting on 14 February 2023 on the situation of battery plants and water utilities, with the participation of several NGOs, but

³⁸ <https://www.soskut.hu/?module=news&action=show&nid=132861#MIDDLE>

³⁹ <https://www.soskut.hu/?module=news&action=show&nid=133743#MIDDLE>

⁴⁰ <https://www.facebook.com/people/%C3%89lhet%C5%91bb-Monostor%C3%A9rt/100063808794621/> 2023.01.27 bejegyzés

⁴¹ <https://www.klubradio.hu/adasok/debrecen-fideszes-vezetese-akkor-is-tamogatja-az-akkumulatorgyarmegepiteset-ha-a-population-not-132019>

⁴² <https://forbes.hu/uzlet/akkumulatorgyar-kina-acs-beruhazas/>

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no one from the government attended. This was repeated in April 2024, when Fidesz (governmental party) MEPs walked out right at the beginning⁴³.

Official submissions, petitions from the public, or even from opposition mayors, are often ignored by the government or other authorities, such as more recently public data requests. The Water Management does not release data on Samsung's wastewater treatment plant in Vác, and the government agency wanted to classify data on Samsung's monitoring wells for 10 years (as it turned out later, there was one well, but it was buried in 2018, Éltető, 2023). The composition of Samsung's rennet foam, which was found in several places in the sewers in Göd, was not released⁴⁴, the case of NMP found in standing water in the fields in Göd was not investigated⁴⁵. In May 2024, the municipality contracted NNK Kft⁴⁶ to drill several places in the soil and reported that no NMP was found, but the reports were not released⁴⁷. Thus, it is not known whether they tested for e.g. the presence of the severely irritant N-methyl succinimide, to which NMP rapidly degrades (Nemes, et al, 2023) and what detection limit the instruments were set to. Despite repeated requests for data and current legislation, the national environmental (OKIR) database for groundwater has not been updated for five years. When an accident occurs, companies have a news blackout and the authorities do not communicate.

Another propaganda tool **is the untrue statement**. It is known, for example, that half of the workers in CATL's German factory are Chinese⁴⁸, and that in the Debrecen factory at least the management and the main operators will be Chinese. In addition, the factories in and around Debrecen are luring the few Hungarian workers from each other. Nevertheless, at the government info in February 2023, minister Gulyás said that 100 percent of the workers in Debrecen will be Hungarian, even if they move from Oradea to work there, they will be Hungarians⁴⁹. In the past year, however, the residents of Debrecen and Mikepércs have already experienced the presence of more and more Chinese and Asians... The statement of the mayor of Ács (no battery factory will come here) was untrue in its content, just before the announcement of the battery raw material cathode factory⁵⁰. Untrue statements are also made by companies. The Chinese manager of CATL stated that the Debrecen company will be carbon neutral and this was picked up by the government media. Already the first CATL factory in Debrecen will

⁴³ <https://24.hu/belfold/2024/04/17/akkugyarak-bizottsagi-ules-kormanyparti-kepviselok-kivonultak/>

⁴⁴ The waterworks' response to the data request: "As a result of an internal investigation by Samsung SDI Hungary Zrt., regarding the origin and quantity of the foaming agent, the company has informed our company that a small amount of foaming agent was released from their facility into the sewer network. Samples taken directly from the foam were delivered to the central laboratory of DMRV Zrt. Their laboratory analysis indicated the presence of some detergent, but did not lead to any quantitative or qualitative results. Therefore, we were not in a position to issue a report."

⁴⁵ <https://www.greenpeace.org/hungary/sajtokozlemeney/11078/a-greenpeace-a-godi-kommunalis-szennyvizben-talalt-akkumulatorgyartashoz-hasznalt-magzatkarosito-oldosert/>

⁴⁶ Gödi Körkép, issue 9, <https://god.hu/elet-a-varosban/kultura/godi-korkep/>

⁴⁷ <https://infostart.hu/belfold/2024/09/07/szitava-furtak-a-godi-talajt-bejelentettek-hogy-mit-talaltak-a-samsung-gyar-kozeleben>

⁴⁸ <https://www.autobild.de/artikel/batteriefabrik-von-catl-elektroautos-reportage-arnstadt-21845289.html>

⁴⁹ <https://telex.hu/belfold/2023/02/09/kormanyinfo-sopron-kormanyules-gulyas-gergely-szentkiralyi-alexandraunios-csucs>

⁵⁰ <https://merce.hu/2023/06/22/a-bejelentes-elott-egy-hettel-meg-kategorikusan-cafolta-a-polgarmester-hogyakkugyar-epul-acson/>

have ten natural gas boilers, using 90 million m³ of natural gas per year, so in practice it cannot be carbon neutral. The Samsung SDI representative at the public hearings in Göd firmly denied that there would be a second and then a third phase of the factory, after which both were or are being built.

Another propaganda tool is **silence**. Mention of the toxic solvent found in the groundwater at Göd is avoided. At the beginning of 2023, János Áder, former president of the Republic, spoke in a podcast with Péter Kaderják, head of the Hungarian Battery Association, where Áder said (28.05p): *'NGOs took samples in 3 places, took them to the laboratory, and found lithium in the groundwater'*.⁵¹ Ten minutes later, Péter Kaderják spoke about dangerous chemicals and corrected him: *"by the way, in Göd, not only lithium was found in the water, but so-called NMP.."* In the podcast on youtube_ (which was referenced in the news reports mentioning the podcast), this one minute or so was cut out.⁵² By the way, the environmental working group of the Hungarian Battery Association produced a comprehensive study in the autumn of 2023 (Nemes et al, 2023), which also describes the hazards of chemicals used in battery production, recommends a national environmental impact assessment and monitoring, but it was only posted on their website a year later, in October 2024.

