

The Energy Transition: Religious and Cultural Perspectives

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SUSTAINABLE ENERGY FOR RURAL INDIA

by R. V. Ravikrishna

Abstract. This paper begins with an introduction to the ancient spiritual tradition of India. The focus is upon aspects of ancient Indian philosophy relevant to modern society. In the Indian context, science and spirituality are complementary. The application of ethical and religious motivations derived from these ideas is delineated with respect to the practical implementation of energy projects. The efforts of religious and social groups in promoting renewable energy in India are included. A few bioenergy technologies relevant to rural communities in developing nations are then described. The paper argues that though scientific research, technology development, community-based efforts, environmental activism, and renewable energy policy making are important elements in dealing with the energy crisis, they are not sufficient to solve the crisis. The paper closes with the premise that the main wisdom to be drawn from the religious, spiritual, and philosophical traditions concerns the inner transformation that is key to meeting today's energy and environmental crisis.

Keywords: bioenergy; Indian philosophy; rural communities; solar energy; sustainable energy

The topic of energy has indeed become one of major and urgent concern to humanity across all nations, given the impending crisis of fast-depleting oil reserves and the concurrent environmental cost that accompanies current energy choices and usage patterns. Governments of both developed and developing nations are considering various technology options to meet the rising energy demands. Never before in the history of humankind do we have such an amazing array of energy technology options, some

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of which are proven, and some of which offer enormous potential but whose techno-economic feasibility is yet to be proven. This has made the task of governments more difficult in terms of selecting the technology options for long-term investments. This is especially so in the case of developing nations that face the challenge of providing energy for fast-growing economies while trying to minimize the environmental impact. The additional and far more important issue facing these nations is that of unequal growth and the impact of the energy and environmental crisis on the poorest of the poor. It is clear that the solution cannot be based purely on scientific and economic considerations, but has to be holistic and humanistic. This is especially so for rural communities in the developing regions of Asia, Africa, and South America. One of the questions this essay aims to answer is whether scientific research and development (R&D), government policy, and economics are alone sufficient to deal with this crisis, or whether any wisdom and insight from the philosophical and spiritual traditions of ancient civilizations such as that of India would also be relevant. The presentation of the material will thus begin with an introduction to the ancient spiritual tradition of India. The emphasis is on some of the relevant ideas, followed by a discussion of the harmony between science and spirituality in the Indian perspective. The application of ethical and religious motivations derived from these ideas will then be delineated with respect to the practical implementation of energy projects. Following that is a review of the role being played by social and religious groups in India in promoting renewable energy. A brief description of some relevant bioenergy technologies relevant to rural communities is presented. The final section discusses the importance of adopting a human-centric approach and argues that the way out of the energy and environmental crisis lies in the “inner” transformation of humanity.

SANATANA DHARMA, THE ETERNAL PHILOSOPHY

The age-old spiritual tradition of the subcontinent of India was called the “*Sanatana Dharma*,” which can be translated as “Eternal Religion” or “Eternal Philosophy” in the Sanskrit language. It is recognized as a very ancient spiritual tradition with written records from 7000 to 8000 years ago as estimated from astronomical calculations of planetary positions mentioned in ancient scriptures (Danino and Nahar 1996; Frawley 1993). A fundamental aspect is the belief that the Divine Principle pervades the entire cosmos from the smallest atom to the largest galaxy. The universality of this spiritual tradition is perhaps its most relevant aspect; it might be a guiding light in today’s world. It is also characterized by universal human values: Truth, Righteousness, Peace, Love, and Nonviolence, “*Vasudhaiva Kutumbakam*”; the concept of entire world as one family; and the recognition that all religions are “different paths to the same Goal.” The following quote by Swami Vivekananda delivered during his famous

address at the World Parliament of Religions held in Chicago in 1893 aptly summarizes this view.

I am proud to belong to a religion which has demonstrated to the world both tolerance and universal acceptance I will quote to you, brethren, a few lines from a hymn I remember to have repeated from my earliest boyhood [and] which [is] every day repeated by millions of Indians: As the different streams having their sources in different places all mingle their water in the sea, so, O Lord, the different paths which men take through different tendencies, various though they appear, all lead to Thee.

