SU2POV v3.2 for SketchUp v6 (Free and Pro)

D. Bur, May 2008

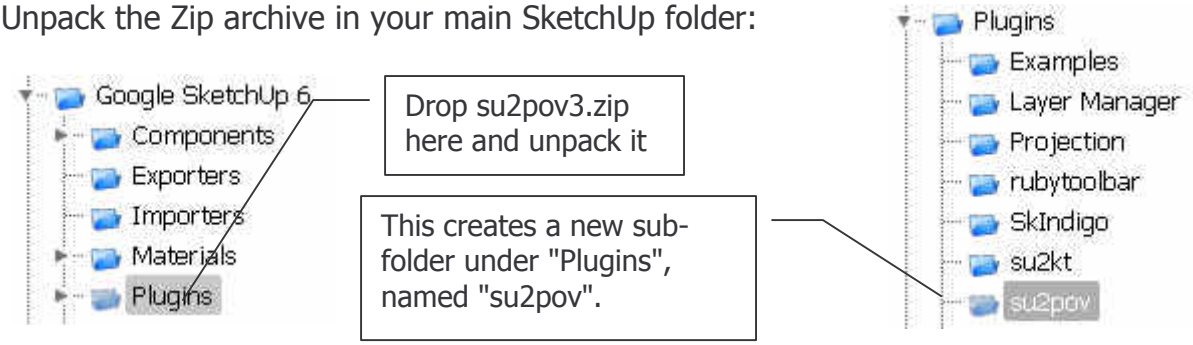
This is an update of the previous version su2pov 2.4. with lots of changes and enhancements. The main change is that it works now with Google SketchUp v6, both free and Pro versions.
I wanted to make as simple as possible for the user: prepare your scene in SketchUp, one click, and render it. So, many features are automatic, with some drawbacks but if you know Pov-Ray's syntax it is quite easy to tweak the pov scene.
In this Quick Start Guide I want to show how easy it is to render your day or night scenes using only SketchUp tools and icons to set up the render.
Don't expect sophisticated renderings like Kerkythea's renders, although you can achieve very acceptable renders with Pov-Ray in a few seconds.

Main features:

- More user-friendly and more simple to use than previous versions,
- SketchUp scene support: ground, background, fog, render mode settings,
- Perspective and orthographic camera,
- Sun light, point lights, spot lights,
- Automatic coloring and intensity of sun light and of shadows,
- Unlimited nested levels for groups/components,
- UV maps support for textured objects and imported images.
- What's visible is what's exported,
- Clay render, Glass render, Clay-Glass render, Textures & X-Ray render
- Adjustable materials properties
- Renderind and image options.

1. Installation:

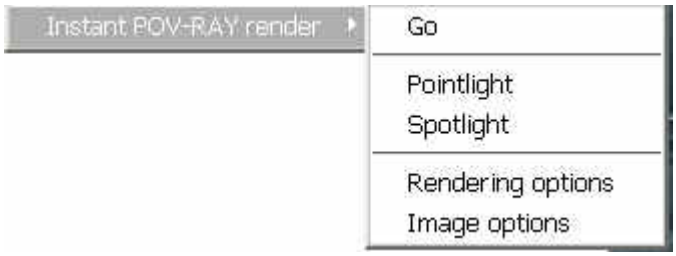
It is not necessary to delete previous version if you have one installed, since file names of scripts and components are not the same.
Unpack the Zip archive in your main SketchUp folder:



The main script "su2pov3.rb" is in the "Plugins" folder, and let's have a look into the "su2pov" sub-folder:

"povray_reserved.txt" is a list of keywords Pov-Ray uses. It is loaded by the script to replace material names or object names that otherwise would cause problems.
"su2pov_materials.exe" is the dialog box to adjust materials properties.
The three other skp files are components loaded by the script when you insert lights, or when the sun is visible from the observer's viewpoint.

If you restart SU you'll find the following options under the Plugins menu:



2. Quick start:

You also will find in the Plugins folder, a sample SketchUp model "windmill.skp". Move it to your desktop. Double-click on it to start SketchUp or open it from SketchUp if it is already running.

This is a file downloaded from the 3DWarehouse that have been enhanced a bit. The original model is "The Mill of Roderwolde" by janhin and can be downloaded here.
Here is a photo of the real one.

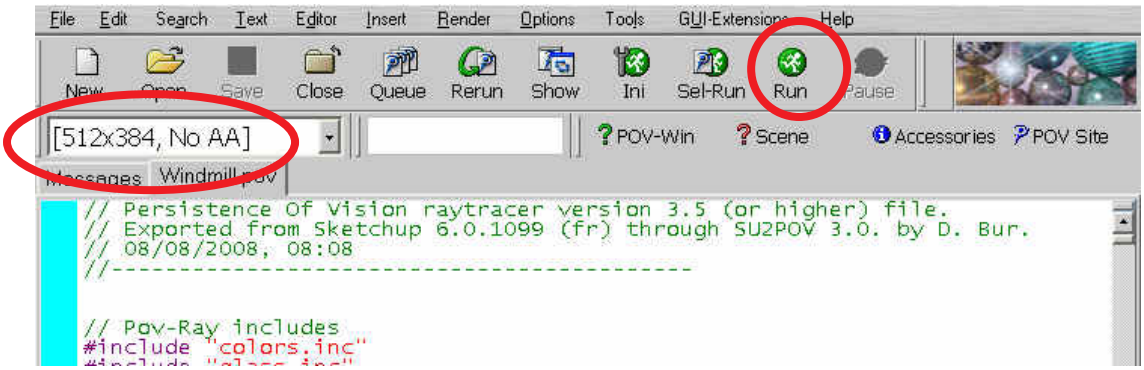
There are 5 scenes in this model, each one with a different camera and style.

Render #1:

Click on the tab "Viewpoint 1" if it is not selected.
The scene has no ground, no sky, there is only the model on a white background.
Go to the "Instant POV-RAY render" of the Plugins menu and select "Go".

Watch the status bar while the script is running. The export is pretty quick and if Pov-Ray is correctly installed on your system, it will start and load the new generated file. (See paragraph #5 for informations on Pov-Ray settings).

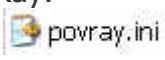
Select a size for your render in the left dropdown list: 512x384, No AA will be enough and quick for tests. Click on the "Run" button to start the render.



