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DRAFT FINAL REPORT

ON

ENERGY-INFORMATION DISSEMINATION INTO THE REAL-ESTATE INDUSTRY

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by

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DRAFT FINAL REPORT ON ENERGY INFORMATION DISSEMINATION
INTO THE REAL ESTATE INDUSTRY

The contract "Energy Information Dissemination into the Real Estate Industry" is a continuation of an earlier Department of Energy funded effort that produced a carefully designed curriculum to encourage and assist real estate professionals to incorporate relevant energy facts and information into their daily business routines. The efforts of this earlier project ranged from the analysis of existing data and the development of institutional materials, to the statistical measurement of the curriculum's effectiveness and the subsequent refinement of its contents. The present project developed a set of nine slide/tape programs and two sets of overhead transparencies to accompany the earlier developed curriculum materials. Additionally, the present project included the development of standardized implementation procedures for use by energy extension service offices throughout the nation, as well as an instructor's manual designed to integrate use of the slide/tape programs and overhead transparencies with the textbook developed in the earlier effort.

The development of these audio-visual aids and accompanying materials took place in four major phases. In Phase I, the audio-visual aids were developed. This development process consisted of selecting topics for coverage in the slide/tape programs and overhead transparencies to the actual production of these audio-visual materials. In Phase II of this effort, standardized implementation

procedures were developed for use by energy extension service (or state energy) offices throughout the nation. Additionally, these standardized implementation procedures were followed in Phase III of this project in which the materials developed in Phase I were field tested. The field testing consisted of presenting the integrated package to representatives of the real estate industry in the cities of Yakima and Seattle, Washington. In Phase IV of this effort the audio-visual aids were refined as a result of the field testing, and assistance has been provided to other states interested in adopting the instructional package developed.

Development of Audio-Visual Aids

The development of the audio-visual aids was accomplished in several distinct tasks. First, fundamental energy concepts and ideas relevant to real estate professionals were identified and isolated in the textbook Making the Most of Energy in Real Estate. For the most part, each of the slide/tape programs produced act as an introductory overview of a particular chapter or combination of chapters in the textbook mentioned above. The only exception to this rule is the introductory slide/tape program, which presents an overview and highlights of materials to be covered in the remaining slide/tape programs.

The slide/tape programs are arranged in order to heighten the students' attitudes toward energy in general and energy conservation in particular. The need to establish a positive and receptive attitude among the students before presenting substantive energy facts and information has clearly been established in the earlier program in which the curriculum materials were developed. The introductory

slide/tape show employs actual testimony from representatives of the real estate industry who have already adopted energy facts and information into their daily business routines. This procedure helps to instill the positive attitudes required by example. The very first slide/tape program in the series, "Energy Legislation Today," emphasizes the impacts recent energy legislation will have upon the real estate industry. The carrot and stick nature of this legislation is emphasized in this slide/tape program because the imposition of federal sanctions and incentives has been found to heighten the interest of real estate professionals in the energy area in the curriculum development effort described earlier.

The next slide/tape show introduces the students to certain fundamental energy ideas and concepts useful in real estate. The third slide/tape show focuses upon energy conservation techniques in new construction. Next, energy conservation in existing homes is examined carefully. The first four slide/tape programs following the introductory program all emphasize basic energy facts and information useful to real estate professionals.

The next two slide/tape programs introduce the students to energy and present value calculations. The slide/tape programs are very short with the actual calculations presented in a step-by-step manner using overhead transparencies.

The next to last slide/tape program deals with solar energy. This slide/tape presentation provides the students an overview of the economic feasibility of solar energy throughout the United States, as well as an analysis of the major components which make up active solar energy systems.

The final slide/tape show contains additional testimony from representatives of the real estate industry about how they have incorporated relevant energy facts and information into their daily business routines. This last slide/tape is probably the most powerful of all. However, this particular slide/tape presentation must be withheld till the very end of the workshop and/or seminar in which these materials are presented. The testimony in the introductory slide/tape program is taken directly from this slide/tape program. This process brings the student in a full circle, from the initial introduction and heightening of awareness, to the understanding of basic facts and information, to the types of calculations needed, and back to ways in which these new ideas and information can be incorporated into the real estate professional's business routines.

Production Techniques

All slide/tape programs and the two overhead transparency sets were produced using the same basic techniques. Specifically, each and every slide was designed in order to carefully illustrate the contents of the script. Using standard 3 x 5 file cards, scripts were written in rough draft form on the right half of this card with a rough representation of the slide drawn on the left portion of the card. The cards were then placed in sequence on a story-board so that the logic and flow of the slide/tape program could be carefully scrutinized.

After carefully reviewing a complete set of story-boarded cards for a slide/tape show, they were turned over to artists who drew 8½ x 11 representations of the left portion of each card. Meanwhile the script on the right portion of each card was prepared for recording. As the

artwork and typed scripts were finished, they were reviewed once again for logic and consistency.

Finally, the artwork was photographed using standard 35mm colored film. At the same time, the scripts were recorded in a sound studio. Upon receipt of the developed slides, slides and script were integrated into the proper sequence. All slide/tape sets use audio cue signals of 1,000 Hz for automatic advance.

Presentation Techniques

When presenting technical information, various vehicles are possible. But, because the real estate industry as a whole is very suspicious of the importance of energy in their business, it was decided that a vehicle that deals with these doubts should be utilized. Specifically, two primary speakers are used throughout the slide/tape programs. One of the speakers is the usual narrator type voice. However, the second voice is that of a "doubting Thomas" representative of the real estate industry. This second voice periodically interrupts the narrator to express the same kinds of doubts that the students probably are experiencing. The students identify with this characterization. Then, the narrator answers the "doubting Thomas" in such a way that the character, and the students, are thoroughly enlightened.

Standardized Implementation Procedures

The development of standardized implementation procedures paralleled the development of the audio-visual aids. First, liasons were established with trade associations from each of the designated target groups. The trade associations provided publicity for the

workshops in which the materials were tested. Logistics for these workshops were provided by a local board of realtors and by a local home builders association.

In order to assist any state energy extension service office or any state energy office that desires to adopt these audio-visual aids, a manual entitled "Implementation Guidelines for 'Making the Most of Energy in Real Estate' Workshops" has been prepared. A copy of this manual can be found in Exhibit A.

Additionally, "An Instructor's Manual to Accompany the Audio-Visual Aids for 'Making the Most of Energy in Real Estate'" has also been prepared. A copy of this manual can be found in Exhibit B. The scripts for each slide/tape show can be found in this latter manual. These two manuals combined contain ample information for any state energy office or state energy extension service office to conduct as many workshops as they feel are necessary within their state using the audio-visual aids developed in this project.

Field Testing and Evaluation of Materials

The field testing and evaluation of the workshops in which the audio-visual aids were presented is identical to that recommended in the implementation guidelines manual mentioned above. Specifically, two primary testing instruments are used in the evaluation procedures. A set of thirty-two statements to which students indicated their extent of agreement or disagreement constitutes a pre- and post-test given to the students immediately before and after each workshop. Secondly, a standard program evaluation form was filled out by each student completing the workshops.

Table I contains a summary of the pre- and post-test workshop evaluations. This table contains three columns. In the first column the statement the students were asked to respond to is given. The next two columns are standard t-statistics generated from a difference of means test. Specifically, these t-statistics measure the extent to which students improved their understanding of each statement during the workshop. Those t-statistics with a double asterisk indicate areas where the students showed no change in understanding of the statement during the workshop. Those t-statistics with one asterisk indicate a slight improvement in understanding of the statement. Those t-statistics with no asterisks indicate substantial improvement in understanding of the statement. A negative t-statistic indicates a reduction, rather than an improvement, in the students' understanding of the statement. The t-statistics for all items combined and for both workshops indicate that the students overall acquired a significant improvement in their understanding of the materials covered.

The statistical analysis of the pre- and post-test results suggests that the workshop materials and audio-visual aids were strongly effective in improving the students' understanding of relevant facts and information concerning energy in the real estate business. No statistically significant differences were noted in the extent of this effectiveness for the variety of real estate professionals present at each workshop. In other words, the workshop materials are highly effective for all types of real estate professionals, including real estate lenders, brokers, appraisers, as well as builders and developers.

The workshop participants also completed a standard workshop evaluation form. The results of these evaluations are presented in

TABLE I

Summary of Workshop Evaluations
(T-Statistics for Before vs After Responses on the Opinion Survey)

<u>Statement</u>	<u>t-Statistic</u>	
	<u>Yakima</u>	<u>Seattle</u>
Substantial state and federal legislation already exists dealing with energy.	1.5844	1.6677
Federal energy legislation exists that instructs the Department of Housing & Urban Development to develop a national energy efficiency performance code for all new and renovated housing.	3.6622	.8581**
When the U.S. Department of Energy was created, it was given awesome <u>new</u> regulatory powers.	.6708**	.0000**
Space heating reduces entropy.	-1.5027	-.5455**
Utilities are <u>required</u> to arrange for installation of energy conservation items in their customers' residences.	-.2469**	4.5033
Natural gas, oil, coal, and wood are examples of non-renewable energy sources.	.5040**	-2.3567
Btu means Basic Thermodynamic Unit.	.3123**	.6470**
It takes a highly skilled specialist to estimate the energy savings realized by energy conservation items.	.3471**	.4366**
Oil is an important source of energy because its BTU content per pound is greater than that of any other fuel.	.4235**	.3734**

TABLE I--Continued

Summary of Workshop Evaluations
(T-Statistics for Before vs After Responses on the Opinion Survey)
(cont.)

<u>Statement</u>	<u>t-Statistic</u>	
	<u>Yakima</u>	<u>Seattle</u>
Solar energy is the cheapest source of energy available.	1.1473*	1.0142**
Carefully constructed energy-conserving homes always cost more to build than traditionally built homes.	1.9604	4.8321
Temperature control is the only way to achieve human thermal comfort.	1.005**	-1.0333**
Most people are quite comfortable within a wide range of air temperature, relative humidity, and air velocity.	.4113**	1.2742*
Heat flows both from warm to cool substances, and from cool to warm substances.	1.2736*	1.0088**
The orientation of a home on its site is of little importance in determining the home's energy needs.	.3547**	-1.8516
Thermal integrity is the effectiveness of a building in keeping the inside of a home cool in hot weather and warm in cold weather by reducing the amount of thermal transfer.	1.6775	.3119**
Most heat loss occurs through the ceiling of a structure.	3.9528	5.55

TABLE I--Continued

Summary of Workshop Evaluations
(T-Statistics for Before vs After Responses on the Opinion Survey)
(cont.)

<u>Statement</u>	<u>t-Statistic</u>	
	<u>Yakima</u>	<u>Seattle</u>
Glass windows transmit from ten to twenty times as much heat as a well-insulated walls.	1.0171**	-.6286**
Builders typically oversize heating and cooling units in residential structures.	2.8228	2.4416
It is more efficient to oversize heating and cooling equipment than to undersize the equipment.	2.8398	4.338
Earth berming is an example of an <u>active</u> solar energy system.	1.8351	-.4671**
Undesirable heat exchanges in the walls and roof of a structure can be pinpointed using thermography.	1.3843*	1.6082
Life Cycle Cost should be applied to living things.	1.9052	.7454**
Discounted payback periods are superior to simple payback periods.	1.2797*	.0000**
Infiltration is the greatest source of undesirable heat exchanges in most buildings.	3.3134	.7767**

TABLE I--Continued

Summary of Workshop Evaluations
(T-Statistics for Before vs After Responses on the Opinion Survey)
(cont.)

<u>Statement</u>	<u>t-Statistic</u>	
	<u>Yakima</u>	<u>Seattle</u>
Sliding glass doors are highly energy efficient, especially in the warmer climates.	1.4552*	1.7094
It is far easier and less costly to retrofit an existing house for energy conservation than to build an energy efficient house.	1.6828	-.4286**
Most standard real estate forms contain adequate room for relevant energy information.	-1.6878	-.7111**
An energy audit is the result of an accountant's review of a public utility company's financial records.	-.7161**	.7093**
Careful attention to design principles helps to reduce the size and increase the efficiency of mechanical heating and cooling systems.	1.8351	.3612**
All items	5.7354	4.0917
Both Cities	7.0200	

**Indicates no significance

*Indicates slight significance

No * Indicates strong significance

Negative

sign Indicates a reduction in understanding

Positive

sign Indicates an improvement in understanding

Tables II and III. The most popular descriptive statement about these workshops (cited by practically every workshop participant) is, "I gained new knowledge about and insights into the subjects which were covered." The overwhelmingly strong response of the workshop participants to this statement lends further evidence of the effectiveness and usefulness of the audio-visual aids and materials developed in this project. Additionally, Table II indicates that the workshop has met its primary objective with at least fifty percent of those attending it. Specifically, over half of the respondents at both workshops indicated that they "will do some things differently as a result of this program." Finally, negative descriptive statements about the workshops simply were not mentioned at all.

The extent of satisfaction with the workshop is indicated in Table III. Notice that on the average the workshop participants were at least very satisfied with most, and at least moderately satisfied with the rest of the statements in this table. The one aspect of the program with which the participants were least satisfied was its length. For this reason, the workshop materials have been organized into both a one-day as well as a two-day package for presentation purposes. The organization of these one-day and two-day presentations has also been specialized for specific real estate audiences. The instructors' manual mentioned above contains a table that describes these one- and two-day suggested programs. The Seattle and Yakima workshops were two full days in length.

As a result of these evaluations, very few modifications were made to these slide/tape sets. Nonetheless, comments from Department of Energy representatives and other real estate professionals and non-real estate energy experts led to certain minor modifications. Specifically,

Summary of Workshop Evaluations
(Percent Response to Descriptive Statements)

<u>Statement</u>	<u>% Response</u>		
	<u>Yakima</u>	<u>Seattle</u>	<u>Both</u>
I gained new knowledge about and insights into the subjects which were covered.	100.00	90.91	95.83
I will do some things differently as a result of this program.	53.85	54.55	54.17
The program helped me realize the importance of continuing education.	46.15	45.45	45.83
The informal conversations with my colleagues benefited me much.	46.15	45.45	45.83
It was a richly rewarding experience.	30.77	18.18	25
We covered too much material in the time available.	23.08	0	12.50
The instruction was too general.	15.38	0	8.33
I was not really well satisfied with this experience.	0	9.09	4.17
I helped some of my colleagues with their problems.	7.7	0	4.17
I saw no relation between this program and my everyday job.	0	0	0
I didn't learn anything.	0	0	0

TABLE III

Summary of Workshop Evaluations
(Degree of Satisfaction)

<u>Statement</u>	<u>Mean</u>	Very Satisfied		Moderately Satisfied		Dis-satisfied	
		1	2	3	4	5	6
Instructor(s)	1.667		*				
Methods of instruction	1.810		*				
Organization of the program	1.833		*				
Opportunity to participate	1.857		*				
Time of Program (Month, day, hour)	1.875		*				
Physical arrangements	2.00		*				
Instructional materials	2.00		*				
Refreshments	2.167		*				
Over-all program	2.333		*				
Choice of subjects	2.381		*				
Length of Program	2.710		*				

a short introductory slide/tape program was produced. This program has already been discussed elsewhere in this report. Also, a rather detailed discussion of entropy was deleted from Slide/Tape Set II. Other minor refinements were made to selected slide/tape programs, such as mentioning regional Department of Energy offices as a source of additional energy information to the real estate industry.

