ANALYTICS

Evidence-based Impact in Transition Infrastructure

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Executive summary

We are pleased to share the impact assessment methodology that serves as a decision tool enabling TPG Transition Infrastructure ("TI") to identify and invest in critical infrastructure assets that support the transition to a lower-carbon and more resilient economy. Infrastructure sits at the center of the energy transition: it provides the essential systems on which economies depend, it is long-lived, and, because so much of it must be built, maintained, and decarbonized in the decades ahead, it represents one of the largest and most durable impact opportunities available to investors.

Infrastructure investing differs in important ways from the growth-oriented investing context in which our prior impact methodologies were developed. Growth-oriented investing typically focuses on companies scaling products, services, or technologies, with impact tied closely to incremental growth during the ownership period. Infrastructure investing, by contrast, often involves asset-heavy businesses that provide essential services through long-lived physical systems and ongoing operating and maintenance requirements. Impact is therefore created not only by adding new capacity, but also by stewarding existing assets, preserving their availability, extending their useful life, and enabling credible transitions in mature operating platforms.

We have developed an adapted methodology designed specifically for the infrastructure investing context while preserving the core logic of the broader Y Analytics framework. This methodology builds upon the principles developed in our previous impact whitepapers – *Evidence-Based Impact* and *Evidence-Based Impact in Climate* – while introducing a series of refinements tailored to the distinctive characteristics of infrastructure investing.

Methodological Pillars

The methodology presented herein rests on four pillars, consistent with our approach to impact assessment for The Rise Funds and TPG Rise Climate.

- **Anchored in a quantitative, evidence-based framework.** Similar to other adaptations to new thematics and fund strategies, the building blocks of the Impact Multiple of Money (IMM) and Carbon Yield (CY) – breadth, depth, value, duration, and risk adjustment - remain well suited to evaluating TI.
- **Grounded in evidence and continued learning.** Estimates are built on third-party research and company-specific evidence, and the approach will continue to be refined as our experience across infrastructure assets grows.

- **Integrated across the deal lifecycle.** The methodology draws its inputs from the investment team's underwriting and, for gray-to-green transition deals, from a management-aligned science-based transition plan, so that impact and financial underwriting remain consistent.
- **Tailored to the fund context.** Refinements capture the hyper-local nature of infrastructure competition, the lower risk profile of later-stage operating businesses, the durability of assets, and the value of stewardship.

Key Characteristics of Transition Infrastructure Investments

The characteristics of transition infrastructure investments that have shaped the approach described in this paper include:

- **Local criticality.** Physical infrastructure assets benefit local communities across several sectors, including power generation, transport and logistics, infrastructure services, and environmental services. Not only is infrastructure fundamental to societal wellbeing, but it is also difficult to replace and is relied upon continuously.
- **Lower technology risk.** TI investments are more likely to involve larger, later-stage companies deploying proven technologies, shifting risk away from technology and toward execution.
- **Longevity and durability.** Infrastructure assets are underpinned by long-term contracts, permits, and regulatory frameworks that provide predictable cash flows and reduced uncertainty. The long-lived nature of these assets allows them to deliver social and environmental benefits for decades, well beyond a single ownership period.
- **Substantial operating, capital-intensive platforms.** Value is created not only by building new capacity but by operating, maintaining, and refurbishing existing critical assets. Higher operating and maintenance capital expenditure is expected to be central to long-term impact generation.

Primary Decision Metrics

We adapt our key decision metrics to the infrastructure context and call them the **IMM_{Inf}** (Infrastructure Impact Multiple of Money) and the **CY_{Inf}** (Infrastructure Carbon Yield). These metrics are structurally identical to the Impact Multiple of Money (IMM) and Carbon Yield (CY) deployed across the broader Y Analytics framework and retain the same underlying logic:

- IMM_{Inf} estimates the monetized social and environmental value generated per dollar of capital deployed.
- CY_{Inf} estimates the net metric tons of CO_2e averted per $100 of capital deployed.

The distinction is that IMM_{Inf} and CY_{Inf} incorporate methodological refinements to reflect the key characteristics of transition infrastructure investment strategy, which ensures collinearity between impact and financial returns. These refinements include:

- An asset- and market-specific counterfactual and a competition assessment, which address the local criticality of the strategy.
- A recalibrated impact realization risk rubric for later-stage infrastructure platforms, reflecting the lower technological risk.
- A tailored approach to capturing post-exit durability, including the terminal value period and remaining useful life of infrastructure assets, which captures the longevity and durability of the substantial operating and capital-intensive platforms.

In all other respects, the methodology remains consistent with the core approach. Importantly, the IMM_{Inf} and CY_{Inf} remain as estimates rather than measurements. They are intended to inform investment decisions by providing a structured view of expected impact, not to serve as an accounting of realized outcomes. They are most effective when paired with thoughtful investment judgment and responsible investing assessments, including considerations of risks, trade-offs, externalities, and stakeholder considerations that may not be fully reflected in a valuation of impact.

