Community Sustainable Development:  
A Self-Sustaining Approach to Resource Conservation and Environmental Justice:

Rising energy costs, water shortages, and concerns about air quality and health, will require communities to upgrade their existing home and building stocks. Unless done using market-based approach, these upgrades will tax local economies.

Energy costs will become a progressively more significant component of the family and business budget. Scarcity of water, especially in high plains deserts like the Rocky Mountain region will become more of a reality. The realization that indoor air quality (IAQ) is a health concern – particularly to the seniors and disabled - will become more prevalent. All of this retrofitting will take money, and a means to finance the seamless implementation of these services – particularly for the low-income, seniors and disabled and the agencies that serve them - will be needed. A holistic approach that considers residents and employees as part of the system, and uses traditional energy retrofits alongside new innovative solutions such as education and behavior change programs, and provides “market based” financing programs, is needed to create a sustainable model. The required upgrades have to be installed using private funds from the owners, banks, and Community Development Financial Institutions (CDFIs). To assure self-sufficiency and longevity, a rigorous “market based” approach to project implementation will be needed so that the energy cost savings realized from projects is sufficient to repay the investment. iCAST believes this approach to be widely replicable across rural and urban communities.
Community Sustainable Development:
A Self-Sustaining Approach to Resource Conservation and Environmental Justice:

Driven by rising energy costs, growing scarcities of water in many areas, and the evolving health needs of aging populations, communities will face an across-the-board need to update and upgrade their existing home and building stocks. Energy costs will become a progressively more significant component of the family and business budget. Scarcity of water, especially in high plains deserts like the Rocky Mountain region will become more of a reality. The realization that indoor air quality (IAQ) is a health concern – particularly for the seniors and disabled - will become more prevalent.

To complicate the issue, in many areas of the country, the “low hanging fruit” on the energy efficiency tree has already been harvested. Incandescent lamps have been replaced by compact fluorescent bulbs. Weather stripping has been improved. Programmable thermostats have been installed, and energy costs as a percent of disposable income continue to rise...

The “higher fruit” of energy efficiency will require more effort to harvest. Upgraded windows; better HVAC systems; insulated building structures; efficient appliances including refrigerators, water heaters, “smart” thermostats and power strips, and control systems, while offering the opportunity for more savings, are more expensive to implement but offer the potential for substantial savings in energy costs.

Energy consumption is tied to water consumption – less water used for hot showers or washing clothes and dishes means less energy used. Energy efficient applicants are water efficient too.

Sealing a home or building structure so that it does not leak the heat in winters and cool air in summer leads to energy savings - but can also lead to reduced air exchanges and impact indoor air quality (IAQ) unless addressed. Carbon Monoxide or Radon that might have escaped before the home/building was sealed to save energy may cause IAQ issues leading to health and safety concerns.

All of this retrofitting will take money – and a means to finance the seamless implementation of these services – particularly for the low-income, seniors and disabled - will be needed. If a market-based approach is used to fund these improvements, then lenders will be involved, and they will need to be assured that the loans they make will be repaid (and borrowers need to be assured that they will save sufficient money from the improvements, to pay back the loans). In the case of the underserved populations, the concerns of lenders (and borrowers) can become even more acute.

The process involves five steps:
1. Assessments – that provide a project scope with costs and benefits;
2. Evaluation of plan and selection of final scope of work by home/business owner
3. Securing financing for the project;
4. Managing the implementation of energy conservation measures, behavior change, water conservation measures, IAQ improvements, etc.
5. Final inspections, invoicing and tracking results.

To assure self-sufficiency and longevity, a rigorous “market based” approach to project implementation will be needed so that the energy cost savings realized from projects is sufficient to repay the investment. Experience has shown that no single activity can be compromised at the expense of the others. An implementation “gone wrong” can destroy carefully established financial models. Even if everything goes smoothly, if recipients do not know how to adopt allied behavior changes, the project gains can be lost quickly. And finally, in the absence of tracked results, the opportunity to garner “lessons learned” is lost, as is the ability to provide existing, and prospective, lenders with evidence of program performance over time.

**Activity 1:** Assessments – that provide a project scope with costs and benefits:

This activity is used to establish the baseline from which predictive EE, water and IAQ implementation models are derived. Baseline data is acquired to help residents understand their current energy and water usage and energy efficiency and water conservation upgrade needed. A variety of modeling packages are available to calculate energy and water savings. Although each audit is conducted individually, there is a set of “SOPs” (Standard Operating Procedures) covering an assessment. The cost of this assessment is borne by the home or building owner and is their buy-in and investment into making the improvements on their property.

**Program Goal Achieved By This Activity:**
Residence and business facility owners receive energy, water and IAQ assessments that outline the costs, savings and other benefits from implementing the plan laid out in the assessment report.

