



NC CLEAN ENERGY TECHNOLOGY CENTER

Advancing Clean Energy for a Sustainable Economy

Green Building | 919-515-3480 | www.nccleantech.ncsu.edu

A Word to the Wise:

Advice regarding green building practices

You have made the decision to take on a building project utilizing sustainable and/or renewable energy strategies. **Now what do you do?** How do you make wise decisions along the way?

Start by becoming informed about sustainable building practices and renewable energy technologies. Take the opportunity to learn from existing buildings, attend home tours, spend time researching on the internet, interviewing building professionals, and utilizing government resources.

The tips in this publication were written to help you become an active and knowledgeable consumer. A successful project can be achieved if you prepare yourself for the process. Don't let unfamiliar terms, equipment, or processes intimidate you. Take your time and do your research; your home is often the

Be especially careful about:

- References and consumer complaints
- Contracts, fees, and payment schedules
- Warranties, bonding and Insurance
- Product specifications in design
- Completion deadlines
- Construction changes / change orders

largest investment decision you will make.

Selecting a Project Team

A challenge facing any consumer is choosing reputable designers and contractors (i.e. general

contractors, sub-contractors, energy raters, etc.). Claims concerning expertise should be verified before a professional is accepted as a member of the project team.

A time-honored method of researching firms is through referrals and testimonials from past clients. Check with **at least three former clients** that have first-hand experience with the company you're researching. Ask the contractor for references, checking with friends, family, and colleagues for experiences with the contractor. Ask the references about their level of satisfaction with the job's quality. If possible, personally visit previous projects, obtain price documentation, and comparatively evaluate them. These steps are time consuming, but essential in receiving quality work at a fair price.

Be sure that the individuals or firms you are researching are **properly licensed by the State of North Carolina to perform the work**. For example, a solar installer will typically hold an active **General Contractor** license in order to directly solicit and contract with a customer. Solar thermal (space and water heating) installers must be, or use, a **licensed plumbing contractor**. Solar electric (photovoltaic) installers should be, or use, a **licensed electrical contractor**.

Licensed individuals take exams and meet standards set by state licensing boards. Licenses are renewed annually, but only some require the completion of continuing education credits. Professional license information and status is obtained directly from the board that issued the license. Search a Board's website for a Directory; major building professional Board's in NC include:

North Carolina Board of Architecture
Phone: (919) 733-9544

NC STATE UNIVERSITY

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Web: <http://www.ncbarch.org>

The North Carolina Licensing Board for General Contractors

Phone: (919) 571-4183

Web: <http://www.nclbgc.org>

North Carolina Board of Examiners for Engineers & Surveyors

Phone: (919) 791-2000

Web: <http://www.ncbels.org>

North Carolina State Board of Examiners of Plumbing, Heating and Fire Sprinkler Contractors

Phone: (919) 875-3612

Web: <http://www.nclicensing.org>

State of North Carolina Board of Examiners of Electrical Contractors

Phone: (919) 733-9042

Web: <http://www.ncbeec.org>

To check for complaints about a firm or product, two avenues are available:

Better Business Bureau

Web: <http://www.bbb.org>

Directory: <http://www.bbb.org/us/find-a-bbb/>

The NC Department of Justice, Attorney General's Office, Consumer Protection

Toll-free Consumer Hotline: 1-877-5-NO-SCAM

Web: <http://ncdoj.gov/Consumer.aspx>

These two agencies provide notification of legal action or consumer complaints filed against a particular business.

In addition to licenses, it is important to assess the contractor's qualifications and experience by asking pointed questions about their business practices, products, and certifications.

Certifications should be based on national, industry-recognized workforce guidelines.

For solar system installations, the industry's recognized installer certification is the North American Board of Certified Energy Practitioners

(NABCEP) Certification. If an installer holds either a photovoltaic or solar thermal NABCEP certification, they have been tested on their ability to provide installation services using current best practices. Verify NABCEP certification at this website: <http://www.nabcep.org/installer-locator>.

Insurance

Consumers should verify that contractors carry appropriate *General Liability Insurance*. A contractor should carry Workman's Compensation Insurance when applicable (i.e. they are not a sole practitioner). ***If a contractor does not carry this insurance, the property owner may be liable for employee injury.*** Ask for copies of insurance documentation when you are researching potential team members for a project. If a business does not provide these documents, it is strongly recommended they be removed from consideration.

Professional Organization Involvement

Many professionals are involved with professional organizations or associations related to their field. These groups do not attest to the quality of their members' work, but may indicate a professional's interest in remaining current with the industry.