An introduction to the ancient spiritual tradition of India would be grossly incomplete without reference to the *Vedas*, the ancient scriptures considered to be the basis of this spiritual tradition. In fact, the oral tradition of teaching the *Vedas* continues to this day, as it has for a few thousand years. India is known as the only culture and civilization having religious continuity from ancient times. *Vedas* are the accumulated treasury of spiritual truths discovered by different persons at different times in this long procession. The discoverers of these experiences are the sages who are honored as perfected beings. Their spiritual truths are universal and lead people irrespective of caste, creed, sex, and race to realize them in life.

It is important to understand the development of the Vedic tradition. As mentioned above, Indian culture has had continuity for at least 7000–8000 years, quite unlike other ancient cultures such as Egyptian, Mesopotamian, Babylonian, etc. The origins themselves are lost in the mists of time. This culture already first appears in a highly sophisticated, developed form, disclosing a state of social evolution long past the primitive stage and poised for a mighty advance on the plane of mind and thought. Vedic Indians were an energetic race, deeply religious with sufficient leisure to invest their surplus energies on the plane of the mind. This led to bold philosophical speculation. They asked questions about the nature of the universe and the meaning of human existence, with a philosophic temper and inward bias that grew in range and volume. The outcome is a *Weltanschauung* that has sustained India for centuries and is dynamic even today (Ranganathananda 2004).

Every culture and civilization has behind it the inspiration of a philosophy. Indian culture in its long career has experimented with life in its diverse aspects. And although it has enriched several fields such as art, science, mathematics, astronomy, literature, and politics, its greatest and unique contribution has been in the field of religion and philosophy. Here, the spirit of inquiry was unparalleled, a search for truth with a single-minded devotion that is rare in the history of thought. This quest was unhampered by tyranny of dogma or political authority or pressure of public opinion and characterized by a creative role of skepticism that is a prelude to rational faith. As the sages and seers sought to unravel the truth of the external universe, they found it baffling. Yet their inquiry only

deepened the mystery. Their discovery accords with that of Lincoln Barnett (1949):

In the evolution of scientific thought, one fact has become impressively clear; there is no mystery of the physical world, which does not point to a mystery beyond itself. All highroads of intellect, all byways of theory and conjecture, lead ultimately to an abyss that human ingenuity can never span. The further he extends his horizons, the more vividly he recognizes the fact that as the physicist Niels Bohr put it, "We are both spectators and actors in the great drama of existence."

The ancient Indian seers and sages went further. They realized that the mystery of the external world only deepens and does not diminish in spite of advancing knowledge, *if the mystery of the inner world is not tackled. Humanity is thus his own greatest mystery.* For a complete philosophy of reality, then, there is a need to have data from both fields of experience, the outer and the inner. So the sages undertook the study of religion as a thorough scientific study of the facts of inner life. The methods of investigation were very similar to those followed in modern scientific pursuit, namely, collection of facts and their classification, a dispassionate study of the above to reveal underlying laws, and the application of such knowledge for humankind's spiritual growth, for alleviation of human suffering, and for enrichment and fulfillment of human life.

This led to a comprehensive concept of nature encompassing not only the physical and biological, but the mental and spiritual aspects of the universe of experience. The universe is not static but dynamic, and cosmic energy passes from the undifferentiated to the differentiated state (through various degrees of differentiation). There is not only organic but cosmic evolution (Ranganathananda 1991). The mystery of the universe is finally resolved through the solution of the mystery disclosed within one's own nature. The sages discovered the center of the universe in the center of their being—through this joyous discovery, humanity was revealed in its infinite dimension. A fundamental discovery was made by the sages—humanity in its essential nature is divine; behind the finite human is the Atman, ever free, ever pure, changeless, and ever luminous. The body, mind, and ego are the externals of the real person who is immortal and divine. Thus, the ancient Indian Sages gave a clarion call to humanity—"Arise, O Ye Children of Immortality!" This human-centric approach of the ancient spiritual tradition of India to the mystery of life has great relevance with respect to the current energy and environmental crisis facing mankind today. To that we turn.

