



Vidya Vikas Education Trust's
Universal College of Engineering
Kaman - Bhiwandi Road, Vasai, Maharashtra
Accredited with 'B+' grade by NAAC, approved by AICTE, DTE
Recognised as Gujrati Linguistic Minority

CURRENT WAVES

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College Profile

Everything you need to know about us.

Embraced by lush greenery and scenic beauty, Universal College of Engineering is a treasured place for aspiring engineers to leave their imprints towards success.

As a college within the wider network frame, we are one of the fastest growing institutions in India. Our institute has been accredited by National Assessment and Accreditation Council (NAAC) with **B+ grade** in the first cycle of accreditation. Times of India Survey **Ranked No. 1** in India among Top Emerging Private Engineering Institutes for 5 consecutive years 2015, 2016, 2017, 2018 and 2019 and the saga of accolades still continues.

In response to the expectations of quality technical education, our college is approved by the All India Council for Technical Education (AICTE), New Delhi; recognized by the Directorate of Technical Education (DTE), Government of Maharashtra; affiliated to Mumbai University.

Our college is also associated with professional bodies like IEEE, IETE, ISA and CSI to update the revolutionary technological advancements.

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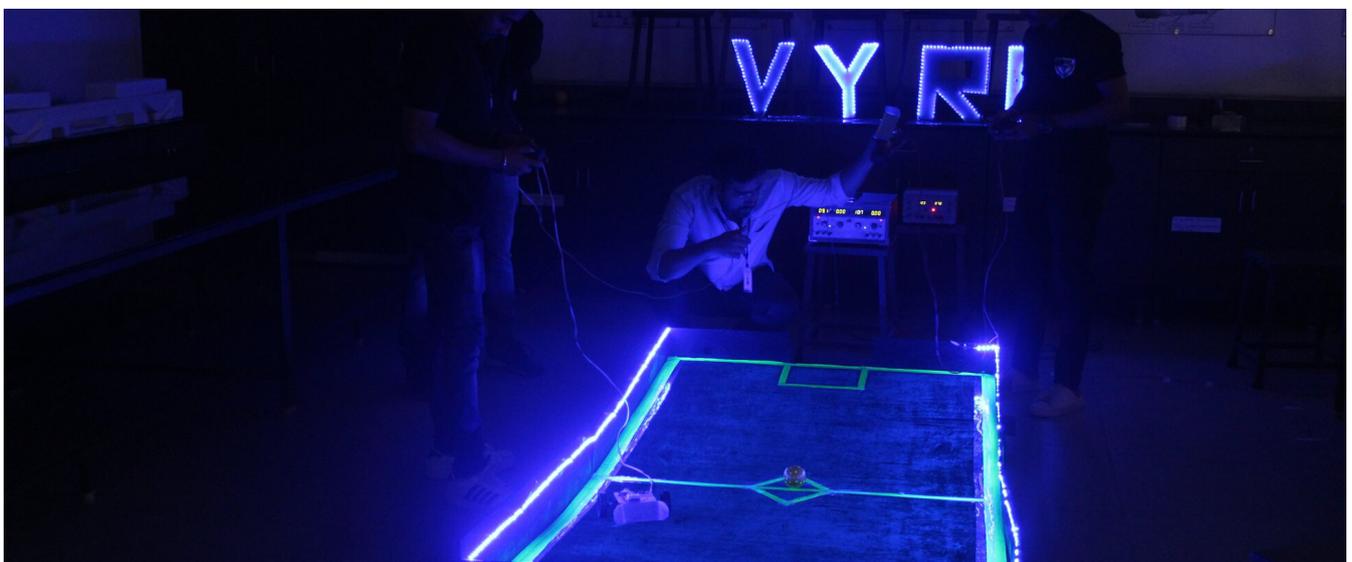
We offer 4 years full-time Bachelor of Technology in Computer Engineering, Civil Engineering, Artificial Intelligence & Machine Learning, Information Technology Engineering and Data Engineering.

