



Empira Group Research: The green value gap

Creating value via the energy transformation
of German residential real estate



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Dear Reader



Decarbonizing residential real estate is no longer just a sustainability or compliance issue. Energy efficiency and CO₂ intensity are turning into economically impactful quality characteristics that directly affect cash flows, valuation assumptions, refinancing ability and exit liquidity. This is in turn seeing “Transition to Green” (T2G) become an investment-relevant performance indicator. This study investigates the conditions under which T2G strategies in German residential real estate are economically viable – and where the risk of a negative “green value gap” arises. The green value gap describes the difference between the investment pathway required from a technical or regulatory perspective and the benefit that can actually be monetized. The decisive factor is not whether renovation should be carried out, but whether and when renovation is economically viable.

In other words, value creation is context-dependent. It is determined by the initial position in terms of energy efficiency, year of construction, regional market conditions, the extent of measures, energy and CO₂ price development, financing conditions and quality of information. Consequently, T2G is not a blanket modernization program, but more a strategy for prioritization-based and risk-driven transformation.

The study follows a clear, investor-oriented structure: first, the regulatory framework and its densification over time are explored. Then, the energy-efficiency baseli-

ne of German housing stock is analyzed – from year of construction and renovation level to EPC distribution. This serves as a basis to empirically investigate how the market capitalizes energy efficiency in purchase prices and rents. Finally, economic transformation pathways, opportunity-risk profiles and strategic recommendations for investors are derived from this.

The analysis deliberately works with ranges and scenarios instead of point forecasts. Energy prices, construction costs, regulatory structure and market reactions are subject to uncertainties. The aim is therefore not a deterministic forecast, but a reliable framework for decisions.

Transition to Green can create value in suitable market and property constellations – but this does not occur automatically. The key question for investors is not “whether” but “where, when and to what extent” energy-efficiency measures make economic sense.

Key findings

1. Optimized energy efficiency is increasingly being capitalized in the German residential real estate market – especially through higher market values.
2. The direct leverage effect for rent is limited; T2G primarily affects ongoing income via stabilizing effects and all-in rent potential.
3. The investable T2G segment is in the middle of the energy ratings scale (EPC D–E).
4. Economic success depends on the relationship between the necessary CapEx and capitalizable benefits.
5. Professional investors can create added value through high data quality and predictable projects.
6. The economic success of energy transformations is heavily dependent on the local market environment.

Regards

Lahcen Knapp

Founder and Chairman of the Board of Directors, Empira Group



1. Policy and regulatory framework of the Transition to Green

This chapter sets out the regulatory framework within which T2G would become economically relevant in the German residential property market. It focuses on the requirements at EU and national level, their densification over time and the question of how they affect costs, financing and marketability.

Energy efficiency and CO₂ regulation at EU and national level

In the building sector, T2G is primarily an economic issue: regulation determines which properties can be rented out and financed in the long term. For investors, regulation relating to housing stock is primarily relevant via three mechanisms: target pathways for efficiency and decarbonization, transparency and record-keeping obligations, and the conversion of emission intensity into recurring costs.

At EU level, the revised Energy Performance of Buildings Directive (EPBD) sets the strategic framework for decarbonization by 2050. The focus is on national reduction pathways for energy consumption within existing buildings, the priority treatment of the least energy-efficient buildings and the zero-emission standard for new buildings from 2030. For investors, the target vision is less important than its national translation into timelines, thresholds and enforcement, because CapEx, financing and exit assumptions depend on it.

In Germany, the Building Energy Act (Gebäudeenergiegesetz, GEG) forms the operational basis. Energy certificates are increasingly becoming a market signal because they make energy demand and CO₂ emissions visible. At the same time, data quality remains heterogeneous: demand-based and consumption-based certificates differ in terms of meaningfulness and comparability, with the result that energy-efficiency risks often only become fully visible during due diligence or financing. Furthermore, the GEG is in a phase of political reassessment. Adjustments to technological specifications, closer integration with municipal heating planning and clarification of retrofitting and replacement obligations are under discussion.

In addition, regulation has a direct impact on costs. CO₂ pricing transfers emission intensity directly into operating costs; this is reinforced by the phased model of cost distribution between landlords and tenants. The higher a building's emissions, the greater the share to be borne by the investor. This makes emission intensity relevant in terms of cash flow.

Overall, regulatory target pathways, transparency requirements and cost mechanics jointly determine which properties are capable of being transitioned and where stranding risks or valuation haircuts will occur first. The decisive factor is less the individual instrument, and more the densification of these elements over time.

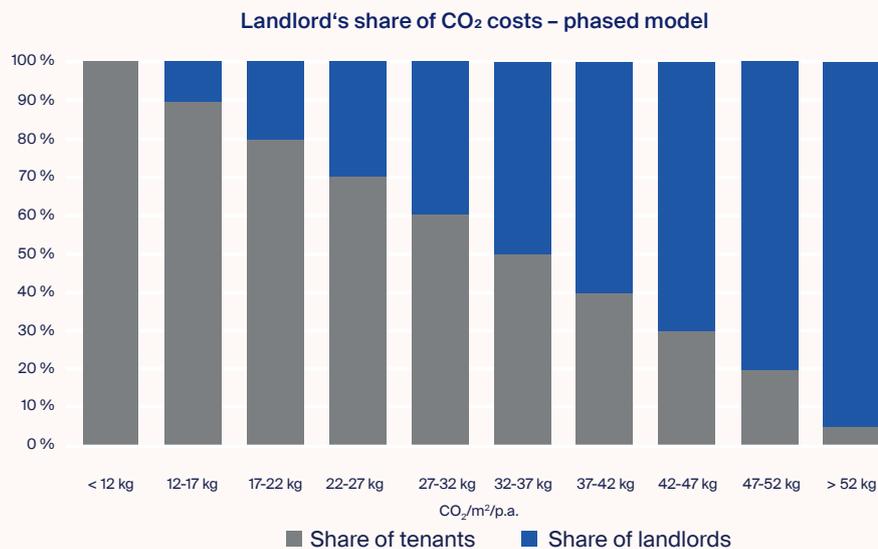


Figure 1: Share of CO₂ covered by tenants and landlords, phased model; source: Carbon Dioxide Cost Allocation Act (Kohlendioxidkostenaufteilungsgesetz, CO₂KostAufG), legal status 01/2023

Regulatory timeline 2026–2050

The period from 2026 to 2050 will be decisive for existing buildings, as European target pathways are gradually being translated into specific requirements in terms of energy efficiency, emission intensity and choice of technology. The bottleneck is less in the target vision than in the implementation: increasing demands are coming up against scarce capacities, volatile construction costs and heterogeneous building stock. Timing is thus becoming a key driver of CapEx and portfolio risks.

The phase of operational densification will begin in 2026. EU requirements need to be transposed into national law; multiple requirements will accumulate during the period up to 2030. For investors, this will not initially entail a comprehensive renovation obligation, but rather the clear prioritization of energy-inefficient buildings, because these are linked to regulatory pressure, high energy consumption and CO₂ costs.

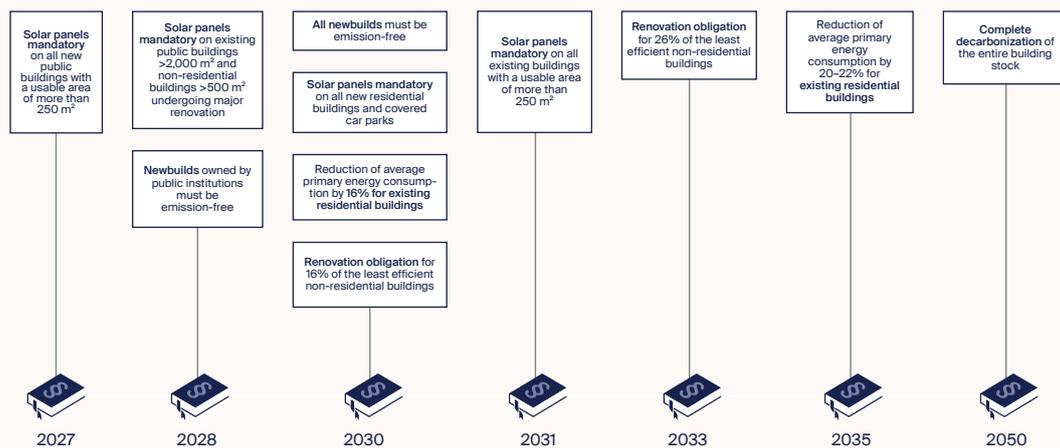


Figure 2: Impact of “Fit for 55” on the quality of real estate; source: Haufe.de, Gebäudeforum.de, Council of the European Union

Between 2030 and 2035, the focus will shift from target definitions to valuation relevance. In this phase (if not before), energy efficiency will become a universal differentiating feature of market and financing relevance. The pressure to adapt in this respect will arise less from formal usage bans than from rising costs, limited financial viability and more difficult exits.

