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CITY OF SACRAMENTO

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CITY MANAGER'S OFFICE

TRAFFIC ENGINEERING DIVISION
1023 J STREET — SUITE 202 SACRAMENTO, CALIF. 95814

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September 28, 1978

City Council
Sacramento, CA

Honorable Members in Session:

SUBJECT

Funding of Light Rail Line Feasibility Study

SUMMARY

The County, in cooperation with the City, State, and SRAPC, has undertaken a County-wide transportation study. One of the major items of the study is a light rail line in the Folsom/US-50 Corridor. The state has made an offer of financial assistance to the City for the study of such a rail line. It is recommended that the offer be accepted and the staff be instructed to meet with the State along with other local agencies to identify sources of funds and amounts of state assistance.

BACKGROUND INFORMATION

Mayor Isenberg and Vice-Mayor Connelly met with Ms. Adriana Gianturco in July to discuss possible State funding for further study on the downtown historic trolley proposal. On August 3, 1978, Ms. Gianturco sent a letter to the Mayor indicating a willingness to discuss funding for a study of a light rail system to relieve community-wide transportation problems. A line running from downtown to California State University, Sacramento, and beyond, was mentioned.

On September 6, 1978, the Caltrans staff attempted to have the I-80 Bypass Steering Committee include such a light rail line in the I-80 Bypass Corridor Study. This proposal was rejected since two light rail lines are already included, a County study is already underway, and the specific proposal would unduly expand the I-80 Corridor Study.

On September 18, 1978, the City Manager and Vice-Mayor Connelly met with Caltrans headquarters staff to further discuss the August 3, 1978 letter from Ms. Gianturco. The offer of financial assistance for a community-wide study was reiterated. It was also pointed out that SRAPC must be included. Another letter from Ms. Gianturco is forthcoming and will be

APPROVED
BY THE CITY COUNCIL
OCT 3 1978
OFFICE OF THE CITY CLERK

as amended
report due
11-7-78

attached to this report if it arrives in time.

Meanwhile, the County Transportation Study has advanced to the stage where a draft work program has been prepared for the study of a light rail line in the Folsom/US-50 Corridor. This is basically the same light rail line referred to by the State. Additionally, the County study is a cooperative effort by the County and SRAPC and includes input from the City and State. A report was submitted to the City Council on January 3, 1978, explaining the study and our involvement.

The draft work program for the Folsom/US-50 light rail line study describes all of the elements to be included in the study. The staffing, funding, and time schedules for the effort have not been detailed and meaningful discussions with the State regarding funding would be welcomed as an aid to wrapping up this phase of the work. For example, it has been determined that the State should provide the computer projections of patronage. This work is estimated to cost $6,000, and until now, the State has indicated they will do it if the County will agree to pay. This could be one of several areas of financial contribution from the State.

FINANCIAL DATA

The County is already committed to a study of a light rail line in the Folsom/US-50 Corridor. SRAPC has included this in their work program and has already contributed staff time. Additionally, the City, State, and SRAPC staffs are cooperating with the County on this study. Any financial assistance from the State will make it possible to do a more meaningful and comprehensive study. It will also aid in the effort to complete this study within the same time frame as the I-80 Bypass Study.

RECOMMENDATION

It is recommended that the City accept the State's offer of financial aid on behalf of all local agencies. It is further recommended that the City, County, and SRAPC staff meet with the State to identify funding sources and determine the details of State financial assistance.

Respectfully submitted,

L. M. Frink

L. M. Frink, Traffic Engineer

RECOMMENDATION APPROVED:

William H Edgar

fw Walter J. Slipe, City Manager

October 4, 1978
All Districts

LMF/gs

CITY OF SACRAMENTO

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July 26, 1978

City Council
Sacramento, California

Honorable Members in Session:

SUBJECT: HISTORIC TROLLEY FEASIBILITY STUDY

SUMMARY

The matter of further study of the Historic Trolley System has been left unresolved since late 1977. It has been requested that this matter be brought before the City Council to make a decision regarding the next steps, if any, in the process.

BACKGROUND INFORMATION

The consultant for the Historic Trolley Feasibility Study made a presentation late in 1977. The report contained a list of actions which could be initiated to progress toward implementation. The Council requested SRAPC to make an estimate of costs for the first five items on the list and to return with a proposal for accomplishing the work. A copy of page 144 from the consultant's report, which outlines the action items, is attached. In November of 1977, SRAPC sent a memo to the Council outlining methods to accomplish and fund the study. This memo was never acted upon.

Since that time, another study has been undertaken to consider removal or modification of various features on the K Street Mall. Also since that time, the I-80 Bypass Study has begun. It includes analysis of two trolley systems extending from the K Street Mall to the northeast area.

It has been the staff's position all along that the chances of obtaining outside funding for a Historic Trolley System are very slim. At best, we feel that any outside funding would require a very large local contribution. Most of the federal funding for projects of this sort has been for demonstration type systems and UMTA has already funded several such demonstrations. Prior to the passage of Proposition 13, there may have been some hope of finding local funds from sources such as tax increments. However, these funds have now been diminished to the point where approved projects must be dropped. Therefore, it is not likely any money can be found for the implementation of a trolley system.

FINANCIAL DATA

The SRAPC report dated November 21, 1977 recommended that the City and Regional Transit each appropriate $2,000 toward a $16,000 study. SRAPC suggested that

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they could modify their 1977-78 work program to include the other $6,000 worth of effort.

RECOMMENDATION

It is recommended that the City Council put aside further consideration of a historic trolley until the I-80 Bypass Study is complete and until some significant amount of outside funding for such a project becomes available.

Respectfully submitted,

L. M. Frink
Traffic Engineer

Recommendation Approved:

Walter J. Slipe
City Manager

LMF:js
Attachment

August 1, 1978
All Districts

The following is a general outline of actions which could be initiated by SRAPC, in cooperation with the City and Regional Transit, to progress effectively toward implementation of a historic trolley system:

1. Conduct joint study of potential public sector funding sources including possibilities of State and Federal support, and including identification of any necessary enabling legislation.

2. Conduct survey of attitudes of K Street Mall merchants and property owners toward removal of sculptures and replacement with a historic trolley.

