# From Soot-to-Servers

*Columbia SIPA Capstone Final Presentation*

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**Client:** Roland Berger

April 24, 2026

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# Acknowledgements

The Columbia SIPA Capstone team would like to extend our sincere gratitude to the individuals and organizations whose guidance, insights, and support made this project possible.

We would like to express our deepest appreciation to **our client, Roland Berger**. We are particularly grateful to **Mike Granowski** for his support, and **Antoine Pitard** for his guidance, engagement, and insights throughout the project. Antoine's perspective helped shape the direction of our work and challenged us to think critically about both the strategic and practical implications of our analysis.

At SIPA, we are especially grateful to **our Faculty Advisor, Professor Gregory Stoupnitzky**, for his thoughtful guidance, continuous support, and valuable feedback throughout the project. His mentorship played a central role in refining our analytical approach and strengthening the overall quality of our work. We also extend our appreciation to the Columbia SIPA Capstone Program, including Suzanne Hollmann and Saleha Awal, for their support and coordination throughout the semester.

We also would like to thank the **SIPA Capstone team, the professionals, experts, and stakeholders** who generously shared their time and perspectives throughout this research. Their insights into data center development, energy infrastructure, policy, and local community considerations were critical in shaping our analysis and strengthening our recommendations. Their contributions allowed us to better understand the practical challenges and opportunities associated with coal-to-data center transformations.

This project would not have been possible without the collective support and contributions of all those involved, and we are sincerely thankful for the opportunity to work with and learn from each of them.

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4. Deep Dive: Meredosia Coal Plant Brownfield to DC Overview
5. Risk Analysis
6. Construction Solution
7. Business Model
8. Financial Modeling & Scenario Analysis
9. Decarbonization Toolkit for Meredosia
10. Conclusion
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# Meet the Team

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*Faculty Supervisor*

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# Introduction to the Capstone Project & Roland Berger

This Columbia SIPA capstone, commissioned by Roland Berger, investigates whether retired U.S. coal power plant brownfields can be converted into data centers and at what scale.

- **Scope:** Building on 2 previous successful Capstone projects on coal power plant transformation, we specifically investigate the feasibility and trade-offs associated with converting retired coal power plant brownfields into data center campuses.
- **Approach:** Analyze what criteria successful transformations have to meet, and illustrate findings with an already retired coal power plant brownfield in IL.

Roland Berger

**Roland Berger,** a leading global management consultancy founded in 1967 in Munich, has 50+ offices across 35 countries. Its Energy & Utilities practice focuses on infrastructure transformation, energy transition, and digital economy investments.
**Client Sponsor:** Antoine Pitard, Manager at Roland Berger & SIPA alumni

# Executive Summary

### Coal-to-data center conversion is a viable and scalable solution to meet surging AI-driven power demand

- U.S. data center demand expected to triple by 2030, while greenfield development is constrained by interconnection delays (3–7 years) and equipment procurement lead-time
- Brownfield coal sites offer “speed-to-power” advantage through existing grid infrastructure, permits, and land reuse

### The chosen plant in Meredosia (IL) demonstrates a compelling investment case for decommissioned sites

- Narrowed 83 retired coal plant sites to a single high-potential candidate (Meredosia)
- Strong fundamentals: 345kV grid proximity, water access, resolved environmental liabilities, and favorable MISO market
- Financially viable, but highly sensitive to power costs, PUE, and BTM reliance

### Value creation is unlocked when key risks are actively managed

- Critical risks: flooding, policy uncertainty (tax credits), interconnection limits, and community opposition
- Mitigation: engineered flood adaptation, early utility coordination, renewable PPAs, and proactive stakeholder engagement

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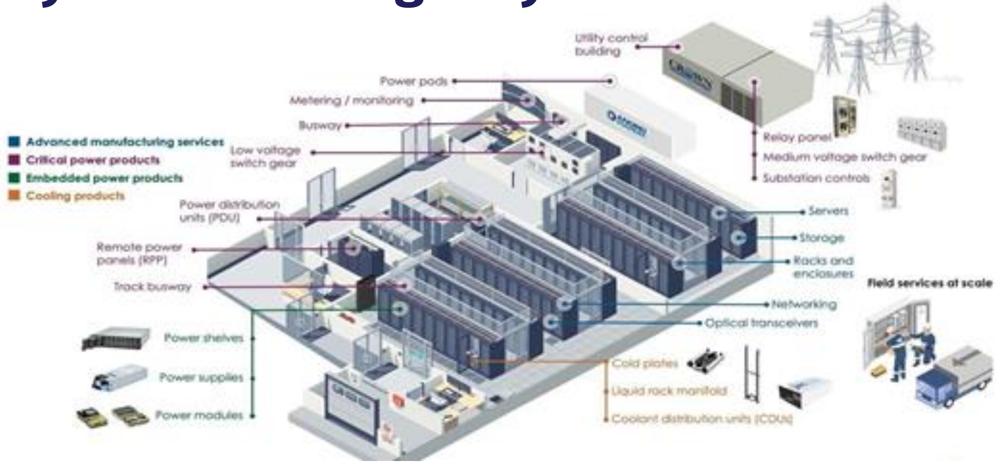
# Data center performance is driven by the coordination of five core systems working in sync