Overall, the audio-visual aids produced in this project in concert with the textbook mentioned earlier constitute a very powerful tool for achieving rational energy decisions in the real estate sector of the U.S. economy. The emphasis in these workshops is upon residential structures, but this is as it should be. The profit motive is sufficiently strong to encourage rational energy conservation measures in income-producing properties. Most real estate professionals who partake in these workshops will, as a direct result of this participation, do things differently than they had in the past. Specifically, they will begin to incorporate relevant energy facts and information into their daily business routines.

Monitoring and Further Refinement

Originally, the contract called for WSU to distribute the audio-visual aids and other materials to other states desiring them at cost. However, this was an error. Instead, the audio-visual aids must be distributed to other states through the U.S. Department of Energy Audio-Visual Branch in accordance with federal regulations. Also, the Department of Energy-Energy Extension Service Office has taken charge of the distribution of the standardized implementation procedures and instructor's manual described earlier in this report. Nonetheless, as other states adopted and expressed an interest in the workshop materials,

assistance was rendered to them as time and funds remaining in the project permitted.

Implementation Guidelines for
"Making the Most of Energy in Real Estate"
Workshops

By

Hans R. Isakson

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INTRODUCTION

This implementation booklet is designed to be a simple, straightforward, step-by-step guide for the implementation of the two-day workshop "Making the Most of Energy in Real Estate"; and related follow-up activities. The booklet was written for the individual in a state Energy Extension Service office who has been assigned the responsibility of disseminating relevant energy facts into the real estate industry. This booklet, then, is that individual's handbook of instruction for the complete planning and organizing of the program from six months prior to the workshops to two weeks, and more, following the workshops.

The entire workshop has been thoroughly tested as to its effectiveness and has proven to be quite successful and well-received. Every phase and each aspect of the program has been carefully designed, and it is therefore recommended that implementation procedures be carefully adhered to; particular attention to the timing of each step will lead to fewer difficulties and, ultimately, more positive results.

Implementation Guidelines for
"Making the Most of Energy in Real Estate"
Workshops

The major purpose of these guidelines is to provide a state energy extension service office with a set of easy to follow procedures for conducting and evaluating workshops for real estate professionals entitled "Making the Most of Energy in Real Estate." These workshops consist of a series of slide-tape presentations and several sets of overhead transparency projections. These visual aides have been carefully developed to be presented by someone with at least a fundamental understanding of energy use in real estate. Naturally, the better versed the instructor of these workshops is, the more impressive are the results. Portions of the workshop should also be strengthened by outside speakers.

The rationale for developing these workshop materials is based upon the energy information dissemination process shown in Exhibit 1 on page 2. The real estate sector consists of two major groups: professionals in the real estate industry, and the real estate buying public. If participants in the real estate sector are well informed about energy matters, then real estate decisions may reflect the scarcity of our dwindling energy supplies.

Exhibit 1

The Energy Information Dissemination Process in the Real Estate Sector

THE REAL ESTATE PROFESSIONALS

Public education efforts are already underway to better inform the real estate buying public. The primary functional objective of this workshop is to educate and inform real estate professionals about energy matters so that they can more effectively serve the real estate buying public.

In Exhibit 1 on page 2 notice that information from the workshops and the mass public educational efforts flows through "opinion leaders." The key opinion leaders in the real estate industry can be conveniently subdivided into three main areas: (1) those concerned with the financing and appraising of real estate, (2) those concerned with the selling and brokerage of real estate, and (3) those concerned with building and developing real estate. Because these key opinion leaders will transmit information within the real estate industry, the workshop materials have been carefully developed to appeal to the leaders in each of these areas.

Although public opinion leaders can also be categorized, to do so would be irrelevant to the workshop.

These guidelines have been carefully developed so that the opinion leaders of the real estate industry in a particular target area are the ones most likely to attend and absorb the information being presented in the workshop.

Overview of the Implementation Procedures

Once a state energy extension service (or state energy) office has decided to conduct "Making the Most of Energy in Real Estate" workshops, the first step is to identify those cities within the state where the workshops are to be held, and secondly, to identify those groups that will be invited to attend the workshops. Obviously, the major metropolitan areas of a state will be prime candidates as the cities in which the workshops are to be offered. Nonetheless, the energy extension service (or state energy) office should not neglect smaller urban areas that display a strong interest in energy matters.

The groups to invite to the workshops include real estate lenders, appraisers, home builders, developers, and realtors. Because the workshop materials have been carefully designed to appeal to members of all of these groups, there need be no concern about mixing these various real estate professionals together in one room. On the contrary, experience shows that such a mixture produces a very positive interaction among the workshop participants.

Alternatively, it is also possible to specialize the workshop presentation for any particular group of real estate specialists. Suggested programs are contained in the Instructor's Manual.

Once the target areas and target groups have been identified, the implementation procedures branch into two main areas, namely strategies and logistics. Workshop logistics are concerned with the actual site of the workshop, the arrangement of adequate workshop facilities, the

registration of workshop participants, and program coordination during the workshop. Workshop implementation strategies are concerned with how to obtain names, telephone numbers, and addresses of resource contacts such as utility company representatives; how to encourage participation in the workshop by members of the target groups; and how to promote the workshop.

An overview of all of these activities is presented in Exhibit 2 on page 6.

Workshop Logistics

Workshop logistics consist of the selection of an appropriate site for the workshop, the arrangement of workshop facilities, registration activities, and program coordination during the workshop. In order to enhance target group participation in the workshops, it is highly recommended that the logistics be under the control and direction of a trade association that represents one of the target groups. In most areas the best trade association to do this is the local board of realtors in each city selected. By allowing the local board of realtors to handle these logistics, they will (1) set the fee for the workshop, (2) collect fees in the registration process, (3) make all local arrangements, and (4) profit from these efforts. It is this last element, namely the profit available to the local board of realtors for their efforts, that will help to insure the success of the workshops. Nonetheless, it is strongly recommended that the state energy extension service office guarantee the local board of realtors that they will

Exhibit 2

Overview of the Implementation Procedures

not lose money, even if the workshop is a complete failure and has to be cancelled due to a lack of interest.

Physical requirements for the workshop are listed in Exhibit 3 on page 8.

It is recommended that workshop participation be limited to 50 students in order to enhance interaction among the instructors and students.

A 35mm slide projector with a zoom lens will be able to fill a 70 x 70 inch projection screen in almost any size room. Please note that this slide projector must be equipped with a sync cord in order to connect it with the slide-sync tape recorder. This is because the tapes used in the workshop have inaudible tones that automatically advance the slide projector at the appropriate time. Remote speakers are generally required due to the poor quality of speakers in most tape recorders.

A projection stand and a double outlet extension cord are also required.

An overhead projector is an essential piece of equipment, but the pointer and arrowhead pointer can be considered optional. Name tags and notebooks enhance the workshops, but the textbook is almost indispensable.

The need for workshop logistics to be under the control of one of the co sponsoring trade associations cannot be over emphasized. Not only does the trade association control over these matters help to relieve the energy extension service (or state energy) office of this burden, but it also will enhance the success of the workshop. The profit motive of real estate professionals is strong. If a particular educational exercise becomes profitable for a trade organization, it will engage in that educational exercise until these profits have been won. Use the profit motive to insure the success of these workshops.

Exhibit 3

Recommended Workshop Facilities

Classroom

50 Students

Comfortable Chairs and Tables

35 MM Slide Projector-Carousel Type

2.5-4 Inch Zoom Lens

Sync Cord

70 x 70 Inch Projection Screen

Slide-Sync Tape Recorder

Standard Cassett Size

Remote Speakers as Needed with Cord

Standard Projection Stand

15 Foot Double Outlet Extension Cord

Overhead Projector

Pointer or Arrow Head Light Pointer

Name Tags

Notebooks

Textbook, Making the Most of Energy in Real Estate

Workshop Strategies

The major groups at which these workshops are aimed and the trade associations that represent these target groups are listed below.

Recommended Target Groups	Most Common Representative Trade Associations
Real Estate Lenders	
Commercial Mutual Savings Banks	State Bankers Association State Mutual Savings Banks Associations
Savings and Loan Associations	State Savings and Loan League
Credit Unions	State Credit Union League
Real Estate Appraisers	Local Chapters of American Institute of Real Estate Appraisers Local Chapters of the Society of Real Estate Appraisers
Home Builders	State and Local Homebuilders Associations
Realtors	State Association and Local Boards of Realtors
Developers	

The first, and most important, contact to be made in implementing these workshops is a telephone call to the local board of realtors in each city selected as a workshop location. A local board of realtors frequently offers educational programs of interest to all real estate professionals, from lenders to builders and appraisers. The other trade organizations are not as interested in promoting educational programs that benefit anyone but their own members. Additionally, it

is not at all uncommon to find a local board of realtors in a large city with its own classroom facilities. Frequently, these classroom facilities can be made available for the workshop. Finally, realtors are often looked upon by others as key opinion leaders in the real estate industry.

Real estate appraisers, particularly the Society of Real Estate Appraisers, may also show a strong interest in sponsoring this workshop. Recent changes in standard appraisal forms and the Society's continuing education requirements (10 hours per year) has helped to stimulate interest among appraisers in energy workshops.

In any event, the most obvious source for the names, telephone numbers, and addresses of the trade associations is the telephone book. However, many libraries have trade association directories. These directories can prove to be very useful in identifying the appropriate trade association contacts. Also, the director, president, or chief executive officer of the local board of realtors probably knows who to contact at the other trade associations.

Initial telephone contacts with these trade associations should cover the major points listed in Exhibit 4 on page 11. State the purpose of the telephone call immediately, then acquaint the contact with the workshop itself. Explain to the contact what co-sponsorship involves, and then discuss alternative workshop dates. When contacting the local board of realtors, be sure to detail explicitly the workshop logistical assistance that you will be asking them to provide. Obviously, do not

Exhibit 4

Major Points to Cover in Initial Telephone Contacts

State Purpose of Call (to invite co-sponsorship)

Acquaint Contact with the Workshop

- Co-sponsorship requires no cost
(trade Association handling logistics
could make a profit)

- Workshop endorses no commercial products

- Workshop does not specify insulation standards

- Workshop has a "how-to" emphasis

Explain What Co-Sponsorship Involves

- Workshop logistics (for only one trade association)

- Promotional support

Discuss Workshop Dates

- Identify dates to avoid

- Identify best days of the week

Verify Name, Title, and Address of Director or Equivalent

Inform Contact of Forthcoming letter

forget to mention that the board will make a profit, or at least will suffer no financial loss, by co-sponsoring and arranging local facilities. Finally, verify the name, title, and address of the director of the association, and inform the contact that they will be sent a letter formally requesting their co-sponsorship. An example of this letter can be found in Exhibit 5 on page 13.

About two weeks after the letters to the trade associations have been mailed, they should be contacted once again by telephone. The purpose of these follow-up telephone calls (see Exhibit 6 on page 14) is to confirm receipt of the letter, answer any questions that the trade association may have, encourage their positive and prompt reply, and to confirm the workshop dates. Most trade associations will require the approval of their board of directors before granting co-sponsorship. Mark down the dates that their board of directors are scheduled to meet to discuss this matter and make additional follow-up telephone calls ten days to two weeks after this date, if a written reply is not received within this time frame. Occasionally, a trade association may desire to have a representative of the energy extension service (or state energy) office present during the board meeting at which this matter is discussed. In any event, the energy extension service (or state energy) office ought to do all that it can to encourage the various trade associations to co-sponsor these workshops.

Workshop Promotional Activities

After securing the co-sponsorship of the major real estate trade associations, the next step is to begin promoting the workshops.

WASHINGTON STATE UNIVERSITY

PULLMAN, WASHINGTON 99164

Exhibit 5 A- 13
Representative Letter to
Trade Association

COLLEGE OF BUSINESS AND ECONOMICS
Department of Business Administration
Telephone (509) 335-3507

August 29, 1978

Mr. William Wynn, Executive Vice-President
Seattle Master Builders Association
170 Mercer Street
Seattle, WA 98109

Dear Mr. Wynn:

I would like to offer the Seattle Master Builders Association the opportunity to co-sponsor a series of two day workshops called, "Making the Most of Energy in Real Estate." The subject content of these workshops was tested in Georgia, and was found to be highly effective. The workshops are being offered in Washington in order to field test a set of slide-tape programs that I am developing to accompany the text book written in Georgia. The U.S. Department of Energy is funding this effort and the results will be distributed nationally through the Energy Extension Service.

For your reference, I have enclosed an outline of the workshops and a copy of a brochure describing the Georgia program. The workshops have been scheduled for Yakima on February 8-9, 1979, Spokane on February 14-15, 1979, and Seattle on February 22-23, 1979. Registration fees have not yet been determined, but they will range from \$40 to \$75, depending on local room and meal costs. The costs of development and the instructor's fee (I will be the instructor) are paid for by the Department of Energy.

If you should like to co-sponsor these workshops, then I would like you to distribute an announcement brochure to your members and/or to announce the workshops in a newsletter or other suitable publication. Please let me know your decision not later than September 12, 1978 so that I can include your group as a co-sponsor on the brochures. Other organizations that have expressed an interest in co-sponsoring these workshops include the Washington Savings and Loan League, Washington Association of Realtors, Washington Credit Union League, Washington Bankers Association, Mutual Savings Association of Washington, and various local chapters of both the American Institute of Real Estate Appraisers and the Society of Real Estate Appraisers.

If you have any questions on this matter, please call me at (509) 335-3872.