3. Determine general level of public interest and support for a historic trolley system project through a series of public information meetings in the Central City and other mechanisms for communication.

4. Establish costs and implications of including facilities for a historic trolley system in plans for the Multi-modal Transportation Center, through a separate consultant services contract.

5. Determine degree of interest and support from State planners for incorporating a historic trolley system in evolving plans for the State Office complex and Old Sacramento.

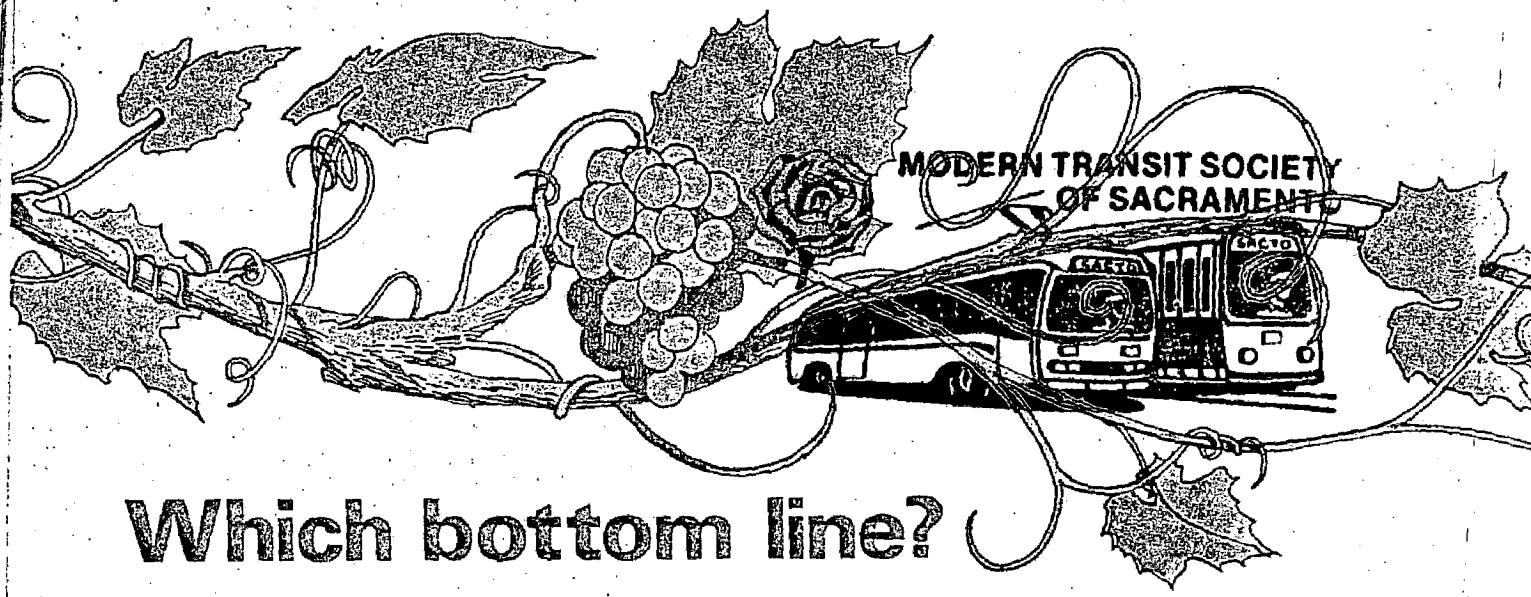
6. Following completion of the above, and if sufficient support is indicated from private businessmen affected and the general public, conduct detailed alternatives analyses including preliminary engineering studies, environmental impact analyses, and related citizen involvement activities.

7. Incorporate the historic trolley system into the official Transportation Plan and Transportation Improvement Program.

8. Secure enabling legislation, if required to implement funding program.

9. Arrange detailed funding/project management commitments.

10. Authorize initial-increment design, including vehicles.



Which bottom line?

Current conventional wisdom says that the price of synthetic fuels and especially the investment associated with them are prohibitively high. That's not necessarily so. Here we show why developing synthetic fuels is not intrinsically more expensive than is finding oil and gas. We'll demonstrate that the apparent high price of coal-derived fuels is due mainly to differences in tax, accounting and legal practices. This is an important general concept; that is, that cost of energy is under *public* control—through the Congress.

Under present U.S. tax laws and accounting practices, the required selling price for synthetic fuels has to be higher than that for natural oil and gas. The crux of the matter is simply this: *In drilling for oil and gas, 75% or more of the initial investment can be written off as an operating expense for computing both taxes and corporate capital assets. Synthetic fuel projects require full capitalization of initial costs.* Thus in order for both routes to look equally attractive, cash flows in the first year of synfuel processing must be extremely large. This follows from the fact that capitalization accounting defers initial costs long into the future. Thus early tax liabilities suddenly rise. For this reason producers cannot afford the same investment in synfuel process plant that they make in drilling and exploration—an immediately recoverable cost. Under capitalization accounting, producers would have to look for new equity capital which, at present interest rates, leads to higher costs than internally guaranteed capital requires.

The "right to expense" has special advantages in terms of inflation, and, as we'll see, also implies a better return on shareholder equity. These advantages are not fully evident when one examines an investment by discounted cash flow (DCF) venture analysis or standard return on investment calculations.

Expense vs. capitalize

(If one *expenses* an investment, the total cost is subtracted from total profits of all projects for the fiscal year in which the investment is made. Taxes are calculated on the balance. Only a portion of a *capitalized* investment can be taken as an expense the first year. The remainder is recovered in later years. The time span for recovery is related to the anticipated useful life of the investment.

