

White Paper: Gathering and Using Residential Energy Form Information in Florida

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August 28th, 2014

Summary

As Florida's residential market continues to grow we are missing the opportunity to collect valuable information from the existing energy forms submitted to the building departments with every residential permit. Residential energy use makes up one quarter of all the energy used in Florida. An example copy of this information for a new home is included in Attachment 1.

If electronically submitted and combined with the property # this information can be used for research into:

- Energy efficiency of Florida's residential construction
- Effectiveness of incentive and regulatory programs
- Comparison of building material systems and efficiencies over extended time periods and across regional climate zones
- Impact of household characteristics on utility consumption

Additional potential uses of this data are contained in a paper by Dr. Raymond Issa at UoF School of Building Construction. This paper is included as Attachment 2.

One of the keys to making collection of this information successful is that it cannot burden the builder or the building departments any more than the existing collection system. This can be accomplished through utilizing the existing technology available for cloud based data collection and storage combined with minor modification to the programs currently used (or being developed) in Florida to calculate the residential energy use (currently EnergyGauge and REScheck). This software is maintained by the Fla Solar Energy Center and the Department of Energy respectively. These programs could be easily modified so that output was uploaded to the web for submittal and checking.

We strongly feel that the value of the data that can be collected with these minor changes is so great, the entire cost of the program can be generated by private investment and will pay large dividends both to private industries and to the public. The program can be designed so that the inconvenience to builders and building departments along with the cost to the State of Florida would be zero.

Filling out the form

At the present time builders are primarily depending on the HVAC contractors and private "energy consultants" for filling out the energy forms on their homes (FORM 405-10 please see Attachment 1). 99.99% of these forms are generated from one of the two computer energy programs. A report from the

energy program is then printed out and turned in by the builder to the building department with his permit package.

The building department is then supposed to compare the printout from the energy program with the plans. A copy of the first page of each form is sent quarterly into the State by the building departments for all residential permits. The Uoff School of Construction Management, under contract with the State of Florida, currently collects the first page of the energy form in hard copy. Unfortunately, the data is almost unusable in hard copy form and is collected in boxes and sits in a warehouse. One of the few uses of the data has been by the Masonry Association of Florida (MAF). The MAF has, in past years, used the forms for statistical sampling and analysis of building types in the Florida residential market.

The requirement for the building department to submit this energy form to the State was accidentally deleted in the last code process. We are currently trying to get this corrected in the current code cycle. The MAF has contracted with Uoff to take over the cost of collecting the forms so that there would be no cost to the State.

There are two separate problems that must be overcome to develop the full potential of this data. The first is the electronic submittal of the energy forms to the State of Florida. The second is the attachment of the property # (also referred to as a Tax ID #) to the energy form.

The concept of electronic submittal is for the data to be submitted on the web to a program set up by the State of Florida to review and approve the submittal prior to printing and submittal to the local building department. A possible way that the electronic submission of the form might function is that when the energy form preparer pushed the print button he would be asked by the software if this were the final submittal and if he was ready to submit a copy to the State of Florida. If he chose to submit to the State the data would be uploaded to a computer managed by the State and a consistency check performed on the various inputs to make sure they made sense. If it passed the check the data would be stored by the State and the printout would include a page indicating that the data had been submitted and checked by the State. The energy form preparer would be able to rerun his program and revise his submittal at any time and for any number of times. If it failed the check the submitter would be given immediate feedback on the nature of the discrepancy or omission and possible solutions.

The quality of data being currently submitted to the building departments across the state is questionable. Many of the submittals make no sense in that the basic house geometry has not been input correctly. The building official wastes time, first figuring out what the builder is trying to submit and second going back and forth with the builder trying to get him to correct his submittal.

With a State of Florida based program running a consistency check on the submitted data, the quality of the data would be modestly improved (the input data would not be checked against the plans). This would reduce some geometry problems encountered by the building department. The State program would not recheck the energy calculations or check the input against the actual plans. It would simply review the geometric consistency of the information put into the form. The geometry check that we are discussing could (and

probably should) be performed by the program running the analysis. If this were the case, data collection by the State Computer would become extremely simple.

Adding the Property #

Additionally, the form preparer would be required to attach the Property # to the submitted form. There are current existing statues on the books that require the Property # to be on the permit. The energy form itself does not currently require the Property #.

This State requirement to attach the Property # to the Building Permit is not currently enforced and many Building Departments do not do it. Other Building Departments attach the Property # themselves. Regardless of how it is done, the Property # would have to be on the form electronically submitted to the State of Florida in order for the data to have maximum value.