Gray-to-Green Transition Investments

Transition infrastructure sits at the intersection of two imperatives: scaling green solutions and actively decarbonizing existing systems that remain essential to the economy. Significant emissions reductions cannot be achieved solely by allocating capital to already-low-emission businesses; many of the highest-emitting sectors also contain the largest near-term opportunities for absolute emissions reductions. A credible transition strategy therefore requires both the growth of low-carbon infrastructure and the transformation of carbon-intensive assets where ownership, governance, operational support, and capital investment can change the emissions trajectory of the business.

For such gray-to-green investments, the methodology will leverage a sum-of-the-parts ("SOTP") impact assessment that separately evaluates gray and green business activities, as well as a science-based transition plan embedded in the financial underwrite.

Evidence-based Impact in Transition Infrastructure

Defining Transition Infrastructure and Investment Categories

The purpose of our impact decision tools – the IMM_{Inf} and CY_{Inf} – is to provide transition infrastructure investments with an evidence-based estimate of the environmental and social impact generated relative to the capital deployed. These tools increase investor confidence that the assets in which they invest will generate a positive, durable impact. Before describing the methodology, it is useful to define what we mean by Transition Infrastructure and why we need it, and to identify the two key categories of investment.

The Need for Transition Infrastructure

Infrastructure is the backbone of modern economies. It provides the essential services on which households, businesses, and communities rely every day across power, transportation, water, and waste. Much of this infrastructure is aging, capacity-constrained, or no longer fit for the demands being placed on it. At the same time, electrification, digitization, the rise of artificial intelligence, climate change, and continued urban and industrial growth are increasing demand for reliable, efficient, and modern physical systems. The result is a large and durable need for investment not only to build new infrastructure, but also to maintain, modernize, and extend the useful life of existing assets that provide critical services.

Within that broader infrastructure need, low-carbon and climate-resilient infrastructure represent a particularly important investment opportunity. Economies require substantial expansion of low-cost renewable power and battery storage; electrified vehicle fleets, charging infrastructure, and other efficient transport systems; enabling infrastructure services that keep assets available and productive; and environmental services such as water, waste management, recycling, and resource recovery. These infrastructure systems will deliver energy, mobility, resource efficiency, resiliency, and public services while also supporting a lower-carbon economy.

The benefits of investing in low-carbon and resilient infrastructure are multidimensional. Renewable generation and electrified transport can reduce greenhouse gas emissions and local air pollution relative to fossil-based alternatives. Battery storage can also help communities maintain access to electricity and essential services during extreme weather events and other climate-related disruptions. Waste management, recycling, and resource recovery platforms advance a more circular economy by diverting material from landfill,

recovering value from end-of-life products, and avoiding additional virgin resource extraction and associated environmental impacts. Water infrastructure can deliver multiple benefits, safeguarding access to clean and reliable water, improving treatment and reuse, and strengthening the resilience of communities to drought, flooding, and other water-related stresses.

Investment is also needed because existing infrastructure cannot simply be ignored while new capacity is built. Many assets that support today's economy are long-lived, deeply embedded in local systems, and difficult to replace quickly. In many cases, continued stewardship of existing assets is necessary to preserve essential services.

In other cases, ownership capital and operational focus can transition carbon-intensive assets toward lower-emissions pathways. Transitioning some carbon-intensive assets is therefore a complement to, not a substitute for, investing in green infrastructure. For gray-to-green opportunities, the investment strategy prioritizes assets with transition plans that are core to the investment thesis and economically aligned with value creation. The real-world transition will require an all-of-the-above approach: efficiently maintaining and quickly scaling low-carbon and climate resilient infrastructure and improving the emissions profile of select incumbent assets where there is a credible and measurable transition plan to reduce environmental impact. An investment strategy that includes both types of investment is better positioned to support the systems-level change required across all infrastructure classes.

Two Categories of Transition Infrastructure Investments

The Transition Infrastructure strategy is expected to encompass two distinct categories of investments.

- **Climate infrastructure investments,** where revenue and impact are highly collinear – companies whose products and services are already substantially aligned with climate mitigation or adaptation outcomes. Examples span power generation, transport and logistics, infrastructure services, and environmental services, including renewable power generation, battery energy storage systems, electrified transportation systems, enabling infrastructure services, water infrastructure, waste management, recycling, and resource recovery platforms.
- **Gray-to-green transition investments,** where a company's current activities are carbon intensive, but the investment thesis is fundamentally centered on decarbonizing the core business or transitioning it to lower-carbon alternatives. Examples could include a large diesel fleet operator actively electrifying its vehicles or a large independent power producer (IPP) with a mix of thermal and renewable

assets, which is leveraging cashflows from existing thermal plants to fund acquisition and construction of new renewable projects.

Refining Impact Assessment in the Transition Infrastructure Context

This is the backdrop for the investment strategy of TPG Transition Infrastructure ("TI"), and it is also why impact assessment in this context requires its own treatment. Infrastructure impact depends heavily on operating, maintaining, modernizing, and extending the life of critical assets, and on the additionality of assets whose service depends on long-lived contracts, permits, and local market dynamics. The approach set out in this paper is built to capture that impact case.

Maintaining Foundational Impact Assessment Building Blocks

The impact assessment methodology retains the same core impact architecture used across the Y Analytics framework. Each impact pathway is defined by its breadth, depth, monetization, and an adjustment factor for the uncertainty of impact, and then aggregated over time to arrive at IMM_{Inf} and CY_{Inf}.

