

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Commission Review of Numeric) DOCKET NO. 080407-EG
Conservation Goals)
Florida Power & Light Company)
_____)

In re: Commission Review of Numeric) DOCKET NO. 080408-EG
Conservation Goals)
Progress Energy, Florida, Inc.)
_____)

In re: Commission Review of Numeric) DOCKET NO. 080409-EG
Conservation Goals)
Tampa Electric Company)
_____)

In re: Commission Review of Numeric) DOCKET NO. 080410-EG
Conservation Goals)
Gulf Power Company)
_____)

In re: Commission Review of Numeric) DOCKET NO. 080411-EG
Conservation Goals)
Florida Public Utilities Company)
_____)

In re: Commission Review of Numeric) DOCKET NO. 080412-EG
Conservation Goals)
Orlando Utilities Commission)
_____)

In re: Commission Review of Numeric) DOCKET NO. 080413-EG
Conservation Goals)
Jacksonville Electric Authority)
_____)

DIRECT TESTIMONY AND EXHIBIT OF:

WILLIAM STEINHURST

1 **Q. Please state your name and occupation.**

2 A. My name is William Steinhurst, and I am a Senior Consultant with Synapse
3 Energy Economics (Synapse), which is headquartered in Cambridge, Massachusetts. My
4 business address is 45 State Street, #394, Montpelier, Vermont 05602.

5 **Q. On whose behalf did you prepare this prefiled testimony?**

6 A. I prepared this testimony on behalf of the SACE-NRDC.

7 **Q. Please summarize your qualifications.**

8 A. I have over twenty-five years' experience in utility regulation and energy policy,
9 including work on renewable portfolio standards and portfolio management practices for
10 default service providers and regulated utilities, green marketing, distributed resource
11 issues, economic impact studies, and rate design. Prior to joining Synapse, I served as
12 Planning Econometrician and Director for Regulated Utility Planning at the Vermont
13 Department of Public Service, the State's Public Advocate and energy policy agency. I
14 have provided consulting services for various clients, including the Connecticut Office of
15 Consumer Counsel, the Illinois Citizens Utility Board, the California Division of
16 Ratepayer Advocates, the D.C. and Maryland Offices of the Public Advocate, the
17 Delaware Public Utilities Commission, the Regulatory Assistance Project, the National
18 Association of Regulatory Utility Commissioners, the National Regulatory Research
19 Institute, AARP, the Union of Concerned Scientists, the Northern Forest Council, the
20 Nova Scotia Utility and Review Board, the U.S. EPA, the Conservation Law Foundation,
21 the Sierra Club, the Oklahoma Sustainability Network, Illinois Energy Office, the
22 Massachusetts Executive Office of Energy Resources, the James River Corporation, and
23 the Newfoundland Department of Natural Resources.

1 I hold a B.A. in Physics from Wesleyan University, and an M.S. in Statistics and
2 Ph.D. in Mechanical Engineering from the University of Vermont.

3 **Q. Please summarize any prior experience working on energy efficiency.**

4 A. I have testified as an expert witness in approximately 30 cases on topics including
5 utility rates and ratemaking policy, prudence reviews, integrated resource planning,
6 demand side management policy and program design, utility financings, regulatory
7 enforcement, green marketing, power purchases, statistical analysis, and decision
8 analysis. I have been a frequent witness in legislative hearings and represented the State
9 of Vermont, the Delaware Public Utilities Commission Staff, and several other groups in
10 numerous collaborative settlement processes addressing energy efficiency, resource
11 planning and distributed resources.

12 I was the lead author or co-author of Vermont's long-term energy plans for 1983,
13 1988, and 1991, as well as the 1998 report *Fueling Vermont's Future: Comprehensive*
14 *Energy Plan and Greenhouse Gas Action Plan*, as well as Synapse's study *Portfolio*
15 *Management: How to Procure Electricity Resources to Provide Reliable, Low-Cost, and*
16 *Efficient Electricity Services to All Retail Customers*. I was recently commissioned by the
17 National Regulatory Research Institute to write *Electricity at a Glance*, a primer on the
18 industry for new public utility commissioners, which included coverage of energy
19 efficiency programs.

20 **Q. Have you previously testified before the Florida Public Service Commission?**
21 **(“the Commission” or “PSC”)?**

22 A. No.

1 **Q. Please summarize your testimony.**

2 A. I respond to and provide recommendations for certain items in the April 14,
3 2009, Staff Proposed Issues List (“Staff Issues List”). I also recommend for the
4 Commission’s consideration several aspects of good program design and implementation
5 that should be taken into account in goal setting and elsewhere.

6 My recommendations are made in light of my understanding of Florida Statute
7 and the recent FEECA bill (Fla. St. §§ 366.80-85, 403.519) and how they would be
8 applied by an expert in utility resource planning and are guided by its statement of the
9 Florida Legislature’s policy, which reads in relevant part:

10 377.601. Legislative intent

11 * * *

12 (2) It is the policy of the State of Florida to:

13 (a) Develop and promote the effective use of energy in the state, and
14 discourage all forms of energy waste, and recognize and address the
15 potential of global climate change wherever possible.

16 (b) Play a leading role in developing and instituting energy management
17 programs aimed at promoting energy conservation, energy security, and
18 the reduction of greenhouse gas emissions.
19
20

21 **Q. How is your testimony organized?**

22 A. I address, in order, several of the issues listed in the Staff Issues List. Following
23 that, I discuss several aspects of good program design and implementation and how they
24 should be taken into account in goal setting in this proceeding.

25

1 **ISSUE 2:** Did the Company provide an adequate assessment of the achievable
2 potential of all available demand-side and supply-side conservation
3 and efficiency measures, including demand-side renewable energy
4 systems?

5 **Q.** Do you have any concerns about the manner in which utility avoided cost
6 estimates for energy and deferred capacity were prepared?

7 A. Several. Below, I discuss some of the ways in which avoided cost estimates ought
8 to be done. NRDC-SACE witness Mosenthal discusses how DSM potential screening
9 should be done. However, it is very hard to determine specifics on what was done by the
10 FEECA utilities. Little relevant quantitative information was provided by most of the
11 FEECA utilities in their direct case. Certain discovery responses that may be relevant to
12 this question were received just before the deadline for filing this testimony, and we have
13 not yet been able to review those responses. I may need to provide updated testimony
14 once we have reviewed that data.

15 **Q.** Is it appropriate to accord DSM and demand-side renewables zero capacity
16 value prior to the date of the next needed generation unit?

17 A. Not necessarily. First of all, there may be value in pure demand reductions,
18 especially ones that are dispatchable or remotely controllable or ones that have a high
19 coincidence with system peaks, even if the generation system is relative to the required
20 level of reserves. Benefits in that situation can include extra on-peak T&D loss
21 reductions, longer life for transformers and other T&D equipment as well as generators
22 dispatched for spinning reserve, ancillary services value delivered, reduced clearing
23 prices for ancillary services, and the ability to make off-system sales of firm capacity to
24 neighboring utilities or regions. Air quality may be improved due to reduced operation of
25 comparatively inefficient peakers or older, dirtier cycling plants to meet reserve

1 requirements or super-peak loads; those air quality benefits are likely to accrue during
2 hours when air quality is at its poorest and may be assigned some quantitative value due
3 to freed up air permits or allowances, reduced constraints on economic development by
4 industries that are subject to air quality regulation, or other public benefits. In addition,
5 there may be situations where additional capacity can contribute to increased reliability of
6 the system, both from a generation adequacy point of view and a T&D constraint
7 perspective, locally or regionally. Such increased reliability can be of value to consumers,
8 even if hard to quantify.

9 If Florida is growing quickly, now or after recovery from the recession, someone
10 will probably need capacity.¹ There is likely to exist at least an informal bilateral market
11 for capacity during the initial years of a given DSM measure's life, and imports from
12 outside Florida are projected to be substantial.² Therefore, it is not plausible to assume
13 zero avoided capacity value for even the early years of DSM measures. Furthermore,
14 discounting "Uncertain Resources," i.e., unsited utility or merchant generation, the
15 Commission's target reserve margin will not be met as early as 2010, supporting that
16 conclusion.³ One of the FEECA utilities, Gulf Power, is a member of the Southern
17 Company System, which has an automatic mechanism in their system agreement for
18 "capacity equalization" in which companies compensate each other for capacity deficits
19 and surpluses. This mechanism may create a non-zero value for avoided capacity in
20 every year, both for Gulf Power and for any FEECA utility within transmission distance
21 of it.

¹ The 2008 FRCC load forecast calls for 2.1% per year demand growth between 2008 and 2017.

² The FRCC projected firm interregional purchases for 2008 of 2,448 MW, decreasing by 2017 to 846 MW, which is still a substantial opportunity for avoiding capacity needs.

³ NERC 2008 report at 84.

1 I recommend that the Commission require the FEECA utilities to account for the
2 value of the sales of surplus capacity and all other products or resources freed up by DSM
3 in both the near term and the long term. If they are really claiming ZERO avoided
4 capacity cost for some period, then they should be required to demonstrate that they have
5 “gone to the market” with capacity for sale in a manner verifiably designed and
6 executed to maximize the value of capacity for sale, and that no one was interested.

7 **Q. Does the avoided cost method used by the FEECA utilities appear to**
8 **properly preserve the capacity value associated with DSM that was approved in a**
9 **previous FEECA goal-setting proceeding and relied upon in subsequent resource**
10 **plans and need determination proceedings?**

11 A. No, it appears that the proposed new goals for 2010-2014 are based on a zero or
12 near-zero capacity value for the early years of their measure life. In contrast, when goals
13 were set for that time period in the 2004 FEECA goal-setting proceeding, programs
14 implemented in those years were assumed to contribute to the forecast capacity need of
15 each utility.

16 For example, in the Standard Offer Contract filed by FPL on May 20, 2008, the
17 Company’s Avoided Unit has an in-service date of June 1, 2014. Under that contract, the
18 capacity value is approximately zero until June 1, 2014.

19 Consider a hypothetical energy efficiency measure with a measure life of four
20 years, installed at two locations on June 1, 2012 and June 1, 2014. The measure installed
21 on June 1, 2014 would have approximately twice the capacity value than the measure
22 installed on June 1, 2012 since it would receive capacity value credit for the full four
23 years of its measure life rather than only the final two years of its measure life.

1 However, in the previous 2004 goal-setting proceeding, FPL appears to have
2 relied upon an Avoided Unit with an in-service date of June 1, 2007 (Petition for
3 Approval of Florida Power & Light Company’s Standard Offer Contract, December 5,
4 2003, Docket 031093). This proceeding would also have covered the two hypothetical
5 measures I described above, but would have assigned them each an approximately equal
6 avoided capacity cost value since they would both have been installed after the effective
7 date of the in-service date of the Avoided Unit.

8 The current effective goals for FPL and the other utilities are based in part on the
9 avoided capacity values utilized in the 2004 proceeding. Subsequently, FPL and other
10 FEECA utilities filed resource plans and petitions for determination of need that relied, in
11 part, upon meeting those goals and installing that capacity.

12 In this proceeding, the FEECA utilities propose to reduce their goals for the five
13 year period based, in part, on a method of analysis that includes approximately zero
14 capacity value for several years until the utility’s next Avoided Unit in-service date is
15 reached. Yet measures implemented during this time period, at least up to the levels
16 anticipated in the utilities’ existing resource plans, obviously do have capacity value
17 since that capacity has been relied upon in the resource plans and the utilizes have
18 already or will soon avoid the need to build, purchase or otherwise obtain alternate
19 capacity to meet forecast capacity needs.

20 Given this apparent change, I recommend that the Commission require the
21 utilities to justify their method for valuing avoided capacity cost during the first five
22 years of the plan and explain why it does not reflect the value that was attributed to
23 meeting the goals in the prior FEECA goal-setting proceeding. There may be some need

1 to update these values to place them in a consistent analytic framework (e.g., taking
2 inflation into account).

3 **Q. In identifying the avoided generation unit benefit, do the utilities ever**
4 **consider the potential to avoid or delay, in whole or in part, the construction of a**
5 **nuclear unit?**

6 A. I cannot determine what the utilities actually do from the materials they filed.
7 However, it appears based on Wilson’s testimony that the utilities have never
8 incorporated the capacity value of any nuclear plants, including nuclear plants that are
9 merely proposed, in determining the avoided cost of capacity for DSM screening.

