GARP
SCR | Sustainability and Climate Risk

EasyXDI Assessment

Welcome to GARP's EasyXDI Assessment for SCR certificate holders. The assessment has been designed to give you practical experience in assessing the physical risks that will arise from climate change and has been divided into four sections.

Part One acts as a tutorial, taking you through the core functionality of the EasyXDI platform. Part Two presents six questions to test your general understanding of the physical risk assessment process. Part Three gets you to conduct a physical risk assessment across two properties, test various adaptation measures, and compare the viability of each from the perspective of a potential investor. Finally, Part Four provides you with an opportunity to explore the risks impacting other asset categories.

Completion of this assessment should take approximately one hour. If you have any queries, you can contact us at xdiproject@garp.com.

PART ONE – EasyXDI Tutorial

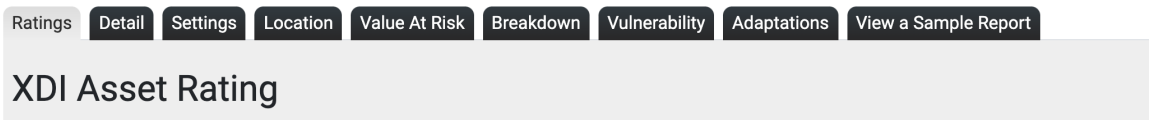
The following steps guide you through using EasyXDI as a tool for assessing the physical risk of a potential or existing asset.

1. Login to EasyXDI at https://easyxdi.com/
2. Enter the following address, asset category and asset type into EasyXDI.
3. Search the following address: **1 Skirsgill Lane, Eamont Bridge, CA10 2BQ**
4. Choose the asset category: **Building** and asset type: **Simple House**

   Note: Make sure you confirm the location by clicking the full address which appears in a black box underneath the search bar.

5. Click 'Go' and then 'View free report'.

A variety of different tabs will appear, each providing information on the asset's physical climate risk. The following steps will aid you in exploring the capabilities of each tab.

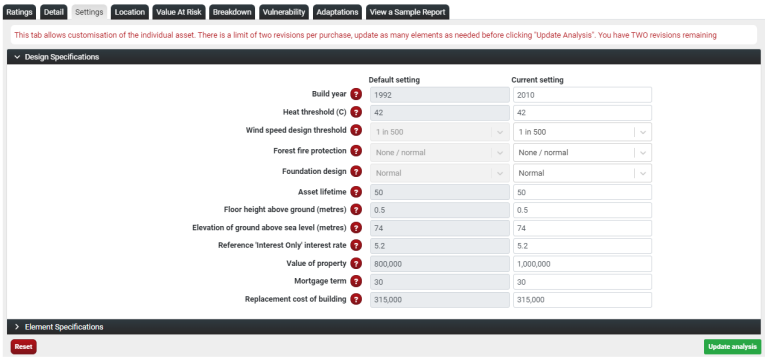


6. In the Ratings tab, take note of the three different risk ratings an asset could have. The magnitude of the Value-at-Risk (VAR%) is a useful metric for assessing an asset's overall risk, and significance of individual hazards.

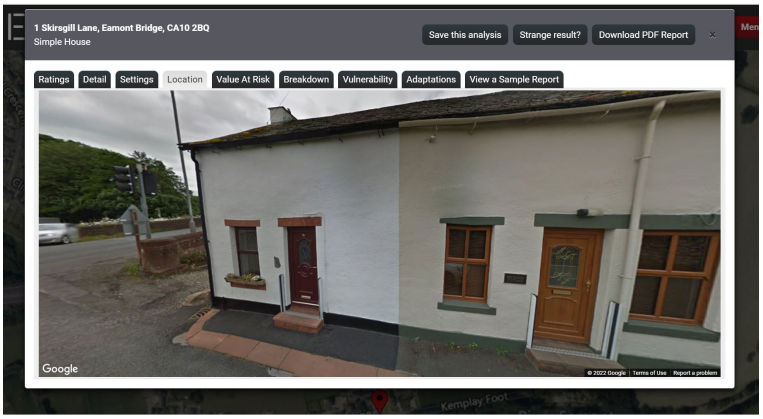
7. In the Detail tab, you will find information relevant to the asset, such as elevation and archetype design specifications, as well as information on the climate scenarios and models used.

