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Cash flow optimal analysis on NPV risk based on break event point of various types of housing in housing development projects

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Abstract : Community's need for simple type of house is a problem for the government in order to improve the quality of life of the community. The developers or residential developers attempt to offer homes by making various types of homes that are of interest to the public is of high value, artistic as well as the acquisition of adequate benefits. On the other hand, the construction project is one of the temporary projects with a relatively high degree of uncertainty of risks compared to projects in the non-construction sector. The risk of time and cost risks on construction projects will ultimately lead to reduced profits, due to inaccurate regulation of cash flow optimally. The impact of the inaccuracy of the cash flow arrangement to housing investment has an effect on the very low profit gain so that it affects the quality of the house produced. This study aims to determine the optimal cash flow that can be planned in order to obtain optimum profit by taking into account the break-even point of sale of various types of homes in housing development in Denpasar so that obtained housing with adequate quality and affordable by the community. The research method begins with cost planning analysis, determining the cash flow scenario and break-even point analysis with the concept of cash flow to find the optimum profit. The results of the interim research resulted in the Break Event Point (BEP) cutoff point at the five alternative points at maximum capacity with the minimum Present Worth Cost (PWC) value in alternative 4 with the house type ratio of 1: 6: 3. This indicates the construction of housing with the number of luxury type house types larger than the middle house and the modest house resulting in a high PWC value. While the composition of the comparatively low and medium-sized homes larger than the luxury homes yields a relatively lower PWC value. Based on the feasibility indicator analysis, the Net Present Value (NPV) shows that the number of housing units and the combination of types of houses offered, as well as the local land market price, is very influential in the cash flow planning to obtain the optimal cash flow that yields the maximum NPV value. And from the result of project sensitivity analysis to the value of change of key variable, the project obtained is very sensitive to the type of housing with the number of housing units and the relatively small land price and the variables that are very influential on the sensitivity of the project feasibility value is the construction cost reaches 89.6% and first-year earnings reached 69.4%

Keywords : cash flow, benefit, break even point

INTRODUCTION

The development of settlements today is increasing. This is in line with the development of housing projects with the aim of meeting the needs of the community will be beautiful and comfortable dwelling. But in the implementation of the investor or the developer need to know the certainty of investments

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invested in a large amount of funds, as an illustration and reference for investors in analyzing the feasibility of investment in further development projects.

Property investments include capital-intensive investments or require substantial capital. The inappropriateness of cash flow arrangements leads to a non-optimal profit gain. It takes a more careful financial calculation by taking into account some cash in or cash out alternatives in cash flow. Based on the results of research from Martho F.Tolangi [1], Optimal Cash Flow Analysis on the Contractor of Housing Development Project concluded that the flow of funds or cash flow is affected by the length of payment and the amount of the down payment. It is important to consider the addition of the advance amount on each payment. This means one of the alternative cash flow arrangements that can be applied to cash flow planning.

The high cost of property development also affects the selling price of the house, causing the decrease of profit obtained by the housing developer. Housing developers are usually more interested in developing a luxury house type (for the middle to upper class) because it is more profitable in terms of benefits than if developing a simple home type. But on the other hand more people need a simple type of house according to their ability. The high community need for simple type of house is a problem for the government in order to improve the quality of life of the community. The developers or residential developers will attempt to offer homes by making various types of homes of interest by people of high value, attractive looks and predicted market aspects. Thus the developer can get the desired profit cost. Based on the results of the study Wahyu Ramadan [2], Cost Analysis Developer Benefits From Price Selling Different Types of Houses in Building Housing states that the biggest advantage is obtained from the sale of luxury type houses with fewer units of the type of simple house.

