

Sustainable Industrial Policy - Building on the
Ecodesign Directive - Energy-using Product Group
Analysis/2

Lot 5: Machine tools and related machinery

Minutes - 3rd Stakeholder Meeting

Venue: **BERLAYMONT Building**
Room Schuman
200 Wetstraat / Rue de la Loi
1000 - Brussels

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These minutes are an abridged, summarized version of statements, questions and comments. It is not a direct transcription of what was said, but Fraunhofer checked based on the recordings of the meeting, that statements are summarized correctly.

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10:00	Welcome	M. Bennett
10:10	Introduction of Agenda	K. Schischke
10:15	Presentation Changes Task 1-3 Reports	E. Hohwieler/ K. Schischke
10:45	Discussion on Tasks 1-3	

Ms. Garczyńska (CECIMO): The draft definition for all machine tools is definitely different from that of metal working machine tools. Secondly we read in the definition of the metal working machine tools that the term “transportable” is part of the definition, and I think that is not needed because it is enough to say that “machine tools” are not portable by hand.

Mr. Schischke (Fraunhofer IZM): The definition of the metal working machine tools should be a sub segment of the overarching machine tools we provide in Task 1. Regarding the aspect of the aspect mobile / stationary / to be carried by hand etc.: that is



now in line with the overarching definition where we have the dedicated definition for stationary, mobile, transportable and portable by hand. We made that distinction to make the definition clear for the smaller units in particular the light stationary wood working machine tools. For example there are units, which can be carried around by hand, that is why we made the distinction which indeed might differ from the wording that you typically applied for your sub segment of metal working machine tools. Similarly for the welding units. It was the basic intention to have a similar wording for the different sectors.

Ms. Garczyńska (CECIMO): Intention is clear, but we will expect that this clarification is somehow included in the executive summary as well, so that will be clear for the reader.

Mr. Hagemann (VDW): Did I understand it right that you want to have manually operated energy driven tools to be covered by this scope?

Mr. Schischke (Fraunhofer IZM): As long as a part of the tool is standing on the floor or on the table, yes. A power tool which you carry in your hand will be out of the scope of the study. A chain saw that you carry with you in the forest should be out of scope, a table saw should be in the scope, so that is the distinction here.

Ms. Garczyńska (CECIMO): The second comment is on table 1.14 on page 52 on working study plausibility check. Some units are presented in terawatt hours and some in kilo watt hours, maybe we should agree that energy is presented in joules. I think these units should be synchronized and calculated.

Mr. Schischke (Fraunhofer IZM): I would be happy if we could delete this table at all, because the environmental screening is from the beginning of the study, now we have much more detailed data and detailed figures.

The second point is that we have to be careful with the units: We state in watt hours typically end energy use electricity and what we state in joules will be the primary energy. We tried to make this clear on every figure with the primary energy and the end energy.

Mr. Gerczyński (CECIMO): I wanted to comment on the table that you have mentioned before. One of the important numbers there is the electricity consumption assigned to the machine tools. You say that the consumption of the entire sectors is about 163 TWh, your calculation of the electricity consumption of the machine tools is from 75 to 110 terawatt hour which seems to be far too high.

Mr. Schischke (Franhofer IZM): I agree that compared to that, there is some discrepancies. We could delete this whole part, but the other possibility would be to update in

the Task 1 the results and take the results from the end of the study, but that could look a little bit strange, because we come up here of all of a sudden with some data. This table should not be taken too seriously at this point, because the more important figures will be than provided later on in the study.

Mr. Gerczyński (CECIMO): I referred to the text under the table 1 which includes the numbers I just mentioned, it seems it is kind of basis for you to cross check your results and it does not match.

Mr. Schischke (Fraunhofer IZM): We have to state these 163 TWh for machinery and transportation sector, they cover most of the sectors where machine tools are used, but there is no 100%-match, there are still minor less relevant sectors where these machine tools are used as well, we can't take that as a granted maximum number.

Mr. Reintjes (ÖKOPOL): Energy consumption seems to be the most important point and it is highly economic to improve energy efficiency of the machine tools, so for my logic it would be the question, where are the barriers for the purchaser? Why does he not buy energy efficient machine tools? And I think this is what should be elaborated in task 3, but I don't find these barriers listed somewhere.

Mr. Schäfer (Verein Deutscher Werkzeugmaschinenfabriken e.V.): We can't talk about barriers, because there are no barriers. The question is: the machine tool is not produced to meet energy efficiency with priority; the first task is to meet some productivity, accuracy requirements, to build a work piece and a lot of other main tasks. That's why a machine tool is designed the way it is delivered. And one aspect is energy efficiency but it is not a major one. And in some cases the same machine might be delivered more or less efficient depending on the different tasks performed on the machine.

Ms. Garczyńska (CECIMO): The point is that in the table 1.14 the data is not valid in the later calculation, and I could agree that indeed in Task 2 there are already different data. The point is I can't read in the study which numbers are becoming historical. If we would like to evaluate the numbers than it is difficult to see which one of them we should take into account.

Mr. Bennett (EC): This is a good point, so we can insert a new table or column to indicate, which data is outdated and where to find an update in the study.

Ms. Garczyńska (CECIMO): A final comment on Task 3: You included the last developments regarding the energy efficiency communication towards the end users. However I still read on page 8 as a summary that industry is not following that trend, so that eco-design and eco-performance is a trend but main industries do not follow this trend. As I remember this is the summary from the first draft of this task 3, but my understanding is that this conclusion should be different today.



Mr. Schischke (Fraunhofer IZM): We need to take into account the difference between the manufacturers and the users of the machine tools, so there are a lot of activities among machinery manufacturers and partly they are accepted by the customers or are taken into account rather by smaller companies. Smaller SMEs, smaller companies do not look that much on this aspect. The automotive sector looks pretty much at energy efficiency, but smaller companies do not look that much on that aspect.

Mr. Hagemann (VDW): This is not a question of company size, even small companies in the automotive supply chain follow the same guidelines as the large ones. This is not a question of the company size.