8. Navigate to the Settings tab. Change the build year to 1950 and the value of property to 315,000. Click the "Update Analysis" button in the bottom right corner.

   Note: Although we're leaving the other settings as their default values, these could be altered for future analyses if more accurate values are known.



9. In the Location tab, click and drag the image to see what surrounds the chosen asset.



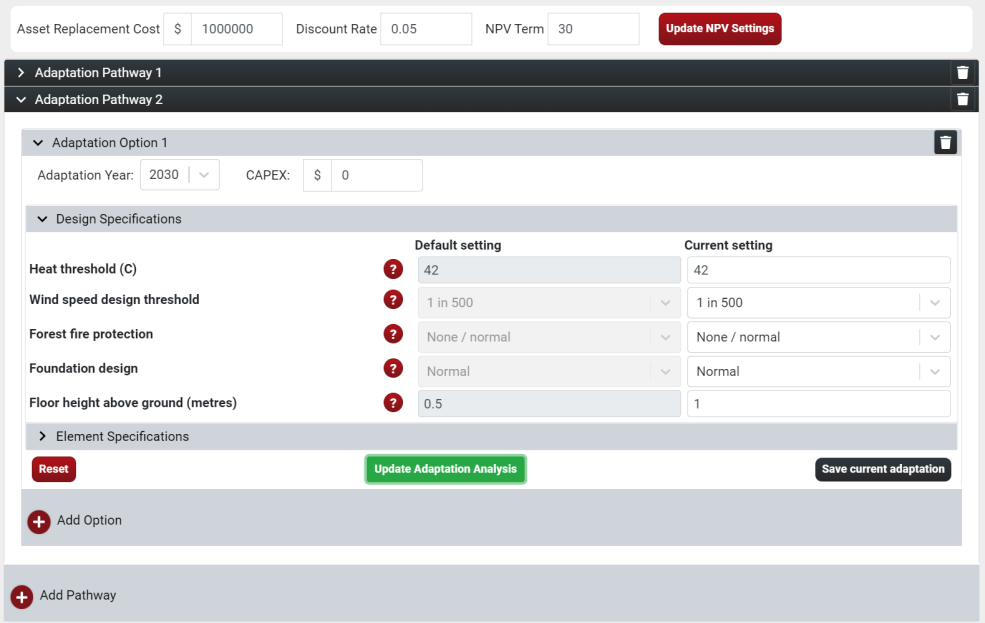
10. Navigate between the Value-at-Risk, Breakdown, and Vulnerability tabs to see total asset VAR%, asset level hazard VAR%, and element level hazard VAR%. Hover over the graphs to get specific values and try clicking the different hazards in the legend to see the impact of less significant hazards more clearly.

Note: if you would like to turn off a hazard from the graph, you can click on it in the legend, and it will be visually omitted.

11. In the Adaptations tab, run two different adaptation pathways. To add a pathway, simply click 'Add Pathway', and click 'Update Adaptation Analysis' after changing the settings. The settings you should change are specific to the asset you chose. In the case of 1 Skirsgill Lane, try the adaptations outline below:

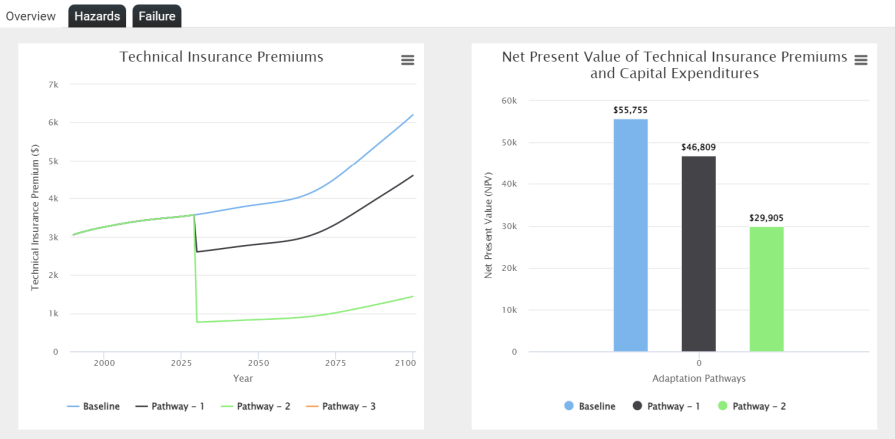
    Pathway 1 - Floor height above ground (metres) = 0.6

    Pathway 2 - Floor height above ground (metres) = 1.0

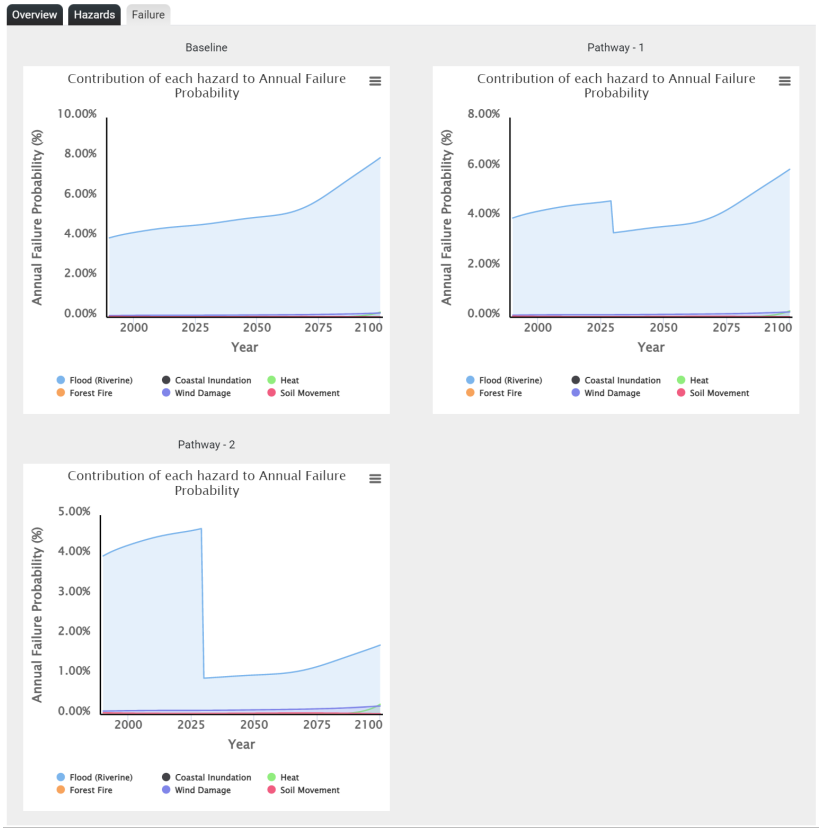


12. Use the Overview, Hazards and Failure tabs WITHIN the Adaptations tab to see the effect of each pathway on Technical Insurance Premiums (TIP), Value at Risk (VAR), and the contribution of each hazard to the annual failure probability, respectively.

    You can see the results of the Floor Height adaptation measures below.



Overview
Hazards
Failure
Baseline
Contribution of each hazard to Annual Value At Risk (%)
Annual VAR (%) per Hazard
0.80%
0.60%
0.40%
0.20%
0.00%
2000
2025
2050
2075
2100
Year
Flood (Riverine)
Coastal Inundation
Heat
Forest Fire
Wind Damage
Soil Movement
Pathway - 1
Contribution of each hazard to Annual Value At Risk (%)
Annual VAR (%) per Hazard
0.50%
0.40%
0.30%
0.20%
0.10%
0.00%
2000
2025
2050
2075
2100
Year
Flood (Riverine)
Coastal Inundation
Heat
Forest Fire
Wind Damage
Soil Movement
Pathway - 2
Contribution of each hazard to Annual Value At Risk (%)
Annual VAR (%) per Hazard
0.40%
0.30%
0.20%
0.10%
0.00%
2000
2025
2050
2075
2100
Year
Flood (Riverine)
Coastal Inundation
Heat
Forest Fire
Wind Damage
Soil Movement