Building Blocks

Breadth. Quantity of socially or environmentally beneficial output produced or operated, adjusted for both durability of impact and a company's position within a broader value chain.[1] For example, GWh of renewable electricity generated, passenger-miles driven by an electric vehicle, or metric tonnage of material recycled.

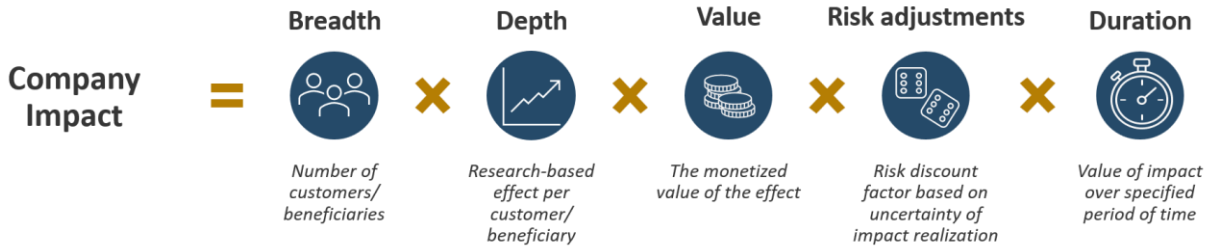
Depth. Impact per unit of output, measured relative to the displaced counterfactual product or service, updated to be more location- and context-specific as described in the next section.

Value. Monetized value of the impact – e.g., social cost of carbon or social value of water.

Risk Adjustment. Discounts reflecting regional competitive dynamics and uncertainty of impact being realized during the hold and being maintained for the duration of the post-exit period.

Duration. The period over which impact is expected to occur, including both newly created capacity and the remaining useful life of existing infrastructure. Captured mathematically in the 'Breadth'.

Figure 1. Impact Multiple of Money



As with our prior methodologies, the approach described in this whitepaper is intended as a decision tool rather than an accounting framework. Three points follow from that premise:

[1] The more critical its product or service is to delivering the impactful outcome, the greater the share of impact we credit, while more distant contributions receive a higher value-chain discount. We do not apply a fixed value chain discount. We instead calibrate value chain attribution to each impact pathway using the best available proxy for a company's relevance and proximity to the outcome.

1. The approach generates estimates. Just like financial models, there are assumptions inherent in the approach, and we strive to ground those assumptions in as much evidence and third-party research as possible. We do not claim precision.
2. The approach fits the premise of the fund and therefore makes choices about weightings, risk adjustments, time horizons, and constructed counterfactuals to align decisions with that premise. This is a different purpose from accounting.
3. The approach is executed to inform investment decisions and therefore must be implemented at the speed of a deal cycle.

Updating the Methodology for the Transition Infrastructure Context

Adapting the Y Analytics methodology to the Transition Infrastructure context requires three primary refinements.

1. First, the counterfactual and competition assessment must become more asset- and market-specific, reflecting the fact that infrastructure assets are often local, permitted, contracted, and difficult to replicate.
2. Second, the impact realization risk rubric must be recalibrated for later-stage operating platforms, where technology risk is often low but execution and dependence on customer demand or policy support can materially affect whether impact is achieved.
3. Third, the methodology must better capture the durability of infrastructure impact after exit, including both an adjusted terminal value approach and the remaining useful life of assets whose continued operation depends on ongoing stewardship, maintenance, and reinvestment.

Context-Specific Counterfactual Assessment and Competition Discount

Infrastructure assets can often be location-specific, difficult to replicate, and characterized by contractual or regulatory moats. For this reason, the counterfactual and competition analysis deployed for TI investments is deeply localized.

TI-specific counterfactual analysis attempts to benchmark a target against regionally-specific market conditions, with the goal of more accurately reflecting what would, or would not, have happened in the absence of the target company and its underlying asset base, contracts, and permits. Instead of deciding whether an asset's service exists elsewhere in the market, the relevant question becomes *whether sufficient capacity exists within a practical radius to provide equivalent products or services at the required scale, cost, and reliability.* As a result, the

analysis considers factors such as available competing capacity, transportation distances, low-cost alternative solutions, and the ability of alternative providers to absorb demand within a reasonable timeframe.

This approach better reflects the operational realities of infrastructure markets, where assets are often location-bound and substitution is constrained by physical, economic, and regulatory considerations. For example, a composting facility may serve a defined catchment area in which other facilities are unable to compete for various economic, commercial, and regulatory reasons. In the absence of this composting facility, the feedstock may instead be landfilled. This would be captured in the counterfactual effect size, which would assume 100% of the compost volumes managed by the company would otherwise be landfilled.

In a case where the same company's composting facility serves an area that does have viable, competing compost operators, the counterfactual would account for these competitors through a weighted average counterfactual effect size, based on the carbon intensity and relative volumes of various waste management pathways (e.g., landfilling, composting, incineration). The target company's effect size would then be compared to the counterfactual and impact would be attributed based on the delta between the two.

Similar dynamics may exist across other TI sectors like water, where local treatment capacity, reuse and recycling potential, network constraints, and permitting conditions can materially influence the relevant counterfactual.