10 Even if a nuclear unit were actually under construction, there is, until quite far
11 along, a large “to-go” cost that could be avoidable. Failure to cancel a unit that could be
12 avoided by DSM less expensive than that remaining “to-go” cost would constitute
13 imprudent management. Allowing in the avoided cost calculation for the possibility of
14 canceling a nuclear construction project is quite reasonable.

15 Even big supply side resources can be avoided or deferred by small DSM. First,
16 aggressive implementation of many small DSM measures can, taken together, amount to
17 a large block of avoided demand. Second, because load forecasts and resource needs are
18 not known with certainty, it is possible that a small amount of DSM delivered could
19 allow deferral of a large unit on a statistical basis. Also, if Florida looks at avoided costs
20 on a utility-specific basis, a particular utility’s DSM achievement could quite reasonably

1 allow it to have a smaller share in a nuclear construction project (initially, or by selling an
2 interest in an underway project).⁴

3 **Q. Were the baseline assumptions used by the utilities (growth rates, capital
4 costs, fuel costs, etc.) appropriate? Were the sensitivity analyses useful in identifying
5 the impact of varying these parameters on the total economic potential?**

6 A. I was unable to determine from the materials filed by the utilities whether those
7 assumptions and analyses were appropriate. Certain discovery responses that may be
8 relevant to this question were received just before the deadline for filing this testimony,
9 and we have not yet been able to review those responses. I may need to provide updated
10 testimony after reviewing that data.

11 **Q. Are there other shortcomings in the way the FEECA utilities handled other
12 benefits of DSM or externalities in establishing the benefits of energy efficiency?**

13 A. Yes. I discuss carbon externalities below in my response to Issue 5. In addition to
14 the non-electric benefits mentioned earlier in my response to this Issue 2, I would like to
15 describe three other problems with the FEECA utilities' handling of the benefits of DSM
16 and demand-side renewables.

17 The first is the potential for energy efficiency and demand-side to delay or
18 moderate constraints on Florida's economy. It is my understanding that Florida does not
19 have major problems today with levels of criteria pollutants (under the Clean Air Act
20 Amendments or CAA). However, if a situation were to develop where one or more of
21 those pollutants was out of compliance or was expected to become out of compliance,
22 there are provisions in the CAA that could limit commercial or industrial development in

⁴ For further discussion of these points, see, for example, <http://www.synapse-energy.com/Downloads/SynapseReport.2005-09.UNFCCC.Using-Electric-System-Operating-Margins-and-Build-Margins-.05-031.pdf> at 11-13.

1 the affected regions of the state or require expensive retrofits of fossil fueled power plants
2 to come back into compliance. Energy efficiency measures and programs would then
3 become the Florida economy's first line of defense. This may be a hypothetical at this
4 point, but I recommend that the Commission consider such benefits in exercising its
5 discretion in setting goals for utility energy efficiency and demand-side renewables.

6 Second, there are significant benefits from DSM for at-risk citizens. By at-risk, I
7 mean limited-income, elderly, disabled and ill residential customers and small businesses.
8 To the extent that utility energy efficiency programs deliver bill reductions to at-risk
9 residential customers, they will benefit from both more affordable heating and cooling of
10 their residences and more disposable income for food, medicine and other expenses that
11 support well-being. (This applies to institutional customers serving such populations as
12 well, including nursing homes and hospitals.) The Commission should take that into
13 account in setting goals and should disregard any claims that utility energy efficiency
14 programs cannot benefit those customers because they are renters, live in manufactured
15 housing or other justifications. Programs can be fielded that are feasible for those
16 customers and attractive to them. There are also secondary benefits that flow to the State
17 and all taxpayers (and ratepayers) from those benefits. For example, increased well-
18 being, more comfortable living environments, and more disposable income available for
19 medical care and other expenses can reduce the burden on public assistance of all kinds
20 and health care systems, including shifting of costs to other payers.

21 Third, energy conservation programs provide additional benefits by acting as a
22 hedge against volatile market prices for power and generating fuels. Utilities often invest
23 in relatively high cost resources to ensure system reliability and reduce the risk of being

1 required to make expensive market power purchases. The premium price associated with
2 these investments can be thought of as hedging against the uncertainty in the supply and
3 demand forecast.

4 The most sophisticated treatment of this issue that I am aware of is the resource
5 planning process used by the Northwest Power and Conservation Council. The NWPCC
6 considers nine sources of uncertainty in its resource planning model for the Fifth Power
7 Plan, and may add three additional sources of uncertainty to its Sixth Power Plan model.
8 The sources of uncertainty considered in that plan are:

- 9 • Load requirements
- 10 • Gas price
- 11 • Hydrogeneration
- 12 • Electricity price
- 13 • Forced outage rates
- 14 • Aluminum price (may be dropped in Sixth Power Plan)
- 15 • Carbon allowance price
- 16 • Production tax credits
- 17 • Renewable energy credit (green tag value)
- 18 • Power plant construction costs (may be added in Sixth Power Plan)
- 19 • Technology availability
- 20 • Conservation costs

21 The NWPCC resource plan includes options to install various energy resources,
22 including new power plant construction and new conservation and demand response
23 measure installation. The decision to move forward with a power plant entails certain

1 construction, operation and retirement risks, which may be matched with the plant costs
2 and benefits. Variation of the sources of uncertainty listed above affect the magnitude of
3 the risks, costs and benefits.

4 The NWPCC planning process considers a wide range of plant build options
5 (“plans”) as well as variations in the sources of uncertainty listed above. Modeling
6 conducted for the plan demonstrates that resources used to minimize the risk of cost
7 spikes by definition cost more than their expected value. The premium price for these
8 resources, whether they are peaking plants or energy conservation resources, is necessary
9 to reduce potential price volatility.

10 In a study of the hedging value of energy conservation, the NWPCC found that
11 under least cost planning the effect of energy conservation is to defer single cycle
12 combustion turbines. The study indicates that this is counter to traditional uses of low-
13 capital cost resources for risk management (e.g., combustion turbines) rather than high-
14 capital cost resources (e.g., conservation). The study indicates that the advantage of
15 conservation is that it delivers energy savings value to the system under any scenario,
16 while a combustion turbine only delivers value if it is actually needed. For this reason,
17 conservation has a quantifiably lower premium cost associated with reducing system cost
18 risk, and is thus the hedging instrument of choice in the NWPCC.

19 The NWPCC estimated that the risk premium represented by a combustion
20 turbine unit is about 90% of total cost, in comparison to lost opportunity conservation
21 (e.g., new construction or replace on burnout measures) with a premium cost of 40% of
22 total cost and discretionary conservation with almost no premium cost. The discounted

1 risk premium available from conservation measures was estimated with a conservation
2 cost of \$50 per MWh, which is higher than typical conservation measure costs.

3 In summary, the NWPCC has demonstrated the value of its policies to reduce
4 system cost risk by accelerating investment in energy efficiency programs.

5 It is interesting to note that FPL makes a quite similar point in its Need Study for
6 the Turkey Point nuclear units in the section titled "Discussing the Hedge Provided by
7 Fuel Diversity." The study states, "Because the price of nuclear fuel has been and is
8 projected to remain relatively stable, and because changes in nuclear fuel prices are not
9 directly linked to changes in the prices of natural gas and fuel oil, having a fuel diverse
10 portfolio that includes significant contributions from nuclear fuel helps dampen the effect
11 of volatility in natural gas prices. For this reason the addition of Turkey Point 6 & 7 will
12 help dampen the volatility in system fuel costs and make the cost of electricity more
13 stable and predictable." (FPL, "Need Study for Electrical Power, Docket No. 070650-EI,
14 p. 33) Considering that the price of "energy efficiency fuel" is almost always zero, it is
15 evident that it would offer an even greater hedge value than nuclear fuel can offer to
16 dampen the volatility in system fuel costs.

17 **Q. Overall, how does the method used by Florida utilities compare with methods**
18 **for establishing the value of energy efficiency in other jurisdictions?**

19 A. The FEECA utilities took advantage of certain economies of scale and scope by
20 working together with Itron. However, the way in which this was done has led to
21 numerous concerns outlined here and in the testimony of other NRDC-SACE witnesses. I
22 recommend the approach used by the New England ISO. The electric and gas utilities,
23 together with relevant state agencies and various intervenor organizations, work together

1 to calculate consistent avoided costs for electricity and gas on a regional basis. This is
2 done every two years, and the various program administrators in their DSM plan filings
3 use the results.⁵

4 Benefits of the AESC approach include: consistency between electric and gas
5 avoided costs, consistency across utilities (results are not identical, but are consistent with
6 differences driven by real differences in portfolios and load shapes), cost efficiency (in
7 that there is one big model and process rather than several), transparency (anyone can
8 participate in the AESC study group and assumptions and results are discussed openly
9 and documents are posted to a project-specific website), and buy-in (at the end the groups
10 seem to be in reasonable agreement, perhaps not as to every detail, but as a general matter
11 leading all groups to accept the results).

12 **Q. Are there other system benefits to energy efficiency that were not considered,**
13 **for example the insurance (or hedging) value of energy efficiency against fuel cost**
14 **spikes?**

15 A. I was not able to determine from the FEECA utilities' Testimony or information
16 available through the Collaborative process whether other system benefits were
17 considered. Discovery responses that may be relevant to this question were received just
18 before the deadline for filing this testimony, and we have not yet been able to review
19 those responses. Accordingly, I may need to provide updated testimony once we have
20 reviewed that data.

21 However, the Commission should understand that there are a number of benefits
22 that accrue to states that pursue energy efficiency programs. Aside from energy and

⁵ See, for example, <http://www.synapse-energy.com/Downloads/SynapseReport.2007-08.AESC.Avoided-Energy-Supply-Costs-2007.07-019.pdf>. The 2009 AESC study is nearing completion, but not yet available.

1 capacity cost savings and avoided CO2 costs, these benefits include non-electric benefits
2 such as water and heating fuel savings, lower prices due to the demand-reduction-induced
3 price effect (DRIPE), economic stimulus, job creation, risk reduction, and energy
4 security. DRIPE benefits are being scrutinized by an increasing number of jurisdictions,
5 including most of the New England states, the NY State Energy Research and
6 Development Authority (NYSERDA). New England, New York, Illinois, and Oklahoma
7 regulators, among many others, consider energy security, job creation and economic
8 stimulus benefits. Jurisdictions that rely on risk reduction benefits are discussed below in
9 this testimony. The *NAPEE* discusses job creation, economic development benefits, and
10 risk reduction; it also places water savings, other fuel savings and environmental benefits
11 explicitly as part of the TRC.⁶

12 Many electric efficiency measures also deliver non-electric benefits. Insulation
13 and air sealing measures not only save on air conditioning costs in the summer months,
14 but also save the customer money on heating fuels. High efficiency clothes washers use
15 less water and impose smaller burdens on sewage treatment plants than standard, top-load
16 models. LED exit signs and long lasting fluorescents reduce the maintenance cost of
17 changing light bulbs and reduce air conditioning requirements.

18 Reductions in the quantity of energy and capacity that customers will need in the
19 future due to efficiency and/or demand response programs result in lower prices for
20 electric energy and capacity in wholesale markets. Lower demand means that the
21 wholesale markets do not need to purchase the next most expensive unit. This benefit
22 from utility energy efficiency programs reducing market prices is referred to as the
23 Demand-Reduction-Induced Price Effect (DRIPE) and helps all customers, not just

⁶ *NAPEE*, Chapter 6, generally, and especially p. 6-22.

1 participants. It can also reduce the price of natural gas for all gas consumers, not just
2 utilities. The electric market clearing price benefit during peak hours can be much higher,
3 and also has a dampening impact on price volatility. DRIPE impacts are significant in
4 absolute dollar terms, since very small impacts on market prices, when applied to all
5 energy and capacity being purchased in the market, translate into large absolute dollar
6 amounts. Moreover, consideration of DRIPE impacts can also increase the cost-
7 effectiveness of peak-focused EE measures on the order of 15% to 20%, because the
8 estimated absolute dollar benefits of DRIPE are being attributed to a relatively small
9 quantity of reductions in energy.