Mr. Schischke (Fraunhofer IZM): What I have in mind than is the wood working sector, where there are also large furniture manufacturer asking for environmental performance, and there are also machinery manufacturers actively promoting energy efficiency of their machines. But none of their smaller customers asks for that, no one actually is interested in this aspect. At least, that is what I got toknow when I talked with the machinery manufacturers.

Mr. Hagemann (VDW): We talk about metal working machine tools at this point, not wood working. If there is a difference, please make it clear in the report. I can offer you sources that even small and medium sized companies in the metal working sector is asking for energy efficient machine tools.

Mr. Schischke (Fraunhofer IZM): Any updated evidence is appreciated.

11:00 Presentation Task 4 Report

K. Schischke

11:30 Discussion on Task 4

Mr. Schäfer (VDW): Talking about the machining centers, of course we know that pictures shown are good to understand what a machining centre is. But similar to other aspects we must understand that we have a wider range of also smaller machines than you have shown here, and all this is called machining centers. But in your calculation you are always talking about the consumption versus the shifts the machines are used. As we see it from the numbers I think this is very misleading because you calculated, as far I could understand , that machining centers are calculated on bases of three shifts, whereas in welding or in other machines like table saws you refer to only one shift. What we see here is a problem that does not make the results comparable because you talk about the use of some of the equipment, table saws for example or welding by a craftsman on one side, and on the other side you compare it with industrial automatic use. This is something different. Because when you talk about welding, of course

there is a crafts man using it once every second day, but when we know how the car is produced, there is welding running in the body shop 24 hours, this is also welding. The same is with stamping, you say that there is a small impact, but if you look on the table spoon which is produced in 20 million pieces in 3 shifts during a day, it is similar to a machining centre. So the comparison must go down to one shift, than you can compare the machining centre with a stamping machine, with a laser cutting machine or with an automated welding process.

Second comment is when you look into the bending machines, you have compared very different machines. In the machining centers it is already a very large range, but in the bending machines you have even all kinds of massive forming, sheet metal bending etc , this is very different and very theoretically.

The last question is, you are talking about waste in the machining centers. What waste and where is it produced, in life cycle, in process, or during the production of the machine? So what kind of waste and in what category are you talking about?

Mr. Schischke (Fraunhofer IZM): So replying to the last point, the waste generation is partly related to the production phase so metal cut when producing the machine tools. Metal chips are going to recycling that is taken in account in the methodology. And on the other hand also the end of life of the machine tool is considered, where again we can state that most of the recycled content is money, no question, but nevertheless it has to be processed somehow for the recycling and that is taking into account here.

Mr. Schäfer (VDW) : But I do not see the comparison to woodworking here, because there, during the process the wood is cut and there are a lot of chips similar to metal, so there we see some inconsistency.

Mr. Schischke (Fraunhofer IZM): No, the waste is, while the machine tool is in operation, while the machine tool is producing, is not taken into account at all. What I referred to metal chips is while producing the machine tool upstream.

Mr. Schäfer (VDW) : But then it is even more unlogic , because when you purely look at the picture of a wood working machine and one metal working machining centre it is almost the same. Producing this one or that one, produces the same amount of chips when producing the machine, so each of this machines has from this view point the same result in terms of waste. There is no difference. I can't understand it at all.

Mr. Schischke (Fraunhofer IZM): You are right, in absolute terms there should not be a difference. Or at least only a minor difference, maybe. The use phase is very important to energy consumption of a highly productive machine tool, then of course it is dominating and it shrinks down the impact share from the waste. Although in absolute figures it might be the same as for a wood working machine tool which is used less frequently, one shift operation, than the same amount of waste generated in producing the machinery and when scraping the machinery, turns out to have a higher impact over the whole life cycle. So in an extreme case, if I would take the same wood working



machine tool, and I just produce the machine tool, place it in a workshop, never operate it, and scrap it after 20 years. Then the impact would be related mostly to end of life and production, the use phase would not have an impact at all for such kind of a machine tool. The charts on the slides (right hand side) have to be understood to be relatively, not as absolute values.

Mr. Schäfer (VDW): If you have the same machine, call it machining centre for the wood working or metal working. The same machine it is to 90 percent of the design and the equipment part the same. The only difference is that on the one hand you put a piece in wood on it and on the other you put a piece of metal on it to machine it, so maybe you need more energy for the machine with the metal piece, but all in all it is almost the same. So why is there a difference, it is more or less the same machine.

Mr. Schischke (Fraunhofer IZM): It is related to the assessments where the power consumption is different, so for the metal working high power motors are needed, and for the wood working the power of the motors can be lower. And indeed the other effect is that of the shifts models: Actually for the metal working machining centers we calculate with a two shifts model, but for the wood working basically it was a one shift model so far. And that hopefully can somehow explain these differences here.

Let's come back to your other question: It is not the intension of the study to compare metal working machine centers with wood working. It is no need to say that the one is better or worse than the other. I just picked up the figures here to give an impression about the correlations. We tried to approximate as good as possible the real use scenario for each of these types of machine tools, for each of these base cases. And that's why for metal working machine tools we calculated with two shifts, and for wood working, which is normally used by crafts man frequently than some kind of small equipment on one shift only. So that is what we tried to address here with the shifts models.

Mr. Reintjes (ÖKOPOL): I tried to understand the impact of consumables of these machine tools. We do not have the information about the consumables in the study. These information is very scattered. It is scattered in task 1-3, but it is even more relevant in later tasks. This aspect is not covered systematically. The charts you presented give the impression these other aspects are included as well, but they are not, obviously. Please make clear, that consumables are not covered in the study.

Mr. Schischke (Fraunhofer IZM): I don't agree to your last statement, but I agree that it is pretty scattered information. As soon as we spotted that there seems to be no major improvement potential, we just excluded it from further consideration due to some pragmatism. If there is no improvement so there is minor relevancy to have it always on top of the calculation. But we take a point that this should be done and considered more systematically.

