

Project Neon Oasis

An Infrastructure-First Blueprint for Fractal Regional Development Using an Integrated, Net-Positive Circular Economy Stewardship Framework

Executive Overview

Project Neon Oasis proposes an infrastructure-first approach to regional development. Rather than beginning with individual buildings, isolated industries, or stand-alone master plans, it begins with the shared infrastructure that enables an entire regional economy to flourish.

The proposal argues that when energy, water, AI infrastructure, mobility, communications, hospitality, housing, media production, manufacturing, and public space are intentionally designed as mutually reinforcing systems, every investment becomes capable of strengthening the others. Instead of optimizing individual projects, Project Neon Oasis optimizes the relationships between them.

The result is a methodology for **Fractal Regional Development: reusable stewardship patterns that can be adapted from neighborhoods to districts, from districts to cities, and from cities to entire regions.**

The pages that follow are intentionally presented as a **reference architecture, not as the only possible implementation. Nearly every major component described already exists commercially. The purpose of this paper is to demonstrate that a next-generation regional circular economy can be assembled today by integrating proven technologies within a coherent stewardship framework.**

Five Design Principles

1. **Infrastructure First** – Shared infrastructure becomes the primary long-term regional asset.
2. **Integrated Systems** – Energy, water, computing, mobility, hospitality, housing, media, manufacturing, and public space are designed as one ecosystem.
3. **Net-Positive Circular Economy** – Every subsystem seeks to create more value than it consumes.
4. **Stewardship Governance** – Technology remains accountable to people; people remain at the center, stewards remain in the loop, and learning occurs all around.
5. **Fractal Regional Development** – Successful ecosystem patterns become reusable building blocks capable of thoughtful expansion.

From Principles to Practice

The remainder of this document illustrates one possible implementation of these principles. It intentionally preserves an engineering-first perspective built around commercially available technologies and proven practices. It is offered as a conversation starter and reference design to encourage collaboration, refinement, and future demonstration projects.

Reference Architecture

I. Executive Summary & Value Proposition

Project Neon Oasis transitions urban development away from resource depletion and into intentionally stewarded value creation. The model integrates an **AI-optimized data center array with luxury casino resorts, mixed-income urban residential zones, next-generation media production nodes, and an integrated solar micro-utility infrastructure into a unified, car-free megastructure network.**

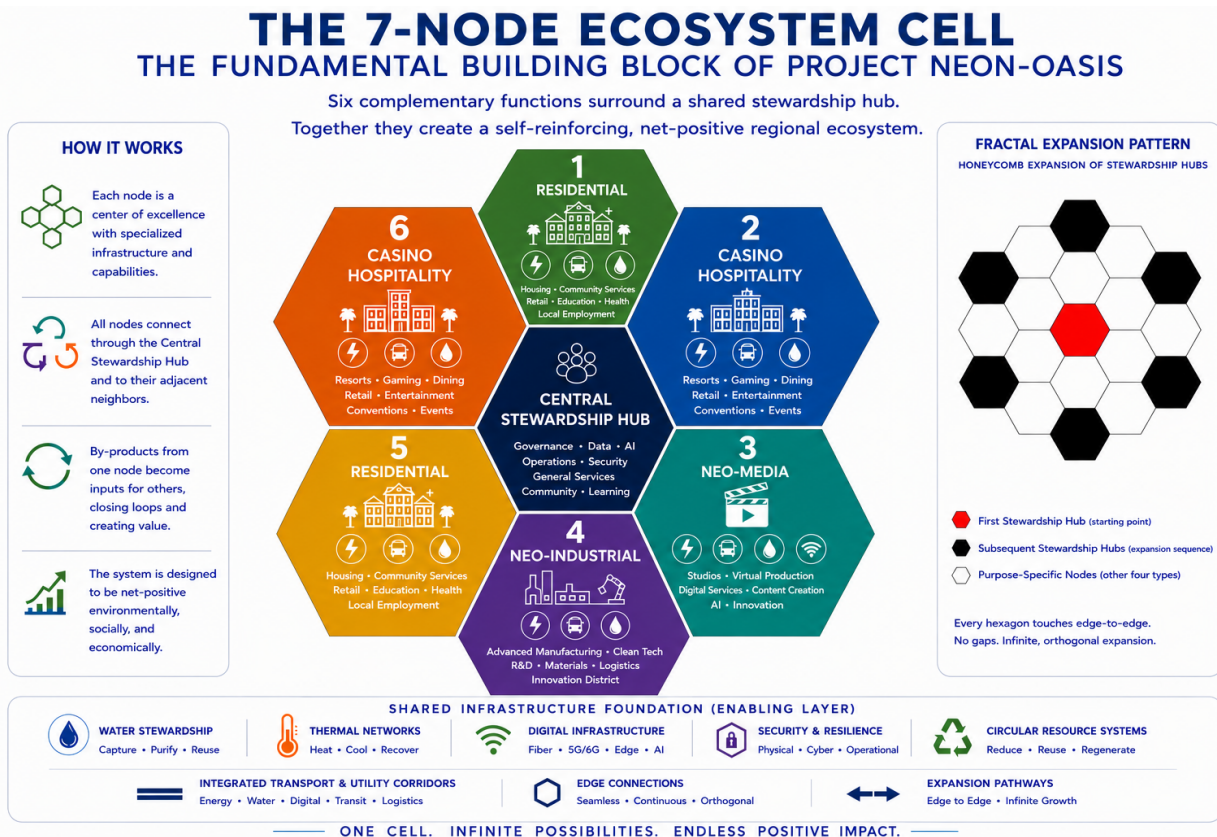
Designed to expand via an interlocking hexagonal layout, this master plan details **three independent, standalone site options for deployment within Clark County. Each site is a distinct alternative for a self-contained, 7-node circular ecosystem cell:**

