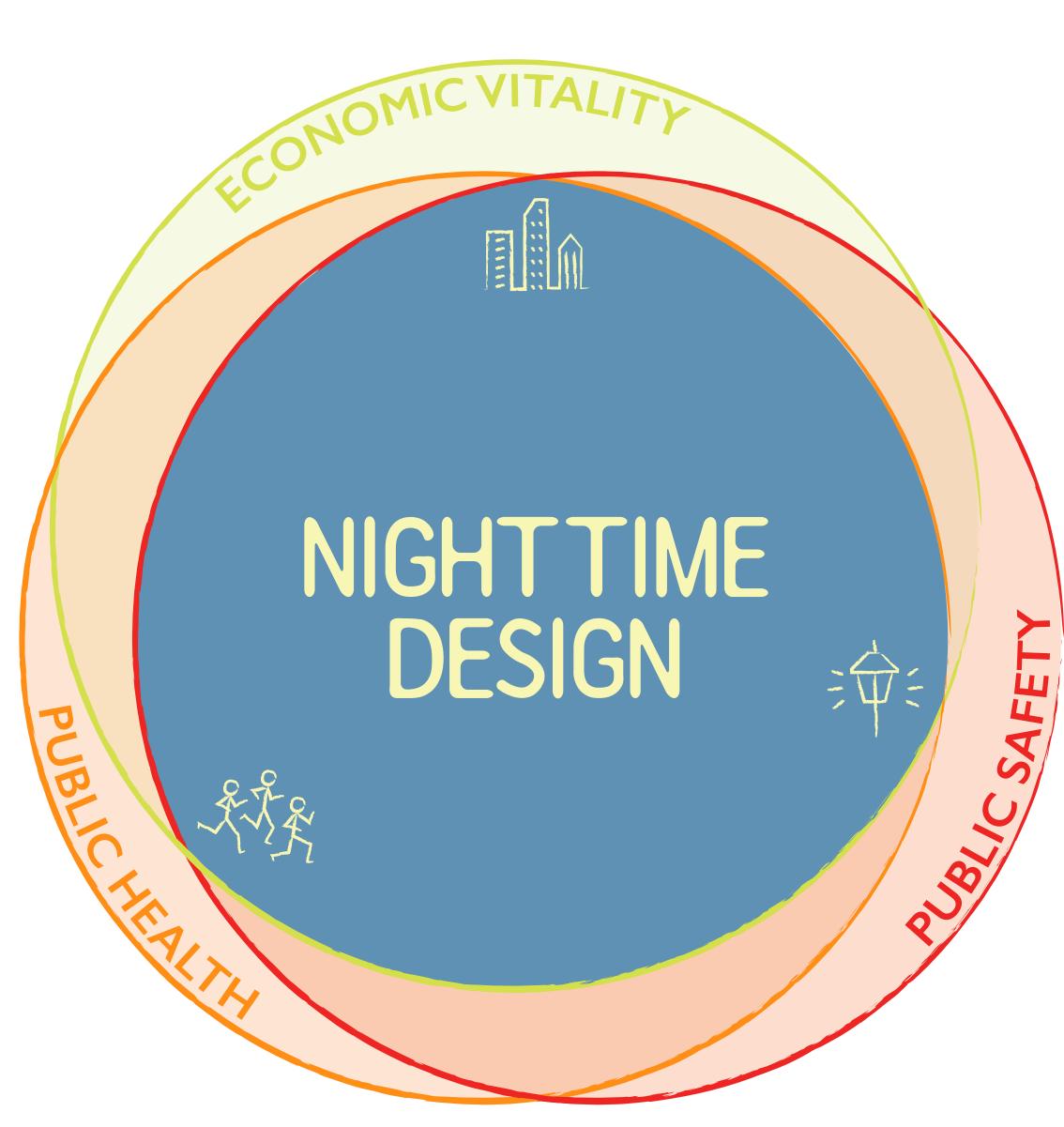# Deployment of Responsive Lighting by the International Nighttime Design Initiative (NTD)