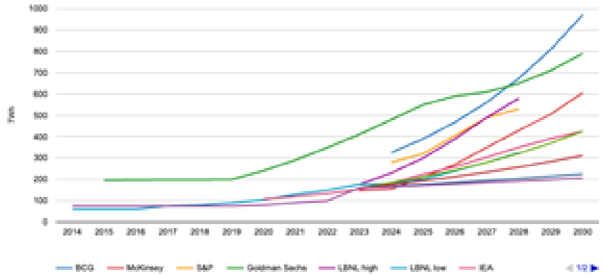

- **IT Load: Brain** — Core computing and data processing infrastructure
- **Power: Bloodstream** — Reliable and redundant power delivery system
- **Cooling: Respiratory** — Thermal management and heat removal system
- **Network: Nervous** — High-speed data connectivity infrastructure
- **Operations: Immune** — Safety, security, and facility control systems

| Data Center Type | Average PUE | Normal IT Load Range | Representative Companies |
|---|---|---|---|
| Hyperscale | 1.1 - 1.2 | 100 - 500+ MW | AWS, Google, Microsoft, Meta |
| Co-location | 1.2 - 1.4 | 10 - 100 MW | Equinix, Digital Realty, CyrusOne |
| AI / HPC | 1.1 - 1.3 | 50 - 200 MW | CoreWeave, Lambda Labs, Crusoe |

Source: Flex Power Modules; Flexential, "Power Usage Effectiveness Explained"; Equinix, "What Is a Data Center? What Are Different Types of Data Centers?"

# Finding greenfield sites that are conducive to data center operations is challenging. Retired coal brownfields can be part of the answer

## Challenges: Rapid Data Center Growth




- US data center electricity demand will reach **606 TWh** in 2030
- Projected share of US power demand from data centers: **3.7%** (2023) to **11.7%** (2030)

### Power Supply

Capacity Demands

- 460 TWh of demand added from 2023 to 2030

Long Wait Times

- 3-7 years for grid interconnection

### Water scarcity

Cooling Demand

- Data-center-related water consumption in the United States is likely to increase by 170 percent by 2030

### Resources

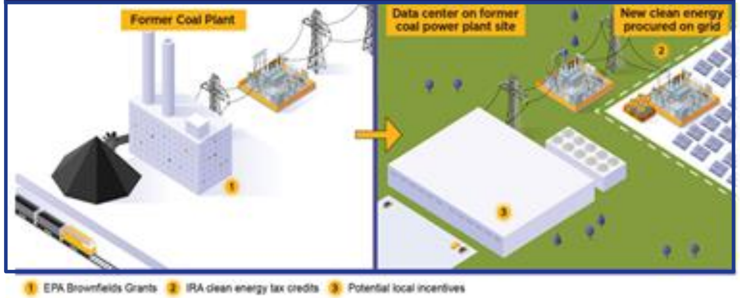
Land Use

- Associated infrastructure

Labor

- Professionals doing mechanical-installation work

## Solution: Coal-to-Datacenter




**Grid Infrastructure**

**Policy Incentives**

**Community Benefit**

**Environmental Benefits**

**Economics Benefit**



Source: Pacific Northwest National Laboratory: Redeveloping Coal Power Plants: Data Centers, Mckinsey & Company: AI's Power Binge

# For this transformation to succeed, development must align with local stakeholder priorities and address key community concerns

## Grid Impact

### Load Addition
Utility-scale data center using existing substation would have minimal impact on distribution system but may contribute to increased grid strain.

### Interconnection Queue
Using existing infrastructure increases speed-to-power.

### Substation Reuse
Retired coal plant has existing 345kV transmission ties; reusable infrastructure reduces upgrade costs and supply chain risk.

### Upgrade Costs Contained
Ameren's regulatory framework specifically prevents "cost shifts" to consumers. The developer pays for their transmission connection, and the increase in system usage subsidizes the fixed costs of the existing grid for all other customers.

## Local Employment

### Construction Jobs
Approximately 400-500 temporary construction jobs during 18-24 months build-out, supporting local trades and contractor.

### Permanent Jobs
Approximately 30-50 permanent, high-wage, long-tenure positions in a county with limited alternatives.

### Indirect Job Effects
Modest multiplier effect on local services, food, housing demand; meaningful for a small town; not transformative.

## Tax Base & Land Reuse

### Local Tax Gains
The project is estimated to generate ~$54M annually in combined state and local tax revenue at stabilization and $608–729M cumulative over the 15-year hold.*

### Industrial Land Reuse
Repurposes remediated land in an area with few alternative development prospects, avoiding further deterioration of the land near a common resource, the Illinois River.

### Tax Advantages
A combination of federal, state, and local tax credits add additional incentives.

## Controversies & Pushback

### Water Rights Conflicts
Proposed closed loop cooling system relies on water discharge rights in the Illinois River. Environmental groups and residents may protest warm water discharge.

### County Opposition
Potential objections over truck traffic on rural roads, pollution, and lack of regional consultation. There has been some opposition in neighboring counties.

### Zoning & Permitting
Industrial-to-data-center rezoning faces scrutiny; some residents prefer alternative reuses such as clean manufacturing or agriculture.

## Indirect & Environmental

### Noise Pollution
Cooling equipment and backup generators produce continuous low-frequency noise; persistent quality-of-life concern for residents in the village of Meredosia close by.

