Modern Methods of Housing Construction

An analysis of the costs and benefits of the potential greater use of modern methods of housing construction in Western Australia

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Urban Development Institute of Australia
WESTERN AUSTRALIA

Executive Summary

Unlike other capital cities across Australia, housing construction in Perth is dominated by 'double brick' construction. Given this dominance, UDIA together with a group of developers, commissioned EY (Ernst and Young) to undertake a cost-benefit analysis of modern methods of construction for the Perth market and how this compares to double brick construction.

The research found whilst there are strengths and weakness to both forms of construction, a number of factors had limited the supply of modern construction methods in the Perth. This included:

- The small number of large building companies with a dominate market share;
- Dominant, highly efficient, vertically integrated, builders and building material supply companies;
- Relatively small-scale housing market;
- Historically plentiful supply of large, sand based englobo lots;
- A relatively stagnant construction market;
- Local workforce skillset traditionally geared towards brick builds; and
- Historic consumer preference, particularly amongst older demographics for brick, although this preference is in decline.

A cost-benefit model was developed to estimate both financial and economic cost differences between modern construction methods and traditional brick builds. Financial costs were considered to be the direct cost of construction, whilst economic costs included the wider costs to society and new home buyer. Four scenarios were modelled in order to ascertain the relative merits of the different construction methods, under different site conditions.

In general, the modelling found that in the current market, financial costs for structural frame with cladding were higher than double brick, however these costs were offset by economic savings associated the value of additional space created and rental savings derived from reduced construction timeframes. Although not included in the economic model, indications are that alternative forms are construction are likely to be even more price competitive for two storey homes, and in particular those on small lots.

Scenario	Structural frame with cladding: Cost Saving	Current State 2019	Future State 2024
1	Greenfield, one storey project home, A-class site	0%	8%
2	Greenfield, one storey project home, S1-class site	2%	10%
3	Infill, one storey project home, A-class site	0%	8%
4	Infill, one storey project home, S1-class site	1%	9%

Nevertheless, the relatively small-scale nature of the current framed construction market means that there are significant opportunities to increase efficiencies, as building practices become more accustomed to modern methods of construction and supply chain efficiencies are realised. These efficiencies are anticipated to generate savings of up to 10% for modern construction methods over the next five years.

At the same time, construction costs for traditional builds are evolving and likely to increase. The construction labour force is shifting, with the number of brick layers diminishing whilst carpentry is becoming a more popular trade. The future supply of land for housing development is also likely to require greater volumes of fill, which itself is likely to more expensive as the supply of basic raw materials diminishes.

In the current market, modern construction methods can be cheaper than double brick builds, however, this was not always translating to cheaper prices for consumers as the Perth market generally utilised higher pricing margins to cover a perceived higher level of risk associated with such builds.

1. Introduction

Purpose

The Western Australian home building industry is predominantly characterised by double brick construction. The dominance of this construction methodology is unique to Perth, with other capitals and states across Australia, as well as international cities, more commonly using alternative or lightweight construction methods.

Given this dominance, UDIA identified a need to undertake research examining the 'cost and benefits' of modern methods of construction comparative to double brick construction. As a result, UDIA, together with a small group of developers, commissioned EY (Ernst and Young) to undertake a cost benefit analysis of modern methods of construction in WA.

Specifically, the research sought to examine:

1. The cost and benefits of alternative building methods (materials/processes) and the various factors that underpin those, as compared to the traditional brick construction method; including;
    - jurisdictional differences;
    - comparative timeframes assuming optimal timeframes can be achieved;
    - supply of raw materials and skilled labour (current and future);
    - cost and efficiency of production (including changes as volume increases); etc.
2. WA market (builders and buyers) attitudes and expectations around traditional vs alternate techniques as well as other barriers whether real or perceived;
3. The extent that lot size vs dwelling storeys impact cost/efficiency of construction, e.g. use of traditional vs alternative building materials on small lots (< 180m2) with dwellings of 2 or more storeys;
4. Potential time and cost savings in the land development process, e.g. reduced fill requirements, to produce lots other than Class 'A' or 'S' and suitable for light framed construction;
5. Strategies to expand WA's use of alternative building methods; and
6. Any other relevant matters.

In order to evaluate the report's methodology and findings, UDIA commissioned an independent third party, peer review by a Perth based housing industry expert.

