Madden Room – South Windsor Town Hall

1. **Call Meeting to Order**

The meeting was called to order at 4:30 p.m.

2. **Roll Call**

Members Present: Hank Cullinane, Resident
Deputy Mayor Carolyn Mirek, Town Council
Sherman Tarr, Resident
Stephen Wagner, Resident

Members Absent: Larry Brown, Resident
Mike Gantick, Director of Public Works
Richard Grigorian, Resident
Patrick Hankard, Board of Education
Councilor Edward Havens, Town Council
Athena Loukellis, Resident
Councilor Janice Snyder, Town Council
Richard Stahr, Board of Education

5. **New Business**

A. Virtual Net Metering Update

Mr. Wagner explained that Lodestar received the last allocation of incentives for the Agricultural Virtual Net Metering program. They did not get every incentive they requested, but did receive 80-85% which is enough to move forward with a project. Once Lodestar receives the agreement, they will go to the Siting Counsel for approval. If all goes well, this project will come on-line in the Spring of 2017 assuming the town goes into a contract with Lodestar.

Mr. Wagner stated that the Town Manager had brought a project to the Town Council with Greenskies Renewable Energy. Greenskies Renewable Energy wanted to build a facility on Barber Hill Road. The Council did not support the project after hearing from neighbors who would have been directly impacts.

Deputy Mayor Mirek felt it was a great idea if it was in the right location.

(Discussion Continued on Next Page)

ITEM:

5. A. ***(Continued)***

Mr. Wagner explained further that the same company has sent the Town Manager a proposal for seven prospective Solar Arrays at multiple municipal owned sites, as shown in attached **Exhibit A**. The total savings from each project is shown on attached, **Exhibit B**.

Answering questions from the Council, Mr. Wagner explained that the creation of solar car ports will be discussed in the future after all of the LED Streetlight issues are resolved.

B. LED Streetlights Update

a. AMA (American Medical Association) on street light color

Mr. Wagner explained that AMA adopted Community Guidance to reduce the harmful human and environmental effects on high intensity street lighting, as shown in attached **Exhibit C**.

b. Update on project status

Mr. Wagner informed the Committee that Torrington has decided to not turn the State streetlights off. Mr. Gantick went back to Ameresco to ask if there was a way to make the project cost under $1.5 million dollars without turning any lights off.

C. Energy Star Application for Orchard Hill Elementary School

Mr. Wanger informed the Committee that it appears that Orchard Hill Elementary School qualifies for an Energy Star rating. More work will need to be done to get that designation. The Sewer Plant had extra upgrades so the Town will have to see if that building qualifies as well as the new elementary school

D. Municipal Action Plan – data update and editing

The Committee has had time to review the Municipal Action Plan. A meeting between Steve Wagner, Sherman Tarr and Athena Loukellis will be scheduled to further review the Municipal Action Plan and make edits to it.

ITEM:

3. **New Meeting**

Mr. Wagner stated a meeting will be scheduled if necessary. The Committee should save the date of August 16th.

6. **Miscellaneous**

Mr. Wagner stated that the Home Energy Solutions is still open but the rates have increased. The Town could run another Solarize Campaign. The Committee felt that it is too soon to run another Solarize Campaign. Mr. Wagner suggested promoting Home Energy Solutions at the Farmers Market and Deputy Mayor Mirek added that the Wapping Fair would also be a good place to promote Home Energy Solutions.

Mr. Cullinane explained that he had learned from Ray Favreau that the Wappling School has gotten approved for an Engineering Audit. Mr. Cullinane offered Mr. Favreau his services if needed.

7. **Adjournment**

At 5:23 p.m. Mr. Cullinane made a motion to adjourn the meeting. Deputy Mayor Mirek seconded the motion; and it was approved, unanimously.

Respectfully submitted,

Deborah W. Reid

Deborah W. Reid
Clerk of the Council

In a Power Purchase Agreement, South Windsor agrees to purchase 100% of the energy produced by the Solar Arrays. All responsibilities concerning the Arrays shall be borne by Greenskies and its affiliates. General descriptions of the terms of the PPA are found below.

The business terms set forth herein have been created with the underlying assumption that Greenskies will install, service, maintain, and monitor Solar Arrays ("Arrays") owned by a Special Purpose Entity ("SPE") on certain property owned by South Windsor ("Project").

1. PROPERTY

The certain properties owned by South Windsor at:

- **Water Pollution Control Facility** – 1 Vibert Rd, South Windsor, CT
- **South Windsor High School** – 161 Nevers Rd, South Windsor, CT
- **Timothy Edwards Middle School** – 100 Arnold Way, South Windsor, CT
- **Pleasant Valley School** – 591 Ellington Rd, South Windsor, CT
- **Orchard Hill School** – 350 Foster St, South Windsor, CT
- **Eli Terry School** – 569 Griffin Rd, South Windsor, CT
- **Town Hall** – 1540 Sullivan Ave, South Windsor, CT

2. INSTALLATION

Greenskies will be responsible for properly engineering the Arrays and the installation of the Arrays to the Property. Prior to installation, Greenskies will acquire approval from all appropriate state, utility and municipal committees and institutions for permitting, net-metering and grid-interconnection purposes.