Dr. Kenneth Appleman, NTD Team;   Dr. Ute Besenecker, NTD Team;   Leni Schwendinger, NTD Team Leader
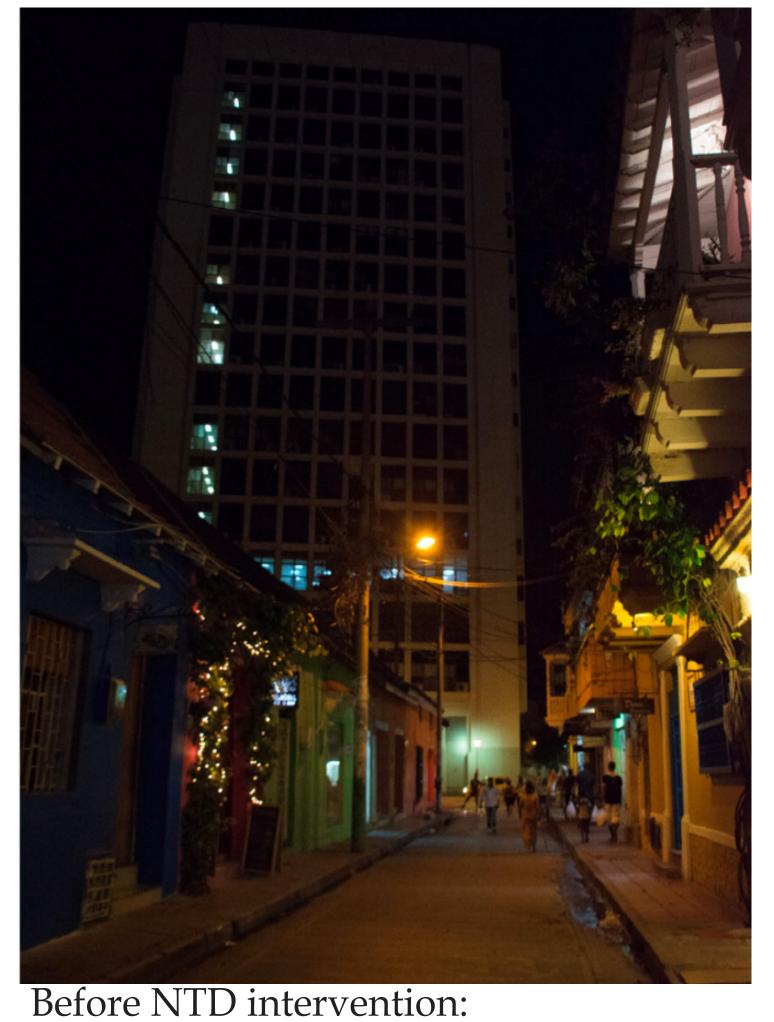
The **International Nighttime Design Initiative (NTD)** is composed of an **international team** generating an **interdisciplinary, socially aware approach to the issues of cities after dark**, conducting research, education, strategic planning and forming a network of advocacy hubs, worldwide.

Overarching frameworks allow for methodologies that are **site specific and localized** — applicable to communities everywhere, **cognizant of geography, culture and climate**.
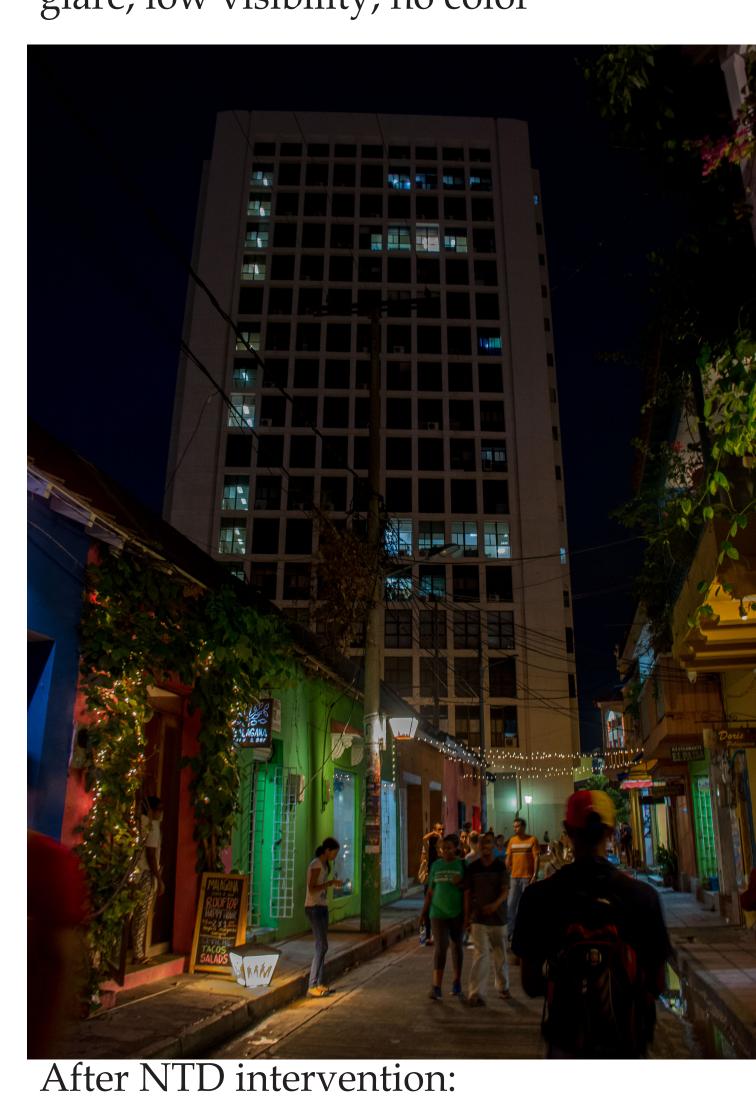
NTD has innovated a multifaceted **design process to revitalize cities**, which includes pilot-based research to envision a practical and **sustainable strategy for urban lighting**. This strategy considers the holistic possibilities of the night hours, and the citizens that inhabit public space.