László Papp, the mayor of Debrecen, did not mention NMP in his interview either, but he said: *'...a representative of the Gödért Association spoke at our forum, claiming that the battery factory is polluting the water of Göd. According to the test report on the website of the Danube Regional Waterworks, lithium is indeed present in the water of Göd. Not because of the battery factory, but it has always been present.'*⁵³ "Lithium, of course, does not bother anyone in Göd, but the reproduction-damaging NMP does.

The industrial security risks discussed in the first half of the article are also being concealed by the government. There is not a single mention of the national security risks (e.g. Chinese control of a significant part of Hungarian industry and exports, battery factories as excellent military targets, the Chinese control of large amounts of data), nor is there any mention of the huge amount of hazardous chemicals that will be moved and stored in the country due to the many battery manufacturing plants (three times as much NMP alone as in the EU)⁵⁴. The 'NGOs' supported or endorsed by the ruling party (e.g. Future of Debrecen⁵⁵) do a wide range of environmentally friendly things from dog walking to collecting used oil, but are coyly silent about battery factories and their impacts, (maybe share a positive news story about CATL's leading sustainability award⁵⁶).

⁵¹ <https://open.spotify.com/episode/43hBVavhXLWPVh4827YY82>

⁵²

https://hvg.hu/itthon/20230310_Ader_raszolt_a_mergezo_akkugyarrol_beszelo_vendegre_majd_kivagtak_az_adasbol_a_problem_about_problems

⁵³ <https://index.hu/belfold/2023/03/06/debrecen-papp-laszlo-polgarmester-debreceni-akkumulatorgyar-energiaemergency-orussian-ukran-haboru/>

⁵⁴ https://vilaggazdasagi.blog.hu/2024/05/17/nem_mindig_lathato_de_rengeteg_veszelyes_hulladekok_az_akkumulatorgyak

⁵⁵ <https://www.szabadeuropa.hu/a/nem-foglalkozik-az-akkumulatorgyar-uggyel-az-onkormanyzati-tamogatasu-debreceni-zoldszervezet/32242707.html>

⁵⁶ <https://futureofdebrecen.hu/jovomuhely/miert-kaphatott-fenntarthatosagi-dijat-a-catl-vezetoje/>

This leads us to another propaganda tool, which is **diversion**, the "greening" of minor issues. The Debrecen administration, for example, has tried to gain confidence in the population with loud "green" programmes. The "*Plant 10,000 trees*" programme, for example, sequesters 38,000 kg of CO₂ and the programme for the reinforcement of the defences 134,000 kg in the first 10 years. The two programmes together will therefore sequester 172 t/year of CO₂ while CATL's documented projected local carbon dioxide emissions are 338,000 tonnes per year. A "Green Codex" for Debrecen was adopted in early 2024, promising 10,000 more trees and other greening measures (see later) and referring to the planting of saplings in a container as an "instant forest"⁵⁷. The promises to mitigate the impact of factories are not always kept: in Ivánca the mayor promised the village a seven-metre noise barrier, which turned into a hill of about three metres without trees.⁵¹ The replacement forest in Göd, which would have compensated for the felling of 25 hectares of forest, was realised on paper in Pécel.

In the spring of 2023, with the aim of building confidence, the University of Debrecen and the city administration set up a committee to develop and operate an environmental monitoring system⁵⁸. It is announced that this will be a 24-hour-a-day automated data collection, analysis and monitoring system with a data validation laboratory. The first important thing would have been a baseline survey (against which future pollution could be compared). On 17 September 2022 on Debrecen TV's Evening Close-up programme the head of the Department of Environment, Nature Conservation and Waste Management of the county of Debrecen said how important it was to carry out baseline measurements before the factories were built⁵⁹. In the meantime, since the beginning of 2024, the Semcorp separator film factory has been running a trial operation, CATL began module assembly, Halms Hungary is also operational, so the original "baseline" is already gone.⁶⁰ For the environmental monitoring system, air and water measuring equipment and measuring containers have been ordered through a public procurement for a total of HUF 800 million, and are being installed at 18 points in the city. Debrecen will be the first city to have a complex environmental monitoring system⁶¹, monitoring the city's air and water, which is a positive development. However, the environmental monitoring committee has no official power, not any right even to enter factory areas, the monitoring results are only published after preliminary screening, and the range of the instruments is limited compared to the many variations of chemicals present.⁶² If they measure pollution, they cannot - and have no right to - trace it back to the factory where it came from, but can only report it to the Government Office. As the experience of the past five years shows, the government agencies are specifically protecting the interests of the

⁵⁷ <https://greendex.hu/debrecen-zold-kodex/>

⁵⁸ <https://www.dehir.hu/debrecen/megkezdte-a-munkajat-a-debreceni-kornyezeti-monitoringbizottsag/2023/04/18/>

⁵⁹ <https://www.facebook.com/100091405532381/videos/k%C3%B6zlem%C3%A9ny2023-%C3%A1prilis-3%C3%A1n-volt-egy-%C3%A9ve-hogy-debrecen-megyei-jog%C3%BA-v%C3%A1ros%C3%B6nkorm%C3%A1n/1946534735780470/?rdid=33AfP1zmUdumDp9c>

⁶⁰ https://m.facebook.com/story.php?story_fbid=pfbid0Ph7MTdQPvtad8ocY8szroSS19XzqHS9BqjCzNQTk gXhuX5XH8sbHQAu1mdML9YDol&id=100091405532381

⁶¹ In Göd, the municipality has contracted NNK Kft. to develop a simpler groundwater monitoring system.

⁶² <https://hirek.unideb.hu/kornyezeti-ellenorzo-rendszerrol-jovomuhelyben>

battery factories and not the public, sometimes even in violation of the law (Éltető, 2024), thus the monitoring system in Debrecen will unfortunately remain a diversionary tool.