The unique state-of-the-art facility of the institute has been carefully designed to accommodate the needs of the students. Laboratories are equipped with world-class facilities based on the latest technology of different sectors. Our smart classrooms are well ventilated, spacious and equipped with overhead and LCD projectors along with the public address system. College library provides a rich collection of specialist library resources and services to support students' academic work and enrich their research skills.



We are obliged to equip our students to get placed in highly reputed companies by mentoring their necessary skill set for cutting-edge technologies. The core highlighted areas are helping students with their technical competency, communication skills along with career guidance and counselling.

Universal College of Engineering has produced a large number of successful alumni who are working in reputed organisations in India and abroad and have contributed immensely to the cause of nation-building and society. We welcome all engineering aspirants to create an incredible legacy in the field of engineering.



ISRO's journey to private participation and beyond

In this newsletter, we talk about the government's plan to entice private players to participate in space exploration.



Policy

The story

Getting to orbit is hard and the economics of space exploration can be unforgiving. Think—“the rocket equation”. *This equation specifies all your constraints: gravity is this much, fuel weighs a minimum of that much, and you need to take quite a lot of it almost up to low Earth orbit, and that leaves you able to carry only a tiny sliver of cargo.*

Meaning, despite spending millions of dollars in getting the rocket up to space, there’s only so much you can carry. And if you are a private company you won’t have taxpayers to bail you out in case the mission goes awry. So space exploration is “risky business” no matter how you look at it.

But there’s still money to be made. Consider SpaceX. They’ve been able to build a reasonably successful business by building rockets, ferrying cargo (for NASA), and launching satellites for private players like Orbcomm, SES, and Iridium. They are even planning to offer cheap reliable internet by leveraging a constellation of about 1500 satellites scattered across the earth’s exosphere. Forbes estimates that SpaceX is probably making revenues to the tune of **~\$2.7 Bn already** (2019 estimates). And if they pull off that mission to Mars, who knows what else they could do.

But Indian companies can’t possibly aspire to replicate the success at SpaceX because they have a resource problem.



Right now, private players can't access ISRO's playground. Yes, they do interact with India's space agency. But these interactions are limited. For instance, ISRO has tie-ups with around **150** private companies, including the likes of **Larsen & Toubro**, Godrej, and Walchand Nagar Industries, and these entities manufacture close to **75-80%** of components for ISRO's launch vehicles.

But ISRO takes full ownership afterwards. And the likes of L&T and Godrej only act as subcontractors, vendors, or component suppliers. Nothing more. They can't launch their own rockets. They can't use ISRO's testing facilities and there's no way they'll be allowed to explore the space on their own accord. This has perhaps been the biggest bottleneck to entice private players into the ecosystem.

But last month, finance minister Nirmala Sitharaman vowed to fix this. It was perhaps the first admission that existing regulations impeded the private sector from fully participating in space exploration. And just a few days back, the Union cabinet finally approved the formation of a new organization- the Indian National Space Promotion and Authorisation Centre (**IN-SPACe**) under the Department of Space (DoS). IN-SPACe will now be in charge of regulating, guiding and promoting the activities of the private sector in the space industry. More importantly, through INSPACe, private companies will be allowed to build their own facilities on DoS premises after they vet their application.

But Indian companies can't possibly aspire to replicate the success at SpaceX because they have a resource problem.

And this is a big positive. Here's ISRO chairman, **Dr. Sivan** explaining this bit.

"Under the present situation, ISRO has reached its limit on providing our services due to manpower limitations and we can't scale up more than 3 per cent market share. That's why we need private players to get involved and that will also boost market share when they diversify into many services".

But there's one other problem that still needs attention—the liability problem. Since the Department of Space is the sole owner of space technology in India, the risk of failure and disaster rests with the state and the state alone.

Think space debris—fragments of spacecraft that are floating in space right now thanks to a mission gone awry. ISRO takes full responsibility for all this trash. But if private players enter the fray—Who takes liability in the event they screw up?