### Energy Source
If powered by the regional grid (coal generation heavy), net emissions may not improve in the short-term without dedicated renewable PPAs and/or clean behind-the-meter energy. Load shifting is the easiest method for carbon savings for latency-tolerant workloads. If enabled with BESS, scheduler-level telemetry access, and tenant consent at lease execution, demand response is also possible to a limited extent.

Source: Hamm Institute for American Energy (2025); Morgan County Supervisor of Assessments; Jacksonville/Morgan County Enterprise Zone; BCG, "Breaking Barriers to Data Center Growth" (2025) and "Solving the US Data Center Power Crunch" (2026); McKinsey, "The Data Center Balance" (2025); IRS Clean Electricity Investment Credit (Sec. 48E); US Treasury Energy Communities guidance; stakeholder interviews (Apr 2026)

*Fiscal impact calculated as an overlay on financial model operational inputs. Model is only 21% federal corporate tax; Illinois state/local channels applied here using Illinois tax mechanics.

# Looking at what it takes for a site to pose a suitable transformation target, we filtered all sites to select one for further analysis

**Data Source: Global Energy Monitor - US Retired Coal Plant List**

**FIRST PASS:**
**83 Sites** (Filtering Criteria: Start Year Cut-Off 1986, Retired Units, Total Capacity of 200 - 500 MW)

**SECOND PASS:**
**14 Sites** (States: Georgia, Illinois (w/o Chicago), Indiana, Tennessee, Maryland, Texas)

**THIRD PASS:**
**4 Sites** (Applied quantitative scoring framework alongside site availability verification (sold/unsold status))

**FOURTH PASS:**
**2 Sites** (Deep-Dive Assessment)

**Final Site Selection & FIFTH PASS:**
**1 Site**



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# From a bird's eye view, Meredosia can be a successful soot-to-servers transformation

## Site Specs

**Location:** Morgan County, IL

**Capacity:** 355.4 MW (retired 2011)

**Land:** 40 acres

**Owner:** Environmental Liability Transfer

**Grid:** 345kV @ 0.2 km

**ISO:** MISO

**Water:** Illinois River


## Why Meredosia Over Alternatives

### Key Advantages

- Already retired
- Lack of disincentives (moratoriums)
- MISO > PJM for large loads
- State and county level tax benefits

### vs. Greenfield Sites

- Skip some portion of the interconnection queue
- Pre-approved environmental permits
- Access to hard-to-procure infrastructure

### Trade-offs Accepted

- Rural location
- No Tier 1 fiber (build required)
- Flooding Adaptation Costs
- Local community engagement

# Previous redevelopment efforts failed due to underlying structural challenges

## Meredosia Redevelopment Timeline

| | |
|---|---|
| 2009 - 2011 | **Coal Operations End** |
| 2012 - 2015 | **FutureGen 2.0 Attempt** |
| 2016 - 2018 | **Environmental Remediation** |
| 2019 - 2023 | **Monitoring & Compliance** |
| 2024 | **CCR (Coal Combustion Residuals) Closure Certification** |
| 2022 - Present | **Industrial Redevelopment** |

**#1: Vulnerable Financial Structure**
- $1B ARRA federal funding with hard deadline
- $650M private capital never secured
- ARRA sunset = hard stop

**#2: Legal Uncertainty: The "Cloud of Risk" Effect**
- Sierra Club PSD challenge
- Class VI appeal; PPA litigation
- Investors refused to close

**#3: Market Timing – Coal Died Mid-Development**
- Shale gas boom; Power prices collapse
- Coal sector investors exit
- Alliance members pulled out

**#4: Policy-Dependent Project**
- Exelon opposition
- Federal support tied to stimulus
- No durable bipartisan structure

Source: SIPA Capstone Team - Decommissioning Analysis

# Given the site's characteristics, Meredosia is well suited for a data center development

## Best Fit for Site's Infrastructure Profile

| Site Attribute | Data Center Need |
|---|---|
| 345kV substation | Grid connection |
| 40 acres | Target Data Center Size: 200 MW IT load |
| River proximity | Cooling effects and water supply |
| Rural industrial zoning | Commercial Infrastructure |
| Reduced economic vitality in the nearby community due to retired coal and failed FutureGen 2 | Construction Jobs<br>Permanent Skilled Jobs<br>Investment<br>Ancillary Development |

## Possible Target Customers (Co-location)

IT Firms — Cloud infrastructure, AI training, GPU compute cluster
Government Agencies — Federal/state IT workloads
Health Systems — Electronic health records and medical imaging

## Data Center vs Previous, Failed Carbon Capture

**Carbon Capture Project (FutureGen 2.0)**

**Financial (poor)**
- Reliance on government funding

**Legal Uncertainty/Policy (moderate)**
- Lawsuit issues reduced investor confidence

**Market Timing (poor)**
- Shale gas boom, power prices collapse

**Data Center**

**Financial (good)**
- Financially feasible because of the site advantages
- No decommissioning cost

**Legal Uncertainty/Policy (moderate)**
- Illinois governor just announced 2-year pause on data center tax credits

**Market Timing (good)**
- AI boom, data center demand surging

# Meredosia's grid infrastructure and resolved environmental liabilities make it a strong brownfield candidate, despite flood risks

