Guardians of the Four Realms:

A Kabbalistic Model of Ecological Awareness & Action

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"Contemplate the wonders of creation, the divine dimension of their being, not as a dim configuration that is presented to you from the distance but as the reality in which you live. Know yourself and your world . . . find the source of your own life, and of the life beyond you, around you, the glorious splendor of the life in which you have your being. The love that is astir in you – raise it to its basic potency and its noblest beauty, extend it to all its dimensions, toward every manifestation of the soul that sustains the universe."

Abraham Isaac Kook (1865-1935, Palestine)

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Leit atar panuy minei

There is no void devoid of divinity.

Tiqqunei Zohar, 57

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I.

Kabbalah is the Jewish mystical strand of thought, study, and exercise that plumbs the depths of the Jewish literary tradition and scales the heights of its practices. Spiritually spelunking the cave of divine interworking and navigating between its theosophic stalactites and theurgic stalagmites, Kabbalah is a guide towards the nexus of the transcendent Holy One and the Immanent Divine Presence.

Jewish mysticism transcends the realm of purely academic thought. While study of the texts generates a unitive experience with the divine, there are also practical applications imbedded in the text. The concept of four worlds (also called four dimensions or four realms) is a concept of Jewish mysticism with hidden practical uses. A deeper journey into understanding the spiritual and practical applications of the four worlds model will show that not only are they a pathway to a deeper connection to God, but powerful tools to understanding humanity's connection to the Earth. The four worlds are also building blocks for strengthening communities through ecological consciousness and the holy practice of cultivating a sustainable way of living as stewards of the earth.

The origin of the multiple "worlds" can be traced back to Neoplatonic and Gnostic sources. The Hebrew names for three of the four worlds, however, is taken from a verse in the Bible. In the Book of Isaiah 43:7 it states: "All who are **linked** to My name, whom I have **created (Bri'ah), formed (Yetzirah),** and **made (Assiyah).**" Gershom Scholem, a 20th century academic scholar of Jewish mysticism teaches:

> The use of the term "world" in the sense of a separate spiritual unit, a particular realm of being, came to the halakhic kabbalists from the heritage of neoplatonism. At an early stage, from the beginning of the 13th century, many such "worlds" are mentioned, representing a mixture of original Jewish, gnostic, and neoplatonic concepts. In the development of the doctrine of the ten Sefirot, each *Sefirah* was considered as a complete world in itself which, in a way, had a mystical topography of its own. The world of emanation could be seen as such a unit, but so could every single component or some of its configurations. Medieval philosophy knew of three worlds: the higher world comprising the separate intelligences often identified with the angels, the middle world of the spheres of

> heaven, and the lower, sublunar, world of nature and man. It was a natural step to add the world of the Godhead which could be identified with the world of emanation (*Atzilut*, or the ten emanations) to this scheme. That way, four worlds would emerge. [1]

Depending on the school of thought with which one grapples with, the number of worlds may shift. For the sake of this study, it is the four worlds model which will be the focus. Indeed, the number four is a balanced and stable number and provides the foundation for this multidisciplinary journey.

The first explicit mention of four *Olamot* is not found in the Zohar, though the seeds of this model are planted therein. The Zohar, the central kabbalistc text, is a 13th century mystical exegesis of the Torah. It was written by Moses De Leon (and perhaps a circle of his colleagues) and pseduoepigraphically attributed to the 2nd century sage Shimon Bar Yochai. Within the Zohar, as we have seen, there is the idea of an upper world and a lower world which are intimately connected- so much so that one mirrors and influences the other. The four worlds system begins to take shape in the later appendices of *Tikunei HaZohar* and *Raya Mehemna*,[2] as well as in Hayim Vital's (1542-1620) work *Etz Chayyim* (Tree of Life), *Sha'arei Kedusha*, and Moses Cordovero's (1522-1570) *Pardes Rimonim* (Orchard of Pomegranates). "Kabbalistic teaching, as it became formulated and transmitted from one generation to another, contains a definite, systematic cosmological point of view according to which the whole existence, from the highest of the divine sefirot, down to the lowest level on earth, is constructed in four stages, each stage being a complete world on its own."[3] While the Torah is the bedrock of the Israelite/Jewish story, Kabbalah seeks to peel back the layers of sediment and investigate the inner workings of this core text. Indeed, kabbalistic exploration is replete with extensive systems and structures, angels and demons, palaces and heavens, that seek to peek into the hidden divine pleroma that permeates existence.

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[1] Scholem, Gershom. "Worlds, the Four." *Encyclopedia Judaica*. Ed. Michael Berenbaum and Fred Skolnik. 2nd ed. Vol. 21. Detroit: Macmillan Reference USA, 2007. 224-225. *Gale Virtual Reference Library*. Web. 7 Aug. 2012.

[2] Tishby, Isaiah. The Wisdom of the Zohar, An Anthology of Texts, Volume II. (Littman: London,1989). Page 555.

[3] ibid. Page 555.

In this four world model, "the view that gained most acceptance was that the world of emanation was the realm of the sefirot; the world of creation contained the Throne of Glory, the seven palaces and the other celestial powers of the chariot; the world of formation was the abode of the angels, led by Metatron; and the world of making was the physical cosmos, the home of heavenly spheres, human beings, and husks."[4] But this is just the beginning, and as new eyes reach these ancient texts the meaning and application of these four worlds morphs and shapes to fit the present experience of the sacred. How might we take the heritage of the four worlds and translate it so that it resonates with our present moment Divine Struggling-Seeking-Striving communities? The four worlds are one pathway to come closer to God and understand the divine creative process (which in turn humanity emulates) in our midst.

An example of one contemporary understanding of the four worlds is given by Rabbi Arthur Green. Rabbi Green teaches that the four worlds are four ways one may understand and connect to the divine. While the kabbalistic understanding of these worlds is that they emanate down in a hierarchical fashion (from *Atzilut* to *Assiyah*), his teaching begins at the opposite end and meets the reader where he/she is at the present moment. In this interpretation the first world is the space of *Assiyah* – of making, doing or activity. God in this place is first experienced as "other" and God as King is paramount in this dimension. The "I" of personal identity is separate from the transcendent unknowable God. Using the metaphor of Martin Buber, one's relationship to the world, cosmos, divine is functioning on a level of "I-it," and there is a rift between the two. In order to leave this dimension where ego and pride dominate one must become vulnerable. Through vulnerability one will be able to receive and move into the world of *Yetzirah*. *Yetzirah* is the world of formation, and in Arthur Green's paradigm of the four worlds and human relations to the divine, God, here, is the loving parent. It is in this place that one begins to reflect on the individual self and consider the roots of individuation. The small "soul" is aware of the cosmic "Soul" and how they are connected, however there is still differentiation, still separation. In this world Love and

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4 Ibid. Page 555.

Fear are dominant and are two emotions that arise when one becomes vulnerable. In this world of emotions the relationship to the divine begins to shift. This is the place of *Heneini* – Here I am, I am ready, and the notion of separation begins to slip into the world of *Br'iah* – Creation. This world one relates to God like a Lover. This is the experience of the Song of Songs where Eros and passion are paramount; longing for union with the divine, to cleave to God yet there is still a residue of separateness.[5] Lastly, in the world of emanation there are no words for they only create barriers. The journey of the seeker to the source has evaporated and an intimate cleaving oneness arises.

5 Green, Arthur. Ehyeh, A Kabbalah for Tomorrow (Jewish Lights, Vermont, 2003). Chapter 5.

II.

Perhaps connecting to God is challenging and the veils that cloak divine holiness are too heavy and opaque. Looking deeper into the number four will show that it resonates and reverberates throughout the Jewish tradition. By unzipping these garments so that the divine elements begin to emerge; and holiness, sacredness, and divineness may be experienced in the natural world (Appendix One):

> "One of the building blocks of Jewish time, space, and soul is "fourness." There are four letters of God's name, four matriarchs, four promises of liberation, four cups at the Passover seder, four prayer times that span the Sabbath, four mystical worlds of being, four guardian angels, and, according to some, four layers of the spirit. On a more physical level, there are four elements, four winds, four seasons, four phases of the moon, and four directions. There are four corners on the ritual garment called the *tallit*, four species of plants gathered together for the ritual bundle called the *lulav*, and four poles to hold up the Jewish wedding canopy known as the chuppah. There are four ways of interpreting Torah: *pshat*, *drash*, *remez*, and *sod* (the plain meaning, the allegorical meaning, the interpretive meaning, and the mystical meaning). There are four rivers in the Garden of Eden. Fourness reflects the ages of human experience: youth, maturity and generativity, reaching one's full power in mid-life, and the challenges and joys of old age. The Jewish world-tree, the *etz chayim* or tree of life, passes through four levels of existence on its way between heaven and earth."[6]

All of these "building blocks" can be interpolated into the four worlds experience. The Kabbalists teach that we dwell in the realm of *Assiyah* – action – the physical world, and it is the playground for understanding and integrating these four worlds. It is the four elements, Earth, Water, Air, Fire that are the ancestral genome of physical life. Further, each of these elements corresponds to one of the four worlds. Earth is *Assiyah*, Water is *Yetzirah*, Air is *Bri'ah*, and Fire is *Atzilut.* With these four pairs of terrestrial-mystical DNA, the four worlds can begin to be understood and strengthened in our midst.

If we draw a vertical axis (perhaps on a slight slant) from the depths of our oceans to the sun we will also experience the layers of the four worlds. The Bedrock – the foundation stone of the ocean floor is the Earth, the realm of *Assiyah*, up through the Depths (*m'ma'amakim*) of the oceans and rivers that flow over this foundation stone (*Yetzirah*),

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[6] Four Worlds. Earth, Water, Air, Fire. http://telshemesh.org/four/. Accessed at June 29, 2012.

lifting into the firmaments of the atmospheres of air (*Bri'ah*), to the fiery life sustaining and giving presence of the Sun (*Atziluf*). The four worlds are not only our dialogue with God but are the four elemental pillars of our terrestrial existence. Existence as we know it would not be possible if we lacked one of these elements. Each are interconnected, one within the other to foster life and stimulate growth. These four gifts have been given to the inhabitants of this world to cultivate and nurture.

Sustainability, and environmental stewardship are cornerstones of the Jewish tradition. Today, these ideals are also taking center stage in the global arena. "Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations."[7] Traipsing back multiple generations, "the Talmudic and midrashic traditions continue this implicit assumption of man's obligation to, and responsibility for, nature's integrity: Nothing that the Lord created in the world was superfluous or in vain; -hence all must be sustained. An agadah, often repeated in the literature, says that God created the world by looking into the Torah as an architect into a blueprint. Creation, the Rabbis were saying, is contingent upon the Torah-or, the survival of the world depends upon human acceptance of moral responsibility."[8] In order for sustainability to come to fruition, there needs to be action, and the calling is for humanity to be stewards of the land.

> "[W]e are told of God placing Adam in the Garden of Eden- which, from its description in Scripture, was a model of Ecological health. 'And the Lord God took the man and put him into the Garden of Eden to work it and watch over it.' The undefiled world was given over to man "to work it," to apply to it his creative resources in order that it yield up to him its riches. But alongside the mandate to work and subdue it, he was appointed its watchman: to guard over it, to keep it safe, to protect it even from his own rapacity and greed. Man is not only an oved,

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[7] What is Sustainability? http://www.epa.gov/sustainability/basicinfo.htm#sustainability. Accessed at October 13, 2012

[8] Waskow, Arthur editor, Torah of the Earth: Exploring 4,000 Years of Ecology in Jewish Thought (2 vols., Jewish Lights, 2000) Page 110-111.

