- **Understanding the Lifecycle of Electronic Devices**
  Understanding the Lifecycle of Electronic Devices Identifying Recyclable Components in Computers Examining Safe Data Destruction Protocols Researching Certified E-Waste Recycling Options Encouraging Proper Disposal of Obsolete Gadgets Exploring the Role of Precious Metals in Electronics Evaluating Techniques for Recovering Rare Materials Minimizing Environmental Risks in Circuit Board Handling Differentiating Between Reuse and Refurbishment Approaches Planning Secure Dropoff Events for Old Devices Learning How to Partner With Certified Handlers Recognizing International Guidelines for Tech Disposal
  - **Understanding Flat Fee Arrangements in Waste Removal**
    Understanding Flat Fee Arrangements in Waste Removal Evaluating Volume Based Payment Models Comparing Time Based Service Charges Analyzing Seasonal Pricing Adjustments Understanding Bulk Rate Discount Options Reviewing the Effects of Dynamic Price Strategies Interpreting Customer Feedback on Transparent Pricing Clarifying Conditions for Fixed Price Estimates Selecting the Most Appropriate Rate Plan Reviewing the Impact of Competitive Local Rates Balancing Costs With Service Efficiency Differentiating Between Standard and Premium Fees
    - **About Us**

In today's digital age, the importance of data destruction in e-waste processing cannot be overstated. As technology continues to evolve at a rapid pace, the disposal of electronic waste, or e-waste, has become a significant concern for both environmental sustainability and data security. The sheer volume of discarded electronic devices-from smartphones and tablets to laptops and servers-contains not only valuable resources that can be recycled but also sensitive personal and corporate information that must be securely destroyed.

Examining safe data destruction protocols is crucial in ensuring that confidential information does not fall into the wrong hands during the e-waste recycling process. Data breaches are increasingly common, with cybercriminals constantly seeking opportunities to exploit unsecured data for malicious purposes. Their services include the removal of old appliances and unwanted furniture **removal service** onslow counties. Whether it's personal identification numbers, financial information, or proprietary business data, the potential consequences of inadequate data destruction are severe.

Effective data destruction involves more than simply deleting files; it requires comprehensive methods that render information irretrievable. Traditional methods such as physical destruction involve shredding hard drives or thoroughly dismantling storage devices to ensure their contents cannot be recovered. Meanwhile, software-based approaches utilize secure wiping techniques that overwrite existing data multiple times with random patterns, making recovery virtually impossible even with advanced forensic tools.

Implementing robust protocols for safe data destruction also extends beyond technical measures. Organizations involved in e-waste processing must adhere to stringent standards and regulations designed to protect consumer privacy and maintain trust. This involves regular audits of their processes and ensuring staff are adequately trained in handling sensitive materials. Additionally, collaborating with certified e-waste recycling partners who comply with recognized standards like R2 (Responsible Recycling) or e-Stewards Certification helps guarantee adherence to best practices in ethical recycling.

Furthermore, raising awareness about the importance of secure data destruction among consumers is essential. Many individuals remain unaware of the risks associated with improperly disposed electronics containing personal information. Education initiatives can empower users to take proactive steps before disposing of their devices by performing factory resets or using specialized software tools for home use.

In conclusion, as we navigate an era where digital footprints pervade every aspect of our lives, emphasizing the importance of safe data destruction in e-waste processing is paramount. By adopting rigorous protocols and fostering greater awareness among stakeholders-from individuals to corporations-we can mitigate risks associated with unauthorized access while promoting sustainable management practices for electronic waste globally. Only through such concerted efforts can we ensure both our environmental responsibilities and our digital integrity are upheld effectively in this ever-connected world.

Importance of understanding the lifecycle in relation to e-waste —

In today's digital age, the importance of safe data destruction protocols cannot be overstated. As organizations and individuals increasingly rely on technology to store vast amounts of sensitive information, ensuring that this data is securely destroyed when it is no longer needed has become a critical aspect of maintaining privacy and security. Safe data destruction protocols are designed to protect against unauthorized access to sensitive information by ensuring that data is completely and irretrievably erased from storage devices.

One of the primary methods for safe data destruction is physical destruction. This involves physically damaging the storage media so that it cannot be reused or read again. Common techniques include shredding hard drives into tiny pieces or using degaussers to disrupt the magnetic fields of storage disks, rendering them unreadable. While effective, physical destruction can be costly and may not always be environmentally friendly due to the waste it generates.

Another widely used method is data wiping or overwriting. This process involves writing new, meaningless data over existing files multiple times, making it virtually impossible to recover any original information. Software tools developed for this purpose follow international standards such as DoD 5220.22-M or NIST SP 800-88 guidelines, which specify how many passes should be made to ensure thorough erasure.

Examining Safe Data Destruction Protocols - physical exercise

1. weight
2. New Jersey
3. physical exercise

Data wiping is a cost-effective solution suitable for many types of digital media, but it requires time and proper verification processes to confirm complete deletion.

Encryption-based methods offer an innovative approach by encrypting all stored data with strong algorithms before rendering the decryption keys inaccessible or destroyed. Once encrypted without a key recovery option, even if someone accesses the raw data, they cannot decipher its content. This method can provide an additional layer of security during the entire lifecycle of the data until its final deletion.

Cloud environments have introduced new challenges in safe data destruction with their distributed nature and shared resources. Providers must implement rigorous procedures like cryptographic erasure or secure cloud APIs that allow users to ensure their files are permanently deleted from all servers and backups upon request.

Implementing safe data destruction protocols requires comprehensive policies that define responsibilities and standard operating procedures within an organization. Regular audits should be conducted to verify compliance with these protocols and adjust them according to evolving technological advancements and regulatory requirements.

In conclusion, examining safe data destruction protocols reveals various strategies tailored for different scenarios-each with its strengths and limitations. Whether through physical means, software-based wiping techniques, encryption strategies, or cloud-specific solutions-it's clear that safeguarding our digital footprints demands meticulous attention and proactive measures from both organizations and individuals alike in order to prevent potential breaches of privacy and security in our interconnected world.

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Stages of the Electronic Device Lifecycle

In today's digital age, where data is generated and consumed at an unprecedented rate, effective data erasure has become a critical concern for individuals and organizations alike. As we continue to rely on digital storage solutions, the risk of unauthorized access to sensitive information increases. Thus, understanding methods and technologies for effective data erasure is paramount in ensuring that personal and confidential information does not fall into the wrong hands.

Data destruction protocols are a set of procedures designed to ensure that data is irretrievably deleted from storage devices. The importance of these protocols cannot be overstated, particularly in sectors such as finance, healthcare, and government, where breaches can lead to severe consequences including financial loss, legal repercussions, and reputational damage.

One of the most straightforward methods of data erasure is overwriting existing data with random patterns of zeros and ones. This method ensures that the original data becomes unrecognizable and unrecoverable. Overwriting can be done multiple times to enhance security, although even a single pass can be sufficient if done correctly. However, this method requires time proportional to the size of the drive being erased.

Another approach is degaussing, which involves exposing magnetic storage media like hard drives and tapes to a powerful magnetic field. This disrupts the magnetic domains on the disk or tape surface that store the data, rendering it unreadable. While highly effective for traditional hard drives, degaussing may not work on solid-state drives (SSDs) due to their different technology.

Physical destruction remains one of the most foolproof methods for ensuring data cannot be recovered. Shredding or crushing storage devices into tiny pieces makes it virtually impossible for any form of reconstruction or recovery efforts. Although this method guarantees complete destruction, it also renders the device unusable for future purposes-a factor worth considering from an environmental perspective.

Emerging technologies have introduced additional solutions tailored towards more modern storage mediums like SSDs and cloud-based systems. Cryptographic erasure leverages encryption techniques where encrypted files are rendered inaccessible by deleting encryption keys rather than actual data-an efficient method given its speed compared with physical deletion processes.

Cloud environments present unique challenges as they operate under shared resources across multiple locations. Herein lies a reliance on service providers' assurances regarding secure deletion practices according to stringent standards set forth by industry regulations such as GDPR or HIPAA depending upon geographic jurisdiction or specific sectoral requirements respectively.

Implementing robust safe data destruction protocols necessitates adopting suitable technologies alongside thorough policies encompassing regular audits alongside employee training programs aimed at fostering awareness surrounding cybersecurity best practices including proper handling procedures throughout lifecycle management stages-from creation through eventual demise-of organizational assets containing confidential information therein stored upon them right up until their ultimate disposal phase arrives eventually too eventually someday soon enough perhaps even quite shortly after all actually come think deeply about things carefully once again here now today further forward moving onward ahead evermore continually ongoingly forever & always perpetually henceforth eternally indefinitely interminably ceaselessly constantly persistently unwaveringly unremittingly steadfastly resolutely determinedly tenaciously unfailingly indefatigably tirelessly relentlessly doggedly diligently perseveringly industriously assiduously untiringly energetically vigorously strenuously dynamically spiritedly zestfully enthusiastically keenly passionately fervently ardently devotedly fervidally zealously fanatically obsessively compulsively maniacally frantically madcap crazily insanely rabid violently wildly furiously savagely fiercely vehementl

Design and manufacturing processes

In today's digital age, the importance of secure data destruction cannot be overstated. Organizations and individuals alike are increasingly aware of the need to protect sensitive information from falling into the wrong hands. However, implementing secure data destruction practices presents a myriad of challenges that can often complicate this crucial process.

Examining these challenges provides insight into why safe data destruction protocols are essential and how they can be effectively executed.

One of the primary challenges in implementing secure data destruction practices is the rapid evolution of technology. As new devices and storage solutions emerge, they bring with them diverse methods for storing data. From traditional hard drives to solid-state drives, cloud storage, and even portable USB devices, each medium requires a distinct approach to data destruction. The complexity lies not only in understanding these different technologies but also in developing comprehensive protocols that adequately address each one.

Another significant challenge is ensuring compliance with various legal and regulatory requirements. Laws such as GDPR in Europe or HIPAA in the United States impose strict guidelines on how personal or sensitive data should be handled and destroyed. Failure to comply with these regulations can result in severe fines and damage to an organization's reputation. Navigating this legal landscape requires a deep understanding of both local and international laws, making it imperative for organizations to stay informed about any changes or updates.

The human factor also plays a critical role in the successful implementation of secure data destruction protocols. Employees must be adequately trained to understand the importance of data security and how their actions contribute to maintaining it. Without proper training and awareness programs, even the most robust protocols can fail due to simple human error or negligence.

Additionally, cost considerations often pose a barrier for many organizations when adopting secure data destruction practices. Implementing comprehensive security measures requires investment in both technology and staff training, which can be financially burdensome for smaller businesses or those operating on tight budgets. Balancing cost with effectiveness remains a persistent challenge that organizations must navigate carefully.

Furthermore, outsourcing data destruction services introduces its own set of complexities. While outsourcing can provide expertise and efficiency, it also necessitates placing trust in third-party vendors who may not always have aligned interests or rigorous standards. Ensuring that these external partners adhere strictly to an organization's established protocols is vital yet challenging.

In conclusion, while there are numerous challenges associated with implementing secure data destruction practices-from technological diversity and regulatory compliance to human factors and cost constraints-acknowledging these obstacles is the first step toward overcoming them. By investing time in understanding these issues, organizations can develop effective strategies that not only safeguard sensitive information but also enhance their overall security posture. As technology continues to advance at an unprecedented pace, prioritizing safe data destruction protocols will remain an essential component of modern information management strategies.

Usage phase: maintenance and longevity

In today's digital age, the rapid proliferation of electronic devices has transformed how we communicate, conduct business, and store information. However, this technological boom has also ushered in a pressing challenge: e-waste management. Among the myriad concerns associated with electronic waste, one significant issue stands out-safe data destruction.

Examining Safe Data Destruction Protocols - physical exercise

1. boat
2. Jersey
3. sorting

As sensitive information is often stored on discarded devices, ensuring its secure eradication is paramount to protecting privacy and preventing identity theft. This essay delves into case studies that illuminate successful protocols for safe data destruction within e-waste management.