You will obtain this:

Now let's have a look at the Desktop to see what happened there.
Up is a snapshot of my desktop.
Beside the SKP file, a new folder has been created, its name is the same as the SketchUp model. Here is a snapshot of an Explorer window, of the "Windmill" folder contents:

The original textures names have been changed to suit Pov-Ray needs and syntax. Their format are the same as the original textures (embedded in the SketchUp materials), but remember that only gif | tga | iff | ppm | pgm | png | jpg | tiff | sys are supported in Pov-Ray.

You also will find a 

file in this folder. This file contains the render parameters and options (see paragraph #3).

Zoom in the scene and change the field of view of the camera, for instance like in the left image below. Go to the Plugins menu and select "Go". The exporter runs again and the updated file is re-loaded in Pov-Ray (See paragraph #5 for informations on how to do this). You will obtain the image on the right:

SketchUp

Pov-Ray

As you can see, moving the camera and changing the field of view can immediately be taken into account.

Render #2:

Switch to the SketchUp window and click on the "Viewpoint 2" tab.
This scene includes a gradient blue background, the camera is closer to the windmill, looking upwards.

Go to the Plugins menu and select "Go". The exporter runs again and the updated file is re-loaded in Pov-Ray (See paragraph #5 for informations on how to do this).

Click on the "Run" button again to start the new render.
You should obtain the image on next page:

Let's compare this render with the SketchUp display:

The main difference here is the alpha channel support through the PNG textures. Look at the shadows of the vanes on the windmill body for instance and at the shadows of the wooden deck as well.
As you can see, the gradient background of the SketchUp scene has been exported with exactly the same colors in Pov-Ray, as the solid background color was also exported in render #1.

Render #3:
Switch to the SketchUp window and click on the "Viewpoint 3" tab.
This scene includes a gradient yellowish-pink background, the camera is behind the windmill, it is late in the afternoon. A layer containing the grassy ground and the front wall is added. The SketchUp ground is also visible at the horizon.

Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain this:

Sun automatically changes the color of light at sunrise and sunset and the amount of light as well. At sunrise the light is cold yellow, at sunset it is more orange-pink. The textured ground and the entrance wall have been rendered, this means that the script exports all visible objects in the SketchUp window: if a layer is not active, all objects on this layer won't be exported. If an object is hidden, it is not exported as well.

Switch back to the SketchUp window and move the camera around the windwill to have a point of view like on the left image.
Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain the image on the right. Note that the sun is at its exact position in the sky.

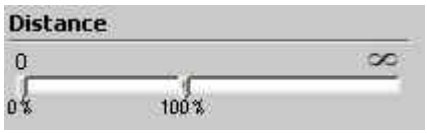
SketchUp

Pov-Ray

Now move the camera in front of the building, looking down from the air. Click on the icon to set shadows display off. Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain this image:

The sun light has been replaced by an ambient white light, so there are no more shadows. Remember that to activate the sun, shadows display must be on.

In SketchUp, click on the "Viewpoint 3" tab to get the original viewpoint, and open the fog dialog. Set and display a grayish fog like this:



Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain the image on the right:

SketchUp

Pov-Ray

Fog color and fog distances are exported just as they are set in SketchUp.

Render #4:
Switch to the SketchUp window and click on the "Viewpoint 4" tab.
We are now in front of the windmill, a layer with trees is active.

Click on the shadows settings icon .
We are on July 7th, 11H01, the "Light" slider is on 40, the "Dark" slider is on 60.
A render with these settings would give this:

Click on the shadows settings icon , and set the day to April 13th, 15H01. Set the "Light" slider to 95 and the "Dark" slider to 20.
Double-click on the central road group and paint it with a texture, say "Asphalt". Click outside the group to stop editing the group.
Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain this:

As you can see, the shadows settings and sun direction are just as you set them in SketchUp. Note also that the sun is brighter and the shadows darker than they would have been if you didn't change them: a clearer sun gives more "power" to the sun light, and darker shadows as well. The asphalt texture change is also visible, of course.

Now click on the "Hidden Line" render mode icon in SketchUp. Your SketchUp window should look like the image on the left.
Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain a "clay render" like on the image on the right.

SketchUp

Pov-Ray

A clay render can also be obtained with the "monochrome" render mode .
Note that the color of the default material of the style of the current scene is exported and used for the clay render.

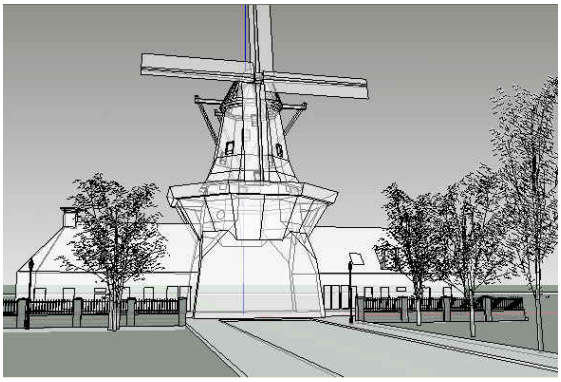
Click on the "Shaded with textures" icon and on the "X-Ray" icon
Your SketchUp window should look like the image on the left.
Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain a transparent render like on the image on the right.

SketchUp

Pov-Ray

Activating the X-Ray render mode in SketchUp outputs a "Glass render". The "finish" of all textures has been changed, making them all transparent, using the glass finish that is set in the "Options" dialog box (see paragraph #4).
Clay render and glass render can be combined:

Click on the "Hidden line" icon to switch off textures
Your SketchUp window should look like the image on the left.
Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain a "clay-glass render" like on the image on the right.

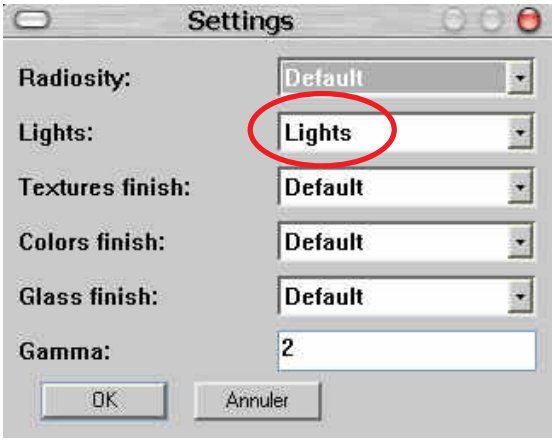

SketchUp

Pov-Ray

Render #5:
Switch back to the SketchUp window and click on the "Viewpoint 5" tab.
This scene is a night scene with a gradient dark-gray background. Take a look at the shadows settings: it's 5PM, November 8th in the Northern hemisphere. So it's night...

