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APPRISE
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MEMO

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FROM: David Carroll

SUBJECT: Recommendations on Models and Vendors

Background

On February 3, 2006, Colorado Governor Owens signed into law House Bill 1200. This statute provides funding for a variety of new initiatives designed to assist low-income residents with their household energy consumption. To fulfill the mandate of this legislation, the State of Colorado proposes to issue an RFP to solicit bids to furnish services under the "Energy $ervices: First Response" program. This program is targeted at low-income households with average or below average levels of electricity and gas consumption; the goal being to reinforce good consumer energy using behaviors and to provide some quick and immediate assistance in lowering energy consumption.

In this project, APPRISE conducted research on the service delivery models for high-volume, low-cost services that have been implemented in other states. We identified models, documented the service delivery approach and the services delivered, and obtained information on the evaluation findings for the program models. In this report, we furnish information on the program models and the organizations and/or vendors who implemented the program, and we make recommendations to Colorado regarding the applicability of these models to the "Energy $ervices: First Response" program.

Findings and Recommendations

Our review of programs demonstrated that there are at least three different service delivery models for high-volume low-cost programs. Within each model, there are a number of variations. The models include:

- Direct Installation Programs – In these programs, service delivery agencies recruit eligible clients, set an appointment for service delivery, conduct an on-site assessment of eligible energy saving opportunities, directly install energy saving measures (or facilitate client installation), and deliver energy education information to the client. One variation on this model is the "neighborhood blitz" approach where the service delivery agency identifies neighborhoods with a high proportion of low-income households, advertises that crews will be in the area on a specific day and conducts a door-to-door campaign on that day for service delivery.

- Workshop / Energy Saving Kit Programs – In these programs, service delivery agencies recruit clients to attend an energy education workshop, deliver energy education to the

clients, and give the workshop participants energy saving devices to install in their homes. One variation on this model is to furnish clients one-on-one energy education during intake into an energy assistance program, and then to give the client a kit of energy saving devices.

- Energy Saving Kit Programs – In these programs, energy saving kits are distributed to low-income households. Options for distributing kits include:
    - Mailing kits to eligible households
    - Mailing information on the availability of kits to eligible households and then sending kits to those households that respond
    - Distributing kits at community-based organizations
    - Distributing kits at community events

While there is extensive literature on the design and implementation of these programs, there have been few evaluations of program effectiveness. From the available evidence, it is clear that the lowest cost programs (i.e., Energy Saving Kits) have the potential to deliver the highest cost-effectiveness ratios. However, Direct Installation programs have the potential to deliver more energy efficiency services to each home and could potentially have the greatest impact on energy affordability for low-income households.

While the evaluation data on the impact of programs is limited, simple engineering calculations demonstrate the potential for program success. If the programs focus on low-cost service delivery of cost-effective measures, the programs can be cost-effective even with relatively low measure and action adoption rates. For that reason, we recommend that OEMC pursue all three options and use the first program year to assess the total energy savings from each program model and to measure the cost-effectiveness of the program. Using the results from short-term projections and longer-term impact evaluation, OEMC can revise the mix of programs each fiscal year to enhance the overall program effectiveness.

Engineering Estimates of Energy Saving Potential

As part of this analysis, Synertech Systems developed engineering estimates of the energy savings potential from individual measures and actions. Based on survey research data and program evaluation studies, we developed estimates of three other factors:

- Opportunity Rates – The percentage of homes that had the energy saving opportunity.
- Adoption Rates – The percentage of clients that would adopt the energy saving measure or action.
- Retention Rates – The percentage of clients that would retain installed measures or maintain action commitments.

Table 1 shows the estimates furnished by Synertech Systems with respect to energy saving measures and actions. For each measure or action, Synertech estimated the savings

associated with installation of the measure or installation of the action. The estimates of energy savings are expressed either as savings per hour of use or in saving percentages. The estimates were based on engineering calculations. The estimate of baseline energy usage was developed from consumption data available from the EIA RECS survey and from other energy research studies. The annual dollar savings were based on average Colorado energy prices of $0.906 per kWh and $1.025 per therm.

Table 1 – Energy Saving Potential

Measure or Action	Estimated Savings	Annual Baseline Usage	Annual Consumption Savings	Annual Dollar Savings
MEASURES				
13 W CFL	47 watts per hour	876 hours	41 kWh	$3.73
23 W CFL	77 watts per hour	876 hours	67 kWh	$6.11
Showerhead	33%	100 therms	33 therms	$33.83
ACTIONS				
Turn off computer at night	100 watts per hour	2,920 hours	292 kWh	$26.46
Turn up refrigerator 5 degrees	12.5%	1000 kWh	125 kWh	$11.33
Turn down water heater 10 degrees	10%	250	25 therms	$25.63
Turn down thermostat 5 degrees	15%	500	75 therms	$76.88
Set back thermostat 5 degrees	5%	500	25 therms	$25.63
Wash clothes in cold water	100%	100	100 therms	$102.50

Table 2 shows the estimated opportunity rates, adoption rates, and retention rates for measures and actions associated with direct install programs. The opportunity rates, adoption rates, and retention rates were estimated from a survey of LIHEAP customers and from program statistics from a number of program evaluation studies. The analysis demonstrates that even relatively low effective rates of measures and actions per household (7.5% to 25%) can generate a significant level of savings.

