# MEMORANDUM

**TO:** Civic Engine Guaranty Fund Stakeholders
**FROM:** Jonathan Arnold, Arnold Development Group
**DATE:** February 5, 2026
**RE:** Long-Term Impact Projections & Theory of Change: How $200 Million Generates Billions in Community Value

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## Executive Summary

This memorandum projects the cumulative impact of the Civic Engine Guaranty Fund over 20 and 40-year horizons, integrating Arnold Development Group's full theory of change — the insight that addressing all eight major household cost burdens simultaneously creates conditions for genuine family financial mobility.

The Civic Engine Guaranty Fund --- initially $30 million, scaling to up to $200 million at full deployment --- generates measurable community impact through rolling guarantee releases and redeployment across financial, social, and environmental dimensions.

### Headline Impact

| Metric | 20-Year | 40-Year |
|---|---|---|
| Total Development Enabled | $3.3 billion | $6.1 billion |
| Housing Units Created | 12,000 | 22,000 |
| Affordable Units Created | 4,800 | 8,800 |
| Residents Housed | ~27,000 | ~49,500 |
| Cumulative CO2 Avoided | 180,000 tons | 760,000 tons |
| **Core Social Value (Auditable)** | **$333 million** | **$1.41 billion** |
| **Total Community Value (All 8 Streams)** | **$549 million** | **$2.32 billion** |
| Impact Multiple of Money | 4.6x | 19.5x |

**For every $1 committed to this fund, investors generate $19.47 in cumulative community value over 40 years — while their capital compounds at ~4.35% annually and is returned with accumulated growth at Fund termination.**

# 1. Theory of Change: From Housing to Family Financial Mobility

## 1.1 The Core Insight

Housing alone does not break the cycle of poverty. While stable, affordable housing is foundational, it does not by itself overcome the compounding cost burdens that trap working families in financial precarity.

Arnold Development Group's insight — validated through 27 years of practice — is that addressing ALL major household cost burdens simultaneously creates the conditions for genuine upward financial mobility. When families save $1,500-2,500 per month through integrated development design, they can build emergency reserves, eliminate debt, and begin accumulating wealth.

## 1.2 The Eight-Stream Cost Reduction Model

Working families face eight major cost categories that, when reduced simultaneously, create substantial savings:

| Stream | Typical Monthly Cost | Integrated Solution | Monthly Savings |
|---|---|---|---|
| **1. Housing** | $1,200-1,800 | LIHTC affordable rents (30-60% AMI) | $500 |
| **2. Energy** | $150-250 | Passive House + TEN = near-zero utilities | $120-200 |
| **3. Childcare** | $800-1,200/child | On-site affordable childcare center | $400 |
| **4. Healthcare** | $150-300 | On-site FQHC/FQAC preventive care hub | $150 |
| **5. Food** | $600-900/family | On-site public market, 18+ local vendors | $100 |
| **6. Transportation** | $600-900/car | Transit-oriented, walkable community design | $600 |
| **7. Wellness** | $50-100 | 30,000 SF community wellness center | $50-100 |
| **8. Economic Opportunity** | Lost wages | On-site job training, coworking, workforce dev | $400+ |
| **Total Potential Monthly Savings** | **$2,000+** | | |

When these savings compound over time — invested in even basic index funds — a family saving $1,500/month can accumulate approximately **$230,000 in 10 years**. This represents infrastructure for genuine wealth building.

## 1.3 Historic Northeast Lofts: First Deployment

This is not theory. Historic Northeast Lofts — a $451 million, 22-acre adaptive reuse development in Kansas City — broke ground December 2025 with all eight cost-burden streams operational. HNEL is the Fund's first backstop project: the Fund provides the completion guarantee that satisfies JPMC's requirement for a warm-body guarantor or SPE with at least $10M in assets as Federal Historic Tax Credit investor.

| Component | Specification | Impact |
|---|---|---|
| Housing | 395 units (83% affordable, 30-80% AMI) | Below-market rents for working families |
| Energy | 4 MW solar + 228 geothermal wells | Zero utility bills for residents |
| Childcare | On-site early learning center | Walkable, affordable childcare |
| Healthcare | FQHC/FQAC community health hub | Preventive care replacing ER visits |
| Food | 29,500 SF public market, 18 vendors | Fresh food access eliminating food desert |
| Transportation | Independence Ave bus (17 min downtown) | Reduced car dependency |
| Wellness | 30,000 SF community wellness center | Free/low-cost fitness and health programs |
| Job Training | Workforce development + coworking | Pathways from $30K to $40-45K jobs |

**Financing:** LIHTC + Historic Tax Credits + ITC + TIF + EPA Brownfield RLF ($7.575M) + Housing Trust Fund + conventional debt. This is a construction-stage, institutionally financed development that proves the eight-stream model works at scale.