- **Option 1: The Henderson Frontier (Undeveloped Canvas)** — Utilizing open, unmapped expanses in Henderson to establish a master-planned, tech-agrarian smart town center from scratch.
- **Option 2: The University District Infill (UNLV Corridor)** — Reclaiming and density-optimizing the underutilized urban corridor just north of UNLV. The intersection of East Flamingo Road and S Maryland Parkway serves as the exact southwest corner of this urban hexagonal cell alternative.
- **Option 3: The Summerlin Media Core (The Digital Cinema Capital)** — Transforming the western valley space previously blocked out for a media city center design into a world-class, high-density digital cinema, virtual production, and interactive entertainment hub.
- By utilizing a modular design, each project alternative turns the traditionally heavy resource footprints of gaming, computing, film production, and urban living into a solar-powered, closed-loop system.

The Las Vegas Urban Paradox Solved (Applicable to All Options)

- **Solar-Hydrogen Energy Infrastructure:** Rather than adding strain to the NV Energy grid, the entire 1,200-acre cell envelope is converted into a multi-tiered solar harvesting platform. Combining high-efficiency rooftop photovoltaics, agrivoltaic sun-shelters, and kinetic media tracking panels, the cell generates its own clean power. Excess solar energy produced during peak afternoon hours runs on-site water electrolyzers, converting recycled water into green hydrogen fuel for 24/7 backup power and local transit.
- **Water Security:** Neon Oasis captures, treats, and recycles 100% of resort, studio, and residential graywater through engineered indoor wetlands. This treated water runs the data center's closed-loop immersion cooling networks and irrigates local food loops, reducing municipal water demands.
- **Thermal Efficiency:** AI computing and media rendering racks produce tremendous amounts of heat. Rather than spending millions on energy to vent this heat into the desert air, Neon Oasis routes this thermal energy directly into the urban network. This resource heats millions of gallons of guest pools, runs domestic hot water systems for thousands of homes, and maintains climate control for massive soundstages and agrarian biomes.
- **Grid Protection:** By pairing the data center's multi-gigawatt battery systems with the widespread solar array, the cluster acts as a Virtual Power Plant (VPP). This system stabilizes the Nevada energy grid during peak summer heatwaves.
- **Media & Entertainment Synergy:** The data centers act as the physical computational backend for both localized community media and global entertainment content, running real-time rendering pipelines natively within the network.

II. Spatial Geometry & The Standalone Urban Network The master development scales using a Fractal Hexagon Pattern. Whichever geographic option is selected, the project forms a self-contained “Mega-Hexagon” spanning roughly 1,200 acres. As the community grows, new hexagonal cells can lock into the edge of the chosen network, expanding the transport links, utilities, and public spaces smooth



Cell Structure & The 5-Tier Node Topology

To balance economic growth with community needs, the nodes within the standalone hexagonal network utilize four specialized configurations:

Type A: The Gaming & Entertainment Anchor (2 Nodes per Cell)

- **The Solar Cap:** High-efficiency, integrated building photovoltaics (BIPV) coat the southern facades of the resort towers and wrap the massive central canopy, shading guest pool decks while generating megawatt-scale power.
- **The Subterranean Core:** A 50 MW liquid-immersion data center built beneath the resort's foundation. It serves as the local cloud backbone and runs heavy real-time gaming, casino analytics, and hospitality processing.
- **The Podium & Shell:** A 1,500-room luxury casino resort, complete with a gaming floor, convention spaces, and performance venues.

