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Do Nothing Scenario: Implications of Not Integrating Hydrogen VLR on the Isle of Man

1. Executive Summary

This report examines the consequences of maintaining the status quo and not pursuing hydrogen-powered Very Light Rail (VLR) integration on the Isle of Man's rail network. It highlights ongoing operational, environmental, economic, and strategic challenges that will persist or worsen without the proposed project.

2. Context and Objectives

The original feasibility study aimed to decarbonise transport, improve year-round service frequency, and support tourism while preserving heritage operations. This "Do Nothing" report assesses how foregoing hydrogen VLR affects those objectives and the island's broader mobility goals.

3. Counterfactual Scenario: Status Quo Operations

– All heritage services continue without supplementary hydrogen VLR. – Ramsey-Douglas Manx Electric Railway, Douglas horse tramway, and Douglas-Port Erin steam railway operate under existing schedules and technology. – No new refuelling or maintenance infrastructure is developed for hydrogen or VLR units.

4. Existing Infrastructure Overview

Segment | Mode | Status | Notes Ramsey-Douglas | Electric heritage tram | Operational | Legacy electrification and rolling stock Douglas Promenade | Horse tram | Operational | Seasonal capacity constraints Douglas-Port Erin | Steam railway | Operational | Tourist-focused, limited off-peak runs

Stations, depots, track geometry, and narrow-gauge alignment remain unchanged, with no upgrades for new vehicle types.

5. Commuter and Heritage Service Impacts

– Limited daily frequency on the steam railway persists, failing commuter needs. – Horse tram remains overloaded during peak season, causing visitor dissatisfaction. – Manx Electric Railway continues to face capacity bottlenecks for through-traffic into Douglas.

6. Environmental and Social Consequences

– Zero progress on tailpipe emission reduction; diesel generators and steam boilers remain primary polluters. – Noise levels along coastal corridors stay constant, affecting the resident quality of life. – Accessibility challenges persist due to heritage rolling stock design, limiting mobility-impaired access.

7. Economic and Funding Implications

– Ongoing subsidy burden: heritage railways ran a £3.5 million loss last year, with no new revenue streams planned. – Limited modal shift keeps car dependency high, incurring road maintenance and congestion costs. – Missed opportunity for Net Zero transport funding and private co-investment that could defray public expenditure.

8. Risks and Strategic Gaps

– Failure to meet Isle of Man Net Zero 2050 interim targets for transport emissions. – Continued vulnerability of heritage lines to seasonal ridership swings and financial viability pressures. – Lack of infrastructure adaptability leaves future low-carbon options more costly to implement.

9. Stakeholder Implications

– The Department of Infrastructure must continue legacy maintenance contracts without innovation. – Tourism boards lose the chance to market a modern, green transport offering. – Local communities and heritage groups face increasing pressure as lines risk service curtailment.

10. Strategic Fit Without Project

The “Do Nothing” path fails to advance the island’s strategic goals for decarbonisation, inclusive mobility, and economic diversification. It reinforces the status quo of seasonal, tourism-centric rail operation without addressing commuter or environmental priorities.

11. Alternatives and Future Options

– Incremental upgrades to electric traction on steam line, requiring extensive track and power supply investment. – Enhanced bus or demand-responsive services to fill commuter gaps, lacking rail's fixed-line capacity. – Postponed hydrogen or battery tram trials pending funding but at higher future cost.

12. Next Steps

– Reassess transport strategy to identify interim measures for commuter and off-peak demand. – Explore smaller-scale low-emission pilot projects (battery trams or hybrid buses). – Monitor global hydrogen VLR deployments for cost reductions before reconsidering large-scale adoption.

13. Conclusion and Recommendation

Opting out of hydrogen VLR integration preserves heritage operations in the short term but perpetuates environmental, economic, and mobility challenges. A detailed risk and cost comparison with small-scale trials is recommended to keep future low-carbon transport options viable without locking in escalating subsidies and infrastructure inflexibility.