> a worker and fabricator, he is also a shomer, a trustee who, according to Halakah, is obligated to keep the world whole for its true Owner, and is responsible to return it in no worse condition than he found it."[9]

All of our communities across the four corners of this world are bastions of environmental stewardship; where love of Torah and the Earth is focal. At this intersection lies the Four Worlds as an ecological model to cultivate and transform this love into action. Sojourning into each world, understanding its kabbalistic intention and its elemental symbology, there emerges environmental initiatives that promote sustainability and enhance our connection to the divine through the *Olamot.*

Each section of the four worlds model will begin with an excerpt from the Zohar which will open up a connection between mystical texts and one of the elements. This will flow into a later mystical text where the mystical-elemental connection is strengthened. Upon this **foundation**, a picture of the current state of the environment as it pertains to the specific element/world will be **formed**. Finally, a **creation** of a green initiative that bridges the mystical-elemental-environmental consciousness will be offered as a symbolic communal practice towards ecological sustainability and awareness. We are all worlds within worlds **emanating** a divine love for our planet through spiritual, physical, symbolic and practical pathways.

In the Level of Assiyah – Action –Earth – Digs the Shamir 2.0 in the Genizah Compost.
In the level of Yetzirah – Formation – Water- grow Plants in a Hydroponic Havdalah Garden
In the level of Bri'ah – Creation – Air/Wind we realize our human Carbon Imprint and Offset it with a Wind Energy Initiative
In the level Atzilut – Emanation – Fire – our eternal flame, truly become an eternal flame with the Solar Ner Tamid

[9] Ibid. Page 126.

III. A. Assiyah

The journey of the four worlds begins in *Assiyah*. This dimension is associated with: "doing, making, **action**," and for the focus of this project, the element of **Earth**. *Assiyah* is the foundation of the mystically infused ecologically conscious four worlds initiative. It is from this first world that we may seek the three other worlds. The excerpt from the Zohar I, 231a-231b discusses the relationship between the foundation stone (stone, being the corollary for earth), and the other elements:

> "Come and see. This stone was created from fire, air, and water. It was composed of them all and became a single stone, and it stands above the deeps. Sometimes waters flow from it and the deeps are filled. This stone stands as a sign in the center of the world. It is the stone which Jacob set up and established, the basis and sustenance of the world. This is the significance of "And Jacob took a stone, and set it up for a pillar" (Genesis 31:45), "And this stone which I have set up for a pillar" (ibid., 28:22). But was this stone really set up by Jacob? Surely it had been created at the very beginning, when the Holy One, blessed be He, created the world? But [Jacob] set it up in order to sustain the upper and lower worlds. Therefore it is written "which I have set up for a pillar." What is the meaning of "which I have set up?" it is written "it shall be a house of God" (ibid.). He set up here the abode of the upper world."[10]

The foundation stone is the center of the world for the kabbalists. In *Midrash Tanhuma, Kedoshim* 10 describes this Tradition center as the axis mundi: "The land of Israel is the navel of the world, being placed at its center. Jerusalem, is the center of the land of Israel. The temple is at the center of Jerusalem. The Holy of Holies is at the center of the Temple. The Ark is at the center of the Holy of Holies. And in front of the Holy of Holies is the weaving-stone of which the world was woven." These concentric circles of holiness revolve around a terrestrial center symbolized by a stone. This dimension grounds the four worlds in the physical. *Assyiah* emerges and emanates from the three "higher" worlds just as here, the Stone emerges from fire, air, and water. The stone-earth is a symbol of the tangible, the immanent- it is something than can be grasped. The relationship between the four worlds paradigm is planted here. The four worlds are

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[10] Tishby, Isaiah. The Wisdom of the Zohar, An Anthology of Texts, Volume II. (Littman: London,1989). Page 571-2.

not necessarily a vertical experience but one experience with four aspects. Hayyim Vital (1542-1620) in his book *Sha'arei Kedushah* continues the development of the four worlds narrative. Vital is the student of Isaac Luria (1543-1572), a premier kabbalist whose mystical teachings carves out a new development in Kabbalah as a whole. Vital, studied with Luria for Luria's last two years of life. At the age of 38 Luria dies, and Vital writes down his teachings. It is through Vital's writings that Luria's kabbalistic wisdom is perpetuated. Luria further develops the notion of four worlds, adding a fifth world:

> These are the five worlds: Adam Kadmon, which the sages called "sparks." The second is the world of Atzilut. The third is the world of Beriyah. The fourth is the world of Yetzirah. The fifth is the world of Assiyah. These five worlds are called one Divine Name (or: one Divine Being/Havayah Achat). The point of the yud is Adam Kadmon, the yud is Atzilut, the first heh is Beriyah, the vav is Yetzirah, and the last heh is Assiyah. Because Adam Kadmon is mostly hidden, it has no letter image except for the point of the yud, for the Infinite doesn't even have a point as an image. So, we only mention the four worlds; Atzilut, Beriyah, Yetzirah, and Assiyah, for they are the complete letters and those four together are called the Divine Name. (Hayyim Vital, *Sha'arei Kedushah* 3:1).

The dimensions of the divine are encapsulated and experienced through the worlds. Traditionally, the worlds are taught and experienced as emanating from the supernal realm down to the terrestrial. However, for the sake of rootedness this discussion flows in the opposite direction, beginning with *Assiyah* and flowing towards *Atzilut.* The fifth world, in Lurrianic Kabbalah, called Adam Kadmon, may be thought of that which integrates the four worlds. It is beyond the realm of conception and may be understood as the hidden thread that weaves the four worlds into experience. Adam Kadmon, Primordial being, is the ethereal blueprint, an unknowable Seed of seeds, which fosters the expansion of the four worlds. For the four worlds to function simultaneously they need to be integrated. Adam Kadmon, the tip of the yud begins and guides this integration. The question remains, how can these worlds of divine influence be experienced in the present moment? At the outset of Vital's book (*Sha'arei Kedushah* 1:1) he states, **"From the four spiritual elements (fire, air, water, earth) all the upper worlds were created, and these are the four letters of the divine name (*yud, hey, vav, hey,* or *atzilut, briyah, yetzirah,* and *assiyah*).** The seeds of

integration are set here. The four elements, without which our world could not exist, are intimately connected to the four worlds. Earth, wind, air, and fire are elements that we can experience. They are the fundamental ancient building blocks of all life on Earth. The "stone" that the Zohar mentions that is comprised of the other elements, though rooted in a Jewish framework, is also a symbol of the Earth that holds life, and it is from this place that the four worlds as a model of ecological awareness and sustainability is grounded.

Assiyah (Earth, soil), is the substratum of growth. It is a foundational substance that holds the potential for the other elements. How might we care for the earth so as to deepen the connection to the dimension of *Assiyah*? Composting is one key way to nourish growth and actually create soil. Further, transforming the genizah (the ritual burial of documents with God's name on it) draws in the Jewish spiritual element.

The Science of Earth

Composting Science and History

New York City created its Department of Street Cleaning in 1881. During this time refuse was typically thrown out on the street, 75% of which was collected by this new agency and dumped in the Atlantic Ocean. In 1895 a Recycling law was created by Commissioner George Waring and enforced by police commissioner Theodore Roosevelt, which divided garbage into food waste, rubbish, and ash. With the advent of World War One, this program ceased and dumping in the ocean returned. During the years after World War One 22 incinerators and 89 landfills were built. In New York City, by 1994 all of the incinerators were closed down, and in 2001 the last of the landfills (Fresh Kills, Staten Island) was closed. It wasn't until 1989, that Local Law 19 made recycling in New York City mandatory. By 1997, all of the five boros were recycling like material. Visy Paper (NY) Mill opened on Staten Island handling half of the City's paper recycling (about 150 thousand tonnes) and Sims Municipal Recycling of New York,

LLC[11] managing the City's 200,000 tons of plastic, glass and metal per year.[12] In a 2002 interview with Amy Eddings, Visy's general manager, Daryl Whitehead, estimated, "with research we've done in Australia, every person produces a ton of waste per year. Of which, conservatively, 30 to 40 percent of that is paper products."[13]

The Department of Environmental Conservation stated, "In 2009, 10.6 million tons of solid waste were disposed of in New York State landfills, considerably less than the 14.1 million tons of solid waste that was landfilled in 1990. As of June 2010, there were 27 active municipal solid waste landfills, 16 active industrial/commercial waste landfills, 14 construction and demolition (C&D) landfills, and 3 active ash monofill landfills."[14] Composting is one way to ease the load of New York City's waste stream. The 2004 Municipal Solid Waste Composting Report sought to analyze the components of New York City's current waste stream as well as the technologies needed to develop an effective composting program. "A useful way of thinking about these materials is to group them as either biodegradable ("degradable") or non-degradable. Everything organic (derived from once-living organisms) eventually degrades over time. For example, plastics and certain textiles, while organic, are not classified as degradable. Therefore, the residential waste stream is 63.8% degradable and 36.2% non-degradable. The institutional waste stream is 74.5% degradable and 35.5% non-degradable."[15] Of this post-recycling waste stream roughly one third is paper and prime for recycling or composting.[16]

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11 Sims Metal Management Municipal Recycling
http://www.simsmm.com/us/divisions/municipal-recycling/. Accessed August 20, 2012.
12 History of NYC Recycling. http://www.nyc.gov/html/nycwasteless/html/resources/history.shtml. Accessed August 20, 2012.
13 Visy Paper Mill Seen As Recycling Success Story, Wednesday, June 05, 2002, By Amy Eddings
http://www.wnyc.org/articles/wnyc-news/2002/jun/05/visy-paper-mill-seen-as-recycling-success-story/). Accessed August 20, 2012.
14 Solid Waste Landfills http://www.dec.ny.gov/chemical/23681.html. Accessed August 20, 2012.
15 Municipal Solid Waste Composting Report.
(http://www.nyc.gov/html/nycwasteless/html/resources/reports_msw_composting.shtml) Accessed August 20, 2012.
16 The Decomposting Process. http://www.nyc.gov/html/nycwasteless/html/compost/science_decomposition.shtml Accessed August 20, 2012).
Basic Principles of Decomposition: Organic materials have many different qualities and uses. Yet all organic materials have a common trait that sets them apart from other materials: they naturally decompose. Decomposition is nature's way of recycling organic matter to replenish the soil and nourish plant growth.

Composting the Name of God

In The Babylonia Talmud, *Masechet Shavuot* 35a-b there is a discussion around which names of God may and may not be erased.

