**OLE MAGNE KVINDESLAND:** My name is Ole Magne Kvindesland from Norconsult. I'm very happy to be here at AU and be able to speak to you about workflows between the PDMS and Plan 3D and Revit. A little bit about myself, I run the CAD and BIM department of Norconsult [INAUDIBLE], which is a daughter company from the Norconsult group in Norway, the biggest civil and structural engineering company and Norway.

This IT company, which I come from, now has about 200 employees, of which 50% are developers and the rest are consultants and sales people. The CAD part, which I'm responsible for, counts 12 people at the moment. We've been around since-- or the department has been around since a 1987, so it's quite a lot of time. And we have been dealing with CAD-related software since, mostly, on the MicroStation or the Bentley platform.

And we have been dealing with the Autodesk platform since, well, five or six years ago. And our software is branded under either the Easy CAD or the Easy Plant brand. And most of the components that I'm going to describe today will belong to the Easy Plant family of products. My background, I'm a civil and structural engineer. I joined the company in 1995, so that's also a long time ago. I don't want to think about that.

If I do my job today, you should be able to, after this class, to know how to share multi-disciplinary data between Autodesk Plant software and PDMS. You should know how to import existing PDMS models into AutoCAD and into Revit, and to convert PDMS specification database into AutoCAD Plant 3D, and convert Plant 3D and Revit models into intelligent PDMS models. That's quite a lot of stuff to cover in one hour. We'll try.

And if there is time at the end, of course, we'll have some questions as well. The agenda is first to give you a little background why we started this journey. And I'm going to give you a little bit about PDMS basics. I don't want to go into details on Plant 3D and Revit itself. I assume you have some basic knowledge at least on those. I want to cover the interfaces between Plant 3D and PDMS, and also with Revit and PDMS. And I want to share some project samples with you at the end.

So a little bit of background. Why PDMS? Why we started this. Well, it's the fact that PDMS dominates the Norwegian oil and gas market, where we have most of our business, and also in other markets, of course. For instance, in China they are very dominant. That started back

in the early '90s when the biggest contractors in Norway, they abandoned Intergraph PDS, and then started to use PDMS instead.

And the operators and the all the biggest contractors, they standardized on that and started to require data to be handed over on PDMS format. So back in 2012, I was contacted by one of the major Autodesk resellers, or [INAUDIBLE] in Norway. They were very frustrated because they couldn't get into the market with their Plant 3D software since everybody has to deliver in PDMS formant.

And they asked me if I saw some solutions to that. And we took the challenge. So we started developing an interface. That has been a long journey, and has been quite steep. But now we have an up and running solution, which we will have a closer look at later on. Along the road we were also contacted by customers requesting, also, interfaces from, for instance, Revit and from Inventor.

There could be many reasons for that. For instance, on onshore facilities, the EPC contractors tend to use subcontractors for the civil works. So the civil contractors tend to use Revit as you know. And then it makes sense to also be able to share data with Revit. Inventor, many Skids or special equipment [INAUDIBLE] to be put in these process plants were modeled in Inventor. And the PDMS was quite poor on importing such models. So those models tend to be very heavy and not very usable.

So we took that on board along the road. And today we have this family of products supporting both Inventor, Revit, Plant 3D and altogether. And also I have to say that both the owner operators and the biggest contractors has been very positive to what we have doing, because they see it as a big advantage that they have more flexibility in selecting contractors. They have a bigger range of contractors to choose from, to put it simple.

A little bit about PDMS basics. Anybody of you are you using PDMS, or are familiar with? OK, very good. It is a multi-disciplinary system, originally focusing on piping and equipment and structural. And took other disciplines on board along the road.

**AUDIENCE:**     [INAUDIBLE].

**OLE MAGNE KVINDESLAND:**     Yes, certainly. It has a proprietary database. So both the data and the graphics are stored in databases. There are no specific graphics files like VWG or GGM files, and the corresponding database. Everything is stored in the database. It is cataloged as specification driven. So there

was a special Cat. and spec. database which stores both the properties and the geometric shapes, or the parametric shapes, of the various piping components, or components to be used in the model.