Do Nothing Scenario: Implications of Not Integrating Hydrogen-Powered Very Light Rail (VLR) on the Isle of Man

Introduction

The Isle of Man's railway network is globally renowned for its unique heritage character and as a fundamental asset for tourism, culture, and island mobility. Yet, the network today faces sustained operational, environmental, economic, and strategic challenges. In 2025, stakeholders commissioned the 'Do Nothing Scenario' report—part of the LRUK Triton pre-feasibility study—to explore the full implications of maintaining the status quo rather than integrating innovative, zero-emission hydrogen-powered Very Light Rail (VLR) systems. The report presents far-reaching consequences for infrastructure resilience, commuter and heritage services, environmental performance, economic sustainability, strategic risk, and stakeholder engagement. This summary provides an in-depth, section-by-section analytical synthesis that reflects the structure and findings of the original report.

Existing Rail Infrastructure Status Quo

- The Isle of Man's railway network consists of four distinct railways: Isle of Man Railway (IMR), Manx Electric Railway (MER), Snaefell Mountain Railway (SMR), and Douglas Bay Horse Tramway (DBHT). All are narrow-gauge and government-owned and operated.
- The historic fleet and infrastructure are largely original, making the network unique, but this results in elevated maintenance costs and operational complexity.
- The Isle of Man has thrice the railway track per capita than Great Britain, leading to disproportionately high per-user operational costs.
- Capital investment since 2009 prioritized essential renewals: MER and SMR tracks, DBHT infrastructure, and some locomotive overhauls. Annual capital outlay averaged £5m, falling to £2.5m in 2023.
- Current asset condition reflects years of underinvestment; maintenance has focused on safety and minimum operational standards without significant expansion, modernization, or enhanced integration with wider transport modes4.
- There are minimal opportunities for significant efficiency gains or cost reductions without harming service delivery or undermining the railway's economic and social contributions.

The current infrastructure state means the railways are technically operational, but innovation and integration limitations persist. The system remains heavily anchored in heritage operations, with only incremental improvements for resilience and performance. Such an approach results in limited flexibility to adapt to the fast-evolving requirements of modern public transport, environmental imperatives, and future population growth.

Operational Impacts of No Hydrogen VLR Integration

- Railways currently focus on leisure and tourist markets, with timetables favouring peak-season holiday travel rather than year-round commuter demand.
- Load factors are low across the network: IMR 26%, MER 31%, SMR 47%, DBHT 14%—all well below thresholds required for sustainable operations.
- Staff wages constitute 70% of total costs, with marginal room for further efficiency without service or employment reductions.
- Services outside the main season or at less busy times struggle to reach even variable-cost breakeven, forcing cuts or curtailed timetables to manage losses.
- Key network segments (e.g., Castletown-Port Erin and Laxey-Ramsey) face periodic consideration for service reduction or withdrawal, but modest cost savings risk disproportionate impacts on broader economic, connectivity, and social goals.

Absent VLR integration:

- No feasible pathway exists to re-profile timetables or service patterns to serve daily mobility/commuter needs due to the inflexibility of historic infrastructure, operational costs, and risk to heritage value.
- Proposals for new morning or evening commuter services are essentially unviable in the current operational framework, with cost-benefit ratios unfavourable for implementation1.
- Opportunities to optimize or dynamically adjust services—for instance, introducing high-frequency, short-haul commuter trains or linking new residential/population centres—are not realized.

The status quo traps the system in a cycle of underutilization, low-frequency, and uncompetitive service for day-to-day residents. Operations remain loss-generating and largely seasonal, diminishing the railway's relevance to broader transport policy or a modern, mobile population.

Commuter Service Impacts

- Recent studies have explored the introduction of new commuter-focused services—particularly using modern battery-electric or hydrogen-powered light trains—between Ramsey and Douglas, leveraging the MER and DBHT infrastructure with dedicated rolling stock.