This report provides a summary of the study its findings and UDIA's next steps.

2. Benefits of Different Construction Typologies

There are a wide range of materials and combinations of materials, available to construct our homes. These materials can be used using many different construction systems, each with their own advantages and disadvantages which vary depending upon climatic and soil conditions, distance from the source of basic raw materials, maintenance regimes and consumer preferences for particular design styles and appearances.

In WA, the majority of new homes are built using double brick, whilst in the eastern states, timber-framed construction dominates. In general, both methods have advantages and disadvantages.

2.1 Double Brick

Strengths

High thermal mass can moderate internal temperatures: Clay and concrete brickwork both have a high thermal mass, requiring significant amounts of energy to change their temperature. If a double brick home is subjected to a heating or cooling cycle that crosses the thermal comfort zone, the walls can maintain a relatively stable level of heat energy for an extended period of time.

Fire resistant: Clay and concrete brickwork both have good fire resistance, and do not burn when exposed to bushfire.

Good sound insulation: Brick provides good sound insulation due to its mass.

Durable: Bricks possess high durability and load bearing capacity.

Low maintenance: If built well and unpainted, double brick is a relatively low maintenance building method.

Moisture resistant: The cavity between the internal and external brick walls help to prevent moisture being transferred directly from the outside walls to the home's interior. However, while clay bricks do resist the penetration of rainwater, over extended periods of time, some moisture may eventually soak through the mortar joints.

Good sustainability rating: Material longevity, low maintenance requirements and recyclability contribute to their characterisation as a relatively sustainable form of construction.

Does not harbour vermin: Clay and concrete bricks consist of dense inorganic materials that tend not to harbour vermin.

Knowledge, labour and materials required for construction are readily available: Clay and concrete bricks are manufactured throughout Australia and are available at competitive prices. There is a large body of knowledge and experience on standards and techniques for constructing double brick homes in Western Australia with the existing labour force in the residential construction industry structured around double brick construction.

Weaknesses

Reduces internal floor space: Standard double brick walls are typically 250mm in width, all else equal, the use of double brick can result in a 4% reduction in internal space compared to framed construction (which is equivalent to 10.4m² or a bathroom in a 250m² house)[1]

Requires additional slab and footing work on sub optimal sites: Due to the weight of double brick construction, investment into site slabs and footings is required on sites classified as lower than A Class. Alternatively, the achievement of A Class lot status (to enable double brick builds) typically requires significant amounts of fill.

Lengthy construction time: Double brick construction can take significantly longer than timber framed construction due to the time it takes to lay the

[1] Timber Insight. 2017. Builder user guide for construction of timber framed Housing in WA. Confirmed by rough estimates provided during stakeholder consultations.

bricks and cure the concrete slab if extensive reinforcements are required. This results in extra site administration, supervision, amenity and utility costs, as well as additional rental and mortgage costs for the home owner.

Creates large volume of on-site waste: Double brick generates significantly more on-site waste than a framed construction This can reduce amenity and result in additional build costs and/or environmental costs.

2.2 Structural Timber Frame Construction

Strengths

Potential support for the achievement of infill targets: Framed construction may be more appropriate than traditional builds in tight infill areas, or urban areas with reactive soil conditions. Modern construction methods can help to maximise interior living space on smaller lots.

Reduce land development costs and associated externalities: As more land is developed, the supply of more preferable, easy to develop sites is diminishing. Developers may be under increasing pressure to deliver high quality sites at market competitive prices, however due to difficult soil conditions this may be increasingly difficult to do. Fill to support land development is likely to become increasingly scarce which may increase costs of traditional, double brick builds over time. Modern building methods are far more adaptable to imperfect lots.

Reduce construction externalities: Framed construction has the potential to produce less waste, shorter construction timeframes and may also present an opportunity to reduce the negative impacts of construction (i.e. dust, noise, delivery vehicles, etc. on local communities.

Better fit with emerging skill mix: The supply of brick layers is reducing, and the average age of bricklayers is increasing. A labour shortage may induce price increases for builders paying tradesman.

Affordable housing: Depending on market and sector conditions, the cost savings obtained by developers and builders by reducing land development costs and build costs is likely over time to be passed onto the end consumers. More broadly this could help reduce household debt and stimulate economic growth.