10 The economic stimulus provided by energy efficiency occurs, in part, through a
11 reduced dependence on imported fossil fuels and an increased focus on development of
12 in-state solutions. Local resources are used to manufacture, construct or install, and
13 operate energy efficiency technologies, thereby creating direct local jobs. As a result,
14 energy efficiency can provide new sources of income for those who work in struggling
15 industries.

16 Energy efficiency creates both direct and indirect jobs. Because the focus of the
17 effort is not simply in manufacturing, but also in R&D, service and installation, these are
18 well-paying, skilled positions that are not easily outsourced to other states and countries.
19 Direct jobs result from the use of local skilled workers in the development, manufacture,
20 construction, installation and operation and maintenance of energy efficiency
21 technologies. Indirect jobs result from development of energy efficiency technologies as
22 the payment of wages and purchase of goods and services in the economy results in
23 additional job creation as workers and firms supplying goods and services to the energy

1 efficiency industry, in turn, make purchases from the local economy. In addition, as
2 energy efficiency reduces energy bills, businesses and households gain increased
3 discretionary income which becomes available to purchase goods and services or for
4 investment. This drives jobs in those markets and investment areas.

5 Energy efficiency reduces risks associated with fuel price volatility, unanticipated
6 capital cost increases, more stringent regulations, fossil fuel supply shortages, and climate
7 change. The highly volatile nature of natural gas prices has been a primary driver of more
8 volatile electricity rates. This situation is unlikely to change in the near future, no matter
9 which type of new supply is developed and brought into service.

10 Another risk avoided by energy efficiency deals with the long development
11 timelines and inflexibility associated with conventional generation (compared to the short
12 lead time and maneuverability of energy efficiency programs) exposes these resources to
13 longer-term increases in the cost of labor and materials – unanticipated cost increases
14 which increase the risk of disallowance and stranded costs and many other potential
15 changes in the economy that can invalidate the planning assumptions originally used to
16 justify them. It can take more than a decade before new coal and nuclear plants are
17 operational. Conversely, energy efficiency is more nimble and less risky, both financially
18 and environmentally. Aggressive energy efficiency eliminates the risk associated with
19 committing to huge investments a decade or more before they will be needed.

20 Other downsides faced by fossil fuel plants include longer-term supply concerns
21 due to finite supply and transportation bottlenecks. Recent issues with transporting coal
22 have caused some existing coal plants to buy supplies at higher prices on the spot market

1 in order to meet electricity demand. Energy efficiency is not subject to supply and
2 transportation constraints that impact fossil fuels.

3 Fossil fuel plants are often sited at sea level or along rivers because they require
4 large amounts of cooling water. Risk factors such as sea level rise, storm surges, and
5 drought, which have become more frequent due to climate change, pose concern, as do
6 risks of thermal and other forms of pollution of marine and estuarine habitats.

7 Implementation of energy efficiency reduces greenhouse gas emissions, which reduces
8 the risk of adverse effects from climate change without adding other risk factors.

9 Energy efficiency reduces competition between states for fuels to support
10 electricity production, competition between states for electricity imports, and dependence
11 on imported oil for electricity production. Oil prices have spiked above \$135 per barrel
12 and, long term, will continue to rise due to a number of factors including diminishing
13 supply, increased demand in many countries and additional costs associated with
14 safeguarding supplies located in countries suffering from economic, social and political
15 instability. This cost increase makes increased reliance on oil unlikely. Energy efficiency
16 can help states meet future demand increases and reduce dependence on out-of-state or
17 overseas resources.

18 Early adoption of energy efficiency policies could help states garner additional
19 allowances (i.e., funds) as part of any national greenhouse gas programs that are enacted
20 by Congress. Following the trend established by the Regional Greenhouse Gas Initiative
21 (RGGI), global warming bills introduced in Congress have tended to include provisions
22 to auction allowances, rather than to give them away free to sources, but also to provide
23 additional allowance allocations to (1) utilities and states that take early action by

1 establishing binding greenhouse gas reduction targets, (2) utilities and states reducing
2 greenhouse gas emissions and (3) states with more aggressive greenhouse gas reduction
3 targets than equivalent Federal programs.

4

5 **Issue 4. Do the Company's proposed goals adequately reflect the costs and benefits**
6 **to the general body of ratepayers as a whole, including utility incentives**
7 **and participant contributions, pursuant to Section 366.82(3)(b), F.S.?**

8 **Q. Do you have an opinion on this issue?**

9 A. Yes, I do. The FEECA utilities' proposed goals do not adequately reflect the costs
10 and benefits of utility energy efficiency to the general body of ratepayers as a whole. In
11 part, this goes back to the concerns raised in response to Issue 2. Further, the new
12 FEECA legislation requires (explicitly or through broad policy statements) inclusion in
13 cost-effectiveness testing of benefits that are not reflected in the utility studies and goals.

14 **Q. Do the utilities' goals flow from a complete and appropriate estimate of the**
15 **technical potential for energy efficiency in Florida?**

16 A. Not entirely. As explained by NRDC-SACE witness Wilson in his prefiled
17 testimony, the overall technical potential should be increased by at least 8%, from 34% to
18 42% statewide due to a short list of very specific omissions.

19 A reasonable estimate of the additional technical potential that the Commission
20 might reasonably add to the findings of the technical potential study is 12,700
21 GWh, including 3,400 GWh savings from the excluded end-use sectors and
22 10,600 GWh from the overlooked measures, of potential energy savings. This
23 represents an increase of approximately 8%, or a total statewide technical
24 potential of 42% rather than the 34% reported by Itron.

1 **Q. Do the utilities' goals flow from a complete and appropriate estimate of the**
2 **economically achievable potential for energy efficiency in Florida?**

3 A. No, they do not. In addition to an underestimate in the technical potential—the
4 starting point for further analysis—of at least 8%, there a number of other errors and
5 omissions were made. NRDC-SACE witness Mosenthal sums up his investigation of the
6 achievable potential studies this way:

7 The result of the achievable potential analysis on its face is simply not a credible
8 estimate of the maximum amount of DSM resources that could be captured cost-
9 effectively in Florida.

10 Among the errors and omissions Mr. Mosenthal identified in his review are:

- 11 • unreasonable assumptions and criteria;
- 12 • a flawed understanding of the principals of integrated resource planning and the
13 language of the new Statute;
- 14 • unreasonably low penetration rates for energy saving measures;
- 15 • inaccurate cost-effectiveness analysis; and
- 16 • failure to consider new and innovative program strategies that could result in
17 much higher penetration of cost-effective efficiency and demand resources

18 So, overall, given the shortcomings identified by those witnesses and in my own
19 testimony, one must conclude that

20 (1) the benefits of avoided energy and capacity including, but not limited to,
21 carbon emissions,

22 (2) the technical potential (which would certainly increase with a fuller
23 assessment of the benefits of utility energy efficiency), and

1 (3) the achievable potential (which, again, would certainly increase with a fuller
2 assessment of the benefits of utility energy efficiency and the technical potential),
3 as estimated by the utilities do not amount to a complete and appropriate estimate
4 of the economically achievable potential for energy efficiency in Florida.

5 **ISSUE 5: Do the Company’s proposed goals adequately reflect the costs**
6 **imposed by state and federal regulations on the emission of**
7 **greenhouse gases, pursuant to Section 366.82(3)(d), F.S?**

8 **Q. Do you have an opinion on this issue?**

9 A. I do. In summary, the answer is “no.”

10 **Q. Please give an example.**

11 A. Per the testimony provided by JEA witness Kushner (at page 6), CO₂ allowance
12 prices are not included in the fuel price forecast. Witness Kushner also testified that
13 such prices are included in the sensitivity analyses. See Kushner Exhibit BEK-2, page 1
14 of 1, which provides CO₂ allowance price assumptions. The data contained in this
15 Exhibit are from EIA’s input to S 2191 (Lieberman-Warner).

16 **Q. Do the data provided by witness Kushner (and also mentioned by other**
17 **FEECA witnesses) adequately address the requirements of Section 366.82(3)(d) of**
18 **the Florida Statutes?**

19 A. As I understand them, in part yes and in part no. The data provided by witness
20 Kushner and other FEECA witnesses address potential federal legislation. Florida also
21 has state requirements to develop regulations to limit greenhouse gas emissions. Also,
22 the data cited by witness Kushner and other FEECA witnesses are taken from US
23 Senate bill 2191, also referred to as the Lieberman-Warner bill, which is from 2007 and
24 now obsolete.

25 **Q. Did any other FEECA utility witnesses rely on that data?**

26 A. Apparently. TECO witness Bryant also mentions the CO₂ price per ton range used
27 for federal legislation. Bryant direct prefiled at 33.

1 **Q. Leaving aside for a moment the numerical values adopted by FEECA utility**
2 **witnesses, how were the values applied to reflect those costs in their proposed**
3 **goals or measure screening?**

4 A. It appears that at least some of the FEECA utilities merely ran additional
5 sensitivity scenarios reflecting certain low and high carbon costs. *See*, for example,
6 Kushner direct prefiled at 6. Likewise, it appears that those sensitivity scenarios had no
7 effect on some of the FEECA utilities' proposed DSM goals. *See*, for example, Bryant
8 direct prefiled at 37, lines 5–17. Gulf Power's witness Floyd, on the other hand, states
9 that that company included a "mid-range" value of \$20 per ton (2014 dollars, escalating
10 thereafter at an unstated rate) and FPL witness Sims states that his company used a
11 "base case" value of \$14 in 2013 rising to \$23 in 2018 (both nominal dollars). Sims
12 Exh.-SRS-7.

13 I consider those values to be at the extreme low end of the reasonable range of
14 estimates and inappropriate as a basis for meeting the requirement to adequately
15 address the requirements of Section 366.82(3)(d) of the Florida Statutes.

16 **Q. Please explain.**

17 A. I will first address federal legislation to limit greenhouse gas emissions, and later
18 focus on Florida's state efforts to reduce such emissions.

19 With respect to federal legislation, the data from S 2191 are now two years old
20 and were based upon legislative objectives that have since become more comprehensive
21 and more stringent. Recent bills introduced during 2009, notably Waxman-Markey,
22 reflect deeper GHG reductions. The utilities high price assumption reference is based on
23 federal legislation that would prohibit or severely restrict the use of international offsets.

1 This outcome is not likely. The Waxman-Markey bill provides for a 50/50 split between
2 domestic and international offsets, and would permit the quantity of international offsets
3 to increase, if sufficient domestic offsets were not available. We would expect the effect
4 of allowing offsets to be used, and to increase the percentage of international offsets if
5 insufficient domestic offsets are not available, will be to keep allowance prices below the
6 high price assumptions used by the utilities in their assessment of federal greenhouse gas
7 legislation. On the other hand, the utilities' low and mid-range CO₂ allowance prices are
8 below the ranges I would recommend.

9 **Q. Can you give us some examples of CO₂ allowance prices used in utility**
10 **resource planning?**

11 A. Yes. In its 2005 Integrated Resource Plan, Avista used a range from \$7 to \$25/ton
12 for the 2010 planning year and from \$15 and \$62/ton for the 2023 planning year. Portland
13 General Electric and Pacificorp adopted a range of \$0 to \$55 beginning in 2003 and 2004,
14 respectively. Idaho Power adopted a range of \$0 to \$61 starting in 2008. Northwest
15 Energy adopted a range of \$15 to \$41 starting in 2005. (I would not consider \$0 to be a
16 credible low case value at this time.) Those values are all in 2005 dollars.⁷

17 The California PUC requires that regulated utility IRPs include carbon adder of
18 \$8/ton CO₂, escalating at 5% per year as of 2005.⁸ The Oregon PUC has adopted a range
19 from \$0 to about \$85 (levelized 2013-2030 in 2007 dollars). Other PUCs have adopted
20 ranges from the teens to \$35-\$45 (also levelized 2013-2030 in 2007 dollars).⁹

⁷ David Schlissel, Lucy Johnston, Bruce Biewald, David White, Ezra Hausman, Chris James, and Jeremy Fisher, *Synapse 2008 CO₂ Price Forecasts*, at 21. Available at <http://www.synapse-energy.com/Downloads/SynapsePaper.2008-07.0.2008-Carbon-Paper.A0020.pdf>

⁸ CPUC Decision 05-04-024

⁹ Schlissel, et al., op. cit.