Equipment can be modeled by primitives, like boxes or cylinders or extrusions, et cetera. So they are not spec driven. But piping and HVAC, and maybe also steel sections, are mostly driven by specification. So a project, a PDMS project is incomplete, if you don't have the specification database. It's not self-containing. That's a very important thing to know.

For instance, in Plant 3D, if you do a Plant 3D design, you will also use a specification, but all the data will still be in the DWG files, so you can open it up and review it and edit it, but not that in PDMS. It also has a fixed design hierarchy, like site, zone, et cetera. I tried to show that over here.

So these levels of the hierarchy are fixed. But was is not fixed is what they contain. So people can put whatever they like into a zone or a site. And they can put a mixture of various disciplines. But at least the biggest contractors, they have a strict naming convention for what disciplines and how they organize their data into sites and zones.

I also mentioned the Everything3D, which is the new product range from Aviva. Eventually it will probably replace PDMS. Excuse me. But it's using the same database format as PDMS. So currently, it's possible to use both Everything3D and PDMS, the old PDMS, in one and the same project together, sharing the same data. It also has a review format, which is called RVM, storing the geometry and hierarchy information.

So you can export their RVM file and review it, for instance, in Navisworks. If you want attributes or components attribute, you need to export an attribute dump together with the RVM data. So that is basically what we have to deal with. So I wanted to start by saying something about Plant 3D and PDMS.

So I'm going to do that by simulating a small modification project. The typical workflow, or one possible workflow, is that you have an existing PDMS project, maybe an owner operator. Sorry. He wants a modification contractor to do a minor modification using Plant 3D. And then the data is going to be converted back into PDMS.

So in more detail, we should export existing PDMS data into a format readable by Plant 3D. We will import it into AutoCAD or AutoCAD Plant 3D. We will have a look at which

specifications that should be done, be used in Plant 3D. And we will convert those specifications from PDMS into Plant 3D and use them. Then we will do a new design, a few pipes and a few equipment's in Plant 3D.

And then again, convert everything back into PDMS. Was that understandable? Good. So this is the existing PDMS model. It was exported from PDMS on RVM format, and then opened up in Navisworks. So since Navisworks support this, why not use it to get an overview of what we should do here.

I'm sure you have all seen Navisworks before, so that's nothing new. But I picked two lines here, or two pipes, which I'm going to use and hook up new pipes on inside Plant 3D. Sorry. So I identified my pipes, which I'm going to hook up something new on. And the next thing now is to bring this PDMS model into AutoCAD, so that I can use it as a reference, or as an exref in Plant 3D.

We developed a software called EasyCAD import PDMS, for AutoCAD, which will read the RVM and attribute file, and create a set of DWG files. [? Intelligent ?] DWG files which contains both the PDMS model hierarchy and all the properties, et cetera. So I'm going to do that now. And I'll just point that the RVM file and the corresponding attribute file, and do an import.

So that will create a set of DWG files. In this case, I said I wanted to split on the pipe PDMS zone. So each zone will become one DWG file. But I don't have to worry about which files does contain the various things, because-- sorry. Skip a little bit forward. At least it gets repeated.

We create a set of DWG files. They contain both the graphics and the properties. Here is a list of files. To be able to review them. I'm going to use a small application, which we developed. And we have posted onto the Autodesk exchange app. This is a tree structure where you can browse the PDMS hierarchy, just like in PDMS. You will see exactly the same sites and zones and breakdown. And the properties will be shown in that window over here.

See now, I hope you can see the pipes as well. So I'm going to look at the same pipes as I did in the original model. At first I want to show some functionality of this little plug-in. You can do zoom and highlight, and go to, and search for components. Everything in pure AutoCAD. So this is a free application which can be downloaded from the Autodesk exchange. And everybody who gets DWG files produced by our tools are able to use this tool to review the data inside AutoCAD.

So here are the pipes that I'm going to work on. And I'm going to have a look at what spec has been used. I'm going to click on the-- the property on that component tells me that the spec has a name AS200 underbar VA. The next thing I was going to do, then, is to convert that spec into Plant 3D.