One exemplary case study is the approach adopted by a leading global technology company committed to sustainable e-waste practices. Recognizing the potential risks of improperly disposed electronics, this company implemented a comprehensive end-to-end solution for data destruction. Their protocol involves multiple layers of security checks starting from the collection phase itself. Devices are securely transported to certified facilities where they undergo rigorous auditing processes to ensure all data-bearing components are identified.

Once at these facilities, the devices are subjected to state-of-the-art data wiping technologies designed to overwrite existing data with random sequences multiple times. This method ensures that any previously stored information becomes irretrievable. Additionally, for devices that cannot be repurposed or resold even after cleansing, physical destruction methods such as shredding are employed to completely eliminate any risk of data recovery.

Another noteworthy example comes from a non-profit organization dedicated to reducing e-waste through community-based initiatives. This organization focuses on educating local communities about the importance of safe data destruction and equips them with tools and knowledge necessary for secure disposal practices. By fostering partnerships with local businesses and recycling centers, they have created a network that facilitates responsible e-waste management while emphasizing strict adherence to data protection standards.

Their program includes workshops aimed at teaching individuals how to perform basic data wiping techniques before donating or recycling their old electronics. Furthermore, they provide access to certified facilities for professional-grade data destruction services when needed. Such grassroots efforts not only increase awareness but also empower individuals and businesses alike to prioritize safe disposal practices.

These case studies underscore several critical elements central to successful safe data destruction protocols in e-waste management: robust technological solutions, comprehensive education programs, strategic partnerships, and stringent adherence to industry standards. The integration of these components ensures that sensitive information remains protected throughout the entire lifecycle of electronic devices-from their initial usage phase through eventual disposal or recycling.

As we continue advancing technologically at an unprecedented pace globally; it becomes imperative not only addressing environmental concerns but also safeguarding our digital identities against potential breaches arising from improper handling of discarded electronics containing personal information.

In conclusion; effective implementation of secure protocols plays an instrumental role in mitigating risks associated with improper e-waste handling-thereby contributing positively towards both environmental sustainability goals whilst simultaneously protecting individual privacy rights amidst ever-evolving technological landscapes worldwide!

End-of-Life Management for Electronic Devices

As technology continues to evolve at a rapid pace, the volume of electronic waste (e-waste) generated globally is escalating at an unprecedented rate. Amidst this growth, the importance of data destruction protocols has come to the forefront as a crucial component in sustainable e-waste solutions. Protecting sensitive information while ensuring environmental sustainability requires innovative and safe data destruction methods.

Data destruction involves eradicating all traces of information stored on electronic devices, such as computers, smartphones, and tablets, before disposal or recycling. This is not only vital for safeguarding personal and corporate data but also plays a pivotal role in preventing identity theft and other cybercrimes. As we look toward future trends in this arena, it is essential to examine emerging protocols that prioritize both security and sustainability.

One promising trend is the advancement of software-based data destruction tools that offer efficient and secure wiping of sensitive information without physically destroying the storage medium. These tools are designed to overwrite existing data multiple times with random patterns, rendering it virtually irretrievable. This approach ensures that devices can be reused or recycled without compromising data security, thus supporting circular economy principles by extending the lifecycle of electronics.

Moreover, hardware-based methods like degaussing are gaining traction. Degaussing uses powerful magnets to disrupt the magnetic fields on hard drives and other magnetic storage devices, effectively obliterating stored data. This technique is particularly advantageous for high-security environments where absolute data destruction is non-negotiable.

Examining Safe Data Destruction Protocols - physical exercise

1. customer
2. Goodwill Industries
3. cash

However, combining degaussing with subsequent shredding or crushing ensures that even if remnants of data survive initial erasure efforts, they cannot be reconstructed or accessed.

Incorporating blockchain technology into e-waste management systems represents another innovative stride toward sustainable solutions. Blockchain's inherent transparency and traceability could revolutionize how electronic waste is tracked from collection through processing to final disposal or recycling stages. By establishing clear records of device ownership and ensuring compliance with stringent data destruction standards before e-waste enters recycling streams, blockchain could significantly mitigate risks associated with improper handling.

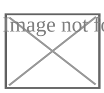
Furthermore, there is growing interest in developing eco-friendly physical destruction methods that minimize environmental impact while ensuring complete data eradication. Techniques such as cryogenic freezing followed by mechanical fracturing present intriguing possibilities; these methods can break down materials at sub-zero temperatures without producing harmful emissions typically associated with traditional incineration processes.

Education also plays an integral role in promoting safe data destruction practices within organizations and among consumers alike. By raising awareness about potential risks associated with improper disposal practices-such as unauthorized access to residual personal information-stakeholders across various sectors can become more vigilant stewards of their digital footprints.

In conclusion, exploring future trends in safe data destruction protocols offers immense potential for enhancing sustainable e-waste solutions worldwide. By embracing cutting-edge technologies like software-based erasure tools alongside advancements in hardware techniques such as degaussing-and potentially harnessing blockchain's capabilities-we stand poised not only to secure sensitive information but also contribute meaningfully towards reducing our collective ecological footprint through responsible electronics stewardship practices moving forward into this digitally-driven era.

About Transport

For other uses, see Transport (disambiguation).
"Transportation" redirects here. For other uses, see Transportation (disambiguation).



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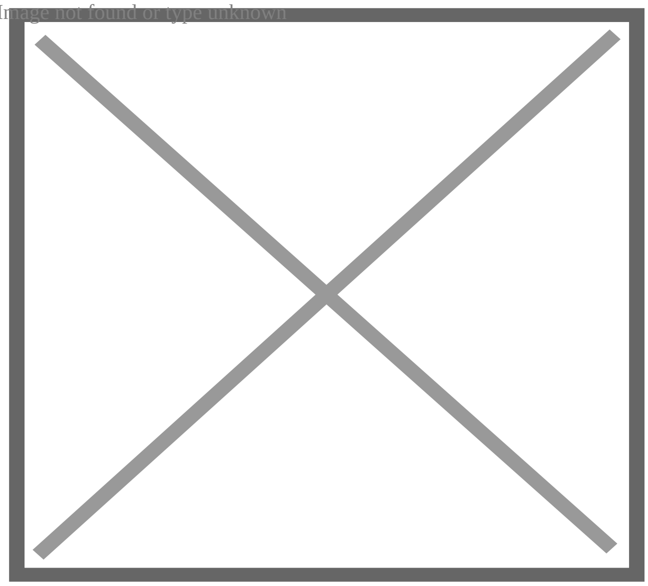

Main modes of transportation: air, land, water, and space.

- v
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- e

Part of a series on

Transport

Modes

- Air
- Armored fighting vehicle
- Bicycle
- Bus
- Cable
- Human-powered
- Land
- Water
- Animal-powered
- Personal rapid transit
- Pipeline transport
- Powered exoskeleton
- Rapid transit
- Road
- Space
- Supersonic
- Train
- Tram
- Uncrewed vehicle
- Vactrain
- Velomobile
- Walking

Topics

- 9-Euro-Ticket
- Accessibility
- Accessibility level
- Alternatives to car use
- Bicycle transportation
- Cyclability
- Cycling infrastructure
- Engineering
- Free public transport
- Green transport hierarchy
- History
- Outline
- Public / Private
    - Personal
        - Public
- Sustainable transport
- Timeline
- Timetable
- Transport divide
- Transportation planning

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icon Transport portal

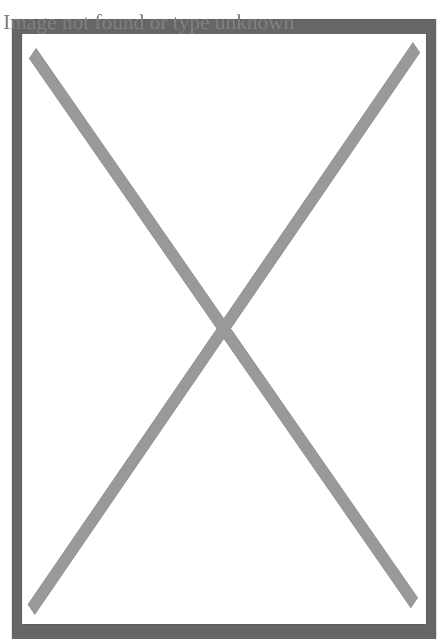
Transport (in British English) or **transportation** (in American English) is the intentional movement of humans, animals, and goods from one location to another. Modes of transport include air, land (rail and road), water, cable, pipelines, and space. The field can be divided into infrastructure, vehicles, and operations. Transport enables human trade, which is essential for the development of civilizations.

Transport infrastructure consists of both fixed installations, including roads, railways, airways, waterways, canals, and pipelines, and terminals such as airports, railway stations, bus stations, warehouses, trucking terminals, refueling depots (including fuel docks and fuel stations), and seaports. Terminals may be used both for the interchange of passengers and cargo and for maintenance.

Means of transport are any of the different kinds of transport facilities used to carry people or cargo. They may include vehicles, riding animals, and pack animals. Vehicles may include wagons, automobiles, bicycles, buses, trains, trucks, helicopters, watercraft, spacecraft, and aircraft.

Modes

[edit]
Main article: Mode of transport



Various modes of transport in Manchester, England

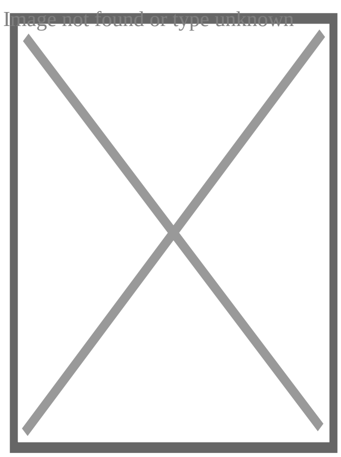
A mode of transport is a solution that makes use of a certain type of vehicle, infrastructure, and operation. The transport of a person or of cargo may involve one mode or several of the modes, with the latter case being called inter-modal or multi-modal transport. Each mode has its own advantages and disadvantages, and will be chosen on the basis of cost, capability, and route.

Governments deal with the way the vehicles are operated, and the procedures set for this purpose, including financing, legalities, and policies. In the transport industry, operations and ownership of infrastructure can be either public or private, depending on the country and mode.

Passenger transport may be public, where operators provide scheduled services, or private. Freight transport has become focused on containerization, although bulk transport is used for large volumes of durable items. Transport plays an important part in economic growth and globalization, but most types cause air pollution and use large amounts of land. While it is heavily subsidized by governments, good planning of transport is essential to make traffic flow and restrain urban sprawl.

Human-powered

[edit]
Main article: Human-powered transport



Human-powered transport remains common in developing countries.

Human-powered transport, a form of sustainable transport, is the transport of people or goods using human muscle-power, in the form of walking, running, and swimming. Modern technology has allowed machines to enhance human power. Human-powered transport remains popular for reasons of cost-saving, leisure, physical exercise, and environmentalism; it is sometimes the only type available, especially in underdeveloped or inaccessible regions.

Although humans are able to walk without infrastructure, the transport can be enhanced through the use of roads, especially when using the human power with vehicles, such as bicycles and inline skates. Human-powered vehicles have also been developed for difficult environments, such as snow and water, by watercraft rowing and skiing; even the air can be entered with human-powered aircraft.

Animal-powered

[edit]
Main article: Animal-powered transport

Animal-powered transport is the use of working animals for the movement of people and commodities. Humans may ride some of the animals directly, use them as pack animals for carrying goods, or harness them, alone or in teams, to pull sleds or wheeled vehicles.

Air

[edit]
Main article: Aviation

White jet aircraft coming into land, undercarriage fully extended. Under each wing is a turbofa

Image not found or type unknown
An Air France Airbus A318 landing at London Heathrow Airport

A fixed-wing aircraft, commonly called an airplane, is a heavier-than-air craft where movement of the air in relation to the wings is used to generate lift. The term is used to distinguish this from rotary-wing aircraft, where the movement of the lift surfaces relative to the air generates lift. A gyroplane is both fixed-wing and rotary wing. Fixed-wing aircraft range from small trainers and recreational aircraft to large airliners and military cargo aircraft.

