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Waste to Energy Projects: Economic Considerations for Electric Utilities and Ratepayers

Assembly Committee on Utilities and Commerce

Informational Hearing

of

Assembly Utilities and Commerce Committee

WASTE TO ENERGY PROJECTS:

ECONOMIC CONSIDERATIONS FOR

ELECTRIC UTILITIES AND RATEPAYERS

State Building, Room 1122
Los Angeles, California
October 16, 1985

CHAIRWOMAN: HONORABLE GWEN MOORE

William Julian, Consultant

Yvonne Wilson, Committee Secretary

California Legislature

Assembly Committee on Utilities and Commerce

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MEMBER OF THE ASSEMBLY
FORTY-NINTH DISTRICT

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Interim Hearing
Assembly Committee on Utilities and Commerce
State Building, Room 112
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The Garbage Crisis

For the past twenty years, California has disposed of its waste in sanitary landfills -- placing it at or near the surface of the ground in a relatively untreated condition. Existing landfills are being rapidly depleted, and the siting of new landfills has become an increasingly lengthy and uncertain process. These phenomenon are at the root of what the California Waste Management Board (CWMB) has called the "Garbage Crisis." In a 1982 study, the Waste Board estimated that California will lose 55 % of its existing landfill capacity in the next five years, through closures and depletion.

California generates 35 million tons of waste per year, and spends an average of $ 38 per ton to collect and dispose of it, according to a 1982 study by the CWMB. Collection accounted for nearly three-fourths of the cost. In the large urban areas in Southern California, the overall cost of disposal at landfills is relatively low -- 3 to 6 dollars per ton. However, as landfills close, the costs of disposal will increase rapidly. Estimates are an average 150 % increase in disposal costs.

The average cost of collection and disposal statewide is estimated by the CWMB to exceed $ 50 per ton by 1990, with the increase in costs concentrated in the disposal function in the larger counties.

The costs of current methods of disposal are defrayed either by general tax revenues or user fees charged to waste generators. Sales of recycles materials are important supplement to the revenue stream, but prices in the secondary materials market for recycled materials are low, and fluctuate based on market condistions. There is little dispute that with disposal costs escalating rapidly, and disposal techniques rapidly changing, current user charges do not reflect the real marginal costs of waste creation, collection and disposal.

Waste-to-Energy Facilities as a Disposal Option

The alternatives to landfill disposal include incineration, waste source reduction and recycling. Existing state policy encourages resort to all three methods. However, the air pollution associated with incineration is a significant problem, requiring increasingly expensive solutions, if solutions are to be found at all.

The heat that results from burning waste is a potential resource to be recovered, either directly or through the generation of electricity. Supplementing the revenue available for waste disposal through sales of this recovered resource may be an attractive option for local governments both strapped for cash and running out of landfill capacity.

These considerations led the CWMB to observe in its Draft Comprehensive Plan (November 1984) that

> Waste (refuse)-to-energy appears to have the greatest potential to share the burden of handling increased volumes of waste that landfills may not be able to handle.

The CWMB recommends that 50 % of state municipal solid wastes be processed by refuse-to-energy facilities by the year 2000. The County Sanitation Districts of Los Angeles predict that by the year 2000 60 % of LA County solid waste (estimated to be 45,000 tons a day) "could go to refuse-to-energy facilities for burning and conversion to power...."

Despite these ambitious development goals, state policymakers have equivocated on the specifics of promoting development.

Public Resources Code § 25441.1 provides in pertinent part:

> It is the intent of the Legislature to encourage the development of thermal powerplants using resource recovery (waste-to-energy) technology. Previously enacted incentives for the production of electrical energy from nonfossil fuels in commercially scaled projects have failed to produce the desired results.

Nevertheless, the Legislature has not articulated any new "incentives" targeted specifically to waste-to-energy projects and their special characteristics.

The Governor signed legislation this past session removing certain permitting obstacles to the development of a waste-to-energy plant in the City of Long Beach (SB 1463, Dills), but vetoed virtually identical legislation affecting a project in the City of Los Angeles (AB 889, Harris.)

Significant legislation (SB 166, Rosenthal) dealing with the air quality impacts of development of new cogeneration projects omitted new waste-to-energy projects from key provisions dealing with entitlements to utility offset credits.

The Role of Electric Ratepayers

Perhaps the single most attractive feature of waste-to-energy facilities for waste managers is the existence of a guaranteed market for electricity sales under the provisions of the Public Utility Regulatory Policy Act (PURPA). This is an assured revenue source, although the amount of those revenues may be in sharp dispute. Under PURPA, and implementing provisions of the California Public Utilities Code and regulations of the Public Utilties Commission, electric utilities must purchase electricity produced by "qualifying facilities" (QFs) using cogeneration or alternative (non-fossil-fuel) technologies. The costs of these electricity purchases are passed on to the utilities' ratepayers. This market contrasts favorably for project developers with the "free" market for other recycled resources, because it is relatively stable.

Electric Utility Considerations

Using waste as a substitute for fossil-fueled electric generation may be an attractive option for the state's electric utilities. However, important resource planning and pricing issues have not been definitively resolved.

A) What Price to Pay for Electric Energy ?

The Public Utilities Commission has been engaged in a long-running and still evolving process of creating and refining long term power contracts (standard offers) between utilities and third party power producers, including operators of waste-to-energy facilities. Under these contracts, the utility pays its "avoided cost" for energy (electricity produced and delivered) and capacity (the ability of the facility to deliver electricity instantaneously on demand).

Determination of the "avoided cost" is a complicated and vigorously contested process. The theory is that the "market price" of the electricity produced by the monopoly seller, the utility, can be approximated by determining the costs that the utility "avoids" by purchasing a unit of electricity rather than producing it itself. This then would be the price paid to the QF.

Clearly, "avoided costs" change over time, as the economy changes; as the characteristics of the utility's system change; as the characteristics of the demand by the utility's customers change. Utility customers want some reasonable assurance that the price they are paying for electricity at any given time, including QF electricity, is a fair, "market" price, and not more.

However, this introduces an element of uncertainty in the price to be paid for QF power that has important implications for projects which, like waste-to-energy facilities, are capital intensive. These projects are built with borrowed money, which must be repaid out of the stream of income generated over the life of the project. Project developers and financiers want certainty that there will be adequate income to assure repayment.

A signal example of the impact of the uncertainties caused by changes in the avoided cost payments occurred this spring, when the PUC suspended one particular payment option for long term capacity commitments which many waste-to-energy developers has been counting on in negotiations with utilities. The PUC believed that the prices being offered were too high; developers argued that without payments at the previous level, project financing would be jeopardized. The Los Angeles County Sanitation Districts sought to have certain of their unexecuted contracts with Edison Company grandfathered, arguing that the state's commitment to resource recovery justified the higher level of payments. The PUC refused an exemption from the suspension. The question clearly posed is whether electric ratepayers ought to be providing the "incentives" to invest in waste-to-energy facilities.

"Avoided costs" on the Southern California Edison system are much higher than those on the Los Angeles Department of Water and Power system, so virtually the entire market in Southern California consists of potential sales to Edison. The situation

is comparable in Northern California, where PG & E is a monopsony buyer of QF electricity.

B) Does California Need the Power ?

The Energy Commission has been attempting to describe the respective roles of various alternative energy sources -- including waste-to-energy -- in the state's long term electricity supply system.

The CEC has developed an assessment of the state's long-term need for electricity supply which it is using to guide its decisions in siting of new powerplants over 50 megawatts capacity. Its intent is to use regulatory methods to assure that electricity supply and demand match over the next twelve years. The approach adopted has been to develop a demand forecast, and a portfolio of power supply modalities to be developed to keep supply abreast of demand. Powerplant authorizations issued under the CEC's siting authority will be limited to that amount of supply necessary to meet the predicted demand.

This approach to supply planning and siting is quite controversial for many QFs and utilities, who may disagree with the philosophy (setting supply levels through regulation rather than market forces) or the implementation (the demand forecast is wrong.) However, with respect to waste-to-energy development the CEC noted in the 1985 Energy Plan that "[Waste-to-energy projects] should be allowed to develop because of their general societal benefits. Their development should not be constrained because of a lack of an electricity need allocation."

Case Studies of Southern California Proposals

A number of waste-to-energy projects have been proposed in Southern and Northern California. Financing construction and operation is quite complex. Issues related to siting the facilities; negotiating power purchase contracts under the standard offers; mitigating air quality impacts and selection of appropriate technologies are unresolved for many of the proposed projects. So many of the unresolved issues are specific to individual projects that generalization is difficult without a detailed case study approach.

Attached are some materials describing representative Southern California projects.

Economics of Waste to Energy

1) The Economics of Waste Disposal

   A) What are the costs of conventional waste disposal ?

      1) Collection

      2) Disposal -- Landfills
                  -- Burning
                  -- Recycling

   B) What are the revenue sources for conventional disposal ?

      1) Tipping Fees

      2) Governmental subsidies -- general fund and "environmental clean-up" funds

      3) Resource Recovery

2) A New Revenue Source -- The Utility Ratepayer

   A) What is the need for additional third party electricity Generation

   B) What is the price to be paid for third party power--avoided cost pricing under the standard offers

3) Costs Associated with Burning

   A) Survey of incinerator/Co-generation Technologies --

   B) Environmental impacts of respective technologies

      1) Air quality

      2) Toxic emissions

4) Financing Scenarios

      1) An analytical study

      2) Some Case studies --

         a) The City of Commerce Project

         b) The Spaadra Project

         c) The City of Los Angeles Lancer Project

CHAPTER I: SUMMARY

The proposed Spadra Landfill and Resource Conservation Project is a cooperative effort of the County of Los Angeles, California State Polytechnic University at Pomona (Cal Poly) and the Sanitation Districts of Los Angeles County. The Sanitation Districts have evaluated the proposed project and have prepared this Final Environmental Impact Report (EIR) for the following purposes:

a) To report the landfill and resource conservation designs that have been studied for the proposed project,

b) To describe potential environmental effects of the project and the measures which would be employed to reduce or eliminate potential negative effects,

c) To evaluate alternatives to the project,

d) To report citizen and public agency comments received during the planning process and review of the Draft EIR, and

e) To report responses to issues raised during the review of the Draft EIR.

This Final EIR is comprised of a revised version of the Draft EIR on the proposed project which addresses questions, concerns and comments raised by the public and responsible agencies during the review period for the Draft EIR. An additional chapter which summarizes the major environmental issues raised during the review of the Draft EIR and the Districts' response to these issues is also a part of the Final EIR.

PROJECT DESCRIPTION

The 164 acre Spadra Landfill site is located approximately 1.4 miles southwest of the intersection of the San Bernardino (10) and Orange (57) Freeways. The site is owned by the County of Los Angeles and operated by the Sanitation Districts under a Joint Powers Agreement with the County of Los Angeles. A 128 acre portion of the site was originally permitted for use as a sanitary landfill in 1956. In addition, under an agreement with Cal Poly, a 45 acre parcel of land owned by the University, bordering the site on the northwest, was used for sanitary landfilling and was completed in 1976. At the current rate of disposal, the landfill will reach its permitted capacity in mid-1988. However, at the current rate of cover soil utilization, on-site cover soil will be exhausted by mid to late 1985.

Presently, the Spadra Landfill receives an average of approximately 1,600 tons per day, Monday through Saturday, of non-hazardous waste, serving the disposal needs of a tributary population of approximately 300,000. A majority of the population served by this project reside in the communities of Pomona, Walnut, Claremont, San Dimas, La Verne and Diamond Bar.

The proposed project consists of:

1) Continued sanitary landfilling on the existing Spadra Landfill site,

2) The placement of additional refuse fill on the (previously filled) 45 acre parcel owned by Cal Poly,

3) Cover soil excavation and sanitary landfilling on a 70 acre portion of a canyon area owned by Cal Poly and bordering the Cal Poly 45 acre parcel on the northwest, and

4) Implementation of resource conservation measures including a 1,000 ton per day refuse-to-energy facility, a landfill gas-to-energy facility, the use of reclaimed water for irrigation, dust control and cooling water, and the use of sewage sludge as a soil amendment on completed areas of the landfill.

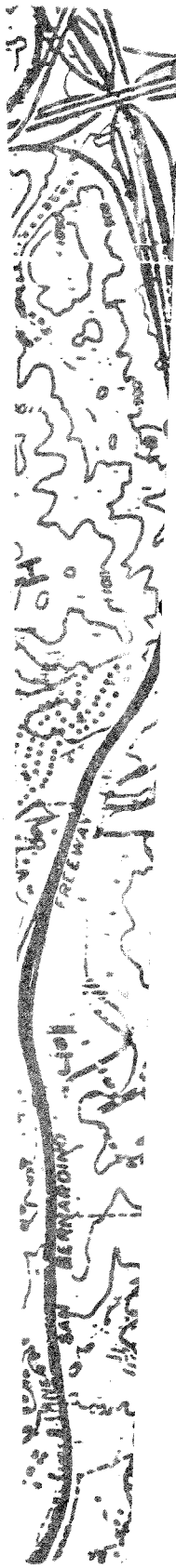
The existing landfill site and proposed project areas are shown on Exhibit I-1, and the proposed fill design and location of the proposed refuse-to-energy facility site are shown on Exhibit I-2.

The primary goal of this project is to provide a multifaceted approach to solid waste management for the local communities around the Spadra Landfill that is both environmentally sound and cost effective. The project is also designed to satisfy regional needs for permanent greenbelt areas, along with long term agricultural research and recreational opportunities.

The sanitary landfill operation involves placement, compaction and covering of the refuse completely with soil prior to the end of each working day. The thickness of the daily soil cover is approximately nine to twelve inches. Final cover soil over the compacted top surface of the fill would be a minimum of five feet thick and slopes would be covered with a layer of earth a minimum of seven feet thick. Earth excavations would be made almost entirely from areas that will later be filled, minimizing the excavated area that would be permanently exposed. The landfill would accept refuse for disposal between 8 a.m. and 5 p.m., Monday through Saturday, the current hours of operation.

The refuse-to-energy facility operation involves the combustion of municipal solid waste and recovery of the resultant heat energy for useful purposes. Three alternate sites for the refuse-to-energy facility were presented in the Draft EIR. Site No. 3 at the existing entrance on Valley Boulevard was selected as the location for the refuse-to-energy facility as a result of air quality and traffic considerations as well as input received during the public review period. In this project, the recovered energy would most likely be converted to approximately 24 megawatts of electricity and sold to the Southern California Edison Company (SCE).

The gas-to-energy facility would utilize landfill gas produced by biological decomposition of the refuse within the landfill. The gas would be captured by the site's expanded gas collection system and could be used in a number of ways: either to fuel an engine/generator set to produce electricity, which would be sold to SCE; burned in a boiler to produce steam, which would be sold to a steam user; sold directly as a fuel; or a combination of the above.



The prediction of future refuse disposal rates at the Spadra Landfill is difficult because refuse quantities received at a given site depend on factors such as population growth rates, per capita waste generation rates, the opening and closing of other facilities, and the tipping fees being charged at each facility. The Districts estimate that the average daily tonnage at the site will be between 1900 and 3700 tons per day by the year 2000 (see Section 7 of Chapter 3).