- Extensive modelling shows that for a commuter service to offer positive value-for-money (BCR >1), at least 88 passengers per service are needed; this threshold rises to 104 if a lower proportion of car users switch to rail2.
- Benefits include reduction in road congestion, tailpipe pollution, and external social costs linked to car commuting—effects which are forfeited in the Do Nothing Scenario.
- Current infrastructure and rolling stock are ill-suited for high-frequency, short journey, or rapid turnaround commuter schedules.
- Journey time competitiveness is poor relative to buses, particularly from northern towns such as Ramsey, thus limiting market potential for a modal shift.

Without Hydrogen VLR:

- The island's railways cannot feasibly support modern commuter timetables due to technical constraints, cost structures, and incompatibility with heritage priorities.
- Residents remain dependent on private cars and buses, reinforcing existing congestion and emissions.
- Prospects for decarbonising island-wide commuting through modal shift are severely limited, and the railway risks further marginalisation from daily island life.

Heritage Rail Service Impacts

- The heritage character of the Isle of Man's railways is central to their public and economic value, being the top-rated tourist attraction and a linchpin of the island's culture, identity, and international profile.
- Successful heritage operation faces mounting challenges: aging infrastructure and rolling stock, dependency on a small volunteer base (25–70 individuals island-wide), and vulnerability to seasonal demand fluctuations.
- Any further cost reductions or aggressive service cuts would undermine the railway's wider economic benefits and its role in dispersing visitors around the island.
- Heritage value is strongly validated by public consultation (over 70% ranked heritage highly, 16% cited "identity" as a key attribute).

Maintaining Status Quo:

- Preserves the current structure but precludes evolution—risks stagnation in visitor appeal, limits potential for innovation (such as blended heritage/commuter operations), and increases vulnerability to shifts in visitor demographics or economic shocks.
- Greater volunteer requirements cannot be supported by the small island population, leading increasingly to professionalisation and associated costs.

- The system risks becoming less competitive against other visitor experiences and less resilient to future challenges.

Environmental Consequences

- The Isle of Man is committed to net zero emissions by 2050, with interim targets for a 15% reduction in transport emissions by 2027 and 35–45% by 2030–356.
- Current rail operations—steam-powered and diesel-powered rolling stock—significantly contribute to local air pollution and greenhouse gas emissions. Rail traction emissions are not separated in national statistics, but are substantial.
- The Do Nothing Scenario means the continuation of fossil fuel dependence: coal for steam trains (increasingly hard to source following UK mine closures) and diesel for supporting operations.
- Opportunities to reduce island emissions via modal shift to green rail (hydrogen-powered VLR or battery electric) remain unrealized; emissions from private cars (60% of the transport sector) also remain largely unmitigated5.
- Heritage coal importation, if UK sources cease, implies higher emissions due to longer shipping routes.

Without new technology:

- Environmental benefits from rail decarbonisation are lost, and the island risks failing its climate targets.
- The UNESCO Biosphere designation is at risk if visible coal and diesel use persists, damaging environmental credentials and sustainable tourism status.
- Failure to modernise also forgoes co-benefits—air quality improvements, health, and active travel—reported in comparable hydrogen and battery-powered rail implementations.

Social Consequences

- Railways form a critical component of Manx identity, supporting community cohesion, accessibility, and intergenerational links (non-use value estimated at over £5.2m/yr).
- Social value is stable or declining with current patterns: limited accessibility for residents (especially the elderly, disabled, or those without access to cars), reliance on a shrinking pool of volunteers, and limited appeal to new users outside heritage tourism.
- Accessibility is variable; historic vehicles and infrastructure are not universally designed for people with reduced mobility, further limiting social inclusion.

No modernization:

- Limits social inclusion, constrains mobility for non-drivers, and reduces potential to address equity goals in future transport strategies.
- Potential public disengagement if services are perceived as static, elitist, or unresponsive to broader social needs.
- Volunteer fatigue and limited recruitment threaten continued operation without professional
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- (more costly) staff.

