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I have finished eating hahaha OK uh and I'm sorry for no dare I.啊呃eleven student in the class。well，it's a for。for me，it's no problem，呃，we，呃。we had the lesson as it is you are recording this and that you are providing the information.we have a lot of powerpoint slides which can be forward. i don't know,do we forward,uh,uh,fuyin?yes,I think miss we,miss we will stand the powerpoint in the we chat group chat.t she shares these power points,yeah,so the students are in principle get best documentation. we can provide.啊，摄像头没有关。哦，没摆好是吧？哦，对OK。88。哈哈哈。啊so only today is holiday or this week or how many days？t it's only one day,but tomorrow the you know it is that tomorrow is Saturday noon,that is Friday.Saturday and the day tomorrow is also er well,many people make vacation on exactly this day because it's bridging.eh,the weekend right? OK,OK,yeah,so people are here somehow,um,in the mood of doing vacation.normally,it's no problem because er we are having here rainy and cold,but today er it's even Sunny er.OK呀，那我们呃还是麻烦课代表把这个名点一下啊，这个呃那。呃，同学们，这个这个课应该有30个学生是吧？对对，孙瑶来了吗？哦，来了啊嗯就。呃呃，孙杨will a record the a tendency呃，you can see from the camera a camera，there are more。a student coming.OK,yeah,no problem. OK ay,so let's start.一样OK。so last time.we have talked about the different types of factories,the so called high tech factory,which is for very er complicated products,by the way.eh,also this e hemmer and art,so this this vaccine,which was again for covet.eh,it's also a high tech factory,although it is it has been moved into a building which was already existing.所以there has not been built new。but here semiconductors,eh?factory with a very clear structure of product lines.this is the low cost factory where just only one hall after the other is or one hall. one expansion is done,then second expansion,third expansion.anya until we see also see that the that the area is not well structured,it just filled with buildings and that's it.um so from a factory planning point of view,it is locos whatever they do inside is another,May be another story.but the local and the factory itself is,yeah,erin the end,not a real,not a specific.呃，design。eh,also the question is,look here we see on on.here we see also that er that the parking area so er. it's also not well structured,of course er.but it's the low cost factory. and then we have assert the fast factory,high tech factories are mostly also fast factories.嗯，好的，那我们上一节课呢，也给大家呃展示了几个案例啊，就是关于我们这个。呃，从factory planning的角度来说，哎，这个是呃，怎么样的？这个呃，一个工厂，那我们呃，给大家一开呃，看了一个是这个high tech的factory是吧？它这个。呃，应该是一家生产芯片的公司，那它的这个厂房呢？互相之间呃，有两个主厂区对吧？中间还有很多的联通环节。然后呢？呃，那一般来说呢？呃，就像现现在这个平面图里面所展示的，对吧？它的各个的。这个呃，不同的原材料部件和这个装配线，它之间都会有一些呃交互对吧？然后呢？它的整个流水线的布置的这么一个规律去呃，做它的工厂。然后呃，另外一种呢，就是我们所谓的比较低成本的呃，工厂那呃，它这边呢，就没有什么所谓的设计感啊，就是呃，等于说它只是一个厂房，跟一个厂就是一个厂房，一个厂房的堆叠。啊，建筑的堆叠，它也没有呃，特别的去呃，就是在呃搭建的时候，它就是把厂房建起来，那我们是只是从这个存储这个。呃，工厂设计的角度去说啊，但是呃，至于工厂里面呃，是不是呃，它这个到底是呃，这个人工的还是high tech的还是怎么样？就内部我们不管啊，我们是从。这个工厂设计的角度来嗯，说的那OK，那我们看到就是一般现在的这个high tech factory的呃，平面图呢呃，也是我们所谓的这个所谓的这个快。fast，fast factory就是呃，快速的这个工厂或者说是比较高效的工厂啊，它的这样子的一个平面图。OK,why far fast,because what we see is we have here clear logistic axis in a factory,so here we have.er,let's a an an an isle where the goods can be transported directly to this isle and from here.it can be sent directly to the corresponding pre assemblies it could be also er sent into such a buffer.and then sent directly to this ya central assembly line.so er here,we see that the fast means it is a direct ways,no er,no loops,er er er and immediate.看kind of immediate。呃，immediate transport。好的，那我们这边的这个fast呃，它的这个意义呢？就是说它整个的流程对吧？是非常快速的，或者说是它的这个企业内部的。呃，不管是它的物流也好，它的整个的这个产线的呃呃。它从原材料对吧？到最后的这个是的组装的流程呃，生产流程都是呃，可以很顺畅快速的进行的，那我们可以看到啊，从它的这个呃。供应商这边拿来的啊，不同的组件也好，不同的这个模块也好，到我们的这个装配线上对吧？和它的呃，不同的这个。嗯呃，不同的这个呃，这个部部门的交互对吧？就包括一些预安装的部分啊，包括它的这个主要的这个呃部件的这个呃，流水线式的安装对吧？到最后的这个。呃，包括出库，然后呃，最后的这个嗯呃。服务对吧？等等的那呃都是呃，非常的呃，顺畅的，或者说是中间都是没有间歇的，或者说是没有所谓的loop，对吧？没有那个。呃，间隙那呃都是呃，这个顺着这么呃，留下来的，或者说是它是很顺畅的一个，这个一一条流程。哈哈哈。now the next one is the er what we have discussed last time is the assembly line of the smart,the smart car.er,which is er looking like a crosser here and in fact er the.we have a chain in the system here and on this chain they put they hang the cars.eh and then they are er transported throughout the complete building.umer hanging on this chain and once the once the car is delivered,the chain still is continued and here ready.er to catch new cars and then it is they start again to transport,so here we have a very special factory,the so called cooperative factory.and it means here we don't produce nothing. here we just only assemble,we could also call it the assemble factory.but to a certain extent,it is cooperative because also the suppliers are somehow integrated.嗯，好的，那我们呃这边呢？呃，这个案例其实之前包括在呃呃前面的讲义中也给大家讲过，现在是看到它的平面图，这个是。呃，smart在德国的这个工厂对吧？这也是我们工厂设计中一个比较经典的案例，它是一个十字架型的，对吧？那呃。整个的这个呃，我们之前也跟大家说过呃，工厂的分类对吧？那这个工厂呢？呃，只做这个assembly对吧？就是主要还是做的这个组装的工作那？那我们从这个意义上来讲呢，它也是一个组装的工厂呃，那我们的这个呃，整个工厂呢，它是呃，为什么叫它这个cooperative factory呢？是因为。它这个十十字的这个模块的周围啊，这些包括bors啊，reynolds啊，这个啊um OS这些都是它的，这个供应商对吧？然后我红色的这一条产线是我的主装配线。那这个主装备线，刚才教授也跟我们讲了，是它是就是我们呃在有的视频里面也看到过，对吧？它是汽车的这个白升啊，它都是挂在那边的，对吧？它这边是一个所谓的黑in line，就是一个。这个这个一个一个这个嗯，我们叫。我们叫这个呃，这种悬挂式流水线，那从这个起点到到这个最后安装完了以后呃。这个测试完以后，那它就直接和外部的这个呃火车对吧？它是外面的跟跟它的这个外部的交通网也都连接起来了，然后呢？呃，这个运完以后呢？它又再回到这边起。对吧，这个呃，这条这条这个呃，流水线那我们可以看到啊，它这个cooperative的cooperative就是说所谓的合作性工厂呢呃，包括我们那天的特斯拉案例里面也。也是说的对吧，现在它很多的就是我的诶呃，主装配线我的这个呃。OEM的这个呃车厂对吧？都是喜欢把我的这个呃周围的这些大的呃，或者说是呃我的供应商主供应商对吧？让他在我旁边设厂。那这边呢，包括整个的厂区的设置跟供应商的一个呃互动，对吧？