**Spinelli Pillar Narrative**

***Summary:***

The Spinelli Pillar is a magnificent, energy-generating landmark anchored in the Green Corridor of Mannheim. The soaring obelisk is both a tribute to the past and a promise to the future.

Rising from the ground of the old Spinelli Barracks, the new pillar seeks to cement the memory of World War II hero Pfc. Dominic V. Spinelli. The tower is a memento of the selfless actions of one man’s duty to save his endangered comrades – but also a reminder of the collective bravery and courage needed to overcome the dark days of our past. Those same principles – selflessness, bravery, and courage – are called upon again in today’s climate war.

Beginning from a simple form - the design draws focus to its lattice-like facade - an inspiration from small garden trellises used to support plants. The facade is patterned with both LSC panels and natural greenery, creating a monument that aids people toward a greener future.

***Technology:***

The facade features large luminescent solar concentrator (LSC) panels to generate electricity. By using the pillar's large-scale and sizeable panels, solar energy is efficiently converted at high concentration factors - powering close to 375 households over a year. By focusing on the modular nature of our panelized façade, the LSC panels can be used on a variety of scales (see further paragraphs below), generating multiple uses off one technology. These panels also double as the colorful facade of the project, creating a vibrant and inviting structure for curious visitors.

***Public Activities and Social Co-benefits:***

Inside the Pillar – The Mind**:** The monument itself is a symbol for Mannheim, one that cements the city’s desire for a green future – but also an interactive structure that residents and tourists can visit.

Immediately entering the structure, one is met with stairs that spiral to the top. Along the way people are given select viewpoints of the City of Mannheim, as well as the BUGA garden festival. The grand panoramic vista is offered to those who finish the hike, and a slow elevator ride down to the ground floor allows for a moment to cool down. Finally, once at grade, a cold, serene pond creates a place to think and ponder what a sustainable future can mean. Climbing the monument is a metaphor of its own - a reminder that the path towards climate change is no easy feat - but one which will have a rewarding end.

Lighting the Streets – A Guide**:** The project is broken down into various scales through a simple twisting motion – using the same façade applied for different uses. At the pedestrian level, the landmark monument transforms to an elegant self-sufficient streetlamp, where the energy generated by LSC panels during the day illuminates the street at night.

Alternating with the LSC panels are lattices of the green climbing plants, transforming what was once just a streetlamp into a vertical planter. These streetlamps, arrayed towards the Spinelli Pillar – provide a wayfinding path to the main obelisk – yet also serve as a spiritual guide, constantly reminding us the possibilities of clean energy.

In the Garden – Day-to-Day Product: Further twisting the streetlamp – we transform the project into the home gardening trellis. These small product-like structures sit in each individual Scherbergarten - generating power for gardening tools and doubling as an aid for growing plants. At night, each individual trellis lights up in various colors, giving everyone their own piece of the Spinelli Pillar.

***Supporting UN Sustainable Development Goals:***

 This project primarily tackles 5 of the 17 UN Sustainable Development Goals – which are:

*Goal 3: Good Health and Well-Being*

By serving as a constant reminder to a positive goal (sustainable future) – as well has incentivizing healthy habits (gardening/walking)

*Goal 7: Affordable and Clean Energy*

The Spinelli Pillar – as well as its derivatives produce enough energy to power small neighborhoods, all with the free and clean power of the Sun.

*Goal 9: Industry, Innovation, and Infrastructure*

Innovative use of the LSC panels – both within the wooden super-frame of the pillar and the large-scale uses of the streetlamp and garden trellis push the boundaries of infrastructure and the gardening industry.

*Goal 11: Sustainable Cities and Communities*

The pillar, streetlamp, and garden trellis could be re-used and adapted to any city. Using the LSC panel in a modular way, various forms can be created – both in shape and size – providing a beautiful way to power future communities.

*Goal 13: Climate Action*

At its heart, the Spinelli Pillar is a message – that climate action takes a collective effort, and that it won’t be easy. But the message is clear – a green earth is possible, it can be beautiful, and it can start small – even in your backyard garden.

**MWh Generated Per Year:**

* **Formula:** Total Solar Panel Area (m²) x Solar Panel Yield (%) x Annual Average Solar Radiation on Panels (MJ/day) x Performance Ratio x 365 days = Total Kilowatts Hours Produced in a Year.
	+ Performance ratio 77% 1
	+ Average solar irradiation: 6.2 2
		- 1 peak sun hour = 1000 W/m² (or 1 kW/m²) of sunlight per hour.
		- 7% panel yield
* **Solar energy harvest:** (35m width \* 120m height \*3 facades (1+1+0.5+0.5) \* 0.76 76% panel coverage) \* 0.07 conversion efficiency \* (6.2 KWh Mannheim solar irradiation) \* 0.77 performance ratio \* 365 days)

**(35m \* 120m\* 3 \* 0.76) \* 0.07 \* (6.2 KWh) \* 0.77 \* 365 =**

**1,168,039 KWh/year**

**3,113 KWh** per household per 44 year (2018) 3; 1,168,039KWH/3,113 KWh =

**375 homes per year**

1. Muenster. (2019, May 31). *Watts matter: Maintaining the performance ratio of PV Systems*. Solar Industry. https://solarindustrymag.com/watts-matter-maintaining-the-performance-ratio-of-pv-systems
2. Kemper, Christopher et al. (2021, June 29). *What are Peak sun hours?* Palmetto.
https://palmetto.com/learning-center/blog/what-are-peak-sun-hours
3. *Electricity consumption of private households by household size*. Federal Statistical Office of Germany. (2020, September 4). https://www.destatis.de/EN/Themes/Society-Environment/Environment/Material-Energy-Flows/Tables/electricity-consumption-housedholds.html

**Environmental Impact Summary**

The Spinelli Pillar provides a positive impact to its environment – at all scales and uses of the project. Distilled to the singular modular element – the alternating lattice-like façade of LSC panels and climbing vegetation – is a combination of renewable energy facades with re-growable plants. Using this fabric across various scales and sizes creates a net-positive carbon footprint.

 Taking it further, the structure that frame these panels are constructed of accoya wood – a renewable building material with industry grade reinforcement. Whether used in the pillar, as a streetlamp, or in your backyard – the project borrows from the Earth and produces clean, sustainable power.