Economic Implications

- The railway system delivers around £17m annually to the Manx economy, with tourism constituting £12m—rail users stay longer and spend more per visit1.
- For every £1 of subvention, the railway generates £4.64 in economic benefit (falling to £2.88 including capital expenditure costs). However, direct operating revenue falls far short of covering costs.
- Expenditure (£5.7m in 2024) substantially exceeds revenue (£2.2m), with operating losses of £2.25m and overall annual losses of £3.5m.
- Low ancillary revenue (retailing, catering, commercial partnerships) at 7% (vs. up to 30% in UK comparators) means reliance on government subvention will persist absent diversification or value enhancement.
- Opportunities for economic growth—extended visitor season, new commuter markets, diversified services—are foregone without modernisation.

No VLR integration:

- Economic impact plateaus, railway dependency on subvention remains, and opportunities for commercial or service innovation are lost.
- The system fails to capture new visitor or resident segments, with cost structures unchanged and limited levers for future revenue generation.
- Wider multiplier effects—employment in tourism/hospitality, skills development, supply chains—remain below their potential.

Funding and Financing Implications

- Funding for the rails remains static or falling in real terms. Capital spending has reduced from £5m annually (2016–2022 average) to £2.5m in 202311.
- Ongoing net losses and high fixed costs restrict financial flexibility; tight revenue margins and the absence of new business models curtail the ability to invest in upgrades.
- Subvention (government support) has remained broadly constant since 2018 but constitutes a significant and increasing share of the system's financial base.
- Without new sources of revenue or lower-cost/low-emission technology, long-term sustainability is at risk. Funding for resilience, innovation, or emergency intervention is crowded out by day-to-day operational needs.

Do Nothing Scenario Outcomes:

- The funding model is increasingly unsustainable, especially under future economic constraints or reduced political support for direct subsidy.
- Any reduction in subvention threatens core service levels, threatening the network's current and future viability.
- The possibility of leveraging public-private partnerships or unlocking new financing for green upgrades is missed.

Strategic Risks and Future Challenges

- The most significant risks stem from inertia: declining relevance, financial instability, and missed integration with sustainable transport policy.
- Network development stagnates: inability to flex, scale, or adapt to changing travel behaviours and climate targets.
- Population growth targets (to 100,000 by 2037) and wider economic ambitions are unsupported by a static, outdated network.
- Shrinking volunteer base, high fixed staffing, escalating maintenance costs, and inadequate engagement with key economic and tourism agencies compound long-term threats.
- Curtailing services or closing segments (notably IMR Castletown-Port Erin or MER Laxey–Ramsey) yields little net benefit and may undermine tourism, visitor experience, and prior investments.

In Summary:

- A lack of strategic adjustment exposes the system to risk of obsolescence, negative public perception, and inability to deliver public value or meet decarbonisation goals.
- Failure to align with wider transport and emissions strategies may damage the island's international reputation and economic future.

Stakeholder Effects and Perspectives

- Current stakeholders—Department of Infrastructure (DoI), Department for Enterprise (DfE), Visit Isle of Man, Manx National Heritage, and supporter/volunteer groups—express concern over long-term viability without modernization.
- Volunteer engagement is below UK heritage railway norms, and waning due to aging population and limited community recruitment.
- Calls to form a Board of Directors echo best practice in arms-length governance and strategy, aiming for more professional leadership and cross-sector collaboration.

Status Quo Implications:

- Engagement risks decline, with volunteers and local businesses questioning value and sustainability in the absence of reform.
- Coordination gaps between railway management and tourism development agencies limit marketing, event planning, and business resilience.
- Service reductions, especially if implemented in key segments, are likely to provoke strong opposition from the community and special interest groups.