SCIENCE AND SPIRITUALITY IN THE INDIAN CONTEXT

The above discussion points to one fact that the ancient seers of India undertook: the study of the soul in a very scientific manner. In the Indian perspective, modern science and religion are seen to be complementary, and not contradictory. In fact, *Vedanta*, the essence of the Vedas, is

similar in its “spirit, temper, and objectives” to twentieth-century science. Conservation of energy and unity of matter and energy are integral to Indian philosophical thought. Further, there are amazing parallels between the findings of particle physics with quantum mechanical and relativistic effects and ancient Indian thought (Capra 1991). The basic oneness or unity of the universe, the mutual interrelation of all things and events—the essence of ancient Indian thought—is an important revelation of modern particle physics. To quote Fritjof Capra:

The most important characteristic of the Eastern world-view—one could almost say the essence of it—is the awareness of the unity and mutual interrelation of all things and events. The Eastern traditions constantly refer to this ultimate indivisible reality, which manifests itself in all things, and of which all things are parts. . . . The basic oneness of the universe is not only the central characteristic of the mystical experience, but is also one of the most important revelations of modern physics. It becomes apparent at the atomic level, and manifests itself more and more as one penetrates deeper into matter, down into the realm of sub-atomic particles. (Capra 1991)

As Swami Ranganathananda summarizes in his book “Human Being in Depth” (Ranganathananda 1991):

The spirit behind both pure science and religion is the same, namely, the search for truth; the difference lies only in the field of the search. The physical scientists have been seeking for truth in the physical universe, in the world revealed by the five senses, and by instruments helpful to the five senses. The seeker of the science of religion seeks for it in that field of experience that lies beyond the world revealed by the five senses, “beyond where the organ of speech (and other senses) and the mind (dependent on mere sense-data) do not reach” as the *Taittiriya Upanishad*, one of the ancient Indian scriptures, puts it. That is India’s testament after long experiments and verifications.

Just as a modern-day scientist would publish an article about a certain scientific observation, which in turn is verified by other scientists till it is confirmed to be a scientific truth, so also, ancient Indian sages made observations about the spiritual truths that were verified time and again by other sages. That is why, in the spiritual tradition of India, the question is not of believing in a creed or dogma, but experimenting with and experiencing the truth about the soul. Gandhi’s autobiography is titled *The Story of My Experiments with Truth* (Gandhi 1948). In this autobiography, he writes, “But I should certainly like to narrate my experiments in the spiritual field which are known only to myself, and from which I have derived such power as I possess for working in the political field.” For the external efforts of man to bear fruition, whether it is in the political or scientific or social spheres, it is clear that there has to be an inner transformation. This is the message of the ancient spiritual tradition of India. This is aptly reflected in a typical dialogue between a disciple and his spiritual master. The disciple asks, “Master, the whole world is in turmoil. There is poverty, conflict between nations, disease, and human

suffering. How do I change the world? How should I go about solving the problems of the world?’ The Master smiles and gently replies, ‘You can start by changing yourself.’”

SOME RELEVANT PERSPECTIVES

One of the interesting perspectives of relevance to the current topic is the concept of “Shakti,” which translates from Sanskrit as energy. In the ancient spiritual tradition of India, the material world or the physical world is visualized as the feminine aspect of Divinity, that is, as the Universal Mother. One of the names of the Universal Mother is “Shakti.” This again has interesting connotations for the discussion in the previous section since the fundamental reality of the physical world at the realm of the subatomic particles is energy. In other words, the solid forms of objects seen in the physical world are only perceived to be solid. In a fundamental sense, however, they are composed of vast empty spaces in which subatomic particles are moving at great speeds. The concept of mass is no longer valid, and the relativity theory has shown mass has nothing to do with any substance, but is a form of energy. Thus, in the ancient spiritual tradition of India, not only is there a deep symbolism in referring to the material world as “Shakti” or energy, but more importantly, a reverential attitude toward nature is observed. A religious dimension accompanies the scientific.

