

Levelization of Capital Costs of Cost-Based Regulated Dutch District Heating Companies

Phase 2 – Intergenerational cost allocation



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Frontpage picture:	An overview of a district heating network consisting of different consumer types and production units. Created with Copilot Premium.
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**Authority for
Consumers & Markets**



Prinses Beatrixlaan 2, 2595 AL The Hague
VAT-no.: NL00.31.66.946.B43
Johan.de.Ruijter@acm.nl
<https://www.acm.nl/en>

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List of abbreviations

Abbreviation	Meaning
ACM	Authority for Consumers and Markets
Bcw	Besluit collectieve warmte consultation version 2024
BNG	Bank Nederlandse Gemeenten
CAPEX	Capital expenditure
DCF	Discounted cash flow
DH	District heating
DSCR	Debt Service Coverage Ratio
GRW	Garantieregeling Warmtenetten
MWh	Megawatt hour
GWh	Gigawatt hour
TWh	Terawatt hour
IRR	Internal Rate of Return
M€	Million euros
MWh	Megawatt hour
NPV	Net Present Value
OPEX	Operating expenditure
RAB	Regulatory Asset Base
VAT	Value-added tax
WACC	Weighted Average Cost of Capital
Wcw	Wet collectieve warmte
WTS	Warmte Transport System (WarmtelinQ)

1 Executive Summary and Key Findings

Recommended approach: Use annuity depreciation as the standard method for both regular district heating companies and WarmtelinQ (WTS), with a possible regulated growth-adjusted alternative for WTS if its volume ramp-up and financing conditions justify it.

Why: It offers the best overall balance of consumer fairness, predictable capital charges and potential support for operator financeability; more back-loaded methods depend more heavily on uncertain future uptake.

Implementation: Apply asset-specific depreciation periods and transparently separate annual depreciation from the allowed return on the regulatory asset base.

This report assesses how capital-related costs in cost-based regulated Dutch district heating (DH) systems can be allocated over time in a manner that balances consumer fairness, operator financeability and regulatory transparency. It builds on the asset categorization and lifetime analysis completed in Phase 1, and focuses on the timing of investment recovery through depreciation and the remuneration of capital. The analysis covers regular DH companies (above 1,500 consumers) and WarmtelinQ (WTS), including production, transmission, distribution and connection-related assets, and considers both mature systems, as well as expanding and new networks.

The study focuses on the transition from the current Dutch gas-reference approach to phased cost-based tariff regulation under the Wet collectieve warmte (Wcw). Under this framework, the Authority for Consumers and Markets (ACM) will further develop the tariff methodology, regulatory accounting rules, asset valuation and the treatment of efficient costs and reasonable returns. The report does not determine the allowed Weighted Average Cost of Capital (WACC) or the opening value of the Regulatory Asset Base (RAB). Instead, these are treated as regulatory inputs, allowing the analysis to focus on how alternative depreciation profiles affect tariffs, cash flows and the distribution of costs between present and future consumers.

Four approaches are examined: linear depreciation, annuity depreciation, progressive/back-loaded depreciation, and growth-adjusted depreciation. In all cases, the annual capital recovery charge consists of depreciation plus the cost of capital applied to the unrecovered RAB. Linear depreciation recovers an equal amount of the asset value each year, producing a declining total capital charge as the RAB falls. Annuity depreciation combines depreciation and capital remuneration into a constant annual charge. Progressive depreciation shifts a larger share of recovery to later years, while growth-adjusted depreciation links recovery more directly to expected consumer growth, heat demand or network utilization.

The methods are compared against nine criteria defined by ACM: regulatory predictability, intergenerational consumer fairness, operator cash flow, impact on the Debt Service Coverage Ratio (DSCR), alignment with business-case practice, connection risk, gradual network maturation, asset lifetimes and avoidance of tariff shocks. The assessment combines literature review, calculation examples and practical knowledge from Danish DH companies. The Danish cases underline the value of long and asset-

specific depreciation periods, access to long-term financing, transparent treatment of over/under recovery, and controlled flexibility where infrastructure is commissioned ahead of consumer uptake.

The nominal/real value distinction applies to all four methods, not only the annuity. Chapter 4 compares their capital-recovery profiles using ACM's 6.83% nominal WACC and, assuming 2% annual inflation, a corresponding 4.74% real WACC. The nominal approach can bring more nominal recovery into earlier years but leave unrecovered capital exposed to unexpectedly high inflation; the real approach protects its purchasing power but can shift nominal payments to later users and affect early cash flow and DSCR. The effects depend on the depreciation profile, utilization and financing obligations. Inflation must not be compensated both through the WACC and through RAB or depreciation indexation.

A qualitative assessment of the different depreciation methods, which is carried out in Chapter 6, is summarized below. "Strong", "Acceptable" and "Weak" describe performance against each criterion, not a numerical or weighted total. The cash flow and DSCR assessments are indicative and reflect the relative timing of capital-cost recovery rather than calculated project cash flows or DSCR outcomes. The calculation examples presented in Chapter 6 are in nominal values.

Assessment criteria	Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adj. depreciation
Regulatory predictability	Strong	Strong	Weak	Weak
Intergenerational consumer fairness	Weak	Acceptable	Acceptable	Strong
Indicative cash flow implications for operators	Strong	Strong	Acceptable	Weak
Impact on Debt Service Coverage Ratio (DSCR)	Strong	Strong	Weak	Weak
Alignment with business-case practice	Strong	Strong	Weak	Weak
Connection risk	Weak	Acceptable	Acceptable	Strong
Gradual network maturation	Weak	Acceptable	Strong	Strong
Asset lifetimes	Acceptable	Acceptable	Acceptable	Acceptable
Avoidance of tariff shocks	Acceptable	Strong	Acceptable	Acceptable

Source: Chapter 6, Table 5. Qualitative assessment of the four depreciation methods against ACM's nine criteria.

The comparison shows that no method is strongest on every individual criterion. Linear depreciation is simple, transparent and supports rapid recovery, a stronger early capital-recovery profile and lower cumulative financing costs. However, in new or expanding networks it places a comparatively high burden on early consumers. Progressive and growth-adjusted depreciation can better reflect gradual network maturation and the beneficiary-pays principle by postponing part of the recovery until more consumers are connected. Their benefits, however, depend on forecasts that may not materialize; these retain a higher RAB for longer, increase cumulative financing costs, may weaken early cash flow and place pressure on DSCR, and require more intensive regulatory monitoring and adjustment.

Annuity depreciation provides the most balanced overall result. It converts the approved depreciable asset value and the allowed cost of capital into a stable annual capital recovery charge over the relevant depreciation period. Although the composition changes over time — capital remuneration falls as the

RAB declines, while depreciation increases — the total annual charge remains constant in nominal € under a nominal WACC on an unindexed RAB, or constant in base-year € under a real WACC with consistent RAB indexation. This supports predictable capital charges and operator revenues within the chosen convention, aligns closely with discounted cash flow, Net Present Value (NPV), Internal Rate of Return (IRR) and WACC-based assessment of whether an investment is financially viable, and can match common annuity-based financing structures more closely.

Where financing is structured on an annuity basis and permitted revenue is collected as expected, the resulting revenue profile can more closely match scheduled debt service and support more stable DSCR performance. It reduces the likelihood of pronounced capital-charge changes when compared with more strongly front- or back-loaded approaches; per-consumer tariffs can nevertheless change as connections, volumes and other costs evolve.

From an intergenerational perspective, the annuity method does not explicitly track consumer growth, but the calculation examples show that it produces a reasonably even distribution of costs between early and later consumers. It avoids the comparatively high initial burden associated with linear depreciation without making recovery dependent on uncertain long-term uptake forecasts. This is particularly relevant in the Netherlands, where connection is not generally mandatory and deviations from expected uptake could leave costs unrecovered for longer and increase exposure for future consumers. A common annuity approach for regular DH companies and WTS would also improve consistency, comparability and regulatory review across the sector, while still allowing depreciation periods to reflect the expected economic benefit and risk profile of individual asset categories.

It is therefore recommended to use annuity depreciation as the standard approach for intergenerational cost allocation for both regular DH companies and WTS. The recommendation is based on its performance across the full set of criteria: it is strong in regulatory predictability, indicative operator cash flow, potential support for DSCR, alignment with business-case practice and avoidance of tariff shocks, while remaining acceptable in relation to intergenerational fairness, connection risk, gradual network maturation and asset lifetimes. It provides the best overall balance between consumer fairness, potential support for operator financeability and regulatory transparency. Actual financeability and DSCR will also depend on achievable tariff revenues, customer uptake and collections, OPEX, leverage, interest rates and the applicable debt-repayment schedule. The Chapter 6 assessment generally also applies to WTS, although Gasunie's financing may reduce the weight placed on cash flow, DSCR and business-case criteria, subject to the actual terms; regulated revenue timing, refinancing and Gasunie's exposure still matter. ACM could permit growth-adjusted depreciation specifically for WTS where a documented volume ramp-up justifies it, but this would delay recovery and increase tariff and financing uncertainty, rather than replace annuity as the standard recommendation.

Implementation should be transparent and auditable. The annuity should be calculated from the approved depreciable asset value, an asset-specific depreciation period and the allowed cost of capital. Each annual charge should be separated into depreciation and return on the opening or average RAB. The framework should ensure that the RAB reaches the approved residual value at the end of the recovery period, cumulative depreciation does not exceed the depreciable amount, and nominal or real

parameters are applied consistently. ACM should define the relevant price index and inflation reconciliation and reset rules for a real WACC approach, or the inflation assumption and review rules for a nominal WACC approach, so inflation is not recovered twice. If a WTS-specific growth-adjusted alternative is allowed, the forecast should be independently reviewable, with prospective adjustments at defined intervals (for example, every three or five years), safeguards against under- or over-recovery, and a test of the ten-year volume ramp-up against financeability. These safeguards allow full, but not excessive, recovery and support compliance with the future cost-based tariff framework under the Wcw and subsequent ACM methodology decisions.

The Danish experience also shows that depreciation is only one lever for balancing affordability, intergenerational fairness and financeability. For regular DH companies, long-term financing and asset-specific recovery periods can spread costs over the years of benefit, while differentiated connection fees and targeted support can encourage early uptake and allocate one-time connection costs separately from ongoing tariffs. For networks built ahead of demand, including a larger share of the investment in tariffs as more consumers connect, or a temporary reduction in loan repayments while consumers are connecting, can limit the burden on initial consumers without changing the standard depreciation method. For WTS, which transports heat rather than connecting individual households, the relevant parallel is Vestforbrænding's large-scale network expansion: capital costs are incurred ahead of full utilization, so the timing of their inclusion in tariffs and the allocation of costs as demand grows require particular attention. Transparent treatment of over- and under-recovery, including money set aside specifically for future investments where the rules allow it, can smooth tariffs across years.

The transition to the new framework should distinguish between investments already represented in the initial RAB and investments made under the upcoming regime. Historical depreciation methods at the time of regulation change should be respected, while the treatment of new investments should follow the methodology introduced by ACM. Across both groups, the implementation should avoid retrospective reallocation, double recovery and abrupt tariff effects. The report's conclusions provide a clear basis for the further specification of depreciation rules within the Wcw, Bcw and subsequent ACM methodology decisions.

2 Introduction and scope

The Dutch DH framework is being reformed through the Wet collectieve warmte (Wcw). When the Wcw enters into force, possibly on 1 January 2027, the transition to cost-based regulation will take place in phases. Phase 1 will retain the current gas-reference methodology (“niet meer dan anders”), under which the tariff cap reflects the opportunity cost of gas, including both variable energy costs and fixed transport costs. Phases 2 and 3 will be cost-based, with Phase 2 starting no later than 2031 and covering production, transport, distribution, consumer contact and sales. Under the future framework, the Authority for Consumers and Markets (ACM) will establish the tariff methodology, determine maximum tariffs, assess efficient costs and reasonable returns, monitor over- and under-recovery, and supervise compliance. The detailed treatment of investments, depreciation, regulatory asset values and the reasonable return will be specified in the Besluit collectieve warmte (Bcw) and subsequent ACM methodology decisions.

This report builds on the asset categorization, economic and technical lifetime considerations developed earlier. It focuses on the allocation over time of the capital-related component of regulated district-heating tariffs: the recovery of DH investments through depreciation and coverage of financing costs associated with these investments. The analysis covers heat production and procurement assets, transmission and distribution infrastructure, and other relevant assets within cost-based regulated Dutch DH systems of different types, scales and stages of maturity.

The report examines four principal approaches:

- Linear depreciation
- Annuity depreciation
- Progressive (back-loaded) depreciation
- Growth-adjusted depreciation

For each approach, it considers the interaction between depreciation, the remaining regulatory asset base and the cost of capital, including the consequences of applying a nominal or real Weighted Average Cost of Capital (WACC)¹. The analysis also considers whether different treatment may be appropriate for the initial regulatory asset base present before January 2027 and for subsequent investments, while maintaining consistency with the Besluit collectieve warmte (Bcw) framework.

In Chapter 6 the approaches are compared on a consistent basis against a set of criteria requested by the Authority of Consumers and Markets (ACM):

- Regulatory predictability
- Intergenerational consumer fairness
- Indicative cash flow implications for operators
- Impact on Debt Service Coverage Ratio (DSCR)
- Alignment with business-case practice
- Connection risk
- Gradual network maturation

¹ Explained in section 3.2.3.1.

- Asset lifetimes
- Avoidance of tariff shocks

The assessment is supported by an extensive literature review, calculation examples and practical experience from Danish DH systems. It addresses both existing DH systems with a solid consumer base and new or expanding systems in which production and distribution infrastructure is constructed ahead of consumer uptake or development of the heat demand.

The scope is limited to the timing and distribution of capital cost recovery and the associated regulatory design choices. The report focuses on how depreciation charges are allocated between generations; the cost of capital is treated consistently as a regulatory input applied to the unrecovered RAB rather than as a separate allocation variable. Moreover, the report does not determine the allowed WACC or establish the value of the initial regulatory asset base. Instead, these are treated as regulatory inputs so that the report can assess how alternative allocation methodologies perform under transparent and comparable assumptions. The report concludes with a substantiated recommendation of the most suitable method.

3 Regulatory context and analytical framework

3.1 Context and objective of the report

3.1.1 Consumer tariffs in DH systems

Consumer tariffs in DH systems are used to recover investment and operating costs and, where permitted by the regulatory framework, to provide a reasonable return on invested capital.

The customer tariff can be divided into two main components: a capital-related tariff and a non-capital-related tariff, as shown below for a year (t):

$$Tariff(t) = Tariff_{NonCapital}(t) + Tariff_{Capital}(t)$$

Where:

- **The capital-related tariff** covers the costs associated with infrastructure investments, including the recovery of the initial investment cost, the cost of financing the investment, and, where applicable, the allowed return on invested capital.
- **The non-capital-related tariff** covers the costs associated with the operation of the DH system, including operating expenses (OPEX), maintenance, taxes and levies, and other non-capital costs related to the DH system. A simplified tariff formula² for the non-capital-related tariff is presented below:

$$Tariff_{NonCapital}(t) = \frac{OPEX(t) + Taxes(t) \pm Adjustments(t)}{Energy Sales(t)}$$

The scope of this project focuses on the capital-related component of the tariff, $Tariff_{Capital}(t)$.

In practice tariffs could typically be split up into sub-tariffs. A method to split up the tariff is the “kostægte” or “cost-effective” approach, which is mandatory to use in Denmark. This method divides the tariff into a variable and a fixed part, where all variable costs (e.g. OPEX, taxes, etc.) are retrieved through the variable part of the tariff, while the fixed tariff covers capital costs, labor cost, insurance cost, etc. The purpose of this approach is to ensure as transparent and direct cost retrieval as possible.³

3.1.2 Capital-related tariff

3.1.2.1 Depreciation⁴

DH systems are characterized by substantial upfront investments in infrastructure assets, which usually have a long lifetime, typically ranging between 20 and 50 years. These assets can for example be

² Adjustments can refer to balancing accounts, previous over/under recovery, subsidies, etc. The energy sale includes heat sale in all cases, and in some cases also sale of electricity generated by the utility.

³ Further details are provided in Sections 5.2 and 5.4.

⁴ A more detailed definition is provided in Section 3.2.2.

distribution networks, transmission pipelines, heat production facilities, thermal energy storage systems, substations, and pumping stations.

Since these assets provide services for many years or decades, their costs are typically not recovered immediately upon commissioning. Otherwise, the full cost of the investment would be charged immediately the investment is made, placing a disproportionate burden on the consumers connected at the time. This would hence not reflect the fact that the asset is expected to be in operation over an extended period of time.

Depreciation addresses this issue by distributing the investment costs over a specific period (called the depreciation period), thereby spreading the burden of repaying the investment more fairly among the generations of consumers that benefit from the infrastructure. The depreciation period can e.g. be chosen either based on its technical lifetime, economic lifetime, or a period prescribed by the applicable regulatory or financing body. Depreciation lifetimes are addressed in detail in the Phase 1 report.

3.1.2.2 *Cost of capital⁵*

Financing large upfront investments also represents a cost that must eventually be borne/covered by the consumers. DH infrastructure is typically financed through a combination of debt and equity:

- Debt financing has an explicit cost in the form of interest and principal payments to lenders.
- Equity financing does not always require regular cash payments in the same way as debt. However, equity investors generally expect to earn a return on the capital they have invested and could otherwise allocate elsewhere.

3.1.2.3 *Capital-related tariff formula*

Consequently, consumer tariffs generally include not only the recovery of the initial investment cost through depreciation, but also the cost of capital, as shown in the following formula:

$$Tariff_{capital}(t) = \frac{Depreciation(t) + Cost\ of\ capital(t)}{Energy\ Sale(t)}$$

Different approaches can be used to allocate both depreciation and the cost of capital over the lifetime of a DH asset. The methodological choice can have a significant impact on consumer tariffs, as it determines when and from whom the capital-related costs are recovered. This is particularly important in new or expanding DH systems, where infrastructure is scaled to be able to supply all potential consumers in an area, but the number of connected consumers and the volume of heat sales often increase gradually over time.

If capital costs are recovered too quickly, early consumers may bear a disproportionate share of the investment burden, even though future consumers will continue benefiting from the infrastructure for a prolonged period. Conversely, if cost recovery is deferred excessively, future consumers may be required

⁵ A more detailed definition is provided in Section 3.2.3.

to pay for investments from which earlier consumers derived substantial benefits. As a result, the selected cost-allocation methodology plays a key role in ensuring intergenerational consumer fairness.

3.1.3 Objective of the report

The purpose of this report is therefore to investigate different approaches for allocating the capital-related component of DH tariffs, including both depreciation and the cost of capital.

The objective is to identify methodologies that distribute depreciation costs as fair as possible among consumers over time, so that each generation contributes to the recovery of DH infrastructure investments in a manner that closely reflects their benefits and heat consumption from the DH system.

3.2 Definitions

The following section provides definitions of the main terms and concepts used throughout this report and serves as a reference for the analyses presented in the subsequent chapters.

3.2.1 Capital expenditure (CAPEX)

Capital expenditure (CAPEX) or investment cost refers to the expenditure incurred to acquire, construct, upgrade, or extend long-term assets used in a company's operations. These expenditures are capitalized on the balance sheet as assets rather than being immediately recognized as expenses in the income statement, reflecting their role in generating economic benefits over multiple years. (Corporate Finance Institute, 2020)

3.2.2 Depreciation

When a long-lived asset is acquired or constructed, its cost is typically capitalized rather than recognized immediately as an expense. Since the assets are expected to generate economic benefits over multiple years, charging its full cost to a single accounting period would overstate expenses in the year of acquisition and understate expenses in subsequent years. Depreciation addresses this issue by systematically allocating the cost of the asset over the periods during which it provides services or contributes to revenue generation, thereby achieving a better correspondence between costs and the benefits derived from the asset. (Corporate Finance Institute, 2020)

3.2.3 Cost of capital

3.2.3.1 Weighted Average Cost of Capital (WACC)

The cost of capital represents the minimum required return on invested capital needed to compensate debt and equity providers for financing an investment. Before a business can generate a profit, it must earn sufficient returns to cover the cost of the financial resources used to fund its activities. (Corporate Finance Institute, 2020)

The cost of capital reflects the combined cost of debt and equity financing, weighted according to their respective contributions to the overall financing structure. This weighted average is commonly referred to as the WACC:

- The cost of debt is the interest rate that a company pays on its existing debt.
- The cost of equity is the expected return on the company's shareholders' investment. In regulated utility sectors, this expected return is often reflected through an allowed return on capital, commonly determined using a WACC-based approach. The extent to which such returns can be recovered through consumer tariffs depends on the applicable regulatory framework.

In some DH systems, particularly those operating under cost-recovery or non-profit principles, the recovery of financing costs may be limited to actual borrowing costs and no explicit return on equity is permitted. Hence, the WACC in this case is equal to the interest rate on the existing debt.

The WACC represents the required return on invested capital and can therefore be used here as a proxy for:

- The financing costs (debt part).
- The potential profit that can be made by the utility company (the allowed return to equity providers).

The WACC does not include repayment of the initial investment.

3.2.3.2 Calculation method of the cost of capital using a declining RAB

With a Regulatory Asset Base (RAB) approach, the cost of capital is calculated each year based on the portion of the investment that has not yet been recovered through depreciation. As the assets are depreciated, the RAB gradually decreases, reflecting the declining amount of capital still invested in the assets. As a result, the annual cost of capital is highest in the first year and gradually declines over time.

The annual cost of capital can therefore be calculated as:

$$\begin{aligned} \text{Cost of Capital}(t) &= \text{WACC} \times \text{RAB}(t) \\ \text{RAB}(t) &= \text{CAPEX} - \sum_{i=1}^{t-1} \text{Depreciation}(i) \end{aligned}$$

Where:

- (RAB in year (t)) represents the remaining value of the asset that has not yet been recovered through depreciation
- (WACC) is the Weighted Average Cost of Capital
- (CAPEX) is the initial investment costs

3.2.3.3 Difference between Cost of capital & actual debt service

A distinction should be made between the cost of capital estimated by applying a WACC to the RAB and the actual debt service.

When an investment is made, the utility can finance the asset through a combination of debt and equity. For example, a 100 M€ investment may be financed with 70 M€ of debt and 30 M€ of equity.

The utility must then establish a tariff structure, in accordance with the applicable regulatory framework, that at least⁶ enables the recovery of both non-capital costs and capital-related cash outflow (interest payment, financing fees and principal repayment of the loan).

Debt service, by contrast, arises from the utility's contractual relationships with lenders (banks). They primarily include principal repayment, interest payments⁷, financing fees and other borrowing costs.

$$\text{Debt service}(t) = \text{Principal Repayment}(t) + \text{Financing cost}(t)$$

With:

$$\text{Financing costs}(t) = \text{Interest}(t) + \text{Financing Fees}(t)$$

$$\text{Interest}(t) = \text{Interest rate} * \text{Outstanding Debt}(t)$$

$$\text{Outstanding debt}(t + 1) = \text{Outstanding Debt}(t) - \text{Principal Repayment}(t)$$

Figure 1 illustrates the difference between the cost of capital & the debt service.

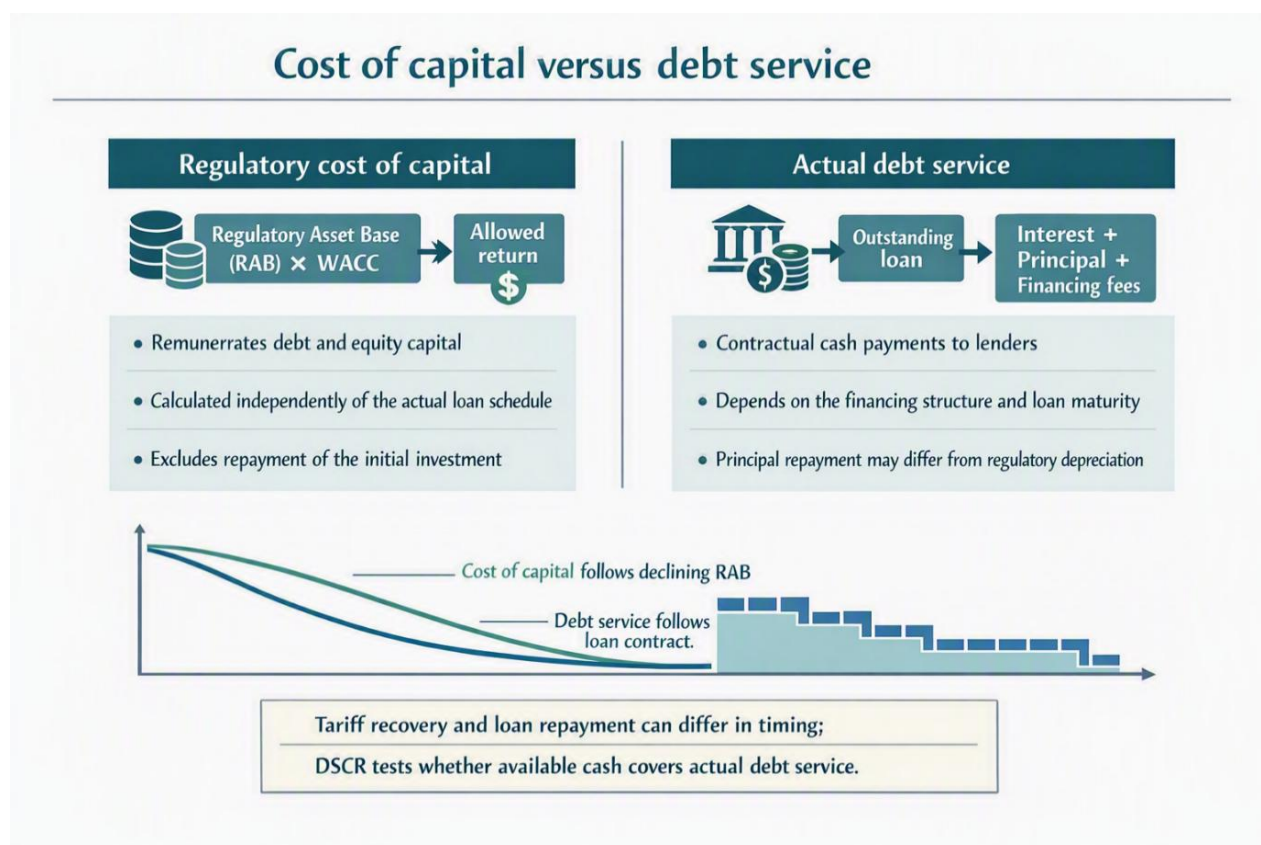


Figure 1: Regulatory cost of capital compared with actual debt service and contractual repayment timing.

⁶ In a case where profits are allowed, the tariffs can enable more than the recovery of the non-capital and capital-related costs.

⁷ Interest is calculated on the outstanding debt balance, rather than on the RAB.

Note that:

- The WACC-based return intends to remunerate both debt and equity capital, irrespective of the utility's actual loan structure.
- The depreciation period used for tariff-setting purposes may differ from the duration of the underlying loans.
- Principal repayment is not required to be equal to depreciation: depreciation determines how the investment is allocated and recovered through tariffs, while principal repayment follows the contractual loan schedule.
- Consequently, the RAB and outstanding debt may evolve differently over time.
- Consumer tariff revenues, actual financing costs, and principal repayments are cash flows. By contrast, depreciation is a non-cash accounting expense, and the regulatory cost of capital is an allowed return rather than a measure of actual financing cash flows.

The abovementioned distinctions are important because Debt Service Coverage Ratio (DSCR) is based on actual cash available and contractual debt service—not directly on depreciation or the regulatory cost of capital calculation.

3.2.4 Capital recovery charge

In this report, the capital recovery charge for year t is defined as the sum of depreciation and the cost of capital incurred in that year.

3.2.5 DSCR

The DSCR (Debt Service Coverage Ratio) is a financial metric used to assess a project's or company's ability to meet its debt repayment obligations (annual interest and principal obligations) from its available cash flow. (Corporate Finance Institute, 2020)

It is typically calculated as:

$$DSCR(t) = \frac{\text{Cash available for debt service}(t)}{\text{Debt service}(t)}$$

$$DSCR(t) = \frac{[Tariff_{NonCapital}(t) + Tariff_{Capital}(t)] * Energy Sales(t) - Expenditures(t)}{Interests(t) + Principal Repayment(t) + Financing Fees(t)}$$

Where:

- (Cash available for debt service) generally corresponds to operating cash flow after operating expenses.
- (Debt service) includes interest payments, debt repayments and some financing fees.

Depreciation is not deducted from the cash available for debt service because it is a non-cash accounting expense. However, the selected depreciation and cost of capital methodology indirectly affects the DSCR by determining the capital-related tariff revenue that may be recovered from consumers.

A DSCR of:

- 1.0 means the project generates just enough cash to service its debt.
- >1.0 indicates a cash surplus after debt repayment.
- <1.0 indicates insufficient cash flow to meet debt obligations.

Typical lender requirements for infrastructure projects are often in the range of 1.25-2.0, depending on the project risk profile.

3.3 Pre- and post-2027 investments

Investments carried out before 1 January 2027 are to be included in the initial RAB at their approved remaining value. Their historical depreciation should be respected, and only the unrecovered value should be recovered either using the original method or the new regulatory framework. The transition should avoid retrospective adjustments, double recovery and abrupt tariff effects.

Investments made on or after 1 January 2027 will be treated in accordance with the regulatory framework applicable to new investments. This framework is expected to establish the general basis for how such investments are recognized and how their capital-related costs may be allocated over time. The treatment may therefore differ from that applied to investments already included in the initial RAB, reflecting the prospective nature of the new regulatory regime. The relevant principles, methodological options and their implications for companies and consumers are examined in the subsequent chapters of this report.

3.4 Nominal and real values

The distinction between nominal and real values affects the timing of capital cost recovery under any depreciation method. To avoid over- or under-recovery, the choice of nominal or real WACC must be consistent with how inflation is treated in the regulatory asset base (RAB). This section sets out the two internally consistent approaches; the nominal and real assessment for each of the four depreciation methods are compared in Chapter 4.

Under a nominal WACC approach, the approved RAB is maintained at historical nominal cost (apart from approved additions, disposals, contributions and depreciation), without general inflation indexation. The nominal WACC, which includes expected inflation, is applied to the unrecovered nominal RAB. For any depreciation method, the resulting annual capital recovery charge is expressed in nominal €. Its timing depends on the depreciation profile: a charge that is level in nominal € loses purchasing power over time, whereas a front- or back-loaded profile distributes recovery differently between early and later consumers. This approach may align more closely with nominal debt service, but high or unexpected inflation can erode the real value of unrecovered capital if the allowed nominal return is not reset appropriately.

Under a real WACC approach, the unrecovered RAB is explicitly indexed for actual inflation using a specified price index, and the real WACC is applied to that indexed balance. With any depreciation method, the recovery profile should be specified in base-year € and translated into each year's nominal € through

consistent indexation. The RAB roll-forward should show each change separately: the opening balance, inflation adjustment, approved additions and deductions, depreciation, and closing balance. The inflation adjustment remains in the RAB for recovery in later years; it is not also paid as a nominal return in the current year. This approach protects the purchasing power of unrecovered capital, but can shift nominal recovery to later years relative to an otherwise comparable nominal approach. This could potentially affect early cash flow, DSCR and the risk that later consumers will face higher charges if inflation rises or consumer uptake falls short of expectations. The extent of these effects depends on the depreciation method and is compared for each method in Chapter 4.

An increase in nominal charges caused by indexation does not in itself demonstrate overcompensation. The assessment should instead consider whether the nominal and real parameters are applied consistently, whether the RAB is correctly reconciled and whether the present value of the permitted recovery exceeds the approved depreciable amount and allowed return.

If a real WACC approach is implemented, ACM should define which price index to use, when the RAB will be indexed and the WACC reset, how forecast and actual inflation will be reconciled, how the opening RAB and residual value will be treated, and how to prevent inflation from being recovered twice—through both the WACC and an increase in the RAB or indexed depreciation.

If a nominal WACC approach is chosen, ACM should specify the inflation assumption used to set the WACC, when the rate will be reviewed or reset, and how the opening RAB, additions, depreciation and residual value will be recorded at nominal historical values without general inflation indexation. It should assess the effects of actual inflation differing from the assumption used to set the WACC, while ensuring that inflation is not also compensated through RAB indexation or indexed depreciation.

For WTS, the choice is particularly relevant because transmission assets require substantial upfront investment while transported volumes may build up over time. Under a nominal WACC, the RAB is not adjusted for inflation; instead, expected inflation is included in the allowed return on the remaining asset value. This may bring a larger share of nominal capital payments into the early years, although a fixed nominal annual charge becomes worth less in real terms over time. Under a real WACC, the RAB is adjusted for inflation, preserving the purchasing power of capital that has not yet been recovered. Nominal charges can then rise with inflation, potentially leaving a larger share for later users to pay. For WTS, the impact on transport charges, cash flow and DSCR also depends on when charges can be adjusted, how much heat is transported and when debt payments fall due. Neither approach addresses directly low utilization in the early years. ACM should therefore test both conventions against WTS's expected volume ramp-up and financing obligations, using consistent assumptions for the WACC, RAB and depreciation.