Building upon the localized counterfactual assessment, we have updated our approach to capturing localized competitive dynamics. To deploy our competition discount in a rigorous and consistent manner, we have refined the competition rubric originally developed for the IMM and CY. Our aim is to reflect the distinctive dynamics of infrastructure assets – stationary, capital-intensive, and attuned to local market structure. When considering the impact that would likely have occurred in the absence of the asset, we consider:

1. **Near-Term Replicability:** One proxy is number of viable competitors. Capturing only competitors with existing capacity able to absorb demand. Geographic radius is relevant given most infrastructure assets are stationary and transport costs limit substitution.
2. **Contractual and regulatory durability.** Longer, stickier contracts reduce displacement risk and increase confidence that impact will persist. High: 10–20+ year contracts, often take-or-pay. Medium: 3–7 year contracts with rebid risk. Low: <3 years, month-to-month, or spot contracts. Ranges for contracts depend on industry norms. Regulatory and permitting moats similarly factor into understanding the durability of impact, as permitting creates binary barriers to entry that limit replacement capacity. High: multi-year permitting; new capacity unlikely near-term.

Medium: permitting achievable within a few years or via expansions. Low: minimal regulatory friction.

We capture these considerations in the competition risk rubric below. Assets with more challenging replicability and longer contractual and regulatory durability are more additional and will therefore receive lower competition discounts. For example, the new composting facility set to start operating in a region without viable competitors would be scored "Low" on *Near-Term Replicability* given the limited number of competitors who could absorb the volume of compost, and "High" on *Contractual and Regulatory Durability* based on the difficulty of permitting new composting facilities. Taken together, this would result in a 0% competition discount. In other words, we assume in the absence of the company, none of the projected volumes of waste would have been composted.

Figure 2. TI Specific Competition Discount Rubric

Near-Term Replicability

Considering both the number of viable competitors with permitted capacity and the asset's location, how readily could the asset's capacity be absorbed in the near term?

Contractual and Regulatory Durability *Longer and stickier contracts and regulatory permitting imply the incumbent company will be harder to displace*	**High**	**Medium**	**Low**
Low	80%	60%	40%
Medium	60%	40%	20%
High	40%	20%	0%

The percentage represents the competition discount, or the share of impact removed to reflect the likelihood that comparable impact would have occurred absent the asset. Lower discounts apply where greater contractual and regulatory durability, combined with lower near-term replicability, indicate the asset is harder to displace and therefore more additional.

Impact Realization Risk in Transition Infrastructure

For all deals, we account for the likelihood that projected impact is realized by discounting each pathway based on the specific risks to achieving that impact. These impact realization

risk discounts are distinct from the commercial risks that are already embedded in the breadth of impact as our starting point in the deal team's underwriting, which ensures collinearity. Impact realization risk discounts are applied by Y Analytics as an additional, impact-specific layer on top of the financial underwrite, capturing the residual risk that impact does not materialize even where the commercial case holds. This allows us to be rigorous about impact without double-counting risks already embedded in the financial model.

The TI risk rubric comprises four categories: i) rigor, ii) geography, iii) impact execution, and iv) passenger. Each component is discounted in 10 percentage point increments between 0% - 30% for rigor and geography, and 0% - 20% for impact execution and passenger, for a total risk discount ranging from 0% (full confidence in impact occurring) to 100% (no chance of impact occurring).

Rigor and geography risk discounts are applied based on the quality and relevance of the evidence used to calculate per-unit effect sizes. These categories are important because the methodology relies on external research, market studies, and third-party benchmarks to estimate the environmental or social effect of each unit of output. In fact, the nature of infrastructure assets and their associated hyper-localized counterfactuals will naturally require specialized and geographically confined research, which may not always be available. To account for the importance of this research and the fact that it will not always be easy to come by, we attribute 30% to these two categories.

Because TI deals more often involve later-stage operating platforms, proven technologies, physical assets, and contracts and permits, the key uncertainty is usually whether the company i) is likely to deliver on not just the commercial case but the impact outcomes and ii) controls the growth of its impactful business line. The rubric captures these through impact execution and passenger risk, which are likely to be most relevant in gray-to-green transition scenarios.

- Impact execution risk captures whether management, governance, capital planning, and operational capability are sufficient to deliver the underwritten impact case, not just the commercial case.
- Passenger risk captures whether the company is actively driving the growth or transition that generates impact, or whether it is largely dependent on customer demand, policy incentives, or market conditions outside its control.

Together, these four categories capture the operational and asset-level risks that determine whether infrastructure impact is actually realized.

Infrastructure Impact Realization Risk Rubric

The full rubric below sets out the guidance for applying different increments of risk within each category. Each category is scored independently, and the discounts are combined to produce the total impact realization risk discount for each pathway.