Mr. Reintjes (ÖKOPOL): What is the evidence that you say that there is no improvement potential?

Mr. Schischke (Fraunhofer IZM): We partly did it; we partly looked at the literature and other sources, which partly pointed out certain measures, more less the availability of the measures. There is not much information out there. Minimum quantity lubrication is frequently cited as a measure, but this is rather related to a technology shift, not related to machine design for example.

Mr. Reintjes (ÖKOPOL): It don't insist on saying that it is an important point, but without a thorough analysis it is hardly possible to judge whether it is.

Mr. Tollit (EPTA): The base cases are by definition general, but speaking particularly about table saws, we think 20 years lifetime is excessive. We might propose something more realistic.

Mr. Schischke (Fraunhofer IZM): I am happy to include another sensitivity analysis, as a complementary calculation to the existing one, but would rather not like to change the whole base case calculation at such a late stage of the study.

Mr. Couderc (Air Liquide): For welding equipment we have indeed very different use patterns. If we apply the same requests for automotive production and crafts man or the hobby market, this is problematic, because in the latter case it is rather the carbon footprint of the manufacturing phase, not the use phase, and energy efficiency requirements result in additional manufacturing efforts having a negative impact on the total environmental performance, whereas for industrial applications there is indeed a savings potential. The base cases calculate with some average data, but this might not reflect the whole spectrum of use patterns.

Mr. Schischke (Fraunhofer IZM): Part of the definition is "for professional use". This is relevant particularly for welding equipment and light-stationary wood working. Right from the beginning it was the intention to keep the DIY market out of the scope, but it is difficult to make a clear distinction in legal terms. By now I'm not aware of any other suitable definition to make a distinction of DIY and industrial use.

Mr. Couderc (AL): For welding we have two different safety standards, one for DIY and one for industrial use, so this reference would allow a distinction of both segments.

Mr. Schischke (Fraunhofer IZM): Such a distinction would be perfect, which leads us to the question, whether a similar differentiation is possible for wood working?

(reactions from the audience indicate, that no such distinction is known)



13:00 Presentation Task 5

K. Schischke/ E. Hohwieler

13:30 Discussion on Task 5

Ms. Garczyńska (CECIMO): We agree with the final conclusion, that there is no single improvement potential which can be applied for all machine tools, and that the improvement potential on the module level might vary on the total machinery level. That is very much in line with our findings. I would like to draw your attention that we still have in this chapter a statement as on page 6: "there are some approaches which address non energy related improvements, such as media consumption, mass-reduction and productivity increase". I guess this is not in line with your findings anymore. I think you should have a look at it and modify it because it is not in the final summary.

Mr. Hohwieler (Fraunhofer IPK): We need to have a closer look at the mentioned statement. If there are conflicts with later findings, we need to update the report.

Mr. Couderc (AL): You say that on a short term cost effects often exceed total cost savings. Coming back to the DIY issue, there is equipment, which is not used 5 hours a day. We arrive at the same situation: we increase the cost of the equipment, but savings are not realized throughout the product life. So again, take care about generalisation of one solution for the whole welding market.

Mr. Pastewski (Festo): I still need a key distinction between BAT and BNAT, as for pneumatics you mention both in the same chapter. At least three of them are BNAT. Either separate these or delete them.

Mr. Schischke (Fraunhofer IZM): Comment in writing would be helpful, which measures you consider BNAT.

Mr. Dürer (CETOP): One point is you cannot use vegetable oil for hydraulics, maybe for lubricants, but not hydraulics.

You described this hydraulic free machining centre, than it is said in your study the shift from the hydraulic system to all electromechanical results in energy saving of 4 % for the machining centre. It has to be clear that it is in one special case.

The other point is you say electrical clamping is better than hydraulic clamping, not only regarding energy consumption but also to other things. This statement is more or less taken from a home page of a producer of electrical clamping so it is pure advertising. Then you mention yourself in the study that you can save this energy consumption with several different technologies within the hydraulics. So this is contradictory. We proposed a text which is more neutral. You had to decide which technology is best in your case when you build a machine tool and you can save this energy in idle situations as well with electrical solutions as with hydraulic solutions.

Mr. Schischke (Fraunhofer IZM): I have to agree we cite sources which indicate that electrical clamping is the better solution. To be transparent we should state in the report that there are such claims made by some manufacturers. And it was also clearly stated that we did not verify these claims and that we can't say that there are generally true. And I do fully agree that for some cases such claims might hold true and for others they can be totally wrong. But nevertheless at least referencing such kind of sources can help for the transparency.

Mr. Dürer (CETOP): From my point of view this is not a serious kind of working taking an advertisement, comparing electrical system with a hydraulic system where the pump is continuously working. We gave you a text which is more neutral, which says that you can save energy consumption in electrical clamping and you can have it also in the hydraulics. If our text is not precise enough we can also give you another one. In our point of view it is not possible that you write in your study based on a homepage of a producer of electrical clamping who gives a comparison between an old hydraulic system and an electrical system and saying electrical systems are better than hydraulic.

Mr. Weiss (inspire AG): A comment on solution 6 in 5.1.7: it should be more clearly distinguished between dry machining, wet machining, and dry machining with cooling, dry compressed air. When you talk about minimum quantity lubrication, this is usually cooling by compressed air, which energy wise can be more demanding than wet machining. It depends on the circumstances, and I think the distinction is not clearly made.

Mr. Reintjes (ÖKOPOL): Logically when I asked to including non energy aspects in the earlier task, it would be logically to ask to cover the non energy aspects as well in the solution parts in Task 5. Aspects that are not on the level with energy they should also come up here as a solution as well in individual chapters. If there are any.

14:00 Presentation Task 6 Report

K. Schischke

14:30 Discussion on Task 6

Mr. Tollit (EPTA): The light stationary products are clearly designed for initially application but secondly costs. The improvements identified will add costs which impact the end user. Given that in most cases these products have an energy cost of something like 40 euros a year the cost sensitivity will tend to drive users to the lower cost imports instead of continuing with higher priced products.