Some national associations a designer or contractor may be a member of, depending on their profession:

- American Institute of Architects (AIA)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Institute of Electrical and Electronics Engineers (IEEE)
- National Association of Home Builders (NAHB)
- National Society of Professional Engineers
- Solar Electric Power Association (SEPA)
- Solar Energy Industries Association (SEIA)
- U.S. Green Building Council (USGBC)

There are many local organizations which support the growth of the sustainable building/renewable energy industry. Some example NC groups are:

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- Charlotte, Triad, and Triangle Chapters of the USGBC
- Cape Fear Green Building Alliance
- Green Home Builders of the Triangle
- NC Energy Efficiency Alliance
- NC Sustainable Energy Association
- Sustainable Sandhills
- Western North Carolina Green Building Council

Asking the Tough Questions

It is essential to see beyond the marketing pitch in determining how the professional will perform. Some questions to get written answers to are:

General Questions

1. Who is qualified in my area to work on my project? What are those qualifications?
2. How long has the company been in business?
3. Who will actually be doing the work, i.e. preparing the design, building the structure, installing systems etc.?
4. Can you provide a list of references from your previous clients?
5. How will the project affect my homeowner's insurance and will bonds be secured for contracted work/supplies?
6. Who is responsible for obtaining and paying for any necessary local permits?
7. Can you provide proof of General Liability and Workmen's Compensation Insurance?
8. Are commissioning services available, and who performs those services?

Renewable Energy System Specific Questions

1. How do I determine whether or not my project is a good candidate to use renewable energy, and which type of renewable energy is right for the site?
2. What modifications need to be done to the building to use a renewable energy system?
3. Will the solar features face true south; if not, how many degrees off of south and in which direction, and how will this affect the efficiency of the system?

4. Will solar features (i.e. windows, collectors, etc.) have obstructed access to the sun?
5. Is there sufficient room in the correct orientation to accommodate the collectors and desired storage for an active solar system?
6. For a passive solar design, will the building have sufficient thermal mass to keep it from overheating on very sunny days, but still work on cloudy days?
7. Do the materials used to construct the system meet industry standards, and has the system been tested and received a rating from an independent industry or government authority?
Ex: Solar Rating and Certification Corporation
8. Will the performance of the building or system be monitored and what equipment or techniques will be used for the monitoring?
9. Will the system operate without interfering with the operation, replacement, and maintenance of other equipment?
10. How much will the renewable energy features cost, what are the expected energy cost savings over what time period, and what assumptions about inflation in energy prices are incorporated into these estimates?
11. How long will the system last compared to the typical renewable energy systems of this type?
12. Who is responsible for maintaining the system, what are my responsibilities as the property owner (i.e. cleaning schedule and methods, recommended maintenance, etc.), and are replacement parts readily available?

Signing a Contract

A written contract is a must for your protection as a consumer. Some guidelines to consider include:

- **Read and study** the written contract for a clear understanding prior to signing.
- **Never sign** a contract unless all blanks have been filled in completely, including where the other party signs.
- **Keep a copy** of the contract for your records.
- **Obtain a written cost quote** on the complete job. Consider costs along with other factors, including specifications, product brand

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names, size of the materials, and payment methods.

- **Learn** what the different types of contracts are and what they mean.
- **Don't be pressured** into signing a contract. Take your time to consider the responsibilities/liabilities you will assume if you sign.

During and After Construction

Understanding the materials and equipment that are specified for your project will be helpful in operating and maintaining the building.

Consumers should **strongly consider hiring a designer or third party inspector** to complete the tasks mentioned below:

- Obtain a copy of any certification the building has received including energy efficiency and green building programs.
- Before and during installation, check to be sure the materials are exactly as ordered or specified. Do not accept delivery/make payments without understanding any changes.
- Verify that all indoor and outdoor solar system piping is insulated as specified.
- Have the installer test completed systems for leaks or malfunctions. Verify that all moving parts and switches are functioning in the system(s).
- Review the system with the installer and consumer to ensure they understand its operation and maintenance. This includes receipt of all equipment operation manuals, and review of troubleshooting procedures.
- Get a system tune-up of old equipment with installation of new equipment. Have new equipment tuned/balanced.
- Installed equipment should operate under normal conditions for one week, and be re-checked by the installer in a follow-up visit.
- For active solar water heating or space heating systems, thermometers should be placed on the ducts going to and from the collector to monitor the system's heat gain. Another thermometer can be placed in the storage area to measure heat retained.
- Be sure installed solar collectors face as true south as possible and are not shaded .

- Obtain and retain the contact information of the service provider in a safe location.

Warranties: What Do They Mean?

Warranties are critical in ensuring that your home will be repaired if something should malfunction during the warranty period. Different components may be warranted for different amounts of time. For example, a new home should have individual warranties covering specific materials or assemblies, such as windows and roofing, for 10 or more years if properly installed.

For active solar systems used for space or water heating, the collectors, heat exchanger, storage units and insulation, should be covered for no less than two years. Remaining system components should be warranted for no less than one year.

Examine your warranties carefully. What are their limitations? Remember that a warranty and a guarantee are the same thing: a promise by manufacturers or sellers to stand behind their products in the case of design or manufacturing defects. Federal legislation requires that the warranty issuing body honors these **written promises**.

Be sure you understand who is responsible for honoring the warranty or warranties of different components. The seller should disclose the warranty responsibility of each party, be it the installer, the dealer, the builder, or the manufacturer. Know the financial arrangements, such as contractor bonds, to assure that the warranty will be honored. Remember, a warranty does not guarantee that a company will remain in business; obtain contact information for issues.