Table 1. TI-Specific Impact Realization Risk Rubric

Risk Category	Low Risk	Medium Risk	High Risk
Weighting (%)	**0% Risk Discount**	**15% Risk Discount**	**30% Risk Discount**
Rigor *How rigorous is the methodology used in the study?*	Independent Meta-Analysis, Lifecycle Assessment, or Product Carbon Footprint. Market projections derived from triangulation of multiple studies.	Company-commissioned studies. Market projections from a single study, sense-checked by at least one other.	Case study (with insufficient "n" size), or industry report with no control group. Market projections from a single study.
Geography *Does the research measure a similar geography?*	Research reflects the same geographic range as the target – effectively the same catchment radius or local market.	Research reflects a different catchment area within the same general geographic region (e.g., state, ISO/RTO region) as the target.	Research reflects a different region but within the same country or continent as the target.
Weighting (%)	**0% Risk Discount**	**10% Risk Discount**	**20% Risk Discount**
Impact Execution *How confident are we in management's execution capability, governance, and risks to continued climate action?*	High confidence that management has the capability, governance, and commitment to deliver the underwritten impact. Low risk of external factors delaying or reversing delivery.	Some risk that management will not meet intended impact targets, or some external factors may delay plans.	Substantial risk that management will not meet targets. Plans could be too ambitious, or external factors may undermine execution.
Passenger *How much control does the company have over the growth of its low-carbon business activities?*	Full control over delivery of its impactful product / service. Realization does not depend on customers demanding a higher-impact product.	Some risk that the plan depends on variables outside its control (e.g., customer demand or policy incentives).	Very limited control over delivery. Realization depends entirely on customers demanding a higher-impact product / service.

Terminal Value in the Infrastructure Context

Infrastructure assets frequently generate stable environmental and social benefits over long periods of time. Accordingly, the TI methodology modifies the treatment of terminal value in three ways, each of which is reflected in the calculation of the primary decision metrics.

- First, the methodology lengthens the horizon of the post-exit (or terminal value) period to match the longer horizon of the hold period for TI investments.
- Second, it reduces the terminal value discount applied to impact projected over that period to reflect the greater confidence that impact will continue after exit.
- Third, and most significantly, it incorporates remaining useful life. Because remaining useful life is attributed within the terminal value period, it is presented here as a subsection of the terminal value discussion.

Longer Terminal Value Horizon

The standard impact assessment approach used in the growth-oriented investing context anchors on a five-year post-exit or terminal value period to capture the impact catalyzed by our investment and growth of the business. In the infrastructure context, the terminal value period is matched to the underwritten hold period for the investment, which is expected to be between six and seven years. Because the investment horizon for infrastructure correlates with the period of transformation, aligning the terminal value period with the hold period better captures the impact realized after exit.

Lower Terminal Value Discount Rate

In addition to extending the duration of the terminal value period, IMM_{Inf} and CY_{Inf} apply a smaller terminal value discount factor to reflect the durability of infrastructure assets and the greater likelihood that their impact persists after we exit.

It is worth being precise about what this factor is and what it is not. The terminal value discount is **not** a financial discount rate – it is not the cost of capital nor is it used to discount cash flows. Instead, it is a probability adjustment: it expresses our confidence that the impact generated during our ownership period will persist well beyond our exit. A lower discount signals greater confidence; a higher discount signals less certainty.

In the TI context, the terminal value discount ranges from 2% to 10% per year, applied on a compounding basis across the terminal value period. The range sits at these levels because infrastructure assets are physically long-lived, contracted, permitted, and difficult to replace, all of which raise the probability that output – and therefore impact – continues under new ownership. Impact generated during the hold period is also more likely to persist through and beyond the terminal value period given the asset-heavy nature of the strategy.

Terminal value discounts are determined on a deal-by-deal basis, using a risk rubric similar to the competition discount. The score is driven by two questions about impact continuation rather than by any view on future valuation:

- **Certainty of Delivery.** Considers the physical longevity of the asset as well as regulatory or permitting moats that will protect the ability of the asset to produce products or services in the long run. Attempts to answer the question: Will the asset keep producing after exit?
- **Customer Stickiness.** Assesses customer and contract stickiness to answer the question: Will customers continue to purchase the product/service after exit?

Figure 3. TI-Specific Terminal Value Discount Factor Rubric

			Delivery Certainty *Will the asset keep producing output after exit?*		
			Low	**Medium**	**High**
			New company in developing industry; or Company is a new entrant to the industry	Company is established in the industry; Industry somewhat established	Company is mature; Industry is well established
Customer Stickiness *Will customers continue to purchase the product/service after exit?*	**Low**	Customer base characterized by high turnover	10%	8%	6%
	Medium	Customer base is moderately stable; Existing relationships with customers	8%	6%	4%
	High	Customer base is highly stable; Long-term relationships with customers	6%	4%	2%

Remaining Useful Life (RUL) Attribution

One of the defining characteristics of infrastructure investing is the importance of stewardship. Traditional impact frameworks primarily emphasize newly constructed assets and the incremental capacity added during ownership. While appropriate in many growth-oriented investing contexts, this approach can understate the social and environmental value created through the operation and maintenance of existing critical infrastructure.

Infrastructure assets typically require continuous maintenance, refurbishment, and capital reinvestment in order to remain effective over time. The societal benefits generated by the continued operation of these assets frequently persist well beyond the investment holding period.

Our framework therefore recognizes that infrastructure investors can create impact not only through the construction of new assets, but also through extending and preserving the impact-generating capability of existing assets. Notably, the enduring nature of infrastructure assets is a critical feature of the value attributed by the next set of investors for TI companies, along with being essential for TPG's underwriting. This recognition of long-term impact generation is operationalized by estimating the remaining useful life of infrastructure assets at the end of TPG's envisioned hold period, calculating the present value of the impact generated during the remaining useful life, and attributing it in the first year of the envisioned terminal value period.

