

Why to install the EnviroTower Water Treatment for your cooling system
or
Potential SAVINGS with *EnviroTower*

For a typical 100,000m² (1,000,000 sq.ft.) building, average annual HVAC operation expenditure (or OpEx) is over US\$705,000 per year. \$495,000 goes to energy, \$155,000 for water, \$55,000 (average) is chemical treatment cost, plus of course, labor (maintenance, operations etc.) which wasn't shown here.

Scale in the system will add 5-25% on energy bills, hence "chiller punching" (cleaning process involving acid and brushing, with cost that can go over \$5,000 per chiller and also has Health & Safety risk to it - with financial aspect – insurance will go up if anything had happened...).

Chemicals (as water treatment for cooling circuits) solve about 90% of the scale problem, so chiller cleaning is required every year or 2.

There are some technologies, as soft sponge balls running through the chiller tubes, cleaning scale deposits – but only inside the chiller... all other HVAC system components as cooling towers, pipes, pumps, valves etc. are still scaling up.

Corrosion is an issue – reducing equipment life expectancy. It is crucial to remember that chiller cleaning - not only that it doesn't help prevent corrosion – it actually, physically, removes copper from the tubes(!), usually worse than just corrosion, shortening even faster the life span of this costly equipment!

Now – re equipment life: Lets do a quick calculation (without the full scope of interest rates, amortization rates etc., just simple numbers). Lets say we have a \$2.5 million chiller and the manufacturer (York or Trane or whoever) said it should last 25 years, so this is what you got in your books – 25 years. We could now say that every year could have a cost of \$100,000 (\$2,500,000 divided by 25 years). If after say 18 years the chiller is inspected, and you were told that the tube thickness is below spec and so you need a new chiller 7 years before the expected life-end of 25 years... you are actually short \$700,000 (7 years times \$100,000 per year)! When you do it "financial full-scope" (with amortization calculation, interest rate, "cost of money" etc.) the numbers are even "heavier".

Here is how *EnviroTower* saves you money

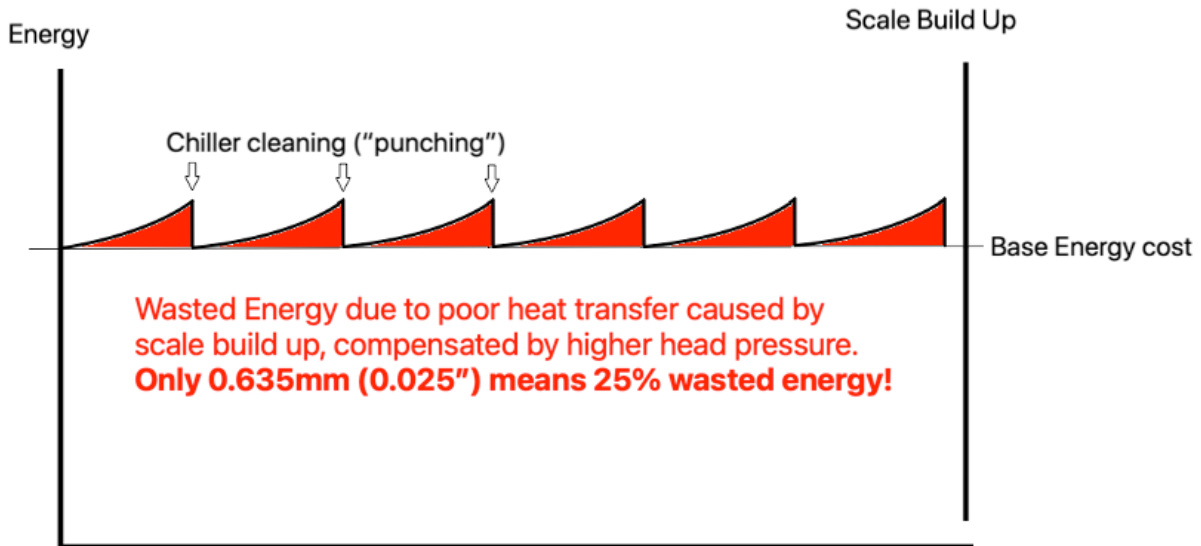
First and foremost, *EnviroTower* could eliminate 98-99% of scale (vs. 90% by chemicals), hence – less chiller cleaning is required. It saves on the actual cleaning expenditure, for sure, but also the downtime, the health & safety risks (cleaning or “punching” chillers is a combination of mechanical cleaning by machines and acid scale dissolving... accidents do happen!), and as said, extends life expectancy of the chillers. It also saves a lot of energy. Why? Because when your system scales up, you need more head pressure in the chillers to compensate for the scale – which effects heat transfer which is the idea behind chiller design – so extra pressure means 2 things: shorten life for the chiller and extra energy to get there...

