The research and discussions which were a part of this project have led to two main thrusts for follow on work. The first thrust has been a gathering of several Departments at the University of Minnesota into the preparation of a major proposal to the National Science Foundation for an Engineering Research Center on Underground Infrastructure Technology. This proposal also includes the cooperation of local public works agencies and some national geotechnical consultants. The second thrust has been towards the creation of a database which would allow the question of the impact of utility cuts on pavement life-cycle costs to be addressed. A Research Need Statement was prepared and submitted to two committees of the Transportation Research Board at their January 1994 meeting.

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APPENDIX A

TRB RESEARCH PROBLEM STATEMENT

TRB Research Problem Statement

Submitted to the Transportation Research Board committees dealing with Pavement Maintenance (Committee A3C05) and Subsurface Soil-Structure Interaction (Committee A2K04) in January 1994

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Underground Space Center
Department of Civil and Mineral Engineering
University of Minnesota
Member TRB Committee A2K05, NRC
Chairman, U.S. National Committee on Tunneling Technology, NRC

A significant contributor to the deterioration of road pavements in urban areas is the repeated cutting of the pavement and excavation of pits and trenches for utility installation and repair. Although properly specified and executed backfilling techniques work well, these techniques often are not followed - especially on small projects. The result is an unsightly and uneven road surface which often causes earlier pavement replacement than would otherwise be the case. Techniques for repairing and installing utilities with only limited access from the surface are under rapid development. Often, however, they suffer from higher first costs than the alternative technique of trenching from the surface. In order to lower the overall cost to the public of maintaining both utilities and road pavements, it is necessary to have a means of estimating the statistical impact of a road cut on the life cycle cost of a pavement. When established, this indirect cost can be applied to utility pavement cut decisions in the same way as congestion costs and accident costs are applied to highway alignment decisions

Objectives

1. To evaluate the available data from selected public works agencies on the history of road pavements under their control. The data would be evaluated to determine if the available data were sufficient to establish a relationship between the number, size, quality control, etc. of pavement cuts and the resulting pavement condition assessment and/or life. Neural network evaluation probably would be suitable for this assessment since it can be open-ended in terms of the parameters considered.

2. To define the data collection needs which would allow a better future evaluation of the relationships involved.

Key Words

Pavement repair, utility repair, utility installation, pavement maintenance, life cycle costing, trenchless technology.

Related Work

The U.S. National Committee on Tunneling Technology has identified trenchless technologies and microtunneling as having major potential impacts on the provision and repair of underground infrastructure in the U.S.

Europe and Japan are very actively engaged in developing these technologies and are also wrestling with the indirect cost issues. In the U.K, for example, recent legislation requires the consideration of the indirect costs of road work in terms of traffic congestion and other costs when such projects are planned. The North American Society for Trenchless Technology (primarily an industry group) is a focus for the developments in the technology in the U.S.

Urgency

This is an important cost issue for public works agencies and the public. The available data probably is not of the extent and quality desired for a thorough analysis but many public works managers intuitively understand there to be a relationship. It is important that current efforts at improving the data collection aspects of pavement management include this problem as an issue. This study would provide the necessary input to do this.