Urban lighting can transform the way a city operates at night. **The goal of NTD is to increase safety and security, stimulate economic growth, improve public health, and increase social interactions into the night hours for cities around the world.**

Problems and Opportunities with Imposing New Lighting

Before NTD intervention:
glare, low visibility, no color

Cities have an opportunity to leverage the energy savings, control flexibility, and reduced maintenance costs of new LED lighting systems. Many are converting street lighting to LED-based systems as quickly as budgets and schedules allow.

However, **imposing lighting without the efforts to gather community input can be problematical**. Some examples:

Montréal ("Montréal drops disputed LED plan after angry protests", LUX, January 20, 2017)

London ("New LED strategies could damage eyesight and disrupt sleep, warns Public Health England," Independent, April 3rd 2018)

New York ("Some NYers Are Struggling To Adapt To Harsh, 'Authoritarian' LED Streetlights", Gothamist.com, February 2, 2017)

NTD collaboratively creates "Responsive" Lighting, distinctive from:

"Smart" lighting – which can be roughly described as lighting with native computing capability allowing it to make preprogrammed choices about its operational modes

"Connected" lighting – which is lighting that is controllable through a variety of digital networking protocols, either wired or wireless.

NTD's **Responsive Lighting utilizes both of these technologies,** with knowledge obtained through the Nighttime Design Process **to enable and meet the requirements of the communities they serve.**

NTD incorporates **community input, developed by workshop methodologies** that elicit the needs of each community, into every aspect of Nighttime Design.

After NTD intervention:
comfotable, visible color

Two pilot projects are being developed obtaining community input into the lighting plan and nighttime design strategy.

1. Responsive Lighting Testbed

The "Responsive Lighting Testbed," provides a large-scale, flexible and varied test environment, facilitating rapid build-up and break-down of multiple testing scenarios. Multiple scenarios may be supported at the same time, in different physical areas and locations of the testbed.

The testbed will provide a malleable, highly adaptive space for evaluating NTD scenarios. It is conceptulized to be comprised of multiple building blocks, including:

- Meeting space for community design sessions

- Large inventory of multiple manufacturers' responsive lighting building blocks, including smart, connected, multi-spectrum and dynamic distribution lighting systems

- Comprehensive infrastructure support; and data-gathering and recording equipment to track individual and group utilizations and reactions.

- Infrastructure consisting of adequate power access and multi-protocol network (wired and wireless) support

- Data-gathering and recording equipment to compile testbed results.

2. Responsively-Lit Outdoor Patch

The "Responsively-lit Outdoor Patch" will be implemented in an open, public space, a campus or park, and will provide an interactive environment for prototyping lighting schemes, sensing mechanisms, and for collecting community input, reactions, and responses.