A nominal WACC must not be applied to an inflation-indexed RAB without adjusting its inflation component. For consistent assumptions, the exact relation is:

$$Real\ WACC = \frac{1 + Nominal\ WACC}{1 + Inflation} - 1$$

Nominal WACC $\approx$ real WACC + expected inflation is only an approximation. (Rijkswaterstaat, Ministerie Infrastructuur en Waterstaat, 2026) For the purpose of this report, a nominal WACC evaluation is carried out in Chapter 6, using a nominal WACC at 6.83%, as provided by ACM. For the comparisons in Chapter 4, an average annual inflation of 2% is assumed, resulting in a real WACC of 4.74%, using the methodology explained above.

3.5 Compliance with Bcw

Article 7.15 of the Besluit collectieve warmte consultation version 2024 (Bcw) forms part of the regulatory framework for determining the capital-related costs that may be reflected in regulated heat tariffs. For the purposes of this report, compliance is assessed by considering whether a cost-allocation method provides a transparent, consistent and verifiable recovery of efficiently incurred investment costs over the period in which the relevant assets provide economic benefits, while avoiding double recovery and ensuring that the remaining regulatory asset value can be reconciled over time.

Compliance depends on the depreciation method's detailed regulatory specification and application. As a minimum, the method should:

- start with an approved asset value and clearly defined commissioning date
- use an asset-specific depreciation period that does not exceed the period of expected economic benefit
- specify the treatment of residual value, grants, contributions and disposals
- calculate the allowed cost of capital only on the unrecovered RAB
- ensure that cumulative depreciation does not exceed the depreciable amount
- keep a clear record of changes to the RAB over time

Linear depreciation

Linear depreciation provides the most direct route to demonstrating compliance because the annual charge, depreciation period and RAB development are clearly visible. It is suitable where asset utilization is broadly stable and the selected depreciation period reflects economic life. In a growing network, however, its formal transparency does not by itself ensure balanced intergenerational allocation; the regulator should therefore verify that early consumers are not required to bear an unreasonable share of costs related to infrastructure that will also benefit future users.

Annuity depreciation

An annuity method can comply with Article 7.15 where the annuity is decomposed each year into depreciation and an allowed return on the opening or average RAB, the same WACC convention is applied consistently, and the RAB reaches the approved residual value at the end of the recovery period. The constant total charge must not conceal an implicit return above the allowed cost of capital or depreciation beyond the approved asset value.

Progressive (back-loaded) and growth-adjusted depreciation

Back-loaded methods may also be compatible with Article 7.15, but require additional attention because they defer recovery and keep the RAB higher for longer. Their use should be conditional on an objective and documented link to expected network utilization or consumer growth:

- an independently reviewable forecast
- predefined review intervals
- symmetric adjustment when actual development differs from forecast
- a cap on the amount and duration of deferred depreciation
- an end-of-life test demonstrating full, but not excessive, recovery

The regulatory treatment of forecast error should be established in advance so that underperformance is not automatically shifted to future consumers and overperformance does not create double recovery.

Moreover, for all methods nominal and real parameters must be internally consistent. As mentioned earlier in this chapter, a nominal WACC should be combined with nominal cash flows and asset-value treatment, while a real WACC should be combined with real amounts or an explicit indexation mechanism. Mixing approaches can over- or under-remunerate capital and would weaken compliance.

Overview

On this basis, linear and annuity-based recovery can comply with Article 7.15 under a relatively straightforward set of conditions. Progressive and growth-adjusted depreciation should not be regarded as prohibited, but their compliance is more conditional because the timing of recovery depends on assumptions about future users and demand. If ACM permits such methods, the regulatory decision should specify the eligibility criteria, forecast governance, regular adjustments based on actual outcomes, limits on deferral, rules for updating the RAB and measures to protect consumers. Accordingly, this report supports these methods as regulated alternatives rather than as unrestricted choices by the operator.

4 Depreciation methods

This chapter describes four approaches to recovering the initial investment cost of DH infrastructure over a defined period:

- Linear depreciation
- Annuity depreciation
- Progressive (back-loaded) depreciation
- Growth-adjusted depreciation

They are selected because they span the main choices relevant to cost-based tariff regulation: equal annual depreciation, a stable combined capital recovery charge, a predetermined shift of recovery to later years, and recovery linked to expected growth in connections or utilization.

Comparing these distinct profiles makes it possible to assess how the timing of recovery affects the remaining RAB, tariffs, intergenerational cost allocation and operator financeability on a consistent basis. Linear depreciation is well established in accounting and utility regulation, while annuity-based capital recovery is familiar in DH investment planning and financing, including the Danish practice discussed in Chapter 5 later in this report. Progressive and growth-adjusted profiles are included as analytically relevant alternatives for new or expanding networks; they should not be understood as equally established standard regulatory methods across DH systems.

Other approaches are possible, including accelerated or declining-balance depreciation, units-of-production methods, and case-specific combinations. They are not examined separately in this report because they either bring recovery forward, largely duplicate one of the timing profiles assessed, or require asset-output measures that are less suitable for a common, transparent regulatory rule across DH assets.

In each of the four approaches, the annual capital recovery charge combines depreciation with the allowed cost of capital on the unrecovered RAB; under the annuity approach, the two components are calculated together to produce a stable total charge.

For this study, the cost of capital is calculated by applying a WACC to the remaining RAB. As mentioned in the previous chapter, this approach is commonly used in economic regulation because it provides a standardized and financing-neutral framework for remunerating invested capital.

4.1 Linear depreciation

4.1.1 Definition

Linear depreciation is one of the simplest methods for allocating the cost of an infrastructure asset over a specific period. Under this approach, the depreciable value of an asset is distributed equally throughout the depreciation period.

The depreciable value corresponds to the initial investment cost subtracted by any residual value (RV) expected at the end of the depreciation period. The residual value represents the estimated remaining economic value of an asset after the end of the depreciation period. In practice, the residual value may be based on the expected resale value of the asset, the value of reusable components, the value of land, or the remaining economic value of the asset if it is expected to continue operating beyond the depreciation period. For many DH assets, the residual value is often assumed to be zero.

4.1.2 Methodology

The cost of capital is not included in the linear depreciation method itself and should be added to the annual depreciation to calculate the annual capital recovery charge.

The capital recovery charge for year (t) can be calculated as follows:

$$\text{Capital Recovery Charge}(t) = \text{Depreciation} + \text{Cost of Capital}(t)$$

With:

$$\text{Depreciation} = \frac{\text{CAPEX} - \text{RV}}{n}$$

$$\text{Cost of capital}(t) = \text{RAB}(t) * \text{WACC}$$

Where:

- (Depreciation) is the annual depreciation using here the linear depreciation method
- (CAPEX) is the initial investment costs
- (RAB) is the Regulatory Asset Base in year (t), representing the remaining value of the asset that has not yet been recovered through depreciation
- (WACC) is the Weighted Average Cost of Capital
- (RV) is the residual value at the end of the depreciation period
- (n) is the depreciation period in years

When the residual value is assumed to be zero, which is a common simplification for many DH assets, the equation becomes:

$$\text{Depreciation} = \frac{\text{CAPEX}}{n}$$

4.1.3 Practical application of the method

For example, an asset investment of 100 M€ with an economic lifetime of 40 years is considered.

- *If the depreciation period is assumed to correspond to the asset's economic lifetime and no residual value is considered, the annual depreciation amounts to 100 M€ / 40 y = 2.5 M€/y.*
- *If, for example, the financing source requires that the investment must be fully depreciated over a maximum of 30 years and no residual value is accepted, the annual depreciation increases to approximately 100 M€ / 30 y = 3.3 M€/y.*

Shortening the depreciation period accelerates the investment cost recovery of an asset and reduces the risk of unrecovered investments. However, it also shifts a larger share of the cost burden to early consumers. Future consumers may continue to benefit from the asset after it has been fully depreciated and

therefore contribute less to its investment recovery than would be the case if the depreciation period were aligned with the asset's economic lifetime.

The following example illustrates a CAPEX of 100 M€, depreciated over a period of 40 years, and a nominal WACC of 6.83% p.a.:

- In Year 1, the remaining asset value (RAB) is equal to the initial investment cost of 100 M€. The annual cost of capital is therefore $100 \text{ M€} \times 6.83\% = 6.83 \text{ M€}$. Combined with the annual depreciation of 2.5 M€/y ($100 \text{ M€} / 40 \text{ y}$), this results in a total capital recovery charge of 9.33 M€.
- In Year 2, the asset has been depreciated by 2.5 M€, reducing the remaining asset value (RAB) to $100 \text{ M€} - 2.5 \text{ M€} = 97.5 \text{ M€}$. The cost of capital is therefore $97.5 \text{ M€} \times 6.83\% \approx 6.66 \text{ M€}$. The corresponding capital recovery charge becomes $2.5 \text{ M€} + 6.66 \text{ M€} \approx 9.16 \text{ M€}$.
- The same calculation is repeated each year. As the assets are depreciated, the RAB gradually declines, resulting in a decreasing cost of capital over time. By Year 40, the remaining asset value at the beginning of the year is 2.5 M€, and the corresponding cost of capital is $2.5 \text{ M€} \times 6.83\% \approx 0.17 \text{ M€}$.
- At the end of Year 40, the final depreciation charge is applied, the investment is fully recovered, and the RAB reaches zero. Consequently, no further cost of capital is associated with the asset.

Figure 2 and Figure 3 illustrate the evolution of the annual depreciation charge and cost of capital over the depreciation period for respectively the nominal WACC approach in nominal and real values.

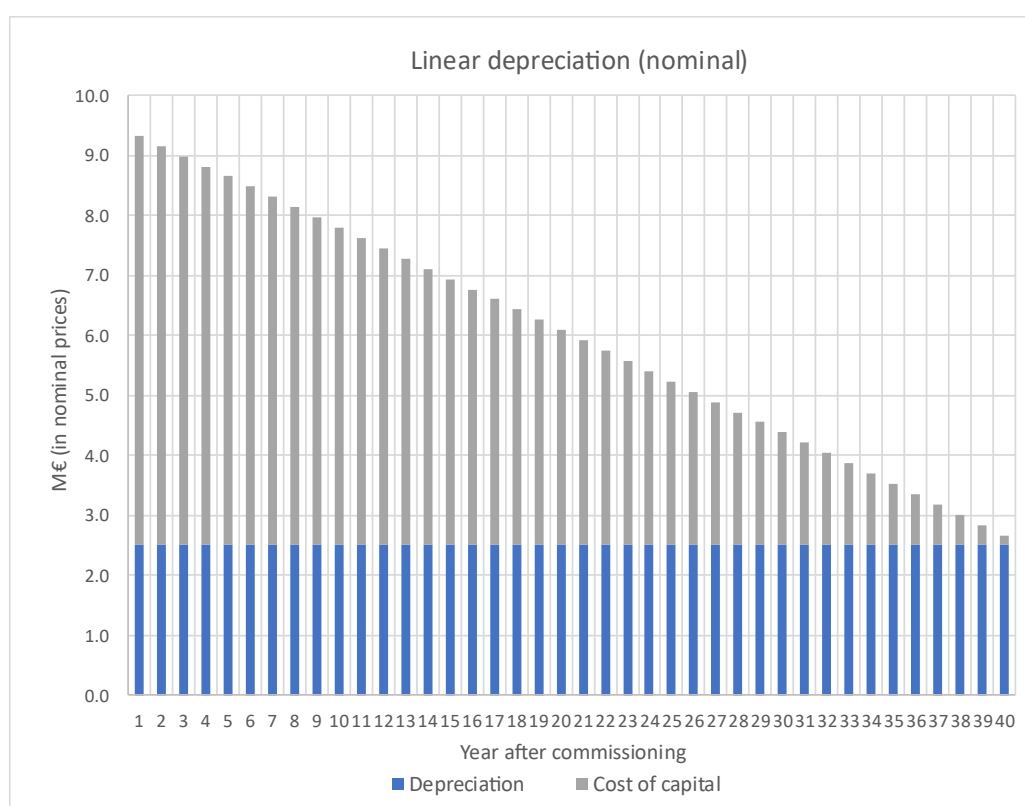


Figure 2: Annual depreciation and cost of capital using the nominal WACC approach in nominal values and linear depreciation method.

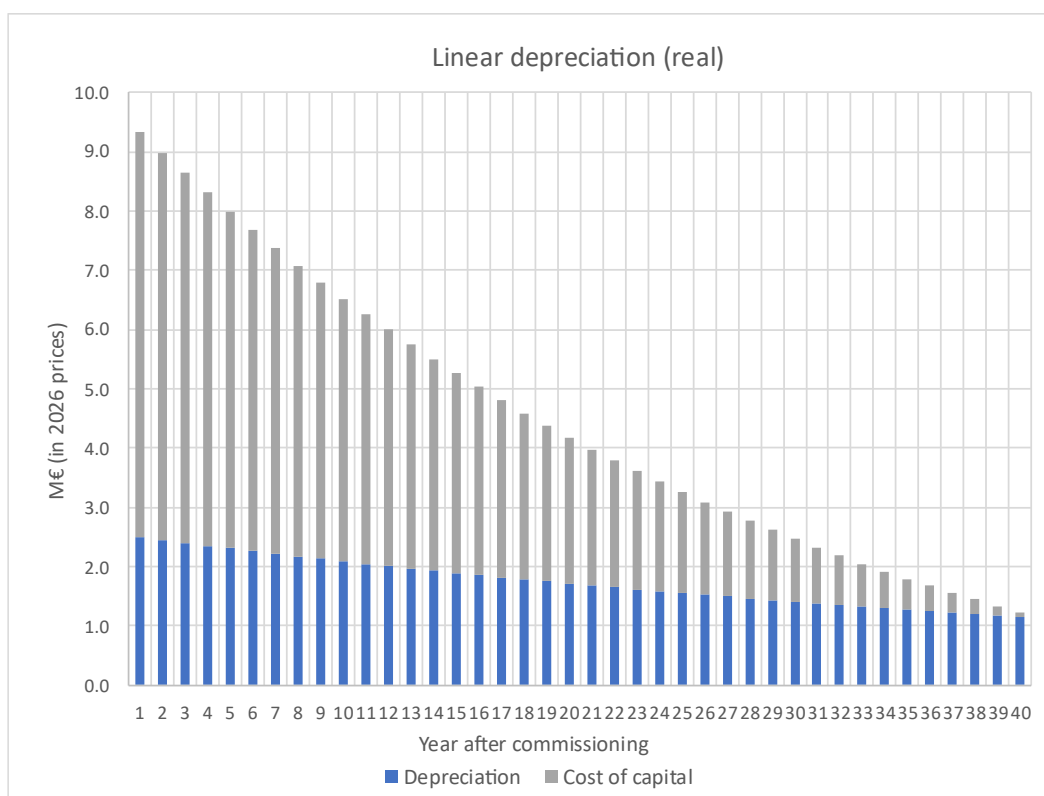


Figure 3: Annual depreciation and cost of capital using the nominal WACC approach in real values and linear depreciation method.

The figures show that, under a nominal WACC, fixed nominal depreciation and a declining return on the unindexed RAB produce a falling nominal capital charge. Expressed in real terms, that charge falls faster as inflation diminishes its purchasing power. The figures show the nominal WACC approach in nominal and real values; they do not depict a real WACC approach.

For comparability, the real WACC capital recovery charge should also be translated into nominal € using the assumed price index. Indexation does not necessarily cause the nominal capital recovery charge to increase each year, as the effect of indexation may be partly or fully offset by the declining return on the remaining RAB. A comparison between the nominal and real WACC approaches in nominal values is carried out in the next section.

When the capital recovery charge is calculated, the capital-related tariff can be estimated by dividing (the sum of the initial investment depreciation and the associated cost of capital) with (the energy sales).

Following the previous example, and assuming heat sales increase from 20 GWh/year in Year 1 to 30 GWh/year by Year 5, the annual capital recovery charge is distributed across an increasingly larger volume of heat sales. In Year 1, the charge of 9.33 M€ (2.5 M€ depreciation plus 6.83 M€ return on the opening RAB) corresponds to approximately 467 €/MWh. By Year 5, the opening RAB has fallen to 90 M€, so the charge is approximately 8.65 M€ (2.5 M€ plus 6.15 M€), or 288 €/MWh at 30 GWh of heat sales. The reduction reflects both higher heat sales and the declining return on the RAB.

4.1.4 Comparison of nominal and real WACC approaches

To provide a like-for-like comparison of the amounts payable by consumers over time, Figure 4 expresses the capital recovery charges under both the nominal and real WACC approaches in nominal €. Under the real WACC approach, the charge calculated in constant 2026 € is translated into nominal € using the assumed annual inflation rate of 2%.

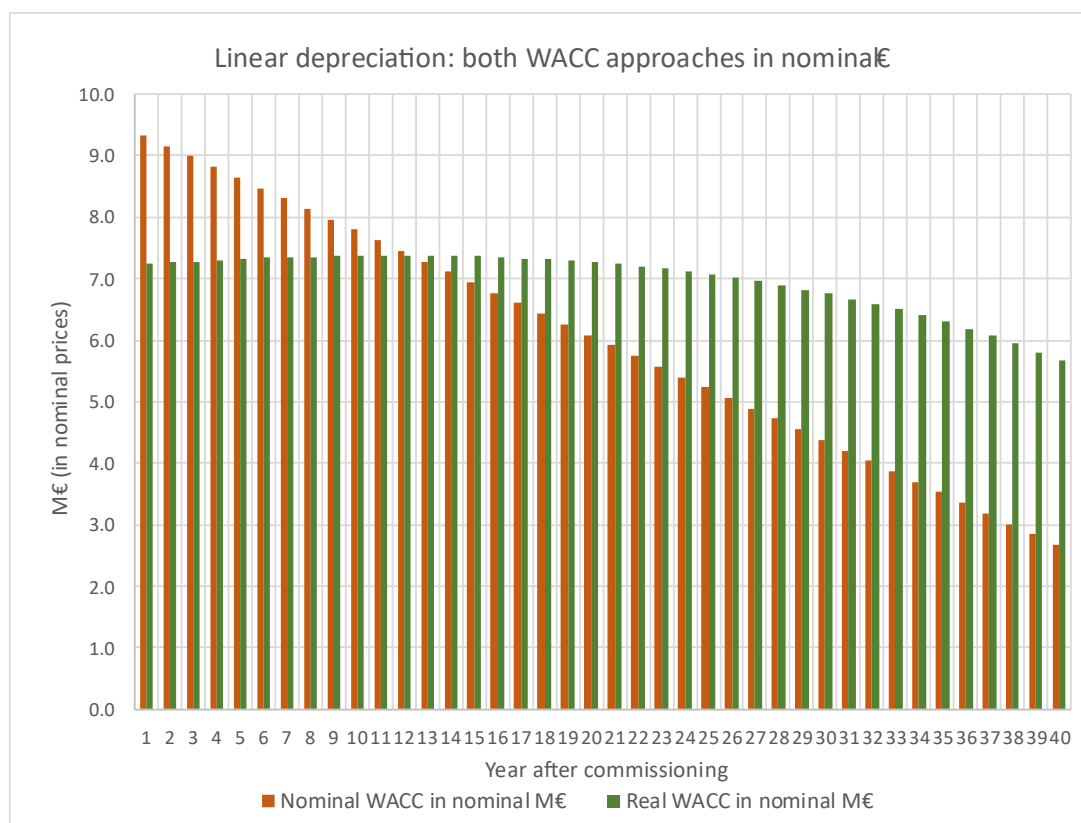


Figure 4: Comparison of the nominal and real WACC approaches under the linear depreciation method, with both capital recovery charges expressed in nominal €. The real WACC charge is initially calculated in constant 2026 € and subsequently indexed using the assumed annual inflation rate of 2%.

Under the nominal WACC approach, the capital recovery charge declines throughout the depreciation period because annual depreciation remains constant while the return on the declining unindexed RAB decreases. Under the real WACC approach, expressed in nominal €, indexation initially outweighs the reduction in the return on the RAB, causing the charge to increase slightly until approximately Year 12. Thereafter, the declining return becomes the dominant effect and the nominal charge decreases. The figure therefore illustrates that indexation does not necessarily cause nominal charges to increase throughout the full recovery period.

4.1.5 Advantages and limitations

Advantages:

- Simple, predictable and transparent methodology: stakeholders can readily understand how the initial investment is allocated over the assets' depreciation period.

- Easy to calculate and explain.
- Well-established and widely used in accounting and utility-regulatory practice. (CEER, 2025)
- Consistent with standard accounting practices.
- Requires only limited assumptions regarding the asset (depreciation period & residual value).
- Does not rely on forecasts of future demand, connection rates, or energy sales: the annual depreciation charge remains unchanged even if actual utilization differs from the original expectations, which makes the method relatively robust from an accounting perspective.
- The lowest cost of capital among the evaluated depreciation methods.

Limitations:

- Higher tariff burdens for early consumers in situations with growing heat demand.
- Does not reflect consumer growth or network maturation.

4.2 Annuity depreciation

4.2.1 Definition

Annuity depreciation is a method for recovering both the initial investment cost and the cost of capital through a constant annual charge throughout the depreciation period.

Although the annual charge remains constant throughout the depreciation period, its composition evolves over time:

- During the early years, a large share of the capital recovery charge corresponds to the cost of capital, while only a relatively small share is associated to the depreciation.
- As the outstanding asset value decreases, the cost-of-capital component gradually declines, and an increasing share of the annual capital recovery charge is associated to the depreciation.

This method is widely used in infrastructure planning and energy projects, including DH projects in Denmark, as it converts a large upfront investment into a stable annual capital recovery charge that incorporates both depreciation and the cost of capital.

4.2.2 Methodology

The capital recovery charge for the year (t) can be calculated as follows:

$$\text{Capital Recovery Charge}(t) = \text{Depreciation}(t) + \text{Cost of Capital}(t)$$

With:

$$\text{Depreciation}(t) = \text{Annuity} - \text{Cost of capital}(t)$$

$$\text{Annuity} = \text{CAPEX} \frac{r(1+r)^n}{(1+r)^n - 1}$$

$$\text{Cost of capital}(t) = \text{RAB}(t) * \text{WACC}$$

Where:

- (Depreciation) is the annual depreciation using here the annuity method
- (CAPEX) is the initial investment costs

- (RAB) is the Regulatory Asset Base in year (t), representing the remaining value of the asset that has not yet been recovered through depreciation
- (r) is the cost of capital (typically the WACC)
- (WACC) is the Weighted Average Cost of Capital
- (n) is the depreciation period in years

4.2.3 Practical application of the method

The following example illustrates a CAPEX of 100 M€, depreciated over a period of 40 years, and a nominal WACC of 6.83% p.a.:

The annuity, which combines both the depreciation and the cost of capital, amounts to 7.35 M€ per year:

$$A = 100 \text{ M€} \times \frac{0.068(1.068)^{40}}{(1.068)^{40} - 1} \approx 7.35 \text{ M€/year}$$

For Year 1, the cost of capital is calculated by applying the 6.83% nominal WACC to the opening RAB of 100 M€, giving 6.83 M€:

$$\text{Cost of Capital}_1 = 100 \text{ M€} \times 6.83\% = 6.83 \text{ M€}$$

The Year 1 depreciation component is the 7.35 M€ annuity minus the 6.83 M€ cost of capital, or approximately 0.52 M€:

$$\text{Depreciation}_1 \approx 7.35 \text{ M€} - 6.83 \text{ M€} = 0.52 \text{ M€}$$

For Year 2, the opening RAB is the initial 100 M€ less Year 1 depreciation of approximately 0.52 M€, or 99.48 M€:

$$\text{RAB}_2 \approx 100 \text{ M€} - 0.52 \text{ M€} = 99.48 \text{ M€}$$

For Year 2, the cost of capital is $99.48 \text{ M€} \times 6.83\% \approx 6.8 \text{ M€}$. Subtracting this from the annual annuity of 7.35 M€ gives a depreciation charge of approximately 0.55 M€.

$$\text{Depreciation}_2 \approx 7.35 \text{ M€} - 6.8 \text{ M€} = 0.55 \text{ M€}$$

The same calculation is repeated throughout the 40-year period. As the RAB declines, the cost-of-capital component decreases and depreciation increases, while the total nominal annuity remains constant at approximately 7.35 M€ per year.

Figure 5 and Figure 6 illustrate the evolution of the annual depreciation charge and cost of capital over the depreciation period for respectively the nominal WACC approach in nominal and real values.

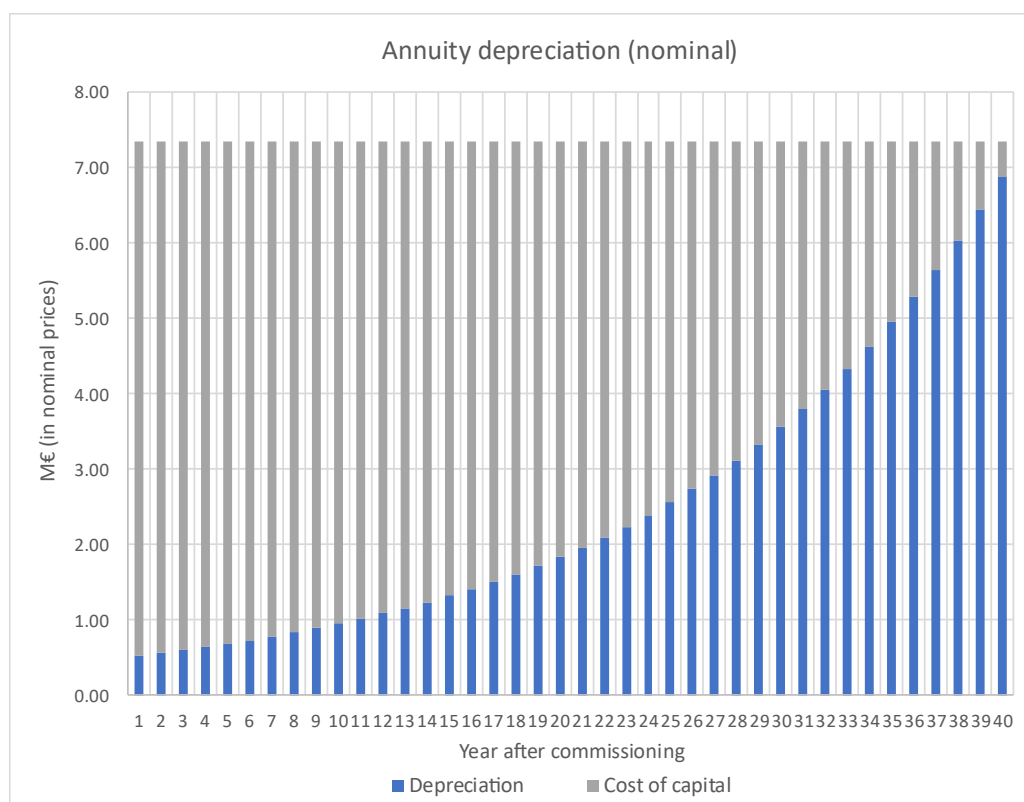


Figure 5: Annual depreciation and cost of capital using the nominal WACC approach in nominal values and annuity depreciation method.

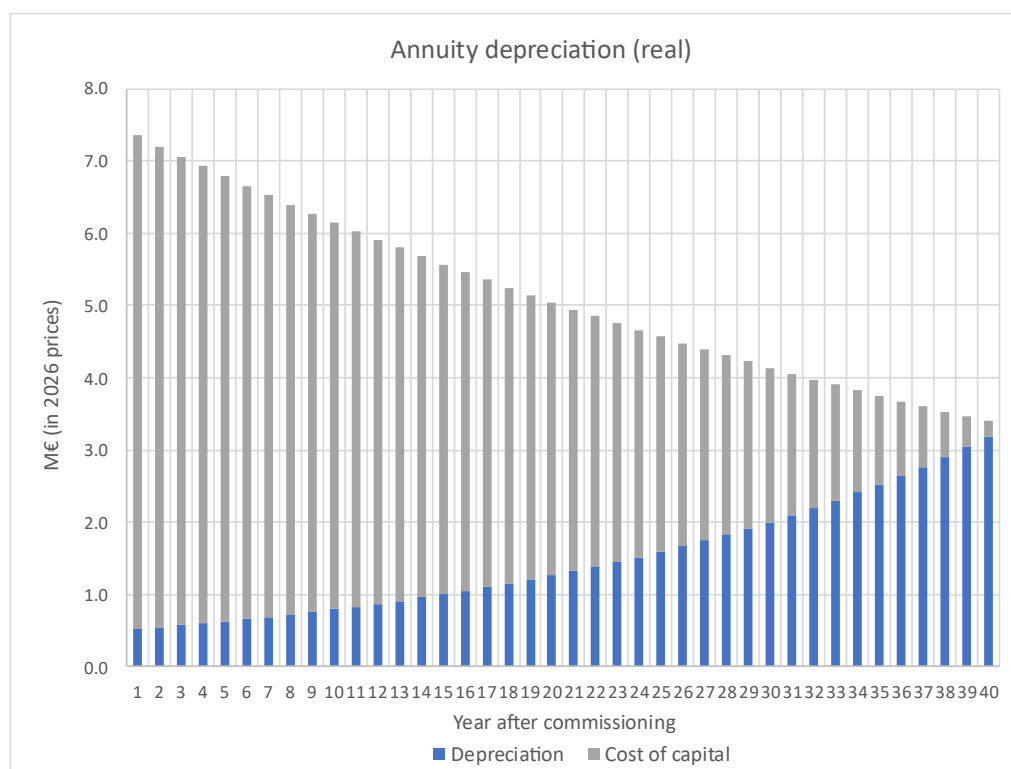


Figure 6: Annual depreciation and cost of capital using the nominal WACC approach in real values and annuity depreciation method.

Under the nominal WACC approach, the annuity remains constant in nominal € but declines in real terms as inflation diminishes its purchasing power. In both figures, the return component falls as the unindexed RAB declines, while the depreciation component rises in nominal terms.

Under a nominal WACC approach, the capital recovery charge is constant in base-year € but changes in real € in accordance with the specified price index. A comparison in nominal € is therefore required to illustrate the timing of the amounts payable by consumers under the two WACC approaches, which is carried out in the next section.

Although the annual capital recovery charge remains constant throughout the depreciation period, the corresponding cost per unit of heat supplied may vary significantly depending on the development of heat demand and customer uptake.

With the 100 M€ investment, 40-year period and 6.83% nominal WACC used above, the annual nominal annuity is approximately 7.35 M€. If heat sales increase from 20 GWh in Year 1 to 30 GWh by Year 5, the capital-cost component falls from approximately 368 €/MWh to 245 €/MWh. The latter figure applies from Year 5 onward only if sales remain at 30 GWh/year and the nominal annuity is unchanged.

4.2.4 Comparison of nominal and real WACC approaches

To provide a like-for-like comparison of the amounts payable by consumers over time, Figure 7 expresses the capital recovery charges under both a real and nominal WACC approaches in nominal €. Under the real WACC approach, the charge calculated in constant 2026 € is translated into nominal € using the assumed annual inflation rate of 2%.

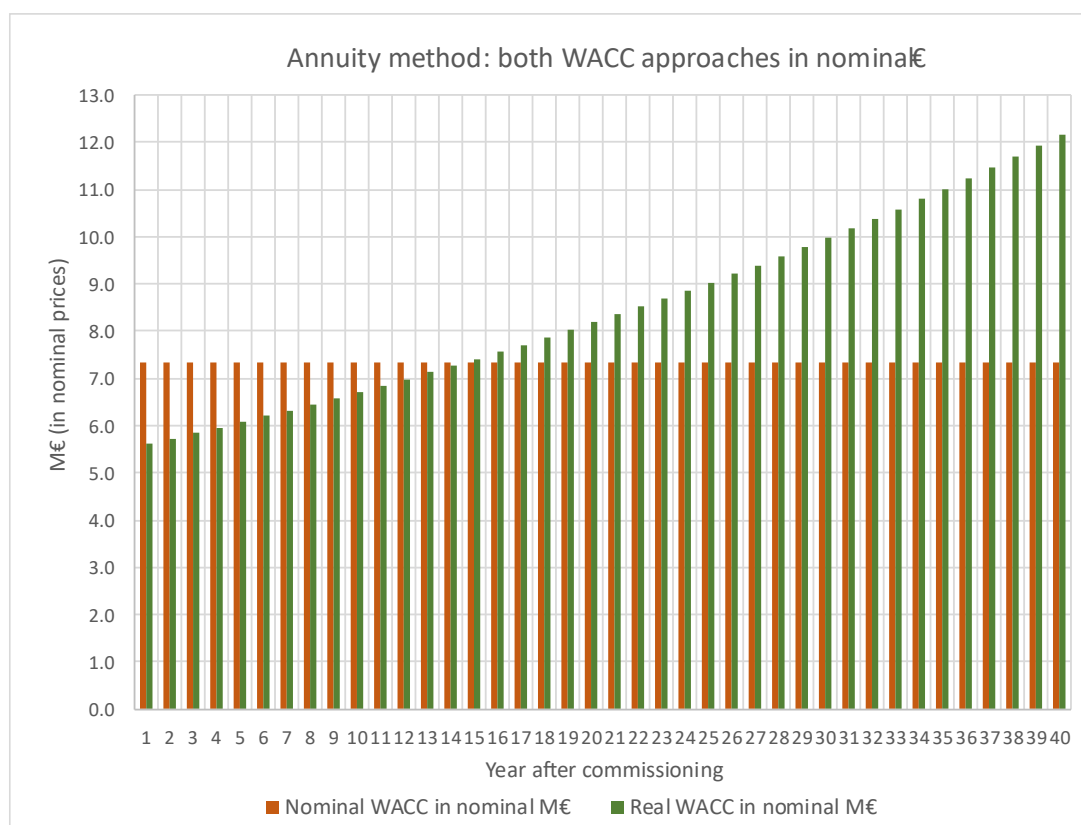


Figure 7: Comparison of the nominal and real WACC approaches under the annuity depreciation method, with both capital recovery charges expressed in nominal €. The real WACC charge is initially calculated in constant 2026 € and subsequently indexed using the assumed annual inflation rate of 2%.