This characteristic of a worshipful attitude toward nature is not unique to India. It can be found in many ancient cultures such as those of Native Americans. In the spiritual tradition of India, daily worship includes prayer for the welfare of plants and animals, in addition to humans. Fire, Air, Earth, Water, and Space (Ether) are considered the most important elements. Sun worship is a very important aspect, and the essence of this is an expression of gratitude, since the ancients realized the primary role of the Sun in our ecosystem. Sustainability was the very life-breath of ancient Indian culture and is very much alive in rural India. Renewable energy choices follow naturally from this world-view. Bioenergy and solar energy are considered important options, and the next section will show how religious groups are promoting renewable energy.

A practical perspective of relevance is the “Ceiling on Desires” program formulated by one of the foremost spiritual leaders of this century, Sri Sathya Sai Baba. It is currently followed by millions of people inspired by his teachings in over 170 countries. This is a lifestyle-change program with roots in the Indian spiritual tradition that does not frown or look down upon pleasure or prosperity, but treats them as valid human pursuits. Yet it considers greed and delusion, arising from unchecked organic cravings, as unethical, because they are antisocial. Thus, there is a recognition that it is very natural for human beings to have desires, and the right approach to managing the desires is definitely not in suppressing

them. Rather, the middle path of maintaining a “ceiling on desires” is encouraged.

This program specifically targets four resources, namely, time, energy, money, and food. Every person is expected to use these resources only to the extent that is needed and utilize what is saved not for himself but for the welfare of society. The emphasis is on maintaining a disciplined lifestyle; valuing resources such as time, energy, money, food as God-given; and finally on sharing additional resources with the community.

ROLE OF SOCIAL AND RELIGIOUS GROUPS

Some of the interesting work in sustainable energy being undertaken by religious and social groups in India is the subject of this section. It has been observed that a synergistic partnership between social and religious groups wanting to promote renewable energy and technology providers with social commitment can work wonders. Two such technology providers who have been very successful in partnering with spiritual groups in India are the following. The first is SELCO Solar Light Pvt. Ltd. headquartered in Bangalore, India. SELCO was keen to break the myths that “poor people cannot afford sustainable technologies,” “poor people cannot maintain technologies,” and “one cannot build a sustainable business while meeting social objectives.” They were early to realize that prior attempts at promoting renewable energy among the poor failed because technology diffusion was never backed with appropriate service, there was no established partnership between technology and finance, and no financial institutions were financing energy services. SELCO has pioneered door-step service and door-step financing in rural communities, some of which are located in very remote areas of India. To provide accessible and affordable financing, they have partnered with numerous rural financial institutions. They have created numerous financial products in the field of energy services and convinced the financial institutions to create separate financial portfolios for energy services. They have developed a technology package for a solar photovoltaic-based home lighting system that costs as little as \$300, a system actively used by spiritual groups in India for rural communities. Figure 1 shows a schematic of the elements comprising this technology package.

Another technology provider is Gadhia Solar Energy Systems. This deals with solar power generation, heating, drying, air conditioning, desalination, etc. Gadhia Solar has installed the world’s largest solar cooking system (steam-based) at the holy Indian town of Shirdi, used for cooking food for 50,000 people per day. Other similar large-scale solar thermal systems have been established at several other religious centers (Tirumala—15,000 people per day, Mt. Abu—10,000 people per day). It appears that the main motivation for these places of worship to move to renewable energy is that a holy place should be pure and in harmony with

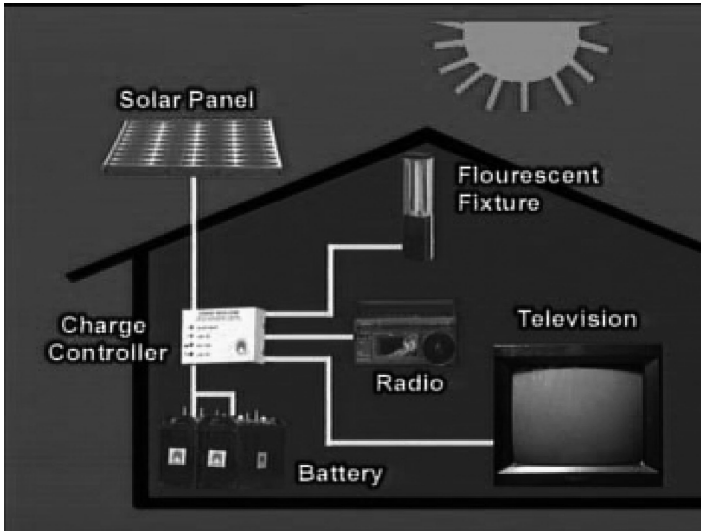


Figure 1. A Schematic of a Typical Technology Package Consisting of the Solar Panel, Charge Controller, Battery, and CFL Lamps Offered for Rural Homes. Reprinted with permission.