## 1.4 The Track Record Evolution

| Stage | Project | Scale | What It Proved |
|---|---|---|---|
| **1** | Second & Delaware (2019) | 276 units, $109M | Passive House construction viable at institutional scale (550,000 SF) |
| **2** | Historic NE Lofts (2025) | 395 units, $451M | Full theory of change financeable; all 8 streams operational; Fund's first backstop |
| **3** | Civic Engine (2026+) | ~4,000 units, ~$1.15B | Proven model deployed across two districts at neighborhood scale |

Each stage was deliberately designed to prove the next level of ambition. Civic Engine is not an untested concept — it is the third stage of a methodical, institutionally financed evolution.

# 2. The Guarantee Multiplier: How Revolving Capital Compounds Impact

## 2.1 How the Structure Works

The Civic Engine Guaranty Fund invests 100% of its capital in U.S. Treasury securities, then pledges those Treasuries as collateral for construction loan guarantees. This structure means:

1. **Capital is never spent.** Unlike grants or direct loans, the fund's principal remains fully invested in Treasuries throughout the guarantee period.
2. **Returns accrue continuously.** The Treasury portfolio earns 4.5% gross (~4.35% net after ~0.15% actual expenses, retained in Fund) regardless of construction activity.
3. **Guarantees release on schedule.** As projects stabilize and convert to permanent financing (~6 years), guarantee obligations terminate and capital is available for redeployment.
4. **The fund grows.** Retained earnings compound, enabling each successive cycle to support larger developments.

## 2.2 Grant vs. Debt Fund vs. Guarantee Fund

The guarantee structure is fundamentally different from traditional philanthropic or impact investing models:

| Model | $200M Deployed | 40-Year Development Enabled | 40-Year Social Value | Capital Remaining |
|---|---|---|---|---|
| **One-Time Grant** | Capital consumed | $552M (1 project) | $451M | $0 |
| **Revolving Loan Fund** | Capital at risk | ~$1.5B (moderate recycling) | ~$800M | Variable |
| **Guarantee Fund** | Capital preserved in Treasuries | $6.1B (11 projects) | $2,317M | ~$487M |

The guarantee fund delivers **5.1x more social value** than a grant of the same size — and returns the capital, grown to $487 million, for continued deployment.

### 2.3 The Capital Recycling Flywheel

Each cycle follows a predictable pattern:

> ***Fund earns Treasury returns → Fund provides construction guarantee → Development proceeds → Project stabilizes, converts to permanent financing → Guarantee released → Larger fund redeploys to next project***

This creates a compounding flywheel where each cycle enables more development than the last:

| Cycle | Years | Fund Size | Development Enabled | Affordable Units Added |
|---|---|---|---|---|
| 1 | 1-6 | $200M | $552M | 800 |
| 2 | 7-12 | $150M | $697M | 1,012 |
| 3 | 13-18 | $190M | $882M | 1,280 |
| 4 | 19-24 | $240M | $1.11B | 1,612 |
| 5 | 25-30 | $304M | $1.41B | 2,044 |
| 6 | 31-36 | $385M | $1.78B | 2,584 |
| 7 | 37-40+ | $487M | $2.26B | 3,268 |
| **CUMULATIVE** | **$8.68B** | **12,600** | | |

A single $200 million investment, through the flywheel effect, enables **$8.68 billion** in cumulative sustainable development.

## 3. Single-Project Impact Baseline: The Two-Tier Framework

Each Civic Engine development generates value across eight dimensions simultaneously. We quantify this impact in two tiers to maintain analytical rigor while communicating the full magnitude of community benefit.

### 3.1 Tier 1: Core Impact (Conservative, Auditable)

These three streams are contractually guaranteed, physically measured, and valued using single authoritative sources.

| Stream | Calculation Basis | Annual Value | Data Source |
|---|---|---|---|
| Rent Savings | 800 LIHTC units × $500/month differential | $4,800,000 | HUD, CoStar |
| Energy Savings | 2,000 units × $1,200/year (Passive House + TEN) | $2,400,000 | EIA, DOE |
| Carbon Avoidance | 4,000 tons CO2 × $51/ton social cost | $204,000 | EPA |
| **Core Subtotal** | **$7,404,000** | | |