By 2040 and beyond, the scaling of integrated renovation programs will become increasingly important. The chronological sequence will be key for portfolios: which buildings will be transformed when, to what extent and with what technology. The final 2045/2050 corridor serves less as a legal reference date in this regard and more as a long-term valuation anchor that is already being incorporated into CapEx pathways, financing conditions and exit assumptions.



The economic leverage potential of Transition to Green

For the residential real estate market, the regulatory pathways should not only be read as a compliance framework, but also as an economic parameter for valuation, financing and exit capability. Energy efficiency and CO₂ intensity are having an increasing impact on operating costs, expected investment pathways, refinancing conditions and property marketability. Put another way, Transition to Green (T2G) is not a downstream ESG dimension, but a component of the economic quality of an asset.

From an investor's perspective, T2G will have a two-fold impact. On the one hand, successful repositioning in terms of energy efficiency will limit downside risks by reducing future price markdowns, financing disadvantages and stranding risks. On the other hand, it can create value if a property is transferred to a more robust quality band, thereby increasing its economic viability. However, the decisive factor is not the technical ambition as such, but its economic effectiveness.

This gives rise to its analytical core: the green value gap, which refers to the difference between the required investment pathway and the benefits of a transformation that can actually be capitalized. A positive impact is contingent on the economic added value exceeding the necessary expenses and risks. With that in mind, the key question for investors is not whether energy-efficiency renovations are fundamentally sensible, but under which market, property and cost constellations a positive risk-adjusted net effect can be achieved.

In order to provide a reliable answer to this question, the next step is to precisely classify the structure of German residential real estate. The construction year categories, renovation levels and efficiency segments in which there is the greatest need for transformation and where this leads to investable constellations are decisive. Only on this basis is it possible to identify the property segments in which the Transition to Green strategy can be operationalized in an economically viable manner.



Figure 3: Transition to Green value chain; source: own illustration

2. Differentiation of German residential real estate

The economic viability of T2G strategies depends to a large extent on the structure of the building stock. Consequently, German residential real estate is differentiated below according to year of construction, renovation level and energy efficiency. Only by doing so it is possible to reliably define transformation needs, investable segments and prioritizable action plans.

Housing stock by construction year category

German housing stock is diverse in terms of energy efficiency, and its profile with respect to year of construction has developed over time. The year of construction is a useful proxy for technical condition, shortcomings in terms of energy efficiency and CapEx intensity. In terms of volume, the post-war years dominate and thus shape the baseline condition of the stock with regard to energy efficiency.

The high-volume construction year categories of the 1950s to 1970s, in particular, are often structurally weak in terms of energy efficiency. Many buildings were constructed prior to effective thermal insulation

requirements, consume significantly more energy than younger buildings, and often have a fossil-fuel heating structure, too. Buildings from these construction years are therefore often associated with high energy demand and high CO₂ intensities.

Buildings with more recent years of construction, by contrast, usually have better underlying energy efficiency, not least due to stricter minimum requirements since the 1990s. From a T2G perspective, this means that the transformation of existing housing stock is primarily a consideration for post-war properties. As such, construction year categories are a key screening criterion because they are highly likely to reflect transformation needs, technical feasibility and CO₂ exposure.

Construction year categories provide an initial approximation of the energy-efficiency situation and technical renovation requirements. From an investor perspective, however, they should always be read in conjunction with the renovation level, heating system and envelope quality.

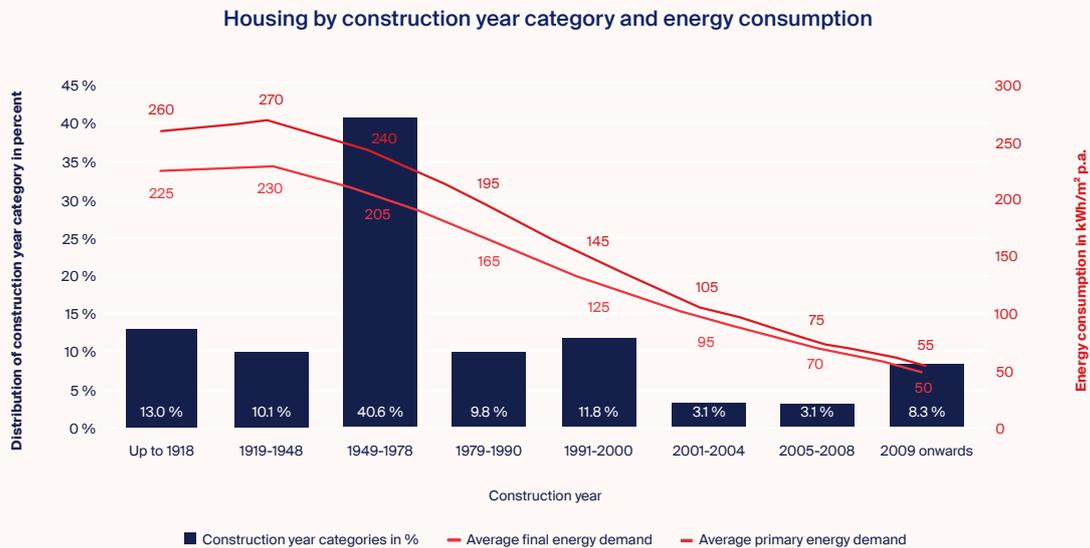


Figure 4: Housing stock by construction year category and energy consumption by year of construction (data available: 2024 and 2022); source: Federal Association of the Energy and Water Industry (BDEW) based on Destatis



Housing stock by renovation level

The analysis of construction year categories shows that older properties make up the lion's share of housing stock; the quantitative baseline is dominated by post-war buildings constructed up to the end of the 1970s in particular. As they were often built prior to modern thermal insulation requirements, the renovation level serves as the key lever to offset shortcomings in terms of energy efficiency.

However, the renovation level makes it clear that energy-efficiency modernization has not yet taken place to the extent required for the regulatory target pathways. The proportion of fully renovated residential buildings remains low: around 30% not renovated, around 50% partially renovated, only around 7% fully renovated; around 12% are new buildings.

The renovation level of housing varies greatly from region to region. One analysis (IW Consult, ImmoScout24) shows that building stock in eastern Germany performs particularly well in terms of the need for renovation. Of particular note are cities such as Chemnitz (9.1% of the stock in need of renovation and below energy efficiency class E), Rostock (9.5%), Potsdam (14.3%) and Leipzig (14.5%). The greatest need for renovation is found in cities in Lower Saxony and North Rhine-Westphalia, including Bremerhaven (61.5%), Salzgitter (60.4%), Krefeld (59.7%) and Mönchengladbach (59.2%).

From an investor's perspective, the large group of partially renovated buildings is of particular relevance. These have already undergone some work, mostly selective in nature (e.g. windows, roofs, heating), leaving a broad spread of interim energy efficiency levels. In order to ensure long-term compliance with regulations, financial viability and marketability, there is a need for additional CapEx here.

The renovation level reflects a renovation rate that has been too low for years. While regulatory target pathways become denser, the real pace of modernization remains limited. Market pressure therefore arises primarily from the growing gap between the target pathway and actual renovation progress.

The low proportion of fully renovated buildings also underlines the technical potential of the existing building stock: older buildings, in particular, offer high absolute savings potential because they have above-average energy requirements and often use fossil-fuel heat sources. Far from being an optional upgrade, renovation is the central mechanism for reducing structural efficiency shortcomings in the dominant property segments.

This presents investors and developers with a clear picture of the market: the building stock is old, the level of renovation is low and the need for transformation is high. Transition to Green is not a marginal phenomenon, but a large-volume investment market with potential for value-add strategies, repositioning and serial modernization approaches.

Renovation level of residential buildings in Germany

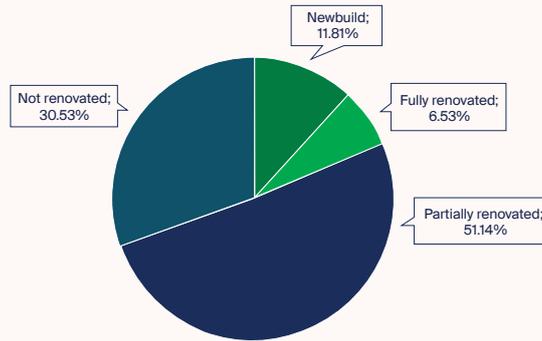


Figure 5: Renovation level of residential buildings in Germany; source: co2online gemeinnützige Beratungsgesellschaft mbH (www.wohngebaeude.info, data sets 2002-2023)

Housing stock by EPC classes

The composition of construction years and renovation level lead to an EPC distribution (EPC = Energy Performance Certificate) that adds density to the initial energy efficiency of German housing stock. This is key for investors because it makes the transformation volume visible and identifies the segments in which T2G might be economically scalable.

