HAIKU DESIGN & ANALYSIS

4234 Hana Hwy., Haiku, HI., 96708
(808) 572-2519

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To: Energy Metrics / Status Reports Work Group

From: Carl Freedman, Facilitator

Re: Phase 1 Summary and Presentation of Recommended Metrics

This is a brief summary of Phase 1 of the Hawaii Energy Policy Forum's effort to develop metrics and periodically updated status reports to serve as meaningful measurements of Hawaii's progress towards its "Clean Energy" objectives. The Forum's effort is divided into three sequential phases:

- Phase 1: Planning and Design – a facilitated stakeholder process to determine what needs to be measured to characterize progress towards clean energy objectives and what metrics are appropriate
- Phase 2: Data Collection and Reporting Methodology and Testing – refinement and quantification of the metrics, including determination of feasible sources and methods for data collection, calculation and updating of the clean energy metrics
- Phase 3: Hawaii Energy Status Reports – development, posting and updating one or more periodic reports that are meaningful to the general public, energy stakeholders, decision-makers and researchers.

Phase 1 activities included four facilitated stakeholder meetings. Participating stakeholders contributed comments and direction regarding what the metrics should measure and made specific suggestions for meaningful metrics. Participating economists and Hawaii data experts made detailed suggestions and provided comment on the accuracy and feasibility of candidate metrics.

The facilitator was charged (by the stakeholder group) with the task of developing a recommended list of metrics for review by the stakeholder group. A list of recommended metrics was presented to the stakeholder group and was given a critical review at the most recent meeting on May 25, 2011. The meeting was attended primarily by economists and data experts. Critical comments focused primarily on two aspects of the metrics:

- The recommended metric summarizing overall progress includes quantification of embedded fossil fuel BTU content associated with fuel cycle production, processing and transportation. The purpose for this approach was to provide sufficient detail to make some meaningful distinctions regarding underlying merits of biofuel versus fossil fuel use

and local versus imported biofuel use. These distinctions were previously identified by stakeholders as important attributes of an overall metric. This suggested approach, however, was criticized by reviewers as perhaps too complicated and requiring some parameters that would have to be estimated.

One suggestion was to make the pertinent distinction defining "clean energy" as locally produced versus imported fuels, for example: "BTU content of imported fuels per person." This would eliminate the need to rigorously account for fossil fuel BTU content of Hawaii's fuel use. It would also entirely exclude imported biofuels from consideration as a contributor to clean energy use in the overall summary metric.

- The recommended metrics exclude quantification of the embedded fossil fuel BTU content of non-fuel energy alternatives. For example, the recommended metrics do not include any accounting for the fossil fuel use embedded in the production of solar panels, wind generators and other means of energy production and consumption. This approach was recommended because tracking the fossil fuel BTU content of capital goods would be too complicated, difficult to properly scope and would require too many parameters that would have to be estimated. This aspect of the recommended approach was criticized by reviewers as being inconsistent with considering embedded fossil fuel content of Hawaii fuel use since it only would address embedded aspects of direct fuel use in Hawaii but ignore the fossil fuel contribution embedded in non-fuel alternatives.

After extended critical discussion, the group was polled and, despite the concerns noted above, there was unanimous support for going forward with the list of recommended metrics with the understanding that:

- Phase 2 would include further review of the feasibility and refinement of the metrics. In particular, both the cost and specific methods of determining and maintaining the recommended metrics will have to be more specifically determined.
- The list of recommended metrics used to scope Phase 2 efforts should note the pertinent concerns and suggestions identified by the reviewers.

Accordingly, the attached list of recommended metrics is provided, noting pertinent identified concerns and suggestions. The list of recommended metrics will serve as the basis for scoping work for Phase 2 activities.

It remains the recommendation of the Facilitator that any overall summary indicator of progress towards clean energy objectives needs to address stakeholder concerns regarding meaningful characterization of biofuel versus fossil fuel use and local vs imported biofuel use. If this is not possible by accounting for embedded fossil content of fuels used in Hawaii or some other feasible method, it is suggested that the second recommended "overall status/progress indicator" metric be used instead ("Index of attainment of underlying objectives").

Any further comments or suggestions regarding the recommended metrics should be made to the Phase 1 Facilitator at 4234@hawaiiantel.net.

Recommended Metrics

The following list of "clean energy" metrics was developed and recommended by the Phase 1 stakeholder group and Facilitator. The metrics identified below are recommended for further refinement and quantification in Phase 2. As part of Phase 3, a separate determination can be made regarding which metrics are most appropriate to include and present in the ongoing periodically updated status reports.

Comments and suggestions made by stakeholder reviewers at the most recent stakeholder meeting are briefly noted in italics. A previous version of the recommended metrics, dated April 19, 2011, was distributed that includes some detailed annotation discussing the basic and assessment of the feasibility of each of the metrics presented below.