包括我们这边的交通线什么的，所以说我们就是叫它。呃，这个呃cooperative呃partners对吧？然后呢？它包括呢？它和我它的partner之间呢？也有一个就是他们有呃里面的系统呃，包括的整个物流线也都是对接的。嗯OK。and what we see is that the suppliers are now very close,so we have short distances from the suppliers to the car.eh,and this is part of the so called PR operative to have short distances,although they are independent right.they believe this belongs to the corresponding this real estate belongs to the supplier.but it is in principle the supplier has to rent it,of course what we have here is the so called eton parts with denim it nobel.which is the the the plastic pieces?the big plastic pieces of the door of the of the front area of the side area.so in principle,this,this is with a normal car. it's made of steel,but here it is made of kind of plastic.because with the plastic,they can colour this here directly,and they do not do it in the paint shop. the painting of the big parts of eh?the smart is done exactly here.ander and then provided,of course,here because here the doors are then assembled to the car.嗯，那我们呃也是看到啊，它周围这些供应商呢，他虽然说呃就是为什么要把它放在这个十字的周围，因为它这样子的话离它。这个组装配件离它的主场很近，对吧？那我就是啊，保证了这个距离短，对吧？那就是呃，跟我的这个组装线可以快速的来对接，但是呢它。虽然说是近，但是还是属于每家厂各自的，对吧？它还是一个独立的公司，它并不是说是呃，属于smart，对吧？它这边还是每个公司都是独立的主体。那呃，这边呢呃，像我们也看到啊，这这边呃，教授也是说到这个所谓的Adam parts啊，是在这个在denominator nobel这家公司来做的一些塑料件，因为呃，大家应该也见过smart。它那个车对吧？有很多人都喜欢做一些个性化的呃，这个涂装啊，或者说是有一些个性化的插件啊，对吧？那它这些呢？就不是在这个paint shop里面，就是有汽车件里面做，而是。这些塑料件或者说是贴片，或者说是一些个性化的，这种装配件，它就是在外面呃就呃这个定做对吧？然后呢呃也在那边涂涂好油漆。然后呢，再最后来装上来那呃，这边呢也是一个比较特殊的，或者说比较有意思的一个地方嗯。what we see as well is the socalled railway track.which is an integrated part,so we are not only considering the factory itself here,we also are considering supply chain elements.eh because eh,everything is very close together and even the distribution of the cars finally.is organized by the railway and we have regular trains to different cities like like iness in a normal city for passengers.for people,eh? here they have regular trains to different cities transporting the cars there.so er we have a fixed schedule and this means that the factory has to be very flexible.because because it has to adjust to make sure that all the cars which are needer wanting to go to join the train,let's say at two o'clock.they have to be here at two o'clock,otherwise the train starts and the cars are still.still in the area and have to be parked somewhere,this happens by the way to big companies frequently that they have very big parking areas.where the produced cars are stored and this is tried to avoid here in this factory just by producing just in time for the train.i enter eh also for the trucks because eh also a lot of eh.cars are transported by a track in,I think it will.was twelve cars can be transported on a truck and if a truck would start and one car is missing then already round about ten percent of the car of the truck is empty.and so they optimize the complete flow and therefore we have were very close fun actions and even to the train or to the distribution. and that's the.the so called cooperative element，嗯，好的，那我们这个工厂的这个所谓的合作性呢，不仅是在它这个呃，这个组装线对吧，包括跟周围的公司。包括它最后把我们的这个供应链这一块也给整合进去了呃，我们可以看到这儿的railway track对吧？那它这儿等于说是呃。成品的车辆出来以后呢，它能够直接对接到这个后段的运输对吧？那我们这边的railway track呢？就跟正常的铁路线是一样的，对吧？呃，货运的它是每天有班次的，对吧？每天有几班火车？那呃，所以说呢呃，因为它的这个最后的运输的需求，它比如说每天哎，下午两点前呃，你这边必须把所有的。生产完的，今天生产完的，你都给装上火车，对吧？那我这边的话，它呃等于说生产过程中它就要有非常的。大的一个掌控性和灵活度，对吧？就是比如呃，就是需要呃just in time produce，就是我们要赶着那个点，对吧？那呃，那刚才教授也是说了，就是我们有很多别的一些车厂，就是因为它运输。上面啊，它这边可能诶，今天呃生产的全部运掉了，或者说是诶，这次没赶趟，那它可能就运不掉，那它有很多公司就是在。这个呃，会有一大块的，这个场地对吧？在这个呃factory的旁边，它会播一大块的场地来放这些已经生产好的。这个呃，车辆对吧？就是等待运输的车辆，但是现在我这个smart他们家呢，它就是呃，就是为了避免这种大量的呃，这种空间对吧去呃，浪费掉，或者说是去放置这些车。它所以说呢，它的生产就是都是按照我们的它的这个运输班次去做这个just in time的这个生产那呃，所以说呢，像我们一般来说我。嗯，大家应该也看到过那种装汽车的，这种呃大卡车对吧？一辆这种大的，这种卡车大概能装上12辆。呃，这个小汽车那像呃像这边呢，它这边也是要看哎，我这边生产好了以后，然后呃，那我这边就可以避免有这么多的这个空间，对吧去？而而而不用这个大卡车，我就直接对接我的铁路线嗯。this factory is also called the socalled breathing factory,so it is adjusting its capacities.according to the demand of the produced cars in principle,the production is designed for seven hundred cars a day.and eh but sometimes they are having in a week maybe er five thousand cars.and a suh or a shift is and and sometimes they have,uh uh.in a week,maybe two thousand five hundred,and so they can do adjust the shift models er either to produce more or to produce less,they nevertheless.they never want to produce cars for the for the yard,where no customer is there.so what they do then is week. for week they adjust the shift model,and this is called breathing because.it is sometimes bracing strong and sometimes bracing only a little,because when there are not enough customers in a week.好的，那我们看到这个工厂呢，我们把它一个角度上称为它的这个cooperative factory，对吧？它的这个合作型的这个包括跟我们的供应商，包括最后的这个运输线，对吧？这个铁路也是它的，这个cooperative的一一环，那另外一一个从另外一个方面来说呢，这个刚才那个从just in time的这个。呃，生产呃来说呢，它也我们也把它称为一个呃，所谓的bracing呃factory就是它是律动的，呼吸的一个工厂什么这个是怎么来理解呢？就是呃，这个工厂呢？它的呃产能设计呃，它是可以生产700辆车呃一天，但是呢，有的时候可能订单这周的订单多哎，可能我需要生产5000辆。呃，那下周的订单少，我可能只需要生产2500辆，但是呢，我不会呃说诶，因为我生产的多了，然后我就。这个呃，需要一个很大的停车空间去置放，我的是多生产多的这个车子啊，这个是它避免的情况，因为它会根根据。呃，这个工厂呢？它会每周根据它的这个产能的需求，订单的量的需求去调整它的这个排班就是包括生产的这个排班，包括它的工人的排班，也就是说。呃诶，这个礼拜我只有2500辆的需求，那我很多工人，我可能就让他放假去休息了，所以说。呃，今天呃，这周要生产的多，那我就多叫一点工人，或者说我就要排多一点班，多开两条产线，所以说我们就叫它是会呼吸的，这个工厂因为它有的时候呼吸强一些，有时候呼吸弱一些。那它就是按照这个不同的需求来调整我的所谓的呼吸的强弱，那就是调整它的产能和排班。now when we呃。