Support delivery of community and social housing: Faster delivery times achieved through modern methods of construction may support the delivery of community and social housing as this lower end of the market tends to be very time sensitive. Cost savings achieved through the construction process may also be passed on to tenants through lower rents

Enable greater design innovation: Alternative materials generally offer greater design flexibility than traditional double brick. These methods are also more adaptable to imperfect lots and can be more easily and cost effectively 'built to the land'.

Support local timber manufacturing industry: The use of alternative materials provides an opportunity to support WA timber producers and manufacturers.

Adaptability: Framed homes can be more easily modified over time (such as shifting internal walls) and therefore may facilitate 'ageing in place' objectives that are inherent in numerous government policy documents.

3. Current WA Construction Landscape

3.1 Building Activity

Whilst WA has seen a decline in construction activity in recent years in the level of, the construction sector provides a significant contribution to state economy, accounting for 9.8% of WA's total employment in 2018.

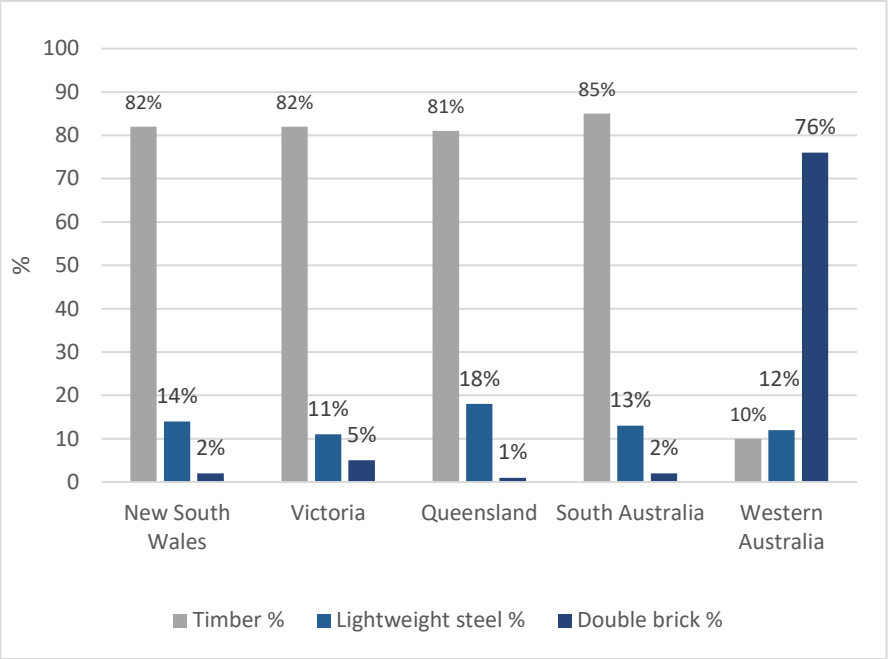
The total number of approved dwelling units commenced in 2018 was approximately 15,615 and the number of dwelling units currently under construction remains relatively low.[2]

3.2 Construction Mix

In terms of construction mix, Western Australia is almost a mirror image of practices in east coast cities in which alternative construction methods dominate market shares. At around 10% of the market, it is estimated that timber framed builds may number in the order of 1,300 per year in Western Australia; in NSW a comparable figure is in the order of 25,000 and in Victoria, 31,400.[3]

However, the share of builders using modern construction methods in Western Australia is growing. Use of timber framing in the construction of new residential dwellings in WA is estimated to have increased from 2% in 1997 to 10% in 2018. As a result, the use of double brick has decreased from 80% in 1997 to 76% in 2018. The use of steel framing in the construction of new residential dwellings in WA is estimated at 12% of the market.

Figure 1: Sample of framing material used in the construction of new detached residential houses 2017/18 (%)



Source: Australian Construction Insights. 2018. Framing Material Use in Residential Construction.

[2] Source: ABS 2019. Dwelling units under construction by sector, states and territories original: Table 77, ABS 2019. Dwelling unit completions by sector, states and territories: Original. Table 39, ABS 2019. ABS 8752 Dwelling unit commencements by sector, states and territories: Original. Table 36

[3] Ibid

Market Share

Compared to Victoria and New South Wales, Western Australia's housing construction market is dominated by a small number of large building companies. In 2018, nearly 46% of all new homes built were built by the seven largest building companies. However, it is important to note that the HIA does not include BCG, also one of WA's largest building companies.

