

EXECUTIVE
SUMMARY

Islands in the Wastestream

BASELINE STUDY OF NONCOMMERCIAL COMPUTER
REUSE IN THE UNITED STATES

CompuMentor
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A COMPUMENTOR REPORT BY JIM LYNCH

Executive Summary

The United States faces a unique challenge and opportunity regarding the disposal of obsolete computer equipment. On the one hand, three-quarters of all computers sold in the United States remain stockpiled in businesses and homes.¹ On the other, thousands of schools, nonprofits, and low-income families could greatly benefit from access to this resource. Unfortunately, no direct nationally based distribution system links this supply with this demand.

CompuMentor's Baseline Study of Noncommercial Computer Reuse in the United States examines the computer reuse field to establish the quantity, quality, and overall effectiveness of computer reuse taking place in the Bay Area and, to some degree, the rest of the country. The study also profiles how businesses fit into the field of charitable computer reuse.

To the best of our knowledge, definition of the noncommercial computer reuse field has not been completed anywhere else in the country to the extent reflected in this study. Our findings bring new information and analysis to those interested in environmental and digital divide philanthropy.

STUDY HIGHLIGHTS

- **Approximately 40% of US families do not have Internet-capable computers.**²
- **Approximately 30%-40% of nonprofit workers do not have Pentium-level computers to perform their work.**³
- **CompuMentor research estimates public school need for computers at 140,000 in the Bay Area and 9 million nationally.** This need has been dramatically affected by recent state and local budget cuts.
- **Demand for low- or no-cost computers is high and currently largely unmet in the San Francisco Bay Area and the US.**
- **Noncommercial computer reuse demonstrates increasing potential to fulfill these needs in the US.**
- **US corporations are interested in donating computers, but primarily to meet philanthropic or corporate citizenship concerns.** Currently, no uniform or substantial tax deduction benefit exists for US businesses to donate fully depreciated computers to charities and schools.
- **Computers for Schools Canada is a functioning proof-of-concept for non-commercial computer reuse,** already supplying 25% of computers in Canadian schools, and also supplying computers to Canadian nonprofits. Canada is far ahead of the US in this field.
- **From an environmental standpoint, it is preferable to reuse computers an extra two or three years than to recycle their components.** Over each computer's life cycle, reselling or upgrading computers saves 5 to 20 times more energy than recycling.

AN INTRODUCTION TO NONCOMMERCIAL COMPUTER REFURBISHING

The noncommercial computer refurbishing field is a small part of the overall computer recycling industry, under 2% in the US. It is comprised of noncommercial organizations⁴ that refurbish discarded computer equipment to help achieve a broader social mission, such as reducing the environmental impact of e-waste or helping individuals and organizations cross the digital divide.

KEY CHARACTERISTICS

Key characteristics of the noncommercial computer refurbishing field are listed below:

- **Businesses and government supply a majority of computer donations to noncommercial refurbishers.** Donations from individuals account for a smaller portion of the donation stream.
- **60% of US noncommercial refurbishers surveyed by CompuMentor do not charge fees for the refurbished computer equipment they provide.**
- **Noncommercial refurbishers typically employ two or three paid staff but rely heavily on volunteers, with an average of 30 or 40 volunteers each.**
- **Most of the noncommercial refurbishers surveyed report that they expect their capacity to double in the next three years.**
- **66% of surveyed noncommercial refurbishers report that they can properly clean data from donated computers as part of their process, but only the larger refurbishers report doing so on a routine basis.**
- **CRT monitors are the biggest e-waste cost factor for noncommercial computer refurbishers.** In the San Francisco Bay Area, most refurbishers charge at least \$10 to cover CRT monitor disposal costs. In the rest of the country, only 25% of refurbishers charge donors for accepting monitors.
- **Original equipment manufacturers have played a limited role in the noncommercial computer reuse field** even though noncommercial refurbishers would like to work more closely with them.
- **Noncommercial refurbishers engage in minimal information sharing regarding technical issues but do not share an established set of standards.**
- **Private foundation and government grants are currently inadequate to support the development of the noncommercial computer reuse field.**

LOW SUPPLY, HIGH DEMAND

Largely due to low visibility and the lack of a large-scale donation distribution system, the supply of computers via noncommercial refurbishers is relatively small at an estimated 23,000 computers per year in the Bay Area and 200,000 computers per year in the US. According to a Catalyst Alliance/UC Berkeley Haas School of Business study, the San Francisco Bay Area business community is very interested in donating computers. However, they are unclear on how to donate equipment, ensure data security, and recover costs (or at least avoid disposal costs).