We don't know yet...

Hopefully, when the new space laws are reworked and the Space Activities Bill is tabled in the parliament we will get a more comprehensive idea of how ISRO plans to get around some of these challenges.

Until then...



The Real Reason why Fuel prices are on the rise

In this newsletter, we take a look at why petrol and diesel prices are on the rise once again. This is a must read folks !!!



Business

The story

The premise is simple. Global crude oil prices have been tanking for a while now and yet, fuel prices in India have remained firm. It's inexplicable. It doesn't make any sense. This must be a conspiracy. But wait...

Crude oil isn't the end product. It's an intermediary that requires additional refining. You don't get petrol or diesel, right off the bat. You need to pump crude through a processing facility, hoping to turn it into a consumable product. And herein lies the key distinction.

The price of the end product can vary depending on the complexity involved in processing crude into its desirable constituents.

Consider diesel. It's heavier, less volatile, and easier to refine compared to petrol. As a consequence, diesel tends to be **slightly cheaper** than petrol in most countries around the world. We see the same trend in India. But diesel prices trade at a much steeper discount here because of our lopsided tax structure. People use diesel in industries, farmlands, generators, trucks, etc as opposed to petrol which is largely used in personal vehicles. So the government doesn't tax diesel at much. And as a consequence, diesel has always been more affordable. But that trend seems to be reversing.



On June 24th, for the first time in **living memory**, diesel was sold at a higher price than petrol. Bear in mind, this only happened in Delhi, but it was still a sight to behold.

But before we get to this bit and explore the price differential here, we need more context.

So let's start with the Oil Marketing Companies (OMCs)—Entities largely responsible for processing, refining and selling auto fuel. Think Indian Oil Corporation Ltd (IOCL).

The nationwide lockdown has taken a toll on these people. Petrol consumption dived 60% in April. Diesel sales plummeted 55%. But their fixed costs didn't dissipate as quickly.

The companies still had to keep shipping crude oil, pay salaries, run their factories (at low capacity) and spend money even when there aren't enough consumers buying fuel.

But OMCs were smart. They saw this coming. They **stopped revising prices** after March 16th. They could see that crude oil prices were trending downwards and they wanted to keep their margins intact. In the process, however, consumers were left hanging. Despite crude oil prices **breaching \$0 back in April**, Indian customers did not get to buy fuel at low prices*. We did not get to benefit one bit.

**Point of Interest: It was WTI crude futures that broke the \$0 mark and India buys a different basket of Oil. However the prices of the Indian basket were also trending downwards just like WTI. Hence the comparison*

On the flip side, the central government saw an opportunity to make some money here. After all, tax collections were abysmal. They were already borrowing too much. And they were desperately looking to fund their expenditure through any means necessary. All they had to do was go in and increase the excise on petrol and diesel.

But bear in mind, excise isn't like your ordinary tax. The consumers don't get to pay it. Instead, it's a duty levied on the producers and the sellers. And when the government increased excise on petrol and diesel back in May, the OMCs had to make a choice. Bear the excise duty themselves or pass it on to consumers.

Ideally, you'd think they would just pass it on by hiking prices. But that would have wreaked havoc across the board. After all, the government increased excise by a record ₹10 per litre on petrol and ₹13 per litre on diesel, planning to raise ₹1.6 lakh crore additional revenue. Imagine seeing retail prices increase by this much overnight. Yeah... It's not a nice look. So the OMCs stood tall and refused to revise prices. They took a hit on their margins and they made peace with it. After all, they are primarily owned by the central government. So they couldn't increase prices even if they wanted to.



Also, look at those numbers once again. Do you see how the revised excise on diesel is much higher than the excise on petrol? Yeah, that's been happening for a while now and slowly but surely, diesel prices have been inching upwards. Its the tax structure that's reducing the price differential between petrol and diesel and now you know why.