The rate at which refuse is received at the site and the capacity of the fill design will determine the operational life of the landfill project. The proposed fill design presented in this document is a modification of the design in the Draft EIR based on input received from Cal Poly University. The modifications suggested by Cal Poly include substantially more contouring of the fill slopes and more topographical relief on the top surface. The proposed fill design has a capacity of approximately 26 million cubic yards of total volume, including presently permitted capacity. It is intended that ash residue from the refuse-to-energy facility would be disposed of at the Spadra Landfill for the design life of the refuse-to-energy facility. Based on the proposed fill design, the landfill portion of the project would have an operational life of approximately 19 years to 24 years depending on when the proposed refuse-to-energy facility is implemented and on the rate of incoming refuse, without taking into account capacity reserved for ash disposal throughout the life of the refuse-to-energy facility. Based on the projected implementation of the refuse-to-energy facility during 1990, the overall project, including both the landfill and refuse-to-energy facility, would have an operational life of approximately 35 years. In order to preserve ash disposal capacity throughout the design life of the refuse-to-energy facility, the refuse disposal rates may have to be controlled during the latter stages of the landfill project life.

A complex set of regulations and standards govern the disposal of solid waste. These regulations are administered by local, County, State and Federal agencies. The land use permits necessary for operation of the proposed Spadra Landfill and Resource Conservation Project are Conditional Use Permits (CUP's) which would be issued by the City of Pomona and the County of Los Angeles. These permits would describe the specific minimum conditions under which the project would be operated. Other permits pertaining to the environmental controls over the project would need to be obtained from the California Regional Water Quality Control Board, County Department of Health Services, California Waste Management Board, South Coast Air Quality Management District, and State Department of Fish and Game.

Landfill operations on the Cal Poly property would be performed under the terms of an agreement between Cal Poly, the County of Los Angeles and the Sanitation Districts which would provide to Cal Poly the opportunity, with input from the Districts and the County, to master plan the interim and ultimate uses of the site. The most probable interim uses are agricultural research, non-food chain crop production and recreational uses such as jogging and equestrian trails, wildlife areas and botanical gardens. The Districts would be responsible for maintenance and operation of the site's environmental control systems both during and after completing the landfill operation.

TI-2

SPADRA LANDFILL AND RESOURCE CONSERVATION PROJECT AREA
PROPOSED OPERATING AREA ON CAL POLY PROPERTY
EXISTING SPADRA LANDFILL SITE
PROPOSED LANDFILL PROJECT LIMITS
CALIFORNIA STATE POLYTECHNIC UNIVERSITY POMONA
SPADRA LANDFILL
POMONA
SAN BERNARDINO
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1

EXHIBIT I-1

COMMERCE REFUSE TO ENERGY FACILITY
5900 Sheila Street, Commerce, California.

FACT SHEET

Project Description: Recovery of energy from municipal solid waste. An average of 255 tons per day of solid wastes will be combusted in a mass burn water wall furnace and the resulting heat will be used to generate steam which will be used in the production of electricity. Approximately 10 megawatts of electricity will be sold to the Southern California Edison Company. This is the equivalent electrical energy consumed by approximately 10,000 homes.

Project Sponsor: Commerce Refuse-to-Energy Authority formed in November 1983 by a Joint Powers Agreement between the City of Commerce (City) and County Sanitation District No. 2 of Los Angeles County (District).

Project Firsts:

1. First major refuse to energy facility to break ground in California.
2. First refuse to energy facility in the United States since 1975 and the first ever in California to be financed with pure revenue bonds backed solely by project revenues from tipping (disposal) fees and energy sales.

Environmental Significance: Demonstration of solid waste conversion to energy as a method to divert waste from landfills. The project will provide an example of refuse-to-energy technology in the South Coast Air Basin that will stimulate development of other similar projects throughout Southern California.

Operational Data:

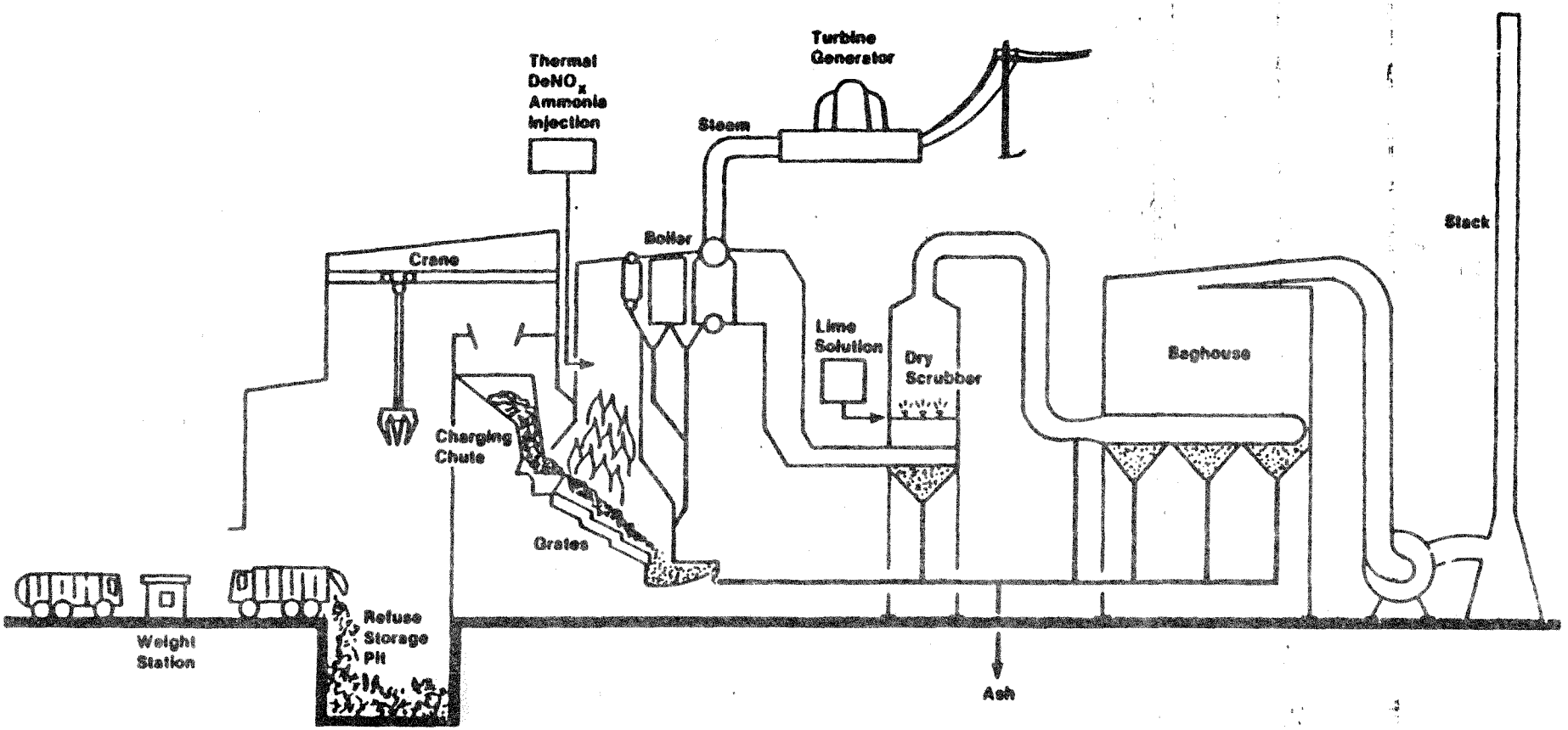
1. Energy recovery: 24 hours per day, 7 days per week.
   Processing rate: 300 tons per day (design capacity);
   255 tons per day (average)
   93,000 tons per year (average)
2. Ash residue: Approximately 75 tons per day.
3. Traffic: Municipal Solid Waste Delivery - Approximately 53 trucks per day.
   Ash Disposal - Approximately 4 - 5 trucks per day.
4. Air Pollution Control: The most advanced control devices will be utilized. No visible plume will be emitted from the stack. Control equipment will include: 1) dry scrubber for acid gas removal, 2) baghouse for particulate removal and 3) ammonia injection for NOx removal.

Key Dates:

February 11, 1985:	Award general contract
March 8, 1985:	Begin construction
February 1987:	Construction complete
June 1987:	Commercial operation to commence

Project Cost: Construction and financing $49,175,000

COMMERCE REFUSE TO ENERGY FACILITY



Waste to Energy Projects:
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October 16, 1985
Los Angeles, California

CHAIRWOMAN GWEN MOORE: We're going to started. It looks like we are not going to have very many members. I had hoped Assemblyman Byron Sher would be down. He came up with some unexpected matters, so he won't be able to join us. So, we are going to get started. I think Assemblywoman Wright will join us.

Members, guest and friends, this hearing on Waste-to-Energy: Economics and Finances addresses an issue area that reaches broadly across a number of traditional legislative concerns. It is the first of three hearings on waste-to-energy development by Assembly Committee dealing with what promises to be one of the most prominent issues in the Legislature next year. The background for this hearing rests in two areas.

First, I have become increasingly concerned waste disposal problems in the Los Angeles area. Waste-to-energy has been described one of the most promising waste management solutions for us in Southern California, but it has a potential high level of costs to electric ratepayers. I hope that we come out of this hearing with a better understanding of the financial role that utility customers may be expected to play in the development of these projects.

Secondly, I am the author of AB 937, a bill which proposes a bond issue for the November 1986 ballot that would provide some equity for advanced air pollution control of waste energy projects. Understanding the traditional economics of these projects will be of assistance of evaluating the needs for the bond facilities in my legislation.

Our first witness will be Dana Hays from the Waste Management Board and Charles Cary from the Los Angeles County Sanitation District.

MS. DANA HAYES: Thank you, Madame Chairwoman. As Director of Legislation for the Waste Management Board, I am pleased to have this opportunity to give you the Board's perspective or asssessment on the subject of waste disposal in the state and its related costs. Some forty communities throughout California are currently investigating and have been in the past interested in potential waste-to-energy technology. They are not really necessarily interested in finding electrical powerplants, but it is because they recognize the need to dispose of their garbage. The Waste Management Board has long maintained that waste to energy is a viable waste disposal option for this state. It is a well proven technology developed and practiced for nearly 30 years in various places throughout the world and recently in the United States.

We look at it, however, first and foremost as a waste disposal technology, not as an energy technology. Although, with the energy crisis a few years ago, it was waste-to-energy that

was promoted as an energy producer, as opposed to the waste disposal option as its primary benefit.

Now, many individuals in the waste management industry, and our Board to a certain extent, believe that California is on the verge of a garbage crisis. We published a report in 1982 in which we did our first initial assessments on landfill capacility statewide. The crisis, however, can best be defined as an indication of the strong trend that we have, that we are experiencing in terms of decreasing landfill capability, the inability to site new landfills and the increased cost of maintaining landfills. Landfills will always be with us. Waste to energy will not in essence get rid of that problem. However, we will always need to bury the residuals whether it's the initial solid waste or the ash itself.

Our most recent figures... (I did bring a few copies here)... of our comprehensive plan, also referred to in your background document, was our draft plan. We have finalized it now. The present landfill capacity in this state will last until 1996. Now, that's an average. There are some landfills that will last well into the year 2000. There are some landfills that are anticipated to close in 1985. In Los Angeles County alone that would include Burbank, which currently take 65 tons of waste per day, Toyon Canyon, which takes 780 tons per day. To just get a perspective, 1.5 million tons is what Sunshine Canyon takes, which is scheduled to reach capacity in 1991.

Without new landfills and exploring expansion of existing ones, the need some sort of alternative form of technology to dispose of this waste is self evident. Now the cost of landfilling our solid waste in California has been kept artifically low, in our estimate. Compared to what other ratepayers or utility users pay, garbage rates are very low. Part of this stems from the regional variations. In San Francisco, the rates are not that low. The total cost of disposal and collection averages about $99 per ton. Whereas in Los Angeles, you don't have the uphill hauls and that type of things, the total runs about $34 to $38 per ton.

CHAIRWOMAN MOORE: Are you saying that perhaps the price is not as great in Los Angeles County since they are only paying $34 now, they could afford to go up to $99?

MS. HAYES: No Madam. What I am saying is that currently the increases will come to Los Angeles County. They are going to come because if we do not find additional landfill capability or and additional way to dispose of the waste, that transportation cost will increase, and additional increases in cost will incur.

CHAIRWOMAN MOORE: I guess what I'm saying and I heard what your comments were, but the question is this: If San Francisco can bear $99, how come Los Angeles can not do the same?

MS. HAYES: But primarily, that...

CHAIRWOMAN MOORE: I'm asking you is there a crisis until Los Angeles gets to $99?

MS. HAYES: That's definitely a debatable point. We think with good planning that there is no need for Los Angeles to reach that stage. You have a lot more geographical ability to site landfills and alternative disposal technology, whereas, in San Francisco, they have a different geographical range.

CHAIRWOMAN MOORE: Is there a user fee in San Francisco?

MS. HAYES: I believe so.

CHAIRWOMAN MOORE: But you don't know what it is?

MS. HAYES: No.

CHAIRWOMAN MOORE: Do you by any chance?

MR. STEVE MCGUIN: No.

CHAIRWOMAN MOORE: I'm just curious to the extent that if Los Angeles who is running out of landfills space and paying $34, there is some room without building waste energy plants.

MS. HAYES: Well, what I would like to bring to the committee's attention is the fact eventually these costs are going to increase whether you have a waste-to-energy plant or whether you continue to landfill. Waste-to-energy provides additional benefits, and can also help to keep the cost down if you look at, you know, in terms of not turning this back to the actual generator.

CHAIRWOMAN MOORE: I don't want to continue to belabor this, but I guess the real concern is, is it a crisis that Los Angeles is paying considerably less than the Bay Area at this point, and is there room to grow to $99 and still not be a crisis?

MS. HAYES: Yes, the crisis of cost versus the crisis of capacity, I don't think -- I mean it's comparing apples and oranges. When we talk about the garbage crisis, we're talking about the actual landfill space. This is John Rowden, our Division Chief for Alternative Technology who is going to explain it.

MR. JOHN ROWDEN: My name is John Rowden. I'm with the Waste Management Board. I head up our advanced technology division.

The situation in San Francisco can be looked at as what may happen in the near future in Los Angeles and other metropolitan areas. Basically, that community has run out of landfill all together and must go its neighboring county to find decent landfill space. They got it on a contract with Alameda County currently dispose of it at a landfill which is 55 miles away, so extreme haul distance to transfer all that waste to that particular facility.

The situation the way we see it in Los Angeles, you have a number of major landfills that potentially could be closing in the near future. If that situation happens, the waste will have to be redirected to major landfills which will accelerate their closure date.

Right now, the way the rates are set in the Los Angeles area due to one efficient collection system or two efficient way of managing the landfills. However, if the landfills are filled up quickly, all of a sudden your cost will jump radically and

very quickly, instead of having sort of a gradual cost increase. So, the crisis that we characterize is a startling trend in landfill closures where we see that in ten years you can haul the waste any place in the state all the landfills will fill up in a ten year period due to a permanent capacity at this time.

CHAIRWOMAN MOORE: But all the people who are opponents of this keep citing to me the desert. All the desert space and we have lots, lots, and lots of desert space.

MR. ROWDEN: Oh, there is lots of desert space, but unfortunately, what we go by is what has been planned, in the Solid Waste Management Plans, those are local plans that would take a local landfill determination use of the space. Right now, we don't have that scenario identified in any of the local plans. Even though, people point to the east and say, yeah, there is lots of room, that hasn't been a scenario that has been investigated in the local plans.

CHAIRWOMAN MOORE: Why not?

MR. ROWDEN: That's a question, I think, you have to ask the neighboring counties of San Bernardino and Irvine.

CHAIRWOMAN MOORE: Again, I guess the point that I'm making is that I would be interested in knowing what the $99 actually represents in terms of actual breakdowns in user fees if that is the case in San Francisco.

MR. ROWDEN: You mean on a monthly basis?