> Shall we say that Merciful and Gracious are Names? This is contradicted [from the following]: There are Names which may be erased; and there are Names which may not be erased. These are the Names which may not be erased, such as: *'El', 'Eloha', 'Elohim'*, 'your God', I am that I am, *'Alef Daleth', 'Yod He', 'Shaddai', 'Zebaoth'* — these may not be erased; but the Great, the Mighty, the Revered, the Majestic, the Strong, the Powerful, the Potent, the Merciful and Gracious, the Long Suffering, the One Abounding in Kindness these may be erased! Abaye said: Our Mishnah means: '[I adjure you] by Him who is Gracious';

The rabbis have designed levels of holiness with respect to the written name of God, whereby some linguistic forms of the divine possess an added level of holiness. The implications of the writing of such names determines how one cares for it and disposes of it. Maimonides (1135-1204) in *Hilkhot Yesodei HaTorah*, Chapter Six[17] states,

> Whoever destroys one of the holy and pure names with which the Holy One, blessed be He, is called is liable for lashes according to Scriptural [Law]. This punishment is given because such an act violates one of the Torah's prohibitions. The prohibition is derived as follows: With regard to the worship of false gods, [Deuteronomy 12:3-4] states: "And you shall destroy their names from this place. Do not do this to God, your Lord."
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> There are seven names [for God]: the name which is written ***Yud-Hey-Vav-Hey***. This is [referred to as God's] explicit name and is [also] written *Alef-Daled-Nun-Yud.* ***El; Elo'ah; Elohim; Elohai; Shaddai; Tz'vaot***; Whoever erases even one letter from [any of] these seven names is [liable for] lashes.

Anaerobic Decomposition and Methane Production: In some situations, such as human-engineered landfills, decomposition can create serious problems. When buried, organic materials are cut off from air and decompose very slowly-even newspapers from 40 years ago can still be found relatively intact in landfills.
Decomposition in the absence of air-or anaerobic decomposition: produces methane gas. Methane can build up in landfills or migrate underground to nearby buildings, creating the danger of explosion. As rain or groundwater percolates through the landfill, weak acids produced by decaying organic matter wash through the landfill and react with the other trash, creating a potentially toxic leachate that can contaminate groundwater, lakes, and streams. The systems designed to capture methane gas and collect leachate make landfills expensive to build and operate.
Managed Decomposition: Composting: When organic materials are separated from trash and allowed to decompose with an adequate amount of oxygen-or aerobically-they can be turned into **compost**, a valuable resource. When used in gardens and parks, compost helps to make soil loose and well-drained, provides plants with valuable nutrients, protects soil from erosion and compaction, and conserves water and other resources.
17 Mishneh Torah. http://www.chabad.org/library/article_cdo/aid/904982/jewish/Chapter-Six.htm. Accessed August 20, 2012.

Maimonides categorizes these seven holy names of God. He juxtaposes the care for these written names to the Deuteronomic commandment to destroy the names of false Gods. How are we then to treat these seven written names of God? In the *Kitzur Shulchan Aruch*[18] a treatment is proscribed:

> A Torah scroll that has become worn should be placed in *genizah*. The same applies to other sacred texts, writings, and ritual articles. *It is forbidden to burn them. {They should be placed in an earthenware container and buried in the grave of a Torah Sage (*Shulchon Oruch, Orach Chayim* 154:5).

Texts with Gods name on it must be buried in the earth. Embedded in the Jewish tradition is a pre modern form of composting - the *Genizah*. Taking this traditional practice one step further will help to intensify and strengthen our terrestrial connection to the earth. Creating a compost genizah in the community aids in the breakdown of *genizah* materials into rich nutrient soil that may be used to foster new growth.

Assiyah and Earth

The Green Initiative: Shamir 2.0 Compost Genizah

"The sense of the human relationship with nature is evident in the saying of the *Baal Shem Tov*, founder of Hasidism, as his disciples records: 'A man should consider himself as a worm, and all other small animals should be regarded *as his friends in the world*, for all of them (i.e. man and the other species) are all created."[19]

Red Wiggler worms[20] are used to aid the breakdown of organic materials into soil. Perhaps they are the descendants of the *Shamir*. What is this mythical mystical creature

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18 The Torah Scroll and Sacred Texts. http://www.torah.org/learning/halacha/classes/class76.html#. Accessed August 25, 2012

19 Waskow, Arthur editor, Torah of the Earth: Exploring 4,000 Years of Ecology inJewish Thought (2 vols., Jewish Lights, 2000) Page 119.
Page 119.

20 Eisenia fetida (older spelling: foetida), known under various common names such as redworm, brandling worm, panfish worm, trout worm, tiger worm, red wiggler worm, red californian earth worm, etc., is a species of earthworm adapted to decaying organic material. These worms thrive in rotting vegetation, compost, and manure; they are epigean. They are rarely found in soil, instead preferring conditions that are inimical to some other worms

know in Rabbinic literature as the Shamir? Is it a worm, a snail, or a radioactive substance?[21] In the Talmud, Masechet Sotah 48b it states,

> " The Rabbis taught: The *Shamir* was used by Solomon to build the Holy Temple, as it says, 'When the Temple was being built, it was built of complete quarried stone, [there was neither hammer nor ax nor any tool of iron heard in the house, while it was being built]" (Kings 1 6:7). These words are as to be understood as they are written- according to the view of Rabbi Yehudah (i.e. the Shamir was used to prepare the stones, rather than tools."

From this excerpt the *Shamir* possesses the supernatural power of breaking stone. But where does the Shamir find its origin in Rabbinic texts? *Mishnah Avot* 5:6 mentions ten sacred items that were created at a special moment in the rabbinic myth of creation:

> "There are ten things that were created on the eve of [the first] Sabbath, and these are they: The mouth of the earth (that swallowed Korach); the mouth of the well; the mouth of the ass [of Balaam]; the rainbow; the manna; the staff; the Shamir; the Written Torah; the writing [on the Tablets]; and the Tablets."

The *Shamir* has the potential of breaking down organic and inorganic matter as Rashi states, "Like *Shamir*- a type of worm, that one shows it upon the stone, and it splits opposite it."[22]

In this level of *Assiyah*, the world of action, the element of earth, the red wiggler worm, a modern day Shamir dwells. It is a veritable *Shamir* 2.0, engaging in the divine action of transforming spiritual matter into a tangible physical growing substrate. The *Shamir* 2.0 composting *genizah*[23] draws together the ancient practice of the *genizah*, with the environmentally conscious practice of composting to promote spiritual awareness and physical growth that can be experienced in the realm of *Assiyah*. Shneur Zalman of

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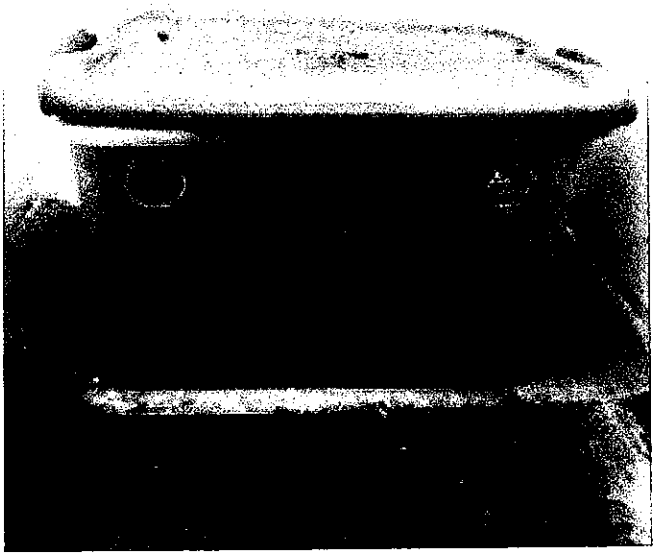
21 Slifkin, Natan. Sacred Monsters: Mysterious and Mythical Creatures of Scripture, Talmud and Midrash. (Gefen Books: New Jersey, 2011).
22 Slifkin, Natan. Sacred Monsters: Mysterious and Mythical Creatures of Scripture, Talmud and Midrash. (Gefen Books: New Jersey, 2011). Page 210.
23 An indoor composting bin and worms can be bought at http://www.lesecologycenter.org/index.php?option=com_content&view=section&id=3&Itemid=6
To note: What can and cant be put into the compost bin: Browns, dried leaves, lint, coffee grinds, paper, egg shells GREENS Leaves, NO – OILS, MEATS, FRUIT, DAIRY, (bug free zone)

Liadi, the Alter Rebbe, sums up the inherent beauty in a practice like the *genizah* compost:

> "The radiance [of the Divine]... manifests its power and ability in the element of the earth in an immense manifestation, in more enormous strength than elements transcending [the earth], even the hosts of heaven. For they do not have it in their power and ability constantly to bring forth something from nothing, like the element of earth which constantly makes grow something from nothing—these are the plants and trees—from the creative power it possesses, which is *Ayin* [Divine void] and spiritual."



III. B. Yetzirah

Journeying from the realm of *Assiyah*- earth, we flow into the world of *Yetzirah*. *Yetzirah* is the space of **formation** and is associated with the element **water**. Taking the raw material and experience of *Assiyah* and transforming it so as to enhance the immanent connection to the divine in the present moment. The Zohar I, 32b teaches about upper and lower waters:

> "And God said: Let there be a firmament in the midst of the waters and let it divide the waters from the waters" (Genesis 1:6). Rabbi Judah said: There are seven firmaments above and they all stand in supernal holiness, and the holy name is completed through them, and this firmament is in the midst of the waters. This firmament rests upon other creatures and it separates the upper waters from the lower waters, and the lower waters call to the upper waters, and they drink from this firmament. It is this that separates them, for the waters are all comprised in it, and then it sheds [water] upon these creatures and they draw water from it.[24]

The Zohar is expanding on the creation story found in Genesis. The Zohar translates the terrestrial firmament of the genesis narrative in seven firmaments that correspond to the seven lower *sefirot* – divine emanations. The "holy name" is the tetragrammaton, (one of the written names of God that must be buried) and the ten sefirot have corollaries to each of the four letters much like each of the four worlds is associated with one of the four letters of the tetragramaton. The firmament in the midst of the waters is the *Sefirah* of *Malchut*, the divine that we experience in the realm of *Assiyah*. This section of Zohar depicts two sets of "waters" one is the supernal waters that flow down from above and the lower waters which can absorb the nourishment of the "upper waters" through the *Sefirah* of *Malchut*. Thus the level of *Malchut* stores the supernal waters and then irrigates the lower waters so as to provide sustenance.

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[24] Tishby, Isaiah. The Wisdom of the Zohar, An Anthology of Texts, Volume II. (Littman: London, 1989). Page 581-2.

Drawing from the Creation story in Genesis, Hayim Vital teaches in *Sha'arei Kedushah* 3:2,

> "This is the secret of what Scripture says: Let us make man in our image." This verse is in the plural because all the worlds participated in the making of human beings. The human being, through his/her deeds, helps life to flow in heaven and earth, and it is as if humanity planted and founded the worlds."

In both of these texts *Malchut* and humanity stand at the nexus of the upper supernal world and the lower terrestrial world. Each, respectively, is the pathway through which both worlds are fed. Further, actions in the lower world impact and are reflected in the upper world. This theurgic component to the text strengthens the influence that each world has upon the other. For example, R. Meir ibn Gabbay understands the name of God, "*Ehyeh asher Ehyeh"* as the connection between human and God as, "man, being the basic pattern of the higher structure, [who] is able to influence its state by his activity: ontological resemblance serves the theurgical goal."[25] Humanity is the shadow of God, and within each being there exists the divine structure of God. Moshe Idel, suggests that, "the theurgical approach conceives man as the fulcrum of important characteristics: he is, at least to a certain extent, the paradigm and the source of power."[26] Humanity is the link between this world and the supernal realm. The flow of spiritual waters come down into our plane of existence and is transformed into living waters that saturate this earth. Water, this second fundamental element is crucial to our existence. Humans and the earth are comprised primarily of water. Water conservation is thus of utmost importance. To waste water is to disrespect our bodies.