But we are not done yet. Remember state governments also have to make some money off of selling petrol and diesel. And once again, we see that most state governments have chosen to increase taxes on petrol and diesel to shore up revenue these past couple months. Now unlike excise, this tax (VAT) is borne by the end consumer. So if you saw fuel prices increase at your next-door petrol station anytime between March 16th and June 6th, it's probably because your state government chose to ramp up taxes.

Why **June 6th** you ask?

Well, that's when OMCs finally decided to start revising prices once again. By then, crude oil prices had started firming up. Oil-producing nations had cut output and the excess supply was slowly being mopped up. And as OMCs started buying crude at higher prices, their margins evaporated rather quickly.

Soon they were selling petrol and diesel below cost. They were making a loss on each unit sold. So they had no choice but to start revising prices. And as crude prices started inching upwards, OMCs started pricing their products higher in tandem. And truth be told, they'll probably keep doing this until they can turn a profit on every litre of fuel sold.

Now obviously, you could debate if there's anyone to blame here and if the government should roll back the tax hikes. After all the tax component on fuel can be as high as 70%. But in doing so, you have to first understand how we got here and why we got here in the first place. It's incumbent on you to premise your argument after fully understanding the mechanics of pricing fuel. So if you've had a friend or a family member engage in a passionate discussion about petrol and diesel prices this week. Here's what you need to do to level the playing field. Share this story on WhatsApp, Twitter, or LinkedIn. Ask them to absorb it fully. And then debate.

It'll be a more fulfilling discussion. We promise you.

Until next time...



How can trains pull so much weight?

In this newsletter, we take a look at how a single engine is able to pull off an entire train. This is an interesting read !!!



Navigation

The story

Locomotives can pull massive weights due to these bad boys. Hydraulic dampers, essentially large springs. Besides the 2 greasy disks that you see above, there is one more behind the hook, working in reverse. There are springs behind all three. The disk springs get squeezed when pushed, the hook spring gets squeezed when pulled.

In reality, a locomotive doesn't actually pull the entire train when starting from a stand still. There just isn't enough traction for it. Instead it pulls one carriage at a time.

The way it works is, from a stand still -

1. Locomotive starts moving.
2. It starts to pull the 1st coupling. It starts squeezing the dampers (the ones behind the hook). They have a movement of about 2 inches or so.
3. The dampers max out, and only then the first carriage starts to move. But yet the rest of the train hasn't budged.
4. As the Engine+1st carriage move, the dampers between the 1st and second carriage get squeezed. TADA, the 2nd moves. And so on.

So an engine only needs extra traction to pull one carriage at a time.

So by the time the entire train has moved, the train is longer by a few feet. Depending on the number of linkages. (say 40 cars * 4inches between cars = 13ft. The train will be longer by 13 ft)

Note to add: While braking or on descending gradients, the reverse happens. The entire train starts squeezing into these disks between each other and the length of the train will shorten by a few feet.

That's why train engineers are always skilled.

One really needs to know practical physics to manage half a million tons bearing down on them when they need to brake a 100 car grain train or an oil train when going downhill.



If I bought a new phone sealed and left it 100 years in sealed condition, will it turn on?

This column will address a question which will answer a question based on technology and its application. We hope you this will help you increase your curiosity.