Mr. Schischke (Fraunhofer IZM) :The first part of your remark I rather take as an agreement to our findings and conclusions what we have in the report. The second part on the imports, actually when talking about EuP and eco design directive it refers to products brought on the market in the EU 27 regardless whether they are



imported or produced here. Whether market surveillance works or not it is another issue I know that is a critical point. But basically speaking from the policy perspective, if there would be any kind of requirement it has to be fulfilled by those who produce here for the domestic market as well for those who are importing to the European market. There need to be a some kind of mechanism here. Your only out if you produce here and export it to somewhere else than you can do what you want.

Mr. Siderius (SenterNovem): I noticed that in various graphs with the least lifecycle cost the scale of the right hand side with the cost was very condensed. The differences between the steps were very small and the lines with the life cycle costs were almost flat. Can you give any indication on how differentiations in your assumptions will influence this? Especially in those cases where the lines are almost flat or where there is a minimum increase this might become a kind of theoretical effect. And in practice there are many other factors that affect the costs. So these smaller differences might be not relevant in the end and when other options still add to improve environment and energy consumption, then you might not go so far with your improvements while the extra costs might be absorbed or not exist at all. Regarding those smaller differences in cost, did you do any sensitivity analysis or analysis on assumptions are other than you show?

Mr. Schischke (Fraunhofer IZM): Not really. So typically if there is a curve like this, pretty flat like here, that are options which are stated not to have really an cost increase in purchase price. You have to look in the report most likely the options 5, 6, 7, 8, 9 they seem to be without any cost added to initial purchase price, so they pay off then. But energy savings are not really very significant, so also the cost decrease in terms of energy costs savings are also minimal. So the plus minimal and the minus is minimal in this case so it is not the case that the plus is huge and the minus is huge at well Than it would be a subject to huge uncertainty, but if you want to be provocative you could say these options do not matter at all. So that is basically the case here and only at that end we start with those options where there was a previous statement that they add 3 percent to investment costs of the initial machine tool. There is not a single measure which pays off with energy savings for a 3 percent investment increase.

Mr. Akkerman (BAM): Are the development costs taken into account here? Because these are small numbers of units. And for small improvements if you know the technical solution you might have an estimate of energy efficiency increase, you still have to change technology, you still have to change your product. Is it taken into account?

Mr. Schischke (Fraunhofer IZM): I just can reply how the survey was made, and it was exactly the way it was the questionnaire we presented one year ago went out to the companies. Cecimo took the initiative to share it among their member companies, member associations and even extended that and made some changes, also broke it

down to the module level, pretty much appreciated. But the only question we raised there, is, we listed the options and asking the question how much does it change the machinery invest, that's what we called it. I would assume that from those who replied that they took this into account, but I can't guarantee that everybody understood the question in the same way, so it should be in there hopefully.

Mr. Schäfer (VDW): I think we can't really judge on this, because we have to take into account that a lot of producers are prepared to offer its customer another drive or whatever other solution in an existing machining concept. Therefore there is not an increase of cost, but when you look in total and you would have to change the concept, than I would doubt that this is calculated here.

Mr. Schischke (Fraunhofer IZM): I would have hoped that this aspect has been considered by the respondents. But we did not have directly contact with them. That was provided through Cecimo. We did not ask directly the individual respondents, we did not make a round of clarifications.

Ms. Garczyńska (CECIMO): It was not specified that these costs should be included in the life cycle costs, so we could not provide you with this information. But what we specified was that we expect answers only from people who consider themselves experts in the technology or in the solutions to provide this answer.

Mr. Hagemann (VDW): I think we are coming to the point which is quite difficult to answer, because as you remember the new efficient motors that have been introduced, and no one has asked the machine tool industry what additional costs are applied by this change. So again this question was only raised within the machine tool industry, we did not cover any developments or other additional costs which might be applied from sub suppliers and so on. So I think again this is only a very limited focused answer.

Mr. Eckert (ZVEI): I have a question concerning welding. At the improvement potentials you have an option where you refer to an average efficiency of 80 % which could go to 90 %. And my question is, what do you mean with the average efficiency of 80 percent, what does this average refer to?

Mr. Schischke (Fraunhofer IZM): As we did not provide the analysis with a distinction of single-phase and three-phase power supplies at this end that is really rather a rough approximation of what a market might look like, so not dedicatedly a real world welding unit, but rather an average of what is out there, and we don't made our own measurements.

Mr. Eckert (ZVEI): I only wanted to mention that 80 % is not the average of the market. If you take the most efficient part which is in the inverter technology, than you have



these 80 % but not if you see the whole market today. So the starting point of our perspective should not be 80 % because these 80 % is the highest level today achievable.

Mr. Schischke (Fraunhofer IZM): Ok, than I would be happy about any evidence to correct that figure, keep in mind it should refer to the welding units which are sold today, but not the old stock, and referred to that anything that is more precise than what we provide here I would be happy to take on board here.

Mr. Couderc (AL): 25% of the market is still transformer type. That means at minimum the average is around 75 %. So that means we have got 5 % of more improvement possible. But we have to take care also with this 90 %, because it is stated here this is best available technology. If you measure according to the standard you will never reach 90 % , but only 85 % I would say. Why? Because welding equipment is designed in order to achieve not a continuous welding. So if you measure at 100 % duty cycle what we used to do at this standard, you are not at the best efficiency, not at the maximum setting. So for me this is something that we need to solve. If you put 90 % here, this is at maximum welding current, or you take 5 percent less for a value corresponding to the test standard. It's more a mathematical fact, but we can find the right solution, we can provide some information to you.

Mr. Schischke (Fraunhofer IZM): Indeed, at this point my understanding was also that there is rarely any market data regarding the efficiency. So if you have a bit better data on that of course it would be more than welcome to get the basic facts right here and also of what is achievable, and I'm just happy to take this into consideration. Much of that by now was rather guesswork, or based on some initial input, what might be out of the blue possible.