Sincerely,

Hans R. Isakson
Assistant Professor

HRI/ntb

enclosures

Exhibit 6

Follow-Up Telephone Calls to Trade Associations

Confirm Receipt of Letter

Answer Questions

Encourage Positive Response

Confirm Dates

Local energy utilities should be invited to send a representative to address the workshop participants about their firm's energy conservation programs, and their outlook of the area's energy future. The involvement and co-sponsorship of the utilities will help to enhance the professionalism of these workshops. The utility representatives should prepare a short hand-out that summarizes their presentation and that supplies energy data useful to the participants. Often utility representatives on the program will attract many workshop participants who otherwise would not attend.

Also, each co-sponsoring organization should be given an opportunity to recommend or to supply a program speaker to assist with presentation of one or more of the slide-tape shows. The more trade association involvement of this type, the stronger is the turn out from that group.

Additional workshop promotional activities are listed in Exhibit 7 on page 16. These consist of the preparation of promotional materials, contacting printing services for timing information, sending out one-page announcements, sending out public service announcements, and the distribution of all media news releases. Samples of these promotional materials are contained in Exhibits 8 through 12 on pages 17 through 21. Please note that the distribution of some of these materials must start at least two months prior to the actual date of the workshop, so plan accordingly.

A one-page announcement with detachable registration forms and news release items should be sent to all of the co-sponsoring trade associations for distribution in their periodic publications. Most

Exhibit 7

Details of Workshop Promotion

Prepare Promotional Materials

News Releases

Announcement/Registration form

Contact Printing Services for Timing Information

Send One-Page Announcements and Slides to Radio and TV Stations*

Distribute All Media News Releases**

* At least two months prior to workshop

** At least one month prior to workshop

Making the Most of Energy in Real Estate

A Course of Relevant Energy Facts for Real Estate Brokers, Lenders, Appraisers, Developers, and Builders

OFFERED AT THREE LOCATIONS

YAKIMA

Feb. 8-9, 1979
Thunderbird Motel
(509) 966-1866
Fee: \$50.00

SPOKANE

Feb. 14-15, 1979
Downtown Holiday Inn
(509) 326-9222
Fee: \$50.00

SEATTLE

Feb. 22-23, 1979
710 Cherry Street
(206) 264-9888 or
266-9610
Fee: \$75.00

CO-SPONSORS

LENDERS

Washington Bankers Association
Washington Credit Union League
Mutual Savings Banks Association of Washington
Washington Savings League

UTILITIES

Washington Water Power Co.
Pacific Power and Light Co.
Seattle City Light

APPRAISERS

American Institute of Real Estate Appraisers
Society of Real Estate Appraisers

STATE AND FEDERAL AGENCIES

U.S. Department of Energy
U.S. Energy Extension Service
Washington Energy Extension Service

REALTORS

Seattle-King County Board of Realtors
Spokane Board of Realtors

BUILDERS

Home Builders Association of Spokane
Central Washington Home Builders Association
Seattle Master Builders Association

REGISTRATION FORM

(Name—please print or type)

(street address)

(telephone)

(city)

(state)

(zip)

(affiliation and position)

Make Checks Payable and Mail To:

[] Seattle: Seattle-King County Board of Realtors
(fee: \$75) 710 Cherry Street
Seattle, WA 98104

[] Spokane: Spokane Board of Realtors
(fee: \$50) P.O. Box 5230
Spokane, WA 99205

[] Yakima: Central Washington Home Builders Assoc.
(fee: \$50) 4100 Summitview Avenue, Suite 8
Yakima, WA 98908

Fee: Includes instruction costs, textbook, two luncheons, and coffee breaks

Enrollment is limited to 50 persons at each location.

"Making the Most of Energy in Real Estate," a workshop of relevant energy facts for the home builder and other real estate professionals, will be held February 22&23, 1979 at the Seattle-King County Board of Realtors classroom center, in Seattle. The workshop is cosponsored by the Seattle Master Builders Association, the U.S. Department of Energy, and many other real estate groups in the area.

The program is designed to equip the home builder with the knowledge and the tools necessary to cope with today's energy problems, and to prepare him/her for expected real estate market changes, as new energy-saving devices and techniques make their impact.

Instructors at the workshop will include Hans R. Isakson, assistant professor of business administration/real estate, Washington State University, Robin C. Calhoun, Director, Office of Conservation, Seattle City Light, and a representative of the Washington State Energy Office. Professor Isakson is one of the nation's leading experts on energy use in real estate. Ms. Calhoun is currently responsible for coordination and initiation of projects directed toward achieving electric conservation in all end-use sectors including residential, commercial, industrial and governmental in the Seattle area.

The workshop will include discussions of government energy policies, the condition of the nation's energy resources, the energy characteristics of real estate, principles of thermal comfort, design of energy efficient systems and investment analysis as it relates to conservation and solar systems.

The two-day workshop will consist of specially prepared audio-visual aids, easy to follow and understand presentations, and active student participation.

The registration fee is \$75.00, which includes instruction costs, text, conference materials, refreshment breaks, and two luncheons. The workshop will be limited to the first 50 paid registrants. For further information call (206) 264-9883 or 266-9610.

WASHINGTON STATE UNIVERSITY

News Service

(509) 335-3581

PUBLIC SERVICE ANNOUNCEMENT

30 SECONDS

A TWO-DAY WORKSHOP ON MAKING THE MOST OF ENERGY IN REAL ESTATE
IS BEING OFFERED ON FEBRUARY 22ND AND 23RD AT THE OFFICE OF THE
SEATTLE-KING COUNTY BOARD OF REALTORS.

THE WORKSHOP IS BEING CONDUCTED BY WASHINGTON STATE
UNIVERSITY UNDER THE SPONSORSHIP OF THE U.S. DEPARTMENT OF ENERGY,
UTILITY COMPANIES, LENDING INSTITUTIONS AND INDUSTRY ASSOCIATIONS.

ATTENDANCE WILL BE LIMITED TO THE FIRST 50 PERSONS REGISTERED.

FOR ADDITIONAL INFORMATION AND REGISTRATION FORMS, CONTACT THE
SEATTLE-KING COUNTY BOARD OF REALTORS AT 624-9610 OR 624-9888.

WASHINGTON STATE UNIVERSITY

A-20

NEWS SERVICE

(509) 335-3581

"Making the Most of Energy in Real Estate," a workshop on relevant energy facts for home builders and other real estate professionals will be held at the offices of the Seattle-King County Board of Realtors, 710 Cherry Street, Feb. 22 and 23.

The workshop is being presented by Washington State University and sponsored by the U.S. Department of Energy (DOE), the board of realtors, and several industry associations.

Program instructors will include Hans R. Isakson, assistant professor of business administration and real estate at WSU; Robin C. Calhoun, director of the office of conservation for Seattle City Light; and a representative of the Washington State Energy Office.

Isakson, who is one of the nation's experts on energy use in real estate, designed the program under a grant from the DOE.

The workshop will include discussions of government energy policies, the condition of the nation's energy resources, energy characteristics of real estate, principles of thermal comfort, design of energy efficient systems, and investment analysis as it relates to conservation and solar systems.

Isakson said similar workshops will be held in Yakima, Feb. 8-9, and Spokane, Feb. 14-15.

He said the program is being conducted as a pilot project in Washington and will be evaluated for possible use on a nationwide scale through the DOE's Energy Extension Service.

Registration is being limited to 50 persons at each locations. Fee for the Seattle session is \$75 which covers text, conference materials and two luncheons.

For further information and registration materials contact the Seattle-King County Board of Realtors.

WASHINGTON STATE UNIVERSITY

NEWS SERVICE

(509) 335-3581

February 1, 1979

PULLMAN, Wash.--Registrations are being accepted for a Spokane workshop, "Making the Most of Energy in Real Estate," scheduled for Feb. 14 and 15 at the Downtown Holiday Inn.

The program, being presented by Washington State University faculty member Dr. Hans Isakson, will include discussions of governmental energy policies, the condition of the nation's energy resources, energy characteristics of real estate, principles of thermal comfort, design of energy efficient systems, and investment analysis as it relates to conservation and solar energy systems.

Sponsoring the workshop with WSU are the Spokane Board of Realtors, the United States Energy Department, and several industry associations.

Program instructors with Isakson will be Dan Ripley, a design specialist with the Washington Water Power Company, and a representative of the Washington State Energy Office.

Isakson said the program is being conducted as a pilot project in Washington and will be evaluated for possible use on a nationwide basis through the Energy Department's Extension Service.

Registration is being limited to 50 persons. Fee for the session is \$50 which covers text, conference materials and two luncheons. The Spokane Board of Realtors is conducting the registration.

trade associations will require only one camera ready copy of these items in order to include them in their newsletters, magazines, etc. Public service announcements for television stations should be accompanied by a 35mm slide, properly blocked for television. This slide should contain printed information consisting of the workshop title, dates that it will be held, and telephone number that can be called for further information. The telephone number to use in all public service announcements is that of the local board of realtors, or the trade association that has agreed to handle the workshop logistics.

Finally, a general news release concerning the workshops should be sent to all newspapers, television newsrooms, and radio newscasters.

Although most television and radio stations will not give the workshop much pre-program coverage, it will do no harm to send them these news release items. On the other hand, the real estate editors of major newspapers will probably include information concerning the workshops in their sections with no problems.

Other Pre-workshop Activities

In addition to the above promotional activities, a schedule of events of the workshop should be prepared and sent to the local board of realtors or trade association handling workshop logistics. They, in turn, will send the information to the registrants approximately two to three weeks prior to the workshop itself. A sample of a two-day workshop schedule of events can be found in Exhibit 13 on page 23. Note that this schedule of events includes not only the time and dates of the

MAKING THE MOST OF ENERGY IN REAL ESTATE

Downtown Holiday Inn
Spokane, Washington

SCHEDULE OF EVENTS

Wednesday February 14Session

8:30 a.m.	Registration
9:00	<u>Introductory Remarks</u> by Dr. Hans R. Isakson, College of Business and Economics Washington State University
9:30	<u>Energy Legislation Today</u> with remarks by Frank Welch, Energy Systems Engineer, Washington State Energy Office
10:30	Coffee Break
10:45	<u>Energy Basics for Real Estate Professionals</u> with remarks by Dan Ripley, Electric Industry Representative, Washington Water Power Company
11:45	Lunch--room to be announced
1:30 p.m.	<u>Build It Right In the First Place</u> with discussion
2:30	<u>Tightening Up Existing Homes</u> with discussion
3:30	Coffee Break
4:00	<u>Panel Discussion</u> Dr. Hans R. Isakson, Moderator Frank Welch, Washington State Energy Office Dan Ripley, Washington Water Power Co.

Thursday February 15Session

8:30 a.m.

Coffee

9:00

Examination of Equipment Needs and
Energy Conservation Ideas--Bring your
Calculator!

10:30

Coffee Break

10:45

Life-Cycle Costing Techniques and
Applications--More Calculations

12:00

Lunch--room to be announced

1:30 p.m.

Solar Energy Made Easy
with discussion

2:30

Guidelines and Aids for Making the
Most of Energy in Real Estate

3:30

Coffee Break

4:00

Review and General Discussion

workshop, but its location as well, in order to remind the registrants about these important details. Also, note that the schedule of events recommends that the participants bring their pocket calculators for the second day events. Finally, the trade association mailing the schedule of events may also wish to include a cover letter recommending nearby parking facilities.

About a week before the workshop the local board of realtors or trade association handling local logistics should be contacted and reminded about the equipment needed on hand the day of the workshop. Additionally, other workshop logistical matters should be discussed and clarified at this time.

Workshop Evaluations

The energy extension service (or state energy) office should be interested in evaluating the impact and effectiveness of these workshops. If this is the case, then the sample pre- and post-tests in Exhibit 14 on page 26 and workshop evaluation form in Exhibit 15 on page 31 should prove useful. The pre- and post-tests should be administered immediately before and after the workshop presentation. The questions on this test have been carefully selected to measure the effectiveness of the workshop presentation. Although the questions are presented as opinion items, they are actually true-false statements. The "correct" response for each item is circled in Exhibit 14. Measurement of the effectiveness is achieved by calculating the extent to which the workshop participants have moved toward or away from the "correct" response.

Exhibit 14

Pre-and Post-Tests

MAKING THE MOST OF ENERGY
IN REAL ESTATE

- Opinion Survey -

Name	Professional Affiliation
Address	City & State

In order to ascertain the effectiveness of this course and your achievement, we would like your reaction to a number of energy related statements. Please circle the number which corresponds to the Extent of your AGREEMENT or DISAGREEMENT with the following statements. Do not skip any items.

	<i>Definitely Disagree</i>	<i>Disagree</i>	<i>Slightly Disagree</i>	<i>Slightly Agree</i>	<i>Agree</i>	<i>Definitely Agree</i>
1. Substantial state and federal legislation already exists dealing with energy.	1	2	3	4	5	⑥
2. Federal energy legislation exists that instructs the Department of Housing & Urban Development to develop a national energy efficiency performance code for all new and renovated housing.	1	2	3	4	5	⑥
3. When the U.S. Department of Energy was created, it was given awesome <u>new</u> regulatory powers.	①	2	3	4	5	6
4. Space heating reduces entropy.	①	2	3	4	5	6
5. Utilities are <u>required</u> to arrange for <u>installation</u> of energy conservation items in their customer's residences.	1	2	3	4	5	⑥

	Definitely Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Definitely Agree
6. Natural gas, oil, coal, and wood are examples of non-renewable energy sources.	1	2	3	4	5	⑥
7. BTU means Basic Thermodynamic Unit.	①	2	3	4	5	6
8. It takes a highly skilled specialist to estimate the energy savings realized by energy conservation items.	①	2	3	4	5	6
9. Oil is an important source of energy because its BTU content per pound is greater than that of any other fuel.	①	2	3	4	5	6
10. Solar energy is the cheapest source of energy available.	①	2	3	4	5	6
11. Carefully constructed energy-conserving homes always cost more to build than traditionally built homes.	①	2	3	4	5	6
12. Temperature control is the only way to achieve human thermal comfort.	①	2	3	4	5	6
13. Most people are quite comfortable within a wide range of air temperature, relative humidity, and air velocity.	1	2	3	4	5	⑥
14. Heat flows both from warm to cool substances, and from cool to warm substances.	①	2	3	4	5	6

	Definitely Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Definitely Agree
15. The orientation of a home on its site is of little importance in determining the home's energy needs:	①	2	3	4	5	6
16. Thermal integrity is the effectiveness of a building in keeping the inside of a home cool in hot weather and warm in cold weather by reducing the amount of thermal transfer.	1	2	3	4	5	⑥
17. Most heat loss occurs through the ceiling of a structure.	①	2	3	4	5	6
18. Glass windows transmit from ten to twenty times as much heat as a well-insulated wall.	1	2	3	4	5	⑥
19. Builders typically oversize heating and cooling units in residential structures.	1	2	3	4	5	⑥
20. It is more efficient to oversize heating and cooling equipment than to undersize the equipment.	①	2	3	4	5	6
21. Earth berming is an example of an <u>active</u> solar energy systems.	①	2	3	4	5	6
22. Undesirable heat exchanges in the walls and roof of a structure can be pinpointed using thermography.	1	2	3	4	5	⑥

	Definitely Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Definitely Agree
23. Life Cycle Cost should be applied to living things.	①	2	3	4	5	6
24. Discounted payback periods are superior to simple payback periods.	1	2	3	4	5	⑥
25. Infiltration is the greatest source of undersirable heat exchanges in most buildings.	1	2	3	4	5	⑥
26. Sliding glass doors are highly energy efficient, especially in the warmer climates.	①	2	3	4	5	6
27. It is far easier and less costly to retrofit an existing house for energy conservation than to build an energy efficient house.	①	2	3	4	5	6
28. Most standard real estate forms contain adequate room for relevant energy information.	①	2	3	4	5	6
29. An energy audit is the result of an accountant's review of a public utility company's financial records.	①	2	3	4	5	6
30. Careful attention to design principles helps to reduce the size and increase the efficiency of mechanical heating and cooling systems.	1	2	3	4	5	⑥

31. Please circle your area of expertise in real estate listed below:

1. appraiser	5. builder
2. lender	6. other _____
3. real estate broker/salesperson	7. none
4. land developer	

32. Please circle the type of organization with which you are employed:

1. savings and loan association	7. real estate broker
2. mutual savings bank	8. self-employed
3. mortgage bank	9. government agency _____
4. commercial bank	
5. life insurance company	10. other _____
6. appraisal firm	

Evaluation Form

Exhibit 15

PROGRAM EVALUATION

- I. Please read all of the following statements and check only those which best describe how you feel about this program.