Table 1: Builders Market Share

Western Australia		Victoria	
Company	**% of total**	**Company**	**% of total**
ABN Group	14.1	Metricon Homes	7.1
Ventura	7.8	Simonds Group	3.9
JWH	6.9	MJH	3.4
Redink Homes	5.2	Henley	3.4
SSB Pty Ltd	4.7	Burbank	3.1
Summit Homes	4.1	Porter Davis Homes	2.5
Delstrat Group	3.1	ABN	1.2
Total builds	**45.9**	**Total builds**	**24.6**

Source: HIA –Housing100, ABN Groups home builder websites.

Another key characteristic of the Western Australian market is the vertical integration of building and building material supply companies, particularly brick companies, which makes them highly efficient.

3.3 WA Construction Labour Market

Bricklaying

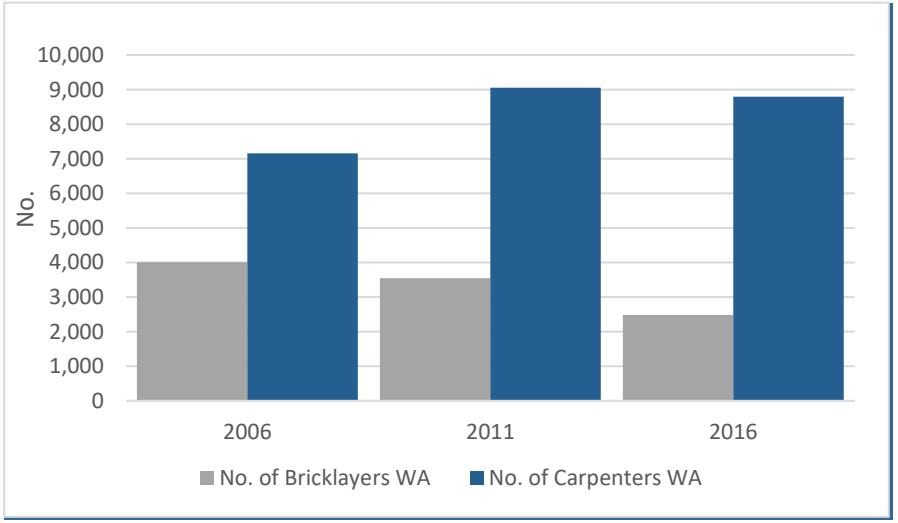
Based on data sourced from the 2006 and 2016 census surveys, the number of employed bricklayers in the Western Australian market decreased from 4,007 to 2,481. As at 2016, there were 31% fewer brick layers between the ages of 15-29, 16% fewer between the ages of 30-39 and 56% fewer between the ages of 40-50. This trend is replicated Australia-wide which has also seen a significant decline in bricklayer employment numbers.

Carpentry Occupation

Western Australia's carpentry occupation workforce has grown by over 22% between the 2006 and 2016 census surveys from 7,154 to 8,791.

In 2016, there were over 22% more carpenters between the age of 15 and 19, 49% more between the age of 30-39 and no significant difference between the age of 40-50.

Figure 2: Number of employed bricklayers in WA 2006-2016



Source: ABS Census Survey 2006-2016

4. Key Drivers of Construction Outcomes

4.1 Summary of Stakeholder Feedback

EY interviewed a total of 19 different organisations representing a broad range of different industries and professional disciplines across the housing construction industry. This included representatives from developers, builders, construction material suppliers, civil engineers, sales consultants, waste service providers, peak bodies and academia. Common feedback received during the consultation included:

I. Small number of large building companies with a dominate market share

A common theme encountered in stakeholder consultations was the limited incentive for larger builders to innovate and disrupt the market. Those who had a view of east coast markets tended to note that the smaller builders tend to be more innovative. Generally, it is found across many sectors that smaller firms tend to be more innovative while larger firms tend to be more comfortable in maintaining the status quo. The market dominance of larger builders was repeatedly referred to by stakeholders as one of the contributing factors to the relatively low level of modern construction builds in Western Australia.