Mr. Sivitos (ECOS): I would like to pick up on this point and say how important it is for any improvement potential to be given forward to the consultants at this moment in order to avoid what happened in some other preparatory studies, where the study has been concluded and quite some time later during the consultation the data is challenged, so this is very welcome to come up with appropriate potentials now.

Mr. Faulkner (CLASP): I was a little bit disappointed on how low many of the energy savings potentials where from the different technical options we've got. So my question is how robust do you think these energy savings estimates are? Are they just results of speaking to machine tool builders or have you also have spoken to the suppliers of these equipments, such as drives, lubricant pumps and so on?

Mr. Schischke (Fraunhofer IZM): We got the data on the machinery level from the 18 manufacturers, on the top of that we got input from 3 suppliers of components, modules, specific subsystems etc. And indeed typically these suppliers than saw from their

perspective slightly or somewhat higher savings potentials. However that is documented in the report, but did not really make it into the calculations as on one hand the number of respondents was very low on that level, and on the other hand, our impression was that better to base that on the currently applied approach among the machinery manufacturers, what they state having in mind the whole system and not only a subsystem. But indeed there are indications that suppliers might see it a bit more positive.

Mr. Schäfer (VDW): I would come back to this question that not all optimization potentials that are mentioned can be used by all machine types, this is on the one aspect. The other aspect is that the effect of the optimization technique might not lead to the same result in the different types of machines, depending on the use, depending on the concept of the machine. So out of this you cannot judge just from the component potentials, but more interesting question was picked up by the welding side, where do we start from? Because we are now talking about general potentials, that out of the optimization can be the effect in the whole market of welding machinery or wood working machinery. The machine directive focuses on responsibility to optimize the machine on to the single producer and his product. So here the major question is what is state of the art, where do we start off? Do we start off the 80 %? Or do we start off the lower, for whatever reason. In our case do we start off from the state of art of the most of the European machines that have quite a lot of optimized aspects already introduced in their machine or do we start off from some very low end imported machines, who have nothing introduced yet? Because then if you start off from there you can put on new drives, new pumps, optimized concept and you reach 20 % where as when we start off we have to do something new and we may end up with 2.5 % , so that is the question, which is not answered yet.

Mr. Schischke (Fraunhofer IZM): I don't know whether you might expect me to answer that question because it is a political question, what should be the bench mark. There could be some measures just to cut off the worst performing part of the market, the least the efficient ones, or you set just less ambitious targets, so it is not really up to us at Fraunhofer.

Regarding the point what is the starting point for the analysis here, when we talk about base case and average, the intention was that the base case should reflect the products going into the market currently, regardless where they come from. But I recognize the point the survey was made now with CECIMO basically, and the companies linked to CECIMO, then of course it was European manufacturers responding to that. We don't have actually any evidence how well or not well performing are imported machine tools. At least for the analysis we could not address into account so far, it might be a point which might have been overlooked.

Mr. Schäfer (VDW): We might end up at the similar situation just picked up by welding. Quite a number of imported machines do not have the level of the state of the art that you started of your analysis. We were discussing about consumables all the time. Here



we also have to take into account, that the consumables are more or less part of the process and depending on material combination, tool and work piece that has to be managed in the machine. And therefore in the same machine you might have to use a large volume of lubricant and in the same machine for other materials you need nothing. So this is more process driven and not part of the machine.

Mr. Reintjes (ÖKOPOL): I am a bit confused about this discussion. My understanding is that eco design directive and its implementing measures are meant to cut off the worst products from the market, so we need a full picture of the entire market and then see where the worst products are and say we don't want these products on the market. And of course it comes to the discussion what is good and what is not good enough anymore, but that is my entire picture and from that picture I derive what is the savings potential, what are the cost effects etc. If we have now the European picture, if we have the sub sector of products that are already on the higher level and only come from this and see what is the saving there that is not my picture I would need the entire picture.

Mr. Bennett (EC): I got a lot of sympathy of what just Mr. Reintjes said, because I think that this is literal reading of the directive. In the few lots that I have been involved in as a stakeholder often the emphasis has been the Japanese are doing this, the North Americans are doing that, why is Europe behind? It has to cut the other way as well, if Europe is ahead than the others have to catch up. And it is quite right that for the least performing products that there will be some kind of measure that will either be volunteer agreement or implementing measure etc. Surely the way forward has to be to cut off the least performing ones.

Mr. Siderius (SenterNovem): In direct response of this discussion. In this case if we have a product category where Europe is the front runner and makes the most efficient machines. Then I would not think that the analysis that was made here is that bad, and if we conclude that there are only within this group smaller saving percentage but nevertheless we can base some requirements on that. Indeed to complete the picture what are the effects on the total market and how large is the import or what is the energy state of the other machines that would be nice to have, but for setting targets this study gives good information.

Mr. Schischke (Fraunhofer IZM): Maybe two remarks before we become too ambitious. I would really favor if there would be any data available regarding the performance of imported products vs. products that were manufactured here. But I am not aware of any such data and I pretty much doubt that there is any such data, because it is again about what is the energy consumption of an average machine, so how to compare. You could only do that on a case by case basis. So having for the exactly same application imported machine tool and locally manufactured one and then you have

only this 2 machines and not the average of the local market and the imported market. So I say that before somebody writes on the stakeholder comments that they would like to have this distinction in the report. We would not be able to fulfill it. And also a remark regarding cutting of the worst performing products, which I also see in the political discussion and how other product groups were addressed, but the methodological approach is somewhat different. When looking at this graph we start with the base case with the market average, our benchmark is the product which should represent the best case what is currently going to the market, that is not the worst performing product, that is the market average. And only from the market average we start to investigate what are the improvement potentials, and if we set a threshold at the base case level, we would mathematically already cut off 50 % of the market - that is much more than only the worst performing product. Just to make clear what the methodology is about and on the other hand what the political discussion is about. There is not a complete match of these 2 aspects, which also means that the study can in no way deliver the answer what is 20 % of the worst performing products that should be cut off, that is not integrated in the analysis.