So the first step in that process will be to export that actual spec from PDMS. This screen dump is actually the spec editor tool in PDMS. It's called Paragon. So we developed an application inside Paragon which dumps that particular spec into an XML format. And that XML format will contain both the graphics representations, the parametric components, all the attributes, et cetera, which is needed in order to rebuild the spec inside PDMS.

So this last step here is to take this XML file, export it from PDMS, run it into another program that we developed to put some additional settings and mappings. And out you get a Plant 3D spec, with all the components. OK, the next step will then be to create a new design model inside Plant 3D, using the converted spec.

Now I have loaded my Plant 3D environment. I have loaded my converted spec. So the components that you see on the side here are now from the PDMS spec. And of course I want to bring, also, the existing model into Plant 3D so I will start by starting this review application, also in Plant 3D to get access to the data, to the existing data. So I will open up that zone, holding that particular pipes.

You can see them highlighted there. And now I'm going to do a very quick modeling using Plant 3D. You can see how effective Plant 3D is. You click on some equipment, some piping, and some additional wells, et cetera. And to check that they are properly modeled, I'll create an ISO. So you see the ISOs coming up, but they are all create now by the converted spec.

One thing I had to do now is to add some flow direction arrows. PDMS requires that a pipe has a flow direction [? we find. ?] And Plant 3D does not. So we found the only way to solve that was to use these flow direction arrows in Plant 3D and assign them. And then we are able to extract the data afterwards and use it in PDMS.

So these flow direction arrows are then added. They will also show up on the ISOs. So when I have completed that, I think the next step will be to export this new design into an intermediate format. That will be brought into PDMS. And we do that with another application. We simply select the pipes and the equipment to export. And it will all be exported into a special XML file, based on the ISO 15926.

You will have a quick look at that file. It contains two equipments and four lines. And all the properties and relations. OK, there it is. So this EXpLant file, which is based on the ISO 15926. For piping it contains the piping logic, how things are put together. It contains all the spec references, I mean, each component on the pipe will point to a specification. It will contain the connect points. It will know where in space the components are located, and the orientation. And of course, all the properties belonging to the two components.

For equipment, this file will contain both the geometric representation, represented as primitives of boxes or cylinders or spheres or whatever primitive has been used to model them. It contains the nozzles. And the nozzles are linked to the pipe, which are connected to the equipment. And of course, the properties.

So XMpLant is an open standard that can be used. The company providing it also provides a lot of tools to read and write XMpLant format. We only focused on the format itself and wrote our own software to read and write the software, sorry, the data. So now I have an interface file containing the Plant 3D design. And I'm going to import it back into PDMS.

This dialogue box on the side here is the important program in PDMS, where I simply specify my XML to import. And I can specify a lot of settings files also, for instance, component mapping. In this case, since the original spec was a PDMS spec, I don't need to map it. But if I had an existing out of the box Plant 3D spec which I'm being used, I have to manually make sure that those components are present in the PDMs-- in the receiving PDMS system. And set up a mapping between those.

And I can do a lot of other mappings as well, for instance, especially if I were in the PDMS sites and zones, the new design should be placed. So then I simply point to the XMpLant file, which I exported from Plant 3D. And first of all, I will do a validate on that data. So this validation will actually check if the components in the interface file, it has all the components in the spec, in PDMS. And it will also compare the connect points, et cetera, to the actual sizes in the spec of the PDMS.

Because if the dimensions are slightly different, there might be a problem in getting this to be connected. So it will give me and error messages if there are any deviations. But if that's OK, I will continue and do an import in PDMS. So now you'll see that it is actually building a model in PDMS. And it looks very much the same as it did in Plant 3D.

Here you will have all the piping components imported. And this is the way a pipe is built in PDMS. It has a pipe and it has branches. That was also a challenge, because in Plant 3D you don't have these branches. So we needed to find out to figure out how to place component into branches instead of just one entire pipe. And to show that this is a real pipe, I will put on some new components in PDMS, for instance, I think it was a new flange or something.

