

PROPOSALS

This chapter focuses on the proposal—the kind of document that gets you or your organization approved or hired to complete a project. It is your opportunity to pitch your idea for change (often times an improvement) within an organization. Proposals often demonstrate that a problem exists that needs attention and address a very specific audience with the authority to move your suggestions forward.

In a technical writing course, the proposal assignment is an opportunity for you to present an idea to a specific, named audience about an idea you have to improve a certain aspect of that company, organization, center, or other business. Whatever topic you choose, you must be able to conduct thorough research that you will integrate into your final report.

To begin planning a proposal, remember the basic definition: a proposal is an offer or bid to complete a project for someone. Proposals may contain other elements—technical background, recommendations, results of surveys, information about feasibility, and so on. But what makes a proposal a proposal is that it asks the audience to approve, fund, or grant permission to do the proposed project.

A proposal should contain information that would enable the audience of that proposal to decide whether to approve the project, to approve or hire you to do the work, or both. To write a successful proposal, put yourself in the place of your audience—the recipient of the proposal—and think about what sorts of information that person would need in order to feel confident having you complete the project.

It is easy to confuse proposals with other kinds of documents in technical writing. Imagine that you have a terrific idea for installing some new technology where you work, and you write up a document explaining how it work, showing the benefits, and then urging management to install it. Is that a proposal? All by itself, this would not be a complete proposal. It would be more like a feasibility report, which studies the merits of a project and then recommends for or against it. However, all it would take to make this document a proposal would be to add elements that ask management for approval for you to go ahead with the project. Additionally, for some technical writing classes offered in college, one of those elements may be scholarly research. Check with your instructor to see if this is the case. Certainly, some writers of proposals must sell the projects they propose, but in all cases, proposals must sell the writer (or the writer's organization) as the one to complete the project.

TYPICAL SCENARIOS FOR THE PROPOSAL

Many of you may have never given much thought to producing a technical report based on a viable proposal. Here are some sample proposal ideas to ponder:

- Imagine that a company has a problem or wants to make some sort of improvement. The company sends out a request for proposals; you receive one and respond with a proposal. You offer to come in, investigate, interview, make recommendations—and present it all in the form of a report.
- An organization wants a seminar in your expertise. You write a proposal to give the seminar—included in the package deal is a guide or handbook that the people attending the seminar will receive.
- An agency has just started using a new online data system, but the user's manual is technically complex and difficult to read. You receive a request for proposals from this agency to write a simplified guide or startup guide.
- Imagine that a nonprofit organization focused on a particular issue wants an consultant to write a handbook or guide for its membership. This document will present information on the issue in a way that the members can understand.

Not all research topics are appropriate for technical writing. Topics that are based on values and beliefs do not fall into the category of technical. Historical and literary topics do not qualify.

If your technical writing course requires that you integrate scholarly research into your final report, choose a topic for which you can readily find such material. While interviews and other first-hand sources are often valuable to a report, one that relies heavily on these sources may not meet the outcomes of your particular course.

Always check with your instructor about any topic ideas you have before starting on your project.

COMMON SECTIONS IN PROPOSALS

The following provides a review of the sections you will commonly find in proposals. Do not assume that each one of them has to be in the actual proposal you write, nor that they have to be in the order they are presented here. Refer to the assignment sheet provided by your instructor and consider other kinds of information unique to your topic that should be included in your particular proposal.

Introduction. Plan the introduction to your proposal carefully. Make sure it does all of the following things (but not necessarily in this order) that apply to your particular proposal:

- Indicate that the content of the memo is a proposal for a specific project.

- Develop at least one brief motivating statement that will encourage the recipient to read on and to consider approving the project (especially if it is an unsolicited or competitive proposal).
- Give an overview of the contents of the proposal.

Background on the problem, opportunity, or situation. Often occurring just after the introduction, the background section discusses what has brought about the need for the project—what problem, what opportunity exists for improving things, what the basic situation is. For example, management of a chain of day care centers may need to ensure that all employees know CPR because of new state mandates requiring it, or an owner of pine timber land in eastern Oregon may want to get the land producing saleable timber without destroying the environment.

While the named audience of the proposal may know the problem very well, writing the background section is useful in demonstrating your particular view of the problem. Also, if the proposal is unsolicited, a background section is almost a requirement—you will probably need to convince the audience that the problem or opportunity exists and that it should be addressed.

Benefits and feasibility of the proposed project. Most proposals briefly discuss the advantages or benefits of completing the proposed project. This acts as a type of argument in favor of approving the project. Also, some proposals discuss the likelihood of the project's success. In an unsolicited proposal, this section is especially important—you are trying to “sell” the audience on the project.