TYPICAL NODE CROSS-SECTION

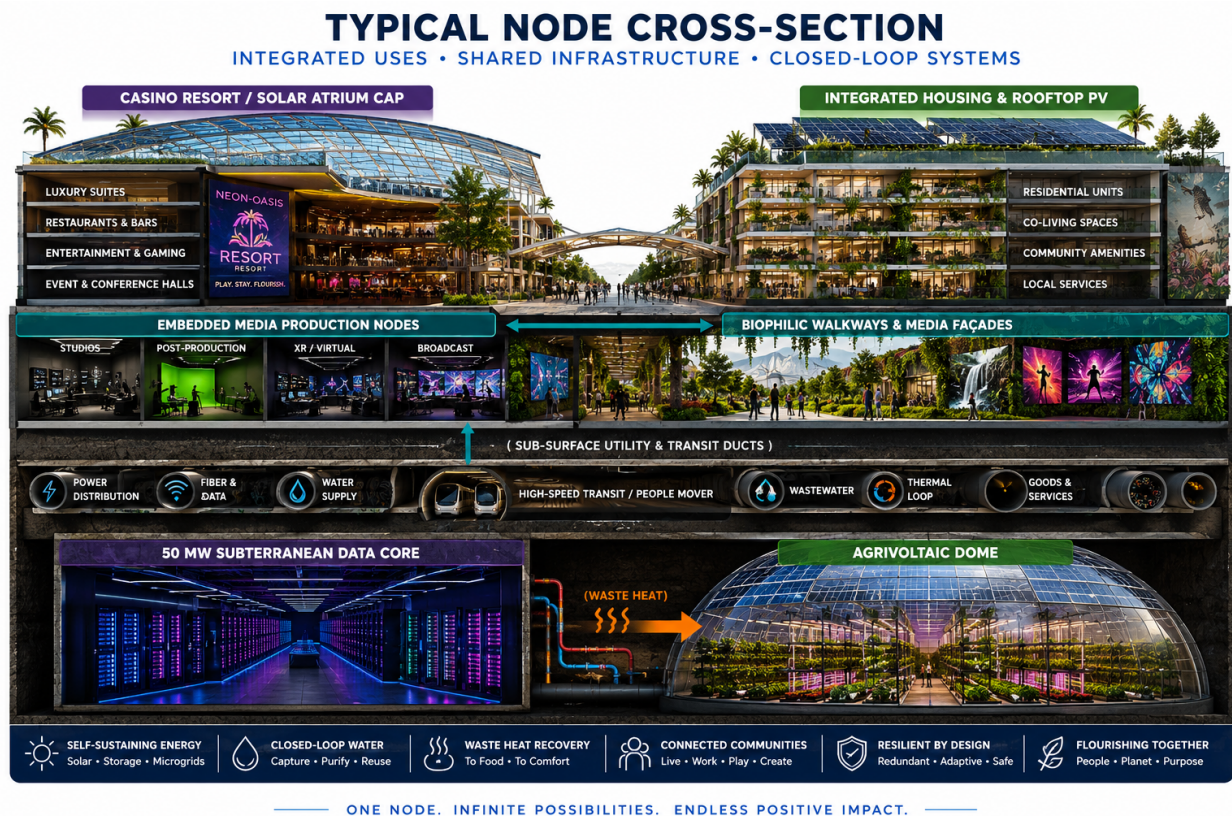
INTEGRATED USES • SHARED INFRASTRUCTURE • CLOSED-LOOP SYSTEMS



ONE NODE. INFINITE POSSIBILITIES. ENDLESS POSITIVE IMPACT.

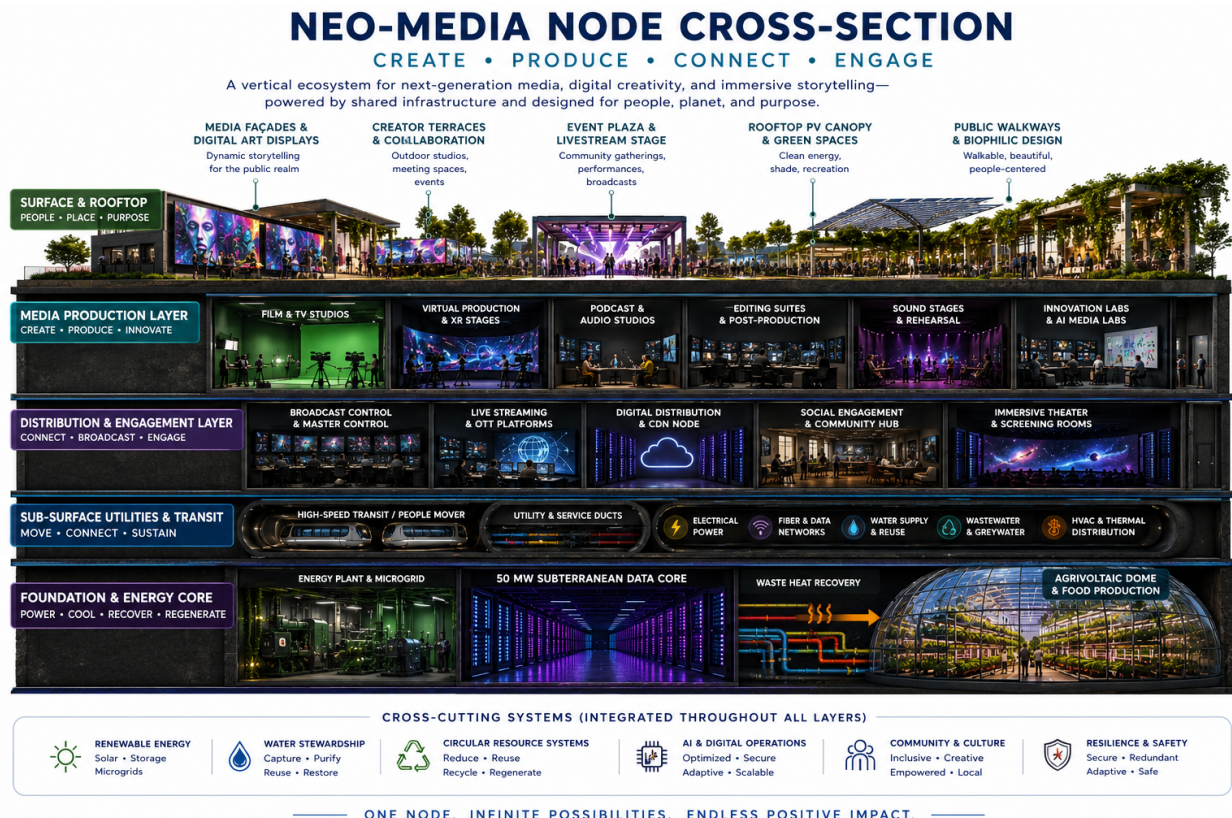
Type B: The Living Commons (Residential-Focused Nodes)