For chemical treatment to work well, it requires fine-tuning on a weekly basis (as the open circuit is a “live open system” and many factors may change daily...). Increasing dosage (a common “solution” by chemical suppliers’ technicians) not only wastes your money (as to extra chemical usage), it might cause problems (as extra corrosion or building resistance by some bacteria to treatment, for example) but also causes environmental contamination (blown-down water going to drain/sewage, but even the drift could cause problems in surrounding areas, as acidic spots on parked cars in parking lots around the building or “burn spots” in lawns).

0.635mm (0.025”) of scale costs extra 25% energy! After chiller cleaning you don’t waste energy but as soon as scale builds up again – you start wasting, until next cleaning!

With *EnviroTower* your cooling system stays scale-free so you win on both problems – energy isn’t wasted and chiller requires less cleaning (also, as said – *EnviroTower* reduces the Health & Safety risk, not only less hazardous acid & mechanical brushing of chiller tubes will be require, as one small incident there might double your insurance policy cost, but also less chemicals to be stored in your building for day-to-day operation of the cooling towers)!

Maximize energy efficiency: *EnviroTower* guarantees superior protection against scaling and fouling buildup. Scaling and fouling can reduce chiller efficiency up to 25 percent and more in some cases. The next graph shows why chillers are “punched” – to reduce waste of energy.



Second, *EnviroTower* protects all your system against corrosion (as the ScaleBuster water conditioners in the system have cathodic protection in the ScaleBuster).

Now, some corrosion is found under scale build up. When there is no scale – there will also be less corrosion. Again – we need to remember that corrosion shorten equipment life.

Third, with *EnviroTower* you use less chemicals. Actually, *EnviroTower* only “shocks” the water once daily (with both biocide, Bromine, and Azole which protects the copper in the chillers by creating a microscopic film in the copper tubes). Why? Because *EnviroTower* doesn’t sell chemicals... we only want what is best for you. So we also save you money here.

Forth, *EnviroTower* allows for cycling up, or in simple words – with *EnviroTower* you “use” the water more times through the towers before it is blown-down. It is important to remember that some water is evaporated by the towers, this is the way to “lose energy”, “lose heat”, this is the way cooling towers work, no one can “save” on this. When water is evaporated, all minerals in the water stay behind and their concentration goes up, which now is not good as it causes scale and corrosion... so *EnviroTower* controls the blow down according to water conductivity so it doesn’t waste water but doesn’t allow the cooling system to scale up. *EnviroTower* also stops blow down when it adds either chemical – so *EnviroTower* lets the chemicals do their job and not go down the drain immediately... because – again – *EnviroTower* doesn’t sell chemicals. *EnviroTower* does offer Azole-based chemical creating a microscopic film

inside the copper tubes for corrosion protection. Again, *EnviroTower* doses it once daily (to 4-7ppm which is sufficient for the purpose but doesn't waste the chemical).

Fifth, when working with biocide, one is supposed to switch between oxidizer and non-oxidizer biocide every 3-4 weeks (otherwise the bacteria "gets used to it" and becomes resistant to it). Most chemical suppliers don't bother, they simply crank up the dosage. Why? because they sell chemicals. *EnviroTower* shocks the tower once daily (to 0.5 – 1.0 ppm) and it is proved to be efficient, inexpensive and the water is so low on biocide that it could be re-used (for example, for irrigation!) even in California!

