Emerging Technologies Impacting EH&S

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US Ecology, Inc. is a leading North American provider of environmental services to commercial and government entities. The Company addresses the complex waste management needs of its customers, offering treatment, disposal and recycling of hazardous and radioactive waste, as well as a wide range of complementary field and industrial services. US Ecology's focus on safety, environmental compliance, and customer service, enables us to effectively meet the needs of our customers and to build long-lasting relationships. Headquartered in Boise, Idaho, with operations in the United States, Canada and Mexico, the Company has been protecting the environment since 1952.

Emerging Technologies

- Defined
- Industrial Revolutions
- EHS Evaluation in Production Life Cycle
- Disruptive Technologies and EHS Implications

Industrial Revolutions

1. 1784

   Steam, water, mechanical production equipment

2. 1870

   Division of Labor, electricity, mass production

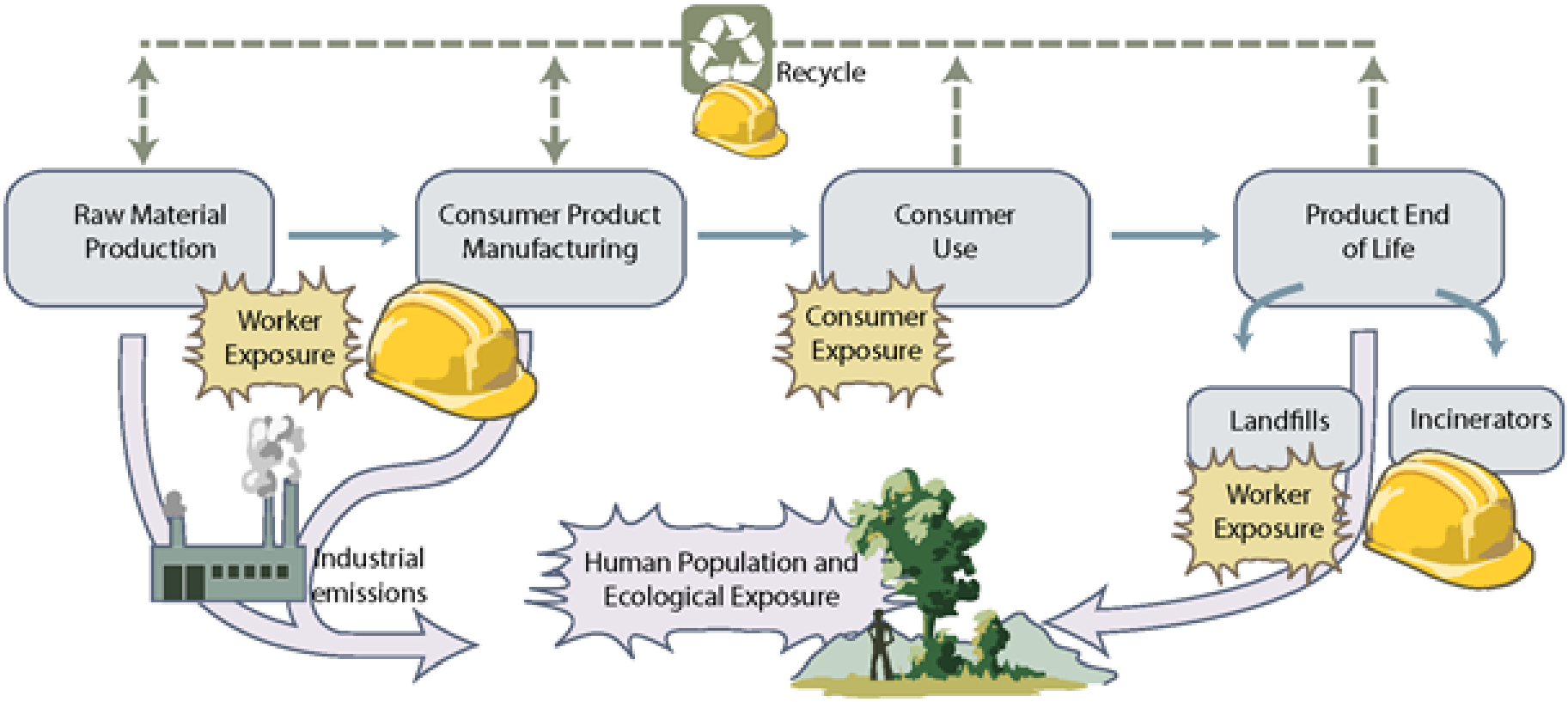
3. 1969

   Electronics, IT, automated production

4. Current

   Cyber – physical systems

Product life cycle showing different points for EHS evaluation.



