Ted Smith:

Why we are „Challenging the Chip": The Challenges of Sustainability in Electronics

Abstract

Ted Smith, co-founder of some of the first organizing efforts in the field of electronics activism, recounts the transformation of Silicon Valley from an agricultural center into the first hub of a global electronics industry and the rise of electronics activism in response to growing evidence of the industry's environmental and occupational health hazards. From their original focus on Silicon Valley, activists have broadened their effort to focus on end-of-life issues, especially through the demand for extended producer responsibility. They also address the globalization of production hazards, addressed through an „International Campaign for Responsible Technology" that links local actors and organizations in North America, Europe, and Asia in a global effort to advance a comprehensive agenda of labor rights and environmental justice.

Agenda

Author

Ted Smith

- Ted Smith is the founder of the Silicon Valley Toxics Coalition (www.svtc.org) and the International Campaign for Responsible Technology and is Chair of the Electronics TakeBack Coalition (www.electronicstakeback.com), ✉ tsmith@igc.org
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Background and History of Occupational and Environment Health Concerns

Fifty years ago, the agricultural valley south of San Francisco, California was known as the Valley of Heart's Delight because it produced such abundant fruits and vegetables. Today it is known worldwide as Silicon Valley, and the high-tech revolution that started here has transformed the world. Many of the workers who used to work in the fields picking fruit and vegetables became electronics workers, making semiconductor chips, disk drives and circuit boards for the high-tech revolution. Little did they know that they were guinea pigs in a terrible toxic experiment.

The first public indications that the electronics industry – which called itself the „clean industry" – was in fact a hazardous industry that depended on toxic chemicals to make its products came from research by the Santa Clara Center for Occupational Safety and Health (SCCOSH), formed in the mid-1970s. SCCOSH documented occupational illness in electronics workers and published the first materials on the chemical hazards in the industry.

Alida Hernandez was one of the many fruit processing workers who were 're-invented' as a 'clean room' worker and didn't realise that she was sacrificing her health in a pattern that would soon be replicated around the world. No one ever told her that her exposure to electronics solvents at IBM's disk drive factory in San Jose, CA, would lead to her cancer. She is just one of many who have suffered dreadful diseases without realising what they had signed up for.

As the toxic troubles emerged in other parts of the US and then throughout the world, other casualties were discovered - the 'collateral damage' of the high-tech revolution. Unfortunately, there are too many stories of other electronics workers suffering similar illnesses and giving birth to children with serious birth defects. While the electronics industry has vigorously resisted comprehensive health studies of its workers, data continues to emerge connecting work in electronics factories to serious health problems for workers and their children. This is especially crucial since all around the world most electronics production workers are women of childbearing age. Here are some examples:

- Three epidemiological studies done in the US all found high rates of miscarriages among semiconductor workers.[1]
- IBM maintained a 'corporate mortality file' which documented that, over a 30-year period, IBM workers with exposure to chemicals died younger and more frequently from toxic-related cancers than the national average.[2]
- The Scottish Health and Safety Agency conducted a health study of workers at National Semiconductor in Scotland[3] and found disproportionately high rates of cancer among them.
- After years of resistance, the Semiconductor Industry Association has contracted with Vanderbilt University to conduct a chip industry worker health study to assess the cancer risk to semiconductor workers. The results are expected in 2010.
- In their groundbreaking article 'Cancer and Reproductive Risks in the Semiconductor Industry', Joseph Ladou, MD, and John C Bailar III, PhD, documented the serious health concerns of semiconductor workers.

The environmental and health problems have not been limited to production workers. In 1982, with the discovery of widespread chlorinated solvent pollution in the groundwater throughout Santa Clara country (now called Silicon Valley), SCCOSH spun off a community-based organization called Silicon Valley Toxics Coalition to focus on the environmental aspects of high-tech pollution, primarily related to the production processes. More than 100 groundwater pollution sites were discovered at high-tech facilities throughout Silicon Valley and 29 of them – including IBM, Intel, Hewlett Packard, Advanced Micro Devices, National Semiconductor and other well known companies - were eventually listed by USEPA as „superfund sites"[4], a classification used for the worst contamination sites in the country. Hundreds of families came forward to file lawsuits alleging that their children's birth defects and cancer were caused by drinking polluted water. Similar patterns of groundwater pollution were well documented in several other high-tech centers around the U.S., including Austin, Texas, Albuquerque, New Mexico, and Phoenix, Arizona.