**Core Blended Impact IRR: 11.4%** (~4.35% financial + ~7.05% social)

## 3.2 Tier 2: Expanded Impact (Illustrative, Data-Sourced)

These six streams depend on service availability and resident utilization. They are grounded in authoritative data sources with conservative assumptions, but are not contractually guaranteed. We present them to show the fuller picture of family financial benefit enabled by the comprehensive wraparound-services model proven at Historic Northeast Lofts.

| Stream | Calculation Basis | Annual Value | Data Source |
|---|---|---|---|
| Childcare Savings | 200 families × $400/month savings | $960,000 | Child Care Aware, BLS |
| Healthcare Savings | 800 individuals × $1,500/year FQHC value | $1,200,000 | NACHC, HRSA |
| Transportation Savings | 160 families avoid 2nd car × $600/month | $1,152,000 | AAA, BLS |
| Food Access Value | 400 families × $100/month savings | $480,000 | USDA ERS |
| Job Training Uplift | 80 individuals × $5,000/year wage increase | $400,000 | DOL, BLS |
| Wellness Value | 600 individuals × $1,000/year value | $600,000 | CDC, IHRSA |
| **Expanded Subtotal** | **$4,792,000** | | |

### 3.3 Total Annual Community Value Per Project

| Component | Annual Value | Return Equivalent |
|---|---|---|
| Financial Return (Net to Investors) | $8,700,000 | ~4.35% |
| **Tier 1: Core Social Value** | **$7,404,000** | **6.22%** |
| **Tier 2: Expanded Social Value** | **$4,792,000** | **4.03%** |
| **Total Community Value** | **$12,196,000** | |
| **Illustrative Blended Impact IRR** | **~15.5%** | |

## 4. The Compounding Model: 40-Year Cumulative Impact Projections

### 4.1 Projection Methodology

The projections assume the fund continues deploying capital into projects matching the Civic Engine scope: 2,000-unit Passive House developments with comprehensive wraparound services and, where local infrastructure supports it, integrated Thermal Energy Networks. As construction loans convert to permanent financing, guarantee capacity is released and redeployed.

**Key Assumptions:**

| Parameter | Value | Source |
|---|---|---|
| Project Cadence | One new project every 4 years | Conservative estimate |
| Construction Period | 3 years per project (phased) | Industry standard |
| Project Scale | 2,000 units per project (800 affordable) | Civic Engine baseline |
| Building Design Life | 50+ years (Passive House) | PHIUS certification standards |
| Impact Duration | Benefits accrue from occupancy through horizon | Building lifetime |
| Wraparound Services | Each project includes all 8 cost-burden streams | Design commitment |
| Financial Returns | ~4.35% net annually, reinvested | Fund structure (0.25% cost-recovery fee; ~0.15% effective cost) |
| Inflation Adjustment | Not included (constant 2026 dollars) | Conservative |

## 4.2 Financial Returns Alongside Community Value: The Master Projection Table

This table shows the financial growth of the fund alongside the cumulative social and environmental value created across all eight impact streams. This is the complete picture of what a $200 million commitment generates over time.

### Scale & Financial Growth

| Milestone | Projects Operating | Projects Initiated | Total Units Created | Affordable Units | Residents Housed | Fund Value |
|---|---|---|---|---|---|---|
| **Year 5** | 1 | 2 | 2,000 | 800 | ~4,500 | $145M |
| **Year 10** | 2 | 3 | 4,000 | 1,600 | ~9,000 | $176M |
| **Year 15** | 3 | 4 | 6,000 | 2,400 | ~13,500 | $214M |
| **Year 20** | 5 | 6 | 12,000 | 4,800 | ~27,000 | $260M |
| **Year 30** | 7 | 8 | 16,000 | 6,400 | ~36,000 | $386M |
| **Year 40** | 10 | 11 | 22,000 | 8,800 | ~49,500 | $487M |

*"Projects Operating" reflects projects delivering social value. "Total Units Created" includes projects under construction.*

## Cumulative Value Created: Core Social Value (Tier 1 — Auditable)

| Milestone | Rent Savings | Energy Savings | Carbon Value | Core Total |
|---|---|---|---|---|
| **Year 5** | $9.6M | $4.8M | $408K | **$14.8M** |
| **Year 10** | $48M | $24M | $2.0M | **$74.0M** |
| **Year 15** | $115M | $57.6M | $4.9M | **$177.7M** |
| **Year 20** | $216M | $108M | $9.2M | **$333.2M** |
| **Year 30** | $504M | $252M | $21.4M | **$777.4M** |
| **Year 40** | $912M | $456M | $38.8M | **$1,406.8M** |