- ☐ It was a richly rewarding experience.
- ☐ I will do some things differently as a result of this program.
- ☐ I gained new knowledge about and insights into the subjects which were covered.
- ☐ The informal conversations with my colleagues benefited me much.
- ☐ I helped some of my colleagues with their problems.
- ☐ The program helped me realize the importance of continuing education.
- ☐ The instruction was too general.
- ☐ I was not really well satisfied with this experience.
- ☐ I saw no relation between this program and my everyday job.
- ☐ We covered too much material in the time available.
- ☐ I didn't learn anything.

- II. How satisfied were you with the following:

	Very Satisfied		Moderately Satisfied		Dis- satisfied	
Length of Program	1	2	3	4	5	6
Time of Program (Month, day, hour)	1	2	3	4	5	6
Physical arrangements	1	2	3	4	5	6
Refreshments	1	2	3	4	5	6
Instructional materials	1	2	3	4	5	6
Instructor (s)	1	2	3	4	5	6
Organization of the program	1	2	3	4	5	6

	Very Satisfied		Moderately Satisfied		Dis- satisfied	
Choice of subjects	1	2	3	4	5	6
Opportunity to participate	1	2	3	4	5	6
Methods of instruction	1	2	3	4	5	6
Over-all program	1	2	3	4	5	6

Comments on above (length of program, time of program, physical arrangements, etc.)

III. If another program of this nature is held, what subjects should be included for study? (Be specific)

IV. Please give us the benefit of other suggestions which would improve a future program.

Thank you for your cooperation.

Interpreting the responses to the workshop evaluation form contained in Exhibit 15 is relatively straight forward. The purpose of this form is to ascertain the overall impact of the workshop rather than its effectiveness.

In addition to the pre- and post-testing and workshop evaluations, it is also recommended that randomly selected workshop participants be interviewed by telephone at least one month after the completion of the workshop. The workshop evaluation form in Exhibit 15 can be used as a guide in conducting this interview. However, the workshop participant should be encouraged to describe in his own words the impact the workshop has had upon his routine business practices. Often, workshop participants are unable to evaluate the things they learn in a workshop until they have had a chance to try using these things in their daily business routines and practices.

Post-Workshop Activities

Upon the successful completion of this workshop, the participants should be awarded a completion certificate. A sample of such a certificate can be found in Exhibit 16 on page 34. The certificate can be awarded immediately following the close of the workshop, or it can be mailed to the participant at a later date. By awarding these certificates, those real estate professionals unable to attend the workshop will be encouraged to do so at a later date in order to receive their certificate.

CERTIFICATE OF ACHIEVEMENT

Presented to

For Participation in the Workshop
**MAKING THE MOST OF ENERGY
IN REAL ESTATE**

March 1, 1979

Gary M. Walton

Gary M. Walton, Dean
College of Business and Economics
Washington State University

Hans R. Isakson

Hans R. Isakson, Assistant Professor
Business Administration/Real Estate
Washington State University

Additionally, workshop participants should be listed in their various trade association categories, with trade associations completely unrepresented at the workshops sent a letter similar to that shown in Exhibit 17 on page 36. Those trade associations represented at the workshop, should be very interested in recognizing their members who received the completion certificates. A post-workshop news release item similar to that shown in Exhibit 18 on page 37 would be most appropriate. Furthermore, these post-workshop news release items will help to promote future workshops.

WASHINGTON STATE UNIVERSITY

PULLMAN, WASHINGTON 99164

A-36

COLLEGE OF BUSINESS AND ECONOMICS
Department of Business Administration
Telephone (509) 335-3507

Letter to Unrepresented
Trade Associations

Exhibit 17

March 1, 1979

Mr. Schlosstein, Executive Vice-President
Washington Bankers Association
1218 Third Avenue, Suite 505
Seattle, WA 98101

Dear Mr. Schlosstein:

On February 8 & 9, 1979, the workshop "Making the Most of Energy in Real Estate" was held at the Thunderbird Motor Inn Convention Center in Yakima, Washington. The program was designed to equip the real estate professional with the tools necessary to cope with today's energy problems, and to prepare him/her for expected real estate market changes as new energy-savings devices and techniques make their impact.

The workshop was attended by Yakima area real estate professionals, including representatives from the Central Washington Home Builders Association, the Yakima Chapter of the Savings and Loan League, the Yakima Board of Realtors, the Society of Real Estate Appraisers, as well as the Washington Energy Extension Service and local utility companies. All of those who participated in the workshop indicated that they had gained new insights into the problems of energy in real estate and that the workshop was professionally worthwhile.

Unfortunately, the Washington Bankers Association was not represented at this event, although the WBA was represented at the Seattle workshop. Perhaps WBA members in the Yakima area did not receive the information sent to you earlier.

In any event, if your Yakima area members show an interest in this workshop in the future, arrangements for its presentation can be made by calling the Washington Energy Extension Office in Yakima at (509) 575-2481.

Sincerely,

Hans R. Isakson
Assistant Professor
Business Administration/
Real Estate

HRI/dji

Exhibit 18

Post-workshop News
Releases

A recent workshop entitled "Making the Most of Energy in Real Estate" was attended by (name of association) members (name of attendees).

The workshop was designed to equip the (builder, lender appraiser, etc.) with tools to cope with today's energy problems and includes such topics as government energy policies, energy design and thermal comfort principles, heat gain calculations and investment analysis as it relates to conservation and solar systems. Thoses attending reported that they gained new insights into the problems of energy in real estate and they found the workshop to be professionally worthwhile.

The instructor of the workshop was Hans R. Isakson, Assistant Professor of Business Administration/Real Estate, Washington State University. Professor Isakson developed the program and is one of the nation's leading experts on energy use in real estate. Also at the workshop and providing valuable information was (name of State Energy Office Representative) of the (State Energy Office), of (Utility Company Representative) of (Utility Company), and (Utility Co. Representative) of the (Utility Company).

The two-day workshop consisted of slide-tape presentations and active student participations.

The program is available for presentation as a two-day workshop or in a number of separate sessions. For information call the Washington Energy Extension Office in your area.

AN INSTRUCTOR'S MANUAL TO ACCOMPANY THE AUDIO-VISUAL AIDS FOR:

"MAKING THE MOST OF ENERGY IN REAL ESTATE"

BY

HANS R. ISAKSON

COLLEGE OF BUSINESS AND ECONOMICS

WASHINGTON STATE UNIVERSITY

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INTRODUCTION

The workshop called "Making the Most of Energy in Real Estate" has one overall objective, namely to change the behavior of the students attending the program. Specifically, the goal of the program, whether it is presented as a one-day intensified seminar or a two-day program, is to convince the students to incorporate relevant energy facts and information into their daily business routines. To accomplish this goal, the instructor must first build the students' confidence towards energy matters in general, and energy effects on real estate in particular. This basic understanding of the real estate sector is needed for the accurate analysis of energy-conserving investments, and it is achieved by the first two lessons described in this manual.

Because attitudes, knowledge, and behavior are interdependent with each other, positive attitudes toward energy in general, and energy conservation in particular, should be encouraged first among the students. Next, the students must be provided a common background of basic energy information. This is accomplished with Lessons III and IV in which basic energy facts are presented as they apply to residential structures.

By far the most difficult portions of the workshop are contained in Lessons V and VI. These lessons are designed to teach basic energy calculations and life-cycle costing techniques to the real estate professional. The students should be encouraged to bring their pocket calculators to these sessions.

The solar energy session immediately follows the more difficult material above in order to provide the students a pleasant change of pace. The slide/tape show for Lesson VII has been carefully designed to precipitate a fair amount of student interaction and discussion. The final slide/tape show uses testimony from representatives of the real estate industry to suggest certain guidelines and aids that the students will find useful in incorporating what they have learned into their daily business routines. The specific guidelines and aids discussed in this last slide/tape show are not meant to be the only guidelines and aids that are possible. The students should be encouraged to discuss these topics fully, and to evaluate the possibility of incorporating them into their businesses in their climatic region. In this way, additional guidelines and aids will emerge from the discussion.

Note that the materials can be presented to one of two typical trade group combinations. The first of these consists of lenders and/or appraisers; the second consists of builders and/or real estate brokers/salespersons. Additionally, one may select either a one-day or a two-day program as outlined in the accompanying table that should appeal strongly to the interests of the real estate industry representatives cited at the heading of the table. The key differences between these suggested programs is in the amount of time devoted to Lessons III, IV, V, and VI. In the programs suggested for lenders and/or appraisers, more time is devoted to Lessons V and VI than to Lessons III and IV in the other suggested programs. The opposite is true for the builder and/or brokers suggested program in which more time is spent on Lessons III and IV than on Lessons V and VI. Also note that a minor difference exists between the recommended programs on Lesson VII dealing with solar energy. In any event, the one-day programs

consist of six full hours of instruction and additional time allocated to lunch, registration and coffee breaks to total eight hours. The two-day format contains ten and one-half hours of instruction and sufficient time for lunches, registration and breaks to total fourteen hours. The suggested two-day programs contain room for as much as two hours of additional materials, but the one-day program contains no room for additional materials. It is strongly recommended that a new construction site and/or an existing residential structure be toured by the class as a part of the two-day program. This tour would more than fill the extra two hours in the two-day program format.

Finally, regardless which program format selected, the slide/tape show "Introduction to Making the Most of Energy in Real Estate" should be shown before covering any other material. This show explains why a real estate professional should be concerned about energy, and what types of information the workshop will give him or her.

SUGGESTED PROGRAMS

Lesson	Lenders/Appraisers		Builders/Brokers	
	One-day	Two-day	One-Day	Two-Day
Introduction	1/4 hr.	1/4 hr.	1/4 hr.	1/4 hr.
Energy Legislation Today	1/2	1	1/2	1
Energy Basics for Real Estate Professionals	3/4	1 1/4	3/4	1 1/4
Build it Right in the First Place	1/2	1	1	2 1/2
Tightening Up Existing Homes	1/2	1	1	1 1/2
Examining Equipment Needs and Energy Conservation	1 1/2	2	1/2	1
Life-Cycle Costing Techniques and Applications	1	2	1/2	1
Solar Energy	1/2	1	1	1
Guidelines and Aids	1/2	1	1/2	1
Total Instruction	6 hrs.	10 1/2 hrs.	6 hrs.	10 1/2 hrs.
Lunch	1	2	1	2
Registration	1/2	1/2	1/2	1/2
Breaks	1/2	1	1/2	1
Total Time Required	8 hrs.	14 hrs.	8 hrs.	14 hrs.

Presentation Techniques

Each lesson in this workshop should begin with the appropriate slide/tape show. All of the slide/tape shows, except "Energy Legislation Today" are synchronized with the accompanying audio tape when the first slide in the machine is the black slide provided. For "Energy Legislation Today," there is not sufficient room in the carousel tray for the extra black slide. Therefore, this slide/tape show must begin with the screen completely lit up from the projection light.

Be sure to focus the title slide before beginning the tape recorder. If an automatic focus slide projector is used, no further adjustments will be necessary throughout the entire workshop.

Upon the completion of each slide/tape show, immediately rewind the tape while asking for questions from the students. Do not ask the students if they understood what the slide/tape show contained, instead ask them if they have any questions on the material covered in the slide/tape show.

The remainder of this manual contains a summary of and key terms and concepts covered in each slide/tape show. Additionally, suggestions for the presentation of each lesson are also contained in the materials that follow. Finally, the last section of this manual contains the scripts for each of the slide/tape programs used.

An instructor should not attempt to make use of any of these aids without carefully reading this manual and studying the aids themselves.

LESSON I

Energy Legislation Today

Summary:

Most federal legislation directly affecting the real estate industry is discussed in this program. Previous research has shown that increased awareness of existing energy legislation improved the attitudes of real estate professionals toward energy conservation in real estate. This lesson presents an overview of existing legislation and discusses its impact on the real estate industry. The 1978 edition of the text (Making the Most of Energy in Real Estate) does not contain materials concerning the 1978 National Energy Acts. National Energy Act handouts are available from regional U.S. Department of Energy offices.

Key Terms and Concepts:

Textbook Ref.

Changing land use patterns	pp. 22-23
Commercial Loan Guarantee Program	pp. 8-9
Energy audits	p. 9
Energy Conservation and Production Act 1976	pp. 1-7
Energy Extension Service	pp. 16-18
Energy Policy and Conservation Act 1975	pp. 1-7
Federal Energy Regulatory Commission	p. 12
Insulation requirements	pp. 6-7
Lighting efficiency standards	p. 6
National energy efficiency building codes	pp. 7-8
Product efficiency standards	pp. 4-5
Product labeling requirements	pp. 4-5
Public information programs	pp. 5-6
Rising energy prices	pp. 19-23
Solar easements	p. 19
State energy conservation plans	pp. 6-7
State solar energy laws	p. 19
The Department of Energy Act of 1977	pp. 9-12
The Economic Regulatory Administration	pp. 15-16
Thermal efficiency standards	pp. 6-7

Suggestions:

By contacting the state energy office, the instructor can update the energy legislation relevant to the students. The student's own state can be used as a case study of the energy legislative process, if so desired. State, regional, or federal energy agencies should be asked to provide an instructor for this lesson. The guest speaker should be encouraged to bring along handout materials relevant to the students. This speaker must limit his or her discussion to existing and pending state energy legislation that will affect the real estate industry.