But again, this is now a native PDMS model. So any editing can be done in PDMS on it. This can be moved along the pipe, but that is not rocket science in a plant design system. OK, so here you now see the imported data, which I created in the Plant 3D. It is now hooked up to the existing pipes in PDMS. And total model should now look like this.

This is now the modification project, done by a subcontractor in Plant 3D. And the other things are the existing PDMS plant. So that was pretty much what I wanted to say about Plant 3D and PDMS in this presentation. So the next thing will be Revit and PDMS. As I said, that was a thing that came up along the road when we started on the other development.

And the first challenge was to get existing PDMS models into Revit to be able to review them and to have them available. We developed a piece of software that uses the same RVM file and attribute file so that a pipe, or equipment, or a stru element in PDMS will go into generic models families in Revit, along with the attributes. So as you see over here, these attributes comes from PDMS.

Another model, or sample model, one equipment and you will see all the generic models will be listed here in this project browser on Revit. And their attributes will be listed here in this property, property reviewer. A little bit more complex model. We were a little bit frightened about the performance issues in Revit, but the experience so far is that Revit is very capable of handling big models.

So typically, what you'll put such an imported model into one separate Revit file, and then link that into your current project. Or of course, you could also place your-- put your own design in the same model. But again, if this is a repetitive task, it makes sense to use it as a linked model. A lot of components. They can all be edited, of course. They can be moved around and deleted, if you'd like to do that.

So then the other challenge is to get the Revit models into PDMS, or to be able to export PDMS models from Revit. Revit does not to use the same kind of cataloging spec as Plant 3D do, so it doesn't make sense to convert the spec from PDMS into Revit. So we ended up by

creating a Revit plug-in that will run inside Revit, and analyze the model, and create a simple PDMS macro file that can be played into PDMS. And build the model in PDMS.

We put a lot of effort into analyzing the elements in Revit, and to find a good match, or good mapping, to PDMS element types. That was not a trivial issue. We also put a lot of effort into creating a geometry engine that will break down the Revit solids, I would say, into primitives that matches the way PDMS likes to get the data.

And this engine is being reused, both in the Plant 3D exporter in Revit, and Inventor and AutoCAD. So it's a general engine that will analyze data on the boundary representation level, and create or detect, or recognize that that's, for instance, boxes or extrusions or cylinders. In this tool, we can also set up a mapping between Revit categories and PDMS sites and zones, or stru, so that you're able to form the hierarchy inside PDMS.

Very often the contractor or the operator has his requirements how the model should look. And then it's very important to be able to map that or to specify how it should look. We can also convert or transport any properties from Revit into PDMS attributes or user defined attributes. And we can use, for instance, properties in Revit as names of the object in PDMS, or transfer tag information.

We also had to find a way to handle coordinate systems, because not often, not everybody, not every time, the Revit model has the correct coordinates. So we ended up by supporting then a project of shared coordinate systems in Revit. You can specify a shared coordinate system, which is corresponding to the required coordinate system in PDMS. And then it will end up in the correct location.

So this is how it looks. It could look inside Revit. This is an architectural model inside Revit. Nothing special about that. And then we do a kind of save as command, producing a macrofile that is entered into PDMS, and built a corresponding model in PDMS. So here is the resulting model inside PDMS.

Actually, this model is created from two Revit models. So there was a structural model. And there was an architectural model. And they're both assembled in the same PDMS model, or the same PDMS structure. So we did a mapping between categories and folders in PDMS. We use intelligent wall elements for walls from Revit.

That was a big challenge to find suitable element types, as I said. Now you can see the

structural model, which was not in the architectural model I showed you in the beginning. But again, there is a lot of flexibility in how you will form this hierarchy. And this hierarchy, or this model, is now pretty much as a native PDMS model.

Here is structural steel. They're all converted into PDMS spec-driven section elements. So there is a simple mapping file between the sections in Revit, and the corresponding sections in the PDMS system. The graphics are-- which is not mapped into a spec-driven-- objects are converted into primitives like box or cylinders. Any questions so far on the Revit side? No?