No additional work by the builder

The builder would have no more work involved with an automatic submittal of his energy forms online to the State of Florida and should have no complaint about correcting any problem areas picked up by the reviewing program. Therefore, I do not believe this would add additional work to the builder's current responsibilities. He would have the advantage of additional online help in properly inputting data to the energy program.

Attachment of the Property # may actually be a larger problem as the builder will have to know what it is prior to submittal. Actually inputting the # into the form should not cause the preparer of the form more than a few seconds of extra work.

No additional work by the building department

The electronic submittal of the form to the State by the builder would eliminate the need for the building departments to copy and submit the first page of all the forms every quarter. The information would have already been collected in a usable electronic form, not in boxes sitting in a warehouse. Additionally, they would have less work involved in reviewing the energy form as the quality of submittals would be increased, possibly reducing the "back and forth" involved with improper geometry in the submitted form.

Data you can use

By having 100% of the data collected electronically it becomes highly usable. To date, any data taken from the forms has to be done manually. This process is prone to error and ridiculously labor intensive. Electronic access to all of the data releases the full potential for its use in both research and marketing. It is expected

that the sale of marketing data collected from the forms will pay for the entire UofF energy data collection program thus eliminating any cost to the State.

Collecting Information by Property #

We were first introduced to the need of attaching a property # to each energy form by Dr. Issa at UofF. The attachment of a property # would allow the data to be compared to a number of other data bases existing in the State (see Attachment 2 by Dr. Issa). The potential for energy use comparisons by the existing utility companies are tremendous. With the use of smart energy meters it would allow energy producers to evaluate various building products and components for their ability to reduce energy use and to swing energy use to off-peak time periods.

This property # addition unlocks the full potential of this data. Within two or three years we could conceivably learn more about residential energy use in Florida, along with a host of other important areas, than we have in the previous 30 years.

What is required to do this?

- 1- Development of a computer program able to analyze the output sheets from any of the current residential software available in Florida. Rough estimated cost - \$60,000 up front.
- 2- Contracting with an entity, such as UofF School of Building Construction, to maintain, update and operate the system. This would have to include a call desk to handle discrepancies which are bound to come up on a regular basis. Rough estimated cost - \$100,000 per year.
- 3- Modification of both the EnergyGauge, REScheck, and any other software under development to communicate with the UofF computer. Rough estimated cost \$40,000 up front.
- 4- Communications with residential building contractors, and HVAC contractors/consultants to educate them on how to submit their energy forms online. Rough estimated cost of training \$20,000 total over one year.
- 5- Communications with Building Departments on changes in the procedures for contractor submittal of the energy forms. Completed forms would continue to be printed and submitted to the building departments by the contractors, as they are now, except that they would have an attached computer printout showing pre-submittal to the State. Rough estimated cost \$2000 up front.

(The above rough estimated costs are for conceptual purposes only and have had no verification or backup.)

Summary of advantages in checking energy forms online and adding the property #

- Submitted forms, and thus energy compliance, become more accurate. Will be checked at submittal to State for geometric discrepancies.
- Data becomes available for important research in residential construction. This data mining would very possibly lead to an understanding of residential energy use far beyond what is currently known. With residential energy use in Florida representing a quarter of Florida's energy requirements, this understanding could potentially save the residents of Florida tens of millions of \$ per year on their energy bills and possibly save the energy companies from building another power plant.

Disadvantages

- **Cost of set up (program development)**
- **Cost of program administration (program maintenance)**

Total Guesstimated Costs

1st Year (Development)----- $\$60,000 + \$40,000 + \$20,000 + \$2000 = \$122,000$

Perpetual - \$100,000/year

- **It is expected that the entire cost of this program would be paid for by the industries most benefiting from the data.**
- **The above rough estimated costs are for conceptual purposes only and have had no verification or backup.**
- **This estimate is based on the State computer doing some type of geometric check of the submitted data. This check could easily (and should be) incorporated into any software accepted by Florida for use in generating Form 405. If this check was not required by the data collection computer at the State, both the development cost and maintenance costs would reduce by at least 50%.**

Conclusion

We believe that a serious consideration of this project would lead anyone currently involved with residential energy to conclude that Florida cannot afford to continue to let the valuable information on the energy forms go to waste. There are data bases throughout the State on residential housing. These are kept by universities and private companies. If these could be combined with the information off of the energy forms it would allow research that could save residents of Florida a lot of energy and money – much more than the cost of modifying the current collection procedures.

The information available would be so valuable that we believe the cost of developing and maintaining the program would be Zero \$ to the State of Florida.

Residential energy use in Florida accounts for approximately a quarter of Florida's energy needs. Any reasonable person would agree to the importance of conserving energy in the Florida residential sector. There is no better way to do this, at a very modest cost, than to implement the recommendations put forth in this paper.