The break-even point is a useful management tool in the planning process because it provides a relatively quick and easy way to estimate the sales volume needed to cover operating costs and fixed costs. But when using calculations in forecasting, the provisions that must be made in the calculations for improvements in operating efficiency are the likely impact of inflation. [3] Based on the results of the study Dimi Ofileanu mentioned that the breakeven point is an important analytical instrument to measure the effects generated by the selling price, with variable unit costs, and with fixed costs to be achieved before the entity to obtain an optimum profit. [4] The results of Marek Potkan's research also concluded that the priority of the absolute contribution indicator of higher value products has a positive impact on improving economic outcomes, but on the fixed form of total revenues required to achieve the BEP provides the same level of contribution of relative margins of this product [5]

METHODOLOGY

The types and sources of data used in this study are as follows:
a. Primary data
Primary data, ie data source research obtained directly from the original source in the form of interviews, polls from individuals or groups (people) as well as observations of an object, event or test results (objects).
b. Secondary Data
Secondary Data is the source of research data obtained through intermediate media or indirectly in the form of books, records, existing evidence, or archives whether published or not published in general.

The Data Collection Method used in this study are:
1) Library Studies

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Namely research conducted by reading literature such as reading books, scientific magazines, both from college and obtained from libraries, internet and other sources. Data obtained from this manner is additional data as a support or often referred to as secondary data.

2) Field Research
That is research conducted directly to the relevant sources to obtain data about the state of the field and the price of local units.

The research stages are as follows:
1. Determining the object of research is the housing that in the planning and implementation phase with a combination of several types of houses type luxury house type, middle type and simple home type.
2. Survey of the field to determine the condition eksisiting as data calculation budget project cost.
3. Plan several cash flow scenarios with a combination of selling several types of houses to find out break even point.
4. Develop a cash flow scenario to analyze the optimum cash flow on the NPV @ Risk value with the CrystalBall software program.
5. Financial Feasibility Analysis with data input on cash flow in the form of distributed data so that the results of the calculation of these numbers are scattered in a distribution that has been arranged in the program into a distribution of the results of these calculations.

RESULT AND DISCUSSION

Object of Research

The object of research is housing in the area of Denpasar city. Housing used as research object consists of 3 (three) housing, that is housing with variable number of units (32 units, 75 units, 100 units) hereinafter called housing type 1, housing type 2 and housing type 3.

Analysis of Housing Investment Costs

Cost component is a very important component in an investment. Therefore it is necessary to get serious attention, especially in determining the comparison between cost as own capital, investor capital cost and capital cost as a loan from financial institution. In this analysis the cost component component structure is 40% loan capital and 60% investor capital. The consequences of using a loan as one of the funding in investing, then arise interest on the loan as a component of financing. Interest rates are based on the development of investment credit interest rate between 2007 and 2017, obtained interest rate of at least 5,75%, the most frequent interest rate is 7.50% and the maximum interest rate is 9,50%. Secondly, the interest rates of banks supporting the project are BNI (9,95% -12,5%), BRI (8,75% - 13%), BCA (9,75% - 10,5%) and BPD (10.31% -12,34 %). So the loan interest rate used is 12% for bank loan capital with a loan term of 10 years.

Housing costs include:

Housing Investment Cost

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The calculation of investment cost is calculated based on data from Housing project and other supporting data. The components of investment costs consist of: land procurement, legality and licensing, infrastructure and facilities costs, and construction cost of the building.

1) Land Procurement Cost

Land for this housing consists of the cost of purchasing land. The price of land to build this housing ranges from Rp 400,000.000,00 to Rp 700.000.000,00 per acre. By knowing the land area of each housing location then calculated the cost incurred for the procurement of land / land.

2) Legality and Licensing Fee

Types of legality and permits on housing to become ready-to-build stocks that must be met by the company in the implementation of housing projects consist of Land Use Permit and Land Use (IPPT) issued by the National Land Agency (BPN), License Determination Location (IPL) issued by the Regional Planning and Development Agency (Bappeda), Public Works (PU) and District Government (Pemkab), Site Plan Approval and Permit, and Building Permit (IMB), which includes the incorporation and splitting of land certificates. Estimated cost of legality and licensing 10% of total construction cost.

3) Infrastructure and Facilities Costs

The cost of infrastructure in this housing includes the infrastructure of the park, the gate that includes the guard post, landfills, roads, channels, PJU lights, the procurement of PLN electricity network as well as PDAM water supply network. Based on the results of research Abdul Adhim in the Cost Analysis Analysis Infrastructure Housing obtained percentage of infrastructure and facilities costs ranged from 5% to 6% of the cost of construction.