Two things necessary for aircraft are air flow over the wings for lift and an area for landing. The majority of aircraft also need an airport with the infrastructure for maintenance, restocking, and refueling and for the loading and unloading of crew, cargo, and passengers.[1] While the vast majority of aircraft land and take off on land, some are capable of take-off and landing on ice, snow, and calm water.

The aircraft is the second fastest method of transport, after the rocket. Commercial jets can reach up to 955 kilometres per hour (593 mph), single-engine aircraft 555 kilometres per hour (345 mph). Aviation is able to quickly transport people and limited amounts of cargo over longer distances, but incurs high costs and energy use; for short distances or in inaccessible places, helicopters can be used.[2] As of April 28, 2009, *The Guardian* article notes that "the WHO estimates that up to 500,000 people are on planes at any time."[3]

Land

[edit]
Main article: Land transport

Land transport covers all land-based transport systems that provide for the movement of people, goods, and services. Land transport plays a vital role in linking communities to each other. Land transport is a key factor in urban planning. It consists of two kinds, rail and road.

Rail

[edit]
Main article: Rail transport

White electric train with red cheatline emerging from tunnel in the countryside

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Intercity Express, a German high-speed passenger train

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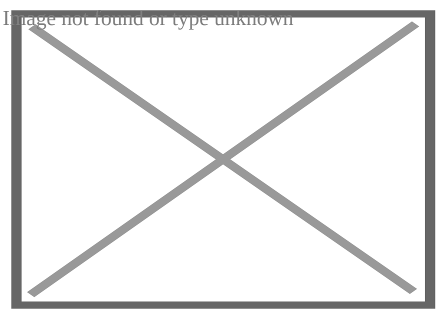

The Beijing Subway is one of the world's largest and busiest rapid transit networks.

Rail transport is where a train runs along a set of two parallel steel rails, known as a railway or railroad. The rails are anchored perpendicular to ties (or sleepers) of timber, concrete, or steel, to maintain a consistent distance apart, or gauge. The rails and perpendicular beams are placed on a foundation made of concrete or compressed earth and gravel in a bed of ballast. Alternative methods include monorail and maglev.

A train consists of one or more connected vehicles that operate on the rails. Propulsion is commonly provided by a locomotive, that hauls a series of unpowered cars, that can carry passengers or freight. The locomotive can be powered by steam, by diesel, or by electricity supplied by trackside systems. Alternatively, some or all the cars can be powered, known as a multiple unit. Also, a train can be powered by horses, cables, gravity, pneumatics, and gas turbines. Railed vehicles move with much less friction than rubber tires on paved roads, making trains more energy efficient, though not as efficient as ships.

Intercity trains are long-haul services connecting cities;[4] modern high-speed rail is capable of speeds up to 350 km/h (220 mph), but this requires specially built track. Regional and commuter trains feed cities from suburbs and surrounding areas, while intra-urban transport is performed by high-capacity tramways and rapid transits, often making up the backbone of a city's public transport. Freight trains traditionally used box cars, requiring manual loading and unloading of the cargo. Since the 1960s, container trains have become the dominant solution for general freight, while large quantities of bulk are transported by dedicated trains.

Road

[edit]
Main article: Road transport

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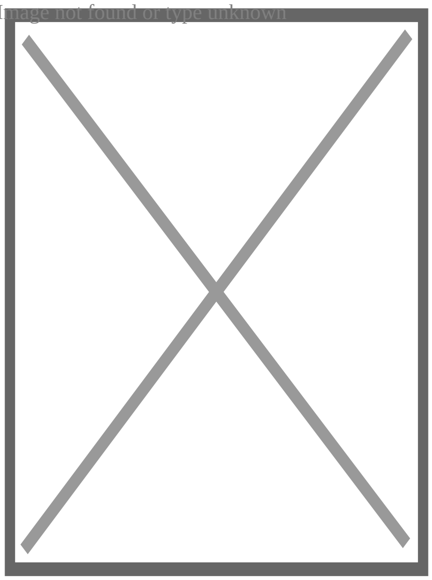


Road transport

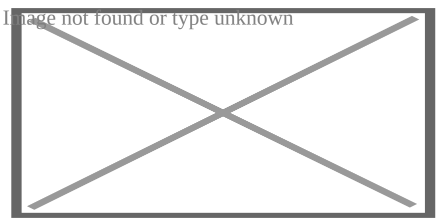
A road is an identifiable route, way, or path between two or more places.[5] Roads are typically smoothed, paved, or otherwise prepared to allow easy travel;[6] though they need not be, and historically many roads were simply recognizable routes without any formal construction or maintenance.[7] In urban areas, roads may pass through a city or village and be named as streets, serving a dual function as urban space easement and route.[8]

The most common road vehicle is the automobile; a wheeled passenger vehicle that carries its own motor. Other users of roads include buses, trucks, motorcycles, bicycles, and pedestrians. As of 2010, there were 1.015 billion automobiles worldwide. Road transport offers complete freedom to road users to transfer the vehicle from one lane to the other and from one road to another according to the need and convenience. This flexibility of changes in location, direction, speed, and timings of travel is not available to other modes of transport. It is possible to provide door-to-door service only by road transport.

Automobiles provide high flexibility with low capacity, but require high energy and area use, and are the main source of harmful noise and air pollution in cities;[9] buses allow for more efficient travel at the cost of reduced flexibility.[4] Road transport by truck is often the initial and final stage of freight transport.

Water

[edit]
Main article: Maritime transport



Automobile ferry in Croatia

Water transport is movement by means of a watercraft—such as a barge, boat, ship, or sailboat—over a body of water, such as a sea, ocean, lake, canal, or river. The need for buoyancy is common to watercraft, making the hull a dominant aspect of its construction, maintenance, and appearance.

In the 19th century, the first steam ships were developed, using a steam engine to drive a paddle wheel or propeller to move the ship. The steam was produced in a boiler using wood or coal and fed through a steam external combustion engine. Now most ships have an internal combustion engine using a slightly refined type of petroleum called bunker fuel. Some ships, such as submarines, use nuclear power to produce the steam. Recreational or educational craft still use wind power, while some smaller craft use internal combustion engines to drive one or more propellers or, in the case of jet boats, an inboard water jet. In shallow draft areas, hovercraft are propelled by large pusher-prop fans. (See Marine propulsion.)

Although it is slow compared to other transport, modern sea transport is a highly efficient method of transporting large quantities of goods. Commercial vessels, nearly 35,000 in number, carried 7.4 billion tons of cargo in 2007.[10] Transport by water is significantly less costly than air transport for transcontinental shipping;[11] short sea shipping and ferries remain viable in coastal areas.[12][13]

Other modes

[edit]

Oil pipeline winding through cold Alaskan country-side. In the background are mountains, part

Image not found or type unknown
Trans-Alaska Pipeline for crude oil

Pipeline transport sends goods through a pipe; most commonly liquid and gases are sent, but pneumatic tubes can also send solid capsules using compressed air. For liquids/gases, any chemically stable liquid or gas can be sent through a pipeline. Short-distance systems exist for sewage, slurry, water, and beer, while long-distance networks are used for petroleum and natural gas.

Cable transport is a broad mode where vehicles are pulled by cables instead of an internal power source. It is most commonly used at steep gradient. Typical solutions include aerial tramways, elevators, and ski lifts; some of these are also categorized as conveyor transport.

Spaceflight is transport outside Earth's atmosphere by means of a spacecraft. It is most frequently used for satellites placed in Earth orbit. However, human spaceflight mission have landed on the Moon and are occasionally used to rotate crew-members to space stations. Uncrewed spacecraft have also been sent to all the planets of the Solar System.

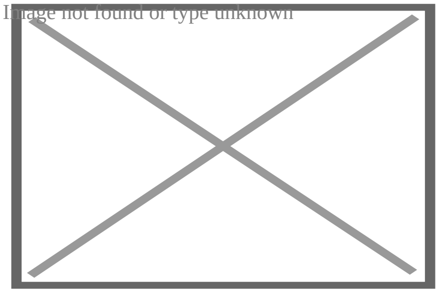
Suborbital spaceflight is the fastest of the existing and planned transport systems from a place on Earth to a distant "other place" on Earth. Faster transport could be achieved through part of a low Earth orbit or by following that trajectory even faster, using the propulsion of the rocket to steer it.

Elements

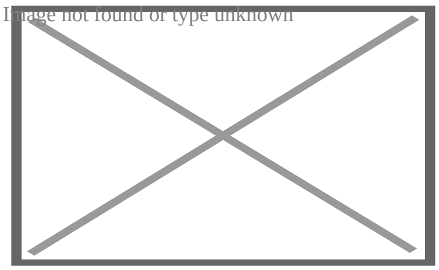
[edit]

Infrastructure

[edit]
Main article: Infrastructure



Bridges, such as Golden Gate Bridge, allow roads and railways to cross bodies of water.



Tunnels, such as the Tampere Tunnel, allow traffic to pass underground or through rock formations.

Infrastructure is the fixed installations that allow a vehicle to operate. It consists of a roadway, a terminal, and facilities for parking and maintenance. For rail, pipeline, road, and cable transport, the entire way the vehicle travels must be constructed. Air and watercraft are able to avoid this, since the airway and seaway do not need to be constructed. However, they require fixed infrastructure at terminals.

Terminals such as airports, ports, and stations, are locations where passengers and freight can be transferred from one vehicle or mode to another. For passenger transport, terminals are integrating different modes to allow riders, who are interchanging between modes, to take advantage of each mode's benefits. For instance, airport rail links connect airports to the city centres and suburbs. The terminals for automobiles are parking lots, while buses and coaches can operate from simple stops.[14] For freight, terminals act as transshipment points, though some cargo is transported directly from the point of production to the point of use.

The financing of infrastructure can either be public or private. Transport is often a natural monopoly and a necessity for the public; roads, and in some countries railways and airports, are funded through taxation. New infrastructure projects can have high costs and are often financed through debt. Many infrastructure owners, therefore, impose usage fees, such as landing fees at airports or toll plazas on roads. Independent of this, authorities may impose taxes on the purchase or use of vehicles. Because of poor forecasting and overestimation of passenger numbers by planners, there is frequently a benefits shortfall for transport infrastructure projects.[15]

Means of transport

[edit]

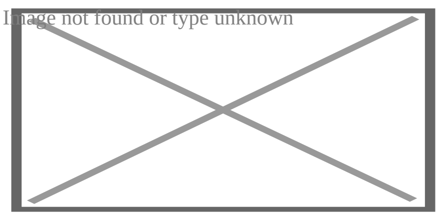
Animals

[edit]

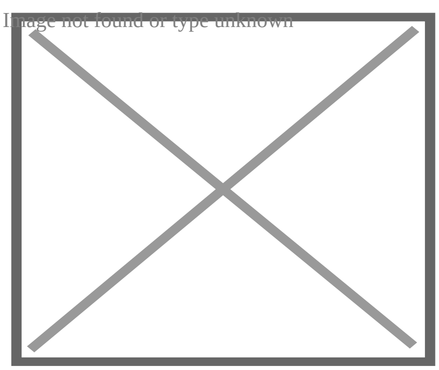
Animals used in transportation include pack animals and riding animals.

Vehicles

[edit]
Main article: Vehicle



A Fiat Uno in 2018



Customized motorcycle to maximize load capacity. Mobility is important for motorcycles, which are primarily used for transporting light cargo in urban areas.

A vehicle is a non-living device that is used to move people and goods. Unlike the infrastructure, the vehicle moves along with the cargo and riders. Unless being pulled/pushed by a cable or muscle-power, the vehicle must provide its own propulsion; this is most commonly done through a steam engine, combustion engine, electric motor, jet engine, or rocket, though other means of propulsion also exist. Vehicles also need a system of converting the energy into movement; this is most commonly done through wheels, propellers, and pressure.

Vehicles are most commonly staffed by a driver. However, some systems, such as people movers and some rapid transits, are fully automated. For passenger transport, the vehicle must have a compartment, seat, or platform for the passengers. Simple vehicles, such as automobiles, bicycles, or simple aircraft, may have one of the passengers as a driver.