- **The Solar Canopy:** Residential roofs are constructed as unified solar arrays, utilizing tracking solar shingles that optimize solar gains in the desert sun while acting as structural insulation.
- **The Subterranean Core:** A 50 MW data center core optimized for edge computing, civic processing, and distributed localized rendering loops.
- **The Integrated Urban Shell:** High-density, mixed-income residential housing blocks accommodating **5,000 residents per node**. Structures feature passive desert cooling architecture, shaded terraces, and interior community courtyards.



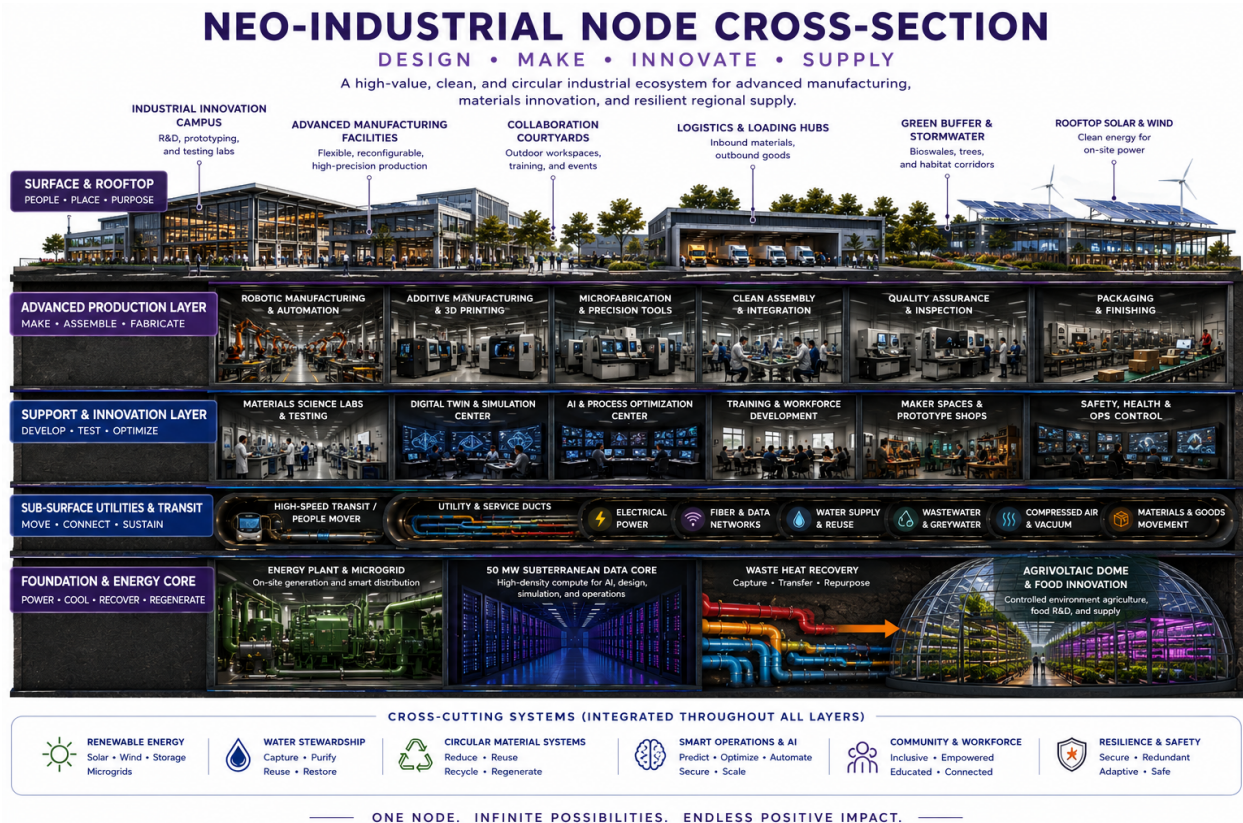
Type C: The Neo-Media Production & Creative Commons (Media-Focused Nodes)

- **The Kinetic Solar Facades:** Soundstage exteriors feature dual-purpose surfaces: kinetic, sun-tracking solar panels that shift throughout the day to maximize energy capture, which flip at night to become high-resolution micro-LED media display screens.
- **The Subterranean Core:** A 50 MW hyper-dense rendering and AI-processing data center core. This core provides dedicated, low-latency compute directly to adjacent media spaces for real-time 3D environments, virtual production pipelines, and digital compositing.
- **The Creative Shell:** Industrial-grade soundstages, immersive LED volumetric capture studios, post-production edit suites, spatial audio mixing bays, and creative incubator offices.