4) Building Construction Cost

The cost of building construction in this housing includes the construction of various types of houses in each housing in accordance with the number of units planned. The cost of building construction is obtained by multiplying the Budget Plan (RAB) type of house with the number of housing units to be created.

5) Total Investment Cost

Total investment cost is derived from the sum of land procurement costs, legality and licensing, infrastructure and facility costs, and construction cost of the building. After the total total investment cost is obtained.

6) Operation and Maintenance

Expenses for residential operations Housing costs consist of electricity, water, telephone, employee salaries, marketing expenses, and estate management costs. Estimated operating expenses are assumed to be 10% of the cost of construction.

The cost of building construction changed according to the combination of house type comparison, with 5 comparison alternatives.

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Housing Benefits Analysis

The projected income from each Housing is obtained from the sale of housing units based on field data which is then assumed based on the sales trend. Housing units offered on each housing are calculated according to the type of house. The price of housing units includes SHGB (Surat Hak Guna Bangun), IMB (Building Permit), electrical installation, water, and landscape.

The calculation of the housing benefit is obtained by combining house type comparisons with 1: 3: 6 residential concept, ie one luxury house, three medium houses and one simple house by combining the comparison so as to obtain some cash flow alternatives and then analyzed by simulation of monte carlo to obtain cash flow optimum.

Break Even Point Analysis

Housing construction can actually be done by making a comparison of house type plans to minimize the cost of building construction and supporting costs. Housing development by maximizing the type of luxury homes, may be done along with the actual needs of consumers. Where the actual needs of consumers will usually follow the behavior of market growth (product life cycle). Initially the actual needs are still relatively small which will then increase gradually until it finds the maximum needs. If the maximum increase in actual demand will be achieved in a relatively short period of time, the option to build a luxury type house in maximum capacity (full capacity) becomes the best option. But if the reverse event, the need for maximum capacity is still long enough, consider the development with various combinations of house type comparisons can be one of the rational considerations. This can certainly increase the productivity of the investment itself, and will reduce the amount of investment that must be inculcated from the beginning of the activity, reduced operating costs and maintenance of facilities and other non-productive costs.

To find out the conditions on how to construct various combination of house type that produces an optimal and productive investment, it is done break even point analysis to find the optimum condition. An investment cash flow is not always obtained completely, which consists of cash in and cash out, but can be measured directly cost aspects or benefits only. Cash Flows whose benefits are taken into account are called Present Worth of Benefit (PWB) whereas if only the cost is called Present Worth of Cost (PWC).