Table 1. Direct cost for oil, gas and synthetic fuels (all data in ¢/MM Btu)

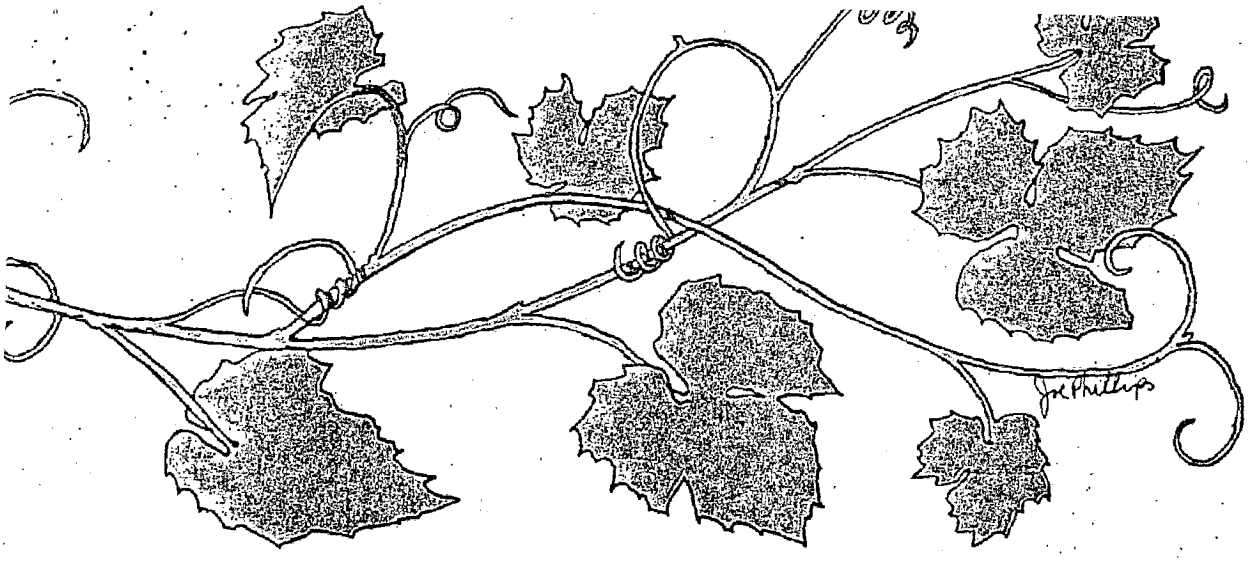
	direct investment[a]	operating costs	total cost
oil and gas (averaged historic costs) (*4*)			
1969–1973	30	16	46
1973–1974	50.5	22.4	72.9
1974	58	24.5	82.5
1975	70	27	97
imported oil (1977)			250
synthetic fuels (estimated costs)[b]			
shale oil 1972[b]	12	37	49
shale oil 1975	22	55	77
shale oil 1977	45	90	135
SNG (Lurgi) 1972[b]	21	90	111
SNG (Lurgi) 1977	50–60	120–130	170–190
syncrude (from coal mine mouth plant including mine, 1977)	75	100	175
methanol from coal 1976 (western coal coproduction with SNG)	55–65	150–170	205–235

[a] Interest charges are not included. [b] Refs: *1–3, 16.*

Importantly, going companies find it hard to switch from a system where most initial costs are expensed to one in which they require capitalization. The problem of switching is even more serious in times of inflation. Let's look in detail at how all this comes about by focusing on alternate energy systems. The arguments pertain to all investment-intensive businesses, however.

Table 1 compares historic costs of finding oil and gas in the U.S. with cost estimates for providing synthetic fuels. Because we are interested in determining the influence of tax laws and different accounting practices, we've not included taxes, interest and profits in Table 1.

We've assumed that any cost incurred before the start of production is, in both cases, an investment; all costs occurring during production are operating expenses (*7, 9, 10*). To convert total direct investment cost to cost per million Btu, we take total direct investment (exclusive of interest during construction) and divide it by the estimated total production over 20 years. Production costs are already annualized so we merely divide them by capacity to get cost/MM Btu.



To estimate historic costs for oil and gas we determined the total amount of money spent during a given period for exploration and development by the oil and gas industry and divided it by the amount of oil and gas actually found. The latter we obtained by noting the difference in total reserves between the end of the period and its beginning after adding back the amount produced during this period. Operating costs are directly taken from API statistics.

This procedure actually underestimates the cost of oil and gas. A lot of the increased reserve is due to extension of old fields, not to discovery of new ones. Furthermore, new oil is in deep wells and/or is offshore so that production cost for it will be higher than the historical average. (Further and relevant statistics will be sent to readers who send a courtesy envelope to CHEMTECH, 48 Maple Street, Summit, N.J. 07901.)

Our best (conservative) estimate of the investment needed to actually find a million Btu of new oil and/or gas is $1.10–$1.30 for 1974–75; to this we add an operating cost to get a total cost for the same years of $1.45–$1.75. This figure, it can be seen, lies within the range of recent estimates for synthetic fuels from shale or coal. Note however that the totals are differently comprised: for oil and gas, direct investment is the major cost; for synthetics, operating cost takes the lion's share.

Now, we can ask why shale has not been found attractive by the same companies which year after year bid each other up for offshore drilling leases. And we can ask why, though synthetic fuels are cheaper than imported oil, people still claim that they are unattractive (5), thereby upsetting our balance of payments, to say nothing of our freedom. In the strange context of our present tax laws, past decisions are, believe it or not, sensible; so if we want to find a solution to our present crisis, we have to look at these laws.

The first question that one might ask is how accurate our costs are. Obviously, they are not absolute numbers. Estimates for synthetic fuels are just what their name implies. We may have as much as a ±30% error. The costs for oil and gas are fuzzy, *but conservative* for reasons

What became of the Little Guy

In earlier times, drilling for oil could be done by small independent investors, but no longer. Today deep wells and offshore locations involve huge single expenditures. Similarly, a single synthetic fuel plant producing the equivalent of 50 000 barrels per day would cost a billion dollars. Thus, we need an enterprise in which such an expenditure is only a portion of total cash flow. Large oil companies not only have this cash flow; they also have the management capability to do so.

What alternative to the large company do we have? The main one is direct government production of energy. Today's ten large oil companies do provide competition and freedom of choice. A single government agency wouldn't be thus tempered.

Reuel Shinnar is Professor of Chemical Engineering at the City College of New York and an industrial consultant. He is a graduate of The Technion in Haifa and received a PhD in Chemical Engineering from Columbia. His present interests concern process control reactor design, process economics, and policy research. Well known for his many papers, he particularly enjoys collaborating with his two sons. One such study, with his older son, Shlomo, applied chemical engineering principles to predict the effect of prison stay on crime rate. It has received wide attention.