Companies also make gestures of friendship towards the public - this is also the case in other countries and for other companies, under the heading of "social responsibility". CATL has supported the local basketball team in Thuringia, distributed Christmas parcels in Debrecen, signed an agreement with the university, sponsored the Campus Festival, the Flower Carnival and donated several times to the University of Debrecen's Paediatric Clinic. EVE Power also supports the local football team and the university. Samsung SDI has built a playground⁶³ and gives a gift pack to babies as part of its "baby gift" programme. SK supported financially the foundations in Komárom, epidemiological measures, children and large families in Ivánca, and paving and building of sidewalks in Ivánca.⁶⁴ In Ács, Bamo (Huayou Cobalt) promised a playground and a crèche, and in Heves, the Chinese BYN promised support for local kindergartens and schools, sports and planned to set up a civic fund (before local residents thwarted the project).

Inventing new language is also an interesting communication tool, avoiding the word "battery". CATL's battery module assembly hall at INPARK in Debrecen (which it leases from a company close to the government) is called "Electromobility Providing Rechargeable Unit (ELBUE) Module Assembly Plant", which is also the title of the environmental impact assessment. In the municipal brochure for the Andrada recycling plant in Salskút, the name of the battery waste was "inert green energy storage".

In the light of the above, there is already a strong suspicion of **greenwashing**, which in the literature is mainly applied to companies. Delmas and Burbano (2011, p. 66) define greenwashing as 'the misleading of consumers about a company's environmental practices or the environmental benefits of a product or service'. Companies are generally not interested in publicising their environmentally destructive activities, but rather in creating a sustainable image. Greenwashing is difficult to combat because, if successful, the benefits are significantly higher than the cost of being caught (Kurpierz and Smith, 2020, p. 1087). Blome et al (2017) find that there is less greenwashing where managers themselves attach importance to ethical and sustainable production, compared to firms where only regulation puts pressure on managers. In our case, in addition to the battery companies, we also find features of greenwashing in the communication of the Hungarian government and some municipalities (Greenwashing and its indulgence by municipalities was, by the way, studied in China by Tang et al 2020 and Zhang et al, 2022). Horiuchi et al (2009) describe ten characteristics of greenwashing communication, which are applied to the Hungarian case and are presented in Table 2.

⁶³ <https://magyarnemzet.hu/kulfold/2023/10/jatszoteret-epitett-a-samsung-sdi-a-godi-gyermekeknek>

⁶⁴

https://www.facebook.com/permalink.php?story_fbid=2892036067730015&id=1956638591269772
<https://telex.hu/belfold/2021/05/19/ivanca-sk-innovation-akkumulatorgyar-epites-fejer-megye-epitkezes-zajmunkahely>⁵¹

Table 2: Greenwashing in government and corporate communications on battery production

Greenwashing technique	Example	Applying
1. words with vague meanings	"instant forest" , ELBUE	local government
2. green product, polluting company	battery cell factory, cathode factory, separator film factory, battery recycler	government, company
3. "green" suggestive images	government news portals, municipal information websites	government, local government
4. irrelevant claims	mandatory environmental permits, "tightening" law on air pollution, fencing of the Göd playground, CATL 4 carbon neutral factory, the Samsung police report	government, company, municipality
5. "best in class"	cell factories in Debrecen, Nyíregyháza, cathode factory in Acs	government, companies
6. not credible	"not chemical, just physical process", "closed system", NMP, NCM is a non-hazardous substance, CATL: 2000 tonnes of NMP use per year.	Companies
7. jargon, special words	ELBUE (battery), "inert bioenergy storage" (battery waste)	local government
8. "imaginary friends"	Department of Energy regulations	government
9. no evidence	"stricter rules than in Germany," "NMP has long been in the ground in Gödöllő"	government, pro-government Institute
10. lie	100% Hungarian workers at CATL, carbon neutral CATL in Debrecen, Samsung: no second/third factory	government, companies

Source: own compilation based on Horiuchi et al (2009)

A product can be "green" even if the producing company pollutes the environment or puts workers at risk. As we saw at the beginning of this article, several companies in the battery industry, which already mentioned above, work with a lot of hazardous substances. According to the literature, green companies often communicate - even realistically - that they are still the leaders in the field ('best in class'). In the case of CATL, this is communicated by the company, the government and the local government, as the company dominates almost 40% of the world market for batteries. The SUNWODA cell factory in Nyíregyháza is a 'world leader' in consumer electronics, building the 'most

advanced' energy and environmentally conscious factory.⁶⁵ In Debrecen, EVE Power is building an artificial intelligence-assisted plant "at the top of the industry", bringing the latest technology in the production of cylindrical battery cells.⁶⁶ According to its website, Samsung SDI is "a leader in creative energy and materials use," and SK Innovation is "a global leader in the new energy sector." "Building on the group's 21 years of experience, we are bringing the world's most advanced and cutting-edge manufacturing technology to Acs," said a Bamo representative.⁶⁷

Pictures with "green vibes", smiling faces and positive news, for example on the debreceniakkugyar.hu portal, are also greenwashing tools.

Irrelevant statements and actions are also greenwashing techniques (making small green statements when the whole activity is not green). When the government media or the CEO of the Hungarian Battery Association or the company itself boasts that CATL has four carbon neutral factories (see how environmentally friendly), this is irrelevant for the people of Debrecen. The four factories are in China, next to huge rivers or seas, with hydroelectric power plants, while the Debrecen factory (the first phase under construction), as mentioned, runs its boilers on imported natural gas and emits a lot of carbon dioxide every year.