look for the socalled breathing factory,what does it really mean er? this was my example here that we see that the customer orders for.week or or er with a two weeks lead time,it goes up and down and we can adjust a capacity.of our of our factory to this demand and this is done here where we see that on on the different days.er,we have the different capacities er which can be produced according to the production programme planning and sometimes when we have to do a lot.the ner even the saturdays is er,then the shift is working but maybe or here we have two shifts or two volumes.and here we have only half of the production of a day。嗯，好的，那我们具体来看一下啊，什么是bracing factory？那我们看到这边的呃举这个案例啊，我们的。这个客户的订单对吧？呃，这个一周或者说是两周的订单，我们看它的这个每天的曲线对吧？这个是数量对吧？这是时间，那它是有高有低的。那我根据我的客户的订单来制定我呃，每周的这个生产排班对吧？每天的生产排班之后，从周一到周六对吧？一般来说周日是。呃，休息的嗯，那呃，就是在我订单量多的时候对吧？那我可能。我就一天排两班，或说是排三班，对吧？那订单量少的时候，那我可能只要排一班，那就是根据我的订单的不同，我来呃。我来这个排我的整个的production production planning就是我的这个生产安排，那如果实在有需要，甚至可以在礼拜天加一个班次等等的，对吧？那就是根据他的实际的客户订单的需求。来排我的生产计划。all what we see here is then the peak we got his line,then we see the peak is one day where we produce up to.ayad this volume and AH low a level is done when we go this way.though letter should be this one and then on that,though of when on days where we have less to do.there should be there,there confused and then the volume is is smaller.and呀。好的，那我们我们这种呃排班呢，它一般就是适用于的是这种短期的啊，就是呃不呃，理论上是一般都是不超过两周，一般都是一周一排嘛。然后呢？那我们看到这个图里面，它是也是为了一周的生产计划进行排班，然后它是两周，因为它的就是指的这个我的整个生产规划，我要看前看后嘛，对吧？我只是为我这周排班，但是。还是要往后看一下那。我们再来看这个图啊，就是说在我的唉，我看到这边是一。一个生产顶峰，对吧？这个是一个低谷，那我对应的，我做相应的班次的调整和排列，对吧？然后呢？嗯，那我这边呢？一般来说呃。呃，这个周一到周五呃的排班就是你看它这边周这儿对应下来，周一它就没有排班对吧？然后周二它就会排的多一点，那像这种呢，一般来说就是根据它的这个产能。去呃，或者说需求量去调整我的产能，然后呢呃？哎，这种呢，就是上上下下的，那我们就把它叫做呼可呼吸式的，可以调节的，对吧？就是呼吸的会呼吸的这个工厂嗯。yeah,and with this er,of course,the shift models are designed,and they say,OK,on Monday we have three shifts until.Tuesday,Wednesday and on Friday they can have only two shifts normally,but in case there is very much to do,they have an additional shift and even sometimes in case the peak is even hard.they go for the Saturday,so this is then the kind of flexibility they try to use. and if the demand is less.then they even can try to have only two shifts on in the night. let's say the night shift is then.er skipped so there have a lot of possibilities to adjust the capacity of the factory to the demand of the customers.好的，那我们有了这个呃，我的这个产能的呃，这个规划以后呢？那我要根据这个规划来排班，对吧？那我们一般呢就是。呃，三班制对吧？早班中班和晚班那呃，周一到周四呢？那我可能我根据这个产能情况，我都是排排满三班对吧？那周五周六呢？就看诶根据这个。呃，生产计划对吧？如果说是它的这个呃，产产就是需求量比较大的话，那我可能周六还要加一班，对吧？如果说是我的这个产产量，或者说需求量不足。那我有可能呃，甚至周一到周五，我也只需要排两班，我晚班就不排了，对吧？那就通过了我们的。这个呃，客户订单去呃，先做我的这个产能的呃排班对吧？然后呢？根据产能呢？再定我的整个的呃，工人的排班制这样子呢去调节。呃，一个工厂，它的这个嗯。每天的哎，需这个产量对吧？包括它的这个整个的动态，那这个呢？呃，它的这个自由度的调节那？这个呢，就是我们这种呃工厂呢，我们就把它称为这个bracing factory。at this,this let's say this time shift model is sent to the suppliers as well,so the suppliers should then know how many cars are produced every day.and then they produce their cars,eh? some of the or their pieces they supply,they produce their pieces.and some of these pieces are sent directly to the assembly chain,and some are going to a buffer and then to the chain and for the chain.US to say that this is the this is the chain about which we are talking. it is here more as ketch,but this is the the chain so.they are sending the chorus some pieces directly to the chain,specially the big pieces and smaller pieces are sent to a kind of buffer.it's a very small Warehouse which,and from there.they also bring the goods er to this ya to to this chain，嗯，好的，那我们刚刚前面也看到啊，这个主体的。主体的这个安装线，我们是在这个十字架的这个厂房里面对吧？然后呢？那我们这边的生产计划呢？就根据我们客户订单而产生的这个生产计划呢？也会共享给我们这儿的supplier对吧？我的供应商，那我的供应商呢？也是根据呃，最终的这个它的组装线的排班去呃，进行自己的生产流程，对吧？那他也会再根据呃，我这边提供我的production program，然后做。它的整个的这个排班系统，它们之间的信息是共享的，那呃，我的这个supplier就是我的供应商，他的生生产完了以后呢，有一部分就是刚才我们也看到那个识字的那个模型呃，这个。图对吧？这个它的这个layout那它有的呢？是直接就对接到了，特别是那些大件儿，对吧？就是像可能是像门啊，这些的大件儿它它生产完我的这个供应商生产完呢，它就直接对接到了。我的这个组装线里面了，就是我的这个传送带就直接连到它那边去，有的呢，它生产完就是，比如说是一些个性件或塑料件呢，它还是会放到一个所谓的buffer，就是缓冲区一个小的仓库，缓冲仓库里面。然后呢？再从这个呃，这个所谓的缓冲区缓冲仓库再去对接我的assembly呃，就是再去去对接我的组装产线。yeah,a dead from here,the of course the the deliveries to the trains is also then planned,putting here to the customer.at the beginning,they have started with trucks because they could not feel complete the trains,so they had to adjust capacities.because track transports only twelve vehicles have to adjust capacities to the real demand,which of course.cannot be changed too much,saying OK when we are having very low volumes,then we can not tell the train are we only use half train.er,so when we are trying to integrate er more inflexible,inflexible transportation means.we have to be more careful and there the solution in the end is to have a let's say a core transport volume with the train and all the additional transports.which are more than the standard,let's say the minimum could be the kind of the minimum volume.this is transported then by trucks，嗯好的，那我们这边生生产完了以后呢？后面到呃这个客户端呢？它的呃量也是一定一点点积累的，对吧？在前期的时候它可能量不多的时候我们。呃，就会用这个卡车来运，因为呃，刚才也说了一辆卡车，它大概能装12辆车对吧？但是呢，一辆火车，你可能就要装几百辆车了，但我不可能说哎，我这个。火车不满，我就开掉了，对吧？我半个车皮我就走了，所以说呃，这个呢呃，在比如说它的客户订单这周不多的时候呢？或者说是量比较少的时候，我可能也会考虑说是呃，还是用这个呃卡车的这种形式对吧？它这个互相之间也会有一个补充，因为嗯，火车呢，实际上相对来说是一个。又不太灵活的运输方式，因为它的这个量也大，对吧？那你的。呃，运送的这个呃周期也会比较长，那这个呢？就是要看诶，我根据每周的这个生产的安排，我来看诶，到底是不是呃，如果产量低，那我可能也会还是选择这个。直接用卡车预定掉好了。now we come to the role of enterprises and eh? these enterprises are having.um,a considerable impact on society and they address eh several levels. eh,we can say they address politics.they address public administration. they address society and they address the citizens.嗯呀，好的，那我们这个呃，我们所谓的这个factory planning对吧？我们的客户其实主要面对的就是公司对吧？enterprises。公司那公司呢，它就呃在做决策之前，它各就是公司本身，它是有自己呃的不同的属性的，对吧？它有它的这个呃社会属性，它有它的政治属性。它有它的这个社会责任，对吧？或者说公共责任，然后呢？它也有这个面向呃，这个包括我们的面向公民，或者说是呃。