nature. The religious center at Tirumala has also been generating revenue from carbon credits. For the past several years, this center has adopted solar cooking technology, allowing it to dramatically cut down on the amount of diesel fuel it uses. Figure 2 shows pictures of the solar collectors installed and a typical kitchen utilizing the steam generated for cooking purposes.

Like Tirumala, dozens of holy places across India are moving toward green energy. Art of Living, for instance, a 25-year-old spiritual organization, is also focusing on returning to “the way of life espoused in the ancient Indian scriptures.” Muni Seva Ashram, in Gujarat, which combines spiritual practice with social activism, is working to make its premises entirely green by using solar, wind, and biogas energy. A residential school for 400 students is already running exclusively on green energy. Interestingly, *TIME* magazine in 2008 reported,

It is not surprising that religious groups are in the vanguard of India’s green movement: India is the birthplace of four of the world’s largest religions—Hinduism, Buddhism, Jainism and Sikhism, all of which revere nature and preach conservation. It is observed that religious groups are keen to marry spirituality with sustainability. . . . And India’s faith-based organizations are also helping spread the gospel of green. The UK-based Alliance of Religions and Conservation, which works with the UN to involve religious groups in environmental outreach, is working on a conservation campaign in the holy city of Vrindavan, as well as pushing India’s 28,000 Sikh temples to convert their kitchens to green technology. The combined potential of such efforts is limitless. India’s religious groups have



Figure 2. Solar Collectors Installed in a Religious Center (top) and a Typical Kitchen Setup for Utilizing Steam for Cooking Purposes (bottom). Reprinted with permission.

sizable incomes, own vast amounts of land, and have enormous influence on public opinion through their educational institutions. (Singh 2008)

It is interesting to note that there is a ripple effect of these efforts on government energy policy. The Government of India has recently

launched a program termed “National Solar Mission,” an ambitious project with a budget of around \$19 billion. Spread over 30 years, its goal is to achieve solar power generation of 20 gigawatts (GW) by 2020. It involves a three-phase plan of 1–1.5 GW by 2012, 6–7 GW by 2017, and the rest by 2020. It aims to reduce production costs of solar panels and drive domestic manufacturing. Special funds have been marked to motivate production, installation, and R&D. The near-term target is 100 megawatts and long-term target is 100 GW by 2030 or 10–12 percent of total power generation capacity projected for that year. The project on completion will guarantee large-scale use of solar generated power for grid-connected as well as off-grid provision of commercial energy services. It would help India reduce about 42 million tonnes of CO₂ emissions. Around 20 million solar lights would be set up by 2020 thereby saving 1 billion liters of kerosene per year. It would be made mandatory for hospitals, hotels, and government buildings to have solar-powered equipment and applications. Rural communities and small towns will also be encouraged to do so with micro-financing. The plan also makes provisions for a system where households would get paid if they feed any surplus power from solar panels back into the grid. Around 3 million households would get lighting access through solar power by 2012. India will promote solar heating systems and utilize 40–50 million m² of area to install solar collectors in domestic, industrial, and commercial sectors. Thus, this program has the potential to bring about a renewable energy revolution in India.

RELEVANT ENERGY TECHNOLOGIES

Many developing countries are setting an economy growth rate of 7–8 percent per year. There is a direct correlation between economic development and energy use. If India has to achieve its goal of becoming a developed nation, there is a need to find modern and renewable ways of producing energy to bridge the increasing gap between demand and supply. Around 70 percent of the population in India lives in rural areas. Approximately 80 percent of the villages in India are deemed to have been electrified, which means that around 125,000 villages still remain to be electrified. Only 44 percent of rural households have access to electricity. Energy sources such as woodchips, agro residues, and animal waste contribute around 30 percent of the total primary energy consumed in the country. If the African region is considered, the statistics are grim. This region, which accounts for 13 percent of the world population, generates about 3.1 percent of the world’s electricity. The per capita electricity utilization is the lowest in the world. Access to electricity ranges from greater than 90 percent in Northern Africa to about 26 percent in the sub-Saharan African region and in the rural area to less than 1 percent (International Energy Agency 2011). Biomass has been a major source of

