Md. Muhtasim Galib Inan

Study of Colored Facade-integrated PVs with physical scale modeling

in cooperation with IFE that is in the process of developing new material samples

Graduate thesis in Sustainable Architecture Supervisor: Barbara Szybinska Matusiak July 2022











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Abstract

Implementing renewable energy sources and promoting clean energy has now been in practice to increase sustainability and to decrease greenhouse gas emission. Though using photovoltaics has been one of the most convenient ways to employ clean energy, its integration is quite limited to roof surfaces. For arctic countries like Norway, facade integrated photovoltaics have high probability due to lower sun elevation, eventually has the potential to change the urbanscape. The aim of this research is to study the light and colour performance of such sample materials through physical modelling in the city of Trondheim. the method adopted for the purpose includes making of scale models with samples provided by IFE and a questionnaire survey; leading to an analysis of perception of speculairty of the materials. The result obtained from surveying 70 participants show the preference towards the sandblasted texture over the smooth surface and inclination towards the green scheme compared with the yellow one. The study also confirms that the discomfort due to reflection is higher on a sunny clear sky than a cloudy overcast sky condition.

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Abbreviations

PV Photovoltaic

BIPV Building Integrated photovoltaic FIPV Façade Integrated photovoltaic

NCS Natural Colour System

1 Introduction

1.1 Background

According to International Energy Agency, buildings are the largest energy consumption sector accounting to one third of global energy usage and greenhouse gas emission (Xiang & Matusiak, 2022). The building sector in OECD countries is liable for approximately 40% of total final energy consumption (Athienitis et al., 2018). With the climate change in action and gradual rise of temperature, the Paris agreement act set the goal in 2015 to limit the global warming and reduce the temperature by 1.5 degree Celsius (Bell et al., 2015)To reduce the impact of global warming and save the world, alternative to fossil fuel is sought after throughout the world, looking for a cleaner form of energy, a sustainable approach towards energy production.

To reduce the annual CO2 emissions by 80% within 2050, aim set by EU, large scale implementation of various kinds of clean energy system is required (Xiang & Matusiak, 2021). Solar energy is the most abundant and inexhaustible form of renewable energy currently available (Jelle et al., 2012). Using Photovoltaics (PVs) to generate electricity has been a promising strategy which has attracted strong interest of researchers (Xiang & Matusiak, 2021). The concept of building integrated photovoltaics is thus one of the most convenient strategies to employ clean energy and have been studied and experimented on.

The conventional use of PV is mostly limited to its integration in roof as it is most efficient from the perspective of energy production (Xiang & Matusiak, 2019a). Due to limitation of roof area, it is often not sufficient to produce the electricity for domestic use (Freitas et al., 2017). So, utilizing the façade areas for energy production can compensate for the limited energy production on roof surface (Xiang & Matusiak, 2019b). Thus, building facades are now being explored to be used for energy production. When most of the previous studies deal with energy efficiency, performance and productivity, the architectural integration and the perception of people is yet to be explored (Saretta et al., 2019; Xiang et al., 2022).

In urban areas, the roof area is limited, thus increases the necessity to integrate PVs on building facades (Xiang et al., 2022). FIPVs are now regarded as a type of façade material like that of brick, wood or concrete (Xiang, Moscoso, et al., 2021), thus has a direct impact on the aesthetic of the building itself and also on the urban streetscape. in arctic countries

with lower sun elevation, like Norway, FIPVs are more feasible (Xiang, Matusiak, et al., 2021).

1.2 Research objective and questions

Research in FIPVs encompass different fields of architectural design, environmental aesthetics, architectural engineering, material science, energy efficiency and so on, as a result, a cross-disciplinary systematic method is required (Xiang, 2022). The studies on FIPV done so far deals with the energy performance, aesthetic environment and efficiencies of the materials, whereas the impact of gloss and texture of FIPV on aesthetic performance is yet to be studied (Xiang, 2022). There is a deficit in consideration of colour texture and pattern of the PVs which needs to be addressed by architects and urban designers (Farkus et al., 2013).

The specularity of the material or the reflection caused by the sunlight on the surface of the material can only be observed with physical modeling. Study of specularity with actual samples through physical modeling is yet to explored (Xiang, Matusiak, et al., 2021). The main aim of this thesis is to see the impact of gloss and texture of the surface of FIPV through physical modeling. The research questions are:

- 1. What are the preferences of people in terms of colour and surface texture of the FIPVs?
- 2. How people react to the reflectance of the materials?
- 3. What are the differences in visual impression in sunny and cloudy weather?
- 4. How is the impact of sandblasted treatment of PVs on the final colour of the FIPV?

2 Literature Review

It was 1839 when Alexandre Edmond Becquerel first observed the photovoltaic effect in a conductive solution (Bacquerel, 1839) and it took 44 years to invent the world's first working solar cell (Fraas, 2014). Since then, Photovoltaics have been a topic of research interest and now solar PV systems are believed to be the most promising type of renewable energy system (Xiang, 2022). Although the systems are technologically promising, they have not been sufficiently used in architecture or building design (Munari Probst & Roecker, 2011).

2.1 Architectural integration of FIPV

Façade Integrated Photovoltaics or FIPVs are defined as architectural integrated photovoltaics replacing traditional materials on building façades, which can be viewed as a new type of façade materials like brick, wood or concrete (Xiang & Matusiak, 2021). These FIPVs if used in the buildings would form the external covering of the building, creating impact on the aesthetics of the neighbourhood.

Conventional integration of PVs on roofs not only have limited area but also have less visibility. When compared with roof integrated PV systems, FIPV systems have higher public visibility which requires careful architectural integration (Munari Probst & Roecker, 2011). Special focus on aesthetic quality is need in addition to functional and constructive aspects while using FIPV (Xiang, 2022). Additionally, PV façade colours, texture, pattern and glare should also be taken into consideration to improve its integration into urban environment (Sánchez-Pantoja et al., 2018).

CLOSE VISIBILITY LOW LOW LOW

Figure 2.1 higher visibility of FIPV from public domain, collected from (Munari Probst & Roecker, 2011)

Originally the PVs were dark blue and blackish in colour as darker colours yield in higher absorption of light and better performance in production of energy. However, city planners and architects agree that the dark colours create hindrance in applying PVs to building facades (Xiang, Matusiak, et al., 2021). Since people's perception of urban environment is

influenced by the colours of the façades (Lynch, 1960) it is crucial that the colours of the PVs blend with the surrounding. The conventional dark blue and black coloured PVs don't match the façade colours in most cities. Though one or two black or dark coloured buildings can be acceptable, for a general use, such colours are not suitable (Xiang, Matusiak, et al., 2021). Moreover, covering all buildings in same tone to generate electricity would be monotonous and shall loose the uniqueness of each street.

2.2 Colour in FIPV

Ongoing research in FIPVs are yielding in production of coloured samples. Though there is limited option in terms of colours, industries exploring different techniques to produce varied colours, for instance, KromatixTM technology works with multi-layered filters to get desired colour (Jolissaint et al., 2017). Other technologies like application of anti-reflective coatings, mineral coatings, special filters etc. are also being adapted to generate more options (Xiang, Matusiak, et al., 2021).

The contrast of colour preference from architectural perspective and energy perspective makes the process challenging. Lightness of FIPV is considered the most crucial factor influencing the energy production; lower lightness level results in higher electricity generation (Røyset et al., 2020). On the contrary, from aesthetic perspective, lighter colours are commonly preferred for building facades. Experiments show that people prefer facades with primary colour in high lightness level (Xiang, Matusiak, et al., 2021).

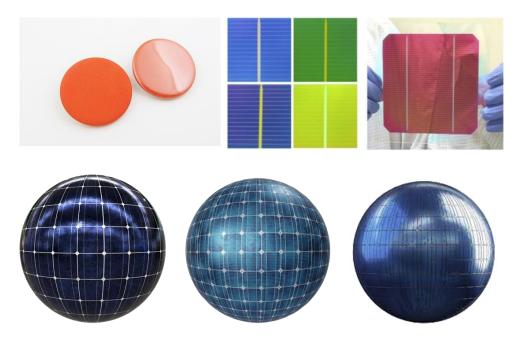


Figure 2.2 PV samples of different colours and texture (source: internet)

2.3 FIPV in Norway

Most of the projects and research on BIPVs, from the last decades, focus majorly on its application on roof (Xiang & Matusiak, 2021). The energy production is less due to limited roof area and in arctic countries like Norway, snow is an obstacle during winters. Building façades in such case can be an alternative potential to generate electricity. In façade installation, the geographical location, inclination angle due to the location and the direction determines the amount of solar energy collected. For northern part of the earth, PV modules perform better when oriented towards south, south east and south west (Atmaja, 2013). For arctic countries like Finland, Sweden, Norway, the southern façade has almost the same potential as that of roof when considered for PV production (Gholami et al., 2021).

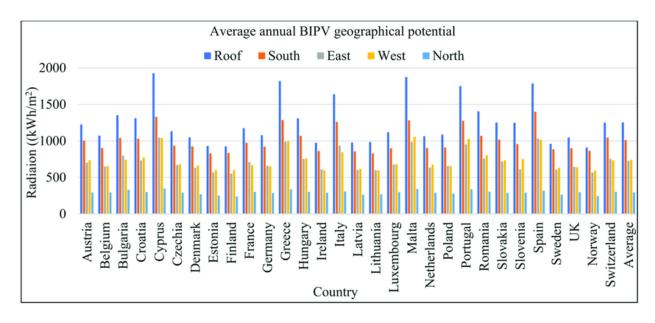


Figure 2.3 annual BIPV geographical potential (Gholami et al., 2021)

From the graph above, it can be observed that the difference between available radiation is less as the location moves towards the poles.

Trondheim has sufficient solar irradiance; as much as 99Wh/m² per day mean annual global irradiance (equal to 867 kWh/m² per year)can be expected on this region (Olseth & Skartveit, 1986; Xiang et al., 2022). The dominating low solar elevation angle during the year ensures abundance of daylight in Trondheim. Due to high latitude of 63.25°N, the highest position of sun in Trondheim is 50.0°(Xiang et al., 2022). The solar angle is between 0° to 10° for more than one third of daytime throughout the year (Matusiak & Anter, 2012; Xiang et al., 2022). This is an indication of importance of investigating façade integrated PVs in Trondheim.

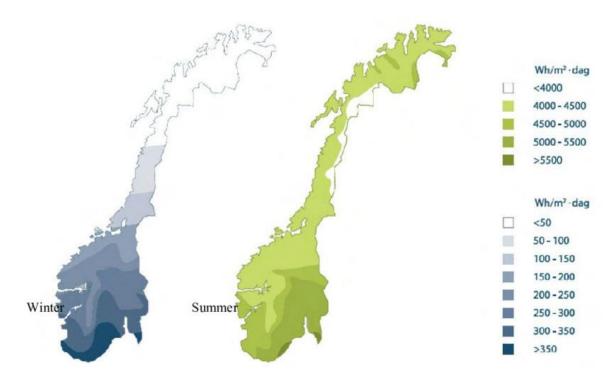


Figure 2.4 Solar Irradiation on horizontal surface of Norway in summer and winter(Tamrakar et al., 2019)

The widely discussed and accepted concept of colour harmony has developed through research and experiments, now suggests colour pairs with similarity in hue or chroma, different in lightness levels are more harmonious (Schloss & Palmer, 2011; Szabó et al., 2010; Xiang et al., 2022). The national standard in Sweden and Norway, Natural Colour System (NCS) also confirms the preference towards composition of colours with one or more colour attribute similarity (Xiang et al., 2022).

2.4 Colours of Trondheim

The city of Trondheim acts as a backdrop for this experiment, where the models are to be compared with the existing colour palette of the city. The first capital of Norway has an important role in the history of Norway. With rich urban history, Trondheim has become a dynamic city where history and modern development co exist (Xiang, Matusiak, et al., 2021). Most of the traditional buildings are located around the centrum, are easily distinguishable for their unique colour and volume. Majority of the buildings alongside Nidelva river used to be warehouses dating back to 17th century (Xiang, Matusiak, et al., 2021) when these were important for trading activities. As most of those warehouses were repeatedly burnt, the same principle was followed for reconstructing them (Grytli, 2013).





Figure 2.5: Traditional buildings around Nidelva in Trondheim has a specific colour scheme

These traditional buildings are appreciated by the city residents and forms the urban identity of the city setting up an iconic and colourful image (Xiang et al., 2022). There is a demand to respect the tradition of chromatic variation of building facades in Trondheim to preserve this valuable identity and sense of place (Angelo & Booker, 2018; Xiang et al., 2022). For a long-term aesthetic sustainability, considering the context, it is important to implement proper colour design strategies.

Using the NCS index and NCS colour system, Angelo and Booker registered the nominal colours of 200 buildings of Trondheim to develop a colour palette. The colour harmony concepts together with the colour palette of Trondheim context (Angelo and Booker, 2018) acts as the reference for the research.

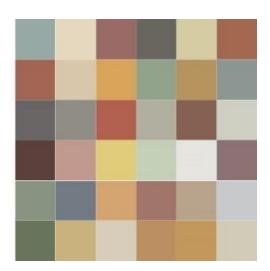
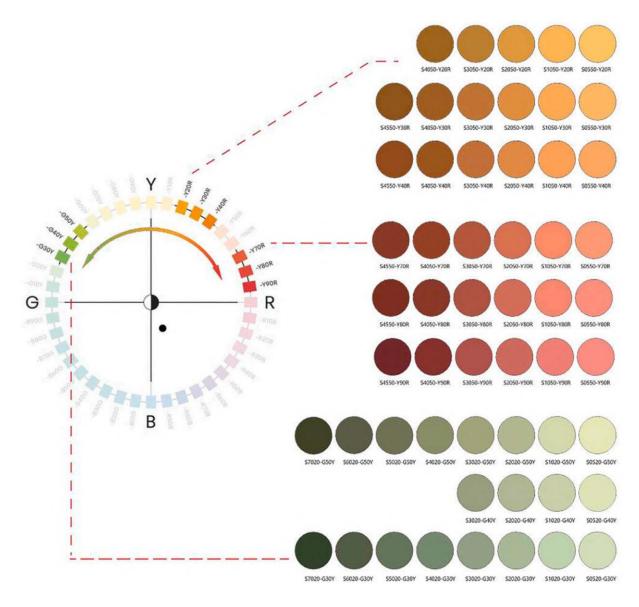


Figure 2.6 The overall colour palette of Trondheim (Angelo & Booker, 2018)



Figure~2.7~on~the~left:~selected~NCS~hues~for~cFIPV~design;~on~the~right:~detailed~NCS~colour~palette~for~cFIPV~design~(Xiang~et~al.,~2022)

The typical hues in such traditional buildings range from reddish hues to greenish hues; very rarely buish hues are observed and violets are not found (Xiang, Matusiak, et al., 2021). Groups of NCS colours are thus chosen taking this colour range of Trondheim into consideration.

3 Methodology

One of the aims of the research is to observe and examine the specularity of the materials produced by IFE. The efficiency of a PV panel can be calculated through simulation software, however, the reflectance or the glare cannot be perceived in such a way. Thus, the physical modelling is essential to understand how the materials behave in real life. This project has been planned and developed in cooperation with Institute of Energy Technology (IFE), which is developing new solutions for PV panels having different colours and different types of glass cover. The colours of the Trondheim palette chosen for the study could not be recreated in form of coloured PV samples by IFE at the time, therefore the glass cover and connected with it danger for solar glare was of special interest. The desired colours of future-coloured PVs were simulated with outdoor surface paints.

Initially the scope of the project was to make 6 models, 3 pairs in 3 different colours; each pair having one textured and one smooth surface. The colours of Trondheim were taken into consideration with yellow, green and red. Unfortunately, the company could not produce the required number of sample pieces in time required to make 6 models which eventually led to limiting the model number to 3 only.

3.1 Design of the model

The third largest city in Norway, Trondheim possess a rich history in urban development, a coexistence of traditional historic buildings with modern architecture. (Xiang, Matusiak, et al., 2021). Most of the traditional buildings are located in and around the city centre, with a long row of such buildings on either side of Nidelva.



Figure 3.1traditional buildings of Trondheim

The iconic buildings stand out in terms of colour and volume, pitched roof, built of wood and coloured in bright colours. Such a residential building of 4 storied is taken as the prototype for this experiment. Buildings near the old bridge, on either side of Nidelva and streets of Bakklandet were observed to determine the unique feature of the buildings in Trondheim.



Figure 3.2 typical facades of buildings near bakklandet

After observing the buildings, a façade with balconies and windows on southern side, the roof pitched equally on east and weatern side was considered for the experiment. Different window to façade ratio or height to width ratio were tried out to see which of them works best for the modelling.