Meir Shinnar, Reuel's son, is finishing his doctoral thesis in mathematics at Princeton, and planning to enter Harvard Medical School in the Fall. His BSc is from Columbia. Meir has a variety of interests, one of which is economics, a hobby he plans to pursue with a career in medical research.

Table 2. A venture analysis

(100% equity 10 year project life; discounted cashflow with 15% rate of return, income tax 50%—all costs in million of dollars)

year	(1) investment	(2) operating cost	(3) sales	(4) allowable depreciation	(5) income tax[b]	(6) net cash flow[d]	(7) net cash flow[c] discounted to year zero
0	(100)[a]					(100)	(100)
1		50	60	10	0	10	8.70
2		100	130	10	10	20	15.10
3		100	130	10	10	20	13.15
4		100	130	10	10	20	11.45
5		100	130	10	10	20	9.95
6		100	130	10	10	20	8.65
7		120	160	10	15	25	9.4
8		120	160	10	15	25	8.17
9		120	160	10	15	25	7.11
10		120	160	10	25	35	8.65
Total	(100)	1030	1370	100	120	220	0.33

[a] ( ) Parentheses note negative cashflow.
[b] Income tax is equal to ½ (column 3 − [column 2 + column 4]).
[c] Column 6 divided by 1.15^n (n = number of years).
[d] Col. 6 − (Col. 2 + Col. 5).

we've already mentioned. But we feel confident that the real result of the difference between these two imprecise numbers will be in the direction indicated.

Our problem is compounded by the fact that we live in a time of strong inflation, especially in the construction industry. Inflation makes comparisons based on historic costs difficult. *Nevertheless, decisions must be made and those made by industry and the government are based on numbers similar to those given in Table 1.*

We thus use them as our starting point to find out how costs of synthetic fuels would be reduced if they were treated similarly to those for oil and gas. Should the reader prefer different cost estimates, we ask him/her to bear with us as we develop our main argument, and then try it on the costs he/she prefers.

Inherent differences

First, with oil a significant part of the initial expense occurs many years in advance of actual production. This kind of time lag is less for synthetic fuels. Next, the structure of the investment cost in oil differs from that in synfuel. This difference allows a greater flexibility for the former in the way we treat costs in accounting both for tax purposes and profitability analysis. Finally, with oil expenses (at least in the past) occur in smaller individual chunks than they do in synfuel.

There are some psychological differences, too. In synfuel there is a clear, *visible* investment standing there: a large plant. Most of the initial cost is related to that investment. In drilling for oil, despite the fact that the initial investment is larger, only a small part is "visible." Most of the investment is for "exploration," the cost of unsuccessful leases, dry holes, and so forth. These costs are just as predictable and essential as is designing and building a synfuel plant, but the oil drilling firm has flexibility to consider its costs as operating *expenses*. That flexibility leads to massive savings in income tax.

Venture analysis

To explain all this we should review some of the principles of Venture or Discounted Cash Flow Analysis. In this kind of format (*2, 10*) we compute that selling price which produces that rate of return on *capital* which our business "requires."

Each plant is considered as a single separate venture and cash flows computed over its entire estimated life. The year by year net values of these cash flows, after deduction of income taxes, are then discounted back to the start of the project at that rate of return which we have elected. We have a "profitable" venture if the total discounted cash flow equals or exceeds the initial investment. An example is given in Table 2.

In Table 3 we consider the case of shale oil in greater detail. Our total direct investment is $462 million for a plant that produces 106 trillion Btu/y (~160 MM bbl of crude oil). Just to pay back this capital investment over the plants 20-year life results in a direct cost of 22¢ per million Btu produced.

There is also the annual operating cost of $58.3 million, which adds another 55¢ per million Btu. Thus the figure for total cost to be compared with data in Table 1 is $0.77/MM Btu.

(Note that in this computation we used the costs in ref. *2*, which were the basis of the conclusions of the government study in ref. *2*. They compare realistically to the historic costs of oil and gas *in 1973*, but are now probably half the actual capital required.)

But now comes the rub: we have to include the time value of money. First we must take account of the cash outflow, which starts years before production. Most estimates multiply capital by a factor of from 1.10–1.15 arbitrarily to account for interest during the period. Now we are ready to compute the cash flow needed to provide the desired rate of return. (Actually, we should deduct 10% of our investment for the tax credit given by the federal government, but doing so is not common in published estimates for synthetic fuels.)

There's another small charge for interest on working capital but this capital, unlike fixed capital, doesn't have to be "recovered". We thus assume that working capital must only earn interest as though it were borrowed. This results in a cost of $0.03/MM Btu.

For this project the charge related to return on invested capital is $1.22 per million Btu, of which half is for income tax.

Now note investment-related expenses, with return rate on capital included, are more than two and a half times operating expenses. Had we expensed our investment we

would not have incurred all this required return on investment, but, of course, elsewhere in the firm there must be a profit to expense against.

Since all energy sources have high relative initial costs, all share the problems associated with the fact that investment costs have a much higher weight than operating expenses. Such projects are thus strongly dependent both on interest rate and on the way the project is financed. A useful parameter in discussing this and other investment-related points is Total Capital Return Ratio (TCRR). It is the ratio of the total amount of money recovered over the project life to the initial investment. For the venture of Table 3 this ratio is 6.2. It is computed as follows $[(2.02 - 0.55) \times 106\ 10^6 \times 20] \div (462 + 41)\ 10^6$. Examples for some other options are in Table 4. Look at what happens if we expense all of our original investment (which is tantamount to instantaneous depreciation). The TCRR reduces to 3.7! One way in which we could get the same effect would be by reducing our venture's return on investment from 15% to 9%, but why would we want to do that?

Return on investment

Profitability should not depend on bookkeeping, but it seems to. The standard measure of profitability is return on undepreciated capital assets. If we artificially reduce (or inflate) our assets, the calculated return changes, despite the fact that the real after-tax dollar profit is constant.

Let us now look from this point of view at the advantage of expensing vs. capitalizing. Consider two large, *old* oil companies. Each year both drill new wells to keep annual production constant. Every year each invests $1 billion, spends $0.2 billion for operating expenses, and sells the oil produced for $1.5 billion. The first capitalizes its yearly drilling costs; the second expenses 75% of this investment. *In the steady state* both deduct for tax purposes $1 billion from their income for costs incurred in that and previous years. The first company will have an annual depreciation of $1 billion made up of carry forward depreciations from many previous years. The second, with drilling *expense* of $0.75 billion, has a like set of depreciations from earlier years of $0.25 billion.