## Cumulative Value Created: Expanded Social Value (Tier 2 — Illustrative)

| Milestone | Childcare | Healthcare | Transportation | Food Access | Job Training | Wellness | Expanded Total |
|---|---|---|---|---|---|---|---|
| **Year 5** | $1.9M | $2.4M | $2.3M | $960K | $800K | $1.2M | **$9.6M** |
| **Year 10** | $9.6M | $12.0M | $11.5M | $4.8M | $4.0M | $6.0M | **$47.9M** |
| **Year 15** | $23.0M | $28.8M | $27.6M | $11.5M | $9.6M | $14.4M | **$115.0M** |
| **Year 20** | $43.2M | $54.0M | $51.8M | $21.6M | $18.0M | $27.0M | **$215.6M** |
| **Year 30** | $100.8M | $126.0M | $121.0M | $50.4M | $42.0M | $63.0M | **$503.2M** |
| **Year 40** | $182.4M | $228.0M | $218.9M | $91.2M | $76.0M | $114.0M | **$910.5M** |

## The Complete Picture: Financial + Social Value

| Milestone | Fund Value | Core Social Value | Expanded Social Value | Total Community Value | Impact Multiple |
|---|---|---|---|---|---|
| **Year 5** | $145M | $14.8M | $9.6M | **$24.4M** | 0.2x |
| **Year 10** | $176M | $74.0M | $47.9M | **$122.0M** | 1.0x |
| **Year 15** | $214M | $177.7M | $115.0M | **$292.7M** | 2.5x |
| **Year 20** | $260M | $333.2M | $215.6M | **$548.8M** | 4.6x |
| **Year 30** | $386M | $777.4M | $503.2M | **$1,280.6M** | 10.8x |
| **Year 40** | $487M | $1,406.8M | $910.5M | **$2,317.2M** | 19.5x |

By Year 15, the cumulative social value created exceeds the original fund investment. By Year 40, the fund has generated **$19.47 in community value for every $1 originally committed** —

and the $200 million in principal has grown to $487 million, available for continued deployment.

## 4.3 Environmental Impact Compounding

Carbon savings compound as each operational Passive House project continues generating environmental benefits throughout its useful life:

| Milestone | Projects Operating | Annual CO2 Avoided | Cumulative CO2 Avoided | Climate Value (at $51/ton) |
|---|---|---|---|---|
| **Year 5** | 1 | 4,000 tons | 8,000 tons | $408K |
| **Year 10** | 2 | 8,000 tons | 40,000 tons | $2.0M |
| **Year 20** | 5 | 20,000 tons | 180,000 tons | $9.2M |
| **Year 30** | 7 | 28,000 tons | 420,000 tons | $21.4M |
| **Year 40** | 10 | 40,000 tons | 760,000 tons | $38.8M |

Over 40 years, the fund's projects avoid **760,000 tons of CO2** — equivalent to removing approximately 165,000 cars from the road for one year, or the annual emissions of a small city.

## 4.4 Present Value Adjustment

For institutional investors who require time-value-of-money adjustments, the following table presents the cumulative total community value on a net present value basis, discounted at 3% (consistent with the EPA's central Social Cost of Carbon discount rate):

| Milestone | Undiscounted Cumulative | NPV (3% Discount Rate) | NPV per $1 Invested |
|---|---|---|---|
| **Year 20** | $548.8M | ~$364M | $3.06 |
| **Year 40** | $2,317.2M | ~$1,067M | $8.97 |

Even on a present-value basis, the fund generates **$8.97 in community value for every $1 committed** over its full lifecycle. This exceeds the Rise Fund / Bridgespan Group's 2.5x minimum Impact Multiple of Money threshold by a factor of 3.6.

### 4.5 Employment Impact

| Milestone | Construction Jobs (Cumulative FTE-Years) | Permanent Jobs (Ongoing) |
|---|---|---|
| **Year 10** | 5,500 | 120 |
| **Year 20** | 16,500 | 360 |
| **Year 30** | 22,000 | 420 |
| **Year 40** | 30,250 | 660 |

## 5. Comparative Analysis: 20-Year and 40-Year Horizons

### 5.1 Summary Comparison

| Metric | 20 Years | 40 Years | Compounding Factor |
|---|---|---|---|
| Projects Initiated | 6 | 11 | 1.8x |
| Development Enabled | $3.31B | $6.07B | 1.8x |
| Housing Units Created | 12,000 | 22,000 | 1.8x |
| Affordable Units | 4,800 | 8,800 | 1.8x |
| CO2 Avoided | 180,000 tons | 760,000 tons | 4.2x |
| **Core Social Value** | **$333M** | **$1,407M** | **4.2x** |
| **Total Community Value** | **$549M** | **$2,317M** | **4.2x** |
| Social Value per $1 Fund | $4.61 | $19.47 | 4.2x |
| Fund Value | $260M | $487M | 1.9x |

The 4.2x compounding factor between 20 and 40 years reflects the power of patient capital. Social value does not merely double as time doubles — it compounds because earlier projects continue generating annual value while new projects add to the total. This is the fundamental argument for long-term capital commitment in impact investing.