The sample sizes promised by IFE was of 60mmX120mm in dimension. The façade was developed in such a way so that there is minimum waste of material and the orientation of the samples are along the same horizontal direction throught all the floors. While deciding on number of windows, care was taken so that the maximum surface area can be used for the PV panels. Thus the current façade was generated.

3.1.1 The façade type

The historical warehouses situated alongside Nidelva river face towards the waterbody, the waterway being the principle mode of communication in the then time. The entry façade is generally simple, provided with simple doors and windows, often accompanied by a balcony with a pulley system on the topmost level for easier transportation of goods. 4 such similar types of façades are designed keeping the size of the PV samples in mind and one of them is selected based on available surface area for the panels, window area etc.

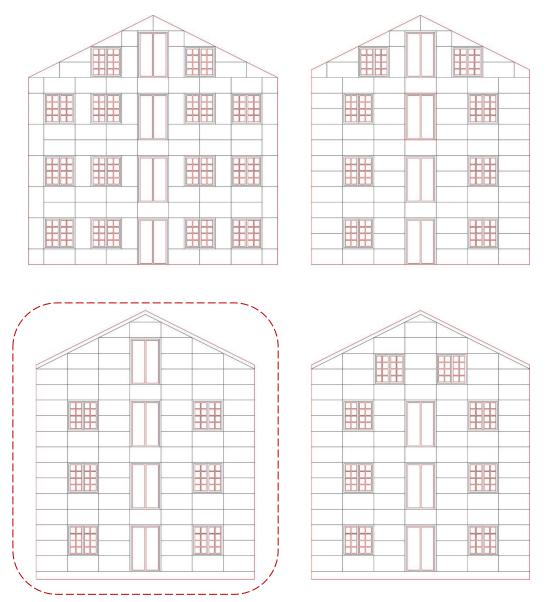


Figure 3.3 different types of facades

clockwise from top left, a. façade with 2 sets of windows on either sides of the balcony, b. façade with single set of windows on either side of balcony, c. façade with 4 balconies, one on each floor, d. façade with 3 balconies and window only on the topmost floor.

		No. of	No. of	Pv area	Total	Percentage	Remarks
		Windows	Balcony	in mm	area in	of area for	
					mm	PV	
Type a	2 set of	14	4	518400	806400	64%	The width of
	windows						the model is
	on either						highest but
	sides of						the area of
	the						façade for
	balcony						PV panel is
							lowest

Type b	1 set of windows on either side of the balcony	8	4	516600	718200	71%	The total width of the façade is less but the area for PV panel is more.
Type c	1 balcony on each floor, no window in the topmost floor	6	4	568800	743400	76%	The façade has highest PV area
Type d	1 pair of windows on each level, no balcony in the topmost floor	8	3	561600	743400	75%	The façade has 3 balconies and the window area is higher

3.1.2 The façade scale

A scale model is a physical model which is geometrically similar to an object, like building, vehicle etc.; generally smaller than the large prototype, used for design and testing. A scale model gives the impression of the actual object in a smaller area or volume for convenience. While determining the scale of the model, 2 major things were taken into consideration.

- The size of the samples provided
- Allowable size in the laser cutter

IFE promised to provide the samples in dimension of 120mm X 60mm. taking this size into consideration, the façade was designed in such a way so that there is least waste of materials. The majority of the buildings in Trondheim have wooden panels on the façade, examples of old buildings with horizontal and vertical orientation of wooden panels can easily be found. Both vertical and horizontal orientation of the panels were considered where it was observed that the vertical orientation required more cutting of samples which eventually leads to more waste. Thus the horizontal orientation was chosen. The laser cutter also has a limitation of

area, so the highest possible size with least amount of waste was tried over different scale of the models.

Height	Width	Remarks
960	960	Compact with least wastage
960	1020	Highest width, horizontal orientation leads to wastage of samples
720	720	3 panels in a floor, size is handy, less PV area
720	720	A mix of horizontal and vertical panels make it chaotic
480	480	PV area is very less

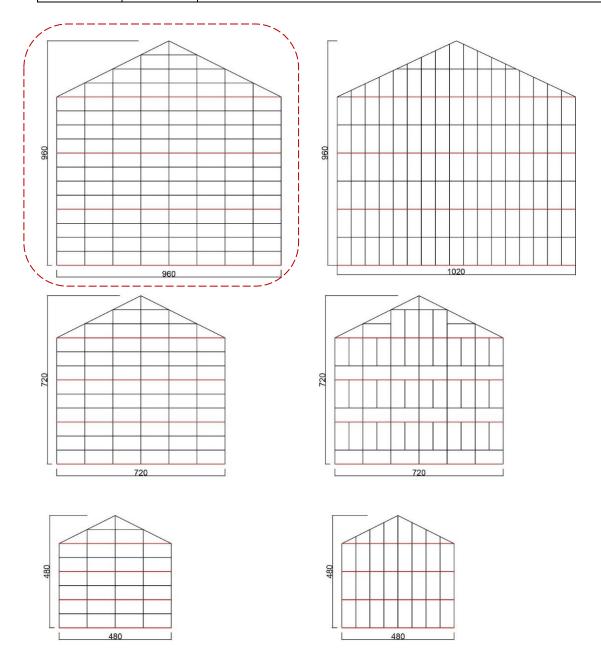


Figure 3.4 Different scaled facades with the same size of samples yield in different outcomes. The horizontal orientation is selected for the least wastage and higher surface area available.

3.1.3 Colours of the models

Trondheim has a colour scheme on its own and it is very evident in the older part of the city. The experiment was to be carried out in Bakklandet where the surrounding buildings are of the same colour scheme. Initially the three dominant colours of Red, Yellow and Green are taken into consideration, however, the project was limited to only two colours of green and yellow due to lack of samples.

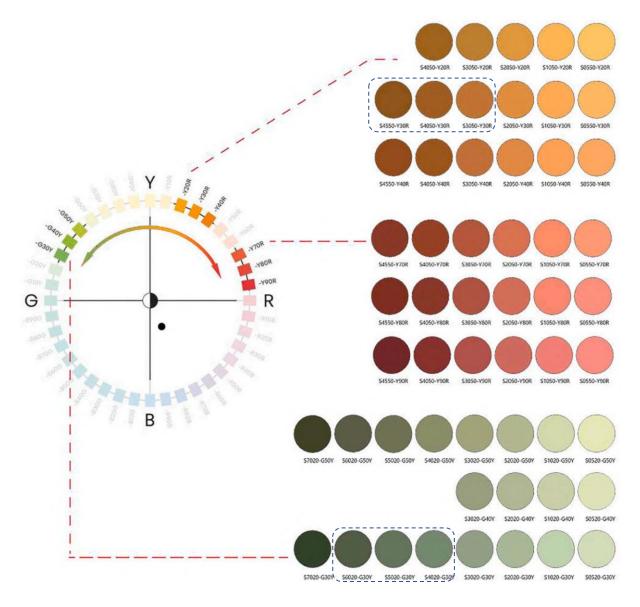


Figure 3.5 the colours chosen for the modeling of the facades.

A common architectural expression in many architectural projects with pixelization is gradual reduction of blackness level from top to bottom of the façade (Xiang, Matusiak, et al., 2021). This change in blackness level of the colours is followed in the experiment, the lighter nuances are in the top most level, making it less contrasting with the lighter sky colour. For

each of the models, 3 different colour nuances are used; the darkest one in the bottom two floors, darker in the third floor and the lightest in the topmost level.

Initially nuances selected for the yellow scheme are S4050-Y30R, S3050-Y30R, S2050-Y30R whereas nuances selected for the green scheme are S6020-G30Y, S5020-G30Y, S4020-G30Y. These exact nuances of the paints were made and collected from Trømsdal Favenhal. When the colours were tried on the model surface, the yellow scheme appeared to be brighter than what was expected, so a darker nuance S5050-Y30R with similar difference of 10 was selected as the darkest tone and the rest were adjusted accordingly.

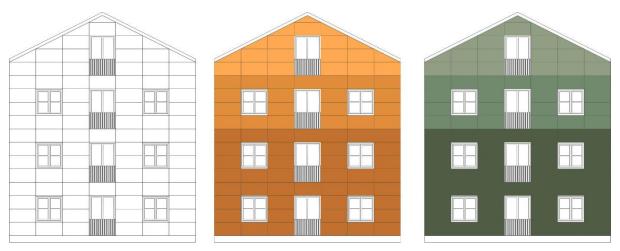


Figure 3.6 the designed facades in the selected colour scheme.



Figure 3.7 the actual colours of the models with the samples

3.2 Selection of location

Trondheim has low average sun angle and the sun is tilted towards south. A façade exposed to south in such a location would be the most suitable for absorbing sunlight, south-east and south-west are also good. Similarly, the reflection of the sunlight from the south-oriented facade would also be highest. So, a location where the models could be oriented towards south as well as the surrounding holds the typical colours of Trondheim to compare was

sought. Care was taken so that the location is not shaded by any adjacent building or landscape. The criteria for selection of site are as follows:

- Orientation: the model needs to be placed facing towards south, so the worst possible scenario during a bright sunny day can be observed.
- Surrounding: the site needs to have enough clearance from adjacent buildings so that the models are not shaded by any part of building or landscape. The survey also requires the participants to walk around the models and observe them from different angles. Moreover, the adjacent building schemes also help the people to compare the colours of the models.
- Background: The place where the models are to placed would have a backdrop, be it
 a building façade or something else. The colour of the building façade was to be
 chosen in such a way that it does not affect the colours of the models, in other words,
 the colour of the backdrop needs to equally complement both the colours chosen for
 the models.
- Accessibility: the location required to be easily accessible and noticeable. The
 people taking part in the experiment can easily see the models from a distance and
 would not create any hindrance for the other passersby. A busy street with a
 continuous flow of people would be ideal for such an experiment.

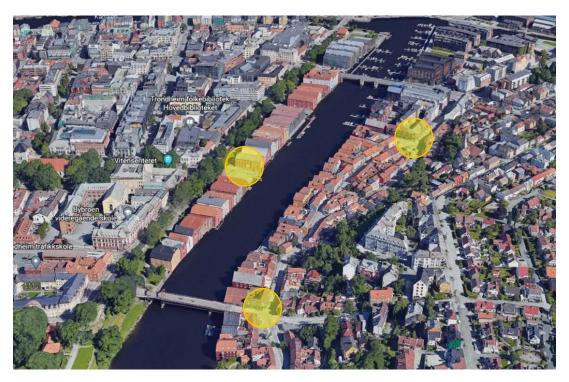


Figure 3.8 image showing probable locations for the experiment (image collected from Google maps)

The three probable locations thus chosen were – the eastern end of the old town bridge, piren near Kjopmannsgata and the intersection of Nygata & Nedre Bakklandet. All three of them are south facing with a decent amount of traffic. However, the intersection at Nygata was chosen due to its easy access to parking. The final models turned out heavier than expected and needed to be transported by a car. Thus, the location with easier access for transportation was chosen.





Figure 3.9 photo taken around the location of Nygata

3.3 Physical modelling

The samples arrived in a square form as a test batch and then requested in the shape of 120mm X 60mm rectangles. The difference in texture is less when the piece s are compared individually, however, when placed in group, the whole surface acts as one and the difference is evident. The sandblasted surface appears more whitish and less reflective whereas the smooth surface reflects more light. The figure below shows the difference in texture and reflection when captured in indoor condition.



Figure 3.10 the samples provided by IFE (left: compared individually, right: compared as a whole model surface)

The base of the models was tried out with 4mm plyboard and 3mm MDF boards. Both of the materials were tested with colour and gluing of the samples. The plyboard surface got uneven when the paint dried making gluing of samples difficult. The MDF was stiffer compared to the plyboard but it was heavier despite its lesser thickness.



Figure 3.11preliminary models with MDF and Plyboard tried to test the colours

The colours were applied 2 times for a uniform texture and when complete dried the panels were stuck with a heavy-duty glue. The glue turned out to be less transparent when applied on glass surface, glue marks could be observed if someone looks at the model from very proximity.



Figure 3.12 Doors and windows cut out of plyboard and lined with aluminum foil

The windows of the models were made out of aluminum foil to create the impression of glass. A transparent material for the glass was avoided to provide maximum accuracy of the materials. Most of the glass used for the windows are reflective, so a foil surface created the same appearance. The balconies were provided with doors of same material. The railing was designed in the simplest manner so that it does not overpower the model.

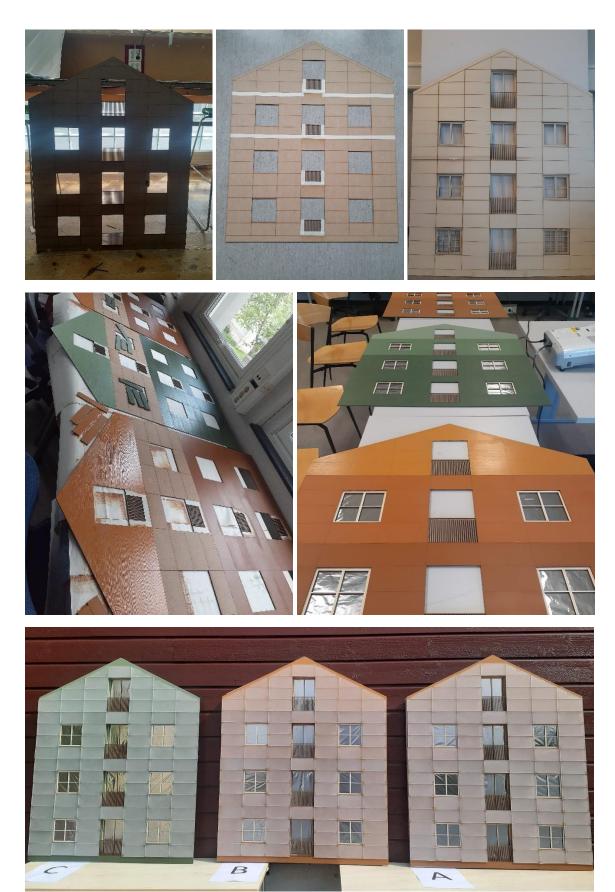


Figure 3.13 photo taken at different stages of making the models

The panels received from IFE had minor defects in terms of size and shape. Some of the sample pieces were uneven on the edge while some had broken edges. The triangular pieces required for the topmost floor had to be cut by hand into desired shape.

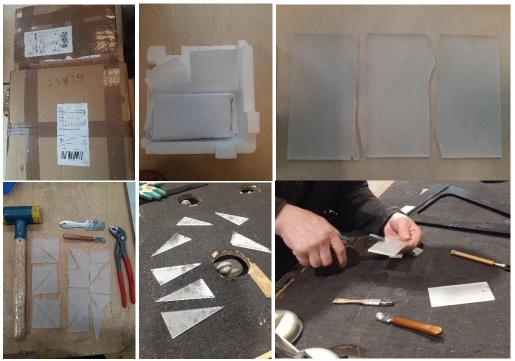


Figure 3.14 cutting of glass samples into required shape and size.

When all the panels were glued to the MDF surface, the model became heavy and was prone to bending when lifted. To limit this bending, cardboard back support was provided for each of the models.

3.4 Questionnaire survey

The final part of the experiment was to create a questionnaire to observe and analyze how people perceive the materials. A questionnaire with comparison 6 different models were first created and approved by Norwegian Centre for Research Data- NSD. When the sample quantity was reduced the questionnaire had to be adjusted accordingly. The final questionnaire includes a comparison between 3 models and participants are asked to rate the models in terms of their preference and discomfort. Additionally, they are also asked about how the colours and the materials correspond to the existing surroundings.

The questionnaire included basic information of age, gender, colour vision difficulty to observe how different age or gender group react to the same model. People of different ages were asked to take part in the survey so that the outcome becomes more acceptable and reliable.

The initial aim was to get as many as 50 participants to take part in the survey. Over the two days, 70 responses were collected. The survey form is attached as follows:

This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.