## STRENGTHS

- Substation located 0.2 km from site, interconnection advantages
- 40 -acre industrial site with Illinois River access for cooling
- Located in MISO, which is less congested than PJM for large data center loads
- CCR closure certified in 2024; all environmental liabilities resolved

## WEAKNESSES

- Flood-prone location requires investment in adaptation
- Rural location could increase costs, limited available pool of specialized data center workers
- FutureGen 2.0 failure may create investor skepticism about the site

## OPPORTUNITIES

- Global DC demand expected to triple by 2030, reaching ~219,000 MW
- $6.7T in global investment needed by 2030, with 40%+ flowing to the U.S.
- Global DC capacity doubling from 103 GW to 200 GW by 2030; colocation leading growth at 19% CAGR (JLL); government, healthcare, and enterprise are key segments

## THREATS

- Illinois suspended DC tax credits for 2 years effective July 2026
- Serious data centers delays or cancellations in the US due to equipment scarcity
- Rising community opposition nationally
- Grid interconnection delays

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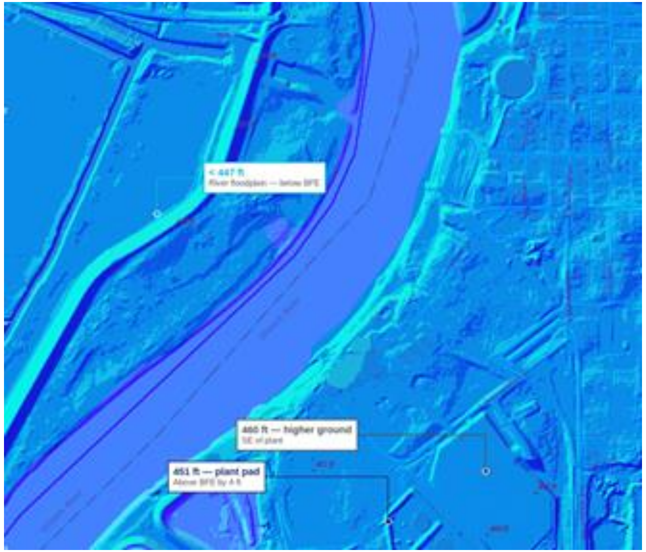
Sources: Bloomberg (Apr 2026); McKinsey, "The Cost of Compute" (Apr 2025); McKinsey, "The Data Center Balance" (Aug 2025); BCG, "Breaking Barriers to Data Center Growth" (Oct 2025); BCG, "Solving the US Data Center Power Crunch" (Mar 2026); Bain, "How Can We Meet AI's Insatiable Demand for Compute Power?" (Sep 2025); Roland Berger, "Watt's Up in AI" (Nov 2025); Roland Berger, "Infrastructure Investment Outlook 2026" (Jan 2026); JLL, "2026 Global Data Center Outlook" (Jan 2026); CBRE NA Data Center Trends H1 2025; S&P Global (Apr 2026)

# LIDAR confirms the coal plant pad sits above Base Flood Elevation. A 7-foot raise exceeds critical facility standards to protect investments




USGS 3DEP Lidar Map - Ground Elevation

**The Site Condition**

- FEMA Zone AE (1% annual chance of flood); Base Flood Elevation = 447
- Reported flooding in recent years, despite FEMA's moderate risk rating
- Approximately 30% of the 43-acre parcel falls inside Zone AE; remainder is outside this hazard zone; other acreage included in the model also remains outside hazard zone

**The Adaptation Strategy**

- 7 feet of compacted concrete fill
- Exceeds ASCE 24-14 FDC 4 for high-risk facilities with a minimum of BFE + 2 ft; builds headroom against 2040 flood projections, lowering future risk

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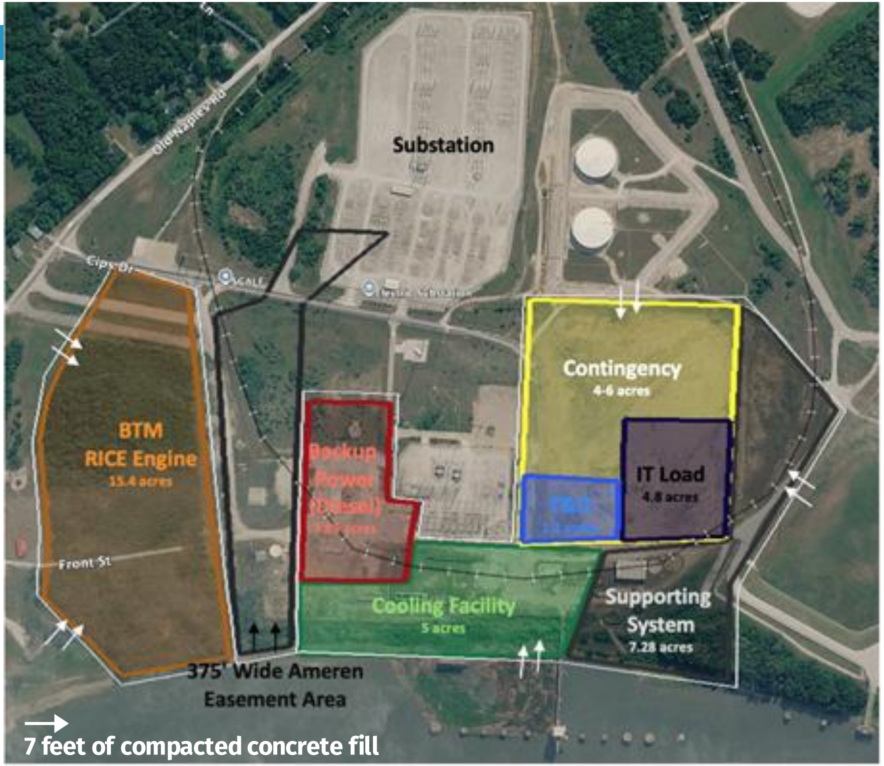
Source: USGS 3DEP Lidar Explorer