Remaining useful life is estimated using the most appropriate indicator available for a given asset class, tailored to the specific asset and the information available. We see two primary asset classes – those with discrete useful lifetimes and those with non-discrete useful lifetimes.

Discrete Useful Lifetime Assets

Assets with discrete useful lifetimes are defined by equipment that is ultimately replaced – for example, solar facilities, battery systems, or vehicle fleets. For these assets, remaining useful life is typically estimated using either technical[2] or economic[3] useful life. Technical and economic useful life figures are standard benchmarks included in techno-economic feasibility assessments and are usually readily available during the due diligence process.

Non-Discrete Useful Lifetime Assets

Non-discrete assets are site-based operating platforms that can be continuously maintained – for example, waste facilities, terminals, transfer stations, and water infrastructure. For these

[2] Maximum duration an asset can operate safely and effectively, assuming robust maintenance and timely replacement of degraded components.
[3] Period over which it remains profitable to operate the asset.

assets, remaining useful life is typically estimated using contract or permit useful life[4] or other bespoke approaches to estimating Sponsor-enabled asset longevity like opex-enabled useful life[5]. Contract or permit life, like technical or economic useful life, is a well-defined concept within infrastructure investing, and the duration of a target's commercial contracts or regulatory permits should be a standard component of the due diligence process.

RUL Calculation and Attribution Approach

We calculate remaining useful life only for assets that existed prior to investment. When remaining useful life impact is calculated and attributed, we follow a consistent set of steps:

1. Calculate remaining useful life by comparing the asset's useful life against its age at the expected time of exit.
2. Estimate the impact generated over each year of the asset's RUL.
3. Apply an annual, compounding discount factor to each year of RUL impact.
4. Calculate the present value of RUL impact by summing all years of remaining, discounted impact.
5. Attribute the total in the first year of the terminal value period.

For net-new (greenfield) assets, we maintain the standard approach applied across the broader platform – attributing full lifetime impact in the year the asset becomes operational[6].

[4] Term of the commercial agreement or regulatory authorization that underpins the asset's operation.
[5] Period of continued operation enabled by the asset owner's operating expenditure and maintenance capital expenditure, informed by maintenance and refurbishment cycles.
[6] As detailed in Evidence-based Impact in Climate, we attribute lifetime impact to companies when they build long-lasting, durable products.

Investing in Transition: Assessing Gray-to-Green Deals

Alongside investments in low-carbon infrastructure, TI will also pursue select gray-to-green opportunities. These are companies or asset platforms whose current operations are emissive, but where the investment thesis is centered on a credible transition over the hold period to reduce the carbon intensity of the business. Because these businesses often include both emissions-intensive legacy activities and lower-carbon growth or transition activities, they require a sum-of-the-parts impact assessment that evaluates each component separately before aggregating the resulting impact into IMM_{Inf} and CY_{Inf}. Gray-to-green opportunities will also require a science-based transition plan that is embedded in the financial underwrite, including the capital requirements, operational milestones, emissions-reduction pathway, and governance needed to deliver the transition.

Characteristics of Impactful Gray-to-Green Investments

For the gray-to-green subset in particular, our experience indicates that the most impactful transition investments share a consistent set of characteristics. These serve as qualitative screening criteria that complement the quantitative decision metrics:

- **Centrality.** Transition is a core part of the investment thesis and business plan, not an incidental feature; the centrality of the transition is reflected in the financial accretion it provides for the business.
- **Alignment.** Management teams and equity partners are aligned on the transition strategy.
- **Management capability.** The management team has the capability and track record to carry out the transition plan.
- **Efficient emissions reduction.** Meaningful absolute reductions in emissions are achievable, and the investment is efficient in driving those outcomes.
- **Funded transition.** The capital required to achieve the transition is incorporated into the business plan.

Transition Archetypes

Analysis of transition opportunities points to several archetypes, defined by the business lever used to effect the transition. These archetypes are descriptive rather than prescriptive, but they help frame diligence and the risks that follow:

- **New product mix.** A company develops a new, lower-carbon product that displaces or complements its existing line. For example, a vehicle operator shifts its fleet from legacy diesel and gas vehicles to electric.

- **New process.** An incumbent decarbonizes the way it delivers an existing product or service, reducing carbon intensity over time. For example, adding carbon capture to an existing production facility.

Sum of the Parts Impact Assessment for Gray-to-Green Investments

For these deals, the impact assessment methodology incorporates a sum-of-the-parts ("SOTP") approach. The purpose of the SOTP approach is to separately evaluate the portions of a business that generate positive climate impact from those that remain emissions-intensive, allowing the impact assessment to reflect the underlying economics and transition strategy of the company more accurately. Rather than treating the company as a single homogeneous entity, the methodology divides the business into distinct operating segments and evaluates each segment independently within the IMM_{Inf} and CY_{Inf} framework before adding the individual components back together to estimate net impact.