Description of the proposed work (results of the project). Most proposals must describe the finished product of the proposed project. In a technical writing course, that means describing the written document you propose to write, its audience and purpose; providing an outline; and discussing such things as its length, graphics, binding, and so forth. In the scenario you define, there may be other work such as conducting training seminars or providing an ongoing service. At this early stage, you might not know all that it will take to complete your project, but you should at least have an idea of some of the steps required.

Method, procedure, theory. In some proposals, you will need to explain how you will go about completing the proposed work. This acts as an additional persuasive element; it shows the audience you have a sound, thoughtful approach to the project. Also, it serves to demonstrate that you have the knowledge of the field to complete the project.

Schedule. Most proposals contain a section that shows not only the projected completion date but also key milestones for the project. If you are doing a large project spreading over many months, the timeline would also show dates on which you would deliver progress reports. If you cannot cite specific dates, cite amounts of time for each phase of the project.

Costs, resources required. Most proposals also contain a section detailing the costs of the project, whether internal or external. With external projects, you may need to list your hourly rates, projected hours, costs of equipment and supplies, and so forth, and then calculate the total cost of the complete project. Internal projects, of course, are not free, so you should still list the project costs: hours you will need to complete the project, equipment and supplies you will be using, assistance from other people in the organization, and so on.

Conclusions. The final paragraph or section of the proposal should bring readers back to a focus on the positive aspects of the project. In the final section, you can urge them to contact you to work out the details of the project, remind them of the benefits of doing the project, and maybe make one last argument for you or your organization as the right choice for the project.

Special project-specific sections. Remember that the preceding sections are typical or common in written proposals, not absolute requirements. Always ask yourself what else might your audience need to understand the project, the need for it, the benefits arising from it, your role in it, and your qualifications to do it. What else do they need to see in order to approve the project and to approve you to do it?

SPECIAL ASSIGNMENT REQUIREMENTS

Depending on the writing situation, your proposal may need to include other specialized elements as well. Your supervisor might ask you to include in your proposal any of the following:

Audience:PROPOSALS AND AUDIENCE

Remember that, in a technical writing course, the proposal assignment serves several purposes: (1) it gives you some experience in writing a proposal; (2) it gets you started planning your major assignment; (3) it gives your instructor a chance to work with you on your project, to make sure you have a viable topic. For the second and third reasons, you need to include specific elements in your proposal (as noted in your assignment sheet) some of which may not seem appropriate in a real-world proposal.

The proposal is often the beginning of a weeks-long research and writing process that goes through many stages until it gets to the end point: the technical report. In this case, you only submit the proposal once during this process. After that, you may write and submit different types of documents: a progress report, an outline, an annotated bibliography, a graphics draft, a report draft, and a final report. Be careful to use the term “proposal” only if you are specifically referring to the proposal stage of your project.

Another point to keep in mind relates to the audience for different kinds of documents that may be produced for the same project. Consider the example of a proposal written to a supervisor at a solar power company suggesting the creation of a policy manual for residential solar panel installers. The proposal's audience may be an executive, whose knowledge of the technicalities may be very broad. Let's imagine the executive approves the proposal and requests completion of the manual, which will be produced well after the proposal. The manual's audience is the technicians, who may have more specialized knowledge than the executive. The content and language used for these two different audiences will need to be adjusted to fit the writing situation. (For more on this, review the chapter on Audience Analysis.)

Describe the audience of the final report (which may be different than the audience for the proposal). You may need to discuss for whom the report is designed, their titles and jobs, their technical background, and their ability to understand the report.

Information sources:List information sources; make sure you know that there is adequate information for your topic; list citations for specific books, articles, reference works, other kinds of sources that you think will contribute to your report.

Graphics:List the graphics you think your report will need according to their type and their content. (If you cannot think of any your report would need, you may not have a good topic—do some brainstorming with your instructor.)

Outline:Include an outline of the topics and subtopics you think you will cover in your report.

REVISION CHECKLIST FOR PROPOSALS

As you review and revise your proposal, keep the following in mind:

- Use the right format.Check with your instructor to insure you are using the format requested and look at any samples provided.
- Write a clear summary of (or introduction to) your proposal topic.
- Identify exactly what you are proposing to do.
- Ensure that a report—a written document—is somehow involved in the project you are proposing to do if that is what your instructor has assigned.
- Ensure that the sections of your proposal are in a logical, natural order and that you use sub-headers and bullets (and any other formatting styles) correctly.
- Address the proposal to your named audience—not your instructor.

TECHNICAL REPORTS: COMPONENTS AND DESIGN

Technical reports (including handbooks and guides) have various designs depending on the industry, profession, or organization. This chapter shows you one traditional design. If you are taking a technical writing course, ask your instructor for any design specifications she has for your documents. The same is true if you are writing a technical report in a science, business, or government context. Organizations very often have their own “stylesheets” on which all organizational document designs are based, so make sure the design presented in this chapter is acceptable.