In contrast to these low supply levels, demand for good low- or no-cost working computers is significant, estimated at a half million in the Bay Area and 28 million in the US.

TABLE 1
ESTIMATED DEMAND FOR
REFURBISHED COMPUTERS

	SAN FRANCISCO BAY AREA	UNITED STATES
Nonprofits	96,000	4.2 million
Low-income families	160,000	10.5 million
Microenterprises	135,000	5 million
Schools	140,000	9 million
TOTAL NEED	531,000	28.7 MILLION

** Microenterprises are small, often family-owned businesses capitalized at under \$25,000 per year. They currently account for approximately 16% of Bay Area and US employment.*

The noncommercial computer reuse field is not meeting this demand. Several factors have hampered the growth of this field, but the high cost of operating systems arguably has been the most significant stumbling block. This cost factor alone has caused noncommercial refurbishers to limit their capacity to the number of operating systems they could afford, thus keeping programs small and marginal.

IMPORTANT DEVELOPMENTS: MAR AND LINUX/OPEN SOURCE

CompuMentor's March 2003 survey of noncommercial refurbishers found that most computers are donated either with hard drives wiped or without the operating systems, media, and documentation sufficient to reuse the software. Operating systems supply the device drivers required to run the graphics card, modem, network card, sound card, and other essential parts of the computer.

- **THE MAR PROGRAM** Launched in December 2002 as an initiative of Microsoft and CompuMentor, the Microsoft Authorized Refurbisher (MAR) Program has greatly remedied the operating system problem and increased capacity in the field by approximately 30% among refurbishers. Schools are the main recipients of MAR computers, receiving 50% of the computers that are processed through the program. Nonprofits receive 27% and low-income families and individuals receive 23% of MAR computers. The average cost of these computers to recipients is \$49, although 55% of MAR refurbishers supply them for free.

Not surprisingly, MAR has quickly become integral to the noncommercial refurbishing movement and has provided a central point of reference for the field.

- **LINUX/OPEN SOURCE** The Linux/Open Source movement is another area of interest among noncommercial refurbishers. Many noncommercial computer refurbishers use Open Office or 602 PC Suite on their computers, if for no other reason than the MAR program does not yet supply an office suite. Several people in the Linux/Open Source refurbishing community are also interested in building Linux-based "thin client" computer networks in which a server runs the programs and the PCs simply display the video and accept keyboard and mouse input. Because the server runs a version of Linux, the software is free, virus issues are minimal, and maintenance time is substantially reduced. Only the server needs to be a fairly current computer, while the clients can be low-end Pentium Is. Companies like Academic Computing Environments and Symbio Technologies in New York are promoting thin client Linux solutions. Efforts to develop Linux thin client solutions have mostly targeted schools, but there is also active interest among community technology centers.

PROOF-OF-CONCEPT: COMPUTERS FOR SCHOOLS CANADA

Computers for Schools Canada is a large and successful nationwide noncommercial computer reuse program that now furnishes 25% of the computers supplied to Canadian schools. Although largely unknown in the US, the program is a fully developed proof-of-concept directly applicable to low- and no-cost computer needs within the US. Of course, excellent refurbishing programs do operate in the US—such as Per Scholas in New York, Computers for Schools in Chicago and Philadelphia, and OTX West in Oakland—but the US does not have a coordinated, nationwide means of supplying donated computers to schools, nonprofits, and low-income families such as exemplified by Computers for Schools Canada.