Directions: Choose only of the boxes (unless otherwise mentioned)

Name	Name (optional):									
Age	□18-25	□ 26-35	□36-45	□46-55	□56-65	□66+				
Gende	Gender \square Male \square Female \square Other \square Prefer not to say									
Do you	Do you have any visual impairment you know of?									
	□Yes, (optional) □No									
Do you	ı have any difficı	ulties with colou	r vision?							
	□Yes(optional) □No □Sometimes(optional)									
	scope of master g new building				odels of an imagi	nary 4-floors				
Which	of the models d	o you like bette	r? Rank them in	terms of prefere	ence (3- best 1-v	vorst)				
	☐ Model A ☐ Model B ☐ Model C									
2.0	nuch visual disco ghest score?	mfort do you fe	el walking along	and looking at t	he model that y	ou gave				
	\Box I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it \Box The sunlight reflection bothers me, but I can look directly at the model for a short time \Box The strong light reflection makes it impossible to look at the model									
	How much visual discomfort do you feel around the model that you gave the lowest score?									
	☐ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model									

Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?										
COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings										
Not at all						Very well				
GLOSSINESS: mark how well to	he mate	rial fits in	nto surro	ounding	regardir	ng glossiness				
Material is too glossy						no problem with glossiness				
Considering the model that you material shown on the model	500	97		Market I						
COLOUR: mark how well the c	olour of	the faça	ide mato	hes the	colours	of the surrounding buildings				
Not at all						Very well				
GLOSSINESS: mark how well to	he mate	rial fits in	nto surre	ounding	regardir	ng glossiness				
Material is too glossy						no problem with glossiness				
Thank you very much for your participation										

3.5 The experiment

The models were set in front of Royal Haircut saloon, at the Nygata intersection. Tables were used so that the models are at eye level of the participants. The three models were marked as "A" (yellow with glossy finish), "B" (yellow with textured finish) and "C" (green with textured finish). Participants were allowed to observe the models from different angles and were asked to take a walk assuming the as real buildings. With a brief introduction to the project, they were asked to answer the questionnaire and share their thoughts and feedback about the models.





Figure 3.15 the models on two different weather condition (top: sunny, bottom: cloudy)

The experiment was carried for 2 days, one on a bright suuny day, with less clouds and other on a cloudy day. A digital luxmeter (BEHA digital luxmeter, model 93408) was used to measure the overall light intensity around the model on both sunny and overcast day. A luminance meter (Minolta luminance meter, model LS-100) was used to measure how illuminated the surface was for the three different models, for 3 different nuances.



Figure 3.16 photo of the devices used for the experiment

Luminance is the amount of light passing through or reflected from a surface from a solid angle. The luminance of the materials were measured for different time of the day. To keep the process systemic, same points were measured under different conditions.



Figure 3.17 Figure 10: photo showing the marked areas where the readings were taken by the luminance meter.

4 Results

4.1 Results of the survey

The questionnaire survey included basic questions of age and gender to ensure people of different age took part in the experiment. A total of 70 participants took part over 2 days of the experiment. The majority of the participants were young, 76% of the total participants range from 18-35 years; the gender ratio is almost equal and none of the participants had difficulty in colour vision.

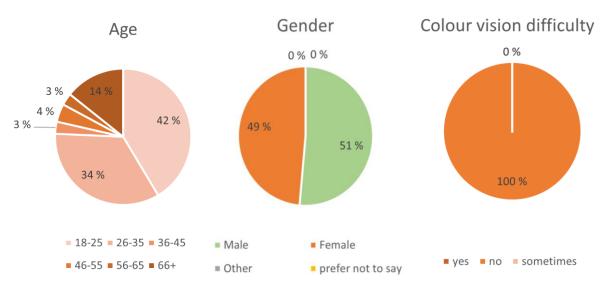


Figure 4.1 Charts showing percentage of Age group, gender and colour vision difficulty among the participants of the survey.

The participants were asked to score the models in terms of preference, 1 being the least preferred and 3 being the best. The three models were marked as A (yellow smooth surface), B (yellow textured surface) and C (green textured surface). Majority of the people, 64% preferred the Green textured one over the other 2 samples while the smooth surface was the least preferred by maximum number of people 74%.

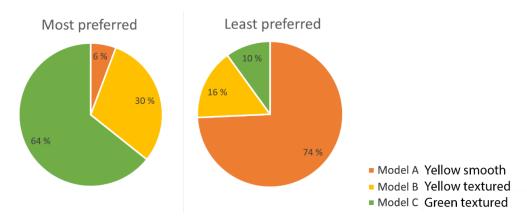


Figure 4.2 Charts showing the percentage of preference of the three models in respect of colour and glossiness.

Participants of the survey were asked to walk around the models and observe form different angles. Since specular reflection can be observed from a certain angle corresponding to the angle of the sun, this movement around the models ensured that they get the chance to see if the reflection create any discomfort in eyes.

Majority of the people choose the green textured sample over the other two and the amount of discomfort is lowest. While some of the people couldn't distinguish the textural or finish difference between the models of same colour until mentioned some others could easily isolate the two types. However, majority of the people claimed the reflection from the models were not very discomforting to their eyes. As the green coloured and sandblasted sample was preferred by majority, none of the participants claimed to have any discomfort looking towards it, even during a sunny day.

The location of the experiment allowed people to compare the models with the existing buildings, already in the colour palette of Trondheim. when asked about how the colours correspond to the existing colour scheme, people took their time to look around and make their decision keeping that in mind.

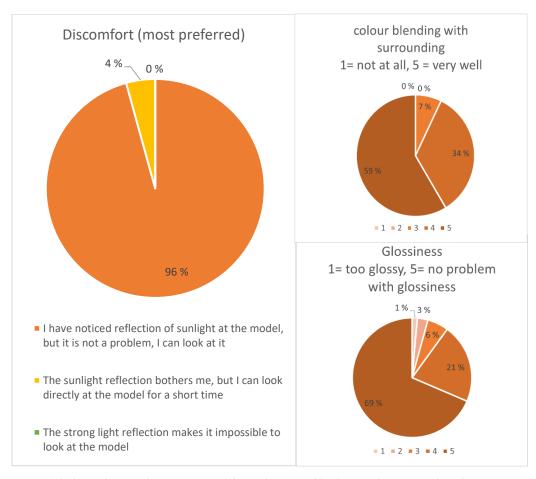


Figure 4.3 charts showing the percentage of discomfort caused by the samples most preferred

Maximum people responded that the colour blends well with the surrounding and none responded in opposition. While 69% of participants were not bothered by the glossiness of the material a few of them marked it too glossy.

The least preferred model turned out to be the one with smooth surface. 74% of the participants marked this type as the worst in their opinion. Some of the comments on the yellow model included that the colours could have been brighter. There was a mix of opinion about how much the colour blends with the surrounding, though majority were agreeing to it, 6% mentioned the colour does not go with the surrounding. In terms of texture or glossiness, the distribution is somewhat equal. However, when calculated, the higher percentages show people claimed it to be very glossy for a finish material.

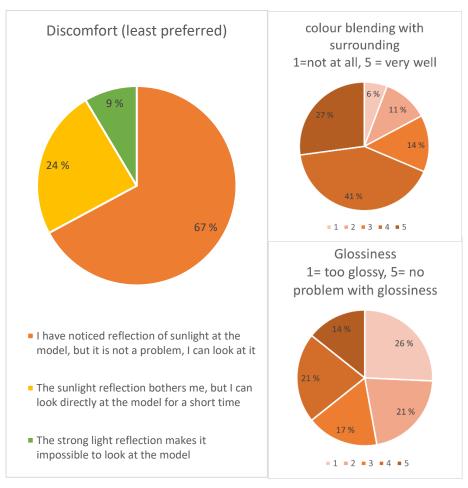


Figure 4.4 pie charts showing the percentage of discomfort caused by the sample least preferred

Since the experiment was carried out in two different weather conditions, the results were also separated to analyze if there is any impact of the sun on the perception of glare or discomfort. The sun is more visible on a bright sunny day and thus create more specular reflection on the surface, whereas on an overcast sky condition, the direct sun position often can not be determined, creating less obvious reflection on the surface.

4.1.1 Results for Sunny condition

The models appeared whiter in the sun than that of a cloudy day. Majority of the people opted for the green model whereas some of them willingly liked the one with reflection. It is evident that about 8% of the people liked the reflective smooth surfaced model over the other two.

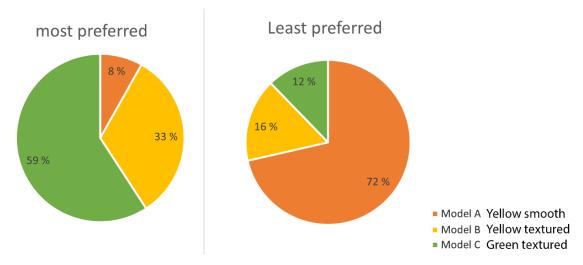


Figure 4.5Charts showing the percentage of preference on sunny day.

With the luminance meter, the luminance from the model surfaces were recorded. For each record of the data, 3 readings were taken and an average is calculated from them. On the sunny day, the readings were taken in such a way that they correspond to the angle of reflection from the sun. since the exact angle of incidence on the surface could not be precisely determined, readings were taken on 4 different angles assuming the angle of reflectance, the points are marked in the figure below.

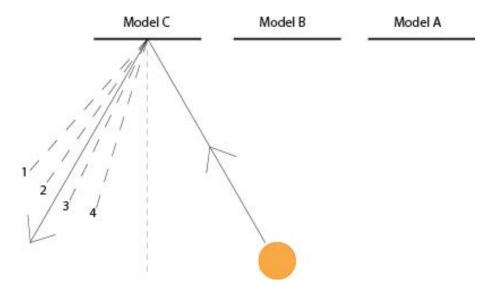


Figure 4.6 top view of the positions where the readings were taken by the luminance meter.

M	od	lel	ŀ
IVI	OC	lei	F

S3050-Y30R	10040	9975,667	10900	10876,67	10160	10233,33	9543	9553,333
	9987		10790		10360		9562	
	8972		9393		8826		8090	
S4050-Y30R	8795	8882,333	9415	9411	8822	8852,667	8010	8050
	8880		9425		8910		8050	
	9342		9653		9267		8343	
S4050-Y30R	9330	9335,667	9719	9687,667	9233	9262,333	8240	8337,667
	9335		9691		9287		8430	
Model B								
	9918		10940		10330		9484	
S3050-Y30R	9956	9920,333	10480	10796,67	10090	10150	9359	9453,333
	9887		10970		10030		9517	
	8130		8888		8397		7745	
S4050-Y30R	7995	8311,667	8895	8877,667	8320	8369,333	7773	7749,333
	8810		8850		8391		7730	
	7391		8232		7866		7117	
S4050-Y30R	7151	7276,333	8116	8172,667	7849	7836	7157	7157
	7287		8170		7793		7197	

10180

Model C

	9056		10060		9587		8970	
S4020-G30Y	9133	9090,333	10030	10029	9590	9571,333	8941	8944
	9082		9997		9537		8921	
	8150		8649		8067		7851	
S5020-G30Y,	8177	8118,667	8670	8669,667	8039	8072	7859	7858,667
	8029		8690		8110		7866	
	6981		8295		7516		6698	
S6020-G30Y	6957	6945	8280	8255	7629	7558,667	6695	6686,333
	6897		8190		7531		6666	

Figure 4.7 Tables showing luminance of the models on a sunny condition for each colour nuance.

The measured luminance was highest for model A and lowest for model C, from observations points 1, 2, 3 and 4, respectively. At the same time, luminance is higher in colours with lower blackness level, and is measured to be lower, where blackness level is high.

4.1.2 Results for cloudy condition

For the majority of time, Trondheim has an overcast or a cloudy sky. The experiment on a cloudy day reveals how differently the material behaves in different lighting condition. For the cloudy overcast sky condition, the sun was not visible. With diffused light, it was hard to get a reflection of light from the coloured surface behind the glass. Materials were not reflecting too much light but appeared like mirrored surface. None of the participants preferred the reflective smooth surface as the topmost.

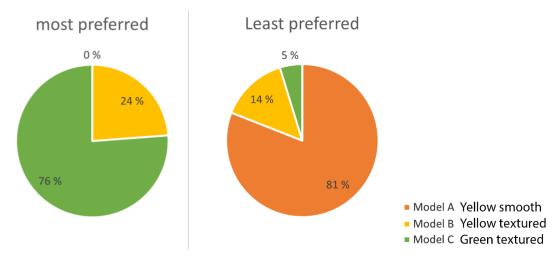


Figure 4.8 Charts showing the percentage of preference on a cloudy day.

Since it was not possible to get a direct specular reflection from the surface on an overcast day, readings were not taken at different angles like that of during sunny day, rather luminance of the models were measured at different times of the day as it appeared different in terms of daylight. The sky was darker during early morning and it got brighter as the day went by. With increase of daylight on the surface material, the luminance level also changed, these values are shown in the table below.

	8.30 am		10.30 am		12.30pm	
	1153		1691		6343	
S3050-Y30R	1167	1166	1663	1685	6297	6316,667
	1178		1701		6310	
S4050-Y30R	867		1259		5288	
	857	861,7667	1281	1273	5257	5272
	861,3		1279		5271	
	830		1347		5373	
S4050-Y30R	824	825	1351	1349	5377	5377
	821		1349		5381	
		Model B				
	8.30 am	Model B	10.30 am		12.30pm	
	8.30 am 1007	Model B	10.30 am		12.30pm 5290	
S3050-Y30R		Model B 1016,667		1613,667		5285,333
S3050-Y30R	1007		1615	1613,667	5290	5285,333
S3050-Y30R	1007 1019		1615 1618	1613,667	5290 5286	5285,333
S3050-Y30R S4050-Y30R	1007 1019 1024		1615 1618 1608	1613,667 1284,333	5290 5286 5280	5285,333 4488,333
	1007 1019 1024 809	1016,667	1615 1618 1608 1286		5290 5286 5280 4499	
	1007 1019 1024 809 793	1016,667	1615 1618 1608 1286 1270		5290 5286 5280 4499 4477	
	1007 1019 1024 809 793 787	1016,667	1615 1618 1608 1286 1270 1297		5290 5286 5280 4499 4477 4489	

	8.30 am		10.30 am		12.30pm	
	1002		1727		5318	
S4020-G30Y	1005	1001,333	1730	1726,333	5282	5290
	997		1722		5270	
	880		1478		4781	
S5020-G30Y,	865	874,3333	1490	1485	4749	4757
	878		1487		4741	
	706		1277		4284	
S6020-G30Y	711	710,6667	1245	1252,333	4281	4321,667
	715		1235		4400	

Figure 4.9 Tables showing luminance of the models on a cloudy condition for each colour nuance.

The luminance is significantly lower than in sunny conditions. The measured luminance was highest for model A and lowest for model C in same weather condition.

4.1.3 Comparison of results between sunny and cloudy condition

49 participants took part on the survey during the sunny day whereas 21 participants took part in that of a cloudy day. Though the number of persons taking part in the survey varied in two days, the results for the two days are noticeably different. While 59% of participants preferred Model C (green textured) on sunny condition, on cloudy day, the preference is 27% higher than that of the sunny day. It is interesting to note that none of the participants preferred the model A (yellow smooth) on cloudy condition.

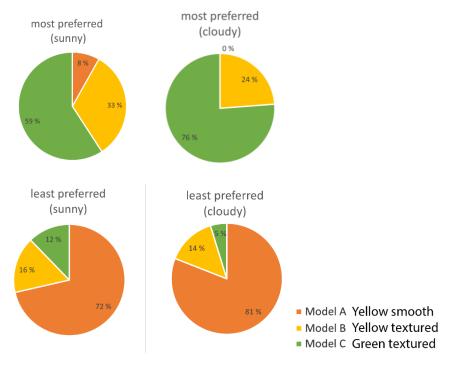


Figure 4.10 Preference comparison for different sun conditions.

Despite the difference in percentage, the overall impression is the same, in both cases, the green textured model is the most preferred one and the glossy yellow on is the least preferred.

Additionally, it is important to note that the material appears to be glossier in sunny sky condition. For the model which is least preferred in both the days, model a or the yellow one with smooth surface, 35% of the people mentioned the material to be very glossy in sunny condition whereas only 5% mentioned it the same in a cloudy day. The sunlight has impact on the perception of colour as well. Though for both the cases, model C or the green one with sandblasted surface is the most preferred, the acceptance of colour compared with the surrounding is different for the two days. On sunny day, 51% of participants agree that the colour blends very well while people agree more, up to 76% on a cloudy day.

The sky condition for sunny day was clear and thus the light intensity was high. The average illumination measured on the sunny day was 46,200 lux. For the cloudy condition, the exact position of sun was often not distinguishable. With no direct sun position, the illumination was low and measured as 11,520 lux.

The luminance of the backdrop was measured separately without the models to see what the models were compared with. The luminance level distinctly differed in the said two conditions.



Figure 4.11 photos of the backdrop where the experiment was carried out, sunny day on left, overcast day on right.

On overcast day, the daylight was varying due to moving clouds, it started to get brighter as the day went by and thus readings were taken at three different times with difference in surrounding light.

356		525		779	
361	361,6667	519	520,3333	781	769
368		517		747	

On a sunny day, on the other hand, the readings were somewhere close.

1385		1405	
1349	1367,667	1412	1398
1369		1377	

4.2 Research results

1. What are the preferences of people in terms of colour and surface texture of the FIPVs?

From the survey, it is clear enough that in terms of colour, the green one is more accepted than the yellow one and for texture, the sandblasted surfaces are preferred over the smooth ones. In separate weather conditions, the preferance for the green colour and textured surface (Model C) is evident from the following pie charts.