The Municipality of Debrecen has announced a "green roof programme" under point 50 of the Green Codex (arbours on the roofs of institutions and prefabricated houses), donated 6,500 rainwater harvesting barrels to the population, installed green islands and trees with containers, and commissioned CO₂ sequestration murals. It is also installing bird boxes, hedgehog garages, parapets, upgrading street lighting, organising environmental education and combating ragweed (Debrecen, 2024). There is also a Green Bus programme⁶⁸. All this is commendable and positive, but it is not known whether the combined resource requirements and immission effects of the battery factories around the city have been estimated or calculated in advance by the municipality, and we cannot forget that the pollution of the Halms has been kept secret for months. The water director, who had warned of the need for caution over water abstraction in Debrecen, has been replaced⁶⁹. Of the seven (!) battery plants around Debrecen, EcoPro cathode plant has warning statements about groundwater, surface water and air pollution in its environmental assessment documentation. (EcoPro, 2022, 2024). If there was a fair and public calculation of the combined, cumulated water extraction of the industrial park companies in Debrecen, it might reassure the public more than the hedgehog garage... (Or not, and that is why there is no such calculation?)

It is also irrelevant that the Fidesz-backed mayor of Göd is filing a police report against an unknown perpetrator because Samsung SDI released 88 tons of NMP into the air in 2021, and this was accidentally discovered three years later⁷⁰. The government office and the factory could have been held to account immediately in public, but the police

⁶⁵ <https://www.nyiregyhaza.hu/post/high-tech-gyar-zold-megoldasokkal-a-kinai-sunwoda-beruhazasanyiregyhazan-2023-07-28>

⁶⁶ <https://realista.ingatlan.com/business/az-eve-power-also-europai-uzemet-debrecenben-epiti/>

⁶⁷ <https://index.hu/gazdasag/2024/03/06/katodgyar-acshuayou-bamo-technology/>

⁶⁸ <https://www.dehir.hu/debrecen/zold-kodex-es-civaqua-program-az-elmult-ot-evet-ertekelte-balazs-akos-videoval/2024/10/01/>

⁶⁹ https://www.debreciner.hu/cikk/13105_mi_tortenik_a_vizzel_az_elbocsatott_vizugyi_igazgato

⁷⁰ <https://telex.hu/belfold/2024/02/27/god-polgarmester-kammerer-zoltan-feljelentes>

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investigation could drag on for years. In Göd, Samsung "solved" the noise problem, which has been a problem for five years, by fencing off the playground next to the factory, which hardly protects nearby residents from the noise⁷¹ .

At the government level, the Ministry of Energy has announced a "tightening up" of the law requiring all companies involved in battery production to have an environmental permit⁷² . This is irrelevant, on the one hand, because most of them would have already long needed such a permit under the current Hungarian legislation, and even under a 2011 EU directive⁷³ , and on the other hand, because experience so far shows that the environmental permit is only a formality and has been obtained in all cases (even if waste treatment, waste water treatment, air pollution could not be operated properly, see Samsung SDI). In addition, in the meantime, the authorities themselves, or the legislator, are "tricking" the environmental procedure by granting a building permit⁷⁴ , so that the factory is built first and then the environmental use is examined. For a few more years, the ministry's other decree, which is being presented as a "tightening up" on air pollution, is also irrelevant, because instead of the previously planned 2025, factories already in operation will be given a "preparation period" until 1 January 2028, and those already authorised until 1 January 2027⁷⁵ . In addition, a 2023 decree will neutralise the whole thing, as it states that there is no need to penalise polluters by concluding an "environmental authority contract"⁷⁶ . The ministry's regulations thus fit into the "imaginary friend" greenwashing technique, pretending as if an independent party gives a certificate, a "green stamp" (but in fact the factories' wishes are being fulfilled).

Greenwashing communication is that is not credible or has no evidence. Those familiar with the technology and practical experience of battery production do not believe that it is "just a physical process", as was said at the public hearings in Göd and elsewhere; that it is a "closed system" (South Korean factories have proven otherwise); that NMP is "not dangerous because it is not listed in the 2011 law"; that the NCM used in Ács is not dangerous, or that while SK uses 11,000 tonnes of NMP, Samsung uses 14,000 and CATL's similar cell factory uses only 2,000 tonnes. (Few people know that the real figure is 47,000 tonnes.⁷⁷) The government regularly tells us how strict the Hungarian legislation is, even stricter than the German one, but never gives any examples or evidence (the NMP limit applied to factories, for example, shows the opposite). The Göd NMP pollution was interpreted without any investigation by the director of the government-affiliated MCC Climate Policy Institute, who said that "it was most likely previously released into the soil

⁷¹ <https://magyarnarancs.hu/belpol/zajvedot-epit-a-samsung-godon-elkeritettek-egy-jatszoteret-266074>

⁷² https://hvg.hu/itthon/20240719_akkumulatorgyar-kotelezo-kornyezeti-hatasvizsgalat

⁷³ "This Regulation is intended to comply with Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment."

Government Decree amending Government Decree No. 2005.(XII. 25.) on the Environmental Impact Assessment and the Uniform Environmental Use Authorisation Procedure, 5§

⁷⁴ <https://drive.google.com/file/d/1uCCNwwZxiFu2pgNm4WpBqq4txX4zGFPq/view>

⁷⁵ <https://kormany.hu/hirek/jelentosen-szigorodnak-a-gyarakra-vonatkozó-kornyezetvedelmi-eloirasok>

⁷⁶ https://m.hvg.hu/360/20241014_kormany-onkormanyzat-acs-kinai-katodgyar-akkugyar-nagy-marton-ukrajna-kornyezetvedelem

⁷⁷ <https://greenfo.hu/blog/2x245-az-nmp-rejtely/>

by other industrial activities"⁷⁸ . Except that Samsung closed its picture tube factory (other industrial activities) in Göd in 2014, and NMP in the soil decomposes in maximum 11-12 days...

4. Dealing with civil protests

There is a large literature on the fate and activities of NGOs in declining democracies and autocracies. In addition to the recipe of regulatory restriction and stigmatisation ("foreign-funded organisations"⁷⁹), it is common to spread government disinformation about NGOs, or even to support or create systemic NGO (GONGO) groups (Sombatpoonsiri, 2023). These co-opted or captured organisations⁶² do not cooperate with the rest (Gerő, et al, 2023) and may even strengthen the autocratic system.