3. PPA

South Windsor will enter into a PPA with an SPE to contractually obligate South Windsor to purchase 100% of the electricity produced by the Arrays. The SPE will sell to South Windsor all electricity produced by the Arrays during the term of the PPA, at the price per kilowatt-hour specified in Exhibit A-PPA.

4. TERM

The initial term of the PPA shall be for 20 years. Following the conclusion of year five (5) of the PPA, South Windsor shall be provided with an option to purchase the Arrays from the SPE at a price and upon terms which are to be determined in the PPA. After the 20-year initial term South Windsor will have the option of: (a) purchasing the Array at fair market value; (b) extending the PPA for an additional 5 years; or (c) requesting Greenskies to remove the Arrays at no cost to South Windsor.

5. PPA CONTINGENCIES

The performance of Greenskies' responsibilities under the terms of the PPA shall be subject to the following contingencies:

- Acceptance by the local power company of a utility interconnect
- SPE to acquire requisite state-level incentives in applicable EDC territory
- Approval of the Project by all applicable state, local and federal permitting authorities.

6. DELIVERY

The Arrays shall be live and online within 365 days of the acquisition of state-level incentives. Upon actual delivery, South Windsor shall become immediately responsible for the payment of the price per kilowatt-hour of the electricity generated by the Arrays as they are commissioned by appropriate state and utility authorities.

7. GREENSKIES' CONTINUING RESPONSIBILITIES

It shall be the ongoing responsibility of the SPE and Greenskies during the entire Term of the PPA, to repair, service, maintain and monitor the Arrays. Such services shall be at no cost to South Windsor who has only a responsibility to purchase the electricity produced by the Arrays at the agreed-upon rate. The SPE will also provide South Windsor with online, real-time monitoring of the electrical generation of the Arrays for the term of the PPA.

Solar Output	Site 1: 1,134,000kWh/Year Site 2: 801,200kWh/Year Site 3: 733,700kWh/Year Site 4: 288,239kWh/Year Site 5: 253,800kWh/Year Site 6: 176,700kWh/Year Site 7: 39,800kWh/Year	Source: PVSyst – Proprietary PV Array Modeling Software
Average Commercial Utility Rate	Site 1: $0.14 kWh Site 2: $0.14 kWh Site 3: $0.14 kWh Site 4: $0.14 kWh Site 5: $0.14 kWh Site 6: $0.14 kWh Site 7: $0.14 kWh	Source: Price per kWh is estimated through the Town of South Windsor. $0.14 is the avoided cost. Retail rate is closer to $0.16 Cents.
Utility Inflation	2.5%	Source: In a ten-year span (1999-2009) the Office of Legislative Research found an average inflation rate of approximately 5.70%. See, McCarthy, Kevin F. Connecticut's High Inflation Rates and the Legislative Response, 2010. http://www.cgarct.gov/2010rpt/2010-R-0015.htm
Total Savings (by year 20)	Site 1: $2,316,614 Site 2: $1,636,747 Site 3: $1,470,859 Site 4: $605,332 Site 5: $547,532 Site 6: $381,200 Site 7: $63,083	**Cumulative Savings** **$7,021,368**

Exhibit C

AMA News Room

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June 14, 2016

AMA Adopts Community Guidance to Reduce the Harmful Human and Environmental Effects of High Intensity Street Lighting

For immediate release:
June 14, 2016

CHICAGO - Strong arguments exist for overhauling the lighting systems on U.S. roadways with light emitting diodes (LED), but conversions to improper LED technology can have adverse consequences. In response, physicians at the Annual Meeting of the American Medical Association (AMA) today adopted guidance for communities on selecting among LED lighting options to minimize potential harmful human and environmental effects.

Converting conventional street light to energy efficient LED lighting leads to cost and energy savings, and a lower reliance on fossil-based fuels. Approximately 10 percent of existing U.S. street lighting has been converted to solid state LED technology, with efforts underway to accelerate this conversion.

"Despite the energy efficiency benefits, some LED lights are harmful when used as street lighting," AMA Board Member Maya A. Babu, M.D., M.B.A. "The new AMA guidance encourages proper attention to optimal design and engineering features when converting to LED lighting that minimize detrimental health and environmental effects."

High-intensity LED lighting designs emit a large amount of blue light that appears white to the naked eye and create worse nighttime glare than conventional lighting. Discomfort and disability from intense, blue-rich LED lighting can decrease visual acuity and safety, resulting in concerns and creating a road hazard.

In addition to its impact on drivers, blue-rich LED streetlights operate at a wavelength that most adversely suppresses melatonin during night. It is estimated that white LED lamps have five times greater impact on circadian sleep rhythms than conventional street lamps. Recent large surveys found that brighter residential nighttime lighting is associated with reduced sleep times, dissatisfaction with sleep quality, excessive sleepiness, impaired daytime functioning and obesity.