OK so I'm going to share some project samples with you. I'm going to start by a lab building. The contractor or the owner here is Statoil, a regional oil company. And it is an LNG plant, onshore land LNG plant. Of course, the contractor is a Norwegian company, Multiconsult. And they used Revit for architectural and structural discipline. They used Magicad, which is an HVAC and piping and electrical application running inside of Revit.

So the model we had, there was one Revit model per discipline, and they were all being linked together. This is going to be delivered in December 2015, so we have had already several preliminary handover, and discussed the details with the client. So we're now waiting for the final as built updates to be done. And then we will provide the final conversion.

There was some requirements here, like structural section mapping, that should be done. So all the set steel sections should be spec-driven elements. There's a lot of tagged component, like HVAC components, like electrical components, lights, et cetera. They all have tag numbers. It was important to have that transferred into PDMS as well.

So this was the architectural Revit model. It looks pretty much like the one in the previous slide, but it only contained, then, the architectural elements. And the way we selected to isolate or to filter what components should actually be converted is by using views Revit. So you simply define a view, conversion view, and then what you see is actually what you get.

I will show you another sample where I have a multi-story building, which should be separated into sites or zones per story. Then we used-- we simply define various views in the Revits. But the resulting architectural model in PDMS, with a proper site, zone hierarchy and frameworks. The structural model looks a little bit like the architectural model, but it has some other components as well, concrete, and steel, et cetera, is being converted into a model like this in PDMS.

As you see down here, I used, then, section elements to represent the steel works.

**AUDIENCE:** How many people [INAUDIBLE]

**OLE MAGNE KVINDESLAND:** We are three or four people to develop this. The HVAC and piping from Revit. [INAUDIBLE] we don't support making, for instance, HVAC into intelligent HVAC in PDMS. That is something that we will probably do in the future. But now we represent that as equipment objects or primitive based elements in PDMS. And for most purposes, that this accepted.

**AUDIENCE:** [INAUDIBLE].

**OLE MAGNE KVINDESLAND:** It is. But it is possible to do it more intelligence, because when you use Revit MEP, there is a fixed structure. So it's possible to extract that information and convert it into intelligent PDMS HVAC models. So this is the resulting model where we use this geometry recognition, and turn that into cylinders. So most of the components are now being cylinders or elbows, and are very simple primitives.

Electrical model inside Revit, that is lighting, and it is cable trace, and other electrical components, and carpets, et cetera. This slide shows that we convert these lightings, which has tag numbers, into stru elements in PDMS, using the tag number as the name of the component, which was a requirement from the customer. And the entire electrical model, no, that was not the entire. But the ladders are also convert it into boxes and extrusions.

**AUDIENCE:** [INAUDIBLE].

**OLE MAGNE KVINDESLAND:** It is. Everything is from Revit. And this is, then, the final assembly in PDMS. Which then assembles all disciplines from all the various Revit files. It was five or six different Revit files, now nicely set up inside PDMS, with one zone for each model.

The next sample project is power plants designed by Babcock Volund in Denmark. They are to design and manufacturer, and also operate, actually, and maintain three facilities in the UK. They are currently in the design phase. Velund is using PDMS for the process plant, and part of it. And they use subcontractors using Revit and Inventor. So they are doing concurrent engineering, and they had a big need to see or to review each other's data along the road.

So they asked us, actually, to do a conversion on a regular basis, weekly or every two weeks, to convert the civil models from Revit into PDMS, and vice versa, the process plant from PDMS into Revit, and hand those over to the civil clients. Question?

**AUDIENCE:** When you were doing this conversion you showed setting the mapping. Is that into a template that you can define for this client? And then that way you can tweak it as the project goes on? Or do you have to rebuild it from scratch every time?

**OLE MAGNE KVINDESLAND:** No, that can be set as a template. So you have the settings for one customer, for instance, and you reuse that. So some screenshots from this model as well. This is a process plant being done in PDMS, which we then converted into Revit so that the civil contractors can see and to do class detections, et cetera.