Under the nominal WACC approach, the annuity remains constant at approximately 7.35 M€ in nominal € throughout the recovery period. Under the real WACC approach, the annuity remains constant at approximately 5.62 M€ in constant 2026 € but increases in nominal € when adjusted for inflation. The two approaches therefore produce different nominal payment profiles: the nominal WACC approach provides a level nominal charge, whereas the real WACC approach preserves a level charge in purchasing-power terms and shifts a larger share of nominal recovery to later years.

4.2.5 Advantages and limitations

Advantages:

- Produces a stable and predictable annual charge throughout the depreciation period.
- Explicitly incorporates both recovery of the CAPEX and the cost of capital.
- Aligns conceptually with infrastructure-finance structures that match debt repayment profiles to expected project cash flows.
- Can support stronger and more stable DSCR performance where the regulatory annuity is aligned with the project's actual debt-service profile and permitted revenue recovery.
- Consistent with NPV, IRR and WACC-based business-case methodologies.
- Can contribute to a more even distribution of capital costs between generations of consumers.

Limitations:

- A little more complex to calculate and explain than linear depreciation.
- Requires assumptions regarding the WACC and financing conditions.
- Results are sensitive to the selected WACC and depreciation period.
- Does not explicitly account for consumer growth.
- May result in relatively high capital charges during the early years of projects with low initial heat demand.

4.3 Progressive (back-loaded) depreciation

4.3.1 Definition

Progressive (back-loaded) depreciation is a depreciation method in which the annual depreciation charge increases over time. Unlike linear depreciation, where the same amount is recovered every year, back-loaded depreciation intentionally delays a large share of the investment recovery to later years.

The underlying rationale is that DH infrastructure assets are in some cases intended to accommodate future consumers or future heat demand. This method therefore seeks to improve intergenerational cost allocation by reducing the burden placed on consumers during the early years of a project and increasing the contribution of future consumers as the network matures and utilization increases.

4.3.2 Methodology

Just like for linear depreciation, the cost of capital is not included in the depreciation method itself and should be added to the annual depreciation to calculate the annual capital recovery charge.

The capital recovery charge for the year (t) can be calculated as follows:

$$\text{Capital Recovery Charge}(t) = \text{Depreciation}(t) + \text{Cost of Capital}(t)$$

With:

$$\text{Cost of capital}(t) = \text{RAB}(t) * \text{WACC}$$

There is no standard methodology for back-loaded depreciation. One possible mathematical formulation to assess the depreciation value is:

$$\begin{aligned} \text{Depreciation}(t) &= \text{Depreciation}(0) (1 + g)^{t-1} \\ \text{Depreciation}(0) &= \text{CAPEX} \frac{g}{(1 + g)^n - 1} \end{aligned}$$

Where:

- (CAPEX) is the initial investment costs
- (n) is the depreciation period in years
- (g) is the annual depreciation growth rate – in other words, the rate at which cost recovery is shifted toward future consumers

4.3.3 Practical application of the method

The following example illustrates a CAPEX of 100 M€, depreciated over a period of 40 years.

For the theoretical approach, assuming an exemplary annual depreciation growth rate (g) of 3%, the annual depreciation in year t is calculated using the following expression:

$$\text{Depreciation}_t = 100 \text{ M€} \times \frac{0.03}{(1 + 0.03)^{40} - 1} \times (1 + 0.03)^{t-1}$$

This results in an annual depreciation of approximately 1.3 M€ in Year 1, 2.3 M€ in Year 20 and 4.2 M€ in Year 40.

In practice, however, regulatory applications often rely on simpler stepwise depreciation schedules. The allocation percentages are typically chosen to reflect expected network development, consumer growth, heat-demand growth, or broader regulatory objectives.

Using the same example as above, the 100 M€ investment depreciated over 40 years could be allocated as shown in Table 1.

Period	Depreciation share	Annual depreciation
Years 1-10	15%	1.5 M€/year
Years 11-20	20%	2.0 M€/year
Years 21-30	30%	3.0 M€/year
Years 31-40	35%	3.5 M€/year

Table 1: Practical implementation example of the back-loaded depreciation method.

Figure 8 illustrates the depreciation profiles obtained using the two different approaches to progressive depreciation mentioned above:

- The first approach is a theoretical formulation based on different values of the growth parameter (g), where higher values result in a more pronounced back-loading of depreciation and a larger share of the investment being recovered in later years.
- The second approach is practical implementation based on the stepwise depreciation schedule presented in Table 1, where the annual depreciation charge increases gradually throughout the assets' lifetime.

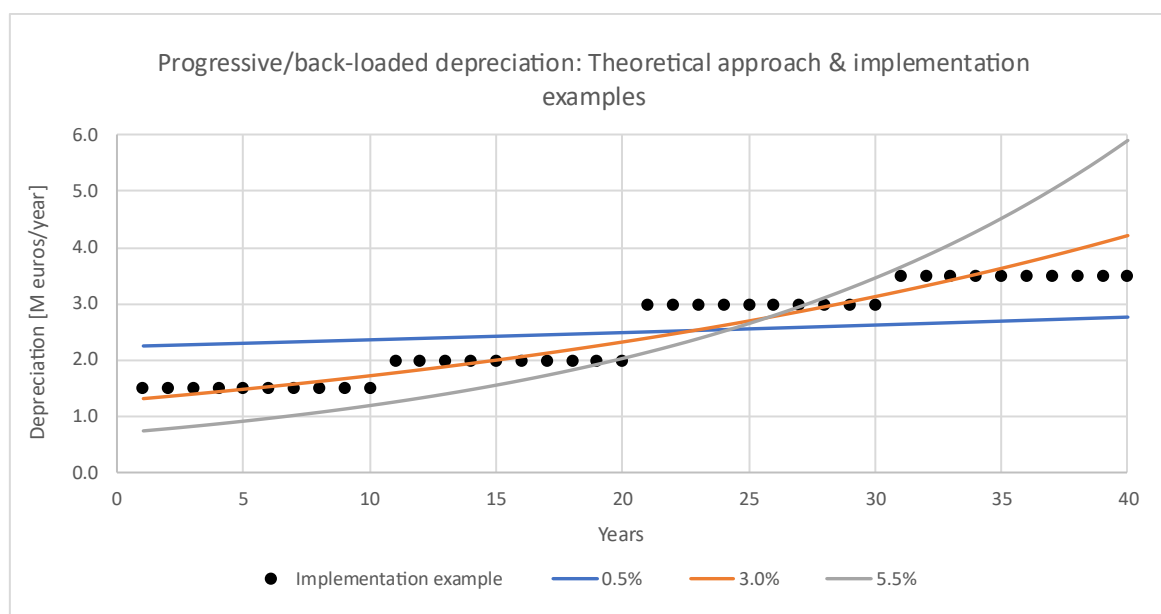


Figure 8: Comparing different approaches for calculating progressive / back-loaded depreciation: a theoretical approach and a practical implementation examples.

The cost of capital and the resulting capital recovery charge are calculated using the same approach as for the linear depreciation method:

- In Year 1, the remaining value of the RAB is equal to the initial investment cost of 100 M€. The annual cost of capital is therefore $100 \text{ M€} \times 6.83\% = 6.83 \text{ M€}$. Combined with the annual depreciation of 1.5 M€ (in the case of the practical example), this results in a total capital recovery charge of 8.33 M€.
- In Year 2, the assets were again depreciated by 1.5 M€, reducing the remaining asset value to $100 \text{ M€} - 1.5 \text{ M€} = 98.5 \text{ M€}$. The cost of capital is therefore $98.5 \text{ M€} \times 6.83\% \approx 6.73 \text{ M€}$. The corresponding capital recovery charge becomes $1.5 \text{ M€} + 6.73 \text{ M€} \approx 8.23 \text{ M€}$.
- The same calculation is repeated each year. As the asset is depreciated, the RAB gradually declines, resulting in a decreasing cost of capital over time. By Year 40, the remaining asset value at the beginning of the year is 3.5 M€, and the corresponding cost of capital is $3.5 \text{ M€} \times 6.83\% \approx 0.24 \text{ M€}$.
- At the end of Year 40, the final depreciation charge is applied, the investment is fully recovered, and the RAB reaches zero. Consequently, no further cost of capital is associated with the asset.

Figure 9 and Figure 10 illustrate the evolution of the annual depreciation charge and cost of capital over the depreciation period for respectively the nominal WACC approach in nominal and real values, using the practical application example (Table 1).

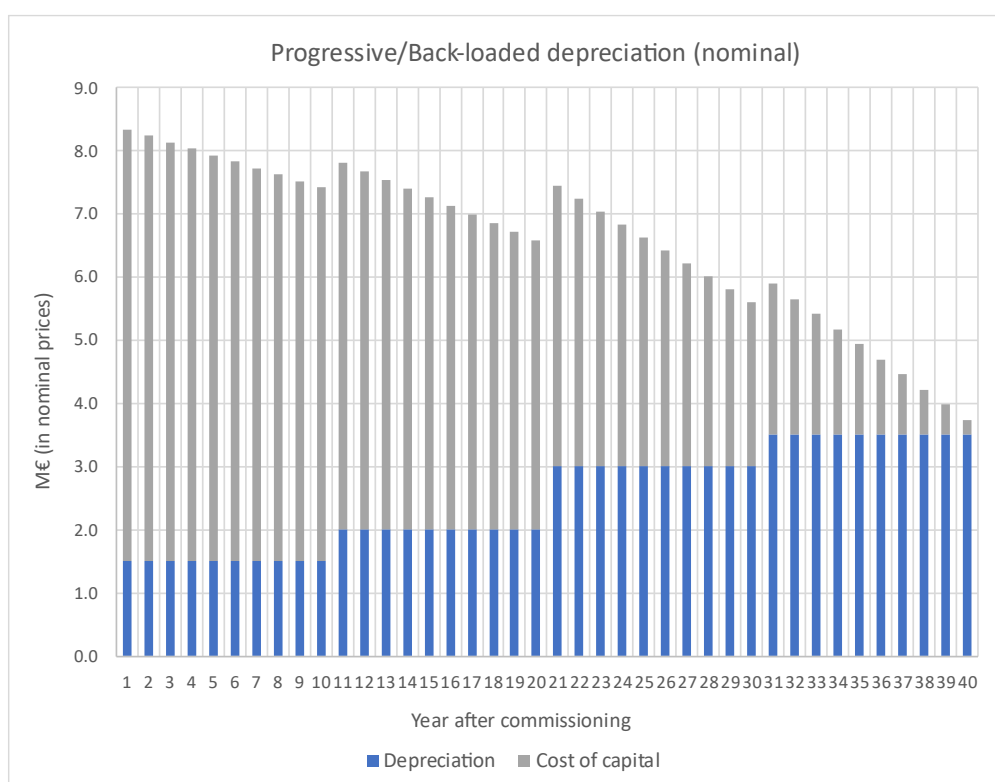


Figure 9: Annual depreciation and cost of capital using the nominal WACC approach in nominal values and progressive/back-loaded depreciation method.

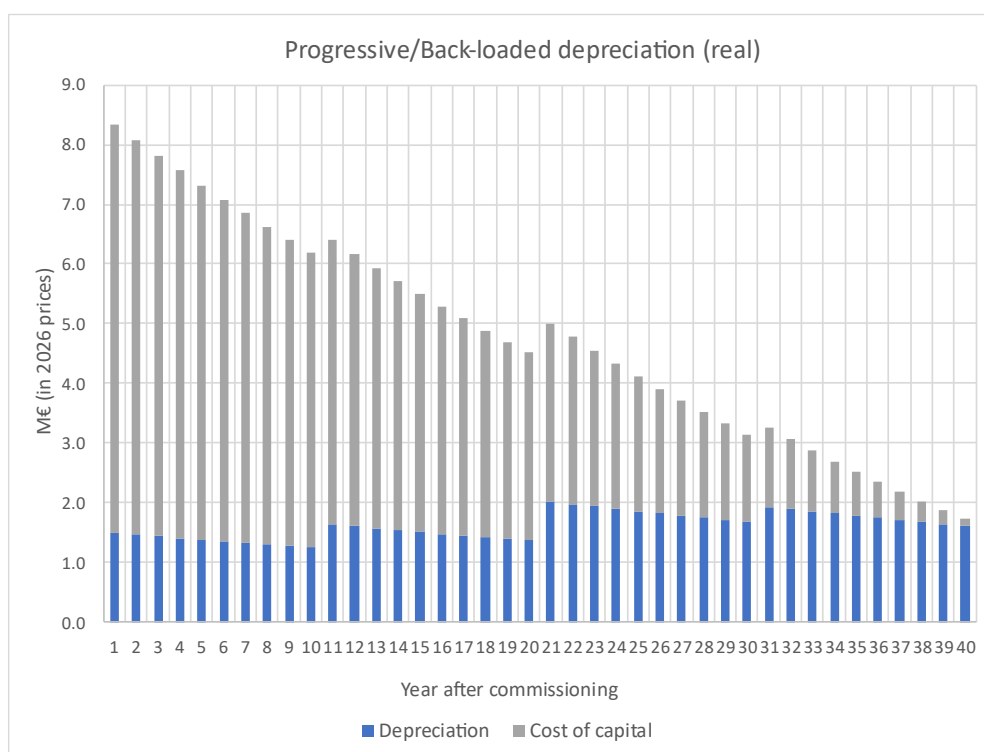


Figure 10: Annual depreciation and cost of capital using the nominal WACC approach in real values and progressive/back-loaded depreciation method.

Under either approach, progressive depreciation shifts more asset recovery to later years, while the return on the remaining RAB declines in the terms used for the calculation. With a nominal WACC and charges calculated in nominal € on an unindexed RAB inflation is reflected in the allowed rate, so later charges lose purchasing power. When calculated in real values, the RAB and charges are expressed in constant 2026 € and translated into nominal € through indexation. This preserves the purchasing power of unrecovered capital and may result in higher nominal amounts payable by later consumers, even where the charge declines in constant-price terms. The choice therefore affects how inflation risk and the burden of later recovery are shared over time.

A progressive (back-loaded) depreciation profile does not necessarily imply that the total capital recovery charge increases each year. Although the depreciation component increases over time, the return on the declining RAB may decrease by a larger amount, resulting in a declining total charge in either real or nominal €. The nominal development depends on the interaction between the depreciation profile, RAB development and indexation. A comparison between nominal and real WACC approaches is carried out in the next section.

When the capital recovery charge is calculated, the tariffs associated with the initial investment depreciation and its associated cost of capital can be estimated by dividing it by the energy sales.

Using the stepwise depreciation schedule above and assuming heat sales rise from 20 GWh in Year 1 to 30 GWh by Year 5, the capital-cost component falls as the charge is spread over more heat sales. With a 6.83% nominal WACC, the Year 1 charge is 1.5 M€ depreciation plus 6.83 M€ return on the 100 M€ opening RAB, or 8.33 M€—approximately 417 €/MWh. By Year 5, the opening RAB is 94 M€ after four years of 1.5 M€ depreciation. The charge is therefore 1.5 M€ plus 6.42 M€ return, or approximately 7.92 M€—approximately 264 €/MWh at 30 GWh of heat sales.

4.3.4 Comparison of nominal and real WACC approaches

To provide a like-for-like comparison of the amounts payable by consumers over time, Figure 11 expresses the capital recovery charges under both approaches in nominal €. Under the real WACC approach, the charge calculated in constant 2026 € is translated into nominal € using the assumed annual inflation rate of 2%.

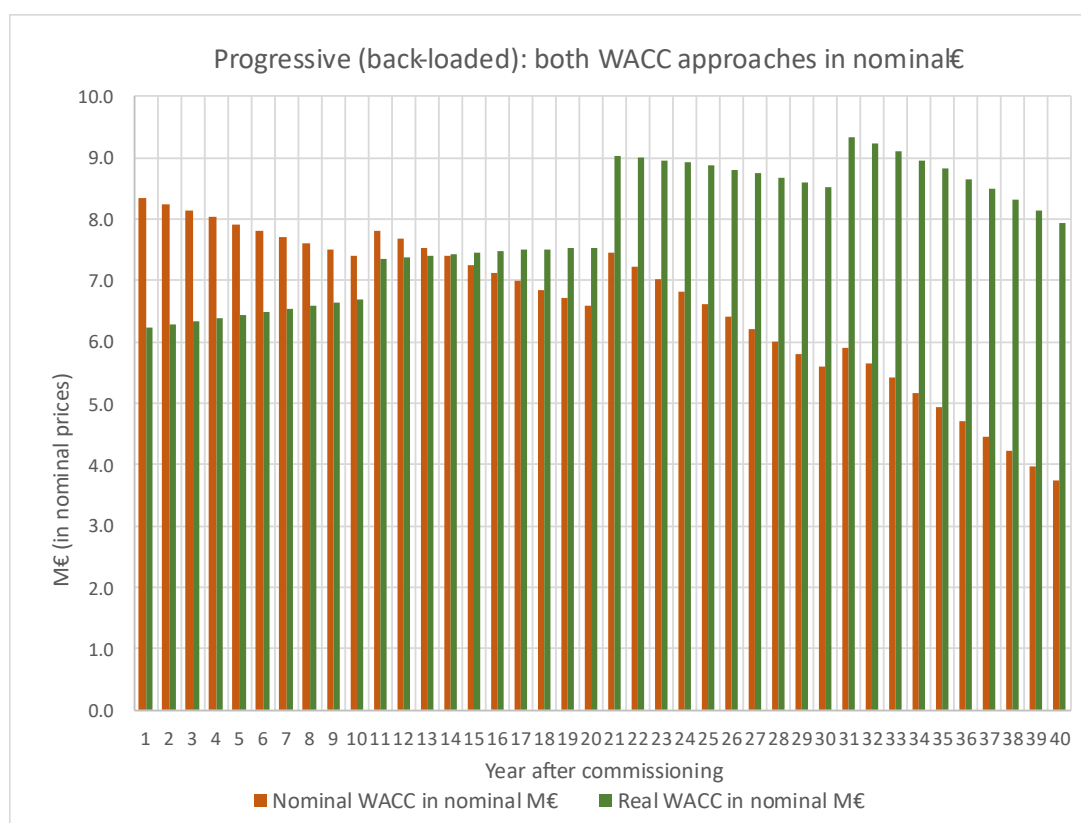


Figure 11: Comparison of the nominal and real WACC approaches under the progressive (back-loaded) depreciation method, with both capital recovery charges expressed in nominal €. The real WACC charge is initially calculated in constant 2026 € and subsequently indexed using the assumed annual inflation rate of 2%.

The stepwise depreciation schedule raises both charges in Years 11, 21 and 31. Between these increases, the nominal WACC charge declines as the return on the RAB falls; the real WACC charge, shown in nominal €, may rise or fall within each period because it also includes inflation adjustments.

The comparison also demonstrates that a back-loaded depreciation profile does not necessarily imply that the total capital recovery charge increases every year. “Back-loaded” describes the timing of depreciation recovery, whereas the development of the total charge reflects the combined effect of depreciation, the return on the remaining RAB and, under the real WACC approach, indexation.

The real WACC profile is lower in nominal € during the early years but becomes higher later in the recovery period because indexation preserves the purchasing power of the unrecovered capital. This shifts a larger share of nominal recovery to later years and increases reliance on future consumers and revenues.

The higher nominal amounts in later years do not in themselves indicate overcompensation, as the present value of the accumulated capital recovery charge equals 100 M€ for both approaches.

4.3.5 Advantages and limitations

Advantages:

- Reduces tariff levels during the early years of network development and supports affordability during consumer acquisition and market expansion.
- Better aligns cost recovery with expected growth in network utilization and allows future consumers to contribute to the recovery of a larger share of investments from which they benefit (assuming that forecasts are correct).
- Can improve perceived intergenerational fairness for growing DH systems (assuming that forecasts are correct).

Limitations:

- More complex methods and more challenging to explain and administer from a regulatory perspective.
- Requires assumptions regarding future network development and consumer growth.
- Delays capital recovery and increases reliance on future revenues, thereby increasing the risk. This is because a larger share of the depreciation is recovered later, increasing reliance on future consumers and revenues. Indexation under a real WACC approach may further increase the nominal amounts payable in later years, although this does not in itself indicate overcompensation.
- Maintains a larger RAB for a longer period, increasing cumulative financing costs.
- May weaken DSCR performance during the first years of operation.

4.4 Growth-adjusted depreciation

4.4.1 Definition

Growth-adjusted depreciation is a depreciation method in which the recovery of costs is linked to the expected utilization of the DH system. Annual capital recovery charges are adjusted according to the expected number of consumers connected, the expected amount of heat delivered, or the expected utilization and benefits derived from the DH infrastructure.

The underlying principle is that consumers should contribute to the recovery of costs in proportion to the benefits they receive from the DH infrastructure. As a result, the method seeks to align cost recovery with the gradual development and maturation of DH.

This method is often viewed as one of the strongest implementations of the beneficiary-pays principle⁸ and is particularly relevant for newly established DH systems or major network expansion projects where significant growth in the number of consumers and/or the heat demand is expected.

⁸ Principle whereby the costs of an investment are allocated to the consumers who benefit from the associated infrastructure.

4.4.2 Methodology

Under the growth-adjusted method applied in the calculation example, the total capital recovery requirement is allocated in proportion to the expected number of connected customers in each year. An alternative approach would be to keep cost of capital independent of consumer growth, to avoid situations where the method does not recover adequate costs to service cost of capital (and additional loans could be necessary). However, this would fundamentally alter the method's growth-adjusted nature, as it would result in high payments being charged to a small number of customers in the early years. The method therefore seeks to maintain a broadly constant capital recovery charge per customer-year within the price convention applied.

The annual capital recovery charge is calculated as:

$$\text{Capital recovery charge (t)} = K \times N_t$$

Where:

- (N_t) is the expected number of connected customers in year t
- (K) is the permitted capital recovery charge per customer-year

Under the nominal WACC approach, K is determined so that the undiscounted annual depreciation amounts sum to the approved depreciable asset value, while the cost-of-capital component is calculated by applying the nominal WACC to the opening nominal RAB:

$$\begin{aligned}\text{Cost of Capital}_t &= WACC_{\text{nominal}} \times RAB_t \\ \text{Depreciation}_t &= CRC_t - \text{Cost of Capital}_t\end{aligned}$$

The RAB is subsequently reduced by the annual depreciation.

Under the real WACC approach, the corresponding capital recovery requirement is determined in constant 2026 € using the real WACC. The real customer-year charge is calibrated so that the present value of the recovery stream equals the approved depreciable amount. The resulting constant-price charges are subsequently translated into nominal € using the assumed price index.

The method therefore differs from an approach in which depreciation alone is allocated according to customer growth. In the calculation example, the total capital recovery charge is allocated according to customer-years, while depreciation is the residual amount after deducting the allowed return on the RAB.

4.4.3 Practical application of the method

The following example illustrates a CAPEX of 100 M€, depreciated over a period of 40 years.

Table 2 presents an exemplary customer growth scenario used to demonstrate the application of the growth-adjusted depreciation method.

Period	Total number of connected customers
Years 1-10	1,000
Years 11-20	2,000
Years 21-30	3,000
Years 31-40	4,000

Table 2: Example of development in customer numbers over time.

The total cumulative customer-years over the depreciation period amount to 1,000 customers * 10 years + 2,000 customers * 10 years + 3,000 customers * 10 years + 4,000 customers * 10 years = 100,000 customer-years.

The resulting annual depreciation becomes:

Period	Formula	Annual depreciation
Years 1-10	$100 \text{ M€} * \frac{1,000}{100,000}$	1 M€/year
Years 11-20	$100 \text{ M€} * \frac{2,000}{100,000}$	2 M€/year
Years 21-30	$100 \text{ M€} * \frac{3,000}{100,000}$	3 M€/year
Years 31-40	$100 \text{ M€} * \frac{4,000}{100,000}$	4 M€/year

Table 3: Example of annual depreciation for this example.

As shown in Table 3, annual depreciation increases progressively from 1 M€/year during years 1-10 to 4 M€/year during years 31-40. Table 3 presents the depreciation component only. The total capital recovery charge also includes the allowed cost of capital and is calculated separately below.

The example below shows how the capital recovery requirement is allocated across the assumed customer profile:

The assumed customer profile corresponds to 100,000 customer-years over the 40-year recovery period. Including the cost of capital, the capital recovery charge under the nominal WACC approach is approximately 2,742 € per customer-year.

This results in total annual charges of approximately 2.74 M€ for 1,000 customers in Years 1-10, 5.48 M€ for 2,000 customers in Years 11-20, 8.22 M€ for 3,000 customers in Years 21-30 and 10.97 M€ for 4,000 customers in Years 31-40. The total charge increases with the number of connected customers, while the nominal charge per customer remains constant.

Under the real WACC approach, the charge per customer-year is constant in 2026 € and subsequently indexed to nominal €. Its nominal amount therefore increases over time, while its purchasing power remains constant.

Figure 12 and Figure 13 illustrate the evolution of the annual depreciation charge and cost of capital over the depreciation period for respectively the nominal and real WACC approaches. As both figures show

with the orange columns, the method implies a risk that the recovered capital does not meet the capital costs until a certain level of growth is reached, resulting in under coverage. To ensure the levelized distribution of costs in the method, this under coverage should also be deterred throughout the full period.

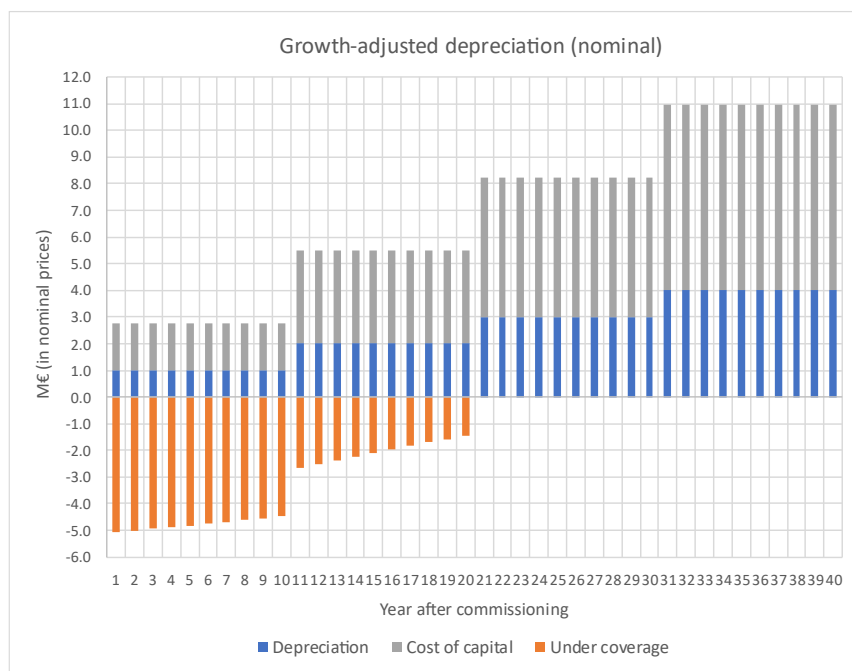


Figure 12: Annual depreciation and cost of capital using the nominal WACC approach in nominal values and growth-adjusted depreciation method.



Figure 13: Annual depreciation and cost of capital using the nominal WACC approach in real values and growth-adjusted depreciation method.

Under the growth-adjusted method, the total capital recovery charge is allocated in proportion to the assumed number of connected customers. The total annual charge therefore increases in steps when

the customer base increases. Within each period, the charge is stable in the price terms used for the calculation, while its composition between depreciation and the return on the RAB changes as the RAB develops over time.

Under the nominal WACC approach, the charge per customer-year is constant in nominal €, and the nominal WACC is applied to an unindexed RAB. Under the real WACC approach, the charge per customer-year is determined in constant 2026 € and subsequently translated into nominal € through indexation. The two approaches therefore produce different nominal timing profiles: the nominal approach maintains a constant charge per customer-year in nominal terms, whereas the real approach maintains a constant charge per customer-year in purchasing-power terms. Indexation may result in higher nominal amounts in later years, but this does not in itself indicate overcompensation.

When the capital recovery charge is calculated, the tariffs associated with the initial investment depreciation and its associated cost of capital can be estimated by dividing it by the energy sales.

In the nominal WACC example, the annual capital recovery charge is approximately 2.74 M€ for 1,000 connected customers, 5.48 M€ for 2,000 customers, 8.22 M€ for 3,000 customers and 10.97 M€ for 4,000 customers. This corresponds to an approximately constant nominal capital recovery charge of 2,742 € per connected customer per year.

Under the real WACC approach, the charge is initially calculated in constant 2026 € and subsequently indexed to nominal €. The nominal payment per customer therefore changes over time, even where the charge remains stable in purchasing-power terms.

4.4.4 Comparison of nominal and real WACC approaches

To provide a like-for-like comparison of the amounts payable by consumers over time, Figure 14 expresses the capital recovery charges under both approaches in nominal €. Under the real WACC approach, the charge calculated in constant 2026 € is translated into nominal € using the assumed annual inflation rate of 2%

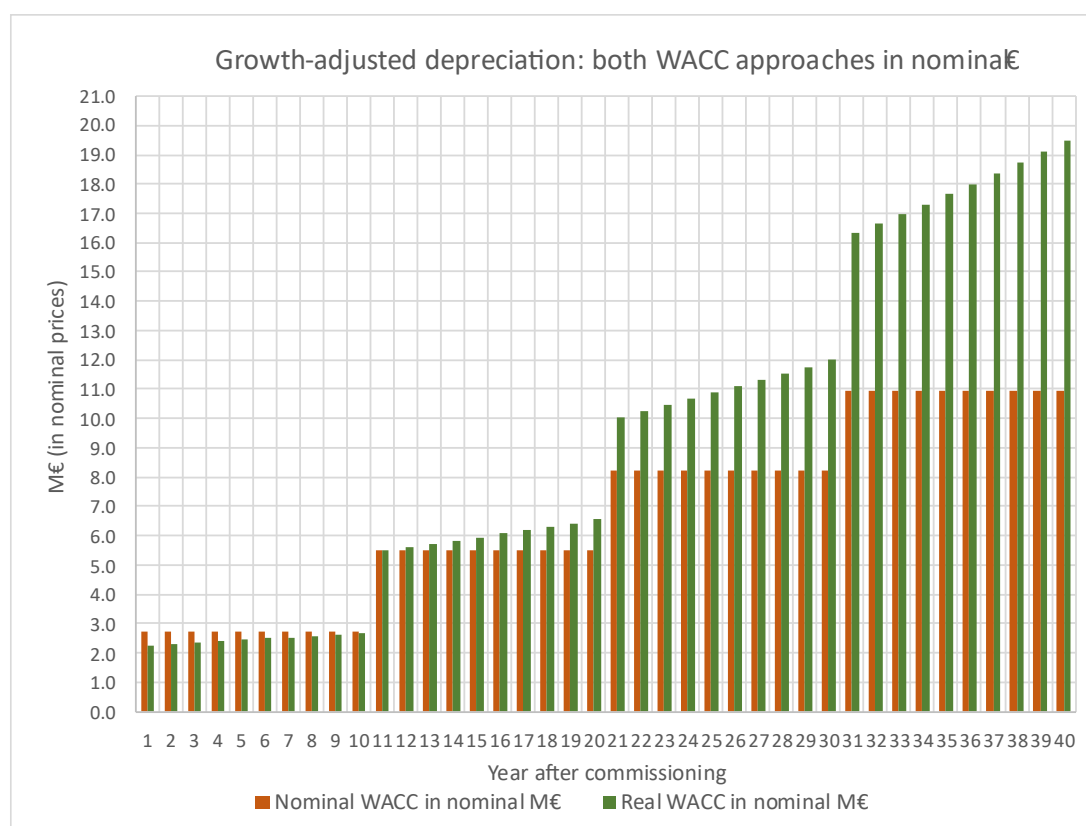


Figure 14: Comparison of the nominal and real WACC approaches under the growth-adjusted depreciation method, with both capital recovery charges expressed in nominal €. The real WACC charge is initially calculated in constant 2026 € and subsequently indexed using the assumed annual inflation rate of 2%.