LESSON II

Energy Basics for Real Estate Professionals

Summary:

This lesson introduces the student to certain key energy terms and their use. It demonstrates how to compare energy prices and the meaning of the laws of thermodynamics. Finally it develops the notion that energy efficient homes need not cost more to build than conventional homes.

Key Terms and Concepts:

Textbook Ref.

Alternative energy technologies	pp. 295-359
Ancilliary investment projects	p. 98
Barrels of oil	pp. 26-29
BTU content	pp. 26-29
Commercialization	pp. 76-78
Conversion heat rates	p. 27
Economic efficiency	pp. 88-90
Energy conservation	pp. 79-81
Energy facility production lead times	p. 75
Energy price conversion multipliers	p. 28
Energy research and development	p. 75
Geographical distribution of organic fuels	p. 33
Hidden aspects of energy efficiency	p. 97
Investments in energy conservation	pp. 96-100
Kilowatt-hours	pp. 25-59
Laws of Thermodynamics	pp. 84-90
MCF	pp. 25-26
Multidisciplinary barriers	pp. 98-99
Projecting local fuel prices	pp. 92-96
Real energy prices	p. 90
Regional energy consumption	pp. 55-60
Relative thermodynamic qualities	pp. 87-88
Residential energy consumption	pp. 52-60
Thermal efficiency	pp. 84-88
Thermal generating plants	pp. 46-50
Therms	pp. 26-29
U.S. energy projections	pp. 71-76
U.S. gross energy consumption	pp. 61-71
Utility rate structures	pp. 97-98

Suggestions:

The slide/tape show accompanying this lesson should be followed by representatives of local utility companies who should discuss (1) the present energy situation in the region and (2) the future outlook for prices and supplies in the region. Also, the representatives should describe any energy audit or other services they can offer the students. Finally, these guest speakers should be encouraged to distribute a handout of facts and data (degree-days, design temperatures, price schedules, etc.) relevant to their region and the real estate industry.

Note:

Table II-2 on page 28 of the text Making the Most of Energy in Real Estate contains an error; a therm of natural gas contains 100,000 BTU's. Therefore, the natural gas conversion factors in the table are in error by a factor of 10. Please note this correction to students using this text.

LESSON III

Build it Right in the First Place

Summary:

This lesson explains the basics of how human comfort is determined by heat exchange processes and environmental factors. It then describes various corrective measures used to achieve thermal comfort, and how careful attention to certain micro and macro design principles can be used to build an energy efficient home.

Key Terms and Concepts:

	Textbook Ref.
Absorptivity	p. 128
Air exchange	pp. 120-122, 149
Air flow	pp. 116-122
ASHRAE Standard 90-75	pp. 132-135
Building envelope	p. 123
Building shape	pp. 109-112
Chimney effect	pp. 147-148
Comfort zone	pp. 104-108
Condensation	pp. 138-144
Conduction	p. 104
Convection	p. 104
Emissivity	p. 130
Equivalent temperature difference	p. 127
Evaporation	p. 104
Fenestration	pp. 144-147
Heat transfer	pp. 102-104
Heat transmission losses	pp. 124-127
Landscaping	p. 113
Orientation	pp. 116-119
Prevailing winds	p. 114
Radiation	pp. 102-104
Relative humidity	p. 106
R value	pp. 128-130
Site layout	pp. 109-111
Structural design principles	pp. 108-150
Temperature	p. 105
Temperature variation	pp. 114-116
Thermal comfort principles	pp. 101-108
Thermal components of the environment	pp. 104-108
Thermal integrity	p. 123
U value	pp. 127-135
Vapor barrier	pp. 139-141
Vegetation	pp. 113-114

Suggestions:

This lesson covers a substantial amount of material. The instructor needs a strong familiarity with the key terms and concepts listed above. The assistance of a local builder, who is also familiar with these concepts and their applications in the region, is strongly recommended. Indeed, the contents of this lesson can be reinforced by a visit to a nearby construction site, preferably one where energy efficient design principles are being practiced. In the recommended two-day program format, there is ample time for such a visit.

LESSON IV

Tightening Up Existing Homes

Summary:

This lesson focuses upon ways to measure the energy efficiency of existing homes, and how these structures can be made more energy efficient. It discusses infrared photography, energy audits, utility bill analysis, and various energy retrofit manuals.

Key Terms and Concepts:

Textbook Ref.

Emissivity effects	pp. 152-153
Energy audits	pp. 153-155
Indirect measures of energy efficiency	pp. 155-156
Project Conserve	p. 154
Retrofitting	pp. 156-161
Thermography	pp. 151-153
Warm air currents	p. 152

Suggestions:

Again, the instructor must be familiar with the key terms and concepts listed above. A local contractor, who offers energy audits and retrofit services, may prove to be a valuable source of additional information in this lesson. A visit to an existing home for a "walk-through energy audit" will reinforce the contents of this lesson. Once again, there is time in the recommended two-day program format for a site visitation.

LESSON V

Examining Equipment Needs and Energy Conservation

Summary:

This lesson consists of a short introductory slide/tape show to be followed by a series of overhead transparencies (Energy Calculations - Set A). The overheads are designed to present frequently used energy calculations to the students in a step-by-step manner. A short description of each overhead transparency can be found below to assist the instructor in the presentation of these materials.

Overhead Transparency Descriptions:

ENERGY CALCULATIONS

(Overhead Transparencies - Set A)

- A-1 The fundamental relationship mentioned in the slide/tape program is shown here. (Read contents of O/H)

Now, let us examine these factors, one at a time.

- A-2 The thermal integrity of a house is simply the rate at which the house loses heat when it's cold outside. (Explain O/H)

- A-3 One way to measure TI is as shown here. (Explain O/H)

Other means of measuring TI are possible, but this means is more convenient for what follows.

- A-4 Degree-days are defined as. (Explain O/H) Note that the base temperature of a house will vary with its thermal integrity; the tighter a house, the lower the base temperature.

- A-5 Degree-day data to selected bases is available from the National Climate Center in Ashville, North Carolina, upon request.

- A-6 The price of useful fuel is given by this formula.

No O/H At this point the instructor should hand out a set of sample calculations applicable to his area. The handout should list the data needed first, with the calculations of TI and P separated, and the calculation of C last. Go over this handout with the students, step by step.

- A-7 Now that we understand how heating costs are determined, we need to examine how to calculate the value of energy saved due to an energy conservation measure that improves the thermal integrity of a house.
- A-8 Because the base temperature for degree-days goes down as the thermal integrity of a house improves, the calculations become burdensome.
- A-9 But, we can estimate the value of the energy saved using a simplified approach, provided that the change in thermal integrity is small relative to the change in degree-days. For most energy-saving materials this is the case when examined separately. If several energy-saving materials are encountered, then this simplified approach must be used carefully, adjusting the degree-days used in each subsequent calculation. These procedures will be examined later. (Explain O/H)
- A-10 The ECS or Energy Conservation Factor is calculated as shown here. Note (1) the load factor of the structure cancels out of the calculations, and (2) the result is expressed in dollars of cost per 1000's of Btuh saved. (Explain terms, noting that the price used should be the "marginal" price of the last BTU of fuel used, not the average price of the fuel.)
- A-11 The 1000's Btuh saved by a particular energy-saving material is easiest to determine using Manual J load calculation tables. (Explain terms)
- A-12 Here we have a table of HTM's from Manual J. (Work out example of calculating Δ HTM using this table)
- A-13 The HTM's in Manual J are calculated from R-values and the design temperature difference as shown here. Thus, one can calculate the 1000's of Btuh saved using this formula, or Manual J.
- For example, adding six inches of R-19 insulation to a 1500 square foot attic would result in a Δ HTM of $(1/19) \times 1500 = 79.9474$.
- A-14 At this point the instructor should hand out a set of calculations representative of his climate that demonstrate how to estimate the savings per heating season of energy-conserving materials.
- A-15 Some energy-saving ideas do not affect the thermal integrity of a house, instead they improve the efficiency of the furnace. Conversion to a heat pump, flue dampers, new burners, etc., are examples of these sorts of ideas.
- A-16 To calculate the savings per heating season of these devices, we must use a different formula. (Explain terms in the equation)
- A-17 Average Seasonal Heating Costs can be calculated as shown here. (Explain terms)
- No O/H At this point the instructor should work out an example of how to calculate the Dollar Savings of Energy-Conserving Devices.

Key Terms and Concepts:

	Textbook Ref.
Air-water system	pp. 170-172
All-air system	pp. 164-167
All-water system	pp. 108-170
ASHRAE	p. 186
Calculating exposed wall, ceiling and floor area	pp. 189-192
Clock thermostats	p. 213
Component selection	pp. 196-207
Effective duct length	pp. 198-200
Energy efficiency ratio	p. 176
Forced air systems	pp. 163-164
Heat gain factors	pp. 187-196
Heat loss factors	pp. 187-196
Heat pump	pp. 173-175
Heat transfer multipliers	p. 192
HVAC system	pp. 162-175
<u>Manual J</u>	p. 194
Outdoor design temperature	pp. 179-181
Radiant heating	pp. 172-173
Relative humidity	pp. 181-182
Sizing an HVAC system	pp. 175-196
Total system design	pp. 176-177

Suggestions:

The instructor must fully understand the overhead transparencies in this lesson before attempting to deliver it. Be sure to solicit questions and comments after each overhead is presented. Encourage the students to interpret the calculations in their own way. Open conversation among the students should not be discouraged during this lesson. Finally, the instructor must prepare his or her own sample calculations given local fuel prices and climatic conditions.

LESSON VI

Life-Cycle Costing Techniques and Applications

Summary:

This lesson also consists of a short slide/tape show and a series of overhead transparencies (Present Value Calculations - Set B). The overheads are designed to explain the most frequently used formula for incorporating the time value of money into the analysis of energy conservation materials and devices.

Overhead Transparency Descriptions:

PRESENT VALUE CALCULATIONS

(Overhead Transparencies - Set B)

B-1 In order to convert the dollar savings per year realized by energy-conserving materials and devices into present worth amounts, we must distinguish between two kinds of future case disbursements. (Explain O/H)

B-2 Lump sum payments are the easiest to understand. (Give an example)

B-3 Periodic payments are often called ordinary annuities, and their present value is calculated as shown here. (Give an example)

B-4 Now, to make use of these formulas, we need an understanding of economic life, study period, and residual (or reversion) value.

B-5 (Explain O/H)

B-6 (Explain O/H)

B-7 (Explain O/H)

No O/H At this point the instructor should distribute and cover a handout that demonstrates how to

- (1) calculate the present value of energy saved (use previous example) over a short (say 7 years) study period;
- (2) calculate the residual value of the material or device by assuming that the annual savings will persist over the entire economic life of the structure,
- (3) calculate the present value of the residual value, and
- (4) show that the sum of (1) and (3) is exactly equal to the present value of the annual savings over the entire economic life.

Emphasize the differences between (1) and (4) when deciding whether the added costs of the energy-saving material or device is economically justifiable.

- B-8 If energy prices are expected to rise faster than the overall rate of inflation, then the Inflation Adjustment Factor (IAF) should be calculated and multiplied by the current price of energy to obtain a price corrected for future expectations.
 - B-9 Note the relationship between the IAF and "a", the real rate of growth in energy prices. Thus, if "a" equals the overall rate of inflation, $IAF=1$.
 - B-10 Another useful tool from present value analysis is the discounted payback period, a factor that reflects the time value of money (the conventional payback period does not do this).
 - B-11 This O/H may prove useful when working out examples.
 - B-12 This O/H is useful for demonstrating the difference between marginal and average prices.
- No O/H After working out several examples, the instructor should review the step-by-step procedures used to evaluate the economic feasibility of energy-conserving materials and devices.

Key Terms and Concepts:

	Textbook Ref.
Base line case	pp. 272-274
Differential cost escalation	p. 271
Economic life	pp. 260-264
Life-cycle cost minimization	p. 269
Major repair and system replacements	pp. 269-271
Operating and maintenance costs	p. 258
Payback periods	pp. 271-272
Present value of \$1	p. 260
Present value of an annuity of \$1	p. 260
Residual values	p. 264
Savings to investment ratios	p. 271
Time value of money	pp. 259-260

Suggestions:

The instructor must fully understand the overhead transparencies in this lesson before attempting to deliver it. Be sure to solicit questions and comments after each overhead is presented. Encourage the students to interpret the calculations in their own way. Open

conversation among the students should not be discouraged during this lesson. Finally, the instructor must prepare his or her own sample calculations given local fuel prices and climatic conditions.

LESSON VII

Solar Energy

Summary:

This lesson explores the mechanics and economic feasibility of active solar energy systems. Passive and photovoltaic systems are not discussed in the slide/tape show; these topics should be covered by the instructor if the students show an interest in them.

Key Terms and Concepts:

Textbook Ref.

Active system	pp. 232-233
Auxiliary energy systems	pp. 234-236
Flat plate collector	p. 223
Operational modes	pp. 224-228
Optimum collector tilt and orientation	pp. 223-225
Passive system	pp. 228-231
Solar collectors	pp. 223-224
Solar energy system	pp. 221-223
The geography of economic feasibility	pp. 236-246
Thermosiphoning systems	p. 230
The solar window	pp. 220-221
Water storage systems	pp. 233-234

Suggestions:

Passive and photovoltaic principles are discussed in the text. The instructor should encourage the students to express their views about the role of solar energy in the future.

LESSON VIII

Guidelines and Aids

Summary:

The slide/tape show for this lesson is very powerful. It contains testimony from representatives of the real estate industry about how they incorporated energy into their business routines.

Suggestions:

By this time, the students will be thoroughly exhausted. They will need some probing to generate discussions. The instructor should ask individual students, one at a time, what they plan to do differently as a result of this workshop. If this does not generate interest, then try asking individual students to sum up what they have learned in the workshop.

SCRIPTS
FOR
SLIDE/TAPE
SHOWS

INTRODUCTION TO

"MAKING THE MOST OF ENERGY IN REAL ESTATE"

(3:12 min.)