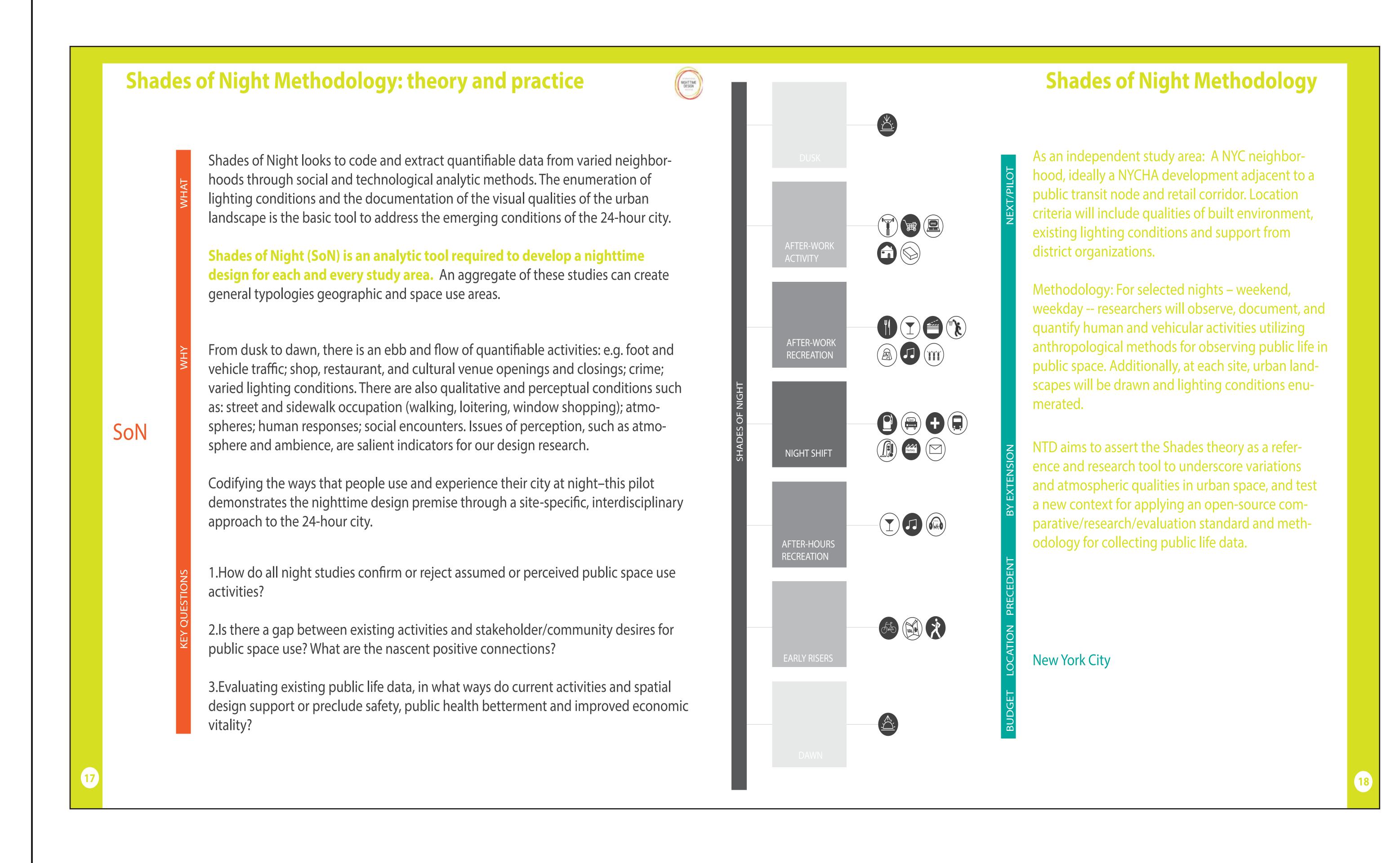Among the issues that the patch will enable to investigate:

- What are expectations and opportunities for lighting in an open, public space?

- What kind of lighting will feel to be the right light at the right time?

- How can light support comfort, safety and usability of the space?

The objective is to utilize an existing public space as a testbed and implement the following:

- Multi-modal lighting systems to support several themed areas.

- Area usage will determine lighting modes: Sensors and user publicly-accessible input devices – "switches" – will be used to determine modes.

- Sensors to determine occupancy and activity level, creating automatic lighting modes

- Controls (a physical push-button? A microphone, for voice activation?) will provide real-time community/occupant adjustment of lighting mode

Evidence-based Evaluation: Audio and video recording, questionnaires and surveys will be used to track results of experimental setups for evaluation and methodology development.

Shades Of Night Concepts

Summary

Nighttime Design methodologies **insert community input** into the process of **urban lighting design** resulting in **appropriateness of illumination** and significantly **improved acceptance** for the fresh illumination concepts and equipment.

Nigtime Design strives to have a **visible impact on the cities** where it is deployed. We seek citizens, government, and urban professionals to utilize and **support the ongoing development of the Nighttime Design methods** to enliven and protect the sustainability and future of our urban environments.

For further information, please contact:

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