The data shows a concentration in medium to low efficiency classes. Of particular relevance are D and E, corresponding to the dominance of older and often only partially modernized buildings. The need for transformation is therefore less to be found in a small, extreme segment, and more in the broad mid-range.

The lowest efficiency classes G and H are particularly visible from a regulatory perspective, but do not usually form the core of the investable transformation market. They are often associated with higher construction risks and disproportionate CapEx, meaning that, for institutional investors, the apartment building segment in D and E and, in some cases, F is particularly relevant: these properties have shortcomings in terms of energy efficiency but do not need to be completely renovated or replaced with a newbuild.

This shifts the perspective from the worst stock to the stock which is economically viable as regards transformation potential. The central T2G potential lies in the improvable mid-range region: for stock with recognizable energy-efficiency leverage, manageable technical complexity and a fundamentally controllable CapEx profile.

Frequency distribution of building efficiency classes by property type

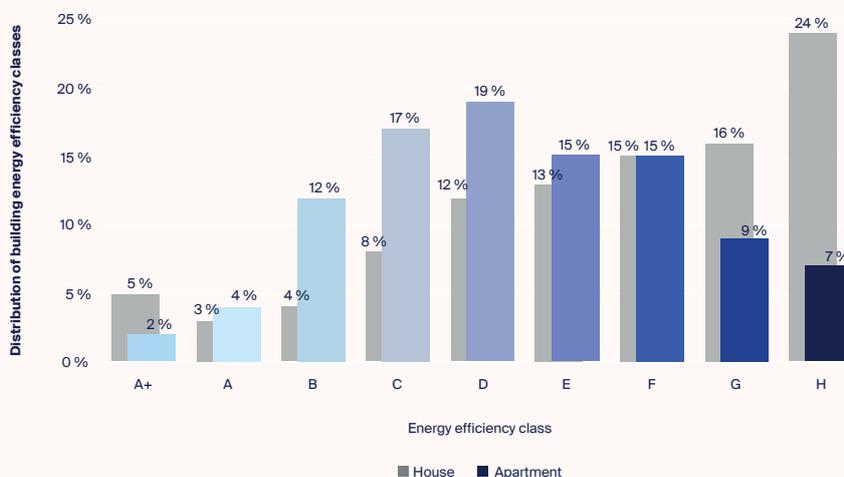


Figure 6: Frequency distribution of building efficiency classes by energy demand (status as of 2019); source: Federal Ministry for Economic Affairs and Energy (2020)

3. Evaluation of energy efficiency by the market

Whether energy efficiency is already having an economic impact today can be seen in the market response. The following chapter combines empirical evidence on how energy efficiency is capitalized in purchase prices, rents and risk perceptions, thus bridging the gap between technical quality and economic relevance in the investment context. The following evidence is based on different energy-efficiency indicators; their overall trends are consistent, but they are not 1:1 comparable.

Evidence regarding purchase prices and valuations

As described in the basic chain of effects, Transition to Green is not valued on the market as an ESG label, but rather via revenue, cost and risk channels. Energy efficiency and CO₂ intensity influence expected ancillary costs, the future CapEx pathway, refinancing ability and exit liquidity – and are therefore translated into purchase prices in terms of earnings value/DCF thinking.

Empirically, this capitalization is now clear to see in the German residential real estate market. vdpResearch provided a reliable evaluation based on hedonic regressions with around 1.32 million listings for apartments and 1.55 million listings for houses (2015–2023). The analysis controls for factors such as the quality of the location, the size of the property and the year of construction, thus isolating the influence of the energy efficiency class.

In 2023, there were significant price markdowns compared to efficiency class A+: for apartments, around –20% (class D, demand-based certificate), –23% (E), –25% (F), –27% (G) and –28% (H). For detached and semi-detached houses, the reductions are even greater, reaching as much as –31% for class H (vdpResearch, 2024).

In other words, it is not necessary to go to the outer classes to find a price-relevant threshold; this can be located in the broad mid-range area. In addition, vdpResearch points out that markdowns increased significantly in 2023 compared to 2022 – plausibly as a combination of expected increases in energy prices and higher financing costs, which make investments in renovation more expensive and thus have a greater impact on pricing.

For investors, the markdowns mainly take the form of risk and CapEx discounts. Poor EPC classes indicate higher future investment needs, weaker scope for refinancing and rising operating costs. Accordingly, such properties are valued with lower multiples or higher return require-

ments; the decisive factors are marketability, exit scope and stranding risk.

In addition, the Deutsche Bundesbank provides evidence of the correlation between energy price expectations and valuation levels. A scenario analysis based on NGFS climate pathways (Network for Greening the Financial System) shows that ambitious transition scenarios – especially with sharply rising CO₂ and energy prices – imply significant valuation risks for inefficient residential buildings. There is discussion of potential losses of around 11–13% of the total residential property value if market participants switch from a low intervention scenario to a high carbon pricing scenario (Ter Steege & Vogel, 2021). The results should be read less as a point forecast, but more as an indication that transition risks have found their way into macroprudential valuation approaches.

For investors, this means that energy-efficient renovations impact value because they address the markdown issue. Value leverage does not arise automatically as a “green premium”, but rather from repositioning – the transfer of an asset from a marked-down efficiency class to a segment with higher liquidity, better scope for financing and lower risk premiums. Whether this results in a positive net effect is determined by the relationship between capitalizable added value (exit price, yield compression, liquidity) and the required CapEx – i.e. the operational side of the green value gap.

At the same time, the evidence generally takes the form of ranges, not linear rules, with price impact varying by property type, region, market situation and data quality. Taruttis & Weber (“Estimating the impact of energy efficiency ...,” 2022) demonstrate, for example, that an increase in energy efficiency of 100 kWh/m²a is associated with an average price increase of around 6.9%, but the effects are widely dispersed regionally. In terms of methodology, energy efficiency also has an impact through the yield value approach: rentability, vacancy risks, management costs and risk-adjusted capitalization rates have an effect on earnings value. Overall, energy efficiency is no longer a “soft factor”; double-digit discounts are visible not only in the G/H region, but also in the broad swathes of properties in classes D to F. Transition to Green is thus becoming a systematic valuation variable – but only adds value if CapEx, location rationale and market premiums interact consistently.

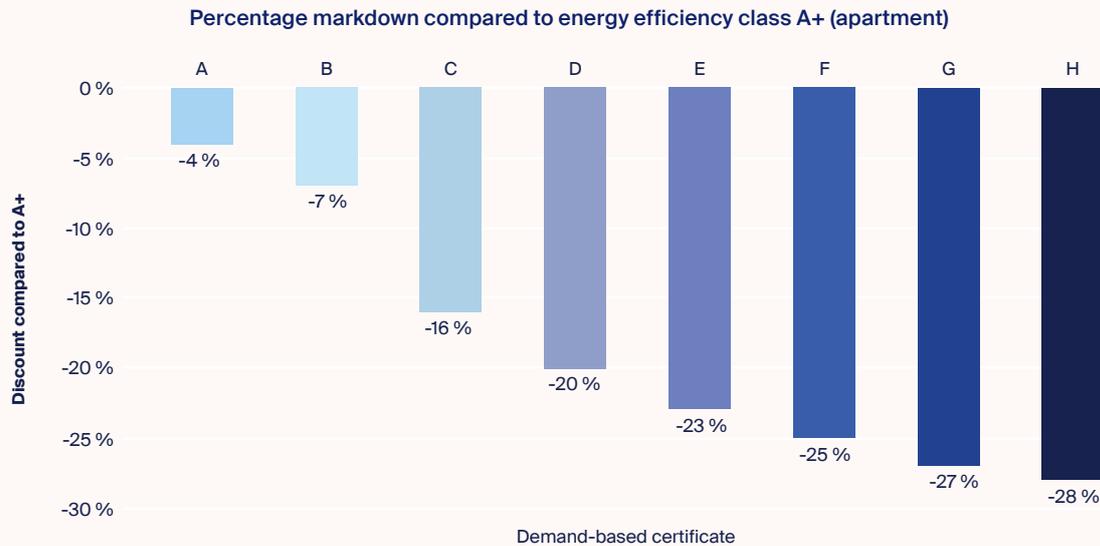


Figure 7: Percentage discount for condominiums compared to energy efficiency class A+ in the demand-based certificate; data as at: 2023; source: vdpResearch 2024

Evidence regarding rental income and costs

The ongoing income from a residential property does not just include basic rent, but the periodic net operating income (NOI) as a combination of rental income and management costs (in particular non-recoverable costs, rent loss risk, vacancies/fluctuation). As such, energy efficiency has an impact via two closely linked channels:

1. It can increase the amount of basic rent that tenants are willing to pay (or the amount that can be enforced), because tenants are able to pay more basic rent if the all-in rent remains the same.
2. It reduces energy costs and – via CO₂ cost allocation and risk mechanisms – the cost- and risk-sensitive portion of property management.