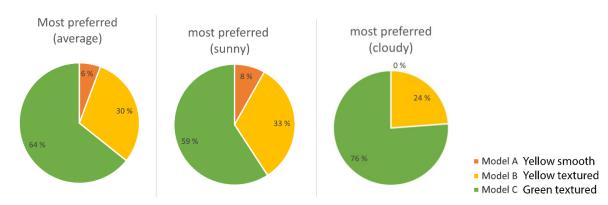


Figure 4.12 green coloured and textured surfaces are preferred

The pie charts above show that a maximum preference towards green textured samples irrespective of weather condition. On sunny condition, 59% preferred model type c and it is higher, 76% on cloudy condition.

2. How people react to the reflectance of the materials?

Most of the people were okay with the reflectance from the materials while a few of them termed them as very glossy in their opinion. The sandblasted surface appears less glossy and reflects less light, the smooth surface, on the contrary, appears glossier, especially on a sunny day.

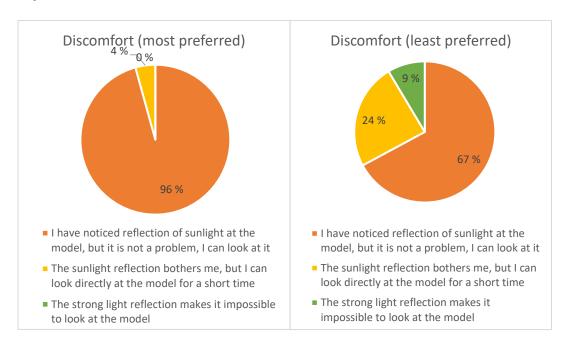


Figure 4.13 Discomfort is less in the sandblasted samples and higher in the smoother ones.

3. What are the differences in visual impression in sunny and cloudy weather?

Despite a similar overall impression in terms of preference (majority supporting the green sandblasted sample façade), the acceptance of gloss and colour remarkably changes in different weather condition. The sunlight has direct influence on the reflectance of the materials. Same material appears glossier on a sunny day to the majority of people. The colours also fade with higher daylight, as a result the acceptance of the colour changes in different weather condition. Thus, the same colour nuances appears more acceptable in cloudy sky than a clear sunny sky and the same material look glossier in sunny condition than that of a cloudy one. For both condition, model A or the yellow smooth one being the least preferred, it is observed that it appears that more glossier on sunny day (35%) than on a cloudy day (5%) whereas, model C or green sandblasted one being most preferred on both days, the colour seems more acceptable (76%) on cloudy day than that of a sunny day (51%).

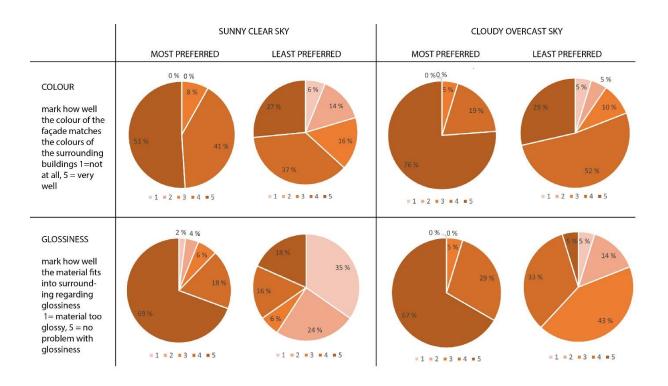


Figure 4.14 difference in visual perception between sunny and cloudy condition

4. Impact of sandblasted treatment of glass on final colour of the PV?

The models appear whiter in colour when the samples were placed on top of them. Initially the colours chosen for the yellow one had to be adjusted due to this phenomenon. Models A and B, despite made up of same material and colour, the luminance level is different due to sandblasting of one of the materials. Under the same weather and daylight condition, the luminance of the smooth surface is higher than that of the sandblasted surface.

Model A					Model B				
	9900		10940			9918		10940	
S3050-Y30R	10040	9975,667	10900	10876,67	S3050-Y30R	9956	9920,333	10480	10796,67
	9987		10790			9887		10970	
	8972		9393			8130		8888	
S4050-Y30R	8795	8882,333	9415	9411	S4050-Y30R	7995	8311,667	8895	8877,667
	8880		9425			8810		8850	
	9342		9653			7391		8232	
S4050-Y30R	9330	9335,667	9719	9687,667	S4050-Y30R	7151	7276,333	8116	8172,667
	9335		9691			7287		8170	

Figure 4.15 table showing luminance difference due to sandblasting of the samples

5 Discussion

5.1 Limitations of the experiment

A questionnaire survey often has some limitations which cannot be overlooked. The limitations or the drawbacks from the survey are listed below:

- 1. The questionnaire survey was done on two weekdays, most of the people taking part in the survey were ranging from 18-35 or 66+. The middle age groups are assumed to be busy with work and thus the result lacks equal distribution of age. However, in terms of gender, it's almost equally balanced between the two opposite genders (49% female, 51% male). None of the participants recorded to have any colour vision problem so the result can be claimed as free from colour vision limitation.
- 2. Since the survey was done in two different days, the same participants were not available on the other day, or, there was no repetition of participants. Since the individuals are completely different, the comparison is difficult and would have been nice if the same participants could be used for different weather conditions.
- 3. Some of the participants were personally biased towards a specific colour due to personal preference. Such participants reduce the accuracy of the survey conducted. Similarly, some of the participants were unable to notice any difference between the two textured unless mentioned, a few of them also mentioned it appeared same in their eyes as well. On the other hand, some of the participants were in favor of reflections or reflective surfaces from personal choice. They mentioned to observe glare but were completely okay with it. A few of the participants, especially on cloudy day, mentioned they didn't have any sort of discomfort looking at the surfaces; since the questionnaire had no option of having no discomfort, this is a limitation of the survey.

The process adopted for the research had a few limitations as well. These are listed as follows:

 The visual appearance of the colours were different in real life than what was seen on computer screen. The nuances were selected digitally and mixed with the help of computer aided mixing machine in the colour shop, yet the outcome was different than expected.

- 2. The thickness of the smooth samples was higher than that of the sandblasted ones. The thickness of the materials may have some impact on the perception of colour.
- 3. The materials received from IFE were not perfectly in the size ordered. The slight inaccuracy in cutting of glass had an impact on the overalls outlook of the model. In some cases, the edges were not as sharp and straight as the other ones.



Figure 5.1inaccuracy of cutting of samples

Despite all these limitations, the research shows how the perception of colour and texture varies in real world in real atmosphere. The major achievement of the research is this finding and it would help the company to review their samples in future.

5.2 Luminance abnormality in smooth sample

The luminance level of nuances with less blackness level is higher than that of one with higher blackness level. The colour nuances were arranged in a such a way that the blackness level is higher in the bottom storey than that of the top one. For the smooth surfaced façade in Model A, the luminance level is higher for the darkest colour (S4050-Y30R) than the middle one (S4050-Y30R).

Model A								
	9900		10940		10180		9555	
S3050-Y30R	10040	9975,667	10900	10876,67	10160	10233,33	9543	9553,333
	9987		10790		10360		9562	
,,	8972		9393		8826		8090	
S4050-Y30R	8795	8882,333	9415	9411	8822	8852,667	8010	8050
1	8880	1	9425	1	8910		8050	
i	9342		9653		9267		8343	
S4050-Y30R	9330	9335,667	9719	9687,667	9233	9262,333	8240	8337,667
'	9335		9691		9287		8430	

Figure 5.2 higher luminance level in darker nuance

For each of the readings taken for the model A, the luminance of the darkest nuance is higher than that of the middle one. One of the reasons could be due to the angle through which the

readings were taken or due to the fact that the darkest tone had a different base; all the colours were oil based except for the darkest yellow tone (S4050-Y30R) which was a water based colour.

However, it is interesting to observe that the same process is not repeated when it comes to the sandblasted samples of Model B. with same colour nuance, same base material, same weather condition, the luminance level gradually decrease as the blackness level increase in Model B.

Model A					Model B				
	9900		10940			9918		10940	
S3050-Y30R	10040	9975,667	10900	10876,67	S3050-Y30R	9956	9920,333	10480	10796,67
	9987		10790			9887		10970	
	8972		9393			8130		8888	
S4050-Y30R	8795	8882,333	9415	9411	S4050-Y30R	7995	8311,667	8895	8877,667
	8880		9425			8810		8850	
	9342		9653			7391	1	8232	
S4050-Y30R	9330	9335,667	9719	9687,667	S4050-Y30R	7151	7276,333	8116	8172,667
	9335	- -	9691			7287	_ 	8170	'

Figure 5.3 luminance level abnormality for smooth sample

5.3 Further scope of work

Due to time constraint and limitation of scope of work for a master's thesis, this study was limited to city of Trondheim only for two different weather conditions. The result obtained from 70 participants show the preference between the 3 models. The study can be elaborated with another model, the green nuances with a glossy surface; which was supposed to be a part of this research, but was avoided due to lack of available samples in given time. For further research, the study can be expanded with a larger sample size in other locations of Trondheim or different parts of Norway as well. The sky condition varies remarkably in different parts of Norway; with higher rainfall, the cloud coverage is higher in Bergen for example. The perception of the materials in a heavy cloudy sky condition or during rain can be examined in such a way.

6 Conclusion

Application of FIPVs in built environment has the potential to tackle challenges of climate change and shortage of fossil fuel energy; if utilized properly in urban context, it can be a promising strategy to harvest clean energy. This research tries to fill in the gap between theoretical implementation of PVs in façade with actual visual perception of the materials. With an intention to shed light on the perception of FIPVs in real life, this research was conducted with physical modeling. The scale models showed the participants how a real-life building can look like with FIPVs on façade. Based on the questionnaire survey, it is evident that the sandblasted samples are the ones which people are more drawn to, they are less glossy and had little to no discomfort on their eyes from looking at it. The texture makes the surface less glary on one side and whiter on the other, so darker nuances can be adopted for better electricity production. The colour nuances, both yellow and green, are acceptable in the opinion of most of the participants and has the characters to blend with the existing surrounding. These positive responses can be a driving force for the industry to promote PVs in Trondheim, which in turn, can yield in making Trondheim a greener and sustainable city in terms of cleaner energy production.

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 RITERIA FOR FACADE INTEGRATED PHOTOVOLTAICS IN URBAN CONTEXT

8 Appendix

8.1 Appendix A

The idea of making six models was there from the start, the questionnaire was initially designed keeping that in mind, the older questionnaire had to be reformed due to limitation of the samples.

This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be about the found of the confidential.	How much visual discomfort do you feel around the model that you gave the lowest score?	do you feel around	I the model	that you g	ave
Directions: Choose only of the boxes (unless otherwise mentioned)	☐I have noticed reflection of sunlight at the model, but it is not a pro ☐The sunlight reflection bothers me, but I can look directly at the mc ☐The strong light reflection makes it impossible to look at the model	ection of sunlight a tion bothers me, bi flection makes it in	t the model ut I can look npossible to	but it is r directly a look at th	\Box I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it \Box The sunlight reflection bothers me, but I can look directly at the model for a short time \Box The strong light reflection makes it impossible to look at the model
Name (optional):		•			
Age	Considering the model that	you gave the hig	hest scor	e, what is	Considering the model that you gave the highest score, what is your opinion about use of the
Gender □Male □Female □Other □Prefer not to say	material shown on the model in relation to the surrounding existing buildings?	ii in relation to the	surrounaing	existing	undingsk
	COLOUR: mark how well the	colour of the façad	le matches t	he colour	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Do you have any visual impairment you know of?					
□Yes, (optional) □No	Not at all				Very well
Do you have any difficulties with colour vision?	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness	the material fits int	to surroundi	ing regard	ing glossiness
Uyes(optional)	Material is too glossy				sociosci with alosciosci
│ No │ Sometimes(optional)	Material is too glossy				no problem with glossiness
n the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels					
A photovoltaic panel (PV panel) refers to an electrochemical type of equipment that is used to facilitate the conversion of light into electricity. Façade integrated PV panels will generate electricity and thus is a sustainable option for the environment.	Considering the model that you gave the OWEST score, what is your opini material shown on the model in relation to the surrounding existing buildings?	you gave <u>the low</u> I in relation to the s	/est score	what is y existing k	Considering the model that you gave the IOWEST score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
There are 6 models, 3 pairs in 3 different colours, each pair has one smooth and the other textured material	COLOUR: mark how well the	colour of the façad	le matches t	he colour:	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Which of the models do you like better? Rank them in terms of preference (6- best 1-worst)	Not at all				Very well
□ Model A					
□ model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness	the material fits int	to surround	ing regard	ing glossiness
			[[
	Material is too glossy				no problem with glossiness
How much visual discomfort do you feel walking along and looking at the model that you gave					
the highest score?					
☐I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model		Thank you very much for your participation	ich for your	participat	uo

8.2 Appendix B

(2)							
	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?					
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings					
	Name (optional): Beathe	Not at all					
	Age 18-25 26-35 36-45 46-55 56-65 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness					
	Gender □Male ☑Female □Other □Prefer not to say						
	Do you have any visual impairment you know of?	Material is too glossy					
	□Yes, (optional)						
	Do you have any difficulties with colour vision?	Considering the model that you gave the lowest score, what is your opinion about use of the					
	☑Yes(optional)	material shown on the model in relation to the surrounding existing buildings?					
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings					
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all					
	\ □Model A 2 □Model B	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness					
	☼ ☐ Model C How much visual discomfort do you feel walking along and looking at the model that you gave	Material is too glossy 🗹 🗆 🗆 no problem with glossiness					
	the highest score? I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time The strong light reflection makes it impossible to look at the model	Thank you very much for your participation					
	How much visual discomfort do you feel around the model that you gave the lowest score?						
	☐ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model						
0	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?					
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings					
	Name (optional):	Not at all					
	Age 18-25 26-35 36-45 46-55 56-65 66+	CLOSSINESS.					
	Gender □Male □Female □Other □Prefer not to say	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness					
	Do you have any visual impairment you know of?	Material is too glossy					
	□Yes, (optional) □No						
	Do you have any difficulties with colour vision?						
	□Yes(optional) □No □Sometimes(optional)	$ \textbf{Considering the model that you gave } \underline{\textbf{the lowest score}}, \textbf{what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?} $					
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings					
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all					
	⊠Model A						
	I 題Model B 3 apModel C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness					
	How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy					
	I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time						
	The strong light reflection makes it impossible to look at the model How much visual discomfort do you feel around the model that you gave	Thank you very much for your participation					
	the lowest score? If have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time The strong light reflection makes it impossible to look at the model						

3							ı							
	results shall be a	re is designed as a nonymous, and an ou will remain cont	y information ob				Considering the model that material shown on the model							on about use of the
	Directions: Choc	se only of the boxe	es (unless otherw	vise mentioned)			COLOUR: mark how well th	ne colour o	f the faç	ade ma	tches th	e colour	s of the sur	rounding buildings
	Name (optional)	Anastasi	α				Not at all				6		١	ery well
	Age 🖺 18-25	□ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how we	II the mate	erial fits	into sur	roundin	g regard	ing glossin	ess
	Gender □Male	☐ Female	□Other	☐Prefer no	t to say		Material is too glossy		ò				no probl	em with glossiness
	Do you have any	visual impairment	you know of?				, , ,						,	
	□Yes, (o ☑No	ptional)												
	Do you have any	difficulties with co	lour vision?					_						
	□No	otional)					Considering the model that material shown on the mod							about use of the
		naster thesis at NTN			models of an im	naginary 4-floors	COLOUR: mark how well th	e colour o	the faç	ade ma	tches th	e colour	s of the sur	rounding buildings
		dels do you like be			erence (3- best	1-worst)	Not at all						\	'ery well
	\ □Mode 3□Mode						GLOSSINESS: mark how we	II the mate	rial fits i	into sur	roundin	g regard	ing glossine	ess
	2.☐Mode						Material is too glossy	D					no proble	em with glossiness
	How much visua the highest sco	discomfort do you ore?	ı feel walking alo	ng and looking a	at the model tha	at you gave								
	☐The su	noticed reflection nlight reflection bo rong light reflection	others me, but I o	can look directly	at the model fo			Thank yo	u very n	nuch fo	r your pa	articipati	on	
	How much visua the lowest sco	discomfort do you re?	ı feel around the	model that you	gave									
	☑The su	noticed reflection nlight reflection bo rong light reflection	others me, but I o	can look directly	at the model fo									
(A)							1							
	results shall be ar	e is designed as a p onymous, and any u will remain confi	information ob				Considering the model the material shown on the m							
		e only of the boxes		ise mentioned)			COLOUR: mark how well	the colour	of the	façade	matche	s the co	lours of th	e surrounding building
		14					Not at all					/ -	1	Very well
	Name (optional):.					1 100								
	Age 18-25	□ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how w	ell the ma	iterial fi	its into	surrour	ding re	garding glo	ossiness
	Gender Male	☑Female visual impairment y	□Other	□Prefer not	t to say		Material is too glossy						no p	roblem with glossines
	□Yes, (o	otional)												
	™o	PER - Int Int I												
	□Yes(opt	lifficulties with col					Considering the model the material shown on the mo							
	☐Someti	mes(optional) aster thesis at NTN			models of an im	naginary 4-floors	COLOUR: mark how well t	the colour	of the f	façade i	matche:	s the co	lours of th	e surrounding building
	building new buil	ding that is covere	d by coloured so	lar panels			Not at all		d					Very well
		els do you like bet	ter? Rank them	in terms of pref	erence (3- best	1-worst)								
	√ □Model 2 □Model 3 □Model	В					GLOSSINESS: mark how w	ell the ma	terial fi	ts into			garding glo	ssiness
	How much visual	discomfort do you	feel walking alo	ng and looking a	at the model th	at you gave	Material is too glossy					u Ce		roblem with glossiness
		e? noticed reflection on alight reflection bo									4			
		ong light reflection discomfort do you						Thank	you ver		for you	r partic	ipation	
	the lowest scor													