1. What you are about to experience is a carefully developed workshop dealing with
2. MAKING THE MOST OF ENERGY IN REAL ESTATE
3. The materials in this workshop have been designed to appeal to all types of real estate professionals, including lenders, appraisers, builders and developers, and, of course, real estate brokers and sales people.
4. TOM: Alright! (.....long pause.....) Suppose that I am a real estate lender. Why should I be concerned about energy?
5. NAR: If you are concerned with government impacts on real estate financing, you'll be very much interested.
6. If you want to stay in business....in some aspects of the new energy legislation.
7. Also, many lenders are already incorporating energy facts into their real estate loan underwriting criteria.
8. TOM: Now, suppose that I am a builder or a developer. What does energy have to do with this business?
9. NAR: Some builders and developers have been driven to the brink of bankruptcy when natural gas service was curtailed to their empty lots.
10. Others found that it is more profitable to build energy efficient houses than the standard homes they were building before the era of rapidly rising energy prices.
11. TOM: O.K.So how about real estate appraisers? Why should they concern themselves with these matters?
12. NAR: That's an easy one. The standard Fanny Mae appraisal form requires appraisers to incorporate relevant energy facts into their evaluation of single family homes.
13. TOM: Well, with everyone else taking care of this energy thing, real estate brokers and sales people have nothing to worry about. Right?
14. NAR: No, nothing could be further from the truth. Real estate courses, seminars, and workshops dealing with energy are being taught all over the country. The more profit motivated real estate professionals are discovering that they can get a leg up on their competition by incorporating relevant energy facts and information into their business routines.

15. TOM: These sound like good enough reasons to me. But, just what do I need to know about energy?
16. NAR: In addition to energy legislation, you'll need an overview of energy basics as they apply to real estate.
17. Then you'll also need to know how these apply to building houses.....
18.and renovating existing structures.
19. You'll need an understanding of the calculations used to evaluate ideas that save energy.
20. One such idea, that we examine in depth, is Solar Energy.
21. Finally, you'll want to know how other real estate professionals have incorporated relevant energy facts and information into their business practices.
22. TOM: Can I learn all this information in this workshop?
23. NAR: You'll learn a lot from the workshop presentations and exercises.
24. And the textbook is designed to help every participant become skilled at making the most of energy in real estate.

ENERGY LEGISLATION TODAY
(12:45 min.)

1. Title Slide -- Energy Legislation Today
2. NAR: Many real estate professionals are surprised to find that substantial legislation exists dealing with energy, much of which affects the real estate industry.
3. TOM: "Now wait a minute! In all my years as a real estate professional, the only energy I've had to worry about was the energy to get out a week's work.....in a week!"
4. NAR: Well, the new energy legislation will make real estate professionals broaden their outlooks toward energy. This legislation includes the Energy Policy and Conservation Act of 1975, the Energy Conservation and Production Act of 1976, the Department of Energy Act of 1977, and the National Energy Acts of 1978. It seems that a year does not go by without one or more major pieces of energy legislation being signed into law.
5. For example, the United States will have nearly the equivalent of a nationwide building code as a result of the 1976 act.
6. New forms of consumer information are required by the 1975 act.
7. Let us look at some of the key points of these acts which will affect the real estate industry. Of the five main subsections of the 1975 act, the one dealing with energy efficiency affects real estate.
8. The subsections of the 1976 act that affect real estate include Energy Conservation Standards for New Buildings, and Energy conservation and Renewable Resource Assistance for Existing Buildings.
9. The 1977 act pulled together various energy agencies into the new Department of Energy.
10. The 1978 legislation is packed with provisions affecting real estate which we will discuss later.
11. A feature of the 1975 act affecting real estate deals with consumer product labelling.
12. TOM: "Does this mean that all houses will have a consumer product label on them?"
13. NAR: Not exactly. What it does mean is that certain consumer products must have labels that reveal their rate of energy consumption.
14. These products include refrigerators, dishwashers, clothes dryers, water heaters, kitchen ranges, 'air' conditioners, furnaces, and many other appliances.

15. TOM: "You mean I gotta check the EPCA label on everything in every house I deal with?"
16. NAR: Not quite, but consumers may soon make use of energy information for household appliances as they now do for other products.
17. Not only that, but the 1975 act calls for the establishment of energy efficiency standards for these appliances.
18. The National Bureau of Standards will specify energy improvement targets for each of these consumer products.
19. These targets will be such that, by 1980 the energy efficiency of all the products listed will improve by at least 20%.
20. TOM: "Aha! You mean, now I'm gonna hafta differentiate between efficient and lousy appliances."
21. NAR: Now you are getting it. And this will help you provide better service to your clients, and, thereby increase profits.
22. Also, the 1975 act provides assistance for the development of state energy conservation plans.
23. These plans include lighting efficiency standards for public buildings.....
24. programs promoting carpools and public transportation.....
25. energy efficiency standards for purchases made by state and local government agencies.....
26. thermal efficiency standards and insulation requirements for all new and renovated buildings.....
27. right-turn on red laws.....
28. and optional programs such as restricted building operating hours and low-cost technical assistance to industry.
29. The goal of these programs is a 5% reduction in statewide energy consumption by 1980.
30. TOM: "Did I hear you say something about 'Thermal Standards'?"
31. NAR: That is right. And in addition to the state thermal standards, the 1976 act instructs HUD to develop a national energy efficiency building code.
32. The HUD code will specify energy performance of buildings rather than how they should be built.
33. TOM: It still sounds like building codes to me.....and building codes are a local matter."

34. NAR: Yes, but real estate financing depends upon a multitude of federal assistance programs,
35. and under the 1976 act, federal assistance will be withheld from institutions in areas that do not adopt and comply with the energy codes.
36. TOM: "OK, you've shown me the stick. Is there a carrot?"
37. NAR: Yes, there is a carrot. The act calls for a commercial loan guarantee program to assist 'hardship cases'.
38. TOM: "Where does the Department of Energy fit into all this?"
39. NAR: The Department of Energy Act of 1977 established the first Executive Branch Department since the Department of Transportation began twelve years earlier.
40. The act draws together many fragmented energy programs created over the years within the federal government.
41. The thermal standards and commercial loan guarantee programs are administered by the Assistant Secretary for Conservation and Solar Applications. Educational programs, product labelling requirements, and product efficiency standards, are being developed through this office.
42. TOM: "What about the DOE's awesome new regulatory powers I keep hearing about?"
43. NAR: The 1977 act created no new regulatory powers. The DOE, through the Economic Regulatory Office, simply administers those regulations formerly administered in the other agencies.
44. Also, some parts of the National Energy Acts of 1978 contain legislation that alters existing federal regulations in the areas of industrial boilers, public utility operations, and natural gas pricing.
45. Indeed, the provisions of the National Energy Act dwarf those we have already discussed. The NEA is actually a package of five separate acts.
- Parts of each of these acts will have dramatic impacts upon real estate.
46. For example, the National Energy Conservation Policy Act requires utilities to offer energy audits to their residential customers, and to arrange for the installation and financing of energy conservation ideas identified as economically feasible by the audit:.....
47. This act also contains provisions for a solar energy loan program to be administered by HUD.....

48. a low interest home-improvement loan program for energy conservation measures to aid the elderly, and moderate income families.....
49. more energy efficiency standards for appliances.....
50. special grants and energy audits for schools, hospitals, and other public buildings.....
51. and a host of other provisions ranging from conservation requirements for federal buildings to an assessment of the conservation potential of bicycles.
52. TOM: "Wow! All this heavy stuff in just one act! What about the others?"
53. NAR: Well, the Power Plant and Industrial Fuel Use Act prohibits the use of oil or natural gas in new boilers rated 100 million BTU's per hour or more.
54. This act also limits the use of natural gas by existing utility power plants to whatever they used during 1974-1976,
55. and also requires that the use of natural gas cease by 1990.
56. TOM: "But won't the conversion from oil and gas to coal increase pollution and cause other problems?"
57. NAR: The act has provisions to reduce the negative impacts from increased coal production; for example, there is an \$800 million pollution control loan program.
58. TOM: "Now, what about these public utility regulations you mentioned."
59. NAR: The Public Utility Regulatory Policies Act contains several voluntary programs, designed to encourage utilities to experiment with new rate designs, such as time-of-day rates, seasonal rates, cost of service pricing, interruptible rates as well as others.

The act also contains requirements concerning co-generation and wholesale distribution of electrical power.
60. TOM: "The old carrot and stick approach. But didn't I hear you say something about natural gas pricing?"
61. NAR: That is right. The Natural Gas Policy Act is also a part of NEA.
62. The act eliminates the old distinctions between interstate and intrastate gas markets and calls for the deregulation of most natural gas by 1987.
63. TOM: "Wow! Do you mean that the federal government is going to let the market place determine the price of natural gas?"

64. NAR: Yes, but not all at once. The deregulation is gradual, and the President still has certain emergency authorities if lives, health, or property are endangered by the process.
65. Additionally, the act calls for the passing through of initial price increases to industrial rather than residential, users, within reasonable limits.
66. TOM: "Alright. Much of this is beginning to sound familiar, but haven't I heard something about energy tax credits?"
67. NAR: yes, the Energy Tax Act contains several tax credit provisions.
68. The act provides for a non-refundable income tax credit for residential insulation and energy conservation measures--up to \$300 or 15% of the first \$2000 expended.
69. Also, a similar tax credit is available to home owners who install solar or wind energy equipment--up to \$2,200 on the first \$10,000 spent.
70. Finally, tax credits will also be available to businesses that invest in alternative energy equipment, such as coal fired boilers and heat recycling equipment.
71. TOM: "Wasn't there also something in the act about a 'gas guzzler' tax?"
72. NAR: Yes, new gas guzzling cars are taxed. Moreover, other provisions deny investment tax credits and accelerated depreciation for new gas and oil fired boilers.
73. TOM: "These new rules sure do change the ballgame. Where can I get some help on these new laws?"
74. NAR: A good source of additional information and assistance in the area of energy conservation is the new Energy Extension Service.
75. In addition, every state has a State Energy Office which oversees the state's energy conservation plans. And the U.S. Department of Energy's regional offices can provide valuable information to real estate people.
76. TOM: "Well there sure are a lot of energy programs that will affect those of us in real estate.
77. NAR: That is right. Making the most of energy in real estate means a lot more than just having energetic real estate people. It means making use of energy knowledge in building a profitable business.

ENERGY BASICS FOR REAL ESTATE PROFESSIONALS
(7:35 min.)

1. NAR: For real estate professionals, an important nature of energy is its ability to do work. Of even greater interest is the measurement and cost of the forms of energy most commonly used in or by real estate.
2. The major forms of energy used in real estate are electricity,
3. natural gas and propane or bottled gas,
4. and oil.
5. Each of these sources of energy are measured in different units. For example, electricity is measured in kilowatt hours, natural gas in therms, and oil in gallons or barrels.
6. The common denominator that links all of these measurement units together is the British Thermal Unit, or BTU.
7. A practical definition of a BTU is that it equals the amount of heat given off by the tip of an Ohio Blue Tip match. The scientific definition of a BTU is "the quantity of heat required to raise the temperature of one pound of water by 1 degree F."
8. Here we have the BTU content of a number of common fuels.

TOM: "Hey! Not so fast!"

NAR: Not you again.

TOM: "Yes, me again...I want to make sure I got this right..."
9. (TOM continued) I see that natural gas has the highest BTU content of the fuels shown. Is that why it is the preferred fuel for heating homes?"
10. NAR: No, in general, the preferable fuel is the cheapest fuel available. It just so happens that in most parts of the country, natural gas is the cheapest fuel available.
11. In some areas natural gas may not be available or may only be available at a high price. In these cases some other fuel will be preferred.
12. TOM: "Well, how can I tell which fuel is the cheapest, especially if natural gas is not available?"
13. NAR: Using this formula one can calculate the cost per BTU of any fuel doing any job or task, such as heating a home.
14. The first factor in this formula you can get from your local utility company or fuel supplier.

15. The next item is found in this simplified conversion table. Note that this table can be found on page 28 of the textbook Making the Most of Energy in Real Estate.
16. The efficiency of a fuel in performing a given task, such as heating a home, varies from fuel to fuel and task to task. Your local HVAC contractor should be able to give you these factors.
17. TOM: "You've lost me again. Am I going to need a mathematician to handle all the formulas?"
18. NAR: No. If we compare two fuels it is only necessary to convert one into the measurement units of the other, rather than both into costs per BTU.
19. For example, suppose natural gas costs 22¢ per therm and electricity costs 5.5¢ per kilowatt hour. Which is the cheaper fuel for home heating?
20. Most gas furnaces operate at 60% efficiency; that is, 40% of the natural gas burned is wasted, while the remaining 60% heats the home or building.
21. So, for a 60% efficient gas furnace, we find that 22¢ per therm is equivalent to 4.5¢ per kilowatt hour.
22. Electrical resistance heating is 100% efficient, therefore the 5.5¢ per kilowatt hour price of electricity is the same as the cost of the heat it produces. Note that the conversion factor here is one. This is because the price of electricity is already in cents per kilowatt hour. But, we still must use the efficiency factor to account for wasted energy. In this example, it just so happens that electric resistance heating is 100% efficient in heating a home.
23. Thus, we find that the 60% efficient gas system is economically superior to the 100% efficient electric resistance system.
24. TOM: "Ah! Now I've got you! Sunshine is free, so according to your formula, solar energy is the cheapest of all fuels. Right?"
25. NAR: SORRY! There is no such thing as a free lunch.
26. A heavy capital outlay is required to collect, to store, and to use solar energy. The foregone purchasing power and interest on this capital outlay represents the real costs of solar energy.
27. Thus, the formula still holds. The only difference is that the cost per BTU of sunshine collected must be calculated using standard capital budgeting procedures. The conversion factor is one, and the efficiency factor varies widely from system to system.
28. TOM: "Alright, but I've heard that solar energy is a renewable energy source. What are renewable energy sources and why are they so important?"