CHAIRWOMAN MOORE: Yes.

MS. HAYES: Eight or nine dollars a month per household.

CHAIRWOMAN MOORE: Do people scream and jump up and down or do they pay it?

MR. ROWDEN: They just pay it. The thing is that we have looked into garbage rates sort of peripherally, because statutorially we are directed not to look at things that have to do with rate setting, but actually we try to keep our ears to the ground and try to find out what's going on with that. But, we don't know of any studies that really looks at the elasticity of the garbage rates to know what are critical points. All we do, see, is that every time you raise garbage rates a penny or a dime or a nickel, you get a considerable amount of posturing by local levels concerned about the increase in garbage rates. So, we really don't know what the top end is that could be paid for garbage. We just know that moving those rates up is difficult.

CHAIRWOMAN MOORE: No one wants to pay any more than necessary, but I think no one wants to be stuck with their garbage either.

MR. ROWDEN: Right.

CHAIRWOMAN MOORE: Okay. We will follow that figure in terms of what it means as we look to alternatives to landfills.

MS. HAYES: As John pointed out, the cost of landfills is going to be rising and, comparing waste-to-energy to landfills, that is something that needs to be kept in mind right now. We are at an artifically low point that, with the stricter environmental standards and studies that are now being conducted, will rise. The assessment of each landfill found potential

impacts from burying the waste. The affect that has on the water quality is something that needs to be considered; when you start looking at air pollution as the trade off in control of that pollution for waste-to-energy technology.

The Board has consistently regarded waste-to-energy as a safe and economical manner in which to dispose of waste, although high capital and financing costs have impeded the progress of most projects. We believe that it can help reduce environmental hazards in waste disposal: either you bury it or you burn it. We believe there is an additional benefit to waste-to-energy in that you reduce the volume of the waste which extends your landfill capacity so although you will always need landfills, you won't need big capacity. Landfill lifes will be extended beyond our current limitations.

We also looked at waste-to-energy as promoting recycling. There is legislation which requires that each waste-to-energy proposed plant have their recyclables appropriately taken care of if you will. Recycling only represents maybe at best a 10% area of municipal solid waste. But, we see that as an additional benefit.

CHAIRWOMAN MOORE: Are you encouraging or the Solid Waste Management Board trying to encourage the development of methods to reduce waste volumes? Are you doing that now?

MS. HAYES: Right. That has been one of our charges statutorily and otherwise for quite a few years. We ran a very strong strongly a recycling program, not only to encourage local

government, but as John explained, we set the state policy. We encourage local governments to do the best they can with their limited resources and provide technical assistance to industry as well as local communities -- to encourage....

CHAIRWOMAN MOORE: You are doing a variety not just recycling, but a variety of methods?

MS. HAYES: Correct. We do support. There is currently a bill in the Legislature to provide tax incentives for the secondary materials market. That was the recommendation that the Board had made out of their comprehensive plan.

Primarily, in summary, the Board does support waste-to-energy. We have introduced legislation to look at the feasibility of providing funding for the projects upfront to help mitigate some of the back-end cost and to get the projects actually on line, to improve our disposal capacity in the state. The $500 million bond measure that we had initially recommended and we are continuing to look into the feasibility of G.O. bonds.

CHAIRWOMAN MOORE: I am going to ask you to speak up. I see people straining in the back to hear what you are saying.

MS. HAYES: The Board believes that the state should explore its ability to help fund these projects. The Waste Management Board also, however, believes that the project should be on a loan basis. Part of the reason why these projects have not come on line as quickly is because of the restrictive environmental controls and the expense of the necessary equipment to maintain these facilities. Also, to be able to prove they are

economically viable at the very beginning is very difficult for most project proponents.

CHAIRWOMAN MOORE: I would assume from that recommendation then, your assumption is that the waste-to-energy facilities could stand without public subsidy? If you are saying to make it on a loan basis, you assume that they will be self-supporting, that they would be able to pay back a loan. I am assuming that the Solid Waste Management Board believes, and your analysis shows, that these projects could become self-supporting and independent. Is that what you're telling me?

MR. ROWDEN: Well, AB 1170 is a subsidized loan program, because it offers loans lower than what the projects would be able to finance through other places. The way the loan was set up, that the money would be borrowed at the interest rate of what the G.O. bonds would go for. So, there is a subsidy.

CHAIRWOMAN MOORE: What I'm saying is that on an ongoing basis, there is some feeling that the trade-off for having a waste-to-energy facility, their capacity of helping reducing the landfill needs, ought to be subsidized in some degree by public financing. I understand they ought to be able to pay back, but that assumes that at some point you are going to break even with what you are doing. There are those who disagree that would ever happens.

MR. ROWDEN: We took a very conservative approach with this. The examples of other nations, states that were involved in waste-to-energy development,,,(INAUDIBLE). This particular

loan program that we proposed is, given the nature of project development, and given the way solid waste management is conducted in this state, we felt this was "most closely parallel" to what was done in the State's Budget. Subsidies would definitely be part of waste-to-energy in other parts of the world.

MS. HAYES: Basically, that concludes my comments. If you have any additional questions. We primarily attempted to address the garbage, landfill capacity issue. John is very knowledgeable about the other area that you have on your agenda. If you have any specific questions, I'd be happy to answer them.

CHAIRWOMAN MOORE: Thank you, but don't go away. Okay, we have Steve McGuin.

MR. STEVE MCGUIN: Madame Chairwoman, my name is Steve McGuin. I'm with the Los Angeles CountySanitation Districts. Chief Engineer and General Manager, Chuck Carry wanted very much to be here, but has a conflict. He's meeting with our Board of Directors, so he was unable to attend. He sends his apologies.

I'd like to take a few minutes of your time to focus the issue of the disposal capacity crisis or situation in Los Angeles County alone. Currently in Los Angeles County, we dispose about 40 thousand tons per day or roughly, one-third of the state's total. In 1979, we operated a total 16 major landfills which are a combination of publicly-operated such as the regional system my agency operates, privately-owned and small municipal sites which provides a very high level of "competition" (I'll put that in

quotes for now, and expand on that later). Again, we now have 10 operating major landfills. Of those, the three largest, without additional permits, will close in early or mid 1990. Again, with the senario with no additional permits, the County of Los Angeles will have no further landfilling capacity by the year 1995 or 1995. Clearly there is not going to be a standstill situation, with no metropolitan area landfills, the alternative would be the long haul. And, this may answer a question you were referring to earlier. Assuming a remote site in Los Angeles County is permittable and I don't think that is a good assumption because we have been involved in siting issues, for example, in the north end of Los Angeles County with a great deal of opposition. I think the issues are the same in the desert as they are in the metropolitan area. People in either area are going to raise siting issues.

CHAIRWOMAN MOORE: There are less of them in the desert than there are in the cities.

MR. MCGUIN: Somehow that is not always relevant.

CHAIRWOMAN MOORE: Democracy. This is America and majority rule.

MR. MCGUIN: But assuming we could get a remote site, in addition to the current metropolitan sites that we have, there are costs associated. The economics are easy to identify. We could easily triple or quadruple current cost of solid waste management in Los Angeles county due to the long haul vehicles we would have to transport the waste. Instead of a facility now

very close to the point of the origin, the facility would now be a great number of miles out in the remote areas, in the county. In addition, there is a fuel cost. That would consume something like 16 million gallons of fuel annually, and produce something like 8 million pounds of air pollutants just to transport that waste. Those are real costs that we have to consider. It is almost easier to say, well, why shouldn't Los Angeles County pay...

CHAIRWOMAN MOORE: So, you are responding to my question why not the desert?

MR. MCGUIN: Yes. It is not clear you can assume you could put it there; there are costs more than just dollars that are associated. Over the last several years, there have really been three goals. One is to expand our existing sites, and we have been successful on some levels. We have had two of our sites recently expanded to continue the operation of the close sites to avoid the cost of the fuel consumption and air quality emissions. Two: site new facilities, which is more difficult, but a track which we are following. The last is to preserve the capacity we do have. Again, I said, if nothing changes, we are going to be out of capacity in approximately 10 years. We can extend that. If we reduce the amount of waste that we put in each day into those landfills, we can make them last longer. So, we undergone a pretty large effort to determine just what we can do with that waste.

We looked in great deal at recycling and what we called material recovery landfills. We conducted a county-wide source separation report entitled, "A Guide for You Our Member Cities." The district serves both the waste water, solid waste needs of 76 cities of Los Angeles County. The cities in essence are partners in these efforts. We produced the guide book to conduct a city-level recycling program. We also have done extensive research...

CHAIRWOMAN MOORE: I am going to interrupt you to recognize my colleague from the San Bernardino District joining us, who represents part of the deserts where I'm trying to put the landfill sites, Assemblyman Bill Leonard. You just came in time. Go ahead.

MR. MCGUIN: So, we have both recycling in the homes and at the landfills. We have identified up to 5 thousand tons per day that under very ambitious goals could be diverted away from the waste stream. By the Year 2000, we are going to produce 40 thousand, though, so we will have a net 45 thousand. The technology that offers the largest single techique to divert waste away from landfills we identified as waste-to-energy. Of the waste stream in Los Angeles county, which is extremely complex waste, only one-third is residential waste. Two-thirds of it don't come from homes. Approximately 60% of that material could be diverted to waste energy.

CHAIRWOMAN MOORE: That's 60% of the total?

MR. MCGUIN: Of the 45 thousand, 27 thousand tons per day could be diverted to waste energy facilities in this county. Althougn seven thousand of that per day could come back as ashe and rejects, but we're still talking about a net reduction in landfill disposal of 20 thousand tons per day. So, with what Dana said, there is still an ongoing need for landfill disposal. In Los Angeles County again we will cut it from 45 thousand tons per day down to 20 thousand tons per day, but we will have diverted 25 thousand away by recycling, material recovery and waste-to-energy. And again, I stress the largest component of that is the wate-to-energy fraction.

Moving along that program, we are involved right now in six separate projects. We have under construction the first waste-to-energy facility in California, in the City of Commerce. It is a joint effort by my agency and the City of Commerce. It is due to be in commercial operation in 1987. Another project, which is a partnership of my agency and the City of Long Beach known as SERRF, (the Southeast Resource Recovery Facility), has recently taken bids for the final design and construction of that facility. We recently received all the local land use permits, which is typically the toughest part of the process, for a one thousand tons per day facility in Pomona. We have three other projects varying in size from a few hundred tons to several thousand tons per day under various stages of development. So, we have tried to move forward on this program of diverting waste so we can preserve the capacity of what sites we have while we

are simultaneously trying to expand their capacity and look for new sities.

CHAIRWOMAN MOORE: Do the economics support the establishment of those sites?

MR. MCGUIN: It depends on when you ask that question. We've got to recogize, I'm sure we will get into that later today, there was a major change in the economics of these projects in April of this year, a very major change. Both your bill and Senator Campbell's bill were authored, they were offered under the senario of the avilability of what's known as Standard Offer Number Four. In that case it was well known that waste-to-energy did pencil out over the 30 year period of life, but the first ten years were very, very difficult. Standard Offer Number Four recognized that, and so, provided some additional assistant in the first ten years. So, the picture has changed. We now have a poorer revenue stream analysis. The need for assistance by a bond bill or whatever mechanism is even greater since April.

CHAIRWOMAN MOORE: Well, we will hear about that I'm sure. Bill, do you have any questions of these witnesses?

ASSEMBLYMAN WILLIAM LEONARD: My question is on the project in Commerce.

MR. MCGUIN: Yes.

ASSEMBLYMAN LEONARD: Who is the operator?

MR. MCGUIN: My agency.

ASSEMBLYMAN LEONARD: What type of process are you using?

MR. MCGUIN: Mass burn.

ASSEMBLYMAN LEONARD: The mass burn process. Any particular manufacturer or did you build your own?

MR. MCGUIN: Which part of the equipment, sir?

ASSEMBLYMAN LEONARD: The mass burning equipment.

MR. MCGUIN: Are you talking about the actual boiler or burner?

ASSEMBLYMAN LEONARD: Yes. I have seen several. Some operators, as I understand, is total where the garbage is their fuel. Others use supplemental fuels.

CHAIRWOMAN MOORE: I wasn't going to get into...At the end, we are going to get into the project.

MR. MCGUIN: I wasn't going to get into the equipment specifics, but I can answer the question very simply. It is a Foster-Wheeler Process, which burns only the refuse. There is no supplemental.

CHAIRWOMAN MOORE: We are going to hear a little bit about that.

ASSEMBLYMAN LEONARD: Good.

CHAIRWOMAN MOORE: Any questions for the State Solid Waste Management Board, Bill?

ASSEMBLYWOMAN LEONARD: No.

CHAIRWOMAN MOORE: Thank you. We are going to ask Lory Larson to do the waste-to-energy, the current survey of the technology.

MR. MIKE HURTELL: I'm Mike Hurtell of Southern California Edison. We will bring out slides up before we begin our briefing on the technology.

MR. LORY LARSON: I'm Lory Larson from Southern California Edison. I'm in the Research and Development Department dealing with waste-to-energy. I will cover the basic technologies that are presently available and on the horizon, in development and ready for commercial application.

The most common technology which you have already heard about is mass burning. That is where raw refuse as you see it here is delivered off the truck. It is picked up and put into a furnace. It is burned as is. We see only large bulky items such as refrigerators and appliances of that nature that wouldn't be suitable are removed prior to going to these mass burn facilities. This is a schematic of the overall system where the refuse is in a storage pit and placed into a combuster where it is burned to recover the heat for steam production and turn electrical generation.

Another process involves refuse derived fuel. This is a shot of a disk screen. This is one technology that has been recently developed to process refuse and separate it. It removes the inorganics such as glass, dirt and grit away from the combustibles or organic fractions, such that, you can have a clearner fuel to go into the combuster. There are facilities operating throughout the country, primarily on the east coast that employ this technology. There are more mass burn facilities

in operation at this point. There are successful refuse derived fuel facilities. This is a more involved schematic -- mainly I wanted to show you the top where refuse is processed. It goes on a conveyor and through some equipment in which includes a magnet and different screening devices to remove the inorganics prior to going into the combustion chamber. So, as it prepares to mass burn where the rocks or glass and that materials do go in with the fuel fraction, only the fuel fraction of the refuse, the paper and that type of material go into the actual combuster.

CHAIRWOMAN MOORE: Where is that process used?

MR. LARSON: In Dade County, Florida is one of the more sophisticated systems. It is one of the largest in our country. It is a 3 thousand ton per day facility that does some very extensive processing of the refuse prior to going to combuster.

A process that has not been implemented in a commercial state, but has gone through a significant amount of development is biological process, which is anaerobic digestion. The two white tanks at the top are the actual digesters. The other equipment shown in yellow are self-supporting equipment.

Digestion involves the mixing of the refuse derived fuel fraction, the process refuse, with sewage and the associated water to make a slurry. That slurry is put into a tank similar to a sewage treatment plant operation, and in that process without the presence of oxgen, biological organisms decompose the material and then produce methane gas, NCO2. The CO2 can be removed if desired and you end up with pipeline quality gas or

you can burn the CO2 and the methane together, depending on what your end use desire is. This is the only technology that really has absolutely no air emission associated with the process. There is no combustion or thermal reaction going on. It is simply a biological process.

The draw back to this technology or the other aspect of it it does require another technology associated with it to complete the process. Inner-digestion removes 50% of the solids, converts that material into a gas. The remaining solids needs to be further processed. That can be done either by dewatering and composting making a soil amendment, which can be utilized. -Kelloggs _____--- indicated they would purchased material from digestion of municipal waste. The other option is, they could be processed thermally to produce steam or electrical generation, in which case you will have two fuel products of gas and steam or electrical energy out of the process.