☐ have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model

6												
	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the <u>highest score</u> , what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?										
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings										
	Name (optional):5114.E	Not at all Urry well										
	Age №18-25 □ 26-35 □ 36-45 □ 46-55 □ 56-65 □ 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness										
	Gender □Male □Other □Prefer not to say	Material is too glossy										
	Do you have any visual impairment you know of?											
	□Yes, (optional)											
	Do you have any difficulties with colour vision?	L										
	□Yes(optional) ☑No □Sometimes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?										
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings										
	building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all Urywell										
	Model A											
	2 □Model B 3 □Model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness										
	How much visual discomfort do you feel walking along and looking at the model that you gave	Material is too glossy										
	the highest score?	Vellow could be brighter.										
	☑f have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model	Thank you very much for your participation										
	How much visual discomfort do you feel around the model that you gave the lowest score?											
6	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?										
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings										
	A	Not at all										
	Name (optional):											
	Age ☑18-25 ☑ 26-35 ☑36-45 ☑46-55 ☑56-65 ☑66+ Gender ☑Male ☑ Female ☑ Other ☑ Prefer not to say	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness										
	Do you have any visual impairment you know of?	Material is too glossy										
	□Yes, (optional)	* * * * * * * * * * * * * * * * * * *										
	Do you have any difficulties with colour vision?	N at the state of										
	□Yes(optional)	Considering the model that you gave the OWEST score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?										
	Sometimes(optional)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings										
	building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all										
	♀□Model A ∖□Model B	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness										
	3□Model C	Material is too glossy										
	How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?											
	M have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model	Thank you would for your nationalise										
	How much visual discomfort do you feel around the model that you gave the lowest score?	Thank you very much for your participation										
	☐ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model											

This questionnaire is designed as a results shall be anonymous, and an	information ob				Considering the model the material shown on the mo									
identified with you will remain conf Directions: Choose only of the boxe		ise mentioned)			COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings									
Directions, choose only of the boxe	s (unicss otherw	isc mentioned)			Not at all Very well									
Name (optional): anse-ma	n Stav	Pacilse	21		Not ut un	700					very men			
Age □18-25 □ 26-35	□36-45	□46-55	□56-65	₩66+	GLOSSINESS: mark how w	ell the mate	erial fits	into sur	rounding	regarding	glossiness			
Gender □Male	□Other	☐Prefer not	to say		Material is too glossy					D	no problem with glossine			
Do you have any visual impairment	you know of?													
□Yes, (optional)					7.									
Do you have any difficulties with co	our vision?				Considering the model that									
□Yes(optional) BNo □Sometimes(optional)					material shown on the mo									
In the scope of master thesis at NTN building new building that is covered	U/IAT, we have	prepared scale r	nodels of an ir	maginary 4-floors	Not at all						Very well			
Which of the models do you like be	ter? Rank them	in terms of prefe	erence (3- best	t 1-worst)	GLOSSINESS: mark how we	ell the mate	erial fits	into sur	rounding	regarding	glossiness			
2 □ Model A								_						
☐ Model B З□ Model C					Material is too glossy				DY		no problem with glossine:			
How much visual discomfort do you the highest score?	feel walking alo	ng and looking a	t the model th	nat you gave	0					٨	o reflection until			
☐ I have noticed reflection of ☐ The sunlight reflection bo ☐ The strong light reflection	thers me, but I o	an look directly	at the model f			Thank yo	u very	much for	r your par	ticipation				
How much visual discomfort do you the lowest score?	feel around the	model that you	gave											
This questionnaire is designed as a results shall be anonymous, and any identified with you will remain conf	information ob				Considering the model to material shown on the m					_				
Directions: Choose only of the boxe	(unless otherwi	se mentioned)			COLOUR: mark how well	the colour	of the	façade n	natches t	he colour	s of the surrounding bui			
	,				Not at all					Ø	Very well			
Name (optional): KAE Ka														
Age 🗆 18-25 🗆 26-35	□36-45	□46-55	□56-65	⊠ 66+	GLOSSINESS: mark how v	well the ma	terial f	its into s	urroundi	ng regard	ling glossiness			
Gender Male □ Female	□Other	☐Prefer not	to say		Material is too glossy					D	no problem with gloss			
Do you have any visual impairment Yes, (optional)														
⊠No														
Do you have any difficulties with col					Considering the model th									
□Yes(optional) ⊠No					material shown on the m	odel in rela	ition to	the surr	rounding	existing b	ouildings?			
Sometimes(optional)			adals of an im	aginary 4 floors	COLOUR: mark how well	the colour	of the i	façade m	natches tl	he colour	s of the surrounding buil			
In the scope of master thesis at NTN building new building that is covere			lodels of an im	laginary 4-1100rs	Not at all						Very well			
Which of the models do you like bet	ter? Rank them i	n terms of prefe	rence (3- best	1-worst)										
□Model A 2 □Model B					GLOSSINESS: mark how w	vell the ma	terial fi	ts into si	urroundii	ng regard	ing glossiness			
3 □ Model C					Material is too glossy				, 🗆	12	no problem with gloss			
How much visual discomfort do you the highest score?	feel walking alor	ng and looking at	the model tha	at you gave										
☐ have noticed reflection of ☐ The sunlight reflection bo☐ The strong light reflection	thers me, but I c	an look directly a	t the model fo			Thanky	ou ver	y much f		articipati	ion			
How much visual discomfort do you the lowest score?														
☑I have noticed reflection of	f sunlight at the	model. but it is r	not a problem	I can look at it										
☐The sunlight reflection bo ☐The strong light reflection	thers me, but I c	an look directly a	t the model fo											

	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Name (optional):	Not at all Ury well
	Age ⊠18-25 □ 26-35 □ 36-45 □ 46-55 □ 56-65 □ 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	Gender ™Male □ Female □ Other □ Prefer not to say Do you have any visual impairment you know of?	Material is too glossy
	□Yes, (optional)	
	Do you have any difficulties with colour vision?	
	□Yes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all Urry well
	\ □Model A 3 □Model B 2□Model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy D D D no problem with glossiness
	☑ have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □The sunlight reflection bothers me, but I can look directly at the model for a short time □The strong light reflection makes it impossible to look at the model	Thank you very much for your participation
	How much visual discomfort do you feel around the model that you gave the lowest score?	⊕
	□I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □I he sunlight reflection bothers me, but I can look directly at the model for a short time □The strong light reflection makes it impossible to look at the model	
7		
	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Shections choose only of the society directs otherwise mentionies)	Not at all Ury well
	Name (optional):	
	Age □18-25 □ 26-35 □ 36-45 □46-55 □56-65 □66+ Gender ☑Male □ Female □ Other □ Prefer not to say	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	Do you have any visual impairment you know of?	Material is too glossy
	□Yes, (optional)	
	Do you have any difficulties with colour vision?	
	☐Yes(optional) ☑Ńo ☐Sometimes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all
	\ □Model A 2- □Model B	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	G ☐ Model C How much visual discomfort do you feel walking along and looking at the model that you gave the highest core?	Material is too glossy 🔽 🗆 🗆 no problem with glossiness
	the highest score? If have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time	
	☐ The strong light reflection makes it impossible to look at the model How much visual discomfort do you feel around the model that you gave	Thank you very much for your participation
	the lowest score?	
	☑I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □The sunlight reflection bothers me, but I can look directly at the model for a short time □The strong light reflection makes it impossible to look at the model	

()	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Name (optional): K. eritic	Not at all
	Age \$\int 18-25\$ \$\int 26-35\$ \$\int 36-45\$ \$\int 46-55\$ \$\int 56-65\$ \$\int 66+\$\$	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	Gender □Male □Female □Other □Prefer not to say	
	Do you have any visual impairment you know of?	Material is too glossy
	□Yes, (optional)	
	Do you have any difficulties with colour vision?	
	□yes(optional) ☑No	Considering the model that you gave the IOWEST score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	☐Sometimes(optional)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	building new building that is covered by coloured solar panels	Not at all Very well
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) i □ Model A	Notat all U very well
	로 □Model A 로 □Model B 공□Model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy
	□I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □/fhe sunlight reflection bothers me, but I can look directly at the model for a short time □The strong light reflection makes it impossible to look at the model	
	How much visual discomfort do you feel around the model that you gave the lowest score?	Thank you very much for your participation
1	☑The strong light reflection makes it impossible to look at the model This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The	e Considering the model that you gave the highest score, what is your opinion about use of the
	results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	material shown on the model in relation to the surrounding existing buildings?
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding building:
	Name (optional):50£1A	Not at all Urry well
	Age ☑18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56-65 ☐ 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	Gender □Male □Female □Other □Prefer not to say	
	Do you have any visual impairment you know of?	Material is too glossy
	□Yes, (optional)	
	Do you have any difficulties with colour vision?	
	□Yes(optional) □No □Sometimes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all UVery well
	\ □Model A	
	3 □Model B 2 □Model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy
	### The sunlight reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time	# . ri
	☐The strong light reflection makes it impossible to look at the model How much visual discomfort do you feel around the model that you gave	Thank you very much for your participation
	the lowest score?	* 1
	☐I, have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☑The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model	

This questionnaire is results shall be anor identified with you	nymous, and any	information ob													
Directions: Choose of	only of the boxes	(unless otherw	ise mentioned)			COLOUR: mark how well th	he colour o	of the fag	ade mai	tches th	e colours	of the surrounding	buildings		
Name (optional):	INDA					Not at all						Very well			
Age □18-25	№ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness									
Gender □Male	Female	□Other	□Prefer not	t to say						roundin	g regardi				
Do you have any vis	ual impairment y	ou know of?				Material is too glossy						no problem with រូ	glossiness		
□Yes, (optio	onal)														
Do you have any diff	ficulties with col	our vision?													
⊠No	nal)es(optional)					Considering the model that material shown on the mod				0.00			se of the		
In the scope of mast building new buildir				models of an im	aginary 4-floors	COLOUR: mark how well th	ne colour c	of the faç	ade mat	ches the	colours	of the surrounding	buildings		
Which of the models	s do you like bett	ter? Rank them	in terms of pref	erence (3- best	1-worst)	Not at all						Very well			
✓ □Model A						GLOSSINESS: mark how we	ell the mat	erial fits	into suri	ounding	g regardir	ng glossiness			
2 ☐ Model C How much visual dis the highest score		feel walking alo	ng and looking a	at the model tha	nt you gave	Material is too glossy	M					no problem with g	lossiness		
⊠I have not	ticed reflection o ght reflection bot	thers me, but I o	an look directly	at the model fo											
0.750,0000000000000000000000000000000000	g light reflection						Thank yo	ou very n	nuch for	your pa	rticipatio	in			
How much visual dis the lowest score?	comfort do you	feel around the	model that you	gave											
☑The sunlig	ticed reflection o ght reflection bot g light reflection	thers me, but I d	an look directly	at the model fo											
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This questionnaire i results shall be anoi identified with you	nymous, and any	information ob				Considering the model the material shown on the mo							t use of the		
Directions: Choose			ise mentioned)			COLOUR: mark how well t	he colour	of the fa	çade ma	tches th	ne colour	s of the surroundin	g buildings		
Name (optional):	KELVIN					Not at all					D	Very wel	I		
Age 18-25	₩ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how w	all the ma	torial fits	into su	rroundir	a roaard	ing glossinoss			
Gender ☑ Male	□Female	□Other	□Prefer not	to say			en the ma	teriai iits	/						
Do you have any vis	ual impairment y	ou know of?				Material is too glossy			Ø			no problem with	glossiness		
□Yes, (opti ⊡No	onal)														
Do you have any dif	ficulties with colo	our vision?							_						
√No	es(optional)					Considering the model that material shown on the mo							use of the		
In the scope of mast building new building	ter thesis at NTN	U/IAT, we have	prepared scale n	nodels of an ima	aginary 4-floors	COLOUR: mark how well to	he colour	of the fa	çade ma	tches th	e colour	s of the surroundin	g buildings		
Which of the model	s do you like bett	ter? Rank them	in terms of prefe	erence (3- best 1	-worst)	Not at all						Very wel			
(□Model A						CLOSSINESS									
3 □ Model B 2 □ Model C						GLOSSINESS: mark how we	ell the mai	teriai fits	into sur	rounain	g regard	ng giossiness			
How much visual dis the highest score		feel walking alo	ng and looking a	t the model that	t you gave	Material is too glossy	√					no problem with	glossiness		
☐The sunli	ticed reflection o ght reflection bot g light reflection	thers me, but I c	an look directly	at the model for			Thank	OII nes	much fo	r vous s	articipati	on			
How much visual dis	scomfort do you						ттапк у	ou very	©	, your p	u ucipati	on.			
□ The sunlig	ticed reflection o ght reflection bot g light reflection	thers me, but I c	an look directly	at the model for											

This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that your material shown on the model is						
Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the co	olour of	the faç	ade mat	tches the	e colours	of the surrounding buildings
	Not at all					B	Very well
Name (optional):	6						
Age 18-25 \$\sqrt{2}6-35\$ \$\sqrt{3}6-45\$ \$\sqrt{4}6-55\$ \$\sqrt{5}6-65\$ \$\sqrt{6}6+\$	GLOSSINESS: mark how well th	ne mate	rial fits	into sur	rounding	g regardi	ng glossiness
Gender ☑Male ☐Female ☐Other ☐Prefer not to say	Material is too glossy						no problem with glossiness
Do you have any visual impairment you know of?							
□Yes, (optional)							
Do you have any difficulties with colour vision?	£ =						
□Yes(optional)	Considering the model that yo material shown on the model i						
In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors							
building new building that is covered by coloured solar panels	COLOUR: mark how well the co	olour of	the faç	ade mat	tches the	colours	of the surrounding buildings
Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all					Ø	Very well
② □Model A 1 □Model B							
2 □Model C	GLOSSINESS: mark how well th	ie mate	rial fits i	into suri	rounding	g regardii	
How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy					Ø	no problem with glossiness
☑ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model						(4	ny with reflection.
How much visual discomfort do you feel around the model that you gave the lowest score?	Th	nank yo	u very n	nuch for	your pa	rticipatio	on .
This question raise is designed as a part of Master's Thesis for Sustainable available as a part of Master's Thesis for Sustainable available as a part of Master's Thesis for Sustainable available available as a part of Master's Thesis for Sustainable available avai	Considering the model that ye	ou gave	•bo h	ighes	tr	, what is	vous aninian about use of the
This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	material shown on the model						
Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the o	colour o	f the fa	çade ma	atches th	ne colour	s of the surrounding buildings
Name (antique) Adville Helps	Not at all						Very well
Age 18-25 26-35 36-45	GLOSSINESS: mark how well to	he mate	arial fite	into su	rroundin	ia reaard	ing glossinoss
Gender □Male ☑Female ☑Other □Prefer not to say	GEOSSINESS. Mark now wenter	ne mate	ariai rica	i iiito sui	Touridin	ig regard	
Do you have any visual impairment you know of?	Material is too glossy					,D	no problem with glossiness
□Yes, (optional)							
Do you have any difficulties with colour vision?							
☐Yes(optional) ☑No ☐Sometimes(optional)	Considering the model that you material shown on the model						
In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the co	olour o	f the fag	çade ma	tches th	e colour	of the surrounding buildings
Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all					Ø	Very well
2 ☐ Model A 3 ☐ Model B	GLOSSINESS: mark how well th	he mate	rial fits	into sur	roundin	g regardi	ng glossiness
\ □Model C	Material is too glossy			П	П	D	no problem with glossiness
How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?			_			- 120	problem with glossifiess
☑I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it							