What is the current state of water use and conservation? How we use, treat, and care for our water in the realm of *Yetzirah* directly reflects the pools in the supernal realm.

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[25] Idel, Moshe. Kabbalah: New Perspectives (New Haven: Yale University Press, 1988). p. 176.
[26] Ibid. p.176.

The Science of Water

Water Science and History

Water is required in almost every facet of life. In New York alone,

- "More than 15 billion gallons of water are withdrawn each day from the lakes, rivers, streams, estuaries and groundwaters of New York State for uses that include domestic consumption, industrial use, irrigation and livestock watering, mining and thermoelectric power generation. Thermoelectric power is by far the most significant of all water use categories, accounting for nearly 80% of total water withdrawn. Public water supply accounts for nearly 17%.
- About two-thirds of the total water withdrawn is fresh water. The other third is taken from saline waters and is used primarily for thermoelectric power generation. Surface water withdrawals account for nearly 94% of all freshwater withdrawals in New York State, the remaining 6% of withdrawals are taken from groundwater sources.
- Public water supply use and other domestic water withdrawal uses (including normal household uses such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets and watering lawns and gardens) account for about 26% of all freshwater withdrawals in the state. The majority of these withdrawals (76%) are drawn from surface waters, while the remaining need is provided by groundwater."[27]

These three statements portray the obvious and crucial role water plays in the world. The same can be said for the human body. Without water we cannot live for very long at all. Water is used to fuel living beings and industrial apparatus. Its life giving quality cannot be underestimated. Of note, across the country,

> "Agriculture is a major user of ground and surface water in the United States, accounting for approximately 80 percent of the Nation's consumptive water use and over 90 percent in many Western States. Efficient irrigation systems and water management practices can help maintain farm profitability in an era of increasingly limited and more costly water supplies. Improved water management

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[27] Water Use in New York. Department of Environmental Conservation. http://www.dec.ny.gov/lands/67073.html. September 2, 2012.

> practices may also reduce the impact of irrigated production on offsite water quantity and quality, and conserve water for growing nonagricultural demands."[28]

The need for Best Management Practices (BMP)[29] are vital to insure that water is a sustainable resource. Governor Cuomo recently passed a New York Water Resources Law that went into effect February 15, 2012. The law requires a DEC permit for anyone who withdraws 100,000 gallons of water a day. This also includes current sectors that are already drawing this amount. This will allow for an accounting of the major users of water in the New York State watershed. This law is an example of one way to create awareness of what it means to maintain a sustainable practice of water. On the national level, "In 2005, about 410,000 million gallons per day (Mgal/d) of water was withdrawn for use in the United States."[30]

Returning to the teachings of the Torah, this notion of water conservation is hidden in the practice of observing *shmitah*. Leviticus 25 teaches,

> "And the Lord spoke to Moses on Mount Sinai, saying, " Speak to the Israelites, and you shall say to them: 'When you come into the land that I am about to give you, the land shall keep a Sabbath to the Lord. Six years you shall sow your fields and six years you shall prune your vineyard and gather in its yield. And in the seventh year there shall be an absolute Sabbath for the land, a Sabbath to the Lord. Your field you shall not sow. And your vineyard you shall not prune. The after growth of your harvest you shall not reap and the grapes of your untrimmed vines you shall not pick. There shall be an absolute Sabbath for the land.."

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28 Irrigation and Water Use. United States Department of Agriculture. http://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use.aspx. Accessed September 2, 2012.

29 The future of irrigated agriculture will depend in part on the ability of producers to improve on-farm water management for crop production. Upgrades in irrigation system technologies and improved water-management practices can enhance on-farm water-use efficiency. In addition, coordinating water management at the farm- and watershed-levels may help increase the efficiency of water allocations among competing users. Institutional measures--such as conserved water rights, groundwater and surface-water withdrawal restrictions, drought water banks, and option water markets--can encourage agricultural producers to reduce crop consumptive use while facilitating the reallocation of water to higher valued uses." Irrigation and Water Use. United States Department of Agriculture. http://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use/background.aspx. Accessed September 2, 2012.

30 The USGS Water Science School. Total Water Use in the United States, 2005. http://ga.water.usgs.gov/edu/wateruse-total.html. Accessed December 3, 2012

Here is a biblically mandated BMP. While the *shmitah* practice specifically deals with allowing the earth, the realm of *Assiyah,* to rest, this indirectly implies that the water needed to irrigate these fields is also given a rest. Thus both land and water usage cease during the *shmitah* period. However, this does not mean that one cannot grow produce. Rather, one needs to envision a new way to grow produce without using the land. Hydroponics, is the practice of cultivating plant life, without the use of soil, in a mixture of water with nutrients. Hydroponics, allows the water to be specifically used only to grow the intended plant. Whereas watering a field, will feed other unspecified plants, will evaporate, as well as seep down into the watertable. It is the minerals that are found in the soil that foster plant growth and these minerals can be isolated and added to water in a hydroponic system. The message of the *shmitah* is filtered through hydroponics. The land is allowed to rest, water can be conserved and used in a more effective manner, and plants can still grow.

Yetzirah and Water

The Green Initiative: Hydroponic Havdalah Garden[31]

While the dimension of *Assiyah* and the correlating compost initiative offers nutrient rich soil to be reused, the Jewish tradition also acknowledges the need for *shmitah* – allowing the land to rest and lay fallow. The realm of *Yetzirah* depicts the exchange of waters from above to below. As the supernal waters descend to the terrestrial realm we can experience this flow in the water that encompasses the earth. How we experience the nourishment of the upper waters is directly reflected in how we treat the lower waters of the Earth. When water conservation is practiced in the present, this influences the vitality of the supernal waters. Further, to demonstrate this in the community, a hydroponic Havdalah garden will symbolize the dual nature of water as that which nourishes the body as well as the soul. Hydroponics can be grown year round indoors. Introducing green growth inside, year round, will enliven the built environment. It is a

[31] A simple hydroponic garden can be found at www.aerogarden.com

symbol of the potential for consistent growth (both physically and spiritually). Havdalah, is a ritual that acknowledges the distinction between sacred and profane time. When we harvest the sweet smelling plants to use for Havdalah, we are reminded that we are the ones who can remember and guard sacred time. We form our consciousness and attune ourselves to this ritual which we create and celebrate in partnership with God. In *Yetzirah*, the world of formation, water is fluid, yet it has the power to shape and mold. One need only look at rocks in a riverbed to experience the effects of a consistent flow of water over stone. The world of *Assiyah* plants the foundation of our connection to the earth, now in the realm of *Yetzirah* we begin to shape and form this connection.

III. C: Bri'ah

kol Ha'Neshamah t'halell Yah, Halleluyah

Every Breath Praises the Breath-Wind-Air of all Life, Hallelujah

Psalm 150: 6

Bri'ah is the third world in our travels through kabbalistic sacred space. It is the level of Creation and the element of Air. We have sifted through the earth and swam in the waters of *Assiyah* and *Yetzirah*. Allowing the worms to act through the names of God, and water to form plant life. The realm of air is slightly less tangible than the previous two worlds. Nevertheless, it is just as vital. In Kabbalah, air is associated with soul as the word used for the two (*ruach*) is identical. In addition, the Zohar 1, 205b-206a, adds multiple layers of the soul:

> Rabbi Isaac said: It is all above, for from there the neshamot go forth to this earth, which brings them out and gives [them] to all; for the river that stretches out continuously provides neshamot and brings them into this earth, which receives them and gives [them] to all.
>
> Come and see. When the Holy One, blessed be He, created man, He gathered the dust for him from the four corners of the world, and He made his body in the place of the sanctuary below. And he bestowed upon him the breath of life from the Temple above. There are three levels that comprise the soul, and therefore the soul has three names, and the pattern of the mystery above: nefesh, ruach, neshamah. Nefesh they have already explained, is the lowest of all. Ruah is the [power of] sustenance, which rules over the nefesh and is a higher level than [the nefesh], sustaining it throughout as fitting. Neshamah is the highest [power of] sustenance, and rules over all, a holy level, exalted above all.
>
> These three levels are contained within man, in those who are deserving because of their devotion to their creator. At first he has a nefesh, which is a holy restorer, by which man can be restored. When man begins to purify himself he is restored at this level so that he may adorn himself with ruach, which is a holy level, dwelling above the nefesh, and which stimulates the man who is deserving. Once he has ascended through them, through the nefesh and the ruah, and he has begun the process of restoration through the correct worship of his Creator, the Neshamah rests upon him, the highest holy level, which rules over all, so that he may adorn himself with the highest holy level. Then he is the most perfect of all, perfect in every respect, worthy of the world to come, and he is one who loves the Holy One, blessed be He, as it is said "That I may cause those that love Me to inherit substance" (Proverbs 8:21). Who are those that love Me? It is those that

> posses the holy neshamah.... Come and see. They are all levels, one above the other: nefesh, ruah, neshamah, one level above the other. Nefesh is first, and this is the lowest level, as we have said. The ruah comes after this, dwelling above the nefesh and resting upon it. The Neshamah is the level that rises over all. And they have explained it. Nefesh- this is the soul of David, which waits to receive nefesh from the river that emerges continuously. Ruah- this is the Ruah that exists above the nefesh, and the nefesh receives its sustenance from the ruah alone; and this is the ruah that stands between fire and water, and the nefesh is nourished from there. The ruah is supported by another, higher level, called neshamah, from which come both nefesh and ruah. The ruah is nourished from there, and when the ruah takes [nourishment] the nefesh takes also, and all is one. And they are near to one another: the nefesh is near to the ruah, and the ruah is near to the neshamah, and all is one.

The Zohar speaks of levels of holiness that are attributed to different aspects of the soul. The more one refines oneself the "higher" the soul grows. In the Zoharic conception of the layers of the soul, the first layer *Nefesh* receives its nourishment from "the river that emerges continuously." Perhaps this is connected to the previous world of *Yetzirah.* The next level *Ruach*, is just "above" *nefesh* and "stands between fire and water." *Nefesh* rests between, the water of *Yetzirah* from whence the *nefesh* is sustained and close to the last level of *atzilut* (whose element is fire). The last level of soul in this text is the *Neshamah.* It is this last, highest level of soul that supports the two previous layers.

Turning to Lurrianic Kabbalah, a later strand of mystical teaching, Hayim Vital relays five layers of the soul (adding two higher or inner layers to the Zohar's model).

> One Divine Being includes within it all things, and divides into five worlds, that are called *yechidah*, *chayah*, *neshamah*, *ruach*, and *nefesh*. This material world is the body and the matter for them all. All the worlds are forms of the human, derived from the material world and divided into five kinds of spirit, as I have already mentioned. Hayyim Vital, *Sha'arei Kedushah* 3:2

In this model, the layers of *yechidah* and *chayyah* are added. The *chayyah* may be understood as a guiding super soul that is contained within the *neshamah*, and *yechidah* is the soul essence – the *Nishmata d'Nishmata* (the soul of soul).

