

Notes from conversation with Jim Collin, Anell, 24 June 2021

Introduction

Originally an electrical engineer, Jim Collin went back to school to study lighting design when he realised that his metric toolbox was not enough to create good spaces for people. Following his degree Jim has spent the past 20 years enlightening people in the duality of light as a combination of function and aesthetics. After a multiple award-winning career in lighting design, ending as the international head of Light Bureau, Jim today drives his own business as an internationally hired speaker and lecturer in lighting combined with a partnership at the lighting supply company, Anell Ljus + Form.

Jim has throughout his career strived to raise general awareness of the great potential in proper handling of the lighting matter. By creating good lighting for people, enormous energy savings can be made while lowering the total cost of the lighting installation.

A true win-win-win situation

Interview

Office refurbishment case study

The brief

We're back in 2013 but it's still relevant today. I was just newly hired. We were moving into a completely new built office. It was built as a turnkey project with everything dictated by the contractor.

And I was going to set up the lighting division and it was clear that this wasn't a place where we could sell good lighting, just for the sake of credibility.

Apart from the fact that it was a horrible grey wash over everything- as there usually is when you just do flat panel installation. This was actually fluorescent - pre-LED flat panel. And apart from it being horribly grey, you could see that the energy consumption was tremendous. It was connected to the HVAC system. So it was on and off automatically when people arrive in people go, but it was zoned with 20 people in each. From the first person in the morning at 6:00 AM to the last one to leave about 9:00 PM, that's a lot of hours.

Cutting it short, I went to the electrical division and I said,

Hey, do you want to join me in rebuilding this? we need financing and we need of course approval, so I'm going to go to the, appropriate board. And I'm going to tell them that we can save 80% energy from this completely new build and have a fantastic case. And, I'm sure they will approve.

And I actually think when I pitched it I promised 50%. And then when I approached the board, I raised it to 80% savings because I so badly wanted the new lighting.

The intention, of course, wasn't so much to save energy. That's always been important, but I know that if you do good lighting, you're going to save energy as a default.

I went away from that cursing myself. Why did I say 80? Why couldn't I say 70?

I sweated it out for a couple of months as we took everything down for our 500m² and replaced it with the new lighting, which we designed from a human perspective. So it was all about getting the visual comfort right. It wasn't tunable white at the time, because we didn't really see the right place for it. And it was still early technology.

But we still focused on the human perspective and user control. So everyone can turn on and off their own lighting. And we added some automation. So it turns off if you forget to turn it off, but it doesn't turn on automatically. You have to say I need light. Which gives it a human rights perspective. *'No one tells me when I need light. I can judge for myself'*

And there was no lighting on the floor. Everything was directed to either surfaces working clean surfaces or walls, or in-between windows. Just getting a bit of light between window frames makes the whole wall appears so much brighter - and all of a sudden the window doesn't seem so bright compared to the middle of the wall.

So no one turns the light on just to get rid of that darkness. And when everything was finalised, of course I was sweating: Did I produce this 80% that I promised?

The floor above us had better daylight. So we had parallel meters running for one full week without telling anyone. It was a complete blind test of everyone involved. And when the result came back, I ordered a re-measuring because I didn't trust the results that came in.

And then I even did it a third time because the results showed that we had a measured energy savings of 92%. I always invert that because it's so big a number that you can't really relate to it.

But you can invert that to say that the default solution that was there from the beginning had an over-consumption of 1250%.

So installing lights as a commodity, just all on all off, not taking into account the human perspective, just doing it for the sake of building, you have an over-consumption of 1250% without cheating.

And what about the Lux levels?

The original solution had 300 Lux everywhere. We increased that all the way up to 800 where you need it. The standard may be 300 Lux for everyone. But does that suit a middle-aged man or woman? It's still going to be too little for a lot of the people working there and it's going to be way too much for a lot of them.

So when you put in user control, you can choose how much light you need. Then you also free up so much energy that you can put enough light where you need it - and maybe 800 wasn't even enough. Maybe we should have put 1,000, but at the time we did 800. So we put in almost three times as much light where it was needed, and still created this fantastic saving.

So it's a good case to show off.

What about additional cost and complication?