Thank you very much for your participation

(6)

 \Box The sunlight reflection bothers me, but I can look directly at the model for a short time

☑ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it \Box The sunlight reflection bothers me, but I can look directly at the model for a short time

 $\hfill\Box$ The strong light reflection makes it impossible to look at the model How much visual discomfort do you feel around the model that you gave

 $\hfill\square$ The strong light reflection makes it impossible to look at the model

the lowest score?

results shall I	naire is designed as a p de anonymous, and any	information ob				Considering the model tha material shown on the mod						your opinion about use of the buildings?		
	th you will remain confi hoose only of the boxes		ise mentioned)			COLOUR: mark how well th	e colour	of the fa	çade ma	itches th	ne colour	s of the surrounding buildings		
Nama (antia	nal) DECLACIA					Not at all				Ð		Very well		
		□36-45	□46-55	□56-65	□66+	× ×								
Age 18		□0ther	□Prefer not		□00+	GLOSSINESS: mark how we	ll the mat	terial fits	into su	rroundin	ng regard	ing glossiness		
	any visual impairment y			to say		Material is too glossy			ď			no problem with glossiness		
	s, (optional)													
	any difficulties with col	our vision?												
⋈ Nc	s(optional) metimes(optional)					Considering the model that material shown on the mod		100 TO 100		11600		our opinion about use of the ouildings?		
In the scope	of master thesis at NTN building that is covere	IU/IAT, we have	prepared scale r	nodels of an ima	ginary 4-floors	COLOUR: mark how well th	e colour o	of the fa	çade ma	tches th	e colour	s of the surrounding buildings		
	models do you like bet			erence (3- best 1	-worst)	Not at all			K			Very well		
	odel A			89	**	10 6								
2 □Me						GLOSSINESS: mark how well	ll the mat	erial fits	into sur	roundin	g regard	ing glossiness		
(50)	sual discomfort do you	feel walking alo	ng and looking a	t the model that	you gave	Material is too glossy	4					no problem with glossiness		
□Th	ave noticed reflection of e sunlight reflection bo e strong light reflection	thers me, but I c	an look directly	at the model for			Thank	OH VODE	much fo	r vour n	articipati	00		
How much vi	sual discomfort do you						mank y	ou very	©	your p	urticipati			
the lowest	<u>score</u> r ave noticed reflection o													
This questic	e strong light reflection innaire is designed as a	part of Master's	Thesis for Susta	inable architectu								s your opinion about use of th		
	be anonymous, and an ith you will remain conf		tained in conne	ction with the st	udy that can be	material shown on the mo	odel in rel	ation to	the surr	ounding	existing	buildings?		
Directions:	Choose only of the boxe	es (unless otherw	rise mentioned)			COLOUR: mark how well t	the colour	r of the f	açade m	atches t	he colou	rs of the surrounding building		
Name (option	onal): aryenne					Not at all					D	Very well		
Age 💢 1	8-25 🗆 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how w	ell the ma	aterial fi	ts into su	ırroundi	ng regar	ding glossiness		
Gender □N	lale ÆFemale	□Other	□Prefer not	to say		Material is too glossy					V	no problem with glossiness		
Do you have	any visual impairment	you know of?				Waterial is too glossy					82.1	no problem with glossiness		
□Y Ż(N	es, (optional) o													
Do you have	any difficulties with co	lour vision?				Causidavina tha madal th			OWAS	t	basia.			
□N	es(optional)o o ometimes(optional)					material shown on the mo						your opinion about use of the buildings?		
In the scope	of master thesis at NTN w building that is covere	NU/IAT, we have	prepared scale i	models of an ima	nginary 4-floors	COLOUR: mark how well t	he colour	of the f	açade m	atches t	he colou	rs of the surrounding buildings		
Which of the	e models do you like be	tter? Rank them	in terms of pref	erence (3- best 1	-worst)	Not at all						Very well		
3 □N						GLOSSINESS: mark how w	ell the ma	aterial fit	s into su	ırroundi	ng regard	ding glossiness		
How much v	lodel C risual discomfort do you	ı feel walking alo	ng and looking a	it the model that	you gave	Material is too glossy						no problem with glossiness		
□т	T score? nave noticed reflection ne sunlight reflection bo ne strong light reflection	others me, but I	can look directly	at the model for		2 V	Thank	you very	much f	or your į	participat	iion		
How much v	risual discomfort do you : score?	ı feel around the	model that you	gave					0					

□ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □ The sunlight reflection bothers me, but I can look directly at the model for a short time ♥□ The strong light reflection makes it impossible to look at the model

(9)																
	This questionnaire results shall be and identified with you	onymous, and an	y information ob													
	Directions: Choose	only of the boxe	s (unless otherw	ise mentioned)			COLOUR: mark how well th	e colour	of the fa	çade ma	tches th	e colours o	of the surrounding buildin			
	Name (optional):	Silvan					Not at all					B	Very well			
	Age □18-25	∠ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how we	ll the ma	terial fits	into sur	roundin	regardin	g glossiness			
	Gender Male	□Female	□Other	□Prefer not	to say			ii tiic iiid			- Touriding					
	Do you have any vi	sual impairment	you know of?				Material is too glossy						no problem with glossine			
	□Yes, (opt	tional)														
	Do you have any di	ifficulties with co	lour vision?													
	□Yes(opti ⊠No	onal)					Considering the model that material shown on the mod									
	In the scope of ma	ster thesis at NTN	NU/IAT, we have	prepared scale r	models of an imag	ginary 4-floors	COLOUR: mark how well th	e colour (of the fag	ade mat	tches the	e colours c	of the surrounding building			
	building new build	1056 en 1060 - 1060 - 10			aranca (3- hast 1-	worst)	Not at all						Very well			
	Which of the mode		tterr Kank them	in terms of preid	erence (5- best 1-	worstj										
	3□Model B 2□Model C	e V					GLOSSINESS: mark how we	II the mat	erial fits	into sur						
	How much visual d		ı feel walking alo	ng and looking a	t the model that	you gave	Material is too glossy	Ш	М				no problem with glossines			
	☐The sunl		others me, but I o	not a problem, I at the model for he model			Thank y	ou very i	nuch for	r your pa	rticipation	1				
	How much visual d		feel around the	model that you	gave		◎									
					not a problem, I											
	The stro	ng light reflection	n makes it impos	sible to look at t	he model											
(2)																
	This questionnaire is results shall be anor	nymous, and any	information obt				Considering the model that material shown on the mod			_						
	identified with you v Directions: Choose of			se mentioned)			COLOUR: mark how well the	e colour c	f the faç	ade mat	ches the	colours o	f the surrounding building			
		,					Not at all						Very well			
	Name (optional):	MILY														
	Age ∑18-25	□ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how wel	I the mat	erial fits	into surr	ounding	regarding	glossiness			
	Gender □Male Do you have any visi	☑Female	□Other	☐Prefer not	to say		Material is too glossy				D	_ r	no problem with glossiness			
	□Yes, (optio	onal)														
	☑No Do you have any diff	ficulties with cole	our vision?													
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	™No						material shown on the mod	el in relat	ion to th	e surrou	nding ex	isting buil	dings?			
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(2)

Considering the model that you gave the highest score, what is your opinion about use of the This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be material shown on the model in relation to the surrounding existing buildings? identified with you will remain confidential. COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings Directions: Choose only of the boxes (unless otherwise mentioned) 0 0 0 0 Very well Name (optional): Pariel Largson Age 18-25 □ 26-35 □56-65 □36-45 □46-55 □66+ GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Gender Male Female Other ☐ Prefer not to say Do you have any visual impairment you know of? □Yes, (optional)..... Do you have any difficulties with colour vision? Considering the model that you gave the lowest score, what is your opinion about use of the □Yes(optional)..... material shown on the model in relation to the surrounding existing buildings? No □Sometimes(optional).... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings building new building that is covered by coloured solar panels Very well Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) ↓ □ Model A GLOSSINESS: mark how well the material fits into surrounding regarding glossiness 3 ☐ Model C □ □ no problem with glossiness Material is too glossy How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model Thank you very much for your participation How much visual discomfort do you feel around the model that you gave the lowest score? ☐ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time The strong light reflection makes it impossible to look at the model $\textbf{Considering the model that you gave } \underline{\textbf{the } \textbf{highest } \underline{\textbf{score}_{\textbf{r}}} \textbf{what is your opinion about use of the} \\$ This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The material shown on the model in relation to the surrounding existing buildings? results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) COLOUR: mark how well the colour of the facade matches the colours of the surrounding buildings 0 0 0 0 Very well Name (optional): EUNE Age □18-25 X 26-35 □36-45 746-55 □56-65 □66+ GLOSSINESS: mark how well the material fits into surrounding regarding glossiness □Other ☐Prefer not to say □ □ □ no problem with glossiness Do you have any visual impairment you know of? □Yes, (optional)..... No Do you have any difficulties with colour vision? Considering the model that you gave the lowest score, what is your opinion about use of the ☐Yes(optional)..... material shown on the model in relation to the surrounding existing buildings? No ☐Sometimes(optional)..... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors COLOUR: mark how well the colour of the facade matches the colours of the surrounding buildings building new building that is covered by coloured solar panels Very well Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) ∠ □Model A 3 ☐ Model B GLOSSINESS: mark how well the material fits into surrounding regarding glossiness 1 Model C Material is too glossy

How much visual discomfort do you feel walking along and looking at the model that you gave

🖾 have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model

How much visual discomfort do you feel around the model that you gave

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I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it \Box The sunlight reflection bothers me, but I can look directly at the model for a short time $\hfill\square$ The strong light reflection makes it impossible to look at the model

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Doesn't like green personally.

Thank you very much for your participation

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	results	shall be anony		information obta		inable architectu ction with the st	ure program. The udy that can be										
			nly of the boxes		se mentioned)			COLOUR: mark how well to	he colour c	of the fag	ade ma	tches the	colours	of the surrounding buildings			
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	©Мо В Мо	del A del B					GLOSSINESS: mark how we	ll the ma	terial fit	s into su	ırroundir	ng regard			
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□ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it
□ The sunlight reflection bothers me, but I can look directly at the model for a short time
□ The strong light reflection makes it impossible to look at the model

the lowest score?

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	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. Th results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.										
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	Gender □Male □Female □Other □Prefer not to say	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness									
	Do you have any visual impairment you know of?	Material is too glossy									
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	Do you have any difficulties with colour vision?	Laborate 1									
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	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings									
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all									
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	How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy									
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(D)	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?									
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	Name (optional):	Not at all									
	Age 🗆 18-25 🗆 26-35 🗆 36-45 🗆 46-55 🗆 56-65 💆 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness									
	Gender Male □ Female □ Other □ Prefer not to say	Material is too glossy □ □ □ □ ✓ no problem with glossiness									
	Do you have any visual impairment you know of?	Material is too grossy									
	□Yes, (optional) ⊠No										
	Do you have any difficulties with colour vision?										
	☐Yes(optional) ☐No ☐Sometimes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?									
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings									
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all Very well									
	3 □Model A	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness									
	How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? Much m	Material is too glossy									
	☐ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model	Vidut little the green, suggested black windows									
	ine strong light renection makes it impossible to look at the model	Thank you very much for your participation									

How much visual discomfort do you feel around the model that you gave

☑ have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model

the lowest score?

0



	results	shall be anony		information ob			ure program. The tudy that can be
	Directi	ons: Choose or	nly of the boxes	(unless otherw	ise mentioned)		
	Name ((optional):	lve)				
	Age	□18-25	₾ 26-35	□36-45	□46-55	□56-65	□66+
	Gender	r 🗆 Male	□Female	Other	□Prefer not	to say	
	Do you	have any visu	al impairment y	ou know of?			
		□Yes, (optio	nal)				
	Do you	have any diffi	culties with cold	our vision?			
		□Yes{option	al)				
			(optional)				
			r thesis at NTNI g that is covered			models of an im	aginary 4-floors
	Which	of the models	do you like bett	er? Rank them	in terms of pref	erence (3- best	1-worst)
		□Model A					
		□ Model B □ Model C					
		uch visual disc	omfort do you	feel walking alo	ng and looking a	t the model tha	t you gave
		/	red reflection o	f sunlight at the	model, but it is	not a problem	I can look at it
		☐The sunligh	nt reflection bot	hers me, but I d	an look directly sible to look at t	at the model fo	
	How m	uch visual disc	omfort do you i	feel around the	model that you	gave	
	the lov	west score?					
		☐The sunligh	nt reflection bot	hers me, but I o	model, but it is an look directly sible to look at t	at the model fo	
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	This au	astionnaire is	designed as a n	art of Master's	Thoris for Sustai	nable architectu	ure program. The
	results	shall be anony		information ob	tained in connec		
	Directi	ons: Choose o	nly of the boxes	(unless otherw	ise mentioned)		
	Name	(optional):t.	lector				
	Age	□18-25	26-35	□36-45	□46-55	□56-65	□66+
		r ⊡Male	□Female	Other	□ Prefer not	to sav	
			al impairment y			,	
		□Yes, (optio	nal)				
	Do vou		culties with cold	our vision?			
	100000	☐Yes(option	al)				
		₽No	(optional)				
		scope of maste	r thesis at NTN	U/IAT, we have	prepared scale r	models of an ima	aginary 4-floors
		•	g that is covered			/2 L	
			ao you like bett	er! Kank them	in terms of pref	erence (3- best :	L-worst)
	2	□Model A □Model B □Model C					

How much visual discomfort do you feel walking along and looking at the model that you gave

 $\hfill\Box$ The strong light reflection makes it impossible to look at the model

How much visual discomfort do you feel around the model that you gave

☑I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time

 \square I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it \square The sunlight reflection bothers me, but I can look directly at the model for a short time \square The strong light reflection makes it impossible to look at the model

the highest score?

the lowest score?

COLOUR: mark how well th	e colour o	of the fa	çade ma	tches the	e colours	of the surrounding buildings
Not at all					Ø	Very well
GLOSSINESS: mark how we	ll the mat	erial fits	into sur	rounding	g regardi	ng glossiness
Material is too glossy					Ø	no problem with glossiness
Considering the model that naterial shown on the mod						our opinion about use of the uildings?
COLOUR: mark how well th	e colour c	of the fag	ade ma	tches the	colours	of the surrounding buildings
lot at all				D		Very well
LOSSINESS: mark how we	II the mat	erial fits	into sur	rounding	regardir	ng glossiness
Naterial is too glossy						no problem with glossiness
	Thank y	ou very r	nuch for	r your pa	rticipatio	on
	Thank y	ou very r	nuch foi	r your pa	rticipatio	on
	Thank y	ou very r	much for	r your pa	rticipatio	on
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			6			
	at you ga	ve <u>the l</u>	_©	St score	<u>e,</u> what i	is your opinion about use of th
material shown on the mo	at you ga odel in rel	ve <u>the l</u>	ighe the surr	St score	<u>e,</u> what i existing	is your opinion about use of th buildings?
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Thank you very much for your participation

5)																
	This questionnaire is results shall be anor identified with you v	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings? COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings														
	Directions: Choose o	only of the boxes	COLOUR: mark how well the	ne colour	of the fa	çade ma	atches th	ne colour	s of the sur	rounding bu	ildings					
	Name (optional):	Saval		Not at all				Ø		٧	ery well					
	Age 🖾 18-25	□ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how we	ell the mat	terial fits	into su	rroundin	ng regard	ing glossine	ess		
	Gender □Male	✓ Female	□Other	□Prefer not	to say		Material is too glossy					Ø	no proble	em with glos	siness	
	Do you have any visi		-													
	□Yes, (optio	onal)														
	Do you have any diff	iculties with col														
	∕ŹNo	□Yes(optional)							Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?							
	In the scope of mast	er thesis at NTN	U/IAT, we have	prepared scale n	nodels of an imag	ginary 4-floors	COLOUR: mark how well th	ne colour o	of the fa	ade ma	tches th	ie colour	s of the sur	rounding bu	ildings	
	building new building				/2 b+ 1		Not at all				ď		V	ery well		
	Which of the models	do you like bett	er? Rank them	n terms of prefe	rence (3- best 1-	worst)										
	2 Model B			3			GLOSSINESS: mark how we	ll the mat	erial fits	into sui						
	How much visual dis the highest score?		feel walking alor	ng and looking a	t the model that	you gave	Material is too glossy	Ø					no proble	em with glos	siness	
	☐The sunlig	ht reflection bot g light reflection	hers me, but I c makes it imposs	an look directly sible to look at th				Thank y	ou very i	much fo	r your p	articipati	on			
	How much visual dis the lowest score?	comfort do you	feel around the	model that you p	gave											
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	This questionnaire is results shall be anor identified with you v Directions: Choose o	nymous, and any will remain confi	information ob dential.	tained in connec			Considering the model th material shown on the mo	odel in rela	ation to	the suri	ounding	g existing	buildings?			
	No. of the last No.	5181					Not at all				Ø			Very well		
	Name (optional):	□ 26-35	□36-45	□46-55	□56-65	□166+										
	Gender ☑Male	☑ Female	□Other	□Prefer not			GLOSSINESS: mark how w	ell the ma	iterial fit	s into si	urroundi	ing regar	ding glossii	ness		
	Do you have any vis	ual impairment y	ou know of?				Material is too glossy					D/	no prob	olem with glo	ossiness	
	□Yes, (optio	onal)														
	Do you have any diff	ficulties with col	our vision?													
	⊠No							Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?								
	□Sometimes(optional)						COLOUR: mark how well t	he colour	of the fa	ıçade m	atches t	he colou	rs of the su	ırrounding b	uildings	
	Which of the models	s do you like bet	ter? Rank them	in terms of prefe	erence (3- best 1-	-worst)	Not at all	Ø						Very well		
	2□Model A 3□Model B						GLOSSINESS: mark how w	ell the ma	terial fit	s into su	ırroundi	ng regar	ding glossir	ness		
	1 □Model C How much visual dis		feel walking alo	ng and looking a	t the model that	you gave	Material is too glossy					Q	no prob	lem with glo	ossiness	
	the highest score		f sunlight at the	model, but it is	not a problem, I	can look at it										
	☐The sunlig		thers me, but I c	an look directly	at the model for			Thank	you verv	much f	or vour	participa	tion			
	How much visual dis the lowest score?	comfort do you	feel around the	model that you	gave				, •c.y	©						
	☐The sunlig		thers me, but I c	an look directly	not a problem, I at the model for he model											



This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.