Overview
Hazards
Failure
Baseline
Contribution of each hazard to Annual Failure Probability
Annual Failure Probability (%)
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
2000
2025
2050
2075
2100
Year
Flood (Riverine)
Coastal Inundation
Heat
Forest Fire
Wind Damage
Soil Movement
Pathway - 1
Contribution of each hazard to Annual Failure Probability
Annual Failure Probability (%)
8.00%
6.00%
4.00%
2.00%
0.00%
2000
2025
2050
2075
2100
Year
Flood (Riverine)
Coastal Inundation
Heat
Forest Fire
Wind Damage
Soil Movement
Pathway - 2
Contribution of each hazard to Annual Failure Probability
Annual Failure Probability (%)
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
2000
2025
2050
2075
2100
Year
Flood (Riverine)
Coastal Inundation
Heat
Forest Fire
Wind Damage
Soil Movement

PART TWO – General Questions

This part of the questionnaire takes you through some questions about the XDI platform itself. Take the time to explore the tabs and familiarise yourself with the functionality.

1. **What risk rating would a Value-at-Risk (VAR%) score of 0.25% be considered?**
    - Low
    - Medium
    - High

2. **In which EasyXDI tab would you look for coastal inundation risk in 2042?**
    - Rating
    - Value At Risk
    - Breakdown
    - Vulnerability

3. **In the Breakdown tab, observe that heat only appears in graphs and charts of Failure Probability (i.e. not VAR%). Why is this?**
    - VAR% is a measure of damage, but heat is a failure hazard only
    - Heat is a damage hazard only, and thus does not contribute to VAR%
    - Levels of heat do not change much over time

4. **What Representative Concentration Pathway (RCP) does EasyXDI use in generating results?**
    - RCP 2.6
    - RCP 4.5
    - RCP 6.0
    - RCP 8.5

5. **In which situation would it be more useful to use annual VAR% instead of Maximum VAR%?**
    - Stress testing an asset
    - Developing an adaptation plan
    - Identifying fluctuations in VAR%

6. **Select the correct answer from the following statements.**
    - Increasing the heat threshold will decrease the asset's annual value at risk probability
    - The 1 in 500 wind design threshold increases an assets resilience to extreme wind compared to the 1 in 200 wind design threshold
    - A higher floor height above ground increases the impact of flooding on the asset

PART THREE – Property Comparison

Part Three of the assessment will require you to use EasyXDI as a tool to build a business case for a potential investment. You have been given a choice of two properties to invest in and this assessment's questions will assist you with the house investment decision.

Part Three has been broken down into three components: Location 1, Location 2 and Location Comparison. In 'Location 1', you will be assessing the physical risks that could impact a property located at 30 Lennie Ave, Main Beach, QLD 4217. In 'Location 2' will look at a second location: 61 Dorman Street, Lorne, VIC 3232. In 'Location Comparison' you will be asked to compare these two properties.

To make the comparison in Part Three easier, we suggest that you run the reports for the two locations in two separate tabs in your browser. By doing this, you will then be able to easily compare one location with the other and avoid having to rerun a report.

- Location 1

Search the following address: 30 Lennie Ave, Main Beach, QLD 4217

Choose the asset category: building and asset type: freestanding house

In the settings tab, change the *build year* from 1992 to 2010 (you'll notice that the house looks new by looking at the location tab). The value of the property should be changed to 1,800,000 and the replacement cost of building to 1,000,000

We will leave the other element specifications as the default, though they could be altered to make future analyses more accurate.

Navigate to the Ratings, Value at Risk, Breakdown and Vulnerability tabs and answer the following questions.