Technical reports have specifications as do any other kind of project. Specifications for reports involve layout, organization and content, format of headings and lists, the design of the graphics, and so on. The advantage of a required structure and format for reports is that you or anyone else can expect them to be designed in a familiar way—you know what to look for and where to look for it. Reports are usually read in a hurry—people are in a hurry to get to the information they need, the key facts, the conclusions, and other essentials. A standard report format is like a familiar neighborhood.

When you analyze the design of a technical report, notice how repetitive some sections are. This duplication has to do with how people read reports. They don’t read reports straight through: they may start with the executive summary, skip around, and probably not read every page. Your challenge is to design reports so that these readers encounter your key facts and conclusions, no matter how much of the report they read or in what order they read it.

Be sure and see the example reports.

The standard components of the typical technical report are discussed in this chapter. The following sections guide you through each of these components, pointing out the key features. As you read and use these guidelines, remember that these are guidelines, not commandments. Different companies, professions, and organizations have their own varied guidelines for reports—you’ll need to adapt your practice to those as well the ones presented here.

COVER LETTER

The cover letter is either attached to the outside of the report with a paper clip or is bound within the report. It is a communication from you—the report writer—to the recipient, the person who requested the report and who may even be paying you for your expert consultation. Essentially, it says “Here is the report that we agreed I’d complete by such-and-such a date. Briefly, it contains this and that, but does not cover this or that. Let me know if it meets your needs.” The cover letter

explains the context—the events that brought the report about. It contains information about the report that does not belong in the report.

In the example of the cover letter that follows in the next section (10.2), notice the standard business-letter format. If you write an internal report, use the memorandum format instead. In either case, the contents and organization are the same:

First paragraph. Cites the name of the report, putting it in italics. It also mentions the date of the agreement to write the report.

Middle paragraph. Focuses on the purpose of the report and gives a brief overview of the report's contents.

Final paragraph. Encourages the reader to get in touch if there are questions, comments, or concerns. It closes with a gesture of good will, expressing hope that the reader finds the report satisfactory.

As with any other element in a report, you may have to modify the contents of this letter (or memo) for specific situations. For example, you might want to add another paragraph, listing questions you'd like readers to consider as they review the report.

COVER PAGE

Be sure to create a cover page for your report. It's a step that some report writers forget. Without a label, a report is anonymous; it gets ignored.

The best way to create a cover page is to use your word-processing software to design one on a standard page with a graphic box around the label information. Not much goes on the label: the report title, your name, your organization's name, a report tracking number, and a date. There are no standard requirements for the label, although your company or organization should have its own requirements. (An example of a report label is shown below.)

Report binding and cover
with label

**Energy-Efficiency Guide:
Employing Energy-Efficient Building
Strategies in a Residential Home**

Environmental Building Associates
100 East 38th Street
Austin, Texas 78705



June 25, 2015

Dr. David McMurrey, Chairman
Energy Experts of Austin
2000 W. 39th Street
Austin, TX 78705

Dear Dr. McMurrey:

I am submitting the attached report entitled *Energy-Efficiency Guide:
Employing Energy-Efficient Building Strategies in a Residential Home*.

This report is an analysis of a recent study conducted in Ann Arbor, Michigan, on the effectiveness of employing energy-efficient building strategies to minimize energy consumption and costs in a residential home. Using software technologies, the home was modeled to create two scenarios: an energy-efficient home and a standard home. This report details how the study found the energy-efficient home to be both cost efficient and effective at decreasing energy consumption. Such advances might prove to be the catalyst that the housing market needs to spur builders into a new era of home construction.

I would like to give special thanks to our solar engineer, Thorson James, for carefully checking all the technical details in the report. Also, our technical editor, Cherie Sorenson, was of great help in putting the final report together.

I hope this report meets your needs, generates future studies, and educates the public about the environmentally friendly options available in home building today. If you have any further questions, please feel free to contact me at x 563 or at RLMiller@EBA.com.

Sincerely yours,

Gwen L. Miller, Vice-President
Environmental Building Associates, Inc.

End.: Energy-Efficiency Guide: Employing Energy-Efficient Building
Strategies in a Residential Home

Transmittal letter

ABSTRACT AND EXECUTIVE SUMMARY

Most technical reports contain at least one abstract—sometimes two, in which case the abstracts play different roles. Abstracts summarize the contents of a report, but the different types do so in different ways:

- Descriptive abstract. This type provides an overview of the purpose and contents of the report. In some report designs, the descriptive abstract is placed at the bottom of the title page, as shown in the following:

LIGHT WATER NUCLEAR REACTORS

submitted to

Mr. David A. McMurrey
Energy Research Consultants, Inc.
Austin, Texas

April 27, 19XX

by
Jeffrey D. Lacruz

This report examines light water reactors as a possible alternative source of energy for Luckenbach, Texas. Both types of light water reactors are described, and an explanation of how each reactor produces electricity is presented. Safety systems and economic aspects conclude the main discussion of the report.

