

The Vermont 25x'25 Initiative

2010 Progress Report



Prepared by
The Vermont 25x'25 Alliance
Steering Committee



Prepared for
Agency of Agriculture, Food and Markets
Department of Public Service
Agency of Natural Resources

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“It is a goal of the state, by the year 2025, to produce 25 percent of the energy consumed within the state through the use of renewable energy sources, particularly from Vermont's farms and forests”.

25 by '25 state goal enabling legislation; TITLE 10, Chapter 23, § 580

Vermont 25x'25 Committee Accomplishments in 2009

In 2009, the committee met nine times, with committee members providing sector specific updates and project reports. By the second half of the year, the committee turned its attention to a strategic review of the group's governance structure and purpose. Subsequent meetings focused on establishing long term viability of the group, expanding the committee to include additional stakeholders and preparing the annual report to the legislature. As a result, a list of names was drafted to increase the size and breadth of the committee in 2010 and the committee created the following purpose statement to guide its activities:

Purpose Statement

The Vermont 25 x '25 Alliance acts as a forum to support the goal of producing 25 percent of the energy consumed within the state through the use of renewable energy sources, particularly from Vermont's farms and forests, by 2025. Toward this end, the Alliance facilitates meetings to exchange information, helps to coordinate, communicate and monitor progress towards the 25 x'25 goal, makes regular recommendations, and reports annually to the legislature.

Issues addressed by the Alliance or its working groups include:

- Overcoming technical barriers;*
- Enabling public policies;*
- Identifying necessary capital; and/or*
- Strengthening partnerships and networks among stakeholders.*

To support these activities, the Alliance brings together public and private interests across diverse sectors and agencies. All meetings are open to the public, and open debate and rigorous analysis of opportunities and constraints are encouraged. The expected impact of the 25x'25 Alliance is to catalyze action, as well as serve as a point of contact and continuity for the effective development of Vermont's renewable energy options.

In the prior year (2008), Vermont 25x'25 subcommittees convened to (1) develop recommendations that would support the state's 25x'25 goal, and introduced these for consideration to the Vermont State Legislature and other state policymakers; and (2) generate a series of sector-specific work plan priorities for 2009¹. The status of the subcommittee recommendations for 2009 are outlined on page 6, in the section of this report titled "Update on 25x'25 Subcommittee Work Plan Priorities".

¹ The Vermont 25x'25 2009 report to the Legislature is available online at: www.vermontagriculture.com/energy

Vermont 25 x '25 Steering Committee Members

Steering Committee Members, Active During 2009 and Their Affiliations:

- David Lane, Vermont Agency of Agriculture (Vermont 25x'25 - Chair)
- Rob Achilles, Vermont Agency of Agriculture
- Jane Clifford, Green Mountain Dairy
- Paul Costello, Vermont Council on Rural Development
- Jackie Folsom, Vermont Farm Bureau
- Robert Foster, Nat'l 25x'25 Initiative Steering Committee (VT 25x'25 - Vice Chair)
- Paul Frederick, Vermont Department of Forests, Parks, and Recreation
- Ellen Kahler, Vermont Sustainable Jobs Fund
- Kelly Launder, Vermont Department of Public Service
- Anne Margolis, Vermont Department of Public Service
- Carolyn Moulton, Vermont Agency of Agriculture
- Andrew Perchlik, Renewable Energy Vermont
- Dan Scruton, Vermont Agency of Agriculture
- Adam Sherman, Biomass Energy Resource Center
- Harvey Smith, U.S. Department of Agriculture
- Dick Valentinetti, Vermont Agency of Natural Resources
- Netaka White, Vermont Sustainable Jobs Fund
- Lini Wollenberg, UVM Center for Sustainable Agriculture
- Stephanie Zehler, Vermont Agency of Agriculture

National 25x'25 Committee Highlights from 2009

During the past year, the National 25x'25 Steering Committee facilitated the growth of the national Alliance as it grew to include nearly 900 endorsers, 33 current or former governors, 33 legislatures and 19 State Alliances. The Committee continued to focus on its main priorities of jobs, energy security, sustainability, and the development of alternative fuels while continuing to promote energy efficiency and the production of safe, abundant, and affordable food, feed and fiber.