Ms. Reis (ECOS): I think the point from where to start is very important. Even the mythology to measure the energy efficiency of the machine is very depending on the part. If you use the type of steel or other type of metal then you might have a different performance. You need some kind of methodology to measure and some kind of benchmark workpieces, then you can have some declaration of energy use. I don't think many conclusions can be taken from here, because it is a very global approach. It is not like a refrigerator. A machine tool is different with numerous functions. You should have at least typical benchmarks to be able to compare, because I don't think that it is possible to compare right now.

Mr. Schischke (Fraunhofer IZM): We briefly come to this benchmark aspect and what it could be a suitable point of reference than in the policy analysis because there are different options. Unfortunately it would have been great if we could take such kind of benchmarks also here in the environmental analysis throughout the rest of the study. But unfortunately the product is the machine tool, so that why our point of reference was always the machine tool. And also for machine tools as such at least there are some economic data, there is no data on reference work pieces how many of them are approximately produced. We would fully lose the bases of coming up with data on the European level if we would follow such kind of approach. Besides such kind of reference of work pieces is usually absent, they are not yet defined.

Mr. Schäfer (VDW): Well I think this is almost impossible. When you look at a standardized work piece, a benchmark concept, you need to have this for maybe 120 types of machines. We are talking about honing and deep hole drilling and punching and whatever, so how many work pieces need to be defined? Still then, if you take the same machine once for aluminum, and the same machine is used for titanium, it has a dif-



ferent efficiency. And for that, what is bad and what is good? So this is almost impossible.

Ms. Garczyńska (CECIMO): CECIMO agrees that there is no real bench mark, no clear methodology. You also have mentioned that we should assess the machine tool as such only. And still in the base case scenarios you include how many shifts the machine tool has to operate. When we talk about shifts, we should also talk about productivity and compare different machine tools in the scope of the study, taking into account productivity at least.

Ms. Reis (ECOS): I agree it is very difficult to have different bench marks, but when a customer is buying a machine, he has usually a reason for that for example to cut thin sheets or thick sheets. I think it is not difficult to identify the needs of a customer, if he wants to buy a machine for cutting aluminum, he would not be so interested in cutting titanium and I think a consumer should be more informed of what he is buying.

Mr. Schäfer (VDW): This is very theoretical, because the customer does not buy the machine because of the energy efficiency. He buys the machine to produce a specific product, and these are requirements, he has thought about in designing a piece. That is what he has experience with, that's why he discusses specific production topics with the producer of the machine tool, and even taking into account that there are different technologies to reach the same goal. So even there it is not possible to compare. We have turning machines that produce parts of your watch with a size of 2 millimeters and other processing workpieces 3 meters long. How do you want to compare this? I don't see a solution for this.

15:20 Presentation Task 7 Report

K. Schischke / E. Hohwieler

15:50 Discussion on Task 7

Ms. Reis (ECOS): When you talk about 10 % improvement in a voluntary agreement, so you can say that for a very bad machine it is easy to improve 10% and with a very good machine it would be very difficult to improve by these 10 %.

Mr. Schischke (Fraunhofer IZM): In this scenario we do not talk about 10 % for each individual machine tool. That would be up to the formulation in the voluntary agreement. The overall market target should be 10 % better than then the business is usual, and that would be up to those who implement the voluntary agreement to set the rules, how to achieve an overall 10% improvement.

Mr. Schäfer (VDW): I have the same question on these 10 %. When I have the numbers in my mind, what you presented on the best available technology, we had 2 %, 3 %, 5

% and then we were talking about 100 % of the market. Now you have a voluntary agreement where you do not have 100 % coverage. You come up with 10 % which is by more than double. So what is the basis for this assumption? This assumption of course is crucial. You say in these scenarios there are huge savings in the voluntary agreement and it may appear appealing compared to regulations but what it makes it appealing is your assumption of 10 %. That's why I have asked for bases for these 10 % percent assumption.

Ms. Baton (CLASP): I had the same question and I wanted to add something, could you explain this, how these 10% are distributed? Would it be a responsibility of the manufacturer or the buyers? In terms of market surveillance there are consequences I guess.

Mr. Schischke (Fraunhofer IZM): Luckily I am not in the position to develop a voluntary agreement. That is not our task here. Our task is to watch the market whether is there any kind of a voluntary agreement out there which could qualify as an alternative to an implementing measure. We are now in the position that there is no such voluntary agreement on the table, neither in place. Our scenario is only: If there would be a voluntary agreement, if somebody sets a target of 10 %, what would be the effect on the total market? And we see here that the effect of 10 % would be higher than what would be the effect of implementing the logic of the EuP approach, following the methodology of the study. We also could have assumed a 5% savings target or 20%. Then you can draw the graphs by yourself, it is a simple correlation. It was rather to acknowledge that some developments are going on regarding the voluntary agreement. I haven't heard of any target yet what should be an improvement potential reached with such kind of voluntary agreement. But it is an essential requirement, if a voluntary agreement is accepted as an alternative for implementing measure, that it should be measurable, verifiable for the target. We don't even say whether it should be 10% per machine, or 10% per workpiece, or whatever kind of benchmark. The effect basically would be the same here.

Ms. Reis (ECOS): Related to the machine tools, you are talking about products that have a very long life time and the impact of the new machines' improvements is considered small, but we cannot use fiscal and financial instruments to accelerate the replacement of old machinery or retrofitting? That would have a higher impact on the environment if we look at the older machines that are now in the industry. If they were some kind of incentive to replace these, this would have a much larger effect than just in 20 years for now.

Mr. Schischke (Fraunhofer IZM): Right, we were supposed to look at the fiscal instruments also in the study, and I would fully agree giving the long lifetime fast replacement of old inefficient machine tools by new ones could have significant savings potential. Although the only approach what we passed by was this kind of scrapping bonus, which was already discussed in Germany back in 2008 also for machine tools or



for machinery as such. It was not really supported by the industry association. It might have changed in the meantime as the economic situation changed totally.