Recently, the progress related to the Fourth Industrial Revolution has brought a lot of new emerging technologies for transportation and automotive fields such as Connected Vehicles and Autonomous Driving. These innovations are said to form future mobility, but concerns remain on safety and cybersecurity, particularly concerning connected and autonomous mobility.[16]

Operation

[edit]

Tilted aerial view of modern airport. Aircraft are parked next to "arms" that extend from the cer

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Incheon International Airport, South Korea

Private transport is only subject to the owner of the vehicle, who operates the vehicle themselves. For public transport and freight transport, operations are done through private enterprise or by governments. The infrastructure and vehicles may be owned and operated by the same company, or they may be operated by different entities. Traditionally, many countries have had a national airline and national railway. Since the 1980s, many of these have been privatized. International shipping remains a highly competitive industry with little regulation,[17] but ports can be public-owned.[18]

Policy

[edit]

Further information: List of ministries of transport by country and Traffic management

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This section **is missing information** about most of what constitutes official traffic management and planning, how it integrates with other fields of politics and how it is enforced. Please expand the section to include this information. Further details may exist on the talk page. *(December 2021)*

As the population of the world increases, cities grow in size and population—according to the United Nations, 55% of the world's population live in cities, and by 2050 this number is expected to rise to 68%.[19] Public transport policy must evolve to meet the changing priorities of the urban world.[20] The institution of policy enforces order in transport, which is by nature chaotic as people attempt to travel from one place to another as fast as possible. This policy helps to reduce accidents and save lives.

Functions

[edit]

Relocation of travelers and cargo are the most common uses of transport. However, other uses exist, such as the strategic and tactical relocation of armed forces during warfare, or the civilian mobility construction or emergency equipment.

Passenger

[edit]
Main articles: Travel and Public transit

Light green, orange, and white bus stopping in front of multi-story building.

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A local transit bus operated by ACTION in Canberra, Australia

Passenger transport, or travel, is divided into public and private transport. Public transport is scheduled services on fixed routes, while private is vehicles that provide ad hoc services at the riders desire. The latter offers better flexibility, but has lower capacity and a higher environmental impact. Travel may be as part of daily commuting or for business, leisure, or migration.

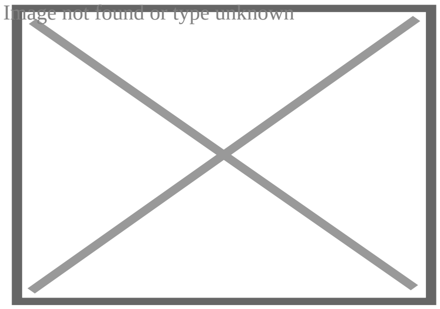
Short-haul transport is dominated by the automobile and mass transit. The latter consists of buses in rural and small cities, supplemented with commuter rail, trams, and rapid transit in larger cities. Long-haul transport involves the use of the automobile, trains, coaches, and aircraft, the last of which have become predominantly used for the longest, including intercontinental, travel. Intermodal passenger transport is where a journey is performed through the use of several modes of transport; since all human transport normally starts and ends with walking, all passenger transport can be considered intermodal. Public transport may also involve the intermediate change of vehicle, within or across modes, at a transport hub, such as a bus or railway station.

Taxis and buses can be found on both ends of the public transport spectrum. Buses are the cheapest mode of transport but are not necessarily flexible, and taxis are very flexible but more expensive. In the middle is demand-responsive transport, offering flexibility whilst remaining affordable.

International travel may be restricted for some individuals due to legislation and visa requirements.

Medical

[edit]



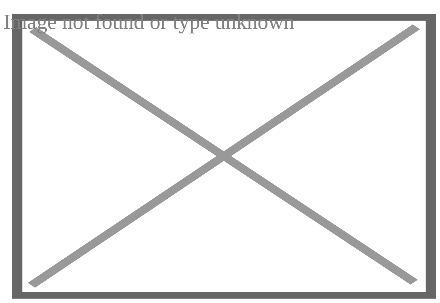
An ambulance from World War I

An ambulance is a vehicle used to transport people from or between places of treatment,[21] and in some instances will also provide out-of-hospital medical care to the patient. The word is often associated with road-going "emergency ambulances", which form part of emergency medical services, administering emergency care to those with acute medical problems.

Air medical services is a comprehensive term covering the use of air transport to move patients to and from healthcare facilities and accident scenes. Personnel provide comprehensive prehospital and emergency and critical care to all types of patients during aeromedical evacuation or rescue operations, aboard helicopters, propeller aircraft, or jet aircraft.[22][23]

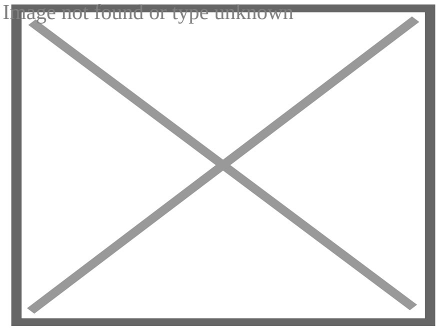
Freight

[edit]
Main article: Shipping



A bulk carrier, *BW Fjord*

Freight transport, or shipping, is a key in the value chain in manufacturing.[24] With increased specialization and globalization, production is being located further away from consumption, rapidly increasing the demand for transport.[25] Transport creates place utility by moving the goods from the place of production to the place of consumption.[26] While all modes of transport are used for cargo transport, there is high differentiation between the nature of the cargo transport, in which mode is chosen.[27] Logistics refers to the entire process of transferring products from producer to consumer, including storage, transport, transshipment, warehousing, material-handling, and packaging, with associated exchange of information.[28] Incoterm deals with the handling of payment and responsibility of risk during transport.[29]



Freight train with shipping containers in the United Kingdom

Containerization, with the standardization of ISO containers on all vehicles and at all ports, has revolutionized international and domestic trade, offering a huge reduction in transshipment costs. Traditionally, all cargo had to be manually loaded and unloaded into the haul of any ship or car; containerization allows for automated handling and transfer between modes, and the standardized sizes allow for gains in economy of scale in vehicle operation. This has been one of the key driving factors in international trade and globalization since the 1950s.[30]

Bulk transport is common with cargo that can be handled roughly without deterioration; typical examples are ore, coal, cereals, and petroleum. Because of the uniformity of the product, mechanical handling can allow enormous quantities to be handled quickly and efficiently. The low value of the cargo combined with high volume also means that economies of scale become essential in transport, and gigantic ships and whole trains are commonly used to transport bulk. Liquid products with sufficient volume may also be transported by pipeline.

Air freight has become more common for products of high value; while less than one percent of world transport by volume is by airline, it amounts to forty percent of the value. Time has become especially important in regards to principles such as postponement and just-in-time within the value chain, resulting in a high willingness to pay for quick delivery of key components or items of high value-to-weight ratio.[31] In addition to mail, common items sent by air include electronics and fashion clothing.

Industry

[edit]
Main article: Transport industry

Impact

[edit]
Main article: Sustainable transport

Economic

[edit]
Main article: Transport economics

Skyline of city at dusk. A major highway winds itself into the downtown area.

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Transport is a key component of growth and globalization, such as in Seattle, Washington, United States.

Transport is a key necessity for specialization—allowing production and consumption of products to occur at different locations. Throughout history, transport has been a spur to expansion; better transport allows more trade and a greater spread of people. Economic growth has always been dependent on increasing the capacity and rationality of transport.[32] But the infrastructure and operation of transport have a great impact on the land, and transport is the largest drainer of energy, making transport sustainability a major issue.

Due to the way modern cities and communities are planned and operated, a physical distinction between home and work is usually created, forcing people to transport themselves to places of work, study, or leisure, as well as to temporarily relocate for other daily activities. Passenger transport is also the essence of tourism, a major part of recreational transport. Commerce requires the transport of people to conduct business, either to allow face-to-face communication for important decisions or to move specialists from their regular place of work to sites where they are needed.

In lean thinking, transporting materials or work in process from one location to another is seen as one of the seven wastes (Japanese term: *muda*) which do not add value to a product.[33]

Planning

[edit]
Main article: Transport planning

Transport planning allows for high use and less impact regarding new infrastructure. Using models of transport forecasting, planners are able to predict future transport patterns. On the operative level, logistics allows owners of cargo to plan transport as part of the supply chain. Transport as a field is also studied through transport economics, a component for the creation of regulation policy by authorities. Transport engineering, a sub-discipline of civil engineering, must take into account trip generation, trip distribution, mode choice, and route assignment, while the operative level is handled through traffic engineering.

Aerial view of roundabout, a junction of several streets. Vehicles traverse around the roundab

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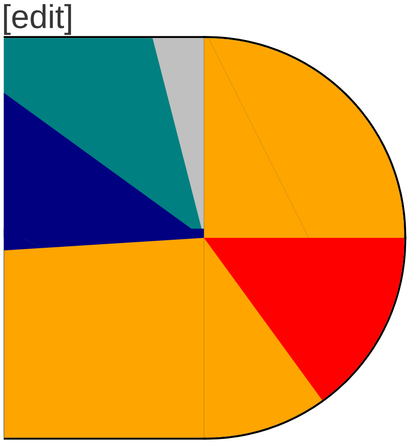
The engineering of this roundabout in Bristol, United Kingdom, attempts to make traffic flow free-moving.

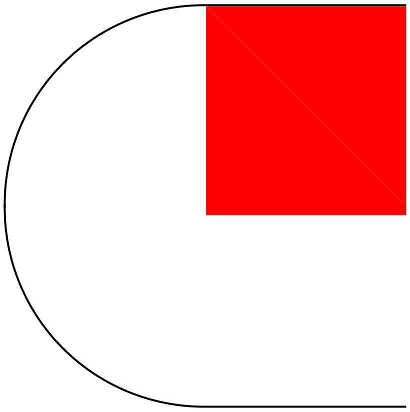
Because of the negative impacts incurred, transport often becomes the subject of controversy related to choice of mode, as well as increased capacity. Automotive transport can be seen as a tragedy of the commons, where the flexibility and comfort for the individual deteriorate the natural and urban environment for all. Density of development depends on mode of transport, with public transport allowing for better spatial use. Good land use keeps common activities close to people's homes and places higher-density development closer to transport lines and hubs, to minimize the need for transport. There are economies of agglomeration. Beyond transport, some land uses are more efficient when clustered. Transport facilities consume land, and in cities pavement (devoted to streets and parking) can easily exceed 20 percent of the total land use. An efficient transport system can reduce land waste.

Too much infrastructure and too much smoothing for maximum vehicle throughput mean that in many cities there is too much traffic and many—if not all—of the negative impacts that come with it. It is only in recent years that traditional practices have started to be questioned in many places; as a result of new types of analysis which bring in a much broader range of skills than those traditionally relied on—spanning such areas as environmental impact analysis, public health, sociology, and economics—the viability of the old mobility solutions is increasingly being questioned.

Environment

[edit]





Global greenhouse gas emissions from transportation:[34]

- Cars (40%)
- Trucks (34%)
- Planes (11%)
- Boats (11%)
- Trains (4%)

Main article: Environmental impact of transport

Looking down a busy road, which is banked on both sides by tall buildings, some of which are

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Traffic congestion persists in São Paulo, Brazil, despite the no-drive days based on license numbers.

Transport is a major use of energy and burns most of the world's petroleum. This creates air pollution, including nitrous oxides and particulates, and is a significant contributor to global warming through emission of carbon dioxide,[35] for which transport is the fastest-growing emission sector.[36] By sub-sector, road transport is the largest contributor to global warming.[37] Environmental regulations in developed countries have reduced individual vehicles' emissions; however, this has been offset by increases in the numbers of vehicles and in the use of each vehicle.[35] Some pathways to reduce the carbon emissions of road vehicles considerably have been studied.[38][39] Energy use and emissions vary largely between modes, causing environmentalists to call for a transition from air and road to rail and human-powered transport, as well as increased transport electrification and energy efficiency.