Air is the soul of the world. It is felt but not seen. In this level of *Bri'ah*, air is a source of creation. The wind and breath of our words create. *Abra Kadabra – Avra k'davra* – I

create as I speak. The soul contains the divine creative stimulus - it is the hidden piece of the divine located in the *Assiyah* – the terrestrial-dust that is the body. As all living things breath they are also breathed by God. It is in this level that the interconnectedness of all is demonstrated. The whole world breathes. Ones' inhalation draws in the exhalation of everything green on this planet, and ones' exhalation is the inhalation of everything green and living. We are all part of this living breathing macro-organism. However, there are byproducts of our actions that affect the quality of the air and this pollution does harm to the planet and jeopardizes the foundation of the sustainability enterprise.

The Science of Air

It has become evident, through research in the Global Science community that human activity on the Earth has an effect on the environment. The human imprint on this planet is one that is of the greatest threats to fostering an ecologically sustainable environment. In urban environments, clean air is a valuable and diminishing commodity. As the world's cities become increasingly populated, industrial consumption grows to supply the human need. As a result, more toxins are being released and polluting our air. The city is becoming an exhaust pipe for the human engine. The great skyscrapers, the lonely creations of an architect's pen, belch forth pollutants, particulate matter that hovers over the city like a cloak. What are the main sources or airborne pollution?

"At the global scale, the key greenhouse gases emitted by human activities are:

Carbon dioxide (CO_2) - Fossil fuel use is the primary source of CO_2. The way in which people use land is also an important source of CO_2, especially when it involves deforestation. Land can also remove CO_2 from the atmosphere through reforestation, improvement of soils, and other activities.

Methane (CH_4) - Agricultural activities, waste management, and energy use all contribute to CH_4emissions.

Nitrous oxide (N_2O) - Agricultural activities, such as fertilizer use, are the primary source of N_2O emissions.

Fluorinated gases (F-gases) - Industrial processes, refrigeration, and the use of a variety of consumer products contribute to emissions of F-gases, which include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Transportation (13% of 2004 global greenhouse gas emissions) - Greenhouse gas emissions from this sector primarily involve fossil fuels burned for road, rail, air, and marine transportation. Almost all (95%) of the world's transportation energy comes from petroleum-based fuels, largely gasoline and diesel.

Emissions by Country: In 2008, the top carbon dioxide (CO_2) emitters were China, the United States, the European Union, India, the Russian Federation, Japan, and Canada. These data include CO_2 emissions from fossil fuel combustion, as well as cement manufacturing and gas flaring. Together, these sources represent a large proportion of total global CO_2 emissions."[32]

The earth that we live in has tolerated its inhabitants thus far. But humans have been leaving behind their polluted imprints from the beginning. The existance of carbon dioxide are a natural part of the earth's process. Though now there is an increased level of carbon dioxide emissions with the burning of fossil fuels, burning of solid waste, and deforestation. The world economy and lifestyle has become predominantly dependent on fossil fuel for energy that is so detrimental to the ecosystem. Forests and oceans that act like carbon sinks, are two natural elements in the ecosystem that sequester carbon dioxide. Trees absorb the carbon dioxide in the air and use it in the Calvin cycle, a process involved in photosynthesis.[33] Many forests are being cleared to create more land for agriculture. Agriculture in turn does not absorb carbon dioxide like forests. The tilling of the new agricultural land releases the carbon that exists in the ground, which reacts with the oxygen in the air to produce more carbon dioxide. All of these anthropogenic sources that emit carbon dioxide into the air are contributing to the greenhouse effect. Gases like carbon dioxide rise into the atmosphere and act like a cloak that traps in the sunrays that reflect off the earth's surface. As less heat escapes the climate begins to change. Global warming is a by-product of human existence. The continuing rise in greenhouse gases will cause the polar caps to melt and the water to slowly creep up on the land.

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[32] Global Emissions, United States Environmental Protection Agency. http://www.epa.gov/climatechange/ghgemissions/global.html. Accessed August 31, 2012.

33 To learn more about the Natural Carbon cycle, refer to the Appendix.

If the human race sees itself as one community than governmental bodies like the Environmental Protection Agency, Congress, and every local state needs to act on this issue. Limiting the emissions of carbon dioxide is a start, but the main goal is to phase out these emissions for an eco-healthy substitution, however long this might take. In the Clean Air Act[34], section 101 it states that, "air pollution prevention (that is, the reduction or elimination, through any measures of the amount of pollutants produced or created at the source) and air pollution control at its source is the primary responsibility of States and local governments." To produce global effects, attitudes must change locally (Cap

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[34] In 1963 the Clean Air Act (CAA) was created. Before this act people identified air pollution with something visible like smoke and smog. Increasing smog in Denora, Pennsylvania led to the death of twenty people and 6000 sick. This tragedy caused by intense smog led to greater national awareness.

The major cohorts of the CAA in 1963 were Edmund Muskie (Senator-MA), Abraham Ribicoff (former secretary of the Department of Health, Education, and Welfare), Kennedy Roberts (Congressman-AL), and Paul Schenck (Congressman-OH). The CAA was primarily in reaction to the increasing amount of pollution coming from automobiles. President Lyndon Johnson dovetailed the CAA with an air quality bill that put the majority of control with the local sector. State Implementation Plans (SIPs) help to provide a guideline by which states can monitor the progress of pollution within each state's perimeters.

The CAAA of 1970 placed more of the authority with the EPA. The EPA, headed by William Ruckelshaus (1970-73), formulated a set of air standards called the National Ambient Air Quality Standards (NAAQS) that would regulate air level qualities and emission standards that each state would have to abide by. President Nixon suggested an additional thirteen amendments to the CAA that would help to alleviate the pressure the major automobile industries were dealing with. In 1977 the CAA were amended again by congress with the additional outside influence of the Sierra Club. Part of these amendments was the Prevention of Significant Deterioration (PSD) that would set certain levels of air quality in places and not allow any further degradation.

During the Regan administration the CAA did not experience any forward momentum. Opponents to this forward momentum were focused on John Dingell and Henry Waxman (both on the committee for House Energy and Commerce and Robert Byrd (senate majority leader, D-WV). It was not until 1990 with the Bush Administration that the CAA regained momentum. Setting "nonattainment" areas and heavy reductions in Sulfer Dioxide reductions.

There were certain factors that impeded the effectiveness of the Clean Air Act and the amendments. When enforcement was transferred to the EPA, the EPA set unreasonable deadlines for efficiency standards. The needed technology to achieve the standards were very expensive and even once implemented would not approach the necessary levels of pollution abatement under the given deadline. Furthermore the EPA was given more control than necessary in regulating the hazardous pollutants. As time progressed the focus of the CAA began to widen its perspective to include not only the large industrial polluters but also all of the individual non-point sources-namely the "family car." With the increasing amount of regulations the EPA failed to provide a significant amount of guidelines for attainment. This coupled with the lack of available data during the CAA developmental years contributed towards the impeded effectiveness of the act. With the health of the American people as the primary goal, the economics of how to protect this health was not gauged properly. Setting ambient air quality standards that are at a healthy level is important but needs to be balanced with the worlds working system. If not then attainment becomes an infeasible goal. The CAA does not incorporate any consideration for costs instead it focuses on the anticipated public human health and welfare benefits. Technology based standards are primarily not cost efficient. The focal point with regulating air quality is that the elimination of pollution is no the answer. A reduction is the answer. In order to enjoy some of life's benefits we need to pollute, we thus need to strive for efficient levels of pollution abatement.

and trade programs are one example[35]). It is everyone's responsibility to become more conscious of our air.

Carbon dioxide exists worldwide. The pollution that one area experiences might be due to emissions of pollutants from another area that traveled by air and settled. Greenhouse gases affect everyone.

> During the 21st century, global warming is projected to continue and climate changes are likely to intensify. Scientists have used climate models to project different aspects of future climate, including temperature, precipitation, snow and ice, ocean level, and ocean acidity. Depending on future emissions of greenhouse gases and how the climate responds, average global temperatures are projected to increase worldwide by 2°F to 11.5°F by 2100."[36]

People who live more inland may be less concerned than those who live on the water. But as sea levels continue to rise, human existence will continue to be in jeopardy. This earth like any living organism has limits. It will be through the combined effort of congressional legislation and EPA regulation that change will be effected. We seek to protect earth by turning to our industries and working with them to create equilibrium whereby emissions of pollutants like carbon dioxide will continually dissipate.

35"Cap and trade," programs are an effective start in the correct direction. The Clean Air Planning Act of 2003 also has much promise. Senator Gregg (R-NH), Senator Lincoln Chafee (R-RI), and Tom Carper (D-DE) are the drafters of this bill (see www.senate.gov/~gregg). A total ban on carbon dioxide emissions would create a chaotic state, all major industries produce carbon dioxide and a cessation of emission would mean a cessation of production, and loss of jobs. Thus the process needs to take time but action and greater awareness needs to start now. The National Park Services need to preserve more forests for carbon sinks. Methods for retaining the carbon in the agricultural soil should be investigated. Urban environments are hotbeds for carbon dioxide emissions. Implementation of more trees and gardens would help to sequester the carbon dioxide that each city emits. Incentives for building roof top gardens by the government would encourage city inhabitants to plant. Acts like the Pollution Prevention Act, which requires polluters to submit a list of the amount of pollution it is emitting, should be strictly followed. Instituting a carbon tax that would charge the polluter a certain tax per unit of carbon emitted can act as a negative incentive to reduce the amount of carbon used.

36 Climate Change Science Overview. http://www.epa.gov/climatechange/science/overview.html. Accessed August 31, 2012.

Bri'ah and Air

The Green Initiative: Carbon off set Program[37]

Within our communities we can take responsibility for our carbon imprint by doing a spiritual and practical accounting. Carbon Calculators are available online whereby one can assess one's carbon imprint from our daily various outputs (transportation, home, office…). Within our community, for example, many of us commute to The Academy for Jewish Religion in various ways on different days. Native Energy or COEJL's Carbon Footprint Calculator are two such companies that aid in the assessment of individual and large scale carbon imprints. When such an assessment is complete, one can offset one's own imprint by donating (consecrating) the dollar amount to one of many wind energy projects across the country. Though the benefits of the offset might not immediately be felt, the earth is one breathing organism and **she** can experience the change. Moreover, by supporting a wind energy program in another part of the country further strengthens the obligated to take care of one another and the earth. Our individual souls are connected to the breath of the earth. When the earth has to inhale pollutants, everyone suffers. Though an eradication of pollutants is impossible, being mindful of the possibilities for one community to support another in reducing the global Carbon imprint places the importance of ecological sustainability at the forefront.

Hillel says, "If I am not for myself, who will be for me? But if I am only for myself, who am I? If not now, when?" Ethics of the Fathers, 1:14

III. D: Atzilut

The Children of Israel are commanded to bring pure olive oil for the *ner tamid*, "a constantly burning light," above the sanctuary. (Exodus 27:20-21)

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Atzilut, emanation, fire is the last dimension in this four worlds ecological narrative. It is both the inner most layer of the four worlds approaching the divine spark within all, and it is the dimension that encompasses all. The sun, is a natural symbol for the world of emanation, radiating down onto the earth. It thus allows for a way to immanently experience a corollary for the spiritual radiance emanating from *atzilut*. The four worlds become successively less tangible as they move from *Assiyah* to *Atzilut*, and in this last world this distance is truly felt by the distance between humanity and the sun. This, however, does not mean that it cannot be felt, but where earth, water, and air dwell in our midst, the average distance of the earth to the sun is 93,020,000 miles. In reaction to the distance we may challenge ourselves to seek new ways to connect to this luminescent divine creation that feeds all living things from a great distance.