II. Dominant, vertically integrated building and building material businesses who are highly efficient

Similar to the above point, many stakeholders highlighted the vertical integration of building and brick companies (considered by stakeholders to be unique to the Western Australian market) that had created incentives for the continued construction of brick builds. Efficiencies meant this model was working well, but limited the need for exploration of different business models and building materials.

III. Relatively small-scale housing market

Innovation or change in any market requires high upfront costs that then (if successful) are recouped by selling large volumes. Some stakeholders suggested that the relatively small-scale of the market in Western Australia is a factor that may weigh on the decisions of builders as to the risks and rewards of innovation or disruption in the market.

IV. Lot Supply

Historically Perth has benefited from a plentiful supply of large, sand based englobo lots, with relatively low engineering and fill requirements. This has resulted in a strong supply of and building company preference for 'A' class lots. However, the economics of modern construction methods are more favourable on lesser classes of lots, as they tend to require less lot construction development and less stringent footing requirements than double brick builds. The requirements of some local governments and the tendency amongst most developers to date has been to produce 'A' class lots, thus limiting the accessibility of some of the potential cost savings associated with modern construction methods.

V. A relatively stagnant market

In recent years, low levels of demand have meant that margins have been tight, and demand has been easy to satisfy. As a result, there has not been any pressure on the building market to find alternative ways to produce large volumes of houses or any pressures to innovate as opportunities to expand have been limited. Similarly, tight margins have limited the desire to undertake risk and change existing business models.

VI. Local workforce skillset

The local construction workforce is fully accustomed to building using double brick. Whilst the skills exist in the Western Australian market to build with alternative materials, because modern methods of construction are not so common, there tends to be a risk premium factored into prices

sought by subcontractors (commensurate with uncertainty). The inclusion of this risk premium can push up the costs of alternative builds making them less attractive to consumers. Those builders that have successfully established cost efficiencies in building using modern construction methods have tended to have found ways to manage the pricing of risk premiums.

VII. Consumer Perception

Stakeholders commented that if there are any consumer perception barriers to modern methods of construction, these barriers tend to be present among older customers (and often not the new home buyers per se, but rather the parents of potential buyers). However, even though some negative perceptions do exist, market sentiment is changing rapidly towards greater acceptance and interest in methods of construction. No party interviewed during this project expressed sentiment that negative consumer perceptions were a major barrier to increased uptake of alternative builds.

5. Financial and economic merits of modern construction methods

A cost-benefit model was developed to estimate both financial and economic cost differences between modern construction methods and traditional brick builds. Financial costs take into account estimated direct costs of construction (for example, fill costs, construction costs) while economic costs take into account wider costs to society (for example, environmental externalities and waste costs) resulting from the different build methods. Economic costs are not typically borne by the consumer but rather society as a whole.

Four scenarios were modelled in order to ascertain the relative merits of the different construction methods. The scenarios modelled were designed to enable an informed view as to the conditions in which modern methods of construction may be best suited, taking into account the number of storeys, build types (project homes versus individual homes), infill and greenfield builds and quality of lots (or site classification). The modelling costs are all based on costings per square metre of home build floor space.

The four scenarios were modelled using a medium standard build with a 190m² footprint in the case of the project home scenarios and 211m² footprint used for the individual house scenarios. These build types were applied to greenfield and infill locations and sites with 'A' and 'S' classification.

Economic Model, Building Scenarios

Scenario 1	Scenario 2
► Single storey ► Greenfield area ► Project home ► A class site	► Single storey ► Greenfield area ► Project home ► S class site

Scenario 3	Scenario 4
► Single storey ► Infill area ► Individual house ► A class site	► Single storey ► Infill area ► Individual house ► S class site

5.1 Summary of Economic Model Inputs

In summary, the following inputs were used to inform the economic costing model;

- Financial Inputs
  - Material inputs
  - Footing and concrete slab costings
  - Construction labour costs
- Economic Inputs
  - Environmental externalities associated with waste
  - Value of additional space
  - Rent incurred during construction

The majority of builders interviewed reported no discernible difference in energy performance of different build methods stating that either build method offered the ability to build to the standard of energy efficiency desired. That is, based on available information, no build method was able to be definitively classified performing better than double brick. For this reason, energy performance costs and benefits were not modelled.

Similarly, a standardised development fill cost was not included in the economic model due to the individual nature of development sites and the wide range of variables that determine the quantity and cost of providing fill and retaining.