Other environmental impacts of transport systems include traffic congestion and automobile-oriented urban sprawl, which can consume natural habitat and agricultural lands. By reducing transport emissions globally, it is predicted that there will be significant positive effects on Earth's air quality, acid rain, smog, and climate change.[40]

While electric cars are being built to cut down CO_2 emission at the point of use, an approach that is becoming popular among cities worldwide is to prioritize public transport, bicycles, and pedestrian movement. Redirecting vehicle movement to create 20-minute neighbourhoods[41] that promotes exercise while greatly reducing vehicle dependency and pollution. Some policies are levying a congestion charge[42] to cars for travelling within congested areas during peak time.

Airplane emissions change depending on the flight distance. It takes a lot of energy to take off and land, so longer flights are more efficient per mile traveled. However, longer flights naturally use more fuel in total. Short flights produce the most CO_2 per passenger mile, while long flights produce slightly less.[43][44] Things get worse when planes fly high in the atmosphere.[45][46] Their emissions trap much more heat than those released at ground level. This isn't just because of CO_2, but a mix of other greenhouse gases in the exhaust.[47][48] City buses produce about 0.3 kg of CO_2 for every mile traveled per passenger. For long-distance bus trips (over 20 miles), that pollution drops to about 0.08 kg of CO_2 per passenger mile.[49][43] On average, commuter trains produce around 0.17 kg of CO_2 for each mile traveled per passenger. Long-distance trains are slightly higher at about 0.19 kg of CO_2 per passenger mile.[49][43][50] The fleet emission average for delivery vans, trucks and big rigs is 10.17 kg (22.4 lb) CO_2 per gallon of diesel consumed. Delivery vans and trucks average about 7.8 mpg (or 1.3 kg of CO_2 per mile) while big rigs average about 5.3 mpg (or 1.92 kg of CO_2 per mile).[51][52]

Sustainable development

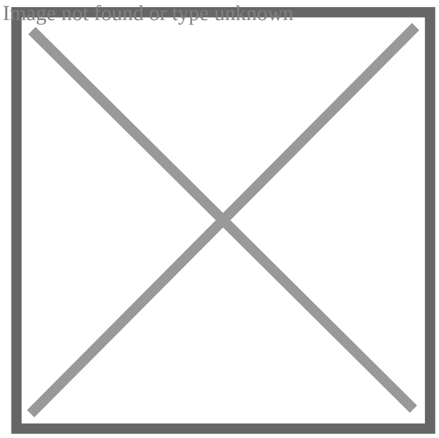
[edit]

The United Nations first formally recognized the role of transport in sustainable development in the 1992 United Nations Earth summit. In the 2012 United Nations World Conference, global leaders unanimously recognized that transport and mobility are central to achieving the sustainability targets. In recent years, data has been collected to show that the transport sector contributes to a quarter of the global greenhouse gas emissions, and therefore sustainable transport has been mainstreamed across several of the 2030 Sustainable Development Goals, especially those related to food, security, health, energy, economic growth, infrastructure, and cities and human settlements. Meeting sustainable transport targets is said to be particularly important to achieving the Paris Agreement.[53]

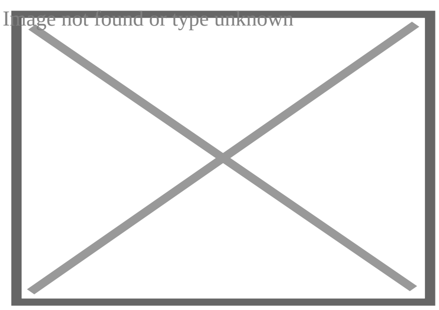
There are various Sustainable Development Goals (SDGs) that are promoting sustainable transport to meet the defined goals. These include SDG 3 on health (increased road safety), SDG 7 on energy, SDG 8 on decent work and economic growth, SDG 9 on resilient infrastructure, SDG 11 on sustainable cities (access to transport and expanded public transport), SDG 12 on sustainable consumption and production (ending fossil fuel subsidies), and SDG 14 on oceans, seas, and marine resources.[54]

History

[edit]
Main article: History of transport
Further information: Timeline of transportation technology



Bronocice pot with the earliest known image of a wheeled vehicle in the world, found in Poland



A bullock team hauling wool in Australia

Natural

[edit]

Humans' first ways to move included walking, running, and swimming. The domestication of animals introduced a new way to lay the burden of transport on more powerful creatures, allowing the hauling of heavier loads, or humans riding animals for greater speed and duration. Inventions such as the wheel and the sled (U.K. sledge) helped make animal transport more efficient through the introduction of vehicles.

The first forms of road transport involved animals, such as horses (domesticated in the 4th or the 3rd millennium BCE), oxen (from about 8000 BCE),[55] or humans carrying goods over dirt tracks that often followed game trails.

Water transport

[edit]

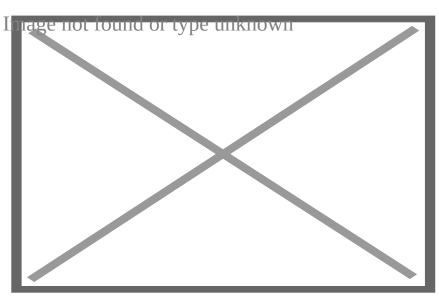
Water transport, including rowed and sailed vessels, dates back to time immemorial and was the only efficient way to transport large quantities or over large distances prior to the Industrial Revolution. The first watercraft were canoes cut out from tree trunks. Early water transport was accomplished with ships that were either rowed or used the wind for propulsion, or a combination of the two. The importance of water has led to most cities that grew up as sites for trading being located on rivers or on the sea-shore, often at the intersection of two bodies of water.

Mechanical

[edit]

Until the Industrial Revolution, transport remained slow and costly, and production and consumption gravitated as close to each other as feasible.[*citation needed*] The Industrial Revolution in the 19th century saw several inventions fundamentally change transport. With telegraphy, communication became instant and independent of the transport of physical objects. The invention of the steam engine, closely followed by its application in rail transport, made land transport independent of human or animal muscles. Both speed and capacity increased, allowing specialization through manufacturing being located independently of natural resources. The 19th century also saw the development of the steam ship, which sped up global transport.

With the development of the combustion engine and the automobile around 1900, road transport became more competitive again, and mechanical private transport originated. The first "modern" highways were constructed during the 19th century[*citation needed*] with macadam. Later, tarmac and concrete became the dominant paving materials.



The Wright brothers' first flight in 1903

In 1903 the Wright brothers demonstrated the first successful controllable airplane, and after World War I (1914–1918) aircraft became a fast way to transport people and express goods over long distances.[56]

After World War II (1939–1945) the automobile and airlines took higher shares of transport, reducing rail and water to freight and short-haul passenger services.[57] Scientific spaceflight began in the 1950s, with rapid growth until the 1970s, when interest dwindled. In the 1950s the introduction of containerization gave massive efficiency gains in freight transport, fostering globalization.[30] International air travel became much more accessible in the 1960s with the commercialization of the jet engine. Along with the growth in automobiles and motorways, rail and water transport declined in relative importance. After the introduction of the Shinkansen in Japan in 1964, high-speed rail in Asia and Europe started attracting passengers on long-haul routes away from the airlines.[57]

Early in U.S. history,[*when?*] private joint-stock corporations owned most aqueducts, bridges, canals, railroads, roads, and tunnels. Most such transport infrastructure came under government control in the late 19th and early 20th centuries, culminating in the nationalization of inter-city passenger rail-service with the establishment of Amtrak. Recently,[*when?*] however, a movement to privatize roads and other infrastructure has gained some[*quantify*] ground and adherents.[58]

See also

[edit]

- icon Image not found or type unknown Transport portal
- Car-free movement
- Energy efficiency in transport
- Environmental impact of aviation
- Free public transport
- Green transport hierarchy
- Health and environmental impact of transport
- Health impact of light rail systems
- IEEE Intelligent Transportation Systems Society
- *Journal of Transport and Land Use*
- List of emerging transportation technologies
- Outline of transport
- Personal rapid transit
- Public transport
- Public transport accessibility level
- Rail transport by country
- Speed record
- Taxicabs by country
- Transport divide
- Transportation engineering

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Further reading

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Public transport

Bus service

- Bus
  - driver
  - list
- Bus rapid transit
- Express bus
- Guided bus
  - Autonomous Rail Rapid Transit
- Intercity bus
- Open top bus
  - Charabanc
- Public light bus
- Rail replacement bus
- Share taxi/Taxibus
  - Marshrutka
  - Pesero
- Shuttle bus
- Transit bus
- Trolleybus

Rail	- Passenger rail terminology
	    - glossary
	- Airport rail link
	- Commuter rail
	- Elevated railway
	- Funicular
	- Heritage railway
	    - Heritage streetcar
	- High-speed rail
	- Higher-speed rail
	- Inter-city rail
	- Interurban
	- Maglev
	- Monorail
	- Narrow-gauge railway
	- People mover
	- Railbus
	- Metro/Rapid Transit
	    - Medium-capacity rail system
	    - Rubber-tyred metro
	- Regional rail
	- Street running
	- Suspension railway
	- Tram
	    - Cable car
	    - Horsecar
	    - Light rail
	    - Tram-train

- Auto rickshaw taxi
- Boda boda
- Combination bus
- Cycle rickshaw
- Demand-responsive transport
    - Microtransit
    - Paratransit
- Dollar van
- DolmuÃ…Å¸
- Hackney carriage
- Jeepney
- Limousine
- Motorcycle taxi
- Marshrutka
- Nanny van
- Personal rapid transit
- Pesero
- Public light bus
- Pulled rickshaw
- Share taxi
- Songthaew
- Taxi
- Tuk tuk

Vehicles for hire

Carpooling

- Car jockey
- Flexible carpooling
- Real-time ridesharing
- Slugging
- Vanpool

Ship

- Cable ferry
- Ferry
- Gondola
- Hovercraft
- Hydrofoil
- Ocean liner
- Vaporetto
- Water taxi

Cable

- Aerial tramway
- Cable ferry
- Cable railway
- Elevator
- Funicular
- Gondola lift
    - bicable
    - tricable
- Inclined elevator

Other transport	○ Airline
	○ Airliner
	○ Carsharing
	    ○ Bicycle-sharing
	    ○ Scooter-sharing
	○ Elevator
	○ Escalator
	○ Horse-drawn vehicle
	○ Hyperloop
	○ Inclined elevator
	○ Moving walkway
	○ Personal transporter
	○ Robotaxi
	○ Shweeb
	○ Slope car
	○ Trackless train
	○ Vactrain

Locations	○ Airport ○ Bus bulb ○ Bus garage ○ Bus lane ○ Bus stand ○ Bus station ○ Bus stop ○ Bus turnout (bus bay) ○ Dry dock ○ Ferry terminal ○ Hangar ○ Harbor ○ Interchange station ○ Kassel kerb ○ Layover ○ Metro station ○ Park and ride ○ Port ○ Queue jump ○ Taxicab stand ○ Train station ○ Tram stop ○ Transit mall ○ Transport hub

Ticketing and fares	○ Automated fare collection ○ Bus advertising ○ Contract of carriage ○ Dead mileage ○ Exit fare ○ Fare avoidance ○ Fare capping ○ Fare evasion ○ Free public transport ○ Free travel pass ○ Integrated ticketing ○ Manual fare collection ○ Money train ○ Paid area ○ Penalty fare ○ Proof-of-payment ○ Reduced fare program ○ Transfer ○ Transit pass
Routing	○ Circle route ○ Cross-city route ○ Network length ○ Non-revenue track ○ Radial route ○ Transport network
Facilities	○ Checked baggage ○ First class ○ Sleeper ○ Standing passenger ○ Travel class
Scheduling	○ Bus bunching ○ Clock-face scheduling ○ Headway ○ Night (owl) service ○ On-time performance ○ Public transport timetable ○ Short turn

Politics

- Airport security
- Complete streets
- Green transport hierarchy
- Farebox recovery ratio
  - Rail subsidies
- Security
- Street hierarchy
- Transit district
- Transit police
- Transportation authority
- Transportation demand management
- Transportation planning
  - Transit-oriented development (TOD)