http://nano.gov/you/environmental-health-safety

Emerging Technologies

Emerging technology is a subjective concept because someone may see a technology as emerging and others may not see it the same way. According to BusinessDictionary.com, emerging technology is a new technology that is currently being developed, or will be developed within the next five to ten years. The new technology will substantially alter the business and social environment; the technology will include information technology, wireless data communications, man-machine communications, on-demand printing, bio-technologies, and advanced robotics.

What truly defines emerging technology is that the majority views its usefulness as dubious and it may not be embraced by most.
C. Christian identifies two main categories:

1. Sustaining: does not significantly impact current markets or society
2. Disruptive: creates new markets and business categories, overriding existing markets

Emerging Technologies With Disruptive Ability

1. **Car & Ride Sharing**
   - Car Sharing – a car rental service for short commutes or errands
   - Ridesharing – similar to traditional taxi services encompassing carpooling characteristics
   - Heavy emphasis on smart phones and GPS
   - EHS implications: autonomous vehicles will not be owned by private citizens, instead shared in a social pool. Implications include reduced vehicle production, reduced carbon emissions,, policymaking, and insurance
2. **Internet of Things (IoT)**
   - Idea allows everyone to be connected to everything via internet usage
   - Leads to more Artificial Intelligence based device creation: all vehicles, dwellings, vending machines, televisions, communication devices
   - EHS implications: data and network security; increased electronics production, use of electricity, generation of Household Hazardous Waste, demand for Rare Earth Metals
3. **Driverless Vehicle** https://youtu.be/ZSL2H9JBWbI
   - A vehicle which navigates without the interface of a human driver
   - In conjunction with car sharing promotes creation of Smart Cities (snow removal, refuse pickup)
   - EHS Implications: reduction in accidents and fatalities; increase in route efficiency, density, and service hours; data and network security; displacement of human workforce

Emerging Technologies With Disruptive Ability

4. Autonomous Robot

- In conjunction with IoT, allows creation of robots that will fill public service jobs
- EHS Implications: Data and network security, displacement of human workforce, increase in service hours and availability

5. Virtual Reality

- Developed for military purposes to simulate high risk training situations
- Allow school / work attendance and interface without being physically present
- EHS Implications: Allow people with health or physical issues to participate in interactive environments, psychological and social effects (reclusion), e-commuting reduces carbon footprint and demand for transportation, displacement of human workforce

6. BitCoin

- Cryptocurrency which allows for digital payment transactions without a central authority or issuer
- Cryptography allows for a secured financial transaction
- EHS Implications: Privacy, data and network security, significant electricity demand for computer usage

Emerging Technologies With Disruptive Ability

7. Block Chain

- Type of distributed ledger technology, a byproduct of Bitcoin
- Virtual log of financial records that are completely public and updated by public users, which should make it hard to corrupt (by removal of a third party intermediary)
- EHS Implications: Privacy, data and network security, significant electricity demand for computer usage

8. 3D Printing

- 3D printer creates “everyday” things – medical field, small houses
- EHS implications: creation of new manufacturing industry, displacement of human workforce, potential for zero waste manufacturing

9. Cloud Computing

- Act of storing a process on the internet (photograph and music consumption)
- EHS Implications: security and privacy, significant electricity demand for computer usage

Emerging Technologies With Disruptive Ability

10. Drones and Autonomous Verticle Take Off and Landing (VTOL) Vehicle

- Extension of drone concept, allowing a passenger to autonomously ride and navigate
- Smart city development
- EHS Implications: displacement of human workforce, dramatic changes in policy making and traffic patterns, data and network security, eliminates need for roads, reduced numbers of vehicles on roads