29. NAR: All energy resources belong to one of two groups--renewable or non-renewable.
30. Depletable energy resources are non-renewable. All of the fossil fuels--coal, oil, and gas--are nonrenewable, as well as uranium.
31. The renewable energy resources include solar, geothermal, wind, tides, wood water, fusion, and waste or refuse.
32. But to understand why the renewable energy sources are important requires an understanding of the laws of thermodynamics.
33. TOM: "Oh-oh. Now I'm going to need a physicist on my staff."
34. NAR: Don't let the terminology scare you. The first law stated simply means that there is no such thing as a free lunch. That is, the amount of energy and matter in the universe is finite. We cannot produce one without losing some of the other.
35. The second law says that once energy is used to do work, that part of it will always be converted into an unavailable form of energy called entropy.
36. The notion of ever increasing entropy can be best illustrated by these three pictures. The most probable sequence of these events is B,A,C. A house is hit by lightning and then explodes.
37. But it is possible, yet highly unlikely, for a bolt of lightning to hit a pile of lumber and stones to make a house!
38. TOM: "But that's ridiculous! It would probably never happen!"
39. NAR: Exactly! And that is what entropy is all about. As long as we use energy of any kind we are always increasing entropy, or making our energy resources less and less useful.
40. TOM: "So, what does all of this have to do with renewable energy sources?"
41. Renewable energy sources contain a large amount of entropy. Non-renewable sources contain low amounts of entropy.
42. We can get more useful work out of our scarce energy resources by reducing the rate at which entropy is increasing.
43. And the best way to do this is through energy conservation in the heating and cooling of buildings. You see, every BTU of energy saved in the home means a reduction of 3 BTU's in the rate at which oil, natural gas, coal, and uranium are used up. Furthermore, oil, coal, natural gas, and uranium that is not used for heating and cooling homes becomes available to industry. If we do not save energy in our homes, we may not have jobs in the future.
44. TOM: "But what about the added cost of energy conservation?"

45. NAR: That's a frequently asked question. First of all, properly designed and well-insulated houses do not have to cost any more than traditionally built houses. Many of the best energy-saving ideas require little or no added cost per se; they only require more careful workmanship and expertise by builders.
46. But even if additional insulating materials are needed, their added costs are easily offset by savings realized in smaller furnaces, air conditioners and lower utility bills.
47. Moreover, home buyers will be attracted by these lower utility bills of the energy efficient home. There is no doubt, whatsoever, that energy efficient homes will be preferred by the American home buying public.
48. (Credits)

BUILD IT RIGHT IN THE FIRST PLACE
(10:04 min.)

1. NAR: Building an energy efficient house requires an understanding of thermal comfort and structural design principles.
2. The comfort part focuses upon the human body.....specifically, the occupants of the structure.
3. The structural design principles are divided into macro and micro considerations...
4. The objective of all these principles is to make the occupants of a structure comfortable at the lowest possible cost!
5. Let us look at the thermal comfort principles first...
6. The human body produces heat through metabolic processes...
7. and as a by-product of physical activity.
8. The metabolic rate at which the body converts food into energy varies with age, sex, and physical condition. Old people chill more easily than young, and men are comfortable at slightly cooler temperatures than women. But in general, each person in a room generates about 600 BTU's per hour in body heat as a result of their metabolic processes and physical activities.
9. The rate at which this heat is removed from the body is determined primarily by two key factors: first, the heat exchange process and second, the surrounding environment. These factors, in turn, determine human thermal comfort.
10. TOM: "OK, wait a minute! Now, what is a heat exchange process?"
11. NAR: There are four heat exchange processes: radiation, convection, evaporation, and conduction.
12. Radiation, which accounts for about 40% of bodily heat exchange, occurs between the body and interior surfaces of a structure. Because heat always flows toward the cooler substance, the direction of radiant heat flow is largely determined by the wall temperature.
13. Another 40% of body heat transfer is accounted for by convection, which requires air molecules to transfer heat. For example, a constant flow of air across the body can result in considerable heat loss.
14. As you know, heat is required to change a liquid into a gas, and the resultant process, called evaporation, accounts for nearly 20% of bodily heat transfers.
15. Conduction, which accounts for very little bodily heat transfer, involves the direct contact between the molecules transmitting and receiving the heat energy.

16. TOM: "OK. Now, what about these environmental factors you mentioned?"
17. NAR: Human thermal comfort is also affected by three important environmental factors: air temperature...relative humidity...and air movement.
18. Air temperature is a measure of the air's ability to gain or lose heat.
19. Relative humidity is the amount of moisture in the air compared to the maximum amount it can hold.
20. Air movement can cause unpleasant drafts or welcome cool breezes.
21. It is the interaction of these three factors that determines human thermal comfort. For example, most people are quite comfortable in rooms with a wide range of air temperature and relative humidity. However, outside of this range, people become too hot or too cold, or static electricity or moisture problems may develop.
22. If the temperature-relative humidity combination falls outside of the comfort zone, then corrective measures are called for.
23. Air velocity and temperature also interact to form a similar comfort zone. Combinations that fall outside of this zone generate complaints of being too warm, too cold, too drafty, or too stuffy.
24. Corrective measures include increasing or decreasing air circulation or temperature.
25. TOM: "Come on now! All that you're really saying is that we need furnaces, air conditioners, and the like in our homes."
26. NAR: It is not quite that simple, but you're on the right track. Corrective measures can be achieved mechanically or by natural means. Obviously, the natural means are less costly than mechanical devices.
27. TOM: "What can I do about these natural means? Aren't they out of my control?"
28. NAR: No, they are not entirely out of your control. The climatic conditions and physical features of the land in an area interact in a predictable manner to determine certain macro design features of a house.
29. For example, the United States can easily be divided into four major, and quite different, climatic regions.
30. The best shape, form, and orientation of a home are largely determined by the sun, although panoramic views may be an overriding factor, here.

31. Undesirable wind and solar effects can be reduced using landscaping and appropriate forms of vegetation. Proper landscaping can also lessen noise and air pollution.
32. Even window placement is governed by climate, especially where winter winds tend to be perpendicular to summer breezes.
33. Earth effects can be subtle, as those caused by hills, mountains, and valleys...
34. or these effects can be extreme, as those associated with berming and earth covered structures.
35. Obviously, there are tradeoffs between these factors. For example, the need for solar radiation in the winter may override the desire for a windowless wall.
36. Also, the advantageous effects of one factor can be used to offset the undesirable effects of another factor. For example, a tree can be used to shade a window needed to ventilate a house.
37. TOM: "Now, wait a minute! Even if I do all of this, I will still need a furnace, or an air-conditioner, and the like. So what's the use?"
38. NAR: Sure, even under ideal macro design conditions, it is often necessary to use mechanical devices in order to achieve human thermal comfort. But, the size and operating costs of these devices are reduced by giving proper attention to these factors before construction begins.
39. In addition, the size and operating costs of these devices can be reduced even further by giving more attention to certain micro design principles, related to the shell of a house.
40. Let's consider the major components of the shell to be the floor....
41. walls....
42. windows and doors....
43. ceiling....
44. and the seams that result when all of these components are put together.

Each of these areas is a potential source of undesirable heat gains and losses.

45. TOM: "But, everyone knows that most heat losses occur through the ceiling, that's why we insulate them so much."

46. Now, that is another common misconception. An analysis of the heating and cooling loads for a typical, single-family structure insulated to FHA minimum standards has revealed that most of the load requirements and operating costs are attributable to heat transfer through the seams of the house, not the ceiling. This type of heat transfer is called infiltration.
47. The heat transfers through the wall of a structure are second only to the seams of the house.
48. The third most important source of undesirable heat loss is the windows and doors of the structure. The design, proportionment, and placement of windows and doors is called fenestration.
49. You see, the heat losses through the ceiling of a house are relatively minor when the ceiling is insulated to FHA minimum standards.
50. Only the floor of a house is of less importance than the ceiling.
51. TOM: "So, in order to build a house right in the first place, we must give more attention to the seams, walls, windows, and doors. Now tell me how to do this."
52. NAR: Well, let us look at the seams first, since they are the most important parts. A critical seam is where the outer walls meet the ceiling. Heat gains and losses along this seam can be tremendous. Traditional ceiling insulation techniques are often inadequate to seal this narrow, hard to reach area.
53. One way to properly insulate this small, confined area is to use higher quality insulating materials here, than used in the rest of the ceiling.
54. Alternatively, the roof trusses can be built up, as in the now-famous Arkansas house, so that the traditional ceiling insulation can adequately cover these perimeter seams.
55. Seams around windows and doors can be improved by carefully insulating the inside and by caulking the outside perimeters.
56. TOM: "Wait! What about heat losses right through the windows and doors?"
57. NAR: One way to reduce these undesirable losses is to reduce total window area to 8%, as done in the Arkansas home. Where windows are used they should be placed carefully with sufficient roof overhang to shade out undesirable solar radiation. Furthermore, thermal panes and glazed glass are often recommended.
58. Exterior doors should be metal faced with urethane cores and magnetic weather stripping. With this type of exterior door, storm doors are not needed, but a screen door may still be desirable in certain climates.

59. Finally, sliding glass doors are an energy nightmare. The best sliding glass door made will increase heating costs by \$50 or more per season, not to mention increased cooling costs.
60. Now let us examine the walls. Certain parts of the walls of a structure require special attention.
61. The exterior wall should be carefully sealed before insulation goes in. Insulation should be tucked, not stuffed, into place.
62. Electrical wire chaseups and outlet boxes should be sealed.
63. Headers should be filled with insulation, rather than wood. Finally, the seams between the walls and between the walls and floor deserve special attention.
64. TOM: "If I do all of this, then I will have an air-tight house!"
65. NAR: That's right! And then, as you may have already guessed, you must guard against condensation problems.
66. The best way to accomplish this is by using vapor barriers near the warm interior surfaces, and by properly ventilating the structure during and after construction.
67. TOM: "Gosh! There's really nothing to all of this. I could easily think of even more low cost ways to save energy. All it takes is a little effort and planning to build a house right in the first place...."
68. and you know, I bet this kind of a house will probably be worth more and be easier to sell.

Slide/Tape--Four

TIGHTENING UP EXISTING HOMES
(5:06 min.)

1. TOM: "Alright, you've convinced me that a house built right in the first place can be energy efficient and yet not cost a whole lot more than a traditionally built home. But what do we do with existing homes?"
2. NAR: The answer is the subject of our next lesson, namely, "Tightening Up Existing Homes."
3. But before we begin stuffing our homes with insulation, we must first ascertain the energy efficiency of the structure.
4. In general, there are two ways to do this. First, we can directly measure the energy efficiency of a home by carefully inspecting the premises.
5. Second, we can indirectly determine the same thing by analyzing a home's actual energy use relative to that of comparable structures.
6. TOM: "What about this infrared photographic technique I've heard so much about?"
7. NAR: Currently, infrared photography is the only technology available that can pinpoint the locations of major heat losses. A skilled viewer can identify those parts of an object through which heat transfer occurs.
8. Armed with this detailed information, the owner can improve the structure's thermal integrity where necessary, thereby saving the expense of reinsulating everywhere.
9. TOM: "What if I don't have an infrared camera?"
10. NAR: An alternative to thermography is the energy audit.
11. An energy audit is simply another means of directly measuring the energy efficiency of a structure. It consists of an inventory of the physical characteristics of a structure.
12. Several do-it-yourself energy audits are available to homeowners.
13. But, better results are obtained when the audit is performed by a trained professional.
14. Many utility companies offer energy audits to their customers free of charge.
15. TOM: "So what if I have an energy audit and an infrared photo of my house, won't the costs of tightening it up be too prohibitive in the first place?"

16. NAR: Maybe! The bottom line of energy efficiency is hidden in the utility bills of a structure. If the utility bills for one house are consistantly higher than those for comparable energy efficient houses, then it may indeed be worth while to tighten it up.
17. The last 12 or more utility bills should be compared on a month-by-month basis. Furthermore, differences in the lifestyles of the occupants must be examined as a possible source of extraneous variance.
18. TOM: "What do I do if I can't find any comparable energy efficient properties?"
19. NAR: This is a common problem. Your best bet, at this time, is to refer to one or more of the property owner's energy retrofit manuals.
20. The manual "In the Bank...Or Up the Chimney?", provides guidelines to determine the cost and expected savings factor of important retrofitting measures. Examples include.....
21. caulking and weatherstripping doors and windows....
22. installing storm windows....
23. and insulating walls and attic areas.
24. The problem is that there are no pat answers to how one should retrofit a particular structure. What should be done varies with climate, type of structure, occupant needs and local energy prices. Using retrofit manuals, the real estate professional will be better equipped to deal with energy saving devices and designs on a case-by-case basis.
25. TOM: "Wow! It sure is easier to build a house right in the first place than it is to fix it up later."

Slide/Tape--Five

EXAMINING EQUIPMENT NEEDS AND ENERGY CONSERVATION
(4:39 min.)

1. NAR: As we have seen, even careful attention to all of the design principles will not eliminate the need for mechanical devices. But, in order not to waste these efforts, we need some way to determine just how large a heating and/or cooling system to install.
2. Furnaces and air conditioners installed without the benefit of these calculations are often larger than necessary because the burden of these calculations are easily avoided by the recommendation of oversized equipment. All too often, the size of a furnace is determined by the size of the furnace next door, or some other rule of thumb.
3. System requirements are accurately determined by heat gain and heat loss calculations. These calculations amount to a highly detailed energy audit.
4. Furthermore, properly sized equipment operates more efficiently than oversized equipment. Oversized furnaces and air conditioners are turned on and off too frequently resulting in wasted energy. Subsequently, much less fuel is required to achieve thermal comfort using properly sized equipment than using oversized equipment.
5. The most widely accepted procedure for determining proper equipment size is that provided by the Air Conditioning Contractors of America publication called Manual J. No other procedure provides the accuracy and simplicity found in Manual J. Due to this high degree of accuracy, it is acceptable as evidence in a court of law.
6. The bottom line in Manual J contains two key figures:
 - 1) The BTU's lost per hour through the structure during the height of the heating season.
 - 2) The BTU's gained per hour by the structure during the height of the cooling season.
7. These results enable us to match the capacities of heating and cooling equipment with the needs of the structure. For example, if the heating load is 42,837 BTU's per hour then a furnace that delivers 43,000 BTU's per hour is about the right size. The same balancing act holds true for cooling loads and ventilating systems.
8. Additionally, where these results are used in concert with the fundamental relationship between climate, thermal integrity, and fuel prices, we can calculate the expected heating and cooling bills for a structure.
9. Using this same fundamental relationship, we can also evaluate energy conservation ideas.
10. Yet another application of this fundamental relationship is in evaluating the energy efficiency of existing homes.

11. TOM: "What is this fundamental relationship you're talking about? It really sounds useful."
12. NAR: You are right! It is a most useful thing to know. However, like most useful things to know, it is a complex concept.
13. In general, the relationship between climate, thermal integrity and fuel costs can be expressed in a simple formula, where

C=costs,
TI=thermal integrity of the structure,
DD=the number of degree days, and
P=the price of useful fuel.
14. From this formula we will derive an Energy Conservation Factor that will prove to be most useful in determining the dollar savings realized by energy conservation ideas...
15. Finally, we will formulate a means for measuring the thermal efficiency of a structure.
16. You should now prepare to work through a number of examples that demonstrate these concepts.