1 Ladou.

2 Clapp.

3 Hesa.

4 SVTC, Maps of Silicon Valley Groundwater Contamination.

The initial focus on groundwater pollution and cleanup evolved into a broader focus on air pollution and then pollution prevention. Some limited progress has been made to implement policies to reduce these hazards in Silicon Valley as the industry began its global expansion.

The initial focus on Silicon Valley expands in two directions: a focus on end-of-life and a focus on the globalization of production hazards

A. The focus on Product End-of-Life Problems and Extended Producer Responsibility

In the 1990s, the focus on electronics and the environment began to broaden from production-related hazards to product related hazards, particularly the end-of-life challenges of disposing of millions of obsolete electronic products that contained significant quantities of hazardous materials such as lead, cadmium, mercury, brominated flame retardants, etc. The European Union developed two watershed laws – the Restriction on Hazardous Materials (RoHS) and the Waste Electronic and Electrical Equipment (WEEE) directive to reduce the hazardous materials in electronic products and to establish Extended Producer Responsibility to require electronics manufacturers to accept life cycle responsibility for their products. There were no similar initiatives in the US at the time, and in fact the US electronics industry – along with the US Trade representative – made unsuccessful attempts to block the E.U initiatives.

Activists in the U.S. were alarmed to learn about these U.S. industry efforts, and organized their own campaign that showed that producer responsibility, far from being the kind of „command and control" regulation lambasted by US industry in the past, simply *internalizes previously externalized* costs of pollution, offers electronics companies *flexibility to innovate* in how they meet its targets for recycling and chemical phase-outs, and encourages them to *compete on grounds of design and recycling efficiency*.

What is Extended Producer Responsibility ?

Extended Producer Responsibility (EPR) is a policy approach that holds manufacturers accountable for the full costs of their products at every stage in their lifecycle. EPR is a strategy that requires producers take back their products at the end of their useful lives, or pay a recycling contractor to do so, thereby internalizing the costs of recycling or disposal in a manufacturer's bottom line. When companies know that they will bear the costs of product return and recycling, they are more likely to redesign their products for easier and safer handling at each step in the lifecycle. This approach enforces a design strategy that takes into account the upstream environmental impacts inherent in the selection, mining and extraction of materials, the health and environmental impacts to workers and surrounding communities during the production process itself, and downstream impacts during use, recycling and disposal of the products. In short, by requiring a company to take its products back, EPR aims to force the company to make the products cleaner in the first place.[5]

The European Union Model and the Soul of Globalization

In the 1990s, American labor, health, and environmental non-governmental organizations (NGOs) concerned about the electronics industry's impact sought to turn the process of economic and political globalization to their advantage. Forming the *International Campaign for Responsible Technology (ICRT)* in the 1990s, NGOs that had worked mainly at the local level first built national and then international ties to share information and strategies and conduct campaigns across borders (see „From Grass Roots to Global," in Challenging the Chip:Labor Rights and Environmental Justice in the Global Electronics Industry). NGOs discovered a promising, comprehensive policy solution in EPR, as embodied in the European Union's (EU) proposed directives on electronic waste and toxics reduction. Activists recognized that by raising standards for the production and disposal of electronics in Europe, the EU directives offered the best tool for raising standards in the United States without sweeping its toxic waste under developing countries' rugs.

EPR promised to promote higher environmental and workplace safety benefits worldwide, rather than shifting risk abroad and fueling a downward spiral in standards. By requiring producers to take back their products, redesign them for easier recycling, and phase out some of the most dangerous toxics, the EU's directives sought to reduce risk at each stage

5 See EPR Working Group for more information <http://www.eprworkinggroup.org>.

of a product's lifecycle wherever it occurred in the globalized electronics industry. Rather than exerting downward pressure on environmental and labor protections, EPR could turn globalization into a force that conditioned access to major world markets on meeting more stringent norms for design and disposal. In the era of global markets, EPR pushes transnational corporations to meet the highest standards set in any major market because it is expensive to manufacture different product lines for different regional markets. In addition, if companies were to produce more hazardous and less hazardous versions of their products for different markets, they would be opening themselves up to public and regulatory criticism (as well as potential liability) for employing an environmental double standard that poses greater risks to some customers and regions.