Sun is automaticlly "shut off" at night. There are some point lights in this scene: one in each street lamp and one above a window on the main wall near the corner of the main building.

By default, the script doesn't export artificial lights, so you must tell it to do so: go to the menu and select "Options".
Select "Lights" in the "Lights" dropdown list and click "OK".

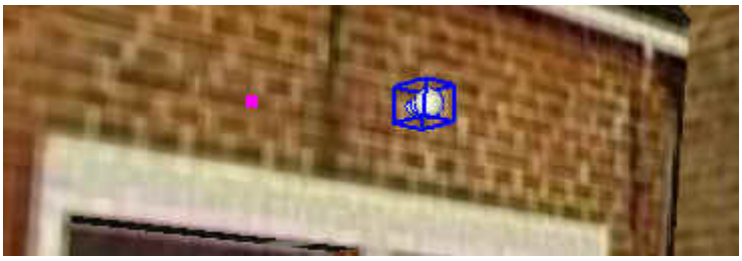


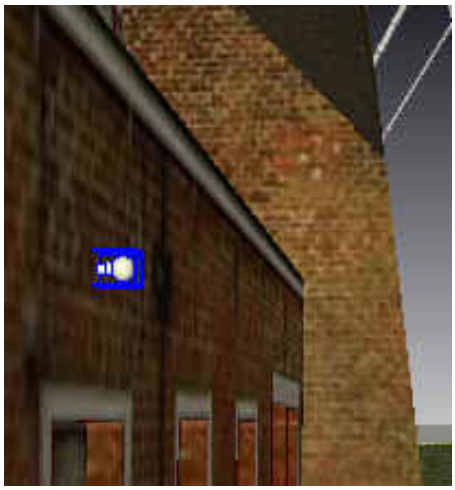
Go to the Plugins menu and select "Go". When the new render file is loaded, click on the "Run" button, you should obtain this:

You get a starry night because of the gradient background.
If you don't want stars in the sky, just modify the style of your scene to display a solid dark background.

Modifying a light:

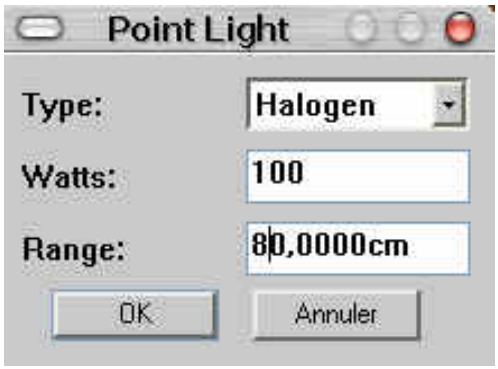
Lights are put on a layer named "su2pov".
Go to the "Layers" windows and make it visible. Zoom to the corner of the building and select the light bulb. Move it along the wall with the move tool until it is above the door:





Note that lights must always be slightly offset from walls or surfaces. This is done automatically by the script when you insert lights.

This one is an incandescent pointlight of 60W. Keep it selected and right-click. Select "Edit Point Light" in the context menu and change the values:



The color of light depends on the light type, here a halogen is more white than the previous incandescent light. The "Range" value is the distance from the light bulb at which the light completely fades away:

If you want to give the light a completely different color than the default types, just paint it with the paint bucket:

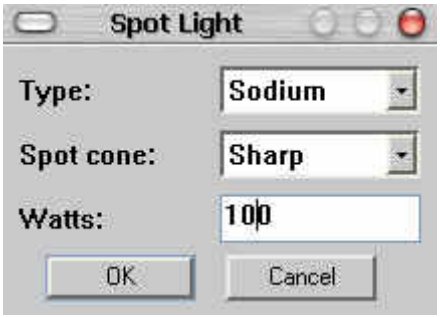
Paint it without editing the component, just drop a color on it when it is selected.

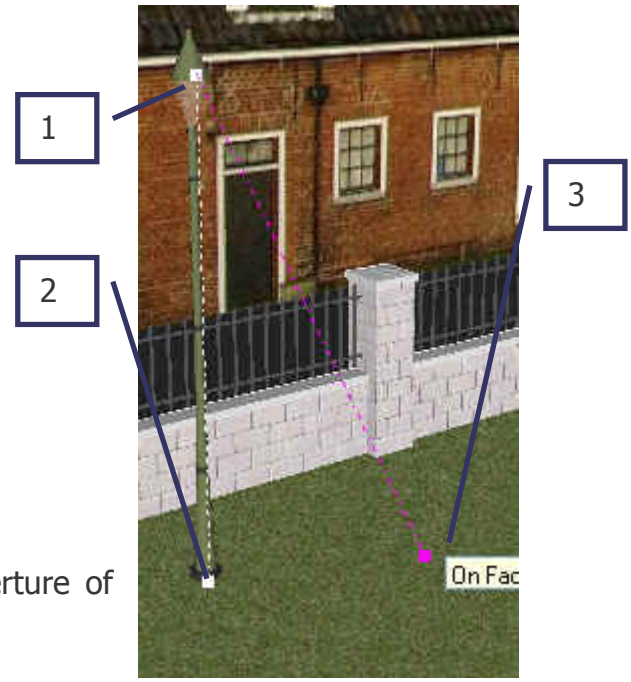
Deleting a light:

Now zoom at the street lamp and select the light bulb with a window capture. This is a sodium 100W light. Delete it like a normal object.

Adding a spot light:

Now let's insert a spot light in the street lamp: select 'Spotlight" in the menu.
Select a light type, for instance a sodium 100W light with an extensive light cone to create sharp edges between light and shadow:





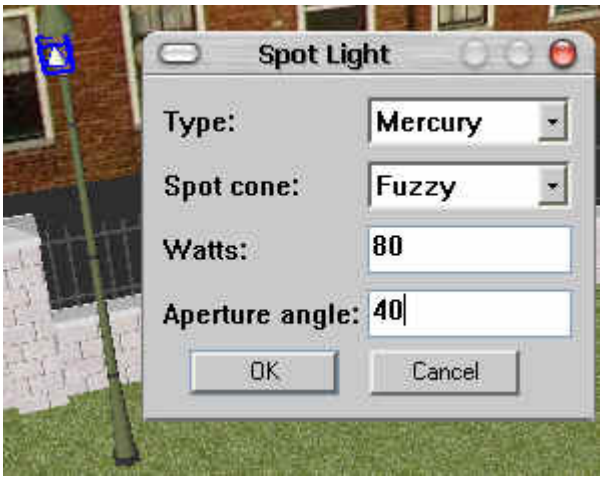
Click a point at the location of the spot (1),
click a second point to orient it (2),
and finally a third point to define the aperture of the light cone (3).