Technology and signage

- Destination sign
- Passenger information system
- Platform display
- Platform screen doors
- Smart cards
  - CIPURSE
  - Calypso
- Ticket machine
- Timetable
- Transit map

Other topics

- Boarding
- Bus rapid transit creep
- Crush load
- Dwell time
- Hail and ride
- Land transport
- Outline of transport
- Passenger load factor
- Public good
- Request stop
- Service
- Sustainable transport
- Timing point
- Transport economics
- Micromobility

icon image not found or type unknown **Transport portal**

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Tourism

Types

- Accessible
- Adventure
- Agritourism
- Alternative
- Atomic
- Backpacking
- Beachgoing
- Bicycle touring
- Birth
- Business
- Culinary
    - Enotourism
- Cultural
    - Archaeological
    - Film
    - Literary
        - Bookstore
        - Tolkien
    - Music
    - Pop-culture
- Dark
    - Disaster
    - Holocaust
    - War
- Domestic
- Ecotourism
    - Shark
- Experiential
- Extreme
- Fashion
- Garden
- Genealogy
    - Heritage
    - Identity
- Geotourism
- Industrial
- International
    - Volunteering
- Jungle
- Justice
- LGBT
- Medical
- MICE (Meetings, Incentives, Conferences, Exhibitions)
- Nautical
- Orphanage
- Recreational drug
- Red
- Religious
    - Christian
    - Halal

Hospitality industry

- Bed and breakfast
- Boutique hotel
- Convention center
- Cruise ship
- Destination spa
- Front desk
- Guest house
- Guest ranch
- Heuhotel
- Homestay
- Hospitality management studies
- Hostel
- Hotel
    - Manager
- Inn
- Motel
- Pension
- Referral chain
- Resort
    - Hotel
    - Island
    - Seaside
    - Ski
    - Town
- Restaurant

Terminology

- College tour
- Convention (meeting)
- Destination marketing organization
- Escorted tour
- Excursion
- Factory tour
- Gift shop
- Grand Tour
- Holiday
- Honeymoon
- Hypermobility
- Journey planner
- Package tour
- Passport
- Perpetual traveler
- Road trip
- Roadside attraction
- Souvenir
- Staycation
- Tour bus service
- Tour guide
- Tour operator
- Tourism geography
- Tourism minister
- Tourism region
- Tourist attraction
- Tourist gateway
- Tourist trap
- Touron
- Transport
- Travel
- Travel agency
- Travel behavior
- Travel document
- Travel insurance
- Travel medicine
- Travel survey
- Travel technology
- Travel visa
- Travel warning
- Travel website
- Vacation
- Visitor center

Travel literature

- Guide book
- Outdoor literature
- Tourism journals
- Travel magazines
- Wikivoyage

Trade associations

- American Bus Association
- American Hotel and Lodging Association
- American Hotel & Lodging Educational Institute
- BEST Education Network
- Caribbean Tourism Organization
- European Travel Commission
- Historical Archive on Tourism
- Life Beyond Tourism
- Musement
- Pacific Asia Travel Association
- South-East Asian Tourism Organisation
- Tourism Radio
- Travel and Tourism Competitiveness Report
- World Federation of Travel Journalists and Writers
- World Tourism Organization
  - World Tourism rankings
- World Travel and Tourism Council
- World Travel Monitor

Trade fairs and events

- Akwaaba African Travel Market
- Arabian Travel Market
- Cruise of the Kings
- Festival del Viaggio
- FITUR
- ITB Berlin
- World Tourism Day

Issues

- Heritage commodification
- Impact of the COVID-19 pandemic on tourism
- Impacts of tourism
- Leakage effect
- Overtourism
- Tourism improvement district
- Tourist tax

Lists

- Adjectival tourisms
- Attractions
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- Casino hotels
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- Cities by international visitors
- Convention and exhibition centers
- Cruise lines
- Hotels
  - Largest
- Motels
- Passenger airlines
- UNESCO Intangible Cultural Heritage Lists
- World Heritage Sites by country

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Supply chain performance drivers

- Facilities
- Information
- Inventory
- Pricing
- Sourcing
- Transportation

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Technology and related concepts

Major technologies

Necessities

- Agriculture
  - Domestication
  - Grafting
  - Working animal
- Clothing
  - Sewing machine
- Cooking
  - Beer
  - Bread
  - Cheese
  - Milling
  - Wine
- Food storage
  - Pottery
- Sanitation
  - Plumbing
  - Toilet
- Tool / Equipment
  - Blade
  - Hammer
  - Plough
  - Wedge
- Weapon
  - Gun

Social

- Accounting
- Calculation
  - Abacus
  - Calendar
- Cryptography
- Lock and key
- Money
  - Banknote
  - Coin
- Musical instrument
  - Phonograph
- Toy
  - Game
  - Video game
- Writing
  - Book
  - Map
  - Printing press
  - Typewriter
- Aqueduct
  - Canal
  - Irrigation
- Arch

	Perspectives

Criticism	○ Appropriate technology
	  ○ Low technology
	○ Luddite
	  ○ Neo-Luddism
	○ Precautionary principle

Ecotechnology	○ Environmental technology
	  ○ Clean technology
	○ Sustainable design
	  ○ Sustainable engineering

Policy & politics	○ Government by algorithm
	○ Intellectual property
	  ○ Patent
	  ○ Trade secret
	○ Persuasive technology
	○ Science policy
	○ Strategy of Technology
	○ Technology assessment
	○ Technorealism

Progressivism	○ Futures studies
	  ○ Technology forecasting
	○ Technological utopianism
	  ○ Technocracy movement
	  ○ Technological singularity
	  ○ Transhumanism

Studies	○ Diffusion of innovations
	  ○ Technology transfer
	○ History
	  ○ Timeline of historic inventions
	○ Philosophy
	  ○ Social construction of technology
	  ○ Technological determinism
	○ Technology acceptance model

Related concepts

Applied science

- Agronomy
- Architecture
- Construction
- Engineering
- Forensics
- Forestry
- Logistics
- Medicine
- Mining
- Navigation
- Surveying

Innovation

- Design
- High tech
- Invention
- Mature technology
- Research and development
- Technological convergence
- Technology lifecycle

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- Image not found or type unknown **Outline**
- Image not found or type unknown **Portal**

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National

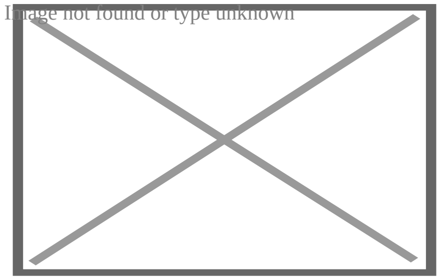
- Germany
- United States
- France
- BnF data
- Japan
- Czech Republic
- Latvia
- Israel

Other

- NARA

About Landfill

For the practice of filling a body of water to create new land, see **Land reclamation**. For other uses, see **Landfill (disambiguation)**.



A landfill in **Å•ubna**, Poland in 1999

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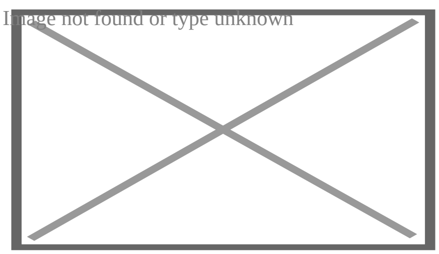
Part of a **series** on

Pollution



Air pollution from a factory

Air

- **Acid rain**
- **Air quality index**
- **Atmospheric dispersion modeling**
- **Chlorofluorocarbon**
- **Combustion**
- **Exhaust gas**
- **Haze**
- **Global dimming**
- **Global distillation**
- **Indoor air quality**
- **Non-exhaust emissions**
- **Ozone depletion**
- **Particulates**
- **Persistent organic pollutant**
- **Smog**
- **Soot**
- **Volatile organic compound**

Biological

- **Biological hazard**
- **Genetic**
- **Illegal logging**
- **Introduced species**
  - **Invasive species**

Digital

- **Information**

Electromagnetic

- **Light**
  - **Ecological**
  - **Overillumination**
- **Radio spectrum**

Natural

- **Ozone**
- **Radium and radon in the environment**
- **Volcanic ash**
- **Wildfire**

Noise

- **Transportation**
- **Health effects from noise**
- **Marine mammals and sonar**
- **Noise barrier**
- **Noise control**
- **Soundproofing**

Radiation

- **Actinides**
- **Bioremediation**
- **Depleted uranium**
- **Nuclear fission**
- **Nuclear fallout**
- **Plutonium**
- **Poisoning**
- **Radioactivity**
- **Uranium**
- **Radioactive waste**

Soil

- **Agricultural**
- **Land degradation**
- **Bioremediation**
- **Defecation**
- **Electrical resistance heating**
- **Illegal mining**
- **Soil guideline values**
- **Phytoremediation**

Solid waste

- **Advertising mail**
- **Biodegradable waste**
- **Brown waste**
- **Electronic waste**
- **Foam food container**
- **Food waste**
- **Green waste**
- **Hazardous waste**
- **Industrial waste**
- **Litter**
- **Mining**
- **Municipal solid waste**
- **Nanomaterials**
- **Plastic**
- **Packaging waste**
- **Post-consumer waste**
- **Waste management**

Space

- **Space debris**

Thermal

- **Urban heat island**

Visual

- **Air travel**
- **Advertising clutter**
- **Overhead power lines**
- **Traffic signs**
- **Urban blight**
- **Vandalism**

War

- Chemical warfare
- Herbicidal warfare
    - Agent Orange
- Nuclear holocaust
    - Nuclear fallout
    - Nuclear famine
    - Nuclear winter
- Scorched earth
- Unexploded ordnance
- War and environmental law

Water

- Agricultural wastewater
- Biosolids
- Diseases
- Eutrophication
- Firewater
- Freshwater
- Groundwater
- Hypoxia
- Industrial wastewater
- Marine
- Monitoring
- Nonpoint source
- Nutrient
- Ocean acidification
- Oil spill
- Pharmaceuticals
- Freshwater salinization
- Septic tanks
- Sewage
- Shipping
- Sludge
- Stagnation
- Sulfur water
- Surface runoff
- Turbidity
- Urban runoff
- Water quality
- Wastewater

Topics

- History
- Pollutants
  - Heavy metals
  - Paint

Misc

- Area source
- Brain health and pollution
- Debris
- Dust
- Garbology
- Legacy
- Midden
- Point source
- Waste
  - Toxic

Lists

- Diseases
- Law by country
- Most polluted cities
- Least polluted cities by PM2.5
- Treaties

Categories

- By country

- Image not found or type unknown icon Environment portal
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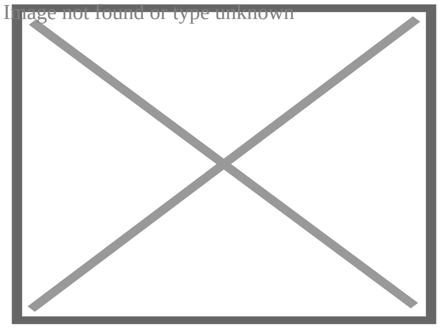
A **landfill**[a] is a site for the disposal of **waste** materials. It is the oldest and most common form of **waste disposal**, although the systematic burial of waste with daily, intermediate and final covers only began in the 1940s. In the past, waste was simply left in piles or thrown into pits (known in **archeology** as **middens**).

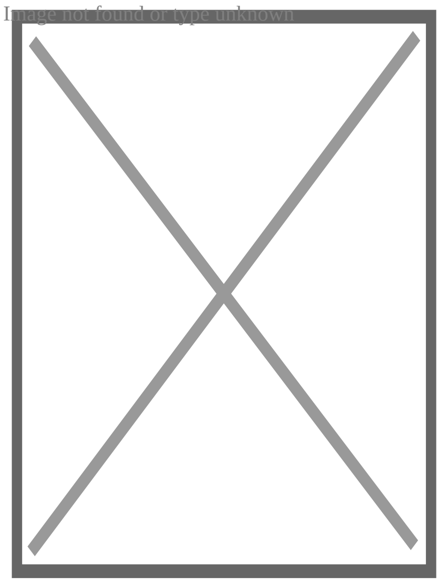
Landfills take up a lot of land and pose environmental risks. Some landfill sites are used for waste management purposes, such as temporary storage, consolidation and transfer, or for various stages of processing waste material, such as sorting, treatment, or recycling. Unless they are stabilized, landfills may undergo severe shaking or **soil liquefaction** of the ground during an **earthquake**. Once full, the area over a landfill site may be **reclaimed** for other uses.