This process is ready for commerical application. One of the big problems is it has not been commercially demonstrated. So, there are risks associated with somebody going in with a process like this. The largest facility that has been operated was the Department of Energy project in -_____ Beach,- Florida. They were 30-foot diameter digesters, and that project has been completed and it was a success. We envision that commercial digesters to be economical would have to be around 120-feet in diameter. They are much larger. The scale up aspects of it impose some risk associated with that development. That is one

thing that slows this and other technologies I will discuss from entering the commercial arena.

CHAIRWOMAN MOORE: Also, the economics of it being an extremely expensive process?

MR. LARSON: Well, the overall economics are very comparable with mass burning. Now, of course, that all depends on what process you use for handling the residue. Fluor Corporation was going to be here today. They had a representative to discuss this is pursuing a commercial project along this line. They strongly believe this technology is actually more competitive. It is actually less costly than mass burn. That is, that is to be determined, but their economics show that it definitely it is comparable and possibly better.

One aspect, economically, one aspect you must understand with mass burning in California you have to have emission control equipment with any form of combustion. That equipment is really expensive. With some advanced technology, that equipment is not required. So, even though the capital cost of this technology and its associated equipment may be more capital intensive, the overall economics, the overall capital cost, of the process may actually be less or equal to mass burning, when you add on the emission control equipment associated with meeting the air quality regulations in this area.

Another, this is an artist's rendering that Fluor put together of an inert digestionprocess where everything is done indoors and the digesters produce the methane gas. They have

used a forced air combustion system to dispose of the residue from the digestive process.

Another concept that is very close to commercialization is fluidized bed combustion. Now, fluidized bed combustion has been done on coal and it has been effective. It has not been one hundred percent successful with refuse; therefore, it is still in the developmental stages.

The basic technology involves a sand medium in the bottom of a vessel with air injected through the bottom. The sand then forms into a fluid state. In essence, it is bubbling from the larg volumes of air passing through the sand. With fluidized bed combustion the material you are going to combust, in this case refuse, is suspended in the sand bed. It comes in contact with the hot particles of sand and helps complete the combustion to a fuller extent. This technology has the advantage of decreasing emissions over some other basic combustion technologies. You have better control of the combustion process, the temperature and the retention time, because the sand bed acts as a damper.

If you put in some wetter refuse, and refuse obviously varies in moisture content significantly from hour to hour as it is spread into a facility, if you get some wetter material, normally your flame temperature will go down in direct combustion. In a fluidize bed state the heat in the sand will help sustain the temperature for a period of time and give you a more controlled combustion. The big technological problem is

injecting the refuse into the sand bed and maintaining it in a uniform state. There is some work being done in Duluth, Minnesota in mixing refuse and sewage in this process. They are still experiencing problems with feeding the refuse. As far as commercial application it is very close, but it still needs some further development prior to going on a commercial state.

Now, another concept utilizing basically the same equipment, the same technology, there is fluidized bed gasification. The main difference is instead of putting in the quantity of air required for combustion, you cut way back on the amount of air, and what it does is create a partial combustion. You put only enough air to burn a portion of the refuse. The remaining refuse in the sand bed is gasified. And that gas is a low BTU gas, approximately 165 Btus for a standard cubic foot. That gas can then go through clean-up process, removing inpurities in its gaseous state prior to combustion. Then the gas goes into various forms of combusters including internal combustion engines for electrical generation. They can also be put into a utility boiler.

Another concept is thermal chemical gasification. This is very similar to fluidized bed gasification, with the exception that instead of a sand bed where the material is in a sand medium moving around, the material is in a fixed bed. There is a steel plate and air is blown in, partial air for partial combustion, is blown into the refuse stream, causing the gasification process to react for gas reduction. This technology is being utilized on

wood. This happens to be a facility that we have at one of our generating stations where we are gasifying wood, and the wood is going into a utility boiler. This is a demonstration project. We intend to do some testing with refuse, but due to the higher ash content and other characteristics of refuse, we are definitely expecting to experience some problems. This technology is further away from developmental stages with refuse. It is available for wood. There are commerical wood gasification facilities in Europe. But, with refuse, it is definitely more difficult and would require more developmental time to become effectively commercial.

The final technology that I am going to mention is pyrolysis. And, pyrolysis is form of gasification, but rather than putting air into the refuse stream, in which which you have partial combustion taking place, combustion of a fossil fuel or the product gas is done outside the vessel. The heat then is transmitted as it would be in the case of a oven, where the refuse then is simply baked. By bringing up its temperature high enough, above 1000° Fahrenheit, you drive off the volatiles. You end up with a gaseous product coming off which rather than being the low BTU gas of gasification which is about 165 BTUs, you end up with about a 400 to 500 Btu gas coming out of pyrolysis. One of the draw backs of pyrolosis is that you also produce a liquid. Depending on the temperature you are at, the liquid can be in equal proportions to the gas, and also it chars pretty easy, because you don't have any combustion, so you are simply baking

this material. You end up with a charcoal, an oil and a gas. The oil and the gas definitely have fuel value as does the charcoal, but they all have to be utilized effectively to get the full energy out. So it becomes more of a marketing problem in trying to adapt this technology to refuse in general. Because, you would need a market for the gas, a market for the oil and preferably a market for the char, because of you have up to one-third of the energy of the refuse still in the char, and you prefer not to have to dispose of it.

All of these technologies do require mechanical processing producing refuse derived fuel prior to going into these technologies.

That concludes my presentation on the technologies. Are there any questions?

CHAIRWOMAN MOORE: Thank you. We have been joined by Assemblywoman Cathie Wright, who represents Simi Valley. We will move on into the electricity sales and potential for sales by having the Energy Commission, the Public Utilities, Southern California Edison and Sanitation Districts to talk about waste-to-energy options. We do not have a representative for the Energy Commission. Oh, I'm sorry. Dan, we will start with you so you can try to set forth the needs for further study.

MR. DANIEL NIX: Assemblywoman Moore and Members of the Committee, my name is Daniel Nix. I am with the staff of the California Energy Commission. I am here today to present you with an overview of California's electricity demand and supply

picture. I have provided you with copies of written testimony and also with briefing packet which goes more fully into the California Energy Commission's recently completed Biennial Report, which I think you might find interesting.

I think the major theme on the electricity supply coming out of the Biennial Report is that the circumstances in California are remarkably different than they were ten years ago. A decade ago we were wondering where the next kilowatt hour was coming from. Today we are wondering how to choose from the many supply options we have available to us. We found that the growth in electricity demand has moderated very dramatically over the last ten years. The growth of the alternative energy industry has resulted in potential supplies, we have estimated, which exceed our needs over the next twelve years by approximately eight times.

Our forecast for total need in California in the next 12 years are for an additional 21,425 megawatts. Of that 21 thousand, nearly 15 thousand consist of recently or nearly completed utility projects or supplies from third party vendors which have all of their licensing permits and are under construction, or from contract sales from out of state. This leaves us with a remaining needed of 6,349 megawatts. We identified as of the end of the first quarter in 1985 over 20 thousand megawatts of active projects. Nearly 15 thousand megawatts of those have signed contracts with California's utilities. So, I think you can see the situation is not where to get our next kilowatt hour, but which mixture to put together.

With that concern, the Commission developed what they called the reserve need concept to try to move California's electricity resource base to a more diversified system than California had during the 60s and 70s, at which time we were heavily dependent on the use of natural gas and oil for electric power generation. I think we are all familiar with the electric rate consequences of OPEC and rises in the price of oil.

The Commission believes that municipal solid waste-to-energy projects can contribute to diversifying the state's energy and electricity resource base. That it is a relatively secure energy resource. And with that in mind, of the 6 thousand plus megawatts of additional need, they felt it was appropriate to allocate a little over one thousand megawatts to the general category of biomass which includes municipal solid waste.

CHAIRWOMAN MOORE: What else?

MR. NIX: There would be other biomass projects such as agricultural waste-to-energy projects.

CHAIRWOMAN MOORE: Of the one thousand, how much do you think would be the average.

MR. NIX: We did not subdivide the one thousand between municipal solid waste and agricultural waste. Our estimates of the municipal solid waste potential are on the order of 400 megawatts. We believe the actual projects that we would see materialize is less than that. We know of approximately 566 megawatts of municipal solid waste projects now under active discussion, already or are under construction.

That is just a summary of my testimony which summarizes the Commission's Biennial Report. I think the picture is clear that we have ample electricity supplies, and we believe that the municipal solid waste can play a role in diversifying our electricity resource base. Thank you.

CHAIRWOMAN MOORE: We will go to Edison and then we will come to the Public Utilities Commission.

MR. MIKE HURTELL: My name is Mike Hurtell, and I'm manager of the Environmental and Regulatory Affairs Group at Southern California Edison. I welcome the opportunity to be before you today. Perhaps first, I can began with a little explanation of why the Edison Company is interested in waste-to-energy at all, municipal solid waste problem. I think we owe a lot of it to my friend, Mr. McGuin at the Sanitation Districts.

We began talking with the Sanitation Districts about their projects to convert municipal waste to energy some time ago. In the course of those discussions it became painfully obvious to us that Los Angeles County, indeed a lot of Southern California, is heading toward a mountain; its not so much a cliff, it is a mountain. It will be at that time in the early 90s when we run out of municipal solid waste landfill space that we hit this wall of dramatically increased prices for dealing with this problem, and deal with it we must. There is no way around that problem. So, one of our basic concerns is how to deal with the societal problem of what to do with that waste.

Another obvious reason why we are involved is because municipal solid waste can be a fuel, much like we retrieve coal, gas or oil as a fuel. So, from that perspective, you heard Mr. Larson today addressing some of the research we have done over the years into those fuel sources.

And a third and probably most obvious way that we are involved, is as a major purchaser of the electricity that might be generated from such projects. In that regard that I want to make a few remarks here today.

We have a set of principles, if you will, or points that we think relate to the waste-to-energy situation and the electrical utility ratepayer, our customer, as a major consumer of that power. The first one is that we believe that the ratepayer has to be treated fairly. That's embodied in the Public Utility Regulatory Policy Act, and in the direction we have received so far from the Public Utilities Commission here in California. That the avoided cost should be set in such a manner that the ratepayer does not experience a higher price for the power that he gets from the waste-to-energy or third-party energy of any source than he would if the electric utility had to provide that power to him directly. That is basically the concept behind the avoided cost. Of course, avoided costs has a couple of components, the fuel component and the capacity component, or the basic ability to generate a certain amount of electricity in any given instance. So, the first thing we want to try to get everyone to support is the notion that the

ratepayer should be held indifferent as it were as to the source of the power in terms of what he pays for.

CHAIRWOMAN MOORE: I think you have that support without asking.

MR. HURTELL: I appreciate that. The second point we need to make is the way of the avoided costs is set. It may not be enough to offset the risk that the Sanitation District or other waste managing components have to tolerate in trying to build some of these projects.

CHAIRWOMAN MOORE: That's a little bit of what I hope to get into. That is why I kind of save you, because I hope you will be able to speak to that issue.

MR. HURTELL: It is a serious problem, because right now the problem we face is that by 1990, we are going to be starting to run out of landfill capacity. But, right now, we are not out of landfill capacity. So, the clock keeps ticking because in a sense there are cheaper alternatives namely landfill, right now available. So, it is very difficult for a proponent of a waste-to-energy project because as in Mr. McGuin's case, the members of his board say, "I would like a hike here in your tipping fees by 100% or so to handle this problem." And, I say, "Wait a minute, there are cheaper alternatives available. We should be spending less money for that service." So, that is part of the reason why we think government has a legitimate role in dealing with this transition between now, while we still have some landfill space left, and the future, when we know we are

going to run out of it. But avoided cost as a way to deal with that problem doesn't pay the whole bill. There isn't enough revenue stream coming out of the cost of electricity or the price that we are able to pay for electricity from waste-to-energy projects to really offset the economic and financial risk that proponents have in those projects. Therefore, it is our view that it is impossible to rely on avoided cost as a stable, steady way to underwrite the total cost. It could be a good cash flow stream, but it is not the whole answer and we should not put it to the electric utility ratepayer to bear the entire cost as the electricity consumer. Now maybe it is the sewer guy that disposes of garbage, but that cost in our view should be put to the service in as correct a manner as possible. So, that may be tipping fees.

In this transition though, this time between now and when we run out of space, we think there is a role for the government to ease that transition a bit with extra funds. That is one of the reasons why we supported AB 937.

A further problem with avoided cost is that it does fluctuate. In 1980-82, for example, the energy component of avoided cost in our service area, and that constitute about 70% of the total of avoided costs that we would pay, that cost then was something on the order of 7.3¢ per kilowatt hour. Now, the cost is down to around 4.5¢ per kilowatt hour. So, you can see if you were trying to do long term planning, which a person like Mr. McQuinn has to do if he is going to build a pretty big

project, he has to try to look ahead a long time and figure out what those avoided costs are going to be. At the time he is ready to contract with Southern California Edison for the sale of that electricity, and I'm sure Mr. Larson talked about the long term contracting problems in trying to set that cost fairly in an economic environment that sees these fluctuations. So, that is another wrinkle, avoided cost changes. So, it is difficult to rely on it.

And finally, I think one major point that we have to recognize is that any one who lives east of downtown Los Angeles from May through October, we experience a very bad air quality in this area. We have to pay the price of dealing with those environmental problems. That means that any new development that involves combustion fuel on this basis is going to meet some very, very stringent tests. We are approximately now, I would say, 300% away from our ozone air quality standard set by the federal government to protect health. We are not going to be a heck of alot of closer by the Year 2000, no matter what we do, and we have done a lot already. Anyone else coming into the basin, no matter if it is very sound societal reason or not, is going to have to complay with some very strict environmental concerns and controls. That means that we have to push the development of the technology from the earlier, from mass burning that we have been talking about, which needs to be done in these first few projects, toward the more advanced technologies that we hope will reduce emissions substantially by using refuse fuel. I

don't think we can expect the municipal waste generators, you and I and the rest of us in the industry who dispose of waste, to pay the full premium cost of that. It is in the developmental stage. We think that it is the proper role for state government to try to, again, cushion that transition between mass burning here and now and then maybe something like biodigestion some time in the future.

CHAIRWOMAN MOORE: Let me ask you this, from your testimony then we are to assume that the waste-to-energy facility probably will not be self-supporting to the extent that it is going to take subsidy. I guess that is essentially what your saying it should not necessary be subsidized by the ratepayers.

MR. HURTELL: That's correct. I believe that we have a societal problem to deal with it. It is legitimate for state government to consider some sort of a helping role in that process. Again, that is why we supported AB 937, because you have within that bill a framework of doing that. Some money set aside to reduce the cost of financing the projects, that deals with the front-end financial risk, and some money earmarked to give incentives for people who push the technology further ahead so we can get some of the advanced air pollution control equipment in the sense of a different technology rather than slapping things on the back end and trying to clean them it.

CHAIRWOMAN MOORE: So you think the bond approach is probably the best?

MR. HURTELL: I think it is the best because we will not in my view bring together the political concensus any other way to deal with this transition from the time when we have some landfill capacity left, which is admittably cheap, and the time when we are going to be too late to start developing some of these technologies and getting them on line.

CHAIRWOMAN MOORE: What about the amount of money you are going to get?

MR. HURTELL: I believe that given the kind of goals that we talked about setting when the bill was first being drafted, which was basically to try to take a shot at dealing with 50% of the municipal solid waste through this transition between now and the mid 90s or so that that amount of money would do the trick. I don't think that...