它的一个这个呃对对，它的这个企业形象对吧？它有它的面向公民的一些属性嗯。er,the politics is creating kind of frame conditions in which er let's say such enterprises can be.uh,can operate and one of that is,for instance,uh,how to manage the supply of pieces from other countries?normally,we have a lot of customs problems and when people are wanting to establish like an automotive factory,they have to make sure that the flow of goods.even though there might be customs er challenge ser that they are overcome and they are not blocked.嗯，那嗯，这边我再多提一句啊，就为什么我们去看这个公司的，它的不同的属性呢，因为在我们呃做这个工厂设计它的规划的时候对吧，因为由于它的公司诶，比如说它有有。有的时候做这个决定，哎，有的时候呃，做那个决定，那他他考虑的背后的问题是有多种方面的，对吧？他有一些政治考量，然后包括他诶，有有时候可能是企业形象的一个考量。他有时候唉，有一些社会责任方面的考量，比如说有一些公司，他要树立说唉，我这边呃，我是一个环保的绿色的公司，对吧？那他呃呃，或者说有的公司，我是一个全球化的，这种大公司，那它的这种。在这个呃，会影响到我们最后面的，包括工厂设计啊，它的整个的一个呃，不同的一个条件，当然呃，刚才教授也提到这个political。这个呃，政治的这个属性或政策的这个属性，它呢是为了我们整个公司也是创建了一个框架的条件，就比如说我这个公司是做全球供应链的，对吧？然后它可能有很多的东西。呃，都是一些外包的，那我可能就要看哎，我是不是现在呃，还是继续我的这种呃，全球化战略这种外包式的，或者说是那那那比如说它。它有些东西它就要看诶，我这边海关会不会卡我的货对吧？那就像我们前面说的，汽车组装呢，很多的零部件它都是在，比如说分包到别不同的国家去做，那我进来诶我我。这个比如说是有一些组件，我要敲的多碎，对吧？它这边才。过海关没有问题，或者说是我一这个海关的条例，有时候也是一直在update的，它的这个所谓的政政策对吧？那诶有时候可能今天就会进了一个这个呃。免运名单了，或者说是黑名单了，或有的时候这个会比较困难，那这些东西呢？都是我的外部的政治条件来看我，现在哎，这个组件我到底是外包掉还是我自己造？e this er here at the beginning when the cars,when German cars have been produced in China with small volumes.the ner a lot of er pieces came.on one side,of course,from from Germany,but other pieces came from Brazil. other pieces came from korea and Japan,so um.the politics have to make sure that this flow of goods,which is coming from different sources,is available on the production site.without without additional problems，好的，那就像我们这个德国啊，整车厂很多，他们的呃，他们的这些部件对吧，它都是来自全世界不同的国家的，它比如说有。有的是在呃中国生产的，有的是在日本，韩国，或者说是巴西等等的，对吧？那我们像呃这边呢，就是欧欧盟或者说。就是德国的海关呢，就是确保呃呃，也是它的这个制定了一些的政策，那就是确保我们的这些呃用于生产的呃，包括汽车零部件也好这种。部件类的啊，就是在海关呢，不会被呃多余的，就是呃扣留呃，或者说它这个能够呃在正常的情况下正常通关不会被呃。逗留也不会去影响到我们后面的生产。tum the next er point in his er and in the next example I have here is er when we er.when BMW was was sitting up a factory in South Africa,they have built a factory and they have also planned about the pieces.er to get them from different countries and when they set up the factory finally they had to speak surprise because they wanted to get pieces from Brazil.but there was no contract between Brazil and South Africa about a free um.free customs or free taxes and suddenly they had to pay alot of taxes for importing pieces which are.really important for the car.嗯，yeah，what？what is send to do with South Africa？I have not to understand e South Africa has a new BMW，has been OK understand South Africa？好的。嗯，好，那那呃，刚才教授举了一个案例啊，就是来说明这个问题，就是像我们呃之前有一个比较经典的案例，就是宝马在南非呃建了一个新的，这个宝马的整车厂。然后呢呃，因为刚才大家也跟大家说了，就是它的这个，现在呃，它的整车对吧？很多的零部件都是由世界各国这个运过去的，对吧那呃？当时呢，他们也没想到这个巴西和南非之间没有这个关税互免的，这个条例就是他们互相之间没有没有那个呃，估计呃，某一方他也没有加入WTO之类的吧，他就是互相之间没有。那个呃关税互免的条例，所以说呢，到后面就是变成哎巴西的这些零部件呃，它也是对汽车非常重要的一些部件，它就进了南非以后呢，它要付很高额的关税。呃呃，才能呃进行生产，然后当时哦欧洲的这边或者说德国这边的宝马，它总部其实当时都根本就没想到这个问题，但是这种呢，也是实实在在存在的。就是呃，所谓的政策性会影响到呃，那所以说呢，它也是一个我们很多建厂的时候，我们要考虑到呃的一个呃大的一个政治框架。and in China there I was.s politics for putting a factory in changchun for because this is an area where people.er,where were also people live and which need to get a job? so the politics and also the public administration.has made possible that their factory is built and getting the pieces from,yeah,mostly from inner China,because this is already a very high developed.嗯呃呃，volume of cars嗯，好的，那包括我像在呃宝马在中国对吧？也是在呃沈阳那边建厂，包括在。呃，东山角呃，就是建的比较多的城，那它这边呢？呃，也是考虑到哎，那个呃，东三省以前的这个老工业区对吧？它也需要呃，它有这个地方，然后呢？有这个工业基础，包括也有这个。这个人口对吧？呃，要为当地创造一定的就业率，那它也会考虑到所谓的politics和这个public administration就是它的这个对公众的。一个呃呃效益对吧，然后包括一些政策性和社会性的一些原因，那呃它也是会在我们建厂的初期，对吧？在factory planning它，比如说在选址也好。各个方面的问题的时候都会去考虑到。and the next one is a society which has to a yard to be informed,which has to accept a new enterprise.eh,we have got the see h challenges nowadays with the tesla factory. eh,there are people opposing to the construction of this factory because of environmental issues.where they say they put,they have built a factory in a in a protected area and they are taking out water and water is sensitive for the protected forest area.and so society has to kind of accept the new role of the new factories in the environment.and it is of course creating an awareness because their awareness is also it creates jobs. it creates um tax income,it is developing the region.so the role of the enterprise in respect to society is is very,very,very uh,very high relevant has a very high relevant.那像我们这个社会性因素这边呢呃，我们也经常会遇到的这。个常见的问题啊，就比如说我现在要在一个地方新建工厂呃，就像我们前面呃，也给大家举过特斯拉的这个案例，对吧？它在柏林呃附近呃，在德国柏林附近要新建的这个工厂，它基本上那块地方以前也是一片森林。对吧，然后是一个自然保护区，那就很多的一些这种环保人士，或者说一些当地的公民啊，有人就赞同，有人就反对，对吧，因为唉，反对的人就觉得你在我这个自然保护区。啊建，这种工厂会不会当对我的当地的环境造成一定的损坏啊？或者说是对我的水质等等等的空气对吧？造成污染那呃，但是呢，另外唉，支持的人是他可能会觉得唉，那这个。呃，特斯拉在我这边造厂那会对我当地的就业率的提升，包括当地的这个纳税对吧？还有它的整个的。嗯，这个当地的经济可以带动起来，那所以说呢？呃，这个所谓的awareness就是creative awareness就是当地的呃。他的这种自觉性的意识啊，就是他们是到底是接受你还是反对你接受程度啊，这个在西方这边国家还是比较常见的，就特别是新建一一些大的工厂化工厂啊，或者说是。甚至是新建一些呃飞机场，火车站，就大家都会呃有很长时间去辩论，或者说是去。这个呃，去认证啊，去进行社会性的认证OK嗯，we should take a break five minutes。好，我们休息五分钟。回来了，三个月的工资给你。为什么我说话那么流流才？denying the sharper idly happy he needs,he counted out niche de fo a light he shouted to be in his side.you have to yacht ones that are turquoise tomorrow the next,not highly turquoise.t.it's kind of about my z of your in video from smart house.嗯hx o和罗海的。嗯。no time.m.uh hu zo is the start,uh uh feel the logistic uh out of his home fair muh no you,you feel the bend what a do can't stop the dam dam Mark no?de de MA TIC de matic aunter yad I had phil logistic ous host on's fema aunt di vo er.