**AUDIENCE:** Question. Do those section properly inside Revit?

**OLE MAGNE KVINDESLAND:** Sorry?

**AUDIENCE:** Do they section properly? If you cut a section then you only see what you cut and not all the other stuff behind it?

**OLE MAGNE KVINDESLAND:** That was a-- that was a tricky question. I'm almost sure, but there was somebody discussing something there. So I shouldn't be too sure, but I can confirm that afterwards. But again, the components are generic models in Revit. So it's like any other CAD import into Revit. A little bit more complex process plant brought into Revit. Again, I'm quite surprised how good Revit handles quite dense models.

And then the other way around. This is the architectural source model that the contractor has been creating inside Revit. Then that this now converted into PDMS so that it can be put together with the process plant. So this is the resulting PDMS architectural model. Looks pretty much the same.

We use elements like G walls and frameworks. Yeah. Pretty much the same as you have seen before. Revit structural model converted the same way into a structural model in PDMS. We use, of course, section mapping so that it is a spec-driven PDMS model. This is the assembled model in Revit.

This contractor, they have been starting-- each of these buildings is a separate Revit file. And they did not have any shared coordinates. So every file has its own coordinate systems. And if you just put them together, they were on top of each other. So they need to define a shared coordinate system. And we needed to add that to teach individual file to put them correctly into

space.

And then fortunately we were able to pick up that in the conversion process, also, so that the resulting PDMS model assembled correctly. Here you can see each building as a [? zone ?] again. And the coordinates match, now, the process plant. My last sample is from an oil rig, a Norwegian oil rig, which is going to be put in the North Sea in six months time, or something.

It's just the living quarter of this platform here. All the rest of the model is being done in PDMS by an EPC contractor. But the living quarter was handed to a subcontractor. And they want to use Inventor for the structural parts, I mean the outer parts and the structural parts of the living quarter. And they wanted to use a Revit for the internals, like HVAC, piping, furniture, all the equipment inside the living quarter.

The contractor-- sorry, the operator has quite a detailed PDMS requirements, how this model should be structured to match the rest of the model, of course. So this is some of the required PDMS structure. They wanted to have one site per discipline per story. So for instance, architectural, HVAC, et cetera, should be put in one site. L 300 here in this screen dump means one story.

So you have one side for structural, architectural, electrical, HVAC, et cetera. And the challenge was that the Revit model, which you can see here, did not have that splitting. So we ended up by defining views, as I explained a little bit earlier, for each story. So we have a kind of conversion view for each story that will output, then, the data. And then we can put that into one site.

Again, there should be zone per category, Revit category. So all these zones here, walls, [INAUDIBLE], stairs, windows, et cetera, has then been mapped from a Revit category into those names. So we are able to then form the hierarchy, pretty much according to the requirement from the operator. This is the Revit model brought into Navisworks. So this is how the hierarchy-- or there's no hierarchy, actually. There's only files and there are categories. And as you can see, it's quite dense.

There's a lot of equipment and furniture and everything. This living quarter is basically like a hotel. It's a lot of small rooms or cabins. This is a converted structural model, which is the outer part of the structure, or the structural thing. And that has been done in Inventor for some reason.

I think it has to do with the production line at this contractor. They have made their production line very according to the way they do it in Inventor. They have tried to use Revit for all purposes, but they found that they couldn't do everything using Revit. They found some limitations.

**AUDIENCE:** [INAUDIBLE].

**OLE MAGNE KVINDESLAND:** Sorry?

**AUDIENCE:** [INAUDIBLE].

**OLE MAGNE KVINDESLAND:** Nope. We have a similar plug-in for inventor so that we export it as a PDMS macro file, and then put it into-- so we do the same kind of geometry recognition in Inventor to represent this as extrusions, or boxes, or whatever. Also, this is made from aluminum. It is not a steel. So maybe it has to do with the special sections, et cetera, in aluminum.