The Zohar *Hadash*, *Bereshit*, 15a, *Midrash* ha-Ne'elam teaches:

> Rabbi Simeon taught: Come and see. The Holy One, blessed be He, made the sun only that it might be of use to mankind. Come and see. The sun moves through three hundred and ninety places in the inhabited world. It ascends and descends and it has certain known degrees and levels. This is the meaning of "Behold I will cause the shadow of the dial which is gone down on the sundial of Ahaz to go back [ten degrees]" (Isaiah 38:8)
>
> Rabbi Jose said: How does it ascend?
>
> Rabbi [Simeon] said: We have learned from the teachers in the Academy that the world is round like a sphere. When [the sun] rises in the east it goes around in a circle until it comes down, and then it is evening. And then it descends in a circular way through certain degrees concealed from us, it brings nightfall to us, but it shines upon those who live beneath us, according to the circular nature of the earth and the way it is inhabited. Then it continues and goes down and separates the water beneath the ocean from the water that is above. It makes a division in the middle of the

> water in order to prevent the stream of water that comes out of Gehinnom from flooding over and injuring mankind. Therefore it is called shemesh, (sun) only because it serves (shimesh) mankind. It is called shemesh, the minister (shamash) that serves all.

The sun is a divine creation that warms the earth. Through harnessing the sun's potential we enter into partnership with God. The creations of humanity and the creations of God intertwine in the space of *Atzilut*. Though this dimension may be the most concealed and mysterious to experience we can begin to experience a hint of its potential through the service of the sun. Embedded in the Hebrew word for sun is the divine yearning for partnership. This intimates the divine desire to shape pathways for humanity to reach out and connect with the Source. To a certain degree we are at the mercy of the sun as it revolves in its fixed path in our galaxy. We cannot force its behavior, we can only engage in it to the extent that it is safely possible.

This last world is the world that encapsulates all. From the supernal perspective *Yetzirah*, *Bri'ah*, and *Assiyah* emanated from this world, and *Atzilut* ushered in these three worlds so that we may navigate a pathway back to the source.

> "We conclude that the Infinite is the "soul of the soul," from which emanated a single Adam that includes all of the worlds- everyone of them. His essence corresponds to the five levels of the soul: nefesh, neshamah, chayyah, and yechidah. He is called Adam Kadmon. His body is the World of Emanation. His clothing consists of the three worlds of Creation, Formation, and Action. Together, these three worlds form only a single world, which is the clothing of the whole World of Emanation."[38]

Our journey began in the latest stage in the four worlds development. Climbing the spiritual ladder through the worlds we approach that which is cloaked by the three previous worlds; turning to the sun and learning about ways we might be able to harness its power so as to strengthen our partnership.

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38 Menzi, Donald Wilder & Padeh, Zwe, The Tree of Life, (Arizal, New York: 2008). Page 109.

The Science of the Sun

Solar History and Science

"In less than an hour, the U.S. receives more energy in the form of sunlight than it does from the fossil fuels it burns in a year."[39]

"According to the United Nations 170,000 square kilometers of forest is destroyed each year. If we constructed solar farms at the same rate, we would be finished in 3 years.

There are 1.2 million square kilometers of farmland in China. This is 2 1/2 times the area of solar farm required to power the world in 2030.

Compare it to the Saharan Desert:

The Saharan Desert is 9,064,958 square kilometers, or 18 times the total required area to fuel the world.

By another measure, "the unpopulated area of the Sahara desert is over 9 million km², which if covered with solar panels would provide 630 terawatts total power. The Earth's current energy consumption rate is around 13.5 TW at any given moment (including oil, gas, coal, nuclear, and hydroelectric)." This measure arrives at a multiplier of 46 times the area needed and shows that my numbers are very conservative."[40]

"Every minute enough photons reach the Earth to meet the Earth's Energy demand for a whole year."[41]

~

Photovoltaic (PV), "materials and devices convert sunlight into electrical energy, and PV cells are commonly known as solar cells."[42] Solar cells, discovered by Edmond Becquerel in 1839, were first implemented in the end of the 19th century. As the sun hits PV solar cells some of the light is reflected back, some light passes directly through the cells, and some is absorbed by the PV unit. But only the absorbed light generates electricity. The energy of the absorbed light is transferred to electrons in the atoms of

---

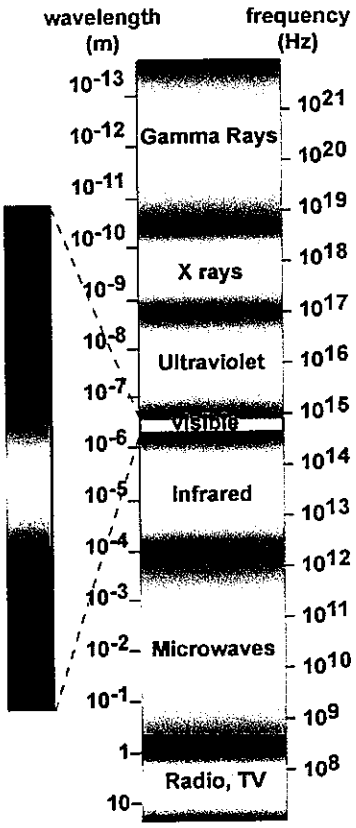
39 Brief History of Solar PV Technologies (U.S.) http://www.statesadvancingsolar.org/solar-101/history-of-solar-us. Accessed September 14, 2012.

40 Total Surface Area Required to Fuel the World With Solar. http://landartgenerator.org/blagi/archives/127. Accessed September 22, 2012.

41 How Solar Energy Panels work. http://www.youtube.com/watch?v=AmWrGPKcMNM. Accessed October 9, 2012

42 Photovoltaics. http://www.eere.energy.gov/basics/renewable_energy/photovoltaics.html. Accessed August 25, 2012.

the PV cell semiconductor material. With their newfound energy, these electrons escape from their normal positions in the atoms and become part of the electrical flow, or current, in an electrical circuit. A special electrical property of the PV cell—what is called a 'built-in electric field'—provides the force, or voltage, needed to drive the current through an external load, such as a light bulb."[43]



"The light that we see everyday is only a fraction of the total energy emitted by the sun incident on the earth. Sunlight is a form of "electromagnetic radiation" and the visible light that we see is a small subset of the electromagnetic spectrum."[44] The form of light was first understood to be a wave (as discovered in the 1800's by Thomas Young, François Arago, and Augustin Jean Fresne). However, the work of Max Planck and Albert Einstein demonstrated that light could also be understood as being comprised of, "indistinguishable energy elements, or a quanta of energy."[45] Thus, light is made up of "packets of energy" called photons which may exhibit the property of a wave at times or as a particle at times this is referred to as "wave particle duality."

PV cells are not 100 % efficient, if they were they would be able to harness all of the sun's potential energy and convert it to electricity. "When light strikes the surface of a solar cell, some photons are reflected and do not enter the cell. Other photons pass through the material. Of these, some are absorbed but only have enough energy to generate heat, and some have enough energy to separate electrons from their atomic

43 Photovoltaic Cells. http://www.eere.energy.gov/basics/renewable_energy/pv_cells.html. Accessed August 20, 2012.
44 Properties of Light. http://www.pveducation.org/pvcdrom/properties-of-sunlight/properties-of-light. Accessed October 9, 2012.
45 Ibid.

bonds to produce charge carriers—negative electrons and positive holes."[46] The Solar cells have a positive and negative side thereby creating an electrical field. When the photons contact the cell some of the electrons are freed from their bond and an electrical current is created. Wires that run from the positive and negative sides of the cells harness these electrons as electricity. The reason PV's lose some of the sun's energy is due to bandgap. "Bandgap is the minimum amount of energy needed to free an electron from its bond, and this energy differs among semiconductor materials. The primary reason PV cells are not 100% efficient is because they cannot respond to the entire spectrum of sunlight. Photons with energy less than the material's bandgap are not absorbed, which wastes about 25% of incoming energy. The energy content of photons above the bandgap is wasted surplus—re-emitted as heat or light—and accounts for an additional loss of about 30%. Thus, the inefficient interactions of sunlight with cell material waste about 55% of the original energy."[47] Ways to increase solar panel efficiency are to keep the cell as cool as possible, reducing the amount of light that is reflected away (antireflection technologies), and increasing metallic electrical contacts.[48]

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46 Photovoltaic Cell Conversion Efficiency.
http://www.eere.energy.gov/basics/renewable_energy/pv_cell_conversion_efficiency.html.
Accessed August 25, 2012
47 ibid.
48 ibid.

Atzilut and Fire

The Green Initiative: Solar Ner Tamid[49]

As I sit and chant the *Shema* and the surrounding blessings leading up to the *Amidah*, I dwell on the words of *Or Chadash.*

Or chadash al tzion tair, v'nizke kulanu m'heira l'oro, Baruch ata Adonay, yotzer hame'orot.

Shine a new light on Zion, - and may we all soon be privileged to enjoy its brightness, Blessed are you, Eternal One, Former of the luminaries.[50]

This prayer has been downplayed and even eliminated in some denominational prayer books for its messianic and Israel-focused implications. But, this prayer can be viewed in a new light. This song is a reminder to be aware of the sun's potential, strength and capability. We should not rely too heavily on unsustainable and unhealthy sources of energy. The sun is glaring us in the face and saying "use me." This "*or chadash*," new light, is not a new light. On the contrary, it existed before we were living on Earth. The new light, is a new perspective on how we can use the sun to our benefit.

The Solar Ner Tamid is a radiant symbol of divine human partnership- harnessing the potential of an astral body through the work of human ingenuity and forming an eternal flame that is a centerpiece of Jewish praxis. A Solar Ner Tamid consists of one solar panel, one battery box, one LED light, and two sets of wires. The Solar panel, "will provide long-lasting, maintenance free, Solar electric light service if installed in locations with good sun exposure to capture the five to six hour sun-day. Snow and Ice should be kept off the panel for best power generation."

The Ner Tamid is a staple of Jewish Synagogue and Study Space. To have it lit by a nonrenewable source, eternally, misses the opportunity to further the ecologically-centered potential of the flame. While *Atzilut* may be an unattainable realm, the Solar

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49 A Solar Ner Tamid kit can be purchased from The Federation of Jewish Mens Clubs

50 Shacharit (an interpretation of the Shabbat morning service)- by Meira Warshauer. http://meirawarshauer.com/NEW/pages/Program_notes/Shacharit_notes.html. Accesssed September 22, 2012.

Ner Tamid translates this hidden divine spark into an eternal source of true union with the Divine.

~

Understanding the components of the Solar Ner Tamid[51]:

Solar Collector Panel: The panel unit is sealed with a glass top sheet over the Photovoltaic grid for trouble-free, long service life. An adjustable aluminum mount is provided for easy attachment to a supporting structure.