呃。ya呃start to bowen on to um。indu script park,though eli cia's some indu script of bowen u't,they come ED out yet thy na delegate soon from the urm.sh tatum,it's g lou BB er de merde.comte drear tag nan owned ade inform it arch de comte de ions. anc is de form it arch again in daw dw on te,given a form of ema bz uh on zu.aunt namitectedtooom sy AH it.t.呃ronald呃political field lenin，that's it's our deferred on fair fair the呃no fabric onto our d the um。OS walston's erdinger,that's hyster dam de ha tye's oct on fear like a fur t hurt year ter machine or the er deer de gantt of port uu MS lyn ia up to date.that get place of ay's y ami ya da er get er two for dins club in logistic BI di so shon tin miya da po yada or the rosier get.t.I lag no logistic I lag on the white white on the fort on DV on my cooking v come on uh ind the uh linen all kon OK k ok OK OK n OK n of the TG an.然后再tie by the mitt media taa consulting呃order into three parks。嗯嗯。t.on'm fine uh hh hhh huh huh huh huh huh huh huh huh huh huh huh huh huh huh huh huh huh huh huh tuh huh。g now in shea mahan,where the old in the two quenftand we d out in in the two quenft disco t in that's wed in the dess MA.t.dua sia au k tisa ZA marin's winter lang hap shatter's young bassa's vital lightened condolences.the fighter glided up an the dei hart mia oh here. the fat Uber.mesh bin mesh BI no ni shi nko by vi eh har bo ni ni ga splash bee gazan dad and a and be zonda thesp be emerg frac kt is that neither the vases sender is vas vas vas vas vas vas vas vas vas vas vas harb on.except that it's ours gan nook on then give this kind of right to a inform informa tual. it's kind of out on my fogging yeah nine,it's can ya our signer that's er.er does the ye's neat sine at sun'tch edit,does this g no? it's been niche to counts in cope. he had me ofer.gardi EA GAR di eh tmi er got plugged open in the farmer into the sea.ezhouth by by in on the by speare is smear in the lto ling logistic on tem lag on the di ha g fat Uber.t.t.t呃，when we are yet are far more。s.better think I'm not up yes's darkness.he helped her in an film,then count a month's wriggling thou ts t smart for him. smart wit wit at the product's own ga lo phn ess,not only his throne and bind him here.Albert erigly kate's next to theodore um,he does it shown by him. he is on an escape dear on the frager.espacitaby two,that's not also hitting it. it's most thane scaa liane,SP hal ian does't think of an ignition by veg and layout,not does d layout,and now that's that's meant of.t.嗯OK好的，那我们呃开始后面这个一段的课程啊，然后我们前面呢也是给大家讲了几个案例啊，特别就是。呃，包括我们呃，在规划工厂的时候要注意的这个几个点对吧？因为像刚才说到的这个，包括我们的一些政治政策性的优呃，这个因素对吧？包括我们的社会性的优。因素包括我们的整个的公共，这个环境对吧？那它就是造成我们要来做这个决策，哎，我这个工厂。建造对吧？那它其实很多方面首先在前期就需要嗯去考察对吧？呃，是不是能够被公呃公公众接受，然后是不是能够？呃呃，满足我的一些政策性的需求，然后一些政策性的条件也决定了我怎么来设计我的整个的供应链，我的整个产线对吧？就包括哎，我的整个。呃，现在的呃，比如说像像我们现在的，有的时候国际化的形式对吧？那有些早几年全球化的时候，那很多公司就做了。做的工厂都是呃，这种外包型态的对吧？我就是很多东西我都不自己生产，那像这几年我们就明显的看到它的这个。生产在回缩对吧？就包括美国也好，欧洲也好，都说我现在要把我的这个生产都对吧？要要made in America或made in什么Germany要回来对吧？那他现在就很多的，就不愿意在外包，而是。希望这个呃，包括像我前段时间也接触过一个代表团啊，就包括我们这个深圳这边的，他们也都是说现在包括我们这个欧洲这边的很多的整车厂，他都要求我们的供应商，就比如说像。呃，这个生产电动车的对吧？就他希望你的厂能够设在我边上，或者说至少要放到欧洲或放到德国来。那它甚至是规定了一定的比例，那它这个也是一些政策性的改换，所以说现这两年有好多的中国的这个汽车零部件供应商，他都是。在寻找来欧洲呃，这个设厂对吧？建厂或者说是呃，这个买一个厂，然后把它呃再再这个改装一下对吧？改建一下，然后。然后呢？去给我的这个最终的。整车上去供货，这个就是真真实实，现在我们的这个现实的案例，那我们前面呢，也给大家讲到了这个smart这个厂啊，就已经多次的提及到了，因为这个的确是。在工呃，在我们factory planning，特别是针对汽车工业的这个factory planning，当年的他也是拿了一个设计类的奖项，就是他这边是一个很经典的案例呃，然后教授呢也是。有一个视频啊，然然后来给大家看一下，就是它的这个呃，我们前面。跟大家说的这个十字形，可能大家也没有特别的一个直观的感受，那我们现在呃教授放一个视频来给大家展这个看一下啊，这个smart它这个场。大概是怎么呃来运作的OK？so now I would like to shower a kind of er ya production,production of the smart.er,because we have talked so much,and then I have,we have a video which is suitable for for this,although maybe it is er because it is in German,we will then translate er.apart of that,so what we see here is now the.is now the emlet's take part of the how how they em.eh how the components are put into this car,it is always with such uh means which are of course.eh for the only big and heavy parts.嗯，好的，那我们看到它的这个呃smart的组装线啊，它这边也是呃呃比较重的，特别是这个呃，这个内这它现在在装这个内内部这cockpit对吧它的？这个操作台这个里面的这个呃，车身的这个啊，操作控操作是主控室那呃，这边呢呃，它也是就是比较重的这些部件呢，它是由这种机械臂呃，或者说是。来安帮忙安装的嗯。ripped esc ulched him.nine gits kai ite skipped the muzikh over the e's shirt ere,then pletsy finks once returns to my god nine.包好你的。这就是我们前面说的它的这个车，它是挂在上面对吧？就是大家也可以看到前面贴了张纸，其实就是我们这个杰斯尼塔的那种看板，对吧？然后呢？它也是这个一直是在上面在走对吧？在在在跟着这个挂在上面在走嗯this here is the so called hock side or a marriage where there？engine part is connected to the white body iii make a step back and.eh and eh show again how these pieces come together,there is the engine part here. we see it's the engine part below.and we see on the top，the the white body。and here they are married，嗯，好的，那这一步呢？我们在汽车的组装里面叫做这个。呃，它们互相之间的一个结结合对吧？结婚或结合，那就是主要就是因为一呃，前面呢？你看它这个呃，白身已经上漆了，对吧？有的东西已经安装好了。呃，那呃，像我们的这个白身部分和底盘底座系统呢，它是就是一开始的时候是大家各走各的，对吧？因为底盘它中间也需要安装很多东西引擎啊，或者说是它的里面的一些。管道啊之类的电电电路啊，那包括我们的白升也是那在这步的时候呢，它们就是底盘和白升之间互相就把它。呃，组装起来，我们呃，这部叫这个marriage嗯。this is a very important process for a car production entered here on on on this level. we have all the other picking and assembling of the subcomponents of the.of the engine side and on the other side,we have done all the processes which are relevant for the for the white body ya in the end already the painted wine body white body.so er when we look into the common effect uring steps from this point on er,all the assemblies can easily be connect,can easily be continued.