I'm quite honest. I say from the very beginning: *listen, I'm not here to make your life easier during the process. I'm here to build you a fantastic solution that's going to give you so much credit over a long time.*

I'm asking you to put in 10% more effort and potentially some 10 or 15% more in initial investments. But for that, I'm going to give you 100%, 200% more outputs. And I'm going to give you savings far beyond the investment that you need to make now.

And this is true, even in this case. This was newly built. So it was complete madness to begin with from an economical perspective. But still when we did it, we built a Bentley. We didn't go for a Skoda. We did it because we were going to sit in that space and sell lighting solutions. So we went for the deLuxe, the creme deLuxe.

And still with every cost shown, we managed to get a return on investment of seven years which might sound like a very long-term return if you're in the industry process.

But statistics tell us the lighting is going to be there for 30 years. So from year seven to year 30, you're going to make money. And in our case, we had a 10 year lease. So we could actually put up an investment plan where we allowed another one year as security and we still pay for it. So we made money from the first second.

The energy savings are so fantastically great because *energy prices are still quite high. They're not high enough because obviously they're too low if you can waste so much energy without being punished.*

It's like going to the supermarket. Very few of us would buy a single portion of ketchup or the one roll of toilet paper. If we have the capital to spend, we would buy something bigger because we know, per portion, that the cost is going to be so much lower.

So as private people, we look at cost and we separate that from investments. But when we build houses it's almost as though we've forgotten about that basic principle of economy.

There's an initial investment, but the cost comes when you start paying the electricity. In every case I've come across, if we just want to look at the economical perspective, then you can absolutely say, there will be an initial investment.

You need to set aside some capital - or you can get funding from a third party that you will pay off with the savings that you make. And that's just looking at the energy. So if you take into account just two people not going on sick leave twice a year. What's the cost of that? And what are the savings in that?

If you add all those things and take into all the factors, in the example from Malmo that we just discussed, the return on investment is a couple of months tops.

This investment allowed you to use the building as a showroom, as a way of demonstrating with pride, what you do...

We just have to figure out: why do we illuminate the room to begin with, why did we put lighting in the room? Do we put it there for the building or for the room? Or do we put it there for the tenants, for the people using it?

The main problem we have with lighting is that we always handle it as part of the building, part of the room. And rooms don't need light, buildings don't need light. Humans need lights and humans need darkness. So when we do the lighting for them instead of for the building, it becomes much better. And we give them control.

I'm a lighting designer at heart. I would say it's almost a human right that I get to control the light, that I get to control the volume.

Light and sound

Imagine, you're going to sit in the office landscape with other people working and you're not going to be there by choice. Some of us are just there because we need the money, because we need the work. So you're going to sit there and I'm going to put on whatever music I like, and it's not really going to have some nice melody. It's just going to be a constant bzzzzzzzzzz. I'm going to control the volume. And it's going to be on the second you walk in and it's still going to be on when you leave.

No one would accept that. But for a lot of people, that's what light is. It's not positive. If you do get the lighting right, you are going to get acoustic effects without knowing it. We sat in that office for many years and other people from the building and clients would come for meetings. And almost everyone had the same response:

Wow. It's so silent. What did you do to the acoustics?

Well, we didn't do anything. We just took away that static light that makes everyone's voice go up, because it, it has that effect on you. If you get too much light, your adrenaline levels go up and you will speak with a louder voice. There are many studies showing this, especially with daycare for example, where you can really see the effects.

But this is the secondary thing you get - you get a calm, that's not just related to lighting. You get the whole environment. It feels different. And if you're in a crowd where everyone is loud, then you're going to be loud too. And if you're in a room where everyone is mellow, you're also going to be mellow.

You can change the experience of the thermal environment as well: If your staff is feeling a bit cold, either you paint a wall red or you project red light on the wall. And just by seeing that red light, you might go from feeling slightly chilly to not feeling cold at all.

Everything is connected: you can never handle lighting separately. It comes down to the basic principle: If you try to make shortcuts, if you try to make it easy by just installing flat panels, you're going to lose, you're going to fail. Because you're going to miss out on the greater picture.

And when it comes to lighting, I would translate that into getting the full spectrum. Between a light source with spikes of energy here and there compared to having a full spectral distribution like daylight - that will make all the difference in the world.

And it's not going to show in the energy savings because if you're just looking at it from the visual aspect of light, you're going to waste some energy. But by having all those wavelengths, you're going to get all those textures. You're going to get all that information that your mind is built for. We've only had electric lights for a hundred years - so we need to look at it how it was for the millions of years we were before.