The news of more and more new battery companies has not enthused locals due to the irregular and polluting operation of South Korean factories in the domestic battery industry. In several municipalities across the country, civil groups have been formed to complement the existing ones. The most active groups are the Göd-Ért Association, the Mothers for the Environment Association (MIAKÖ) in Mikepércs, the Szentiván Our Heart Association and the Sósút Civic Circle, the Bátorterenyi Civil Forum, the "Stand up for Ács." "In the autumn of 2023, these groups came together to form an umbrella organisation called AKÁRTEIS (Association for the Justice for Battery Damaged Settlements).⁸⁰ Where the aim is to prevent a local investment, it is usually referred to as NIMBY (Not In My Backyard) protests, but the aim of this coalition is solidarity.

The pressure, discrediting and threatening of protesting civil society groups soon began. After the public hearing in Debrecen, which attracted a lot of media attention, the protesters were labelled as "pseudo-locals". A leading figure of the MIAKÖ was later attacked in person.⁸¹ The mayor of Göd also denounced Átlátszó, which wrote about the NMP pollution.⁸² The Sovereignty Protection Office is also taking action against the news portal and the Göd-Ért Association, which has proven a large number of industrial safety problems and pollution in the battery industry.⁸³

Fidesz mayors usually obstruct or ignore anti-battery movements (the exception is the mayor of Mikepércs). In three cities (Győr, Bátorterenyi, Sósút) they were replaced by the voters in the June 2024 elections. In Győrszentiván, even in 2022, the reclassification of 350 hectares of prime agricultural land as a highly disturbing industrial area sparked strong protests. The civil group Szívügyünk Szentiván (Szentiván our Heart) collected 5585 signatures against the project, demonstrated, submitted data requests.⁶⁹

⁷⁸ <https://magyarnemzet.hu/velemeney/2023/03/ervek-az-akkumulatorgyar-mellett>

⁷⁹ <https://www.szabadeuropa.hu/a/cimlap-podcast-takacsy-dorka-oroszorszag-szuverenitastorveny/32617200.html>

⁸⁰ <https://atlatszo.hu/kornyezet/2023/11/03/szovetsegbe-tomorultek-az-akkumulator-ipar-altal-karosulttelepulesek/>

⁸¹ <https://magyarnarancs.hu/belpol/kampany-debrecenben-az-akkugyar-ellen-tiltakozo-civileknek-is-nekiment-afidesz-268090>

⁸² <https://magyarnarancs.hu/belpol/egyszerre-tett-feljelentest-kammerer-zoltan-a-godi-szennyez-es-amegjelent-cikkek-miatt-265978>

⁸³ https://hvg.hu/itthon/20240805_Ujabb-front-nyilt-a-Szuverenitasvedelmi-Hivatal-es-az-Atlatszo-jogcsatajaban <https://www.youtube.com/watch?v=E4FGkeqTugw> ⁶⁹

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In March 2023, the local referendum initiative was rejected by the local electoral commission.⁸⁴ In 2024, 7029 signatures were collected, and the mayor declared that the classification would be "other industrial zone" only.⁸⁵ In the 2024 municipal elections, the mayor was elected from the opposition. The mayor of Bátonyterenye is a retired policeman who had previously denounced SungEel's activities and had been active in several cases of rule violations by the factory. The mayor of Sósút was also swept away by protests against the planned battery recycling plant (Andrada)⁷². Earlier, the local mayor of Alsózsolca also supported the residents against Andrada, organising a forum, collecting 3100 signatures of protest and listing environmental arguments. There, the representative body adopted a resolution against.⁸⁶ However, in Ács, where Bamo, owned by the Chinese Huayou Cobalt, is building a cathode factory, the local group "Stand up for Ács" was not allowed by the local council to use the name of the village. However, the council voted to change the name of the industrial park from the Hungarian name Ács to "Huayou Industrial Park"⁸⁷.

Citizens' groups organise demonstrations and forums⁸⁸. Here again, Hungarian protesting habits depend essentially on the background of the protesters, the means available and the goals set by the protesters, so Hungarian citizens do not always protest in the same way every time (Mikecz, 2023). In September 2024, in Heves, residents tricked the mayor into promising a referendum on the NMP regeneration plant being built there, and then rejecting the plant⁸⁹ (although there was no written evidence of this). In most places, opposition parties tried to use the protests of local residents to their own advantage, which often did not bring any serious help, but provided a platform for attacks. Greenpeace provides professional assistance, for example through sampling, laboratory analyses and events. MIAKÖ has installed air pollution measuring equipment at 7 sites with its own money⁹⁰. In addition, NGOs are also trying to achieve results through legal action.

The preference for taking advantage of legal opportunities is given to those where there are lawyers or people with legal knowledge among the active citizens. But the legal path is not smooth, full of rejections, appeals, time and money consuming steps. Even a simple request for data will result in the authorities stalling for time or refusing to release the data for some reason. Referendum requests have also been tried in several places. In Debrecen, more than 120 questions were submitted, all of them rejected.⁹¹ In Sósút, the local electoral commission certified the referendum initiated by local MPs, but following a request from an unknown local resident, submitted just two hours before the deadline,

⁸⁴ <https://24.hu/belfold/2023/03/17/akkumulatorgyar-gyor-nepszavazasi-kerdes-hatarzat-dontes/>

⁸⁵ <https://merce.hu/2024/05/16/nagy-csatat-nyertek-a-gyorszentivaniak-de-az-akkugyarveszely-nem-mult-el/> <https://444.hu/2024/06/12/bevittek-par-utest-a-fidesznek-az-akkugyaras-telepuleseken-van-ahol-a-tiltakozokelett-a-hatalom> ⁷²

⁸⁶ "The body of representatives of the Municipality of Alsózsolca does not agree and protests against the establishment of a hazardous waste processing and storage plant by Andrada Group Ltd. on the property of the property No. 097/31 in the industrial park of Alsózsolca."