Directions: Choose only of the boxes (unless otherwise mentioned)

Name (optional):	Stewn				
Age	□18-25	□ 26-35	⊠ 36-45	□46-55	□56-65	□66+
Gender	Male	□Female	□Other	☐Prefer not	to say	
Do you	have any visua	l impairment yo	u know of?			
	☐Yes, (option ☐No	al)				
Do you	have any difficu	ulties with colou	ur vision?			
	□No	l) optional)				
		thesis at NTNU, that is covered		orepared scale n lar panels	nodels of an ima	ginary 4-floors
Which o	of the models d	o you like bette	r? Rank them i	n terms of prefe	rence (3- best 1	-worst)
V	□Model A ´□Model B ☑Model C					
	uch visual disco [hest score?	mfort do you fe	eel walking alor	ng and looking at	t the model that	you gave
	☐The sunlight	reflection both	ers me, but I ca	model, but it is an look directly a ible to look at th	at the model for	
	uch visual disco vest score?	mfort do you fe	el around the	model that you រ្	gave	
	The sunlight	reflection both	ers me, but I ca	model, but it is an look directly a ible to look at th	at the model for	
result: identi Direct	s shall be anony fied with you w ions: Choose or	mous, and any ill remain confic nly of the boxes	information ob dential.	tained in conne		ure program. The cudy that can be
Name	(optional):B	\$RGE				
Age	□18-25	□ 26-35	□36-45	⊠ 46-55	□56-65	□66+
Gende	er Male	□Female	□Other	□Prefer not	t to say	
Do you	u have any visua	al impairment y	ou know of?			
	□Yes, (option ☑No	nal)				
Do you	u have any diffi	culties with colo	our vision?			
	□No	al) (optional)				
	scope of maste		J/IAT, we have	prepared scale	models of an ima	aginary 4-floors
Which	of the models	do you like bett	er? Rank them	in terms of pref	erence (3- best :	1-worst)
4	Model A ☐ Model B ☐ Model C					
	nuch visual disc ghest score?	omfort do you f	eel walking alo	ng and looking a	t the model tha	t you gave
	☐The sunligh	t reflection bot	hers me, but I o	e model, but it is can look directly sible to look at t	at the model fo	
	nuch visual disco	omfort do you f	eel around the	model that you	gave	
	/	ced reflection of	f sunlight at the	e model, but it is	not a problem,	I can look at it
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						your opinion about use of the
material shown on the	model in relat	ion to t	he surro	unding e	existing l	ouildings?
COLOUR: mark how we	ell the colour o	f the fa	çade ma	tches th	e colour	s of the surrounding buildings
					1	
Not at all					A	Very well
	W.V					1 1 1
GLOSSINESS: mark hov	v well the mate	erial fits	into sur	roundin	g regard	ing glossiness
Manufallo to a alexany			_	-	1	no problem with glossiness
Material is too glossy	Ш	Ш	П		M	no problem with glossiness
Considering the model	that you gave	the lo	west	'ccore v	what is w	our opinion about use of the
material shown on the						
material shown on the	model in relat	ion to tr	ie surro	unding e	xisung t	oundingsr
COLOUR: mark how we	Il the colour o	f the fag	ade ma	tches th	e colour	s of the surrounding buildings
Not at all						Very well
GLOSSINESS: mark how	well the mate	erial fits	into sur	roundin	g regard	ing glossiness
		/				
Material is too glossy		D				no problem with glossiness
	Thank yo	u verv i	much fo	r vour na	erticinati	on
	Thank yo	d very i	(G)	your pe	ii ticipati	OII .
		h	iaho	-4-		s your opinion about use of the
material shown on the	model in rela	tion to t	he surro	ounding	existing	buildings?
COLOUR: mark how we	ell the colour o	of the fa	ıçade ma	atches th	ne colou	rs of the surrounding buildings
Not at all				M		Very well
GLOSSINESS: mark hov	v well the mat	erial fits	s into su	rroundir	ng regar	ding glossiness
					. ,	
Material is too glossy					Ø	no problem with glossiness

Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?

COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings

Not at all Urry well

GLOSSINESS: mark how well the material fits into surrounding regarding glossiness

Thank you very much for your participation $\ensuremath{\mbox{\ensuremath{\mbox{o}}}}$



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This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Name (optional):	Not at all
Name (optional):	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
Gender □Male □Female □Other □Prefer not to say	
Do you have any visual impairment you know of?	Material is too glossy
□Yes, (optional)	
Do you have any difficulties with colour vision?	lowest
□Yes(optional)	Considering the model that you gave the IOWESt score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
Sometimes(optional)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	Not at all
Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	The state of the s
1	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
3 □Model C	Material is too glossy
How much visual discomfort do you feel walking along and looking at the model that you gave	
the highest score?	
∠I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □ The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time The sunlight reflection bothers me, but I can look directly at the model for a short time for a sh	Thank you very much for your participation
☐ The strong light reflection makes it impossible to look at the model	© /
How much visual discomfort do you feel around the model that you gave the lowest score?	
☐ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model	
This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
n-mdd	Not at all Uery well
Name (optional):MatMid	
Age □ 18-25 □ 26-35 □ 36-45 □ 46-55 □ 56-65 □ 66+ Gender □ Male □ Prefer not to say	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
Do you have any visual impairment you know of?	Material is too glossy
☐Yes, (optional) 图No	
Do you have any difficulties with colour vision?	
୍ର Yes(optional) ଔNo	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
□Sometimes(optional)	
In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all
□ Model A □ Model B ☑ Model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy
If have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □ The sunlight reflection bothers me, but I can look directly at the model for a short time □ The strong light reflection makes it impossible to look at the model	
How much visual discomfort do you feel around the model that you gave the lowest score?	Thank you very much for your participation

☑I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model



Considering the model that you gave the highest score, what is your opinion about use of the This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The material shown on the model in relation to the surrounding existing buildings? results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings Directions: Choose only of the boxes (unless otherwise mentioned) Name (optional): Amaleen Age 18-25 □ 26-35 □56-65 □66+ □36-45 □46-55 GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Gender □Male **⊠**Female Other ☐Prefer not to say Material is too glossy □ □ □ □ □ no problem with glossiness Do you have any visual impairment you know of? □Yes, (optional)..... No Do you have any difficulties with colour vision? Considering the model that you gave the lowest score, what is your opinion about use of the ☐Yes(optional)...... material shown on the model in relation to the surrounding existing buildings? ☐Sometimes(optional)... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) 2 Model B GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Model C Ď. o Material is too glossy no problem with glossiness How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? 🖄 have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time \Box The strong light reflection makes it impossible to look at the model Thank you very much for your participation How much visual discomfort do you feel around the model that you gave the lowest score? MI have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model Considering the model that you gave the highest score, what is your opinion about use of the This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be material shown on the model in relation to the surrounding existing buildings? identified with you will remain confidential. COLOUR: mark how well the colour of the facade matches the colours of the surrounding buildings Directions: Choose only of the boxes (unless otherwise mentioned) Very well Name (optional): 145 MUSI EV Age □18-25 □ 26-35 □36-45 □56-65 □66+ X 46-55 GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Gender ☑Male □Female □Other ☐ Prefer not to say Material is too glossy no problem with glossiness Do you have any visual impairment you know of? ☐Yes, (optional)..... Do you have any difficulties with colour vision? □Yes(optional)..... Considering the model that you gave the lowest score, what is your opinion about use of the ™No material shown on the model in relation to the surrounding existing buildings? In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors COLOUR: mark how well the colour of the facade matches the colours of the surrounding buildings building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) Very well 3 ☐ Model A 2 ☐ Model B GLOSSINESS: mark how well the material fits into surrounding regarding glossiness I ☐ Model C How much visual discomfort do you feel walking along and looking at the model that you gave no problem with glossiness Material is too glossy the highest score? \square I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model Thank you very much for your participation How much visual discomfort do you feel around the model that you gave the lowest score?

☑ have noticed reflection of sunlight at the model, but it is not a problem, I can look at it
☐ The sunlight reflection bothers me, but I can look directly at the model for a short time

☐The strong light reflection makes it impossible to look at the model

wn)	results	uestionnaire is d shall be anonyr ied with you wil	mous, and any i	nformation obt			ire program. The udy that can be
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	Name	(optional):(- nelus	,			
	Age		26-35	□36-45	□46-55	□56-65	□66+
	Gende	Male	□Female	□Other	☐Prefer not	to say	
	Do you	have any visua	l impairment yo	u know of?			
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		scope of master g new building				nodels of an ima	aginary 4-floors
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In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors

Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)

How much visual discomfort do you feel walking along and looking at the model that you gave

☐ The strong light reflection makes it impossible to look at the model

How much visual discomfort do you feel around the model that you gave

 $\hfill\Box$ The strong light reflection makes it impossible to look at the model

☑I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □ The sunlight reflection bothers me, but I can look directly at the model for a short time

☑ have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time

ØNo

the **highest** score?

the lowest score?

☐Sometimes(optional)....

building new building that is covered by coloured solar panels

Considering the model the material shown on the me						s your opinion about use of the
material shown on the mi	ouei in reia	tion to t	ne surro	ounding	existing	bulldingsr
COLOUR: mark how well to	the colour o	of the fa	çade ma	tches th	ne coloui	rs of the surrounding buildings
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GLOSSINESS: mark how w	ell the mat	erial fits	into sur	roundin	g regard	ling glossiness
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3		
	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the <u>highest score</u> , what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Name (optional):	Not at all
	Age 🗆 18-25 🗆 26-35 🗆 36-45 🗆 46-55 🗆 56-65 🖸 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	Gender □ Male □ Female □ Other □ Prefer not to say	Material is too glossy □ □ □ □ ⊠ no problem with glossiness
	Do you have any visual impairment you know of?	indicate see grown
	□Yes, (optional) -现No	
	Do you have any difficulties with colour vision?	I amount
	□Yes(optional) ₽No □Sometimes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR : mark how well the colour of the façade matches the colours of the surrounding buildings
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all
	\ □Model A 2.□Model B	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	9 Model C How much visual discomfort do you feel walking along and looking at the model that you gave	Material is too glossy
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)	This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
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		Not at all
	Name (optional):	2
	Age 218-25	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	Gender ☑Male ☐Female ☐Other ☐Prefer not to say	Material is too glossy
	Do you have any visual impairment you know of?	
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	In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all
	7 □Model A 3 ☑Model B	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
	2 □Model C	Material is too glossy
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		mank you very mach for your participation

How much visual discomfort do you feel around the model that you gave

☑I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it □ The sunlight reflection bothers me, but I can look directly at the model for a short time □ The strong light reflection makes it impossible to look at the model

the lowest score?

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		se only of the boxe		vise mentioned)	í		COLOUR: mark how well th	ne colour	of the fa	açade ma	atches th	ie colour	s of the surrounding buildings
	Name (optional)	WALDEMAK	2				Not at all						Very well
	Age 18-25	□ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how we	ll the mat	terial fit	s into su	rroundin	g regard	ing glossiness
	Gender ☑Male	□Female	□Other	□Prefer no	ot to say		Material is too glossy					9	no problem with glossiness
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		ilding that is covere			models of all in	lagitary 4-110013			or the la	içade ma			
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	2 □Mode 1 □Mode 2 □Mode	I B					GLOSSINESS: mark how we	ll the mat	erial fits	s into sur	rroundin	g regard	ing glossiness
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		discomfort do you					*	Thank y	ou very	much fo	r your pa	articipati	on
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		se only of the boxe		rise mentioned)			COLOUR: mark how well th	e colour c	of the fa	çade ma	tches the	e colours	of the surrounding buildings
	Name (optional)	VIGGE					Not at all				V		Very well
	Age №18-25		□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how we	ll the mat	erial fits	into sur	rounding	g regardii	ng glossiness
	Gender ☑Male	□Female	□Other	☐Prefer no	t to say		Material is too glossy	П		П	П		no problem with glossiness
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	Do you have any	difficulties with col	our vision?						1.	.			
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	Which of the mo	dels do you like bet	ter? Rank them	in terms of pref	ference (3- best	1-worst)	Not at all						Very well
	1□Mode 2□Mode	I B					GLOSSINESS: mark how wel	I the mate	erial fits	into suri	rounding	regardir	ng glossiness
		l discomfort do you	feel walking alo	ng and looking	at the model tha	at you gave	Material is too glossy				N		no problem with glossiness
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	results	shall be anon		information obt			ure program. The cudy that can be	Considering the model that material shown on the mod						your opinion about use of the buildings?
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	N (optional):	Panagots					Not at all					P	Very well
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	Age	Male	☐ Female	□36-45 □Other	□46-55 □Prefer not	□56-65	□00+	GLOSSINESS: mark how we	ll the mat	terial fits	into su	rroundir	ig regard	ing glossiness
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			do you like bett			rence (3- best 1	1-worst)	Not at all						Very well
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		□Model B □Model C						GLOSSINESS: mark how we	II the mat					
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	Name	e (optional):	Nickolas					Not at all				Ø		Very well
	Age	18-25	□ 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how we	ell the ma	terial fit	s into su	ırroundi	ng regar	ding glossiness
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		scope of mas	es(optional) ter thesis at NTN ng that is covere	IU/IAT, we have	prepared scale r	models of an im	aginary 4-floors	COLOUR: mark how well th	ne colour	of the fa	açade m	atches t	he colou	rs of the surrounding buildings
			ls do you like bet			erence (3- best :	1-worst)	Not et all						Mamazall
		I □Model A	16.					Not at all	П		₩	П	П	Very well
		2 □ Model B 3 ☑ Model C						GLOSSINESS: mark how we	ell the ma	terial fit	s into su	ırroundi	ng regar	ding glossiness
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	How	much visual di	scomfort do you	feel around the	model that you	gave			Thank y	you very	much fo	or your	participa	tion

I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it

The sunlight reflection bothers me, but I can look directly at the model for a short time

The strong light reflection makes it impossible to look at the model

							ure program. The tudy that can be	Considering the model the material shown on the m							ut use of the
			I remain confid	ential. (unless otherwi	se mentioned)			COLOUR: mark how well						359	ing buildings
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N	ame (d	ptional):A	ruik					Not at all	ш		П		X	Very w	ell
Α	ge	□18-25	X 26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how v	vell the mat	terial fits	into su	ırroundi	ng regar	ding glossiness	
G	ender	Male	□Female	□Other	□ Prefer not	to say		Material is to a plant				F2*			L - :
D			l impairment yo					Material is too glossy				×		no problem wit	n giossiness
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				I/IAT, we have p by coloured so		models of an im	aginary 4-floors	COLOUR: mark how well	the colour o	of the fa	çade ma	atches tl	ne colou	rs of the surroundi	ng buildings
W	hich o	f the models d	o you like bette	er? Rank them i	n terms of pref	erence (3- best	1-worst)	Not at all				X		Very we	ell
	2	□Model A □Model B □Model C						GLOSSINESS: mark how w	ell the mat	terial fits	into su	rroundir	ng regar	ding glossiness	
	ow mu		mfort do you fe	eel walking alor	ng and looking a	t the model tha	at you gave	Material is too glossy			×			no problem wit	h glossiness
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	results	shall be anony		information obt			ure program. The audy that can be	Considering the model that material shown on the mo							use of the ²
				(unless otherwi	ise mentioned)			COLOUR: mark how well th	ne colour of	f the faça	ide mat	ches the	colours	of the surrounding	buildings
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	Name	(optional):Ta	ina												
	Age	□18-25	26-35	□36-45	□46-55	□56-65	□66+	GLOSSINESS: mark how we	ell the mate	rial fits i	nto surr	ounding	regardi	ng glossiness	
		r □Male	Ç X €emale	Other	☐ Prefer not	to say		Material is too glossy			×			no problem with g	glossiness
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		70 AND 100 AND		er? Rank them i		erence (3- best :	1-worst)	Not at all				×		Very well	
		□Model A													
		_□Model B B□Model C						GLOSSINESS: mark how we	ell the mate	rial fits i	nto surr	ounding	regardir	ng glossiness	
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This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Notatall □ □ □ Verywell
Name (optional):	
Age □18-25 🔀 26-35 □36-45 □46-55 □56-65 □66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
Gender □Male □Other □Prefer not to say	Material is too glossy
Do you have any visual impairment you know of? ☐ Yes, (optional)	
Do you have any difficulties with colour vision?	
□Yes(optional) ☑No □Sometimes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Notatall
□Model A □Model B 2- □Model C 3	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
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This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
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Do you have any difficulties with colour vision?	
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Material is too glossy □ □ 🌠 □ □ no problem with glossiness

GLOSSINESS: mark how well the material fits into surrounding regarding glossiness

Thank you very much for your participation 0

Very well

1 Model A 3Model B

2Model C

the highest score?

the lowest score?