The 25x'25 Carbon Working Group made up of nationally recognized experts released a report, *Agriculture and Forestry in a Reduced Carbon Economy: Solutions from the Land*. The report was intended to serve as a discussion guide to help farmers, ranchers, and forest land managers better understand the opportunities and challenges that they will face in a reduced carbon economy. The Carbon Working Group continues to evaluate the impacts of legislative proposals on agriculture and forestry stakeholders; such as cap and trade or a carbon tax. The Steering Committee feels strongly that agriculture and forestry are part of the energy solution and the Committee is working to be sure they are included in the policy and planning discussion.

The Steering Committee commissioned a study by the University of Tennessee's Bio-based Energy Analysis Group to analyze how several proposed energy/climate change policy

scenarios might impact land use change, feedstock production, feedstock prices, and farm income as well as carbon costs and payments for producers. It will be presented in four parts. The first, *Analysis of the Implications of Climate Change and Energy Legislation to the Agricultural Sector*, was released in November².

In terms of measuring progress towards the national goal, in 2004, renewables accounted for 6 percent of total U.S. energy consumption. In 2009 they had grown to 8.2 percent while fossil fuel consumption had declined.

Innovation Center for U.S. Dairy

The National 25x'25 Alliance collaborated with the Innovation Center for U.S. Dairy as members of the 25x'25 steering committee assisted dairy sustainability initiatives by participating on the Innovation Center's board and/or committees. The Innovation Center is working to reduce the carbon footprint of the US dairy industry. Key strategies include increased production of renewable energy from agricultural waste products, and taking measures to increase energy efficiency in dairy operations. More information on the initiative can be found at www.USDairy.com.

Update on 2009 Vermont *SPEED* Program

Vermont's *Sustainably Priced Energy Development* Program was enacted by the Vermont Legislature and Governor in June 2005. The goal of the *SPEED* program is to promote the development of in-state energy sources, which use renewable power (*SPEED* resources) to ensure that to the greatest extent possible the economic benefits of these new energy sources flow to the Vermont economy in general, and to the rate paying citizens of the state in particular³.

In May of 2009, the program was significantly amended to create "standard offer" contracts and "feed-in tariffs" for *SPEED* resources of less than 2.2 MW. This program was created to encourage the development of renewable energy resources in Vermont, as well as the purchase of renewable power by the State's electric distribution utilities. Special cost analysis were done for each sector so that different standard offer rates would incentivize each technology. Final offer rates are pending hearings in 2010. As a result of the Public Service Board reviewing and resetting the default prices established in Act 45, the following table shows the established rates *in 2009*:

² Copies of the report are available on-line;
http://www.25x25.org/index.php?option=com_content&task=view&id=56&Itemid=73

³ Source: <http://vermontspeed.com/>

Technology	Standard Offer Rate (\$/KWH)	Standard Offer Contract Term (Yrs)
Landfill Methane	\$0.12	15
Farm Methane	\$0.16	20
Wind (1.5 KW or less)	\$0.20	20
Wind (over 1.5 KW)	\$0.13	20
Solar PV	\$0.30	25
Hydropower	\$0.13	20
Biomass	\$0.13	20

Note: the above prices and contract terms are based on the 9/30/2009 "Order Establishing a Standard-Offer Program for Qualifying SPEED Resources." Subsequent determinations by the Vermont Public Service Board may change these prices and terms.

Vermont Standard Offer Rates in 2009.

In September 2009, the SPEED Program was opened for projects to apply. With the addition of standard offer contracts, there were many applicants for this program, including 185 solar, 14 digester, 11 biomass, 3 landfill methane, 10 hydroelectric, and 10 wind applications. Each sector was limited to 12.5 MW of electrical generation or 25% of the total cap, which limited the two largest numbers of sector applicants: solar and biomass. The Feed-In-Tariff program spurred a larger than expected interest in renewable energy projects, proving, Vermont businesses are interested in renewable energy project development. Each project will have to meet a number of immediate permitting criteria and will have three years to complete construction. The new standard offer rates will be recalculated and finalized in January 2010.

Update on 2009 Clean Energy Development Fund (CEDF)

Excerpted from the CEDF 2009 draft report: Since its inception, the CEDF has awarded over \$19 million in grants to (those) working to create the clean energy economy in Vermont. This public investment leveraged an additional \$55 million for a total investment of \$74 million in renewable energy, since 2005.