1. **(a) In what year does the house reach moderate risk (B Rating)?**
    - 2033
    - 2024
    - 2096
    - 2060

1 **(b) What does this mean in terms of the property's insurability?**
    - Insurance may become unavailable due to the higher levels of risk
    - Once the risk becomes moderate the insurance costs will be unchanged
    - Once the risk becomes moderate there will likely be higher insurance costs
    -

2. **(a) What are the most significant hazards impacting this property between now and 2100?**

    - Flood (Riverine), Soil Movement
    - Coastal Inundation, Wind damage
    - Flood (Riverine), Coastal Inundation
    - Wind damage, Soil Movement

2 **(b) Of the two hazards chosen in question 2a, which would you specify as the greatest risk in terms of asset damage in 2050?**

    - Flood (Riverine)
    - Soil movement
    - Coastal Inundation
    - Wind damage

2 **(c) Of the two hazards chosen in question 2a, which poses the greatest risk in terms of asset failure in 2100?**

    - Flood (Riverine)
    - Soil movement
    - Coastal Inundation
    - Wind damage

3 **What element of the house is most vulnerable to wind in 2050?**

    - External rafters and beams or soffits openings
    - Piers and foundation
    - Roof structure
    - Wall Structure

We will now turn to the *Adaptations* tab to look at the impact of different adaptation pathways on TIPs, VAR probabilities and Annual Failure probabilities. Remember that every time you make a change to an adaptation pathway you must click *Update Adaptation Analysis* to see it's effect.
Use the *Overview, Hazards and Failure* tabs WITHIN the *Adaptations* tab to answer the following questions.

4 **How high would you need to elevate the property above ground (meters) to effectively remove the probability of annual failure due to river flooding (0.00%) between 2030 and 2100?**

    a. 1.4
    b. 0.9
    c. 1.7
    d. 2.1

5 **Update *Adaptation Pathway 1* so that *Floor Height Above Ground* is increased to 0.9 and the associated *CAPEX* is $15,000. How long can you wait before making this investment and still reduce the *Net Present Value of Technical Insurance Premiums and Capital Expenditure*?**

- 2050
- 2040
- 2045
- 2035

- Location 2

As mentioned at the start Part 3, we suggest that you do not close the report for 30 Lennie Ave, Main Beach, QLD 4217. Instead, open a new tab at https://easyxdi.com/. This will make comparing the two properties in Part Three easier.

In your new tab, generate a new report for the following address which is also a freestanding house: 61 Dorman Street, Lorne, VIC 3232

This property is valued at 1,500,000 and was built in 2005. These values can be updated in *Settings*.

1. **In what year does this property first have a moderate Value at Risk (B Rating)?**
   - 2044
   - 2056
   - 2049
   - 2060

2. (a) **What hazard places this property under the highest Value at Risk?**
   - Heat
   - Wind damage
   - Soil Movement
   - Forest fire

2 (b) **What is the maximum VAR% in 2100 of the hazard identified in question 2(a)?**
   - 0.27%
   - 0.76%
   - 0.53%
   - 0.49%

3. **What is the overall VAR% of the property's *piers and foundation* in 2100 compared to 2050?**
   - 2050: 0.0220% to 2100: 0.0451%
   - 2050: 0.0240% to 2100: 0.0558%
   - 2050: 0.0345% to 2100: 0.0544%

4. **Using the *Adaptations* tab, work out which adaptation measure would result in the largest reduction in VAR%.**

    - Increase the heat threshold from 42°C to 45°C
    - Improve the forest fire protection, in particular for 'heat/ember attack'
    - Improve the forest fire protection, in particular for 'flame exposed'

5. **What effect does an increase to the discount rate have on the Net Present Value?**
    - Increasing the discount rate decreases the net present value of the TIP.
    - Increasing the discount rate does not affect the net present value of the TIP.
    - Increasing the discount rate increases the net present value of the TIP.