# With flooding risk addressed, Meredosia can support a 200MW AI-ready DC through integrated site and infrastructure design




## Land - 40 acres useable

### IT Load & Development Phasing
200 MW IT load (240 MW total facility draw, PUE=1.2)
High Density Rack: 50 kW/rack

### Transmission & Distribution
Existing 345kv on-site substation with legacy coal plant grid connectivity

### Cooling: River Water + Direct-to-Chip (DTC)
Illinois River free cooling via USACE Permit #823
Closed-loop DI water circuit (no consumptive withdrawal)

### BTM Energy: Renewables or gas
Fuel-Flexible RICE (14 units × 18.9 MW), possibly $H_2$-blend capable (e.g., BTM: Wärtsilä 18V50SG)

### Backup Power: Diesel Fleet
Primary: Diesel N+1, 240 MW 24hrs · ~3.85 ac
Emergency dual-use: RICE BTM fleet back up critical loads



Source: KYMEA Official Bond Statement (psc.ky.gov, Feb 2025); Backup: $700/kW industry benchmark

# Project economics are driven by a defined set of power, cost, revenue, and financing assumptions

## Meredosia, Illinois - Base case shown; range reflects scenario analysis

| Power & Energy | Base | Notes |
|---|---|---|
| IT Load / PUE | **200 MW \| 1.20×** | *Scenario range: 1.10–1.30×* |
| Total Facility Power | **240 MW** | *IT Load × PUE* |
| Power Cost (grid) | **$160/MWh** | *Ameren tariff; $150 opt. / $180 cons.* |
| Grid Connection | **345 kV MISO** | *0.2 km to existing substation* |
| BTM Generation | **Grid-only (base)** | *RICE scenarios: 50% & 100% BTM tested* |

| Capital Expenditure | Base | Notes |
|---|---|---|
| DC Shell & Infrastructure | **$1,423 M** | *$1,523 M when involving BTM* |
| Grid Interconnection | **$25 M** | *345 kV upgrade & switchyard* |
| Site Remediation | **$0.24 M/acre** | *Range: $0.03M (opt.) – $0.61M (cons.) / acre* |
| BESS (480 MWh) | **$0 (base) / $151M (BESS)** | *BESS & 50% BTM scenarios only* |
| Contingency & Soft | **13% of hard costs** | *8% contingency + 3% PM + 2% legal* |

| Revenue & Pricing | Base | Notes |
|---|---|---|
| Colo Rate – Year 1 | **$160/kW/mo** | *Escalated at 2.5% annually* |
| Ancillary Revenue | **$100/hr + $50/port/mo** | *Smart hands & cross connect; Escalated at 1.5% annually* |
| Pass-through Revenue | **$68/MWh** | *Escalated at 1.5% annually* |
| Occupancy – Yr 1 / 2+ | **80% → 98%** | *Pre-leasing target; stabilised from Yr 2* |
| ITC + Energy Comm. | **30% + 10%** | *IRA tax credit + energy community bonus* |

| Operating Expenditure | Base | Notes |
|---|---|---|
| Headcount | **50 FTE/200 MW** | *15-20 per shift; some costs tenant-borne* |
| Avg. Loaded Comp | **$150K/head/yr** | *Per MS model; 3% annual CPI escalation* |
| Maintenance + Insurance | **2.0% of CapEx p.a.** | *1.5% maintenance + 0.5% insurance* |
| Property Tax | **7.82412% (3-yr exempt)** | *IL DC exemption Yr 1-3; Morgan County rate* |
| Mgmt Fee / G&A | **$1 M / yr** | *Up to 3 executives* |

| Financing Structure | Base | Notes |
|---|---|---|
| Debt / Equity | **60% / 40%** | |
| Senior Debt Rate | **6.5% fixed** | *Investment-grade project bond estimate* |
| Senior Debt Tenor | **12 years** | |
| Equity IRR Target | **12.0%** | *Sponsor hurdle rate* |
| DSCR Covenant | **1.30×** | *Min. debt service coverage ratio* |

| Project Timeline & Tax | Base | Notes |
|---|---|---|
| Construction Start | **2027** | *Post-permit & financing close* |
| COD | **2029** | *~24-month construction timeline* |
| Model Horizon | **15 years** | *From commercial operations date* |
| Depreciation | **Bonus + MACRS** | *100% bonus on MEP; MACRS on shell/ BESS* |
| Federal Tax Rate | **21%** | *ITC offsets Year 1 tax liability* |