In terms of investor rationale, therefore, the rent premium (taken in isolation) is less relevant than the question of whether all-in rent potential and cash flow stability are improving.

The Kiel Institute for the World Economy provides empirical evidence of this: based on VALUE-AG rent and asking price data as well as German Real Estate Index (GREIX) transactions for 19 German cities (Q3 2014–Q2 2024), energy efficiency markups are also identified on the rental market – but to a much smaller extent than on the purchase market. The average basic rent surcharges for A+/A compared with D/E at the higher energy price level in Q1 2022–Q2 2024 were EUR 0.86/m²/month if efficiency is demonstrated by means of a demand-based

certificate, and EUR 0.47/m²/month for a consumption-based certificate; for B/C, the effects were lower and in some cases not statistically significant (see Figure 8).

The scale can be explained by the costs: the Kiel Institute for the World Economy links consumption differences between A+/A and D/E with gas prices and calculates an average saving of around EUR 0.79/m² per month for Q1 2022–Q2 2024. The basic rent markup observed can thus largely be explained as a capitalization of ancillary cost benefits; an additional green premium remains limited at the rent level.

A second key finding for monetization is the quality of information and evidence. The Kiel Institute for the World Economy shows that both purchase and rental premiums are significantly higher with demand-based certificates than with consumption-based certificates. On the purchase market, for example, significantly higher price premiums are reported with demand-based certificates for A+/A compared to D/E (scale: around EUR 650/m² vs. around EUR 225/m²). This mechanism is plausible: demand-based certificates are derived from an objective analysis of the building, while consumption-based certificates are user- and weather-dependent and thus include measurement errors and selection effects. Differences in individual figures (e.g. EUR 0.79 vs. EUR 0.80/m²; EUR 0.47 vs. EUR 0.45/m²) are generally the result of rounding, aggregation over windows of time (quarter/half-year) and the distinction between total period and sub-periods.

For investors, this results in a clear classification of the periodic impact on earnings: at the rent/NOI level, energy-efficiency measures are often less a direct basic rent uplift than a buffer in terms of stability and risk. A lighter burden on all-in rents improves affordability and security of tenancy (less default/vacancy risks), but leaves only limited scope for additional basic rent. In conjunction with

the variable enforceability under tenancy law and regionally (rental index/Section 558 of the German Civil Code in practice), the scope for capitalization depends heavily on market scarcity, target group and, above all, on reliable data (type of statement, up-to-dateness, plausibility check).

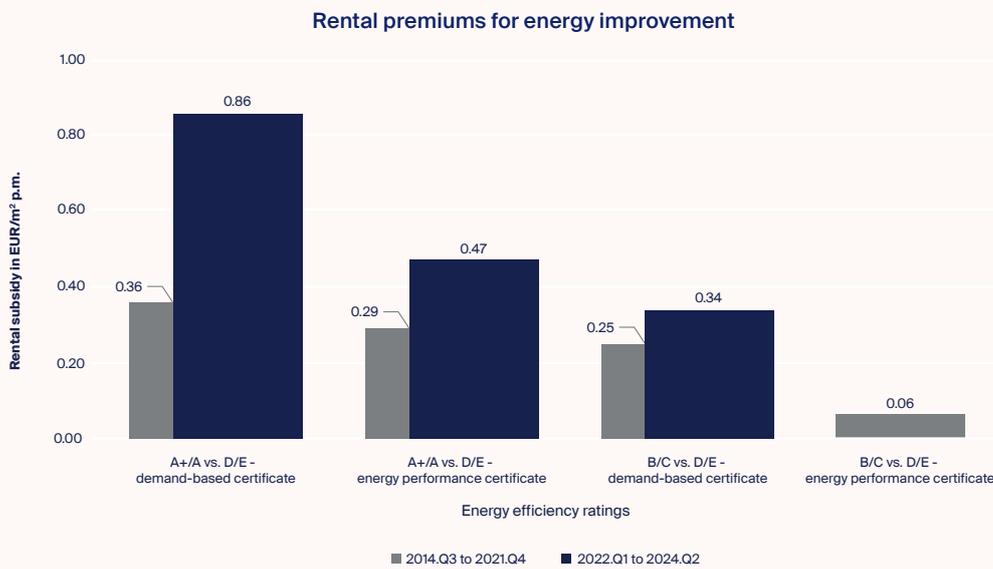


Figure 8: Rental surcharges (basic rent) for energy-efficient apartments by type of energy certificate; Q3 2014 to Q4 2021 and Q1 2022 to Q2 2024 (increased energy price level); source: ifW Kiel 2024 and ValueAG

Further studies

Galvin (2023) presented a meaningful study for western Germany on the question of whether housing and purchase markets reflect energy efficiency in monetary terms. The evaluation is based on a large data set of ImmoScout24 listings (asking price data) from 2007–2021; for estimating effects, the focus is on 2019–2021. Only listings with a demand-based certificate (heating energy intensity in kWh/m²a) are taken into account; multiple listings are adjusted for. For better comparability, dwellings are analyzed separately by construction year cohort; in the following, three building cohorts up to 2009 are considered (before 1946, 1946–1979, 1980–2009).

For each cohort, the study quantifies how closely basic rents and asking purchase prices are related to the level of energy efficiency. The effects are reported as a pre-

mium for each 1 kWh/m²a of lower heating energy intensity (separately for rental and sale). An energy improvement of 100 kWh/m²a is factored into the classification – a scale that Galvin uses as a typical difference between properties that are at a poor level in terms of energy efficiency and a good target level.

The following can be seen across all three building cohorts: a better energy performance indicator is associated with markups both in terms of rents and purchase prices – but the monetary incentive tends to be stronger in the purchase market. For post-war building stock dating from 1946–1979 (particularly relevant for the question of retrofitting), an improvement of 100 kWh/m² p.a. results in a rental markup of around EUR 44 per dwelling and month. For asking purchase prices, there is a one-off markup of around +EUR 36,160 per property. In order to display rental and purchase price effects as a uniform

comparative variable, the one-off purchase price effect is shown as a monthly equivalent (assuming a 25-year life-span of the energy effect, i.e. 300 months): EUR 36,160 / EUR 300 \approx +EUR 120.5 per month. In this illustration, the monetary incentive via the purchase price is significantly higher than the markup in terms of pure monthly rent markup for post-war building stock.

For ease of readability, the values can also be specified as EUR/m² and month. Based on a typical dwelling size of 80 m², this corresponds to approximately +EUR 0.55/m² per month (rent) and +EUR 1.51/m² per month (monthly-equivalent purchase price effect) for the 1946–1979 cohort. The conversion to EUR/m² is for illustrative purposes only; actual dwelling sizes vary by segment and cohort.

The table shows that property energy efficiency is capitalized through both basic rents and purchase prices; the stronger monetization lever is typically found in the purchase price or exit channel.

At the same time, the costs of high-quality efficiency renovations mentioned in the study (approx. EUR 400–600/m²) are of a magnitude that often cannot be borne by refinancing through regular rental premiums alone, so funding, financing and a robust exit story are crucial.

Hence the need for a Transition to Green strategy that structures targeting and technical pathways in such a way that the capitalization effect can be realized in a predictable manner.

Year of construction/ cohort	Rent markup (EUR/m ² p.m.)	Purchase price markup (EUR/m ² one-off)	Rent markup (EUR/80m ² dwelling p.m.)	Purchase price markup (EUR/80m ² dwelling, one-off)	Purchase price markup (EUR/80m ² dwelling p.m., Equivalent; 25 y=300 m)
before 1946	EUR 0.96	EUR 951.89	EUR 76.68	EUR 76.151	EUR 253.84
1946-1979	EUR 0.55	EUR 452.00	EUR 44.00	EUR 36.160	EUR 20.52
1980-2009	EUR 0.09	EUR 711.81	EUR 0716	EUR 56.945	EUR 189.82

Figure 9: Market premiums for an improvement in heating energy intensity by 100 kWh/m²a by construction year cohort (western Germany). Rental premium = basic rent. Purchase price premium = asking purchase price; shown as a monthly equivalent (price markup/300 months or 25 years); source: Galvin 2023, p. 11 (Table 3) and p. 13 (Table 4)

4. Definition of the Transition to Green strategy

Given the regulatory and market-based findings, Transition to Green can be operationalized as a tangible investment strategy. This chapter ascertains which target segments, technical pathways and management approaches appear viable from an investor’s perspective and the constellations under which energy transformation actually drives value creation.

Target segments for core+/-value-add transition

For core+/-value-add investors, Transition to Green is not a comprehensive brown-to-green approach, but a targeting strategy. The relevant segments are those in which transformation needs, scope for monetization and operational feasibility coincide, i.e. not every property with a poor energy efficiency rating is a T2G target; the deci-

sive factor is whether an investable transformation path with plausible value and controllable risk can be derived.