The CEDF was successful in meeting its funding goals for 2009 by granting out a total of \$7.5 million. With (additional) loans of \$3.7 million to seven renewable energy projects/businesses, the Fund disbursed \$11.3 million to promote clean energy projects.

In total, the 2009 CEDF grants and loans leveraged over \$39.5 million dollars in total project costs. These projects will result in the creation of more than 6,900 kW of new renewable energy generation. Using US Department of Energy job formulas, the projects will yield an estimated 145 jobs created and/or retained. The newly formed Clean Energy Development Fund Board hired its new Fund Manager, Andrew Perchlik, in November.

Update on Vermont 25x'25 Subcommittee Work Plan Priorities

The 25x'25 subcommittees met in 2008 and 2009 to identify work plan priorities in the following focus areas: *Cross-Cutting Issues, Financing Issues, Permitting Issues, Technical Assistance, Innovation in Technology, and Market Forces.* The subcommittees could be

reconvened on an as-needed basis. For detailed information surrounding each priority, refer to the 2009 Vermont 25x'25 Report⁴.

Listed below are each work plan priority from 2009 and their status as of January 2010:

1. Cross-Cutting Priorities:

- 1.1. Develop Vermont 25x'25 Monitoring Capacity. *STATUS – in progress*
- 1.2. Complete Renewable Energy Atlas of Vermont. *STATUS – April 2010 release*

2. Financing Priorities:

- 2.1. Develop pool of potential lenders by providing guidance on renewable energy proposals. *STATUS – in progress*
- 2.2. Support initiatives to find and leverage future sources of funding for the Clean Energy Development Fund (CEDF) beyond January 2012 and ensure existing funds for the program remain available. *STATUS – no progress to report*
- 2.3. Support initiatives to find and leverage additional ongoing sources of funding for non-electric generation-type renewables, including biofuels. *STATUS – new sources of funding include VT-DPS “all fuels utility”, BERC and VSJF Congressionally Directed Awards (CDAs), plus all additional energy related CDAs.*

3. Permitting Priorities:

- 3.1. Create a web-based regulatory and procedural guidance toolbox. *STATUS – no progress*
- 3.2. Create a renewable energy ombudsman position. *STATUS – no progress to report*
- 3.3. Create benefit balance strategies. *STATUS – no progress*

4. Technical Assistance Priorities:

- 4.1. Draft an oilseed crop production “best practices” handbook. *STATUS – in progress and funded via UVM Extension*
- 4.2. Conduct workshops for farmers interested in growing oilseed crops. *STATUS – workshops for farmers and Ag professionals were held in August and October, 2009*
- 4.3. Update, expand, and revise the Biomass Energy Resource Center’s Wood Supply Model. *STATUS – in progress, due to be released in late 2010.*

5. Innovation in Technology Priorities:

- 5.1. Support efforts to develop small-to-medium sized manure digesters that are scaled for farms with fewer than 500 cows. *STATUS – U.S. Senator Sanders \$500k CDA to be used to fund two small digesters, VAAFM REAP program*

⁴The Vermont 25x'25 2009 report to the Legislature is available online at: www.vermontagriculture.com/energy

continues feasibility study funding, and U.S. DOE Feasibility and Pilot Project Grant for Vermont Technical College bio-digester project. To date, U.S. Senator Leahy has obtained a total of \$1.9 million in CDAs from U.S. DOE to support this project.

- 5.2. Support the continued development of Vermont based algae-to-biodiesel projects. *STATUS – Three algae projects received notice of funding in 2009 from VSJF, VT-NRCS and VAAFM*
- 5.3. Encourage a cellulosic ethanol production feasibility analysis. *STATUS – no progress*

6. Market Forces Priorities:

- 6.1. Monitor the revision of the Sustainable Priced Energy Enterprise Development (SPEED) program rules. *STATUS – the Feed-In-Tariff program was initiated in the fall of 2009 to allow 50MW of renewable energy projects to be built within three years. The program filled with eligible projects in the first day.*
- 6.2. Assess the Use Value Appraisal (UVA) Program. *STATUS – no progress or expansion. The current program is threatened by 2010 budget cuts.*

2009 Renewable Energy Projects Review

In 2009, more than 414 new renewable energy sites came online, with over 1,112 kW of electric production capacity and over 22.5 MMBtu of thermal capacity. Below is a list of constructed renewable energy projects that came on-line in 2009 for each sector.