Two Storey Homes

Whilst a cost-benefit modelling for two-storey homes was undertaken, stakeholder and peer review feedback suggested that the model did not accurately capture the cost-benefits outputs for two storey construction, citing scaffolding in particular, but also other building requirements specific to two storey homes. Nevertheless, indications are that alternative forms are construction are likely to be more price competitive for two storey homes, and in particular those on small lots, such as town houses.

Feedback from builders has indicated that construction time savings associated for modern forms of construction compared to double price can be in the order of 40-70% depending on specific site characteristics.

It was also noted that the building industry has already widely embraced the advantages of “soft top” construction, with a lightweight frame sitting above brick work ground floor. This take up has been so extensive that form of construction is now the most typical form for two stories homes. Furthermore, the peer reviewer noted that avoiding the concrete slab and scaffolding has savings in the order of $30,000, a fully framed construction would have further advantages. However, it was suggested that the biggest issue with this product type is consumer resistance otherwise the building industry would be offering it.

5.2 Estimated Economic and Financial Cost Comparison

Table 2: Economic Modelling Outputs, Structural Frame with Cladding versus Double Brick

Scenario – Current State 2019		Structural frame with cladding		
		Financial Savings	Economic Savings	Total
1	Greenfield, one storey project home, A-class site	-5%	5%	**0%**
2	Greenfield, one storey project home, S1-class site	-4%	6%	**2%**
3	Infill, one storey project home, A-class site	-6%	6%	**0%**
4	Infill, one storey project home, S1-class site	-5%	6%	**1%**

Scenario 1: Greenfield, one storey project home on an A-class site

Construction costs, including labour costs were found to be higher for structural frame with cladding in scenario 1. However, these costs were offset by savings associated the value of additional space created and savings in rent incurred during construction.

Counterintuitively, across all four scenarios, on site waste costs were found to be higher for framed construction which produces relatively large volumes of volumetric, non-recyclable waste compared to double brick construction.

Scenario 2: Greenfield, one storey project home on an S1-class site

As per scenario 1, construction costs, including labour costs were found to be higher for structural frame with cladding, however construction costs were reduced by savings associated with the costs of footings and concrete slab. As a result, savings associated the value of additional space created and savings in rent incurred during construction meant that there is a marginal saving for framed construction under this site condition.

Scenario 3: Single storey, individual home built on an A class infill lot

Construction costs, including labour costs were found to be higher for structural frame with cladding in this scenario when compared to double brick builds.

However, almost all these costs were offset by the value of additional space provided. These savings, supported by the additional savings in rent incurred during construction mean that overall, there is little to no difference in construction costs between double brick and structural frame under this scenario.

Scenario 4: Single storey, individual home built on an S class infill lot

Construction costs mirrored those in scenario 3, with structural framed construction costs, and labour costing significantly more than double brick construction. However, these costs were reduced by slab and footings costings. As result, the total cost of construction was exceeded by the value of additional space provided. This was further supported by savings in rent during construction period, meaning that framed construction offers a marginal saving of 1% when compared to double brick construction.

5.3 Future State: Cost Comparisons

The modelling of conditions in today's market shows that relative to double brick, modern construction methods offer limited scope for financial and economic cost savings. However, the current market for modern forms of construction within Western Australia is relatively new, and small in scale. As such, many stakeholders believe that further efficiencies in modern methods of construction are possible. The same level of efficiency gains are unlikely to be achieved for traditional construction methods, which benefit

from well-established processes, supply chain and higher volumes of construction.

Therefore, as part of the research, EY modelled how framed construction may compare to traditional, double brick construction in Western Australia in five years' time, considering differential financial and economic costs and benefits across the development and construction phases.