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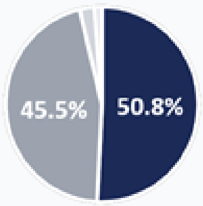
Source: SIPA Capstone Team - Financial Model

# Financial results demonstrate diversified revenue, flat costs, and debt paydown on schedule

*Meredosia, IL · 200 MW IT Load · Base Case · 15-year model horizon (2029–2043)*

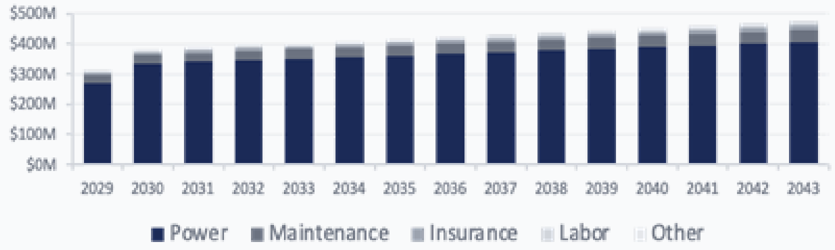
## Revenue Mix — Colocation is the primary revenue driver




| | | |
|---|---|---|
| **50.8%** *$6,679 M* | **Colocation** |
| **45.5%** *$4,986 M* | Pass-through (Power) |
| **2.5%** *$323 M* | Cross Connect |
| **1.3%** *$167 M* | Smart Hands |

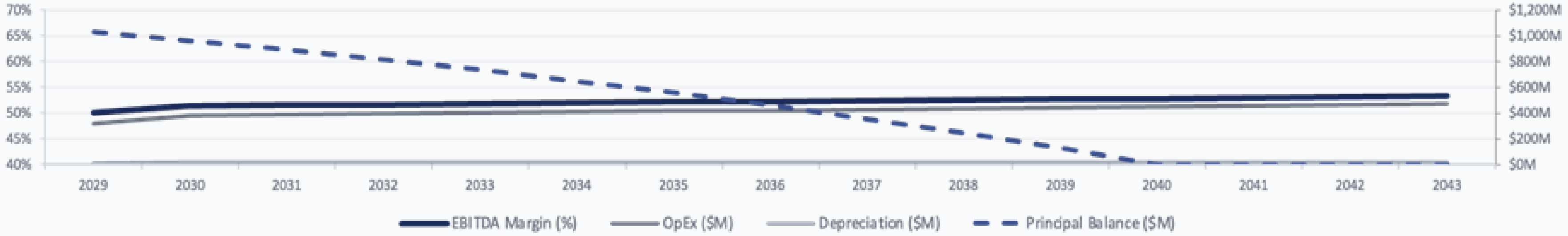
*Colocation + Pass-through = 96% of lifetime revenue; ancillary (Smart Hands, Cross Connect) adds diversification.*

## Operating Costs — Flat trajectory; top 3 = Power, Maintenance, Insurance




*Year-1 OpEx $314M → Year-15 $475M; CAGR <1% after ramp. Power is 85% of costs but* is passed through to tenants.

## Financial Trajectory — Margin expansion, flat opex, debt paydown on schedule






Source: SIPA Capstone Team - Financial Model

# Project viability depends on maintaining low PUE, competitive power costs, and limited BTM reliance

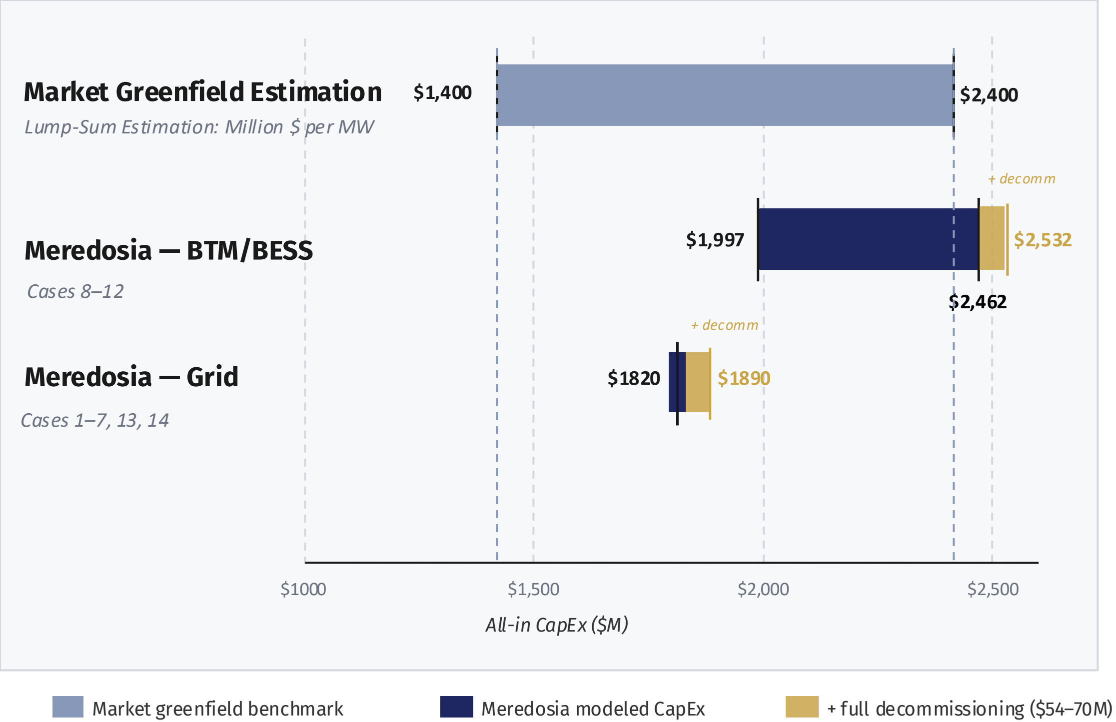
| Category | Scenario | Variable | Equity IRR<br>*Hurdle: 12.0%* | Project NPV |
|---|---|---|---|---|
| PUE | Base Case | PUE 1.20 | 34.48% | $1,043M |
| | Upside | PUE 1.10 | 34.16% | $1,028M |
| | Downside | PUE 1.30 | 34.79% | $1,059M |
| Power Cost | Upside | $150/MWh | 34.24% | $1,032M |
| | Downside | $180/MWh | 34.95% | $1,067M |
| Remediation | Upside | $0.03M/acre | 34.77% | $1,052M |
| | Downside | $0.61M/acre | 33.95% | $1,028M |
| BESS | BESS Case | BESS added | 31.80% | $951M |
| BTM (RICE) | 100% BTM | 100% RICE | 29.28% | $1,075M |
| | 50% BTM | 50% RICE | 29.17% | $971M |
| Gas Price | Upside (100% BTM) | $2.5/MMBtu | 29.45% | $1,086M |
| | Downside (100% BTM) | $5.0/MMBtu | 28.91% | $1,050M |
| Diesel Price | Upside | $4.80/gal | 34.48% | $1,044M |
| | Downside | $6.50/gal | 34.47% | $1,043M |