Here is the render of such a spot:

Use the "Rotate" tool and the "Move" tool to orient, move or copy your spots, use the paintbucket tool to give them different colors.

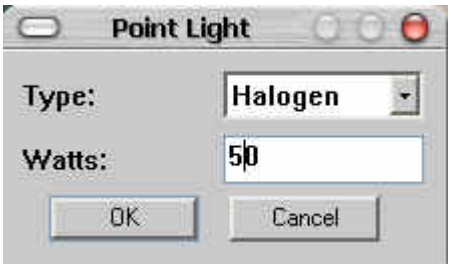
Changing spot properties:

Select the spot, right-click and select "Edit Spot Light" in the context menu. The current properties of the spot are displayed in the dialog box, select other properties and click OK.

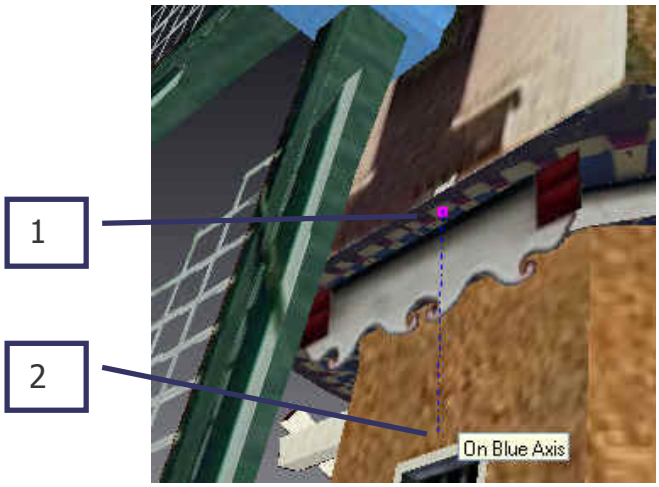


Adding a point light:

Zoom to near the roof of the windmill and select "Point Light" in the menu. Choose the properties of the light in the dialog box:



Click a first point to set the light position (1) and a second point to define its "range" (2). The light is slightly offset from the point you clicked in order to correctly locate the light emission point (neither inside the face nor on it).

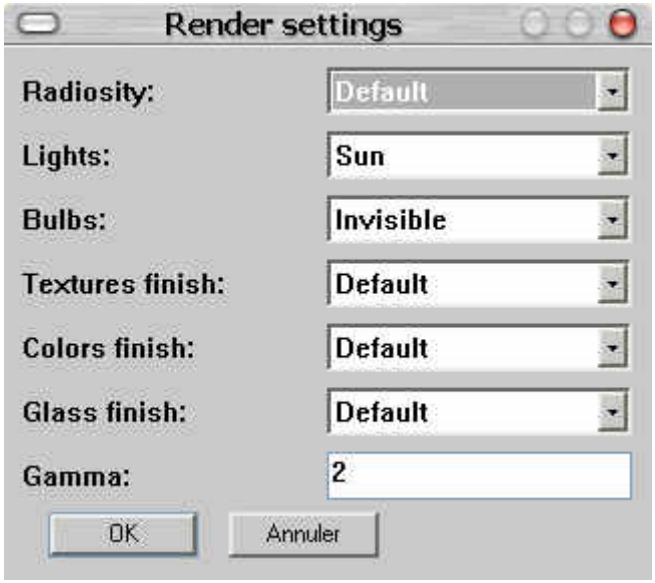


Here is the corresponding render:
Note that all lights appear as white little spheres in Pov-Ray.

3. Options:

3.1. Rendering options:

The "Rendering options" menu of the script displays the following dialog box:



Radiosity:
8 various settings for Pov-Ray global illumination. Select "Default", "Fast" or "Normal" when you are testing your renders, choose "Final" for a very accurate illumination of the scene, and wether you are outdoor or indoor select low or high quality radiosity.

Lights:
Sun: default option. Sun light (parallel) is exported at day, not at night.
Sun and lights: exports both the sun light and the artifical light sources, if any. This is useful for indoor day renderings when you also want to see the effect of your lights.
Lights: exports artifical lights only, even at day time.

Bulbs:
Set them visible to get luminous spheres on the image where the lights are. Invisible is default.

Textures finish:
This is the general rendering aspect of all the textured materials. See 3.2. for setting a special finish to a material.

Colors finish:
This is the general rendering aspect of all the non-textured materials (solid colors). See 3.2. for setting a special finish to a material.

Glass finish:
This is the general rendering aspect of all the transparent materials. See 3.2. for setting a special finish to a material.

Gamma:
The image file gamma. Default is 2, if you find your image too dim, lower this value to 1.8 or so. If you find your image is too bright, set it to 2.2 or so.

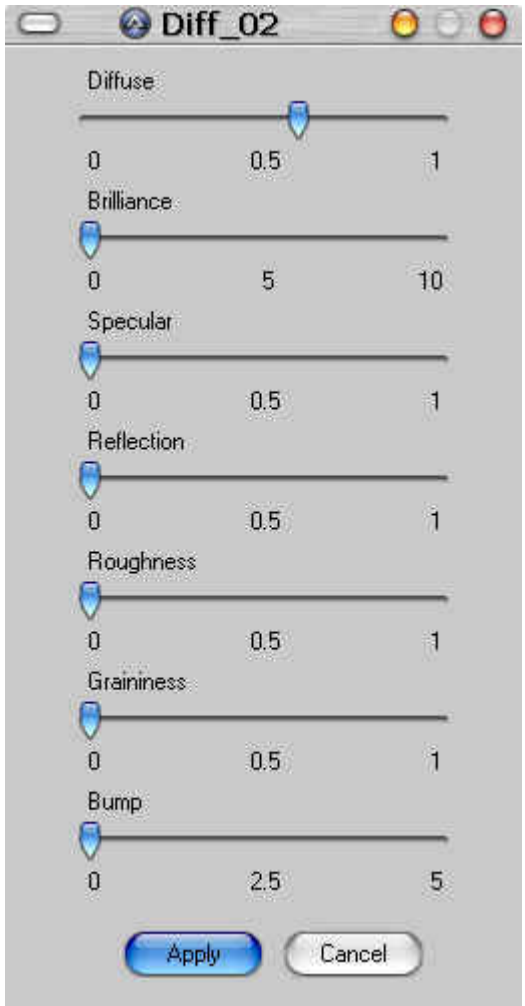
3.3. Adjusting the finish of your Pov-Ray materials:

You can tune the aspect of a particular material within SketchUp so it will have a special finish in Pov-Ray. To do so, right-click on a face painted with the material you want to adjust.