Controller with Battery: The system controller is comprised of a charge controller and sealed GelCell lead acid battery. The charge controller regulates Solar input to the battery to prevent overcharging.

AC Battery Charger: The optional AC battery charger provides backup battery charging from 120 Volt AC house current for locations experiencing totally overcast skies continuously for more than 5 to 6 days. Many locations will experience at least some Sun light on cloudy days.

High Intensity LED Lamp: The high intensity Light Emitting Diode (LED) lamp produces the equivalent candle power of an incandescent bulb at a fraction of the power input. Running at room temperature, the LED lamp lasts longer than the equivalent incandescent lamp.

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51 This information is culled from the Federation of Jewish Mens Club Solar Ner Tamid pamphlet found in the Appendix.

Conclusion

The Four Worlds are a Kabbalistic roadmap for a spiritual journey. To experience this journey through the elements is to provide stability and a framework for this quest. These four practices, connected to each world, are available to integrate into any community - inviting all participants into action and dialogue with God. The engagement in these four practices will help to release the experience and deepen one's connection to Action, Formation, Creation, and Emanation. As part of the Divine mystery, we too function through this four world process in daily life. "While you walk the earth in animation be aware that you are being formed, and that your formation is being created, and that your creation is being emanated."[52] These worlds, like the elements, are simultaneously working around and through us. We are a part of an integrated whole, and Kabbalah provides a framework to experience interconnectedness. In order, for oneness to be experienced through Kabbalah the metaphors and paradigms can shift and become flexible (while retaining their original essence) so as to reach our communities in the present moment. Returning to the words of Rabbi Arthur Green,

> "There is also a universal and environmental element growing directly out of this return to the land that is essential to our Kabbalah for tomorrow. We need a new this-worldly piety in Judaism and in all religions, an attitude fitting to an environmentally concerned future that is already upon us. I seek in a contemporary Kabbalah a Judaism unafraid to proclaim the holiness of the natural world, one that sees Creation, including both world and human self, as reflecting divinity. I seek a Judaism that looks to nature itself, with its wonder, mystery, and beauty, as a source of religious inspiration. I long for a Judaism that teaches us how to live in harmony with the natural world, one whose most basic teachings will demand of us that we position ourselves at the cutting edge of sensitivity toward relieving the suffering and pain of all of God's creatures. God's name is inscribed in all that is. To take for granted the endless material gifts with which we are all blessed is to take God's name in vain. To degrade another human being is to diminish the Divine Image; to stand by as though unaware of his or her degradation is to shut our eyes to the image of God. But we must also learn to read the imprint of God in the rest of Creation, in animal and plant life, in all their infinite and now much-threatened diversity, in such simple but essential gifts as soil, air, and water. It is partly in this spirit that I turn to Kabbalah, and

52 Gershon Winkler. Magic of the Ordinary: Recovering the Shamanic in Judaism. (North Atlantic Books: California, 2003) p. 27.

> especially to Hasidic teachings, seeking to learn from them as they were in the past, but also to adapt and transform their vision for the unique times in which we live."[53]

Guardians of the Four Realms, draws upon the natural environment and Jewish mysticism to uncover and enlighten the connection between Judaism and the Environment. The four worlds paradigm is at once an ethereal-transcendent blueprint for our connection to the divine, and at the same time a tangible-immanent practice to share with our communities. Kabbalah, stems from the root word to receive. How do we receive the teachings of previous generations? How will our teachings be received by the future? Fostering a sustainable atmosphere where tradition, community, and environment intersects, will allow for new meaning within the text to emerge and encourage all to be stewards of the Earth.

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[53] Green, Arthur, Ehyeh: A Kabbalah for Tomorrow. Jewish Lights Publishing, 2003.

APPENDIX

On All Fours

Four Worlds:	**Assiyah**	**Yetzirah**	**B'riah**	**Atzilut**
Four Elements	Earth	Water	Air	Fire
Four Green Initiative	Composting	Havdalah Garden	Carbon Offset Program	Solar Ner tamid
Actions	Doing	Feeling	Thinking	Existing
Aspects of the Soul	Nefesh/Life force	Ruach/emotional being	Neshamah/ mind-soul	Chayah/divine spark
Interpretation of Torah	Peshat	Remez	Derash	Sod
Angels	Raphael	Michael	Uriel	Gabriel
Tetragrammaton	hay	vav	hay	yud
Directions	North	East	South	West
blessing	Ha'olam	melech	Eloheinu	Havaya
Hypostatic potencies (Scholem, 119)	The whole system/ or only terrestrial world	Angels/Metatron	Throne and Chariot	Ten sefirot

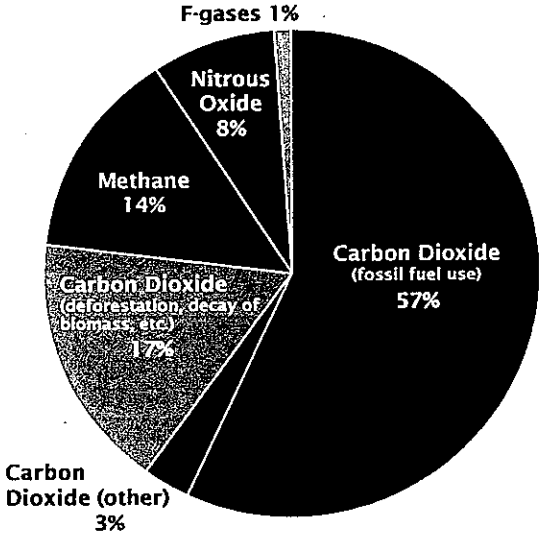
Residential Water Use

Combined water and sewer rate in New York City is:	$8.21 per 100 cubic feet of water* (07/01/11-06/30/12)
National average indoor residential water use per day per person is:	60 - 70 gallons
50 - 75% of all residential water use occurs:	In the bathroom
A standard (pre-1980) toilet uses:	4.5 - 7.0 gallons per flush
1980s vintage toilet (1980 - 1992) uses:	3.5 gallons per flush
A low-consumption toilet uses:	1.6 gallons per flush (or less)
Displacement bags save:	0.6 gallons per flush
Flush valve retrofit kits save:	1.0 - 1.5 gallons per flush
The average faucet uses:	0.5 - 5 gallons per minute
Faucet aerators reduce flow by:	1 gallon per minute
Standard showerheads use:	4 - 7 gallons per minute
Low-flow showerheads use:	2.5 gallons per minute (or less)
A compact washing machine uses:	32 gallons per load (13+ gals/cubic foot)
A standard domestic washing machine uses:	45 - 55 gallons per load (13+ gals/cubic foot)
Water-efficient washing machines use:	20 - 25 gallons per load (8.0 - 9.5 gals/cubic foot)
A dishwasher uses:	5 - 15 gallons per load

*There are 748 gallons per 100 cubic feet (HCF) of water

source: http://www.nyc.gov/html/dep/html/residents/wateruse.shtml

Global Greenhouse Gas Emissions by Gas



Source: IPCC (2007); based on global emissions from 2004. Details about the sources included in these estimates can be found in the *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* .

The Natural Carbon Cycle

"Over millions of years, CO2 is removed from the atmosphere through weathering by silicate rocks and through burial in marine sediments of carbon fixed by marine plants (e.g., Berner, 1998). Burning fossil fuels returns carbon captured by plants in Earth's geological history to the atmosphere. New ice core records show that the Earth system has not experienced current atmospheric concentrations of CO2, or indeed of CH4, for at least 650 kyr – six glacial-interglacial cycles. During that period the atmospheric CO2 concentration remained between 180 ppm (glacial maxima) and 300 ppm (warm interglacial periods) (Siegenthaler et al., 2005). It is generally accepted that during glacial maxima, the CO2 removed from the atmosphere was stored in the ocean. Several causal mechanisms have been identified that connect astronomical changes, climate, CO2 and other greenhouse gases, ocean circulation and temperature, biological productivity and nutrient supply, and interaction with ocean sediments.

Prior to 1750, the atmospheric concentration of CO2 had been relatively stable between 260 and 280 ppm for 10 kyr. Perturbations of the carbon cycle from human activities were insignificant relative to natural variability. Since 1750, the concentration of CO2 in the atmosphere has risen, at an increasing rate, from around 280 ppm to nearly 380 ppm in 2005. The increase in atmospheric CO2 concentration results from human activities: primarily burning of fossil fuels and deforestation, but also cement production and other changes in land use and management such as biomass burning, crop production and conversion of grasslands to croplands. While human activities contribute to climate change in many direct and indirect ways, CO2 emissions from human activities are considered the single largest anthropogenic factor contributing to climate change. Atmospheric CH4 concentrations have similarly experienced a rapid rise from about 700 ppb in 1750 (Flückiger et al., 2002) to about 1,775 ppb in 2005: sources include fossil fuels, landfills and waste treatment, peatlands/wetlands, ruminant animals and rice paddies. The increase in CH4 radiative forcing is slightly less than one-third that of CO2, making it the second most important greenhouse gas.

Both CO2 and CH4 play roles in the natural cycle of carbon, involving continuous flows of large amounts of carbon among the ocean, the terrestrial biosphere and the atmosphere, that maintained stable atmospheric concentrations of these gases for 10 kyr prior to 1750. Carbon is converted to plant biomass by photosynthesis. Terrestrial plants capture CO2 from the atmosphere; plant, soil and animal respiration (including decomposition of dead biomass) returns carbon to the atmosphere as CO2, or as CH4 under anaerobic conditions. Vegetation fires can be a significant source of CO2 and CH4 to the atmosphere on annual time scales, but much of the CO2 is recaptured by the terrestrial biosphere on decadal time scales if the vegetation regrows.

Carbon dioxide is continuously exchanged between the atmosphere and the ocean. Carbon dioxide entering the surface ocean immediately reacts with water to form bicarbonate (HCO3–) and carbonate (CO32–) ions. Carbon dioxide, HCO3– and CO32– are collectively known as dissolved inorganic carbon (DIC). The residence time of CO2 (as DIC) in the surface ocean, relative to exchange with the atmosphere and physical exchange with the intermediate layers of the ocean below, is less than a decade. In winter, cold waters at high latitudes, heavy and enriched with CO2 (as DIC) because of

their high solubility, sink from the surface layer to the depths of the ocean. This localized sinking, associated with the Meridional Overturning Circulation is termed the 'solubility pump'. Over time, it is roughly balanced by a distributed diffuse upward transport of DIC primarily into warm surface waters.

Phytoplankton take up carbon through photosynthesis. Some of that sinks from the surface layer as dead organisms and particles (the 'biological pump'), or is transformed into dissolved organic carbon (DOC). Most of the carbon in sinking particles is respired (through the action of bacteria) in the surface and intermediate layers and is eventually recirculate to the surface as DIC. The remaining particle flux reaches abyssal depths and a small fraction reaches the deep ocean sediments, some of which is re-suspended and some of which is buried. Intermediate waters mix on a time scale of decades to centuries, while deep waters mix on millennial time scales. Several mixing times are required to bring the full buffering capacity of the ocean into effect."[54]

[54] Climate Change 2007: Working Group I: The Physical Science Basis: The Carbon Cycle and the Climate System. http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch7s7-3.html. Accessed August 31, 2012.