1 Various analyses of a number of proposed federal climate change laws indicate
2 early year costs of nearly \$10 to over \$60, with the 2018 range going from just over \$10
3 to about \$90 with all the analyses rising steadily thereafter (in 2007 dollars).¹⁰ The U.S.
4 Department of Energy has recently issued estimates with a low-range value of \$2, a mid-
5 range value of \$33 and a high-range value of \$80, escalating at 3% per year.¹¹

6 **Q. Do you have recommendations for what CO₂ allowance prices the utilities
7 should use for planning utility energy efficiency programs and goal setting?**

8 A. Yes. I recommend that, at a minimum, the Commission require the use of
9 allowance prices with a low-case allowance price of \$15 per ton, a mid- or base-case
10 allowance price of \$30 per ton, and a high-case allowance price of \$78 per ton (all
11 levelized over the period 2013-2030, in 2007 dollars). I believe that a reasonable figure
12 for the *long-run* marginal cost of carbon emissions is around \$80 (in 2008 dollars, about
13 \$78 in 2007 dollars) and recommend that the Commission require high case analysis
14 reflecting that price be analyzed and considered in permanent goal setting.

15 **Q. What are the potential effects from using those allowance prices?**

16 A. There are two main benefits. First, those allowance prices will better reflect the
17 environmental and public health externalities associated with the combustion of fossil
18 fuels. Second, including a CO₂ allowance price enables more cost-effective energy
19 efficiency measures to be adopted and increases the potential to develop additional
20 renewable energy resources.

21 I believe the recommended mid-range allowance price forecast is close to what
22 greenhouse gas allowances will initially sell for in a federal program and much more

¹⁰ Ibid., Fig. 5.

¹¹ U.S. DOE, *Energy Conservation Program: Energy Conservation Standards and Test Procedures for General Service Fluorescent Lamps and Incandescent Reflector Lamps*, pp. 14-15.

1 realistically reflects current expectation than the utility witnesses' assumptions would,
2 even if they had allowed those prices to influence their proposed goals. At the same time,
3 I believe using unrealistically high allowance prices, like those included in the utilities'
4 high price assumptions, do a disservice by overstating the potential costs of a federal
5 program.

6 **Q. Did the FEECA utilities address the potential for state regulation of**
7 **greenhouse gases in Florida?**

8 A. None of the utilities testimony or CO₂ allowance price assumptions includes an
9 analysis of state level GHG regulation.

10 **Q. What state level regulations or programs have been announced or considered**
11 **in Florida?**

12 A. Governor Crist's Executive Order 07-127, as I understand it, requires the Florida
13 DEP to develop a cap and trade program with the following GHG reduction
14 requirements: by 2017, reduce GHG emissions to 2000 levels; by 2025 reduce GHG
15 emissions to 1990 levels, and by 2050, reduce GHG emissions to 20% of 1990 levels.
16 The October 15, 2008, report from the Governor's Action Team on Energy and Climate
17 Change recommended that these regulations first focus on the electric sector.¹² The
18 Florida Department of Environmental Protection has undertaken a rulemaking pursuant to
19 legislative authority to develop GHG reduction rules in 2008.
20 (<http://www.dep.state.fl.us/air/rules/ghg/electric.htm>)

¹² *Florida's Energy and Climate Change Action Plan*, Ch. 4.
<http://www.flclimatechange.us/ewebeditpro/items/O12F20142.PDF>

1 **Q. What would be the effect of Florida adopting regulations to reduce**
2 **greenhouse gas emissions, independently or through joining a regional program**
3 **such as RGGI or WCI?**

4 A. One effect relevant to setting goals for utility energy efficiency programs that
5 could arise would be that in-state fossil fueled generators would have to procure adequate
6 CO₂ allowances to cover their annual emissions. Generators with higher CO₂ emissions
7 per MWh would have higher costs of generation than those with lower or no CO₂ per
8 MWh. These higher costs would then enable more cost-effective energy efficiency
9 programs to be adopted, and they would also help to enable development of demand-side
10 and commercial or industrial scale renewable generation.

11

12 **ISSUE 7 What cost-effectiveness test or tests should the Commission use to set**
13 **goals, pursuant to Section 366.82, F.S.?**

14

15 **Q. What new statutory language has Florida enacted regarding appropriate**
16 **tests for cost-benefit analysis of utility energy efficiency?**

17 A. As explained by NRDC-SACE witness Wilson, the 2008 Energy Act amended
18 Fla. Stat. § 366.82(3) provides that in establishing goals for utility energy efficiency, the
19 Legislature now requires that the Commission consider:

20 a) The costs and benefits to customers participating in the measure.

21 b) The costs and benefits to the general body of ratepayers as a whole, including
22 utility incentives and participant contributions.

23 c) The need for incentives to promote both customer-owned and utility-owned
24 energy efficiency and demand-side renewable energy systems.

1 d) The costs imposed by state and federal regulations on the emission of
2 greenhouse gases.

3 § 366.82(3), Fla. Stat. 2008
4

5 Of these four provisions, subdivision (b) is the one that, on its own terms, bears on the
6 proper test for the cost-effectiveness of such programs.

7 **Q. In that subdivision (b), what is your understanding of how “costs and
8 benefits” and “to the general body of ratepayers” are applied in practice by experts
9 in DSM program design and implementation?**

10 A. In practice, that phrase “costs and benefits” is used by experts in the field to mean
11 the net present value of the difference in whole-life (or life-cycle) utility cost of service
12 with and without a measure, program or other resource. The phrase “to the general body
13 of ratepayers” is applied to mean the cost of service for the entire body of ratepayers, as a
14 whole, including all the system-wide costs and benefits of the measure, program or other
15 resources.

16 **Q. Is the TRC Test consistent with the manner in which experts in the field
17 would apply the phrase “costs and benefits to the general body of ratepayers as a
18 whole”?**

19 A. Yes.

20 **Q. Is it reasonable to interpret that language as consistent with, requiring the
21 use of, or allowing the use of either the RIM Test for the purpose of deciding
22 whether a given program, measure or other resource is cost effective?**

23 A. No.

1 **Q. Have you reviewed the testimony that Mr. Ralph Cavanagh is submitting in**
2 **this proceeding?**

3 A. I have and I agree with Mr. Cavanagh’s conclusion that, as a matter both of my
4 understanding of the language of the amended FEECA statute and as a matter of sound
5 policy, the TRC test—not the RIM test—should be used when setting goals.

6 **Q. As a policy matter, what cost-benefit test do you recommend for DSM**
7 **screening, taking into consideration the public interest and the potential impact on**
8 **economic development?**

9 A. I recommend use of the TRC for program design, goal setting, field screening,
10 and program evaluation. The public interest favors that choice for many reasons, not the
11 least of which is that no other test will lead to resource choices that deliver least cost
12 service to ratepayers. Economic development and the desire for a sound State economy
13 also favor that choice for several reasons including green jobs, said by many to be the
14 likely cutting edge of the future U.S. economy, reduced price volatility, more predictable
15 bills and rates for businesses, and greater economic multipliers for EE (and RE) than for
16 traditional generation).

17

18 **ISSUE 8: What residential summer and winter megawatt (MW) and annual**
19 **Gigawatt-hour (GWh) goals should be established for the period**
20 **2010-2019?**

21

22 **Q. Do you have a recommendation on this issue?**

23 A. Yes, I do. My quantitative recommendations are provided in Exh. WS-1, together
24 with my recommendations for the commercial/industrial goals, and are explained in my
25 response to Issue 9, below.

1

2 **ISSUE 9: What commercial/industrial summer and winter megawatt (MW) and**
3 **annual Gigawatt hour (GWh) goals should be established for the**
4 **period 2010-2019?**
5

6 **Q. Do you have a recommendation on this issue?**

7 A. Yes, I do. My quantitative recommendations are provided in Exh. WS-1 together
8 with my recommendations for the residential goals, and are explained below.

9 **Q. What annual energy DSM savings goals do you recommend to the**
10 **Commission?**

11 A. As I understand it, Florida law establishes that it is State policy to “[p]lay a
12 leading role in developing and instituting energy management programs aimed at
13 promoting energy conservation, energy security, and the reduction of greenhouse gas
14 emissions.” Fla. St. § 377.601(2)(b). In my opinion as an expert on utility resource
15 planning, to do so Florida’s electric utilities will need to be among the leading electric
16 utilities in the nation in terms of savings from their energy efficiency and peak demand
17 reduction programs. That will not happen, in my opinion, unless the Commission
18 establishes savings goals for the utilities that match those achieved by the leading utilities
19 in the nation. The “leading electric utilities in the country” run DSM programs that save
20 the equivalent of on the order of 1.0 percent of electricity sales each year.”¹³ In fact, as
21 explained by other NRDC-SACE witnesses, a number of the leading DSM program
22 administrators consistently save in excess of 1.0% per year. The same reports indicate a

¹³ *National Action Plan for Energy Efficiency (NAPEE)*, p. ES-4. This conclusion is also supported by the Western Governors’ Association Clean and Diversified Energy Initiative in its *Energy Efficiency Task Force Report*, p. 55 (Jan. 2006), available at <http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf>.

1 consensus that the cost of saved energy for those leading DSM programs is on the order
2 of \$0.02-0.03/kWh (utility plus participant costs)..¹⁴

3 One logical conclusion is that the Commission should set savings goals of no less
4 than 1.0% per year, and I recommend that the Commission set savings goals at that level
5 for annual electric energy sales for the years 2010 through 2019. However, I recommend
6 that the Commission do so on an interim basis for both the residential and commercial
7 sectors. In my response to Issue 12, given below in this testimony, I explain what I mean
8 by setting goals on an interim basis and how the Commission should go about
9 establishing permanent goals. Below, I address ramp up issues and my recommended
10 goals for utilities during ramp up years.

11 **Q. Do you have a recommendation regarding winter and summer peak demand**
12 **savings?**

13 A. Yes, I do. The FEECA utilities have various demand response and load control
14 initiatives in place or proposed. My recommendation with respect to winter and summer
15 peak demand savings goals is to set the goals at the sum of (a) the peak demand savings
16 impact for each season from the utility energy efficiency programs needed to deliver my
17 recommended electric energy savings goal of 1% per year, plus (b) the additional peak
18 demand savings impact for each season from each utility's demand response and load
19 control initiatives in place or proposed (as approved by the Commission). Since the
20 seasonal peak demand impacts delivered by the utility energy efficiency programs needed
21 to deliver an electric energy savings goal of 1% per year will depend critically on the
22 specific measures deployed, it will only be possible to determine the appropriate goals for

¹⁴ *Id.*

1 peak demand savings after the Commission has a better idea of the peak demand savings
2 impact of a 1% energy savings goal.

3 **Q. Have your prepared specific numeric savings goals that you recommend to**
4 **the Commission?**

5 A. Yes. After taking into account the known errors in the utilities' analyses identified
6 by myself, Mr. Mosenthal and Mr. Wilson, and taking into account correct application of
7 the TRC test, it is my expert opinion that the actual achievable potential should be well in
8 excess of 10% of retail sales. Accordingly, as I recommended in an earlier answer, the
9 Commission should be confident that it may adopt an across the board interim goal of 1%
10 per year for each utility and each category of savings with certain adjustments explained
11 below. In Exh. WS-1, provide filled out numeric goal tables for each electric utility that
12 prefiled proposed savings goals for itself in this proceeding.

13 The tables in Exh. WS-1 are formatted in the manner requested under Issues #8
14 and #9 in the Staff Issues List with one modification. Because I based my numeric goals
15 on data from the FEECA utility *Ten Year Site Plans*, and because those plans do not
16 disaggregate seasonal peak demands by customer class in the way that the Staff Issues
17 List does, I was only able to provide aggregate seasonal peak demand savings goals.

18 Since FPUC does not file a *Ten Year Site Plan*, I was unable to develop specific
19 numerical goals for that utility, although I do recommend the same 1% per year electric
20 energy savings target apply to FPUC.

21 In addition, as explained in the immediately preceding answer, it is possible to
22 give only illustrative goals for peak demand savings. Therefore, and purely for illustrative
23 purposes, I have calculated the numerical peak demand savings goals from my electric

1 energy interim savings goals as if the peak demand savings were strictly proportional to
2 the energy savings, i.e., 1% per year.