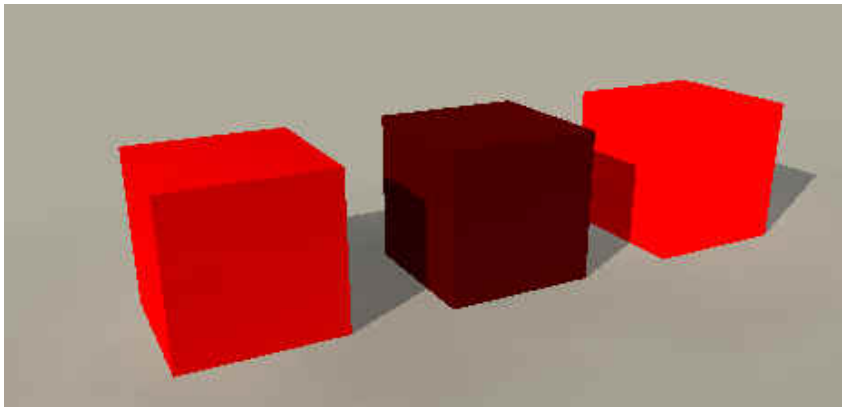
Select "Edit Pov-Ray finish" in the context menu and a dialog box will pop-up to adjust the main material parameters. Wether it is a textured material or a solid color, the adjustable properties only concern its final aspect, not its color or texture.

Default values are 0.6 for diffuse and 0 for all other properties, material name is displayed in the title bar.

See pov-Ray documentation for more informations about material properties, but here are some clues:

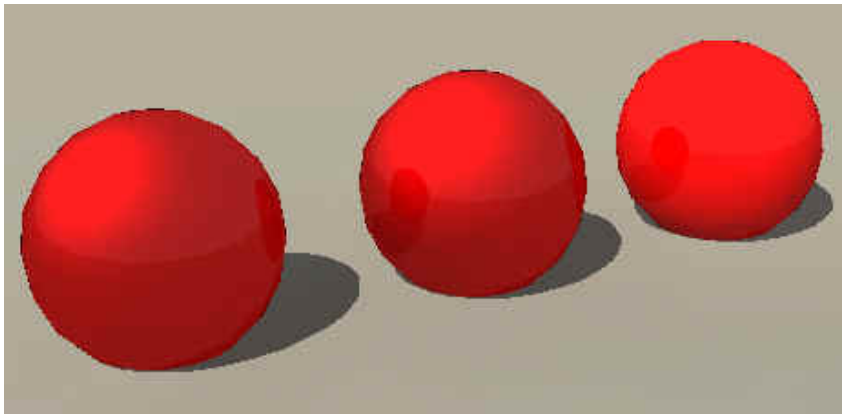


Diffuse: to control how much of the light coming directly from any light sources is reflected via diffuse reflection. For example a value of 0.7 means that 70% of the light seen comes from direct illumination from light sources.



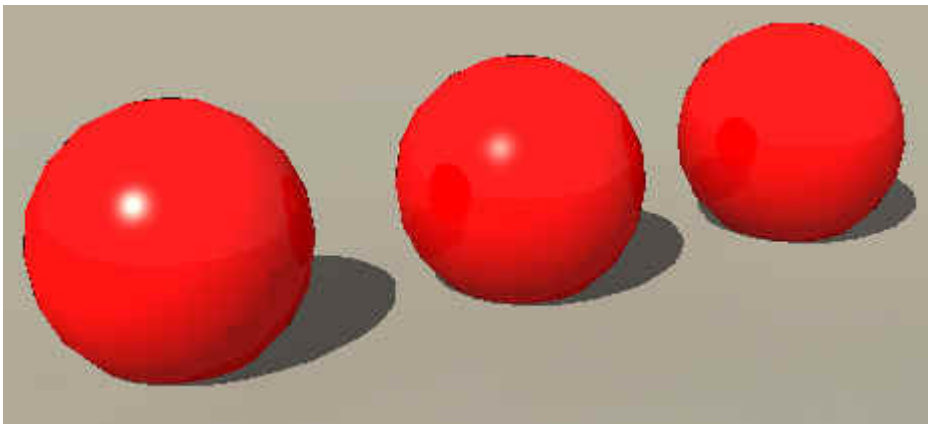
Diffuse 0.6 - 0.2 - 0.9

Brilliance: The amount of direct light that diffuses from an object depends upon the angle at which it hits the surface. When light hits at a shallow angle it illuminates less. When it is directly above a surface it illuminates more. Brilliance vary the way light falls off depending upon the angle of incidence. This controls the tightness of the basic diffuse illumination on objects and slightly adjusts the appearance of surface shininess. Objects may appear more metallic by increasing their brilliance.