Mr. Bennett (EC): When I come back where I come from, which is the heating and boilers and wider heating equipment sector, the problem there is, the worst scrapping schemes were incentives for individuals. That piece of heating equipment is sold directly to the consumer. It's the consumer who directly benefits. But most members states now run away from that with the economic crisis, which is sad, because it means everyone looks after its own money. There has been a big drop in people investing in new heating equipment. Whether the same constraints apply to a business to business environment would be an interesting discussion and something that we would need to look at both, Fraunhofer to look at these things, but also to get feedback from industry and the end use. If you have any feedback on similar related projects, FP7 etc, where there might be socio-economic as well as environmental benefits to say what these savings are. If you have any information, any ideas, on this I think we can enliven the debate. We, Fraunhofer and I and my colleagues will have to answer that question at some point.

Mr. Schäfer (VDW): I still don't see any solution out of this question. I think that position at least from the German view point has not changed that this is not a sufficient solution. Especially with the background that, what is purely supporting the invest in the new machine, taking an old machine off the market is not enough, again we need to define eco efficiency levels. I do not think we want to support it with extra bonus or financial support new inefficient machines put into the market again. So we would need additional criteria, which are the same criteria that we would need to implement SRI or something else, it is always connected to the same question.

Mr. Bennett (EC): It can't be that the basis is just purely how old is the machine or how new is the machine. It obviously has to have some kind of performance that offers added value in every sense of that phrase. But then we come back to this rather awkward question, we don't have the proper base line apart from the life and impacts of a machine tool. The work pieces solution does not seem to be workable. There seems to be no agreement on what a cycle might be. So therefore ultimately we have no benchmark apart from what is the population of the machines now on the market, what are the new ones being sold and put on the market. And then we have to estimate what might happen in the future. But that is all we have to go on at the moment. If CECIMO or any other stakeholder can indicate a cycle that might be useful for the multitude of the machine tools, I would be happy to hear about it.

Mr. Heisenberg (TRUMPF): I have a question concerning the voluntary agreement. If you implement a voluntary agreement with the aim to achieve 10 %, what would be

attractive for the industry to do this, if the implementing measure has much lower goal?

Mr. Bennett (EC): I suppose the attraction would be that if the implementing measure would become legalistic, than if you go ahead of that and say you do 10 %, and “Mr./Ms. Commissioner, I guarantee that we would reach 10 % “, I would expect, that my superiors would say 10 % is good enough.

Mr. Tollit (European Power Tool Association): I would like to pick up your point regarding the product carbon footprint label. As you now, we as an industry have done some work on the developing the procedure on how to measure such a thing on power tools. We have not done it on light stationary, and we can work through that, but it is a very difficult thing to achieve. We have a lot of sympathy with your statement, and your question that you are asking on task 7 report: does transparency regarding life cycle options guide purchase decisions and is it really an incentive for manufacturers to develop equipment with a low footprint. Two points of reference: one is that DG Environment is working at the moment to establish guidelines for environmental footprinting which includes carbon footprint. And so far what we have seen of it, it is incredibly complex and not necessarily pragmatic to implement it. But secondly DG Energy wants to study on product labeling options and the consumer understanding of them, and they are doing this on the back off perfusion of labels that the consumers currently try to understand. We have great doubts that product carbon footprint labels would truly drive the right purchasing decision in an environment which is very price sensitive. It may force the opposite effect that you are trying to achieve and in order to drive the product carbon footprint down you have to add cost to the product.

Mr. Olascoaga (Ideko): Concerning the voluntary agreement, I think we have difficulties in order to quantify to define efficiency indicators. The forecast for 2025, the machines will change, I think we will have new capabilities, new functionalities. Now we have problems to compare machines that are produced in this year. I think we will have much more problems in order to compare the machines that are produced now and the machines that will be produced in 15 years. The other thing is, that efficiency is not the major issue that machine tool users are demanding. They are demanding more availability and precision which are in fact key aspects for the efficiency of products. Putting that kind of objective could lead to reduce the power installed, and I think this could even go against the interest of a machine tool user. Increasing the precision of machines, increasing availability of machines, very often is against the efficiency of the machines. We have to install measuring system etc. and this is of course increasing the power of the machine. So I think that is a little bit risky for the machine tool sector.

Mr. Schischke (Fraunhofer IZM): Once again, the 10 % not necessarily refer to a machine tool as such. It could be a productivity indicator as well. It should not hamper the productivity of the machine tools, or the functionality of the machine tools; that is definitely not the intention. I think it could be a good way forward if that is pushed as a



voluntary agreement, because than the manufacturers themselves are in the position to define how to balance productivity, functionality, and energy savings and not to implement something just because that is the legislation.

Mr. Weber (EUROMAP): Talking about the plastics processing machinery and related machinery in general, I am still unhappy that they are mentioned in task 7. In task 1 you made some great effort to find out that plastic machinery is different from other machine tool. You say in task 7 no further analysis is provided, and you can't apply the design rules. So why do you leave the plastic processing machinery in the study. For Euromap we have still the opinion that plastics and rubber machinery should not be in the study because it is also a little bit confusing: first you talk about machinery, plastic processing machinery are not machine tools, and then you come back to plastic machinery only to say no further analysis is provided.

Mr. Schischke (Fraunhofer IZM): That is the point we had in the beginning regarding the related machinery, which was agreed with the European Commission not only to look at the machine tools, but if similar potentials are visible or similar technical options might be possible in other machinery as well, than not just to draw a scope boundary just because it is not called a machine tool, but have pretty similar components and modules. And therefore right from the beginning the conclusion was, the plastic processing machinery is not considered as a machine tool. Although on the modular component level some conclusions we draw from the study might apply to them as well. And now we end up in task 7 with the recommendation of this design checklist approach, which is not a specific requirement. It is very generic. It leaves open the design decisions in the end. So in the end the engineers have to decide what to take on board, what to implement, what not to implement. And if a requirement is defined like this, I don't see why such kind of an approach should not be applicable to plastics processing machinery and the textile industry and others as well. On that level they are comparable. But that does not match with the main energy consumption of plastics processing machinery. We look rather at a side aspect with that approach.