### 5.2 Core vs. Total Community Value

| Horizon | Core Only (Tier 1) | Total Community Value (Tier 1 + 2) | Expanded Streams as % of Total |
|---|---|---|---|
| 20 Years | $333M | $549M | 39.3% |
| 40 Years | $1,407M | $2,317M | 39.3% |

The expanded streams consistently represent approximately 39% of total community value. This proportion reflects the conservative participation and utilization assumptions built into the expanded framework.

## 6. Evidence Base: Proof at Every Stage

### 6.1 Stage 1 — Passive House at Institutional Scale

**Second & Delaware** (Kansas City River Market, completed 2019)

- 276 units, 550,000 SF, $109 million total development cost
- World's largest Passive House certified building at time of completion
- 70% energy reduction vs. code — measured and verified
- Financed through 4% LIHTC + conventional construction debt
- Fully leased and operational since 2019

**What it proved:** Passive House construction is viable at institutional scale. Energy reduction claims are real, measurable, and persistent. Affordable housing can be built to premium efficiency standards within conventional cost and timeline parameters.

### 6.2 Stage 2 — Full Theory of Change, Institutionally Financed

**Historic Northeast Lofts** (Kansas City Independence Ave corridor, groundbreaking December 2025 — Fund's First Deployment)

- 395 units (83% affordable, 30-80% AMI), 22-acre campus, $451 million
- All eight cost-burden streams addressed through integrated design
- Zero utility bills: 4 MW solar + 228 geothermal wells
- Community infrastructure: 29,500 SF public market, 30,000 SF wellness center, childcare, FQHC healthcare hub, job training, coworking

- Financing: LIHTC + Historic Tax Credits + ITC + TIF + EPA Brownfield RLF ($7.575M) + Housing Trust Fund + conventional debt

**What it proves:** The full theory of change is institutionally financeable at $451 million scale. Multiple public and private capital sources can be layered to support comprehensive, wraparound-services development. This is not a pilot — it is a construction-stage project proving the model under real-world conditions.

### 6.3 Stage 3 — Proven Model at Neighborhood Scale

**Civic Engine / North Loop** (North Loop, Downtown Kansas City, 2026+)

- 2,000 units (800 affordable at 30-60% AMI, 1,200 market-rate), $552 million
- 52 MW Thermal Energy Network utilizing KC Water treated wastewater effluent
- Passive House certified, 70% energy reduction
- Wraparound services modeled on Historic Northeast Lofts
- Construction guaranteed by Civic Engine Guaranty Fund (up to $200M at full deployment)

**What it will prove:** The model scales to neighborhood-level transformation. The guarantee fund structure removes the balance sheet constraint that has historically limited the scale of mission-driven development. Capital recycling enables serial deployment across multiple projects and geographies.

## 7. Systemic Impact & Replication Potential

### 7.1 Beyond Project-Level Impact

The quantified impact projections in Section 4 capture direct, measurable value to residents and communities. But the Civic Engine model creates additional systemic value that cannot be attributed to individual projects:

**Market Demonstration Effect.** Each successful Passive House project at scale changes what lenders, regulators, and developers believe is possible. The first project proves the model; the second makes it a pattern; by the third, it becomes a recognized asset class.

**Workforce Development Pipeline.** Construction of Passive House buildings creates a skilled labor pool — envelope specialists, airtightness technicians, heat pump installers — that reduces costs and accelerates timelines for subsequent projects.

**Municipal Infrastructure Model.** Where local conditions permit, Thermal Energy Networks provide an additional layer of community energy infrastructure — reducing resident utility costs and carbon emissions beyond what Passive House construction alone achieves.

**Capital Market Evolution.** Each successful guarantee cycle builds a track record that enables future fundraising at larger scale and lower cost.

## 7.2 National Replication Scenario

The Civic Engine model requires two conditions: (1) housing demand and (2) supportive tax credit environments. Where local infrastructure supports it, Thermal Energy Networks can be layered in to further reduce resident energy costs — but the fund's theory of change and financial structure do not depend on TEN availability. The guarantee mechanism, tax credit stacking, and Passive House construction standard can be deployed in any market that meets the core conditions. Hundreds of U.S. cities qualify.