CHAIRWOMAN MOORE: You don't think it is a bit high?

MR. HURTELL: I don't. I think the problem is rather immense. I think you heard that testimony here today that sketches out the details. If we don't find some way of dealing with this problem in an effective manner, then we will be much like where we are with the toxic disposal problem now, which is no place to go.

CHAIRWOMAN MOORE: Of course, now, much of what we're hearing is still speculative, and people are not certain as to what the actual figures and facts are in some of these instances. I think everything is dependent on certain things happening, which makes it very difficult to plan. Again, as you pointed

out, if we don't try to do something by 1990, we will be pretty much where we are...

MR. HURTELL: I think that's it. I think it is that uncertainty factor that the Legislature has to take into account in considering whether it is appropriate for public monies to be used to try to deal with this problem. I personally think it is one that faces all of us here in Southern California. Certainly, the Bay Area is heavily impacted by the same kind of approach. Other metropolitan areas within the State of California are likewide impacted.

CHAIRWOMAN MOORE: You heard the Energy Commission's projections on the need and the amount they described. Do you agree with those figures?

MR. HURTELL: Generally speaking, yes. I might just comment that Southern California Edison is as it were fully resourced, meaning we have enough power in the planning stages or construction stages at this point now to last us through to 1995. Again, that creates another pressure on this whole process of how can we walk in and say, to the Public Utilities Commission, and say, you shall take this power from waste-to-energy facilities, no matter what whether you need it or not. In affect that is where we are with PURPA, but the price is variable. I think we will hear something about that. That is another complicating factor.

CHAIRWOMAN MOORE: We are going to go to ...Bill.

ASSEMBLYMAN LEONARD: I would like to pursue the point, I guess, from the other side relating to the principle where ratepayers should not subsidize any projects. I think you will agree with me the definition, as you said, of avoided cost is something different than the fix you are on. Rather than force Edison to purchase this power, the Sanitation Districts of Los Angeles County and those in my county wish to wheel that power to San Diego where your cost may be higher. What would Edison's position be on that?

MR. HURTELL: I think there will be two points. One, the factual situation probably is that you won't get very much higher avoided costs, because the fuel component is so big a part of the avoided cost. In our field it is oil and gas is going to remain the most expensive and was stable.

ASSEMBLYMAN LEONARD: There may be another utility somewhere...

MR. HURTELL: Theoretically speaking, if that were the case, I think it would be our position that our transmission system is paid for by Southern California Edison ratepayers. That transmission system right now, you have to know, is very heavily strained with the system that we have got.

ASSEMBLYMAN LEONARD: You would have a principled objection to it. You would have an economic...

MR. HURTELL: Well in the master principle, Assemblyman, because what we're saying is that if our ratepayers pay for those transmission facilities, we want to maintain control of those

facilities to serve their interest, not to serve the interest of San Diego, or for that matter, the waste-to-energy project proponents. So, I think that's a very controversial area that again the PUC has been dealing with in their investigations and probably we will hear alot more about that.

ASSEMBLYMAN LEONARD: Let's try another version of it. What would Edison's position be if ... I have heard a number of complaints from the metal finishers, for example, the electrical base industries, there is an alternative power source for them. What if one of them got really creative and made an offer of the Sanitation Districts couldn't refuse. If they could put together a waste-to-energy operation and use all the energy on site and drop themselves as a customer on any one of the rate schedules?

MR. HURTELL: In effect, we do that now with a number of situations.

ASSEMBLYMAN LEONARD: With cogeneration.

MR. HURTELL: Essentially the industry will supply its own electrical needs. What you find when you get down to brass tacks, in alot of the specific situations is that the customer will be willing to supply his own electrical needs, but usually more as a backup in case his process goes down. Now from a theoretical standpoint, the ratepayer-serving utility is having to build the system that, while it doesn't have to serve that electrical load most of the time, has to ready to take up the load in the periods of time they can serve them. That imposes additional costs which we try to reflect back to...and that makes

his project less economical typically than he thinks it ought to be. So, I think there are real practical problems there, and again, it's basically a fairness issue. Who profits, who pays and where does the ratepayer stand in that equation.

ASSEMBLYMAN LEONARD: More on this point, though, is cogeneration. We are talking about electrical output on a substantial scale which you could put into an industry where you need half that capacity, and that would be the margin of safety. Their backup needs would be minimal, if any.

MR. HURTELL: In practice it doesn't quite work out that way. I agree in theory. It sounds like it should, but in practice it hasn't worked out that way.

ASSEMBLYMAN LEONARD: It always comes in one at a time.

MR. HURTELL: Typically, but to be fair the cogeneration industry in this state has really blossomed, to say the least. Ms. Moore said, I think, that the Energy Commission participated or the PUC. So, rather than having a problem with trying to find people to come in and work these deals, our difficulty now is how do we continue to accept projects like that which may be quite beneficial in the face of an energy crisis, but which now force us to turn away lower priced economy energy that we could get somewhere else.

CHAIRWOMAN MOORE: Ms. Wright? Why don't we go to -- I'm saving you, Duncan -- we are going to go to the Sanitation Districts. I will give them their shot. Remember, the PUC is going to follow you so you can talk about what their failure to

exempt you means to Los Angeles County and the District that I represent.

MR. STEVE MCGUIN: My name is Steve McGuin from the Sanitation Districts in Los Angeles County. To set waste-to-energy in a slightly different perspective. I am not comfortable with this grouping together of all these other forms of electrical generation. Waste-to-energy first and foremost is a very efficient and environmentally sound means of managing solid waste. It happens to have a extremely large societal benefit in that by exercising that form of management, we produce energy without combusting any fossil fuel, and that's a big a difference. I have some trouble just getting the available sources. I understand balance of power needs of the state and that. I think we are talking about a subject that is somewhat different. You just might want to keep that in mind.

CHAIRWOMAN MOORE: Did the Energy Commission take that into consideration? Did you give them any kind of edge because of that in any major direction?

MR. NIX: Well, not so much that we favor municipal solid waste when making projections, but rather we felt that we were aware of the moving landfill problem. We did not feel that California should be in the position of having precluded the municipal solid waste-to-energy alternative.

CHAIRWOMAN MOORE: Let me ask the question another way. Is that based on your projection of all they could produce or is that based totaly on need and no consideration given to be society's benefit by having that form of energy produced?

MR. NIX: The thousand megawatt number, that I referred to earlier, is actually driven by the composition of energy what goes into the goals.

CHAIRWOMAN MOORE: You gave us a 400 for the biomass.

MR. NIX: I mentioned 400 for agricultural biomass being perhaps the outer limit, the number we would expect to see materialize is probably smaller than that. We would expect the bulk of that one thousand megawatts probably to be made up of municipal solid waste-to-energy projects.

CHAIRWOMAN MOORE: I reversed it.

MR. NIX: Right.

CHAIRWOMAN MOORE: Okay.

MR. NIX: Our primary motivation was the composition of the overall electricity system.

MR. MCGUIN: I know the committee is interested in the financing mechanism involved in waste-to-energy, so I'd like to talk about a couple of subjects. I'll will use our Commerce facility which is under construction and already has been financed as a example. I'd like to just talk also about a different side to put the whole thing into perspective.

CHAIRWOMAN MOORE: You might also talk about the recent PUC decision and what impact it has.

MR. MCGUIN: Most definitely will. The Commerce facility does have a power sales agreement for Southern California Edison, under the terms of the formerly available Standard Offer Number Four. That was the major advantage. It's

a very good contract. In addition, the Commerce project has the advantage of having a very good waste stream. It is a facility wqith a capital cost for a 300 ton per day facility, but it is able to produce the energy of over 400 tons per day. So, we are getting more energy output than we really had to put money in to produce in the first place.

Given those two advantages, that facility required equity contributions among three parties in order to really get it going. The project was basically a $45 million project which needed another $5 million, to bring the total to $50 million. That $5 million was contributed by the two sponsoring parties, the City of Commerce and the Sanitation District, as well as a grant from the Solid Waste Management Board. So, my point is that a project that had a very good power sales agreement and had a very high quality fuel still required a considerable amount, 10% total, more than 10%, upfront cash in order to make the financing work.

Relative to financing, the thing I wanted to point out, you asked a question earlier, Madame Chairwoman, whether these projects pay off over the long run. And typically, no project can go forward that does not, but the financing mechanism also requires that you look at the year-by-year cash flow. That's why you often hear those of us involved in the industry talk about the early years versus the later years. The Commerce project is a pure revenue bond sale. It is backed only by the promised revenue from the facility. The City is not backing the bonds.

They don't have that kind of bonding capacity. I doubt there are many cities in Los Angeles County that could totally back bonds for these facilities. So it is therefore required by the financial markets that you give evidence that year by year you not only have a enough money to pay the bond issued, but have a little cushion. It is typically about 25%. So, we are really looking at two senarios on the cash flow. Overall, will the project be in the hole? Secondly, year by year, is there actual cash flow?

At the request of your staff, we undertook to look at a kind of generic facility that may be built in the future now that the utility crisis senario has changed. So, we did that. And, to put things again in perspective for a typical waste-to-energy facility, and these numbers can change. There are so many site specific factors that I have to generalize.

In general, the payment from the utility for energy is about 80% of the site's revenues. The tip fee runs about 15% and miscellaneous revenues make up the other 5%. So, you can see with that ratio, with the tip fees only accounting for 5%, given the current structure of solid waste management in Los Angeles County, even a doubling of tip fee would only bring another 15% revenue, just from perspective purposes.

With that setting, we look at a generic one thousand ton per day facility, and I'd like to take that size, because that falls into the engineer's curves, size versus sufficiency, where at or above a thousand tons per day, you start to lost the

economics of scale. And also, I told you earlier that Los Angeles County could feasible have 27 thousand tons per day capacity. I have a reasonable memory, at one thousand tons per day, we still looking at 27 of these facilities in a single county, spread all over. With the current situation in the utility market, we also...

CHAIRWOMAN MOORE: How much it would cost to build.

MR. MCGUIN: Three billion dollars in 1984 dollars.

CHAIRWOMAN MOORE: That's a thousand tons?

MR. MCGUIN: I'm sorry, countywide need 27 thousand tons per day. It requires about three billion dollars capital.

The other factor that is pertinent to the financing, of course, is the President's current tax proposal. I mentioned the means we have used: the sale of bonds, exempt bonds, which reduces the cost of the project. As you know, the President's tax proposal would eliminate tax exempt bonds for projects such as these. That is not a closed issue. I understand the House Ways and Means Committee has recommended waste-to-energy because of the societal benefits. Its dual societal benefits suggests it be one of the exempted categories from the President's elimination of the tax exempt IDBs. However, we are limited to three senarios, taxable bonds sales, nontaxable bonds, which is the current situation, and a mechanism such as your bill proposes, a partial low interest loan. We found that for a generic facility, over the life of the project it is very close. It may make it, it may not. It is close enough that it would be

swayed by site specific factors such as where is the project? Is it in an area that has the benefit of preventing somebody from hauling to their current facility? So, you can take credit for actually saving the hauler money, and therefore, can charge more at the gate. Maybe you can bring in a few more percent, this is the case in our Commerce facility. The area that we serve by Commerce is much closer to Commerce facility than to the nearest landfill. Therefore, we are going to charge almost twice the tip fee at the Commerce facility than the nearest landfill charges, because in that manner the hauler is home. It pays a little more at the gate, but he doesn't have to drive his truck as far. So, there are factors like that which site you look at, which street corner you're anticipating. So, it is too close to call the situation over the life of the project with low interest loans.

CHAIRWOMAN MOORE: So, the suggestion that you could just automatically increase the tipping fees may or may not work depending on the site location?

MR. MCGUIN: No, the current situation today if I built a waste-to-energy wherever I placed it, if I set the tip fee of what I needed just to make the economics work, probably no one would come. As long as there are available landfills that are cheaper, why would a hauler accept the economic detriment of driving to a waste-to-energy facility.

ASSEMBLYMAN LEONARD: Could I just follow up on that. You got your contract versus the long term on this generic facility. Suppose 15 years down the line, you discover you are

short. At that point does it become reasonable to increase tipping fees by that amount which may be a lot less than the doubling fees?

MR. MCGUIN: Well, again, we do project a tipping fee increase over time already. We have projected in, in terms of our economics over 30 years, how much can we increase the rates each year. That's more than a regular price considering what's happening in the county, the lack of available sites.

CHAIRWOMAN MOORE: That takes into consideration the possible closing of some landfills and the fact that there will be no place to haul?

MR. MCGUIN: Yes.

CHAIRWOMAN MOORE: Basically, given all those factors that you built in the projection over a period of time, how much will the difference be?

MR. MCGUIN: I don't have a number for the project we built. I know what it start off at, but I can't tell you what the 30 year tip fee would be.

CHAIRWOMAN MOORE: Percentage-wise, does it double by the end of 30 years?

MR. MCGUIN: Much more than that.

CHAIRWOMAN MOORE: It would seem to me it would go very high.

MR. MCGUIN: Yes. Keep in mind that I presented a scenario to you of landfill closures that said that this is the worst case when we don't get permits. The question really is

what if that landfill gets a permit. You won't be able to charge it. In terms of financing the project, you have to look at the other end of the scale too; what if the landfills are sited or permitted. What is the lowest tip fee you will be able to get away with. You have to put both of those in the perpectives too.

ASSEMBLYMAN LEONARD: You talk about 5 percent of the revenues from to other things. Some of the cases that I have read about and visited either sell or use the ash for different purposes. Do you envision that in the Commerce facility or a generic one?

MR. MCGUIN: No, we have not included any revenue for ash. Under the current state of the art in California, is ash is a cost.

ASSEMBLYMAN LEONARD: That is still a cost here?

MR. MCGUIN: Right.

ASSEMBLYMAN LEONARD: No municipal permits without ...

MR. MCGUIN: One of the major issues you have to resolve to build a waste-to-energy facility is to prove to our state Health Department that it is not a hazardous waste.

ASSEMBLYMAN LEONARD: How about metal? Do you include that in the sale of recycled metal?

MR. MCGUIN: No. Again, the Commerce facility is a mass burning. So, it will not separate metal out.

ASSEMBLYMAN LEONARD: One of the facilities I saw was a mass burn. It separated metal after the process; anything that didn't burn as it went into the ash yard had a manual process of separating the metal.

MR. MCGUIN: That is very possible. I understand that this is recent information I can't verify that the market is falling out from this. The market is not as interested in what happens to the metal after it is burned. It doesn't have the same value as the tin can.

I tried to get to a bottom line, and it is so difficult with all these other variable factors moving around. I guess my bottom line is that if tax exempt bonds continue to be available and with a bond issue such as yours to provide low interest loans, it is possible to make up the difference in the lower energy revenues. Though we would still have difficulties in the early years. But, over the life of the project it is possible, in some cases, to show they are financially feasible.

CHAIRWOMAN MOORE: You never got to the Commerce Project.

MR. MCGUIN: The Commerce Project has signed the Standard Offer No. 4 before bonds were sold. We wouldn't have been able to sell bonds without that agreement in hand. So, it has a Standard Offer No. 4 , a year or a year and half ago, Mike? It has that agreement and we will continue to have that agrement.

In projects that we move with on down the road, that will not be available. We do have projects that you mentioned that were out the window. Those, I rather stay away from because they are currently under negotiations with Edison.

CHAIRWOMAN MOORE: I thought that Commerce was impacted.

MR. MCGQUINN: Commerce was not impacted. The projects that were impacted were the Spadra, Southgate, and Puente Hills waste energy facilities.

CHAIRWOMAN MOORE: Duncan Wyse.