This is some more inside architectural models, and electrical ladders source in Revit, converted into PDMS, with the same technique as I've showed now several times. HVAC the same way. And some piping or plumbing. And of course, the furniture is also important. The chairs and the tables and the couches and everything.

**AUDIENCE:** [INAUDIBLE].

**OLE MAGNE KVINDESLAND:** But again, this is now reduced into primitives in PDMS. So they're very lightweight inside PDMS.

**AUDIENCE:** You lost the signal.

**OLE MAGNE KVINDESLAND:** Sorry. Sorry. What happened? I need to call helpdesk, or whatever.

**AUDIENCE:** No change.

**OLE MAGNE KVINDESLAND:** No change. I have no idea, actually, what is-- OK, there it is. It must have the cables in some way. But this couch was actually my last slide. Now it stands still.

So this is a summary. The ISY Plant conversion software enables Plant data sharing between Autodesk plant software and AVEVA PDMS. And PDMS models and graphics and properties

may be brought into AutoCAD and Revit environment, and used as a basis for new design, or for 2D drawing production.

PDMS specs may be converted into Plant 3D. And if converted specs are used in a Plant 3D project, no mapping is required when converting plant data back into PDMS. The Plant 3D piping and equipment may be converted into native PDMS model using the XMpLant format as a transfer, or intermediate format. And Revit models may be converted into PDMS as a combination of spec-driven, or non-spec-driven elements now into a customizable PDMS model structure.

The conversion software developed by Norconsult is currently being used in real projects. And you can find more information on www.isy.no. And the software is now commercially available. We plan to both sell and rent software to clients. And we also can provide conversion as a service. So it is a little bit up to the client to tell.

I will hand-- I will put all this on the AU website so it's possible to download it from there. I will also create some handouts from the presentation, and add that as well.

**AUDIENCE:** [INAUDIBLE].

**OLE MAGNE KVINDESLAND:** I'm in [INAUDIBLE], Norway. But I also go to Oslo from time to time. More questions?

**AUDIENCE:** [INAUDIBLE]. Workflows are [INAUDIBLE] designed to [INAUDIBLE] client looking to move from EMS to Plant 3D?

**OLE MAGNE KVINDESLAND:** Yes. you can, of course, do it the way I showed. But then it will not be an intelligent Plant 3D model. If you're going to have an intelligent Plant 3D model, you'll first have to convert the specs the same way, as I did. And then you can create piping components files, and also PCF files in PDMS, and import them in Plant 3D. We haven't tested that yet, because it's a very new functionality in Plant 3D, the ability to read a PCF file and build a pipe from that.

But since you have the components, or since you have a converted spec, that should not be a problem in building or recreating intelligent pipes in Plant 3D that way.

**AUDIENCE:** [INAUDIBLE].

**OLE MAGNE** I haven't covered that here, but yes. We have developed a special plug-in that exports a Plant

**KVINDESLAND:**  3D project in a way that can be imported into PDMS, sorry, into Revit.

**AUDIENCE:**  Is that available now?

**OLE MAGNE KVINDESLAND:**  Yes, it is available.

**AUDIENCE:**  And all those plug-ins are on your ww site?

**OLE MAGNE KVINDESLAND:**  Yeah, they're all described on our website.

**AUDIENCE:**  [INAUDIBLE].

**OLE MAGNE KVINDESLAND:**  No, unfortunately not. I'm happy to discuss the Plant 3D to Revit in more detail if you like. But is that a real problem or challenge? OK. Any other questions? Yeah?

**AUDIENCE:**  [INAUDIBLE]

**OLE MAGNE KVINDESLAND:**  You mean from plant?

**AUDIENCE:**  [INAUDIBLE]

**OLE MAGNE KVINDESLAND:**  Yeah, it is the same way. So basically the same way for all the disciplines. As long as it's in RVM files.

**AUDIENCE:**  [INAUDIBLE] I've no experience with [INAUDIBLE], but if it was [INAUDIBLE], specifications for [INAUDIBLE].

**OLE MAGNE KVINDESLAND:**  Yeah. We can discuss that in more detail. There should be a way. OK, thank you very much.

[APPLAUSE]