The comparison shows that the growth-adjusted method produces step changes in the annual capital recovery charge when the assumed number of connected customers increases. Under the nominal WACC approach, the charge increases proportionally with customer numbers, resulting in a constant nominal charge per customer-year within the assumptions of the example.

Under the real WACC approach, the charge is initially determined in constant 2026 € and subsequently indexed. The resulting nominal profile therefore reflects both the assumed increase in connected customers and cumulative inflation. The real WACC in nominal values has a slightly lower charge than the nominal WACC charge during the first period, but becomes equal around year twelve and then gradually higher, as the difference increases materially over time as indexation accumulates.

The higher nominal charges in later years do not in themselves indicate overcompensation. They reflect the combination of a larger assumed customer base and preservation of the purchasing power of

unrecovered capital. The regulatory assessment should instead consider whether the customer forecast is realized, whether the indexed RAB is correctly reconciled and whether the present value of the permitted recovery corresponds to the approved depreciable amount and allowed return.

4.4.5 Advantages and limitations

Advantages:

- Strong alignment between beneficiaries and payers and explicitly reflects consumer growth and network maturation (assuming that forecasts are correct).
- Reduces tariff burdens during the early years of network development and can improve affordability during consumer acquisition phases.

Limitations:

- Best suited to short ramp-up periods, minimizing periods of few customers and high capital costs.
- Relies heavily on forecasts of future consumer connections or heat demand and may require periodic updates when growth assumptions change.
- Cost recovery may be delayed if expected growth does not materialize, thereby making this method riskier.
- Maintains a larger RAB for longer periods, hence increasing cumulative financing costs.
- Can result in weaker early-year cash flow and DSCR performance.
- More complex method, which is more challenging to explain and administer from a regulatory perspective.
- The method requires the permitted capital recovery requirement per customer-year to be recalibrated when actual customer growth differs from the forecast. Without a predefined reconciliation mechanism, deviations in customer uptake may result in under- or over-recovery or transfer a disproportionate burden to later consumers.

5 Regulatory and practical context

5.1 Relevant legislation in the Netherlands

Unlike Denmark, the Netherlands does not apply a general “break-even” principle to all district-heating companies (the Danish “break-even” principle is described in the following section). The Wcw’s non-profit or cost-recovery principle applies specifically to heat communities, while other heat companies may recover efficiently incurred costs and earn a reasonable return. A WACC of up to 7.3%, provided by ACM, applies only to the current 2026–2028 regime and does not determine the allowed return under the future cost-based framework. That return will be established separately and does not need to correspond to the operator’s actual financing structure. Operators may choose to accept a lower return where this is compatible with their ownership objectives or financing model.

For collective heat systems with more than 1,500 consumers, designated heat companies must ultimately have a public majority interest of more than 50% or be organized as a heat community. Systems below the 1,500-consumer threshold may qualify as small collective heat systems and are not subject to the same ownership requirement. Existing private-majority networks will have a transition period of 14–30 years, depending on network saturation and the agreements with the municipality, while new networks may have an initial ownership transition period of up to 10 years.

Municipal executives define heat-zone boundaries and designate the heat company responsible for each area. The municipality approves the underlying project, while ACM assesses draft investment plans and takes the municipality’s views into account. ACM’s role is advisory rather than formal approval or rejection of the investment plan: the designated heat company must explain whether and how ACM’s assessment has been reflected in the final plan. There is no general obligation for consumers to connect to a heat network. However, a municipality may use its environmental plan to remove an area from the gas system, which can materially affect the available heating alternatives.

Dutch heat projects use a mixture of public, private and institutional equity combined with term loans, revolving credit facilities and project financing. Some companies borrow from the Bank Nederlandse Gemeenten (BNG), although these loans do not generally provide the same interest-rate advantage as the Danish KommuneKredit model (explained in the next section). The Netherlands is developing the Garantierегeling Warmtenetten (GRW) as a direct state-guarantee scheme. The scheme is intended to cover part of lenders’ credit risk, improve access to debt financing, reduce financing costs and limit the amount of public equity required.

The 2024 consultation draft of the Bcw, which is still under development, proposed a maximum regulatory depreciation period of 30 years⁹. Upfront connection contributions are generally deducted from the regulatory asset value, thereby reducing the amount recovered from future tariffs and already functioning as an intergenerational cost-allocation instrument. For surplus heat, arrangements are generally based on voluntary agreements that allocate costs and responsibilities between the heat supplier and

⁹ Similar to the rules in Denmark, see section 5.2.

the district-heating company, including the boundary between installations located inside and outside the supplier's site.

5.2 Experience from Danish DH systems

The fundamental principle in Danish DH is the “hvile-i-sig-selv” or “break-even” principle, which means that no profit may be made from producing heat for space heating and tap water. In return, all necessary costs may be recovered through charges to consumers. This is regulated by the Danish Heat Supply Act, which defines necessary costs and specifies where a profit may be included, for example from the sale of heat based on renewable energy. A return on equity may likewise be included as a necessary cost, together with income from electricity sales.

Under Danish legislation, investments may be depreciated over a maximum of 30 years. However, new legislation is being prepared that will allow pipeline infrastructure to be depreciated over 45 years. Most Danish DH companies borrow through KommuneKredit¹⁰, where the interest rate is known and no contribution margins change over the loan period. Hence, the financing costs throughout the loan term are known from the beginning, although a variable interest rate may be selected. A KommuneKredit loan requires the relevant municipality to issue a municipal guarantee for the loan. No municipal guarantee has yet been activated in Denmark. However, as the Danish DH sector has become more commercialized over the past ten years, and the rule for mandatory connection to DH is no longer in effect, project risk has increased.

Repayment of the long-term loan is initiated only when the facility is commissioned, and the depreciation period also begins at that point. During construction, costs are financed through a construction credit facility—an interest-only loan—with the interest expenses subsequently being included as part of the project costs.

The municipal guarantee, which may also be used for loans from private lenders, makes it possible to borrow over a long period and thereby spread depreciation over many years. The loan term should never exceed the actual lifetime of the assets, so that depreciation is not charged on assets that have been taken out of service. When providing a guarantee, municipalities charge a guarantee-fee that is based on the project's risk profile as on commercial terms.

With a municipal guarantee, it is possible to obtain a “construction credit”, which postpones raising the permanent loan, and therefore the commencement of loan repayments, until the construction phase is completed and the utility becomes operational. During the construction period, interest is paid on the construction credit. The interest rate on the permanent loan is not fixed until the loan is raised.

There is no formal requirement for uniform depreciation, only a maximum depreciation period. This means that assets may either be depreciated more heavily at the beginning to create room for new

¹⁰ Backed by a guarantee from a municipality or region, local companies, associations, and institutions can borrow funds from KommuneKredit with low interest rates for a wide range of projects. <https://www.kommunekredit.dk/>

investments, or less at the beginning, if they will not be fully utilized until several years later. Depreciation is usually annuity, but as noted, circumstances may justify deviating from this approach. Many DH companies apply different depreciation periods to different asset categories, such as buildings, pipelines and production facilities. Long depreciation periods make many more projects financially viable and contribute to more stable heat prices, reducing the risk that consumers are connected to DH at a time of high depreciation caused by a short payback period. Distributing investment financing costs over the full asset lifetime requires access to long-term, low-risk loans so that interest rates remain low and do not include high risk premiums.

In Denmark, there are no rules governing capital costs as such, but there are rules concerning the depreciation of assets. These rules allow costs included in the tariff to be deferred during the ramp-up period. However, this requires an overdraft credit, which must be repaid in subsequent years. If requirements are imposed on how capital costs are included in tariffs, it becomes more difficult to defer costs during the ramp-up period. Another mechanism would therefore be needed to reduce the costs included in tariffs during this period, such as a repayment-free or partial repayment-free period.

DH projects often consist of a portfolio of assets. Each of them can be depreciated based on their own depreciation method and depreciation period. Over time, DH companies typically manage multiple overlapping depreciation schedules associated with investments commissioned at different points in time. Previously, there was a tendency to adjust depreciation from year to year in response to production costs, using depreciation to maintain a reasonably stable heat price. This approach risks deferring an economic burden unless it is ensured that cumulative depreciation is always lower than under linear depreciation.

Under the “break-even” principle, revenue and expenditure must balance. However, because annual conditions cannot be perfectly predicted — for example, heat sales depend heavily on how cold and long the winter is, which is coupled with the uncertainty regarding energy prices (gas, electricity, etc.) - there will usually be either over-recovery or under-recovery. This must subsequently be reflected in the accounts for coming years, where heat production costs are recovered through the variable tariffs. Under special circumstances, surpluses (over-recovery) may be set aside for specific projects. For example, where a fully depreciated straw-fired boiler can continue supplying heat for several more years, the heat price may be maintained and the accumulated over-recovery reserved for a new production facility. This allows a stable heat price to be maintained instead of reducing it for a few years and then increasing it again.

For certain facilities in Denmark, decommissioning is required by law. A fixed annual amount, indexed to inflation, is set aside each year for dismantling the facility. The amount may also be adjusted in response to changes in dismantling requirements. The funds are deposited in a dedicated account, thereby ensuring that financing is available for decommissioning the facilities.

In Denmark, the Danish Utility Regulator monitors whether heat prices comply with the legislation. DH companies are legally required to submit price documentation to the regulator. Part of the supervision is based on complaints submitted by consumers or other stakeholders, which are then reviewed by the

regulator. Most DH companies aim to maintain a stable heat price, and significant changes must be announced with three months' notice.

5.3 Historical DH prices in Denmark

The historical DH prices in Denmark are collated using data published by Forsyningstilsynet (Danish Utility Regulator) (Forsyningstilsynet, 2026) for the weighted average annual heat bill for a standard house¹¹ connected to DH. The weighted average takes the size of the DH utility into account. The data from Forsyningstilsynet is corrected for inflation per January 2026 and converted to €.

Figure 15 and Figure 16 present the weighted average annual heat bill for a standard consumer in Denmark along with the percentage change in these bills at selected January and August observations from 2014 to 2026. Positive values in Figure 16 indicate an increase compared to the previous level, while negative values indicate a decrease. The figures provide an indication of both the direction and magnitude of historical tariff adjustments and illustrate the extent to which average consumer's heating bills have varied over time.

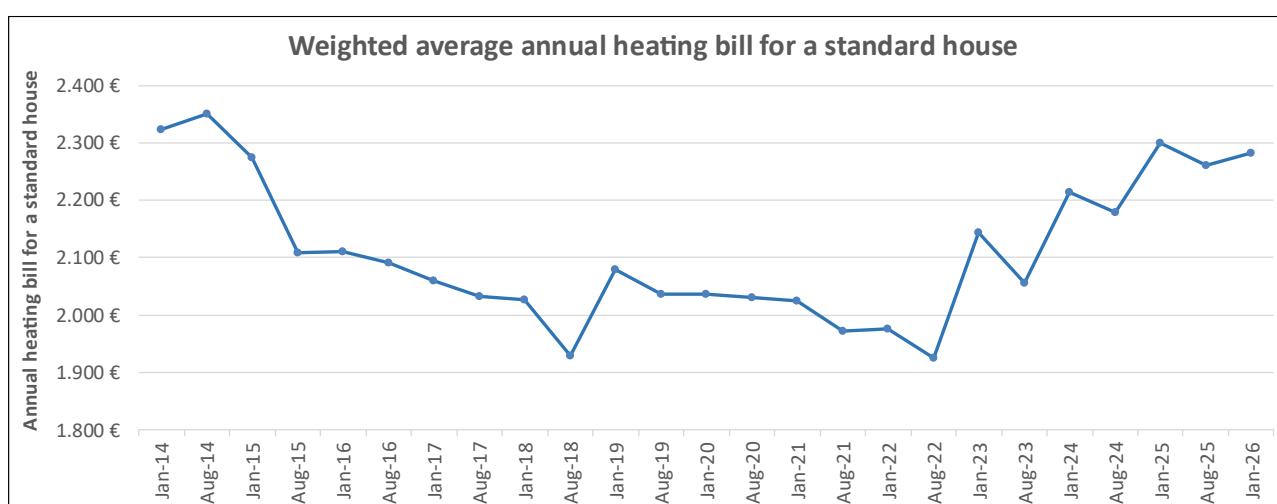


Figure 15: Development of the weighted average annual heat bill in 2026 € for a standard house in Denmark in the period between January 2014 and 2026.

¹¹ The definition of a standard house in Denmark has changed over time and is currently 125 m² with an annual heat demand of 13.4 MWh.

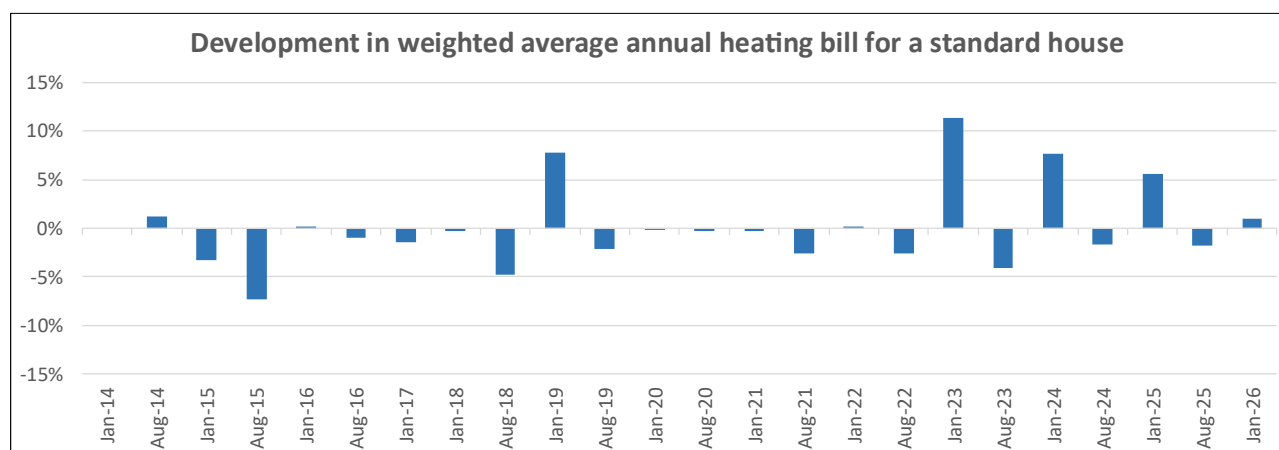


Figure 16: Comparative change in the weighted average annual heat bill for a standard house in Denmark in the period between January 2014 and 2026.

The diagrams show that the weighted average annual heating bill for a standard house did not develop smoothly between 2014 and 2026. Instead, prices alternated between increases and decreases, with relatively modest movements in most periods interrupted by several pronounced adjustments. The largest decrease occurred around August 2015, at approximately 7%, followed by another notable reduction of about 5% around August 2018. These decreases were subsequently offset by increases of approximately 8% around January 2019 and 11% around January 2023, the latter being the largest increase in the period. From 2020 to early 2022, annual price changes were generally close to zero or moderately negative, indicating a comparatively stable period, despite the ongoing pandemic at the time. This was followed by substantially greater volatility from August 2022 onwards: a decrease of roughly 3% was followed by the sharp increase in January 2023, a decline of around 4% in August 2023, and another increase of approximately 8% in January 2024. The alternating pattern continued, with a small decrease in August 2024, an increase of about 6% in January 2025, a modest decline in August 2025 and a small increase in January 2026. The developments between 2023 and 2025 can be attributed to the energy crisis in Europe initiated by geopolitical uncertainty.

The main takeaways from Figure 15 and Figure 16 are that Danish DH prices are relatively stable most of the time, but are still exposed to occasional tariff shocks. The concentration of larger increases in January suggests that major annual tariff revisions are often implemented at the start of the calendar year, whereas several mid-year observations show downward adjustments. The diagrams therefore illustrate that the Danish cost-recovery framework can accommodate both upward and downward adjustments, but does not eliminate significant year-to-year price volatility when underlying costs, investment recovery or over- and under-recovery positions change (e.g. through significant fluctuations in gas and electricity prices).

5.4 Practical examples from Denmark

A few practical examples from Danish DH systems are presented below. The examples showcase how Danish DH companies work with levelized investment costs in practice and exemplify their room for

maneuvering (flexible depreciation periods, pre-investment reserves, and multi-year smoothing of over- and under-recovery).

The following cases are based on interviews with different types of DH companies.

5.4.1 Hedensted Fjernvarme (existing DH system)

Hedensted Fjernvarme (Hedensted District Heating) was founded by residents in 1960, and the first DH plant was built the following year. Hedensted is a medium-sized town in central Jutland with a mixture of single-family houses, industrial areas and a commercial area in the town center. Hedensted Fjernvarme currently continues to expand the DH network to new parts of town, both to existing residential areas and new neighborhoods. The company is a cooperative and all DH consumers are co-owners.

Number of residents	Number of DH consumers	DH heat demand	Density
10,000	3,800	60,000 MWh/year	Varied

Hedensted Fjernvarme uses a multi-part tariff structure, where the consumer's annual payment consists of an area-based fixed charge (house floor area in m²), a fixed meter charge, and a variable energy charge per MWh delivered. In addition, a performance-based tariff is applied in cases of insufficient cooling (i.e. not reaching a low enough return temperature), along with separate connection and service fees.

Connection of new consumers is charged separately through a connection fee, an area-based connection charge, and a service pipe charge per running meter. In 2026, the connection fee for a household is approx. 2,300 € including VAT for new development areas and approx. 1,150 € for connections to the existing network. The area-based connection charge is structured in tiers for commercial consumers, while service pipes are charged at approx. 220 € per meter. This separation distinguishes the one-time costs for network connection from the ongoing charges for capacity and heat supply.

For a standard house at 125 m² with an annual heat consumption of 13.4 MWh the total annual payment based on 2026 prices amounts to approx. 2,175 € including VAT: (1,525 € in variable charges) + (545 € in area-based charges) + (105 € in meter charges). Accordingly, approximately 70% of the standard consumer's bill is consumption-based, while 30% consists of fixed charges. This price is relatively high compared to other DH companies in Denmark. The standard house in Denmark would use a natural gas equivalent of approximately 1,500 Nm³/year.

A fundamental challenge of area-based tariff structures: a consumer's floor area is a simple and controllable metric, but it does not necessarily reflect the capacity demand that the consumer imposes on the system. For residential properties, the simultaneous demand for space heating and domestic hot water during peak morning hours may be more relevant for system dimensioning than either total annual consumption or dwelling size. Consequently, two households with the same number of occupants may generate roughly the same capacity requirement even if their homes differ significantly in floor area. Conversely, large commercial consumers may benefit from economies of scale, which Hedensted Fjernvarme's declining area fixed charge partly seeks to reflect.

The utility has only recently realized that it needs to revise its fixed charges to differentiate between large and small properties. They are currently working out how to implement this, following a new requirement introduced by the Danish Utility Regulator. The high share of variable charges is rooted in a historical focus on encouraging energy savings and was better suited to a period characterized by lower capital intensity and competition from individual gas boilers. In modern DH systems, with substantial investments in distribution networks and production assets, and with individual heat pumps as an alternative technology, the relationship between saving incentives and cost recovery has become more complex. In 2026, Hedensted took a modest step towards a more fixed cost recovery model by reducing the price per MWh and increasing the fixed charge per square meter, explicitly citing the fact that a larger share of the utility's costs are fixed.

One option under consideration is the introduction of a seasonal variable tariff. Under this approach, the variable charge would vary from month to month to reflect the substantial differences in production costs between summer and winter. The utility also faces greater supply risk during the winter, as additional demand generally necessitates increased gas consumption, while in the summer it can largely be covered by heat pump production.

Hedensted Fjernvarme actively applies differentiated depreciation periods based on asset type, technical lifetime, operating profile, and risk considerations. Distribution networks may have a significantly longer economic lifetime than technical equipment, whereas heat pumps and other complex installations may require shorter depreciation periods in case of failures, changes in operating conditions, or if technological developments reduce their expected useful life. Therefore, the flexibility in depreciation period is an important prerequisite.

In the case of network expansion in phases, Hedensted's depreciation practice allows the depreciation profile to be adjusted so that depreciation expenses are lower during the initial years when the asset is not yet fully utilized and increase as customer connections grow and operations mature.

5.4.2 Bjæverskov Fjernvarme (new DH system)

Bjæverskov Fjernvarme (Bjæverskov District Heating) was created in 2022 with the purpose of establishing a DH system in the town of Bjæverskov. The company is a cooperative and all DH consumers are co-owners.

Bjæverskov is a small town south of Copenhagen, comprised of residential and commercial areas, with a large area of single-family houses, as well as shops and industrial areas. Before the inception of the DH utility company, the main part of the town was heated by individual gas boilers. The conversion to DH is currently ongoing and is expected to be fully completed in the early months of 2027.

Number of residents	Number of DH consumers	DH heat demand	Density
3,279	433 (currently) / 900 (expected)	26,750 MWh/year	Open-low

The tariffs are composed of rental of DH meters and a peak load payment. There is no fixed contribution per m² for private households. There is a one-time connection fee of approx. 760 €, which is cheap compared to other DH companies and to the actual cost of connecting the consumers. This approach was chosen to encourage the consumers to convert to DH, by making the transition economically attractive. It is important for the project's feasibility to get as many connections as possible early in the process.

The investment costs in the new DH utility are financed with a loan from KommuneKredit. The loan taken is a 30-year annuity loan and the DH tariffs are calculated so that the total investment budget in the new DH network is recovered. The goal for the DH utility company is to come as close to break-even as possible (neither over- nor under-recovery of funds).

KommuneKredit and Fjernvarmepuljen¹² have been essential prerequisites for the project to be implemented. Kommunekredit has made it possible to finance the project at a reasonable cost, where the municipality acted as a guarantor on the loan, thereby taking on the financial risk. Fjernvarmepuljen added a substantial contribution to the financing of the project, as it contributes approx. 2,700 € per consumer converted from gas or oil until the minimum number of connections necessary for the project to be feasible is reached. The minimum number of connections in Bjæverskov is 785, corresponding to a total subsidy of approx. 2.0 M€. As of the beginning of September 2026, 861 households and 50 future rental units had registered for connection.

The consultant on the project in Bjæverskov suggests that the former Danish scheme of obligation to connect to the collective heating system could be considered in the Netherlands, if EU legislation allows it. This scheme meant that all heat consuming properties had to connect to the DH system within 9 years of the construction of the system. All new buildings had to be connected before they could be taken into use. The scheme was abolished in Denmark in 2019. The obligation to connect to the common heating grid ensured that many more projects were feasible and the DH companies didn't have to convince consumers to connect, thereby ensuring projects didn't have to be dropped due to lack of interested consumers.

5.4.3 Vestforbrænding (existing large DH company)

Vestforbrænding (West Incineration) was established in 1970 and has operated waste-to-energy facilities for half a century. It is one of Denmark's largest waste-to-energy facilities, serving a group of 19 owner municipalities in the Greater Copenhagen area. Its role is twofold: to provide an essential waste management service while contributing to the local energy supply through efficient energy recovery.

Vestforbrænding works with communities and businesses to reuse and recycle as much as possible. But around 500,000 tons of residual waste is handled at the waste-to-energy incineration. The energy generated is supplied to the DH system and the electricity grid, providing energy to households and businesses.

¹² Fjernvarmepuljen (The District Heating Fund) is a state-funded grant programme. It provides financial support to district heating utilities for conversion projects involving the deployment of energy-efficient district heating networks in new service areas and the replacement of individual oil and natural gas heating systems with district heating. <https://ens.dk/tilskud-og-puljer/tilskuds-stoetteordninger/fjernvarmepuljen>

Seven of Vestforbrænding's municipalities receive the nearly 1.37 TWh that is produced. Currently Vestforbrænding is working to expand the grid to offer DH to up to 39,000 new household customers by 2030. This allows households to convert away from individual gas burners and oil furnaces.

The area covered by Vestforbrænding's DH network is hence quite vast and the density of the buildings are very varied, though it consists of mostly larger towns and large parts of the Copenhagen suburbs.

Number of residents (equivalent)	DH consumers	DH heat demand	Density
Approx. 102,000	30,800	1,368,140 MWh/year (Vestforbrænding, 2025)	Varied

The tariffs are composed of a variable part and a fixed part. The fixed part is calculated based on the heat consumption of the previous three years. There is no area¹³ tariff or cooling tariff¹⁴. Vestforbrænding does not rule out introducing a cooling tariff in the future.

There is a one-time connection fee of approx. 2,000 € for those who convert to DH in connection with the expansion project. This is significantly lower than the actual cost of connecting the consumers. As in Bjæverskov, this is to encourage as many consumers as possible to connect, thereby increasing the project's feasibility. Consumers that get connected afterwards must pay approx. 8,700 €, which is significantly higher, but still less than the actual cost of connection.

The depreciation of the investments is incorporated into the tariff structure. The large investments in the expansion of the grid are only possible because Vestforbrænding already has a large consumer base and because the owning municipalities prioritize the expansions and accept that can affect the prices for the existing consumers.

Vestforbrænding use the same depreciation periods of 45 years on pipes and 25 years on all other assets. Long depreciation periods are crucial to ensuring that investment costs are distributed fairly among consumers, regardless of when they connect to the network. In this regard, the proposed extension of the maximum depreciation period for pipes from 30 to 45 years is important, even though it has not yet been formally adopted¹⁵. Vestforbrænding would prefer an even longer depreciation period and believe that would be fair, as many components can last much longer than 45 years.

They use a principle of partial capitalization upon commissioning. For example, if a distribution pipe is constructed in a new area and it takes four years to connect the entire area, only 25% of the investment

¹³ Fixed tariff based on the number of square meters heated in the building.

¹⁴ Tariff paid by consumers who don't cool the district heating water down to the district heating company's requirements.

¹⁵ In a political agreement from 2022 the Danish parliament announced the extension of the depreciation period for district heating pipes from 30 to 45 years. This has not yet been implemented into the legislation as of august 2026.

cost is capitalized and included in tariffs in the first year. This is only possible because it is proven that the components have a long lifespan.

KommuneKredit and the consumer connection rate are essential prerequisites for the large expansions in Vestforbrænding's DH grid. The consumer connection rate can vary a lot from area to area. Vestforbrænding believes a reintroduction of the former scheme of obligation to connect to the collective heating system would make more projects feasible and is working with partners to change EU-law on this area.

6 Assessment of methodological approaches

In this chapter each of the methodological approaches for cost depreciation are assessed based on chapters 2, 3, 4 and 5 and PlanEnergi's general technical and economic knowledge and experience, primarily from the Danish DH sector. This is supplemented by charts and tables based on the calculation examples in Appendix 1: Calculation examples (all calculation examples are in nominal values).

The assessment is structured around the following list of criteria defined by ACM:

1. Regulatory predictability
2. Intergenerational consumer fairness
3. Indicative cash flow implications for operators
4. Impact on Debt Service Coverage Ratio (DSCR)
5. Alignment with business-case practice
6. Connection risk
7. Gradual network maturation
8. Asset lifetimes
9. Avoidance of tariff shocks

Each criterion is examined in this chapter in sections 6.1-6.9 with a brief explanation of the perspective of the criterion followed by an assessment of each of the four depreciation methods¹⁶ on the specific criterion.

The assessment of each criterion is concluded by a qualitative remark for each of the depreciation methods in a simple 3-level grading system from "Strong" to "Weak". The qualitative remark is a sum of PlanEnergi's assessment of the depreciation method on the specific criterion and enables better comparability between the depreciation methods, which is used in a full comparison of the depreciation methods on each criterion in the final section of the chapter.

Qualitative remark	Explanation
Strong	The depreciation method aligns well with the assessment criterion and provides clear advantages.
Acceptable	The depreciation method partly meets the criterion but involves some trade-offs or limitations.
Weak	The depreciation method does not adequately meet the criterion and presents significant drawbacks.

Table 4: Qualitative grading system used to assess the depreciation methods on each of the criteria.

¹⁶ Described in chapter 4.

6.1 Regulatory predictability

Criteria explanation – Regulatory predictability

How the depreciation method provides a stable, transparent, and easily understandable framework for cost recovery. A predictable method allows regulators, operators, investors, and consumers to anticipate future tariff developments and reduces the risk of frequent regulatory adjustments or disputes regarding cost allocation.

Figure 17 presents a simplified example of how the four depreciation methods would impact the consumer's costs over 40 years¹⁷. In the example, three investments are made in year 0. An investment in piping of 40 M€ with a depreciation period of 40 years, an investment in a production plant of 15 M€ with a depreciation period of 20 years and investments in connection assets¹⁸ such as delivery sets/DH units and heat meters of 20 M€ with a depreciation period of 15 years. The depreciation of the investments is shown as a total annual capital charge (per customer) as a combined value of payback and interest payments, with interest payments calculated from a fixed WACC of 6.83 % throughout the 40-year period. The aim of this simplified example is to depict the overall behavior of the fixed consumer cost when subjected to these depreciation methods, while showing some typical “effects” that need considerations.

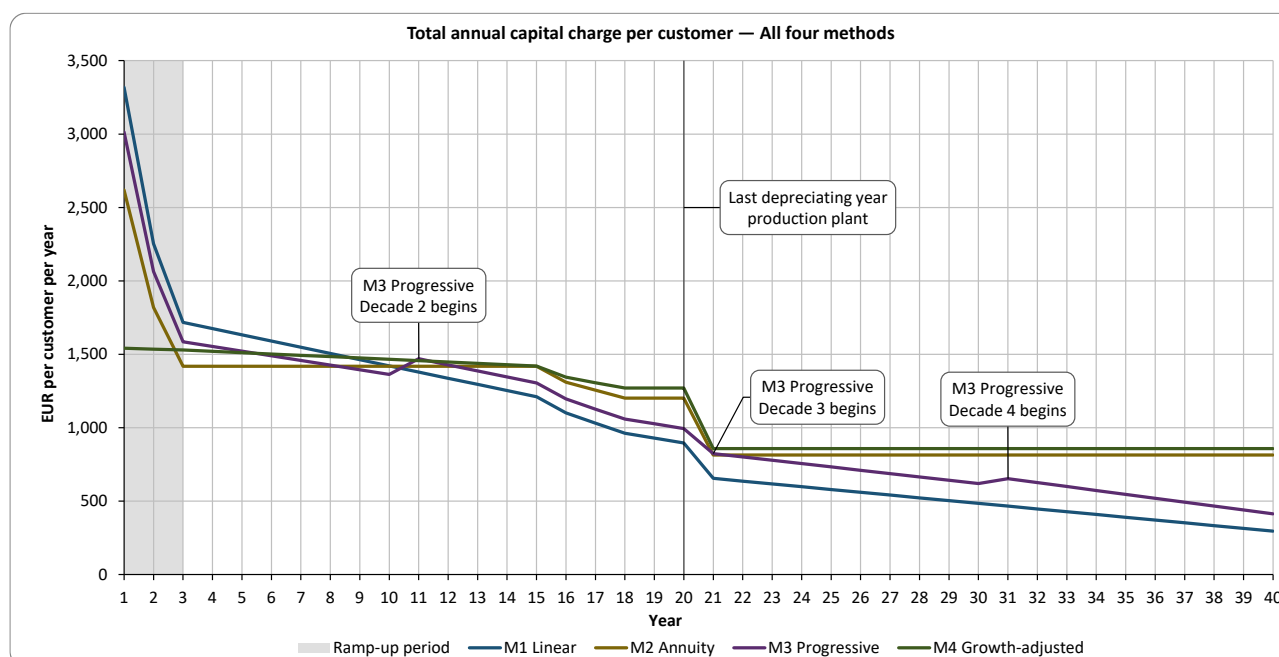


Figure 17: Development in total annual capital charge per customer over 40 years for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 18, Figure 32 and Figure 35.

¹⁷ The illustrative 40-year recovery period reflects the assumed asset life but differs from the maximum 30-year period proposed in the 2024 consultation draft of the Bcw. A 30-year recovery-period sensitivity is presented in Figure 20.

¹⁸ In the calculation example it is assumed that 75% of the investments in connection assets are recovered directly from consumers through one-time fees at connection time.

The 40-year period is initiated by a ramp-up period, where consumers are connected to the DH system. The ramp-up period should be understood as the period where the expected consumers, which the DH system is designed and scaled to supply, are connected. A 3-year period is assumed as a typical length of the ramp-up period, however it may differ, especially depending on the size of the DH system. Smaller systems may be possible to ramp-up in less than 3 years, while larger systems may take longer. If no measures are taken in the chosen financing structure, such as described previously, very high consumer costs would occur.

After 20 years depreciation of the production plant is completed in the calculation example, which results in a drop in depreciation costs for all four depreciation methods from year 21 and onwards. In practice, this will often trigger a replacement investment in new production capacity, which is shown in Figure 18.