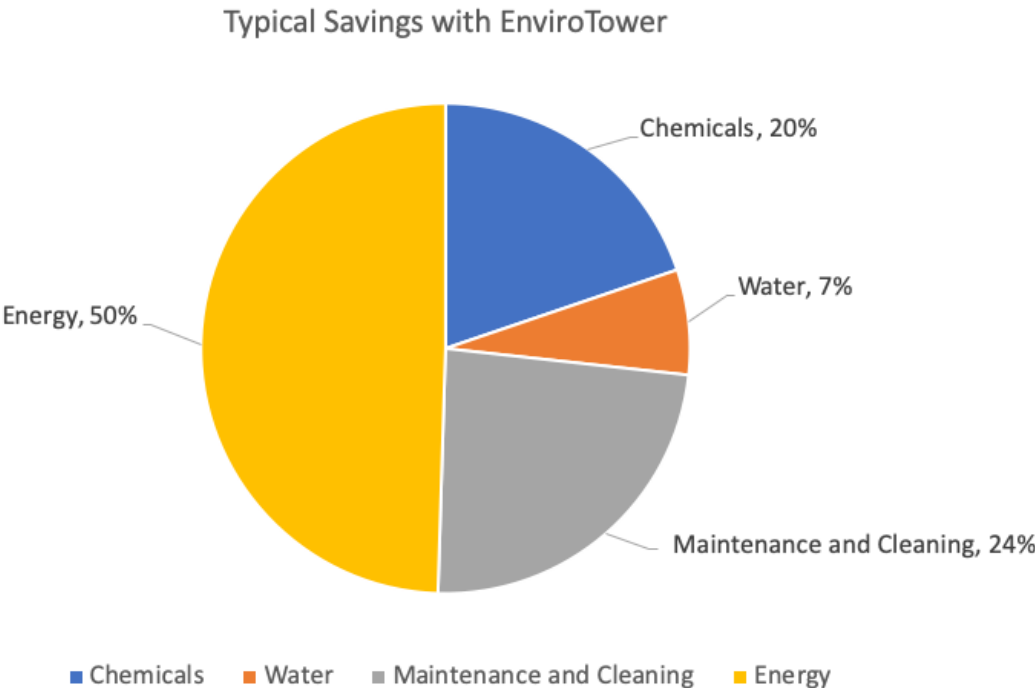
Bottom line – *EnviroTower* could save you

- Water 10-15%
- Energy 10-25%
- Chemicals 80-97%
- Labor 60-90%

On **OpEx (Operational Expenditure)**, and also – *EnviroTower* adds to your equipment life expectancy (and this falls under CapEx, Capital Expenditure, not so much OpEx) 10-25% and sometimes more(!), but as said, this is CapEx, not OpEx... so we will show it later.

Total OpEx savings (average) are 10-20% (and again, there were cases with over these figures) with typical **ROI** (vs. traditional. Chemical treatment) **of 12-36 months**.