嗯，好的，那我们这个因为之前的它的两部呢？是分开的对吧？就是底盘呢？它归属于底盘的这些零部件呃，那它这个都是跟底盘相关的，去组装到一起，然后跟车身相关的组装到一起那。呃，到了后面这步呢，那结合起来以后呢，他们两个作为一个整体的系统，在呃，在往前走嗯。图片嘛，可以这个这个APP。不错吧，也不错。第一点应该保护。of course,everything you see this very good has to fit exactly because it's an automated process.and now the yeh,they are connected,eh? the two pieces are the two,yet the components are connected and screwed up and.from now on,they are join.好。到到不了这里。电话那这么说话。these are now the steps where components are,let's say,assembled in or put into the car.eh and of course component by that this was by the way eh eh a last screw connecting eh the two pieces.but from there oner further components are put into the car.之后他就可以转。对。OK.哦。now,of course,er cables are connected er,maybe we have a kind of.um,how to say kind of er electric,the electric supply,the cables which are part of the white body or of the body itself.they are not.how connected with the engine and all the components which need electricity.yet as if we see very good how the cars are then moved on kind of chain and they are,that's an overhead transportation system.sometimes it's put down to the level of the human,but sometimes it's also transported on a higher level.there now the wheel.嗯，我们看到这边啊，它整个过程都是吊着的，大家看到啊包有的时候呢，它是呃，跟人差不多等高对吧，那你这边就可以来做一些进一步的操作，就这边是。呃，在呃装完呃最最后的装，这个轮子对吧？前面我们也看到它这个掉掉的很高的时候，有的时候是比比人的，整个比你的头这边还高，对吧？有的是掉在半空中的，有的是就是。呃，吊着是跟你的这个人差不多的，它就是整条产线都是一直在动的嗯。我们叫这个，how the seats that's interesting？cause the seats are very light,but volume and they sometimes are hard to put into the car.嗯，那这边你看它这个车，因为smart是一个小车嘛，它的这个座椅也比较轻，它这边就是人直接搬过来，我们对比之前那个特斯拉的那个对吧，它就是用机器人中的这个座椅。那它这边呢？是人过来这个搬过来，然后呃。来安装的。哈哈哈。嗯。now we have the door.然后是装门。here we have a difference to the traditional carmen I FACTS because the doors.I hear a plastic components from outside.but in the reeled in a nom in other carmen I fact uo US,the doors are disassembled on a certain point,then they are filled with all the components and then they are reassembled to the car.嗯。因为smart它这个车呢呃，它也就就都是两门的嘛，然后另外它这个呃。相对来说，它的车门也比较简单一些，所以说它基本上就是就直接就装上了，但是我们在有一些的这个车厂也看到它这个车门。呃，装上以后它可能先得卸下来，就是把车门上再装上别的一些部件，然后再重新再装回去，也有这种情况的。so now we get the next components they are coming from dynamo nobel. what you have mentioned before,what was mentioned before?so they are individual parts，and they are just just plastic parts，嗯，大家记不记得前面我们在说的时候就是我们有些？供应商，它的这个塑料件对吧？就是使你特别像这个smart，大家在国内，我记得我这个还有专门的这种同好者的，这种俱乐部什么的，对吧？他们会定制一些。个性化的这种呃，这种呃，比如说前脸啊，或者说是呃后挡风啊之类的，那这些呃就是呃，是刚才我们那个叫nobel这家厂对吧这些？它做的这个塑料件，或者说是做的一些呃，所谓的addon part，那这些件呢？我们看到啊，刚才不是有一条流水线就单独的。呃，弄进来对吧？这些呢？就是唉，我的有可能是一些个性化的家装啊，或者说是个性化的一些，这个呃，做的这个塑料件零部件，那它这边也会。呃，专门有一条传呃，这个呃，这个传送带跟我们对接对接到我的这个总的组装线里面。this is here now a testing field where some tests are done. the the maybe the electric components are checked,whether they are really working good.嗯，enter。of course,then the marketing where there?that the final yah name of the car is provided好，那这边呢？就是。测试和最后的一些这个呃，包括做一些我们declaration对吧？就是做一些这个呃装饰啊等等的检验，最后检验的部分。包括检验我里面的哎电器件是不是好，对吧？有一些的个性化的哎贴标啊或什么的啊，都是在最后的时候来这个做。this is the end s,the end face where some cheques are still done.er maybe like er the er,the cheque also of the er of the seal two emissions,for instance.啊，这个是最终的终检环节。that's the final inspection we see that here is really some.somebody checking exactly all the critical components or critical parts of the car，嗯，那这边很多的，这个最终的外观检测都还是用人来做。都包括哎，有的呃，一些哎，是不是车企涂的不匀啊？有没有小凹坑啊？或者说是。呃，有一些关键性的部件，会不会有没有损坏啊？就是都基本上都还是用人工去？去看看。this is exactly the point ii meant before that. that's the transport,so which is quite directly integrated to the.呃to the。reprocess here嗯，那我们看到这个整车出来以后，它这边就有一个就直接的，基本上跟我们的产线就是对接了，对吧它这个？呃，整车弄好以后就出来，出来就我们门口就是一个呃，所谓的这个装货区对吧？它这边呃，包括一些整已经呃，弄好的车，它有专门的停车区和它的这个。直接就是跟卡车，或者说是直接跟我们后面的运输线路对接嗯。here we see now that how they are loaded on the tracks and the number of vehicles per truck is is fixed. I think it's.either ten or twelve so normally it was twelve,and here on the track sides we sometimes see.how many they can carry so the trucks are waiting for the i principle they are waiting for the finished for finishing a car and every car finished is directly on a truck.嗯，好好的，那我们这边它这个车厂啊，它也是就是你看它也没有专门的一个呃仓库去放这个整车啊，基本上就是一个这样子，一个停车区域那。呃，这些呃。大卡车呢，它也是一直就等在那边了，基本上就是这些车好了以后我就直接上这个大卡车，我就运掉了，对吧？但我们也可以看到这个一辆车大概能够一辆大卡车能够装六呃12辆这个小车对吧？那呃，其实要根据车型大小，一般来说就是呃装十到12辆，这个呃小车那我们这边呢呃，它这儿也是就是哎，我这个从产线上下来了，那我只要是订单就。边呃就是就呃客户订单其实等着的话，我就直接就让他装车了嗯。er,so we see,and that er,how these production processes are,are really physically done.and.we can figure out how the,how the production site is looking like so that the environment of the people.and this is exactly er. let's see the connection point for the next slide er because we in the next slide we have to address.t.point here er where we say the citizens finding own attitudes of people working here in this factory.er,which of course is the ner er,let's say,making them,bringing them to a happy life.好的，那嗯，我们再回来，我们的讲义啊，就是啊，刚才我们前面一堂课呢，也给大家讲了我们的所谓的呃一些政策性啊，或者说是我的一些社会性，公众性的原因。原这个因素对吧？然后呢另外呢？还有对我们的这个公民来说，哎，是不是对你的在这边建厂是持有一个怎么样的观点？是一个正面的还是？呃呃，反面的观点对吧？就是看这个公众对你这家企业的一个态度，and the enterprises。er,they are. they are defining er in principle,the shape of the factory here,for instance erthismart.they have decided that the factor that the time from customer customer enters to shop.and ih two weeks later,he will get the car that this time is two weeks,so all the complete let's a.manufacturing process,all the processes in the building in the assembly in the white body are linked to the two weeks so.er,this is a very,very fast factory from that point of view.