⁸⁷ Decision No 192/2023 (XII.11), Ács town Mayor's Office, 2023.12.12.

⁸⁸ <https://erdmost.hu/2024/03/04/az-orkutya-szerepet-kell-folvennunk/>

⁸⁹ <https://24.hu/fn/gazdasag/2024/10/01/hevesen-akkuberuhazas-gyozott-lakossagi-ellenallas/>

⁹⁰ https://www.youtube.com/watch?v=2IW_xZWEhA

⁹¹ <https://hang.hu/belfold/akkugyarugy-ujabb-ket-nepszavazasi-kerdest-utasitottak-el-debrecenben-157231>

the tribunal overturned the decision and refused to certify the question.⁹² There have also been lawsuits against Dongwha and Samsung in Sósút, the former for a better safety report and the latter for the burial of a monitoring well in 2018. The difficulties of litigation and the pro-investor attitude of the authorities (even the courts) are illustrated by the following case study of the legal wrangling in Debrecen.

Civil lawsuits in the CATL case

Both CATL's permits (safety and single environmental use permit) were challenged in the Court of Justice by citizens. Although in both cases the Hungarian authorities issuing the permits were sued and not CATL, the Debrecen Court of First Instance included CATL as a defendant in the lawsuit in addition to the county disaster management authority, and then gave CATL the opportunity to support the lawsuit with arguments in addition to the government office in the proceedings for the single environmental permit. CATL's lawyers receive all documents and are present at the hearings. CATL's involvement in the court proceedings is possible under the Administrative Procedure Act.⁹³

In the case of the **safety report**, the complaint (filed on 16 February 2023) was based on the authority's failure to make available for public hearing a second, corrected version of the report (813 pages), which was supplemented with additional relevant information concerning the safety of the public. The Debrecen General Court dismissed the civil party's claim (19 July 2023), stating that this procedural defect was not so serious as to justify the annulment of the licence issued.⁹⁴ Following a petition for review, the Curia upheld the resident's claim and on 29 November 2023 annulled the disaster management licence issued by the Hajdú-Bihar County Directorate of Disaster Management to CATL on the grounds that the authority had violated the rules on publicity in the supplement to the safety report.⁹⁵ In implementing the judgment of the Court of Cassation, the Tribunal should have repeated the licensing procedure and held another public hearing. But, the Directorate for Emergency Situations ordered the company to declare whether it would maintain its previous application and the safety report originally submitted. CATL indicated in its statement that it does not maintain its application and requested the Authority to terminate the procedure. CATL submitted a new application for an industrial safety authorisation on 30 January. On 31 January, the County Emergency Management Directorate issued a final order terminating the emergency permit procedure⁹⁶. With this action, CATL and the Authority and the Mayor were saved from being subjected to another public hearing. Based on the new safety report, a new permitting process has been launched. Due to legislative changes in the meantime (Government Decree 146/2023 (27.4.2023): public hearings can be held without the personal appearance of the parties concerned), the new CATL disaster management licence was only subject to an online

⁹² <https://merce.hu/2024/04/12/elkaszaltak-a-soskuti-akkunepszavazast-hala-egy-ismeretlen-kerelmezonek/>

⁹³ <https://hang.hu/magyar-hang-plusz/perbe-allitottak-a-catl-akkugyarat-a-katasztrofavedelmi-hatosag-oldalan154748>

⁹⁴ https://debreciner.hu/cikk/14422_elsokon-elutasitotta-a-debreceni-torvenyszek-unikum

⁹⁵ <https://24.hu/belfold/2023/11/29/debrecen-akkugyar-catl-beruhazas-kuria-katasztrofavedelmi-engedely/>

⁹⁶ https://hvg.hu/kkv/20240201_CATL_katasztrofavedelem_engedelyezes_eljaras_megszuntetes

public hearing (4 March 2024), where the representatives of the Chinese company did not have to appear in person. The permit was granted on 17 March.⁹⁷

As far as the environmental permit is concerned, the legal process is slow and still ongoing. Until August 2024, four hearings were held (one every quarter). There was a hearing on 25 January, where in particular the part of the environmental permit that "the concentration of NMP detected in the effluent at the first operation of the company will be the limit to be respected by CATL" was discussed. Since NMP is a hazardous solvent that does not occur naturally under normal conditions, the limit value at the baseline measurement should be zero, not the value that the plant first discharges. Even the judge found the quoted passage absurd and the hearing was adjourned.⁹⁸ The next hearing took place on 21 March: the NMP was no longer an issue, but after repeated requests from CATL's lawyers, the court decided that the plaintiffs' standing to sue, i.e. whether they had any standing at all, should be examined and that an expert opinion should be prepared to determine the CATL battery factory's impact zone. The real aim of the CATL lawyers (assisted by the court) was to gain time.⁹⁹ As was the court's decision in August 2024 to stay the lawsuit because CATL had asked the authority for a further, now third, modification of its environmental permit.¹⁰⁰

In the meantime, Government Decree 119/2024 (10.VI.) amending certain rules on the procedure of environmental authorities (effective from 1 July 2024) has been published: the Government has created a new environmental authority within the Ministry of Energy, which will take over the possibility of judicial review at the court of appeal, so that deficiencies in environmental permits will be dealt with within the framework of the state administration.

5. Summary and conclusions

Just as in China the chemical industry has developed faster than the regulatory and safety staffing could keep up, the same picture has emerged for the Hungarian battery industry. The authorities are underfunded, understaffed and the relevant laws and regulations are often outdated, uncoordinated and inconsistent. In addition, South Korean factories have repeatedly failed to comply with them. The administration is simply not prepared to deal with such huge quantities of largely hazardous materials and the problems that this causes.