The investable core is typically to be found in the improvable midfield of the housing stock. Of particular relevance are apartment buildings in efficiency classes D and E and, in some cases, also F, provided that the technical situation allows for economically feasible repositioning. In these segments, the requirement for transformation is evident without there being a need for complete renovation, extensive revitalization or replacement newbuilds. In contrast, buildings in classes A to C have lower energy-related pressure, but usually offer only limited potential for T2G gains. Very poor classes such as G and H are particularly exposed from a regulatory perspective, but are often not part of the strategic core because the level of



intervention, CapEx and execution risks is disproportionately increased.

On the market side, the most attractive target segment is where energy improvement meets sufficiently high scope for monetization. This is primarily to be found in liquid, high-price and tight supply markets, where better energy efficiency can be economically effective through lower brown discounts, higher exit capability, more stable refinancing and improved all-in rent potential. The strategic focus is therefore not on a flat-rate rental premium, but on the question of whether a property that has been repositioned in terms of energy efficiency can be transferred to a more robust market and quality band.

In terms of specific properties, buildings where efficiency gains can be achieved with repeatable packages of measures while the property remains occupied are particularly attractive. Typological similarity, serial predictability, limited scale of intervention and clean management of the construction process have a positive effect. The quality of the data is also part of the targeting: an investable T2G case only arises if the energy-efficiency status, technical measures and expected target quality can be

reliably verified. Targeting therefore always entails assessing data security and implementation capability at an early stage, too.

Strategically, a simple economic target matrix can be derived from this. Priority is given to constellations with a high need for transformation and high scope for monetization – i.e. the actual T2G target for core+/value-add. By contrast, cases with high needs but low scope for capitalization, for example as a result of low market prices, high investment costs or uncertain feasibility, should be viewed critically. Properties with low needs tend to be a stable segment, while constellations that are weak from a technical and market perspective can often only be dealt with meaningfully as part of a more comprehensive revitalization (Figure 10).

Economic target matrix for Transition to Green		
Financial potential Technical potential	High	Low
High	<p>T2G target, core+/value-add (green value gap positive)</p> <p>EPC D-E (including lower brackets where applicable in individual cases)</p> <p>Markets/locations with limited supply and above-average rental and purchase prices (often in big cities)</p> <p>Easily scalable measures</p> <p>Reliable data (market analysis, project planning)</p>	<p>Structural risk segment (green value gap negative)</p> <p>Market/location with excess supply and/or low purchasing power</p> <p>High CapEx requirement close to or above the potential increase in value</p> <p>Difficult refinancing</p> <p>Uncertain data situation, large proportion of risk in project planning</p>
Low	<p>Stability segment</p> <p>EPC A-C</p> <p>Generally lower ongoing CapEx pressure</p> <p>Low T2G risk, but hardly any T2G value-add (unfavorable ratio of CapEx vs. energy effect)</p>	<p>Stranded/revitalization</p> <p>Property weak, market/location may be weak too</p> <p>Low uplift of renovations purely related to energy efficiency</p> <p>High technical outlay</p> <p>Only makes economic sense as an overall project</p>

Figure 10: Economic target matrix for Transition to Green (green value gap approach); own illustration



Technical pathways and integration

The technical approach is an investment pathway, not an end in itself. It determines CapEx, timing, operational effects and implementation risks. As real savings often remain below theoretical values and the marginal benefits of additional measures diminish, cost-optimized, robust packages of measures are usually a more sensible choice than technical concepts aiming to achieve the maximum possible.

Technically robust T2G pathways are based on system consistency between the envelope, distribution/control and generation. The building envelope remains the central lever for reducing the heating load. From an economic perspective, however, this primarily occurs via selective components being subjected to acceptable intervention – such as the roof or top floor ceiling, basement ceiling, windows and connection details, individual amendments to the façade and airtightness – and where synergies with pending maintenance or scaffolding can be exploited.

Heat generation is often the most immediate decarbonization pathway, not in the “heat pump everywhere” model, but as a system choice between centralized or decentralized heat pumps, district heating or hybrid solutions. The approach to heat distribution is also economically critical: if heating areas, hydraulic balancing, control, pipe insulation as well as hot water and circulation systems are not designed to cope with low temperatures, the efficiency and operating cost advantages of new generators are often not realized.

When the envelope becomes more airtight or windows are replaced, ventilation and moisture protection are an integral part of the pathway to ensure robustness, mold prevention and stable real savings. Photovoltaics are a useful addition if they are embedded within a coherent energy concept and function technically and economically on a specific building – particularly with regard to the condition of the roof, remaining useful life, structural considerations, fire protection, shading, grid connection and self-consumption approaches.

The following variant approach (Figure 11) structures these integration requirements into consistent technical pathways and sequences. The decisive factor here is less the maximum extent of measures than the robust combination of CapEx, implementation risk, operational stability and verifiability. Measurability and controllability are therefore not “nice to have”, but prerequisites for reliable commissioning, monitoring and proof. In portfolios, this approach is particularly valuable if it can be scaled as a standardized package of measures; special solutions and “all-in-one” renovations, on the other hand, typically increase complexity and construction time risks.

Technical pathways and integration of the Transition to Green (variant approach)			
Version	Version A: balanced, default pathway	Version B: heat first, quick-win pathway	Version C: envelope first, ambitious pathway
Brief profile	Repeatable standard pathway, robust in terms of NPV Focus: cost-optimized package, good feasibility, traceability	Rapid decarbonization via generation Focus: distribution/low-temperature capability as the enabler	Maximum efficiency gain (higher project risk) Focus: envelope/complexity, “stop” rule due to marginal benefit
Phases	Components		
Phase 0: Data & Controllability (Minimum Requirement)	Meter concept/measurement concept, sub-metering if applicable Control/optimization, hydraulic balancing Quick wins (operational optimization, pumps/control) Data room: consumption, system history, certificates, plausibility check		
Phase 1: Reduce load (envelope, distribution)	Selective envelope work: roof/top floor, basement ceiling, windows/details, selective façade/airtightness Distribution/heating areas and control to enable low-temperature operation Exploit synergies (scaffolding/maintenance)	Minimally selective envelope work (only high impact/low intervention) Priority: readiness of distribution/heating areas (low-temperature capability) Focus on rapid implementability in the building stock	More extensive envelope work (more components/larger interventions) Modify distribution/heating areas; if necessary, ventilation/moisture protection as a mandatory module Higher deadline and implementation risk (complexity rate)
Phase 2: reconfigure heat supply (integrate PV)	Heating system decision: heat pump (centralized/decentralized), district heating, hybrid, etc. PV as a supplement, if feasible: condition of the roof, structure/fire protection, shading, grid connection, own consumption Hot water/distribution/control as integral part (otherwise impact will be missed)	Earlier generation change (decarbonization first) PV where operation (general electricity/heat pump) is being improved in real terms Important: ensure distribution/low-temperature capability before rollout	Generation change after load reduction at a deeper level PV optional, but often synergistic for roofing/envelope measures Higher risk of over-engineering (marginal value)
Phase 3: Commissioning (including verification)	Commissioning/adjustment, approvals, documentation Monitoring: planned vs. actual (performance gap) KPI verification: consumption/emissions, CapEx/deadline, proof of measures		
Integration Requirements (all options)	Distribution/low-temperature capability as a prerequisite for new generators Ventilation/moisture protection in case of a more tightly sealed envelope/window replacement Verifiability as a value driver: data architecture, monitoring/reporting		
„Stop“ rules, decision points	Decreasing marginal benefit: additional envelope efficiency only if additional technical (and monetary) impact → additional costs, risks Performance gap risk: real savings may differ significantly from calculations → proof phase mandatory Feasibility: managing interventions in occupied properties (construction time, tenant intervention, permits)		

Figure 11: Technical pathways and integration of Transition to Green (variant logic); own illustration

The potential of value creation vs. the risk of value destruction

The core economic question of Transition to Green is whether a transformation pathway focused on energy efficiency creates value or destroys it, in risk-adjusted terms. Value creation only occurs when the capitalizable additional benefit of a package of measures exceeds the necessary investment, financing and implementation costs. The key factor is therefore the green value gap at variant level: i.e. the difference between the additional benefits via NOI, exit and financing on the one hand and additional CapEx, time and implementation risk on the other.

In the residential real estate context, value creation can materialize via three channels. Firstly, from an operational perspective, through higher all-in rent potential and more stable cash flows as a result of lower ancillary costs and lower vacancy and fluctuation risks. Second, on the exit side, by reducing brown discounts and repositioning the property in a quality band that is more marketable and more financially viable. Thirdly, on the financing side, through improved scope for refinancing and potentially lower risk premiums, provided the target vision, course of action and verification are robust. In the rental property market, however, the direct leverage in

terms of rent remains limited; the stronger monetization channel is often with respect to exit and risk reduction.