energy in the region, amounting to about 60 percent of the total energy consumption against 14 percent of the world energy in this category. With this background, the remainder of this section describes a few of the sustainable energy technologies relevant for rural communities, especially in developing nations in Asia and Africa. The objective of this section is to demonstrate that mature technologies relevant for rural communities do exist, and dissemination of such technologies is actively taking place. The examples chosen are from the Indian Institute of Science (IISc), Bangalore, where the author is currently a researcher.

Biomethanation is a process involving anaerobic digestion by bacteria of animal waste or biomass in a biogas plant generating a flammable gas consisting mainly of methane and carbon dioxide. The gas can be used as a fuel for cooking, lighting, or power generation, and the residual matter is an excellent fertilizer and soil compost. Biogas technology for energy, manure, and sanitation has the potential to make a significant impact in the quality of rural life. India has an estimated 4 million biogas plants using animal waste as feedstock.

However, insufficiency of animal dung resources limits the use of this technology to only an eighth of the overall Indian rural population. Yet the convenience of a biogas plant in rural households has led R&D efforts to extend the use of biogas plants to other nonanimal dung biomass feedstock and rural residues. Fermenting typical biomass residues in conventional slurry-based biogas plants has been a challenge. Most attempts to convert rural biomass residues into “flowable” slurries such as animal dung have rarely been successful. A better understanding of the underlying processes has greatly helped evolve new fermentation concepts. Success has emerged only through use of multistage processes, where key fermentation properties of biomass feedstock have been acknowledged and digesters designed accordingly. A 25-year effort in understanding the processes of biogas and biomass fermentation, developing new techniques and technologies to ferment biomass feedstock and efforts at simplifying the technology to enable sustainability has been carried out at the Centre for Sustainable Technologies (CST), IISc, Bangalore. Finally, integration of the two or three fermentation steps into a single reactor configuration has enabled evolving simple-to-use digester designs for biomass feedstock, namely the plug flow and the solid-state stratified bed digesters. Figure 3 shows a schematic of a simple plug flow reactor and a photograph of a plug flow reactor involving a three-stage fermentation process. This technology has enabled generation of biogas from almost any kind of biomass feedstock (Chanakya, Rajabapaiah, and Modak 2004).

The biogas that is generated in small reactors at the individual household level is typically used for cooking purposes. One challenge was to come up with a technology for generating electricity efficiently at very low power levels, typically less than 1 kW, which is the normal requirement for

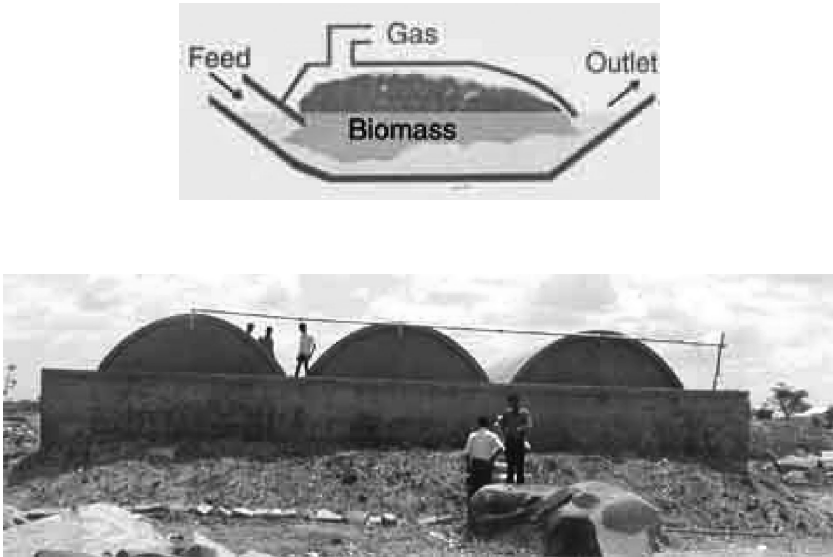


Figure 3. Schematic of a Simple Plug Flow Biogas Reactor (top) and a Plug Flow Reactor with Three-Stage Fermentation (bottom).