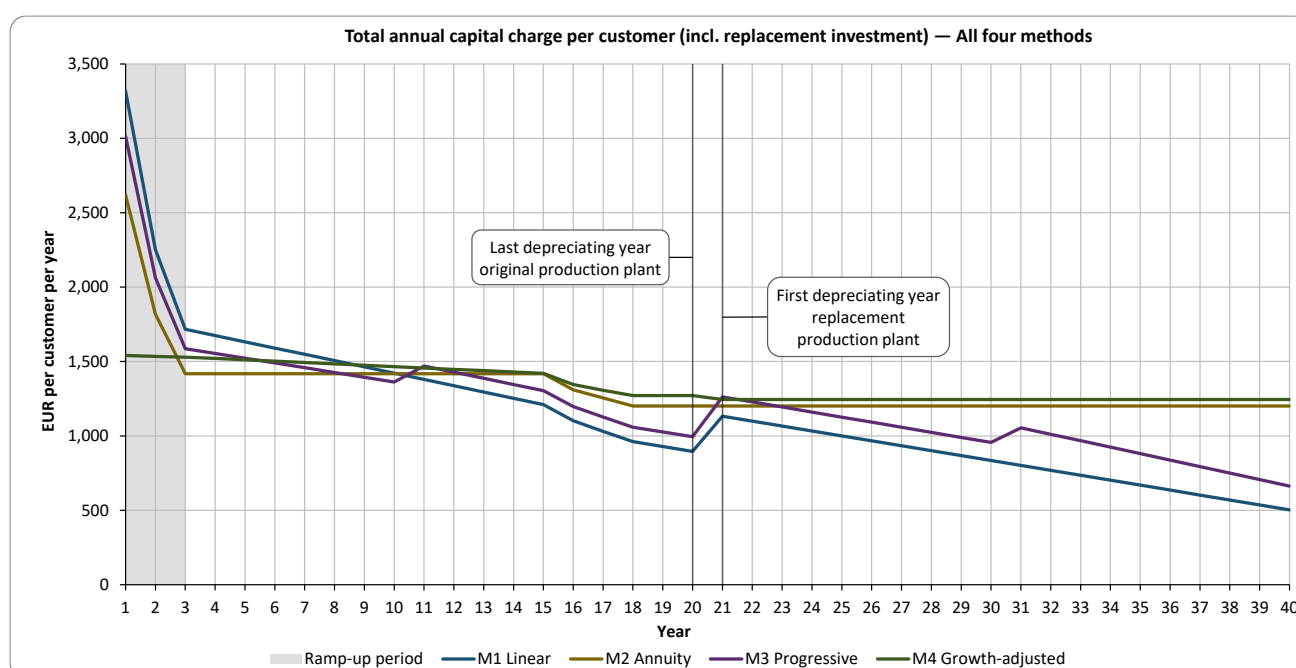


Figure 18: Development in total annual capital charge incl. replacement investment per customer over 40 years for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 17.

From both charts it is seen how capital recovery needs in the linear and progressive methods in general decline over the period, while it is more leveled in annuity and growth-adjusted methods. This is, however, based on fundamentally different prerequisites, as the depreciation in the linear and annuity methods is fixed yearly repayments of investment costs over the asset lifetime, while the depreciation in the progressive and growth-adjusted methods depend on consumer uptake (or forecasts hereof). As consumer uptake might differ from expectations, this dependency increases uncertainty on tariff price levels, which ultimately lowers regulatory predictability of these methods.

For the progressive method different assumptions on the progression e.g. specified for each year might reduce year-to-year tariff increases, but on the other hand it will increase necessity for ongoing follow-up to ensure that investment costs and consumer uptake are according to expectations – and if not might result in increased adjustments of tariffs which could lower regulatory predictability.

The high costs per consumer during the ramp-up period is difficult to address through a specific capital cost recognition method in a simple manner. This is partly because the underlying assumptions may prove incorrect, but also because it is difficult to account for the wide range of possible ramp-up scenarios. In some cases, it may be appropriate to construct production facilities gradually as the system expands. However, there may be situations where capital costs result in an unreasonably high price for the first consumers during the ramp-up period.

It is therefore recommended that this issue is addressed through a separate arrangement covering the expected ramp-up period. Based on the experiences from a Danish context in Chapter 5 this could include the option of a full or partly interest only (repayment-free) loan during the ramp-up period, allowing repayments on the production facilities to commence only after the ramp-up period or through partial capitalization upon commissioning, where only a part of the investment cost corresponding to the degree of utilization is capitalized and included in tariffs in the first years. Figure 19 exemplifies the effect on total annual capital charge per customer for the annuity method in a situation with a repayment-free loan that allows limited repayment¹⁹ during the ramp-up period on behalf of an increased WACC.

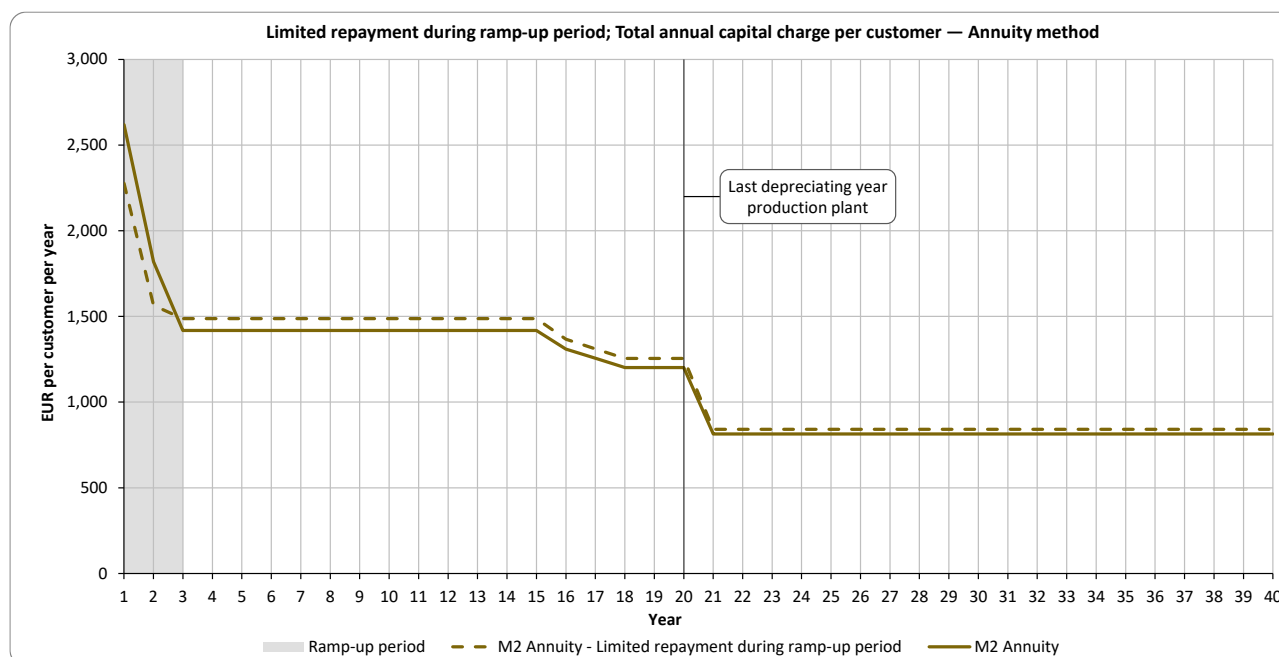


Figure 19: Development in total annual capital charge per customer over 40 years with limited repayment (repayment-free loan) during ramp-up period for the annuity method based on the calculation examples in Appendix 1.

The calculation examples use a recovery period of 40 years. As a sensitivity, Figure 20 applies a 30-year recovery period. The shorter period increases capital charges of all four methods, especially in the first years, but does not change the general characteristics of the four methods.

¹⁹ Repayment-free loan: 100% repayment-free year 1-2, fixed WACC increased to 7.00%.

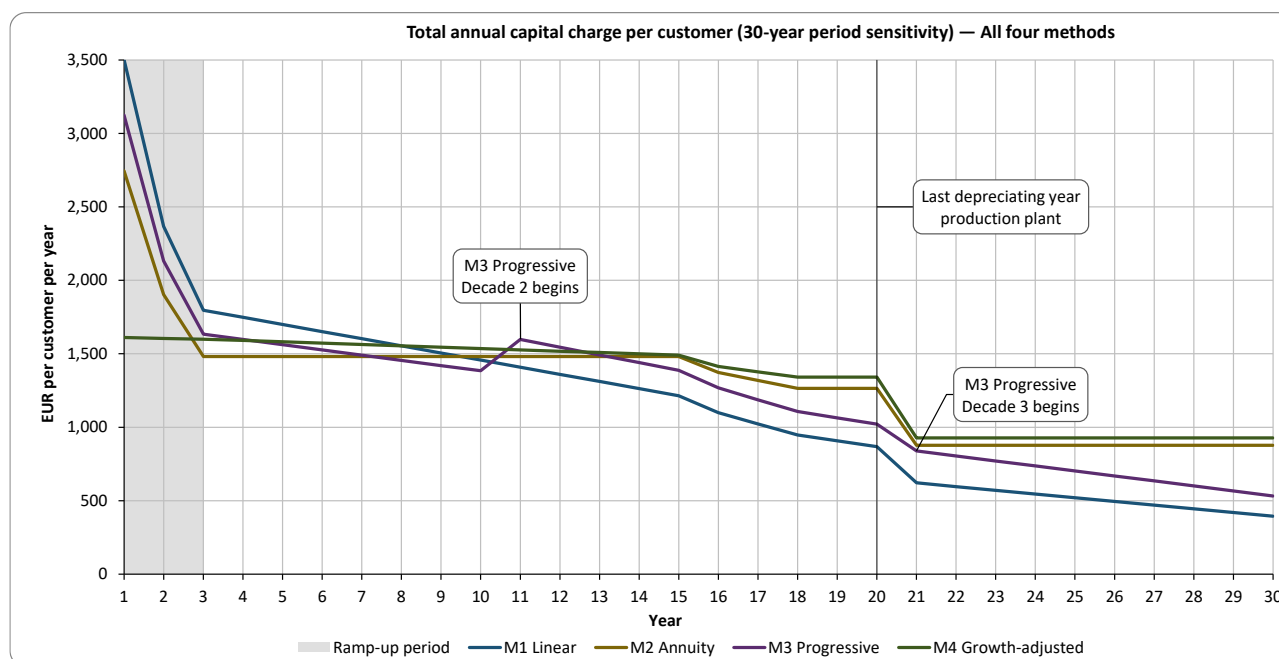


Figure 20: Development in total annual capital charge per customer over 30 years (network depreciated over 30 years) for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 17.

Figure 21 and Figure 22 indicate the effect on the total annual capital charge in the four methods from a 0,5%-point increasing and decreasing WACC respectively. An increasing WACC will (primarily in the end of the period) increase the gap in capital charge between the linear and progressive methods compared to the annuity and growth-adjusted methods – and conversely with a decreasing WACC. This is due to the different payback structures of the methods, where the annuity and growth-adjusted methods disperse a larger part of the payback over the entire period, resulting in higher interest payments during the latter part of the period.

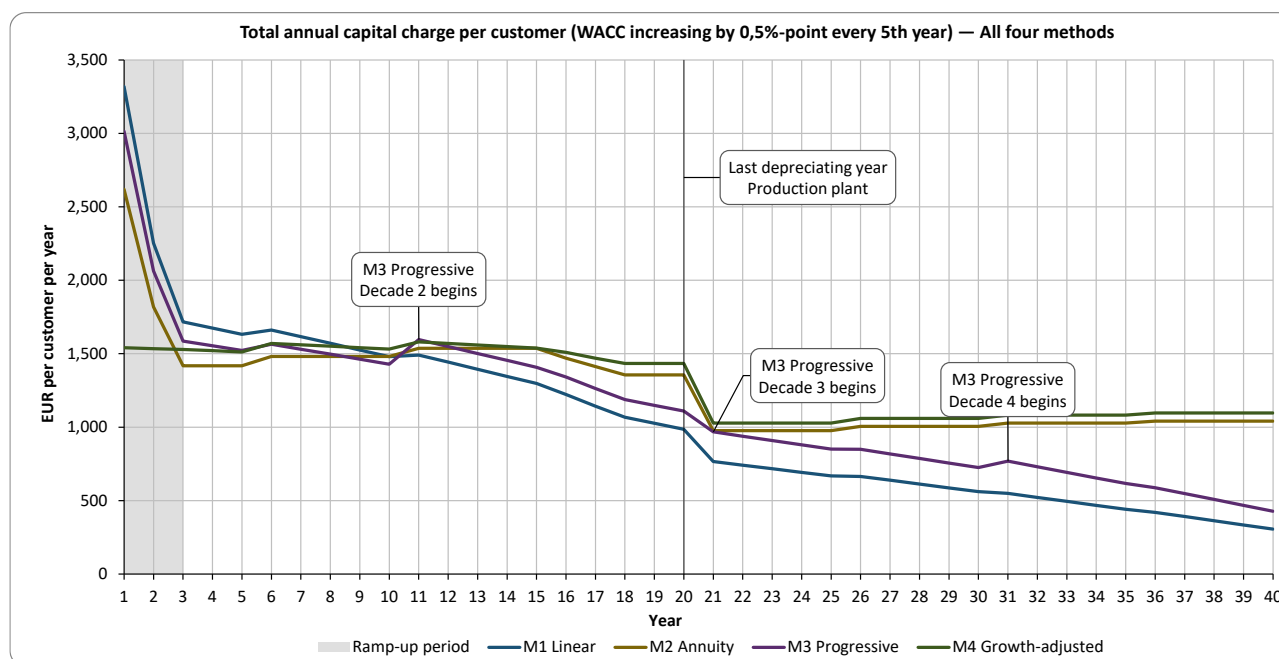


Figure 21: Development in total annual capital charge per customer over 40 years with WACC increasing by 0,5%-point every 5th year for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 17 and Figure 22.

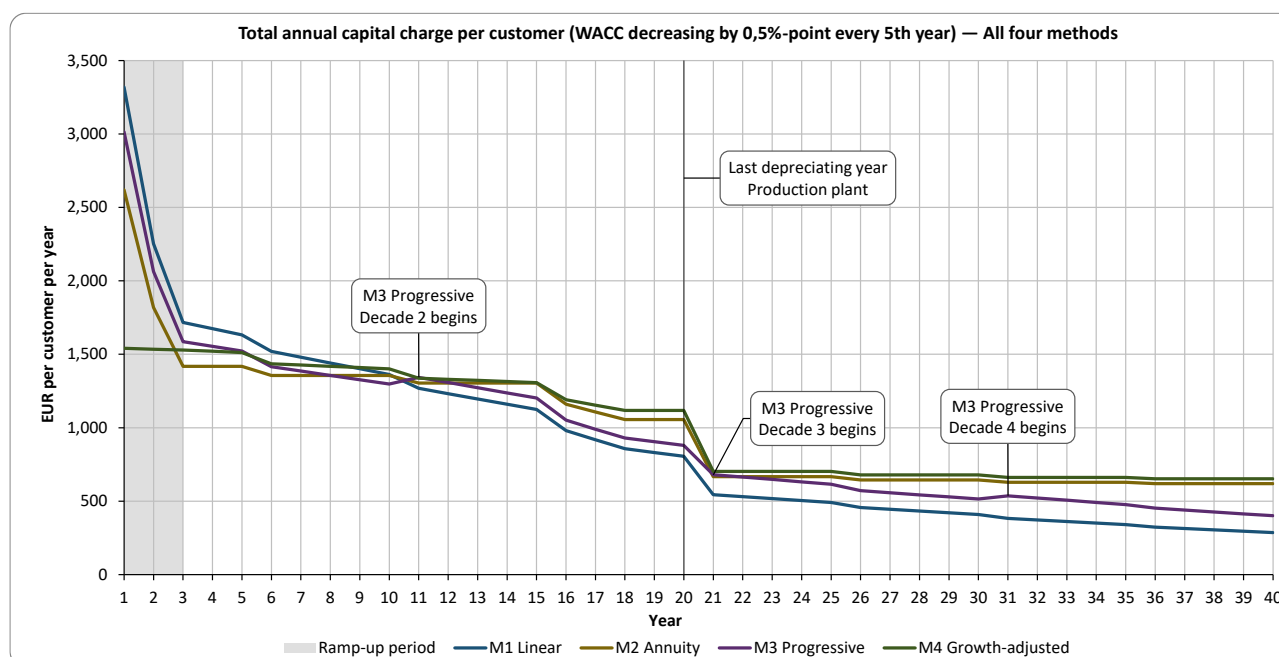


Figure 22: Development in total annual capital charge per customer over 40 years with WACC decreasing by 0,5%-point every 5th year for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 17 and Figure 21.

Figure 23 shows a calculation example²⁰ similar to Figure 17, but for an existing DH system with 10,000 connections that carries out a network expansion of 4,000 new connections. It shows that effects and differences of the four depreciation methods are the same for the expansion example as for the example with a newly built DH system, but on a smaller scale due to the investments being spread on more connections.

The scale is relative to the number of existing connections and size of expansion – the bigger the existing DH system is (more existing connections) and smaller the expansion is (less expensive), the flatter the curves would be Figure 23, which means less significant effect and difference between the four depreciation methods. And reverse; smaller existing systems or larger expansions would shift the curves more towards the curves of newly built systems in Figure 17, with increasingly significant effect and difference between the four methods.

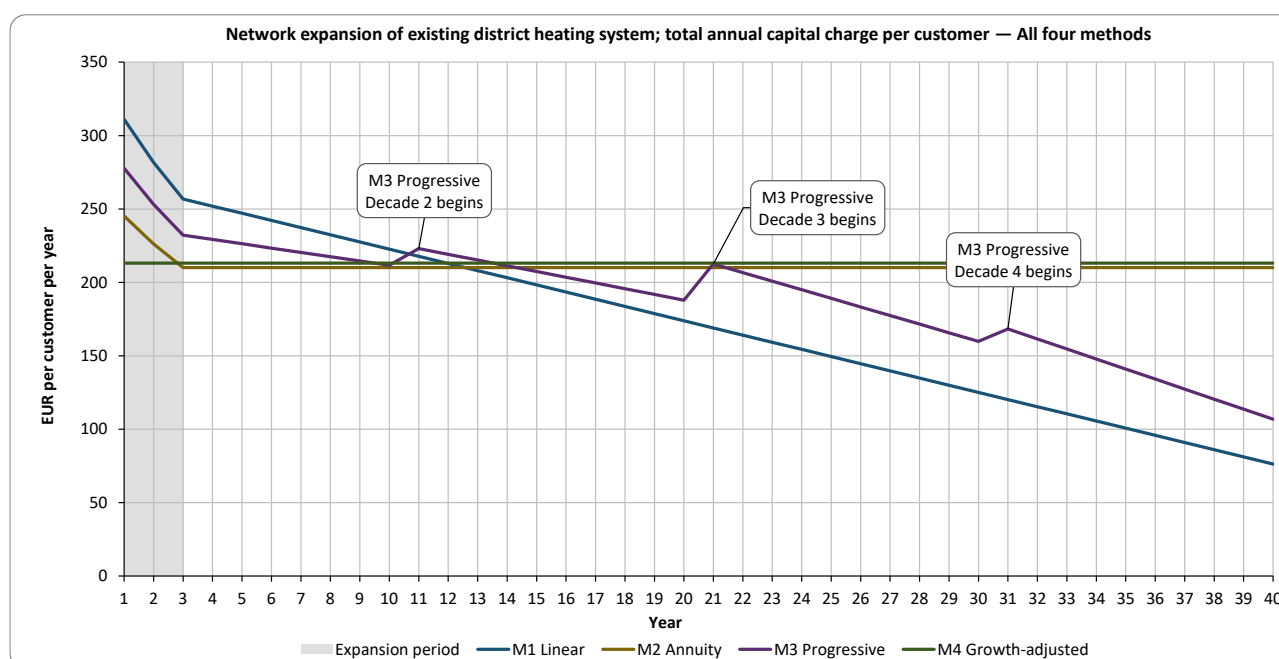


Figure 23: Development in total annual capital charge per customer over 40 years in a network expansion for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 17.

²⁰ The example includes an investment in piping of 40 M€ with a depreciation period of 40 years, with no additional need for production capacity to supply the new connections. In the calculation example it is assumed that 100% of the investments in connection assets are recovered directly from consumers through one-time fees at connection time. Like Figure 17 the depreciation of the investments is shown as a total annual capital charge (per customer) as a combined value of payback and interest payments, with interest payments calculated from a fixed WACC of 6.83% throughout the 40-year period.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
Linear depreciation provides a highly predictable and transparent regulatory framework. The method is straightforward to explain and verify because the depreciable value of the asset is recovered through equal annual depreciation amounts throughout the depreciation period. This simplicity makes it easy for regulators, utilities, investors and consumers to understand how capital costs are allocated over time. In the DH sector, regulatory predictability is particularly important because investments are often recovered over several decades. Network assets such as transmission pipelines, distribution networks and production facilities require long-term planning and financing. The simplicity of linear depreciation reduces the likelihood of regulatory disputes and minimizes the need for adjustments during the life of the asset. Consequently, the method performs strongly against this criterion.	The annuity method performs very strongly with respect to regulatory predictability. The annual capital recovery charge remains constant throughout the recovery period, making future tariff developments easy to forecast. In DH systems, where consumers often make long-term connection decisions and regulators seek stable regulatory frameworks, this predictability can be particularly valuable. The method provides a clear and consistent basis for long-term planning, regulatory oversight and stakeholder communication.	Progressive or back-loaded depreciation provides a less predictable regulatory framework than linear or annuity depreciation because the depreciation profile is intentionally linked to expectations regarding future network development. The method requires assumptions about future consumer growth, heat demand and asset utilization, and these assumptions may need to be reviewed as the network develops. For DH regulators, this introduces additional complexity because future cost recovery depends partly on forecasts rather than solely on observable asset characteristics. While the approach can still be administered in a transparent manner, it generally requires a greater degree of regulatory judgement and periodic reassessment. As a result, regulatory predictability is lower than under more traditional depreciation approaches.	Growth-adjusted depreciation provides the lowest degree of regulatory predictability among the methods assessed because cost recovery is directly linked to forecasts regarding consumer growth, heat demand or network utilization. The depreciation profile can change if assumptions regarding future growth are revised, creating a higher degree of uncertainty regarding future tariffs and regulatory asset values. As a result, regulators may need to monitor actual network development and periodically reassess the underlying assumptions. For DH systems experiencing significant expansion, this additional complexity may be justified by policy objectives relating to fairness and affordability. However, it comes at the cost of reduced predictability compared with linear or annuity approaches.
Strong	Strong	Weak	Weak

6.2 Intergenerational consumer fairness

Criteria explanation – Intergenerational consumer fairness

The extent to which each generation of consumers pays a share of investment costs that reflects the benefits they receive from the district heating system. A fair method avoids overcharging early consumers for assets that will also benefit future consumers, while also ensuring that future consumers contribute appropriately to assets whose value has already been utilized.

Figure 24 compares the accumulated depreciation costs per consumer in three different 5-year periods (Years 1-5, 6-10 and 11-15) under the four depreciation methods. The chart illustrates how investment costs per consumer vary between the calendar periods. A perfectly intergenerationally fair method would allocate costs relatively evenly across all calendar periods, while methods designed to reflect future growth may intentionally shift a larger share of costs to later consumers who also benefit from the infrastructure.

The figure shows that linear depreciation results in the highest costs for the earliest consumers (approximately 10,600 € per consumer) and the lowest costs for those connecting in Years 11-15 (approximately 6,500 € per consumer). In contrast, growth-adjusted depreciation produces the most stable cost profile, with costs remaining close to 6,500-7,600 € per consumer across all periods. Annuity and progressive depreciation fall between these two extremes.

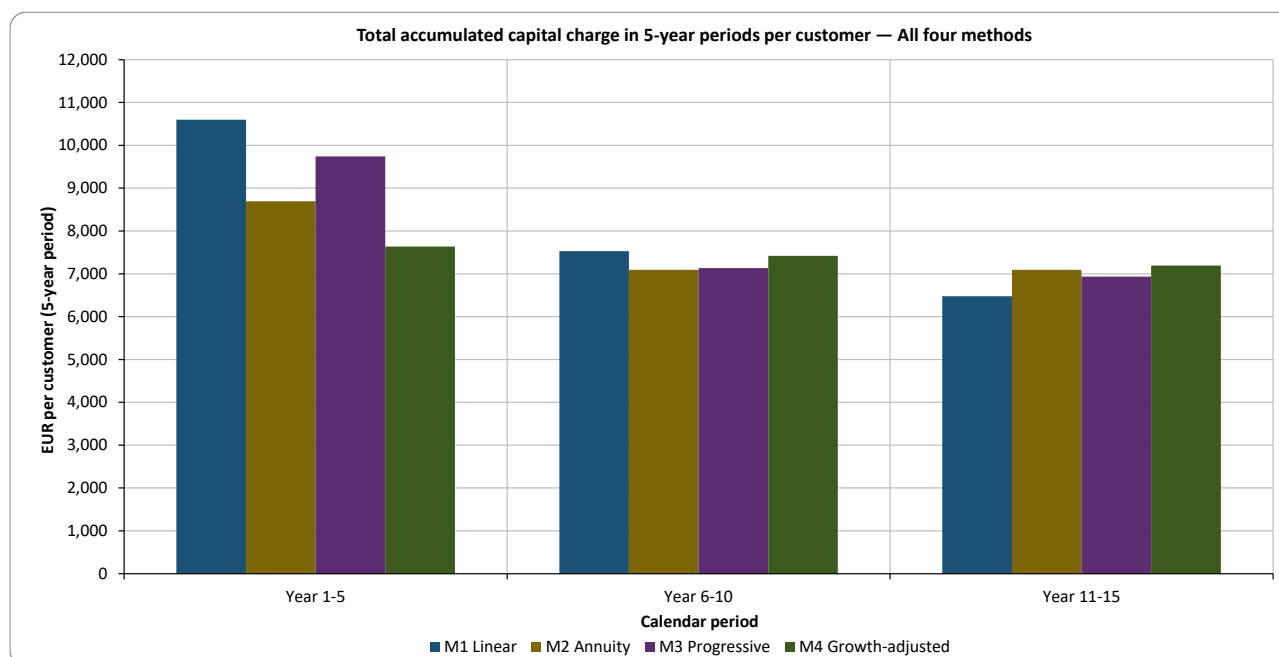


Figure 24: Total accumulated capital charge per customer in 5-year periods (in year 1-15) for each of the four depreciation methods based on the calculation examples in Appendix 1.

From an intergenerational consumer fairness perspective, the chart suggests that growth-adjusted depreciation performs the strongest in terms of maintaining stable costs between calendar periods. By

maintaining a relatively consistent cost allocation across all calendar periods, it ensures that future consumers contribute to assets that were built with their future use in mind. Progressive depreciation performs better than linear and has the potential to perform well, as it reduces the burden on early consumers and shifts a greater share of cost recovery toward later consumers, which is appropriate in systems expecting growth. However, its fairness depends on future consumer uptake materializing as forecast.

Annuity depreciation provides a reasonably balanced outcome, with only moderate variation in costs between periods, making it an acceptable compromise between fairness and financial stability. Linear depreciation performs the weakest against this criterion, as it results in substantially higher costs per consumer in the earliest calendar period. However, the figure does not compare the total charges paid by consumers connecting at different times and therefore does not, on its own, determine the total investment burden borne by early and later consumers.

Figure 25 illustrates that the same picture is reflected in situations where an existing DH system carries out an expansion. It shows that the same effects and differences of the four methods apply to expansions of existing DH systems, but in general in a less significant way, as the investment is shared between more connections, however the magnitude differs relative to the scale. As with Figure 24, the figure shows variation in costs per consumer between calendar periods rather than the total charges paid by consumers connecting at different times.

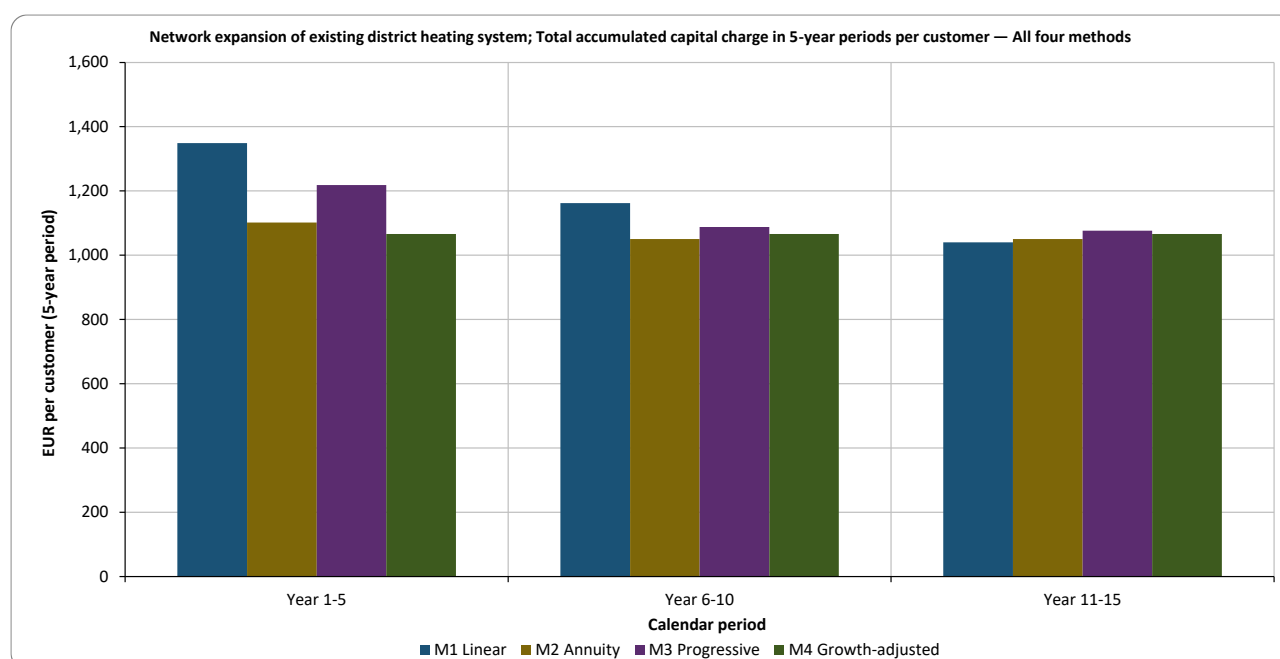


Figure 25: Total accumulated capital charge per customer in 5-year periods (in year 1-15) in a network expansion for each of the four depreciation methods based on the calculation examples in Appendix 1.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
The consumer fairness of linear depreciation depends largely on the maturity of the DH network. In mature systems with relatively stable consumer numbers and heat demand, the method generally provides a reasonable allocation of costs between generations of consumers because all years bear the same depreciation burden. However, many DH investments are made with future growth in mind. New network sections are often dimensioned to accommodate future consumers who may connect many years after the infrastructure is commissioned. In such circumstances, a linear depreciation profile may result in higher costs per consumer in the early calendar periods than in later periods. While the method is fair in stable systems, it is less effective at reflecting the beneficiary-pays principle in rapidly expanding networks.	The annuity method generally provides a balanced allocation of costs between calendar periods because capital costs are recovered through a constant annual charge. Although the method does not explicitly account for consumer growth, it avoids placing a disproportionate share of the investment burden in either the early or later calendar periods. In DH systems with moderate growth expectations, this often represents a reasonable compromise between affordability, fairness and finance ability.	Progressive depreciation performs particularly well from an intergenerational fairness perspective when future network growth is expected. DH networks are frequently designed with spare capacity to accommodate additional consumers over time, meaning that future consumers benefit from investments made many years before they connect. By reducing depreciation in the early years and increasing it later in the asset life, the method shifts a greater share of cost recovery towards later calendar periods, when the customer base is expected to be larger. This creates a closer alignment between cost recovery and anticipated system growth than linear or annuity depreciation in growing systems. However, the fairness benefits depend heavily on growth materializing as expected. If future consumer up-take is significantly lower than forecast, a substantial proportion of cost recovery may ultimately fall on a smaller consumer base than originally anticipated.	Growth-adjusted depreciation performs extremely strongly to the criterion of consumer fairness and is arguably the method most closely aligned with the beneficiary-pays principle. By linking depreciation directly to expected utilization, the method aligns cost recovery between calendar periods with the expected use of the infrastructure. For DH investments that are designed specifically to accommodate future growth, this can provide a particularly fair allocation of over time. Nevertheless, the fairness achieved depends on the accuracy of the underlying growth forecasts. If actual development differs significantly from expectations, the resulting cost allocation may no longer reflect actual benefits received.
Weak	Acceptable	Acceptable	Strong

6.3 Indicative cash flow implications for operators

Criteria explanation – Indicative cash flow implications for operators

The impact of the depreciation profile on the timing of revenue recovery from tariffs. Some methods recover a larger share of investment costs in the early years, while others defer recovery to later years. The criterion assesses whether the method provides a capital recovery profile that supports efficient operation, investment recovery, and long-term financial sustainability.

Figure 26 shows that the methods produce materially different paths for the recovery of the initial investment. The linear method reduces the outstanding unrecovered amount most quickly. The annuity method is slower, while the progressive and growth-adjusted methods retain a larger unrecovered balance through much of the period. All four approaches reach zero by the end of the 40-year period, but the timing of recovery is significantly different.