嗯，那像我们这边呃，如果说呃，我的公司的理念是我这边接到订单以后，我的两呃两周就是我的交货期，对吧？那我这边的后面的所有的生产安排，或者说的我的这个。呃车我的整个的呃factory的一个布置对吧？都要呃来符合我对这个订单它的交期的一个需求，那我们。这边呢，就是前面大家也给大家看过这个所谓的fast far呃factory，对吧？就是所谓的快速反应的这种工厂，那我的整个产线的布置，包括我的整个工厂的设计，就要符合这个理念。and of course they have to look for new possibilities,eventually how to improve production,implementing economic measures,eventually putting in more pools or more robots.and developing new products for the smart,it is not only the for two means the smart for two persons.but later they invented also o. they designed the for for the let's say the for for four people car.嗯，那像我们这边呃，就像刚才的这个案例里面对吧？那smart的，比如说是现在。呃，基本上都是两门的车，对吧？那是不是它有别的这个呃需求对吧？我们也看过smart，它有很多的变形形态，有一种很小的那种。然后呢，包括呃电动车啊，或者说是是不是有四门的啊，或等等的，那它有一些这个呃新产品的一些需求，那呃包括呢呃对我们的整个。呃，完成它的经济目标的一个需求，那呃，对于这个企业的整个定位，它的不同来设计它不同的工厂。um,yeah,and I forgot to mention here on the society. it's not only awareness but also tolerance.because a lot of factories create new new challenges like heavy enduring production,we have noise.and people around the factory are exposed to noise a noise because of maybe a handling of empty boxes,which sometimes can be very noisy.or here in our movie US on video,we have seen when the cars are loaded to the truck and then there is also kind of noise.eran t,we have a lot of traffic because the trucks are coming and empty and they are leaving full.we have additional inconvenience for society嗯，那像刚才我们说到的一个地方，新建一个。工厂对吧？但不仅说哎呃，环保上对吧？那它对这个社区它比如说呃，会造成我当地的这个交通拥堵啊，或者说是你这边新造了一个厂，会对我这边造成噪音污染啊。啊等等等的对吧？这个呃，各个方面都会呃，都是需要它当地的这个呃，这个社区或者说是政府去评估和考量的，那也就是这个公众接受度的一方面。呃，so。the the performance for em efficient factory for efficient factories I ser that we have to er.t consider,let's say different aspects that it's the strategy workshop.we have a green building,we have a total concept,energy,and we have a value stream or resource consumption.so what we are then doing is having an overall view that the value stream mapping is of the.value stream creation is normally that long time before the car is produced,but it is in the end how to reduce the number of machines,the number of people.er and er er,yeah,the total concept energy isis May be something which is impacting.the the quality of the car,the building no here,it's of the building how to get the energy into the building because we need a special power supply for for such factories.and then here the green building,showing that the green,the building is of course environmental frantic.frankly,so there are a lot of further fields where general concepts have to be developed.long time before the building has ever been erected.嗯，那我们看到就是我们之前也给大家讲，就是呃，这个公司或工厂，它整个本质的目的是为了创造价值，对吧？为了这个所谓的value stream，它能够增值的一个过程。那我们呃对呃资源的有效利用，对吧？就是我们在呃工厂，或者说是整个的这个生产物流链，我是希望它能够哎呃这个呃。更高效的利用我的这个各种不同的资源，对吧？包括呃，包括的能源也好，包括我的这个哎，是不是现在呃，我的这？个我在工厂规划的时候，我是不是要考虑到这个绿色环保的因因素，对吧？那我们可以看到有很多呃，他们这个工厂现在都是宣传自己是绿色工厂，对吧？或者说是绿色建筑，节能建筑等等的。因为呃，一般来说呢，它的这种工厂，特别是生产类的，它需要很大的能源的需要耗能也很多，那它可能呃就需要呃，特殊的哎，自己可能都要造一个电站，或者说是能源供应站。那呃，这块呢？现在也是很多的时候是会比较看重的，包括你的整的呃，是不是节能减排的对吧？然后它的整个战略性的呃。战略性的一些规划，包括它的整个增值链是怎么样的？那这。这些呢，都是我们在呃工厂设计的时候，也都要是要考虑到的呃，就是关于如如何的高效的去整合和利用资源。a very interesting discussion point here is this so called value stream,because in the supply chains we try to create a value stream,but.er,we try to create the value stream. ya let's say as late as possible,or the value should be created as.as late as possible.嗯，然后我们关于这个价值链啊，这个就是我们希望它的这个增值的过程啊，就是是循序渐进的，然后也是最后才来产生我们的这个所谓的增值。a good process is when the value of let's say a vacuum cleaner or whatever product we consider.in the different process steps.is is over time,let's say,is increasing slowly.but maybe increasing,of course.but in the last step,it gets the final value. this is a good value chain of a.broder a bad value chain is when we are starting early,having then high price and then continuing.eh with high price eh so uh uh,because in such ache in in such a production scheme.eh,we have already a lot of money in in the working process production site,hmm.好的，那我们这边呢？呃，教授也是给我们画了啊，就是我们希望它的这个价值链呢，它是循序渐进，一步一步的递进，我就是产生价值的，对吧？然后。最后就就希望最这个最后呢，它是呃呃，在它的这个增值最大的这个阶段呢，是能够放在比较靠后的这个时时间段的，而不是说是一开始诶我就。它的这个价格就变得很高，或者说是它的这个，然后这个居高不下，持续一段时间，而是我是希望它的价值链产生是一开始是慢慢慢的对吧，然后最后哎，快到成品的时候，我再一下子增值。啊，是希望是这种形式的。I want to share again.at first i changed the camera.um,and this analysis of the value stream is uri here. also we looked on to the waste of resources.eh PA into feh from the this point of view,so we try to er reduce all the the waste.time,let's say,and the the and even the the spending money and early steps of our production is kind of waste of resources.嗯，好的，那我们这边呢？这个如何的去呃去优化这些资源的呃利用率，或者说是能能够让它的这个呃资源更高效，对吧？啊，那从呃，这个我们先要去分析整个的这个价值链啊，并且呢呃，要寻找出它这个或分析出它这个价值流里面哪里会产生这个资源的浪费？the next point is a analyzing the requirements of energy,water and so on.and also considering eventually other energy concepts for in respect to water,they sometimes er.or frequently,we are recycling now water,but water is a special topic because in case of an emergency when there is a fire.we need a sufficient large lake,let's say a small lake which can then cover the demand of water,and this is let's say.a safety and security aspects which?好的，那我们也要考虑这个呃，去合理的分析这个能源，包括像是水资源等等的这个呃，它的去合理的去呃消费对吧？然后呢？呃，包括呢它呃，我们要去看有没有一些可以呃，可以用的这个替代性能源对吧？也要进行一个评估，那包括现在水资源这一块也有。有很多的一些嗯呃，前期的要去做一些工作啊，就比如说是像我们的一些污水处理完以后，它是不是可以再重新的这个回收利用对吧？然后包括呢？呃哎，如果说你这边嗯着火了，那我是不是有一个呃附近可以有一个呃小湖，或者说是有一个集中的这个水源地能够让呃让我去呃调取对吧能够？呃，快速的去灭火等等的。