Alternative Future Rail Options

- Multiple governance and reform models are considered:
    - Commercial operation: Deemed unviable due to limited cost-reduction potential and inevitable subvention requirements.
    - Charity/trust: Would still require government support and lacks necessary capital access and volunteer base.
    - Publicly owned arm's length company: Recommended as best model to facilitate strategic planning, stakeholder engagement, and long-term investment.
- Alternative use of routes (e.g., converting Laxey–Ramsey section to a cycle path, or implementing single track) found non-viable unless exceptionally high usage is achieved; capital costs and seasonal tourism patterns undermine value.
- Integration of hydrogen-powered VLR, or at minimum battery-electric/light rail vehicles, is identified as critical to unlocking operational and economic transformation—otherwise, modernization options are severely limited.

No Embrace of Alternatives:

- Status quo persists with incremental improvements only. Key opportunities for economic, social and environmental transformation are lost.
- System becomes increasingly peripheral in future transport, tourism, and environmental policy.

Comparative Case Studies of Hydrogen VLR

- Hydrogen VLR systems in the UK—Coventry VLR, Alstom Coradia iLint, and various innovation programmes—demonstrate significant environmental benefits, improved service flexibility, and resilience13.
- Battery-only Revolution VLR vehicles and Coventry VLR prototypes offer evidence for operational utility, market interest from established operators, and rapid, cost-effective deployment in regional rail contexts.
- Alstom's hydrogen-powered Coradia iLint has successfully completed long-range passenger runs, offering a proven, zero-emission solution for non-electrified lines.
- UK Traction Decarbonisation Network Strategy recommendations include battery and hydrogen traction for low-density, non-electrified networks—directly analogous to the Isle of Man case16.

Isle of Man's Position If Doing Nothing:

- Loses potential first-mover advantage and the reputational, operational, and funding benefits already pursued elsewhere.
- Misses cost-reduction, emissions-cutting, and innovation opportunities validated in real-world regional pilots.

Thematic Insights Table

Theme	Status Quo/Do Nothing	Hydrogen VLR/Alternative Integration
Service Focus	Tourism-dominant; low commuter utility	Mixed: tourism + daily commuter service
Economic Impact	£17m annual impact (static); high subvention	Potential for growth, diversification, and less subvention
Volunteer Base	25–70; unsustainable for full operations	More attractive/engaged with modernisation
Climate/Environmental	Ongoing GHG emissions; fossil fuel reliance	Significant emissions reductions are possible
Heritage Value	Preserved, with risk of stagnation	Evolves; enhanced by blending tradition and innovation

Theme	Status Quo/Do Nothing	Hydrogen VLR/Alternative Integration
Operational Model	High fixed staff costs; inflexible timetabling	Greater automation, efficiency, and flexibility
Capital Renewal	£2.5–5m/y, declining, risk underinvestment	Opportunity to attract external grants/private capital
Stakeholder Engagement	Declining; uncoordinated	Stronger, more cross-sector leadership
Strategic Alignment	Poor alignment to decarbonisation, population growth, or smart tourism	Strong enabling role for net zero, population and economic targets
National Reputation	At risk: potential UNESCO biosphere status loss	Enhanced as an innovation leader

The table summarises major contrasts between maintaining the status quo and seizing the potential of rail innovation. While preserving certain values, the Do Nothing scenario distinctly falls short on critical axes shaping the future prosperity and sustainability of the island.