Table 2 – Estimates of Realized Energy Savings for Direct Install Programs

Measure or Action	Opportunity Rate	Adoption Rate	Retention Rate	Effective Rate	Effective Savings per Home
MEASURES					
13 W CFL	10	75%	90%	6.75	$25.18
23 W CFL	10	75%	90%	6.75	$41.25
Showerhead	75%	50%	80%	30%	$10.15
ACTIONS					
Turn off computer at night	25%	50%	80%	10%	$2.65

Measure or Action	Opportunity Rate	Adoption Rate	Retention Rate	Effective Rate	Effective Savings per Home
Turn up refrigerator 5 degrees	75%	67%	50%	25%	$2.85
Turn down water heater 10 degrees	75%	67%	50%	25%	$6.44
Turn down thermostat 5 degrees	100%	15%	50%	7.5%	$5.77
Set back thermostat 5 degrees	50%	50%	50%	12.5%	$3.20
Wash clothes in cold water	50%	50%	50%	12.5%	$12.81
Total Potential					$110.29

Table 3 shows the estimated opportunity rates, adoption rates, and retention rates for measures and actions associated with workshop programs. Compared to the direct install programs, it was estimated that it was appropriate to give clients fewer CFLs to ensure that CFLs would not be wasted. Further, it was estimated that fewer clients would be comfortable in turning down water heaters or raising the refrigerator temperatures without the support of a energy educator on site. The overall estimated savings for the Workshop Program is about 65% of the savings estimate for the direct install programs.

Table 3 – Estimates of Realized Energy Savings for Workshop Programs

Measure or Action	Opportunity Rate	Adoption Rate	Retention Rate	Effective Rate	Effective Savings per Home
MEASURES					
13 W CFL	4	90%	90%	3.24	$12.09
23 W CFL	4	90%	90%	3.24	$19.80
Showerhead	75%	50%	80%	30%	$10.15
ACTIONS					
Turn off computer at night	25%	50%	80%	10%	$2.65
Turn up refrigerator 5 degrees	75%	33%	50%	12.5%	$1.40
Turn down water heater 10 degrees	75%	33%	50%	12.5%	$3.17
Turn down thermostat 5 degrees	100%	15%	50%	7.5%	$5.77
Set back thermostat 5 degrees	50%	50%	50%	12.5%	$3.20
Wash clothes in cold water	50%	50%	50%	12.5%	$12.81
Total Potential					$71.03

Table 4 shows the estimated opportunity rates, adoption rates, and retention rates for measures and actions associated with a mass mailing programs. Much lower adoption rates were

estimated for this program type and savings were expected to be much smaller. However, the cost of mass mailing programs is so low that they are still expected to be cost-effective.

Table 4 – Estimated Realized Energy Savings for Mass Mailing Programs

Measure or Action	Opportunity Rate	Adoption Rate	Retention Rate	Effective Rate	Effective Savings per Home
MEASURES					
13 W CFL	2	75%	50%	0.75	$2.80
23 W CFL	2	75%	50%	0.75	$4.58
Showerhead	75%	25%	80%	10%	$3.38
ACTIONS					
Turn off computer at night	25%	10%	50%	1.25%	$0.33
Turn up refrigerator 5 degrees	75%	10%	50%	3.75%	$0.42
Turn down water heater 10 degrees	75%	10%	50%	3.75%	$0.96
Turn down thermostat 5 degrees	100%	5%	50%	2.5%	$1.92
Set back thermostat 5 degrees	50%	10%	50%	2.5%	$0.64
Wash clothes in cold water	50%	10%	50%	2.5%	$2.56
Total Potential					$17.60

Review of Direct Installation Programs

Three direct install programs that we reviewed demonstrate the potential for this type of program in Colorado.

- Ohio EPP Program – The Ohio EPP program was designed to be a comprehensive baseload program that addressed a full range of baseload measures and actions. It was delivered by local weatherization agencies and a private contractor. The program service delivery evaluation demonstrates that the primary measures installed under the program are refrigerator replacement and CFLs. The program impact evaluation shows that, even with relatively high service delivery costs, the program is generating cost-effective savings. The primary lessons from the program include:

    - CFLs – Direct installation programs can identify a large number of eligible fixtures and achieve significant savings. Despite some removals and failures experienced by the program, most bulbs remained in place and delivered energy savings.