3 **Q. Please explain how you prepared the recommended numeric goals set out in**
4 **Exh. WS-1.**

5 A. In absence of correct analysis from utilities, I recommended in an earlier answer
6 that Commission adopt an across the board interim goal of 1% per year for each utility
7 and each category of savings. The tables in Exh. WS-1 represent an annual savings goal
8 of 1% of a given utility's forecasted energy, summer peak demand or winter peak
9 demand, as the case may be, for the given customer category. Again, the record supports
10 goals of at least 1%, but because of the errors in the utility analysis, I recommend that 1%
11 be adopted as interim goals. I explain further what I mean by setting goals on an interim
12 basis and how the Commission should go about establishing permanent goals in my
13 response to Issue 12, given below in this testimony. Because the most recent *Ten Year*
14 *Site Plans*, provide forecasts only through 2018, it was necessary to extrapolate goals for
15 2019. I adopted forecast values for 2019 electric energy sales and peak demands equal to
16 the 2018 company forecasts plus a percentage increase over 2018 at the same rate as the
17 increase from 2017 to 2018 in those forecasts.

18 **Q. How do you recommend the Commission address ramp up issues in setting**
19 **goals for utility energy efficiency?**

20 A. Time is of the essence in this matter. Every day programs are not in place and
21 fully ramped up, efficiency savings that would have lasted for years are lost. Further,
22 there is not reason the FEECA utilities cannot quickly ramp up to aggressive
23 implementation. Furthermore, the faster and more aggressively programs are scaled up,

1 the lower I would expect their cost of saved energy to be—a goal all stakeholders should
2 share. Utilities new to DSM can ramp up programs quickly to substantial impacts. For
3 example, in 2007, the third year of its DSM program, the Arizona Public Service
4 Company achieved annual energy savings equivalent to 0.89% of retail electricity sales
5 (ramping up from 0.09% in 2005, and 0.37% in 2006).¹⁵

6 **Q. So, do you have recommendations for adjusting your 1% per year savings**
7 **goals during ramp up?**

8 A. Yes, I do. I have separate recommendations for the smaller FEECA utilities and
9 for the larger ones. I consider OUC, FPUC and JEA to be smaller utilities for this
10 purpose.

11 The larger utilities reported savings to EIA in 2007 of between 0.11% and 0.2%
12 of retail sales. Taking into account that baseline, I recommend a three-year ramp up
13 schedule for interim savings goals of 0.33% in year one, 0.66% in year two, and 1.00% in
14 year three and thereafter.

15 Of the three smaller FEECA utilities, two reported savings of 0.10% or less in
16 2007. (OUC did not report.) Taking that and their size into account, I recommend a four-
17 year ramp up schedule for interim savings goals of 0.25% in year one, 0.50% in year two,
18 0.75% in year three, and 1.00% in year four and thereafter.

19 These ramp up schedules are reflected in the illustrative numeric goals in my Exh.
20 WS-1, except that, as mentioned above, I have not prepared a schedule for FPUC.

¹⁵ Arizona Public Service Company's response to Western Resource Advocates First Set of Data Requests, Arizona Corporation Commission Docket No. E-01345A-08-0172, August 4, 2008.

1 **Q. How do those recommendations relate to the utilities' prefiled studies and**
2 **their claims about achievable potential?**

3 A. Obviously, my recommended goals are larger than the utilities' recommended
4 goals. After ramp up, my recommendations are 1% of annual sales, while the FEECA
5 utilities recommended goals average less than one-tenth of that. My recommendation
6 results in a cumulative 10-year savings on the order of 9% of retail sales. NRDC-SACE
7 witness Wilson concludes that the technical potential for Florida might reasonably be
8 estimated as 42%, nearly five times my recommendation. NRDC-SACE witness
9 Mosenthal observes that a ratio of achievable potential to technical potential of about
10 60% is "fairly typical." Applying that ratio to a technical potential of 42% gives an
11 estimate of achievable potential equal to about 25% of load, nearly triple my
12 recommendation. As for the utilities' claims about achievable potential, FPL's estimate
13 of achievable potential is under 1% of load, no more than a ninth of my
14 recommendations.

15 While that may seem like a large difference, it is easily accounted for by the many
16 errors in the analysis of achievable potential conducted by those utilities. Those errors are
17 discussed elsewhere in my testimony and that of the other NRDC-SACE witnesses. Not
18 the least of those errors was their use of the RIM test and the fallacious decision to
19 arbitrarily exclude any measures or programs with a short participant payback. If we
20 compare my recommended goals to the results of the Itron technical potential studies, a
21 different picture emerges. In any event, annual savings goals of 1% of energy sales or
22 peak demand are entirely reasonable given past experience and fully justified under
23 Florida's State policy

1
2 **ISSUE 10:** In addition to the MW and GWh goals established in Issues 7 and 8,
3 should the Commission establish separate goals for demand-side renewable energy
4 systems?
5

6 **Q.** Was the solar PV economic/achievable analysis was done correctly?

7 A. No. For this measure, I have prepared an illustrative cost-benefit analysis under
8 the TRC and Participant tests using information from FEECA utility witnesses and other
9 sources. The analysis was done for 2010 installation and 2015 installation. It showed that
10 demand-side PV did not pass the TRC, but was close to passing the Participant Test in
11 2010 and passed it easily in 2015. I would note that if the Florida State incentives
12 available for PV are counted as a reduction to the capital cost of PV units—an
13 assumption that is not normally made in the TRC—the technology does pass the TRC.
14 Due to time constraints, it was necessary to perform this analysis with highly preliminary
15 “placeholder” inputs, especially for avoided costs. Even so, the finding that the
16 Participant Test is passed with zero or a very small utility incentive, taken together with
17 the emphasis recent Florida statute places on setting goals for demand-side PV, suggests
18 that there are policy considerations that support special consideration for this emerging
19 resource. Certainly, it would be beneficial for the Commission to require the FEECA
20 utilities to undertake a fresh assessment of the market potential for demand-side PV.
21 Alternatively, a small goal now to build infrastructure and public awareness for future
22 full deployment could be deemed reasonable, given the language of Fl. Sta.
23 377.601(2)(h)(i), which says that State policy is to “Encourage the research,
24 development, demonstration, and application of alternative energy resources, particularly
25 renewable energy resources.”
26

1 **Q. What recommendations do the FEECA utilities offer in regard to separate**
2 **goals for demand-side renewable energy systems?**

3 A. In their testimony, each utility representative recommends that the Commission
4 should not establish separate goals.

5 **Q. And what do you recommend?**

6 A. I recommend that the Commission set separate MW and GWh goals for demand-
7 side renewables. These goals can be consistent with Florida's renewable energy
8 resources, and ramp up over time as experience is gained and more technologies become
9 cost effective.

10 Given the policy goals of FEECA, the Commission should do what it can (I'm not
11 a lawyer) to make this a priority in this proceeding if for no other reason than the long
12 term market transformation benefits that would flow from highlighting this demand-side
13 renewable technology. A separate goal would ensure that the utilities and the
14 Commission attend to this specific legislative policy goal and provide a forum for
15 continuous improvement in that area.

16

17 **ISSUE 11: In addition to the MW and GWh goals established in Issues 7 and 8,**
18 **should the Commission establish additional goals for efficiency improvements in**
19 **generation, transmission, and distribution?**

20

21 **Q. Do you recommend that the Commission establish savings goals for these**
22 **categories?**

23 A. Increasing generating plant efficiency and reducing T&D losses can be
24 particularly valuable as all customers benefit directly. They are especially low risk

1 resource options in general because an improvement to an existing facility is typically
2 less onerous and chancy to permit and requires less capital than building a new resource.
3 Further, there would likely be shorter lead times and less planning risk.

4 However, I recommend that the Commission defer this issue briefly for later
5 proceedings in this docket (or another one, such as the next *Ten Year Site Plan* review, if
6 preferred) to allow time for the utilities to perform technical and economic potential
7 studies for efficiency improvements at their existing power plants and in their existing
8 T&D systems. I recommend that the Commission set a date certain by which the utilities
9 will provide that information for review.

10 Ideally, each utility should plan and conduct a comprehensive study evaluating
11 options for improving generator efficiency and transmission and distribution system
12 efficiency. The studies should also identify any environmental regulations that might be
13 triggered as a result of the efficiency improvements (e.g., New Source Review), estimate
14 the cost of compliance with those regulations above and beyond the costs directly
15 associated with the efficiency improvements, and the benefits to the public associated
16 with those additional costs of compliance with environmental regulations.

17 Based on the findings of that study, it should then implement a program to bring
18 its generators and T&D system to the level of efficiency that is optimal on a present value
19 of life cycle societal cost basis within a reasonable period of time. These studies and
20 action plans should be reviewed and updated at reasonable intervals and could form the
21 basis for Commission goals in these areas. Finally, each utility should implement a
22 program, as part of its IRP, to maintain generation and T&D efficiency improvements on

1 an ongoing basis. As many of the subject facilities would affect more than one utility,
2 close cooperation among them should be required for these studies.

3 To give some sense of the range of options, I will list some of the T&D system
4 efficiency measures that are likely to offer benefits as a result of circuit-by-circuit and
5 system-as-a-whole potential study. At a minimum, evaluations should assess the
6 economics and technical feasibility of the following measures:

- 7 • Strategic placement and control of reactive power devices;
- 8 • Distribution circuit reconfiguration;
- 9 • Installation of distribution automation to control reactive power, feeder
10 configuration, phase balancing, and peak loads;
- 11 • Re-conducting lines to larger-sized conductors;
- 12 • Replacement of conventional silicon steel core transformers with high efficiency
13 silicon steel transformers or amorphous metal core transformers;
- 14 • Conservation voltage regulation;
- 15 • Increasing distribution system voltage levels;
- 16 • Implementation of a distribution transformer load management (DTLM) program
- 17 • Implementation of T&D Equipment Selection and Utilization Standards based on
18 life-cycle cost analysis to ensure that all transformer and capacitor selection and
19 purchase decisions fully reflect the TRC of projected capacity and energy losses

1 over the equipment lifetime with due regard for expected loadings and duty cycles
2 and a program to inventory transformers in use and on hand to match transformer
3 loss characteristics with customer load factors, as well as an ongoing system to
4 monitor and adjust transformer loading for optimal economic benefit.

5 **ISSUE 11 (Second mention):** In addition to the MW and GWh goals
6 established in Issues 7 and 8, should the Commission establish separate goals for
7 residential and commercial/industrial customer participation in utility energy audit
8 programs for the period 2010-2019?
9

10 **Q. What is your recommendation regarding this issue?**

11 A. This question suggests the Commission might consider adoption of certain goals
12 that address what would typically be considered an output measurement, not a
13 measurement of results. In the field of program evaluation, several kinds of program
14 evaluation are identified. These types of evaluation include process, input (resource
15 usage), output (service delivery), result (outcome), and cost-effectiveness evaluation.
16 Each has its place in a sound evaluation process. Each has an important place in sound
17 monitoring, verification and evaluation (MV&E) of utility efficiency programs; for
18 example, process evaluation can be especially useful during program startup or after
19 program modification, both to ensure that hard-to-reach customer groups are being
20 recruited and served in ways that work for them and to identify promptly any practices
21 and procedures that are not working optimally so that they may be corrected quickly.

22 Normally, I recommend that regulators set binding goals mainly for results, with
23 process, output and other types of evaluation provided for management and regulatory
24 review. However, Fla. St. § 366.82(11) specifically calls (1) for the Commission to

1 require that utilities deliver energy audits and (2) for utilities to report “actual results”
2 after each six-month period. That statute also requires consideration of "the difference, if
3 any, between actual and projected results . . . be taken into account in succeeding
4 periods.” To me, as an expert in utility resource planning, this language implies the prior
5 existence of goals for this output measurement (required audits). Given this, I recommend
6 that the Commission set goals for delivery of audits. Since the technologies and human
7 resources required for a useful audit of dwellings differs significantly from those required
8 for auditing commercial facilities, especially large ones, I do recommend that the
9 Commission set goals separately for residential and commercial energy audits.