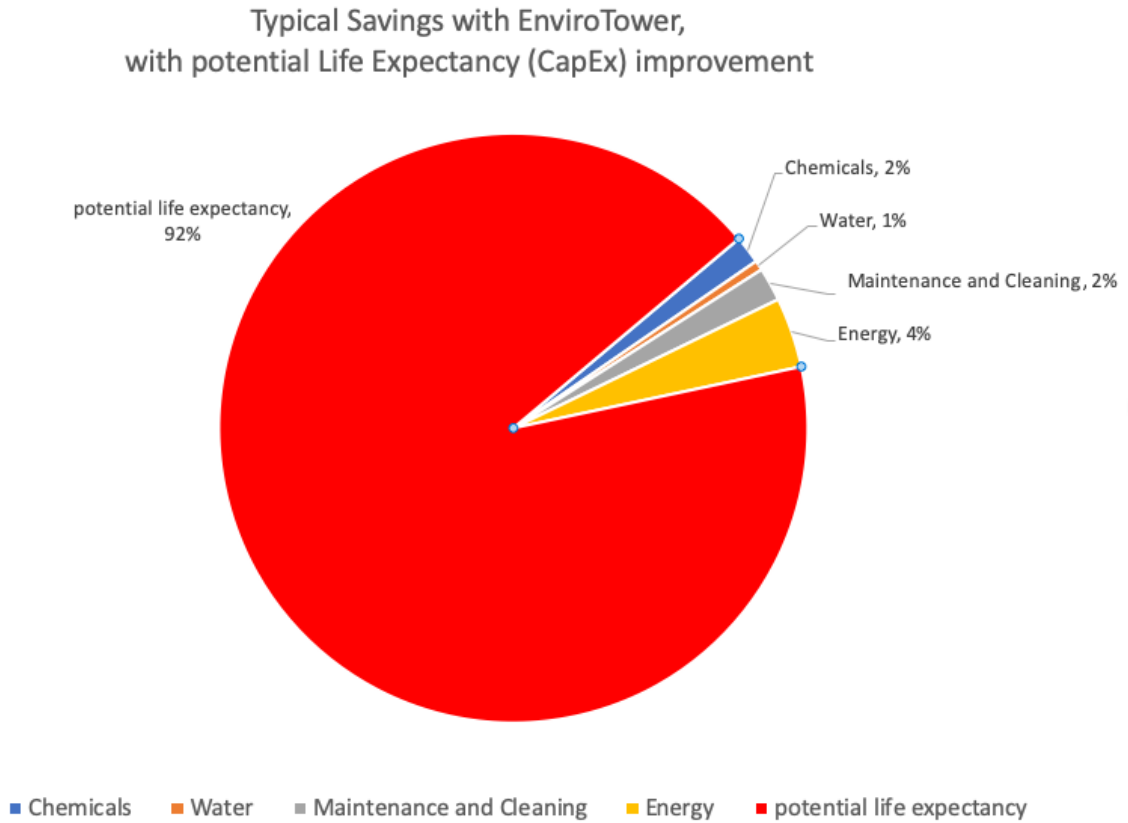
The following graph shows the potential OpEx savings by *EnviroTower* (%).



On top of this, we have mentioned **CapEx (Capital Expenditure) savings**: as *EnviroTower* keeps the chillers scale-free and no “punching” is required, you get the full life-expectancy that the chillers manufacturers estimated upon the purchase of those chillers, compared to 75-90% of the service life if punched regularly (as the cleaning removes scale, but also copper from the tubes...).

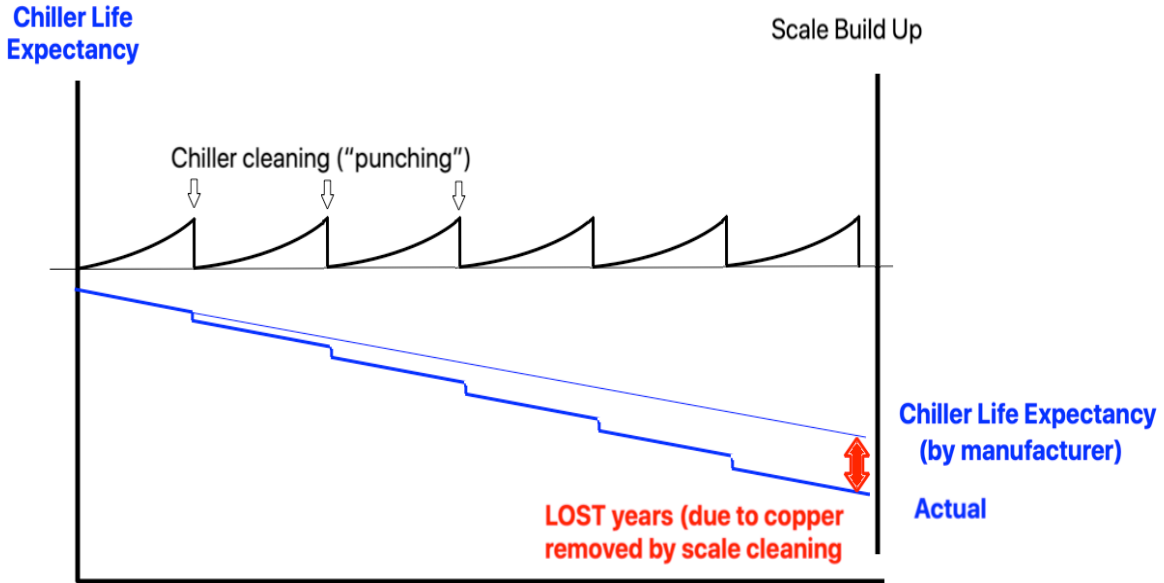
Example: On a \$1.4mn chiller designed for 20 years, it’s like \$70,000 per year (before getting into amortization calculations, interest rates and so forth). 3-4 years shorter life is \$210-280,000 alone, usually way more than the cost of *EnviroTower*!