As a sign of the internationalization of electronics regulation and activism, the ICRT's first step in embracing EPR was to defend Europe's ability to enact it against the US government's and the industry's objections. In 1998, the *American Electronics Association (AEA)*, a major trade association, convinced the US Trade Representative (USTR) and the Mission to the European Union to fight the European directives.[6] The trade associations argued that mandated phase-outs of toxic materials would undermine the „functionality, safety and reliability" of their products, and „impede the development of new technologies and products, increase costs, and restrict global trade in these products" *(Hunter and Lopez paper for AEA, 1999)*. The trade associations also alleged that requiring producers to assume financial responsibility for collecting and processing e-waste violated the General Agreement on Tariffs and Trade (GATT) rules against trade restraints. The US Mission in Brussels agreed, arguing to the EU that the directives raised „unnecessary barriers to trade, particularly the ban on certain materials, burdensome take-back requirements for end of life equipment, and mandated design standards".

In May 1999, a group of environmental activists from Europe and the US met in Soesterberg, The Netherlands, to develop a way to defend the directives from US lobbying and to create a strategy to „get out ahead" of the next generation of electronics problems, rather than continuing to play „catch up" by trying to clean up the problems created by the previous generation of products. There was a keen awareness that Moore's law was driving change so quickly that governments were hopeless in their efforts to regulate such a constantly moving target. The Soesterberg group developed a new vision of sustainability to track the dynamism of Moore's law:

> *Each new generation of technical improvements in electronic products should include parallel and proportional improvements in environmental, health and safety, as well as social justice attributes.*
>
> *Adopted by the Trans-Atlantic Network for Clean Production, May 16, 1999*[7]

The ICRT then wrote a legal response to the industry's claims, showing how industry had erred in arguing that the EU directives were not protected by GATT's exemptions. The ICRT also mobilized a coalition of hundreds of labor, environmental, and community organizations expressing support for the EU directives and calling on then Vice President Albert Gore to rein in the USTR's lobbying efforts. While industry cast the directives as a matter of „free trade" versus „protectionism," activists used the letter to Gore to transform the debate into one about corporate responsibility, sovereignty, and democracy. Later that same year, as part of the major WTO mobilization in Seattle, the ICRT organized a protest against e-waste at Microsoft headquarters to further pressure US industry to back off in its efforts to undermine the EU directives. Microsoft was chosen not only because it was a co-host of the WTO meeting, but also because its constant software updates push demand for more processing speed and drive the pace of computer hardware's rapid obsolescence and the growth of e-waste. As a direct result of this organizing, the USTR backed down from its lobbying in Europe.

Importing EPR into the United States

During the years 2000-2003, as approval of the EU legislation was increasingly imminent, an expanding coalition of NGOs took the lead on introducing EPR into US debates – initially called the Computer TakeBack Campaign[8], it later expanded into the Electronics TakeBack Coalition. Although local and state governments, electronics recyclers, the US Environmental Protection Agency (EPA), and industry began discussing how to build an electronics recycling infrastructure and allocate recycling costs, they focused on improving practices for dealing with

6 <http://www.aeanet.org>.

7 <http://www.cleanproduction.org/Electronics.Green.php>

8 <http://www.electronicstakeback.com>

products at the end of their lives. Had NGOs not advocated for an EU-style solution, the problem would have been seen simply as one of paying for managing e-waste responsibly, rather than as an opportunity to address the effects of electronics at each stage of their lifecycle.

The Future of EPR in the United States

Producer responsibility for electronics has made impressive inroads in the United States since the late 1990s. The industry has conceded, in the words of an invitation to a recent AEA forum on regulation, that „it is clear that European environmental policy is setting a pattern for the rest of the world"[9] . Some of the leading producers have now accepted that they will have to incorporate the cost of handling their products at the end of their useful lives into the prices they charge US consumers. The debate is no longer about „whether" to adopt EPR principles – it is now about „how" to do so.

B. The Grassroots Global Response to Electronics Production Hazards

By the dawn of the 21st century, most electronics manufacturing had moved to Asia and other low-cost areas of the world, bringing with it the same sets of environmental and health concerns that had been discovered in the US and Europe but which were at that point unknown in the new regions. Soon activists in the developing world began to encounter and uncover occupational health hazards and environmental pollution associated with the latest round of rapid expansion. Global networks of activists began to emerge to address the hidden hazards of high-tech development and they are now working to develop comprehensive, holistic and coordinated strategies to bring accountability to and promote sustainability within the global electronics industry. Included within these networks are groups that focus on workers rights, occupational health and safety, environmental pollution, and hazardous waste prevention and cleanup. Some newer voices are beginning to question the underlying model of Moore's law that promotes rapid obsolescence and the „throw away culture" that is fueled by huge advertising budgets informed by state of the art marketing strategies as well as by young consumers grasping for the latest gizmos and whiz bangs. Still others are beginning to examine the role of software development which operates in tandem with the hardware development – each encouraging consumers to continue to buy more complex products and discard older models. Some have dubbed this the WINTEL model, named for the 2 main oligopolies Windows (Microsoft) and Intel.