Green Activities

Business lines that already generate climate-positive outcomes are considered green activities and are assessed using the standard methodology. These segments are typically expected to represent a large positive contribution, and their equity value is often lower at the time of investment given that the green business line typically represents a smaller share of gray-to-green businesses initially.

Gray Activities

Business lines that remain emissions-intensive today, but have feasible decarbonization or transition pathways, are classified as gray activities and evaluated separately from green activities. However, these gray activities are assessed under the same IMM_{Inf} and CY_{Inf} framework as standard climate infrastructure opportunities. This means we assess gray activities based on how they compare to a relevant counterfactual.

Gray activities are typically negative at the beginning of an investment and get 'greener' over time. They may not flip from net negative to net positive impact, but the magnitude of negative impact is expected to decrease over the hold period. Gray activities also encompass a larger starting share of the business, and therefore a larger associated equity value.

Calculating Impact for Transition Businesses

Under the SOTP framework, impact is estimated independently for green and gray activities, and then aggregated within the IMM_{Inf} and CY_{Inf}. For both green and gray business lines, impact is quantified using the same evidence-based methodologies employed throughout the broader TI portfolio. The resulting positive and negative pathways are then aggregated to arrive at a net estimate of impact.

This approach allows investment teams to distinguish between companies whose gray activities are expected to remain largely unchanged and companies where capital ownership is expected to materially accelerate decarbonization or transition. The distinction is important because Transition Infrastructure seeks to support real-world emissions reductions rather than simply reclassifying ownership of emissions-intensive assets.

Sum-of-the-Parts Impact Attribution

$$Gray\ IMMInf = \frac{Impact\ Value\ of\ Gray\ Business\ Line}{Entry\ Equity\ Value\ of\ Gray\ Business}$$

$$Green\ IMMInf = \frac{Impact\ Value\ of\ Green\ Business\ Line}{Entry\ Equity\ Value\ of\ Green\ Business}$$

$$\mathbf{IMM_{Inf} = Gray\ IMM_{Inf} + Green\ IMM_{Inf}}$$

This approach helps address a challenge that frequently arises in transition investing. Many transition businesses are large infrastructure platforms whose current enterprise value is supported primarily by mature operating activities. Traditional impact efficiency metrics can therefore appear low because the denominator reflects the valuation of the entire company, while the positive impact generated by newer transition activities may still be emerging. By assessing gray and green components separately, the SOTP framework creates a closer linkage between capital deployed, business transformation, projected impact generation, and future decarbonization outcomes.

Transition Plans

The impact case for gray-to-green investments ultimately depends upon the credibility of the transition itself. Accordingly, gray-to-green investments are expected to be supported by a quantified, science-based transition plan that identifies emissions reduction pathways, operational improvements, capital requirements, timelines, accountability mechanisms, and monitoring processes. This transition is included in the impact underwrite for the gray side of the business.

The transition plan is a critical component of the investment's additionality case, as it quantifies the magnitude of emissions reduction that could be enabled by TPG ownership and investment capital. Under this framework, impact is created not by transferring ownership of high-emitting assets, but by enabling a measurable and credible reduction in emissions relative to the counterfactual future state of the business.

Illustrative Example: Sum-of-the-Parts in Practice[7]

To show how the sum-of-the-parts assessment works in practice, consider an investment in a global passenger transit platform that operates a large fleet of buses across numerous metropolitan and regional service areas. At entry, the fleet is predominantly diesel, with a small but growing share of zero-emission buses (ZEBs). The investment and impact thesis centers on accelerating the fleet's transition from diesel buses to ZEBs by acquiring electric buses and investing in enabling infrastructure like charging depots. The commercial opportunity is underpinned by increasing municipal and regional decarbonization requirements, which are driving transit agencies to electrify. The company is positioned to benefit from this shift through accelerated fleet electrification, with projected ZEB penetration reaching ~3x the average rate of the countries in which it operates, supporting both commercial growth and environmental impact outcomes.

This thesis is supported by a quantified, science-based transition plan embedded in the financial underwrite, covering the vehicle replacement schedule, compliance with customer contract requirements, the associated capital requirements, and the emissions-reduction trajectory.

The following section outlines the steps taken to build the SOTP impact assessment for a gray-to-green investment.

Step 1 — Segmenting the business. Rather than treating the platform as a single entity, we divide it into its constituent parts – the green (ZEBs) and gray (diesel buses) segments and the associated impact pathways with each. We then establish regional- and segment-specific counterfactuals to more accurately reflect the impact of each side of the business. We evaluate both segments under the same two primary impact pathways: GHG emissions and health impacts associated with air pollution.

Step 2a — Assessing the green segment. We use the TPG Base Case to quantify the existing stock and net new additions of ZEBs over our expected hold period, which establishes the impact and commercial collinearity upfront.[8] Regardless of geography, we assume that in the absence of a ZEB, the equivalent passenger service would have been provided by a diesel bus as they are the dominant bus type in the market today and most likely to reach retirement age compared to newer hybrid buses and ZEBs. Impact is therefore credited based on the delta in emissions between ZEBs and diesel buses.

We intentionally distinguish existing ZEBs from net new additions. For the small number of existing ZEBs, we model remaining useful life at the end of our expected hold period based on fleet age at the beginning of our investment, expected useful life of the buses, and the expected duration of our hold. We then attribute RUL impact in the first year after exit.