Cost

$200,000

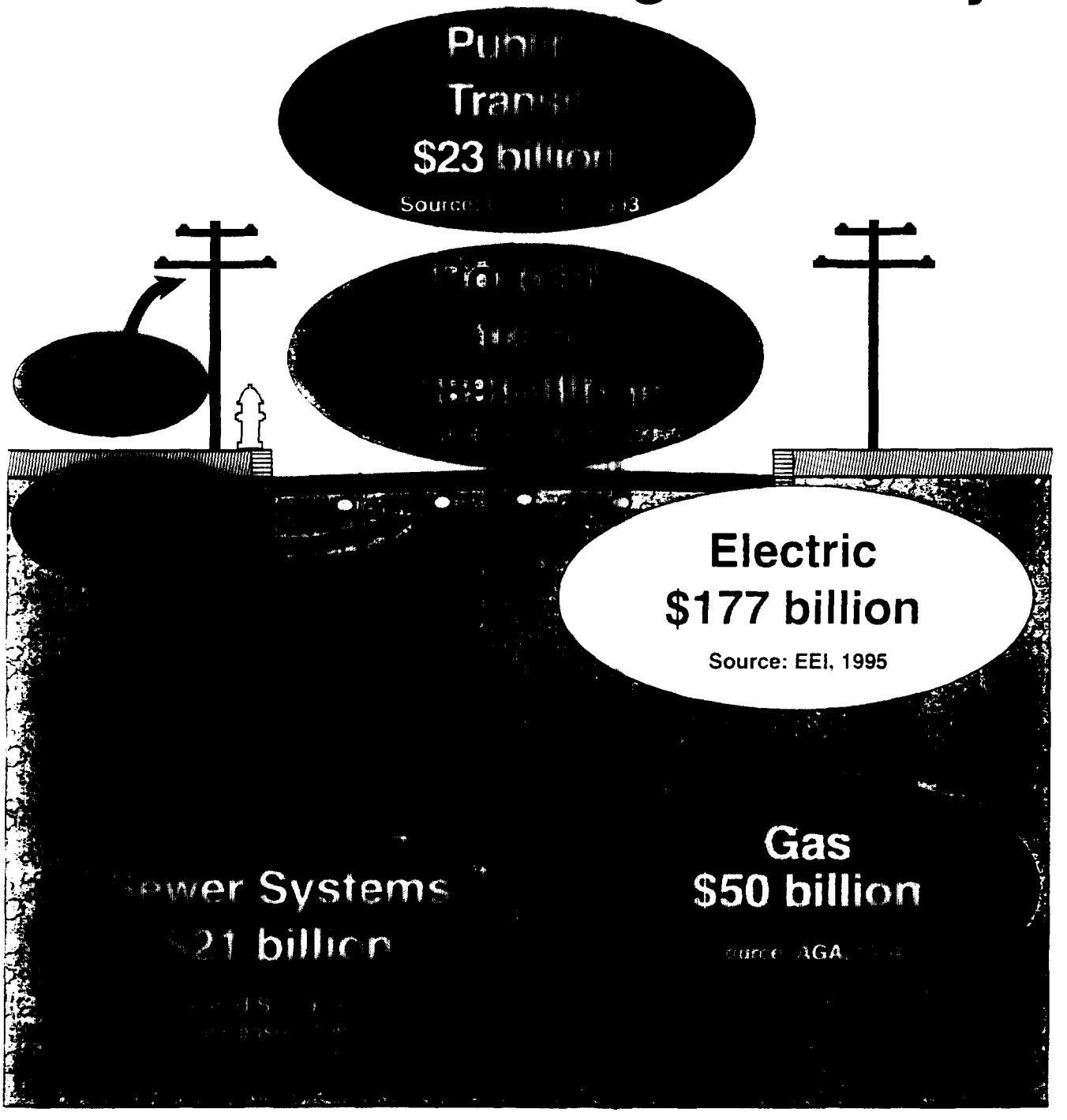
[illegible] OF EXPENDITURES - DENVER GENERAL 1994

(ROW-1)

	RIGHT-OF-WAY	PRELIM. CONSTR.	CONSTR.	MAINT.OF CONDITION	SNOW & ICE REMOVAL	TRAFFIC SERVICES	ADMIN. & ENGR.	TRAFFIC ENFORCE.	CITY-WIDE INDIRECTS	HIGHWAY TOTAL
5110 OFFICE OF MANAGER							257,258			257,258
5120 FINANCE & ADMIN.				569,734	72,347	235,129	27,130			904,340
5210 PROJECT ENGINEERING									0	0
5230 BUILDING INSPECTION										0
5310 TRANSP PLAN/ENGR				385,239		963,098	577,859		169,085	2,095,281
5320 TRANSP CITY ENGR.				1,249,631		156,204	156,204		189,007	1,751,046
5510 STREET MAINT.			2,068,547	11,955,052	1,812,413				1,425,241	17,261,253
5520 SOLID WASTE					1,800					1,800
5530 TRAFFIC OPERATION						3,011,060			219,807	3,230,867
5560 STREET LIGHTS						740,900			23,709	764,609
5910 PARKING MANAGEMENT										0
7000 PARKS WATER FOR HIGHWAYS				165,622						165,622
8100 CAPITAL PROJECTS	192,274	1,274,727	5,281,789			771,539			253,907	7,774,236
8700 BOND PROJECTS			10,100,000							10,100,000
WORKERS COMPENS.				477,376		110,132		292,939		880,447
T O T A L	192,274	1,274,727	17,450,336	14,802,654	1,886,560	5,988,061	1,018,451	292,939	2,280,756	45,186,758