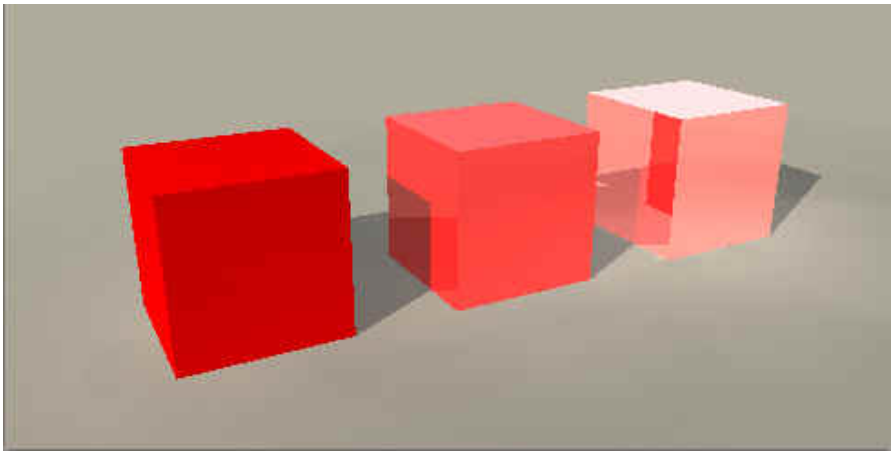
Brilliance 0 - 5 - 9 (reflection 0.2)

Specular: specular more closely resembles real specular reflection and provides a more credible spreading of the highlights occurring near the object horizons. The specular value 1.0 causes complete saturation to the light source's color at the brightest area (center) of the highlight. The default specular 0.0 gives no highlight. Specular is to be used with roughness. Roughness without specular has no effect.



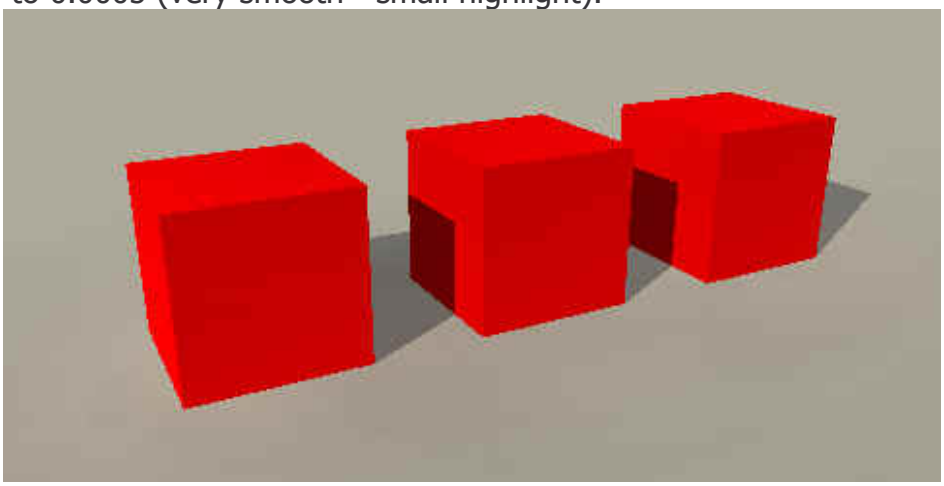
Specular 0.9 - 0.5 - 0

Reflection: When light does not diffuse and it *does* reflect at the same angle as it hits an object, it is called *specular reflection*. Such mirror-like reflection is controlled by the reflection. Although such reflection is called specular it is not controlled by the specular parameter.



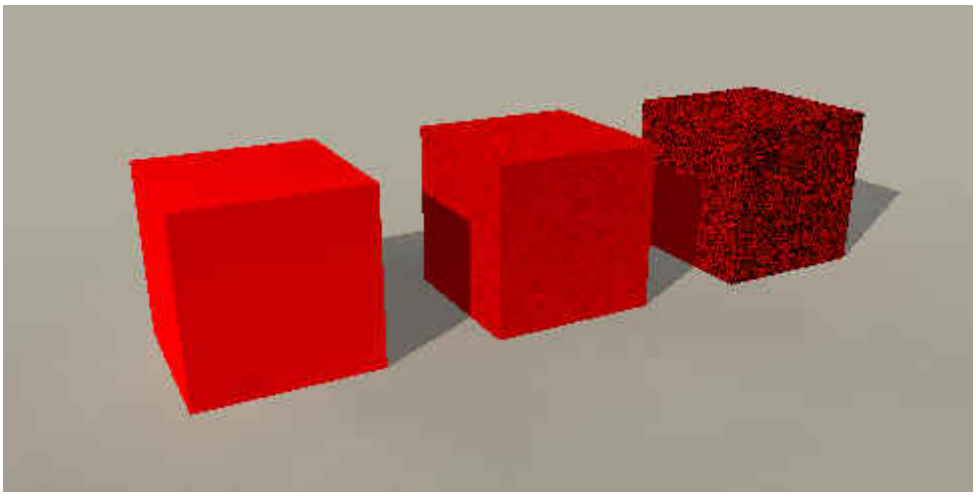
Reflection 0 - 0.4 - 0.9

Roughness: The size of the hifhlight spot (set with specular) is defined by the value given the roughness parameter. Typical values range from 1.0 (very rough - large highlight) to 0.0005 (very smooth - small highlight).



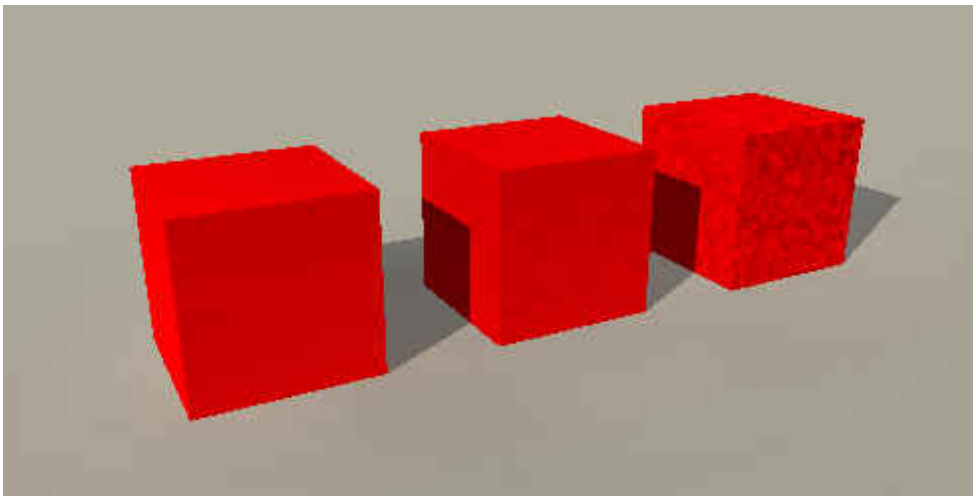
Roughness 0 - 0.4 - 0.8

Graininess: Very rough surfaces, such as concrete or sand, exhibit a dark graininess in their apparent color. This is caused by the shadows of the pits or holes in the surface. The graininess can be added to a finish to cause a minor random darkening in the diffuse reflection of direct illumination.



