

have averaged \$9.1 million, compared with \$4.1 million for technologies commercialized through new ventures and \$1.3 million for those commercialized by the inventor's existing company.

The greater sales resulting from licensing may be attributed to several factors. Licensing agreements are likely to be concluded when the licensee perceives a considerable market for the technology and the licensor finds a firm that has access to channels and markets that the inventor could not tap on his or her own. Licensees tend to be established enterprises that have already gone through the start-up phase that new ventures or recent enterprises still must experience. Licensing thus can provide an avenue for rapid market entry (Weigand, 1986).

Table 3.5 Sales of ERIP Technologies by Date of NIST Recommendation

DOE Numbers	Date of NIST Recommendation	Total Cumulative Sales Through 1990 (\$ millions)	Total Cumulative Sales Through 1992 (\$ millions)	Percent Increase (1990 to 1992)
001 – 100	2/12/76 – 3/30/79	185.0	227.2	22.8%
101 – 200	4/20/79 – 1/27/82	104.0	117.0	12.5%
201 – 300	2/26/82 – 4/30/85	73.8	92.7	25.6%
301 – 400	4/30/85 – 6/24/87	134.0	160.2	19.6%
401 – 500	6/30/87 – 2/7/90	7.2	14.6	102.8%
501 – 557	2/28/90 – 9/30/91	7.7	11.0	42.9%

^aBased on current year dollars.

3.3.3 Sales Versus Appropriations

Table 3.6 compares the sales of ERIP technologies to program appropriations and grant awards, on a cumulative basis using both current and 1992 dollar values. Figure 3.4 plots just the 1992 dollar values. They both illustrate the substantial increase of invention sales over both program appropriations and grant awards.

As an indicator of the effectiveness of ERIP, the \$762.7 million (in 1992-\$) in cumulative sales generated by ERIP inventions can be compared with program costs. Approximately \$41.1 million (in 1992-\$) were awarded through 1992, and program appropriations totalled \$105.7 million (in 1992-\$). Thus, the ERIP program has generated a 19:1 return in terms of the value of sales to grants, and an 7:1 return in terms of sales to total program appropriations.² These ratios have remained remarkably steady since 1986 when they were first calculated.

² These ratios are slightly higher—21:1 and 8:1—when current dollars are used. This is because the grants and program appropriations precede the sales of ERIP technologies and thus are more markedly inflated.