Now although both firms show the same profit ($0.3 billion pre-tax) and both pay exactly the same income tax; the first carries on its books an investment that is 4 times larger than the second. The former thus shows a correspondingly lower return on investment on its balance sheet. Return on non-depreciated investment is therefore not a unique criterion for comparing companies.

Furthermore, few people realize that in an ongoing company the rate of return on non-depreciated investment is not directly related to the Discounted Cash Flow rate of return, despite the fact they sound alike. For the first few years of a new company, DCF return is numerically similar to balance sheet return, but in an on-going company made up of several "aged" ventures the numbers are quite different.

And here is an important point for an emerging industry such as synfuel: "permission to expense" a steady-state situation has no effect whatsoever on real profits and therefore on investment decisions. It has a strong real effect during change (even if that change is "only" inflation). Permission to expense makes capital available for growth so that a company with "permission to expense" has a better capability for growth.

Suppose that an oil company that expenses 75% of its exploration expenses finds out that synthetic fuels are now competitive with oil and wants to switch to them. Instead of spending its billion dollars on exploration and drilling and expensing this amount, it will spend that billion dollars to build a synthetic fuel plant. Now it must capitalize. From previous years depreciation (10-year straight line), it has only $250 million available. It will, therefore, require $750 million after tax *income* to finance the switch from its own earnings. This it simply hasn't got. It is thus a prisoner of current tax policies. Even permission to write off the synfuel investment over a short period would not solve the problem. It is thus apparent that the advantage of expensing applies only if we have a working company with a large cash flow, and sufficient profits, such that our new capitalized investment does not unduly upset its cash flow. And changing tax laws won't be effective unless companies reconsider their outlook on investments.

Vineyard economics

Today more and more companies use a venture analysis approach to evaluate new projects. Doing so makes sense for a new company; but in an ongoing operation one has to be careful. Let me illustrate: Let us dream that we have inherited a large, old chateau near Bordeaux. It's on land that produces the best vintage grape, so we're in the wine business. Each year we sell wine that was put in the cellar several years ago, and put most of the new wine into the cellar. With the proceeds of the sale we pay to remove some old vines and to replace them with new ones. Maybe each year we even expand a little. And sometimes we have to plant new varieties of vine because our old varieties have become blighted or because our soil or climate no longer supports the old variety. Each year after we've paid the expenses of assuring our future, we share what's left with the government in the form of taxes.

Now replacing old vines to "grow wine" in future years is not considered an investment, even if the vines yield a new wine. Thus these structural changes are, like maintenance, considered to be an operating expense, a cost necessary to assure the future of our vineyard. Now, is replacing old vines much different from drilling new oil wells to replace depleted ones? Is changing from one kind of grape to another to make wine different from changing from oil out of a well to oil out of a coal mine?

In the steady state, only the direct cost of storing the wine affects our cash flow. However, if we want to *start* a vineyard by raising equity capital things look different. We have to wait 5–7 years until our new plantings produce, and another 5 until the first wine is ready for sale. Every year of aging increases price, yet at high interest rates long aging becomes expensive. Again, once we reach steady state the effect of aging is small, but when a new vineyard is planted, a discounted cash flow venture analysis is justified because we are dealing with venture, not vineyard, i.e., steady state, economics.

Suppose we have a good business with a positive cash flow. Profit covers expenses sufficiently to provide a safety margin, and the business has a record of adjusting to rising costs so that we make a good, safe, long-run living. How much it costs to bring our vineyard to that state is, for present purposes, immaterial. If we want to sell the vineyard, the sale price is determined not by book value, but by what the prospective buyer thinks he will earn. Using DCF at this point can be misleading if not disas-

trous. We must distinguish between investments essential to the continued success of business and *marginal* investments. In a going concern venture analysis makes sense only with respect to the latter, unless one wants to risk going out of business. If a company wants to add a new line or enlarge R&D, then a venture analysis will indicate the cash flow perturbations. It will also differentiate between alternative investments. But when you go to the heart of the business . . .

Assume that we make a DCF analysis to determine whether to replant the vines in a given year and conclude that replacement doesn't give a sufficient return; that it is better to buy grapes and invest elsewhere the cash saved. This could be a questionable conclusion. The DCF rate refers to the difficulty in raising equity. It may or may not represent the return we would get from our alternative investment. But above all, our conclusion does not consider that by relying on buying grapes, we are endangering the future of our whole enterprise, and our ability to control our future.

There is a special reason why we chose the vineyard for our example. In the Bible, the vineyard symbolizes the transition from the economy of the nomads to that of a stable agricultural community with fixed assets. The blessing to the children of Israel: "you will plant vineyards and eat their fruit," means that with stability comes long-range prosperity.

It is our belief that we now face a change analogous to that faced by ancient Jews. Our own economy and political life has been so dominated by short-range thinking that we could become incapable of taking actions or making sacrifices to provide for our long-range future.

Table 3. Breakdown of cost for equity financing of a synthetic fuel plant

	shale oil
plant capacity (trillion Btu/per year)	106
cost of plant (million dollars)	
direct plant cost (including startup)	462
interest during construction @ 15%	68
working capital	41
total capital investment	571
operating costs in million dollars per year (including raw materials, labor, maintenance insurance, overhead)	58.3
breakdown of product cost (in dollars per million Btu)	
depreciation of direct investment	.22
operating cost	.55
profits at 15% rate of return after tax	.61
income tax	.61
interest on working capital	.03
price of product dollars/million Btu	2.02

Cost details taken from ref. (*2*). Current costs would probably be twice those used. Computation of final cost based on 20-year project life and straight line depreciation.