Type D: The Neo-Industrial Zone

- **The Innovation District:** The Neo-Industrial Zone integrates advanced manufacturing, robotics, research laboratories, and clean technology industries into a walkable innovation campus designed for continuous collaboration and rapid prototyping.
- **The Core:** Flexible industrial facilities support product design, fabrication, testing, repair, remanufacturing, and workforce development, allowing emerging technologies to evolve without requiring wholesale redevelopment.
- **Infrastructure Layout:** Features autonomous logistics systems, additive manufacturing centers, advanced utilities, district thermal recovery, circular materials reclamation, and direct connections to the regional AI data core, renewable microgrid, and transportation network.

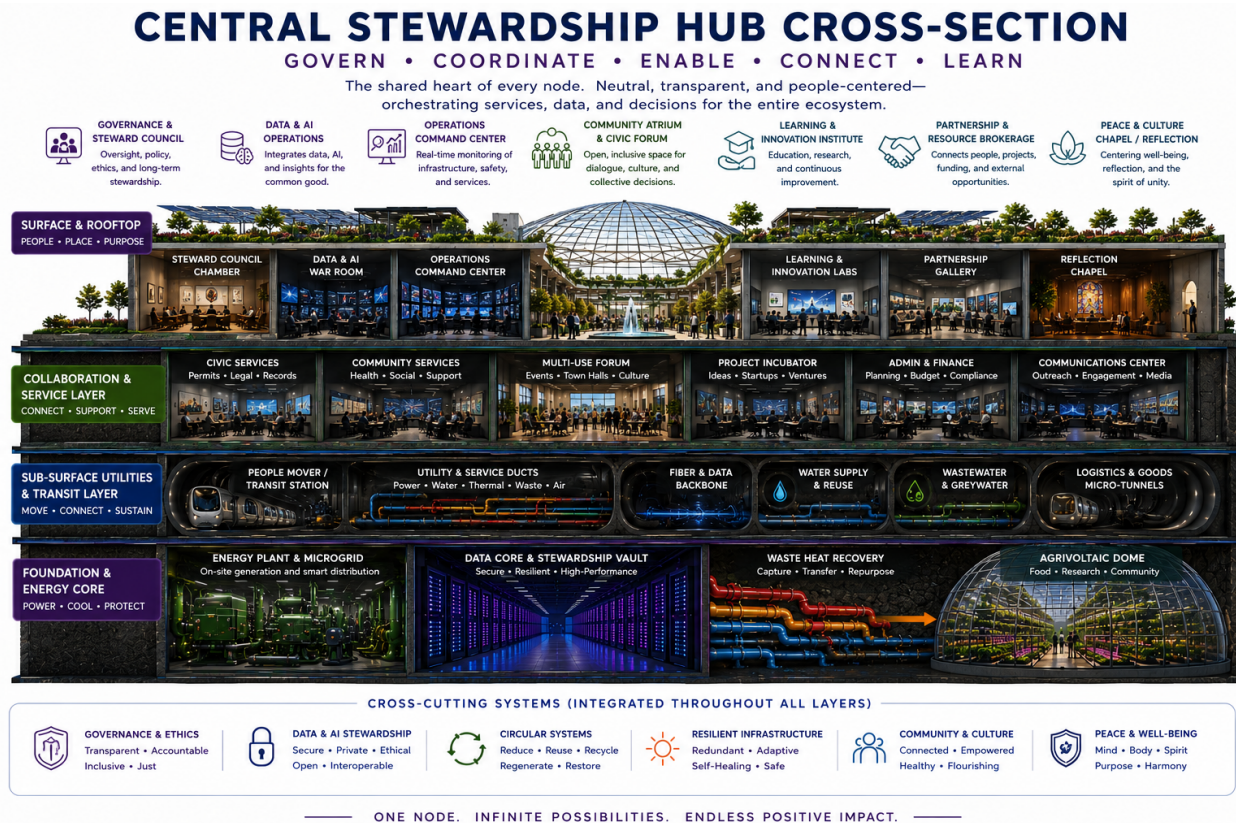


Type E: The Central Translogic Hub (1 Central Node per Cell)

The Solar Concentrator Infrastructure: The central hub features a localized solar canopy over the main logistics yards, alongside a utility-scale battery deployment area.

The Core: The interior pocket of the hexagon contains no permanent housing or casinos. Instead, it serves as the logistical engine for the surrounding six nodes.

Infrastructure Layout: Features a multi-modal high-speed train terminal, a clean energy substation paired with a **Green Hydrogen Electrolyzer Plant**, and an industrial-grade **Circular Reclamation Hub** to process waste and wastewater streams.



III. Geographic Track Alternatives (Independent Location Options)

Option 1: The Henderson Frontier (Undeveloped Canvas)

The Site: Large, open expanses within Henderson's jurisdiction currently lacking a unified central plan.

The Strategy: Serving as the master greenfield blueprint for a brand-new town center. This independent option capitalizes on large, contiguous plots of land to build massive, sweeping circular agrivoltaic domes (where tracking solar arrays shade crops beneath them) and utility-scale water-positive wetlands without the constraints of existing urban block footprints.