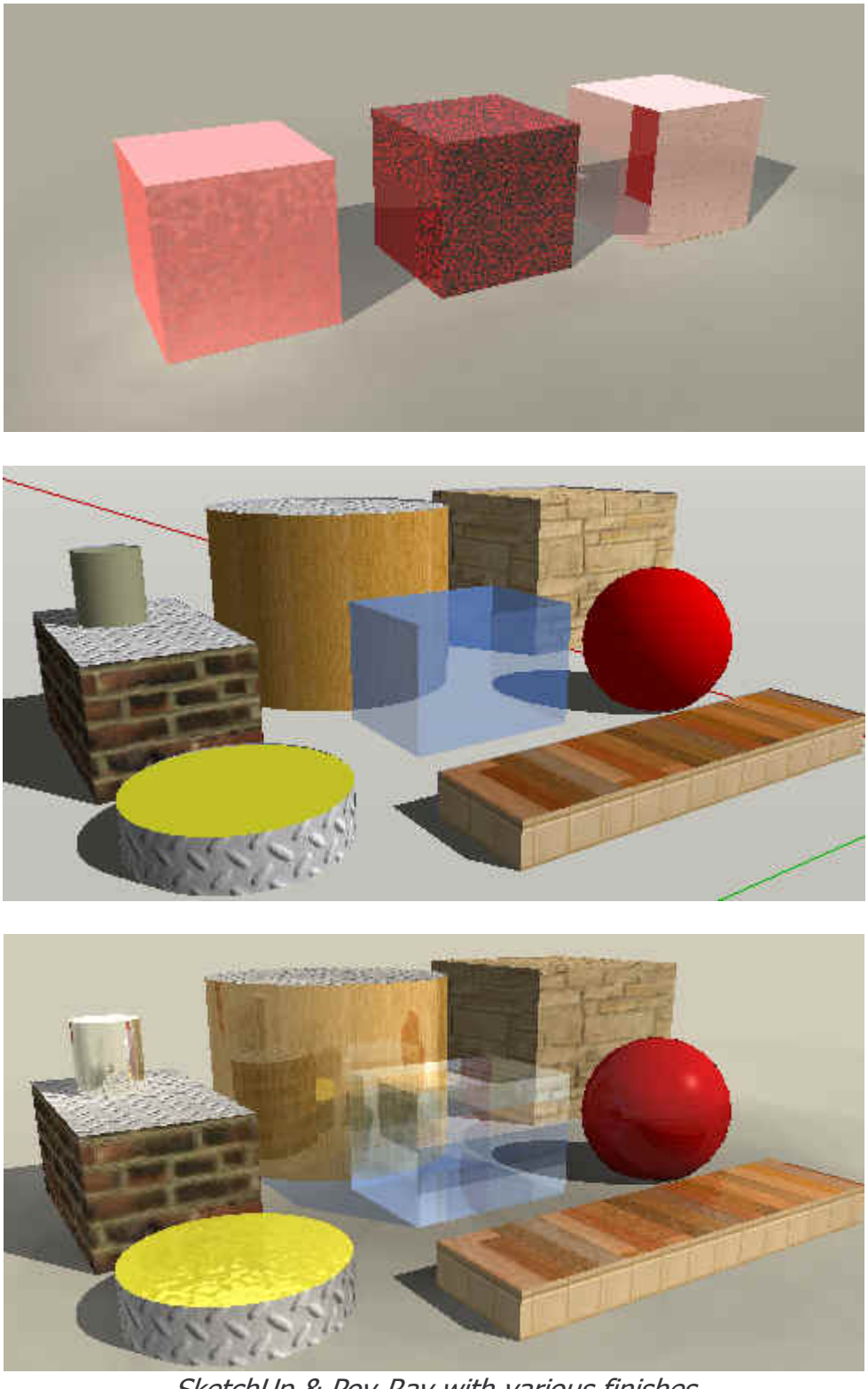
Graininess 0 - 0.2 - 0.8

Bump: Adds normal perturbation based on wether a granite normal map in case of solid colors, or on the texture itself in case of a textured material. If you add bump to a solid color, a standard bump effect will be applied; when you add bump to a textured material, bump effect will use the texture for the bump effect.



Bump 0 - 0.2 - 0.8

Of course each parameter can/must be combined with other to achieve good results.



SketchUp & Pov-Ray with various finishes

Note: all the material adjustments are saved within the model for later use. To delete a material finish, select a face with the corresponding material, right-click and select "Remove Pov-Ray finish" in the context menu.

3.3. Image options:

The "Image options" menu of the script displays the following dialog box:

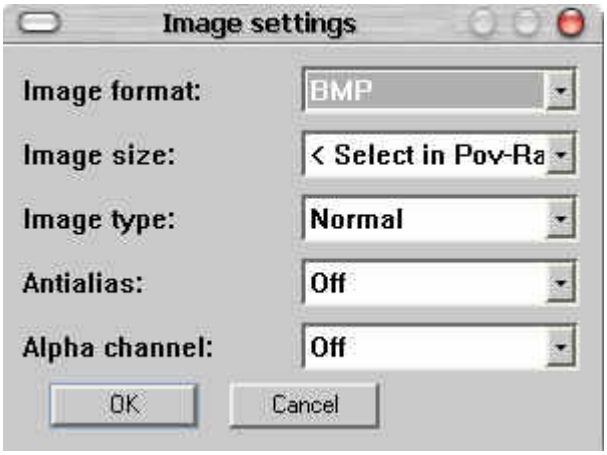
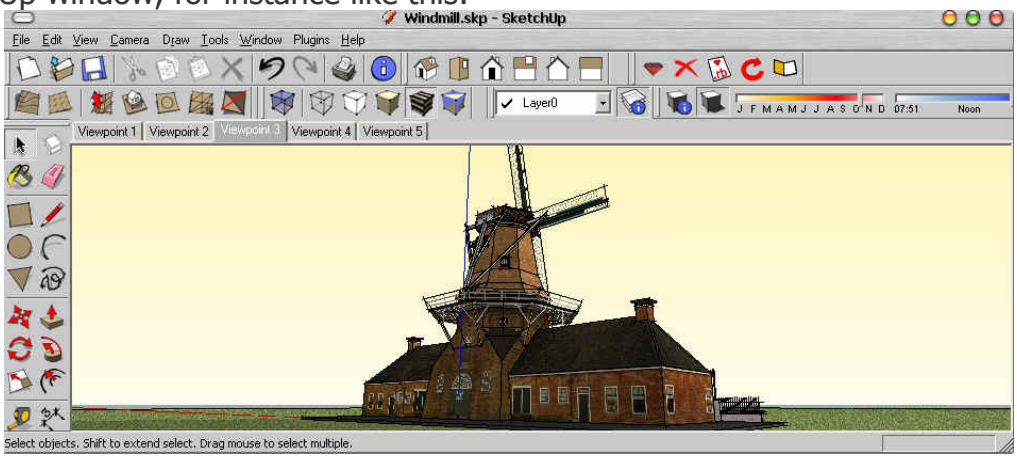