- Location Comparison

When deciding whether to invest in a property, investors will attach a different weight to various criteria reflecting their own priorities and risk appetites. While these 2 properties have quite different risk profiles, they demonstrate the trade-offs when deciding which property to invest in. Accordingly, for different reasons you could choose to invest in either property.

Based on your analysis, choose the criteria in favour of investing in each property.

1 a) Why would you invest in 30 Lennie Ave? Select three options from the list below.

- Heat has a lower failure probability
- Lower value at risk in 2100
- TIP is lower
- Higher elevation above sea level
- Requires only one form of adaptation to reduce both Annual VAR% and Annual Failure Probability
- Fewer elements of the house are vulnerable

1 b) Why would you invest in 61 Dorman St? Select three options from the list below.

- Heat has a lower failure probability
- Lower value at risk in 2100
- TIP is lower
- Higher elevation above sea level
- Requires only one form of adaptation to reduce both Annual VAR% and Annual Failure Probability
- Fewer elements of the house are vulnerable

PART FOUR – Other Asset Categories

- Control Room

Asset Address: **Calle Fernando Montes de Oca 18, Tlaxcopan, 54030 Mexico City, México**

Asset Category: **Control Systems**

Asset Type: **Control Room**

1. **In what year does this property [Calle Fernando Montes de Oca 18] first have a high Value at Risk (>1%)?**
    - 2030
    - 2060
    - 2090
    - Does not reach high VAR% by 2100

2. **Assuming you are concerned about the failure of the control room by 2100, which hazards are most significant?**
    - Heat and soil movement
    - Soil movement and wind
    - Wind and heat

3. **Each of the material elements of this asset is most vulnerable to which hazard?**
    - Wind
    - Heat
    - Flooding
    - Soil movement

4. **Which adaptation pathway has a greater reduction for hazard failure probability by 2100?**
    - Change the floor height above ground (metres) to 1.0
    - Change the wind speed design threshold to 1 in 2000
    - Change the foundation design to high strength / rigid
    - Change the heat threshold to 44C

- Tower

Asset Address: **Calle de Pierre de Coubertin, 9, 08038 Barcelona**

Asset Category: **Telecommunications**

Asset Type: **Tower**

1. **In 2100, which of the following hazards shows the greatest contribution to the annual Value At Risk %?**
    - Wind
    - Riverine flooding
    - Soil movement
    - Coastal inundation
    - Forest fire

2. **This asset is reasonably close to the Mediterranean Sea so why is flooding not of concern?**
    - The tower is ~2 km inland
    - The tower has an elevation of 74 m
    - Sea level in the Mediterranean Sea is not rising much
    - Riverine flooding was not calculated

3. **Which two material elements of the tower are most at risk?**
    - Civil and Electrical
    - Civil and Electronic
    - Electrical and Information
    - Electrical and Electronic

4. **To minimise wind damage on the tower, which adaptation option should be chosen?**
    - Change the wind speed design threshold to 1 in 100
    - Change the wind speed design threshold to 1 in 1000
    - Change the wind speed design threshold to 1 in 2000
    - Change the foundation design to high strength / rigid

- Substation

Asset Address: **3116 Baco Dr, Placerville, CA 95667, United States**

Asset Category: **Power**

Asset Type: **Substation**

1. **In what year does this property [3116 Baco Dr] first have a high Value at Risk (>1%)?**
    - 2030
    - 2060
    - 2090
    - Does not reach high VAR% by 2100

2. **In 2050, which of the following hazards shows the greatest contribution to the annual Value At Risk %?**
    - Wind
    - Riverine flooding
    - Soil movement
    - Coastal inundation
    - Forest fire

3. **Which two material elements of the substation are most at risk?**
    - Civil and Electrical
    - Civil and Electronic
    - Electronic and Information
    - Electrical and Electronic

4. **Which adaptation pathway has a greater reduction on Forest Fire hazard VAR%?**
    - Change the forest fire protection to flame exposed
    - Change the wind speed design threshold to 1 in 2000
    - Change the foundation design to high strength / rigid
    - Change the forest fire protection to heat / ember attack

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