Value destruction follows recurring patterns in practice. Firstly, a negative spread can arise if market premiums cannot keep pace with the investment burden. Although the evidence referred to in the report demonstrates a positive impact on rents and purchase prices for post-war properties, it also shows that high-quality efficiency improvements with typical costs of around EUR 400 to 600/m² often cannot be refinanced through ongoing effects on rent alone. Second, the marginal cost for each additional saving often rises as the extent of renovations increases; this heightens the risk of over-engineering. Thirdly, a performance gap can substantially weaken the business case if real savings fall short of the arithmetical assumptions. Fourthly, split incentive, affordability and implementation risks limit the scope for capitalization, for example if benefits accrue on the tenant side while costs remain with the owner, or if construction duration, interventions in occupied properties and cost deviations override the calculated effect.

Relative abatement costs vs. case-specific energy intensity

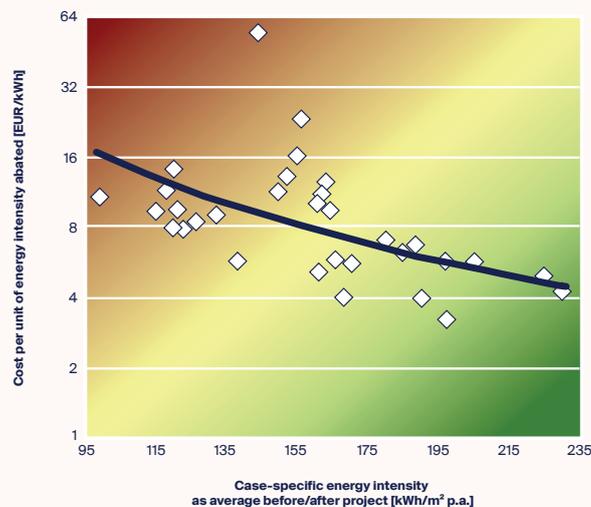


Figure 12: Cost relevance of case-specific energy intensity, based on: Bienert/Groh, Klimaneutralität vermieteter Mehrfamilienhäuser (Climate neutrality of rented apartment buildings), Regensburg 2022, p. 50; own illustration



This results in a clear approach: the decisive factor is not the maximum technical efficiency attainable, but the risk-adjusted efficiency of the capital investment. Action plans should therefore not be considered as a single solution, but as variants, such as balanced, heat-at-first or envelope-first pathways. Opting for more extensive intervention only makes sense if its supplementary technical and monetary effect clearly exceeds the additional costs and risks. Where this is not the case, a “stop” rule must come into play. At the same time, the business case is only resilient when commissioning, adjustment, hydraulic balancing, monitoring and proof are integral components of the pathway; without these elements, the planned realization of value remains uncertain.

Figure 13 condenses this approach into a decision-making system: rather than assessing abstract ESG targets, it evaluates variants based on additional benefits, CapEx, capitalization capacity, timescale and performance risk. Transition to Green thus becomes a disciplined investment decision with clear proceed, proceed-with-conditions or no-go consequences. On this basis, the next chapter shows how screening, due diligence, the business plan and governance translate this rationale into the investment process.

Potential: value creation	Risk: value destruction	Parameters, decision parameters
<p>Operational: All-in rent potential & cash flow stability (lower ancillary costs, lower vacancies/ fluctuation)</p> <p>Exit/valuation: Reduction of brown discount, repositioning in liquidity-ready and financing-capable quality band (EPC/CO₂)</p> <p>Financing: Improved scope for refinancing/potentially lower risk premiums (with high-quality proof and deliverability)</p>	<p>Negative spread: CapEx > capitalizable benefit (or payback too long)</p> <p>Over-engineering: Sharply rising marginal abatement costs → “stop” rule</p> <p>Performance gap (planned vs. actual): Savings targets not met → business case not fulfilled</p> <p>Demand vs. consumption: Systematic uncertainty (some-times large deviations)</p> <p>Split incentive/affordability: Benefit for the tenant, CapEx for the owner → acceptance, vacancy and NOI risk</p> <p>Execution/timing: Construction cost volatility, bottlenecks, tenant interventions → delay affects DCF</p>	<p>Green value gap per variant: Additional benefits ($\Delta\text{NOI}/\Delta\text{exit}/\Delta\text{refi}$) minus additional costs (CapEx, financing, implementation)</p> <p>Marginal abatement costs (EUR/kWh) vs. marginal yields</p> <p>Scope for capitalization (NOI, price, financing, exit)</p> <p>Initial energy intensity (kWh/m²), extent of measure, market/price premiums (incl. quality of proof), cost and time pathway, implementation quality</p> <p>Sensitivities/decision gates: CapEx drift, deadline delay, performance gap → decision: proceed/proceed with conditions/no-go</p>

Figure 13: Transition to Green decision-making system; own illustration



5. Investment management implementation

The strategic approach of Transition to Green needs to be translated into clear decision-making and implementation steps in the investment process. The following outlines how screening, due diligence, the business plan, financing and governance can build on each other in order to anchor T2G as a repeatable playbook.

Screening using the T2G score and due diligence

In the investment process, a suitable T2G score is used for structured pre-selection. This translates the previously derived target approach into an operative screening that only allows cases to progress to in-depth due diligence if their data reliability, technical controllability and economic potential are a good fit. The aim is to utilize a standardized preliminary check that prioritizes deal flow, eliminates unsuitable cases at an early stage and transfers properties worth review to the next level.

Screening should be based on a small number of decision-relevant criteria, such as the initial energy-efficiency level, the quality and completeness of the available data, the basic technical feasibility in terms of the building stock and the expected level of intervention, as well as initial indications of marketability and financial viability. Merely looking at energy efficiency is not enough: the decisive factor is whether a plausible transformation pathway, a resilient CapEx profile and a fundamentally investable case can be derived from the information available.

The T2G score groups this preliminary assessment into three components. Firstly, data confidence: i.e. the coverage, up-to-dateness and plausibility of energy-efficiency, technical and consumption-related data. Second, the technical gap: the gap between the current state and the target state shaped by robust marketabi-

lity and regulatory compliance, including the question of whether the required progress can be achieved with manageable courses of action. Thirdly, deliverability & risk: i.e. the practical feasibility within occupied building stock, including the construction process, interfaces and permits as well as deadline and cost risks. The score is therefore not an ESG rating, but a tool for assessing an asset's scope for transformation.

A clear stage gate should apply to progressing to due diligence. Cases with insufficient data, an unmanageable level of intervention or manifestly poor feasibility should not undergo a full review, but should either be discontinued or pursued only with clear reservations. In-depth due diligence can only be carried out on properties for which a fundamentally viable interplay of data quality, technical logic and implementation capability can be identified. Screening therefore does not shape the investment decision itself, but rather the efficient allocation of review effort.

The subsequent due diligence substantiates the case identified during the screening. From a technical perspective, the building envelope, the system technology, the CO₂ and energy profile and the realistic course of action must be checked, in particular. The commercial focus is on CapEx, operating costs, market and rental assumptions as well as financing effects, while the ability to apportion costs, tenancy law, permits and eligibility for funding, among other considerations, are relevant from a legal perspective. The operational value of the T2G score therefore lies in standardizing pre-selection: it does not replace due diligence, but it makes it faster, more targeted, and more economically disciplined.

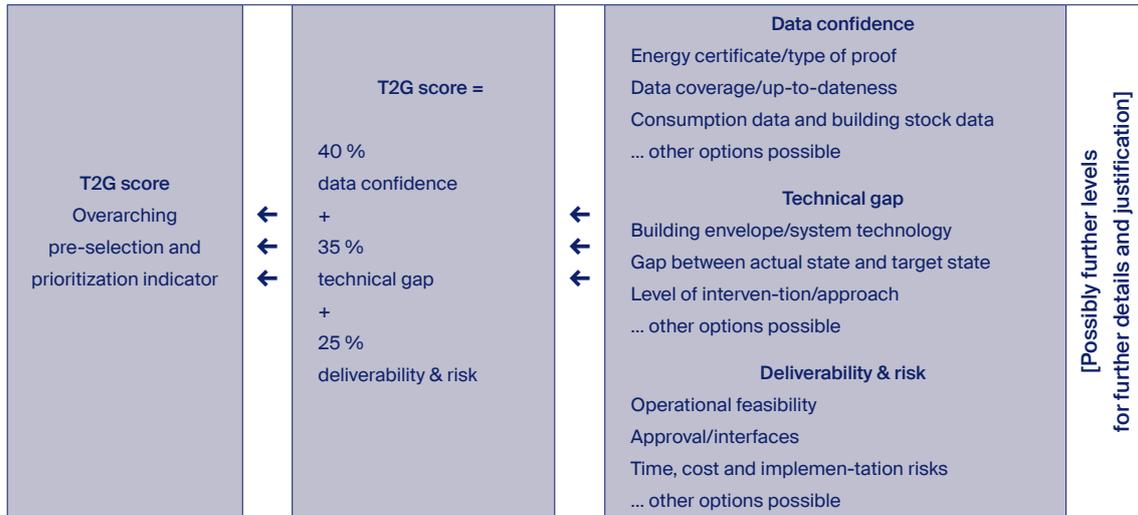


Figure 14: Schematic, three-stage derivation of the T2G score, elements and weightings only as examples; own illustration

Business plan, financing, target performance

The business plan translates the strategic T2G rationale into an investable case. It condenses the action plan, CapEx, funding, financing and target figures into a model that checks the viability of the project under conservative assumptions. The focus is not on the regulatory vision as such, but rather on the question of whether a technically consistent and operationally feasible transformation pathway can be transferred into a robust financing and performance framework.