Table 4. Total capital return ratio for different financing schemes

TCRR = number of dollars, profit that has to be received per dollar of initial investment cost. All examples assume a 20-year project life, enough income to get tax credit for losses; and accelerated depreciation at maximum voted under existing law

	TCRR
equity financing 15% DCF, 15% interest during construction, straight line depreciation.	6.2
equity financing 15% DCF, 15% interest during construction, accelerated depreciation.	5.25
equity financing, 15% DCF, 15% interest during construction accelerated depreciation, and 10% investment credit.	4.72
immediate depreciation of all investments (including interest during construction) 15% DCF, 15% interest during construction.	3.7
equity financing 12% DCF, 15% interest during construction, accelerated depreciation.	3.77
equity financing 9% DCF, 15% interest during construction, accelerated depreciation.	2.91
equity financing 4% DCF, 15% interest during construction, accelerated depreciation.	1.69
utility financing[a] (according to DOE utility scheme).	3.0–4.00
expensing both for accounting and tax purposes, 20% profit before taxes.	1.2

[a] Utility financing is a complex scheme based on high debt to equity ratio which is only useful for utilities with guaranteed rates. It also uses a higher unit price in the beginning of the project. For our purposes the TCRR recommended is enough.

Growing oil in a vineyard

What we need is a way to minimize the effect of the transition from present oil "expense economics" to economics most suitable for long-range development of synthetic fuels. This requires changing tax laws, accounting practices of private companies and their mode of approaching new projects.

Let us start with oil shale, one of our biggest reserves. Developing this resource has significant problems and constraints, but most experts agree that it is important to test the technology now. A million barrel a day U.S. capacity in 1985 is technically feasible and could be achieved according to the estimates of earnings in Table 3.

With 1975 equity financing oil from shale was estimated to cost $2.00 per million Btu, which generated interest. Now estimates for the investment have almost doubled, which with conventional syncrude economics would increase the price above $3.00. That's marginal, especially because capital and operating expense to meet environmental constraints is uncertain. But even at double the calculated investment cost, the direct investment cost is only 44¢/MM Btu. This is far cheaper than the average investment for finding oil or gas. However, because syncrude is capitalized, its TCRR and thus its selling price is high.

But look what happens if we erect a high fence around our oil shale plant and claim that what's inside is an oil field—just another variety of grape, right? Now things change dramatically. Out of the fence comes a pipe transporting crude oil (wine), while we claim that inside the fence we are just digging for more oil, which we seem to be doing efficiently because the cost for our shale plant is less than for finding oil. Now if we're allowed to call our new plant an oil field we can expense 75% of this investment and charge it against current income (provided we have sufficient income). Doing this would reduce our final cost from $3.00/MM Btu to an attractive $1.60, even if we underestimated the investment by 30%. At a price of $1.60 the project would earn 15% DCF on the investment that appears on the books. Synthetic fuels from coal and tar sands and even solar energy conversion are ammenable to the same kind of analysis.

How much our plan would reduce energy prices can be seen from Table 5, where we give the required selling price of synthetic fuel as a function of financing format.

Table 5. Effect of financing methods on costs of energy

(1977 costs in $/MM Btu)

	shale oil	SNG from coal	syncrude from coal (mine mouth)	methanol from coal
a. investment cost	.45	.50	.75	.60
b. operating cost	.90	1.20	1.00	1.60
c. total cost	1.35	1.70	1.75	2.20
capatilization financing				
15% DCF	3.00–3.40	3.70–4.00	4.75–5.50	4.60–5.20
utility financing	2.05–2.50	2.70–3.20	3.25–4.00	3.40–4.00
total expensing[a]				
20% profit on sales (before taxes)	1.62	2.04	2.20	2.75

[a] This will give a TCRR of approximately 2.0, similar to that obtained in oil accounting with 15% DCF.

The examples chosen are from recent DOE cost estimates. We pointed out earlier that such cost estimates are not accurate and that we won't know real costs until real plants are built. *But the cost reduction due to the different accounting and financing approach is real.*

Oil drilling tax and accounting (75% expense, 25% capitalized) when used for synthetic fuels reduces selling price by a factor of almost two as compared to standard equity financing, is cheaper than utility financing, and still gives a 20% pre-tax profit on sales—a healthy project.

The consumer would pay significantly less in the long run despite the fact that his present cost would increase by about 50¢ per million Btu. However, each 50¢ he invests now would save him about $2.00 over a period of twenty years. Few investments promise such an after-tax return.

The transition to the tax and accounting system we propose would prevent a tremendous upset. We use about 160 trillion Btu of oil and gas daily. To replace that quantity with new oil, gas and synthetic fuels would require $29–35 billion annually (50–60¢/MM Btu direct investment), plus a pre-tax profit of some $145 million per year if all the investment is capitalized. Since the total pre-tax profit of all American business last year was about $80 billion, one can see the magnitude of the problem. If our proposal would be accepted, the required profit reduces to $30 billion, which would cause a much smaller upset. Yet our vineyard is really very sick. Buying "grapes" from the Middle East and South America won't save it. Only using today's profits to cut away old plants and replace them with new varieties will save us.

Editorial note added in proof

An alternative, or perhaps complement, to the Shinnars suggestion was made recently in the Business Section of The *New York Times* (5/7/78) by George Soros, a fund manager. Soros starts with two premises:

"As matters stand now, a recession is likely to start in the first half of 1979; the later it comes, the severer it will be."

and

"The main importance of the balance of trade is psychological: it influences the willingness to hold dollars. A prospective improvement in the trade balance resulting from the recession, coupled with an abatement of inflationary pressures and the prospect of declining interest rates, should be sufficient to reverse the direction of capital flows."

He then goes on to recommend "the fix":

"A depreciation schedule that would start at, say, 150% of the cost of new investment and return gradually toward the present 100% over a period of years. The currently proposed $25 billion tax cut could then be delayed and reduced or eliminated altogether."

How long would such a fix stay in force? Here Soros has a novel suggestion: Rather than impose a calendar schedule for phase-out he proposes a dollar limit. Thus when a specified amount of new capital has been spent the allowed excess percent would drop in steps from the initial 50%. One wonders if we would see something like the scramble for public lands that we had in the Go-West-Young-Man era.

One also wonders if this "inflated depreciation" isn't just a kind of accelerated depreciation. Thus with 150% depreciation one "recovers" his entire (albeit deflated) initial investment in 6.7 years instead of 10. True, he'll recover an additional 50% of the initial investment during the next 3.3 years but if those dollars are discounted at an inflation rate of, say, 7%/y then they're equivalent to about half their initial value. Well, even that's a help; but in inflationary and/or transitional times why not just initiate faster depreciation as the Shinnars suggest. The answer perhaps lies in Soros' observation:

"The greatest difficulty of all is bound to be political. Is the public ready to make a concession to business and forgo a tax cut at the same time?