the next point is the green building. the green building is important because we have to make sure that the impact on our.let's say on our environment is,is is small or is reduced. this means we should then try to er.er,yeah,have a low energy consumption,but also where er with the green building we have to make sure that er the.it is protected against,let's say,ya,the heating of the of the factory isis controlled in a way.eh,the sy o too my emissions are low that the er the waste how to do deal with the waste of the suppliers May be is an important point.so the green building has this standard is continuously evolving,and that's one of the challenges of such factories because they don't know what are the standards in two years,in four years,in six years.but it is clear that the that these standards are are continuously er er having a higher require of having higher.impact onto the onto the complete facility嗯，那我们这边也可以看到啊，就是呃，这个现在还有一块，就是我们这个绿色建筑啊，现在就是有一些行业标准，就是包括。我的一些呃，我的整个建筑本身对吧？包括我的这个物流中心啊，或者说是我的行政中心是不是符合我这个绿色建筑的标准，因为呃，包括它的诶，是不是呃，节能对吧，整个建筑本身。或节能减排，然后呢？那那现在有一些的这个呃，政策扶持也是有一些这个环保方面的要求，那这一块呢？呃，也包括这个。资源的这个合理利用等等。and of course,er that we have strategy workshops which are defining all these goals we have discussed here.eh,they are defined,and later we are because we,we can. we cannot overestimate.er,we should be careful with overestimating the goals it would be far too expensive,so we have to develop.呃，let's say this。we have to。care about the existing standards and try to be able to adjust according to the to the to the years which come as the corresponding standards.that we should not build a factory which is over,let's bring too much already.TU MA er complying with standards with at the moment are not required,are not needed because of the.it is too expensive,it is not competitive Lndian the car on the market.那我们这边呢，它的目的呢，整个就是希望我们的整个的嗯呃项目，对吧？它是能够在呃各个方面，包括能源的利用。运动率对吧？水资源也好，那个包括我们的原材料等等的都是能够呃降低它的成本的那。呃，这个呢，也是我们的这个包括。那包括我们的股东也好，包括对我们的这个消费者也好嗯哎，我为什么要做这样的一个理念的一个工厂，这也是我的一个目的和我的一个动力嗯。now we come to er,let's say the seer green buildings or the green definitions.t what is this,uh,for instance,the heat generations?through a central system that's already one of these requirements,green building supports of heat generations through renewable energy.sola thermal guilt er myer and of course this is the source where to get the energy,but also the second one is.reduction of consumption because we know that we will not generate enough,or it's expensive to generate a lot of energy so.reduction or reduction of the consumption is also one of the key goals when erecting such a building.嗯，好的，那我们现在这边来看一个案例啊，就是来做我们的这个所谓的绿色建筑啊，它这边呢也是呃，哎，比如说像这边的这个案例里面呢，它就是用的呃。呃，所谓的再生能源，包括哎，可能我们的太阳能对吧？呃，包括的一些这个呃，生物能的一些可持续的呃，这个是可以呃，再生的一些能源对吧？然后另外呢，它的整个建筑呃，包括。我们它的整个布置呢，都是节能的啊，然后呢呃，包括可能它的采光啊，包括它的这个取暖啊等等的嗯。while they are there exist directives which are not adjusted every year,they maybe have adjustments of we have also some directives from two thousand nine.eh,but they May be adjusted every year,ten years or even eh,it is kind of,let's say.having the basis of the two thousand forty and adding small,let's say SUP golds. and so it's a kind of like a catalogue which is edit stepwise.but the point is that they define goals like twenty five percent lower the deviation of energy building shape should be the building envelope,the technical equipment.the use of renewable energy is a topic here and of course the green building is then looking on the environmental friendly materials.with could be a special kind of.of concrete,which has to be used er and of course was tere.好的，那我们看到它这边啊，就是嗯呃，每年呢，或者说每隔嗯五年还是十年哦，这边欧盟都会有一些呃。它有一些新的，这个评估标准，包括它有一些规范出来啊，就是来评估我这个呃建筑呃，它的这个呃优劣对吧，包括它的这个能源的利用率也好啊。包括它的对呃对的，它的这个形状啊，外形啊，或者说它的这个呃是不是可以可可持续利用对吧？然后呢？它是不是用可持续的这个再生能源它的这个？呃，是不是环保对吧？它是不是用环保的材料等等等的方面呃，然后呢？它都会进行一个评估，就是有一个叫dg MB啊，然后等等的这一些就是诶它。它有一个叫Germany呃，sustainable building concert就是呃，德国可持续发展建筑协会去评哎金奖银奖还是铜奖，就是它会对我们的这些建筑包括这些厂房也好，公司也好进行。进行一个评估。and of gore costing the main goals are always reducing the energy consumption and promote use of renewable energies and the renewables can be a lot of different like solar tur merge oter my.everything is in principle allowed，嗯，好的，那本质上呢？它的这个评估呢？呃，这个绿色建筑的评估也是为了包括它这边的节能条例的评估呢？也是呃，德国建筑法的一部分，那在这个基础上呢？呃，联邦政府和这个呃，相关的这些呃，部门呢？也是建。一起呢来做了一些这个制定建筑法规的标准啊，就是主要就是为了减减少减少能源的消耗，还有就是促进呃再生能源的使用。那呃，这个再生能源呢？包括我们太阳能也好啊，各种的这个地热也好，对吧？呃，有一些生物能也好，都是在这个里面的。we should not forget that these buildings are contributing rust ly with forty percent to the total seal two emissions of Germany.because there are different sectors and building is one of the sectors traffic by the way is another sector.er,which is also very high relevant and is not complying with the reduction of co emissions right now.嗯，那呃绿色建筑一块是节能，一块是减排对吧？因为我们呃这边呢呃，它有一个统计啊，就是说是二氧化碳的全国各国二氧化碳的排放量。有39%是来自于各种各样的building，各种各样的建筑啊呃，另外一块呢，也是交通这块也会产生很多的二氧化碳排放，对吧？那这一块呢？也是呃，绿色建筑比较关心的就是二氧化碳的排放量的问题。er and then er when we look into the er energy consumption design criteria.then it is here,the structure of the building which is already having an impact on that,so it should be a compact shape of the building.eh not too large,eh but it should be,it should be more like a uh vir fil like a like a uh.呀，不好意思。dice，yeah。like big dice。嗯，好的，那我们呃，这边呢？这张PPT里面也给大家展示了，就是我们如何来做，就是在我们做factory planning或建筑设计的时候，从哪几个方面？来考虑啊，包括我们整整体的建筑结构也好，这个能源的呃，各种供应的不同的点，这个是列举了一些啊，就是呃，它也是就像一个色子的不同的面一样。and that's it for today band。yeah，we stop here next time we will go on and discuss what are，let's a kind of green buildings or energy efficient buildings，嗯，好的，那我们下节课呢，再给大家把。这个呃，就是绿色，或者说是节能建筑这一块，再讲一下好，那今天就先到这里嗯，拜拜。哦哦哦啊，thank you very much，have a good day and enjoy your holiday now。yes,we try. thank you.拜拜嗯。一。