MR. DUNCAN WYSE: Madam Chair, members of the Committee, my name is Duncan Wyse. I'm Director of the Policy and Planning Division with the Public Utilities Commission. I'd like to talk a little bit about our role with respect to waste-to-energy development. That is, we set the price the electric utility pays to the waste energy producer for the electricity generated from their project.

As you are aware, over the last several years in California, the PUC, the Energy Commission, the Legislature, the utilities and the independent energy industry itself has worked really hard to develop a new industry in California through a program of avoided cost pricing. At the PUC -Public Utilities Commission- we established a set of regulations which requires utilities to interconnect with various independent producers including waste-to-energy, cogeneration, biomass, wind, hydro, geothermal range of facilities, independentally-owned facilities, and pay a price for power based on the cost that the utilities avoid by purchasing energy from those producers. We been very aggressive in this program. At the PUC, we really encourage utilities to be actively involved. As the chart shows, I think in a nutshell, it has been an enormous success; nothing short of an explosion of resources from new sources in California. I

think there is no question we are leading the country in getting independent third party generation going.

We have 13 thousand megawatts under contract. It is the equivalent of 13 nuclear generation nations in California today. Not all of those have come through and some of it doesn't have the same kind of performance. But, it gives you an idea of what kind of explosion we have seen in California. We are very proud of that effort. We want to stress, I think at the outset, we feel very strongly it is important to pay these producers a fair value. We don't see ourselves, we don't see our ratepayers, as Assemblywoman Moore said, as a deep pocket for any of these projects. Our view is we ought to pay the fair price for this energy that benefits ratepayers.

CHAIRWOMAN MOORE: Is it your belief that's always what we have done?

MR. WYSE: That's all we tried to do in California in all our pricing programs, to set the price as close as we can to the avoided costs.

CHAIRWOMAN MOORE: At the time some of the prices were set was there any kind of margin that was anticipated in some drastic shift in the market?

MR. WYSE: In the settlement process, we sat down and we took the best judgment about the future. Two things were not foreseen. One was the explosion. No one, in none of the forecast we had, had predicted the amount in their view. Second, we did not expect the oil price drop. Both of those events put

pressure on the price. Ultimately, we had to suspend that Standard Offer Four, because it is an avoided cost now. That is where we find ourselves today in this market. We didn't anticipate that at the time when we set the prices.

There are really hundreds of megawatts in that condition. If we had let all of those sign up we expect ratepayers would be paying more than it was worth. It was unfortunate, because our primary responsibility is the ratepayer.

CHAIRWOMAN MOORE: Has the PUC recognized the need to grant any kind of special consideration to muncipalities for their solid waste projects, given their difference from other third parties?

MR. WYSE: Not directly. The fact that we have gone through a great effort to establish long term fixed price contracts is, we believe, a step that has helped not just the municipal waste but all the indpendent producers. All these technologies are preferred, such as municipal energy, wind, hydro, geothermal, by setting up a program that meets those customers needs.

CHAIRWOMAN MOORE: Has the PUC done any study to look differently at the third party provider as opposed to municipalities?

MR. WYSE: Not in terms of paying a higher price. We believe in these projects insofar as it benefits the ratepayers, but we don't believe the ratepayers should be subsidizing these projects. We have gone out of the way, I think, to establish

long term offers, which is pretty unique to California, to provide the financial stability the industry feels it needs. That we have done, but as far as going beyond that, including bonuses or whatever for specific technologies, we just don't feel that is in the best interest of the ratepayer.

I might just briefly run through the various offers we have available. I think it will clear up some of these financing issues. When we set up the program we adopted a number, of what we call "standard offers" available to the independent producers who want to sell electricity to the industry.

The first standard offer is called the "As Available Offer". Just to give you a little detail, the "As Available Offer" is a quoting price offer. It is based on the current condition of the utility systems, based on the price of oil today. As you heard from Edison, it use to be 7¢ per kilowatt hour when oil prices were high. It has dropped since then, and it will float. It tracks true avoided costs, but the problem, of course, for an independent producer is the uncertainty of that offer. You don't know. It's like investing in the stock market. You don't have much certainty about what your prices will be in the future.

A second offer we have available is called "A Firm Capacity Offer." It is particularly used for cogeneration. It fixes capacity payments. It is a fixed annual payment if you are willing to meet certain performance guarantees. The energy price floats as it is available. It tracks oil and gas prices

essentially. For gas-fired cogeneration it is a pretty desirable offer. Their gas prices track utility avoided costs.

ASSEMBLYMAN LEONARD: Standard Offer No. 1, you said, is not very attractive. Has anybody signed up -- the utilities?

MR. WYSE: Wise. Wind producers find it very attractive, because it makes no performance commitment. It is cents per kilowatt hour -- it pays for what you generate.

ASSEMBLYMAN LEONARD: This one is more favored by cogeneration?

MR. WYSE: And other baseloads generation. It is a pretty good contract, but it does have the uncertainty you don't know what you are going to get paid. You are taking a guess on the future energy market. The future of, especially, oil and gas prices when you sign up for that offer. I will stress that there have been a number of producers that have signed up.

ASSEMBLYMAN LEONARD: When you are avoiding oil and gas, then you are going to make it one way or the other.

MR. WYSE: Right. When we set up this program, we heard a lot from the financial world and heavily capital intensive projects about the problems with quoting price offers as a target. As a result the Commission established, what we called, "long term" offers. That conceptually has been quite difficult to implement. When you think about the long term value of energy, you have to think about the future of oil prices. You have to think about the utility's resource plan for the future what alternative projects, what utilities might build. We found

it to be a conceptual nightmare. We spent a lot of time thinking about that offer.

To get the program going in 1983, we held a settlement conference among all the parties and asked them to try to work out an agreement to get a long term offer in place while the Commission continued to deal with refining its methodology of dealing with getting a more permanent offer in place. In the settlement conference three offers were put in place. The first is called the "ten year forecast". What it deals with, it fixed the price for ten years. It took, basically, one of the available offers and we took our best guess on oil prices. It fixed it for a ten year period, if you were willing to sign up and make a long term commitment.

CHAIRWOMAN MOORE: This is in what year?

MR. WYSE: This was in 1983. It was our best guess at that time and it was based on escalaing energy prices, not tremendous escalation, but it did have escalations. Our best guess at the time given our current view of utilities' resource plans. We had a second version of that offer to especially meet the needs of utilities like the municipal waste-to- energy projects, which had a levelization feature. That is if you were willing to commit to performance bonds, you get a higher energy price in the early years, but we levelize you. So, you get less in the late years in a 10 year period. The idea was to deal with some of those up-front payments. Of course, by doing that, you are paying more in the early years than the energy is worth to

ratepayers. So, we had very strong performance bond required to receive that kind of an offer.

ASSEMBLYMAN LEONARD: On those two before they were suspended, who all took advantage of those?

MR. WYSE: The Commerce facility. All the municipal waste projects. I believe most of them actually use the escalating offer, because they didn't want to put up the performance bonds. We felt the performance bonds were really important.

ASSEMBLYMAN LEONARD: So very few used this option?

MR. WYSE: That correct. The third offer, I don't think it is up there, because it is hard to visualize it. It basically a cogeneration offer which fixed, what we called, the incremental energy rates. It fixes part of the payment stream. It doesn't tie up future energy prices. It helps for the cogenerators.

Well, we put those offers in place. The results, if you go back to the first chart, has been the explosion in the independent energy producer industry. It is based on a number of events that occurred in the energy industry in California. Partly it has to do with this increase in capacity, and partly with the oil and gas price dropping. In April of last year, we had to suspend the long run offer and because we felt at the time it appeared to be too high of a price to be paying. Prospectively, and I stress that, prospectively new entrants into the market could not receive Standard Offer No. 4. We are now in the process of putting in a new Standard Offer No. 4. We are

spending an intense year to get a new one in place by next June. Our goal is have an offer which provides stability.

CHAIRWOMAN MOORE: Now, those who took the initial Standard Offer No. 4 that you allowed to be grandfathered in, so to speak, are obviously receiving a much higher rate. Is there any consideration given by the PUC in further reduction of the rate? You have the ratepayer paying a higher cost.

MR. WYSE: Those are signed agreements. When we make these guesses, sometimes we win, sometimes we lose. It is a mutual agreement. The standard offers are very clear. If you sign an offer that is what you get paid. It is the price you pay for stability.

CHAIRWOMAN MOORE: Basically, how much capacity is out there?

MR. WYSE: In the solid waste energy?

CHAIRWOMAN MOORE: With those long term standards that were allowed to be grandfathered in.

MR. WYSE: I pulled that together yesterday. I show 198 megawatts for the Edison territory, 132 in PGE's area, and 99 San Diego's area. I imagine most of those are fixed price contracts. Those are either signed or under construction, but not necessarily in operation.

CHAIRWOMAN MOORE: I guess what I am saying is that overall it is going to represent a very small amount of capacity that could possibly be offset some place else.

MR. WYSE: Of the waste-to-energy?

CHAIRWOMAN MOORE: Yes.

MR. WYSE: Yes. It is not a huge amount, but it is half a nuclear powerplant. To summarize, we do want to bring an all economic renewable energy. I would stress that we hear from all energy producers, of all technologies, about how valuable they are to the State of California. When this program began, we were flooded with individual requests from individual producers for special treatment. We created the standard offer arrangement under what we felt were favorable terms and conditions to allow a program to go in place without having every individual technology coming to the PUC with their individual stories.

We also allowed a process of nonstandard negotiations. That is, within the framework of the standard offer, independent producers can talk with utilities and sign up their own deals consistent with the rates.

CHAIRWOMAN MOORE: Is that subject to the PUC approval?

MR. WYSE: It is subject to PUC reasonableness review, but typically the utilities don't come in for approval of each individual contract. I think that framework has clearly shown as a result that it has worked. We have enormous megawatts. So, we are pretty pleased with the program. As I say, in all of this we have to look out for the ratepayers as our primary interest.

CHAIRWOMAN MOORE: To go over your figures there's 195 and 132. -To Mr. Nix- You indicated that roughly about 600, I guess, by 1990?

MR. NIX: We divided that by 166 projects. It includes some projects that are in advanced preliminary planning stages, which would be a larger number.

ASSEMBLYMAN LEONARD: Back to Edison, during this period of suspension has Edison signed any offers or made any offers or have they signed up? Have they negotiated with individual producer applicants for power?

MR. SEBASTIAN NOLA: To your three questions sir, obviously, we haven't signed any under Standard Offer No. 4. We are continuing to negotiate under Standard Offer No. 2, I think. Under Standard Offer No. 2, we are continuing to negotiate with the county on waste-to-energy projects.

CHAIRWOMAN MOORE: Sir, could you identify yourself for the record.

MR. NOLA: Sebastian Nola, manager of Cogeneration Development for Southern California Edison.

To answer your question, we continue, as Mr. Wyse has indicated, the availability of Standard Offer No. 1, Standard Offer No. 2, and what we call a "short form", Standard Offer No. 3 for the small developers. That continues to be in place. As Duncan has indicated, certainly we will negotiate with the developers to meet their special needs. In the case of the Sanitation Districts, the Commission actually ordered us to continue negotiations, and that is what we are doing right now.

ASSEMBLYMAN LEONARD: Am I right to conclude that you are continuing to work on long term financing offers in the absence of the Commission's setting mandates?

MR. NOLA: To the extent that could be negotiated out, yes.

ASSEMBLYMAN LEONARD: It is my understanding the rate is in substantial disagreements between yourself and the Diablo plant.

MR. NOLA: I think we both are still trying to work something out that meets both of our interests. The ultimate test for us, of course, is in the PUC. When we come before them with the contract, and it may not be tomorrow, but the day our plant goes into operation and we take that energy and capacity and then ask for the Commission's inclusion of those fuel adjustment costs which is subject to being reasonable. So, we take a risk when we make those negotiations.

MR. HURTELL: But, when we take those risks, for example, if you are building a powerplant yourself, you sharpen your pencils and you get down to figuring out exactly what that plant is going to cost over the entire 30 year life, you have some degree -- hopefully, we imagine some pretty firm degree of control of how that plant will be constructed and how it will be built. Of course, the PUC is examining that all the time. It is a serious responsibility that we take.

When we negotiate with someone else, outside the protection of the standard offers, we don't have that kind of control. It just raises the level of risks.

ASSEMBLYMAN LEONARD: Is there a standard offer equivalent when you have to buy your fuel? You are arguing that

you are really at risk because there is no standard set for alternative generation. I think the world is risky when you go out on the domestic or foreign market. There are several reasonable standard on the PUC on that.

MR. HURTELL: That's correct.

MR. NOLA: Let me set the record straight. Right now, we are purchasing fuel under a tariff with Southern California Gas Company. That is determined directly by the Commission.

MR. HURTELL: But, if you look back in time, your assumption is borne out by the fact that we have in the past contracted for fuel oil, looking at our best crystal ball the same as everybody else. The thing crashed. We had prices escalated dramatically in the past. We have had them fall rather dramatically in either case. To some the degree the ratepayer is damaged and to some degree, certainly, the Edison shareholder is damaged.

ASSEMBLYMAN LEONARD: Thank you.

CHAIRWOMAN MOORE: Let me ask you a question. On AB 937, Mr. Wyse, I don't know if you have had a chance to look at it, and I'm sure you have. There is a $500 million bond in the bill. What is your feeling about the appropriateness of that money?

MR. WYSE: I can't answer that. I can get back to you on that.

CHAIRWOMAN MOORE: It has been some great feeling that it might be a bit high in terms of future projects. Have you

noticed since the suspensions, have there been any who have closed up shop?

MR. WYSE: I'm sure there have been. This is a market oriented program and they entrance the market all the time, throughout the life of it.

CHAIRWOMAN MOORE: The projects that were known about that are not quite on line, have they been abandoned as a result of this suspension?

MR. WYSE: I don't know.

MR. NOLA: I am sensing a possible misconception. Those people who have signed Standard Offer No. 4, as Duncan indicates, they have not.

CHAIRWOMAN MOORE: I understand that. There are those who were planning projects or on the verge, were not grandfathered in. I just wondered if the suspension had any impact on abandoning a project close to completion.

MR. WYSE: I am not aware of any, only because prior to the 17th both PG&E and Edison had a flurry because of everyone knowing that the standard offer would be suspended. We had a tremendous on-slaught of contract conservationist.

CHAIRWOMAN MOORE: Why would you do that knowing the suspension was going to go through?

MR. NOLA: We were under an order.

MR. WYSE: It is a standard offer. It is like a tariff.

CHAIRWOMAN MOORE: Well, that took care of the problem that I was concerned about.

MR. MCGUIN: We had a total of six energy projects, three of which were waste-to-energy, that had not had been abandoned, because we still in negotiations. Until those become unsuccessful, we won't abandon them.

CHAIRWOMAN MOORE: How come you couldn't get your act together before the suspension?

MR. MCGUIN: I was going to take issue with Mr. Nola's point that everybody knew. It was not true that everybody knew. We had very clear indications through the PUC that the Standard Offer No. 4 for cogeneration was going to be terminated, but not for waste-to-energy.

CHAIRWOMAN MOORE: Did you do that all of a sudden and not give them fair warning?

MR. WYSE: Well, we moved rapidly as we felt we had to at the time we felt there may be over capacity.

CHAIRWOMAN MOORE: So, was it intentional that they would get caught.

MR. WYSE: It wasn't intensional that anybody get caught. Once we decided we needed to suspend it, we suspended it.

CHAIRWOMAN MOORE: How did some people know and some didn't?

MR. WYSE: I'm not sure. I'm not sure how.