Option 2: The University District Infill (UNLV Corridor)

The Site: The urban pocket located directly north of UNLV. The southwest anchor corner of this independent hexagon maps directly to the intersection of **E Flamingo Rd & S Maryland Pkwy.**

The Strategy: This urban infill alternative focuses on vertical density and rapid revitalization. It transforms underutilized strip malls, low-density commercial storage units, and derelict parking structures into a high-density walkable district. It establishes a direct physical and digital connection to UNLV's research facilities, utilizing building-integrated solar facades across all retrofitted vertical structures to maximize energy harvesting in an urban grid.

Option 3: The Summerlin Media Core (The Digital Cinema Capital)

The Site: The western valley space in Summerlin previously earmarked for an expansive media city center design.

The Strategy: This option functions as a specialized technological powerhouse for the entertainment industry. It pairs elite virtual production soundstages with high-density creative living. It acts as an industry cluster for digital arts, film production, and next-generation interactive media, completely powered by the integrated solar-hydrogen matrix and cooled by the underlying data assets.

IV. Integrated Solar Utility & Media Node Systems

Unlike traditional developments where solar power and media displays are treated as separate, bolt-on components, Project Neon Oasis integrates solar generation and media nodes into the architectural fabric of the city:



Kinetic Solar-Media Skins: Building facades are wrapped in custom kinetic panel matrices. During daytime hours, these panels track the sun to optimize solar generation. At dusk, the panels mechanically tilt to expose a high-durability micro-LED surface, transforming the entire city structure into an open-source, digital media canvas for cinematic display and interactive community art.

Agrivoltaic Public Spaces: Pedestrian promenades, civic squares, and agricultural zones are covered by open-weave solar canopies. These structures generate clean electricity while blocking 40% of the intense Mojave solar radiation, cooling the microclimate below naturally and creating comfortable, walkable outdoor spaces.

Sub-Surface Micro-Studios & Render-Farms: Nestled directly beneath the solar-shaded residential blocks are community-accessible content creation pods. Because these workspaces sit directly on top of 50 MW data center engines powered by the daytime solar grid, local creators can run heavy visual effects and AI rendering tasks with near-zero latency and a net-zero carbon footprint.

V. Thermodynamic & Hydrological Closed-Loop Systems

The core innovation of Neon Oasis is its ability to eliminate waste streams by cascading resources through different temperature zones and treatment layers.



1. Thermal Energy Cascading

Instead of using energy-intensive chillers to cool data center equipment, the facility utilizes dielectric immersion fluids that absorb server heat efficiently. The resulting heated fluid (exiting at 60°C / 140°F) is routed through a cell-wide heat-exchanging grid:

Stage 1 (Resort, Studio & Residential Utilities): The highest heat is transferred directly to resort hot water loops, commercial laundries, large studio climate systems, and residential domestic water systems.

Stage 2 (Climate-Controlled Atriums): Residual thermal energy keeps public spaces, residential green atriums, and media production offices comfortable during cold desert winter nights.

Stage 3 (Agricultural Production): Lower-grade warmth (35°C / 95°F) is piped to adjacent vertical farms and hydroponic greenhouses to accelerate crop growth before the fluid returns to the data center chilled.

2. Hydrological Closed-Loop

In the desert, water is a critical resource. Neon Oasis treats water as a reusable asset rather than a consumable expense:

Urban Capture: Graywater from resort kitchens, hotel rooms, film studio facilities, residential showers, and washing machines is collected through separated utility conduits.

Natural Treatment (Constructed Wetlands): The water passes through a series of terraced, engineered indoor wetlands. Native desert reeds, sand filters, and natural microbes cleanse the water to tertiary standards without harsh chemicals.

Industrial Deployment: The purified water is returned to the data center to replenish its closed-loop cooling systems. Any excess water is used to irrigate local vertical farms or recharge the regional groundwater table.

3. Hydrological Zero-Emission Integrated Transportation Grid



To keep the development walkable, quiet, and pedestrian-focused, all private passenger cars are kept outside the cluster's boundary. Transit is split into three interconnected, zero-emission layers.

The Pedestrian Core: The interior of each resort, studio, and residential node is fully pedestrianized. Shaded by solar-harvesting agrivoltaic structures, walkways protect walkers from the sun, while micro-mobility lanes handle light electric scooters and luggage transport.

The Elevated PRT Loop (Personal Rapid Transit): An elevated track system carrying autonomous electric podcars rings the outer perimeter of the cluster. Residents, crew members, and guests can step into a private podcar at any node and travel directly to another district, studio block, or the central transit hub in under 8 minutes at 30 mph. The tracks are integrated onto the utility viaducts housing the district heating pipes and are shielded by localized solar arrays.

The Central Regional Rail Link: The Central Hub houses a high-speed rail terminal designed to link directly into regional transit networks (such as Brightline West). The autonomous shuttle fleet and hydrogen buses that handle ground logistics are fueled directly by the Central Hub's hydrogen production plant, utilizing the daytime solar energy surplus.

VI. Socio-Economic Framework & The Gaming-Media Commons

The Neon Oasis framework uses its technological infrastructure to introduce new operational models for the hospitality, media, and residential real estate industries.