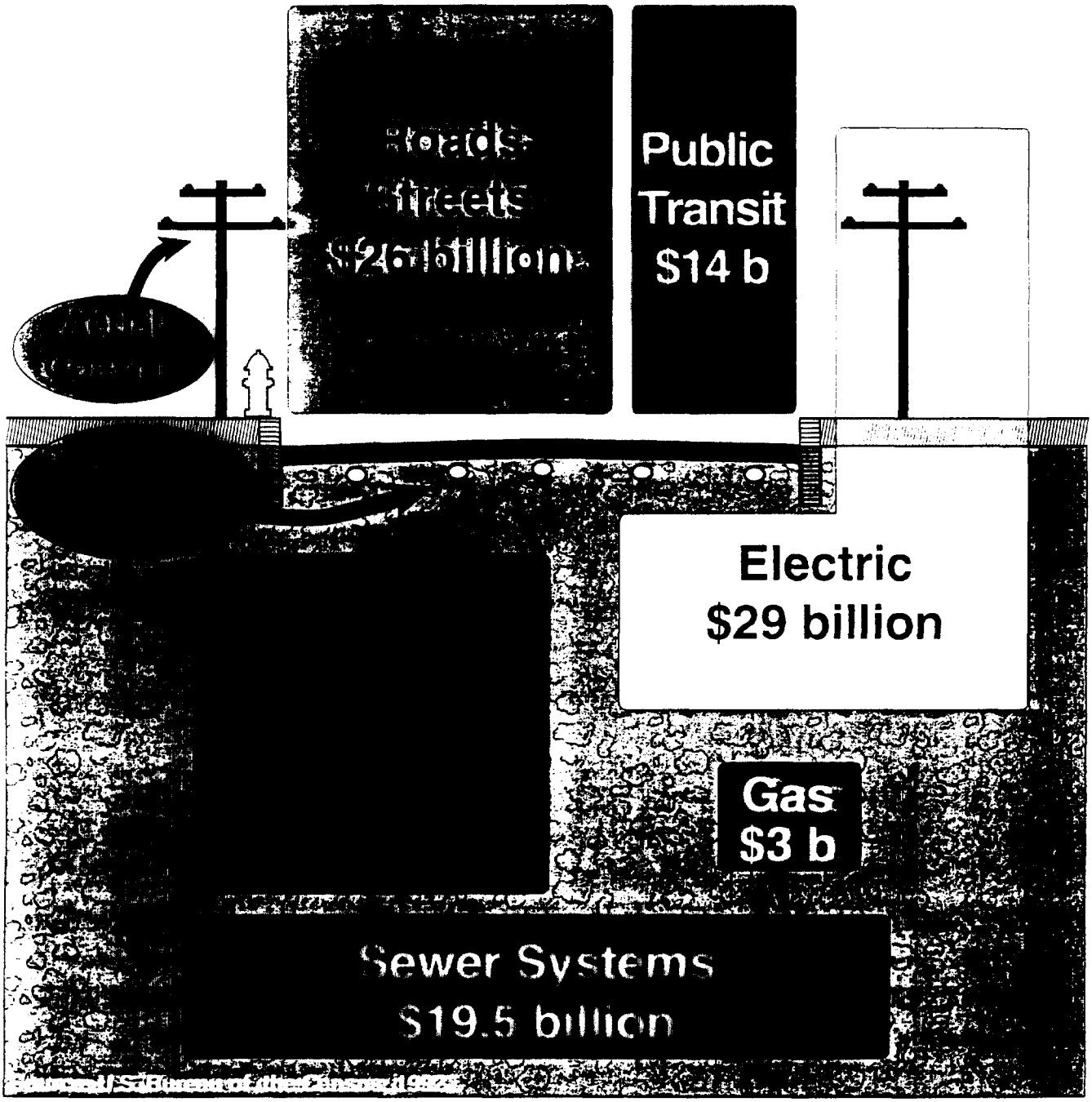
City and County of Denver Department of Public Works Schedule of Expenditures (1994)

Annual Public & Private Revenues Tied to Rights-of-Way



These public and private systems alone conduct roughly $390 billion in business each year, activities which are critical to the economy and highly dependent upon local management of public rights-of-way.

Annual City & County Spending Tied to Rights-of-Way



These local public systems in 1992 represent more than $115 billion in locally-raised property taxes, sales taxes, user fees and other charges.

Selected Federal Statutes Affecting Systems Operating in Local Rights-of-Way