Operations

[edit]



One of several landfills used by **Dryden, Ontario**, Canada



Garbage dumped in the middle of a road in **Karachi**, Pakistan

Operators of well-run landfills for non-hazardous waste meet predefined specifications by applying techniques to:**[1]**

1. confine waste to as small an area as possible
2. compact waste to reduce volume**[2]**

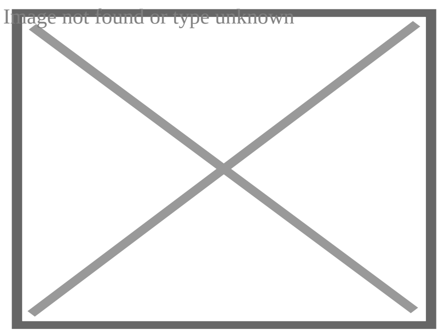
They can also cover waste (usually daily) with layers of soil or other types of material such as woodchips and fine particles.

During landfill operations, a **scale or weighbridge** may weigh waste collection vehicles on arrival and personnel may inspect loads for wastes that do not accord with the landfill's waste-acceptance criteria.**[2]** Afterward, the waste collection vehicles use the existing road network on their way to the tipping face or working front, where they unload their contents. After loads are deposited, **compactors** or bulldozers can spread and **compact the waste** on the working face. Before leaving the landfill boundaries, the waste collection vehicles may pass through a wheel-cleaning facility. If necessary, they return to the weighbridge for re-weighing without their load. The weighing process can assemble statistics on the daily incoming waste tonnage, which databases can retain for record keeping. In addition to trucks, some landfills may have equipment to handle railroad containers. The use of "rail-haul" permits landfills to be located at more remote sites, without the problems associated with many truck trips.

Typically, in the working face, the compacted waste is covered with soil or alternative materials daily. Alternative waste-cover materials include chipped wood or other "green waste",**[3]** several sprayed-on foam products, chemically "fixed" bio-solids, and temporary blankets. Blankets can be lifted into place at night and then removed the following day prior to waste placement. The space that is occupied daily by the compacted waste and the cover material is called a daily cell. Waste compaction is critical to extending the life of the landfill. Factors such as waste compressibility, waste-layer thickness and the number of passes of the compactor over the waste affect the waste densities.

Sanitary landfill life cycle

[**edit**]



Sanitary landfill diagram

The term *landfill* is usually shorthand for a municipal landfill or sanitary landfill. These facilities were first introduced early in the 20th century, but gained wide use in the 1960s and 1970s, in an effort to eliminate open dumps and other "unsanitary" waste disposal practices. The sanitary landfill is an engineered facility that separates and confines waste. Sanitary landfills are intended as biological reactors (**bioreactors**) in which microbes will break down complex organic waste into simpler, less toxic compounds over time. These reactors must be designed and operated according to regulatory standards and guidelines (See **environmental engineering**).

Usually, aerobic decomposition is the first stage by which wastes are broken down in a landfill. These are followed by four stages of anaerobic degradation. Usually, solid organic material in solid phase decays rapidly as larger organic molecules degrade into smaller molecules. These smaller organic molecules begin to dissolve and move to the liquid phase, followed by hydrolysis of these organic molecules, and the hydrolyzed compounds then undergo transformation and volatilization as carbon dioxide (CO_2) and methane (CH_4), with rest of the waste remaining in solid and liquid phases.

During the early phases, little material volume reaches the **leachate**, as the biodegradable organic matter of the waste undergoes a rapid decrease in volume. Meanwhile, the leachate's **chemical oxygen demand** increases with increasing concentrations of the more recalcitrant compounds compared to the more reactive compounds in the leachate. Successful conversion and stabilization of the waste depend on how well microbial populations function in **syntrophy**, i.e. an interaction of different populations to provide each other's nutritional needs.:[4]

The life cycle of a municipal landfill undergoes five distinct phases:[5][4]

Initial adjustment (Phase I)

[edit]

As the waste is placed in the landfill, the void spaces contain high volumes of molecular oxygen (O_2). With added and compacted wastes, the O_2 content of the landfill bioreactor strata gradually decreases. Microbial populations grow, density increases. Aerobic biodegradation dominates, i.e. the primary electron acceptor is O_2.

Transition (Phase II)

[edit]

The O_2 is rapidly degraded by the existing microbial populations. The decreasing O_2 leads to less aerobic and more anaerobic conditions in the layers. The primary electron acceptors during transition are nitrates and sulphates since O_2 is rapidly displaced by CO_2 in the effluent gas.

Acid formation (Phase III)

[edit]

Hydrolysis of the biodegradable fraction of the solid waste begins in the acid formation phase, which leads to rapid accumulation of **volatile fatty acids** (VFAs) in the leachate. The increased organic acid content decreases the leachate **pH** from approximately 7.5 to 5.6. During this phase, the decomposition intermediate compounds like the VFAs contribute much **chemical oxygen demand** (COD). Long-chain volatile organic acids (VOAs) are converted to acetic acid ($C_2H_4O_2$), CO_2, and hydrogen gas (H_2). High concentrations of VFAs increase both the **biochemical oxygen demand** (BOD) and VOA concentrations, which initiates H_2 production by fermentative bacteria, which stimulates the growth of H_2-oxidizing bacteria. The H_2 generation phase is relatively short because it is complete by the end of the acid formation phase. The increase in the biomass of **acidogenic** bacteria increases the amount of degradation of the waste material and consuming nutrients. Metals, which are generally more water-soluble at lower pH, may become more mobile during this phase, leading to increasing metal concentrations in the leachate.

Methane fermentation (Phase IV)

[**edit**]

The acid formation phase intermediary products (e.g., acetic, propionic, and butyric acids) are converted to CH_4 and CO_2 by methanogenic microorganisms. As VFAs are metabolized by the methanogens, the landfill water pH returns to neutrality. The leachate's organic strength, expressed as oxygen demand, decreases at a rapid rate with increases in CH_4 and CO_2 gas production. This is the longest decomposition phase.

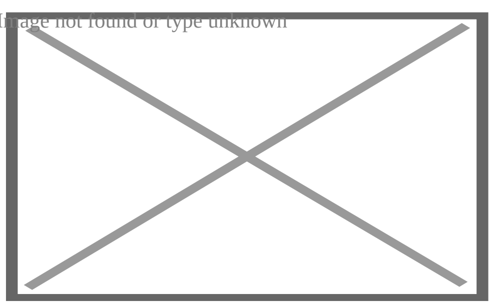
Final maturation and stabilization (Phase V)

[**edit**]

The rate of microbiological activity slows during the last phase of waste decomposition as the supply of nutrients limits the chemical reactions, e.g. as **bioavailable** phosphorus becomes increasingly scarce. CH_4 production almost completely disappears, with O_2 and oxidized species gradually reappearing in the gas wells as O_2 permeates downwardly from the troposphere. This transforms the **oxidation–reduction** potential (ORP) in the leachate toward oxidative processes. The residual organic materials may incrementally be converted to the gas phase, and as organic matter is composted; i.e. the organic matter is converted to **humic**-like compounds.**[6]**

Social and environmental impact

[**edit**]



Landfill operation in Hawaii. The area being filled is a single, well-defined "cell" and a protective **landfill liner** is in place (exposed on the left) to prevent contamination by **leachates** migrating downward through the underlying geological formation.

Landfills have the potential to cause a number of issues. **Infrastructure** disruption, such as damage to access roads by heavy vehicles, may occur. Pollution of local roads and watercourses from wheels on vehicles when they leave the landfill can be significant and can be mitigated by **wheel washing systems**. **Pollution** of the local **environment**, such as contamination of **groundwater** or **aquifers** or **soil contamination** may occur, as well.

Leachate

[edit]
Main article: Leachate

When precipitation falls on open landfills, water percolates through the garbage and becomes contaminated with suspended and dissolved material, forming leachate. If this is not contained it can contaminate groundwater. All modern landfill sites use a combination of impermeable liners several metres thick, geologically stable sites and collection systems to contain and capture this leachate. It can then be treated and evaporated. Once a landfill site is full, it is sealed off to prevent precipitation ingress and new leachate formation. However, liners must have a lifespan, be it several hundred years or more. Eventually, any landfill liner could leak,[7] so the ground around landfills must be tested for leachate to prevent pollutants from contaminating groundwater.

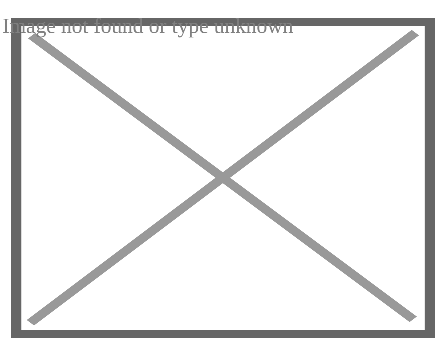
Decomposition gases

[edit]
Main article: Landfill gas

Rotting food and other decaying organic waste create decomposition gases, especially CO_2 and CH_4 from aerobic and anaerobic decomposition, respectively. Both processes occur simultaneously in different parts of a landfill. In addition to available O_2, the fraction of gas constituents will vary, depending on the age of landfill, type of waste, moisture content and other factors. For example, the maximum amount of landfill gas produced can be illustrated a simplified net reaction of diethyl oxalate that accounts for these simultaneous reactions:[8]

$$4\ C_6H_{10}O_4 + 6\ H_2O\ ?\ 13\ CH_4 + 11\ CO_2$$

On average, about half of the volumetric concentration of landfill gas is CH_4 and slightly less than half is CO_2. The gas also contains about 5% molecular nitrogen (N_2), less than 1% hydrogen sulfide (H_2S), and a low concentration of non-methane organic compounds (NMOC), about 2700 ppmv.[8]



Waste disposal in Athens, Greece

Landfill gases can seep out of the landfill and into the surrounding air and soil. **Methane** is a **greenhouse gas**, and is flammable and potentially explosive at certain concentrations, which makes it perfect for burning to generate electricity cleanly. Since decomposing plant matter and food waste only release carbon that has been captured from the atmosphere through photosynthesis, no new carbon enters the **carbon cycle** and the atmospheric concentration of CO_2 is not affected. Carbon dioxide traps heat in the atmosphere, contributing to **climate change**.[9] In properly managed landfills, gas is collected and **flared** or recovered for **landfill gas utilization**.

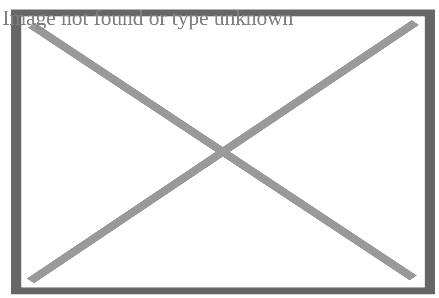
Vectors

[**edit**]

Poorly run landfills may become nuisances because of **vectors** such as rats and flies which can spread **infectious diseases**. The occurrence of such vectors can be mitigated through the use of **daily cover**.

Other nuisances

[**edit**]

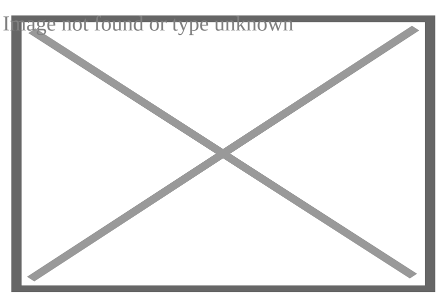


A group of wild elephants interacting with a trash dump in Sri Lanka

Other potential issues include **wildlife** disruption due to occupation of habitat[10] and animal health disruption caused by consuming waste from landfills,[11] dust, odor, **noise pollution**, and reduced local property values.