The Digital Commons & Solar Economy

The Virtual Power Plant Grid: The combined solar output across all seven nodes (estimated at over 150 Megawatts of peak generation capacity) is managed by an AI-driven energy orchestration engine. The data center's solid-state battery banks act as a buffer, storing daytime solar power and deploying it back into the local community or selling it to the Nevada macro-grid during high-tariff peak hours, maximizing grid stability and utility revenue.

The Neon Token Economy: The cluster features a localized digital token system managed via a transparent utility ledger. Guests and residents earn tokens by participating in sustainability initiatives—such as opting out of daily room linen changes, sorting studio set materials, or volunteering at community media nodes. These tokens can be redeemed for slot play, movie tickets, dining credits, or community utility offset bills.

Targeted Ecosystem Integration: For Option 2 (University District), the data center and solar utility network provides direct, free supercomputing access and data storage to UNLV research centers, accelerating academic programs in film, engineering, and climate-positive hydrology.

VII. Financial Architecture & Capital Cost Breakdown

Developing an integrated circular resort, residential, media production, and solar utility network requires significant capital, but the integrated design unlocks operational efficiencies that reduce long-term costs.

Initial Capital Load (Single 7-Node Cell CAPEX Matrix)

The baseline cost to construct two luxury casino resorts, three high-density urban residential districts, two advanced media production nodes, and an independent 300 MW data center footprint would typically approach \$9.80 Billion. Incorporating the complete cell-wide integrated solar utility, hydrogen plant, and circular infrastructure requires a **25.5% development premium, bringing the total budget per cell to \$12.30 Billion.**

Infrastructure Layer	Representative Components	Estimated Initial CAPEX
Advanced Data Core Network (6x)	Six 50 MW liquid-immersion AI/data centers, subterranean excavation, rendering farms, high-voltage switchgear, cooling infrastructure	\$4.53B
Resort & Hospitality Districts (2x)	Integrated resorts, gaming floors, hotel towers, convention facilities, entertainment venues, rooftop solar systems	\$2.25B
Residential Districts (3x)	Approximately 15,000 housing units, schools, neighborhood clinics, retail, rooftop solar, community infrastructure	\$1.58B
Neo-Media Production Districts (2x)	Soundstages, LED volumes, virtual production, post-production facilities, kinetic solar-media façades, creator studios	\$1.15B
Solar Utility & AI Microgrid	Building-integrated photovoltaics, agrivoltaic systems, battery storage, microgrid controls, AI energy orchestration	\$500M
Thermodynamic Utility Network	District heat recovery, insulated thermal loops, studio climate exchange, greenhouse heating, heat cascade infrastructure	\$610M

Water Stewardship Infrastructure	Graywater recovery, advanced filtration, stormwater capture, production runoff treatment, reuse distribution	\$410M
Autonomous Podcar Mobility System	Approximately 15 miles of elevated guideway, autonomous vehicles, logistics transport, maintenance facilities	\$310M
Regional Transit Terminal	High-speed rail station, multimodal transit hub, passenger facilities, regional mobility connections	\$450M
Hydrogen Generation & Storage	Solar-powered electrolyzers, hydrogen storage, fueling infrastructure, resiliency backup systems	\$180M
Landscape & Public Realm	Shaded pedestrian corridors, desert ecology restoration, parks, water features, public gathering spaces	\$72M
Total Initial 7-Node Cell Investment	Complete infrastructure platform for one fully integrated ecosystem cell	≈ \$12.30B

15-Year Financial Summary & Return on Investment (Per Cell)

Investment Category	Traditional Linear Development	Project Neon Oasis Circular Model	15-Year Value Differential
Initial Capital Investment	\$9.80B	\$12.30B	–\$2.50B <i>(Additional Upfront Investment)</i>
Energy & Water Utilities (15 Years)	\$3.10B	\$350M	+\$2.75B
IT Hardware & Rendering Infrastructure (15 Years)	\$7.80B	\$4.68B	+\$3.12B
Secondary Revenue Generation	\$0	\$1.12B	+\$1.12B
End-of-Life Asset Recovery	–\$190M	+\$120M	+\$310M
Total 15-Year Ecosystem Value	–\$20.61B	–\$15.84B	

Amortization & Payback Strategy

The \$2.50 Billion infrastructure and solar development premium is fully recovered within **3.6 years** through the combined extraction of off-grid solar energy offsets, extensive studio utility reductions, rendering hardware savings, hotel/residential bill rollbacks, and secondary cash flows generated by the Virtual Power Plant battery arbitrage.

VIII. Phased Implementation Timeline & Deployment Strategy

To manage capital deployment and ensure early revenue generation, the development of the chosen cell option is executed in three distinct phases:



- **Phase I (Months 1–18) - The Infrastructure Anchor:** Site grading, construction of the Central Hub Transit Terminal, layout of the initial solar substation arrays, installation of the primary water filtration wetlands, and the deployment of the first two 50 MW data center cores to generate immediate cloud computing and render-farm revenue.
- **Phase II (Months 19–36) - The Core Entertainment & Production Mix:** Construction of the first casino resort podium featuring its integrated solar cap, completion of the primary virtual production soundstage node, construction of the first high-density residential node (focusing on the Flamingo & Maryland Parkway corner if Option 2 is chosen), connection of the elevated podcar loops, and integration of the initial solar-assisted microgrid networks.
- **Phase III (Months 37–60) - Full Network Expansion:** Construction of the remaining residential and media districts within the chosen track, deployment of the full agrivoltaic pedestrian walkways, completion of the circular regional agricultural domes, activation of the solar-to-hydrogen plant, and final integration of the cell-wide Virtual Power Plant network.