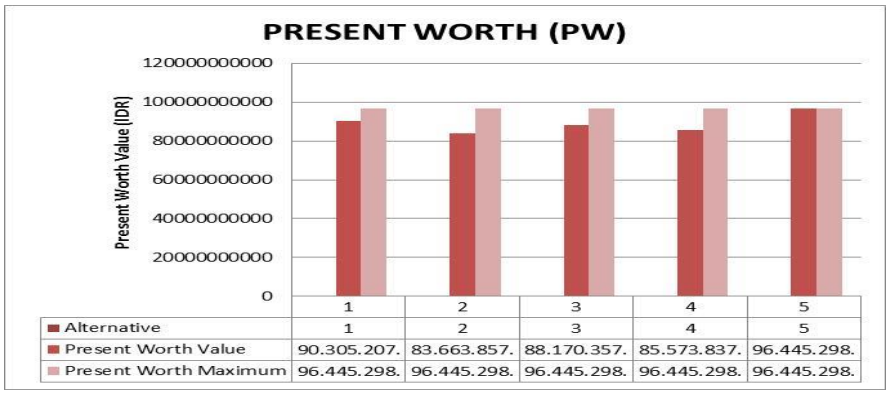

Figure -1 BEP Chart of Housing Type 1

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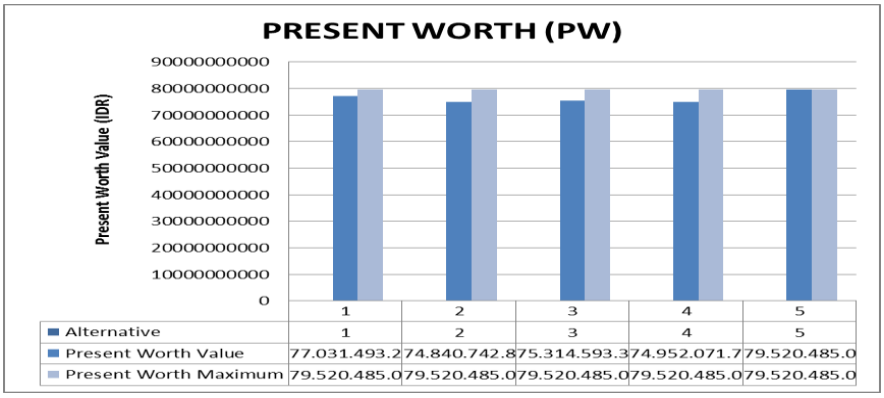

Figure - 2 BEP Chart of Housing Type 2

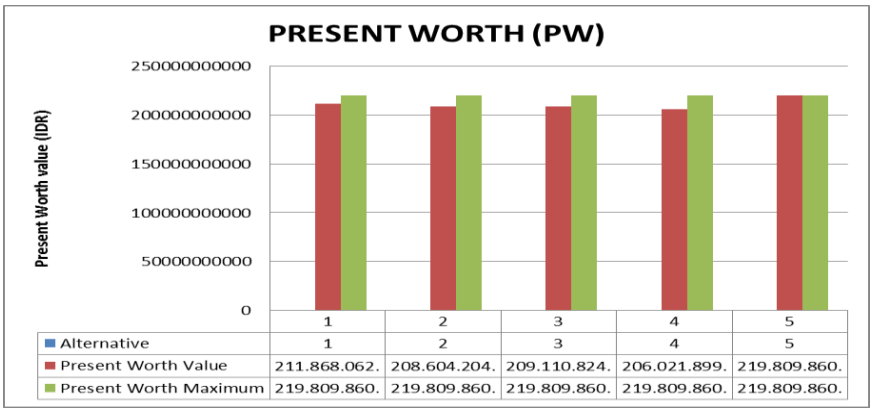

Figure - 3 BEP Chart of Housing Type 3

Based on the BEP analysis various alternative house-type comparisons with three samples of housing with different land and type of house produce BEP cutoff point at alternate point five that is at maximum capacity with minimum PWC value on alternative 4 with house type ratio 1: 6: 3. This shows the construction of housing with the number of comparison types of luxury homes larger than middle houses and simple homes generate high PWC value. While the composition of the comparatively low and medium-sized homes larger than the luxury homes yields a relatively lower PWC value.

Optimal Cash Flow Analysis

Once a number of alternatives are selected and the planning horizon is established then the estimated cash flow will be possible. The estimated cash flow is made by considering the prediction of future conditions as well as considering trends depicted by past data. Cash flow in this case considers the maximum costs incurred from a combination of house type comparisons. The optimum cash flow is obtained by comparing the financial feasibility indicator (NPV) and sensitivity analysis using CrystalBall software.

To find out the optimal cash flow from the five alternatives in each housing, the analysis is continued with Net Present Value (NPV) and Benefit Cost Ratio (BCR) method which yields the NPV> 0 and BCR> 1 values as a feasibility indicator. And based on the analysis of these two indicators is done by

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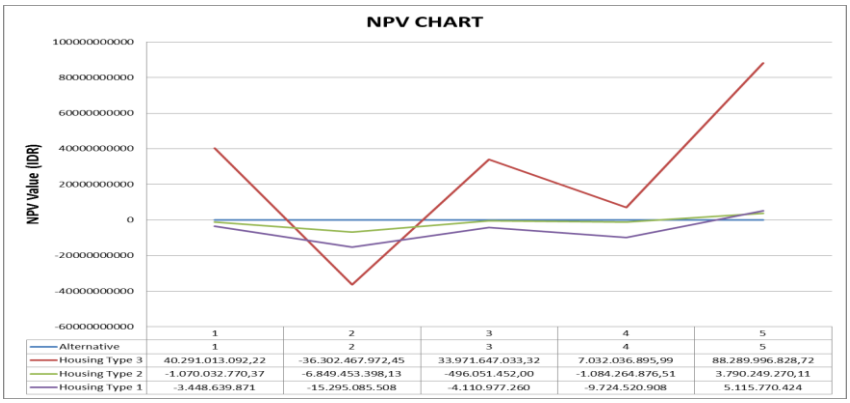
comparing the ratio of NPV and BCR maximum resulting from the five cash flow alternatives analyzed. NPV analysis of three types of housing in Denpasar area can be seen in the following graph:



	1	2	3	4	5
Alternative	1	2	3	4	5
Housing Type 3	40.291.013.092,22	-36.302.467.972,45	33.971.647.033,32	7.032.036.895,99	88.289.996.828,72
Housing Type 2	-1.070.032.770,37	-6.849.453.398,13	-496.051.452,00	-1.084.264.876,51	3.790.249.270,11
Housing Type 1	-3.448.639.871	-15.295.085.508	-4.110.977.260	-9.724.520.908	5.115.770.424

Figure - 4 Recapitulation of NPV Value

Based on the above NPV chart, it can be seen from 5 alternative types of house combination that the value of NPV is positive (decent) in housing type 3 (except alternative 3) with maximum NPV value occurring in alternative 5 with combination of whole luxury house type and second place is alternative 1 with a combination of house type 1: 3: 6 according to existing housing and settlement regulations and requirements. While for housing type 2 and type of housing 1 obtained a positive NPV value (feasible) only on the alternative combination of type 5 home by making one type of house type with luxury house category. Based on the analysis of the above feasibility indicator, the optimal cash flow is obtained from alternative 5 on housing type 3. The result shows that the number of housing units and the combination of the type of house offered and the local land market price significantly influence the cash flow planning to obtain the optimal cash flow that produces maximum NPV and BCR values.

Analysis of NPV @ Risk with Monte Carlo Simulation

The costs and benefits generated on each alternative will be the input of uniform distributed data that includes the lowest and highest values of all alternatives in each housing. With the help of CrystalBall program is a program to calculate numbers that have the value of uncertainty scattered or distributed among a certain value. These distributed numbers are calculated randomly introduced by Monte Carlo. Furthermore, it is enhanced by structured random calculation with certain simulation structure. The results of these numbers are scattered in a distribution that has been arranged in the program into a distribution of the results of these calculations. With the value of such distribution as mentioned above, then performed simulation with CrystalBall software. The results obtained for each type of housing are as follows:

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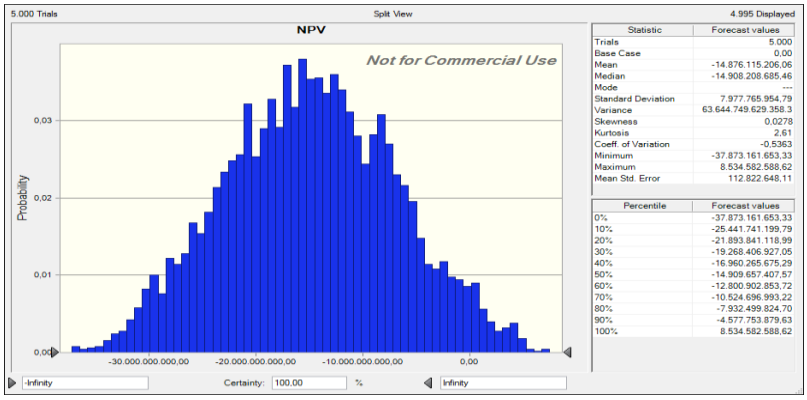

Figure - 5 Sensitivity NPV of Housing Type 1

Retrieved NPV profile with NPV possibility ≤ Rp -14.909.657.407,57 of 50% with minimum NPV value Rp -37.873.161.653,33 and maximum Rp 8,534,582,588,62. Based on the simulation result, it is said that the risk of this project is below 50% and NPV is negative with 90% probability which means that the project is not feasible because the value of NPV is negative.