<p><u>Energy Crops</u> No significant projects noted</p>	<p><u>Wind</u> Burlington International Airport, 100kW Bolton Valley Ski Resort, 100kW 17 small wind projects, 86 kW</p>
<p><u>Agricultural Waste</u> Gervais Family Farm, 200 kW Biodigester Westminster Farm, 225 kW Biodigester</p>	<p><u>Solar</u> 233 solar hot water projects, 21,408 kBTu/day 153 solar photovoltaic projects, 588 kW</p>
<p><u>Wood and Biomass</u> Cabot School, 2 MMBtu/hr Milton Elementary School, 6 MMBtu/hr Milton Middle/High School, 6 MMBtu/hr Missisquoi Valley High School, 6 MMBtu/hr Richford High School, 2.5 MMBtu/hr Vermont Wood Pellet, LLC 10,000 tons/year</p>	<p><u>Hydropower</u> 15 kW Bennington Water Treatment Plant</p> <p><u>Geothermal</u> No significant projects noted</p>

2009 Energy Sector Updates

Energy Crops

Energy crops, also called “bioenergy crops,” are fast-growing crops that are grown for the specific purpose of producing energy from all or part of the resulting plant. Relevant energy conversion technologies include biodigestion, combustion, transesterification (biodiesel), distillation, pyrolysis, etc. By 2025, it is anticipated that more than 11% of Vermont’s total energy needs, which include transportation, could be met from technologies within this sector. The necessary level of energy production will require approximately 120,000 acres (or approximately 20%) of cropland⁵, not including pastureland. To meet this goal, new advances in biomass feedstocks and conversion technologies will be required.

The Vermont Sustainable Jobs Fund (VSJF), University of Vermont Extension (UVM) and the Vermont Agency of Agriculture (VAAFAM) each provided funding and technical assistance to a variety of new biofuel and bioenergy crop Research and Development projects. In 2009, VAAFAM received \$300,000 from the CEDF to fund on-farm biomass energy activities through their VT REAP program⁶. In addition, VSJF allocated \$620,000 for on-farm energy production, algae production R&D, biomass-to-biofuels course development at the University of Vermont and Vermont Technical College, grants to fuel dealers to increase biodiesel blending and distribution, and the Renewable Energy Atlas of Vermont.

Acres of energy crops grown and gallons produced for 2009 include:

- Oilseed crop acres dedicated to biodiesel production are 665 acres
- Biodiesel produced in Vermont increased to approximately 112,000 gallons
- UVM propagated approximately 10 acres of perennial grasses dedicated to energy production (i.e. switchgrass, big bluestem, reed canary grass)

Interest in using mulch hay, and/or dedicated perennial grasses as fuels has been growing. These fuels could be in the form of pellets or briquettes and could be used in small commercial or institutional heating or co-firing for electrical generation. A number of groups and individuals are investigating these opportunities while others have started business plans with intent to commercialize. The *Vermont Grass Energy Partnership*, which is a VSJF, UVM and Biomass Energy Resource Center (BERC) collaboration, initiated a project to produce 14 varieties of grass and grass/wood pellets and test fire them in a 1MMBTU pellet boiler and capture performance and emissions data. The results of the study will be available in the spring of 2010.

Agricultural Waste

Agricultural waste (i.e., manure) can be converted to energy such as electricity and heat through on-farm anaerobic digesters that create “methane biogas” to run generators, which supply electricity to the grid. Biogas digesters in the state are currently generating less


⁵ Source for all energy sector projections in this section: Vermont 25x’25 2009 report to the Legislature, available online at: www.vermontagriculture.com/energy

⁶ Information for the VT REAP program can be found online at: www.vermontagriculture.com/energy

than a tenth of one percent of Vermont’s energy needs, with the potential to produce more than one third of one percent by 2025. This is based on utilizing approximately half of the dairy cow manure in the state, more than 50,000 cows worth or approximately 100 of the larger farms.

Farm digester energy production has been growing at a steady pace. In 2009, Vermont farmers completed and brought on-line two new electricity generating digesters. The farms include the Gervais Family Farm in Bakersfield with Enosburg Electric and the Westminster Farm in Westminster with Green Mountain Power. These facilities represent another 425 kilowatts of power, for a total of over 2 MW of permitted farm digesters in the state.