Source: SIPA Capstone Team - Financial Model

# Meredosia's CapEx fits in the market greenfield range. This is also true for equivalent brownfieds with hypothetical decommissioning costs

## Meredosia vs. Greenfield: CapEx Range Comparison ($M, all scenarios included)




## Decommissioning Cost Build-Up

| Cost Category | Low ($M) | High ($M) |
|---|---|---|
| Main Structure Demolition | $3.55 | $10.66 |
| Asbestos & Hazardous Abatement | $12.00 | $20.00 |
| Long-Term Groundwater Monitoring | $0.30 | $1.50 |
| ***Subtotal A — Buyer-Facing*** | ***$15.85*** | ***$32.16*** |
| Bottom Ash Pond — Closure | $26.33 | $26.33 |
| East Fly Ash Stockpile — Closure | $11.70 | $11.70 |
| **TOTAL B — Full Hypothetical Decomm** | **$53.88** | **$70.19** |

*Buyer-facing cost ($16–32M) excludes CCR closure already completed by Ameren. Chart uses Total B as conservative stress test.*

**TAKEAWAY**

**Our modeling is sanity-checked under 14 scenarios and hypothetical decommissioning cost added**

Even with full hypothetical decommissioning added, grid-only Meredosia ($1,890M) lands near the midpoint of the market range. Only the most aggressive 100% BTM scenario ($2,532M) sits modestly above the market high (about 5% over)



*Source: Modeling Team Financial Model; greenfield CapEx computation: capacity-based greenfield cost build-up method is according to article: https://philipmetzger.com/data-center-cost/*

# Brownfield sites like Meredosia materially reduce development timelines through existing assets and permits

## Reproducible Calculation Pipelines

### Physical Infrastructure

Assets the coal plant provides that a greenfield site would build from scratch: substation, transformers, cooling water, roads, buildings, grounding.

### Interconnection Rights

Queue positions, IAs, network upgrade history, and study results that transfer from retired generator to new load.

### Environmental Permits

CCR closure, NPDES, water rights, zoning, Phase I/II ESA, brownfield incentives, which are often the most underestimated time-saver.

## Calculation Methodology

**Double Counting Problem**

Many workstreams run in parallel, so saving time on one doesn't save time overall if a longer task runs alongside it.

**Solution: Phase × Track decomposition**

Every reusable item is tagged to 1 of 7 phase-tracks. Within a phase, tracks run **in parallel** (take the MAX). Across phases, work is **sequential** (add them up).

*Total Months Saved =*

**Phase 1 + MAX(2A, 2B, 2C) + MAX(3A, 3B, 3C)**

**Phases in the critical path**

| | |
|---|---|
| **Phase 1** | Pre-Development (site assessment, CCR, ISO contact) |
| **Phase 2A** | Environmental Permitting (NPDES, ESA, water rights) |
| **Phase 2B** | Interconnection (queue, IA, studies, TSA) |
| **Phase 2C** | Land Use & Zoning (zoning, CUP, floodplain) |
| **Phase 3A** | Electrical Construction (substation, transformers) |
| **Phase 3B** | Cooling & Water Construction |
| **Phase 3C** | Civil & Structural (roads, buildings, site civil) |