Navigation

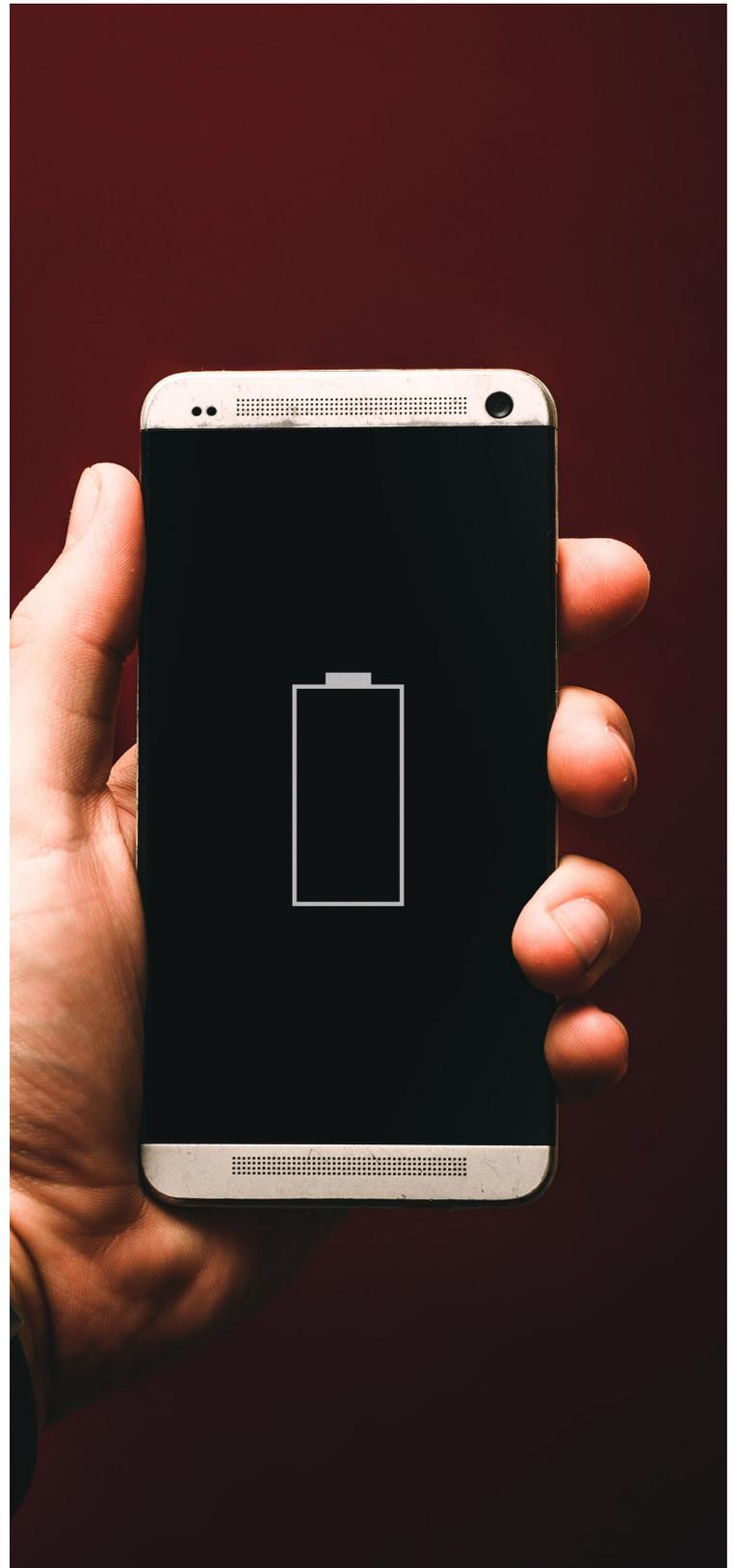
Nope. Absolutely not.

All batteries, including lithium ion batteries, self-discharge over time. Lithium ion batteries in smartphones typically self-discharge at a rate of 1–2% per month. Best case scenario, in 100 months it's completely dead.

Also, when a lithium ion battery shows at 0% in your phone, it still has a small reserve charge left, because if it truly goes all the way to 0 the battery is completely destroyed. In far less than 100 years, any battery currently used in cell phones will be destroyed beyond all hope of recovery.

Also, modern phone operating systems are stored in NAND flash memory. NAND flash slowly loses information over time, because of an inconvenient principle of physics called “quantum tunneling.” Leave NAND flash unpowered for more than 5–10 years at most and it starts losing information. In 100 years, the phone will be completely wiped and will not boot even if you replace the battery.

And finally, current processors experience gradual degradation because of natural radiation, such as cosmic rays and gamma rays. Unless the phone is stored in a heavily shielded area, after a century, cumulative radiation damage may render the processor or other chips inoperative.





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