    - Actions – Clients were willing to make action commitments to save energy. However, a failure by the program to focus on a few actions and to document these actions for clients resulted in a comparatively low level of client follow through.

  - Missed Opportunities – There was a high level of missed opportunities for water heating measures. The program service delivery data showed that in homes with electrically heated water, most clients were eligible for additional measures. However, a failure to focus on the installation of these measures contributed to the poor performance.[1]

- Neighborhood Blitz Programs – An article by the Southwest Energy Efficiency Project (SWEEP) and other literature on these programs demonstrates that they can deliver a lot of energy services for a relatively low cost. For example, the SWEEP article reports that LADWP experienced an average projected savings rate of 254 kWh per client per year as a result of a service delivery visits that average 30 minutes. For areas with a large population of low-income households, such an approach might be effective in Colorado.

- Youth Corp Programs – We identified a number of programs that use Youth Corps to implement direct install programs. These include: the Montana Youth Corps, the California Youth Energy Services, and the Corporation for Youth Energy Corps in NYC. According to Jim Nolan, the Montana program manager, these programs furnish good training for the Youth participants and good services to low-income households. The program will not be evaluated, but demonstrates that low cost services can be effectively delivered by Youth Corps organizations. In Montana, the program focused on measures that may not deliver cost-effective savings (e.g., temporary plastic covering for windows). However, it is clear that the same mechanism could be used to deliver an alternative set of measures.

From this research, we came to the following conclusions.

- Potential – There is significant potential for saving energy in homes of low-income households. Experience from these programs demonstrates that most homes have the potential for installing a significant number of CFLs. Experience from these programs shows that water heating measures can furnish additional savings. A review of evaluations for energy education programs suggests that identification of a few significant actions can result in better follow-up by clients.

- Cost – Neighborhood Blitz models and Youth Corp models cost less than stand-alone service delivery by weatherization agencies.

- Customer Satisfaction – Clients are satisfied with the services delivered through these programs.

Based on these research findings, we recommend that OEMC include a direct install program in the portfolio of services, but that it focus on those measures that have the greatest potential to deliver cost-effective energy savings.

[1] Since the program was limited to electric measures and only 10% of homes had electric water heating, this did not have a major impact on the program cost-effectiveness. However, it is illustrative of the value of focusing on a few, well-understood measures.

Review of Customer Workshop Programs

We found detailed information on two different workshop programs.

- Energy Wise – In recent years, a series of programs have been implemented by Energy Wise in Iowa, Indiana, South Carolina, and other states. These programs offer energy education and a take-home energy kit. A recent evaluation of the Iowa program estimated that mean gas savings were 21 therms (+/- 17 therms) and that mean electric savings were negative 46 kWh (+/- 161 kWh). Survey responses from program participants suggest a high rate of adoption of program actions and installation of kit measures. However, those adoptions rates could not be verified through billing analysis.

- Niagara Mohawk LICAP – From 1994 through 2004, NMPC implemented a workshop program in conjunction with the delivery of other services. The impact evaluation estimated that the energy savings were 513 kWh (+/- 590 kWh). The process evaluation found that a significant number of clients had followed through with actions that are likely to result in significant energy savings.

The evaluations are inconclusive, demonstrating some savings, but with confidence intervals that are large enough that there is a great deal of uncertainty regarding overall program performance. However, given the low cost of service delivery for these programs (about $100 per client) even a low level of savings is likely to be cost-effective. We recommend that OEMC include a workshop program in the portfolio of services. However, as with the Direct Install Program, the measures and actions should be limited to those that are most cost-effective and that can reasonably be installed and/or adopted by clients.

Energy Kit Programs

A large number of energy kit programs have been implemented. However, we were able to find only one program that was evaluated. In the Seattle City Light Program, a solicitation was sent to about 314,000 customers. Over 178,000 customers requested kits. A telephone survey estimated that over 285,000 CFLs were installed as a result of the program. The analysis suggested that other adjustments should be made and that the net impact of the program was the installation of almost 300,000 bulbs. While the estimated savings from the program was only $5-$10 per participant per year, the program was estimated to be highly cost-effective.

There are two important lessons from this program.

- Impact on Energy Affordability – For low-income households, every dollar is important. However, the Seattle City Light Conservation Kit program delivered less than $1 per month in energy savings to clients. Such a small change is unlikely to have a major impact on Client affordability. [In contrast, conservative estimates for the direct install programs estimate that they can deliver almost $10 in saving per month to clients, representing a 10% savings on the average energy bill for low-income households.]

- Cost-Effectiveness – Conservation Kits are the most cost-effective way to achieve reductions in energy usage and deliver energy bill savings to the low-income community.

While the programs may not have a major impact on individual households, they have a gross impact on the overall low-income community.

We recommend that OEMC include Conservation Kit programs in the portfolio of services. Again, careful evaluation of the results from the service delivery will be important to assess which conservation kits are the most effective in delivering benefits to low-income customers.