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Descriptive abstract. Traditionally, it is placed on the title page (not the cover page).

- Executive summary. Another common type is the executive summary, which also summarizes the key facts and conclusions contained in the report. Think of this as if you used a yellow highlighter to mark the key sentences in the report and then siphoned them all out onto a separate page and edited them for readability. Typically, executive summaries are one-tenth to one-twentieth the length of reports ten to fifty pages long. For longer reports,

ones over fifty pages, the executive summary should not go over two pages. The point of the executive summary is to provide a summary of the report—something that can be read quickly.

If the executive summary, introduction, and transmittal letter strike you as repetitive, remember that readers don't necessarily start at the beginning of a report and read page by page to the end. They skip around: they may scan the table of contents; they usually skim the executive summary for key facts and conclusions. They may read carefully only a section or two from the body of the report, and then skip the rest. For these reasons, reports are designed with some duplication so that readers will be sure to see the important information no matter where they dip into the report.

TABLE OF CONTENTS

You are familiar with tables of contents (TOC) but may never have stopped to look at their design. The TOC shows readers what topics are covered in the report, how those topics are discussed (the subtopics), and on which page numbers those sections and subsections start.

In creating a TOC, you have a number of design decisions:

- Levels of headings to include. In longer reports, consider not including only the top two levels of headings. This keeps the TOC from becoming long and unwieldy. The TOC should provide an at-a-glance way of finding information in the report quickly.
- Indentation, spacing, and capitalization. Notice in the illustration below that items in each of the three levels of headings are aligned with each other. Although you can't see it in the illustration, page numbers are right-aligned with each other. Notice also the capitalization: Main chapters or sections are all caps; first-level headings use initial caps on each main word; lower-level sections use initial caps on the first word only.
- Vertical spacing. Notice that the first-level sections have extra space above and below, which increases readability.

Using the automatic TOC creator in your word processor can help you produce a clean, professional document. If you prefer to make your own, learn to use dot leader tabs in order to line up the page numbers correctly.

One final note: Make sure the words in the TOC are the same as they are in the text. As you write and revise, you might change some of the headings—don't forget to change the TOC accordingly. See the example of a table of contents:

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Page-numbering style used in traditional report design: lowercase roman numerals for everything up to the body of the report; arabic numerals thereafter.

EXECUTIVE SUMMARY

This feasibility report analyzes a recent study conducted on a 2,450 ft² residential home (referred to as SH or Standard Home) built in Ann Arbor, Michigan. The goal of the study was to determine the effectiveness of employing energy-efficient building strategies to minimize energy consumption and costs in a residential home. The study was done on a 2,450 ft² residential home (referred to as SH or standard home) built in Ann Arbor, Michigan.

The home was modeled using Energy-10, a software package capable of calculating the energy consumed during the use of the home over a 50-year period. While keeping the basic functional units (such as floor plan, occupancy, type and number of appliances, and internal volume) of the home consistent, SH was then modeled to reduce the energy consumption by employing various energy-efficient strategies (referred to as EEH or energy efficient home).

The total life-cycle energy consumption of SH was found to be 15,455 GJ, which consisted of space and water heating and cooling, lighting, ventilation, and appliances. The total life-cycle energy consumption of EEH was reduced to 5653 GJ. The purchase price of SH was \$240,000 (actual market value) and was determined to be \$22,801 more for EEH. The cost analysis performed found that despite a 9.5% increase in the purchase price of an energy-efficient home, lower annual energy expenditures make the present value nearly equal to the more energy-consuming version. The accumulated life cycle costs are higher in EEH until year 48 and are \$1,054 (or 0.1%) less at year 50.

It was found that the most effective strategy for reducing overall annual energy costs is installation of a high-efficiency HVAC system. However, for reducing overall energy consumption, insulation was the most effective strategy followed by high-efficiency HVAC and air leakage control.

LIST OF FIGURES AND TABLES

If your document has more than two figures or tables create a separate list of figures. The list of figures has many of the same design considerations as the table of contents. Readers use the list of figures to quickly find the illustrations, diagrams, tables, and charts in your report.

Complications arise when you have both tables and figures. Strictly speaking, figures are illustrations, drawings, photographs, graphs, and charts. Tables are rows and columns of words and numbers; they are not considered figures.

For longer reports that contain dozens of figures and tables each, create separate lists of figures and tables. Put them together on the same page if they fit, as shown in the illustration below. You can combine the two lists under the heading, “List of Figures and Tables,” and identify the items as figure or table as is done in the illustration below.