individual households in rural India. Current efforts at the IISc, Bangalore, are focused on R&D of small internal combustion engines that can be modified to run efficiently on biogas. These engines are typically single-cylinder, spark-ignited engines with a capacity of around 100 cc. Modern technology concepts such as lean burn (implying burning with excess air than what is required for complete combustion), multiple spark plugs (for better ignitability of the biogas), and electronically controlled injection of biogas (as opposed to gas carburetion) are being implemented. Engine tests have shown encouraging results of obtaining reasonably high efficiencies even at very low power levels corresponding to part-load operation of the engine. Figure 4 shows the results of these studies in terms of engine efficiencies at high, medium, and low loads for various fueling strategies. Further efforts would involve incorporating these engines into a commercial development of compact power generation units.

Gasification is a process that converts biomass to a gaseous fuel. The fuel consists mainly of a mixture of gases such as CO , H_2 , and N_2 . This fuel can then be used in an internal combustion engine for power generation to substitute fossil fuel. Additionally, it can be used for heating application such as the low temperatures used in drying and the high temperatures used in furnaces, kilns, etc. Further, it can be used for a combination of the above—heat and power. Figure 5 shows a schematic of the gasification process.

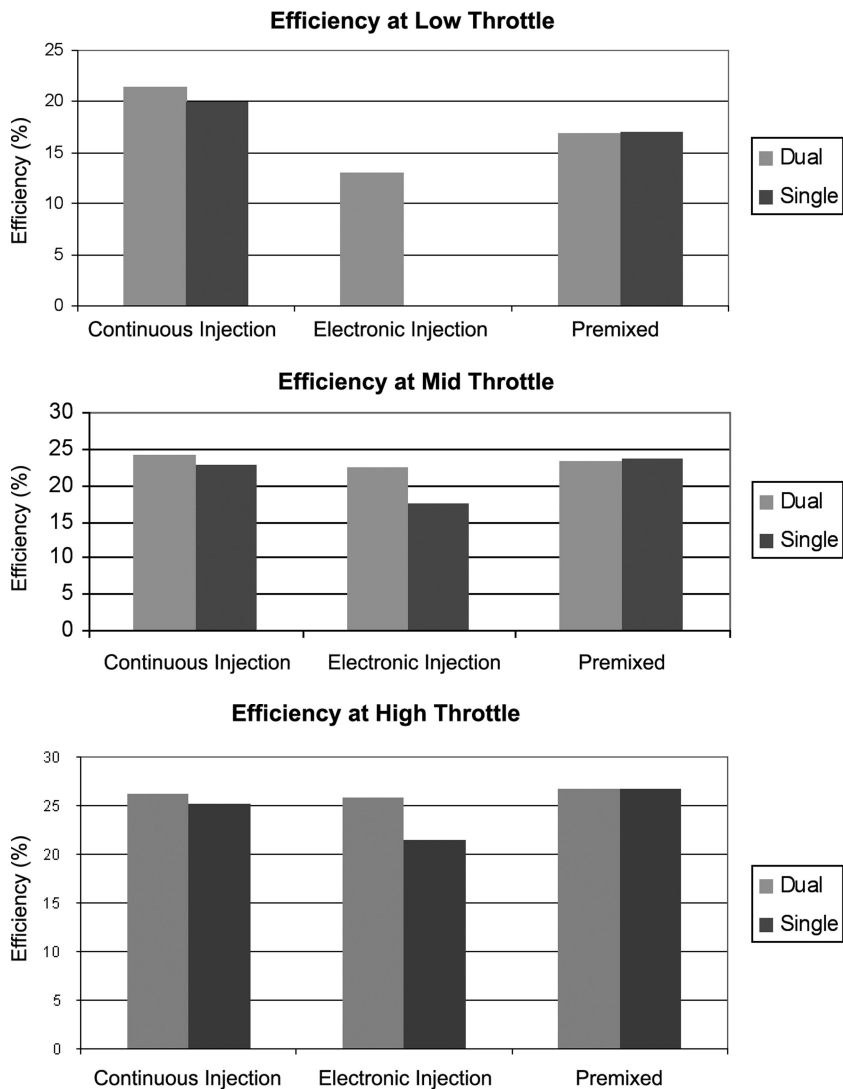


Figure 4. Efficiencies Obtained at Various Loads for Small Biogas-Fueled Engines Comparing Various Fueling Strategies with Single and Dual Spark Plugs.