It sounds as though you can justify the transition from really cheap and nasty to standard in terms of lifetime of the luminaire and cost-savings of other kinds. How do you get them to trade up from a basic to a beautiful?

In most cases it's about catching them early enough. When they're too far along in the process, when the tenant lease is already designed, it's going to need some additional investment. It's much more difficult. But if you raise this question early enough, you can get them to write the lease agreements in the right way. It's also a problem in the building industry.

Our lease contract templates are at least 30 years old.

I've done a lot of hotel projects and I still come across contracts where it's on the landlord to pay for the luminaire, and where the tenant pays for the light bulb and the electricity bill. There isn't a light bulb anymore. But the same thing still applies. So there's no connection between energy in and energy out.

But you could easily justify this by just looking at how the contracts are made. You could ask: *we can either do it the old fashioned way, and we're both going to lose money, or we can do it in a new*

way where we actually look at what technology do we have and how can we handle it from the right way?

How can we create a lease that is partly based on sick leave? It's going to be a risk for the landlord, but if he can prove that he has healthier buildings, he can also get a higher lease rates and he can pay for a bigger investment.

People don't build bad solutions because they're mean people. It's because the economic incentives drive some of the solutions. But if someone would just help them to raise the bar, then they could easily justify that cost.

In fact, it's not going to be a cost. It's going to be an investment that pays off from day one. I can prove that people need a better light - and sell it to them every time. But I need to be there. And even if there's a hundred of me, it will still be too few of us.

So what we need is to increase general understanding.

They don't have to understand how it works, but they need to create the demand to say "we want it to be better."

(Shelley) Florence Lam from Arup pointed out in a previous interview for this series: In the early days she had to make the business case every time that she wanted to introduce LED lighting, because that was new. And now LED is just expected. It's like having a ramp for disabled people or a security system as part of the infrastructure of a well-run organisation. The future of good quality lighting is for that to be on the checklist, just what you would expect.

I don't know if it makes sense, but you could look at ketchup as a sauce.

There's nothing wrong with it as a sauce, but you wouldn't use it seven days a week. You know it's not going to have all the nutrition that you need and you're not going to use it as the biggest thing in your cooking. But there's nothing wrong with it. The goes for flat panels. You could use anything as long as you use it in the right place and in the right proportions. But when you use too basic lighting as your general solution, then you're basically putting up a plate of ketchup and saying, here's the sauce. And maybe I'll put in a small piece of potato for you. It might be food, but it's not going to be great.

And if you think about sustainability, we know that the cheaper products are not necessarily as well regulated in their production methods. But we also we know that they fail more quickly - and only about 20% of luminaires are ever actually recycled at all. So cheap lights are a false economy from an environmental perspective.

Part of the problem we've had with fluorescent lights is almost that they were too robust. When the Swedish energy department looked at the statistics for offices and other buildings in Sweden, they realised that the average lighting installation was 35 years old - and that was the average.

And if you look at cars, that's the equivalent of a Volvo 245, a fantastic robust car. A lot of people love it but it has an energy consumption at 1.5 litres per 10 kilometres. That's a huge energy usage. But it's convenient and you can change the light bulbs yourself, and it lasts forever. If that is the baseline, it's not going to be good.

So we need to handle that as well: sustainability is not about just building something that's going to last forever. It needs to last the amount of time that you want to use it and then make sure that you can reuse it, or if you can reuse it, recycle it.

The consumer and the construction sectors have driven down quality by demanding prices that are way too low. We went from an incandescent bulb that costs 5Kr, which would be like £0.40 each. It had 1000 hours of life and gave out 10 Lumens/Watt

And then we went to an LED bulb today with a lifetime that is 20 times as long and an energy usage that is 1/10th of the incandescent. And we as consumers demand it for the same price as the incandescent lamp.

The supplier could potentially charge twice the price, but not higher than that.

So basically we're asking to get 30 or 40 times as much value for just two times as much investment. And that's what happens in the construction field too, because prices have gone down: Fabricators could sell a good quality lighting fixture for the equivalent of £400 some 15 years ago. That same level now is £150 - or £200 if you account for inflation. The prices have gone in the opposite direction.

I sell lighting fixtures, so I'm speaking in my own interest. But when you ask for quality and take away the money, it's not going to work.