LIST OF FIGURES	
Figure 1. Natural Gas Use by SH and EEH	7
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LIST OF TABLES	
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1.0 INTRODUCTION

1.1 Purpose of the Report

This report analyzes the results of using various energy-efficient strategies to determine if such practices actually make a difference in the amount of energy consumed by an average house. Additionally, it analyzes which home system improvements provide the greatest reductions in energy and whether such improvements are cost-efficient in the long run.

1.2 Background of the Report

Annually, 24% of the natural gas and 35% of the electricity in the US is consumed by the residential housing sector. Consequently, 1.3 metric tons of greenhouse gases are emitted annually [6,7]. Understanding energy consumption and taking measures to reduce it is essential if a systematic and comprehensive reduction of environmental impacts is desired. Reductions in home energy consumption will not only reduce utility costs but also reduce the impact on the environment.

1.3 Scope of the Report

This report provides technical background on the construction of the standard and the energy-efficient house, the energy-efficient strategies used in the latter, energy-consumption rates, construction costs, and other relevant details. Not included in this report are discussions of the receptiveness of the American home-building industry or American home buyers to energy-efficient housing design or of pending legislative to promote energy-efficient housing design.

Note: A basic understanding of terminology for housing constructing, HVAC, and cost analyses is assumed.

Topic overview: Always provide a brief idea of the contents of the report in the introduction.

Audience: Introductions must alert readers about the technical background they must possess to understand the report.

INTRODUCTION

An essential element of any report is its introduction—make sure you are clear on its real purpose and contents. In a technical report, the introduction prepares the reader to read the main body of the report.

See this example of an introduction:

<p style="text-align: center;">LIST OF FIGURES</p> <p>Figure 1. Natural Gas Use by SH and EEH 7</p> <p>Figure 2. Annual Electricity Use by SH and EEH..... 8</p>	<p><i>Topic overview: Always provide a brief idea of the contents of the report in the introduction.</i></p>
<p style="text-align: center;">LIST OF TABLE</p> <p>Table 1. EEH and SH Systems.....</p> <p>Table 2. Energy-10 Simulation.....</p> <p>Table 3. Energy Efficient Strategies</p> <p>Table 4. Cost Comparisons for SH and E</p>	<p style="text-align: center;">1.0 INTRODUCTION</p> <p>1.1 Purpose of the Report</p> <p>This report analyzes the results of using various energy-efficient strategies to determine if such practices actually make a difference in the amount of energy consumed by an average house. Additionally, it analyzes which home system improvements provide the greatest reductions in energy and whether such improvements are cost-efficient in the long run.</p> <p>1.2 Background of the Report</p> <p>Annually, 24% of the natural gas and 35% of the electricity in the US is consumed by the residential housing sector. Consequently, 1.3 metric tons of greenhouse gases are emitted annually [6,7]. Understanding energy consumption and taking measures to reduce it is essential if a systematic and comprehensive reduction of environmental impacts is desired. Reductions in home energy consumption will not only reduce utility costs but also reduce the impact on the environment.</p> <p>1.3 Scope of the Report</p> <p>This report provides technical background on the construction of the standard and the energy-efficient house, the energy-efficient strategies used in the latter, energy-consumption rates, construction costs, and other relevant details. Not included in this report are discussions of the receptiveness of the American home-building industry or American home buyers to energy-efficient housing design or of pending legislative to promote energy-efficient housing design.</p> <p><i>Note: A basic understanding of terminology for housing constructing, HVAC, and cost analyses is assumed.</i></p>

Audience: Introductions must alert readers about the technical background they must possess to understand the report.

BODY OF THE REPORT

The body of the report is of course the main text of the report, the sections between the introduction and conclusion. Illustrated below are sample pages.

HEADINGS

In all but the shortest reports (two pages or less), use headings to mark off the different topics and subtopics covered. Headings are the titles and subtitles you see within the actual text of much

professional scientific, technical, and business writing. Headings are like the parts of an outline that have been pasted into the actual pages of the document.

Headings are an important feature of professional technical writing: they alert readers to upcoming topics and subtopics, help readers find their way around in long reports and skip what they are not interested in, and break up long stretches of straight text.

Headings are also useful for writers. They keep you organized and focused on the topic. When you begin using headings, your impulse may be to slap in the headings after you've written the rough draft. Instead, visualize the headings before you start the rough draft, and plug them in as you write.