## Meredosia Speed-to-Power Advantage

vs. TRUE GREENFIELD

**75** months saved

*Unconstrained, permits-from-scratch baseline*

vs. BEST-CASE GREENFIELD

**38** months saved

*Realistic greenfield with fast-tracked permits*

| Phase / Track | Months |
|---|---|
| *Phase 1 — Pre-Development* | 18 |
| Phase 2A — Env. Permitting | 12 |
| Phase 2B — Interconnection | 12 |
| Phase 2C — Land Use & Zoning | 12 |
| *Phase 2 Critical Path = MAX(2A,2B,2C)* | 12 |
| Phase 3A — Electrical | 7.5 |
| Phase 3B — Cooling & Water | — |
| Phase 3C — Civil & Structural | 3 |
| *Phase 3 Critical Path = MAX(3A,3B,3C)* | 7.5 |
| **TOTAL = 18 + 12 + 7.5** | **38** |



Source: SIPA Capstone Team - Financial Model

# A pragmatic decarbonization pathway pairs grid supply with BESS, enabling demand response for new revenue streams and $CO_2$ savings

| DIMENSION | BASE CASE<br>100% Front-of-Meter (No BESS) | SCENARIO A<br>50% BTM RICE + 50% FOM Grid | SCENARIO B<br>FOM + BESS (480 MWh) |
|---|---|---|---|
| **Power Source** | 100% Ameren grid<br>(345 kV MISO interconnect) | 50% Ameren grid + 50% on-site NG RICE<br>(8× Wärtsilä 18V50SG, 151 MW) | 100% Ameren grid + 480 MWh BESS for peak/demand response |
| **Annual $CO_2$ (Scope 1 & 2 only)** | ~1,182,000 metric tons $CO_2$/yr | ~1,163,000 metric tons $CO_2e$/yr | ~1,040,000 metric tons $CO_2$/yr |
| **vs. Base Case (100% FOM)** | Reference scenario (main proposed plan) | -19,000 mt/yr (-1.6%) RICE ≈ SRMW grid intensity | -142,000 mt/yr (-12%) via MOER load-shifting |
| **Decarbonization Mechanism** | Grid decarbonizes automatically under CEJA<br>(P.A. 102-0662) by 2045 | RICE comparable to average SRMW grid intensity today on a $CO_2e$ basis;<br>grid portion improves with CEJA | BESS shifts load to low-MOER windows (overnight wind); grid improves with CEJA |
| **Carbon Trajectory** | Improves as Illinois grid decarbonizes (CEJA 2045 mandate) | Improves with grid (CEJA); RICE portion flat without fuel switch or mix | Lowest-capex near-term decarb lever among the three scenarios; BESS + CEJA grid combined |
| **Tax Credits & Incentives** | 100% bonus depreciation (electrical, cooling, fire supp., generators, network) MACRS 5/15/39-yr (mixed) | Same depreciation as Base No Sec. 48E ITC for NG RICE (zero-GHG requirement); MACRS 5-yr on RICE engines | Same depreciation as Base + Sec. 48E ITC on BESS: 40% (30% base + 10% energy community bonus) |
| **Key Risk** | Grid dirty near-term (SRMW ~1,240 lbs/MWh, 2026–2030 intensity) | RICE methane slip +15–25% $CO_2e$; gas price exposure; highest regulatory risk under CEJA & carbon pricing | BESS capex risk ($151.2M, ~$315/kWh installed); cycle degradation |

[1] $CO_2e$ includes Scope 1 methane slip from NG RICE (~1–2% of fuel throughput, GWP-100 = 28–30×), adding ~15–25% to direct $CO_2$. Scope 3 upstream methane excluded. [2] $/ton $CO_2$ = annualized BESS capex ($134M / 15 yr) / 142,000 mt $CO_2$/yr abated = ~$63/ton; range $60–70 excludes O&M and ITC benefit. [3] IL DC Program (P.A. 101-0031) suspended eff. July 1, 2026; grandfathering position under review. Annual facility consumption: 2,102,400 MWh/yr (200 MW IT load × PUE 1.2 × 8,760 hrs); MISO/Illinois grid, the SRMW subregion (eGRID 2023).
Sources: EPA eGRID 2023 (SRMW: 1,239.839 lbs $CO_2$/MWh); EPA AP-42 §3.2 (2024); Illinois CEJA (P.A. 102-0662, 2021) & CRGA (P.A. 104-0458, 2026); SIPA Capstone Financial Modell; WattTime MOER methodology

# Soot-to-servers projects are attractive and broadly applicable to make power access, site readiness, policy support, and economics align

### POWER & GRID (NON-NEGOTIABLE)

- Existing transmission infrastructure and interconnection pathways materially reduce development timelines
- Development-ready brownfields with existing, usable infrastructure outperform greenfields where interconnection queues are binding constraints

### SITE READINESS (ENABLER)

- Adequate land, water access (for cooling), and industrial zoning
- Resolved environmental liabilities and limited remediation complexity
- Ability to support high-density, large-load deployments (AI / HPC)
- Manageable physical risks (flood adaptation)

### POLICY AND COMMUNITY (LICENSE TO OPERATE)

- Favorable incentives and stable regulatory environment (IRA credits, local tax policy)
- Tangible benefits (jobs, larger tax base) must outweigh concerns around water, land use, and emissions

### ECONOMICS AND DESIGN (VALUE CREATION)

- Competitive power costs and low PUE are critical to meeting return thresholds
- Overreliance on BTM generation or adverse policy shifts can erode returns