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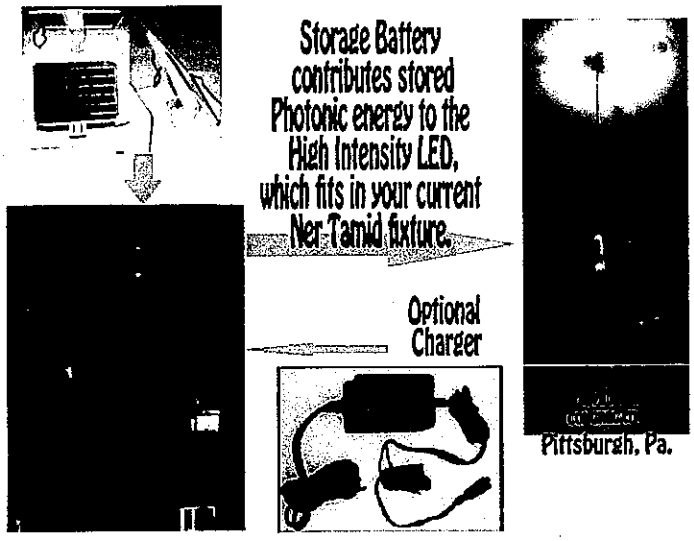
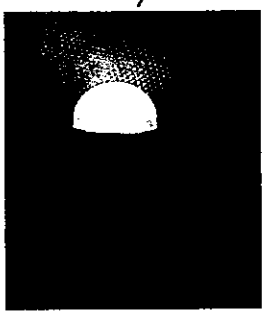
FJMC Solar Ner Tamid

EVERY SYNAGOGUE HAS AN ETERNAL LIGHT, A
NER TAMID,
IN IT'S SANCTUARY AND CHAPEL.
IT IS A SYMBOL OF G-D'S ETERNAL PRESENCE
THAT CAN BE FASHIONED INTO SOMETHING THAT
IS TRULY ETERNAL,
A SOLAR NER TAMID.

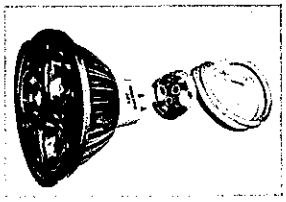
The FJMC Ner Tamid offers innovative features not available in other Ner Tamid systems:



LED lamp options

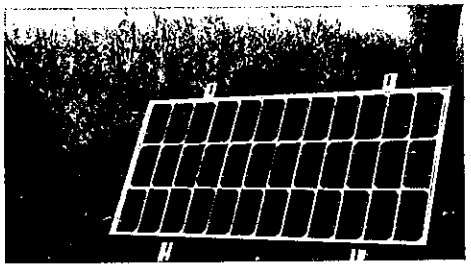


Edison Base adapter screws directly into an existing 120 Volt AC light socket to permit the existing socket and wiring to be converted to 12VDC (do not run the LED lamp from 110VAC, it is a 12VDC lamp). This is designed to allow retrofit of existing 110VAC lamp assemblies to 12VDC LED lamps. The standard lamp supplied with this option is a PAR16 white 3W bulb 180 lumen 6000K 30 degree viewing angle. 1.95 inches diameter x 2.91 inches height. 50,000 hours or more run time. E27 (standard Edison bulb) base.



The high intensity Light Emitting Diode (LED) lamp produces more Lumens per watt of power. The 3Watt LED lamp produces light output greater than a 50W incandescent bulb. And, running at room temperature, the LED lamp lasts longer than the equivalent incandescent lamp.
There are no toxic components in the LED bulbs.

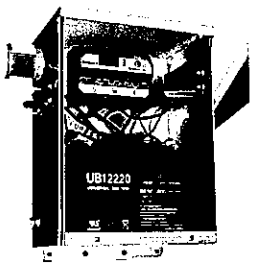
Solar Collector Panel



The panel unit is sealed with a glass top sheet over the Photovoltaic grid for trouble-free, long service life. An adjustable aluminum mount is provided for easy attachment to a supporting structure. 150 feet of solar panel cable (polarized connector already attached) is provided. The unit measures approx. 24 x 36 inches and weighs about 10 pounds. Provided mount is sturdy heavy gauge aluminum, easy to assemble and adjust.

The Electronics Unit

The electronics and battery unit is housed in a heavy gauge aluminum case with an aluminum cover secured with 2 screws. If mounted indoors the cover can be replaced with clear plastic for easy viewing. The unit dimensions 10"W x 16"H x 8"D, and the unit is about 25 lbs. Mounting plates are attached.

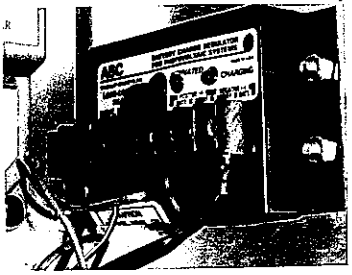


Solar Charge Controller

The system controller is comprised of a charge controller which provides appropriate charging voltage and current to the AGM Deep cycle batteries. The charge controller regulates Solar input to the batteries to prevent overcharging. The controller is temperature-compensated. System (battery) voltage is displayed on an LCD display along with input current from the solar panel and load (output) current to the LED lamp. Lamp current draw (3W) may not cause meter to register load. Red-Yellow-Green charge lights exhibit hysteresis (they change at different voltage going down than up)

Low Voltage Controller

This controller monitors system battery voltage and if battery voltage drops below a minimum safe voltage(11.5V), then the AC charger output is used to maintain battery charge. As soon as solar panels are able to contribute to charging the batteries, the AC charger is then removed from operation.

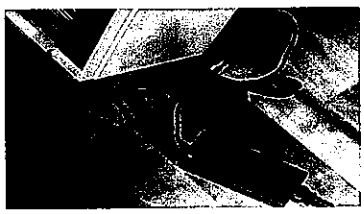


AGM Deep Cycle Batteries:

Universal Battery UB12200s (2 batteries)
The system has 44Ah of AGM deep cycle batteries. These batteries have a lifespan of between 4 and 8 years in continuous operation (depends upon temperature, charge cycling and a number of other factors). Batteries are SLA AGMs (lead acid), recyclable. Batteries are total 44AH at 12VDC (13.2VDC float voltage).

AC Battery Charger

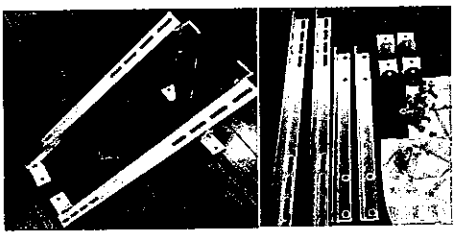
The AC battery charger provides backup battery charging from 120 Volt AC house current if for locations experiencing totally overcast skies for more than 5 to 6 contiguous days. Many locations will experience at least some Sun light on cloudy days. The charger is not used until and unless battery voltage drops below a safe minimum voltage (typically 11.5 V). During normal operation no power is derived from the AC charger.



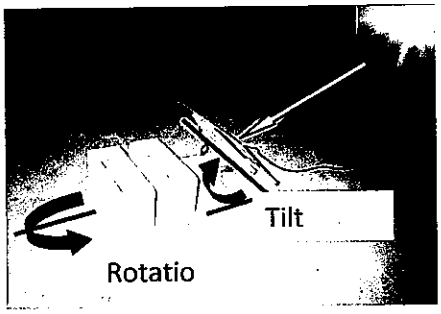
Installation

The collector panel will provide long-lasting, maintenance-free, Solar electric light service if installed in locations with good Sun exposure to capture the 5 to 6 hour sun-day. Snow and Ice should be kept off the panel for best power generation.

a. Mounting



The adjustable mounting frame provided facilitates installation of the Solar panel in a variety of ways, fixed or portable. A portable installation can be accommodated by mounting the frame onto a plywood base along with two or three cinder blocks to prevent the wind from disturbing the panel from the desired Sun orientation. Maximum electric current is delivered by the panel with the Sun light arriving directly to the unit surface, or at right angles to the panel surface.

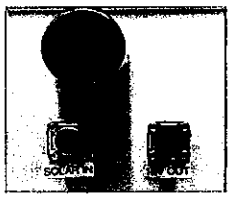


The panel must be installed facing South and there should be unobstructed (no shadowing) sunlight at all times of the day or as much as feasible. This may be achieved by adjusting the mount tilt to angles for the site Latitude noted in the table and figure below:

Site latitude in degrees (Pittsburgh 40 degrees North Latitude)
Tilt Angle in degrees from the horizontal (Tilt 40 +20 = 60)
Add or subtract angle of mounting surface (roof etc.) as required.

0 to 15	15
15 to 24	Same as Latitude
25 to 29	Latitude + 5
30 to 34	Latitude + 10
35 to 39	Latitude + 15
40 and above	Latitude + 20

Electrical Connections



The system is provided with polarized, weatherproof, and labeled cables and connectors between the panel and controller units.The same convention is provided with the battery charger. The electical connection to the solar panel is simply 2 screws in the panel-back electrical box. The Aluminum Housing and all electronics are protected with a Lightning Arrestor in the extremely rare circumstance of a lightning srike anywhere near the system.

Safety

Reasonable care should be exercised in handling and installation of the system for personal safety and to avoid damage to the collector panel, controller, LED lamp, or battery charger. A solid copper standard ground wire needs to be installed to the system case and routed to a common service ground or ground rod. The wiring is all LOW voltage (from panel to unit, and unit to lamp), therefore no shock hazard, no electrician required [just a bit of common sense].The system has a built in surge suppressor to protect against nearby lightning strikes (nothing can protect against a direct strike).

PROVISO: If you experience a Nor' Easter and your Panel is covered with a foot of snow and your power goes out for a few days, the unit should be unplugged from backup charger, as it represents a small electrical load to the batteries.

Warranty and Service

CTSolar LLC and its suppliers Warranty the Solar collector panel for 10 years. The controller is warranted for 5 years, and the LED bulb is warranted for 6 months continuous service. The AC charger is a sealed unit with no owner-needed adjustments; Removal of this seal will void the unit warranty.

CTSolar LLC will replace or repair any part of the FJMC Ner Tamid system due to material or manufacturing defects. Faulty system component(s) must be returned to CTSolar LLC. Please note that evidence of mishandling will void these warranties. Batteries are not covered by warranty (because batteries have a finite lifespan that depends upon installation conditions such as temperature, number of charge/discharge cycles specific to the installation in question and batteries may be damaged by improper installation). Replacement batteries are available from CTSolar and can be field-installed. LED bulbs and batteries are available seperately from internet vendors.

For service or questions, please contact CTSolar LLC by e-mail at sales@ctsolar.com.

Gmail

Your NativeEnergy Certificate

Native Energy <support@nativeenergy.com> Fri, Sep 14, 2012 at 11:28 PM
Reply-To: Native Energy <support@nativeenergy.com>
To: hanniel.levenson@gmail.com

native ENERGY

CERTIFICATE

Hanniel Levenson

has taken decisive and effective action to reduce its carbon emissions by helping build the The Iowa Farms Wind Project Project, keeping a total of 7 tons of greenhouse gas pollution out of the atmosphere.

Certificate: 13829012740
Issued: September 14, 2012

Tom Boucher
Chief Executive Officer