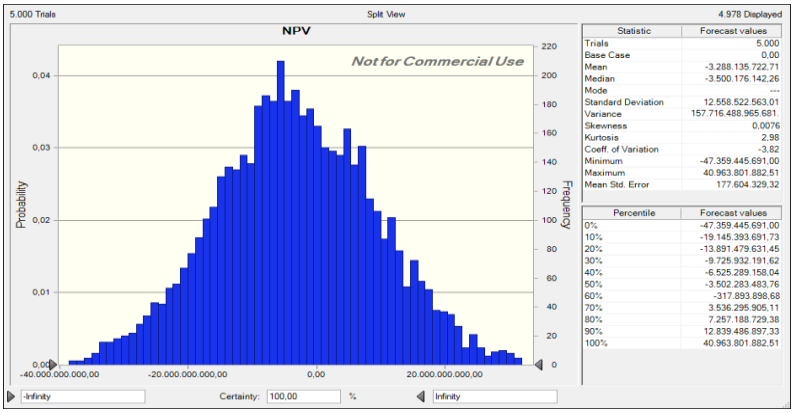

Figure - 6 Sensitivity NPV of Housing Type 2

Based on figure 5.11, the value of NPV with the possibility of NPV ≤ Rp -3.502.283.483,76 of 50% with minimum NPV value of Rp -47.359.445.691,00 and maximum Rp 40,963,801,882,51. Based on the results of the simulation said the risk of this project is below the average value is 50% and NPV is negative with a probability of 60% which means that the project is considered feasible with a 40% probability level.

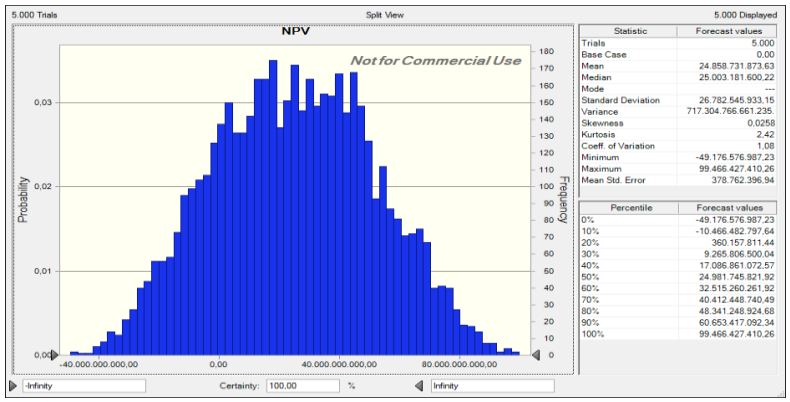

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Figure - 7 Sensitivity NPV of Housing Type 3

From the simulation result, the average value of NPV is Rp 24.858.731.873,63 with the probability that the NPV value is above the average value of 50%. While a positive result (feasible) with a minimum NPV value of Rp 360,157,811.44 and minimum negative NPV value Rp 49.176.987,23

CONCLUSION

Based on the results of the above analysis we can conclude several things as follows:

1. Based on the BEP analysis various alternative house-type comparisons with three housing samples yield BEP cutoff point at alternative point five ie at maximum capacity with minimum PWC value on alternative 4 with house type 1: 6: 3 ratio. This shows the construction of housing with the amount of comparison of types of luxury homes larger than middle houses and simple homes generate high PWC value. While the composition of the comparatively low and medium-sized homes larger than the luxury homes yields a relatively lower PWC value.

2. Based on the analysis of both the feasibility indicators, namely NPV and BCR, the optimal cash flow is obtained in alternative 5 with the type of housing Type 3. The results indicate that the number of housing units and the combination of the type of houses offered, as well as the local land market price greatly affect the cash flow planning to obtain the optimal cash flow that yields the NPV and BCR values of maximum

3. From the results of project sensitivity analysis to the value of changes in key variables obtained the project is very sensitive on the type of housing type 1 with the number of housing units and the relatively small land prices variables that greatly affect the sensitivity of the feasibility of the project is the cost of construction reaches 89, 6% and the value of benefits reached 69.4%

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