Your task in this chapter is to learn how to use headings and to learn the style and format of a specific design of headings. Here are a number of helpful tips:

- Make the phrasing of headings self-explanatory: instead of “Background” or “Technical Information,” make it more specific, such as “Physics of Fiber Optics.”
- Make headings indicate the range of topic coverage in the section. For example, if the section covers the design and operation of a pressurized water reactor, the heading “Pressurized Water Reactor Design” would be incomplete and misleading.
- Avoid “stacked” headings—any two consecutive headings without intervening text.
- Avoid pronoun reference to headings. For example, if you have a heading “Torque,” don’t begin the sentence following it with something like this: “This is a physics principle.....”
- When possible, omit articles from the beginning of headings. For example, “The Pressurized Water Reactor” can easily be changed to “Pressurized Water Reactor” or, better yet, “Pressurized Water Reactors.”
- Don’t use headings as lead-ins to lists or as figure titles.
- Avoid “widowed” headings: that’s where a heading occurs at the bottom of a page and the text it introduces starts at the top of the next page. Keep at least two lines of body text with the heading, or force it to start the new page.

If you manually format each individual heading using the guidelines presented in the preceding list, you’ll find you’re doing quite a lot of repetitive work. The styles provided by Microsoft Word, OpenOffice Writer, and other software save you this work. You simply select Heading 1, Heading 2, Heading 3, and so on. You’ll notice the format and style are different from what is presented here. However, you can design your own styles for headings.

Wall design was given particularly careful consideration. Pierquet, et al., compares the annual energy savings of 42 different wall systems based on varying R-values [5]. Using a standard 2 x 4 stud wall with fiberglass insulation as the base case, Pierquet, et al., compared it with wall sections made of strawbale, structural insulated panels (SIPs), I-beam studs, autoclaved cellular concrete, and varying combinations of 2 x 4 construction and rigid foam insulation. Both the strawbale and the double 2 x 4 walls had very high R-values. Appliances were selected that conserve energy by being more efficient. The range and clothes dryer were switched to run on natural gas [1].

2.4 Energy Consumption Determination

For the purposes of the study, energy consumption was divided into two main home systems: heating and cooling, and electrical.

2.4.1 Heating and cooling systems. Heating and cooling energy were determined with Energy-10 for SH as well as for EEH. The program calculates the heat required to maintain the internal temperature based on the following factors:

- Average conductivity of the thermal envelope (walls, ceiling, floor, foundation)
- Internal temperature (includes adjustment for seasonal/daily temperature change)
- Outside air infiltration through gaps and forced-air ventilation systems
- Furnace and A/C efficiencies were determined
- Solar heat gains through windows

2.4.2 Electrical systems. Electrical energy consumption was determined independently from Energy-10. The amount of electricity in the house was determined, which could be used for various purposes.

3.0 CONSUMPTION COMPARISONS

For energy consumption comparison, resources were broken down into total annual gas and electricity consumption, and then compared for the two homes.

3.1 Gas Consumption

Figure 1 shows annual natural gas use for both SH and EEH. The dramatic decrease in natural gas consumption is due to the greatly improved thermal envelope and a much more efficient HVAC system, causing a decrease in heating natural gas consumption of 91.8%.

While EEH uses natural gas for the stove and dryer (which is not the case for SH), EEH total annual natural gas use is only 21% that of SH [1].

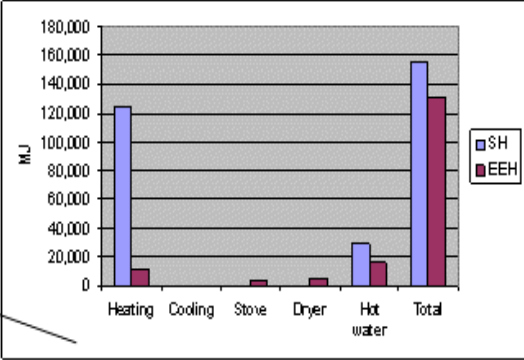


Figure 1: Comparison of Annual Natural Gas Use by SH and EEH. [1, p. 8-9]

IEEE citation using brackets: The borrowed information comes from source 5 listed in References.

Acronym: On this first use, it is spelled out with the acronym shown in parentheses. The spelled-out version does not use initial caps because it is not a proper noun.

Second- and third-level headings: Notice how the system adds a decimal number to each lower-level section heading.

Informal overview of the contents of this section: gas consumption; electricity consumption.

Chart depicting comparative natural gas usage. Notice this chart is treated as a figure and that the figure title appears below the chart.

BULLETED AND NUMBERED LISTS

In the body of a report, also use bulleted, numbered, and two-column lists where appropriate. Lists help by emphasizing key points, by making information easier to follow, and by breaking up solid

walls of text. Always introduce the list so that your audience understand the purpose and context of the list. Whenever practical, provide a follow-up comment, too. Here are some additional tips:

- Use lists to highlight or emphasize text or to enumerate sequential items.
- Use a lead-in to introduce the list items and to indicate the meaning or purpose of the list (and punctuate it with a colon).
- Use consistent spacing, indentation, punctuation, and caps style for all lists in a document.
- Make list items parallel in phrasing.
- Make sure that each item in the list reads grammatically with the lead-in.
- Avoid using headings as lead-ins for lists.
- Avoid overusing lists; using too many lists destroys their effectiveness.
- Use similar types of lists consistently in similar text in the same document.