The 2024 model uses the same financial and economic cost parameters as used in the 'today's market' model, and is based on the following assumptions:

Assumptions regarding scope for efficiencies

- Current volumes of modern methods of construction in Western Australia are in the order of 1,000 to 2,000 per year.
- Some builders and suppliers have invested heavily in capital, skills and marketing, demonstrative of a perception that the market for alternative builds in Western Australia will increase.
- Relative to double brick, efficiencies are possible in today's market and industry confirms that raw material costs here in Western Australia are broadly equivalent to those obtainable in east coast markets (which are characterised by far greater volumes).
- A number of data points pointed to scope for construction efficiencies in the order of 10%, can be achieved in the Western Australian market by 2024:
    - Industry supplier in terms of efficiencies, Western Australia is about two years behind the east coast levels.
    - Local builder efficiencies of 5 to 10% are achievable on today's levels as processes are improved and lessons learnt from early projects. Local builders are also considered to be 5 to 10% away from efficiencies currently achieved on the east coast (as an indicator of progress, WA has been up to 70% behind the east coast in terms of efficiencies).
    - Industry supplier timber frame construction accounting for about 10% of the Perth building market; shares of up to 15% are expected within the next five years (equating to approximately 600-700 additional modern construction builds per year).
- Modelling was undertaken to assess the relative merits of modern construction methods using an assumption that by 2024, the Western Australian market will be 10% more efficient than currently. This is likely to be achieved as time and experience is accrued and additional volumes (an additional 600-700 per year) will also drive economies of scale. Efficiency was applied to construction costs and construction timeframes.

Table 3: Future State Economic Modelling Outputs, Structural Frame with Cladding versus Double Brick

Scenario – Future State 2024		Structural frame with cladding
1	Greenfield, one storey project home, A-class site	8%
2	Greenfield, one storey project home, S1-class site	10%
3	Infill, one storey project home, A-class site	8%
4	Infill, one storey project home, S1-class site	9%

In 2024, taking into account financial and economic cost savings, the modelling results showed modern construction methods being less costly than traditional double brick builds across the four scenarios modelled. This is based on the assumption that costs of construction for double brick have reached peak efficiency and not further cost savings will be achieved. For the purpose of modelling future costs of double brick construction, cost increases are modelled as increasing at the same rate as expected inflation in the economy.

Across all four of the scenarios, as per today's market, whilst the financial costs of construction are reduced, the main drivers of cost savings are scope for additional internal floor space and lower rental costs attributable to faster construction times.

6. Implications in terms of future uptake of modern construction methods

Currently the limited uptake of modern construction methods is largely driven by the two key factors:

Costing Practices

- Some, but not all, Perth builders are able to deliver high quality modern construction builds at lower prices relative to traditional double brick construction. Key to achieving this project management and the allocation and pricing of risk, traditional 'contracting out' construction models struggle to realise these savings. Risk and uncertainty lead to higher quoted build costs from tradies from fill and footings through to roofing and electrical.
- Stakeholders reported that tight build margins are commonly recouped through modern methods of construction and information asymmetries enable this to happen as consumers are not fully informed of potential cost savings.

Pricing practices

- Even if cheaper to build, stakeholders reported that a common option for builders is to price up modern construction methods, to (or above) market prices, to recoup margin (even if the cost of production is relatively low). As a result, the price of modern construction methods is often not attractive to consumers.
- Price skimming, as described above, can be a standard pricing strategy for new products to maximise profits. This involves 'new' products being sold at relatively high prices so as to recoup margins on risks and investments made.
- Discounting is risky and being observed as it requires volume that smaller, more innovative builders do not currently have.

6.1 Key Findings

Costs of construction using modern methods of construction can be cheaper than double brick builds (and in addition to these, costs borne by the wider community can also be lower than those borne under double brick builds). However, lower costs are not as yet always translating into lower prices for consumers. Construction methods are still relatively new in the Perth market and perceived risks are high. As building market activity picks up, builder experiences grow and buyer awareness increases, it is likely that there will be a greater prevalence of relatively lower consumer prices for alternative build methods.

Modelling illustrates the economic and financial benefits of utilising alternative building products can be competitive to double brick builds. There is clearly potential for increased penetration of alternative materials, as evidenced by market activity with a number of volume home builders investing in this space, such as Summit and JWH Group.

Similarly, a number of manufacturing suppliers are also increasing investment in modern construction methods and their marketing activities. As a result, many suppliers have reported an increased interest in these materials, especially over the last two years.

Meanwhile, a number of development projects are using modern construction methods in order to secure approvals or advance consumer profile, such as the Leadlight Hotel, and Bluerock Project's DeHavilland apartment development in Midland.

Whilst supply is increasing, so to is demand. Buyer awareness of materials and building performance is increasing and is likely to further increase over time as preferences for more sustainable outcomes grows. As a result,

modern methods of construction are particularly popular among younger demographics.