Slide/Tape--Six

LIFE CYCLE COSTING TECHNIQUES AND APPLICATIONS
(3:09 min.)

1. NAR: Once the energy savings realized by an energy conservation idea are translated into dollars using the ECS factor, we are then ready to determine the economic feasibility of the idea. We do this using life-cycle costing techniques.
2. These techniques are also useful in evaluating alternative real estate investments, and in sizing solar energy systems. In short, an issue in real estate that involves trade-offs between added costs today and benefits in the future is best analyzed using life-cycle costing techniques.
3. The basis of this analysis is to consider all costs during the life time of an investment. These costs include operating and maintenance expenses, major repairs and component replacements, as well as the initial capital outlay.
4. Since the Arab oil embargo, energy prices constitute a significant and increasing share of the operating expenses of most buildings. Real energy prices have been declining steadily since World War II. However, since 1972, energy prices have been increasing much faster than the rate of inflation, and are expected to continue to do so into the foreseeable future.
5. In the past, investment rules of thumb based solely upon initial capital outlays were adequate. But today, utility costs can vary markedly for apparently identical structures. Subsequently, life-cycle costing techniques have become essential to the energy conscious real estate professional.
6. TOM: "Alright, what are these life-cycle cost techniques?"
7. NAR: They are basically the same as those techniques used in cash flow and present value analysis. And, as you probably already know, these techniques are somewhat complicated. Therefore, we will examine them more thoroughly in much the same manner as we did heating costs, ECS factors, and TE measures.
8. TOM: "Oh no!! Not more calculations!"
9. NAR: Yes, but I believe that you will find these calculations a bit more familiar. In fact, you probably have performed many of them already. For example, if you have ever calculated mortgage payments or internal rates of return, then you are somewhat familiar with what we are about to do.
10. Virtually all life-cycle costing techniques are based on a single economic concept, the time value of money.

11. Money has value distinctly related to timing of its receipts, and disbursements, and this value is determined by the opportunity to earn interest from normal investment activity. But, due to the complex nature of these considerations, we will now work through the mathematics involved in a step-by-step manner using overhead projections and practical examples.

Slide/Tape--Seven

SOLAR ENERGY
(7:18 min.)

1. Solar energy is attracting a lot of interest as an alternative to conventional power sources. So, let's examine this seemingly unlimited source of energy more closely.
2. In general, there are two basic techniques of using the sun's rays to augment the energy needs of a house.
3. Active solar systems use pumps and other devices to transmit an energy carrying medium through the house. These devices generally are powered by electricity.
4. Passive solar systems are merely the application of sound macro design principles, often augmented by thermal mass storage devices.
5. TOM: "The active systems are the ones that interest me. Tell me more then."
6. NAR: Active solar energy systems consist of several common components. These are the solar collector,
7. the heat storage system,
8. heat exchangers,
9. a heat distribution system,
10. control systems,
11. and auxiliary heating sources.
12. Sometimes, a system may also heat domestic hot water, or may be used for this purpose alone.
13. TOM: "Wait a minute! You're moving too fast. Describe those components again."
14. NAR: Ok. Let's start with the collectors, which
15. are available
16. in all sorts of
17. sizes and
18. shapes.
19. Next, heat storage possibilities include open circuit liquid systems,

20. closed circuit liquid systems,
21. and rock storage systems.
22. Heat exchangers can be of the shell and tube type, which we saw earlier,
23. or the shell and double tube variety.
24. Heat distribution possibilities range from a heat exchanger in the cold air return of a standard forced air furnace,
25. and warm air distribution from rock storage,
26. to radiant heat systems,
27. and heat pump assisted schemes.
28. Hydronic distribution systems are also possible.
29. Finally, domestic hot water preheating can be accomplished with preheat coils,
30. preheat tanks in storage,
31. or preheating outside of storage.
32. When all of these components are put together they constitute an active solar energy system, in which electricity is used to operate the pumps, blowers, and other devices needed for moving the heat transfer medium from the collectors, to storage, to the distribution system, and back to the collectors.
33. TOM: "Alright, now just a minute! All of these fancy gadgets must cost a pretty penny or two, right? So how do I know what sort of gadgets will work best? And how do I figure out whether solar energy is worthwhile.
34. NAR: Very good questions! Engineers design solar systems in order to minimize their life-cycle costs.
35. But even minimum life-cycle costs may be more expensive than conventional heating systems.
36. Fortunately, the economic feasibility of optimally designed solar energy systems has been carefully studied, and the results are not exactly optimistic.
37. TOM: "You mean that solar energy is not right around the corner?"
38. NAR: Not exactly. For example, assuming a real interest rate of 4%, the economic feasibility of solar space heating systems begins in the norther tier of states in the 1980's and moves southward, rarely becoming feasible in the deep south. This particular pattern

of feasibility is largely due to the greater distance between wellhead and distribution points, and the higher heating loads in the north. The exclusion of northwestern states is due to the availability of cheap hydroelectric power in this area. Economic feasibility tends to occur only in those areas where high demand is coupled with greatly increased prices of alternative fuels.

39. TOM: "I thought the south would be ideal for solar energy."
40. NAR: Not for space heating, but the pattern for solar hot water heating is quite different. Here economic feasibility begins in the sunbelt and moves slowly up the eastern seaboard, where alternative energy prices are so high.
41. Finally, looking out to the year 1990, we find that solar space heating in twelve states, domestic hot water heating in eleven states, and combined systems in nineteen states will be economically feasible. The Pacific Northwest, where hydroelectric power is cheap, the Tennessee Valley Authority area, where hydroelectric and nuclear power abound, and the natural gas rich state of Louisiana are the only areas where no form of solar energy becomes feasible, even in the year 1990.
42. As solar energy becomes more and more popular, real estate professionals will face many new problems and challenges. Lenders will be faced with mastering life-cycle cost analysis,
43. appraisers will be asked to estimate the value of solar easements,
44. the public will expect builders to understand the complexities of solar systems,
45. building inspectors will be forced to certify solar energy systems,
46. and realtors will be asked to market solar energy homes.
47. TOM: "Wow! How much time do I have to learn all of this new material?"
48. NAR: That depends upon where you live and your local energy situation. But recent market studies show that no matter where you live, it will be quite some time before the demand for solar energy systems is large enough to warrant concern by the average real estate professional, as long as there are a few in the industry who specialize in this area.

Slide/Tape--Eight

GUIDELINES AND AIDS

(11:41 min.)

1. (Main Title) Making the Most of Energy in Real Estate
2. NAR: Now let's get to the bottom line. Let's look at the things real estate professionals can do in order to incorporate relevant energy facts and information into their routine business practices.
3. Let's start with builders and developers, move on to lenders and appraisers, and finish with real estate brokers and salespeople.
4. Bob Schmidt, a builder and developer from Cleveland, Ohio, faced bankruptcy because the local gas company would not service his new subdivision.
5. SCHMIDT: "When I first heard about the cut-off, I didn't realize the depth of the problem--until I found out from the gas company. I went to people in the gas company, to say, 'Just exactly what does this mean?' and I found out very quickly that it was real and permanent. And here we sat, our company was sitting with maybe somewhere in the neighborhood of, oh, at the time, three or four thousand lots...
6. either undeveloped or developed. And the specter of not being able to sell houses on all those lots was pretty frightening, therefore, just to remain economically viable, we had to have extremely efficient, energy efficient, buildings. Well, it takes two things. One is an understanding of what the nature of heat loss or heat gain, in the case of air conditioning, is. Where are the barn doors the horses get out of?"
7. NAR: To stay in business, Bob Schmidt decided to build energy efficient all-electric houses. To heat these homes, he adopted an innovation called the heat pump, which gave him 50% more heat per kilowatt than conventional resistance heating.
8. But even with the heat pump, electric heat would still cost more than gas. Now the only way for Schmidt to bring costs into line would be to reduce undesirable heat losses.
9. SCHMIDT: "Infiltration is the biggest loser of all, and the nature of infiltration is not well understood. You can insulate your house in the normal sense, you can fill you side walls with the best insulation there is for ten inches or two feet over the ceiling, and think that you've insulated that house to the optimum.
10. And if you don't pay any attention to infiltration, which is a single biggest element of heat loss, you still are working with the minor part of the problem, and not the major one. So you need to know where it's getting out and attack to a practical economic limit each element of heat loss. This is what we did.

11. We analyzed it very carefully, we looked to see where we could pick up the most in heat loss reduction with the least amount of money, and it was surprising how much we could do when we were really faced with the problem."
12. NAR: Schmidt attacked infiltration by using a foam core metal door with magnetic weather stripping...
13. ...by using insulation to seal cracks around the frames of windows, and by using a lot of caulk. His attack on infiltration cut total heat loss by 15%.
14. Schmidt attacked heat conductive loss by increasing ceiling insulation from 6 to 10 inches.
15. He also put two inches of styrofoam insulation around the slab foundation.
16. The resulting home cost 300 to 500 dollars more to build, but it was 25% more efficient, and actually cost less to heat than the gas-heated home he used to build.
17. Bob Schmidt not only stayed in business, but had developed a superior product. Houses were going up on his lots, and business was on the move again. But he didn't stop here, he set out to build a second generation of electric houses even more efficient than the first.
18. He began to use styrofoam sheathing to boost the insulating properties and reduce infiltration through the walls of his homes.
19. Now, even the wooden studs would be insulated...Schmidt's new house is now twice as efficient as his old gas house, but it cost 1000 dollars more to build.
20. But the walls became so efficient that Schmidt could eliminate heating ducts in the slab and use ducts hung from the ceiling. This reduced construction costs by as much as 2000 dollars.
21. Schmidt started out facing bankruptcy and ended up with a house that is twice as efficient and cost less to build.
22. TOM: "So what you're saying is it doesn't necessarily cost more to build an energy efficient house...if the developers would investigate and experiment with energy efficient items, always being on the outlook for ways that they can reduce other construction costs as their product becomes more efficient.
23. NAR: That's right! And the builder/developer can use the things learned in this workshop to do this..
24. Now, let's see what lenders can do to make the most of energy in real estate.

25. One of the oldest energy conservation loan programs in the nation is found in Seattle, Washington.
26. The program consists of interest rate reductions on loans used to finance new automobiles, boats, home improvement projects, and homes that save energy.
27. For example, a reduction of one-half of a percentage point is available for home ownership mortgages and 3/4 of a percentage point reduction for auto, boat, and home improvement loans that qualify under the bank's guidelines.
28. In order to obtain a long term mortgage at the lower interest rate, the home must meet the bank's energy efficiency standards or be improved to meet these standards.
29. The house must contain a specific amount of ceiling insulation.
30. Similar minimum insulation requirements are specified for walls
31. and for floors.
32. Additionally, window glazing, weatherstripping and caulking are required.
33. All of these and other requirements are verified by an employee of the bank before the loan is made.
34. The program has received national attention in the press and other media.
35. But more important than the free publicity is the increase in loan volume and profits realized by the bank as a direct result of offering this program.
36. TOM: "Ah! I got the picture! It's that old golden rule of finance...he who has the gold...makes the rules."
37. NAR: Well, that's one way to put it. Lenders have a golden opportunity to demonstrate leadership, by promoting energy conservation.
38. But now, let us move on to discuss real estate appraisers, and how they can incorporate energy into their procedures.
39. Doctor Irving Field has been appraising real estate for years, but recently he has become concerned with the energy characteristics of the buildings he appraises.
40. FIELD: "With energy prices increasing to the point where the utility bills of a home exceed the property taxes, and in some cases the mortgage payment on the home, appraisers can no longer ignore the importance of the energy efficiency in buildings.

41. In fact, if an appraiser uses the almost universally acceptable Federal Home Loan Mortgage Corporation's Residential Appraisal Report Form 70, then he had better get his energy act together. This form calls for considering energy efficiency in all three approaches to value.
42. First, energy efficient items found in a subject property must be reported in the 'interior finish and equipment' section of the form, and their effect, if any, considered in the income approach to value.
43. Second, the 'cost approach' section requires the costs of these items to be reported.
44. Finally, the 'market data analysis' section requires adjustments in the selling prices of comparable properties for differences in energy efficient items.
45. This last requirement will be most challenging to appraisers, because most of us do not have information in our data banks that describes the energy features of the comparable properties we use in the market approach.
46. And this means that we will have to update our files to include this type of information, which will require new market research on our part."
47. NAR: In a nutshell, real estate appraisers must concentrate upon four major issues:
48. First, appraisers must determine to what extent the added costs of energy efficient items add to the value of a structure. There is no pat answer to this problem; the appraiser must determine this matter in the same way he has in the past...through a careful analysis of the market place.
49. Second, if energy features are absent in a building, does this constitute functional obsolescence, and is this obsolescence curable or incurable?
50. Stabilization of energy related expense items in an income statement is the third major issue, but we have already seen how to do this using the inflation adjustment factor.
51. Finally, market-derived sales adjustments for energy efficient items must be determined. As a temporary, stop-gap measure, appraisers can use the present value of future utility bill savings as a rough estimate of these adjustments, until more reliable, market-derived, adjustments can be determined.
52. TOM: "Wow! Appraisers have a lot of work to do. But what about real estate brokers and salespeople? You said you would talk about them, too."

53. (Title)
54. NAR: Okay! This is Gary Broyles, a realtor from Spokane, Washington. Mr. Broyles teaches a course on energy to real estate brokers and salespeople at Spokane Falls Community College.
55. BROYLES: "The reaction from the real estate agents who took the real estate energy course has been very positive. I found that several of the people are using the principles now, and the rest of them are planning on using the principles and their technical knowledge sometime in the future, as they conduct their regular real estate activities.
56. I also found that their...most of their...well, their number one reason for attending the class was to get that technical knowledge that their clients are asking for."
- NAR: In this course, real estate salespeople learned how to incorporate relevant energy facts into their business routines.
57. BROYLES: "By pointing out the different energy efficiencies and deficiencies characteristic to different houses, the real estate professional can allow the prospective buyer to base his decision on the information that's available. And the real estate agent, by using his knowledge, he can ensure that the buyer (will) get his money's worth while he owns that home."
- NAR: Additionally, real estate appraisers will soon be requesting energy related facts in the comparable sales data they collect from real estate brokers and salespeople.
58. TOM: "Energy is everyone's business, so all too often, no one attends to it, because everyone likes to think that the other guy will take care of it. But real estate professionals can no longer ignore the role of energy. We must incorporate relevant energy facts and information into our business routines.
59. This short course helps each of us to make the most of energy in real estate."
60. (Credits)
61. (Credits)