⁹⁷ https://debreciner.hu/cikk/16295_masodjara_is_megkapta_a_katasztrofavedelmi_engedelyt

⁹⁸ <https://telex.hu/video/2024/02/14/catl-debrecen-mikepercs-akkumulatorgyar-civilek-per-birosag-nmp-kormanyhivatal-katasztrofavedelem>

⁹⁹ <https://24.hu/belfold/2024/03/21/catl-debrecen-jarasbirosag-kornyezethasznalati-engedely-per/>

¹⁰⁰ In parallel with the Hungarian litigation, the German CATL power line case Amt

The municipality of Wachsenburg has filed an appeal against the planning approval decision of the Thuringian State Administration 2023. The decision provides an overhead line instead of the underground cable required by the municipality. In the proceedings, the German State Administrative Office examined a total of five overhead and four underground cable options and, according to the Office, the latter would have cost three times more and there was no legal obligation to install underground cabling. CATL did not want to bear the extra costs and in spring 2024 the Thuringian Supreme Administrative Court rejected the application. <https://www.mdr.de/nachrichten/thueringen/sued-thueringen/ilmenu-ilmkreis/catl-klage-gericht-stromtrassestreit-100.html>

Industrial safety problems are not only in the battery industry and not only in Hungary. South Korean factories in other countries and in their own countries often neglect health and safety and environmental issues and regulations for the sake of quick profits. Machinery equipment is sometimes incomplete, dangerous, poorly documented, inadequate in operation and maintenance. Unfortunately, in Hungary, sanctions (if they exist at all) are not significant enough to ensure effective action against repeat offenders. The main reason for this is that the government's priority is to facilitate the activities of foreign multinational companies that generate significant export revenues. The Asian line adds to this, as it is the Orbán government's policy to orient towards the East anyway. In addition to the hoped-for financial benefits, the principle of "similis simili gaudet" also applies, and investors in the Chinese autocratic state will not be bothered by the lack of democracy or corruption, they engage in businesses.¹⁰¹

The ramp-up of the battery industry, which is excessive for the country's size and endowments, is a previous decision that the government does not intend to override, despite the problems, even if it increases the country's exposure to external demand fluctuations. This is another indication that it is a political decision taken primarily not for economic reasons, but for reasons of power, which does not take into account the interests of the population living around the factories or the protection of nature. The authorities are following political will even against the legislation. The mass media are accordingly manipulated and the communication shows all the hallmarks of greenwashing. Local civil society groups have limited possibilities and events so far show that they cannot really assert their interests because of the captive legal system, as the state authorities prefer to ally themselves with foreign companies. As Nemes et al (2023) note, "the launch of the industry in Hungary was not only not preceded by any coordinated awareness-raising activities in policy-makers and professional circles, but also by a regrettable lack of preparation of politicians and media actors" (p.30). This industry could only be run properly on a small scale, with credible and honest communication of the risks to the public, and with strict control and punishment of factories (e.g. on the basis of an effective and transparent external monitoring system). As this article have shown, the current government has not been able to achieve this.

¹⁰¹<https://telex.hu/gazdasag/2024/10/18/akkumulatorgyartas-magyarorszagon-aksigyar-meszaros-lorinc-garancsi-tiborc-mol-ujrahasznositas-infrastruktura-oligarchia>

References

- Bai, Y, Lei Chen, Zijia Feng, Jia Zhu, Yixuan Gu, Ke Li, Hong Liao (2024). Historical and future health burden attributable to PM2.5 exposure in China, *Atmospheric Environment*, Vol.322, 120363, <https://doi.org/10.1016/j.atmosenv.2024.120363>.
- Blome, C., Foerstl, K., Schleper, M.C. (2017) "Antecedents of green supplier championing and greenwashing: an empirical study on leadership and ethical incentives", *Journal of Cleaner Production*, Vol. 152, pp. 339-350.
- Bodnár, Zs (2022). Feketén-fehéren leírta a hatóság, hogy veszélybe került a gödi Samsunggyár több mint 1000 dolgozója Átlátszó, december 23. [Feketén-fehéren leírta a hatóság, hogy veszélybe került a gödi Samsung-gyár több mint 1000 dolgozója | atlatso.hu](https://atlatso.hu)
- Chen, C, Reniers, G (2020) Chemical industry in China: The current status, safety problems, and pathways for future sustainable development. *Safety Science* 128 <https://doi.org/10.1016/j.ssci.2020.104741>
- Cho Y and Yoon J (2001) The Origin and Function of Dynamic Collectivism: An Analysis of Korean Corporate Culture, *Asia Pacific Business Review*, 7:4, 70-88,
DOI: 10.1080/713999116
- Czirfusz, M. (2023). Munkabérek egyenlőtlenségei a globális értékláncokban: a magyarországi akkumulátoripar esete". *Külgazdaság*, 67(11-12). <https://doi.org/10.47630/KULG.2023.67.11-12.28>
- Darvas B (2023). A lítiumionakkumulátor-gyártás és ipari járulékaiknak környezetegészségügyi veszélyei. *Ökotoxikológia*, 5. évfolyam, 3-4. szám, 5-30
- Debrecen (2024). Debrecen Környezetvédelmi Programjának 50 intézkedése. Polgármesteri Hivatal, 8 o.
- Delmas, M.A., Burbano, V.C. (2011). "The drivers of greenwashing", *California Management Review*, Vol. 54 No. 1, pp. 64-87, doi: 10.1525/cm.2011.54.1.64.
- Dong-Hyeon Im, Ji-Bum Chung (2023). social construction of fire accidents in battery energy storage systems in Korea, *Journal of Energy Storage*, Volume 71, 2023, 108192. <https://www.sciencedirect.com/science/article/abs/pii/S2352152X2301589X>
- EcoPro (2022). EcoPro Global Hungary akkumulátorkatódanyag-gyártó üzem Összevont hatásvizsgálati eljárás és egységes környezethasználati engedély iránti kérelem dokumentációja, Mott MacDonald, 2022. augusztus 19.
- EcoPro (2024). EcoPro Global Hungary akkumulátorkatódanyag-gyártó üzem Egységes Környezethasználati Engedély részleges környezetvédelmi felülvizsgálata - új pontforrások létesítéséhez. Mott MacDonald, 2024. augusztus
- Éltető A (2023). Akkumulátorgyártás Magyarországon KRTK Világgazdasági Intézet Műhelytanulmány no. 147. <https://vgi.krtk.hu/publikacio/elteto-a-akkumulatorgyartasmagyarorszagon/> Éltető A (2024). Miért más? A magyar