IX. Regulatory, Zoning, & Funding Frameworks

To move this project from concept to construction, the development strategy utilizes specialized funding and regulatory paths:

- **The Nevada Technology, Tourism & Media Zone (TTZ):** A proposed public-private regulatory framework that allows developers to streamline standard gaming, studio, residential, and industrial zoning approvals by meeting strict water-neutral, localized clean media creation, and net-positive solar energy benchmarks.
- **Solar Utility & Green Bond Financing:** The integrated microgrid, solar skin overlay, and transit layer qualifies for low-interest Institutional Green Bonds, Federal Investment Tax Credits (ITC) for solar and energy storage systems, and Sustainability-Linked Financing, reducing upfront borrowing costs by proving significant carbon, waste, and water reductions.
- **Water & Solar Rights Optimization:** By proving a 100% recycling rate of all internal graywater across hotel rooms, residential suites, and production studios alongside an independent micro-utility solar grid footprint, the project minimizes the need for municipal resource draws, aligning with the Southern Nevada Water Authority's long-term conservation targets and Nevada's Renewable Portfolio Standard (RPS) milestones.

X. The UNLV Partnership Opportunity

Going Beyond Mere Commerce

Project Neon Oasis is intended to be more than a development.

It is envisioned as a living laboratory where students, faculty, researchers, entrepreneurs, and industry partners can collaborate on one of the world's first fully integrated circular urban ecosystems.

Rather than creating entirely new academic programs, the project can serve as a practical, interdisciplinary incubator for areas of study that already exist throughout the University of Nevada, Las Vegas (UNLV).

Using a progressive interdisciplinary model benefits all involved.

Students learn.

Faculty research.

Industry innovates.

The community benefits.

Each new seven-node ecosystem cell, along with the innovative needs of the various nodes themselves, become ongoing educational platforms where ideas can move beyond the classroom into measurable real-world applications.

Potential collaborations include:

UNLV Discipline	Potential Project Opportunities
Architecture	Master planning, regenerative building design, kinetic façades, adaptive reuse, urban placemaking
Civil & Environmental Engineering	District utilities, resilient infrastructure, transportation systems, water stewardship, materials research
Mechanical Engineering	Thermodynamic heat cascading, hydrogen systems, advanced cooling, energy recovery
Electrical & Computer Engineering	Smart microgrids, AI infrastructure, autonomous transportation, digital twins, edge computing
Computer Science	Artificial intelligence, digital governance, cybersecurity, simulation, data visualization
Hospitality	Resort operations, guest experience, convention innovation, tourism analytics
Film, Media & Journalism	Virtual production, digital storytelling, immersive media, public communications

Business	Entrepreneurship, circular business models, finance, economic impact, venture incubation
Public Policy & Urban Affairs	Governance, regulatory innovation, regional planning, public-private partnerships
Environmental Science	Desert ecology, agrivoltaics, biodiversity, climate resilience, resource stewardship
Health Sciences	Community wellness, healthy cities, walkability, environmental health, preventive care
Education	Experiential learning, interdisciplinary curriculum, workforce development, community engagement
Fine Arts	Public art, performance spaces, placemaking, cultural programming, interactive installations

Educational Integration

Project Neon Oasis can support a wide variety of experiential learning opportunities, including:

Senior design and capstone projects

Graduate research initiatives

Faculty-led interdisciplinary research

Internship and cooperative education placements

Innovation competitions and design challenges

Business incubators and startup accelerators

Community-engaged service learning

Public exhibitions and demonstrations

Industry-sponsored research partnerships

Ongoing practicum opportunities that expand as entrepreneurial innovations increase

A Living Laboratory for Southern Nevada

Unlike many academic projects that conclude at graduation, Project Neon Oasis is designed to remain an evolving platform for continuous learning.

Each improvement becomes the next generation's case study.

Each innovation becomes the next prototype.

Each student contributes not only to a degree—but to the long-term stewardship of a community designed to become smarter, more resilient, and more regenerative with every passing year.

In this sense, UNLV is not merely educating students **about** the future.

UNLV is helping to build the future, right on the streets where we live.

XI. An Invitation to Collaborate

What you have just read is not a finished master plan.

It is a first invitation.

A working draft of what may become possible when many people from many disciplines begin building something larger than any one of us could accomplish alone.

If the ideas presented here resonate with you, we would welcome the opportunity to continue the conversation—to refine them, challenge them, improve them, and perhaps even help bring them to life together.

To explore opportunities for collaboration, partnership, research, investment, or educational engagement, please contact:

Grant Shull
GrantShull@me.com

Because the future is rarely built by a single visionary.

It is stewarded into being by communities willing to imagine—and build—it together.