CHAIRWOMAN MOORE: You don't have any idea how you didn't know. Are you sure you didn't know?

MR. MCGUIN: I'm sure we didn't know.

CHAIRWOMAN MOORE: Would you find out why they didn't know.

MR. LIONEL WILSON: Lionel Wilson, legal division of the Public Utilities Commission. ...I assure you that all of our decisions were properly noticed.

CHAIRWOMAN MOORE: The decisions don't get noticed until they have been made.

MR. WILSON: Our decisions do receive notice, and we do publish an agenda.

CHAIRWOMAN MOORE: The journal?

MR. WILSON: That's correct.

CHAIRWOMAN MOORE: You guys didn't read the journal, is that it?

MR. MCGUIN: I don't think it is that clear.

CHAIRWOMAN MOORE: Come back and let us know why. A good try, Mr. Wilson, but I want something more specific.

The City of Los Angeles is going to tell us a little bit about those projects.

MR. MCGUIN: I don't know where the energy sales contracts are going be since it is subject to negotiations.

ASSEMBLYMAN LEONARD: Because of that your revenue projections are different?

MR. MCGUIN: Same holds true.

CHAIRWOMAN MOORE: The City of Los Angeles?

MR. DENNIS WHITNEY: My name is Dennis Whitney. I'm with the Los Angeles Department of Water and Power. It is my

understanding that the Bureau of Sanitation and CAO's office where unable to have anyone here today. So, we were present during the negotiations. Of course, they're selling their output. Well, they are not really selling it to us. The output of the Lancer Project will be used within city facilities. We do allow a cogenerator or allow a power producer to wheel the energy through our system to other locations under their ownership control. So, the city's output from the Lancer Project will be used for street lights and park and recreations, and city buildings throughout the city. We charge for this service about $2 million, two-tenths of a cent.

I think you are all probably aware that the Lancer Project is expected to cost about $240 million. This city has issued tax exempt bonds for that, because they got in ahead of the deadline. They are actually going to use a third party developer to develop the project and operate the project. The output of the energy will belong to the City and be used for the City's facilities.

CHAIRWOMAN MOORE: Would that be at a cost savings to the ratepayer?

MR. WHITNEY: In the early years it exactly break even. It is like all other projects, you have your electrical revenue, and then your tipping fees. It is my understanding they expect to charge themselves the full electric rates which we would charge and reduce the tipping fees as those rates grow over time.

ASSEMBLYMAN LEONARD: One question relating to the Lancer Project. What type of waste-to-energy is it?

MR. WHITNEY: It is municipal solid waste.

ASSEMBLYMAN LEONARD: Does that mean it is a mass burning facility?

MR. WHITNEY: It is currently planned to be a mass burning facility. I don't know that they have done all of their homework on whether they are going to do a presort on certain type of material or not.

ASSEMBLYMAN LEONARD: Have you chosen your third party operator?

MR. WHITNEY: Like I said I'm with the Department of Water and Power. The City has not chosen a third party operator. They have put out an RFP.

ASSEMBLYMAN LEONARD: Have the bonds been issued?

MR. WHITNEY: Yes, they have.

ASSEMBLYMAN LEONARD: So the money is in the city treasury?

MR. WHITNEY: It's my understanding.

MR. BEN WONG: Ben Wong with Los Angeles Water and Power. I work in the Cogeneration Department. I believe they have a team of four consultants. Three of them are chosen by the City themselves. One is picked by the project member which is selected... I believe Smith-Barney, Salomon Brothers and a couple of other firms, minority-owned firms, I don't recall them.

CHAIRWOMAN MOORE: That decision that they just made, wasn't it recently?

MR. WHITNEY: Within the last couple of weeks.

CHAIRWOMAN MOORE: Have a site already been selected?

MR. WHITNEY: Yes, the site has been selected. I don't know where the site is exactly.

CHAIRWOMAN MOORE: Is it in the desert?

MR. WHITNEY: No, it is within the City of Los Angeles. It is in the industrial area, what I call, about 34th Street.

MR. WONG: It is in the proximity of Martin Luther King Boulevard and Alameda.

CHAIRWOMAN MOORE: Sounds like Terry Hughes' district to me. Were there any problems from the people in the area?

MR. WHITNEY: I think it would be foolish to say that everyone agreed fully. The local city council person, Gilbert Lindsay, was advised all along and helped select that site, naturally the people one block or two from it, don't think it is a very good deal. By the time you get a half a mile away, they really don't care too much. It is very localized, the opposition. With any facility like this, I think it would be very unreasonable for everyone to think it was a great idea.

ASSEMBLYMAN LEONARD: Question to both of your projects. How many jobs will come out of your facilities?

MR. MCGUIN: Of course, you have the peakin jobs during the construction period.

ASSEMBLYMAN LEONARD: No, in operation jobs?

MR. WHITNEY: I think, for example, the very small facility like the Commerce 300 tons per day, I think staffing is close to 40. It must be 24 hours a day and seven days a week, I believe.

MR. MCGUIN: It is much more per ton than a typical sanitary landfill -- much more. By comparison our Foothill Landfill that accepts on the average of 12 thousand tons per day has a staff between 60 and 70.

ASSEMBLYMAN LEONARD: So, you are going to put more people to work?

MR. MCGUIN: Yes.

MR. WHITNEY: I thought Lancer is about 50 people, because it is not directly proportional to the number of tons per day.

CHAIRWOMAN MOORE: Lancer Project is going to handle how much?

MR. MCGUIN: About 1600.

CHAIRWOMAN MOORE: Compared to?

MR. WHITNEY: Commerce, 300 and Spadra, 3000.

CHAIRWOMAN MOORE: This is going to be real interesting as it develops. What is the cost?

MR. WHITNEY: $240 million is the estimate.

CHAIRWOMAN MOORE: And your is going to run about?

MR. MCGUIN: Commerce was 50. And Sparta about 3000 tons per day is about $120 million. Let's make sure we are talking about the same number, that is including the engineering

and financing, construction. Total, the amount of bonds you have the sale plus additional costs. Because in the early part of the project, you have to pay for the interest on the bond with bond money.

CHAIRWOMAN MOORE: Are there othe questionss? If not, we want to thank you for your participation. Your testimony was enlightening. The second hearing that will be conducted in conjunction with this Committee by Assemblyman Byron Sher will be in San Francisco on October 22. We hope you will participate in that hearing, and we thank you for your testimony before this Committee.

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SUBMISSIONS AND CORRESPONDENCE

Testimony of Dana K. Hayes
Director of Legislation and Public Affairs
California Waste Management Board
before

Assembly Committee on Utilities and Commerce
The Honorable Gwen Moore, Chairwoman

October 16, 1985

Madam Chairwoman, distinguished members, as Director of Legislation for the California Waste Management Board, I am pleased to have this opportunity to give you the Board's assessment on the subject of waste disposal in the State of California and its related costs.

Some forty communities throughout California are investigating the potential of waste-to-energy technology. Is this because they want to be in the electrical power plant business? No. It is because they recognize the need to dispose of their garbage.

The California Waste Management Board has long maintained that waste-to-energy (WTE) is a viable waste disposal option for this state. This technology, as it has been developed and practiced for nearly thirty years in Europe and Japan, and more recently in the U.S., is principally designed for the purpose of reducing the amount of waste that requires land disposal. It is first and foremost a waste disposal technology, not an energy technology. Although the energy crisis of a few years ago promoted waste-to-energy projects as "energy producers", this remains an ancillary benefit.

Many individuals in the waste management industry believe that California is on the verge of a "garbage crisis". This crisis, however, is a combination of the startling trend of decreasing landfill capacity and the increased costs of managing the waste in a safe, reliable manner. Our most recent figures show that existing, permitted landfill capacity will last until 1996. For example, in Los Angeles County alone, both the Burbank landfill which accepts 65,000 tons/yr, and Toyon Canyon which accepts 780,000 tons/yr are scheduled to close in 1985. Sunshine Canyon which accepts 1.5 million tons/yr will close in 1991.

Without new landfills, expansion of existing ones, or some form of alternate technology to dispose of California's 35 million tons of garbage each year, (of which Los Angeles County generates 14.2 million tons), we'll have no room for waste disposal. This may seem extreme, but it points out two very serious problems -- there is a steadily decreasing capacity for waste disposal, and a growing inability to site replacement facilities for those which are filled.

The cost of landfilling our solid waste in California has always been low. This has been the result of regional variations in price controls, competition among local waste disposal operators and collectors and the perception that there is plenty of landfill capacity within the state.

The Waste Management Board estimates that the average cost of waste disposal is approximately $47/ton. The average cost of collection represents $36-38 or 75-80% of the total waste disposal costs. The average disposal or tipping fees of $6-8 make up the remaining percentage.

Despite these averages, a wide disparity among waste disposal costs is already being experienced. In San Francisco, the estimated cost of disposal is $99-115/ton while in Los Angeles the range is $34-38/ton. The higher rate in San Francisco, despite a $9 user fee, is attributed to the higher collection costs because the waste must be transported to distant landfills in neighboring counties as San Francisco has exhausted all local waste disposal capacity.

We see all waste disposal costs rising statewide, soon and rapidly, as a result of stricter standards, more aggressive enforcement and improved long-term care of the facility site. Recent changes in the Water Resources Control Board's regulations (e.g., requiring liners under all new landfills and doubling the thickness of final cover) alone will result in higher costs. And, it is perhaps only a matter of time before some sort of long-term maintenance fund for proper closure and post-closure maintenance will be required for all waste disposal facilities in California. These will compound already rising landfill costs which are due to increasing haul distances to more remote landfills.

The Board has consistently regarded waste-to-energy (WTE) as an environmentally safe and economically efficient waste disposal option, although high capital and financing costs have effectively impeded the progress of most projects. We see a variety of advantages of waste-to-energy over conventional landfill technology:

- **Waste-to-energy is a demonstrated technology.** It has been in use for decades in Europe and Japan without endangering public health and safety.
- **It can reduce the environmental hazards inherent in waste disposal.** In addition, these projects can be operated safely in industrial areas closer to the source of waste generation.
- **It can extend landfill capacity.** Although there is a residual which requires disposal, it is significantly reduced in volume and is inert. This reduces the threats of groundwater contamination and gas migration which are often associated with landfilling municipal solid waste (MSW).
- **It will increase recycling.** AB 1205 (1983, Bates) protects recyclable materials from waste-to-energy projects, a requirement not expressly made for landfills.

Despite the apparent advantages of waste-to-energy, the technology has been slow to develop in California. One of the strongest arguments against waste-to-energy is its cost. Whether or not to fund a waste-to-energy project may be the most expensive investment decision made by a local government. What makes waste-to-energy so expensive is its intense front-end costs. Construction costs of a waste-to-energy project generally run over $100,000 per daily ton. This means for example, that a 3000 ton per day plant will cost in excess of $300 million to put into operation. This includes the cost of actual construction, interest costs during the period of construction, costs of non-

commercial operation including start-up and general financing costs. Added to that are pre-construction costs of $5-10 million which include planning, feasibility, environmental permits, contract negotiation and engineering design.

Because pre-construction costs are such a small part of WTE development, they tend not to be considered in the decision-making process. However, for other options (i.e., landfills) pre-construction costs are significant relative to the overall project cost.

Further adding to the cost of waste-to-energy is the required up-front demonstration of the projects' ability to repay the loans. Depending on the type of financing used, this could increase the debt service by a factor of 25%.

The Board is considering the use of State general obligation (G.O.) bonds to establish a loan program to promote WTE development in California. For, despite the revenues which flow to a waste-to-energy project in the way of tipping fees and energy sales, there is a substantial financial investment associated with the projects which can be shared by the State through an initial G.O. bond "subsidy", thereby providing added leverage to get projects built.

The Board is therefore exploring the feasibility of a $500 million fund from which loans would be made to actually construct waste-to-energy facilities. The $500 million represents only 10% of the capital investment the Board estimates will be required to bring the necessary facilities on-line by the year 2000 to process 50% of the state's garbage.

In essence that summarizes our current assessment of existing and future waste disposal needs. Although the Waste Management Board recognizes that waste-to-energy currently represents a more expensive waste processing option than landfilling alone, we believe the technology is worthy of development to help extend the state's existing waste disposal capacity.

(4)

Testimony
of
H. Daniel Nix

California Electrical Needs
1984-1996

Staff Testimony
California Energy Commission

Assembly Committee on Utilities and Commerce
Gwen Moore, Chairwoman
October 16, 1985

Los Angeles, CA

California's Electrical Needs

1984-1996

Chairwoman Moore, members of the Committee, good afternoon.

My name is Daniel Nix. I am a member of the staff of the California Energy Commission. At the Committee's request I am here to provide you with an overview of California's electricity demand and supply outlook for the period 1984 to 1996 and the Energy Commission's projections of the need for electricity from a variety of sources, including Municipal Solid Waste.

As you know, the Commission is required every two years to assess the need for new electrical generating facilities. The Commission has recently completed The California Energy Plan, its fifth biennial assessment. I directed the staff analyses which underline the California Energy Plan. My comments will be based on that assessment.

Your have copies of a briefing packet which summarizes the Energy Plan. The plan covers the principal energy forms of electricity, natural gas, and petroleum. I will restrict my comments to the area of electricity.

The electricity supply and demand picture is remarkably changed from a decade ago. The demand for electricity is growing appoximately 2 percent per year, substantially lower than the 7 percent per year growth rate which prevailed in the 1950s and 60s. The decline and stabilization of electricity demand growth rates is shown in Figure 1.

FORECAST OF ELECTRICITY DEMAND GROWTH

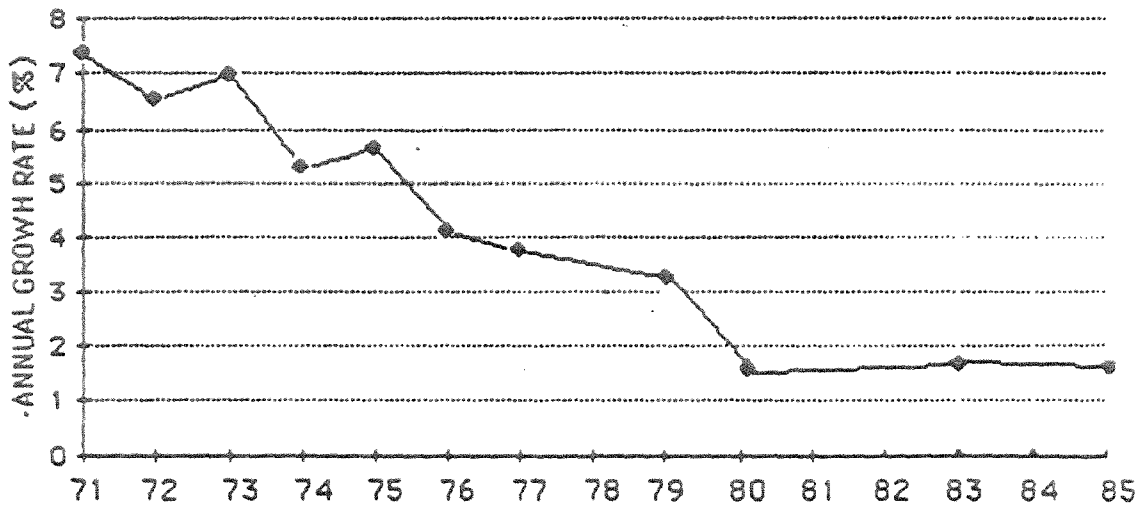

FIGURE 1

There are other factors than simply growth in electrical demand which determine the need for new power plants. These include replacement of old, inefficient power plants, replacement of natural gas, or oil-fueled power plants with other energy types in order to diversify the system, additions required by inter-utility contract changes, and a need to maintain reserve margins to ensure reliable service. The Commission, in cooperation with the state's electric utilities, performs a detailed analyses of these factors for each major planning area.