DEVELOPING THE FIELD

CompuMentor is now undertaking a comprehensive body of research, coordination, and hands-on projects to deepen public knowledge of computer reuse and refurbishing. Much of this work is guided by nine factors that CompuMentor has determined to be critical to building the field's capacity:

- **Increase the computer reuse and refurbishing field's visibility.**
- **Develop the community of noncommercial computer refurbishers for information sharing.**
- **Expand the MAR program to include other needed resources for noncommercial computer refurbishers.**
- **Create a standards or accreditation body that sets practical warranty, fail rate, and data removal standards.**
- **Encourage the creation of large-scale donation or intermediary mechanisms to distribute computers to refurbishers to make corporate donations much more cost effective.** This approach also answers the need that refurbishers have for a more consistent supply of useful donations.
- **Provide noncommercial computer reuse and refurbisher representation to help the National Electronic Product Stewardship Initiative (NEPSI) create a national computer recycling system.**
- **Identify and develop downstream e-waste disposal options to better close the loop between computer refurbishers and recyclers.**
- **Foster the transfer of knowledge and resources around computer refurbishing to developing countries.** While a significant portion of the US population still does not have access to computers, the need is much deeper in Africa, Latin America, and Asia. A number of projects are beginning to work with developing countries, where typically well under 10% of the population has access to computers. Considerable potential exists to bring the reuse and refurbishing infrastructure developed in the US to the benefit of other countries.
- **Advocate for federal legislation to amend Section 170 of the US Federal Income Tax Code so that it will provide full or partial fair market value to computer donations from businesses.** Currently, there is virtually no uniform tax deduction benefit for US businesses to donate fully depreciated computers to charities and schools.

Tremendous growth potential for noncommercial computer reuse and refurbishing exists in the San Francisco Bay Area and the US. The field could divert much material from landfills and also help remedy the digital divide both in the US and in other parts of the world, including developing countries.

1 National Safety Council, Electronic Product Recovery and Recycling Baseline Report, Washington, D.C.

2 Department of Commerce data tables at: <http://www.ntia.doc.gov/ntiahome/dn/hhs/TableH2.htm>.

3 Gifts In Kind International, "Technology Tracking Study of the Nonprofit Sector" 2001, p.8.

About CompuMentor

Based in San Francisco, California, CompuMentor (www.compumentor.org) is one of the oldest and most comprehensive nonprofit technology assistance providers in the United States. Since 1987, CompuMentor has served over 140,000 nonprofits and schools nationwide with a unique combination of hands-on and Internet-based programs that help nonprofits at any stage of technology evolution solve immediate problems, enhance near-term productivity, and develop technological confidence. CompuMentor's hands-on services include matching technical volunteers with schools and nonprofits and providing technology consulting for nonprofits of diverse sizes and goals, from community technology centers to arts organizations and domestic violence shelters.

CompuMentor is also home of the nonprofit technology portal TechSoup (www.techsoup.org). This renowned Web site aggregates technology resources and information for the national nonprofit community and channels technology product philanthropy at a retail value of over \$150 million (in the current year) into the nonprofit sector.

About the Author

Jim Lynch is CompuMentor's Senior Program Manager for Computer Recycling and Reuse. During his seven years at CompuMentor, Jim has developed a deep understanding of computer recycling and reuse issues and has overseen CompuMentor's efforts in this area. His projects have included developing and maintaining CompuMentor's comprehensive and free online information and referral resource for computer donors and those seeking computers (<http://www.techsoup.org/recycle>), consulting regarding the creation of the computer recycling center for the San Francisco Unified School District, designing the Recycled Computers in Schools demonstration project with Resource Area for Teachers (RAFT) in San Jose, California, and co-designing and managing CompuMentor's MAR program (which distributes Windows operating systems to recyclers/refurbishers across the country).

Jim is a member of the National Recycling Coalition and other recycling organizations and has been interviewed extensively over the years on computer recycling and related issues by National Public Radio, CNET radio, Fox TV, NBC TV, New York Daily News, The San Francisco Chronicle, San Jose Mercury News, Salon.com, Wired News, Philanthropy News Network, Chronicle of Philanthropy, and Nonprofit World Magazine.