But is all this a concession to business? **B.J.L.**

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Authors' address: (Reuel Shinnar) Dept. of Chemical Engineering, City College of the City University of New York, New York, N.Y. 10031.

"Official" Caption for photo on pg 392

"James Herbert, Executive VP of Western Electric and a member of Sandia Labs' Board of Directors, admires semi-conductor wafer developed in Sandia's Semiconductor Devices Lab. Bill Spencer (then 2100, now 8100), at left, and President Sparks accompanied Mr. Herbert who was at the Labs for two days of briefings. Super clean room atmosphere in lab calls for all-enveloping smocks and bournous."

STATE OF CALIFORNIA—BUSINESS AND TRANSPORTATION AGENCY
DEPARTMENT OF TRANSPORTATION
OFFICE OF DIRECTOR
1120 N STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-2200

EDMUND G. BROWN JR., Governor

49

August 3, 1978

RECEIVED
OFFICE OF THE MAYOR
AUG 9 1978
AM PM
SACRAMENTO, CALIFORNIA

Mayor Phillip L. Isenberg
City Hall
915 I Street
Sacramento, CA 95814

Dear Mayor Isenberg:

Recently, the City's feasibility study for a "Downtown Historic Trolley Line" was called to my attention. Caltrans' staff has reviewed this transit concept. Since Caltrans has, as a matter of policy, supported innovative approaches to solving our urban transportation problems, I would like to express our views regarding this proposed application of light rail technology.

The "Trolley Line" proposal tends to limit the service area to the downtown core, which would in turn limit its usefulness as a method for relieving communitywide transportation problems. On the other hand, an incrementally built light rail system could provide an alternative to additional road and freeway construction. Also, a light rail system integrated with the existing Regional Transit system could increase transit ridership and capacity through use of timed transfer and innovative scheduling.

We also note that the City of Sacramento is a major participant in the Interstate 80 Multimodal Corridor Study which will focus on the question of the need for additional transportation capacity between the northeast area and downtown Sacramento.

As you approach the early stages of what will hopefully be a communitywide decision on this issue, some consideration should be given to the interrelationship between the I-80 corridor and the I-50 corridor. Light rail, as an alternative to conventional methods for solving transportation problems, should be given equal weight as the community debates the alternatives.

For example, the feasibility of running a light rail line from the downtown area east to the California State University, Sacramento area, and possibly further northeast, may assist

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BY THE CITY COUNCIL
SEP 19 1978
OFFICE OF THE CITY CLERK

CONT 40
10-3-78

in relieving the congestion both in the I-80 and I-50 corridors. If the City is interested in such a feasibility study, my office would be willing to discuss potential funding for such an effort.

Sincerely,

ADRIANA GIANTURCO
Director of Transportation

Enclosure

30

STATE OF CALIFORNIA—BUSINESS AND TRANSPORTATION AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF TRANSPORTATION
OFFICE OF DIRECTOR
1120 N STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-2200

September 27, 1978

Hon. Phillip L. Isenberg
Mayor, City of Sacramento
City Hall
915 I Street
Sacramento, CA 95814

Dear Mayor Isenberg:

This is a follow-up to my letter of August 3, 1978, which discussed the concept of a light rail system integrated with the existing Regional Transit System in Sacramento.

Subsequent to this, members of our District 3 office met with staff representatives of the City and County of Sacramento, SRAPC, and Regional Transit to discuss the possibility of adding an additional light rail alternative to the ongoing I-80 Corridor Study. The staff response was generally opposed to this suggestion.

The subject was presented to the I-80 Corridor Steering Committee at their meeting on September 6, 1978. It was the majority vote of the Steering Committee not to hear the Caltrans proposal. Though the action was not to include the additional light rail alternative with the I-80 study, there appeared to be general agreement that light rail in the Route 50 Corridor was a valid alternative that should be evaluated separately from the I-80 study.

On September 18, 1978, members of my staff met with Councilman Connelly and City Manager Slipe to further discuss this subject and the possibility of Caltrans involvement in feasibility studies.

At this time, we are willing to commit Caltrans assistance in the development of a work plan and feasibility studies for a light rail system providing service from downtown Sacramento easterly. This should be a cooperative effort with City staff and other interested agencies including SRAPC, County, and Regional Transit.

In addition, Caltrans is willing to assist in identifying funding sources and to look favorably on an appropriate Proposition 5 planning application.

This work will require programming the necessary resources on the part of Caltrans, and we would expect the City to concurrently program appropriate local matching funds.

We are aware that the County of Sacramento and SRAPC are planning to study a rail alternative in the Route 50 Corridor. Every effort should be made to coordinate this work to avoid any duplication.

Additionally, regardless of the decision by the I-80 Steering Committee to omit this alternative from further consideration in the corridor study, we will require that both studies be closely coordinated so that appropriate decisions regarding the various alternatives can be made. As you are aware, the I-80 freeway funds are available for transfer for other transportation projects in the Sacramento urbanized area.

We would appreciate your advice on whether the City desires to proceed with this concept. Please communicate your wishes to Mr. Leo J. Trombatore, Transportation District Director for this area. His address is 703 B Street, Marysville, CA 95901.

Sincerely,

Adriana Gianturco

ADRIANA GIANTURCO
Director of Transportation

cc: Leo J. Trombatore

REGIONAL TRANSIT
P.O. BOX 2110 • SACRAMENTO, CA 95810 • (916) 444-7591

October 2, 1978

Sacramento City Council
City Hall
Sacramento, California 95814

Dear Council Member:

The Board of Directors of the Sacramento Regional Transit District voted unanimously at its meeting on September 6, 1978, to urge the Sacramento City Council to continue studies on the feasibility of light rail transit within the City of Sacramento. In taking this action the Board indicated a willingness to give financial support to this study.