The following graph shows the potential **CapEx** and **OpEx** savings by *EnviroTower* (%).



CapEx: Get maximum life span of your equipment: Every time the chillers are cleaned and scale is removed (a process known as “chiller punching”) either by chemicals or mechanical brushing or both, some copper is lost from the chiller tubes, resulting in shorter life expectancy of the chillers (vs. estimated life span by the chillers manufacturers). The *EnviroTower* solution keeps scale build up in the chillers under control, eliminating the need for chiller “punching”.

The next graph shows how the chiller “punching” needed to reduce energy waste actually contributes to shortening chiller’s life span.



Financial Examples

1. Hotel CA USA

OpEx Cost Components	Chemicals	EnviroTower	EnviroTower Savings	Percent Savings
Chemicals or Minerals	\$15,000	\$1,200	\$13,800	92%
Water	\$36,907	\$33,554	\$3,353	9%
Water Rebates	N/A	N/A		
Annual system cleaning/service	\$6,000	\$0	\$6,000	100%
Maintenance/labour	\$7,800	\$1,200	\$6,600	85%
Energy (chiller and pumps operation)	\$212,400	\$189,500	\$22,900	11%
Total OpEx	\$278,107	\$225,454	\$52,653	19%
ET system CapEx		\$142,600		
ROI (Months)		(CapEx divided by savings)	32	

2. Hotel & Conference Center CA USA

OpEx Cost Components	Chemicals	EnviroTower	EnviroTower Savings	Percent Savings
Chemicals or Minerals	\$36,000	\$1,200	\$34,800	97%
Water	\$212,300	\$194,300	\$18,000	8%
Water Rebate	\$0	\$12,900	\$12,900	100%
Annual system cleaning/service	\$5,200	\$1,000	\$4,200	81%
Maintenance/labour	\$3,600	\$600	\$3,000	83%
Energy (chiller and pumps operation)	\$1,671,000	\$1,447,450	\$223,550	13%
Total OpEx	\$1,928,100	\$1,657,450	\$296,450	15%

ET system CapEx	\$297,150
ROI (Months)	12

3. Resort Hotel (Hawaii USA)

OpEx Cost Components	Chemicals	EnviroTower	EnviroTower Savings	Percent Savings
Chemicals or Minerals	\$5,800	\$600	\$5,200	90%
Water	\$22,000	\$19,200	\$2,800	13%
Water discharge cost	\$3,700	\$2,850	\$850	23%
Annual system cleaning/service	\$2,640	\$500	\$2,140	81%
Maintenance/labour	\$1,800	\$300	\$1,500	83%
Energy (chiller and pumps operation)	\$139,800	\$126,200	\$13,600	10%
Total OpEx	\$175,740	\$149,650	\$26,090	15%

ET system CapEx	\$76,950
ROI (Months)	35