How much visual discomfort do you feel walking along and looking at the model that you gave

How much visual discomfort do you feel around the model that you gave

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XI have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time
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Considering the model that you gave the highest score, what is your opinion about use of the This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be material shown on the model in relation to the surrounding existing buildings? identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) COLOUR: mark how well the colour of the facade matches the colours of the surrounding buildings Not at all Very well Name (optional) Age 18-25 □36-45 □56-65 GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Gender Male □Female Other ☐ Prefer not to say Material is too glossy П П no problem with glossiness Do you have any visual impairment you know of? □Yes,-(optional).... No Do you have any difficulties with colour vision? ☐Yes(optional)..... Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings? ☐Sometimes(optional)... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) _ _ Not at all Verv well \□Model A Model B GLOSSINESS: mark how well the material fits into surrounding regarding glossiness **3**□Model C How much visual discomfort do you feel walking along and looking at the model that you gave Material is too glossy no problem with glossiness the highest score? have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model Thank you very much for your participation How much visual discomfort do you feel around the model that you gave 0 the lowest score? ☐ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The Considering the model that you gave the highest score, what is your opinion about use of the results shall be anonymous, and any information obtained in connection with the study that can be material shown on the model in relation to the surrounding existing buildings? identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings Name (optional): Age □18-25 10 26-35 □36-45 □46-55 □56-65 □66+ GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Gender □Male Female □Other ☐Prefer not to say Material is too glossy **a** a a **b** no problem with glossiness Do you have any visual impairment you know of? ☐Yes, (optional)...... 10No Do you have any difficulties with colour vision? Considering the model that you gave the lowest score, what is your opinion about use of the ☐Yes(optional).... **™**No material shown on the model in relation to the surrounding existing buildings? □Sometimes(optional)..... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings building new building that is covered by coloured solar panels 0 0 0 0 Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) Model A Model B GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Model C Material is too glossy Ð no problem with glossiness How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?

₱ I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it

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How much visual discomfort do you feel around the model that you gave

the lowest score?

Thank you very much for your participation

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This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) Name (optional): Sakib Age □18-25 26-35 □36-45 □46-55 □56-65 □66+ Gender Male □Female □Other ☐ Prefer not to say Do you have any visual impairment you know of? ☐Yes. (optional)..... WNo Do you have any difficulties with colour vision? ☐Yes(optional)...... WNO ☐Sometimes(optional).... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) Model A **❷**Model B **■**Model C How much visual discomfort do you feel walking along and looking at the model that you gave Thave noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time \Box The strong light reflection makes it impossible to look at the model How much visual discomfort do you feel around the model that you gave the lowest score? have noticed reflection of sunlight at the model, but it is not a problem, I can look at it \Box The sunlight reflection bothers me, but I can look directly at the model for a short time $\Box \mbox{The strong light reflection makes it impossible to look at the model$ This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) Name (optional):..... Age □18-25 **¥** 26-35 □36-45 □46-55 □56-65 □66+ □Other ☐Prefer not to say Do you have any visual impairment you know of? ☐Yes. (optional)..... Do you have any difficulties with colour vision? ☐Yes(optional)..... ⊠No ☐Sometimes(optional)...... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) **2**Model A Model B **₫**Model C How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? ☑I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it

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Not at all		×				Very well
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This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) Name (optional): Emilia. Age □18-25 26-35 □36-45 □46-55 □56-65 □66+ Gender □Male emale Other □Prefer not to say Do you have any visual impairment you know of? ☐Yes, (optional)..... No Do you have any difficulties with colour vision? ☐Yes(optional).... No □Sometimes(optional)..... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) ZIModel A Model B How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? have noticed reflection of sunlight at the model, but it is not a problem, I can look at it The sunlight reflection bothers me, but I can look directly at the model for a short time $\Box \mbox{The strong light reflection makes it impossible to look at the model$ How much visual discomfort do you feel around the model that you gave the lowest score? 🔊 have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) Age □18-25 □ 26-35 □46-55 Gender □Male Female Other ☐ Prefer not to say Do you have any visual impairment you know of? □Yes, (optional)..... Do you have any difficulties with colour vision? ☐Yes(optional)..... MNo Sometimes(optional)...... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) Z Model A 1 Model B 3Model C How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? 🗷 I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time $\hfill\Box$ The strong light reflection makes it impossible to look at the model How much visual discomfort do you feel around the model that you gave the lowest score?

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	nodel in rela	ition to 1	he surn			s your opinion about use of the buildings?
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This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Name (optional):	Not at all U U Very well
Age ☑18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56-65 ☐ 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
Gender □Male ☑Female □Other □Prefer not to say	Material is too glossy
Do you have any visual impairment you know of?	
□Yes, (optional) ☑No	
Do you have any difficulties with colour vision?	
☐Yes(optional) ☐No ☐Sometimes(optional)	Considering the model that you gave the lowest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all Urywell
©Model A	
愛 Model B ∃ Model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy
☐ have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model	Thank you very much for your participation
How much visual discomfort do you feel around the model that you gave the lowest score?	(a)
☐I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model	
This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.	Considering the model that you gave the highest score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
Directions: Choose only of the boxes (unless otherwise mentioned)	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
	Not at all Urywell
Name (optional):ewith	Notice II I I I I I I I I I I I I I I I I I
Age 18-25 26-35 36-45 46-55 56-65 66+	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
Gender ☑Male □Female □Other □Prefer not to say	Material is too glossy
Do you have any visual impairment you know of?	
□Yes, (optional) ☑No	
Do you have any difficulties with colour vision?	
□Yøs(optional) VNo □Sometimes(optional)	Considering the model that you gave the IOWEST score, what is your opinion about use of the material shown on the model in relation to the surrounding existing buildings?
In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels	COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings
Which of the models do you like better? Rank them in terms of preference (3- best 1-worst)	Not at all
(I) Model A [Z] Model B 3 Model C	GLOSSINESS: mark how well the material fits into surrounding regarding glossiness
How much visual discomfort do you feel walking along and looking at the model that you gave the highest score?	Material is too glossy
✓I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time ☐The strong light reflection makes it impossible to look at the model	Thank you very much for your participation
How much visual discomfort do you feel around the model that you gave	⊚ Since For the participation

☐ The sunlight reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model



Considering the model that you gave the highest score, what is your opinion about use of the This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The material shown on the model in relation to the surrounding existing buildings? results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings Directions: Choose only of the boxes (unless otherwise mentioned) 0 0 0 🗸 Not at all 26-35 Age □18-25 □36-45 □46-55 □56-65 □66+ GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Gender Male □Female ☐Prefer not to say Material is too glossy Do you have any visual impairment you know of? ☐Yes, (optional)....... ☑No Do you have any difficulties with colour vision? Considering the model that you gave the lowest score, what is your opinion about use of the □Yes(optional)..... material shown on the model in relation to the surrounding existing buildings? Mo ☐Sometimes(optional).... In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings building new building that is covered by coloured solar panels Not at all Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) □ Model A 2 Model B GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Model C П П Material is too glossy How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? In have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model Thank you very much for your participation How much visual discomfort do you feel around the model that you gave the lowest score? I have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐ The sunlight reflection bothers me, but I can look directly at the model for a short time ☐ The strong light reflection makes it impossible to look at the model Considering the model that you gave the highest score, what is your opinion about use of the This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The material shown on the model in relation to the surrounding existing buildings? results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential. Directions: Choose only of the boxes (unless otherwise mentioned) COLOUR: mark how well the colour of the facade matches the colours of the surrounding buildings 0 0 0 0 🗸 Not at all Name (optional): Jenifer Age □18-25 Z 26-35 □36-45 □46-55 □56-65 □66+ GLOSSINESS: mark how well the material fits into surrounding regarding glossiness Female Gender □Male □Other ☐Prefer not to say Do you have any visual impairment you know of? □Yes, (optional)..... . ZNo Do you have any difficulties with colour vision? Considering the model that you gave the lowest score, what is your opinion about use of the □Yes(optional)..... material shown on the model in relation to the surrounding existing buildings? No ☐Sometimes(optional)...... COLOUR: mark how well the colour of the façade matches the colours of the surrounding buildings In the scope of master thesis at NTNU/IAT, we have prepared scale models of an imaginary 4-floors building new building that is covered by coloured solar panels Not at all Which of the models do you like better? Rank them in terms of preference (3- best 1-worst) 1 | Model A GLOSSINESS: mark how well the material fits into surrounding regarding glossiness 2 Model B 3 ☐Model C 0 0 8 □ □ no problem with glossiness Material is too glossy How much visual discomfort do you feel walking along and looking at the model that you gave the highest score? ☐ have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time $\hfill\square$ The strong light reflection makes it impossible to look at the model Thank you very much for your participation How much visual discomfort do you feel around the model that you gave the lowest score?

Very well

no problem with glossiness

Very well

□ no problem with glossiness

Very well

no problem with glossiness

have noticed reflection of sunlight at the model, but it is not a problem, I can look at it ☐The sunlight reflection bothers me, but I can look directly at the model for a short time

 \Box The strong light reflection makes it impossible to look at the model



This questionnaire is designed as a part of Master's Thesis for Sustainable architecture program. The results shall be anonymous, and any information obtained in connection with the study that can be identified with you will remain confidential.

Directions: Choose only of the boxes (unless otherwise mentioned)

Name	(optional):	Jannike				
Age	⊿ 18-25	□ 26-35	□36-45	□46-55	□56-65	□66+
Gende	er 🗆 Male	Female	□Other	□Prefer no	t to say	
Do yo	u have any vi	sual impairment y	ou know of?			
	□Yes, (opt	ional)				
Do yo	u have any di	fficulties with colo	our vision?			
	√No	onal)				
In the		ter thesis at NTNU			models of an in	naginary 4-floors
		ing that is covered				
Which	of the mode	ls do you like bett	er? Rank them	in terms of pref	erence (3- best	1-worst)
	1 □Model A 3 □Model B 2□Model C					
1211	nuch visual di ighest score	scomfort do you f	eel walking alo	ng and looking	at the model th	at you gave
	☐The sunli	oticed reflection of ight reflection bot ng light reflection	hers me, but I	can look directly	at the model for	
	nuch visual di	scomfort do you f	eel around the	model that you	gave	
	☐The sunli	oticed reflection of ight reflection bot ng light reflection	hers me, but I o	can look directly	at the model for	
		(88)				
resu iden	lts shall be an tified with yo	e is designed as a p onymous, and any u will remain confi e only of the boxes	information ob dential.	tained in conne		
	, n (Jákan				
		Háken	□25.4F	□46.FF		Псс
Age	☑18-25 der ☑Male	□ 26-35	□36-45	□46-55	□56-65	□66+
		□Female	□Other	□ Prefer not	t to say	
ро у		isual impairment y				
Do y		lifficulties with col	our vision?			
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In th		nes(optional) ster thesis at NTN			models of an im	aginary 4-floors
		ding that is covered			avanas /2 host	1
wnie	n of the mod	els do you like bet	ter? Kank them	in terms of pref	erence (3- best	1-worst)
	Model 6	3				
	much visual o nighest scor	discomfort do you <u>e</u> ?	feel walking ald	ing and looking a	at the model tha	it you gave
	☐The sun	oticed reflection o light reflection bot ong light reflection	thers me, but I	can look directly	at the model fo	
	much visual o	discomfort do you	feel around the	model that you	gave	
		oticed reflection o				

 \Box The strong light reflection makes it impossible to look at the model

COLOUR: mark how wel						buildings?
	l the colou	r of the	façade	matches	the colou	ırs of the surrounding build
Not at all						Very well
GLOSSINESS: mark how	well the m	aterial i	fits into	surround	ing regar	ding glossiness
Material is too glossy					₽⁄	no problem with glossin
Considering the model t material shown on the n						your opinion about use of t buildings?
COLOUR: mark how well	the colou	r of the	façade ı	natches t	he colou	rs of the surrounding buildi
Not at all						Very well
GLOSSINESS: mark how	well the m	aterial f	/		G07 150	
Material is too glossy		Ø				no problem with glossin
	Thank	you ve	ry much	for your	participa	tion
						*
Considering the model that material shown on the mo						our opinion about use of the
material shown on the mo	del in relat	ion to tl	ne surro	unding ex	isting bu	ildings?
material shown on the mo	del in relat ne colour o	ion to th	ne surro	unding ex	isting bu	of the surrounding buildings
material shown on the mo	del in relat	ion to tl	ne surro	unding ex	isting bu	ildings?
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Directions: Choose only of the boxes (unless otherwise mentioned)

Name (optional): Co	arcoline				
Age	⊠ 18-25	□ 26-35	□36-45	□46-55	□56-65	□66+
Gender	− □Male	Female	□Other	☐Prefer not	to say	
Do you	have any visua	l impairment yo	ou know of?			
	□Yes, (option	al)				
Do you	have any diffic	ulties with colo	ur vision?			
	⊠No	l) optional)			*	
			I/IAT, we have p by coloured sol		odels of an imag	inary 4-floor
Which	of the models d	lo you like bette	er? Rank them in	terms of prefe	rence (3- best 1-	worst)
2	□Model A □Model B □Model C					
	uch visual disco shest score?	omfort do you fe	eel walking alon	g and looking at	the model that y	ou gave
	☐The sunlight	reflection both		n look directly a	not a problem, I on the model for a ne model	
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results s identifie	hall be anonym d with you will	ous, and any in remain confide	formation obtai	ned in connecti	ble architecture on with the study	
Name (c	ptional) Philip	.				
	_	□ 26-35	□36-45	□46-55	□56-65	□66+
Gender	☑Male	□Female	□Other .	☐Prefer not to	say	
Do you l	nave any visual	impairment you	u know of?			
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In the so	ope of master t	hesis at NTNU/			dels of an imagir	nary 4-floors
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3	□Model A □Model B □Model C					
	ch visual discor	nfort do you fee	el walking along	and looking at 1	he model that yo	ou gave
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How mu			el around the mo			
	I have notice □The sunlight	reflection bothe		look directly at	ot a problem, I ca the model for a s model	

						s your opinion about use of
material shown on the mo	odel in rela	tion to t	he surro	ounding	existing	buildings?
COLOUR: mark how well t	the colour	of the fa	çade ma	atches th	ne colou	rs of the surrounding buildin
Not at all					×	Very well
LOSSINESS: mark how w	ell the mat	erial fits	into su	rroundir	ig regard	ding glossiness
aterial is too glossy				×		no problem with glossine
onsidering the model th aterial shown on the mo						our opinion about use of th ouildings?
DLOUR: mark how well t	he colour o	of the fa	çade ma	tches th	e colour	s of the surrounding buildin
ot at all					×	Very well
OSSINESS: mark how w	ell the mat	erial fits	into sur	roundin	g regard	ling glossiness
aterial is too glossy			×			no problem with glossine
	Thank y	ou very	much fo	r your p	articipat	ion
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onsidering the model the naterial shown on the mo						s your opinion about use of
laterial shown on the inc	oder iii reia	tion to t	ne sunc	unung	EXISTING	bullulings:
OLOUR: mark how well t	he colour o	of the fa	çade ma	itches th	ie coloui	rs of the surrounding buildin
ot at all						Very well
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ot at all	ne colour c			iches in		Very well
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