If the model is replicated across 10 metropolitan areas over 40 years, the aggregate impact scales accordingly: 220,000+ housing units, millions of tons of CO2 avoided, and tens of billions in cumulative community value — all catalyzed by guarantee fund structures that preserve and grow investor capital.

## 7.3 What Success Looks Like

**At 10 years:** The first Civic Engine project is fully operational and stabilized. The second project is under construction. Measurable data on all eight impact streams validates the model. The fund has grown to $176 million and deployed $1.25 billion in cumulative development.

**At 20 years:** Six projects across multiple neighborhoods — potentially multiple cities — house 27,000 residents. The fund at $260 million supports larger developments each cycle. Foundation and CDFI investors have seen their capital compound at ~4.35% annually for two decades with zero impairment. Cumulative community value exceeds $549 million.

**At 40 years:** Eleven projects housing 49,500 residents have transformed entire corridors. Over $6 billion in sustainable development has been built with a single $200 million catalyst. The fund, now at $487 million, is a permanent institution — a perpetual engine for family financial mobility. Cumulative community value exceeds $2.3 billion. And the buildings, built to Passive House standards with 50+ year design lives, will continue delivering zero-utility-bill housing for generations beyond the projection horizon.

# 8. Additionality & Risk Assessment

## 8.1 The "But-For" Test

The guarantee structure is explicitly additional. Without the Civic Engine guarantee, these construction loans do not close — the development cannot proceed because lenders require credit support that the developer cannot provide from its own balance sheet. Every unit built, every ton of carbon avoided, and every dollar of family savings exists solely because of the fund's guarantee.

## 8.2 Risk Profile

| Risk Factor | Assessment | Mitigation |
|---|---|---|
| Guarantee call risk | Low | Conservative underwriting; GMP contracts; payment & performance bonds; 5-10% contingency; state agency oversight (see below) |
| Financial return risk | Low | Returns backed by U.S. Treasury securities |
| Core impact delivery risk | Low | Rent savings contractually guaranteed (LIHTC); energy savings physics-based (Passive House) |
| Expanded impact delivery risk | Moderate | Depends on wraparound service delivery and resident utilization |
| Projection uncertainty | Increases over time | Years 1-10 high confidence; Years 10-20 moderate; Years 20-40 illustrative/directional |
| Replication risk | Moderate | Each new market requires site-specific feasibility; core model is proven |

### Guarantee Draw Risk — Detailed Analysis

The Fund provides construction loan guarantees covering up to 50% of each project's construction financing. While the guarantee could be drawn upon in the event of a cost overrun or project distress, multiple layers of underwriting and structural protection make a draw unlikely:

**Underwriting Standards.** Each project is conservatively underwritten to usual and customary mortgage lending standards, including third-party market studies that independently verify rent assumptions and absorption demand before construction begins.

**Construction Cost Controls.** Construction contracts are executed on a Guaranteed Maximum Price (GMP) basis, capping the developer's exposure to cost escalation. Payment and performance bonds protect against contractor default. New construction projects carry a 5% construction contingency; historic rehabilitation projects carry 10%.

**Regulatory Oversight.** Projects financed with Low-Income Housing Tax Credits are subject to state housing finance agency review and approval at multiple stages — application, commitment, and final allocation — providing independent scrutiny of project feasibility, capitalization, and operating projections.

**Recovery Mechanism.** In the event a guarantee is drawn upon, the Fund receives a senior claim on all cash flow from the completed asset until the drawn amount is repaid in full with interest at the prevailing Treasury rate. The Fund's position is further secured by subrogation rights against the underlying project collateral. Because the projects are designed to generate stable, long-term cash flow from a diversified tenant base (including LIHTC-restricted affordable units with contractual occupancy demand), the recovery path is supported by the same fundamentals that underwrite the original loan.

## 8.3 Sensitivity Analysis

The blended impact metrics are most sensitive to rent savings assumptions and Treasury yields:

| Scenario | Core Blended IRR | Total Blended IRR |
|---|---|---|
| Base case | 11.4% | ~15.5% |
| Rent savings at $400/month (conservative) | 10.6% | ~14.6% |
| Rent savings at $600/month (higher market rents) | 12.3% | ~16.3% |
| Treasury yield at 3.5% (lower rate environment) | 10.4% | ~14.5% |
| Treasury yield at 5.5% (higher rate environment) | 12.4% | ~16.5% |

The blended IRR remains above 10% even under the most conservative assumptions. The social value components provide substantial downside protection to the total return profile.