- akkumulátorgyártás sajátos jellemzői – Jogi háttér, környezeti hatások. *Külgazdaság* 68 (7-8). 88 -120. <https://doi.org/10.47630/KULG.2024.68.7-8.88>
- Gerő, M., Fejős, A., Kerényi, S., & Szikra, D. (2023). From Exclusion to Co-Optation: Political Opportunity Structures and Civil Society Responses in De-democratising Hungary. *Politics and Governance* 11(1): 16–27. DOI: <https://doi.org/10.17645/pag.v11i1.5883>
- Győrffy, D. (2023). Az akkumulátorhulladék sorsa: szabályozás a technológia, *Külgazdaság*, 67(11–12), 3–27. <https://doi.org/10.47630/KULG.2023.67.11-12.3>
- Hu, X, Mousa, E, Ånnhagen,L., Musavi,Z., Alemrajabi,M., Hall,B., Ye,G (2022). Complex gas formation during combined mechanical and thermal treatments of spent lithium-ion-battery cells, *Journal of Hazardous Materials*, Volume 431, 128541, <https://doi.org/10.1016/j.jhazmat.2022.128541>.
- Kátai-Urbán, L. (2014). Súlyos ipari balesetek megelőzését és a felkészülést célzó jogintézmények egységes rendszerbe foglalása. *Hadmérnök*, 9. 4. 94–105.
- Kurpierz, J.R., Smith, K. (2020). “The greenwashing triangle: adapting tools from fraud to improve CSR reporting”, *Sustainability Accounting, Management and Policy Journal*, Vol. 11 No. 6, pp. 1075-1093.
- Láng, Gy (2024). Modern akkumulátorok és környezetvédelem. Előadás: Environtec, 1-3 október, Hungexpo, C/F3
- Li, Y – Shapiro, J (2020). *China Goes Green - Coercive Environmentalism for a Troubled Planet*. Polity Press, Cambridge
- Mikecz, D (2023). *Civil Movements in an Illiberal Regime. Political Activism in Hungary*. CEU Press, Budapest
- Nemes Cs – Pomázi I (2024). Mennyire kell aggódnunk az akkumulátor tűzesetek miatt? – Egyre több a ketyegő bomba. *Portfolio*, július 27. <https://www.portfolio.hu/gazdasag/20240727/mennyire-kell-aggodnunk-az-akkumulatortuzesetek-miatt-egyre-tobb-a-ketyego-bomba-700503>
- Nemes, Cs., Pomázi I., Varga J., Láng Gy. (2023). Tények és javaslatok a környezeti és társadalmi szempontból fenntartható hazai akkumulátor iparági értéklánc kialakításával kapcsolatban. Műhelytanulmány. Magyar Akkumulátor Szövetség.
- Pántya P (2023). A LI-ion akkumulátorok tűzoltásával kapcsolatos kutatási tapasztalatok, a tűzoltói beavatkozás lehetőségei. *Védelem Tudomány* 8 (2) 19 - 29 <https://ojs.mtak.hu/index.php/vedelemtudomany/article/view/13493>
- Ricz, J (2020). Developmental States in the Twenty-First Century: New Wine into Old Bottles? *Istanbul University Journal of Sociology*, vol 40, no. 2, p 649-676 DOI :[10.26650/SJ.2020.40.2.0056](https://doi.org/10.26650/SJ.2020.40.2.0056)
- SAMSUNG SDI (2123). Magyarország Zrt. gyárára vonatkozó hulladékgazdálkodási terv 2023-2027. október, 8. old.
- Sombatpoonsiri, J (2024). Civil society and autocratizationin: Croissant-Tomini (ed): *The Routledge Handbook of Autocratization*, Routledge, New York, p. 305-317.

- Szunomár, Á, Peragovics T, Mc Caleb A, Song, W (2023). Az állam által hajtott elektromobilitás: az állam szerepe a kínai elektromosautó-ipar fejlesztésében *Külgazdaság*, LXVII. évf., 2023. július–augusztus (66–94. o.)
- Tang Y, Yang R, Chen Y, Du M, Yang Y, Miao X (2020). Greenwashing of Local Government: The Human-Caused Risks in the Process of Environmental Information Disclosure in China. *Sustainability*, 12, 6329; doi:10.3390/su12166329 www.mdpi.com
- Varga J (2024). Vegyi anyagok a Li-ion akkumulátor gyártásban. Előadás: Environtec, 1-3 október, Hungexpo, C/F3
- Zambon, A. (2024). Battery recycling in Europe. Securing supply chain resilience? DNV, <https://www.dnv.com/energy-transition/battery-recycling-in-europe/>
- Zhang, T.; Qin, H.; Xu, W. (2022). Environmental Regulation, Greenwashing Behaviour, and Green Governance of High-Pollution Enterprises in China. *International Journal of Environmental Research and Public Health*, 19, 12539. <https://doi.org/10.3390/ijerph191912539>
- Ye, Q (2024). Soil Pollution Status, Sources and Control Methods in China. *Academic Journal of Science and Technology* Vol. 9, No.2, 155-161. <https://doi.org/10.54097/nxh0c341>