The detrimental effects of high-intensity LED lighting are not limited to humans. Excessive outdoor lighting disrupts many species that need a dark environment. For instance, poorly designed LED lighting disorients some bird, insect, turtle and fish species, and U.S. national parks have adopted optimal lighting designs and practices that minimize the effects of light pollution on the environment.

Recognizing the detrimental effects of poorly-designed, high-intensity LED lighting, the AMA encourages communities to minimize and control blue-rich environmental lighting by using the lowest emission of blue light possible to reduce glare. The AMA recommends an intensity threshold for optimal LED lighting that minimizes blue-rich light. The AMA also recommends all LED lighting should be properly shielded to minimize glare and detrimental human health and environmental effects, and consideration should be given to utilize the ability of LED lighting to be dimmed for off-peak time periods.

The guidance adopted today by grassroots physicians who comprise the AMA's policy-making body strengthens the AMA's policy stand against light pollution and public awareness of the adverse health and environmental effects of pervasive nighttime lighting.

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Media Contact:

Postings

June 21, 2016

LED Street Lighting

The American Medical Association's (AMA) recently adopted community guidance on street lighting adds another influential voice to issues that have been discussed in the lighting community for some time now, regarding light at night, its potential impacts on human health and the environment, and how best to minimize those impacts. While the AMA's guidance is intended to reduce the harmful human and environmental effects of street lighting in general, it focuses on LEDs in particular. But it's important to note that these issues are neither new nor restricted to LED technology.

As explained in the DOE Fact Sheet *True Colors*, there's nothing inherently different about the blue light emitted by LEDs; that is, at the same power and wavelength, electromagnetic energy is the same, regardless of source type. And as the potential for undesirable effects from exposure to light at night emerges from evolving research, the implications apply to *all* light sources – including, but by no means limited to, LEDs. Further, these research results are often also relevant to light we receive from televisions, phones, computer displays, and other such devices.

While there's nothing inherently dangerous about LED lighting, it should be used with the same prudence with which we use any other technology. This means that although LED lighting is an energy-efficient way to illuminate streets, it's important to direct the light only where it's needed; to make sure the emitted spectrum supports visibility, safety, and the health of humans and other living creatures; and to limit glare for pedestrians, bicyclists, and drivers.

In that regard, LEDs have a number of distinct advantages over other lighting technologies. For one thing, their dimmability means LED street lighting systems can now provide only the level of illumination needed at any given time – which is nearly impossible for conventional street lighting products. And LEDs also offer a high degree of control over the pattern and evenness of light on the ground. By contrast, conventional lamp-based technologies produce light in all directions, so more than half of the output is typically redirected toward the desired target by means of reflectors and lenses. This results in a considerable amount of light

spilling in unwanted directions and spreading unevenly across the area, which not only wastes energy but may also cause light-at-night problems, such as impacts on wildlife. When an LED replaces an incumbent product, such as a high-pressure sodium streetlight, the LED can often meet the illumination requirement with only half of the total lumens of the incumbent lamp.

What's more, unlike other lighting technologies, the spectral content of LEDs can be tailored to order – which means that, for example, the blue light emitted can be minimized. As noted above, there isn't anything special about the blue light emitted by an LED. The "blue" spectrum of visible light actually covers a range of wavelengths, from blue-violet to blue-green, although there's no specific definition of "blue light." Correlated color temperature (CCT) is a rough measure of the balance of energy in a spectrum, with lower values indicating relatively less blue content. While CCT doesn't explicitly characterize the potential for nonvisual effects, it's generally able to indicate the spectrum-specific potential for these effects, which also critically depend on quantity and duration of exposure. In point of fact, if one compares the blue content of an LED source with that of any other source, with both sources at the same CCT, the LED source emits about the same amount of blue. This applies to halogen, fluorescent, high-pressure sodium, metal halide, induction, and other source types.

LED street lighting products are available in a range of possible CCTs. Exterior LED lighting products with lower CCTs are now relatively easy to find (although, typically, they're slightly less energy-efficient than those with higher CCTs). At extremely low CCTs, such as the 2200K of high-pressure sodium, the light no longer appears white, and colors can be substantially distorted, reducing visibility. Low CCTs may be beneficial for reducing nonvisual impacts, but they may also reduce the effectiveness of the lighting, potentially even requiring designs with more lumens – which may completely negate the effects of reducing the relative amount of blue light emission.

Some media coverage of concerns about blue light, light at night, and dark-sky issues can give the impression that LEDs are the enemy, when in fact they're a critical part of the solution, which the AMA acknowledges. It's important to remember that these issues have been around for decades, long before the emergence of LED technology. The key takeaway from the AMA's guidance is the importance of properly matching lighting products with the given application, no matter what technology is used. More than any other technology, LEDs offer the capability to provide, for each application, the right amount of light, with the right spectrum, where you need it, when you need it.

Best regards,
Jim Brodrick