As Table 1 shows, the Commission projects a need for an additional 21,425 MW of electrical capacity over the next twelve years. For scale, this is approximately equivalent to 21 large nuclear or coal-fired power plants. However, a large part of the capacity additions needed will be met by recently or about to be completed utility projects, from resources outside the state, and from non-utility (so called third party) sources.

Table 1
Electrical Capacity Needs
MW*, 1983-1996

Northern California	11,271
Southern California	5,824
Los Angeles Department of Water and Power	2,486
San Diego Gas and Electric	1,620
Burbank, Glendale, Pasadena	224
	21,425

Source: Electricity Report 5, Pg. 34
*MW = mega Watt, one million Watts

When Table 1 is adjusted for these imminent supplies, the remaining need is as shown in Table 2.

Table 2

Remaining Basic Need for Electrical Capacity

MW, 1983-1996

Northern California	3,184
Southern California	1,373
Los Angeles Department of Water and Power	758
San Diego Gas and Electric	1,138
Burbank, Glendale, Pasadena	-104
	6,349

The resources available to supply the 6,349 MW California will need in the next twelve years far exceed the remaining need. As example, the Commission's estimate of supply potentially available from cogeneration in

Thermally Enhanced Oil Recovery applications alone exceed 6,500 MWs. The Commission has identified supply sources over eight times the state's electrical capacity needs. Thus, we are not in the position of needing to develop completely every resource available to the state at this point in time. To the contrary, our challenge today is to select from the many options before us those supplies which will help stabilize rates and reduce our dependence on insecure or expensive fuels. An additional goal is to diversify our sources of electricity and thereby reduce our vulnerability to disruptions in any individual fuel or type of generation.

Figure 2 compares the California Electricity resource mix in 1978 with a more balanced mix presented in the 1985 California Energy Plan.

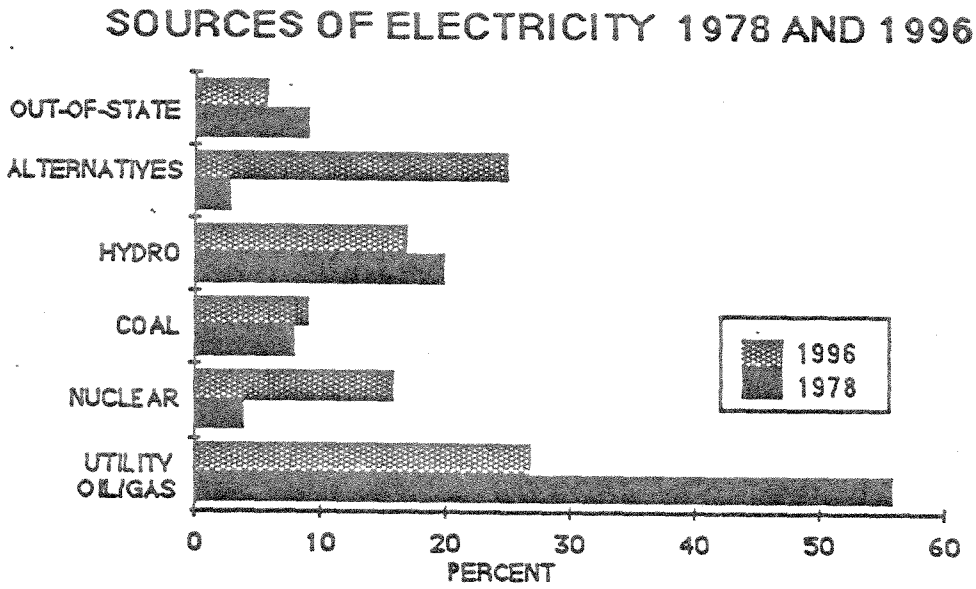

FIGURE 2

Note the significant reduction in utility oil and gas consumption and increase in the category of alternatives. This category includes geothermal, wind, solar, biomass and efficient cogeneration. The balanced mix we hope can be achieved by 1996 is shown in Figure 3.

In order to help achieve a balanced mix, the Commission has developed and is applying a Reserved Need concept. The Commission had determined the extent

to which each basic energy resource should be relied upon for production of electricity and apportioned the unfilled total need of 6,349 MW among the various energy sources.

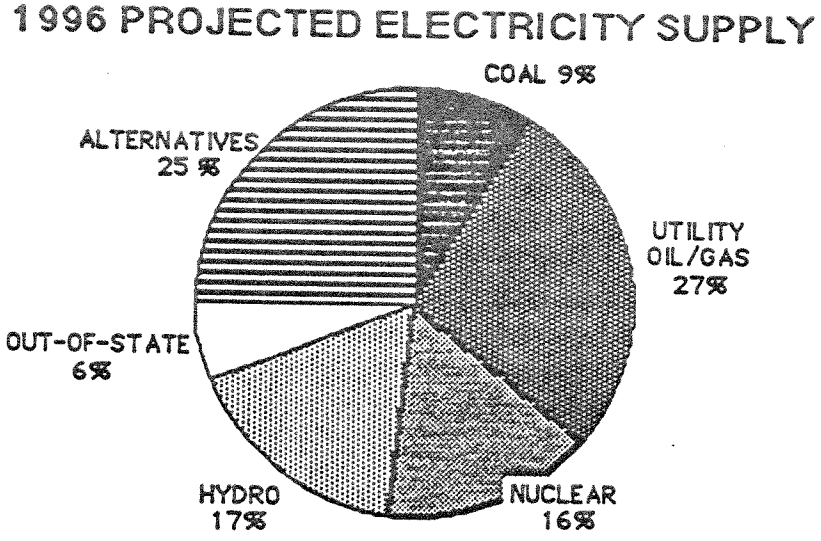

FIGURE 3

The objectives of this approach are many-fold. Perhaps foremost, it continues to promote diversity. Without such supply goals it is likely that future need would be entirely filled by one energy source, most probably natural gas-fueled cogneration. While each potential gas-based cogeneration project may have individual merit, collectively they would return California to the situation in the 1970s: over reliance on one energy form and vulnerability to fuel price increase.

Table 3 presents the Commission's distribution of the 6,349 of unfilled reserved need by energy resource.

Table 3

Energy Resource	Reserved Need Total	Likely to Be Available	Unfilled Reserved Need
Conservation	1,682	302	1,380
Coal	1,209	1,209	0
Nuclear	4,312	4,312	0
Utility Oil/Gas	223	223	0
Cogeneration - Gas Less than 5 MW 5 MW or above	2,060	1,160	900 [250] [650]
Geothermal	1,510	660	850
Wind		590	
wind + solar =	1,107	wind + solar =	300
Solar		217	
Imported Power	4,153	3,503	650
Hydroelectric	2,436	2,186	250
Biomass	1,064	714	350
Unspecified	1,669	-	1,669
	21,425	15,076	6,349

Source: California Energy Commission, Electricity Report 5, Table 4-12

The Commission includes MSW to electricity within the category of "Biomass."

The Commission has reserved a total of 1,064 MW for biomass. This amount includes 714 MW considered "Likely to be Available" from projects now in various planning stages and 350 MW from future, as yet unidentified projects.

Solid waste is a dependable and "secure" fuel supply and can contribute to the security of California's electricity base, provided that issues such as cost and environmental impacts are resolved favorably. The Commission considers these latter issues on a project specific basis as part of its licensing review of projects over 50 megawatts. While there is limited need for new sources of electricity, the Commission has reserved space for waste-to-energy projects to ensure that the option is not precluded by other forms of electricity supply.

Southern California Edison Testimony

California Assembly Interim Hearing On AB937 (Moore)

October 16, 1985

DEVELOPMENT OF ADVANCED CONVERSION/COMBUSTION TECHNOLOGIES -- ENVIRONMENTAL BENEFITS AND REQUIRED FINANCIAL INCENTIVES

The air emissions from direct combustion waste to energy (W-E) systems are becoming the major issue in siting and permitting these facilities. The South Coast Air Basin, in particular, has an intractable air pollution problem with projections showing that federal air quality standard for ozone will not be attained in this century, despite all out efforts to reduce emissions from existing sources and control new emissions growth. The Clean Air Act mandates attainment of air quality standards by end of 1987, with a potential for EPA imposition of sanctions including a ban on construction of all major sources if the deadline is not met. W-E projects would be included in the ban.

Closure of landfills in the Basin and the environmental problems and public opposition to siting new landfills places more pressure on waste to energy as the solution to future waste disposal. Yet, commercially available conventional W-E technology has existed since the turn of the century without significant technological improvements. Control of emissions of air pollution to date has been through the use of add on control technology to an old combustion process that is recognized as a

high emitter of air pollutants (including oxides of nitrogen (NOx) which is a precursor to LA's severe ozone smog problem). Therefore, the large scale application of conventional W-E combustion technologies in severe non-attainment areas is becoming extremely difficult because the local air quality management district's permitting authority requires emissions from such projects to be fully "offset" by making greater than 1:1 reductions in emissions on other existing facilities. These offsets will be difficult to obtain in the amounts required for W-E development. Public concern is also growing over the emissions of toxic air contaminants from conventional W-E technology.

The Southern California Edison Company strongly feels that both the severe air quality problem and the critical landfill problem in the Basin can be helped by rapid commercial development of advanced combustion/conversion technologies to significantly reduce emissions of air contaminants from waste to energy facilities, making siting easier and reducing environmental impacts from waste disposal in the Basin. For these reasons, Edison supports enactment of AB937 which provides financial incentives for commercial development of advanced W-E technology.

We feel that with the right financial incentives to encourage their development, there are several advanced W-E technologies which have the potential to significantly reduce emissions of air pollutants (including toxic air contaminants) compared to

conventional direct combustion. Advanced technologies which are ready for commercial demonstration, or are on the horizon of demonstration development are:

a) anaerobic digestion

b) fluidized bed combustion

c) fluidized bed gasification

d) thermochemical gasification

e) pyrolysis

I would like to very briefly summarize the status of development of each of these technologies, their benefit in terms of reduced air pollution, and financial incentives needed to bring them to commercial availability within the next 3 to 5 years.

a) Anaerobic digestion is a biological conversion process which involves the decomposition of organic material in the absence of oxygen. The organics in refuse and sewage are biologically converted to roughly 60 % methane and 40 % carbon dioxide. The CO_2 can be removed to yield pipeline quality gas. Approximately 50 % of the solids in the digester are converted to a gaseous fuel. The remaining solids can be dewatered and thermally processed to yield steam or low BTU gas for electrical generation, or in some areas composted for use as a soil amendment.

There are no air emissions from the anaerobic digestion conversion processes. The emissions from the combustion of the methane and CO2 are the same as natural gas which is approximately 1.0 lb NOx/MWHr. This is about a 70 % decrease in

NOx emissions over a mass fired W-E facility. The biological breakdown of refuse does not involve the production of toxic air contaminants and, therefore, they are not likely to be present in the product gas.

The anaerobic digestion technology has been developed to a level ready for commercial scale demonstration. The increased risk of demonstrating the commercial operation of digestion compared to conventional mass-fired technology will likely require financial aid in the form of technology performance guarantees to remove the increased technical risk in the eyes of the financial community. This technology will then be on an equal competitive level with conventional combustion technologies.

b) Fluidized bed combustion involves the use of a sand medium which is maintained in a fluid state by high velocity air injection under the bed of sand. The combustion of waste occurs in the sand bed. Fluidized bed combustion has been developed and demonstrated with coal, but has had operating problems with refuse due to the RDF distribution within the bed. The technology is presently undergoing developmental testing, however, and is nearing commercial demonstration readiness.

Fluidized bed combustion can be effectively controlled to reduce air emissions over conventional combustion because the sand bed medium produces more complete and uniform combustion and provides longer, more effective reaction when ammonia is injected to reduce NOx emissions. Estimated emissions are approximately 2 lbs. NOx/MWHr or about 35 % lower than conventional combustion of

refuse. Toxic air contaminant emissions are expected to be lower than the toxic emissions from direct combustion because of longer more uniform temperature control in the fluidized bed combustion.

Fluidized bed combustion technology will be ready for commercial scale demonstration when the developments underway to control and optimize the refuse distribution within the bed are completed. When this problem is corrected, financial support to cover the increased technical risk over conventional combustion, in the form of performance guarantees, would provide the private sector with the incentive to bring this technology to full commercial status within approximately 3 to 5 years.

c) Fluidized bed gasification utilizes the same principles as fluidized bed combustion except the air requirements for complete combustion are significantly reduced. Partial combustion of the waste occurs resulting in a low BTU gaseous fuel which can be cleaned up for use in the generation of electricity. This technology has not developed to the status of fluidized bed combustion, requiring further developmental research to bring fluidized bed gasification to a commercial status within 3 to 5 years.

Emissions from fluidized bed gasification will result from the combustion, after cleanup, of the low BTU product gas. The emissions of NOx from burning this gas would approach that of natural gas which if burned in an electric utility boiler is approximately 1 lb./MWHr. The financial support needed for this technology would be greater than the technologies previously discussed due to the higher risks associated with the lower scale

level of R & D which has taken place. Support in the form of project grants would be necessary to cover the increased risk associated with the application of this technology.

d) Thermochemical gasification is similar in principle to fluidized bed gasification except the fuel is gasified in a fixed bed rather than a moving sand bed. A similar quality gas is produced although more carbon remains in the ash than fluidized bed gasification which creates more potential problems in disposing the gasification waste products. The benefit of fixed bed thermochemical gasification over fluidized bed gasification is lower capital cost which outweighs the slightly lower conversion efficiency.

While thermochemical gasification of coal has recently been commercially demonstrated, the application of this technology with refuse creates many problems due to its diverse heterogenous nature. Commercial scale demonstration projects constructed in the late 70's and early 80's to gasify refuse were unsuccessful. Emissions from this technology after gas cleanup are the same as fluidized bed gasification or approx. 1 lb NOx/MWHr. A financial stimulus in the form of grants would accelerate the commercial development of this technology in about 3 to 5 years.

e) Pyrolysis is the thermal reduction of organic material in the absence of oxygen, which in effect is similar to an oven. Heat is applied externally by combusting the product gas or fossil fuels. The heat drives off the volitiles in the form of oil and gas leaving a char (all three in equal proportions). The process is relatively simple and adaptable to refuse since there

are very few moving parts and a heterogenous composition of the refuse to be converted does not create as many technical problems as gasification.

Pyrolysis has not developed commercially (could be in 3 years) primarily due to the lack of incentives and because of the difficulty in marketing the oil and char which contains two thirds of the overall energy. The emissions from pyrolysis of refuse occur from the combustion of the product gas and oil which will produce similar emissions as natural gas or residual fuel oil when combusted in an electric utility boiler (gas = 1 lb NOx/MWHr and oil = approx. 2.3 lb NOx/MWHr). The emissions of toxic air contaminants are likely to be less than from conventional W-E combustion. This technology is less complicated than the other thermal processes previously discussed, however financial support in the form of project grants would be required due to the minimal development of this technology using refuse as the feedstock. Available markets for the oil and char may be the largest limiting factor.

In conclusion, I have summarized the developmental status of the key advanced technologies that need to be considered for financial assistance in order to aid in solving the landfill problem while not handicapping the attainment of air quality standards, particularly in the South Coast Air Basin. I urge the Committee to consider approval of AB937 which can provide necessary financial incentives to achieve these goals.