Mr. Weber (EUROMAP): In my opinion the reader might think that plastics processing machinery is more relevant than other related machinery, because that is treated separately here. Is there any special reason to treat plastics machinery separately under related machinery?

Mr. Schischke (Fraunhofer IZM): It is just because Euromap cordially provided some additional evidence here, to make the case of plastics processing machinery clear. We cite these findings here. But if you don't want to cover this under the policy analysis we also could delete this part or shift it somewhere else. Needs to be discussed with the EC as well.

Mr. Reintjes (ÖKOPOL): I have two points on this task 7 in general. Regarding the type of implementation you made a broader picture. I recommend to focus more on the implementing measure of the regulation. If you have a long preparatory study, having a lot of details, and in the end I would like to have a starting point for political discussion on potential regulation. It does not hamper that we have parallel discussions on voluntary agreements. I think we need at least this starting point for implementing measure discussions.

We often had the point that there is no information, the machine tools are so different etc. I would be happy if an implementing measure could serve in a medium term for transparency, to have standardized information in a first step, creating information and data, and in a second one to see what is feasible then. I had a problem to really understand what your suggestion is, or what would be the options for the regulations. In your presentation you came from the other end, what is the nature of the measure, what is the reference, what is the type of the information and in the end you came to the scope. In your sectoral table you come to the options for implementing measures. I don't really see what you describe here in the end of this table 7.7 does this refer to everything what you were writing before? For the reading it would be far easier if you have a clearer picture of: this would be the regulation, this would be scope, and this would be the requirement. And from then we could start the discussion on political level: what is feasible, what is not feasible.

Mr. Schischke (Fraunhofer IZM): I am also not very happy with the structure of the task 7 report. Although twisting it the other way around is a little bit problematic. If we would start with a frameset of options it would be actually this one [pointing at the slides], depicting the major conclusion for the different sectors, which kind of approach is feasible and what could be the policy option. There are still so many side aspects to be considered that we don't feel in the position to propose draft implementing measure as many aspects are not covered yet by standards and the like. We list here the possibility of a voluntary agreement, but details have to be developed by industry itself, so we hardly can propose this as a preferred option currently.

Mr. Reintjes (ÖKOPOL): There is no voluntary agreement - that is one part of the answer. And the other answer is: for the political discussion we need a draft working document. So either there is a suggestion in the preparatory study, or the Commission has to do that later. I would suggest that it would be easier for the Commission having such draft, that's one thing, and for the political discussion it is an easier starting point than having an open forum where everybody starts an interpretation of task 7 again.

Ms. Garczyńska (CECIMO): It is not a subject of task 7 to develop implementing measures. The study is supposed to support the industry as well as the European Commission in looking what options could lead to a more energy efficient European economy in general. Any discussion on the implementing measures should start after the decision that such should be developed and it should be done with the close coop-



eration with the industry. So we are in a disagreement on having any draft of implementing measures done in the task 7 of the study.

Mr. Couderc (AL): If there is no implementing measure in task 7 for other sectors, why is there one for welding?

Further questions: In task 4, table 4-2, it is said what the Base Case is. It is 76,8% efficiency for 3-phase, and for the short-term you propose a limit of 80%. That means with the implementing measure in task 7 you at least ban 25% of the units from the market. It is possible, but you also can achieve the same result with setting this as a mid-term target, just to make sure to communicate properly higher costs to the customers. I think the first tier should be not more stringent than the base case. Secondly, on long term you propose 90% at 6 years. Looking at the market today, it is not sure that this is feasible within 6 years. We know 85% is possible with inverter technology. Why not proposing 85% as a long-term target, which still ban the transformer type and makes sure the shift to inverter type.

Regarding the DIY market, what is good is, that this market uses single-phase units only. And if you follow this “minus 5% philosophy” you could have also an improvement in the DIY market with reduced impact on the costs.

Comments will be provided in writing.

Mr. Sivitos (ECOS): I don't remember if it was on the motors or the circulators regulation in tier 1 40 % of the market was wiped out so that is not an argument not to have such an ambition for tier 1, but of course I understand your point. I would like to pin point here, that tier 3 is very important, because it is sending a long term signal to industry. Tier 3 is definitely something that we would support in the implementing regulation, with a revision clause. And finally task 7 indeed might not be a place to put forward an implementing measure, but we would like to make a transition to the next phase faster as we have seen the eco-design process in past years to be too slow.

Mr. Dürer (VDMA/CETOP): Only a little remark you have in task 7 a comparison between electrical drive and hydraulic drive which we would like to change, we would give you a written comment on it.

Mr. Schäfer (VDW): When we look at the self regulation initiative the 10% improvement you propose is not corresponding with the state of the art. And it is easy to say that somebody reaches 20 % and in the average 10 % will be reached, but how can you enforce this? From this viewpoint we really need to do an analysis on the details we have discussed today. And out of this the implementing measures or self regulation initiatives can be described. And I think that this is not a very fast process.

**16:50 Closing Remarks
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K. Schischke / M. Ben-

Mr. Bennett (EC): The next step is also crucial, what do we do with all that huge amount of information that we have accumulated. The message from the Commission was that, at least what I have heard within DG Enterprise and I think DG Energy would follow these lines: We will take what we can, if maybe one or two machines tools categories could be legislated we will go for that. If one sector will go into an agreement, we will go for that. To those who have not made lot of contributions, we will send out a strong signal that you won't get away with it. In the end I hope we will be looking at something that would be a win-win. I think the sector is too important to neglect both positively and in terms of carrots-and-sticks; all options are open at the moment.

End: 17:35.