The starting point is a clearly structured action plan, which should depict the energy-efficiency measures and structural steps in a realistic sequence, including the level of intervention, timeline, awarding approach and interfaces during ongoing operation. This is the basis for CapEx bands, liquidity requirements and cash outflows over the duration of the project. For the investment calculation, not only the total CapEx amount but also its chronological distribution is relevant, because this directly influences interim financing, interest charges and operational controllability.

A robust T2G business plan also includes an active funding strategy from the outset. Subsidized loans, grants or interest rate subsidies can dampen investment peaks, reduce the need for equity capital and significantly improve the cost-effectiveness of individual measures. Subsidies are therefore not a downstream optimization component, but a component of the capital structure. Accordingly, they should not merely be considered summarily in the business plan, but should also be specifically assigned to the respective measures, timepoints and proof requirements.

Financing is to be treated as an integral part of the business plan. The capital requirements for the investment and construction phase as well as the obligations in terms of documentation, funding and verification are to be depicted. For lenders, the decisive factors are a plausible course of action and timescale, reliable cost estimates, defined approval points and a transparent derivation of the expected property quality after implementation. The business plan must therefore not only present the financing mix, but also the conditions under which financing remains viable and marketable in the long run.

At performance level, the business plan should focus on a compact set of KPIs of relevance for managing the project. In particular, this includes targets for energy or EPC quality, CO₂ intensity, CapEx versus budget, deadline, the documented implementation of measures and discrepancies between planned and actual values in subsequent energy consumption. These key figures form the link between technical implementation, financial management and reporting, turning a program of measures into a manageable investment project.

In this sense, the T2G business plan is not a list of technical steps, but rather the entrepreneurial architecture of the transformation. Transition to Green will only become a robust investment and management framework once the action plan, CapEx, funding framework, financing and target performance are consistently combined.

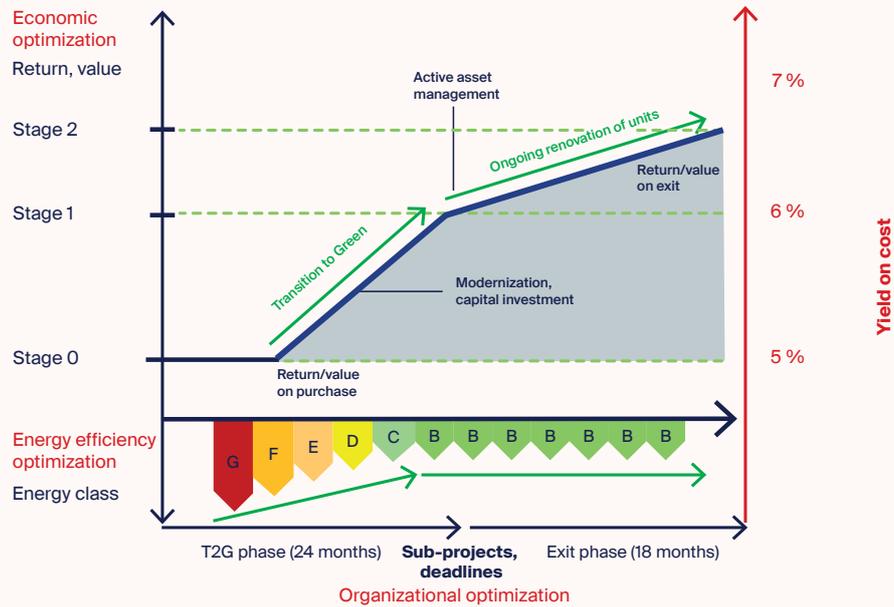


Figure 15: T2G business plan, schematic; own illustration

Implementation, communication, governance

The economic viability of a T2G strategy depends not only on technology, costing and financing, but also on the quality of its operational implementation. Thus, communication and governance are not mere sideline issues, but part of the way in which value is realized. Three stakeholder groups are of particular relevance in this regard: tenants, investors and the market.

On the tenant side, it is crucial that modernizations in terms of energy efficiency are not primarily conveyed as a burden, but as a verifiable improvement in living quality, cost transparency and the stability of all-in rent. Communication should therefore focus on the tangible benefits: greater comfort, more modern technology, lower risks in terms of ancillary costs and better future-readiness of the building. Where rent adjustments are necessary, they must be communicated at an early stage, transparently and with a robust explanation of the benefits. With occupied buildings in particular, phase-based communication is crucial in order to limit resistance, delays and reputational damage.

T2G is only attractive for banks and investors if the transformation path is not only plausible, but also reliably documented and manageable. The decisive factors are a consistent course of action, verifiable cost and schedule assumptions, defined approval and escalation points, and reports that make progress and target achievement transparent. Governance thus becomes directly relevant to financing: it supports capital mobilization, reduces uncertainty and improves connectivity to refinancing and exit.

Similarly, the market assesses not only the technical result, but also the professionalism of the implementation. Professionally managed, verifiably communicated and socially acceptable transformation processes strengthen credibility and reputation vis-à-vis tenants, financing partners and potential buyers. Conversely, communication shortcomings, conflicts or insufficient evidence can noticeably weaken a project's impression on the market and thus its economic viability.

Operationally, T2G is only successful if structural implementation, tenant communication and a reporting strategy appropriate for the capital markets are managed within a common governance framework.



6. Transition to Green case study for residential properties in energy class D

The case study follows the business plan approach outlined above: first, a residential property with poor energy efficiency (but manageable technical scope) is repositioned via T2G. In phase 2, additional factors such as re-letting, marketing, rent increase potential and (optional) retroactive densification are leveraged. The case study is based on anonymized property data, with some figures rounded up/down; individual values are simplified for illustrative purposes.

Investment profile

The case study is based on an existing, primarily residential property in Cologne with clearly identifiable potential in terms of energy-efficiency repositioning. The property combines stable in-place cash flows with a lower initial energy class and thus with a typical Transition to Green profile. It is precisely this combination of ongoing income, limited vacancies and scope for technical improvement that makes the case study interesting for core+/value-add strategies. In the following, the main property, income and investment parameters are summarized as the starting point for the T2G approach.

Parameter	Variant	Parameter	Variant
Asset type	Eight-story apartment building; residential stock fully let; additional commercial space	Initial EEC	Class D; primary energy demand approx. 115 kWh/m ² a
Location	Cologne-Gremberghoven; address and tenant details anonymized	Heat supply	Oil-fired heating; two boilers with approx. 640 kW combined
Areas	Plot: approx. 6,730 m ² ; lettable area: approx. 4,900 m ² , of which: approx. 3,950 m ² is residential, approx. 950 m ² is commercial	Transformation goal	EEC improvement from D to a target corridor from C to A+
Units usage	71 units; of which 63 residential and 8 commercial; average apartment size approx. 62 m ²	Additional potential	Optionally around 13 additional units or > 1,500 m ² of rentable space
Property price level	Net purchase price approx. EUR 13.2 million: approx. EUR 2,690/m ² rentable space approx. EUR 186k per unit (or 10.7 million; 2,184/m ² ; 150k/unit after deduction of the share of building land reserve)	Planning of T2G costs	Approx. EUR 3.2 million; corresponds to: approx. EUR 650/m ² or approx. EUR 45k/unit
Property rental income	Net rent exclusive of heating approx. EUR 0.5 million p.a.; In-place rent residential approx. EUR 8.42/m ² /month; vacancy rate practically 0%	Planning of T2G costs	Federal Grant for Efficient Buildings (BEG) funding: EUR 400,000 covers around 12.5% of this volume

Figure 16: Investment profile of the property in Cologne-Gremberghoven; own illustration



Two-phase approach

In this case study, the economic value is not created in a single step, but in a clear sequence of two phases. First of all, the technical and energy-related repositioning of the building is foregrounded in order to reduce risk, energy consumption and financing disadvantages. Only on this basis can rental growth, active asset manage-

ment and exit potential be systematically leveraged. In other words, the two-phase model structures the case study around the question of when and which value contribution is actually realized. The planning follows the approach from Figure 15; specific rental trends are shown in Figure 20.