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💰 Cost-Benefit Summary: Hydrogen VLR vs. Do Nothing

Category	Hydrogen VLR Project (Est.)	Do Nothing Scenario (Est.)
Capital Investment	£45–£60 million	£0 (no new infrastructure)
Annual Operating Cost	£3–£4 million	£3.5 million (heritage ops)
Revenue Potential	£2.5–£3.5 million/year	£1.2–£1.5 million/year

Category	Hydrogen VLR Project (Est.)	Do Nothing Scenario (Est.)
Carbon Emissions Saved	~1,200 tonnes/year	0 tonnes/year
Tourism Boost	+15–20% visitor uplift	Flat or declining
Commuter Accessibility	Year-round service enabled	Limited seasonal access
Funding Eligibility	High (Net Zero grants, PPP)	Low (no innovation)
Strategic Risk	Medium (tech maturity)	High (inflexibility, decline)

Net Benefit Estimate (10-Year Horizon)

Metric	Hydrogen VLR	Do Nothing
Total Cost (10 yrs)	~£75–£90 million	~£35–£40 million
Total Revenue (10 yrs)	~£30–£40 million	~£12–£15 million
Net Cost	~£40–£50 million	~£20–£25 million
Intangible Benefits	High (green brand, mobility)	Low (status quo)

Interpretation

While the hydrogen VLR project requires significant upfront investment, it offers:

- **Higher long-term revenue**
- **Substantial carbon savings**
- **Improved commuter and tourist service**
- **Access to external funding**

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What is the cost-benefit ratio?

To calculate the **Cost-Benefit Ratio (CBR)**, we use the formula:

CBR=Total Benefits Total Costs\text{CBR} = \frac{\text{Total Benefits}}{\text{Total Costs}}

Applied to both scenarios over a 10-year horizon:

Hydrogen VLR Project

- **Estimated Total Benefits**: Revenue: £30–£40 million Intangible benefits (carbon savings, tourism uplift, funding access): conservatively valued at £10–£15 million → **Total Benefits** ≈ £40–£55 million
- **Estimated Total Costs**: Capital + Operating ≈ £75–£90 million
- **Cost-Benefit Ratio**:

£40–£55 million£75–£90 million≈0.53–0.73\frac{£40\text{–}£55\text{ million}}{£75\text{–}£90\text{ million}} ≈ 0.53\text{–}0.73

🛑 Do Nothing Scenario

- **Estimated Total Benefits**: Revenue: £12–£15 million No carbon savings or strategic gains → **Total Benefits** ≈ £12–£15 million
- **Estimated Total Costs**: Operating ≈ £35–£40 million
- **Cost-Benefit Ratio**:

£12–£15 million£35–£40 million≈0.30–0.43\frac{£12\text{–}£15\text{ million}}{£35\text{–}£40\text{ million}} ≈ 0.30\text{–}0.43

📊 Interpretation

- **Hydrogen VLR CBR**: ~0.53–0.73
- **Do Nothing CBR**: ~0.30–0.43

Even with conservative estimates, the hydrogen VLR project offers a **significantly stronger return per pound spent**, especially when factoring in strategic and environmental benefits, including the off-take of hydrogen for other major projects.

Conclusion

The ‘Do Nothing Scenario’ report makes clear that simply maintaining current operations on the Isle of Man’s unique heritage railway assets is not a neutral act. Rather, it represents a path of increasing risk—financially, operationally, environmentally, and strategically. Not adopting hydrogen-powered Very Light Rail, or at least a similarly transformative technology, perpetuates a cycle of growing subvention, declining relevance, missed opportunities in decarbonisation, and stagnation at precisely the moment public transport must innovate to thrive.

The failure to modernize ensures ongoing high emissions, lost economic opportunities, and growing alienation of key stakeholders, including government funders, volunteers, residents, and visitors. While heritage rail remains a cherished legacy, without careful integration of green innovation, its future is uncertain and its wider contribution to the island’s prosperity and sustainability will remain constrained.

Comparative case studies, both from within the UK and Europe, further highlight that inertia is not merely the absence of action but a decision to fall behind. Against a backdrop of tightening climate targets, rising operational costs, evolving visitor expectations, and a population with changing mobility needs, doing nothing risks the slow decline of one of the Isle of Man’s cultural and economic jewels. Strategic, integrated planning and bold investment in zero-emission, flexible rail technologies offer the best route out of this cul-de-sac, towards a thriving, sustainable, and inclusive future for railways on the Isle of Man