Research on biomass gasification commenced in the 1980s at the IISc. This led to the establishment of the Combustion Gasification and Propulsion Laboratory (CGPL) at IISc, Bangalore, which has pioneered the development of the open top downdraft technology—different from conventional designs. This center has evolved state-of-the art technology with over 450 man-years of R&D effort. The technology has undergone

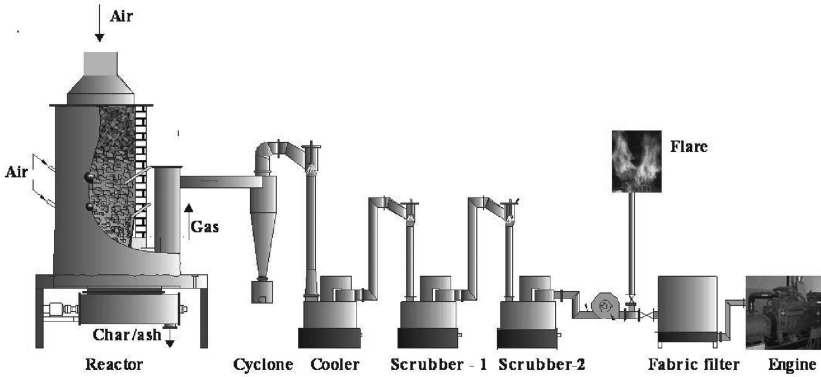


Figure 5. Schematic of Biomass Gasification-based Power Generation. Reprinted with permission.

critical third party evaluation by various groups with over 500,000 hours of operational experience and has led to commercial applications with 10 licensed manufacturers worldwide. This technology is developed for agricultural post harvest residues as the fuel providing a power range from 5 to 1000 kW (Mukunda 2003). Thus, these power systems are ideally suited for agrarian rural communities where availability of biomass is plentiful.

CLOSURE

The distilled essence of all religions reveals universal truths on a need for harmony in humanity's interaction with nature. As Mahatma Gandhi once remarked, "Earth has plenty to satisfy every man's need, but not every man's greed." Indian civilization has had a cultural and religious continuity for thousands of years. It is clear that for a civilization to flourish over such a long time span, sustainability has played an important role. In fact, sustainability was the very way of life. This can be traced to the fundamental tenets of the ancient spiritual tradition of India, which sees Divinity present in every atom of the universe, and as a Unifying Whole.

A closer study of the essence reveals certain interesting ideas, which might help humankind face the crisis of today. The solution lies in adopting a human-centric approach, that is, to start with oneself. Humanity starts with itself, with inner transformation the key. But what kind of transformation is required? A deep awareness of the fatherhood of God and the brotherhood of humankind, and qualities such as love for all creatures, selflessness, and nonviolence in thought, word, and deed have to be developed. Once these qualities are developed, it will automatically lead to lifestyle changes that are environment-friendly and energy-efficient, with a ceiling on desires. At first, this might appear as an idealistic,

impractical, and irrelevant approach. But a deep perusal will reveal that this is indeed the way forward toward evolving solutions for meeting the energy and environmental crises. Efforts such as community-based action, environmental activism, formulating environment-friendly policies, public debate, creating awareness, and development of science and technology are also important, and are required. In fact, good science and technology is available as described in the previous section, and is being constantly improved. However, the main role that the world religions should play is in facilitating the inner transformation of humankind. In fact, community-based efforts and activism will yield the desired results only as the inner transformation has taken place. This is the essence of not only the ancient spiritual tradition of India, but of all the religions of the world. It is this ennobling wisdom that will enable humankind tackle the current environmental and energy crisis effectively.

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