As workers and communities outside of Silicon Valley began to discover this 'dark side of the chip', they also began to come together to confront its 'clean' image. Community and worker based movements began to emerge in other countries - PHASE II in Scotland, Asia Monitor Resource Centre in Hong Kong, TAVOI in Taiwan, CEREAL in Mexico, etc. as the grassroots efforts began to grow into a global movement. Many of these groups are now working together internationally through various networks to develop worker training on occupational health and safety, to clean up and prevent air and water pollution, to press the electronics industry to phase out use of the most toxic chemicals, and to advocate for a safer, healthier and more just workplace for production workers.

As the pace of corporate-led globalisation accelerated, grass roots activists realized that they too needed to develop a robust grassroots global response. That is why many of these groups came together with the *International Campaign for Responsible Technology* to convene the first Global Symposium on Strategies for a Sustainable High-Tech Industry, in 2002, in San Jose, California. Participants came together to address several related issues, including:

- Rising community and workers' health problems.
- Deteriorating workers' rights.
- Increasing water and air pollution.
- Growing crisis of electronic waste.
- Escalating corporate influence on global institutions such as the WTO.

An action plan was developed that included a commitment by participants to pool their experiences into a new book, which became 'Challenging the Chip: Labor Rights and Environmental Justice in the Global Electronics Industry', published in 2006. Contributors to this pioneering volume include many of the world's most articulate, passionate and progressive visionaries, scholars and advocates. Here they not only document the unsustainable and often

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devastating practices of the global electronics industry but also chronicle creative ways in which activists, government agencies and others have attempted to reform the industry -- through resistance, persuasion, and regulation.

One book reviewer captured the importance of the effort:

'Challenging the Chip is certainly the most comprehensive review of the social, health and environmental consequences of the electronics industry to date and provides a critical platform for developing new theoretical and empirical research on the political economy and ecology of the industry. The plethora of topics explored also highlights the multiplicity of disciplines that can contribute to debates about the chip industry, including the social sciences, public health, and environmental sciences. A most impressive feature of the book is the way in which it developed out of a collaborative partnership of intellectuals and activists with a shared vision of sustainability and justice.' - Electronic Green Journal[10]

Since the book's publication there have been many additional efforts by NGOs to move ahead with a „labor rights and environmental justice" agenda for electronics workers and communities. ANROAV - *the Asian Network for the Rights of Occupational Accident Victims*[11] - has increased its focus on electronics workers' health and safety and has included panels and workshops at its last two annual meetings. *The European Work Hazards Network*[12] has also included electronics health and safety workshops at its conferences, as has the national *Committees on Occupational Safety and Health Network (COSH)*[13] in the United States. *Good Electronics*[14] is another network based in Europe that focuses on working conditions in electronics.

There is also growing interest in India and China, countries with the most rapid high-tech growth and consequently with the most at stake in terms of workers' rights, worker and community health, and electronic waste impacts. Following the publication of Challenging the Chip there were forums held in Bangalore and Kerala, India, organised by *Asia Monitor Resource Centre*[15], Waste Not Asia, and other labor and grassroots groups. Likewise, a book tour was arranged in China by *Greenpeace*[16], which energised large groups of students and others at several campuses in south China and in Beijing. The Chinese version of the book also will be available soon. Media attention is growing throughout Asia and throughout the world – a recent presentation at an eco-waste forum in Manila was featured in an article in the Manila Times. And the emergence this past year of the dazzling Internet video *The Story of Stuff*[17] has informed and excited millions of activists around the globe.

It has been a long time since the Valley of Heart's Delight began to disappear in its transformation to Silicon Valley. Hopefully it is still not too late to learn the lessons of this experience to protect emerging 'Silicon Valleys' in India and throughout Asia. The growing grassroots global movement is increasingly speaking truth to power, putting a human face on the dark side of globalisation, and providing a vision for a new sustainable electronics industry. It is about time we learned from the lessons of the past, since the future continues to be built before our very eyes, and, as we know, it is being built on even more powerful and less understood technologies such as nano technology. Our challenges are only just beginning.

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