Following up a list with text helps your reader understand context for the information distilled into list form. The tips above provide a practical guide to formatting lists.

GRAPHICS AND FIGURE TITLES

In technical report, you are likely to need drawings, diagrams, tables, and charts. These not only convey certain kinds of information more efficiently but also give your report an added look of professionalism and authority. If you've never put these kinds of graphics into a report, there are some relatively easy ways to do so—you don't need to be a professional graphic artist. For strategies for adding graphics and tables to reports, see the chapter on Creating and Using Visuals. See the chapter on visuals for more help with the principles for creating visuals.

CONCLUSIONS

For most reports, you will need to include a final section. When you plan the final section of your report, think about the functions it can perform in relation to the rest of the report. A conclusion does not necessarily just summarize a report. Instead, use the conclusion to explain the most significant findings you made in relation to your report topic.

APPENDIXES

Appendixes are those extra sections following the conclusion. What do you put in appendixes? Anything that does not comfortably fit in the main part of the report but cannot be left out of the report altogether. The appendix is commonly used for large tables of data, big chunks of sample

code, fold-out maps, background that is too basic or too advanced for the body of the report, or large illustrations that just do not fit in the body of the report. Anything that you feel is too large for the main part of the report or that you think would be distracting and interrupt the flow of the report is a good candidate for an appendix. Notice that each one is given a letter (A, B, C, and so on).

INFORMATION SOURCES

Documenting your information sources is all about establishing, maintaining, and protecting your credibility in the profession. You must cite (“document”) borrowed information regardless of the shape or form in which you present it. Whether you directly quote it, paraphrase it, or summarize it—it’s still borrowed information. Whether it comes from a book, article, a diagram, a table, a web page, a product brochure, an expert whom you interview in person—it’s still borrowed information.

Documentation systems vary according to professionals and fields. For a technical writing class in college, you may be using either MLA or APA style. Engineers use the IEEE system, examples of which are shown throughout this chapter. Another commonly used documentation system is provided by the American Psychological Association (APA).

PAGE NUMBERING

Page-numbering style used in traditional report design differs from contemporary report design primarily in the former’s use of lowercase roman numerals in front matter (everything before the introduction).

- All pages in the report (within but excluding the front and back covers) are numbered; but on some pages, the numbers are not displayed.
- In the contemporary design, all pages throughout the document use arabic numerals; in the traditional design, all pages before the introduction (first page of the body of the report) use lowercase roman numerals.
- On special pages, such as the title page and page one of the introduction, page numbers are not displayed.
- Page numbers can be placed in one of several areas on the page. Usually, the best and easiest choice is to place page numbers at the bottom center of the page (remember to hide them on special pages).
- If you place page numbers at the top of the page, you must hide them on chapter or section openers where a heading or title is at the top of the page.

CONCLUSIONS

We normally use the word “conclusion” to refer to that last section or paragraph of a document. Actually, however, the word refers more to a specific type of final section. If we were going to be fussy about it, the current chapter should be called “Final Sections,” which covers all possibilities.

There are at least four ways to end a report: a summary, a true conclusion, an afterword, and nothing. Yes, it is possible to end a document with no conclusion (or “final section”) whatsoever. However, in most cases, that is a bit like slamming the phone down without even saying good bye. More often, the final section is some combination of the first three ways of ending the document.

SUMMARIES

One common way to wrap up a report is to review and summarize the high points. If your report is rather long, complex, heavily detailed, and if you want your readers to come away with the right perspective, a summary is in order. For short reports, summaries can seem absurd—the reader thinks “You’ve just told me that!” Summaries need to read as if time has passed, things have settled down, and the writer is viewing the subject from higher ground.

Figure 1: Summary-type of final section. From a report written in the 1980s.

VIII. SUMMARY

This report has shown that as the supply of fresh water decreases, desalting water will become a necessity. While a number of different methods are in competition with each other, freezing methods of desalination appear to have the greatest potential for the future. The three main freezing techniques are the direct method, the indirect method, and the hydrate method. Each has some advantage over the others, but all three freezing methods have distinct advantages over other methods of desalination. Because freezing methods operate at such low temperatures, scaling and corrosion of pipe and other equipment is greatly reduced. In non-freezing methods, corrosion is a great problem that is difficult and expensive to prevent. Freezing processes also allow the use of plastic and other protective coatings on steel equipment to prevent corrosion, a measure that cannot be taken in other methods that require high operating temperatures. Desalination, as this report has shown, requires much energy, regardless of the method. Therefore, pairing desalination plants with nuclear or solar power resources may be a necessity. Some of the expense of desalination can be offset, however . . .