10 I also recommend that the Commission bear in mind that for utility energy audits
11 to provide any useful benefit to ratepayers, those audits must result in actual measures
12 being implemented and savings delivered. Going through the motions of doing audits is
13 not enough. Further, the work of recruiting a customer, performing an energy audit for
14 that customer, and providing the customer with recommendations and the education and
15 explanations needed to understand and act on those recommendations is a substantial
16 investment. So, utility energy audits must result in useful recommendations that
17 customers can and will implement. That, in turn, requires that a comprehensive suite of
18 measures, programs and customer incentives that are attractive to customers back up the
19 audits. In addition, an energy audit can maximize benefits to ratepayers, the utility, and
20 society only if it is designed and implemented to be comprehensive, by which I mean that
21 the audit and the supporting programs ensure that all cost-effective measures are
22 identified, , requires follow through from audits must maximize measures are identified,
23 offered and encouraged, without any arbitrary restrictions. One example of such an

1 arbitrary restriction is a limitation on the number of instances of a given measure (e.g.,
2 CFLs) may be offered. Another is loading the field screening of measures with
3 allocations of A&G, marketing and audit expenses that are already sunk costs.

4 For those reasons, and since, as I understand it, utility energy audits are now
5 required by Florida law, I recommend that the Commission go beyond simply setting
6 goals for the two customer groups and direct utilities to (1) ensure that audits are
7 designed maximize acceptance of audits and recommendations by each customer group,
8 including hard-to-reach customers, (2) provide audit customers with recommendations
9 and the education and explanations that enable them to understand and act on those
10 recommendation, support those audits with a comprehensive suite of measures, programs
11 and customer incentives that are attractive to customers, (4) design and implement audits
12 in a manner that ensures that all cost-effective measures are identified, offered and
13 encouraged, (4) perform program design and field screening without any arbitrary
14 restrictions on the number and type of measures offered, and (5) perform program design
15 and field screening in a manner that does not include in the cost of incremental measures
16 any allocation of A&G, marketing and audit expenses, or other costs that are sunk at the
17 time of delivering the audit recommendations to the customer.

18 **Q. This issue, as posed, does not request recommendations for specific audit**
19 **delivery goals. Do you have any recommendations for how such goals should be set?**

20 A. Setting such goals is a difficult task for a regulator, but it should be addressed in a
21 thoughtful manner. I recommend that the Commission set goals for the pace of audit
22 delivery that are sufficient to fully utilize any available efficiency program resources—

1 that is, to keep the “pipeline full” for efficiency service delivery programs. As programs
2 are fielded and resources allocated to them, the pace of audit delivery can be adjusted to
3 suit those programs and resources.

4 **ISSUE 12: Should this docket be closed?**

5

6 **Q. Do you have any advice on this question?**

7 A. I understand this as mainly a legal question, but I do recommend that the
8 Commission keep in mind from the testimony provided by NRDC and SACE certain
9 practical implications that would follow from making that decision.

10 The bottom line conclusion from the testimony of NRDC’s and SACE’S
11 witnesses is that the studies of efficiency and customer-side renewables potential
12 provided by the utilities greatly underestimate the achievable potential. Based on our
13 review of these studies, it is clear that it is possible to achieve at least 1% annual energy
14 efficiency gains after a brief ramp up period. This conclusion is further supported by my
15 experience with other potential studies, none of which indicated less than 10% achievable
16 potential for energy efficiency over ten years. However, because of the lack of
17 transparency in the economic and achievable potential study, it is possible that more
18 aggressive goals could be supported.

19 Accordingly, the studies are an inadequate basis to set final ten-year goals. These
20 erroneous studies put the Commission in a difficult position. As I understand them,
21 Florida statutes require the Commission to set savings goals for the utilities’ energy
22 efficiency and customer-side renewable programs, but the utilities have given the

1 Commission such inadequate information and process that they cannot form a basis for
2 further action. The phrase “bricks without straw” comes to mind.

3 Of course, as I understand it, the Commission cannot avoid setting goals this year,
4 so I recommend that the Commission set interim goals of 1% per year for utility energy
5 efficiency savings, as indicated above in response to Staff Issues #8 and #9 (modified for
6 the brief ramp up period I recommend). I also recommend one type of demand-side
7 renewable generation goal in response to Staff Issue #10.

8 However, I recommend that the Commission adopt those as interim goals and
9 keep this proceeding open (or initiate a new one) for the following purposes: (1) to
10 require the utilities to perform a review of the technical potential study to address issues
11 identified in this proceeding and a report providing a revised technical potential study; (2)
12 to require the utilities to conduct a full, properly documented and fully transparent
13 revisiting of the economic and achievable potential studies to correct the errors and
14 omissions described by NRDC’s and SACE’s witnesses; (3) to receive and provide an
15 opportunity for review those new studies, with Commission funding for independent
16 expert review of the studies; and (4) to set refined permanent goals for energy efficiency
17 savings and demand-side renewable generation.

18 I am not an expert in Florida’s administrative procedures or its public
19 participation regulations, but I would encourage the Commission to direct these studies
20 and reviews in a manner that provides other stakeholders (not simply my clients) a role in
21 commenting on the study as it proceeds. For example, a number of states use a special
22 master, hearing officer, or other state-appointed official to lead the process of developing

1 the final set of recommendations, rather than relying on the utilities to propose and
2 putting the burden of rebuttal on third parties without access to ratepayer-funded research
3 and litigation resources.

4 I understand that under my proposed approach, there might be a situation where it
5 would not be appropriate to hold a utility fully accountable for meeting the interim goals
6 due to differences between them and the final goals, but stress that a utility should so be
7 excused *if and only if* the Commission's final goals for it are lower than its interim goals
8 *and* the utility's achievements are consistent with those final goals.

9 **Other Items for Consideration**

10 **Q. On the Staff Issues List, Issues #8 and #9 requested proposed goals for both**
11 **energy consumption and peak load by season. Are those the only goals called for in**
12 **the FEECA? If not what other goals should the Commission consider adopting?**

13 A. The subdivision of FEECA (Fla. St. § 366.82(2)) that directs the Commission to
14 adopt goals for energy efficiency reads as follows:

15

16 (2) The commission shall adopt appropriate goals for increasing the
17 efficiency of energy consumption and increasing the development of
18 demand-side renewable energy systems, specifically including goals
19 designed to increase the conservation of expensive resources, such as
20 petroleum fuels, to reduce and control the growth rates of electric
21 consumption, to reduce the growth rates of weather-sensitive peak
22 demand, and to encourage development of demand-side renewable energy
23 resources. The commission may allow efficiency investments across
24 generation, transmission, and distribution as well as efficiencies within the
25 user base.
26

1 It is noteworthy that the statute calls for goals designed “reduce and control the growth
2 rates of electric consumption” and “to reduce the growth rates of weather-sensitive peak
3 demand.” Clearly, the former calls for setting goals for energy savings measured in terms
4 of GWh per year of consumption. The latter charge requires a bit more thought. It calls
5 for reduction in the growth rates of weather-sensitive peak demand. On its face this
6 means goals for the reduction of the demand attributable to certain specific end uses, such
7 as air conditioning, space heating, swimming pool heating, commercial space
8 conditioning, and certain other commercial end uses, whose usage or performance
9 depend on ambient temperature, humidity, wind speed and so on.¹⁶

10 The Commission may wish to set specific goals for reducing the peak load from
11 those weather sensitive end uses or it may prefer to set overall peak demand goals. If the
12 Commission wishes do so *and* adopts my recommendation to hold subsequent
13 proceedings in this docket (see response to Issue 12 below in this testimony), I
14 recommend that it defer setting goals for weather sensitive end uses to that proceeding
15 and direct utilities to identify and add to their revised studies any additional end uses and
16 measures that exist for such end uses.

17 **Q. So, with respect to energy goals and peak demand goals, are both equally**
18 **important? And how should the Commission address differing levels of achievement**
19 **by utilities across those goals?**

¹⁶ While I will not go into detail here, it is worth noting that certain aspects of supply-side electricity consumption have a weather-sensitive peak demand. Some examples are in the T&D sector, such as the energy consumed by the fans that cool large transformer and the increase in resistance of wires as the ambient temperature rises. In the generation sector, some parasitic loads at generating stations increase with ambient air temperature, and the overall thermal cycle efficiency of many types of non-renewable generators declines with higher ambient air or water temperatures.

1 A. Both kinds of goal have important impacts on the public interest, but I
2 recommend the Commission pay the most attention to utility performance against the
3 Commission's energy goals if there is ever a tension between the two kinds of
4 performance. By statute, reducing CO₂ emissions is a policy goal of the State of Florida.
5 For a given fuel mix, CO₂ emissions from the electric industry are primarily driven by the
6 quantity of electric energy produced. Therefore, mitigation of GHG emissions is best
7 addressed through energy goals, rather than demand goals.

8 **Q. You and other NRDC-SACE witness have recommended the Commission**
9 **require use of the TRC test for screening DSM resources. Do you recommend any**
10 **adjustments to that test?**

11 A. Yes, I recommend three adjustments to the TRC test.

12 The first has to do with the inclusion of values for carbon costs in the avoided cost
13 of energy and capacity to be used in design, field screening and evaluation of utility
14 energy efficiency programs and in goal setting. I have recommended specific numeric
15 values for that adjustment elsewhere in this testimony.

16 Second, I recommend an adder of 10% to the avoided cost of transmission and
17 distribution, reserves and ancillary services within the TRC calculation to represent the
18 non-energy benefits of avoiding those requirements, such as land use impacts. I
19 recommend that the Commission direct that these adjustments be applied in addition to
20 the other quantifiable benefits from DSM, and that they be used when calculating TRC
21 values for specific DSM measures and programs in both program design and field
22 screening, as well as for goal setting, for program evaluation and for evaluating the cost-
23 effectiveness of the overall portfolio of a utility's DSM programs. This is comparable to

1 the way external costs of supply-side resources are recognized, for example, in
2 Vermont.¹⁷

3 Third, I recommend that the costs of DSM measures and programs be reduced by
4 10% prior to being used in the TRC calculation to reflect their lower risk compared to
5 supply-side alternatives. In parallel to my first adjustment, I recommend that the
6 Commission direct that this adjustment be applied as a reduction to the sum of the costs
7 of DSM, and that it be used when calculating TRC values for specific DSM measures and
8 programs in both program design and field screening, as well as for goal setting, for
9 program evaluation and for evaluating the cost-effectiveness of the overall portfolio of a
10 utility's DSM programs.

11 **Q. What is the basis for your recommendation of a 10% reduction to DSM**
12 **program and measure costs to represent non-energy benefits of DSM in measure**
13 **and program screening and evaluation?**

14 A. I have discussed the risk avoidance benefits and hedging benefits of utility energy
15 efficiency programs relative to supply-side resources elsewhere in this testimony. Here, I
16 will only discuss one additional perspective on this matter.

17 DSM programs may not always be 100% successful, but compared to supply-side
18 resources they offer immense risk reduction benefits for ratepayers and utility
19 shareholders, alike. For example, energy efficiency can help reduce the risks associated
20 with fossil fuels and their inherently unstable price and supply characteristics and avoid

¹⁷ This percentage adder approach to factoring environmental costs into resource evaluation was widely used in the 1990s and usually applied equally to avoided costs of generation and T&D. *See*, for example, Vt. Public Service Board Final Order in Docket 5270, 1990; S. Stoft, J. Eto and S. Kito, *DSM Shareholder Incentives: Current Designs and Economic Theory*, Lawrence Berkely Laboratories, 1995. More recently in the western states, the emphasis for generation externalities has been on pricing carbon emissions, but the percentage adder approach remains valid for non-generation avoided costs that impose external costs on society in areas of land use, habitat intrusion, scenic and tourism effect, and so on.

1 the costs of unanticipated increases in future fuel prices. As discussed by NRDC-SACE
2 witness Wilson in his prefiled testimony, FPL has claimed in its nuclear plant need
3 determination that fuel diversity is desirable, particularly when it reduces rate sensitivity
4 to fuel costs. Generally, energy efficiency has zero sensitivity to fuel costs making it
5 superior to nuclear generation in that regard.