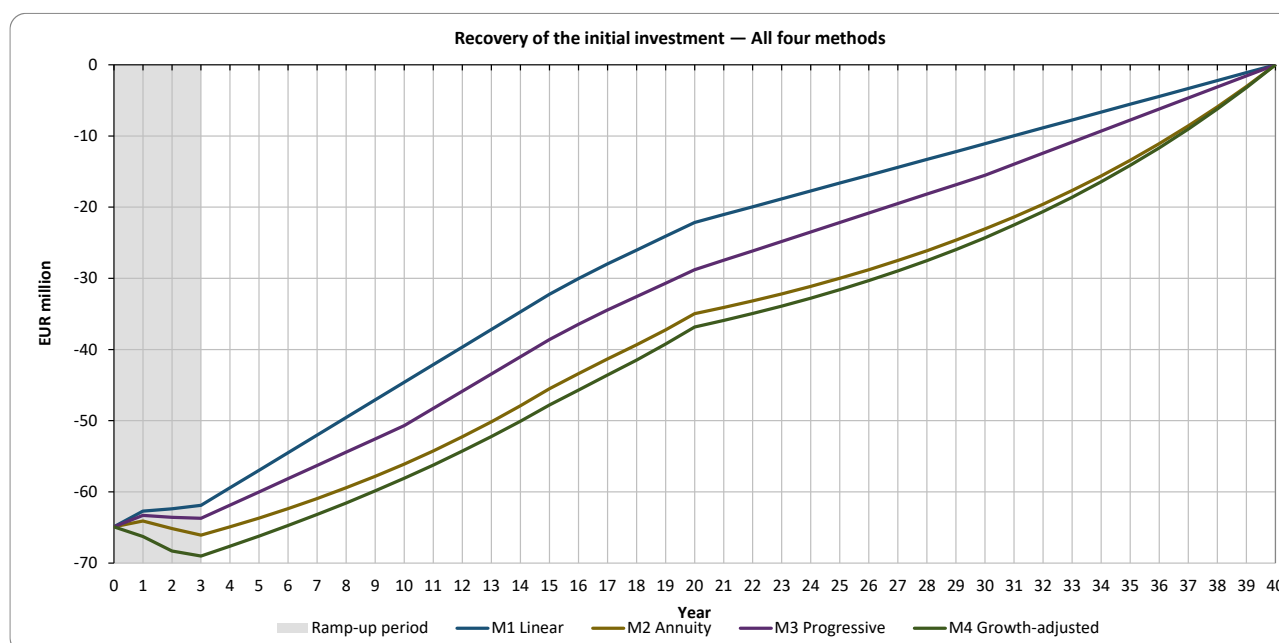


Figure 26: Recovery of the initial investment for each of the four depreciation methods based on the calculation in Appendix 1.

From an operator perspective, this means that the linear method provides for more rapid recovery of the investment through tariffs. This reduces the amount of capital that remains dependent on future tariff revenues. Conversely, the progressive and growth-adjusted methods leave more of the investment to be recovered in later years, increasing exposure to future demand, consumer numbers, regulation, operating costs, and refinancing conditions.

This distinction is particularly important because full recovery over 40 years does not necessarily mean equally strong financial sustainability. A method can recover the same nominal investment in total while

potentially creating a significantly weaker capital-recovery and liquidity position during the first part of the assets' life.

Figure 27 shows the cash flow of the linear method in the calculation example. This method provides a constant annual depreciation or payback amount for the long-lived assets, while interest costs decline as the recoverable or financed balance is reduced. Consequently, the total annual capital charge is highest at the beginning and declines throughout the period.

The linear method has the strongest early capital-recovery characteristics for operators. A relatively large share of the investment is recovered through tariffs in the early years, when financing exposure and interest costs are also highest. This may provide greater support for debt repayment, maintenance, unexpected operating costs, and reinvestment.

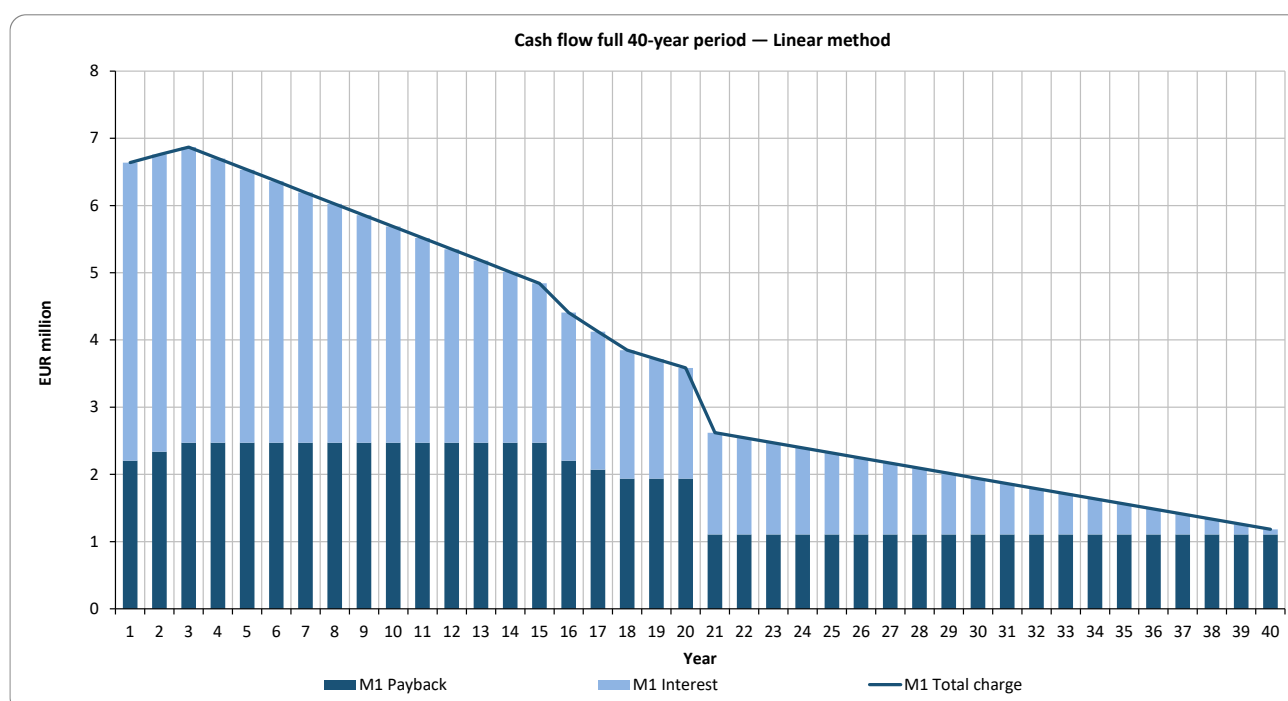


Figure 27: Indicative cash flow in the full 40-year period for the linear method based on the calculation example in Appendix 1.

Under the annuity method, Figure 28 shows a relatively stable total annual capital charge within each asset-lifetime period. Depreciation or payback starts at a low level and increases over time, while interest costs decline. These movements largely offset one another. For operators, the stable total charge gives a predictable capital-related revenue profile and reduces tariff volatility. This can support budgeting and make the development of tariffs easier to communicate to consumers.

However, stability of the total charge should not be confused with rapid investment recovery. A relatively large part of the early charge consists of interest, while the depreciation component is initially low. Consequently, the operator recovers the original investment more slowly than under the linear method. The

method therefore offers stable annual capital-recovery profile but a weaker early build-up of recovered capital.

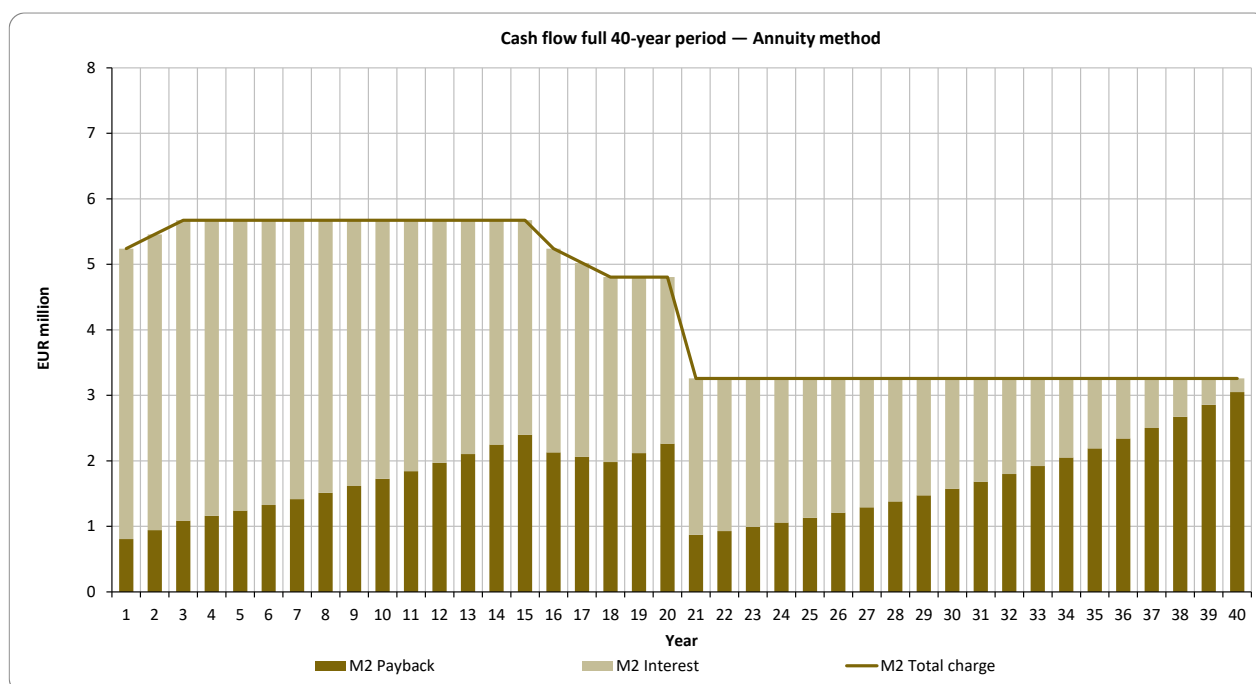


Figure 28: Indicative cash flow in the full 40-year period for the annuity method based on the calculation example in Appendix 1.

Figure 29 shows the cash flow of the progressive method in the calculation example. This method reduces the initial capital charge compared with linear depreciation, which may improve affordability for early consumers. At the same time, it provides more early recovery than the growth-adjusted method in the calculation example. This gives it the characteristics of a compromise between immediate investment recovery and tariff smoothing.

Its main cash-flow weakness is that a larger share of the investment remains unrecovered for longer. In addition, the interaction between progressive profiles and assets with different lifetimes produces changes in the annual charge. These changes may complicate cash-flow planning and could require tariff adjustments even if total heat demand remains constant.

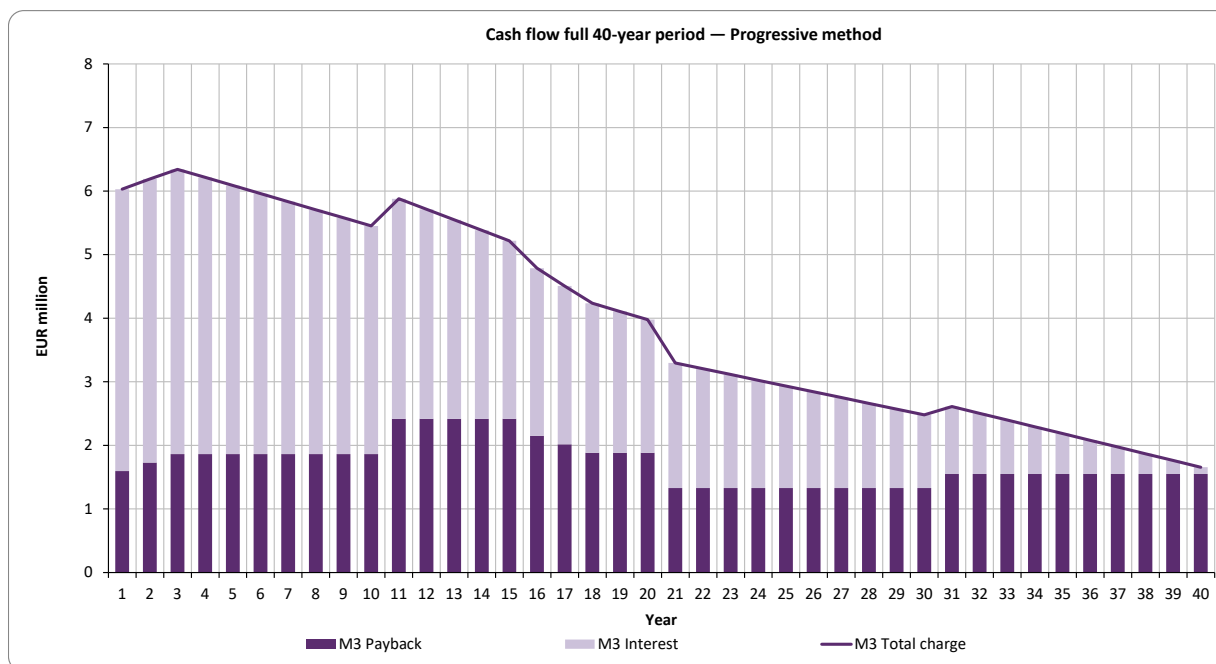


Figure 29: Indicative cash flow in the full 40-year period for the progressive method based on the calculation example in Appendix 1.

Figure 30 presents the most deferred recovery profile. The payback amount is negative in the first year, as the total charge based on consumer uptake does not meet the necessary interest payment, resulting in a supplementary loan. This would weaken internal cash generation precisely when the system is newly established and financing exposure is high. The total charge rises sharply in the opening years as consumer uptake ramps up and then remains relatively stable within the subsequent asset-lifetime periods.

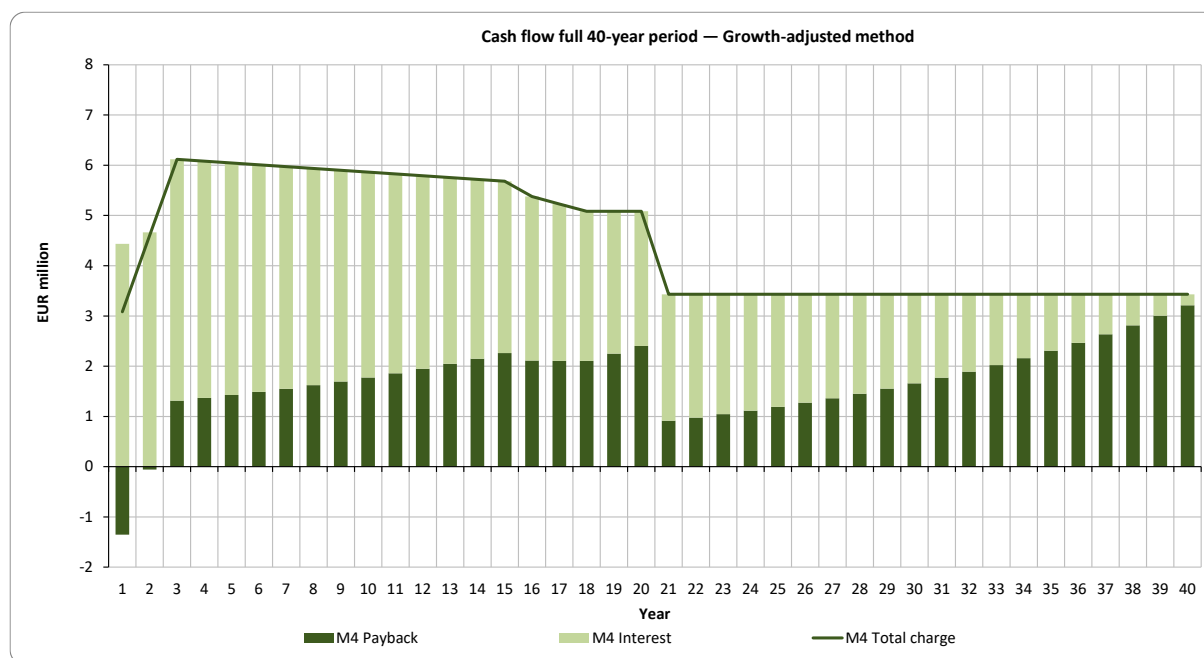


Figure 30: Indicative cash flow in the full 40-year period for the growth adjusted method based on the calculation example in Appendix 1.

Figure 31 confirms that the linear method has the highest total capital charge and the largest annual payback during the first five years. The annuity method has a lower and relatively stable total charge, but its early payback is smaller. The progressive method lies between linear and annuity, obviously depending on how the progression is laid out. The growth-adjusted method has the weakest first-year payback and then moves towards a more stable charge from approximately year 3.

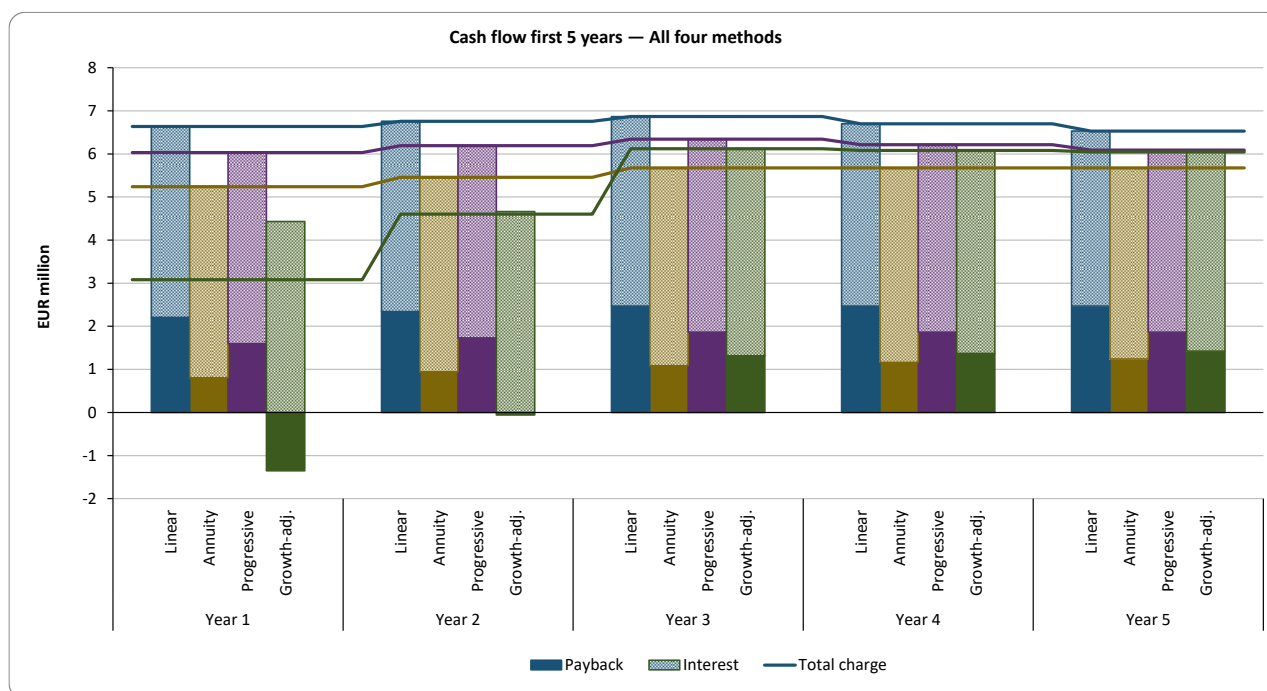


Figure 31: Comparison of indicative cash flow in the first 5 years for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared to Figure 34.

While the four methods affect the cash flow of operators in expanding DH systems in much the same way as for new systems, the consequences are generally less pronounced. This is because the required investment is distributed across a larger customer base. Nevertheless, the extent of the impact depends on both the size of the existing network and the scale of the expansion.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
Linear depreciation provides relatively strong cash-flow characteristics for operators because investment recovery begins immediately and progresses at a constant rate. Compared with methods that delay depreciation into future years, the utility recovers a larger share of the initial investment during the early stages of the assets' life. This can be particularly valuable for DH projects because substantial debt is often incurred before consumer revenues are fully developed. Earlier cost recovery reduces dependence on uncertain future demand growth and decreases the risk that investments remain unrecovered if consumer uptake is lower than anticipated. The method therefore supports financial resilience and contributes to lower cumulative financing costs.	The method provides highly stable cash flows because annual capital recovery remains constant throughout the recovery period. For DH operators managing long-lived and capital-intensive infrastructure, predictable revenues facilitate budgeting, financial planning and investment decision-making. Stable recovery charges also reduce revenue volatility and support long-term financial sustainability.	From an operator perspective, progressive depreciation generally results in weaker cash flow during the early years of a project. Since only a small proportion of the investment is recovered initially, a larger share of cost recovery depends on future revenues. For DH projects, this can create challenges because financing obligations are usually highest shortly after construction, whereas consumer uptake often develops gradually over many years. Operators therefore remain exposed to consumer-acquisition risks for a longer period than under linear depreciation.	Growth-adjusted depreciation generally results in the weakest early-year cash flow among the methods considered. Because depreciation charges are tied to network utilization, cost recovery remains relatively low while the consumer base is still developing. For DH operators, this may increase reliance on external financing and expose the business to a longer period of investment-recovery risk. The utility effectively accepts a larger share of the uncertainty associated with future consumer growth. The approach therefore requires confidence that the DH system will continue to expand and that future consumers will ultimately contribute the deferred portion of the investment costs.
Strong	Strong	Acceptable	Weak

6.4 Impact on Debt Service Coverage Ratio (DSCR)

Criteria explanation – Impact on Debt Service Coverage Ratio (DSCR)

How the depreciation method impacts DSCR. Methods that facilitate stronger revenue generation during periods of high financing obligations may improve DSCR and financing capacity, while methods that defer cost recovery may put greater pressure on financial performance in the early years.

The assessment is qualitative and considers how the timing of capital-cost recovery may support debt service, all else being equal. It does not calculate actual DSCR or financeability, as these also depend on achievable tariff revenues, customer uptake and collections, OPEX, leverage, interest rates and the applicable debt-repayment schedule.

As illustrated in Figure 32, the depreciation profile affects the timing of the annual capital charge included in tariffs and may therefore affect the amount of revenue available to meet debt service requirements.

Linear depreciation generally provides the strongest support for DSCR because it recovers a substantial share of investment costs during the period in which debt service obligations are highest. This creates a closer alignment between revenue recovery and the annuity and linear loan structures typically used to finance DH infrastructure.

Annuity depreciation is particularly well aligned with annuity financing as it produces stable annual charges over time, supporting predictable cash generation and reducing the risk of DSCR deterioration during the loan period.

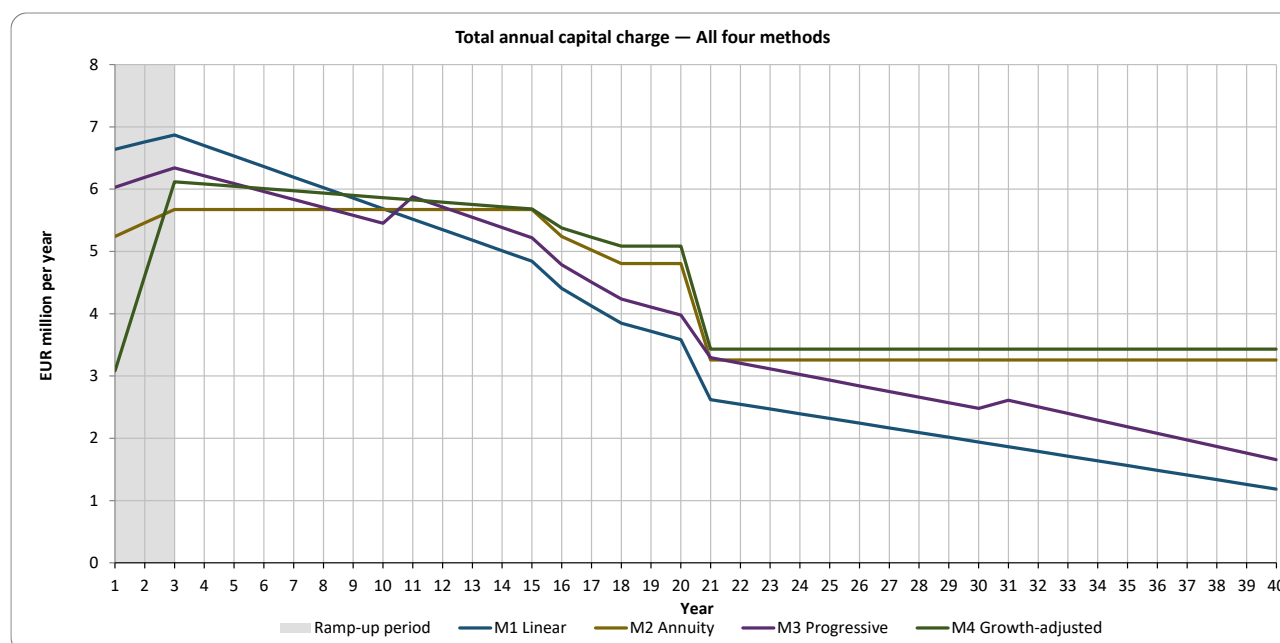


Figure 32: Yearly Total Annual Capital Charge over 40 years for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 17.

Linear depreciation likewise supports DSCR by ensuring relatively strong cost recovery in the early years, when outstanding debt and financing requirements are greatest. In both cases, revenues are generated

when lenders place the greatest emphasis on repayment capacity, which can improve financing conditions and support the ability to fund future investments.

By contrast, progressive and growth-adjusted depreciation defer a larger share of cost recovery to later years of the asset life. While this may reduce tariffs in the short term, it also lowers revenue collection during the loan repayment period, when DSCR is typically most critical from a lender perspective. The resulting mismatch between revenue recovery and debt service obligations can weaken DSCR, increase financing risk, and reduce financing capacity.

This challenge is particularly pronounced under growth-adjusted depreciation, where the recovery of capital costs depends on the realization of future demand growth that may be uncertain at the time financing is secured.

For expanding DH networks, the four methods influence DSCR through the same underlying mechanisms as in newly established systems. However, the effect is moderated, since the additional investment is spread over a greater number of connections. The resulting magnitude varies according to the relative size of the expansion compared with the existing system.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
Linear depreciation generally supports acceptable DSCR performance because a meaningful portion of the investment is recovered from the outset of the project. This is important in DH projects where debt service obligations are often highest during the years immediately following construction. However, as the annual capital recovery charge gradually declines due to the decreasing RAB, revenue generation associated with the asset also falls over time. Consequently, while the method supports financeability reasonably well, it does not provide the same level of stable long-term revenue support as the annuity method.	Among the methods assessed, the annuity approach generally offers the most stable support for DSCR performance. The stable revenue profile aligns closely with typical financing arrangements and loan repayment schedules. This characteristic is particularly relevant for DH projects because financing costs often represent a significant proportion of total project costs. The method can therefore improve financeability and enhance access to debt financing.	The method may place pressure on DSCR during the early years of operation if revenue recovery is intentionally delayed. This can be problematic in DH projects that rely heavily on external debt financing, particularly where lenders place significant emphasis on early-year cash flow performance. Compared with annuity and linear depreciation, progressive/back-loaded depreciation generally provides less support for financeability. Its suitability therefore depends partly on the operator's balance sheet strength, financing structure, and confidence in future consumer growth. Where consumer growth is highly certain and financing conditions are favourable, these risks may be manageable. However, in projects with significant uncertainty, the method may weaken financing capacity relative to alternative approaches.	The method may create challenges for DSCR, particularly during the years immediately following project commissioning. Cost recovery is delayed until utilization increases, while debt service obligations are often already fully in place. From a lender perspective, this may increase perceived financing risk because recovery of investment costs becomes highly dependent on future growth assumptions. Consequently, projects using growth-adjusted depreciation may require stronger supporting evidence regarding consumer uptake or more conservative financing structures. Compared with annuity depreciation in particular, the method generally provides weaker support for financing metrics.
Strong	Strong	Weak	Weak

6.5 Alignment with business-case practice

Criteria explanation – Alignment with business-case practice

How the depreciation method aligns with typically used methods when evaluating investments through business cases and financial models. Higher alignment reduces need for adjustments between investment appraisal and regulatory cost recovery and helps ensure that investment decisions and tariff structures are based on the same underlying economic logic.

Linear depreciation aligns relatively well with business practice, as it is the predominant approach in accounting, asset management and utility regulation. However, because investment decisions are generally assessed using discounted cash-flow methods rather than straight-line cost allocation, some reconciliation is required between investment appraisal and cost recovery.

Annuity depreciation exhibits the strongest alignment with standard infrastructure-investment appraisal practices because it is directly based on WACC-driven capital recovery and is explicitly linked to NPV- and IRR-based methodologies as described in section 4.2.

Progressive depreciation and growth-adjusted depreciation are less aligned with traditional project-finance methodologies because their primary purpose is not to reflect financing costs but to improve the allocation of costs across consumer groups and over time.

As described in Chapter 4, both methods are built around expected network growth, consumer uptake and utilization patterns. As described in Chapter 5 the Hedensted case describes depreciation profiles that can be adjusted when assets are not yet fully utilized, while Vestforbrænding applies partial capitalization during phased network expansion.

Consequently, although progressive and growth-adjusted depreciation diverge from conventional discounted cash flow (DCF)- and WACC-based financial modelling, they may better reflect the practical business logic underpinning DH expansion projects where future consumer growth is a key determinant of project viability. The assessment and conclusions above apply to both newly built DH systems and existing DH systems that expand.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
Linear depreciation is familiar to utilities because it is widely used in accounting and asset management. However, DH investment decisions are typically based on discounted cash-flow models using concepts such as WACC, NPV and IRR. These business-case methodologies explicitly consider the time value of money and often resemble annuity-based capital recovery approaches more closely than linear depreciation. As a result, additional reconciliation may be required between investment appraisals and regulatory cost recovery mechanisms.	The annuity method exhibits the strongest alignment with standard infrastructure-finance methodologies. It is directly linked to concepts such as WACC, NPV and IRR and mirrors approaches commonly used in project-finance analyses. Consequently, there is a high degree of consistency between investment appraisal and regulatory cost recovery. This reduces the need for methodological adjustments and creates a clearer relationship between investment decisions and tariff structures.	Progressive depreciation is generally less aligned with traditional infrastructure-finance methodologies than the annuity method. Most DH business cases are developed using discounted cash flow analysis, NPV calculations and WACC-based approaches, which typically emphasize the time value of money and predictable capital recovery patterns. The primary purpose of progressive depreciation is instead to improve cost allocation between consumer generations and reflect expected growth in network utilization. Consequently, regulatory cost recovery may diverge somewhat from the methodologies used during investment appraisal. Nevertheless, for projects where future network growth is a central component of the investment rationale, progressive depreciation may capture important aspects of the economic reality of the investment that are not fully reflected by more conventional approaches.	Growth-adjusted depreciation is generally less common in conventional infrastructure-finance models than annuity-based approaches. Most business cases focus on discounted cash flows and financing requirements rather than the explicit allocation of costs based on future utilization. However, DH business cases often contain detailed forecasts of consumer uptake, heat sales and network expansion. Because growth-adjusted depreciation directly incorporates these drivers, it may provide a closer link between regulatory cost recovery and the actual development pathway of the network. The method therefore aligns well with the operational logic of many DH expansion projects, even if it is less aligned with traditional project-finance methodologies.
Strong	Strong	Weak	Weak

6.6 Connection risk

Criteria explanation – Connection risk

How the depreciation profile reflects uncertainty regarding the pace and volume of consumer connections. In district heating projects, actual uptake may differ significantly from forecasts, particularly during the early years. A method that accommodates connection risk can help prevent situations where initial consumers will have high tariffs and/or cash flow does not meet expectations.

Figure 33 shows how the 5-year periods of accumulated depreciation costs per connected consumer increase if only 75% of the expected consumers connect.

The chart shows that growth-adjusted depreciation has the lowest additional accumulated cost per consumer in years 1–5, providing the strongest protection during the period when connection levels are typically most uncertain. By keeping early depreciation costs low and increasing them as the consumer base develops, the method reduces the risk that a limited number of initial consumers must bear a disproportionate share of the investment costs.

Annuity depreciation also limits the early burden and maintains a relatively even cost profile across the periods shown, making the consequences of slower connection uptake more evenly distributed over time.