Phase	Technical/operational content	Economic impact
1. T2G renovation	Envelope, roof and window; renovation and/or preparation of heat supply; funding management; award and construction process in occupied properties; structured communication with tenants	Reduction of brown discount; better refinancing options; stabilization of all-in rent; reduction of energy and maintenance risks
2. Active asset management and retroactive densification	Reletting and renovation of existing building; marketing of the asset (now repositioned in terms of energy efficiency); development of additional residential potential on the plot or in the immediate development area	Rental growth after renovation; additional uplift until exit; leverage of hidden space reserves; optional value contribution from development or real estate utilization

Figure 17: Phase model of Transition to Green asset repositioning; own illustration

Phase 1 – Technical levers and investment logic

Phase 1 involves the investment-based repositioning of the property through targeted construction measures and steps relating to energy efficiency. The focus is not only on technical improvements to the envelope, windows and heat supply, but also on the economic feasibility of this for an occupied building. The decisive factor is the consistent coordination of CapEx, funding, the construction process and tenant communication. Only when this first phase is managed in a resilient manner will the basis for NOI stability, refinancing ability and subsequent monetization emerge.

The planned CapEx measures form the operational backbone of the technical repositioning, ranging from traditional improvements to the energy-efficiency of the building envelope and windows to interventions regarding technology, safety and common areas. This demonstrates that Transition to Green approaches do not just consist of a single change in terms of heating or insulation, but of a coordinated package of measures. The following overview summarizes the most important fields in terms of their economic and functional relevance.



Cluster	Examples of measures	Benefit/relevance
Building envelope	Façade insulation; roof insulation; roof sealing including lightning protection and downpipes	Reduction of the heat load; basis for more efficient system operation and improvement of energy characteristics
Windows, access points	Triple glazing (U value < 0.9 W/(m²K)), Renovation of stairwell glazing, building and apartment entrance doors	Less heat loss, better sound insulation, enhanced safety and a visible improvement in the quality of the user experience
Technology, safety	Renovation of the heating system (currently two 320 kW boilers) and preparation for the system change (geothermal feasibility study available); cellar fire compartment; smoke and heat exhaust ventilation system; bell systems; lighting and sensors	Combines repositioning in terms of energy efficiency with technical and regulatory functionality
Outdoor facilities, common areas	Balcony renovation, lifts, dumpster areas, bicycle racks, green areas and external bicycle storage	Does not directly increase the EEC, but strengthens rentability, tenant satisfaction and exit story
Financial prospects		
<p>Costs approx. EUR 3.2 million; equivalent to approx. EUR 650/m² or approx. EUR 45 k/unit</p> <p>Partial compensation through BEG funding: EUR 400,000 covers around 12.5% of this volume</p> <p>Investments lead to: NOI stability, energy efficiency uplift, refinancing ability, subsequent rent increase</p> <p>Reduction in heating and hot water costs of up to 50%</p> <p>Clear and transparent communication with tenants: modernization measures, work in accordance with Sections 555a and 555c of the German Civil Code (BGB), payment of costs, rent adjustments, operating cost savings</p>		

Figure 18: Technical levers and investment approach; CapEx measures as examples

Phase 2 – Active asset management and retroactive densification

With the completion of the technical repositioning, the focus shifts from implementation to monetization. In this second phase, the quality improvements achieved through reletting, rent adjustments, building renovations and the marketing of a more robust product, in terms of energy efficiency, are translated into earnings growth. In addition, the site opens up optional retro-

active densification and utilization potential, which can provide additional support for the exit. Phase 2 thus demonstrates that the economic benefits of T2G are only fully realized via the interaction of technology, asset management and strategic space development.

Review area	Case study findings	Implication
Rental growth (residential)	Approx. +21% after renovation; approx. +37% including active asset management according to business plan (see Figure 20)	The second phase is not an add-on, but an essential value lever after technical repositioning
Plot-related planning	Retroactive densification on separate development area; positive pre-emptive building permit for around 13 terraced houses.	Preliminary work in terms of planning law reduces development risk and makes potential bankable and exit-ready
Reserve area utilization	> 1,500 m ² additional rentable space; alternatively indicative value of the plot in the region of EUR 2.5 million	The retroactive densification can be argued as a development case or as a monetizable reserve at the exit

Figure 19: Active asset management and retroactive densification

Result

The case study shows an investable pattern for core+/value-add properties: phase 1 uses a technically consistent, funding-eligible T2G package to reposition the building in terms of energy efficiency and finance. Building on this, phase 2 draws on rental growth, reletting

and optional redesign to realize additional value contributions in terms of NOI and exit. It is crucial that both phases are managed separately, but conceived in a joint business plan – technically robust, financially conservative and operationally feasible.

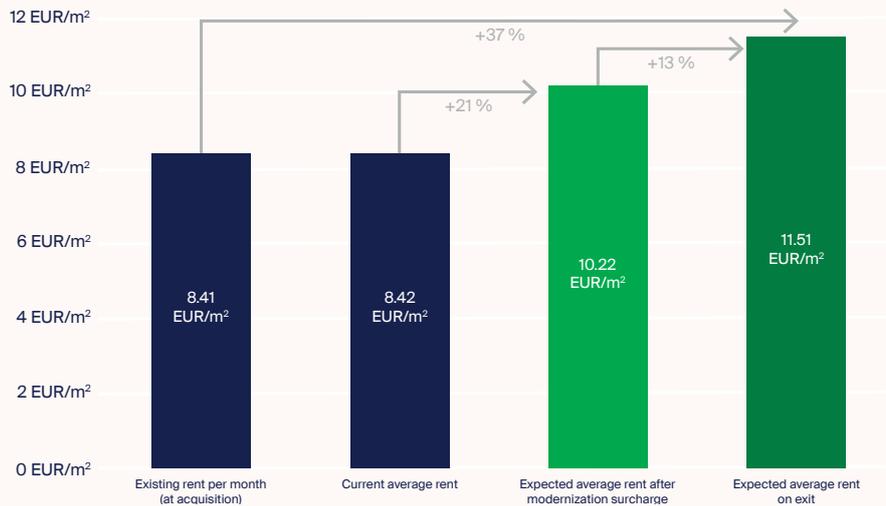


Figure 20: Overview of rental growth for T2G case study of a residential property in Cologne (residential use, excluding commercial; excluding part of newbuild extension); own illustration



7. Outlook & conclusion

Transition to Green (T2G) is no longer exclusively an ESG issue in the German residential real estate market, but an economically impactful factor for valuation, financing and exit capability. The present analysis shows that energy efficiency is increasingly being capitalized on the market – but not uniformly across all channels. While energy efficiency is already clearly reflected in price reductions or repositioning potential in the purchase market, the direct effect on rent is, in many cases, limited and can often be explained primarily by energy cost advantages or all-in rent potential. In addition, capitalization is heavily dependent on the quality and transparency of the underlying information. T2G is therefore not an abstract sustainability dimension, but a tangible market and control variable.

The central analytical framework of this study is the green value gap: the difference between the investment pathway required from a technical or regulatory point of view and the benefit that can actually be monetized. Value arises where a property can be moved from a quality band subject to markdowns in terms of energy efficiency and regulations into a more robust segment where the necessary measures can be implemented with controllable CapEx, manageable execution risks and a reliable data basis. By contrast, there is a risk of value destruction if high levels of intervention, low data reliability, limited profitability, performance gaps or operational delays exceed the scope for capitalization. As such, the economic success of T2G does not depend on the maximum technical ambition, but on the risk-adjusted efficiency of capital investment.

For core+/value-add investors, this provides a clear implementation pathway. Priority is given to building stock in the “improvable midfield”, especially in the investable apartment building segment of classes D and E, and possibly also F. This is where relevant transformation requirements, technical controllability and monetization opportunities (which need to be fundamentally present) are most closely aligned. The prerequisite, however, is a structured process: upstream screening with the T2G score and data confidence gates, in-depth due diligence, variant calculations with “stop” rules, robust business plans and governance that enables verifiability, scheduling and CapEx control as well as performance gap monitoring to be reviewed. In addition, the letting and communications strategy becomes a value lever when all-in rent potential, acceptance and phased implementation are actively managed.

The biggest uncertainties lie less in the long-term vision than in the specific market and implementation conditions: the local situation in terms of rents and prices, heating and network infrastructure, regulatory timing and volatile construction, energy and financing costs. In other words, T2G is not a static measure, but an investment playbook that needs to be regularly calibrated. The conclusion remains clear: Transition to Green can create significant value, but only as a prioritization-based, data-backed and risk-driven investment strategy.



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