“TRUE” CONCLUSIONS

A “true” conclusion is a logical thing. For example, in the body of a report, you might present conflicting theories and explored the related data. Or you might have compared different models

and brands of some product. In the conclusion, the “true” conclusion, you would present your resolution of the conflicting theories, your choice of the best model or brand—your final conclusions.

Figure 2: A “true”-conclusions final section. This type states conclusions based on the discussion contained in the body of the report. (From a report written in the 1980s.)

V. CONCLUSIONS

Solar heating can be an aid in fighting high fuel bills if planned carefully, as has been shown in preceding sections. Every home represents a different set of conditions; the best system for one home may not be the best one for next door. A salesman can make any system appear to be profitable on paper, and therefore prospective buyers must have some general knowledge about solar products. A solar heating system should have as many of the best design features as possible and still be affordable. As explained in this report, the collector should have high transmissivity and yet be durable enough to handle hail storms. Collector insulation should be at least one inch of fiberglass mat. Liquid circulating coils should be at least one inch in diameter if an open loop system is used. The control module should perform all the required functions with no added circuits. Any hot water circulating pumps should be isolated from the electric drive motor by a non-transmitting coupler of some kind. Homeowners should follow the recommendations in the guidelines section carefully. In particular, they should decide how much money they are willing to spend and then arrange their components in their order of importance. Control module designs vary the most in quality and therefore should have first priority. The collector is the second in importance, and care should be taken to ensure compatibility. Careful attention to the details of the design and selection of solar heating devices discussed in this report will enable homeowners to install efficient, productive solar heating systems.

AFTERWORDS

One last possibility for ending a report involves turning to some related topic but discussing it at a very general level. Imagine that you had written a background report on some exciting new technology. In the final section, you might broaden your focus and discuss how that technology might be used, or the problems it might bring about. But the key is to keep it general—don’t force yourself into a whole new detailed section.

Figure 3: Afterword-type final section. The main body of the report discussed technical aspects of using plastics in main structural components of automobiles. This final section explores the future, looking at current developments, speculating on the impact of this trend.

VII. CONCLUSION: FUTURE TRENDS

Everyone seems to agree that the car of the future must weigh even less than today's down-sized models. According to a recent forecast by the Arthur Anderson Company, the typical car will have lost about 1,000 pounds between 1978 and 1990 [2:40]. The National Highway Traffic Safety Administration estimates the loss of another 350 pounds by 1995. To obtain these reductions, automobile manufacturers will have find or develop composites such as fiber-reinforced plastics for the major load-bearing components, particularly the frame and drivetrain components. Ford Motor Company believes that if it is to achieve further growth in the late 1980's, it must achieve breakthroughs in structural and semistructural load-bearing applications. Some of the breakthroughs Ford sees as needed include improvements in the use of continuous fibers, especially hybridized reinforced materials containing glass and graphite fibers. In addition, Ford hopes to develop a high speed production system for continuous fiber preforms. In the related area of composite technology, researchers at Owens Corning and Hercules are seeking the best combination of hybrid fibers for structural automotive components such as engine and transmission supports, drive shafts, and leaf springs. Tests thus far have led the vice president of Owen Corning's Composites and Equipment Marketing Division, John B. Jenks, to predict that hybrid composites can compete with metal by the mid-1980's for both automotive leaf springs and transmission supports. With development in these areas of plastics for automobiles, we can look forward to lighter, less expensive, and more economical cars in the next decade. Such developments might well provide the needed spark to rejuvenate America's auto industry and to further decrease our rate of petroleum consumption.

COMBINATIONS

In practice, the preceding ways of ending reports are often combined. You can analyze final sections of reports and identify elements that summarize, elements that conclude, and elements that discuss something related but at a general level (afterwords).

Here are some possibilities for afterword-type final sections:

- Provide a brief, general look to the future; speculate on future developments.
- Explore solutions to problems that were discussed in the main body of the report.
- Discuss the operation of a mechanism or technology that was described in the main body of the report.
- Provide some cautions, guidelines, tips, or preview of advanced functions.

- Explore the economics, social implications, problems, legal aspects, advantages, disadvantages, benefits, or applications of the report subject (but only generally and briefly).

REVISION CHECKLIST FOR CONCLUSIONS

As you reread and revise your conclusions, watch out for problems such as the following:

- If you use an afterword-type last section, make sure you write it at a general enough level that it does not seem like yet another body section of the report.
- Avoid conclusions for which there is no basis (discussion, support) in the body of report.
- Keep final sections brief and general.