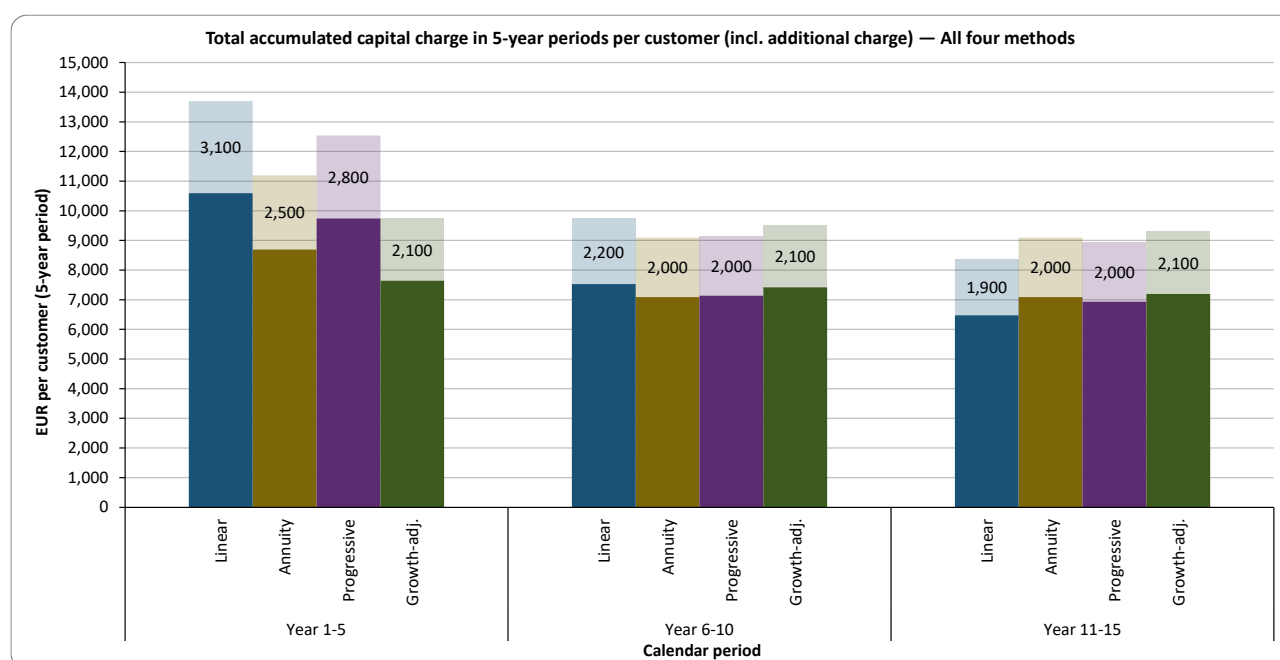


Figure 33: Total accumulated capital charge per customer in 5-year periods (in year 1-15) with additional costs due to less connection uptake (75% of expected) highlighted for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared to Figure 24.

Progressive depreciation also postpones part of the cost burden, and the chart shows that it results in the shared highest accumulated cost per consumer toward years 11–15. Depending on how the

progressive depreciation method is implemented, it has the potential to protect early consumers while increasing reliance on the expected future expansion of the consumer base.

Linear depreciation has the highest accumulated cost per consumer in years 1–5, when the system has fewer connected consumers. If connections develop more slowly than expected, those initial consumers must carry a larger share of the investment costs, potentially increasing tariffs and making the method least effective at accommodating connection risk.

The effects and differences of the four methods in regard to connection risk also apply to existing DH systems that expand, but in general in a less significant way, as the investment is shared between more connections, however the magnitude differs relative to the scale of both the existing system and size of expansion.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
Linear depreciation addresses connection risk only to a limited extent because cost recovery is independent of actual consumer uptake. The annual depreciation charge remains fixed regardless of whether the number of connected consumers develops as expected or not. This can create challenges in newly established DH systems, where consumer acquisition may take many years. If actual connection rates are lower than forecast, fewer consumers must bear the same capital costs, potentially increasing tariffs and creating affordability concerns. The method therefore transfers a significant share of connection risk to both operators and early consumers.	The annuity approach provides only limited protection against connection risk because annual cost recovery remains independent of actual network growth. If consumer uptake is slower than expected, the constant annual recovery charge may result in relatively high tariffs during the early years of operation. While the method provides stable revenues for operators, it does not directly adapt to uncertainties regarding market development.	One of the principal advantages of progressive depreciation is its ability to address connection risk from a consumer perspective. Because depreciation charges are lower during the initial years, tariffs can be kept lower while the network is still acquiring consumers. This can improve affordability and make DH more attractive to potential consumers during the early stages of market development. Lower tariffs may therefore contribute indirectly to consumer uptake and support network expansion. However, the method does not eliminate connection risk. Instead, part of the risk is transferred from early consumers to network operators and future consumers. If anticipated growth does not materialize, recovery of the deferred costs may become more challenging.	This is one of the strongest aspects of the method. Growth-adjusted depreciation explicitly recognizes that DH projects often face considerable uncertainty regarding the timing and scale of consumer uptake. By keeping depreciation charges relatively low during the consumer-acquisition phase, it reduces tariff barriers that could discourage new consumers from connecting to the network. This method therefore directly supports network expansion and consumer recruitment. However, the associated financial risk is transferred to operators because slower-than-expected growth also delays recovery of invested capital.
Weak	Acceptable	Acceptable	Strong

6.7 Gradual network maturation

Criteria explanation – Gradual network maturation

District heating systems typically experience increasing connection rates, heat sales, and asset utilization as they mature. The criterion assesses whether the depreciation profile reflects this gradual growth and allocates costs in a manner that corresponds to how the network generates value throughout its development.

Figure 34 shows the cash flow per consumer in the first 5 years in the calculation example and indicates that the growth-adjusted method performs best on the criterion of gradual network maturation, as it places the lowest cash-flow burden on each consumer during the first years, when connection rates, heat sales and asset utilization are expected to be lowest.

The particularly low, and initially negative, payback component in year 1 postpones cost recovery until the network is more mature. This provides strong alignment between consumer costs and the gradual utilization and value generation of the assets, although it also increases the need for sufficient liquidity or financing during the early years.

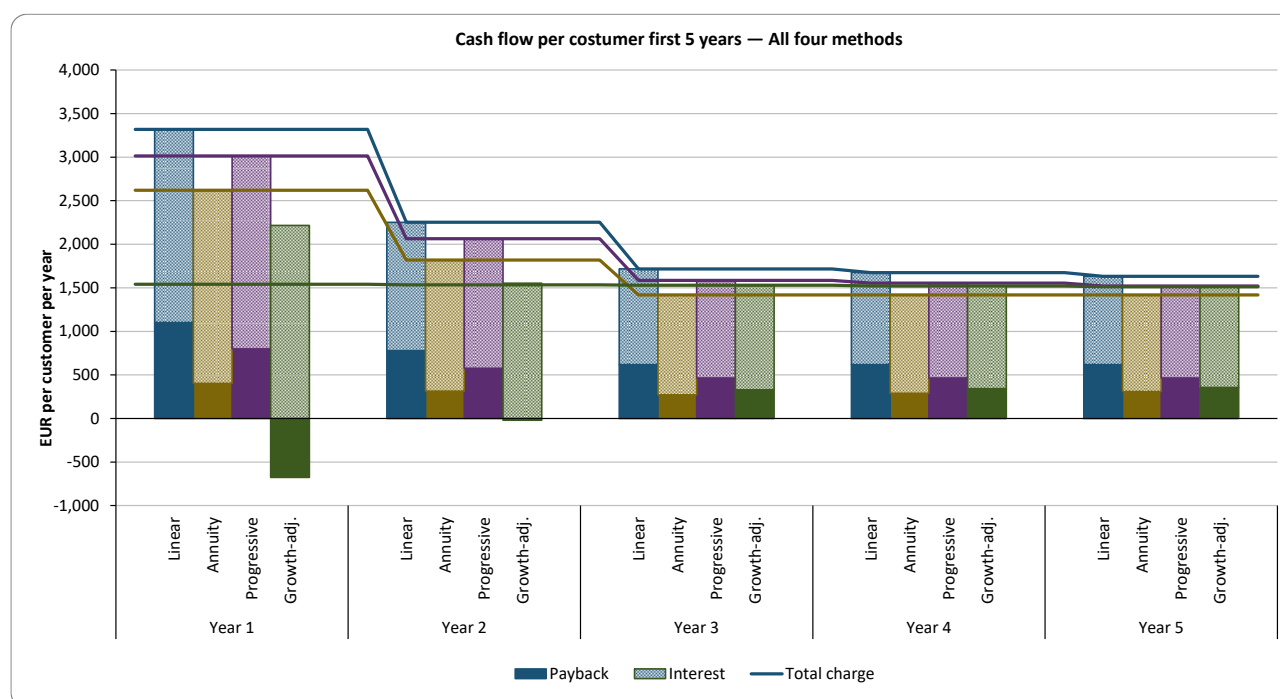


Figure 34: The chart compares the cash flow per customer in the first 5 years for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared to Figure 31.

The progressive method also reflects network maturation, because its relatively low initial payback gradually increases. However, its total early cash flow remains higher than under the growth-adjusted method, making the adjustment to network development less pronounced.

The annuity method provides a comparatively stable cost profile, but only partially reflects gradual maturation because costs are not closely linked to changing asset utilization.

The linear method performs least favorably, as it produces the highest cash flow per consumer in the first years and therefore allocates a relatively large share of costs to early consumers before the network has reached higher connection and utilization levels.

In regard to existing DH systems that expand, the same effects and differences of the four methods apply in relation to gradual network maturation, but in general in a less significant way, as the investment is shared between more connections, however the magnitude differs relative to the scale of both the existing system and size of expansion.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
DH systems often experience a gradual increase in consumer numbers, heat sales and asset utilization after commissioning. Linear depreciation does not explicitly reflect this development because annual depreciation remains unchanged throughout the recovery period. Although tariff levels may decrease over time as heat sales increase, this occurs indirectly rather than through the cost-allocation mechanism itself. The method therefore reflects infrastructure utilization only weakly and may not fully capture how value is created as networks mature.	The method does not directly reflect increasing consumer numbers or heat sales. Capital recovery remains constant regardless of how the network develops. Nevertheless, the tariff impact of capital costs can still decline over time if heat sales increase because the annual charge is distributed across a larger volume of heat consumption. The relationship between depreciation and network maturation is therefore indirect rather than explicit.	This criterion represents one of the strongest arguments for the use of progressive depreciation in DH systems. Many DH networks gradually increase their utilization over time as more consumers connect and heat sales grow. The back-loaded depreciation profile reflects this development by allocating a larger share of cost recovery to later years when the network is expected to be more fully utilized. Compared with linear and annuity depreciation, the method therefore provides a closer relationship between cost recovery and network maturation. This characteristic can be particularly relevant for newly established DH systems and large expansion projects.	Among all methods considered, growth-adjusted depreciation provides the strongest alignment with the maturation process of DH networks. The depreciation profile evolves in response to growth in consumer numbers, heat demand or network utilization. Consequently, cost recovery increases as the infrastructure becomes more heavily used and generates greater value for consumers. This creates a very close relationship between network development and cost allocation and may be particularly attractive for newly established DH systems with significant expected growth.
Weak	Acceptable	Strong	Strong

6.8 Asset lifetimes

Criteria explanation – Asset lifetimes

How the depreciation method allocates costs over the period in which assets generate economic benefits for the network and its consumers. A strong method ensures that depreciation reflects actual value creation rather than only technical lifetime or financing considerations.

Overall, the four depreciation methods do not differ substantially under this criterion. The main differences concern the timing of cost recovery rather than the ability to respond to a shorter or longer asset lifetime. A maximum depreciation or loan period prevents costs from being shifted to future consumers and avoids continued repayment for assets that no longer contribute to the heating system. However, a fixed period limits a utility's ability to align depreciation with the assets' actual operating life.

A shorter depreciation period may be appropriate if an asset underperforms, has frequent outages, or becomes costly to operate or adapt to new regulations. Earlier cost recovery can give the utility greater flexibility to replace the asset and reinvest in new production capacity.

Conversely, the period may be extended if operating conditions increase the assets' useful life. For example, a new heat pump may reduce the seasonal use of a biomass boiler. Any extension of the depreciation period should remain within the maximum permitted depreciation period. These factors apply similarly to newly built and expanding DH systems,

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
Linear depreciation is straightforward when the asset performs for its expected lifetime. If the asset becomes obsolete or underperforms earlier than expected, the period can be shortened to support earlier reinvestment, although this increases near-term charges. If useful life is extended, the period can likewise be prolonged within the maximum limit. Because capital remuneration is included, its treatment of unexpected lifetime changes is broadly comparable with the other methods.	Annuity depreciation provides a stable total capital charge over the expected asset lifetime. If actual useful life is shorter than expected, shortening the recovery period raises the annual charge but enables the remaining investment to be recovered before replacement. If the asset remains useful for longer, the period may be extended within the maximum limit. The annuity profile differs from the other methods, but its ability to respond to lifetime deviations is not materially different.	Progressive depreciation postpones a larger share of depreciation to later years. This can fit assets whose utilization develops gradually, but an unexpectedly short lifetime creates greater risk that deferred depreciation must be recovered over fewer years. Conversely, a longer useful life provides more time for recovery and may justify extending the period within the maximum limit. The method is somewhat more sensitive to early obsolescence, but the overall difference from the other methods remains limited.	If the asset life is shorter than expected in growth-adjusted depreciation, lower early depreciation may leave a larger unrecovered amount that must be collected before replacement. If the asset lasts longer, the period can be extended and recovery spread over the additional years, subject to the maximum limit. Although more dependent on utilization forecasts, its overall handling of lifetime deviations is broadly comparable with the other methods.
Acceptable	Acceptable	Acceptable	Acceptable

6.9 Avoidance of tariff shocks

Criteria explanation – Avoidance of tariff shocks

How the depreciation method contributes to stable and smooth tariff development over time. This includes both the initial recovery of investment costs and the treatment of future reinvestments or asset replacements. Preferably the method should minimize abrupt tariff increases that could undermine affordability, consumer acceptance, or confidence in the district heating system.

Figure 35 illustrates how an unforeseen replacement of the production plant in year 8 affects annual depreciation charges per consumer under the four methods. All methods produce a noticeable increase in annual charges when the replacement investment is introduced. None of the methods therefore eliminates the risk of a tariff shock following a major unforeseen reinvestment. However, the size and subsequent development of the annual charges differ between the methods.

Annuity depreciation maintains the most stable cost profile over the full period. Although the replacement causes an immediate increase, annual charges subsequently develop relatively smoothly and remain comparatively stable after the original and replacement production plants are fully depreciated. Linear depreciation also provides a predictable development, but its declining cost profile creates more pronounced reductions when assets reach the end of their depreciation periods. Introducing a replacement investment against this declining cost base can therefore produce a visible interruption in the otherwise downward tariff path.

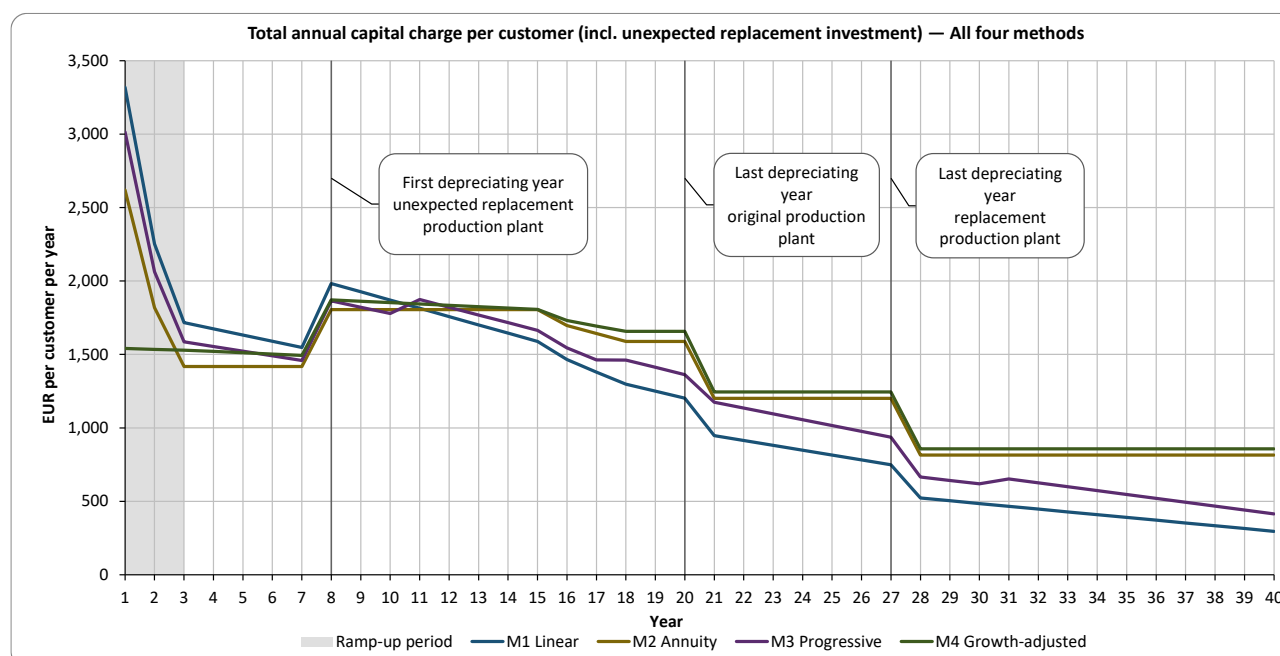


Figure 35: Development in total annual capital charge per customer over 40 years including an unforeseen replacement investment for the production plant (in year 8) for each of the four depreciation methods based on the calculation examples in Appendix 1. Can be compared with Figure 17.

Progressive and growth-adjusted depreciation keep charges relatively low before the replacement but result in higher or more deferred charges later. This may support affordability during the initial development of the DH system, but it also means that replacement costs can coincide with depreciation charges that remain elevated from the original investments. Overall, annuity depreciation performs strongest on the criterion by providing the smoothest long-term development in annual charges. Linear depreciation performs acceptably, while progressive and growth-adjusted depreciation provides less protection against long-term tariff volatility following unforeseen replacement investments.

The ability of the four methods to mitigate tariff shocks follows the same overall pattern in expansions of existing DH systems as in newly developed systems. Yet the impact is less substantial because the investment costs are distributed over a larger number of customers. The actual effect depends on the size of the expansion relative to the established network.

Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adjusted depreciation
The constant depreciation profile contributes to relatively stable tariff development. Consumers benefit from predictable cost recovery, which can improve confidence in DH investments and support long-term affordability. However, because the capital recovery charge gradually declines over time, major replacement investments may still create tariff increases if they are introduced before existing assets have been fully depreciated. The method therefore provides moderate protection against tariff shocks but does not fully smooth costs over time.	This is one of the strongest features of the annuity method. The constant annual capital recovery charge promotes smooth tariff development and minimizes fluctuations in consumer charges. For DH systems, where consumer acceptance and affordability are often central policy objectives, this characteristic can be highly beneficial. The method is also well suited to integrating future replacement investments without creating significant tariff volatility.	The method performs well in terms of reducing tariff pressure during the initial years of operation. Lower early-year depreciation charges can support affordability and facilitate consumer acquisition during network expansion. However, because depreciation charges increase over time, there is a risk that future tariff pressures accumulate. If rising depreciation charges coincide with major replacement investments, consumers may face more significant tariff increases later in the asset life. Consequently, the method provides good protection against initial tariff shocks but may create greater long-term tariff volatility than linear or annuity approaches.	Growth-adjusted depreciation performs well in reducing tariff burdens during the initial years of network development. This can improve affordability and help establish consumer confidence during the expansion phase of a DH project. However, future tariff developments become more dependent on actual growth patterns and investment timing. If growth is slower than expected or significant replacement investments are required while a large RAB remains outstanding, tariff volatility may increase. Consequently, the method provides strong support for affordability during network development but generally offers less long-term tariff stability and predictability than the annuity method.
Acceptable	Strong	Acceptable	Acceptable

6.10 Summarizing assessment

As Table 5 shows, no depreciation method performs strongest across all assessment criteria, and the preferred method therefore depends on the balance between consumer, financial and regulatory objectives. Overall, annuity depreciation provides the most balanced performance. It performs strongly on regulatory predictability, operator cash flow, DSCR, alignment with business-case practice and avoidance of tariff shocks, while providing acceptable outcomes for consumer fairness, connection risk, gradual network maturation and asset lifetimes. Its stable capital-recovery profile also supports long-term financial planning, although it does not explicitly adjust cost recovery to actual network growth.

Growth-adjusted depreciation performs particularly well in growing networks by distributing costs more evenly between consumer generations, reducing the burden during the connection phase and reflecting gradual network maturation. However, these benefits come with weaker regulatory predictability, early cash flow and DSCR, as recovery of the investment becomes more dependent on future consumer growth. Progressive depreciation offers a partial compromise by reducing early consumer costs and reflecting network maturation, but it provides weaker financial and regulatory performance than the annuity method and less direct alignment with growth than the growth-adjusted method.

Linear depreciation performs strongly from a financing and regulatory perspective because it is transparent and provides relatively rapid investment recovery. However, it performs less regarding consumer fairness, where early consumers may carry a disproportionate share of costs and neither connection uncertainty nor gradual network maturation is reflected in the depreciation profile.

The four methods affect new and expanding DH systems similarly. However, the differences are generally less significant for expansions of existing systems, especially when the existing system is large and the expansion is small. Conversely, effects become more significant for smaller systems undertaking larger expansions.

Assessment criteria	Linear depreciation	Annuity depreciation	Progressive depreciation	Growth-adj. depreciation
Regulatory predictability	Strong	Strong	Weak	Weak
Intergenerational consumer fairness	Weak	Acceptable	Acceptable	Strong
Indicative cash flow implications for operators	Strong	Strong	Acceptable	Weak
Impact on Debt Service Coverage Ratio (DSCR)	Strong	Strong	Weak	Weak
Alignment with business-case practice	Strong	Strong	Weak	Weak
Connection risk	Weak	Acceptable	Acceptable	Strong
Gradual network maturation	Weak	Acceptable	Strong	Strong
Asset lifetimes	Acceptable	Acceptable	Acceptable	Acceptable
Avoidance of tariff shocks	Acceptable	Strong	Acceptable	Acceptable

Table 5: The table summarizes the qualitative remarks from each of the assessed criteria in this chapter.

6.11 Specific conditions for WarmtelinQ (WTS)

WarmtelinQ is a heat transmission company owned by Gasunie and is involved in developing a regional heat transmission network in the Netherlands. The network aims to transport surplus industrial heat from the Port of Rotterdam to cities in the southern Netherlands, where local district heating systems can distribute the heat to end users.

As a heat transmission company, WTS owns and operates transmission pipelines that transport heat between large heat producers and cities with district heating systems. Although these pipelines do not produce heat, they could be seen as production assets although with a longer lifetime, as they share certain economic characteristics. They require substantial upfront investment before heat supply can begin and may need to be sized with future demand in mind. Consequently, costs may initially be high relative to the number of connected consumers and the volume of heat transported. This may remain the case even when WTS has contracted part of its future capacity, as contracted capacity does not necessarily result in full utilization from the outset. This is similar to newly established district heating companies.

WTS is planning an expansion under which surplus heat will be transported to cities where district heating systems have yet to be established. Consider a transmission pipeline designed to supply City A and, further along the route, City B. If City B is ready to receive heat several years before City A's distribution network is operational, the transmission pipeline may initially operate below its intended long-term capacity. The resulting challenge is comparable to regular district heating companies, constructing infrastructure for the expected mature level of demand while the associated distribution networks are still being developed. This creates a ramp-up period during the first years of operation.

As discussed previously, it is difficult to design a method for recovering capital costs through tariffs that addresses costs incurred during the ramp-up period without introducing significant uncertainty. The financing effects of the ramp-up period may, for example, be managed through a repayment-free loan period or partial capitalization, without necessarily extending the overall loan term. These measures have different accounting, regulatory, and financing implications and should therefore be assessed separately.

As described above, the specific challenges WTS faces are very similar to those faced by the regular district heating companies. The assessment of the depreciation methods presented in this chapter therefore generally also applies to WTS. There are, however, a few differences, which are discussed below.

The general financeability considerations set out in this chapter remain relevant to WTS. However, WTS differs from a regular district heating company because it is financed through Gasunie, rather than by multiple external lenders. This may provide greater flexibility to align loan repayments with WTS's cash-flow profile. If this is the case, annual principal repayments and short-term DSCR constraints may be less binding for WTS than for an independently financed district heating company. Consequently, the performance of the depreciation methods against the criteria "Cash-flow implications for operators," "Impact on the Debt Service Coverage Ratio (DSCR)," and "Alignment with business-case practice" may carry less weight for WTS. This conclusion would, however, depend on the actual terms and financial requirements.

Nevertheless, the choice of depreciation method still affects the timing of regulated revenues, the amount that may need to be refinanced, and the duration and scale of Gasunie's financing exposure. The relevance of cash flow and DSCR considerations for WTS should therefore be assessed against the actual intragroup loan terms and Gasunie's willingness and ability to provide continued financing or refinancing, rather than solely against a standard external-lender structure.

If greater network-expansion risk is acceptable, growth-adjusted depreciation could benefit WTS by aligning capital-cost recovery with heat volumes during its ten-year ramp-up period. However, the long ramp-up and phased investments could delay cost recovery and increase tariff and financing uncertainty. Because long-term customer growth, heat sales, and investment costs are uncertain, the method may reduce tariff transparency and predictability. The charge should therefore be reviewed periodically, for example every three or five years. If capacity or utilization differs from forecasts, future depreciation should be adjusted prospectively without changing depreciation already recognized. Safeguards should prevent under- or over-recovery. Similar reviews would be required for progressive depreciation, although that method is less directly linked to growth.

Finally, if WTS is placed in a separate regulatory category from conventional district heating companies, ACM may consider it more practicable to permit WTS to apply e.g. a growth-adjusted depreciation method as a specific or limited case. This could contain the broader regulatory consequences associated with applying a less predictable method across the entire district heating sector. The regulatory predictability of the method would nevertheless remain relatively weak. Separate treatment of WTS would therefore reduce the potential system-wide impact of accepting the method, rather than eliminate the method's underlying uncertainty.

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Appendix 1: Calculation examples

Calculation examples and underlying assumptions are presented in this appendix.

The calculation examples show depreciation of investment costs for each of the four evaluated depreciation methods.

Calculation assumptions – new built DH systems (1 of 2)

A. Financial parameters			
WACC (nominal, post-tax)	6.83%	—	
Bouwrente rate (= WACC, capitalised construction interest)	6.83%		
OPEX (annual, excl. capital, memo only)	3.0	EUR M/yr	
B. CAPEX by asset category			
Asset	EUR M	Lifetime (yrs)	Build profile
Network (pipes, civil works, in-ground)	40.0	40	20% / 40% / 40% over 3 build years
Build year 1 %	20%		
Build year 2 %	40%		
Build year 3 %	40%		
Production plant (heat source, pumping station)	15.0	20	60% / 40% over 2 build years
Build year 1 %	60%		
Build year 2 %	40%		
Connection assets (delivery sets, meters)	20.0	15	Deployed as consumers connect — gross cost offset by BAK
Total CAPEX	75.0		
C. Consumer connections & BAK (Bijdrage Aansluitkosten)			
Maximum customers (plateau)	4,000	connections	
BAK per new connection	3,000	EUR per connection — one-time fee at hook-up	
Gross connection asset cost per customer	5,000	EUR/connection (gross, before BAK)	
BAK coverage of gross connection cost	60%	>= 100% means connection assets self-funded by BAK	
Net connection cost per customer after BAK	2,000	EUR/connection net — BAK surplus offsets network costs	
D. Connection profile — construction & ramp-up overlap from Year 1			
Edit new customers freely. Years 1-3: construction, afterwards first connections. Cumulative auto-calculates.			
Year	New cust.	Cumulative	Phase
1	0	0	Construction yr 1
2	0	0	Construction yr 2
3	0	0	Construction complete / early ramp
4	2,000	2,000	Ramp-up
5	1,000	3,000	Ramp-up
6	1,000	4,000	Ramp-up
7	0	4,000	Plateau
8	0	4,000	Plateau
9	0	4,000	Plateau
10	0	4,000	Plateau

Calculation assumptions – new built DH systems (2 of 2)

E. Computed values — bouwrente & opening GAW (do not edit)		
<i>Bouwrente = WACC x (cumul NP-CAPEX at start of year + 0.5 x new NP-CAPEX in year). Split proportionally Network / Production. Capitalised into opening GAW at Year 4.</i>		
NP-CAPEX deployed year 1	17.000	EUR M
NP-CAPEX deployed year 2	22.000	EUR M
NP-CAPEX deployed year 3	16.000	EUR M
Bouwrente year 1	0.581	EUR M
Bouwrente year 2	1.952	EUR M
Bouwrente year 3	3.383	EUR M
Total bouwrente capitalised	5.916	EUR M
Network opening GAW (incl. bouwrente)	44.302	EUR M
Production opening GAW (incl. bouwrente)	16.613	EUR M
Network annual linear depreciation	1.108	EUR M/yr constant
Production annual linear depreciation	0.831	EUR M/yr constant
Network annuity PMT(WACC,40yr,NGAW)	3.258	EUR M/yr constant 40yrs
Production annuity PMT(WACC,20yr,PGAW)	1.548	EUR M/yr constant 20yrs

F. Method 3 — progressive block depreciation (% of GAW per decade, edit freely)		
Network (40yr life) — fraction of NGAW recovered per decade:		
Decade 1 — operational years 1-10	15%	fraction of NGAW (default 15%)
Decade 2 — operational years 11-20	20%	fraction of NGAW (default 20%)
Decade 3 — operational years 21-30	30%	fraction of NGAW (default 30%)
Decade 4 — operational years 31-40	35%	fraction of NGAW (default 35%)
Check sum (must = 100%)	100%	should equal 100%
Production (20yr life) — fraction of PGAW recovered per decade:		
Decade 1 — operational years 1-10	40%	fraction of PGAW (default 40%)
Decade 2 — operational years 11-20	60%	fraction of PGAW (default 60%)
Check sum (must = 100%)	100%	should equal 100%

G. Method 4 — growth-adjusted constant EUR/customer (computed, do not edit)		
<i>K = opening GAW / PV(customer-years). Each year's customer count is discounted at WACC from Year 4. Result: constant real EUR/customer charge regardless of when customers connect.</i>		
PV of customer-years — network (40 op. yrs)	51,649.0	discounted PV customer-years
PV of customer-years — production (20 op. yrs)	40,193.4	discounted PV customer-years
K _{net} (EUR M per PV-customer-year)	0.0009	EUR M per PV-customer-year
K _{prod} (EUR M per PV-customer-year)	0.0004	EUR M per PV-customer-year
K _{net} in EUR per customer (network portion, M4 constant)	858	EUR per customer per year — constant
K _{prod} in EUR per customer (production, M4 constant, yrs 1-20)	413	EUR per customer per year — constant (yrs 1-20 only)

Calculation examples – new built DH systems

Linear depreciation

Timeline				M1 — LINEAR capital recovery							
Year	Phase	New cust.	Cum. cust.	M 1 Net depr.	M 1 Prod depr.	M 1 Conn depr.	M 1 Total depr.	M 1 Return on cap.	M 1 Total charge	M 1 Accumulated Total charge	M 1 EUR/ cust
1	Construction	0	0	0.000	0.000	0.000	0.000	0.000	Bouwrente yr 1		--
2	Construction	0	0	0.000	0.000	0.000	0.000	0.000	Bouwrente yr 2		--
3	Construction	0	0	0.000	0.000	0.000	0.000	0.000	Bouwrente yr 3		--
4	Ramp-up	2,000	2,000	1.108	0.831	0.267	2.205	4.434	6.639	6.639	3,319
5	Ramp-up	1,000	3,000	1.108	0.831	0.400	2.338	4.420	6.758	13.397	2,253
6	Ramp-up	1,000	4,000	1.108	0.831	0.533	2.472	4.397	6.868	20.265	1,717
7	Plateau	0	4,000	1.108	0.831	0.533	2.472	4.228	6.699	26.964	1,675
8	Plateau	0	4,000	1.108	0.831	0.533	2.472	4.059	6.531	33.495	1,633
9	Plateau	0	4,000	1.108	0.831	0.533	2.472	3.890	6.362	39.857	1,590
10	Plateau	0	4,000	1.108	0.831	0.533	2.472	3.721	6.193	46.050	1,548
11	Plateau	0	4,000	1.108	0.831	0.533	2.472	3.553	6.024	52.074	1,506
12	Plateau	0	4,000	1.108	0.831	0.533	2.472	3.384	5.855	57.929	1,464
13	Plateau	0	4,000	1.108	0.831	0.533	2.472	3.215	5.687	63.616	1,422
14	Plateau	0	4,000	1.108	0.831	0.533	2.472	3.046	5.518	69.133	1,379
15	Plateau	0	4,000	1.108	0.831	0.533	2.472	2.877	5.349	74.482	1,337
16	Plateau	0	4,000	1.108	0.831	0.533	2.472	2.709	5.180	79.662	1,295
17	Plateau	0	4,000	1.108	0.831	0.533	2.472	2.540	5.011	84.674	1,253
18	Plateau	0	4,000	1.108	0.831	0.533	2.472	2.371	4.843	89.516	1,211
19	Plateau	0	4,000	1.108	0.831	0.267	2.205	2.202	4.407	93.923	1,102
20	Plateau	0	4,000	1.108	0.831	0.133	2.072	2.052	4.123	98.046	1,031
21	Plateau	0	4,000	1.108	0.831	0.000	1.938	1.910	3.848	101.895	962
22	Plateau	0	4,000	1.108	0.831	0.000	1.938	1.778	3.716	105.611	929
23	Plateau	0	4,000	1.108	0.831	0.000	1.938	1.645	3.584	109.194	896
24	Plateau	0	4,000	1.108	0	0.000	1.108	1.513	2.620	111.815	655
25	Plateau	0	4,000	1.108	0	0.000	1.108	1.437	2.545	114.359	636
26	Plateau	0	4,000	1.108	0	0.000	1.108	1.362	2.469	116.829	617
27	Plateau	0	4,000	1.108	0	0.000	1.108	1.286	2.394	119.222	598
28	Plateau	0	4,000	1.108	0	0.000	1.108	1.210	2.318	121.540	579
29	Plateau	0	4,000	1.108	0	0.000	1.108	1.135	2.242	123.782	561
30	Plateau	0	4,000	1.108	0	0.000	1.108	1.059	2.167	125.949	542
31	Plateau	0	4,000	1.108	0	0.000	1.108	0.983	2.091	128.040	523
32	Plateau	0	4,000	1.108	0	0.000	1.108	0.908	2.015	130.055	504
33	Plateau	0	4,000	1.108	0	0.000	1.108	0.832	1.940	131.995	485
34	Plateau	0	4,000	1.108	0	0.000	1.108	0.756	1.864	133.859	466
35	Plateau	0	4,000	1.108	0	0.000	1.108	0.681	1.788	135.647	447
36	Plateau	0	4,000	1.108	0	0.000	1.108	0.605	1.713	137.360	428
37	Plateau	0	4,000	1.108	0	0.000	1.108	0.530	1.637	138.997	409
38	Plateau	0	4,000	1.108	0	0.000	1.108	0.454	1.561	140.559	390
39	Plateau	0	4,000	1.108	0	0.000	1.108	0.378	1.486	142.044	371
40	Plateau	0	4,000	1.108	0	0.000	1.108	0.303	1.410	143.454	353
41	Plateau	0	4,000	1.108	0	0.000	1.108	0.227	1.334	144.789	334
42	Plateau	0	4,000	1.108	0	0.000	1.108	0.151	1.259	146.048	315
43	Plateau	0	4,000	1.108	0	0.000	1.108	0.076	1.183	147.231	296