**Activity 2:** Evaluation of plan and selection of final scope of work by home/business owner:

With the assessment report in hand, the owners can consult with the assessors to help them determine the ideal solution(s) to their needs. In most cases, and depending on resident/business owner circumstances, a suite of solutions can be selected with a payback of 5-7 years i.e. savings pay for the loans taken out to implement a project for the duration of the loan; after which, the savings go in the owner’s pocket – and as energy and water bills increase, and health care costs rise, so do the savings!

**Program Goals Achieved By These Activities:**
The evaluation of each project site shows a path to reduction in therms, kilowatt hours, and financial savings, with a short-term payback.
Activity 3: Securing financing for the project:

One approach involves working with CDFIs to establish revolving loan funds (RLFs). To assure self-sufficiency and longevity, a rigorous “market based” approach to project implementation will be needed so that the energy cost savings realized from projects is sufficient to repay the investment. Participants can utilize a “no cash from my pocket” approach where the investments in the upgrades literally pay for themselves. Lenders benefit because they are assured that loans that might otherwise be viewed as risky will be repaid. Additional risk mitigation might be provided by government and/or foundations through a loan loss reserve fund that covers loan losses for the lenders. An additional benefit to investors is that their investments are leveraged through the RLF.

Program Goals Achieved By These Activities:
The residential and business facilities can be upgraded once funding is in place. Besides the benefits of reduced costs, better health and comfort, there are the social (local jobs created and economic activity) and environmental (pollution reduction from reduced fossil fuel consumption) benefits accrued from the project.

Activity 4: Managing the Implementation:

At this point, theory meets practice. Project managers, working with local subcontractors, implement energy conservation measures, behavior change, water conservation measures, IAQ improvements, etc. The overall intent is to make the process virtually transparent to program recipients. Whenever possible, subcontractors should be recruited locally, and training should be provided to those in need in the neighborhood in new “green” jobs opportunities.

The technology solutions typically, if installed correctly, work well – but the occupants may not perform at optimal levels. All too often, we find situations where occupants are not benefitting to the extent they might have because they had not realized the importance of a water heater set at 120F instead of 160F, of proper programming of a programmable thermostat (if they programmed it at all), of using cold water in their new EnergyStar™ washer, etc. In the early days of energy efficiency, when light bulbs could be replaced and new weather stripping installed for at most a few hundred dollars, the consequence of a recipient leaving the new lights burning was annoying. Today, when “next generation” solutions may cost several thousand dollars, while at the same time new energy consumers use more energy from a growing assortment of electronic gadgetry, the consequences of not realizing projected savings are severe – to borrowers, lenders, and those seeking the larger national adoption of such measures. In response “Behavior Change” components have to be designed to be implemented in parallel with technology based measures.

Program Goals Achieved By These Activities:
Participants receive energy efficiency and water savings that are measurable. Occupants show a measurable increase in knowledge and behavior change around energy and water consumption and practices that positively impact IAQ and their health.

**Activity 5: Final inspections, invoicing and tracking results:**

Establishing quality control specifications is crucial to ensure quality assurance of the work performed. Final inspections pay the way for payments to the contractors who worked on the project. Tracking serves multiple purposes:

- It provides a means to measure the effectiveness of the measures.
- By benefitting from “lessons learned,” overall program effectiveness increases from year to year.
- From a programmatic perspective, it allows solution providers to demonstrate to the “investors” (foundations, government agencies) that they have made wise investments.
- Finally, and perhaps most important, programs that have a demonstrated record of success are programs that have the best likelihood of receiving continuing – even growing – support from investors.

**Program Goals To Be Achieved By This Activity:**

Evaluation shows reduction in therms, kilowatt hours, and financial savings, with an average 5 to 7 year payback on upgrades, and 20%-30% reductions in utility bills.

None of the ideas expressed above are particularly new, and the reader may be somewhat puzzled to find that we do not present a table showing thousands of tons of carbon emissions reductions, staggering numbers of kWhs saved, evidence of improved resident health and comfort, hundreds or thousands of jobs created and millions of dollars of economic activity – all leading to sustainable development for communities – both rural and urban. This omission was deliberate because none of the activities described above can happen without a way to fund such a program and scale it nationally. This is all the more of an issue since money is in increasingly short supply.

We at iCAST believe that the approach outlined above succeeds in providing lenders with the assurance they need to make the loans to fund the projects that – you knew we’d get there eventually – really do reduce carbon emissions by thousands of tons a year; really do save many thousands of kWhs; and really do provide safer, more comfortable, living circumstances for our citizens, do create much needed jobs and do drive economic activity. iCAST has launched ‘ResourceSmart’ to create sustainable development in a couple of pilot communities within Colorado, using the approach outlined above, and believes that its initial results prove this approach is scalable nationally.