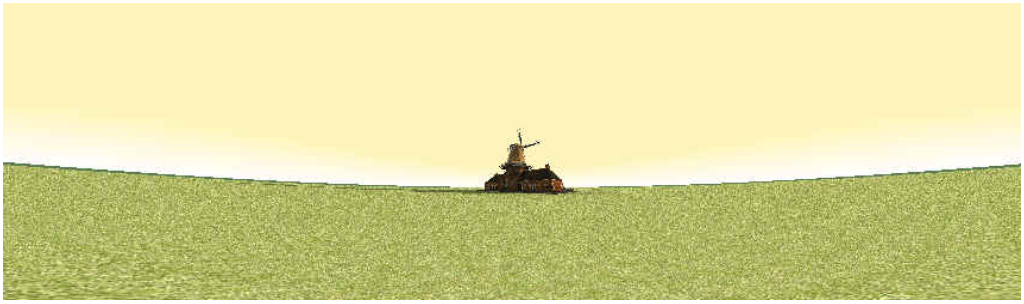
Image format:
Select the output image fomat among BMP (default), PNG, PPM, TGA compressed or uncompressed.

Image size:
Select the image size in pixels, most common sizes are provided.
<Select in Pov-Ray >: (default), will let you select the image size as usual in the pov-ray resolutions selector.
< SketchUp window >: will set the image to the same size than your current SketchUp window. All other common resolutions have an aspect ration of 4/3, but with this option you can render square images, vertical or horizontal rectangular images of any size.

Image type:
Select the image type in the dropdown list:

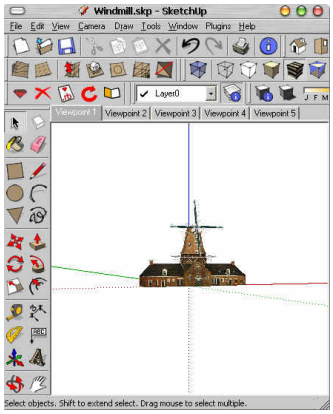
Normal: (default) pinhole camera for perspective or orthographic views,
Panoramic: cylindrical equirectangular projection for panoramic views. It is a good idea to combine this type of image with an image size with the same size as your SketchUp window, for instance like this:





Cylindrical: using this projection the scene is projected onto a vertical cylinder, It is a good idea to combine this type of image with an image size set to the same size as your SketchUp window,

Spherical: when using this projection the scene is projected onto a sphere (good for QT views). It is a good idea to combine this type of image with an image size with the same size as your SketchUp window, with square proportions, just like this:



Fisheye: This is a spherical projection, you should get a circular image:

Antialias:
Sets antialiasing off (default), or on, with "Normal" or "Fine" when on. Normal is an antialias of depth 3 (9 samples per pixel) and "Fine" uses a recursive method of depth 4 (16 samples per pixel).

Alpha channel:
Sets the output of the background as transparent pixels when on. Default is off.

Example of an orthographic view, no shadows, alpha channel on

4. Using images in SketchUp for use in Pov-Ray:

Su2pov can export exploded images or non-exploded images. In this case you just have to "use them as material".
Click on the "Viewpoint 1" tab and zoom near the main door. Import the image "Real_windmill.jpg" and paste it somewhere on the wall. Right-click on it and select "Unglue". Move it slightly off the face (1mm would be enough).
Right-click on it again and select "Use as material".

SketchUp

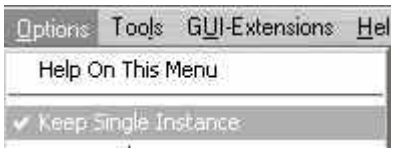
Pov-Ray

UV mapping is also fully supported, (as you may have noticed since the beginning of this quick start because this is an uv-mapped model).

5. Setting Pov-Ray to work with SketchUp as expected:

First ensure that a ".pov" file is associated with the Pov-Ray for Windows executable (also known as POVWIN): browse your disk to find such a file and double-click on it. "Pov-Ray for Windows" must start and load the file.
A "pov" should look like this in the browser:

When generating renders, su2pov writes a ".pov" file each time you select "Go" in the menu, and opens POVWIN with the newest file.
In order to have only one instance of POVWIN running at a time, go to the "Options" menu and select "Keep single instance":



Go to the "Editor" menu, select "Auto-Reload / Always":

The Auto-Reload facility (which by default is set to 'Ask') causes the editor to check the time and date of all files that are currently open when it receives focus from another application. 'Always' means that, if POVWIN detects that a file has changed, it will always reload it without asking you, and you just have to click on the "Run" button to start a new render.

6. Known issues:

Textures formats:
Sometimes the TextureWriter object of the Ruby API exports a texture at the wrong format: if you have a material which uses a BMP texture for instance (especially with an alpha channel), the texture file is exported at PNG format... The script tries to solve this problem, but sometimes can't.

Textures names:
The script changes the names of the textures to suit Pov-Ray syntax (which is rather sensitive). It also changes most commons letters specific to some languages (é,è,à,ë,ù,ç,etc). When using UTF8 very special letters (such as Õ,Å,ă,ę,Ñ, etc) the system raises an error when trying to rename the texture files. As the Ruby API doesnt support Unicode, I can't solve this problem. A message is displayed when this occurs, with the file names involved.

Bad UV mapping:
This happens when the texturing in SketchUp (may appear good) is done with the pins not exactly anchored on corners of a face. Texture may even be distorted or completely twisted.

Good UV mapping

Pov-Ray result

Bad UV mapping
(blue pin not on vertex)

Pov-Ray result