Calculation examples – new built DH systems

Annuity depreciation

Timeline				M2 – ANNUITY capital recovery					
Year	Phase	New cust.	Cum. cust.	M 2 Net ann.	M 2 Prod ann.	M 2 Conn ann.	M 2 Total charge	M 2 Accumulated Total charge	M 2 EUR/ cust
1	Construction	0	0	--	--	--	--		--
2	Construction	0	0	--	--	--	--		--
3	Construction	0	0	--	--	--	--		--
4	Ramp-up	2,000	2,000	3.258	1.548	0.434	5.240	5.240	2,620
5	Ramp-up	1,000	3,000	3.258	1.548	0.652	5.457	10.697	1,819
6	Ramp-up	1,000	4,000	3.258	1.548	0.869	5.674	16.371	1,419
7	Plateau	0	4,000	3.258	1.548	0.869	5.674	22.045	1,419
8	Plateau	0	4,000	3.258	1.548	0.869	5.674	27.719	1,419
9	Plateau	0	4,000	3.258	1.548	0.869	5.674	33.393	1,419
10	Plateau	0	4,000	3.258	1.548	0.869	5.674	39.067	1,419
11	Plateau	0	4,000	3.258	1.548	0.869	5.674	44.742	1,419
12	Plateau	0	4,000	3.258	1.548	0.869	5.674	50.416	1,419
13	Plateau	0	4,000	3.258	1.548	0.869	5.674	56.090	1,419
14	Plateau	0	4,000	3.258	1.548	0.869	5.674	61.764	1,419
15	Plateau	0	4,000	3.258	1.548	0.869	5.674	67.438	1,419
16	Plateau	0	4,000	3.258	1.548	0.869	5.674	73.112	1,419
17	Plateau	0	4,000	3.258	1.548	0.869	5.674	78.786	1,419
18	Plateau	0	4,000	3.258	1.548	0.869	5.674	84.461	1,419
19	Plateau	0	4,000	3.258	1.548	0.434	5.240	89.700	1,310
20	Plateau	0	4,000	3.258	1.548	0.217	5.022	94.723	1,256
21	Plateau	0	4,000	3.258	1.548	0.000	4.805	99.528	1,201
22	Plateau	0	4,000	3.258	1.548	0.000	4.805	104.333	1,201
23	Plateau	0	4,000	3.258	1.548	0.000	4.805	109.138	1,201
24	Plateau	0	4,000	3.258	0.000	0.000	3.258	112.396	814
25	Plateau	0	4,000	3.258	0.000	0.000	3.258	115.654	814
26	Plateau	0	4,000	3.258	0.000	0.000	3.258	118.911	814
27	Plateau	0	4,000	3.258	0.000	0.000	3.258	122.169	814
28	Plateau	0	4,000	3.258	0.000	0.000	3.258	125.427	814
29	Plateau	0	4,000	3.258	0.000	0.000	3.258	128.684	814
30	Plateau	0	4,000	3.258	0.000	0.000	3.258	131.942	814
31	Plateau	0	4,000	3.258	0.000	0.000	3.258	135.200	814
32	Plateau	0	4,000	3.258	0.000	0.000	3.258	138.458	814
33	Plateau	0	4,000	3.258	0.000	0.000	3.258	141.715	814
34	Plateau	0	4,000	3.258	0.000	0.000	3.258	144.973	814
35	Plateau	0	4,000	3.258	0.000	0.000	3.258	148.231	814
36	Plateau	0	4,000	3.258	0.000	0.000	3.258	151.488	814
37	Plateau	0	4,000	3.258	0.000	0.000	3.258	154.746	814
38	Plateau	0	4,000	3.258	0.000	0.000	3.258	158.004	814
39	Plateau	0	4,000	3.258	0.000	0.000	3.258	161.261	814
40	Plateau	0	4,000	3.258	0.000	0.000	3.258	164.519	814
41	Plateau	0	4,000	3.258	0.000	0.000	3.258	167.777	814
42	Plateau	0	4,000	3.258	0.000	0.000	3.258	171.034	814
43	Plateau	0	4,000	3.258	0.000	0.000	3.258	174.292	814

Calculation examples – new built DH systems

Progressive depreciation

Timeline				M3 — PROGRESSIVE block depreciation								
Year	Phase	New cust.	Cum. cust.	M 3 Net depr.	M 3 Prod depr.	M 3 Conn depr.	M 3 Net GAW rem.	M 3 Prod GAW rem.	M 3 Return on cap.	M 3 Total charge	M 3 Accumulated Total charge	M 3 EUR/ cust
1	Construction	0	0	--	--	--	--	--	--	--	--	--
2	Construction	0	0	--	--	--	--	--	--	--	--	--
3	Construction	0	0	--	--	--	--	--	--	--	--	--
4	Ramp-up	2,000	2,000	0.665	0.665	0.267	44.302	16.613	4.434	6.029	6.029	3,015
5	Ramp-up	1,000	3,000	0.665	0.665	0.400	43.638	15.949	4.461	6.190	12.220	2,063
6	Ramp-up	1,000	4,000	0.665	0.665	0.533	42.973	15.284	4.480	6.342	18.562	1,586
7	Plateau	0	4,000	0.665	0.665	0.533	42.309	14.620	4.353	6.215	24.777	1,554
8	Plateau	0	4,000	0.665	0.665	0.533	41.644	13.955	4.225	6.088	30.865	1,522
9	Plateau	0	4,000	0.665	0.665	0.533	40.980	13.291	4.098	5.961	36.826	1,490
10	Plateau	0	4,000	0.665	0.665	0.533	40.315	12.626	3.971	5.833	42.659	1,458
11	Plateau	0	4,000	0.665	0.665	0.533	39.651	11.962	3.844	5.706	48.365	1,427
12	Plateau	0	4,000	0.665	0.665	0.533	38.986	11.297	3.717	5.579	53.944	1,395
13	Plateau	0	4,000	0.665	0.665	0.533	38.321	10.633	3.589	5.452	59.396	1,363
14	Plateau	0	4,000	0.886	0.997	0.533	37.657	9.968	3.462	5.878	65.275	1,470
15	Plateau	0	4,000	0.886	0.997	0.533	36.771	8.971	3.297	5.713	70.988	1,428
16	Plateau	0	4,000	0.886	0.997	0.533	35.885	7.974	3.132	5.548	76.537	1,387
17	Plateau	0	4,000	0.886	0.997	0.533	34.999	6.978	2.967	5.383	81.920	1,346
18	Plateau	0	4,000	0.886	0.997	0.533	34.113	5.981	2.802	5.218	87.138	1,305
19	Plateau	0	4,000	0.886	0.997	0.267	33.227	4.984	2.637	4.787	91.925	1,197
20	Plateau	0	4,000	0.886	0.997	0.133	32.341	3.987	2.490	4.506	96.431	1,127
21	Plateau	0	4,000	0.886	0.997	0.000	31.455	2.990	2.353	4.235	100.667	1,059
22	Plateau	0	4,000	0.886	0.997	0.000	30.569	1.994	2.224	4.107	104.774	1,027
23	Plateau	0	4,000	0.886	0.997	0.000	29.683	0.997	2.095	3.978	108.752	995
24	Plateau	0	4,000	1.329	0	0.000	28.797	0.000	1.967	3.296	112.048	824
25	Plateau	0	4,000	1.329	0	0.000	27.467	0.000	1.876	3.205	115.253	801
26	Plateau	0	4,000	1.329	0	0.000	26.138	0.000	1.785	3.114	118.367	779
27	Plateau	0	4,000	1.329	0	0.000	24.809	0.000	1.694	3.024	121.391	756
28	Plateau	0	4,000	1.329	0	0.000	23.480	0.000	1.604	2.933	124.323	733
29	Plateau	0	4,000	1.329	0	0.000	22.151	0.000	1.513	2.842	127.165	710
30	Plateau	0	4,000	1.329	0	0.000	20.822	0.000	1.422	2.751	129.917	688
31	Plateau	0	4,000	1.329	0	0.000	19.493	0.000	1.331	2.660	132.577	665
32	Plateau	0	4,000	1.329	0	0.000	18.164	0.000	1.241	2.570	135.147	642
33	Plateau	0	4,000	1.329	0	0.000	16.835	0.000	1.150	2.479	137.626	620
34	Plateau	0	4,000	1.551	0	0.000	15.506	0.000	1.059	2.610	140.235	652
35	Plateau	0	4,000	1.551	0	0.000	13.955	0.000	0.953	2.504	142.739	626
36	Plateau	0	4,000	1.551	0	0.000	12.405	0.000	0.847	2.398	145.137	599
37	Plateau	0	4,000	1.551	0	0.000	10.854	0.000	0.741	2.292	147.429	573
38	Plateau	0	4,000	1.551	0	0.000	9.303	0.000	0.635	2.186	149.615	547
39	Plateau	0	4,000	1.551	0	0.000	7.753	0.000	0.530	2.080	151.695	520
40	Plateau	0	4,000	1.551	0	0.000	6.202	0.000	0.424	1.974	153.669	494
41	Plateau	0	4,000	1.551	0	0.000	4.652	0.000	0.318	1.868	155.537	467
42	Plateau	0	4,000	1.551	0	0.000	3.101	0.000	0.212	1.762	157.300	441
43	Plateau	0	4,000	1.551	0	0.000	1.551	0.000	0.106	1.656	158.956	414

Calculation examples – new built DH systems

Growth-adjusted depreciation

Timeline				M4 — GROWTH-ADJUSTED constant EUR/cust			
Year	Phase	New cust.	Cum. cust.	M 4 Net+Prod charge (reset)	M 4 Total charge	M 4 Accumulated Total charge	M 4 EUR/cust
1	Construction	0	0	--	--		--
2	Construction	0	0	--	--		--
3	Construction	0	0	--	--		--
4	Ramp-up	2,000	2,000	2.542	3.082	3.082	1,541
5	Ramp-up	1,000	3,000	3.813	4.605	7.687	1,535
6	Ramp-up	1,000	4,000	5.084	6.119	13.805	1,530
7	Plateau	0	4,000	5.084	6.082	19.888	1,521
8	Plateau	0	4,000	5.084	6.046	25.933	1,511
9	Plateau	0	4,000	5.084	6.009	31.943	1,502
10	Plateau	0	4,000	5.084	5.973	37.916	1,493
11	Plateau	0	4,000	5.084	5.936	43.852	1,484
12	Plateau	0	4,000	5.084	5.900	49.752	1,475
13	Plateau	0	4,000	5.084	5.864	55.616	1,466
14	Plateau	0	4,000	5.084	5.827	61.443	1,457
15	Plateau	0	4,000	5.084	5.791	67.233	1,448
16	Plateau	0	4,000	5.084	5.754	72.988	1,439
17	Plateau	0	4,000	5.084	5.718	78.706	1,429
18	Plateau	0	4,000	5.084	5.681	84.387	1,420
19	Plateau	0	4,000	5.084	5.378	89.765	1,345
20	Plateau	0	4,000	5.084	5.227	94.992	1,307
21	Plateau	0	4,000	5.084	5.084	100.077	1,271
22	Plateau	0	4,000	5.084	5.084	105.161	1,271
23	Plateau	0	4,000	5.084	5.084	110.245	1,271
24	Plateau	0	4,000	3.431	3.431	113.676	858
25	Plateau	0	4,000	3.431	3.431	117.107	858
26	Plateau	0	4,000	3.431	3.431	120.538	858
27	Plateau	0	4,000	3.431	3.431	123.970	858
28	Plateau	0	4,000	3.431	3.431	127.401	858
29	Plateau	0	4,000	3.431	3.431	130.832	858
30	Plateau	0	4,000	3.431	3.431	134.263	858
31	Plateau	0	4,000	3.431	3.431	137.694	858
32	Plateau	0	4,000	3.431	3.431	141.125	858
33	Plateau	0	4,000	3.431	3.431	144.556	858
34	Plateau	0	4,000	3.431	3.431	147.987	858
35	Plateau	0	4,000	3.431	3.431	151.418	858
36	Plateau	0	4,000	3.431	3.431	154.849	858
37	Plateau	0	4,000	3.431	3.431	158.280	858
38	Plateau	0	4,000	3.431	3.431	161.711	858
39	Plateau	0	4,000	3.431	3.431	165.142	858
40	Plateau	0	4,000	3.431	3.431	168.573	858
41	Plateau	0	4,000	3.431	3.431	172.004	858
42	Plateau	0	4,000	3.431	3.431	175.435	858
43	Plateau	0	4,000	3.431	3.431	178.866	858

Calculation assumptions – expansion of existing DH systems

A. Financial parameters			
WACC (nominal, post-tax)	6.83%	—	
Bouwrente rate (= WACC, capitalised construction interest)	6.83%		
OPEX (annual, excl. capital, memo only)	3.0	EUR M/yr	
B. CAPEX by asset category			
Asset	EUR M	Lifetime (yrs)	Build profile
Network (pipes, civil works, in-ground)	40.0	40	20% / 40% / 40% over 3 build years
Build year 1 %	50%		
Build year 2 %	25%		
Build year 3 %	25%		
Production plant (heat source, pumping station)	0.0	20	60% / 40% over 2 build years
Build year 1 %	60%		
Build year 2 %	40%		
Connection assets (delivery sets, meters)	20.0	15	Deployed as consumers connect — gross cost offset by BAK
Total CAPEX	60.0		
C. Consumer connections & BAK (Bijdrage Aansluitkosten)			
Maximum customers (plateau)	4,000	connections	
BAK per new connection	5,000	EUR per connection — one-time fee at hook-up	
Gross connection asset cost per customer	5,000	EUR/connection (gross, before BAK)	
BAK coverage of gross connection cost	100%	>= 100% means connection assets self-funded by BAK	
Net connection cost per customer after BAK	0	EUR/connection net — BAK surplus offsets network costs	
D. Connection profile — construction & ramp-up overlap from Year 1			
Edit new customers freely. Years 1-3: construction and connections. Cumulative auto-calculates.			
Year	New cust.	Cumulative	Phase
1	2,000	12,000	Ramp-up
2	1,000	13,000	Ramp-up
3	1,000	14,000	Ramp-up
4	0	14,000	Plateau
5	0	14,000	Plateau
6	0	14,000	Plateau
7	0	14,000	Plateau
E. Computed values — bouwrente & opening GAW (do not edit)			
Bouwrente = WACC x (cumul NP-CAPEX at start of year + 0.5 x new NP-CAPEX in year). Split proportionally Network / Production. Capitalised into opening GAW at Year 1.			
NP-CAPEX deployed year 1	40.000	EUR M	
NP-CAPEX deployed year 2	0.000	EUR M	
NP-CAPEX deployed year 3	0.000	EUR M	
Bouwrente year 1	0.000	EUR M	
Bouwrente year 2	0.000	EUR M	
Bouwrente year 3	0.000	EUR M	
Total bouwrente capitalised	0.000	EUR M	
Network opening GAW (incl. bouwrente)	40.000	EUR M	
Production opening GAW (incl. bouwrente)	0.000	EUR M	
Network annual linear depreciation	1.000	EUR M/yr constant	
Production annual linear depreciation	0.000	EUR M/yr constant	
Network annuity PMT(WACC, 40yr, NGAW)	2.941	EUR M/yr constant 40yrs	
Production annuity PMT(WACC, 20yr, PGAW)	0.000	EUR M/yr constant 20yrs	
F. Method 3 — progressive block depreciation (% of GAW per decade, edit freely)			
Network (40yr life) — fraction of NGAW recovered per decade:			
Decade 1 — operational years 1-10	15%	fraction of NGAW (default 15%)	
Decade 2 — operational years 11-20	20%	fraction of NGAW (default 20%)	
Decade 3 — operational years 21-30	30%	fraction of NGAW (default 30%)	
Decade 4 — operational years 31-40	35%	fraction of NGAW (default 35%)	
Check sum (must = 100%)	100%	should equal 100%	
Production (20yr life) — fraction of PGAW recovered per decade:			
Decade 1 — operational years 1-10	40%	fraction of PGAW (default 40%)	
Decade 2 — operational years 11-20	60%	fraction of PGAW (default 60%)	
Check sum (must = 100%)	100%	should equal 100%	
G. Method 4 — growth-adjusted constant EUR/customer (computed, do not edit)			
K = opening GAW / PV(customer-years). Each year's customer count is discounted at WACC from Year 4. Result: constant real EUR/customer charge regardless of when customers connect.			
PV of customer-years — network (40 op. yrs)	187,642.3	discounted PV customer-years	
PV of customer-years — production (20 op. yrs)	147,547.9	discounted PV customer-years	
K _{net} (EUR M per PV-customer-year)	0.0002	EUR M per PV-customer-year	
K _{prod} (EUR M per PV-customer-year)	0.0000	EUR M per PV-customer-year	
K _{net} in EUR per customer (network portion, M4 constant)	213	EUR per customer per year — constant	
K _{prod} in EUR per customer (production, M4 constant, yrs 1-20)	0	EUR per customer per year — constant (yrs 1-20 only)	

Calculation examples – expansion of existing DH systems

Linear depreciation

Timeline				M1 — LINEAR capital recovery							
Year	Phase	New cust.	Cum. cust.	M 1 Net depr.	M 1 Prod depr.	M 1 Conn depr.	M 1 Total depr.	M 1 Return on cap.	M 1 Total charge	M 1 Accumulated Total charge	M 1 EUR/ cust
1	Expansion	2,000	12,000	1.000	0.000	0.000	1.000	2.732	3.732	3.732	311
2	Expansion	1,000	13,000	1.000	0.000	0.000	1.000	2.664	3.664	7.396	282
3	Expansion	1,000	14,000	1.000	0.000	0.000	1.000	2.595	3.595	10.991	257
4	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.527	3.527	14.518	252
5	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.459	3.459	17.977	247
6	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.391	3.391	21.368	242
7	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.322	3.322	24.690	237
8	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.254	3.254	27.944	232
9	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.186	3.186	31.129	228
10	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.117	3.117	34.247	223
11	Plateau	0	14,000	1.000	0.000	0.000	1.000	2.049	3.049	37.296	218
12	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.981	2.981	40.276	213
13	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.912	2.912	43.189	208
14	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.844	2.844	46.033	203
15	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.776	2.776	48.809	198
16	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.708	2.708	51.516	193
17	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.639	2.639	54.155	189
18	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.571	2.571	56.726	184
19	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.503	2.503	59.229	179
20	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.434	2.434	61.663	174
21	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.366	2.366	64.029	169
22	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.298	2.298	66.327	164
23	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.229	2.229	68.556	159
24	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.161	2.161	70.717	154
25	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.093	2.093	72.810	149
26	Plateau	0	14,000	1.000	0.000	0.000	1.000	1.025	2.025	74.835	145
27	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.956	1.956	76.791	140
28	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.888	1.888	78.679	135
29	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.820	1.820	80.498	130
30	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.751	1.751	82.250	125
31	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.683	1.683	83.933	120
32	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.615	1.615	85.547	115
33	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.546	1.546	87.094	110
34	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.478	1.478	88.572	106
35	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.410	1.410	89.982	101
36	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.342	1.342	91.323	96
37	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.273	1.273	92.596	91
38	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.205	1.205	93.801	86
39	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.137	1.137	94.938	81
40	Plateau	0	14,000	1.000	0.000	0.000	1.000	0.068	1.068	96.006	76

Calculation examples – expansion of existing DH systems

Annuity depreciation

Timeline				M2 — ANNUITY capital recovery					
Year	Phase	New cust.	Cum. cust.	M 2 Net ann.	M 2 Prod ann.	M 2 Conn ann.	M 2 Total charge	M 2 Accumulated Total charge	M 2 EUR/ cust
1	Expansion	2,000	12,000	2.941	0.000	0.000	2.941	2.941	245
2	Expansion	1,000	13,000	2.941	0.000	0.000	2.941	5.883	226
3	Expansion	1,000	14,000	2.941	0.000	0.000	2.941	8.824	210
4	Plateau	0	14,000	2.941	0.000	0.000	2.941	11.765	210
5	Plateau	0	14,000	2.941	0.000	0.000	2.941	14.707	210
6	Plateau	0	14,000	2.941	0.000	0.000	2.941	17.648	210
7	Plateau	0	14,000	2.941	0.000	0.000	2.941	20.589	210
8	Plateau	0	14,000	2.941	0.000	0.000	2.941	23.531	210
9	Plateau	0	14,000	2.941	0.000	0.000	2.941	26.472	210
10	Plateau	0	14,000	2.941	0.000	0.000	2.941	29.413	210
11	Plateau	0	14,000	2.941	0.000	0.000	2.941	32.355	210
12	Plateau	0	14,000	2.941	0.000	0.000	2.941	35.296	210
13	Plateau	0	14,000	2.941	0.000	0.000	2.941	38.237	210
14	Plateau	0	14,000	2.941	0.000	0.000	2.941	41.178	210
15	Plateau	0	14,000	2.941	0.000	0.000	2.941	44.120	210
16	Plateau	0	14,000	2.941	0.000	0.000	2.941	47.061	210
17	Plateau	0	14,000	2.941	0.000	0.000	2.941	50.002	210
18	Plateau	0	14,000	2.941	0.000	0.000	2.941	52.944	210
19	Plateau	0	14,000	2.941	0.000	0.000	2.941	55.885	210
20	Plateau	0	14,000	2.941	0.000	0.000	2.941	58.826	210
21	Plateau	0	14,000	2.941	0.000	0.000	2.941	61.768	210
22	Plateau	0	14,000	2.941	0.000	0.000	2.941	64.709	210
23	Plateau	0	14,000	2.941	0.000	0.000	2.941	67.650	210
24	Plateau	0	14,000	2.941	0.000	0.000	2.941	70.592	210
25	Plateau	0	14,000	2.941	0.000	0.000	2.941	73.533	210
26	Plateau	0	14,000	2.941	0.000	0.000	2.941	76.474	210
27	Plateau	0	14,000	2.941	0.000	0.000	2.941	79.416	210
28	Plateau	0	14,000	2.941	0.000	0.000	2.941	82.357	210
29	Plateau	0	14,000	2.941	0.000	0.000	2.941	85.298	210
30	Plateau	0	14,000	2.941	0.000	0.000	2.941	88.240	210
31	Plateau	0	14,000	2.941	0.000	0.000	2.941	91.181	210
32	Plateau	0	14,000	2.941	0.000	0.000	2.941	94.122	210
33	Plateau	0	14,000	2.941	0.000	0.000	2.941	97.064	210
34	Plateau	0	14,000	2.941	0.000	0.000	2.941	100.005	210
35	Plateau	0	14,000	2.941	0.000	0.000	2.941	102.946	210
36	Plateau	0	14,000	2.941	0.000	0.000	2.941	105.888	210
37	Plateau	0	14,000	2.941	0.000	0.000	2.941	108.829	210
38	Plateau	0	14,000	2.941	0.000	0.000	2.941	111.770	210
39	Plateau	0	14,000	2.941	0.000	0.000	2.941	114.712	210
40	Plateau	0	14,000	2.941	0.000	0.000	2.941	117.653	210

Calculation examples – expansion of existing DH systems

Progressive depreciation

Timeline				M3 — PROGRESSIVE block depreciation								
Year	Phase	New cust.	Cum. cust.	M 3 Net depr.	M 3 Prod depr.	M 3 Conn depr.	M 3 Net GAW rem.	M 3 Prod GAW rem.	M 3 Return on cap.	M 3 Total charge	M 3 Accumulated Total charge	M 3 EUR/ cust
1	Expansion	2,000	12,000	0.600	0.000	0.000	40.000	0.000	2.732	3.332	3.332	278
2	Expansion	1,000	13,000	0.600	0.000	0.000	39.400	0.000	2.691	3.291	6.623	253
3	Expansion	1,000	14,000	0.600	0.000	0.000	38.800	0.000	2.650	3.250	9.873	232
4	Plateau	0	14,000	0.600	0.000	0.000	38.200	0.000	2.609	3.209	13.082	229
5	Plateau	0	14,000	0.600	0.000	0.000	37.600	0.000	2.568	3.168	16.250	226
6	Plateau	0	14,000	0.600	0.000	0.000	37.000	0.000	2.527	3.127	19.377	223
7	Plateau	0	14,000	0.600	0.000	0.000	36.400	0.000	2.486	3.086	22.463	220
8	Plateau	0	14,000	0.600	0.000	0.000	35.800	0.000	2.445	3.045	25.509	218
9	Plateau	0	14,000	0.600	0.000	0.000	35.200	0.000	2.404	3.004	28.513	215
10	Plateau	0	14,000	0.600	0.000	0.000	34.600	0.000	2.363	2.963	31.476	212
11	Plateau	0	14,000	0.800	0.000	0.000	34.000	0.000	2.322	3.122	34.598	223
12	Plateau	0	14,000	0.800	0.000	0.000	33.200	0.000	2.268	3.068	37.666	219
13	Plateau	0	14,000	0.800	0.000	0.000	32.400	0.000	2.213	3.013	40.679	215
14	Plateau	0	14,000	0.800	0.000	0.000	31.600	0.000	2.158	2.958	43.637	211
15	Plateau	0	14,000	0.800	0.000	0.000	30.800	0.000	2.104	2.904	46.541	207
16	Plateau	0	14,000	0.800	0.000	0.000	30.000	0.000	2.049	2.849	49.390	204
17	Plateau	0	14,000	0.800	0.000	0.000	29.200	0.000	1.994	2.794	52.184	200
18	Plateau	0	14,000	0.800	0.000	0.000	28.400	0.000	1.940	2.740	54.924	196
19	Plateau	0	14,000	0.800	0.000	0.000	27.600	0.000	1.885	2.685	57.609	192
20	Plateau	0	14,000	0.800	0.000	0.000	26.800	0.000	1.830	2.630	60.239	188
21	Plateau	0	14,000	1.200	0	0.000	26.000	0.000	1.776	2.976	63.215	213
22	Plateau	0	14,000	1.200	0	0.000	24.800	0.000	1.694	2.894	66.109	207
23	Plateau	0	14,000	1.200	0	0.000	23.600	0.000	1.612	2.812	68.921	201
24	Plateau	0	14,000	1.200	0	0.000	22.400	0.000	1.530	2.730	71.651	195
25	Plateau	0	14,000	1.200	0	0.000	21.200	0.000	1.448	2.648	74.299	189
26	Plateau	0	14,000	1.200	0	0.000	20.000	0.000	1.366	2.566	76.865	183
27	Plateau	0	14,000	1.200	0	0.000	18.800	0.000	1.284	2.484	79.349	177
28	Plateau	0	14,000	1.200	0	0.000	17.600	0.000	1.202	2.402	81.751	172
29	Plateau	0	14,000	1.200	0	0.000	16.400	0.000	1.120	2.320	84.071	166
30	Plateau	0	14,000	1.200	0	0.000	15.200	0.000	1.038	2.238	86.309	160
31	Plateau	0	14,000	1.400	0	0.000	14.000	0.000	0.956	2.356	88.665	168
32	Plateau	0	14,000	1.400	0	0.000	12.600	0.000	0.861	2.261	90.926	161
33	Plateau	0	14,000	1.400	0	0.000	11.200	0.000	0.765	2.165	93.091	155
34	Plateau	0	14,000	1.400	0	0.000	9.800	0.000	0.669	2.069	95.160	148
35	Plateau	0	14,000	1.400	0	0.000	8.400	0.000	0.574	1.974	97.134	141
36	Plateau	0	14,000	1.400	0	0.000	7.000	0.000	0.478	1.878	99.012	134
37	Plateau	0	14,000	1.400	0	0.000	5.600	0.000	0.382	1.782	100.794	127
38	Plateau	0	14,000	1.400	0	0.000	4.200	0.000	0.287	1.687	102.481	120
39	Plateau	0	14,000	1.400	0	0.000	2.800	0.000	0.191	1.591	104.072	114
40	Plateau	0	14,000	1.400	0	0.000	1.400	0.000	0.096	1.496	105.568	107

Calculation examples – expansion of existing DH systems

Growth-adjusted depreciation

Timeline				M4 — GROWTH-ADJUSTED constant EUR/cust			
Year	Phase	New cust.	Cum. cust.	M 4 Net+Prod charge (reset)	M 4 Total charge	M 4 Accumulated Total charge	M 4 EUR/cust
1	Expansion	2,000	12,000	2.558	2.558	2.558	213
2	Expansion	1,000	13,000	2.771	2.771	5.329	213
3	Expansion	1,000	14,000	2.984	2.984	8.314	213
4	Plateau	0	14,000	2.984	2.984	11.298	213
5	Plateau	0	14,000	2.984	2.984	14.282	213
6	Plateau	0	14,000	2.984	2.984	17.267	213
7	Plateau	0	14,000	2.984	2.984	20.251	213
8	Plateau	0	14,000	2.984	2.984	23.236	213
9	Plateau	0	14,000	2.984	2.984	26.220	213
10	Plateau	0	14,000	2.984	2.984	29.205	213
11	Plateau	0	14,000	2.984	2.984	32.189	213
12	Plateau	0	14,000	2.984	2.984	35.173	213
13	Plateau	0	14,000	2.984	2.984	38.158	213
14	Plateau	0	14,000	2.984	2.984	41.142	213
15	Plateau	0	14,000	2.984	2.984	44.127	213
16	Plateau	0	14,000	2.984	2.984	47.111	213
17	Plateau	0	14,000	2.984	2.984	50.095	213
18	Plateau	0	14,000	2.984	2.984	53.080	213
19	Plateau	0	14,000	2.984	2.984	56.064	213
20	Plateau	0	14,000	2.984	2.984	59.049	213
21	Plateau	0	14,000	2.984	2.984	62.033	213
22	Plateau	0	14,000	2.984	2.984	65.017	213
23	Plateau	0	14,000	2.984	2.984	68.002	213
24	Plateau	0	14,000	2.984	2.984	70.986	213
25	Plateau	0	14,000	2.984	2.984	73.971	213
26	Plateau	0	14,000	2.984	2.984	76.955	213
27	Plateau	0	14,000	2.984	2.984	79.939	213
28	Plateau	0	14,000	2.984	2.984	82.924	213
29	Plateau	0	14,000	2.984	2.984	85.908	213
30	Plateau	0	14,000	2.984	2.984	88.893	213
31	Plateau	0	14,000	2.984	2.984	91.877	213
32	Plateau	0	14,000	2.984	2.984	94.861	213
33	Plateau	0	14,000	2.984	2.984	97.846	213
34	Plateau	0	14,000	2.984	2.984	100.830	213
35	Plateau	0	14,000	2.984	2.984	103.815	213
36	Plateau	0	14,000	2.984	2.984	106.799	213
37	Plateau	0	14,000	2.984	2.984	109.783	213
38	Plateau	0	14,000	2.984	2.984	112.768	213
39	Plateau	0	14,000	2.984	2.984	115.752	213
40	Plateau	0	14,000	2.984	2.984	118.737	213