Landfill gas

[**edit**]
Main article: **Landfill gas**

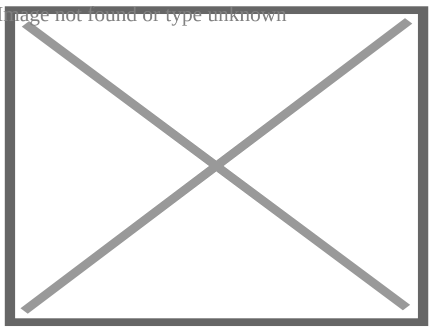


A gas flare produced by a landfill in **Lake County, Ohio**

Gases are produced in landfills due to the **anaerobic digestion** by microbes. In a properly managed landfill, this gas is collected and used. Its uses range from simple **flaring** to the **landfill gas utilization** and **generation of electricity**. Landfill gas monitoring alerts workers to the presence of a build-up of gases to a harmful level. In some countries, landfill gas recovery is extensive; in the United States, for example, more than 850 landfills have active landfill gas recovery systems.**[12]**

Solar landfill

[**edit**]

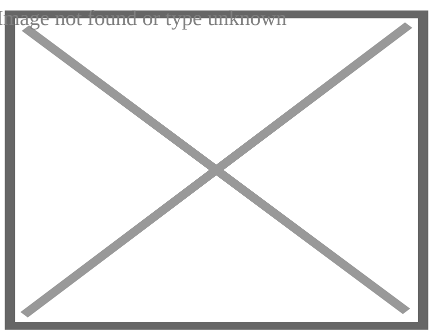


Solar arrays on a full landfill in **Rehoboth, MA**

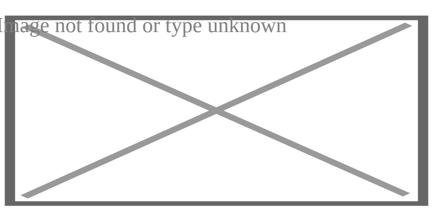
A **Solar landfill** is a repurposed used landfill that is converted to a **solar array solar farm**.**[13]**

Regional practice

[**edit**]



A landfill in Perth, Western Australia



South East New Territories Landfill, **Hong Kong**

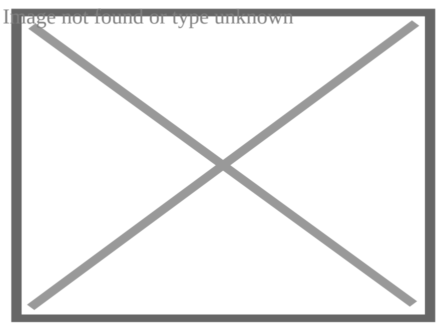
Canada

[**edit**]

Landfills in Canada are regulated by provincial environmental agencies and environmental protection legislation.**[14]** Older facilities tend to fall under current standards and are monitored for **leaching**.**[15]** Some former locations have been converted to parkland.

European Union

[**edit**]



The Rusko landfill in **Oulu, Finland**

In the European Union, individual states are obliged to enact legislation to comply with the requirements and obligations of the European **Landfill Directive**.

The majority of EU member states have laws banning or severely restricting the disposal of household trash via landfills.**[16]**

India

[**edit**]

Landfilling is currently the major method of municipal waste disposal in India. India also has Asia's largest dumping ground in Deonar, Mumbai.**[17]** However, issues frequently arise due to the alarming growth rate of landfills and poor management by authorities.**[18]** On and under surface fires have been commonly seen in the Indian landfills over the last few years.**[17]**

United Kingdom

[**edit**]
Main article: **Landfills in the United Kingdom**

Landfilling practices in the UK have had to change in recent years to meet the challenges of the European **Landfill Directive**. The UK now imposes landfill tax upon **biodegradable waste** which is put into landfills. In addition to this the **Landfill Allowance Trading Scheme** has been established for local authorities to trade landfill quotas in England. A different system operates in **Wales** where authorities cannot 'trade' amongst themselves, but have allowances known as the Landfill Allowance Scheme.

United States

[**edit**]
Main article: **Landfills in the United States**

U.S. landfills are regulated by each state's environmental agency, which establishes minimum guidelines; however, none of these standards may fall below those set by the **United States Environmental Protection Agency** (EPA).**[19]**

Permitting a landfill generally takes between five and seven years, costs millions of dollars and requires rigorous siting, engineering and environmental studies and demonstrations to ensure local environmental and safety concerns are satisfied.**[20]**

Types

[**edit**]

- **Municipal solid waste**: takes in household waste and nonhazardous material. Included in this type of landfill is a **Bioreactor Landfill** that specifically degrades organic material.
- **Industrial waste**: for commercial and industrial waste. Other related landfills include Construction and Demolition Debris Landfills and Coal Combustion Residual Landfills.
- **Hazardous waste[21]** or **PCB waste**:**[22]** Polychlorinated Biphenyl (PCB) landfills that are monitored in the United States by the **Toxic Substances Control Act of 1976** (TSCA).

Microbial topics

[**edit**]

The status of a landfill's microbial community may determine its digestive efficiency.**[23]**

Bacteria that digest plastic have been found in landfills.**[24]**

Reclaiming materials

[**edit**]
Main article: **Landfill mining**

One can treat landfills as a viable and abundant source of materials and **energy**. In the developing world, **waste pickers** often scavenge for still-usable materials. In **commercial** contexts, companies have also discovered landfill sites, and many[*quantify*] have begun harvesting materials and energy.[25] Well-known examples include gas-recovery facilities.[26] Other commercial facilities include waste **incinerators** which have built-in material recovery. This material recovery is possible through the use of **filters** (**electro filter**, **active-carbon** and potassium filter, quench, HCl-washer, SO_2-washer, **bottom ash**-grating, etc.).

Alternatives

[**edit**]
See also: **List of solid waste treatment technologies**

In addition to **waste reduction** and **recycling** strategies, there are various alternatives to landfills, including **waste-to-energy** incineration, **anaerobic digestion**, **composting**, **mechanical biological treatment**, **pyrolysis** and **plasma arc gasification**. Depending on local economics and incentives, these can be made more financially attractive than landfills.

The goal of the **zero waste** concept is to minimize landfill volume.[27]

Restrictions

[**edit**]

Countries including **Germany**, **Austria**, **Sweden**,[28] **Denmark**, **Belgium**, the **Netherlands**, and **Switzerland**, have banned the disposal of untreated waste in landfills.[*citation n*
In these countries, only certain hazardous wastes, **fly ashes** from **incineration** or the stabilized output of **mechanical biological treatment** plants may still be deposited.[*citation neede*

See also

[**edit**]

- **icon** Image not found or type unknown **Environment portal**
- icon Image not found or type unknown **Ecology portal**
- **Bioreactor landfill**
- **Daily cover**
- **Fly-tipping**
- **Hydrologic Evaluation of Landfill Performance** (HELP) model
- **Land reclamation**
- **Landfarming**
- **Landfill diversion**
- **Landfill restoration**
- **Landfill tax**
- **Marine debris**

- Midden
- Milorganite
- National Waste & Recycling Association
- NIMBY
- Open dump
- Recycling rates by country
- Sludge

Notes

[edit]

1. ^ Also known as a **tip**, **dump**, **rubbish tip**, **rubbish dump**, **garbage dump**, **trash dump**, or **dumping ground**.

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External links

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- **US National Waste & Recycling Association**
- **Solid Waste Association of North America**
- **A Compact Guide to Landfill Operation: Machinery, Management and Misconceptions**

- **v**
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Biosolids, **waste**, and **waste management**

Major types

- Agricultural wastewater
- Biodegradable waste
- Biomedical waste
- Brown waste
- Chemical waste
- Construction waste
- Demolition waste
- Electronic waste
  - by country
- Food waste
- Green waste
- Hazardous waste
- Heat waste
- Industrial waste
- Industrial wastewater
- Litter
- Marine debris
- Mining waste
- Municipal solid waste
- Open defecation
- Packaging waste
- Post-consumer waste
- Radioactive waste
- Scrap metal
- Sewage
- Sharps waste
- Surface runoff
- Toxic waste

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Processes	- Anaerobic digestion
	- Balefill
	- Biodegradation
	- Composting
	- Durable good
	- Ecological design
	- Garden waste dumping
	- Illegal dumping
	- Incineration
	- Landfill
	- Landfill mining
	- Mechanical biological treatment
	- Mechanical sorting
	- Photodegradation
	- Reclaimed lumber
	- Recycling
	    - appliance recycling
	    - battery recycling
	    - bottle recycling
	    - fluorescent lamp recycling
	    - land recycling
	    - plastic recycling
	    - textile recycling
	    - timber recycling
	    - tire recycling
	    - water heat recycling
	    - water recycling shower
	- Repurposing
	- Resource recovery
	- Reusable packaging
	- Right to repair
	- Sewage treatment
	- Urban mining
	- Waste collection
	- Waste sorting
	- Waste trade
	- Waste treatment
	- Waste-to-energy

Countries	- Afghanistan - Albania - Armenia - Australia - Belgium - Bangladesh - Brazil - Bosnia and Herzegovina - Egypt - Georgia - Hong Kong - India - Israel - Japan - Kazakhstan - New Zealand - Russia - South Korea - Sri Lanka - Switzerland - Syria - Tanzania - Taiwan - Thailand - Turkey - United Kingdom - United States

Agreements	- Bamako Convention
	- Basel Convention
	- EU directives
	  - batteries
	    - Recycling
	  - framework
	  - incineration
	  - landfills
	  - RoHS
	  - vehicles
	  - waste water
	  - WEEE
	- London Convention
	- Oslo Convention
	- OSPAR Convention

Occupations	- Sanitation worker - Street sweeper - Waste collector - Waste picker
Other topics	- Blue Ribbon Commission on America's Nuclear Future - China's waste import ban - Cleaner production - Downcycling - Eco-industrial park - Extended producer responsibility - High-level radioactive waste management - History of waste management - Landfill fire - Sewage regulation and administration - Upcycling - Waste hierarchy - Waste legislation - Waste minimisation - Zero waste

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About New Hanover County

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Driving Directions in New Hanover County

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Driving Directions From Harbor Way Gardens to The Dumpo Junk Removal & Hauling

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(5)

Great work! Bryce and Adrian are great!

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Howard Asberry

(5)

The manager was very helpful, knowledgeable and forthright. He definitely knew what he was talking about and explained everything to me and was very helpful. I'm looking forward to working with him

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Greg Wallace

(5)

I highly recommend Dumpo Junk Removal. Very professional with great pricing and quality work.

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Kirk Schmidt

(5)

They are great with junk removal. Highly recommend them

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Kelly Vaughn

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Great service with professionalism. You can't ask for more than that!

Examining Safe Data Destruction Protocols**View GBP**

Frequently Asked Questions

What are the key methods for safe data destruction in e-waste processing?

The key methods include physical destruction (shredding, crushing), degaussing (using magnetic fields to erase data), and overwriting or wiping with specialized software to ensure all data is irretrievable.

Why is it important to implement safe data destruction protocols in e-waste processing?

Safe data destruction prevents unauthorized access to sensitive information, protects privacy, complies with legal requirements, and mitigates risks of identity theft and corporate espionage.

How can companies ensure compliance with data protection regulations during e-waste processing?

Companies can ensure compliance by following industry standards like NIST SP 800-88 or ISO/IEC 27001, maintaining detailed records of data destruction processes, and regularly auditing their protocols.

What challenges do organizations face when implementing safe data destruction protocols in e-waste management?

Challenges include ensuring thoroughness across various types of devices, managing costs, keeping up with evolving technology standards, and verifying that third-party recyclers adhere to secure practices.

Are there any certifications or standards that guide best practices for safe data destruction in e-waste management?

Yes, certifications such as NAID AAA Certification and adherence to standards like NIST SP 800-88 provide guidelines for secure data erasure and physical destruction.

The Dumpo Junk Removal

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