In view of the preliminary work which has been completed, I feel it would be a potentially costly mistake to halt the light rail study at this time, only to have to begin anew at a later date. The complexity of the issue requires a continuing effort to find the most appropriate future course of action. You might be interested to know that our Board has also indicated its support of studies of light rail transit in the I-80 Bypass corridor and in the Rancho Cordova-Highway 50 corridor.

To repeat, the RT Board urges you to authorize continuation of studies of the feasibility of light rail transit and stands ready to contribute financially and participate actively in those studies. Should you decide to proceed I urge an early meeting of RT representatives with city officials to establish the framework for such a study.

Sincerely,

W. Nels Rasmussen

W. Nels Rasmussen
Chairman, Board of Directors

RECEIVED
OFFICE OF THE MAYOR

OCT 2 - 1978

AM 7|8|9|10|11|12|1|2|3|4|5|6 PM

Irene Lara
1908 Vallejo Way
Sacramento, 95818

30

October 1, 1978

Dear City Council,

Since I work Tuesday evenings I cannot attend the meeting, but I would like to voice my opinion on two issues. I am a new member of the Modern Transit Society of Sacramento, and ~~I support the feasibility study~~, which might lead our backward community into the enlightened future. This summer in Germany I was able to enjoy the convenience, cleanliness and ecological sense of light-rail rapid transit.

Our libraries need more public support. Our librarians are being over-worked with all the cutbacks and layoffs of student help. Our students need employment opportunities to enable them to have work experience.

Our city needs the caring and sharing the public library system offers. In particular our smaller branches like McClatchy, Belle Coolidge, and McKinley foster civic pride and community spirit. Let's keep them open to provide a viable, tangible connection between municipal government and the citizens.

Sincerely,
Irene Lara

30

DATE: September 30, 1978

RECEIVED
OFFICE OF THE MAYOR
OCT 2 - 1978
AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

TO: Sacramento City Council
California State Department of Transportation

RE: Light Rail Transportation Systems

Dear Sirs & Madames,

As science and environmental education teachers we are very concerned about energy and pollution problems. Both in the classroom and as citizens we are constantly investigating different solutions to these problems.

We believe that a partial solution to both our energy and pollution problems can be found in the development of light rail transportation systems, both in Sacramento and elsewhere in California. Light rail systems have several advantages over other transportation alternatives. Among those advantages are:

(1) Relatively low construction cost.
(2) Very little pollution, both in terms of smog emissions and noise.
(3) Minimal right-of-way requirements.
(4) Very flexible track design.

For these reasons and others we fully support the development of light rail transportation systems. We encourage you to seek the rapid development of light rail systems in Sacramento and elsewhere in California.

Sincerely,

Frank S. Porter
Buckeye Ele. School

Victor A. Perkes
University of California, Davis

Carolyn Lenzi
Northwood Ele. School

Randall G. West
Environmental Educator, Sacramento

Walter E. Jeghus
Tracy Joint Union High School

Susan Hunter
Northwood Ele. School

Eugene M. Triplett
Magnolia School

Terry Bissonnette
Camerado Springs School

Isabelita B. Sarabia
Isabelita B. Sarabia
Edison Senior High School

Julia J. Chouw
Julia Chouw
Edison Senior High School

Prakash C. Jain
Prakash C. Jain
C.K. McClatchy Senior High School

Harold Kaden
Harold Kaden
Will Rogers Intermediate School

Steven E. Hill
Steven E. Hill
Arcade Fundamental School

Beverly Sherrard
Beverly Sherrard
Thomas Kelly Elementary

Sylvia Waters
Sylvia Waters
Sinaloa Junior High

Margaret Meier
Margaret Meier
Pioneer School

Marian Johnson
Lodi High School

Helena Hutchens
Stkn Unif. Sch. Dist
Stockton, Calif. 95204

Mrs. B. W. Elsner
Edison Senior High Sch
1425 S. Center St.
Stockton, Ca.

Bertie Dodd
Bertie Dodd
Woodside Ele. School

Suzanne C. Allen
Suzanne C. Allen
Pioneer Ele. School

John G. Denison
Ione High School
John G. Denison

Patricia Young
Davis, California
Patricia A Young

Cheryl A. L'Italien
Roosevelt Junior High School

John C Echols
John C. Echols
Sierra Mountain Intermediate School,
TRUCKEE

Lila West
Lila West
Auburn, California

Robert T. Walker
Pierce Joint Union High School
Robert T. Hall

Douglas B. Wallis
Northridge Elementary School
Sacramento

Frank Cimino
Tuolumne County Schools
Sonora, Ca.

Robert T. Hall

Donald E. Clausen
Lodi High School.

Robert J. Lokey
Lodi High School

MODERN TRANSIT SOCIETY OF SACRAMENTO
P.O. Box 981 Sacramento, California 95805

October 3, 1978

FROM: Wayne Hultgren, President M.T.S.

TO: Members of the SACRAMENTO CITY COUNCIL in session

MODERN TRANSIT SOCIETY OF SACRAMENTO will welcome affirmative action by the Sacramento City Council to find appropriate funding for the feasibility study of light rail rapid transit from Old Sacramento to the State University. We know that"Proposition 5" gas tax funds are available for this purpose.

The proposed study is needed to solve some of the serious problems in the Central City. Edmonton, capital city of Alberta (Canada), similar in size and numbers of automobiles to Sacramento, has chosen this solution. Only last April they completed a 4½ mile light rail rapid transit line from their downtown. Their modern vehicles are high speed, high capacity, electrically operated and require no parking in the central city for their passengers. They operate on separate rights of way free from traffic, so they actually relieve the congestion caused by the auto.

The light rail rapid transit line from Old Sacramento and the multi-modal Southern Pacific Depot to the State University will connect the two most heavily used transit centers in Sacramento and will be operated by Regional Transit in conjunction with a bus feeder system. Operating costs for light rail area considerably lower than for buses alone.

I am serving on the Advisory Committee for the Regional Transit General Plan. A recent R.T. survey of registered voters by Robert Proctor and Associates,Inc. revealed that 56.9% agree that "within the next 5 to 10 years Regional Transit should develop some form of rapid transit rail system". We consider this a strong mandate to Regional Transit and other agencies and planning bodies to go after this solution to our transportation problems. Your support for the feasibility study will indicate your far-sighted leadership in city transportation planning.