To date, there are 8 operational farm digesters in Vermont and 2 experimental facilities. An additional 14 digester projects were approved and enrolled in the SPEED program in fall 2009.

	Gervais Family Farm 950 milkers 1900 total cows 200 kw output single phase interconnect GHD digester company	Westminster Farm 550 milkers 1200 total cows 225 kw output three phase interconnect GHD digester company
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Grant funding for digesters has come from a variety of sources including USDA REAP, the Vermont Clean Energy Development Fund, VSJF and VT Dept. of Public Service (through US DOE), and the Vermont Agency of Agriculture. Funding feasibility studies through the Vermont REAP program continues to be an excellent avenue for farmers investigating renewable energy options. The USDA Natural Resources Conservation Service (NRCS) has also stepped up their funding of anaerobic digesters to achieve better air and water quality on farms and eliminated the previous NRCS cap on electricity output.

Woody Biomass

Vermont has a long tradition of using wood for energy. Wood is still the most widely used local, renewable source in the state, currently accounting for nearly 5% of Vermont’s energy needs. With a strong preference to utilizing biomass resources for combined heat-and-power technologies, wood energy could constitute nearly 9% of Vermont’s energy needs in 2025.

In 2009, six new projects featuring woody biomass were added to Vermont’s portfolio; one wood pellet manufacturer and five school heating facilities.

- Vermont’s first wood pellet plant, Vermont Wood Pellet, LLC, officially opened in Clarendon on September 29, 2009. The facility employs 15 people and is expected to produce 10,000 tons of wood pellets annually using low-grade white pine for feedstock.

- The five schools which installed wood chip heat systems during 2009 were the Cabot School, Milton Elementary & Milton High School, Mississquoi Valley Union High School and Richford Junior/ Senior High School.

The Biomass Crop Assistance Program (a Federal program administered by the USDA Farm Services Agency) was rolled out and began making matching payments to owners of “eligible material” sold to “qualifying facilities”. To date, Vermont has 19 qualifying facilities including; Burlington Electric Dept., McNeil Station, the Ryegate power plant, Vermont Wood Pellet, Middlebury College, a producer of kiln dried firewood and fourteen wood chip burning schools. The program provides a significant incentive for loggers and landowners to sell biomass to qualifying facilities by nearly doubling the price being paid to producers. Final proposed program rules were released for comments in early 2010.

The Vermont Department of Forests, Parks & Recreation and the Vermont Department of Public Service recently completed a statewide assessment of residential firewood use. The last report of this type was completed in 2000. The final report, to be completed in 2010, is still being finalized, but there are several findings worth noting:

- Vermont households burned an estimated 314,000 cords of wood in 2007-2008. This is an increase of 64,000 cords (26%) used during 1997-1998.
- During the 2007-2008 heating season, 32% of Vermont households (80,744 households) burned wood for at least some space heating. This represents an increase of 15% in the number of households burning wood over the previous survey (1997-1998). Usage of wood for space heat had been steadily declining from a high of 48% (1985-1986) at the time of the 1997-1998 survey.
- The average household using wood as a primary heating fuel burned 5.4 cords of wood during the 2007-2008 heating season; the average household using wood as a supplemental heating fuel burned 2.25 cords.
- Vermont households heating with wood pellets burned an estimated 20,155 tons during 2007-2008. Households reporting that wood pellets were their primary heat source amounted to 1.8% of all Vermont households, while 1% of households reported using pellets as a supplemental heat source. Usage by primary pellet burners averaged 3.8 tons for the heating season, while supplemental pellet users burned an average 1.2 tons for the season.

There are a total of 68 facilities utilizing biomass in the state including: 2 wood burning electrical power generators, 1 wood pellet manufacturer, 49 district energy or institutional heating (including 43 schools burning wood chips) 11 industrial heating or process steam and 5 industrial and institutional co-gen plants.