Development constraints are also evolving and becoming more challenging. The future supply of lots is likely to require greater volumes of fill, whilst the declining availability of basic raw materials and fill in particular, will further squeeze tight margins currently achieved with double brick builds. This, coupled with an international push toward more sustainable building practices and growing interest in the environmental impacts of brick production (energy, noise, pollutants, waste, water use), is likely to further increase the cost of brick production and brick homes.

Whilst material inputs are likely to increase, the labour force is also shifting, carpentry is a more popular trade than brick laying, the average age of brick layers is increasing as the number of brick layers diminishes. These changing labour force dynamics will add further cost pressures to traditional double brick builds.

6.2 Recommendations

If there is a desire to support an increase in the number of alternative builds in the market, the following recommendations are offered to stakeholders:

For Government:

- Utilising innovative materials on Government projects could help promote upskilling, learning and development; and help to broaden already existing supply chains.
- Government could ensure that there is suitable investment scale and new plantations in the WA timber industry so as to ensure adequate supply of materials.
- Government could provide market stimulus through stamp duty or tax concessions for innovative builds.
- Review of building regulations and/or concessions that have typically been drafted with more traditional build forms in mind and hence can make adherence more difficult for alternative build methods.

Local Government

- Local government incentives could be considered for builds that create less waste / negative externalities in the construction process (i.e. through skip bin and tip pass requirements and damage from construction etc.)
- Reduce requirements for ‘A’ class lots.

For industry

- Industry could incentivise builders / trades during the construction process. For example, by offering rewards for speed and build quality.
- Consider production of more S Class lots (rather than A Class lots) and more production and promotion of alternative builds.

7. Validation of Findings and Next Steps

Report Validation: Peer Review

It is important to note that the study included comprehensive industry consultation and input to ensure that the study was accurate. However, in order to evaluate the report's methodology and findings, UDIA commissioned an independent third party, peer review by a housing industry expert.

This review noted that "*in the present marketplace, brick costs have dropped at greater rate than framed pricing which have remained static. It would be fair to assume that in a buoyant market the cost differences may be more marginal, but historically brickwork was favoured. As a result, the cost of a brick home is estimated to be 6% per square meter cheaper than that of framed home.*"

This summary is consistent with EY's modelling which suggests that in current market conditions, double brick single storey homes offer financial savings of 4-6% over framed construction.

However, the independent review noted that the time savings included in EY's model may be conservative, indicating that construction time savings can be in the order of 8 to 12 weeks.

Whilst the reviewer highlighted issues regarding the accuracy of the cost-benefit modelling for two storey homes, which were not included in the final report, the reviewer did note that *"the industry has embraced the advantages of "soft top" a typical two stories. Avoiding the concrete slab and scaffolding has savings in the order of $30,000. To go totally framed would have further advantages. The biggest issue with this product type is consumer resistance otherwise the building industry would be offering it."*

In conclusion, UDIA is satisfied that the findings and outputs provided by the economic model are valid and provide an accurate estimation of the current and future cost differentials between traditional double brick, and modern forms of construction.

Supporting Housing Affordability

Whilst there is no single best solution to housing construction methodology or materials used, the study's economic analysis indicate that modern construction methods have the potential to offer significant financial and economic savings to new home buyers. Furthermore, alternative forms of construction are likely to have significant competitive advantages for two storey homes, as is demonstrated by the widespread adoption of 'soft top' construction.

In addition to house construction savings, UDIA believes that additional savings can be achieved through reduced lot construction costs that modern forms of construction support. Due to the individual nature of development sites and the many combinations of variables that determine the cost of providing fill and producing lots, a standardised 'lot production' production cost was not included in the economic model. Therefore, modern forms of housing construction would be likely to generate additional savings not captured by the model as land identified for development becomes more costly to prepare with increasing volumes of fill required whilst the price of fill is also anticipated to increase.

In conclusion, given the potential economic savings that modern forms of housing construction can provide to new home buyers, particularly over the next five years, there is merit to further investigating and encouraging a greater supply of homes built using modern methods of construction.

Next Steps

UDIA will establish an industry working group, with representatives from all relevant stakeholders, including, developers, builders, architects, engineers, amongst others, to develop a strategy that supports an increase in modern forms of housing construction where appropriate.

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