# 9. Conclusion

The guarantee fund is a proven model for catalytic capital deployment — used successfully throughout the country to unlock development that conventional financing cannot reach. What makes the Civic Engine Guaranty Fund distinctive is not the guarantee structure itself, but the comprehensive approach it enables: housing built to Passive House standards, combined with wraparound services that address the eight cost burdens — housing, energy, childcare, healthcare, food, transportation, wellness, and economic opportunity — that keep low-to-moderate income households living paycheck to paycheck. By providing construction guarantees backed by U.S. Treasuries rather than grants or direct loans, the Fund --- initially $30 million, scaling to up to $200 million --- preserves investor capital while enabling large-scale development.

The projections in this memorandum demonstrate the compounding power of patient, revolving capital in impact investing:

| Single Grant | Guarantee Fund | Advantage | |
|---|---|---|---|
| 40-Year Development | $552M | $6.1B | 11x |
| 40-Year Community Value | $451M | $2.3B | 5.1x |
| Capital Remaining | $0 | $487M | ∞ |
| Affordable Units | 800 | 8,800 | 11x |

Over 40 years, this single fund can house more than 49,000 residents, avoid 760,000 tons of CO2, and generate over $2.3 billion in cumulative community value — all while compounding investor capital at ~4.35% annually and preserving the growing capital base for continued redeployment.

The question is not whether this model works. Historic Northeast Lofts is proving that right now. The question is how quickly we can deploy it.

**Jonathan Arnold**

Founder, Arnold Development Group

# Appendix A: Detailed Year-by-Year Projection Model

## Project Initiation & Operating Timeline

| Year | Project | Status | Cumulative Operating Projects |
|---|---|---|---|
| 2026-2029 | Project 1 | Construction | — |
| 2029+ | Project 1 | Operating | 1 |
| 2030-2033 | Project 2 | Construction | 1 |
| 2033+ | Project 2 | Operating | 2 |
| 2034-2037 | Project 3 | Construction | 2 |
| 2037+ | Project 3 | Operating | 3 |
| 2038-2041 | Project 4 | Construction | 3 |
| 2041+ | Project 4 | Operating | 4 |
| 2042-2045 | Project 5 | Construction | 4 |
| 2045+ | Project 5 | Operating | 5 |
| 2046-2049 | Project 6 | Construction | 5 |
| 2049+ | Project 6 | Operating | 6 |
| 2050-2053 | Project 7 | Construction | 6 |
| 2053+ | Project 7 | Operating | 7 |
| 2054-2057 | Project 8 | Construction | 7 |
| 2057+ | Project 8 | Operating | 8 |
| 2058-2061 | Project 9 | Construction | 8 |
| 2061+ | Project 9 | Operating | 9 |
| 2062-2065 | Project 10 | Construction | 9 |
| 2065+ | Project 10 | Operating | 10 |
| 2066 | Project 11 | Initiated | 10 |

Impact compounds as each project completes construction and begins generating annual community value, while the fund redeploys released guarantee capacity to subsequent projects.

# Appendix B: Per-Project Assumptions & Data Sources

## Project Parameters

| Parameter | Value | Source |
|---|---|---|
| Fund Size (Initial) | $200,000,000 | Fund Sizer v3 |
| Development Budget | $551,690,000 | Alternative Program |
| Construction Loan | $413,767,500 | 75% LTC |
| Total Housing Units | 2,000 | 1,200 MR + 800 LIHTC |
| Affordable Units | 800 (40%) | LIHTC program |
| Construction Jobs | 2,750 FTE-years | IMPLAN estimate |
| Permanent Jobs | 60 | Property management + TEN operations |

## Impact Assumptions

| Parameter | Value | Source |
|---|---|---|
| Monthly Rent Savings per Unit | $500 | Market vs. 60% AMI (HUD, CoStar Q4 2025) |
| Annual Energy Savings per Unit | $1,200 | Passive House + TEN (EIA, DOE) |
| CO2 Avoided per Project | 4,000 tons/year | 70% efficiency vs. code baseline |
| Social Cost of Carbon | $51/ton | EPA 2024 (3% discount rate, central estimate) |
| Childcare Families Served | 200 (25% of LIHTC families) | Conservative utilization assumption |
| Healthcare Individuals Served | 800 (40% of LIHTC residents) | NACHC community health center data |
| Families Avoiding 2nd Car | 160 (20% of LIHTC families) | Transit-oriented development studies |
| Families Using Public Market | 400 (50% of LIHTC families) | USDA ERS food access research |
| Job Training Completers | 80 (5% of working-age adults) | DOL WIOA performance data |
| Wellness Center Users | 600 (30% of all residents) | CDC physical activity data |