Wind Power

Approximately a fifth of a percent of Vermont’s energy is generated from wind resources. It is anticipated that approximately 1.27% of Vermont’s energy could feasibly come from wind, provided that the appropriate technology, policy, regulatory, and financing support

was in place. Wind power is used in large-scale wind farms for national electrical grids as well as in small individual turbines for providing electricity to rural residences, businesses, or grid-isolated locations. With existing group net-metering allowed in Vermont up to 250 kW in size, the potential for neighborhoods to consider a joint wind facility is also possible.

In 2009, there were 17 new wind projects that were built and partially funded by Small Wind and Solar Initiative Grants, for a total of 86 kW. Both the Burlington Airport and Bolton Valley Ski Resort built 100 kW wind turbines in 2009.

Solar Power

The Vermont 25x'25 Initiative's goals for solar technology are that in-state solar photovoltaics and solar hot water resources will satisfy 5% of the state's current electric use and 10% of the energy needed for providing hot water. These goals translate into solar energy meeting 1.73% of Vermont's energy needs by 2025, given the appropriate technology, policy, regulatory and financing support are in place.

In 2009, there were 233 new solar hot water projects that were built and partially funded by Small Wind and Solar Initiative Grants, for a total of 21,408 kBtu/day. There were also 153 new photovoltaic (solar) projects that were partially funded by the state incentive program, for a total of 588 kW of electricity.

Hydro Power

It is anticipated that 1.15% of Vermont's energy needs by 2025 could be met with hydroelectric resources. Vermont has the ability to have up to 15 additional MW of in-state resources in the form of small hydro and existing facility system upgrades. The three challenges to hydroelectric power include permitting, technical issues and the market. In the last 20 years, permitting at the state level has significantly slowed hydro projects from moving forward. The interaction between the Federal and State permitting programs has not been smooth for those seeking to develop hydro resources in the state. The Vermont legislature has introduced bills into the 2010 Session regarding hydropower regulatory processes and rule rewriting.

In 2009, one (1) hydro system was installed in the Town of Bennington's water filtration plant, in Woodford, Vermont. The turbine generates about 15 kilowatts per hour and is powered by the water flowing into the plant. It runs 24 hours a day. The cost of the system was \$160,000, which will take about seven years to payback by net metering the electricity created. The town will save about 50% on the cost of powering the plant because of the turbine. There are about half a dozen other towns in Vermont that have the right conditions to generate power through their water supply or industrial plants.

Geothermal Power

Geothermal energy utilizes heat from the earth to provide energy for space heating or electricity generation. It is anticipated that the amount of installed capacity by the year 2025 could satisfy 5% of the State's energy needs, given the appropriate technology, policy, regulatory and financing support are in place. There is currently no central database that

tracks geothermal systems in Vermont. However, there are about half a dozen vendors in this area. The Vermont Sustainable Jobs Fund and Lyndon State College are currently in the process of conducting a survey to find existing geothermal sites.

In December 2009, a completed geothermal milk cooling study was submitted to Vermont REAP through the Vermont Agency of Agriculture. The information from this study suggests that using geothermal energy for 6 months of the year would significantly reduce cooling expenses for dairy farmers, and would have an estimated payback of between 2 and 6 years, depending on the size of the system.

Energy Efficiency

Vermont has substantial potential to save energy in the thermal and transportation sectors. The Vermont 25x'25 Initiative's goal for this sector is that implementation of in-state energy efficiency policies and practices will keep Vermont's total energy use in 2025 at or below 2008 levels, given the appropriate technology, policy, regulatory and financing support are in place.

Goals for 2010

The Vermont 25x'25 Alliance is looking forward to continuing its renewable energy information exchange and monitoring efforts in 2010. The Alliance Steering Committee has identified the following objectives to guide its progress in the coming year:

1. **Increase participation in and awareness of the Alliance and its mission.** The steering committee will expand its size and breadth by inviting new representatives from energy, government, utility, environmental, agricultural and forestry stakeholder groups to participate in the 25x'25 process.
2. **Stay informed of the issues and opportunities likely to impact the 25x'25 mission.** With an expanded steering committee and plan of action that includes regular updates from private and public sector experts, the Alliance will stay abreast of renewable energy developments in the state.
3. **Monitor progress being made towards the 25x'25 mission, and communicate with the widest possible statewide audience.** The 25x'25 committee members share the responsibility of tracking growth of renewable energy projects and preparing the annual report to the legislature. As staffing permits, issues of importance raised in the Steering Committee meetings will be disseminated through the various media.