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[7] For simplicity, the example below focuses on the IMM_{Inf}, but the same logic, steps, and calculations hold for both the IMM_{Inf} and the CY_{Inf}.
[8] Base Case is based on TPG's subjective judgment for underwriting purposes, based on a number of assumptions, some or all of which may prove incorrect.

Separately, net new ZEBs receive full lifetime attribution when they enter service during our hold period. Because the assets are long-lived and ridership is stable and contracted, delivery certainty is high and the terminal value discount is correspondingly low.

Across both impact categories, the green segment produces a substantial positive numerator – the monetized value of the GHG emissions and local air pollution avoided when ZEBs displace diesel buses. This numerator grows over the hold as the ZEB fleet scales and net new additions accumulate lifetime impact.

Step 2b — Assessing the gray segment. We similarly use the TPG Base Case to model the diesel fleet's evolution over TPG's investment period, inclusive of net additions and retirements. Unlike the green segment, we do not assume the counterfactual is 100% diesel. Instead, we estimate a region-specific counterfactual based on the evolving market share of diesels, hybrids, and limited ZEBs. While this regional counterfactual is predominantly diesel due to low ZEB penetration across the markets in which the company operates, the company's diesel buses generate negative impact relative to the market average. Impact is therefore credited on the delta in emissions between the diesel fleet and this region-specific counterfactual. Negative impact is limited because the gap between a diesel bus and the market-weighted counterfactual is modest. As a result, our methodology attributes more negative impact to diesel buses in regions with a higher share of cleaner alternatives on the road today than in constrained markets that have not been as successful in deploying less emissive alternatives.

Similar to ZEBs, we intentionally distinguish existing diesel buses, which represent the vast majority of diesel vehicle miles traveled over hold, from net new additions. This allows us to capture negative impact attributable to diesel buses in the RUL category. It also accurately reflects the changing dynamics, with negative impact being largest early in the hold when the share of diesel buses is highest, and then declining over hold as diesel buses are retired and replaced with ZEBs.

Across both impact categories, the gray segment produces a net negative numerator – diesel buses produce more GHG emissions and local air pollution than the evolving regional counterfactual against which they are compared. Importantly, when considering the total impact generated during the hold and post-exit periods, the negative impact generated by the gray segment is smaller in absolute value than the green segment's positive impact because the company is a leader in electrification compared to the markets it operates in.

Step 3 – Calculating the Green and Gray IMM_{Inf}. After estimating the value of impact for both the gray and green segments of the business, we convert the absolute impact values into the capital efficiency metric – the IMM_{Inf}. To do so, we divide the monetized impact (positive for green, negative for gray) by the respective entry equity valuation, so that each segment carries its own denominator. Consistent with most gray-to-green businesses, the majority of entry equity value sits with the gray segment, while the green segment

represents a smaller initial share. The result is two distinct values – the Green IMM_{Inf} and Gray IMM_{Inf}.

Step 4 — Summing the parts. The two segments are then recombined: Green IMM_{Inf} plus Gray IMM_{Inf} produces a single IMM_{Inf}. Because the scaling green segment outweighs the diminishing gray segment, the net result is positive. The sum-of-the-parts view also prevents the large legacy diesel valuation from swamping the emerging clean-fleet impact, which is the distortion a blended, whole-company metric would have produced.

Conclusion

The Transition Infrastructure impact methodology is grounded in the same principles that underpin *Evidence-Based Impact* and *Evidence-Based Impact in Climate*: evidence, additionality, net impact, and risk-adjusted estimates. It applies those principles to an infrastructure strategy designed to support critical services across power generation, transport and logistics, infrastructure services, and environmental services, including low-carbon and resilient infrastructure as well as gray-to-green transition opportunities.

The methodology recognizes the distinctive characteristics of infrastructure investing. Infrastructure assets are often long-lived, asset-heavy, contracted, permitted, locally competitive, and dependent on ongoing stewardship, maintenance, and reinvestment. The methodology therefore rests on three primary features: first, a hyper-localized counterfactual and competition assessment; second, an impact realization risk rubric built for later-stage operating platforms; and third, a tailored approach to assessing the durability of post-exit impact.

For gray-to-green investments, the framework also requires a sum-of-the-parts impact assessment that separately evaluates emissions-intensive legacy activities and lower-carbon growth or transition activities, before aggregating the resulting gray and green impact metrics back into a single version of the IMM_{Inf} and CY_{Inf}. To ensure the gray business is 'greened' over hold, these opportunities must be supported by a science-based transition plan that is embedded in the financial underwrite, including the capital requirements, operational milestones, emissions-reduction pathway, governance, and monitoring needed to deliver the transition.

Together, these refinements allow IMM_{Inf} and CY_{Inf} to better capture the environmental and social value created through infrastructure ownership: preserving and improving essential services, reducing emissions and air pollution, supporting adaptation and resilience, creating jobs, and enabling credible transitions in select carbon-intensive assets. As with our prior methodologies, this remains a living document. We will continue to refine the approach as research, evidence, and our experience across infrastructure assets dictate, while preserving comparability with the broader Y Analytics framework.