## Tax Credit Structure

| Component | Value |
|---|---|
| 4% LIHTC Eligible Basis | $178,664,000 |
| QCT Basis Boost | 30% |
| 10-Year LIHTC Credit Stream | $92,905,280 |
| LIHTC Equity (@ $0.80/credit) | $74,324,224 |
| ITC Direct Pay (TEN + GHP) | $54,387,220 |
| Total Tax Credit Benefit | $128,711,444 |

# Appendix C: Impact Measurement Alignment

## IRIS+ Indicator Alignment

| Impact Component | IRIS+ Code | IRIS+ Metric Name |
|---|---|---|
| Affordable Housing Units | PI2159 | Affordable Housing Units |
| Housing Affordability | PI8718 | Housing Affordability |
| GHG Emissions Reduced | PI1479 | Greenhouse Gas Emissions Reduced |
| Energy Saved | PI2764 | Energy Saved |
| Affordable Energy Access | PI3468 | Affordable Energy Access |
| Clean Energy Generated | OI3990 | Clean Energy Generated |
| Childcare Services | PI4739 | Childcare Services Provided |
| Childcare Affordability | PI8472 | Childcare Affordability |
| Healthcare Services | PI3913 | Healthcare Services - Patients Served |
| Healthcare Access | PI5624 | Affordable Healthcare Access |
| Public Transportation | PI9247 | Public Transportation Access |
| Transportation Cost Reduction | PI2108 | Transportation Cost Burden Reduction |
| Food Access | PI9832 | Food Access - Households Served |
| Nutrition Security | PI2847 | Nutrition Security |
| Job Training | PI6141 | Job Training - Individuals Served |
| Income Change | PI2849 | Income/Productivity - Average Change |
| Wellness Services | PI8642 | Wellness Services - Individuals Served |
| Health Programs | PI3028 | Health and Wellness Programs Access |

### UN Sustainable Development Goals Alignment

| SDG | Alignment |
|---|---|
| SDG 7 — Affordable and Clean Energy | Passive House + TEN delivers 70% energy reduction and near-zero utility bills |
| SDG 11 — Sustainable Cities and Communities | Mixed-income housing with comprehensive community infrastructure |
| SDG 13 — Climate Action | 4,000 tons CO2 avoided per project annually; 760,000 tons over 40 years |

### Five Dimensions of Impact (Impact Frontiers Framework)

| Dimension | Assessment |
|---|---|
| **WHAT** | Reduction of 8 household cost burdens enabling family financial mobility |
| **WHO** | Low-to-moderate income families (30-60% AMI), underserved urban communities |
| **HOW MUCH** | $12.2M annual community value per project; $2.3B cumulative over 40 years |
| **CONTRIBUTION** | High additionality — construction does not proceed without guarantee |
| **RISK** | Low financial risk (Treasury-backed); low core impact risk (physics-based, contractual); moderate expanded impact risk (utilization-dependent) |

## Appendix D: Glossary

**AMI (Area Median Income):** The midpoint of a region's income distribution, used by HUD to determine eligibility for affordable housing programs.

**Blended Impact IRR:** The sum of financial returns and monetized social value, expressed as a percentage of invested capital.

**COP (Coefficient of Performance):** A measure of heat pump efficiency. A COP of 4 means 4 units of thermal energy delivered per 1 unit of electricity consumed.

**FQHC (Federally Qualified Health Center):** Community-based health care provider receiving federal funding to provide primary care in underserved areas.

**Impact Multiple of Money (IMM):** The ratio of total social value created to capital invested, developed by the Rise Fund / Bridgespan Group. Measures cumulative community value per dollar committed.

**IRIS+:** Impact Reporting and Investment Standards, the generally accepted system for impact measurement managed by the Global Impact Investing Network (GIIN).

**LIHTC (Low-Income Housing Tax Credit):** Federal tax credit program that incentivizes private investment in affordable rental housing.

**Passive House:** Internationally recognized building standard achieving 70% energy reduction through super-insulated envelope, airtight construction (≤0.6 ACH50), heat recovery ventilation, and thermal bridge-free design.

**PRI (Program-Related Investment):** Investment made by a private foundation that advances its charitable mission while potentially generating a financial return. Must meet IRS requirements under IRC Section 4944.

**SROI (Social Return on Investment):** Framework for measuring and accounting for the broader concept of value created by an investment, incorporating social, environmental, and economic outcomes.

**TEN (Thermal Energy Network):** District heating and cooling system utilizing ground-source heat pumps and treated wastewater effluent as a thermal source, providing space conditioning and domestic hot water to all connected buildings.