6 Energy efficiency can also reduce the risks associated with environmental
7 impacts, by reducing a utility's environmental impacts and helping utilities and their
8 ratepayers avoid the hard to predict costs of complying with potential future
9 environmental regulations, such as CO₂ regulation. Energy efficiency can improve the
10 overall reliability of the electricity system by reducing peak demand at those times when
11 reliability is most at risk and by slowing the rate of growth of electricity peak and energy
12 demands and giving utilities more time and flexibility to respond to changing market
13 conditions, while moderating the "boom-and-bust" effect of competitive market forces on
14 generation supply.¹⁸ In addition, energy efficiency can be generally less risky than
15 supply-side alternatives because DSM programs are modular and easily adjustable as
16 circumstances change, plus each measure installed delivers benefits beginning
17 immediately, unlike power plants that deliver no benefits at all unless and until they are
18 completely built; uncertainties in load forecasts, capital costs of new generation,
19 permitting delays and so on are types of planning risk that burden supply-side options but
20 not DSM resources.

¹⁸ Steven Nadel, Fred Gordon and Chris Neme, *Using Targeted Energy Efficiency Programs to Reduce Peak Electrical Demand and Address Electric System Reliability Problems*: ACEEE 2000, <http://www.aceee.org/pubs/u008.htm>; Regulatory Assistance Project, *Efficient Reliability: The Critical Role of Demand-Side Resources in Power Systems and Markets*, prepared for the National Association of Regulatory Utility Commissioners, June 2001.

1 I consider a 10% downward adjustment to DSM costs a reasonable proxy for the
2 cost of those risks.¹⁹ Ten percent is a commonly use contingency reserve for major
3 construction projects and, so, is a reasonable proxy for at least one of the many risks
4 borne by supply-side resources and not by DSM programs. (Some generation-related
5 projects, such as nuclear decommissioning projects) are planned with contingency factors
6 of 25% or more.)

7 **Q. You have advocated here for several Commission actions, but then**
8 **recommended that those actions be deferred to a later proceeding in this docket or**
9 **another. Why is that?**

10 A. Time is of the essence; prompt action is required of all involved—utilities,
11 interveners, Commission—because of looming new generation investments.²⁰ However,
12 the current recession gives Florida some chance of avoiding the creation of lost
13 opportunities by having new construction/remodeling programs out the door by winter
14 09. Even though Florida is a leader in the area of building codes utility electric efficiency

¹⁹ There are various ways of treating these risk reduction benefits in resource selection. To minimize the regulatory burden, I have proposed the simplest of those: application of a percentage discount to the cost of DSM. That is the approach utilized in Vermont since 1990. Vt. PSB Final Order in Docket 5270. More complicated methods for addressing this issue are widely used by firms of all kinds in their internal planning. Roschelle, A., Steinhurst, W., Peterson, P., & Biewald, B. (2004). *Long Term Power Contracts: The Art of the Deal*. Public Utilities Fortnightly (August), 56-74. One of those methods is the use of risk-adjusted discount rates. See, for example, Mark Bolinger and Ryan Wiser, *Balancing Cost and Risk: The Treatment of Renewable Energy in Western Utility Resource Plans*, LBNL-58450, available at <http://eetd.lbl.gov/EA/EMP>. (“Increasingly, analysts are calling attention to the benefits of renewable energy as a hedge against electricity sector risks. In particular, renewable energy may be viewed as a valuable contributor to a generation portfolio due to its ability to mitigate natural gas price risk and the risk of future environmental regulations, most notably the risk of future carbon regulation (see, e.g., Wiser et al. 2005; Bolinger et al. 2005; Wiser et al. 2004; Awerbuch 1993, 2003; Hoff 1997; Cavanagh et al. 1993).”) The complex Monte Carlo analyses that form the basis of the Northwest Power and Conservation Council discussed elsewhere in this testimony are another approach to the same problem. These methods have much to recommend them in terms of objectivity and transparency and have been used in Washington, Nevada, California, Idaho and other jurisdictions, but their adoption would require the Commission to first undertake a lengthy proceeding to determine the risk tolerance of ratepayers, which is one reason I have recommended a streamlined approach.

²⁰ See, for example, FPL 2009-2018 *Ten-Year Power Plan Site Plan*, pp. 7 ff.

1 programs can procure DSM resources well above the levels of efficiency in building
2 codes.

3 **Q. Do you have any other recommendations in regard to energy efficiency**
4 **programs?**

5 A. Yes, I have two. The first highlights the importance of avoiding the creation of
6 lost opportunities in the course of delivering utility energy efficiency programs and
7 explains some of the standards that the Commission should impose to prevent that
8 outcome. The second relates to provision of energy efficiency services to certain hard-to-
9 reach customer groups and explains some of the standards that the Commission should
10 impose to ensure equitable treatment of those customers and to avoid losing out on the
11 efficiency savings available in their homes and businesses.

12 **Q. Please explain your first additional recommendation.**

13 A. Utility energy efficiency programs, as for any other utility expenditure or
14 investment, should be prudently managed and deliver least cost service. Two important
15 policies are necessary to ensure that outcome.

16 First, utility energy efficiency programs should be designed and implemented to
17 minimize "lost opportunities." Lost opportunities occur when efficiency measures are not
18 installed when it is most cost-effective to do so (e.g., the construction of a new building
19 or facility, building renovations, and the purchase of new appliances or equipment).

20 Second, programs should be designed and implemented to minimize "cream
21 skimming." Cream skimming occurs when only the most cost-effective efficiency
22 measures are installed, even though additional, higher-cost measures would be cost

1 effective. Cream skimming can lead to lost opportunities, because revisiting a customer
2 to install the remaining measures may involve prohibitive transaction costs.

3 While this is not a program design proceeding, I bring this issue to the
4 Commission's attention because of one of the decision rules adopted by FEECA
5 utilities—their omission of measures with participant paybacks of less than two years.
6 The two-year payback criterion for screening measures has the potential to create lost
7 opportunities. Once the overhead has been spent to enroll a customer in an audit or
8 custom measure program or otherwise, deliberately omitting any cost effective measure
9 prevents least cost resource acquisition and is, therefore, imprudent management, as well
10 as contrary to Florida's least cost service policy. Adoption by the utilities of such an
11 arbitrary and self-defeating policy suggests to me that the Commission would be wise to
12 take the precaution of explicitly requiring that utility energy efficiency programs be
13 designed and delivered in a manner that prevents cream skimming or the creation of lost
14 opportunities. I also recommend that the Commission establish goals that are based on
15 potential studies not tainted with such errors and require that utility energy efficiency
16 programs (1) adhere to comprehensive approaches that improve energy efficiency of
17 entire buildings or industrial processes, rather than just address single measures or
18 technologies, and (2) include a full menu of services, including incentives, marketing,
19 training, technical assistance, and education on a number of end use applications (such as
20 lighting, appliances, HVAC systems, and improvements to the building envelope)..

21 **Q. Please explain your second additional recommendation.**

22 A. Equity demands proper treatment of hard-to-reach customers, including those on
23 limited incomes, small businesses, and others. Specifically, the Commission should

1 require that utility energy efficiency programs (or additional, special programs) be
2 designed such customers be designed and implemented so as to ensure that such
3 customers' needs are met in ways the work for them, not the average customer.
4 Comments in the testimony of FEECA utilities in this proceeding indicate a lack of
5 sensitivity to this requirement and lead me to spell out in some detail here the policy on
6 hard to reach customers that I recommend the Commission adopt and require utilities to
7 follow in their energy efficiency programs. The Commission should also establish goals
8 that are based on potential studies not tainted with such errors.

9 **Q. What do you mean by “hard-to-reach” customers?**

10 A. By hard-to-reach customers I mean:

- 11 (1) Residential electricity users who rent their residences from persons other than kin
12 (defined in a manner appropriate to Florida law and society), trusts operated by
13 and for the benefit of the users, or the users' legal guardians,
14 (2) Commercial electricity users who rent their business property from persons other
15 than the users' owners, parent companies, subsidiaries of their parent companies,
16 their own subsidiaries, or trusts operated by and for the benefit of the same;
17 (3) Residential or commercial electricity users who traditionally fail to engage in
18 energy efficiency or demand response programs because of one or more severe
19 barriers beyond those experienced by average residential or commercial
20 customers in a utility's service area.

21 By “barrier,” I mean any physical or non-physical necessity, obligation, condition,
22 constraint, or requisite that obstructs or impedes electricity user participation in energy
23 efficiency or demand response programs. Barriers may include but are not limited to

1 language, physical or mental disability, educational attainment, utility meter type,
2 economic status, property status, or geography.

3 **Q. Policy do you recommend to the Commission in regard to utility energy**
4 **efficiency programs for hard-to-reach customers?**

5 A. I recommend that the Commission policy be that utilities are required to address
6 programs for limited-income customers and hard-to-reach customers so as to assure
7 proportionate energy efficiency programs are deployed in these customer groups despite
8 higher barriers to energy efficiency investments. The Commission may wish to allow
9 programs targeted to low-income or hard-to-reach customers to meet lower threshold
10 cost-effectiveness results than other programs or be enhanced in other ways to ensure that
11 those customers are not left out.

12 **Q. Please summarize the key conclusions in your testimony.**

13 A. Certainly. The FEECA utilities' analysis of technical and achievable DSM
14 potential is woefully inadequate and fails to comply with Florida statutes as an expert
15 working in the field of utility resource planning would understand them. The
16 Commission should reject the FEECA utilities' proposed goals and adopt the interim
17 percentage savings I recommend in this testimony. In view of the many flaws in those
18 utility analyses, the Commission should undertake a more reasoned and consistent
19 potential study and economic analysis across the jurisdictional utilities before setting any
20 final goals. The Commission should ensure that the statutory change in cost-benefit test
21 definitions enacted recently is adhered to by the utilities. The Commission should act in
22 its goal setting and oversight of utility energy efficiency programs and expenditures with

1 a clear understanding that the roles of demand-side renewable energy and customer
2 incentives in the goals require discreet and specific analysis.

3 Among the bases for those conclusions and recommendations are the
4 demonstrated underestimate of the technical potential by at least 8%, illogical and totally
5 improper use of the Participant Cost Test, utility reliance on the RIM test in the face of
6 clear direction from the Legislature to the contrary, and the imposition of arbitrary and
7 pointless restrictions on measures with less than a 2 year payback. For the Commission to
8 take final action on DSM goal setting on such a flimsy foundation would be a huge and
9 possibly irreparable disservice to the people of Florida.

10 **Q. Does that conclude your testimony at this time?**

11 A. Yes.

Load Forecast by Florida Utilities

Note: 2019 values for energy consumption and peak are the corresponding 2018 value incremented by the ratio of the 2018 value to the 2017 value.