We need to realise that the cheapest solutions out there are too cheap.

They are too cheap because it's impossible to develop them in a sustainable way. How can you be sure that there's no child labor involved in production? One of the main problems in finding good products to sell is that when you validate that everything is legitimate, that there is no false game going on, then the price is going to be so high that it's hard to sell. But we still do it because we think that's the way to go.

But it's very, very tough if you look beyond sustainability and ethics to ask what kind of quality is there? How long will they last? The lighting fixtures are going to be up there for a very, very long time so they need to do a good job.

The best thing we can do is to take them away from the building and connect them directly with the tenants, the users of the space. I think the construction industry needs to stop focusing on building 'ready to move in' structures and say: 'we provide you with an infrastructure that is easy to hook up, but just as you provide your own tables, you need to provide your own light fixtures.'

Otherwise whenever we have tenants move out, we're going to have rebuilds, and then we're going to throw all that lighting away. So it doesn't matter if we have something that's going to last for 30 years because we are going to throw it out every four years because we've got a new tenants.

So either we need to build something that only lasts for four years, which doesn't make any sense. Or we need to come up with new lease terms. Perhaps you don't buy the luminaires, you simply lease them. But we need to work together. It's not just the suppliers, it's not just the manufacturers. It needs to be the whole circle of actors that look at it from another perspective.

If you know that you're going to be in the same place for a long time then I can guarantee you that paying a decent price for the luminaire is going to save you money in the long run. It's going to reduce the cost of maintenance.

I've carried out energy audits for industry where the cost of just switching off the conveyor belt for one hour is going to be higher than the complete installation cost. And they still asked why they needed a lifetime expectancy of 10,000 instead of 5,000 hours. And when you look at it from a total cost of ownership, there are only pluses.

I think the biggest challenge I've come across is that this message is almost too strong.

It's a win, win, win situation, and people are always going to be curious and wonder 'where's the catch? you're fooling me!' but there is no fooling.

It's just that the general public is still lying on the ground. So when we're trying to tell them how they can run faster, we're starting from the wrong place. We need to focus on how can we get them to crawl first and then walk, potentially run it at some point in time. But that's not where we need to start.

To go back to the food analogy, we see that there's a difference between an individual portion of catch-up and a bottle of ketchup and a tomato. But it's not obvious when you buy the luminaire, how different it's going to feel. And it's certainly not obvious how long it's going to last.

We need to free ourselves of old way of thinking.

Back in the days when I did energy audits, I came up with a simple calculation that I explained to my clients:

You could either continue to pay £10 pounds a month to the energy supplier, or you can start paying £3 a month to the supplier and six pounds to the bank.

And they would say, 'No, I don't want to pay the bank - then I'm going to be in debt.'

Well the accumulated cost is still going to be nine compared to 10. So paying the energy bill that's overly high, it's also a debt, but it's a debt to someone that doesn't feel like a creditor. So it doesn't feel like the bank.

Buying or renting a place that doesn't have any lighting sounds like more trouble - so people tend to go for that place that had lighting already.

But if you consider that the lighting that is included in the lease lighting might make you sick or might make your staff feel sick - or maybe not actually sick, It doesn't have to be that radical.

It just can take down productivity by 2%, or efficiency by 2%, or creativity by 2%. If it's just about productivity, we can probably agree that just putting up massive amounts of lights and having everyone sit down under 1,000 Lux will increase productivity quite nicely.

But if you do any sort of creativity work, then that sort of setting is going to kill you. Well, it's not going to kill you, but it's going to kill your creative process. It's scientifically proven without doubt that you need a more variable stimulating environment.

The standards were produced many, many, many years ago. And when you look at how much light you need on the vertical or on the horizontal surface, it's all about reading a piece of paper with black writing on it.

If you look just at an office space today, how many hours per day do you do that? How many hours do you look at the self-illuminated screen? How many hours do you actually communicate with your colleagues, with your clients?

And doing that under lighting that is designed for the horizontal surface but makes you and your clients' face look dead and there's no real texture to anything. All these nuances in the communication go away and all you have left is your voice. But communication comes from everywhere. So it's not just about seeing, it's about understanding.

So we need to completely challenge our thinking to ask:
How much light do we need? Why do we need it? And when do we need it?

And when we do that, we're going to save money.
We're going to save energy.
We're going to have a happier, healthier world.