- **Overall Status/Progress Indicator(s)**
    - **Metric: Fossil energy content of Hawaii fuel use (BTU) per person (defacto population)**
        - **Including the "embedded" fossil energy (BTU) used in the production, processing and transportation of fuels to the Hawaii wholesale market**

          It was noted that potential double-counting would have to be addressed for imported fossil fuels used in local fuel production, processing and transportation.

          The cost and feasibility of this approach needs to be further assessed, including consideration of the complexity of accounting and the availability of necessary data.

          One alternative approach was suggested: BTU content of imported fuels per person. This would be simpler to implement. It would represent a categorical policy that imported biofuels would not count as progress towards "clean energy" in the overall summary metric. Note that the existing Renewabe Portfolio Standards (RPS) count all biofuel use as progress towards RPS goals without distinction as to import vs local origin and without consideration of embedded fossil fuel content.
        - **Expressed as a total and broken down into sectors**
    - **Metric: Index of attainment of underlying objectives (listed below)**
        - **Weighted average of indices of attainment of each underlying objective metric**

- **Attainment of Underlying Objectives**
    - **Reducing carbon footprint**
        - **Metric: Fossil carbon energy content of Hawaii fuel use**

        - **Including fossil carbon energy content of fuel BTU used in production, processing and transportation to Hawaii**
- **Reducing export of dollars from Hawaii**
    - **Metric: Expenditures on fuel imports to Hawaii**

      It was noted that this excludes consideration of export of dollars for capital intensive non-fuel alternatives to Hawaii fossil fuel consumption.
- **Reducing energy cost volatility**
    - **Metric: Hawaii fuel portfolio cost volatility**
    - **Metric: Hawaii fuel portfolio cost correlation to world crude petroleum price (using financial security portfolio analysis methods)**
        - **Total and broken down by electricity and non-electricity sectors**
- **Creating "green jobs"**
    - **Metric: Change in "green" category jobs and percentage of total private sector jobs versus 2010 DLIR study benchmark**

      It was noted that DLIR is tracking green jobs but these efforts need to be reviewed regarding the scope/definition of green job categories and the method and frequency of updating data.
- **Increasing fuel supply reliability**
    - **Metric: Hawaii fuel portfolio supply risk expressed as a weighted average of fuel types -- weighted by (fuel type / geographic source / proportion of total fuel use)**
        - **Metric portfolio should include non-fuel energy generation (wind, solar, etc) and a proxy component for conservation measures in order to measure the reduction in fuel supply risk attained by these resources.**
- **Maintaining affordability of energy costs**
    - **Metric: Total actual consumer level (retail) energy expenditures**
        - **Expressed as a pure statistic and perhaps adjusted as a statistic adjusted for world oil price**
        - **Total and broken down by electricity and non-electricity sectors**
- **Reducing environmental impacts**
    - **Metric: Not quantified – use text discussion as applicable**

- **Status of Attainment of State Standards**
    - **Renewable Portfolio Standards (per statute -- electric utility sector)**
        - **Metric: Percentage attainment and recent change in attainment of RPS**
            - **Total and broken down by utility/island**
            - **Broken down by resource type**
    - **Energy Efficiency Portfolio Standard (per statute and PUC order – electric sector)**
        - **Metric: Percentage attainment and recent change in attainment of EEPS**
            - **Total and broken down by island**
            - **Broken down by type of contribution (programs, codes, natural adoption, PBFA vs state vs utility vs other, etc)**
            - **Requires pending resolution of quantification methods per PUC order**
    - **Hawaii Clean Energy Initiative Goal (per Energy Agreement -- all sectors)**
        - **Metric: Percentage attainment and recent change in attainment of HCEI goals**
            - **Total and for Electricity and Transportation sectors**
            - **Broken down by energy efficiency vs clean generation**
            - **Requires resolution of quantification of energy efficiency component in EEPS docket or development of other specific protocols**

            It was noted that this goal differs from the RPS goals in the respect that it calls for 40% of total energy use to be provided by clean energy sources whereas the RPS calls for 40% of the electrical generation component to be provided by clean energy sources.
    - **Greenhouse Gas Emission Goals**
        - **Metric: Current emissions as percentage of 1990 emissions**
        - **Metric: Attained reductions as percent of necessary reductions**

- **Progress on Projects and Programs**
    - **Renewable energy projects**
        - **Metric: MW of renewable energy projects installed (since benchmark date) and "in pipeline"**

        - **Broken down by island and resource type**
- **Energy efficiency programs**
    - **Metric: MWH and MWH per year energy savings from energy efficiency programs**
        - **Broken down by island and by implementer (PBFA, utility, government, private)**
- **Transportation initiatives**
    - **Metric: Impacts of state transportation sector initiatives on fuel consumption**
    - **Metric: Impacts of state and county land use planning impacts on transportation sector fuel consumption**