FPL

	Forecast of RCI Energy Consumption (GWh)			Forecast of Peak Demand (MW)		Winter Season
	Residential	Commercial	Industrial	summer peak	winter peak	
2009	52,041	44,878	3,584	21,124	20,031	2008/2009
2010	51,427	45,417	3,606	21,147	18,790	2009/2010
2011	51,654	46,620	3,656	21,368	19,120	2010/2011
2012	52,438	48,460	3,690	21,933	19,710	2011/2012
2013	52,639	49,537	3,687	22,249	20,098	2012/2013
2014	52,818	51,273	3,676	23,533	21,154	2013/2014
2015	53,087	52,822	3,662	24,142	21,882	2014/2015
2016	53,614	54,515	3,645	24,772	22,396	2015/2016
2017	54,249	56,233	3,631	25,401	22,912	2016/2017
2018	55,175	58,198	3,622	26,143	23,466	2017/2018
2019	56,117	60,232	3,613	26,907	24,033	2018/2019

Source: Schedule 2.1, 2.2, 3.1, and 3.2

Progress Energy

	Forecast of RCI Energy Consumption			Forecast of Peak Demand		Winter Season
	Residential	Commercial	Industrial	summer peak	winter peak	
2009	19,641	11,811	3,890	10,825	12,108	2008/2009
2010	19,563	11,921	3,930	10,844	12,246	2009/2010
2011	20,023	12,243	4,108	11,008	12,457	2010/2011
2012	20,725	12,535	4,265	11,388	12,895	2011/2012
2013	21,184	12,720	4,565	11,685	13,285	2012/2013
2014	21,523	12,909	4,564	11,728	13,254	2013/2014
2015	21,689	13,037	4,492	11,965	13,553	2014/2015
2016	21,968	13,276	4,271	12,160	13,810	2015/2016
2017	22,478	13,528	4,281	12,383	14,096	2016/2017
2018	23,005	13,788	4,295	12,600	14,372	2017/2018
2019	23,544	14,053	4,309	12,821	14,643	2018/2019

TECO

	Forecast of RCI Energy Consumption			Forecat of Peak Demand		Winter Season
	Residential	Commercial	Industrial	summer peak	winter peak	
2009	9,088	6,711	2,392	4,524	5,037	2008/2009
2010	9,276	6,845	2,401	4,613	5,115	2009/2010
2011	9,508	6,968	2,411	4,635	5,208	2010/2011
2012	9,737	7,124	2,419	4,729	5,234	2011/2012
2013	9,974	7,290	2,428	4,815	5,321	2012/2013
2014	10,225	7,457	2,438	4,904	5,411	2013/2014
2015	10,487	7,629	2,446	5,009	5,519	2014/2015
2016	10,755	7,804	2,457	5,116	5,629	2015/2016
2017	11,040	7,987	2,469	5,151	5,743	2016/2017
2018	11,339	8,159	2,480	5,266	5,785	2017/2018
2019	11,646	8,335	2,491	5,384	5,827	2018/2019

Gulf Power

	Forecast of RCI Energy Consumption			Forecat of Peak Demand		Winter Season
	Residential	Commercial	Industrial	summer peak	winter peak	
2009	5,676	3,962	2,147	2,970	2,759	2008/2009
2010	5,842	4,054	2,183	3,040	2,856	2009/2010
2011	6,063	4,213	2,195	3,132	2,953	2010/2011
2012	6,243	4,336	2,185	3,180	3,036	2011/2012
2013	6,423	4,457	2,172	3,252	3,121	2012/2013
2014	6,579	4,560	2,162	3,320	3,183	2013/2014
2015	6,737	4,663	2,150	3,391	3,242	2014/2015
2016	6,934	4,797	2,137	3,446	3,325	2015/2016
2017	7,161	4,960	2,130	3,536	3,426	2016/2017
2018	7,392	5,125	2,141	3,632	3,505	2017/2018
2019	7,630	5,295	2,152	3,731	3,586	2018/2019

OUC

	Forecast of RCI Energy Consumption			Forecat of Peak Demand		Winter Season
	Residential	Commercial	Industrial	summer peak	winter peak	
2009	2,303	388	3,374	1,232		2008/2009
2010	2,320	399	3,401	1,304	1,238	2009/2010

2011	2,352	403	3,457	1,324	1,254	2010/2011
2012	2,433	409	3,543	1,358	1,285	2011/2012
2013	2,508	417	3,625	1,397	1,321	2012/2013
2014	2,584	425	3,710	1,436	1,360	2013/2014
2015	2,662	434	3,805	1,475	1,399	2014/2015
2016	2,746	440	3,883	1,513	1,438	2015/2016
2017	2,833	446	3,962	1,551	1,476	2016/2017
2018	2,925	452	4,037	1,590	1,514	2017/2018
2019	3,020	458	4,113	1,630	1,553	2018/2019

JEA

	Forecast of RCI Energy Consumption			Forecast of Peak Demand		Winter Season
	Residential	Commercial	Industrial	summer peak	winter peak	
2009	5,486	1,388	5,908	2,917	3,039	2008/2009
2010	5,474	1,385	5,896	2,954	3,022	2009/2010
2011	5,525	1,398	5,951	2,973	3,058	2010/2011
2012	5,581	1,412	6,011	3,047	3,138	2011/2012
2013	5,657	1,431	6,093	3,109	3,122	2012/2013
2014	5,735	1,451	6,177	3,179	3,174	2013/2014
2015	5,834	1,476	6,283	3,244	3,218	2014/2015
2016	5,946	1,504	6,405	3,340	3,287	2015/2016
2017	6,064	1,534	6,531	3,417	3,367	2016/2017
2018	6,194	1,567	6,672	3,498	3,480	2017/2018
2019	6,327	1,601	6,816	3,581	3,597	2018/2019

DSM goal 1.00% % increment per year (except ramp-up years)

Cumulative DSM Goal in % of Annual Sales and Peak

Large utilities	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)		0.33%	0.66%	1.66%	2.66%	3.66%	4.66%	5.66%	6.66%	7.66%	8.66%
Commercial (GWh)		0.33%	0.66%	1.66%	2.66%	3.66%	4.66%	5.66%	6.66%	7.66%	8.66%
Industrial (GWh)		0.33%	0.66%	1.66%	2.66%	3.66%	4.66%	5.66%	6.66%	7.66%	8.66%
Total summer peak (MW)		0.33%	0.66%	1.66%	2.66%	3.66%	4.66%	5.66%	6.66%	7.66%	8.66%
Total winter peak (MW)		0.33%	0.66%	1.66%	2.66%	3.66%	4.66%	5.66%	6.66%	7.66%	8.66%

Small Utilities	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)		0.25%	0.50%	0.75%	1.75%	2.75%	3.75%	4.75%	5.75%	6.75%	7.75%
Commercial (GWh)		0.25%	0.50%	0.75%	1.75%	2.75%	3.75%	4.75%	5.75%	6.75%	7.75%
Industrial (GWh)		0.25%	0.50%	0.75%	1.75%	2.75%	3.75%	4.75%	5.75%	6.75%	7.75%
Total summer peak (MW)		0.25%	0.50%	0.75%	1.75%	2.75%	3.75%	4.75%	5.75%	6.75%	7.75%
Total winter peak (MW)		0.25%	0.50%	0.75%	1.75%	2.75%	3.75%	4.75%	5.75%	6.75%	7.75%

FPL

Load Forecast

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	52,041	51,427	51,654	52,438	52,639	52,818	53,087	53,614	54,249	55,175	56,117
Commercial (GWh)	44,878	45,417	46,620	48,460	49,537	51,273	52,822	54,515	56,233	58,198	60,232
Industrial (GWh)	3,584	3,606	3,656	3,690	3,687	3,676	3,662	3,645	3,631	3,622	3,613

Total summer peak (MW)	21,124	21,147	21,368	21,933	22,249	23,533	24,142	24,772	25,401	26,143	26,907
Total winter peak (MW)	20,031	18,790	19,120	19,710	20,098	21,154	21,882	22,396	22,912	23,466	24,033

Proposed DSM Goal

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	0	170	341	870	1,400	1,933	2,474	3,035	3,613	4,226	4,860
Commercial (GWh)	0	150	308	804	1,318	1,877	2,462	3,086	3,745	4,458	5,216
Industrial (GWh)	0	12	24	61	98	135	171	206	242	277	313
Total summer peak (MW)	0	70	141	364	592	861	1,125	1,402	1,692	2,003	2,371
Total winter peak (MW)	0	62	126	327	535	774	1,020	1,268	1,526	1,797	2,117

Progress Energy

Load Forecast

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	19,641	19,563	20,023	20,725	21,184	21,523	21,689	21,968	22,478	23,005	23,544
Commercial (GWh)	11,811	11,921	12,243	12,535	12,720	12,909	13,037	13,276	13,528	13,788	14,053
Industrial (GWh)	3,890	3,930	4,108	4,265	4,565	4,564	4,492	4,271	4,281	4,295	4,309
Total summer peak (MW)	10,825	10,844	11,008	11,388	11,685	11,728	11,965	12,160	12,383	12,600	14,372
Total winter peak (MW)	12,108	12,246	12,457	12,895	13,285	13,254	13,553	13,810	14,096	14,372	14,643

Proposed DSM Goal

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	0	65	132	344	563	788	1,011	1,243	1,497	1,762	2,039

Commercial (GWh)	0	39	81	208	338	472	608	751	901	1,056	1,217
Industrial (GWh)	0	13	27	71	121	167	209	242	285	329	373
Total summer peak (MW)	0	36	73	189	311	429	558	688	825	965	1,130
Total winter peak (MW)	0	40	82	214	353	485	632	782	939	1,101	1,268

TECO

Load Forecast

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	9,088	9,276	9,508	9,737	9,974	10,225	10,487	10,755	11,040	11,339	11,646
Commercial (GWh)	6,711	6,845	6,968	7,124	7,290	7,457	7,629	7,804	7,987	8,159	8,335
Industrial (GWh)	2,392	2,401	2,411	2,419	2,428	2,438	2,446	2,457	2,469	2,480	2,491
Total summer peak (MW)	4,524	4,613	4,635	4,729	4,815	4,904	5,009	5,116	5,151	5,266	5,384
Total winter peak (MW)	5,037	5,115	5,208	5,234	5,321	5,411	5,519	5,629	5,743	5,785	5,827

Proposed DSM Goal

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	0	31	63	162	265	374	489	609	735	869	1,009
Commercial (GWh)	0	23	46	118	194	273	356	442	532	625	722
Industrial (GWh)	0	8	16	40	65	89	114	139	164	190	216
Total summer peak (MW)	0	15	31	79	128	179	233	290	343	403	466
Total winter peak (MW)	0	17	34	87	142	198	257	319	382	443	505

Gulf Power

Load Forecast

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	5,676	5,842	6,063	6,243	6,423	6,579	6,737	6,934	7,161	7,392	7,630
Commercial (GWh)	3,962	4,054	4,213	4,336	4,457	4,560	4,663	4,797	4,960	5,125	5,295
Industrial (GWh)	2,147	2,183	2,195	2,185	2,172	2,162	2,150	2,137	2,130	2,141	2,152
Total summer peak (MW)	2,970	3,040	3,132	3,180	3,252	3,320	3,391	3,446	3,536	3,632	3,731
Total winter peak (MW)	2,759	2,856	2,953	3,036	3,121	3,183	3,242	3,325	3,426	3,505	3,586

Proposed DSM Goal

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	0	19	40	104	171	241	314	392	477	566	661
Commercial (GWh)	0	13	28	72	119	167	217	272	330	393	459
Industrial (GWh)	0	7	14	36	58	79	100	121	142	164	186
Total summer peak (MW)	0	10	21	53	87	122	158	195	235	278	323
Total winter peak (MW)	0	9	19	50	83	116	151	188	228	268	311

OUC

Load Forecast

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
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Residential (GWh)	2,303	2,320	2,352	2,433	2,508	2,584	2,662	2,746	2,833	2,925	3,020
Commercial (GWh)	388	399	403	409	417	425	434	440	446	452	458
Industrial (GWh)	3,374	3,401	3,457	3,543	3,625	3,710	3,805	3,883	3,962	4,037	4,113
Total summer peak (MW)	1,232	1,304	1,324	1,358	1,397	1,436	1,475	1,513	1,551	1,590	1,630
Total winter peak (MW)		1,238	1,254	1,285	1,321	1,360	1,399	1,438	1,476	1,514	1,553

Proposed DSM Goal

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	0	6	12	18	44	71	100	130	163	197	234
Commercial (GWh)	0	1	2	3	7	12	16	21	26	31	35
Industrial (GWh)	0	9	17	27	63	102	143	184	228	272	319
Total summer peak (MW)	0	3	7	10	24	39	55	72	89	107	126
Total winter peak (MW)	0	3	6	10	23	37	52	68	85	102	120

JEA

Load Forecast

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	5,486	5,474	5,525	5,581	5,657	5,735	5,834	5,946	6,064	6,194	6,327
Commercial (GWh)	1,388	1,385	1,398	1,412	1,431	1,451	1,476	1,504	1,534	1,567	1,601
Industrial (GWh)	5,908	5,896	5,951	6,011	6,093	6,177	6,283	6,405	6,531	6,672	6,816
Total summer peak (MW)	2,917	2,954	2,973	3,047	3,109	3,179	3,244	3,340	3,417	3,498	3,581
Total winter peak (MW)	3,039	3,022	3,058	3,138	3,122	3,174	3,218	3,287	3,367	3,480	3,597

Proposed DSM Goal

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential (GWh)	0	14	28	42	99	158	219	282	349	418	490
Commercial (GWh)	0	3	7	11	25	40	55	71	88	106	124
Industrial (GWh)	0	15	30	45	107	170	236	304	376	450	528
Total summer peak (MW)	0	7	15	23	54	87	122	159	196	236	278
Total winter peak (MW)	0	8	15	24	55	87	121	156	194	235	279